FCC RF Test Report

APPLICANT	:	Blancopage LLC
EQUIPMENT	:	Tablet PC
MODEL NAME	:	SX034QT
FCC ID	:	2AIP4-4639
STANDARD	:	FCC Part 15 Subpart E §15.407
CLASSIFICATION	:	(NII) Unlicensed National Information Infrastructure

The testing was completed on Dec. 09, 2016. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

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

Reviewed by: Joseph Lin / Supervisor

Approved by: Jones Tsai / Manager

Testing Laboratory
1190

TABLE OF CONTENTS

REVISION HISTORY **3**

SUMMARY OF TEST RESULT **4**

1 GENERAL DESCRIPTION **5**

1.1 Applicant 5
1.2 Product Feature of Equipment Under Test 5
1.3 Product Specification of Equipment Under Test 5
1.4 Modification of EUT 5
1.5 Testing Location 6
1.6 Applicable Standards 6

2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST **7**

2.1 Carrier Frequency and Channel 7
2.2 Test Mode 7
2.3 Connection Diagram of Test System 8
2.4 Support Unit used in test configuration and system 9
2.5 EUT Operation Test Setup 9
2.6 Measurement Results Explanation Example 9

3 TEST RESULT **10**

3.1 6dB and 26dB and 99% Occupied Bandwidth Measurement 10
3.2 Maximum Conducted Output Power Measurement 13
3.3 Power Spectral Density Measurement 14
3.4 Unwanted Emissions Measurement 17
3.5 AC Conducted Emission Measurement 22
3.6 Frequency Stability Measurement 26
3.7 Automatically Discontinue Transmission 27
3.8 Antenna Requirements 29

4 LIST OF MEASURING EQUIPMENT **30**

5 UNCERTAINTY OF EVALUATION **31**

APPENDIX A. CONDUCTED TEST RESULTS

APPENDIX B. RADIATED SPURIOUS EMISSION

APPENDIX C. RADIATED SPURIOUS EMISSION PLOTS

APPENDIX D. DUTY CYCLE PLOTS

REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR671335-01E	Rev. 01	Initial issue of report	Jan. 23, 2017
FR671335-01E	Rev. 02	Adding duty cycle plots for output power Measurement in appendix d.	Feb. 08, 2017

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result
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
3.5	15.207	AC Conducted Emission	15.207(a)	Pass
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

Blancopage LLC
520 White Plains Road, Suite 500, Tarrytown, New York 1059

1.2 Product Feature of Equipment Under Test

Product Feature	
Equipment	Tablet PC
Model Name	SX034QT
FCC ID	2AIP4-4639
EUT supports Radios application	WLAN 11b/g/n HT20 WLAN 11a/n HT20/HT40 Bluetooth BR/EDR/LE

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

1.3 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx/Rx Channel Frequency Range	5745 MHz ~ 5825 MHz
Maximum Output Power	802.11a : 13.43 dBm / 0.0220 W 802.11n HT20 : 13.56 dBm / 0.0227 W 802.11n HT40 : 13.81 dBm / 0.0240 W
99% Occupied Bandwidth	802.11a : 17.40 MHz 802.11n HT20 : 18.20 MHz 802.11n HT40 : 36.40 MHz
Type of Modulation	OFDM (BPSK / QPSK / 16QAM / 64QAM)
Antenna Type / Gain	Fixed internal Antenna with gain 1.86 dBi

1.4 Modification of EUT

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

1.5 Testing Location

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

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

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

Test Site	SPORTON INTERNATIONAL INC.
Test Site Location	No.58, Aly. 75, Ln. 564, Wenhua 3rd Rd. Guishan Dist, Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855
Test Site No.	**Sporton Site No.**
	03CH12-HY

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

1.6 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
- 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). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (X plane) were recorded in this report.

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
	-	-	165	5825

Note: The above Frequency and Channel in "*" 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.

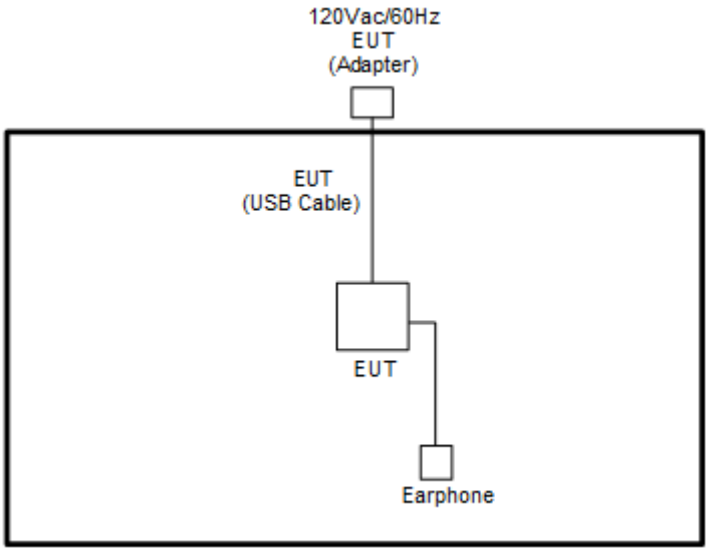
Modulation	Data Rate
802.11a	**6 Mbps**
802.11n HT20	**MCS0**
802.11n HT40	**MCS0**

AC Conducted Emission	Mode 1 : WLAN (5GHz) Link + Bluetooth Link + MPEG4 + MicroSD Card + USB Cable (Charging from Adapter)

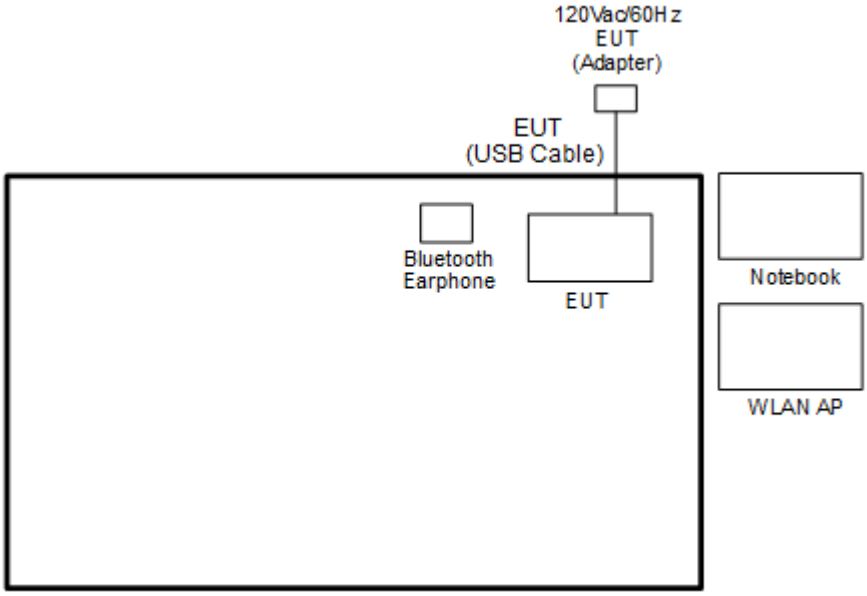
Ch. #		Band IV：5725-5850 MHz		
		802.11a	802.11n HT20	802.11n HT40
L	Low	149	149	151
M	Middle	157	157	-
H	High	165	165	159

2.3 Connection Diagram of Test System

<WLAN Tx Mode>



<AC Conducted Emission Mode>



2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	WLAN AP	ASUS	RT-AC66U	MSQ-RTAC66U	N/A	Unshielded, 1.8 m
2.	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
3.	Notebook	Lenovo	E335	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
4.	Bluetooth Earphone	Sony Ericsson	MW600	PY7DDA-2029	N/A	N/A
5.	Earphone	N/A	N/A	Verification	Unshielded, 1.15 m	N/A
6.	SD Card	SanDisk	MicroSD HC	FCC DoC	N/A	N/A
7.	Earphone	N/A	N/A	Verification	Unshielded, 1.15m	N/A

2.5 EUT Operation Test Setup

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

2.6 Measurement Results Explanation Example

For all conducted test items:

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

Example :

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

Offset = RF cable loss + attenuator factor.

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

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

= 4.2 + 10 = 14.2 (dB)

3 Test Result

3.1 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.

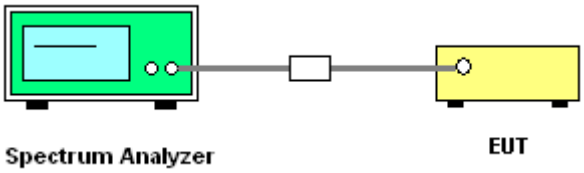
3.1.2 Measuring Instruments

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 ≥ 3 x RBW.
4. Detector = Peak.
5. Trace mode = max hold
6. Measure the maximum width of the emission that is 6 dB down from the peak of the emission.
7. Measure and record the results in the test report.

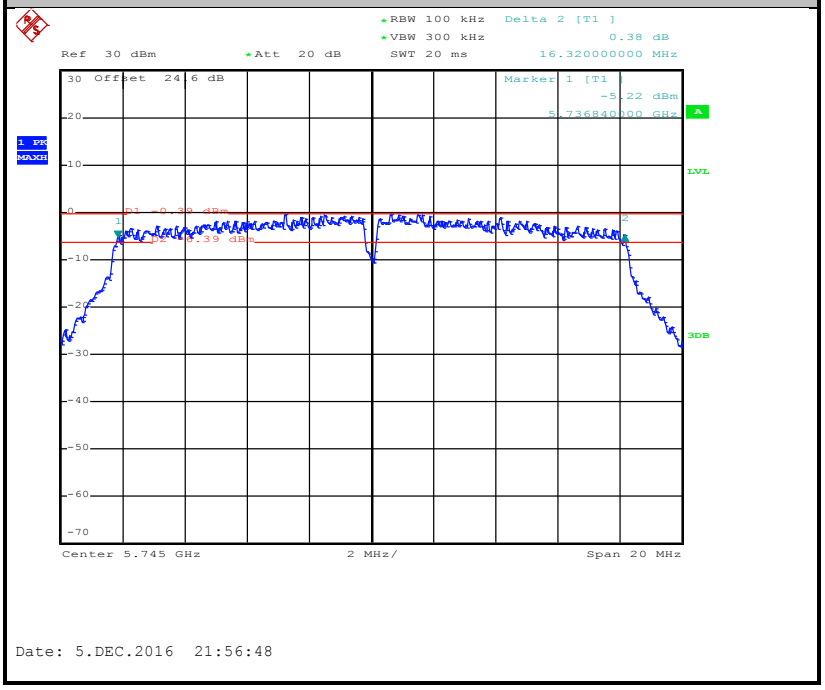
3.1.4 Test Setup



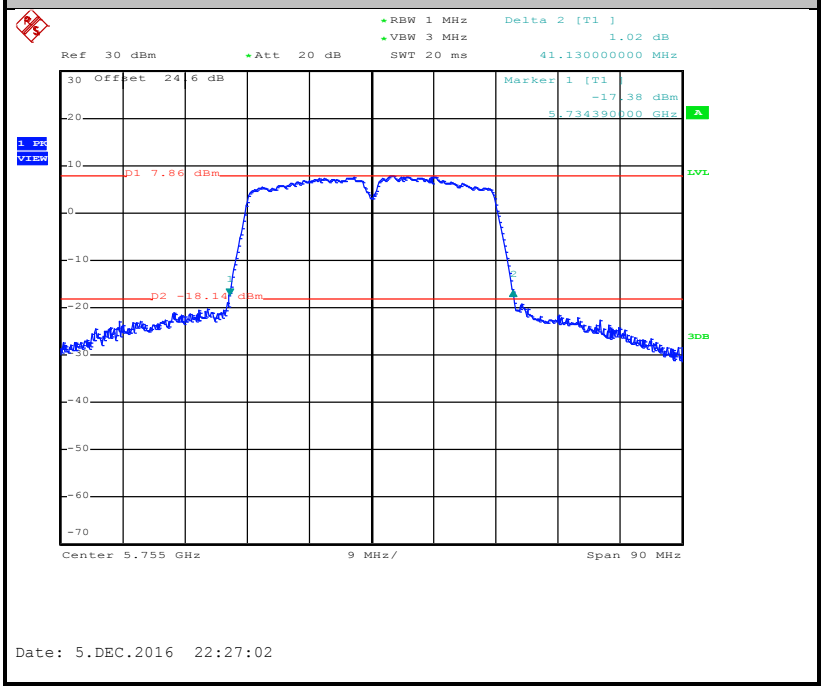
3.1.5 Test Result of 6dB Bandwidth

Please refer to Appendix A.

