FCC RF Test Report

APPLICANT	:	AzulFlower LLC
EQUIPMENT	:	Tablet PC
MODEL NAME	:	SL056ZE
FCC ID	:	2AIP5-3975
STANDARD	:	FCC Part 15 Subpart E §15.407
CLASSIFICATION	:	(UNII) Unlicensed National Information Infrastructure

The testing was completed on Feb. 23, 2017. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

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

Reviewed by: Joseph Lin / Supervisor

Approved by: Jones Tsai / Manager

Testing Laboratory 1190

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

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR671336-01E	Rev. 01	Initial issue of report	Mar. 10, 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

AzulFlower LLC
10 Dorrance Street Suite 700 Providence, RI 02903

1.2 Product Feature of Equipment Under Test

Product Feature	
Equipment	Tablet PC
Model Name	SL056ZE
FCC ID	2AIP5-3975
EUT supports Radios application	WLAN 11b/g/n HT20 WLAN 11a/n HT20/HT40 WLAN 11ac VHT20/VHT40/VHT80 Bluetooth BR/EDR/LE

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 : 13.99 dBm / 0.0251 W 802.11n HT20 : 13.99 dBm / 0.0251 W 802.11n HT40 : 14.00 dBm / 0.0251 W 802.11ac VHT20: 12.85 dBm / 0.0193 W 802.11ac VHT40: 13.09 dBm / 0.0204 W 802.11ac VHT80: 12.95 dBm / 0.0197 W
99% Occupied Bandwidth	802.11a : 17.40 MHz 802.11n HT20 : 18.05 MHz 802.11n HT40 : 36.20 MHz 802.11ac VHT80 : 75.36 MHz
Antenna Type / Gain	Fixed internal Antenna with gain 2.60 dBi
Type of Modulation	802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ac : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)

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. TW1190 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	03CH07-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
- FCC KDB 644545 D03 Guidance for IEEE 802 11ac New Rules v01
- 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 (Z 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
	155#	5775	165	5825

Note:

1. The above Frequency and Channel in "*" were 802.11n HT40 and 802.11ac VHT40.
2. The above Frequency and Channel in "#" were 802.11ac VHT80.

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
802.11ac VHT20	MCS0
802.11ac VHT40	MCS0
802.11ac VHT80	MCS0

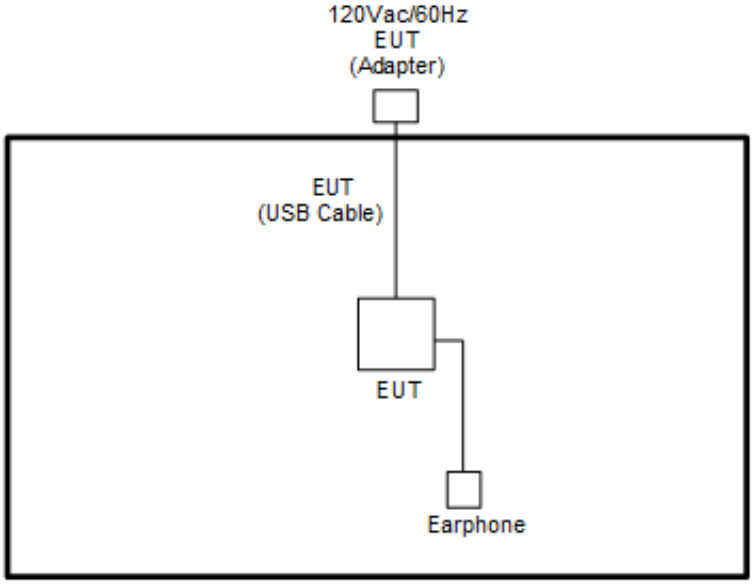
Test Cases	
AC Conducted Emission	Mode 1 : WLAN (5GHz) Link + Bluetooth Link + MPEG4 + Earphone + MicroSD Card + USB Cable (Charging from Adapter)

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

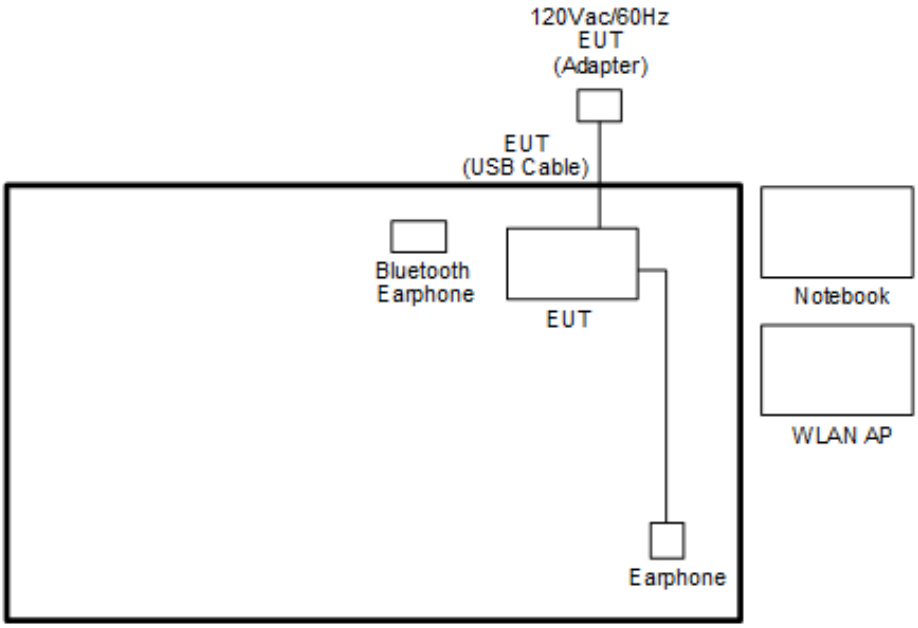
Ch. #		Band IV：5725-5850 MHz		
		802.11ac VHT20	802.11ac VHT40	802.11ac VHT80
L	Low	149	151	-
M	Middle	157	-	155
H	High	165	159	-

2.3 Connection Diagram of Test System

<WLAN Tx 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.	Bluetooth Earphone	Sony Ericsson	MW600	PY7DDA-2029	N/A	N/A
2.	WLAN AP	ASUS	RT-AC66U	MSQ-RTAC66U	N/A	Unshielded, 1.8 m
3.	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
4.	SD Card	SanDisk	MicroSD HC	FCC DoC	N/A	N/A
5.	Earphone	N/A	N/A	Verification	Unshielded, 1.15 m	N/A

2.5 EUT Operation Test Setup

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

2.6 Measurement Results Explanation Example

For all conducted test items:

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

Example :

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

Offset = RF cable loss + attenuator factor.

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

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

= 4.2 + 10 = 14.2 (dB)

3 Test Result

3.1 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

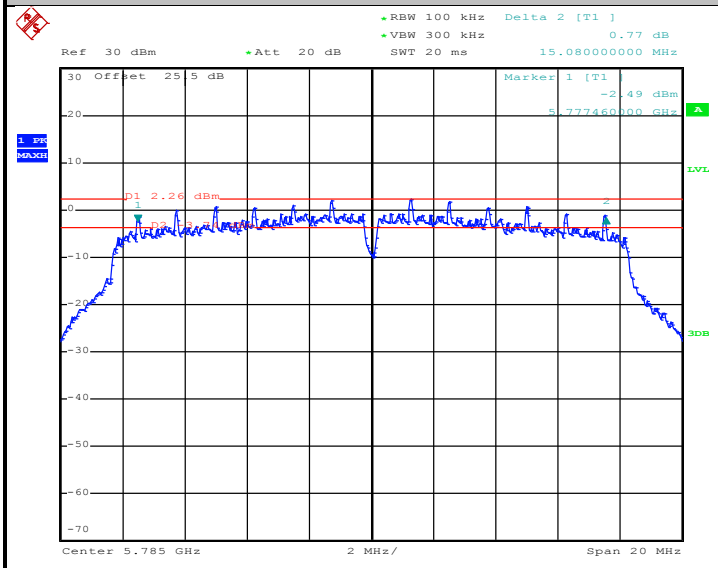
1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r03. Section C) Emission bandwidth for the band 5.725-5.85GHz
2. Set RBW = 100kHz.
3. Set the VBW ≥ 3 x RBW.
4. Detector = Peak.
5. Trace mode = max hold
6. Measure the maximum width of the emission that is 6 dB down from the peak of the emission.
7. Measure and record the results in the test report.