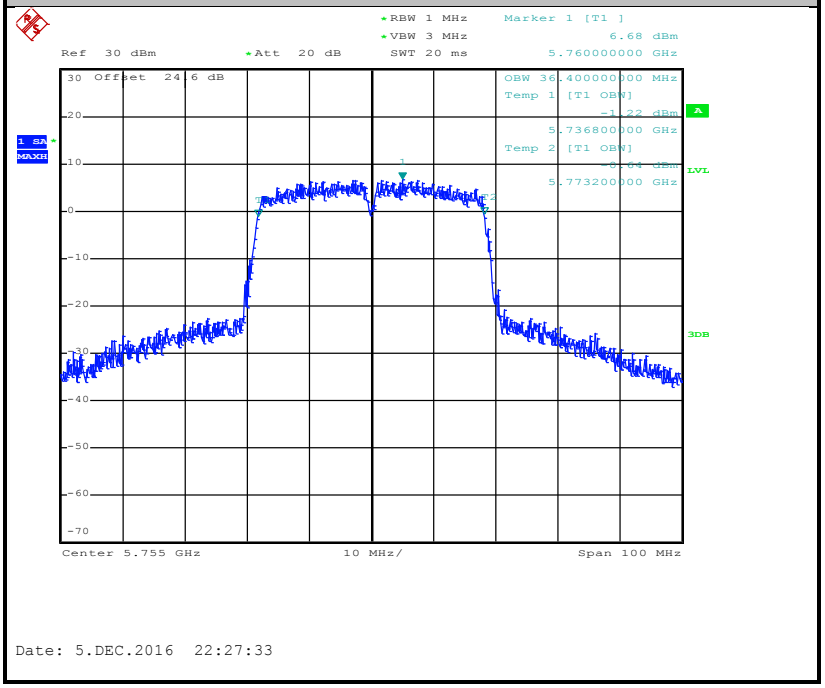
Minimum 6dB Bandwidth



Maximum 26dB Bandwidth



Maximum 99% Occupied Bandwidth



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

3.2 Maximum Conducted Output Power Measurement

3.2.1 Limit of Maximum Conducted Output Power

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

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

3.2.2 Measuring Instruments

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

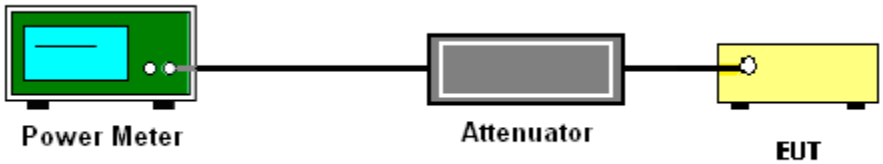
3.2.3 Test Procedures

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

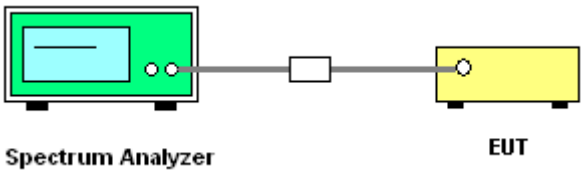
- Measure the duty cycle.
- Set span to encompass the entire emission bandwidth (EBW) of the signal.
- Set RBW = 300 kHz.
- Set VBW ≥ 1 MHz.
- Number of points in sweep ≥ 2 Span / RBW.
- Sweep time = auto.
- Detector = RMS
- Trace average at least 100 traces in power averaging mode.
- Add 10 log(500kHz/RBW)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

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.

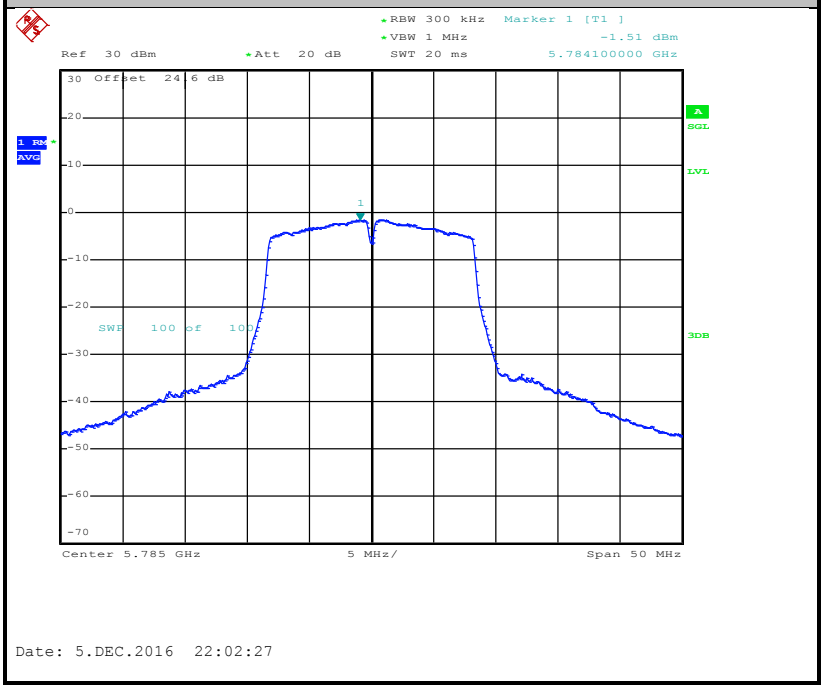
3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.

Worst Case Power Density (dBm/300kHz)



3.4 Unwanted Emissions Measurement

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

3.4.1 Limit of Unwanted Emissions

(1) For transmitters operating in the 5.725-5.85 GHz band:

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

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

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

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

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

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

(3) KDB 789033 D02 General UNII Test Procedures New Rules v01r03 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 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 ≥ 3 MHz
   - Detector = Peak
   - Sweep time = auto
   - Trace mode = max hold

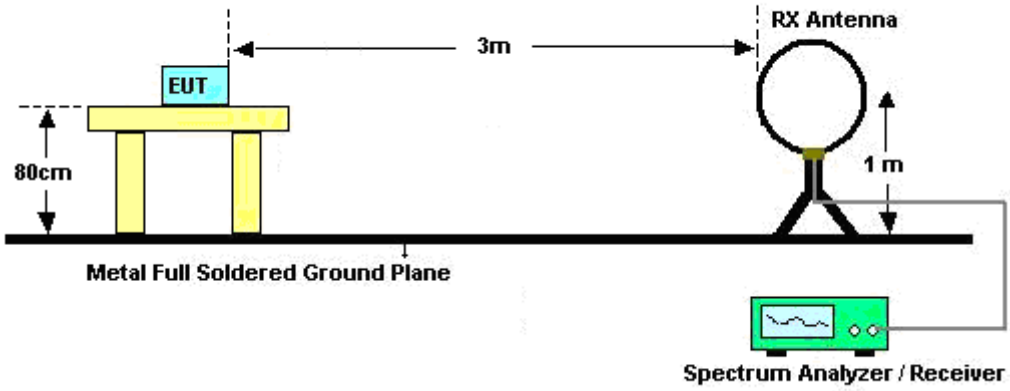
   (3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz

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

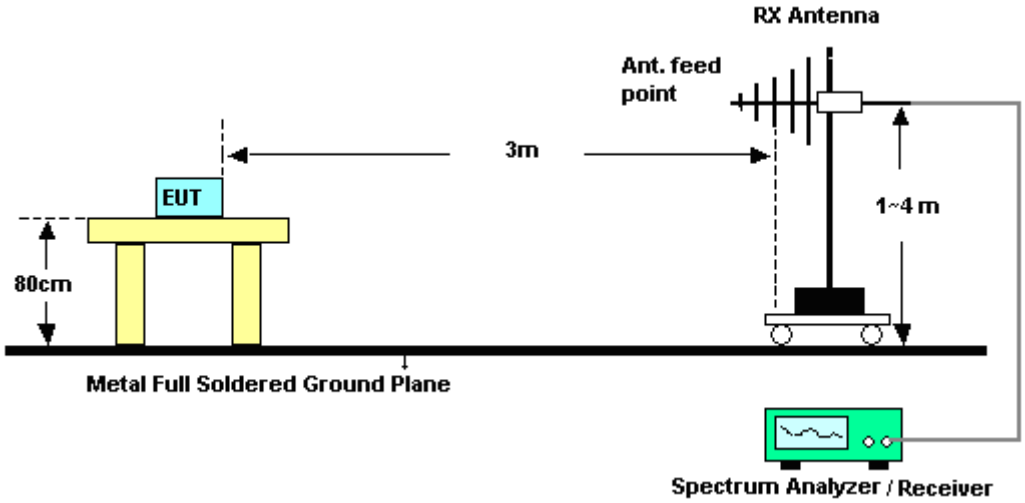
2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband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

3.4.4 Test Setup

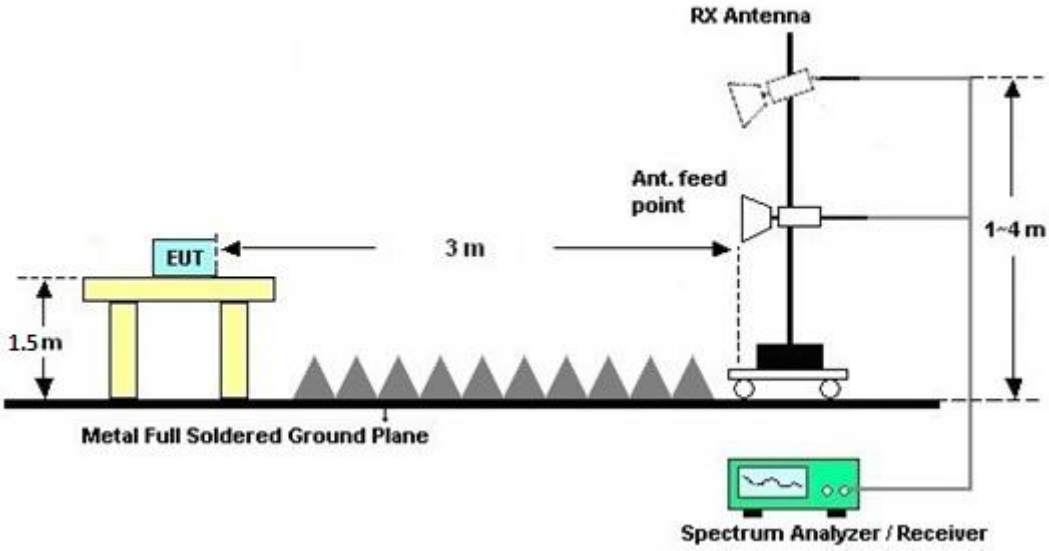
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.4.5 Test Results of Radiated Spurious 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 Spurious at 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 Radiated Spurious Emissions (30MHz ~ 10th Harmonic)

Please refer to Appendix B and C.

3.5 AC Conducted Emission Measurement

3.5.1 Limit of AC Conducted Emission

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

Frequency of emission (MHz)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

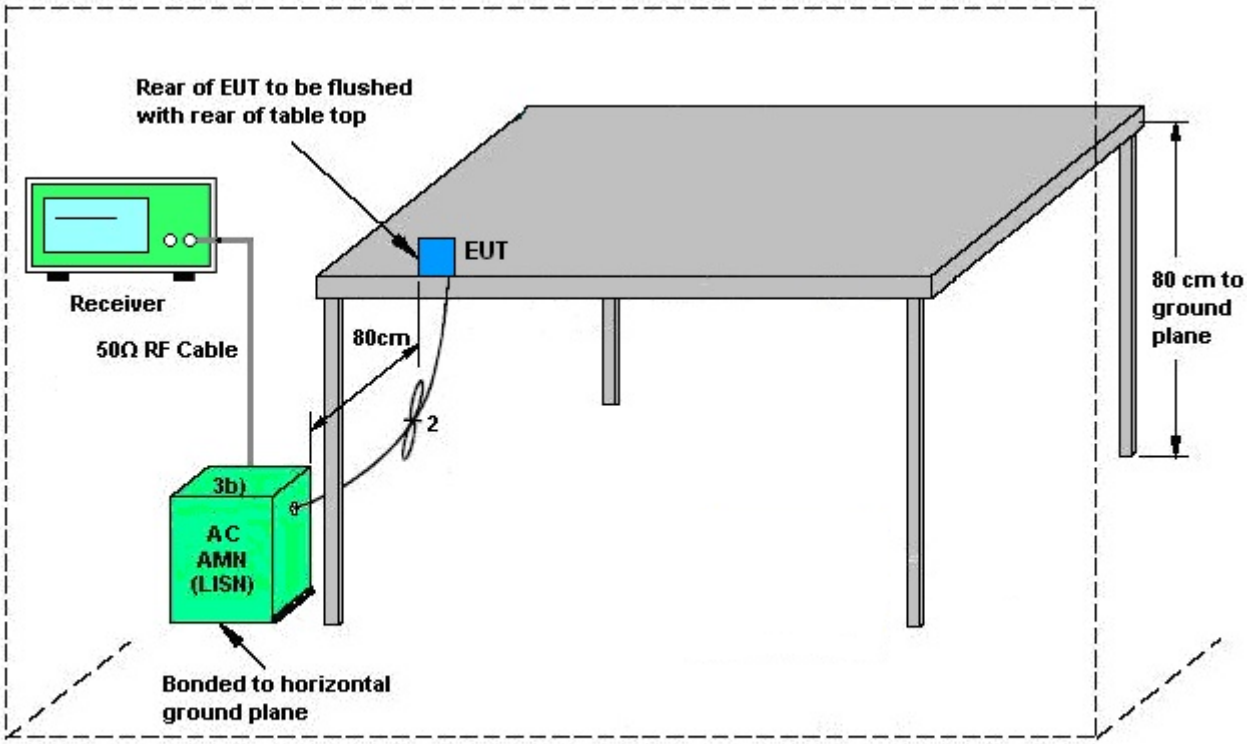
3.5.2 Measuring Instruments

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

3.5.3 Test Procedures

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

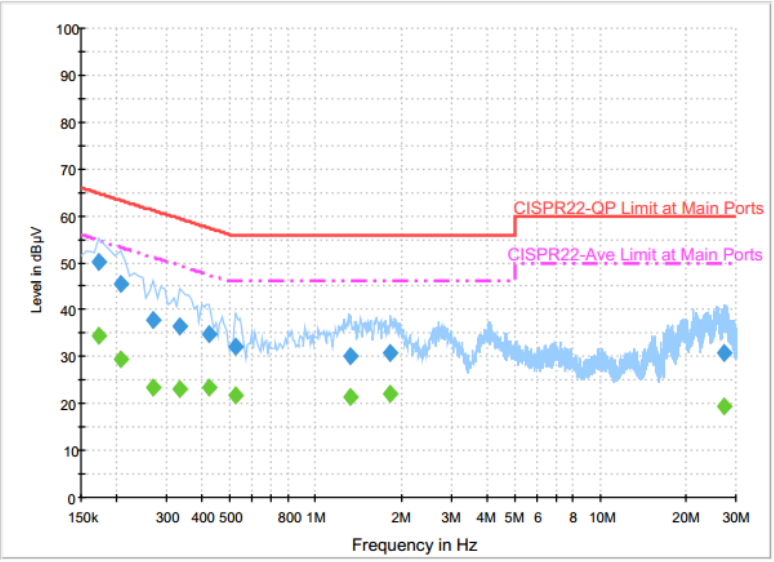
3.5.4 Test Setup



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

3.5.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	**Temperature :**	23~24℃
Test Engineer :	Kai-Chun Chu	**Relative Humidity :**	50~51%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Function Type :	WLAN (5GHz) Link + Bluetooth Link + MPEG4 + MicroSD Card + USB Cable (Charging from Adapter)		



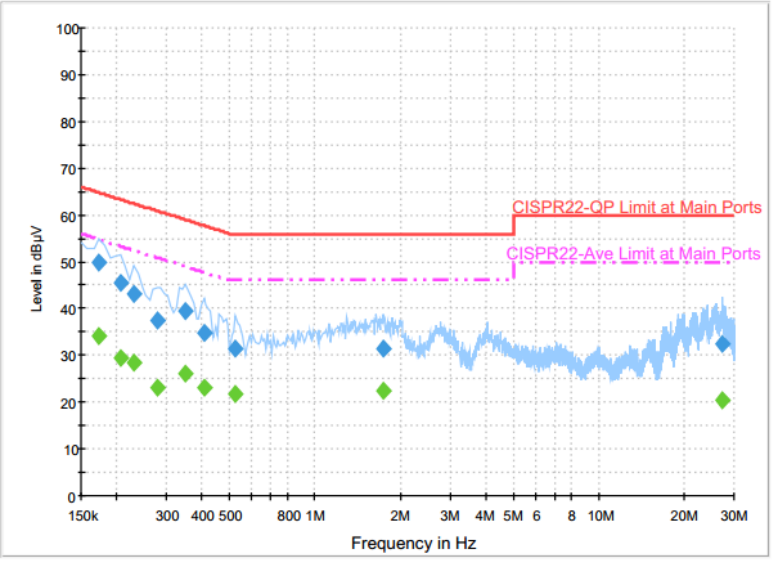
Final Result : QuasiPeak

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.174000	50.1	Off	L1	19.6	14.7	64.8
0.206000	45.6	Off	L1	19.6	17.8	63.4
0.270000	37.6	Off	L1	19.6	23.5	61.1
0.334000	36.5	Off	L1	19.6	22.9	59.4
0.422000	34.9	Off	L1	19.6	22.5	57.4
0.526000	32.0	Off	L1	19.6	24.0	56.0
1.326000	30.2	Off	L1	19.7	25.8	56.0
1.830000	30.7	Off	L1	19.7	25.3	56.0
27.126000	30.9	Off	L1	21.0	29.1	60.0

Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.174000	34.3	Off	L1	19.6	20.5	54.8
0.206000	29.5	Off	L1	19.6	23.9	53.4
0.270000	23.5	Off	L1	19.6	27.6	51.1
0.334000	23.0	Off	L1	19.6	26.4	49.4
0.422000	23.2	Off	L1	19.6	24.2	47.4
0.526000	21.7	Off	L1	19.6	24.3	46.0
1.326000	21.5	Off	L1	19.7	24.5	46.0
1.830000	22.1	Off	L1	19.7	23.9	46.0
27.126000	19.5	Off	L1	21.0	30.5	50.0

Test Mode :	Mode 1	**Temperature :**	23~24℃
Test Engineer :	Kai-Chun Chu	**Relative Humidity :**	50~51%
Test Voltage :	120Vac / 60Hz	**Phase :**	Neutral
Function Type :	WLAN (5GHz) Link + Bluetooth Link + MPEG4 + MicroSD Card + USB Cable (Charging from Adapter)		



Final Result : QuasiPeak

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.174000	49.9	Off	N	19.6	14.9	64.8
0.206000	45.4	Off	N	19.6	18.0	63.4
0.230000	43.2	Off	N	19.6	19.2	62.4
0.278000	37.5	Off	N	19.6	23.4	60.9
0.350000	39.5	Off	N	19.6	19.5	59.0
0.406000	34.9	Off	N	19.6	22.8	57.7
0.526000	31.6	Off	N	19.6	24.4	56.0
1.734000	31.5	Off	N	19.7	24.5	56.0
27.358000	32.5	Off	N	21.2	27.5	60.0

Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.174000	34.1	Off	N	19.6	20.7	54.8
0.206000	29.5	Off	N	19.6	23.9	53.4
0.230000	28.6	Off	N	19.6	23.8	52.4
0.278000	23.2	Off	N	19.6	27.7	50.9
0.350000	26.0	Off	N	19.6	23.0	49.0
0.406000	22.9	Off	N	19.6	24.8	47.7
0.526000	21.7	Off	N	19.6	24.3	46.0
1.734000	22.4	Off	N	19.7	23.6	46.0
27.358000	20.4	Off	N	21.2	29.6	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.

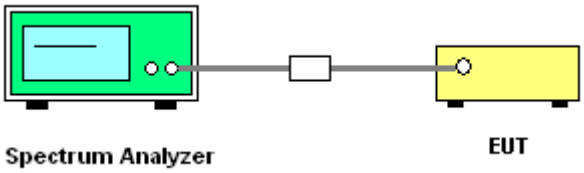
3.6.2 Measuring Instruments

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

EUT is verified this characteristic during the function check of normal sample associated with an access point:

A. Information start: make EUT supply information to the access point.

B. Information stop: stop supplying information to the access point.

While the EUT is not transmitting any information, the EUT can automatically discontinue transmission and become standby mode for power saving.

C. Information start: make EUT supply information to the access point again.

The EUT can detect the controlling signal of ACK message transmitting from remote device and verify whether it shall resend or discontinue transmission.

5745MHz

Note: The control / signalling information during the period B is precluded.