3.1.4 Test Setup

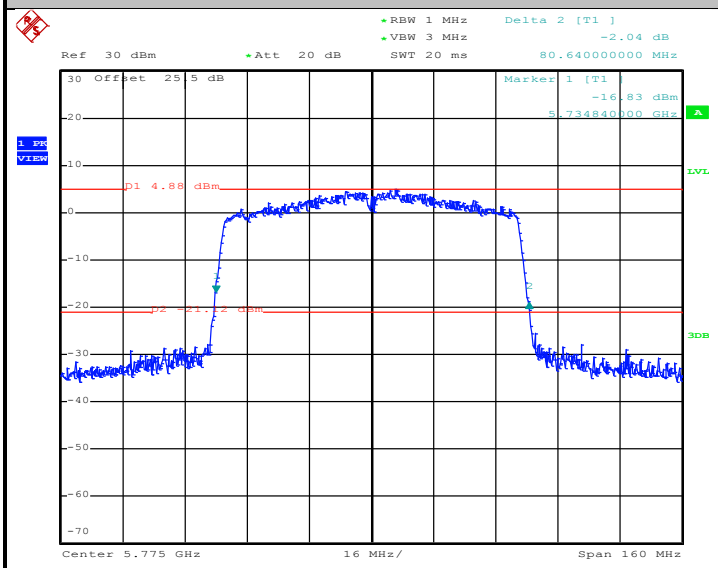
3.1.5 Test Result of 6dB Bandwidth

Please refer to Appendix A.

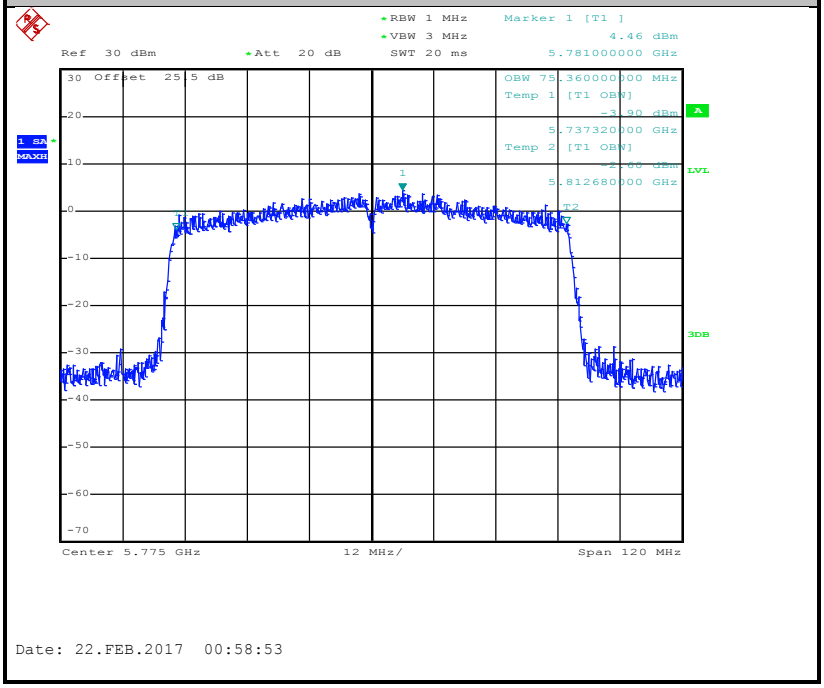
Minimum 6dB Bandwidth



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.

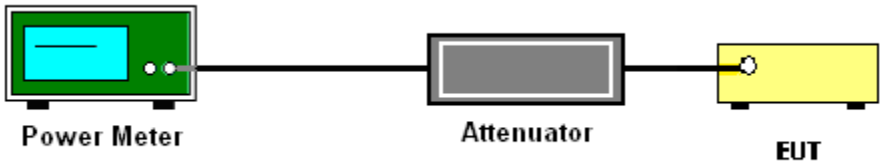
3.2.3 Test Procedures

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.

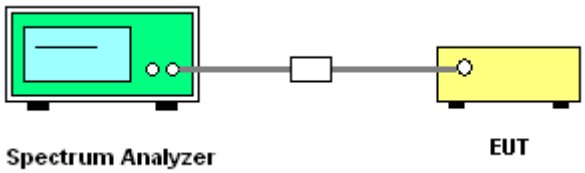
 # Method SA-2 #

(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.

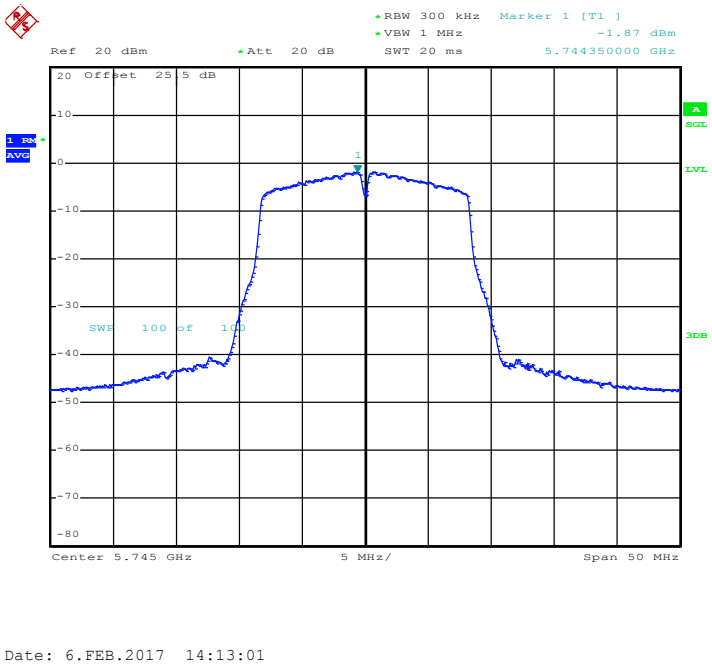
3.3.4 Test Setup



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

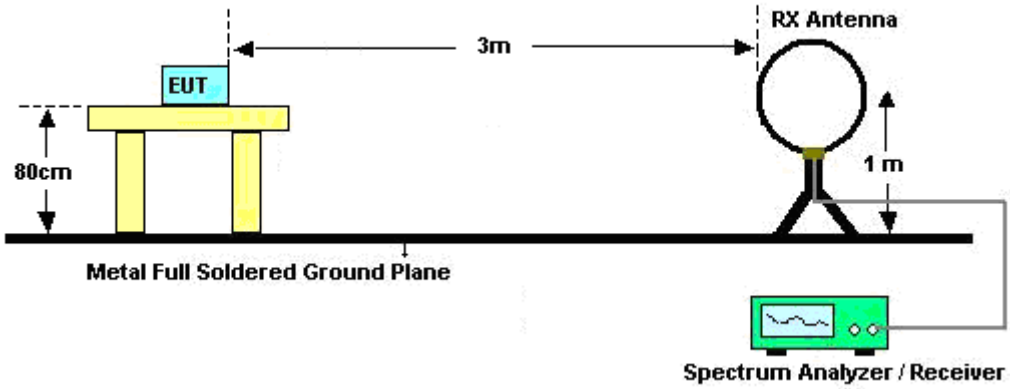
   (3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz

   - 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.

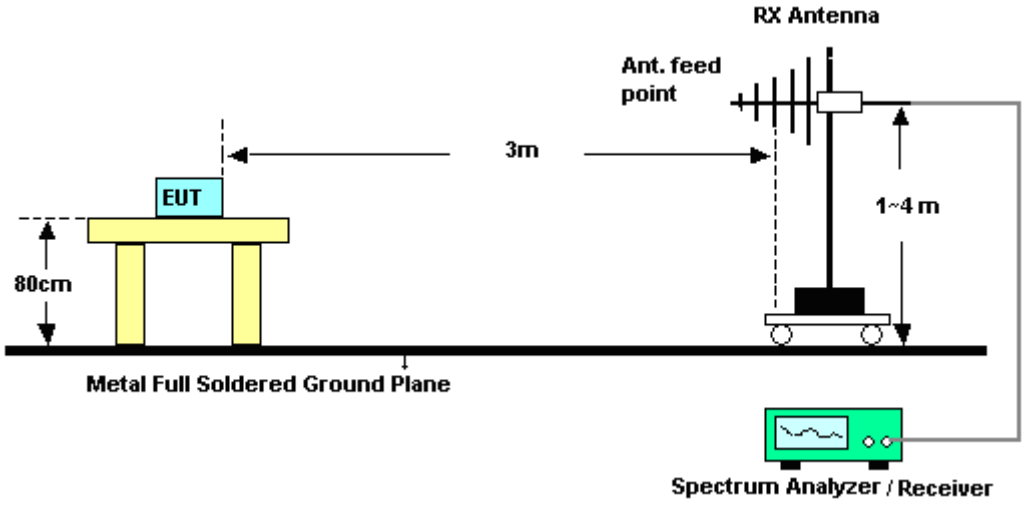
7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again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