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

The antenna gain is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Power Meter	Anritsu	ML2495A	0932001	300MHz~40GHz	Sep. 29, 2016	Nov. 25, 2016 ~ Dec. 09, 2016	Sep. 28, 2017	Conducted (TH05-HY)
Power Sensor	Anritsu	MA2411B	0846202	300MHz~40GHz	Sep. 29, 2016	Nov. 25, 2016 ~ Dec. 09, 2016	Sep. 28, 2017	Conducted (TH05-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP40	100055	9kHz-40GHz	Jul. 17, 2016	Nov. 25, 2016 ~ Dec. 09, 2016	Jul. 16, 2017	Conducted (TH05-HY)
Temperature Chamber	ESPEC	SH-641	92013720	-40℃ ~90℃	Sep. 01, 2016	Nov. 25, 2016 ~ Dec. 09, 2016	Aug. 31, 2017	Conducted (TH05-HY)
Programmable Power Supply	GW Instek	PSS-2005	EL890094	1V~20V 0.5A~5A	Oct. 11, 2016	Nov. 25, 2016 ~ Dec. 09, 2016	Oct. 10, 2017	Conducted (TH05-HY)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Nov. 29, 2016	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESCI 7	100724	9kHz~7GHz	Aug. 30, 2016	Nov. 29, 2016	Aug. 29, 2017	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100081	9kHz~30MHz	Dec. 14, 2015	Nov. 29, 2016	Dec. 13, 2016	Conduction (CO05-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	Sep. 02, 2015	Dec. 02, 2016 ~ Dec. 03, 2016	Sep. 01, 2017	Radiation (03CH12-HY)
Amplifier	SONOMA	310N	187312	9kHz~1GHz	Nov. 10, 2016	Dec. 02, 2016 ~ Dec. 03, 2016	Nov. 09, 2017	Radiation (03CH12-HY)
Spectrum Analyzer	Agilent	N9030A	MY52350276	3Hz~44GHz	Mar. 21, 2016	Dec. 02, 2016 ~ Dec. 03, 2016	Mar. 20, 2017	Radiation (03CH12-HY)
Bilog Antenna	TESEQ	CBL 6111D&00800 N1D01N-06	37059&01	30MHz~1GHz	Oct. 15, 2016	Dec. 02, 2016 ~ Dec. 03, 2016	Oct. 14, 2017	Radiation (03CH12-HY)
EMI Test Receiver	Rohde & Schwarz	ESU26	100390	20Hz~26.5GHz	Dec. 21, 2015	Dec. 02, 2016 ~ Dec. 03, 2016	Dec. 20, 2016	Radiation (03CH12-HY)
Preamplifier	MITEQ	TTA0204	1872107	2GHz~40GHz	Feb. 15, 2016	Dec. 02, 2016 ~ Dec. 03, 2016	Feb. 14, 2017	Radiation (03CH12-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-1328	1GHz ~ 18GHz	Oct. 25, 2016	Dec. 02, 2016 ~ Dec. 03, 2016	Oct. 24, 2017	Radiation (03CH12-HY)
Preamplifier	MITEQ	AMF-7D-0010 1800-30-10P	1815698	1GHz~18GHz	Dec. 14, 2015	Dec. 02, 2016 ~ Dec. 03, 2016	Dec. 13, 2016	Radiation (03CH12-HY)
Preamplifier	Keysight	83017A	MY53270148	1GHz~26.5GHz	Jan. 30, 2016	Dec. 02, 2016 ~ Dec. 03, 2016	Jan. 29, 2017	Radiation (03CH12-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1m~4m	N/A	Dec. 02, 2016 ~ Dec. 03, 2016	N/A	Radiation (03CH12-HY)
Turn Table	EMEC	TT2000	N/A	0~360 Degree	N/A	Dec. 02, 2016 ~ Dec. 03, 2016	N/A	Radiation (03CH12-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170576	18GHz ~ 40GHz	Apr. 15, 2016	Dec. 02, 2016 ~ Dec. 03, 2016	Apr. 14, 2017	Radiation (03CH12-HY)

5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.7

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.1

Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.2

Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.7

Appendix A. Conducted Test Results

Report Number : FR671335-01E

Test Engineer:	Derek Hsu	Temperature:	21~25	°C
Test Date:	2016/11/25~2016/12/09	Relative Humidity:	51~54	%

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

Band IV									
Mod.	Data Rate	N_{TX}	CH.	Freq. (MHz)	99% Bandwidth (MHz)	26 dB Bandwidth (MHz)	6 dB Bandwidth (MHz)	6dB Bandwidth min. Limit (MHz)	Pass/Fail
11a	6M bps	1	149	5745	17.30	21.60	16.32	0.5	Pass
11a	6Mbps	1	157	5785	17.40	21.35	16.34	0.5	Pass
11a	6Mbps	1	165	5825	17.25	21.30	16.32	0.5	Pass
HT20	MCS 0	1	149	5745	18.15	21.50	17.58	0.5	Pass
HT20	MCS 0	1	157	5785	18.20	21.60	17.54	0.5	Pass
HT20	MCS 0	1	165	5825	18.15	21.50	17.58	0.5	Pass
HT40	MCS 0	1	151	5755	36.40	41.13	36.28	0.5	Pass
HT40	MCS 0	1	159	5795	36.30	41.04	36.32	0.5	Pass

TEST RESULTS DATA
Average Power Table

Band IV										
Mod.	Data Rate	N_{TX}	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)	FCC Conducted Power Limit (dBm)	DG (dBi)		Pass/Fail
11a	6M bps	1	149	5745	0.50	13.36	30.00	1.86		Pass
11a	6Mbps	1	157	5785	0.50	13.38	30.00	1.86		Pass
11a	6Mbps	1	165	5825	0.50	13.43	30.00	1.86		Pass
HT20	MCS 0	1	149	5745	0.53	13.56	30.00	1.86		Pass
HT20	MCS 0	1	157	5785	0.53	13.34	30.00	1.86		Pass
HT20	MCS 0	1	165	5825	0.53	13.55	30.00	1.86		Pass
HT40	MCS 0	1	151	5755	1.06	13.70	30.00	1.86		Pass
HT40	MCS 0	1	159	5795	1.06	13.81	30.00	1.86		Pass

Report Number : FR671335-01E

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
11a	6M bps	1	149	5745	0.50	2.22	0.80	30.00	1.86	Pass
11a	6Mbps	1	157	5785	0.50	2.22	1.21	30.00	1.86	Pass
11a	6Mbps	1	165	5825	0.50	2.22	0.84	30.00	1.86	Pass
HT20	MCS 0	1	149	5745	0.53	2.22	0.76	30.00	1.86	Pass
HT20	MCS 0	1	157	5785	0.53	2.22	0.89	30.00	1.86	Pass
HT20	MCS 0	1	165	5825	0.53	2.22	0.44	30.00	1.86	Pass
HT40	MCS 0	1	151	5755	1.06	2.22	-2.48	30.00	1.86	Pass
HT40	MCS 0	1	159	5795	1.06	2.22	-2.29	30.00	1.86	Pass

Report Number : FR671335-01E

TEST RESULTS DATA
Frequency Stability

Band IV										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Center Frequency (MHz)	Frequency Deviation (MHz)	Frequency Stablility (ppm)	Temperature (℃)	Voltage (V)	Note
11a	6M bps	1	149	5745	5745.000	0.000	0.00	35	3.7	
11a	6M bps	1	149	5745	5744.975	-0.025	-4.35	0	3.7	
11a	6M bps	1	149	5745	5745.000	0.000	0.00	20	4.25	
11a	6M bps	1	149	5745	5745.000	0.000	0.00	20	3.5	
11a	6M bps	1	149	5745	5745.000	0.000	0.00	20	3.7	

Appendix B. Radiated Spurious Emission

Test Engineer :	Peter Liao, Karl Hou, and Nick Yu	Temperature :	21~24°C
		Relative Humidity :	54~58%

Band 4 - 5725~5850MHz

WIFI 802.11a (Band Edge @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a CH 149 5745MHz		5636.8	60.34	-7.86	68.2	46.77	32.78	11.79	31	122	124	P	H
		5693.6	61.52	-38.96	100.48	47.77	32.94	11.82	31.01	122	124	P	H
		5720	64.5	-46.3	110.8	50.66	33.02	11.84	31.02	122	124	P	H
		5724.2	71.37	-49.01	120.38	57.52	33.03	11.84	31.02	122	124	P	H
	*	5745	110.58	-	-	96.66	33.09	11.86	31.03	122	124	P	H
	*	5745	99.88	-	-	85.96	33.09	11.86	31.03	122	124	A	H
													H
													H
		5608.4	61.15	-7.05	68.2	47.67	32.7	11.77	30.99	337	345	P	V
		5655.8	61.45	-11.06	72.51	47.83	32.84	11.79	31.01	337	345	P	V
		5714.2	64.71	-44.47	109.18	50.89	33	11.84	31.02	337	345	P	V
		5724.4	70.97	-49.86	120.83	57.12	33.03	11.84	31.02	337	345	P	V
	*	5745	112.01	-	-	98.09	33.09	11.86	31.03	337	345	P	V
	*	5745	101.25	-	-	87.33	33.09	11.86	31.03	337	345	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)
802.11a CH 157 5785MHz		5628.6	60.42	-7.78	68.2	46.87	32.76	11.79	31	105	111	P	H
		5678	60.47	-28.49	88.96	46.76	32.9	11.82	31.01	105	111	P	H
		5713	60.63	-48.21	108.84	46.81	33	11.84	31.02	105	111	P	H
		5720.2	60.22	-51.04	111.26	46.38	33.02	11.84	31.02	105	111	P	H
	*	5785	109.49	-	-	95.46	33.2	11.88	31.05	105	111	P	H
	*	5785	98.88	-	-	84.85	33.2	11.88	31.05	105	111	A	H
		5852.8	60.58	-55.24	115.82	46.22	33.39	12.03	31.06	105	111	P	H
		5872.2	61.2	-44.78	105.98	46.66	33.44	12.17	31.07	105	111	P	H
		5922.8	61.6	-8.22	69.82	46.8	33.58	12.31	31.09	105	111	P	H
		5944.2	62.24	-5.96	68.2	47.24	33.64	12.45	31.09	105	111	P	H
													H
													H
		5630	60.92	-7.28	68.2	47.37	32.76	11.79	31	318	343	P	V
		5683	61.24	-31.42	92.66	47.52	32.91	11.82	31.01	318	343	P	V
		5709.2	60.68	-47.1	107.78	46.87	32.99	11.84	31.02	318	343	P	V
		5721.6	61.12	-53.33	114.45	47.28	33.02	11.84	31.02	318	343	P	V
	*	5785	111.58	-	-	97.55	33.2	11.88	31.05	318	343	P	V
	*	5785	101.09	-	-	87.06	33.2	11.88	31.05	318	343	A	V
		5851.6	60.28	-58.27	118.55	45.93	33.38	12.03	31.06	318	343	P	V
		5855.2	61.41	-49.33	110.74	47.05	33.39	12.03	31.06	318	343	P	V
		5900.6	61.88	-24.34	86.22	47.13	33.52	12.31	31.08	318	343	P	V
		5931.8	61.26	-6.94	68.2	46.43	33.61	12.31	31.09	318	343	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)
	*	5825	110.32	-	-	96.03	33.31	12.03	31.05	100	105	P	H
	*	5825	99.52	-	-	85.23	33.31	12.03	31.05	100	105	A	H
		5852.2	64.47	-52.71	117.18	50.11	33.39	12.03	31.06	100	105	P	H
		5855.2	62.98	-47.76	110.74	48.62	33.39	12.03	31.06	100	105	P	H
		5881.6	61.87	-38.43	100.3	47.3	33.47	12.17	31.07	100	105	P	H
		5936.6	61.75	-6.45	68.2	46.91	33.62	12.31	31.09	100	105	P	H
													H
802.11a													H
CH 165	*	5825	111.56	-	-	97.27	33.31	12.03	31.05	315	329	P	V
5825MHz	*	5825	100.82	-	-	86.53	33.31	12.03	31.05	315	329	A	V
		5850.2	65.1	-56.64	121.74	50.75	33.38	12.03	31.06	315	329	P	V
		5855.4	64.04	-46.65	110.69	49.67	33.4	12.03	31.06	315	329	P	V
		5881.2	62.6	-37.99	100.59	48.03	33.47	12.17	31.07	315	329	P	V
		5947.6	61.74	-6.46	68.2	46.73	33.65	12.45	31.09	315	329	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	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	60.56	-13.44	74	59.74	40.2	18.4	57.78	119	246	P	H
		11490	45.52	-8.48	54	44.7	40.2	18.4	57.78	119	246	A	H
		17235	56.85	-11.35	68.2	48.93	41.92	23.14	57.14	100	0	P	H
													H
		11490	60.52	-13.48	74	59.7	40.2	18.4	57.78	100	23	P	V
		11490	45.66	-8.34	54	44.84	40.2	18.4	57.78	100	23	A	V
		17235	56.54	-11.66	68.2	48.62	41.92	23.14	57.14	100	0	P	V
													V
802.11a CH 157 5785MHz		11570	59.72	-14.28	74	58.97	40.06	18.49	57.8	123	250	P	H
		11570	45.06	-8.94	54	44.31	40.06	18.49	57.8	123	250	A	H
		17355	58.47	-9.73	68.2	50.6	42.18	23.25	57.56	100	0	P	H
													H
		11570	60.49	-13.51	74	59.74	40.06	18.49	57.8	100	23	P	V
		11570	45.54	-8.46	54	44.79	40.06	18.49	57.8	100	23	A	V
		17355	54.35	-13.85	68.2	46.48	42.18	23.25	57.56	100	0	P	V
													V
802.11a CH 165 5825MHz		11650	60.63	-13.37	74	59.95	39.9	18.58	57.8	120	317	P	H
		11650	46.39	-7.61	54	45.71	39.9	18.58	57.8	120	317	A	H
		17475	54.26	-13.94	68.2	46.44	42.44	23.36	57.98	100	0	P	H
													H
		11650	60.21	-13.79	74	59.53	39.9	18.58	57.8	100	22	P	V
		11650	45.66	-8.34	54	44.98	39.9	18.58	57.8	100	22	A	V
		17475	54.27	-13.93	68.2	46.45	42.44	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 802.11n HT20 (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)
		5629.6	60.44	-7.76	68.2	46.89	32.76	11.79	31	100	124	P	H
		5697.8	61.2	-42.38	103.58	47.44	32.95	11.82	31.01	100	124	P	H
		5719.2	65.31	-45.27	110.58	51.48	33.01	11.84	31.02	100	124	P	H
		5723.6	71.64	-47.37	119.01	57.79	33.03	11.84	31.02	100	124	P	H
	*	5745	109.02	-	-	95.1	33.09	11.86	31.03	100	124	P	H
	*	5745	98.23	-	-	84.31	33.09	11.86	31.03	100	124	A	H
802.11n													H
HT20													H
CH 149		5648.2	60.32	-7.88	68.2	46.72	32.81	11.79	31	308	328	P	V
5745MHz		5699.6	60.64	-44.27	104.91	46.87	32.96	11.82	31.01	308	328	P	V
		5720	64.95	-45.85	110.8	51.11	33.02	11.84	31.02	308	328	P	V
		5725	71.77	-50.43	122.2	57.92	33.03	11.84	31.02	308	328	P	V
	*	5745	109.99	-	-	96.07	33.09	11.86	31.03	308	328	P	V
	*	5745	99.27	-	-	85.35	33.09	11.86	31.03	308	328	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)
		5649.2	60.01	-8.19	68.2	46.4	32.82	11.79	31	100	104	P	H
		5674	61.16	-24.84	86	47.46	32.89	11.82	31.01	100	104	P	H
		5700.6	60.95	-44.42	105.37	47.16	32.96	11.84	31.01	100	104	P	H
		5721.2	60.82	-52.72	113.54	46.98	33.02	11.84	31.02	100	104	P	H
	*	5785	108.5	-	-	94.47	33.2	11.88	31.05	100	104	P	H
	*	5785	97.86	-	-	83.83	33.2	11.88	31.05	100	104	A	H
		5854	60.93	-52.15	113.08	46.57	33.39	12.03	31.06	100	104	P	H
		5858	61.28	-48.68	109.96	46.92	33.4	12.03	31.07	100	104	P	H
		5905.2	61.28	-21.53	82.81	46.52	33.53	12.31	31.08	100	104	P	H
		5934.8	61.28	-6.92	68.2	46.44	33.62	12.31	31.09	100	104	P	H
802.11n													H
HT20													H
CH 157		5650	60.28	-7.92	68.2	46.67	32.82	11.79	31	318	343	P	V
5785MHz		5686.2	62.02	-33	95.02	48.29	32.92	11.82	31.01	318	343	P	V
		5707	61.3	-45.86	107.16	47.5	32.98	11.84	31.02	318	343	P	V
		5723.6	59.9	-59.11	119.01	46.05	33.03	11.84	31.02	318	343	P	V
	*	5785	110.32	-	-	96.29	33.2	11.88	31.05	318	343	P	V
	*	5785	99.71	-	-	85.68	33.2	11.88	31.05	318	343	A	V
		5852.6	61.31	-54.96	116.27	46.95	33.39	12.03	31.06	318	343	P	V
		5858	61.57	-48.39	109.96	47.21	33.4	12.03	31.07	318	343	P	V
		5880.4	61.64	-39.55	101.19	47.07	33.47	12.17	31.07	318	343	P	V
		5948.8	61.03	-7.17	68.2	46.01	33.66	12.45	31.09	318	343	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)
	*	5825	109.08	-	-	94.79	33.31	12.03	31.05	100	105	P	H
	*	5825	98.29	-	-	84	33.31	12.03	31.05	100	105	A	H
		5850	63.66	-58.54	122.2	49.31	33.38	12.03	31.06	100	105	P	H
		5858.4	61.47	-48.38	109.85	47.11	33.4	12.03	31.07	100	105	P	H
		5912.6	62	-15.35	77.35	47.22	33.56	12.31	31.09	100	105	P	H
		5937.6	61.17	-7.03	68.2	46.32	33.63	12.31	31.09	100	105	P	H
802.11n													H
HT20													H
CH 165	*	5825	110.63	-	-	96.34	33.31	12.03	31.05	301	328	P	V
5825MHz	*	5825	99.92	-	-	85.63	33.31	12.03	31.05	301	328	A	V
		5850	65.45	-56.75	122.2	51.1	33.38	12.03	31.06	301	328	P	V
		5868	62.22	-44.94	107.16	47.69	33.43	12.17	31.07	301	328	P	V
		5900.4	62.77	-23.59	86.36	48.02	33.52	12.31	31.08	301	328	P	V
		5941.4	61.95	-6.25	68.2	46.95	33.64	12.45	31.09	301	328	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 4 5725~5850MHz