3.4.4 Test Setup

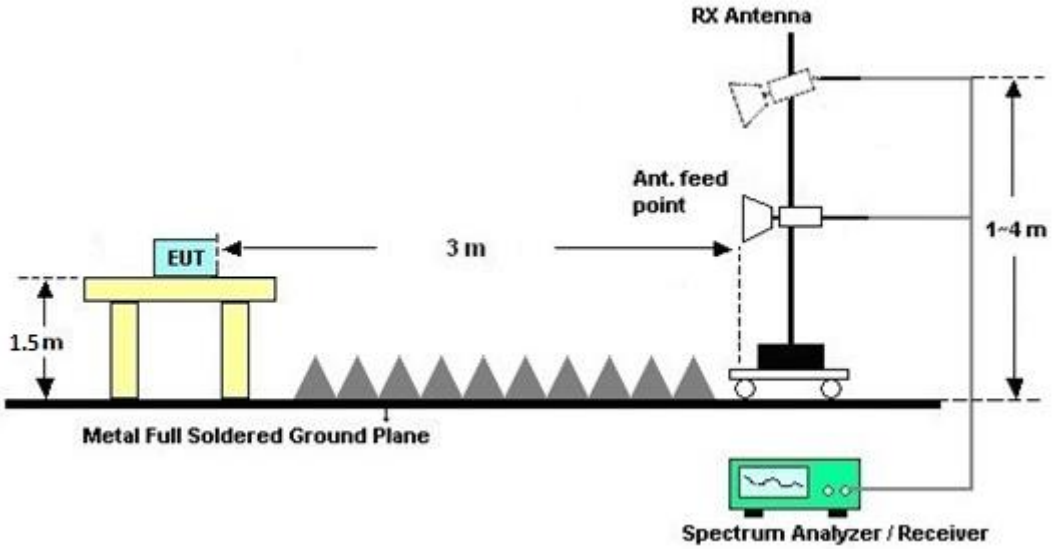
For radiated emissions below 30MHz



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.

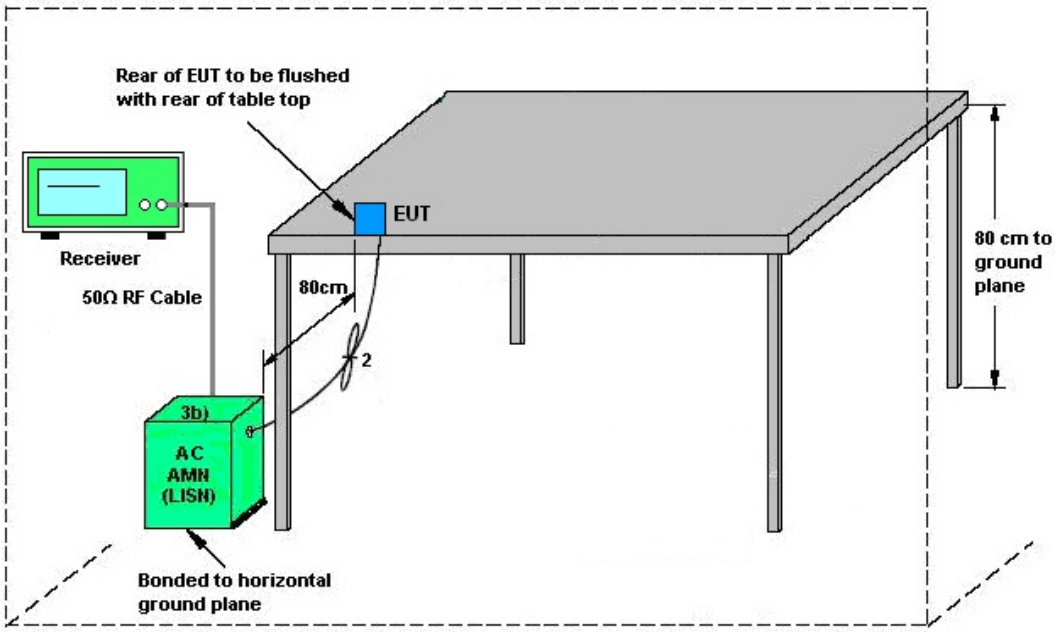
3.5.2 Measuring Instruments

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.

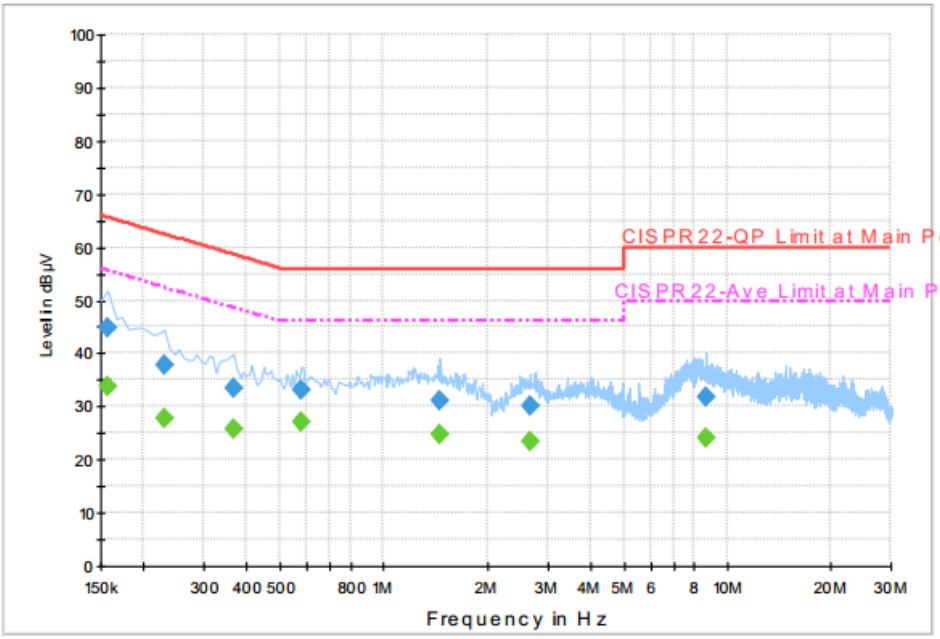
3.5.4 Test Setup



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 :	22~23℃
Test Engineer :	Kai-Chun Chu	Relative Humidity :	51~52%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	WLAN (5GHz) Link + Bluetooth Link + MPEG4 + Earphone + MicroSD Card + USB Cable (Charging from Adapter)		



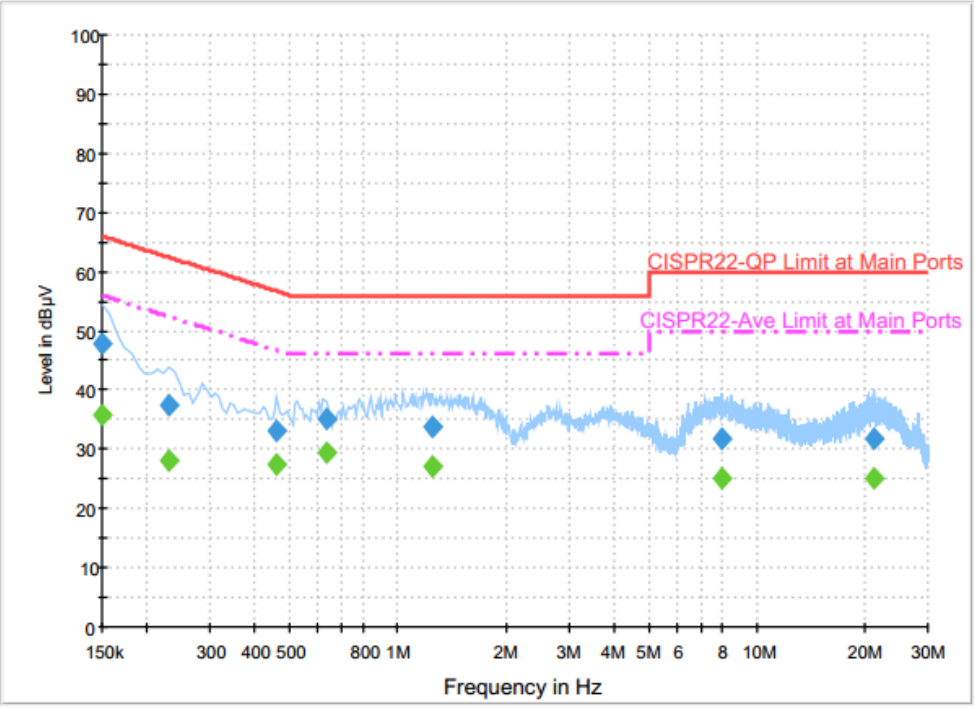
Final Result : QuasiPeak

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.158000	44.9	Off	L1	19.6	20.7	65.6
0.230000	37.7	Off	L1	19.6	24.7	62.4
0.366000	33.6	Off	L1	19.6	25.0	58.6
0.574000	33.0	Off	L1	19.6	23.0	56.0
1.462000	31.0	Off	L1	19.6	25.0	56.0
2.678000	30.2	Off	L1	19.4	25.8	56.0
8.654000	31.7	Off	L1	20.0	28.3	60.0

Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.158000	33.8	Off	L1	19.6	21.8	55.6
0.230000	27.6	Off	L1	19.6	24.8	52.4
0.366000	25.7	Off	L1	19.6	22.9	48.6
0.574000	27.2	Off	L1	19.6	18.8	46.0
1.462000	24.7	Off	L1	19.6	21.3	46.0
2.678000	23.3	Off	L1	19.4	22.7	46.0
8.654000	24.1	Off	L1	20.0	25.9	50.0

Test Mode :	Mode 1	Temperature :	22~23℃
Test Engineer :	Kai-Chun Chu	Relative Humidity :	51~52%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	WLAN (5GHz) Link + Bluetooth Link + MPEG4 + Earphone + MicroSD Card + USB Cable (Charging from Adapter)		



Final Result : QuasiPeak

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	48.0	Off	N	19.6	18.0	66.0
0.230000	37.6	Off	N	19.6	24.8	62.4
0.462000	33.1	Off	N	19.6	23.6	56.7
0.630000	35.1	Off	N	19.6	20.9	56.0
1.246000	33.9	Off	N	19.6	22.1	56.0
7.998000	31.9	Off	N	19.9	28.1	60.0
21.342000	31.9	Off	N	20.7	28.1	60.0

Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	35.8	Off	N	19.6	20.2	56.0
0.230000	28.0	Off	N	19.6	24.4	52.4
0.462000	27.3	Off	N	19.6	19.4	46.7
0.630000	29.3	Off	N	19.6	16.7	46.0
1.246000	27.1	Off	N	19.6	18.9	46.0
7.998000	25.0	Off	N	19.9	25.0	50.0
21.342000	25.0	Off	N	20.7	25.0	50.0

3.6 Frequency Stability Measurement

3.6.1 Limit of Frequency Stability

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

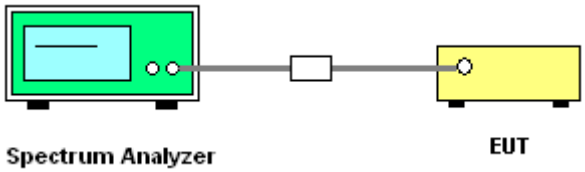
3.6.2 Measuring Instruments

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

3.6.3 Test Procedures

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

3.6.4 Test Setup



3.6.5 Test Result of Frequency Stability

Please refer to Appendix A.

3.7 Automatically Discontinue Transmission

3.7.1 Limit of Automatically Discontinue Transmission

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

3.7.2 Measuring Instruments

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

3.7.3 Test Result of Automatically Discontinue Transmission

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.

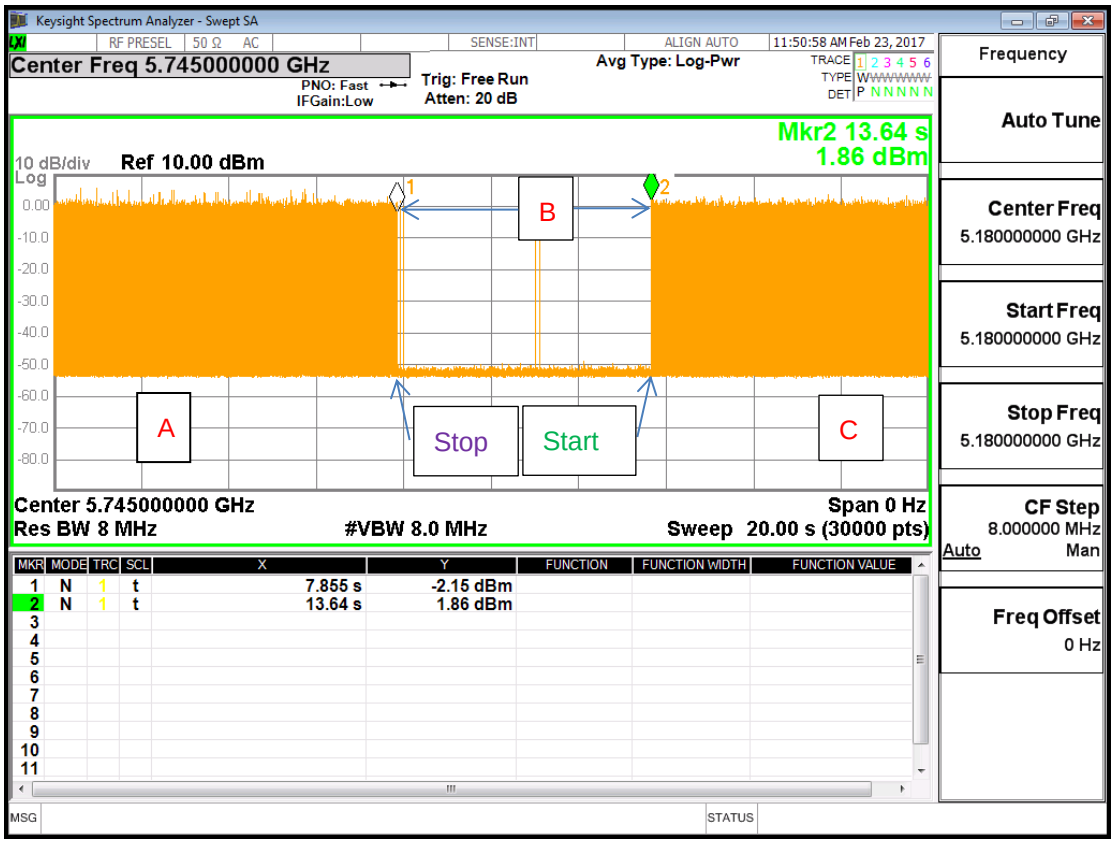
B. Information stop: stop supplying information to the access point.

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	Jan. 25, 2017 ~ Feb. 23, 2017	Sep. 28, 2017	Conducted (TH05-HY)
Power Sensor	Anritsu	MA2411B	0846202	300MHz~40GHz	Sep. 29, 2016	Jan. 25, 2017 ~ Feb. 23, 2017	Sep. 28, 2017	Conducted (TH05-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP40	100057	9kHz-40GHz	Nov. 25, 2016	Jan. 25, 2017 ~ Feb. 23, 2017	Nov. 24, 2017	Conducted (TH05-HY)
Temperature Chamber	ESPEC	SH-641	92013720	-40℃ ~90℃	Sep. 01, 2016	Jan. 25, 2017 ~ Feb. 23, 2017	Aug. 31, 2017	Conducted (TH05-HY)
Programmable Power Supply	GW Instek	PSS-2005	EL890094	1V~20V 0.5A~5A	Oct. 11, 2016	Jan. 25, 2017 ~ Feb. 23, 2017	Oct. 10, 2017	Conducted (TH05-HY)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Jan. 30, 2017	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESCI 7	100724	9kHz~7GHz	Aug. 30, 2016	Jan. 30, 2017	Aug. 29, 2017	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Nov. 29, 2016	Jan. 30, 2017	Nov. 28, 2017	Conduction (CO05-HY)
Bilog Antenna	TESEQ	CBL 6111D&00800 N1D01N-06	35419&03	30MHz to 1GHz	Jan. 07, 2017	Jan. 26, 2017 ~ Feb. 21, 2017	Jan. 06, 2018	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	00075962	1GHz ~ 18GHz	Aug. 19, 2016	Jan. 26, 2017 ~ Feb. 21, 2017	Aug. 18, 2017	Radiation (03CH07-HY)
EMI Test Receiver	Keysight	N9038A(MXE)	MY54130085	20Hz ~ 8.4GHz	Oct. 26, 2016	Jan. 26, 2017 ~ Feb. 21, 2017	Oct. 25, 2017	Radiation (03CH07-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	Sep. 02, 2015	Jan. 26, 2017 ~ Feb. 21, 2017	Sep. 01, 2017	Radiation (03CH07-HY)
Preamplifier	MITEQ	AMF-7D-0010 1800-30-10P	1590075	1GHz ~ 18GHz	Apr. 15, 2016	Jan. 26, 2017 ~ Feb. 21, 2017	Apr. 14, 2017	Radiation (03CH07-HY)
Preamplifier	COM-POWER	PA-103A	161241	10MHz-1GHz	Mar. 18, 2016	Jan. 26, 2017 ~ Feb. 21, 2017	Mar. 17, 2017	Radiation (03CH07-HY)
Preamplifier	Agilent	8449B	3008A02362	1GHz~ 26.5GHz	Oct. 12, 2016	Jan. 26, 2017 ~ Feb. 21, 2017	Oct. 11, 2017	Radiation (03CH07-HY)
Spectrum Analyzer	Agilent	N9010A	MY53470118	10Hz~44GHz	Feb. 27, 2016	Jan. 26, 2017 ~ Feb. 21, 2017	Feb. 26, 2017	Radiation (03CH07-HY)
Antenna Mast	Max-Full	MFA520BS	N/A	1m~4m	N/A	Jan. 26, 2017 ~ Feb. 21, 2017	N/A	Radiation (03CH07-HY)
Turn Table	ChainTek	Chaintek 3000	N/A	0~360 Degree	N/A	Jan. 26, 2017 ~ Feb. 21, 2017	N/A	Radiation (03CH07-HY)
Preamplifier	MITEQ	JS44-18004000-33-8P	1840917	18GHz ~ 40GHz	Jun. 14, 2016	Jan. 26, 2017 ~ Feb. 21, 2017	Jun. 13, 2017	Radiation (03CH07-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170584	18GHz- 40GHz	Nov. 08, 2016	Jan. 26, 2017 ~ Feb. 21, 2017	Nov. 07, 2017	Radiation (03CH07-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))	**5.7**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.5**