WIFI 802.11n HT20 (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 149 5745MHz		11490	60.52	-13.48	74	59.7	40.2	18.4	57.78	131	246	P	H
		11490	43.93	-10.07	54	43.11	40.2	18.4	57.78	131	246	A	H
		17235	55.09	-13.11	68.2	47.17	41.92	23.14	57.14	100	0	P	H
													H
		11490	59.98	-14.02	74	59.16	40.2	18.4	57.78	101	24	P	V
		11490	43.63	-10.37	54	42.81	40.2	18.4	57.78	101	24	A	V
		17235	56.06	-12.14	68.2	48.14	41.92	23.14	57.14	100	0	P	V
													V
802.11n HT20 CH 157 5785MHz		11570	59.86	-14.14	74	59.11	40.06	18.49	57.8	120	313	P	H
		11570	43.3	-10.7	54	42.55	40.06	18.49	57.8	120	313	A	H
		17355	55.59	-12.61	68.2	47.72	42.18	23.25	57.56	100	0	P	H
													H
		11570	60.05	-13.95	74	59.3	40.06	18.49	57.8	100	22	P	V
		11570	43.58	-10.42	54	42.83	40.06	18.49	57.8	100	22	A	V
		17355	53.58	-14.62	68.2	45.71	42.18	23.25	57.56	100	0	P	V
													V
802.11n HT20 CH 165 5825MHz		11650	60.9	-13.1	74	60.22	39.9	18.58	57.8	120	318	P	H
		11650	44.72	-9.28	54	44.04	39.9	18.58	57.8	120	318	A	H
		17475	52.6	-15.6	68.2	44.78	42.44	23.36	57.98	100	0	P	H
													H
		11650	60.41	-13.59	74	59.73	39.9	18.58	57.8	106	23	P	V
		11650	44.02	-9.98	54	43.34	39.9	18.58	57.8	106	23	A	V
		17475	50.8	-17.4	68.2	42.98	42.44	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 802.11n HT40 (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)
		5645.4	60.19	-8.01	68.2	46.59	32.81	11.79	31	100	124	P	H
		5698.2	62.2	-41.67	103.87	48.44	32.95	11.82	31.01	100	124	P	H
		5718.6	71.08	-39.33	110.41	57.25	33.01	11.84	31.02	100	124	P	H
		5721.8	74.31	-40.59	114.9	60.47	33.02	11.84	31.02	100	124	P	H
	*	5755	106.11	-	-	92.17	33.11	11.86	31.03	100	124	P	H
	*	5755	95.35	-	-	81.41	33.11	11.86	31.03	100	124	A	H
		5854.2	60.96	-51.66	112.62	46.6	33.39	12.03	31.06	100	124	P	H
		5869.6	61.51	-45.2	106.71	46.98	33.43	12.17	31.07	100	124	P	H
		5887.8	61.05	-34.65	95.7	46.47	33.49	12.17	31.08	100	124	P	H
		5943.6	61.72	-6.48	68.2	46.72	33.64	12.45	31.09	100	124	P	H
802.11n													H
HT40													H
CH 151		5604	61.15	-7.05	68.2	47.68	32.69	11.77	30.99	339	344	P	V
5755MHz		5698.8	61.69	-42.63	104.32	47.92	32.96	11.82	31.01	339	344	P	V
		5716.4	71.72	-38.07	109.79	57.89	33.01	11.84	31.02	339	344	P	V
		5721.8	73.79	-41.11	114.9	59.95	33.02	11.84	31.02	339	344	P	V
	*	5755	107.27	-	-	93.33	33.11	11.86	31.03	339	344	P	V
	*	5755	96.53	-	-	82.59	33.11	11.86	31.03	339	344	A	V
		5851.4	61.2	-57.81	119.01	46.85	33.38	12.03	31.06	339	344	P	V
		5866.2	61.96	-45.7	107.66	47.43	33.43	12.17	31.07	339	344	P	V
		5886.8	62.06	-34.38	96.44	47.49	33.48	12.17	31.08	339	344	P	V
		5933	62.6	-5.6	68.2	47.77	33.61	12.31	31.09	339	344	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)
		5641.2	61.29	-6.91	68.2	47.7	32.8	11.79	31	100	111	P	H
		5690.8	60.54	-37.88	98.42	46.8	32.93	11.82	31.01	100	111	P	H
		5713.2	60.75	-48.15	108.9	46.93	33	11.84	31.02	100	111	P	H
		5720.4	59.85	-51.86	111.71	46.01	33.02	11.84	31.02	100	111	P	H
	*	5795	105.35	-	-	91.29	33.23	11.88	31.05	100	111	P	H
	*	5795	94.41	-	-	80.35	33.23	11.88	31.05	100	111	A	H
		5851	62.12	-57.8	119.92	47.77	33.38	12.03	31.06	100	111	P	H
		5874.2	61.72	-43.7	105.42	47.17	33.45	12.17	31.07	100	111	P	H
		5896	62.52	-27.1	89.62	47.92	33.51	12.17	31.08	100	111	P	H
		5947.8	61.34	-6.86	68.2	46.33	33.65	12.45	31.09	100	111	P	H
802.11n													H
HT40													H
CH 159		5616.2	60.76	-7.44	68.2	47.25	32.73	11.77	30.99	286	343	P	V
5795MHz		5691.2	60.79	-37.92	98.71	47.04	32.94	11.82	31.01	286	343	P	V
		5713.6	60.65	-48.36	109.01	46.83	33	11.84	31.02	286	343	P	V
		5724.4	60.71	-60.12	120.83	46.86	33.03	11.84	31.02	286	343	P	V
	*	5795	107.28	-	-	93.22	33.23	11.88	31.05	286	343	P	V
	*	5795	96.36	-	-	82.3	33.23	11.88	31.05	286	343	A	V
		5851.2	61.92	-57.54	119.46	47.57	33.38	12.03	31.06	286	343	P	V
		5858.4	61.76	-48.09	109.85	47.4	33.4	12.03	31.07	286	343	P	V
		5885.4	62.11	-35.37	97.48	47.54	33.48	12.17	31.08	286	343	P	V
		5941.2	63.13	-5.07	68.2	48.13	33.64	12.45	31.09	286	343	P	V
													V
													V