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

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

Appendix A. Conducted Test Results

Report Number : FR671336-01E

Test Engineer:	Tommy Lee / Derek Hsu	Temperature:	21~25	°C
Test Date:	2017/01/25~2017/02/23	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)	26 dB Bandwidth (MHz)	6 dB Bandwidth (MHz)	6dB Bandwidth min. Limit (MHz)	Pass/Fail
11a	6M bps	1	149	5745	17.15	21.5	15.12	0.5	Pass
11a	6Mbps	1	157	5785	17.15	21.6	15.08	0.5	Pass
11a	6Mbps	1	165	5825	17.4	21.6	15.08	0.5	Pass
HT20	MCS 0	1	149	5745	18	23.1	15.08	0.5	Pass
HT20	MCS 0	1	157	5785	18.05	25.4	15.08	0.5	Pass
HT20	MCS 0	1	165	5825	17.95	24.2	15.08	0.5	Pass
HT40	MCS 0	1	151	5755	36.2	41.58	35.12	0.5	Pass
HT40	MCS 0	1	159	5795	36.2	41.76	35.04	0.5	Pass
VHT80	MCS 0	1	155	5775	75.36	80.64	75.12	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
11a	6M bps	1	149	5745	0.36	13.99	30.00	2.60		Pass
11a	6Mbps	1	157	5785	0.36	13.97	30.00	2.60		Pass
11a	6Mbps	1	165	5825	0.36	13.98	30.00	2.60		Pass
HT20	MCS 0	1	149	5745	0.38	13.99	30.00	2.60		Pass
HT20	MCS 0	1	157	5785	0.38	13.98	30.00	2.60		Pass
HT20	MCS 0	1	165	5825	0.38	13.95	30.00	2.60		Pass
HT40	MCS 0	1	151	5755	0.67	14.00	30.00	2.60		Pass
HT40	MCS 0	1	159	5795	0.67	13.95	30.00	2.60		Pass
VHT20	MCS 0	1	149	5745	0.35	12.85	30.00	2.60		Pass
VHT20	MCS 0	1	157	5785	0.35	12.63	30.00	2.60		Pass
VHT20	MCS 0	1	165	5825	0.35	12.67	30.00	2.60		Pass
VHT40	MCS 0	1	151	5755	0.67	13.09	30.00	2.60		Pass
VHT40	MCS 0	1	159	5795	0.67	12.90	30.00	2.60		Pass
VHT80	MCS 0	1	155	5775	1.30	12.95	30.00	2.60		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
11a	6M bps	1	149	5745	0.36	2.22	0.71	30.00	2.60	Pass
11a	6Mbps	1	157	5785	0.36	2.22	0.70	30.00	2.60	Pass
11a	6Mbps	1	165	5825	0.36	2.22	0.71	30.00	2.60	Pass
HT20	MCS 0	1	149	5745	0.38	2.22	0.42	30.00	2.60	Pass
HT20	MCS 0	1	157	5785	0.38	2.22	0.37	30.00	2.60	Pass
HT20	MCS 0	1	165	5825	0.38	2.22	0.32	30.00	2.60	Pass
HT40	MCS 0	1	151	5755	0.67	2.22	-2.35	30.00	2.60	Pass
HT40	MCS 0	1	159	5795	0.67	2.22	-2.38	30.00	2.60	Pass
VHT80	MCS 0	1	155	5775	1.30	2.22	-6.10	30.00	2.60	Pass

TEST RESULTS DATA
Frequency Stability

Band IV										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Center Frequency (MHz)	Frequency Deviation (MHz)	Frequency Stablility (ppm)	Temperature (°C)	Voltage (V)	Note
11a	6M bps	1	149	5745	5745.000	0.000	0.00	35	3.8	
11a	6M bps	1	149	5745	5745.050	0.050	8.70	0	3.8	
11a	6M bps	1	149	5745	5745.050	0.050	8.70	20	4.2	
11a	6M bps	1	149	5745	5745.050	0.050	8.70	20	3.4	
11a	6M bps	1	149	5745	5745.000	0.000	0.00	20	3.8	

Appendix B. Radiated Spurious Emission

Test Engineer :	Jesse Wang, James Chiu and Daniel Lee	Temperature :	21~22°C
		Relative Humidity :	44~48%

Band 4 - 5725~5850MHz

WIFI 802.11a (Band Edge @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a CH 149 5745MHz		5640.2	50.2	-18	68.2	38.78	34.6	11.95	35.13	198	281	P	H
		5672.8	50.38	-34.73	85.11	38.91	34.6	12	35.13	198	281	P	H
		5719.8	58.5	-52.24	110.74	46.98	34.6	12.06	35.14	198	281	P	H
		5722.8	63.4	-53.78	117.18	51.88	34.6	12.06	35.14	198	281	P	H
	*	5745	107.26	-	-	95.7	34.6	12.11	35.15	198	281	P	H
	*	5745	99.66	-	-	88.1	34.6	12.11	35.15	198	281	A	H
		5649.8	50.87	-17.33	68.2	39.45	34.6	11.95	35.13	214	91	P	V
		5697	51.52	-51.47	102.99	40.06	34.6	12	35.14	214	91	P	V
		5718.8	57.64	-52.82	110.46	46.12	34.6	12.06	35.14	214	91	P	V
		5725	61.61	-60.59	122.2	50.09	34.6	12.06	35.14	214	91	P	V
	*	5745	108.36	-	-	96.8	34.6	12.11	35.15	214	91	P	V
	*	5745	100.76	-	-	89.2	34.6	12.11	35.15	214	91	A	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		5630	49.96	-18.24	68.2	38.54	34.6	11.95	35.13	200	282	P	H
		5657	50.49	-22.91	73.4	39.07	34.6	11.95	35.13	200	282	P	H
		5718.4	50.78	-59.57	110.35	39.26	34.6	12.06	35.14	200	282	P	H
		5723.6	49.76	-69.25	119.01	38.24	34.6	12.06	35.14	200	282	P	H
	*	5785	107.61	-	-	96	34.6	12.17	35.16	200	282	P	H
	*	5785	100.11	-	-	88.5	34.6	12.17	35.16	200	282	A	H
		5852.8	51.06	-64.76	115.82	39.35	34.6	12.28	35.17	200	282	P	H
		5863	50.86	-57.7	108.56	39.05	34.6	12.39	35.18	200	282	P	H
		5884.4	51.19	-47.03	98.22	39.39	34.6	12.39	35.19	200	282	P	H
		5934.8	50.54	-17.66	68.2	38.63	34.6	12.51	35.2	200	282	P	H
		5638	50.55	-17.65	68.2	39.13	34.6	11.95	35.13	217	90	P	V
		5700	50.98	-54.22	105.2	39.52	34.6	12	35.14	217	90	P	V
		5700	50.98	-54.22	105.2	39.52	34.6	12	35.14	217	90	P	V
		5720.8	49.13	-63.49	112.62	37.61	34.6	12.06	35.14	217	90	P	V
	*	5785	107.81	-	-	96.2	34.6	12.17	35.16	217	90	P	V
	*	5785	100.51	-	-	88.9	34.6	12.17	35.16	217	90	A	V
		5853.6	50.35	-63.64	113.99	38.64	34.6	12.28	35.17	217	90	P	V
		5858.2	51.53	-58.37	109.9	39.83	34.6	12.28	35.18	217	90	P	V
		5879.2	52.36	-49.72	102.08	40.55	34.6	12.39	35.18	217	90	P	V
		5927.8	52.1	-16.1	68.2	40.18	34.6	12.51	35.19	217	90	P	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 165 5825MHz	*	5825	107.71	-	-	96	34.6	12.28	35.17	207	282	P	H
	*	5825	100.31	-	-	88.6	34.6	12.28	35.17	207	282	A	H
		5850	59.64	-62.56	122.2	47.93	34.6	12.28	35.17	207	282	P	H
		5856.4	53.88	-56.53	110.41	42.17	34.6	12.28	35.17	207	282	P	H
		5877.6	51.94	-51.33	103.27	40.13	34.6	12.39	35.18	207	282	P	H
		5940.2	51.06	-17.14	68.2	39.04	34.6	12.62	35.2	207	282	P	H
	*	5825	108.41	-	-	96.7	34.6	12.28	35.17	203	91	P	V
	*	5825	101.11	-	-	89.4	34.6	12.28	35.17	203	91	A	V
		5850.8	60.23	-60.15	120.38	48.52	34.6	12.28	35.17	203	91	P	V
		5855	57.23	-53.57	110.8	45.52	34.6	12.28	35.17	203	91	P	V
		5892.8	52.39	-39.6	91.99	40.59	34.6	12.39	35.19	203	91	P	V
		5944.4	50.88	-17.32	68.2	38.86	34.6	12.62	35.2	203	91	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 4 5725~5850MHz