Remark

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

Band 4 5725~5850MHz

WIFI 802.11n HT40 (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 151 5755MHz		11510	56.02	-17.98	74	55.19	40.18	18.45	57.8	121	314	P	H
		11510	42.67	-11.33	54	41.84	40.18	18.45	57.8	121	314	A	H
		17265	52.48	-15.72	68.2	44.59	41.98	23.17	57.26	100	0	P	H
													H
		11510	56.6	-17.4	74	55.77	40.18	18.45	57.8	100	23	P	V
		11510	43.08	-10.92	54	42.25	40.18	18.45	57.8	100	23	A	V
		17265	50.18	-18.02	68.2	42.29	41.98	23.17	57.26	100	0	P	V
													V
802.11n HT40 CH 159 5795MHz		11590	55.73	-18.27	74	54.97	40.02	18.54	57.8	125	314	P	H
		11590	42.35	-11.65	54	41.59	40.02	18.54	57.8	125	314	A	H
		17385	54.73	-13.47	68.2	46.87	42.25	23.29	57.68	100	0	P	H
													H
		11590	55.45	-18.55	74	54.69	40.02	18.54	57.8	100	24	P	V
		11590	41.87	-12.13	54	41.11	40.02	18.54	57.8	100	24	A	V
		17385	51.54	-16.66	68.2	43.68	42.25	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

Emission below 1GHz

5GHz WIFI 802.11n HT40 (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		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
5GHz 802.11n HT40 LF		94.53	24.46	-19.04	43.5	40.43	15.4	1.06	32.43	-	-	P	H
		160.14	20.69	-22.81	43.5	34.36	17	1.75	32.42	-	-	P	H
		200.37	21.87	-21.63	43.5	36.75	15.83	1.7	32.41	-	-	P	H
		358.8	22.29	-23.71	46	30.95	21.21	2.44	32.31	-	-	P	H
		580	26.13	-19.87	46	30.19	25.04	3.3	32.4	-	-	P	H
		765.5	29.17	-16.83	46	29.81	27.66	3.97	32.27	100	0	P	H
													H
													H
													H
													H
													H
													H
		33.24	28.22	-11.78	40	35.72	24.18	0.78	32.46	100	0	P	V
		72.12	23.59	-16.41	40	42.43	12.55	1.06	32.45	-	-	P	V
		123.15	21.69	-21.81	43.5	34.97	17.72	1.43	32.43	-	-	P	V
		318.2	23.23	-22.77	46	33.1	20.05	2.34	32.26	-	-	P	V
		570.9	25.65	-20.35	46	29.87	24.88	3.3	32.4	-	-	P	V
		752.2	29.37	-16.63	46	30.09	27.61	3.97	32.3	-	-	P	V
													V
													V
													V
													V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

Note symbol

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

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

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

1. Level(dBμV/m) =

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

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

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)

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

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

= 55.45 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 55.45(dBμV/m) – 74(dBμV/m)

= -18.55(dB)

For Average Limit @ 2390MHz:

1. Level(dBμV/m)

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

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

= 43.54 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 43.54(dBμV/m) – 54(dBμV/m)

= -10.46(dB)

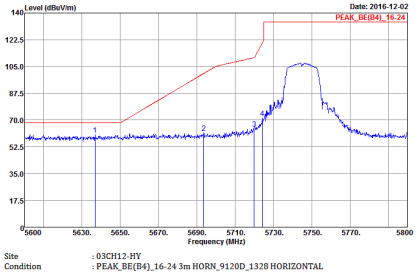
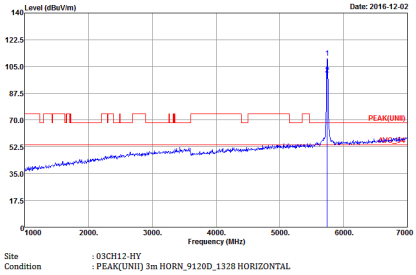
Both peak and average measured complies with the limit line, so test result is “PASS”.

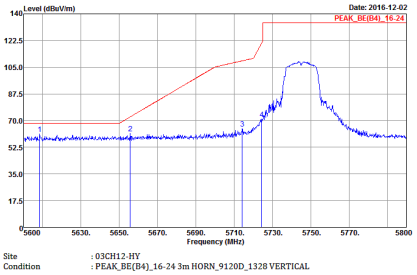
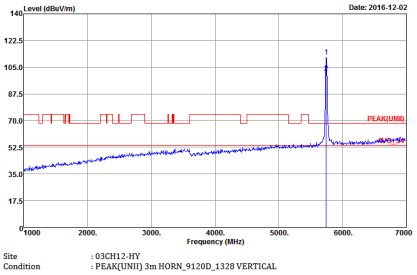
Appendix C. Radiated Spurious Emission Plots

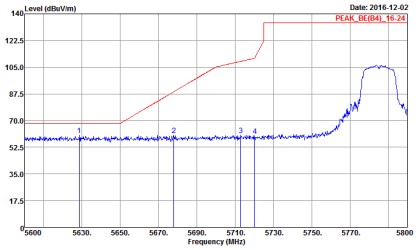
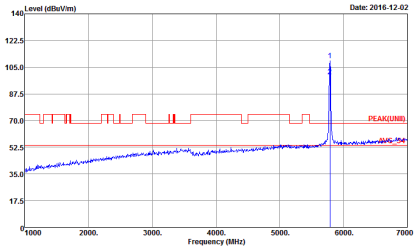
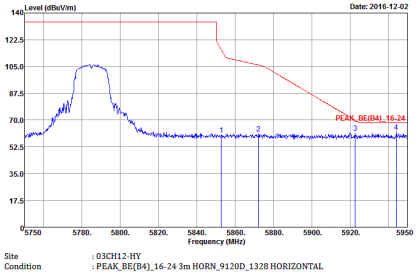
Test Engineer :	Peter Liao, Karl Hou, and Nick Yu	Temperature :	21~24°C
		Relative Humidity :	54~58%

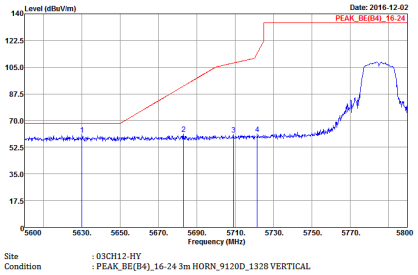
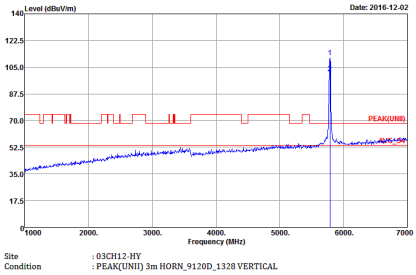
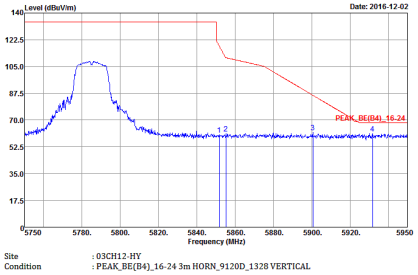
Band 4 - 5725~5850MHz

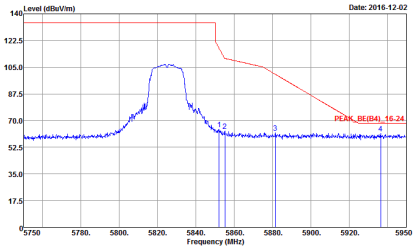
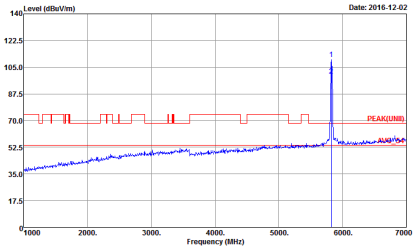
WIFI 802.11a (Band Edge @ 3m)

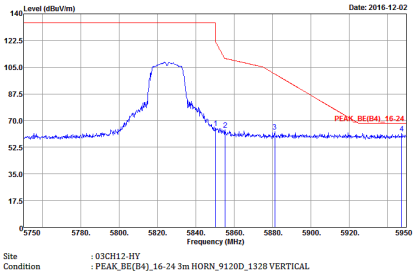
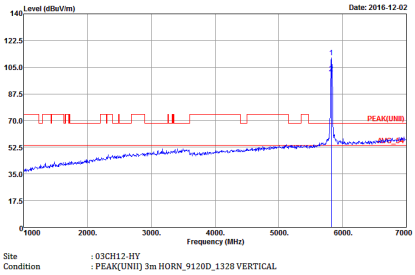
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH149 5745MHz	
1	Horizontal	Fundamental
Peak		

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

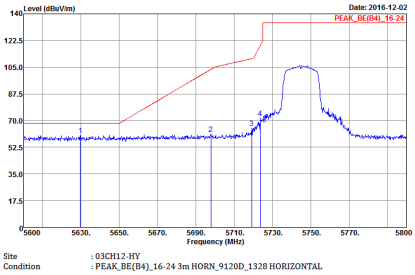
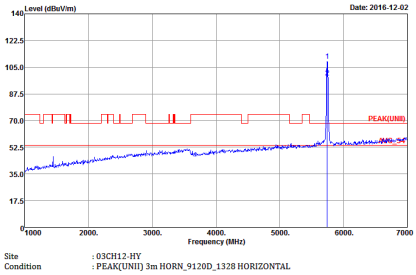
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH157 5785MHz	
1	Horizontal	Fundamental
Peak		
Peak		Left blank

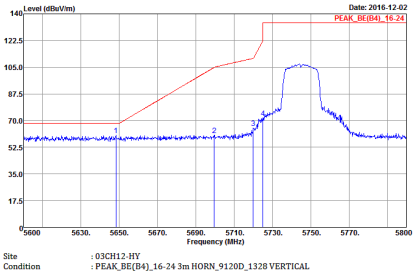
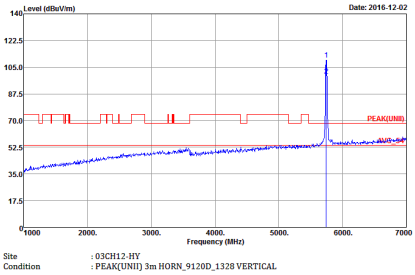
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH157 5785MHz	
1	Vertical	Fundamental
Peak		
Peak		Left blank

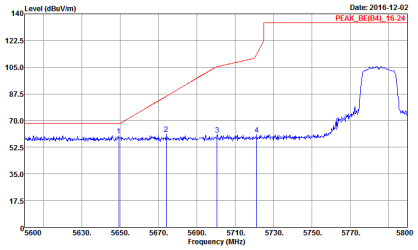
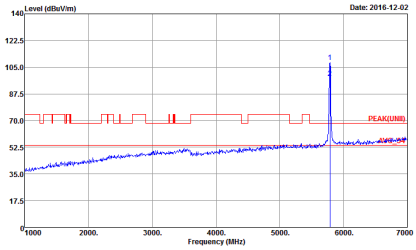
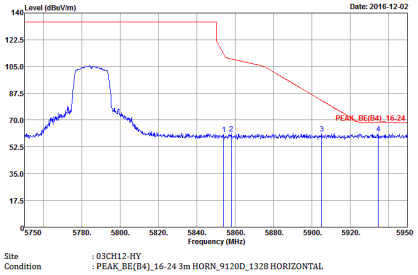
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH165 5825MHz	
1	Horizontal	Fundamental
Peak		

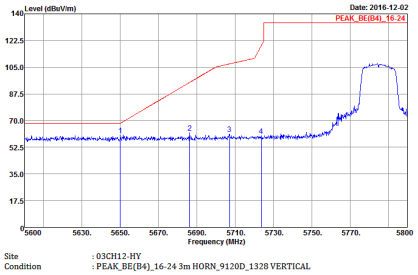
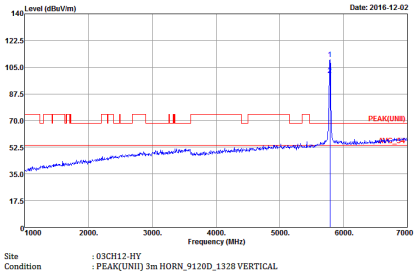
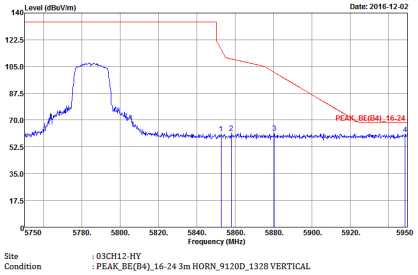
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH165 5825MHz	
1	Vertical	Fundamental
Peak		

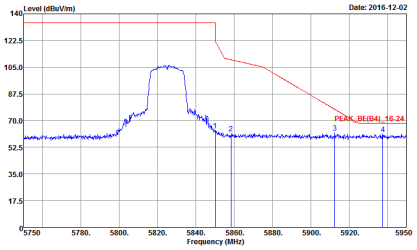
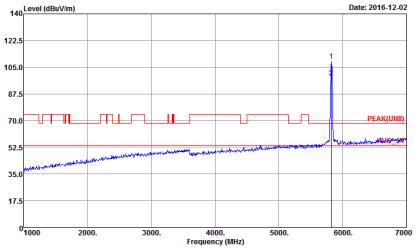
Band 4 5725~5850MHz
WIFI 802.11n HT20 (Band Edge @ 3m)

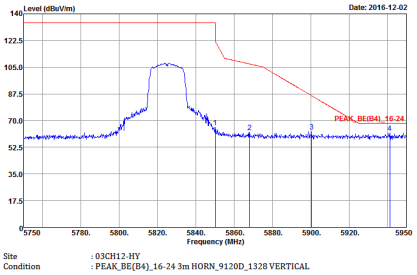
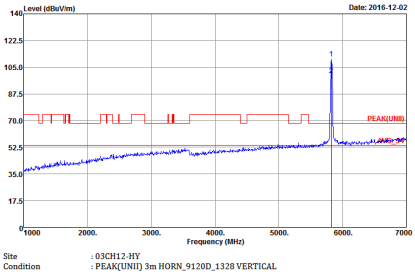
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT20 CH149 5745MHz	
1	Horizontal	Fundamental
Peak		

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

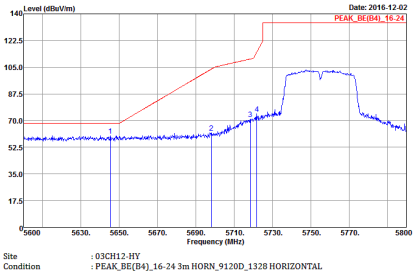
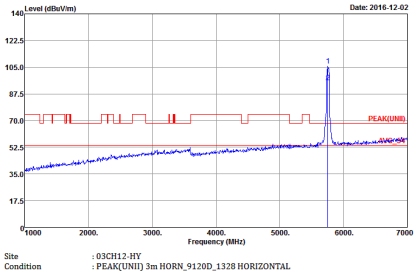
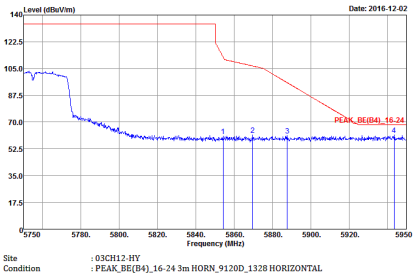
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT20 CH157 5785MHz	
1	Horizontal	Fundamental
Peak		
Peak		Left blank

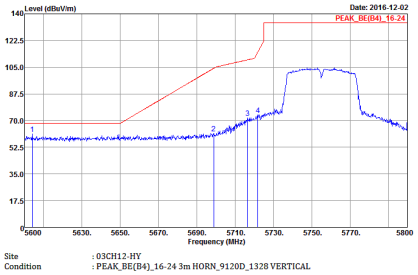
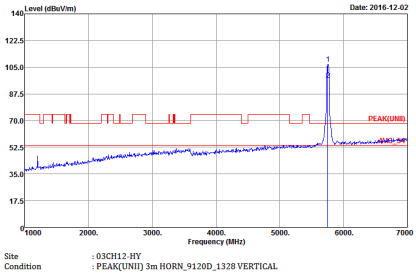
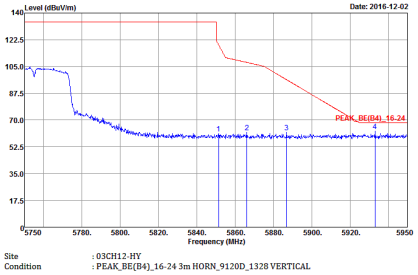
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT20 CH157 5785MHz	
1	Vertical	Fundamental
Peak		
Peak		Left blank

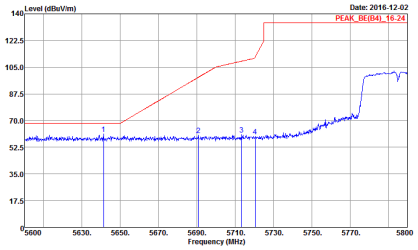
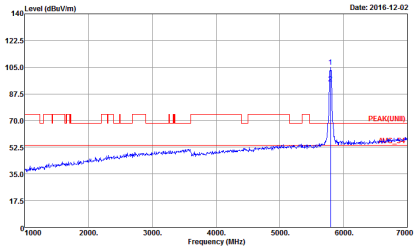
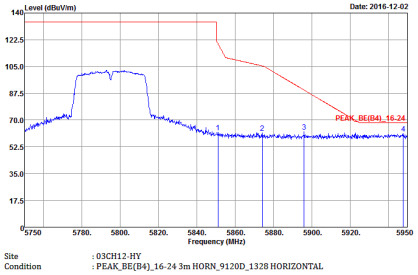
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT20 CH165 5825MHz	
1	Horizontal	Fundamental
Peak		

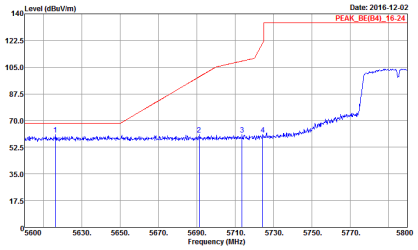
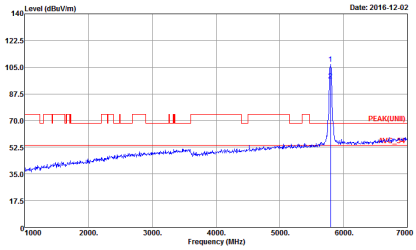
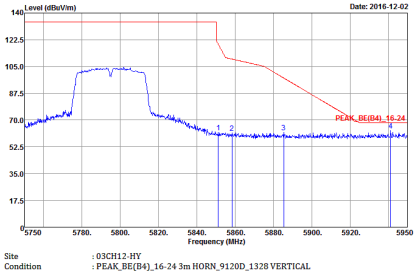
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT20 CH165 5825MHz	
1	Vertical	Fundamental
Peak		

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

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

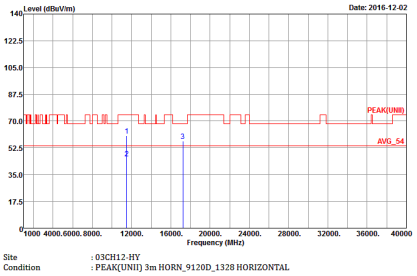
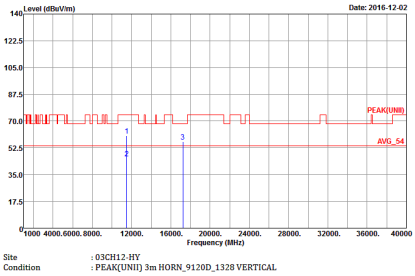
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT40 CH151 5755MHz	
1	Vertical	Fundamental
Peak		
Peak		Left blank

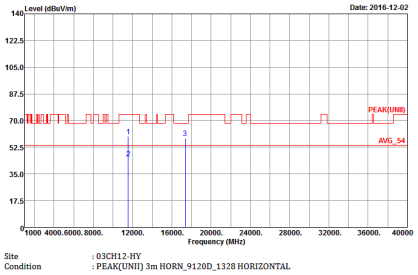
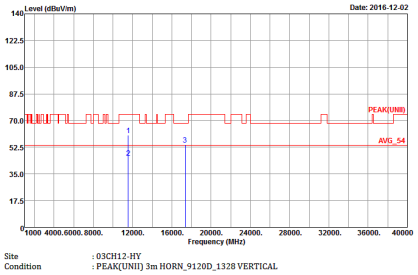
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT40 CH159 5795MHz	
1	Horizontal	Fundamental
Peak		
Peak		Left blank

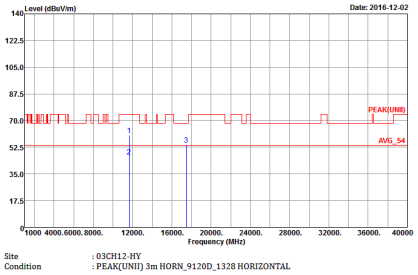
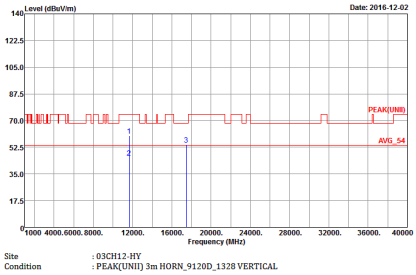
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT40 CH159 5795MHz	
1	Vertical	Fundamental
Peak		
Peak		Left blank

Band 4 - 5725~5850MHz

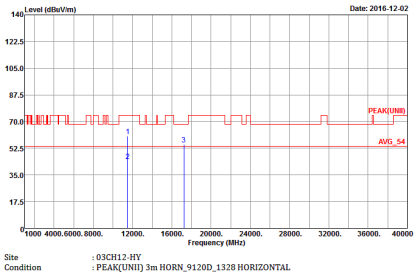
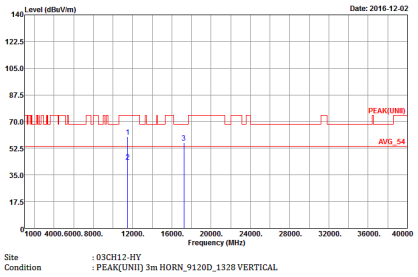
WIFI 802.11a (Harmonic @ 3m)

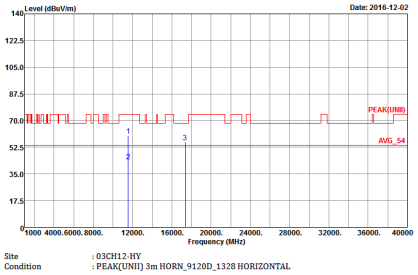
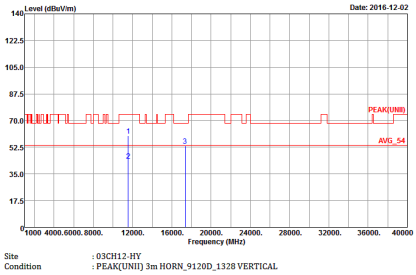
WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11a CH149 5745MHz	
1	Horizontal	Vertical
Peak Avg.		

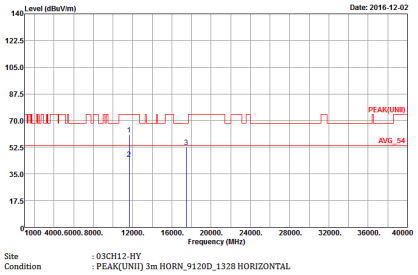
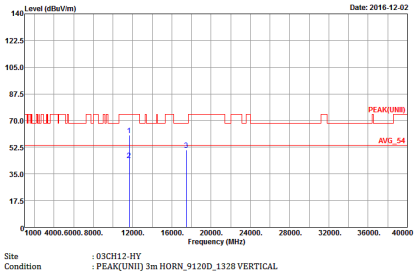
WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11a CH157 5785MHz	
1	Horizontal	Vertical
Peak Avg.		

WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11a CH165 5825MHz	
1	Horizontal	Vertical
Peak Avg.		