WIFI 802.11a (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	47.46	-26.54	74	48.37	39.27	17.16	57.34	100	0	P	H
		17232	44.86	-23.34	68.2	37.56	42.43	20.76	55.89	100	0	P	H
		11490	42.64	-31.36	74	43.55	39.27	17.16	57.34	100	0	P	V
		17232	45.38	-22.82	68.2	38.08	42.43	20.76	55.89	100	0	P	V
802.11a CH 157 5785MHz		11570	47.92	-26.08	74	48.75	39.2	17.16	57.19	100	0	P	H
		17352	45.01	-23.19	68.2	37.87	42.24	20.84	55.94	100	0	P	H
		11570	43.43	-30.57	74	44.26	39.2	17.16	57.19	100	0	P	V
		17352	45.71	-22.49	68.2	38.57	42.24	20.84	55.94	100	0	P	V
802.11a CH 165 5825MHz		11650	48.34	-25.66	74	49.15	39.11	17.16	57.08	100	0	P	H
		17472	46.83	-21.37	68.2	39.84	42.05	20.93	55.99	100	0	P	H
		11650	42.29	-31.71	74	43.1	39.11	17.16	57.08	100	0	P	V
		17472	45.52	-22.68	68.2	38.53	42.05	20.93	55.99	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 4 5725~5850MHz

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)
		5643.4	50.96	-17.24	68.2	39.54	34.6	11.95	35.13	204	281	P	H
		5689	50.95	-46.14	97.09	39.49	34.6	12	35.14	204	281	P	H
		5718.4	59.4	-50.95	110.35	47.88	34.6	12.06	35.14	204	281	P	H
		5724.4	65.62	-55.21	120.83	54.1	34.6	12.06	35.14	204	281	P	H
802.11n	*	5745	107.06	-	-	95.5	34.6	12.11	35.15	204	281	P	H
HT20	*	5745	99.66	-	-	88.1	34.6	12.11	35.15	204	281	A	H
CH 149		5621.4	50.46	-17.74	68.2	39.03	34.6	11.95	35.12	208	90	P	V
5745MHz		5670	52.06	-30.98	83.04	40.59	34.6	12	35.13	208	90	P	V
		5718.6	61.37	-49.04	110.41	49.85	34.6	12.06	35.14	208	90	P	V
		5725	64.49	-57.71	122.2	52.97	34.6	12.06	35.14	208	90	P	V
	*	5745	108.36	-	-	96.8	34.6	12.11	35.15	208	90	P	V
	*	5745	100.96	-	-	89.4	34.6	12.11	35.15	208	90	A	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)
		5645.6	50.25	-17.95	68.2	38.83	34.6	11.95	35.13	197	280	P	H
		5696	51.58	-50.67	102.25	40.12	34.6	12	35.14	197	280	P	H
		5712.8	49.6	-59.19	108.79	38.08	34.6	12.06	35.14	197	280	P	H
		5723	50.4	-67.24	117.64	38.88	34.6	12.06	35.14	197	280	P	H
	*	5785	107.21	-	-	95.6	34.6	12.17	35.16	197	280	P	H
	*	5785	99.81	-	-	88.2	34.6	12.17	35.16	197	280	A	H
		5853.6	51.1	-62.89	113.99	39.39	34.6	12.28	35.17	197	280	P	H
		5865	50.58	-57.42	108	38.77	34.6	12.39	35.18	197	280	P	H
802.11n		5909.4	52.57	-27.14	79.71	40.65	34.6	12.51	35.19	197	280	P	H
HT20		5948.8	51.25	-16.95	68.2	39.23	34.6	12.62	35.2	197	280	P	H
CH 157		5607.4	49.34	-18.86	68.2	37.97	34.6	11.89	35.12	213	138	P	V
5785MHz		5681.2	51.59	-39.74	91.33	40.13	34.6	12	35.14	213	138	P	V
		5701.2	51.47	-54.07	105.54	39.95	34.6	12.06	35.14	213	138	P	V
		5722	49.54	-65.82	115.36	38.02	34.6	12.06	35.14	213	138	P	V
	*	5785	108.51	-	-	96.9	34.6	12.17	35.16	213	138	P	V
	*	5785	101.21	-	-	89.6	34.6	12.17	35.16	213	138	A	V
		5852.4	50.38	-66.35	116.73	38.67	34.6	12.28	35.17	213	138	P	V
		5859	51.86	-57.82	109.68	40.16	34.6	12.28	35.18	213	138	P	V
		5877.8	52.5	-50.62	103.12	40.69	34.6	12.39	35.18	213	138	P	V
		5944.8	50.82	-17.38	68.2	38.8	34.6	12.62	35.2	213	138	P	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)
802.11n HT20 CH 165 5825MHz	*	5825	107.41	-	-	95.7	34.6	12.28	35.17	208	279	P	H
	*	5825	100.21	-	-	88.5	34.6	12.28	35.17	208	279	A	H
		5852.4	62.07	-54.66	116.73	50.36	34.6	12.28	35.17	208	279	P	H
		5857.2	58.07	-52.11	110.18	46.36	34.6	12.28	35.17	208	279	P	H
		5893.4	51.41	-40.14	91.55	39.61	34.6	12.39	35.19	208	279	P	H
		5931.6	50.59	-17.61	68.2	38.67	34.6	12.51	35.19	208	279	P	H
	*	5825	108.91	-	-	97.2	34.6	12.28	35.17	216	121	P	V
	*	5825	101.71	-	-	90	34.6	12.28	35.17	216	121	A	V
		5852.4	62.88	-53.85	116.73	51.17	34.6	12.28	35.17	216	121	P	V
		5856.2	59.52	-50.94	110.46	47.81	34.6	12.28	35.17	216	121	P	V
		5901	51.32	-34.6	85.92	39.4	34.6	12.51	35.19	216	121	P	V
		5935.4	51.98	-16.22	68.2	40.07	34.6	12.51	35.2	216	121	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 4 5725~5850MHz

WIFI 802.11n HT20 (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		11490	47.33	-26.67	74	48.24	39.27	17.16	57.34	100	0	P	H
HT20		17232	44.62	-23.58	68.2	37.32	42.43	20.76	55.89	100	0	P	H
CH 149		11490	42.17	-31.83	74	43.08	39.27	17.16	57.34	100	0	P	V
5745MHz		17232	45.2	-23	68.2	37.9	42.43	20.76	55.89	100	0	P	V
802.11n		11570	47.56	-26.44	74	48.39	39.2	17.16	57.19	100	0	P	H
HT20		17352	44.54	-23.66	68.2	37.4	42.24	20.84	55.94	100	0	P	H
CH 157		11570	44.33	-29.67	74	45.16	39.2	17.16	57.19	100	0	P	V
5785MHz		17352	45.51	-22.69	68.2	38.37	42.24	20.84	55.94	100	0	P	V
802.11n		11650	48.9	-25.1	74	49.71	39.11	17.16	57.08	100	0	P	H
HT20		17472	45.29	-22.91	68.2	38.3	42.05	20.93	55.99	100	0	P	H
CH 165		11650	42.56	-31.44	74	43.37	39.11	17.16	57.08	100	0	P	V
5825MHz		17472	45.94	-22.26	68.2	38.95	42.05	20.93	55.99	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 4 5725~5850MHz