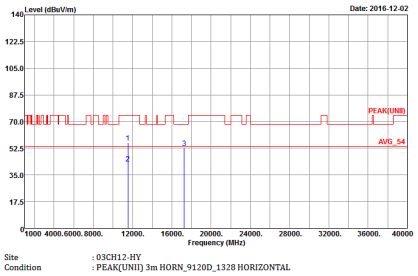
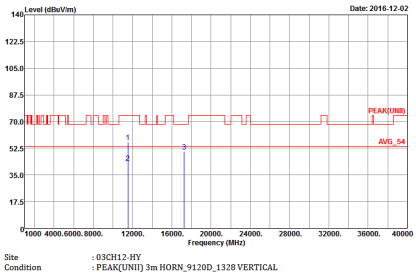
Band 4 5725~5850MHz
WIFI 802.11n HT20 (Harmonic @ 3m)

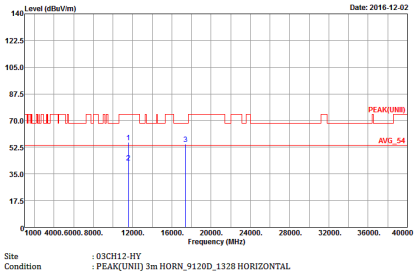
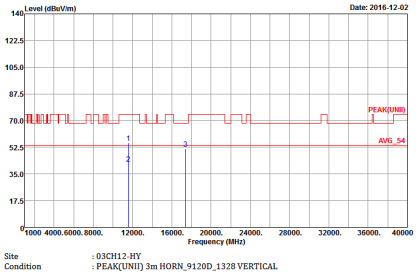
WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11n HT20 CH149 5745MHz	
1	Horizontal	Vertical
Peak Avg.		

WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11n HT20 CH157 5785MHz	
1	Horizontal	Vertical
Peak Avg.		

WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11n HT20 CH165 5825MHz	
1	Horizontal	Vertical
Peak Avg.		

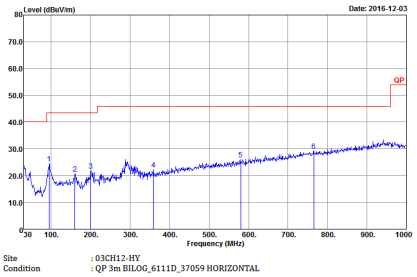
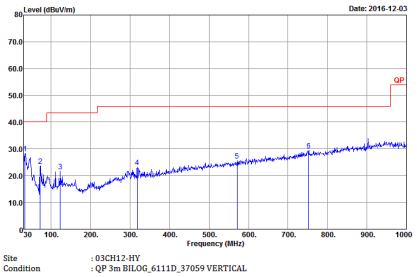
Band 4 5725~5850MHz
WIFI 802.11n HT40 (Harmonic @ 3m)

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

WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11n HT40 CH159 5795MHz	
1	Horizontal	Vertical
Peak Avg.		

Emission below 1GHz

5GHz WIFI 802.11n HT40 (LF)

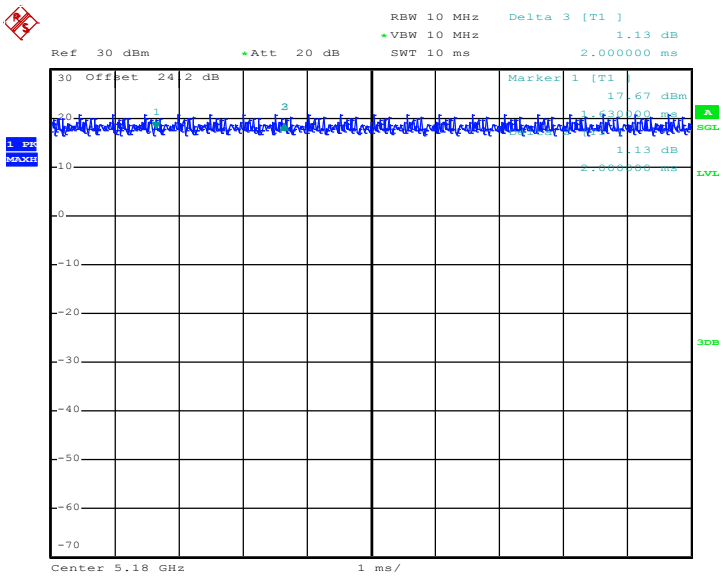
WIFI	5GHz 5725~5850MHz	
ANT	802.11n HT40 LF	
1	Horizontal	Vertical
QP / Peak		

Appendix D. Duty Cycle Plots

<For Unwanted Radiated Emission Measurement>

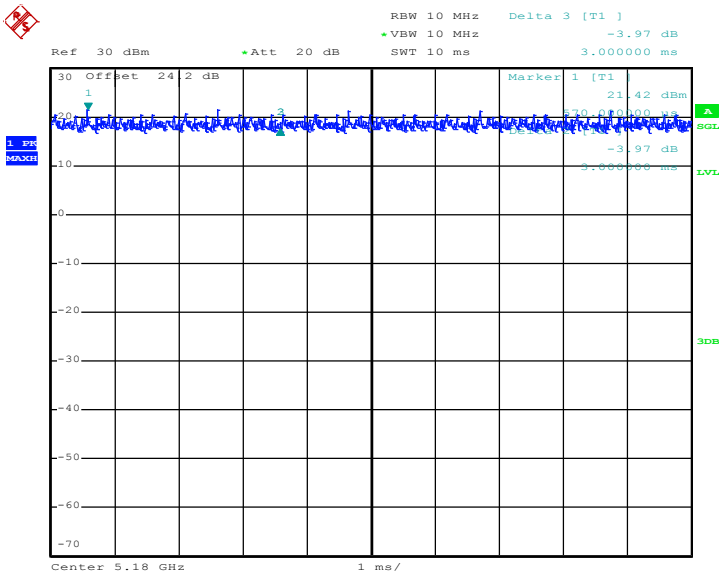
Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting
802.11a	100	-	-	10Hz
5GHz 802.11n HT20	100	-	-	10Hz
5GHz 802.11n HT40	100	-	-	10Hz

802.11a



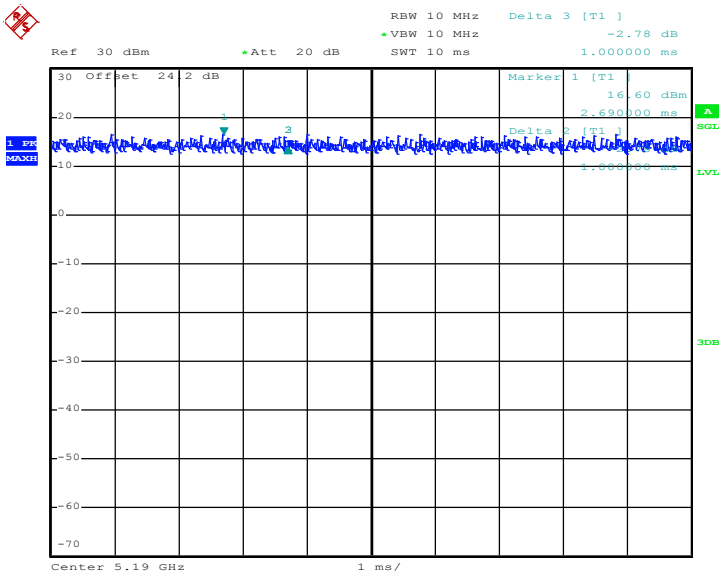
Date: 25.NOV.2016 20:55:02

802.11n HT20



Date: 25.NOV.2016 21:09:08

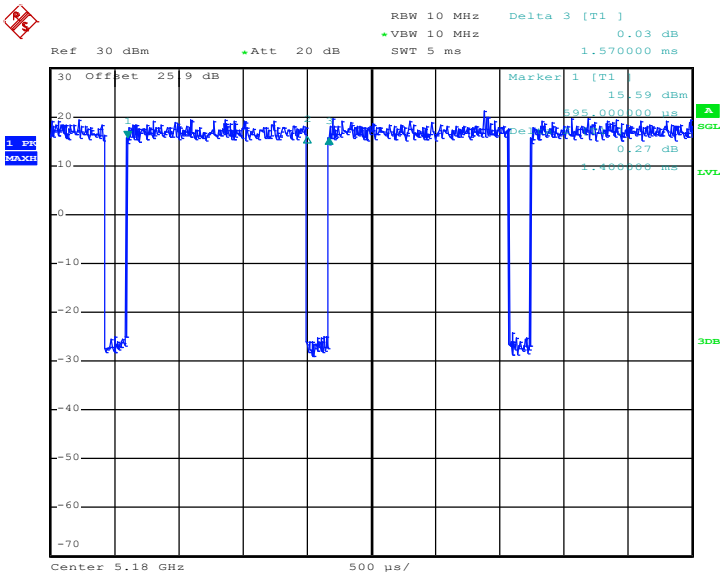
802.11n HT40



Date: 25.NOV.2016 21:22:08

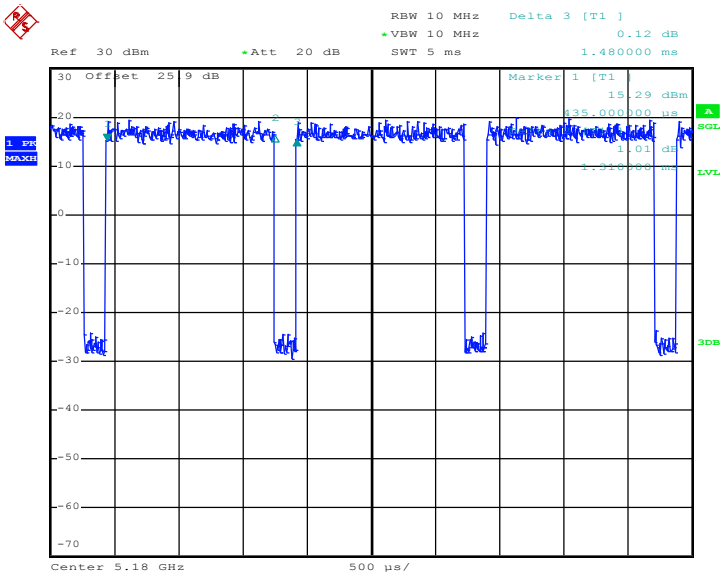
<For Output Power Measurement>

802.11a



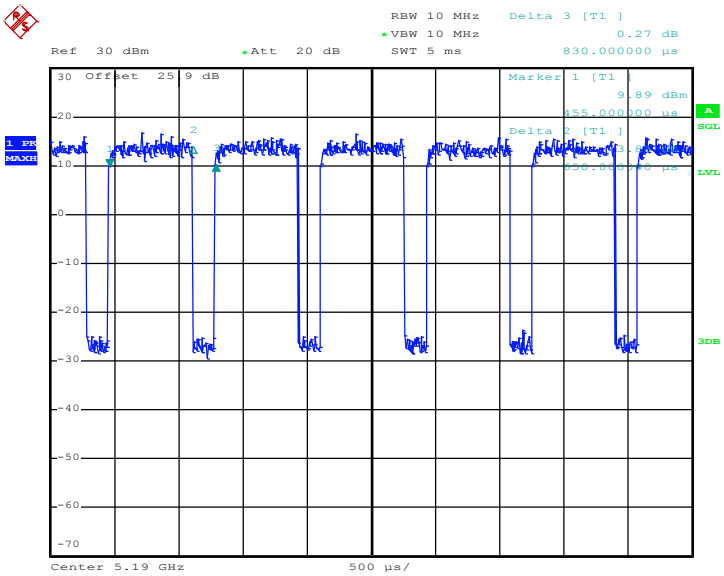
Date: 18.JAN.2017 13:52:28

802.11n HT20



Date: 18.JAN.2017 14:19:16

802.11n HT40



Date: 18.JAN.2017 14:29:38