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)
		5647.8	52.69	-15.51	68.2	41.27	34.6	11.95	35.13	200	280	P	H
		5699	54.98	-49.48	104.46	43.52	34.6	12	35.14	200	280	P	H
		5715.8	66.8	-42.83	109.63	55.28	34.6	12.06	35.14	200	280	P	H
		5722.4	74.53	-41.74	116.27	63.01	34.6	12.06	35.14	200	280	P	H
	*	5755	104.46	-	-	92.9	34.6	12.11	35.15	200	280	P	H
	*	5755	97.26	-	-	85.7	34.6	12.11	35.15	200	280	A	H
		5854	50.57	-62.51	113.08	38.86	34.6	12.28	35.17	200	280	P	H
		5870	51.71	-54.89	106.6	39.9	34.6	12.39	35.18	200	280	P	H
802.11n		5891.2	51.78	-41.4	93.18	39.98	34.6	12.39	35.19	200	280	P	H
HT40		5945.6	51.2	-17	68.2	39.18	34.6	12.62	35.2	200	280	P	H
CH 151		5625	51.39	-16.81	68.2	39.96	34.6	11.95	35.12	200	122	P	V
5755MHz		5696.4	55.56	-46.99	102.55	44.1	34.6	12	35.14	200	122	P	V
		5715.4	68.04	-41.47	109.51	56.52	34.6	12.06	35.14	200	122	P	V
		5721.8	68.97	-45.93	114.9	57.45	34.6	12.06	35.14	200	122	P	V
	*	5755	106.76	-	-	95.2	34.6	12.11	35.15	200	122	P	V
	*	5755	98.96	-	-	87.4	34.6	12.11	35.15	200	122	A	V
		5850.4	50.52	-70.77	121.29	38.81	34.6	12.28	35.17	200	122	P	V
		5855.8	50.8	-59.78	110.58	39.09	34.6	12.28	35.17	200	122	P	V
		5894.2	52.1	-38.85	90.95	40.3	34.6	12.39	35.19	200	122	P	V
		5928	50.81	-17.39	68.2	38.89	34.6	12.51	35.19	200	122	P	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)
802.11n HT40 CH 159 5795MHz		5642	49.68	-18.52	68.2	38.26	34.6	11.95	35.13	196	280	P	H
		5687.4	52.72	-43.19	95.91	41.26	34.6	12	35.14	196	280	P	H
		5718.8	51.8	-58.66	110.46	40.28	34.6	12.06	35.14	196	280	P	H
		5723.4	50.59	-67.96	118.55	39.07	34.6	12.06	35.14	196	280	P	H
	*	5795	105.51	-	-	93.9	34.6	12.17	35.16	196	280	P	H
	*	5795	98.01	-	-	86.4	34.6	12.17	35.16	196	280	A	H
		5851	53.75	-66.17	119.92	42.04	34.6	12.28	35.17	196	280	P	H
		5859.2	56.84	-52.78	109.62	45.14	34.6	12.28	35.18	196	280	P	H
		5875.8	53.79	-50.82	104.61	41.98	34.6	12.39	35.18	196	280	P	H
		5941.2	51.32	-16.88	68.2	39.3	34.6	12.62	35.2	196	280	P	H
		5638.6	50.92	-17.28	68.2	39.5	34.6	11.95	35.13	201	121	P	V
		5699.2	50.55	-54.06	104.61	39.09	34.6	12	35.14	201	121	P	V
		5715	53.06	-56.34	109.4	41.54	34.6	12.06	35.14	201	121	P	V
		5725	50.58	-71.62	122.2	39.06	34.6	12.06	35.14	201	121	P	V
	*	5795	106.31	-	-	94.7	34.6	12.17	35.16	201	121	P	V
	*	5795	99.11	-	-	87.5	34.6	12.17	35.16	201	121	A	V
		5851.8	55.73	-62.37	118.1	44.02	34.6	12.28	35.17	201	121	P	V
		5856.4	56.69	-53.72	110.41	44.98	34.6	12.28	35.17	201	121	P	V
		5881.2	54.92	-45.67	100.59	43.11	34.6	12.39	35.18	201	121	P	V
		5932.6	52.5	-15.7	68.2	40.58	34.6	12.51	35.19	201	121	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 4 5725~5850MHz

WIFI 802.11n HT40 (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		11510	48.74	-25.26	74	49.58	39.3	17.16	57.3	100	0	P	H
HT40		17268	44.63	-23.57	68.2	37.38	42.37	20.79	55.91	100	0	P	H
CH 151		11505	44.44	-29.56	74	45.28	39.3	17.16	57.3	100	0	P	V
5755MHz		17268	43.94	-24.26	68.2	36.69	42.37	20.79	55.91	100	0	P	V
802.11n		11595	46	-28	74	46.82	39.18	17.16	57.16	100	0	P	H
HT40		17388	44.7	-23.5	68.2	37.59	42.19	20.87	55.95	100	0	P	H
CH 159		11590	42.44	-31.56	74	43.26	39.18	17.16	57.16	100	0	P	V
5795MHz		17385	44.67	-23.53	68.2	37.56	42.19	20.87	55.95	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 4 5725~5850MHz

WIFI 802.11ac VHT80 (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT80 CH 155 5775MHz		5644.2	51.02	-17.18	68.2	39.6	34.6	11.95	35.13	100	283	P	H
		5678.2	54.45	-34.66	89.11	42.98	34.6	12	35.13	100	283	P	H
		5715.8	59.71	-49.92	109.63	48.19	34.6	12.06	35.14	100	283	P	H
		5722.2	59.4	-56.42	115.82	47.88	34.6	12.06	35.14	100	283	P	H
	*	5775	99.02	30.82	-	-	34.6	12.11	35.16	100	283	P	H
	*	5775	91.15	37.15	-	-	34.6	12.11	35.16	100	283	A	H
		5855	56.63	-54.17	110.8	44.92	34.6	12.28	35.17	100	283	P	H
		5860.6	56.64	-52.59	109.23	44.83	34.6	12.39	35.18	100	283	P	H
		5877.4	52.48	-50.94	103.42	40.67	34.6	12.39	35.18	100	283	P	H
		5928	50.55	-17.65	68.2	38.63	34.6	12.51	35.19	100	283	P	H
		5646	51.12	-17.08	68.2	39.7	34.6	11.95	35.13	201	129	P	V
		5700	57.34	-47.86	105.2	45.88	34.6	12	35.14	201	129	P	V
		5719	60.62	-49.9	110.52	49.1	34.6	12.06	35.14	201	129	P	V
		5723	59.26	-58.38	117.64	47.74	34.6	12.06	35.14	201	129	P	V
	*	5775	102.02	33.82	-	-	34.6	12.11	35.16	201	129	P	V
	*	5775	94.29	40.29	-	-	34.6	12.11	35.16	201	129	A	V
		5852	57.57	-60.07	117.64	45.86	34.6	12.28	35.17	201	129	P	V
		5857.6	60.37	-49.7	110.07	48.66	34.6	12.28	35.17	201	129	P	V
		5877.4	52.94	-50.48	103.42	41.13	34.6	12.39	35.18	201	129	P	V
		5931	50.3	-17.9	68.2	38.38	34.6	12.51	35.19	201	129	P	V

Remark

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

Band 4 5725~5850MHz

WIFI 802.11ac VHT80 (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac		11550	43.94	-30.06	74	44.77	39.23	17.16	57.22	100	0	P	H
VHT80		17325	45.75	-22.45	68.2	38.58	42.29	20.81	55.93	100	0	P	H
CH 155		11550	42.03	-31.97	74	42.86	39.23	17.16	57.22	100	0	P	V
5775MHz		17325	44.67	-23.53	68.2	37.5	42.29	20.81	55.93	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Emission below 1GHz

5GHz WIFI 802.11n 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		30	27	-13	40	31.28	26	1.07	31.35	-	-	P	H
		207.66	26.19	-17.31	43.5	39.56	16.22	1.87	31.46	-	-	P	H
		264.9	26.6	-19.4	46	35.92	19.7	2.32	31.34	-	-	P	H
		781.6	30.37	-15.63	46	29.56	27.52	3.9	30.61	-	-	P	H
		829.2	32.33	-13.67	46	30.52	28.29	4.1	30.58	-	-	P	H
		957.3	33.09	-12.91	46	29.33	30.22	4.07	30.53	100	0	P	H
		40.53	31.14	-8.86	40	41.72	19.84	1.07	31.49	100	0	P	V
		213.06	20.43	-23.07	43.5	33.68	16.33	1.87	31.45	-	-	P	V
		256.8	23.65	-22.35	46	33.24	19.7	2.07	31.36	-	-	P	V
		815.2	30.9	-15.1	46	29.59	27.99	3.9	30.58	-	-	P	V
		871.2	32.06	-13.94	46	29.61	28.83	4.17	30.55	-	-	P	V
		946.8	33.15	-12.85	46	29.48	30.13	4.07	30.53	-	-	P	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

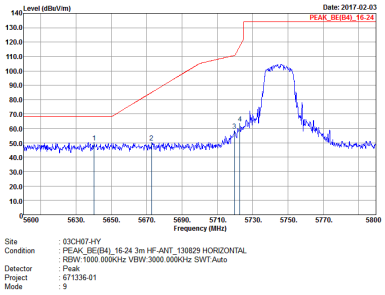
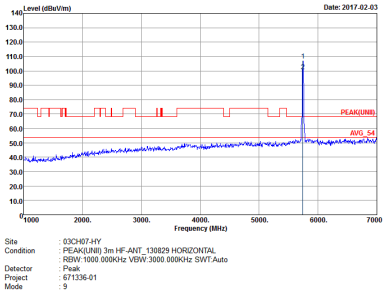
Test Engineer :	Jesse Wang, James Chiu and Daniel Lee	Temperature :	21~22°C
		Relative Humidity :	44~48%

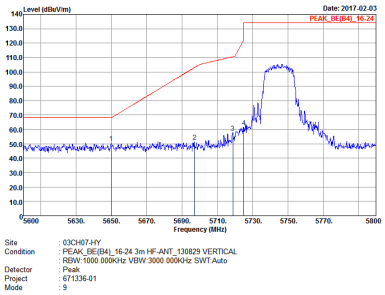
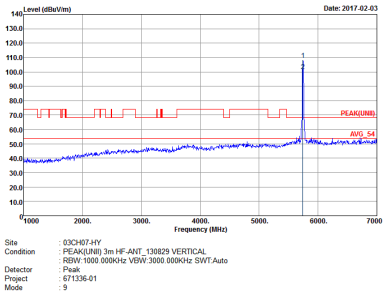
Note symbol

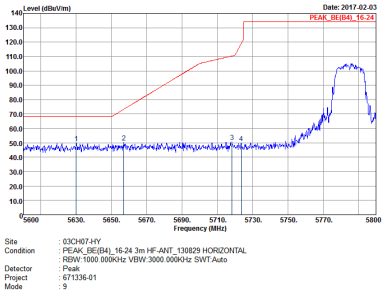
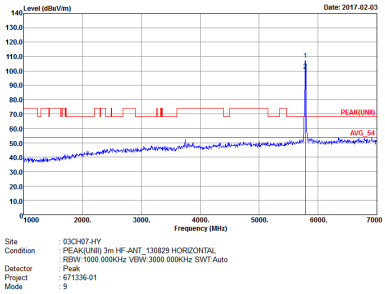
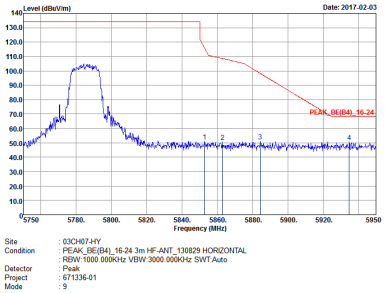
-L	**Low channel location**
-R	**High channel location**

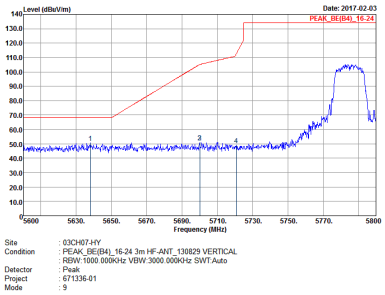
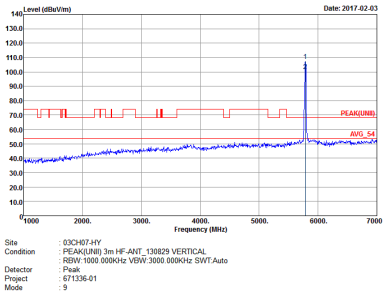
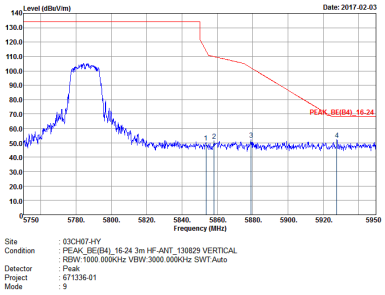
Band 4 - 5725~5850MHz

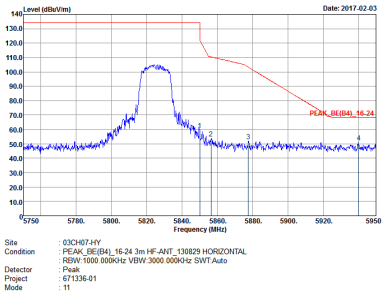
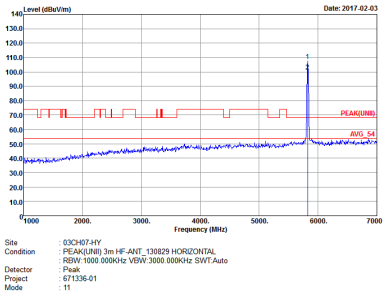
WIFI 802.11a (Band Edge @ 3m)

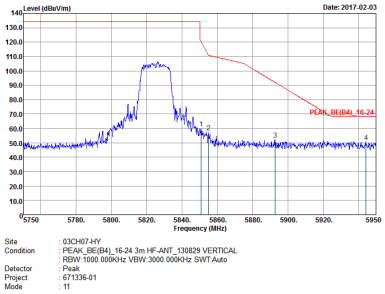
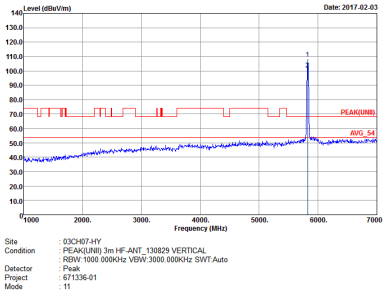
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH149 5745MHz	
1	Horizontal	Fundamental
Peak		

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

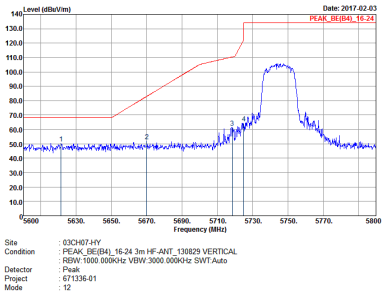
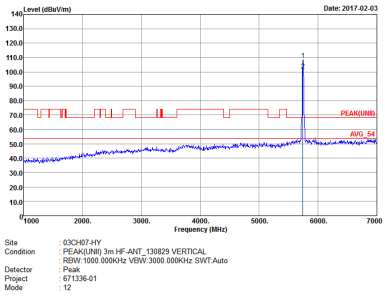
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH157 5785MHz	
1	Vertical	Fundamental
Peak		
Peak		Left blank

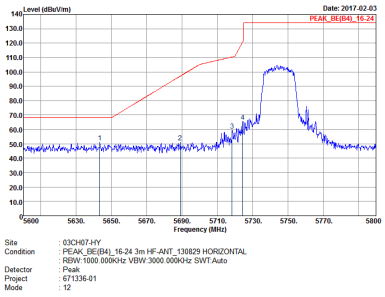
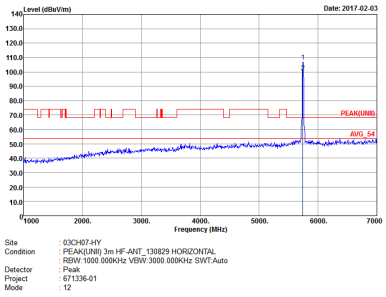
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH165 5825MHz	
1	Horizontal	Fundamental
Peak		

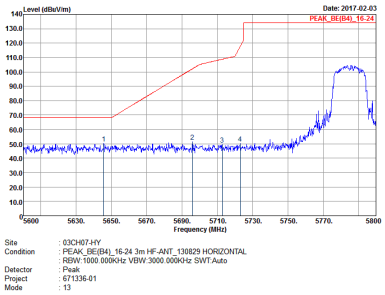
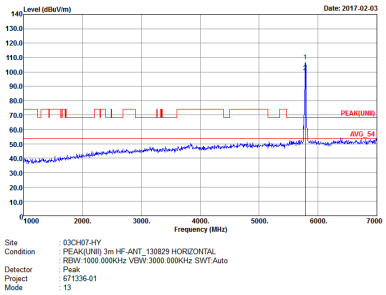
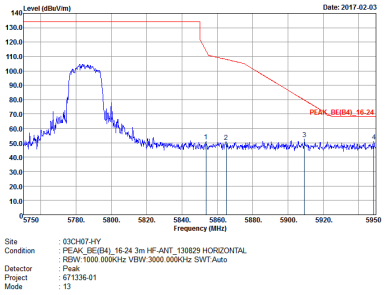
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH165 5825MHz	
1	Vertical	Fundamental
Peak		

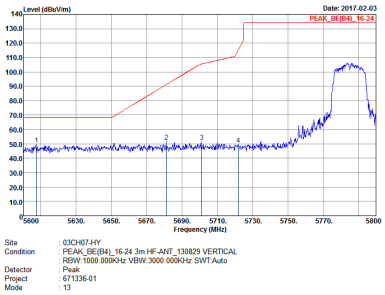
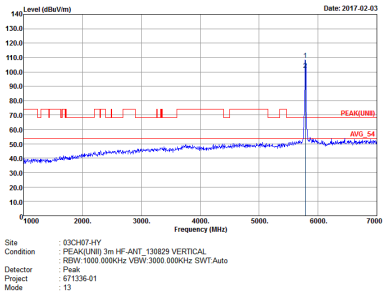
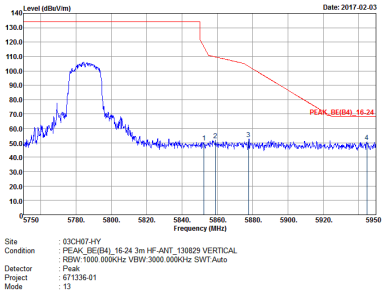
Band 4 5725~5850MHz

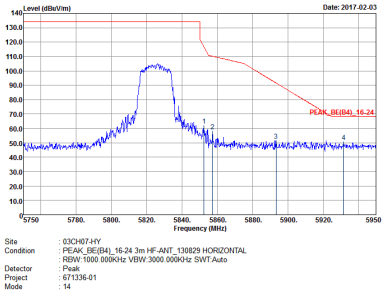
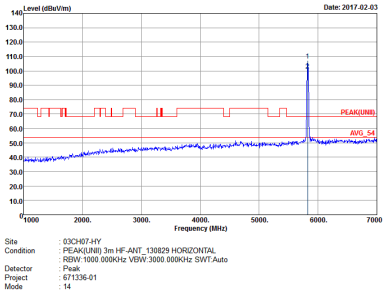
WIFI 802.11n HT20 (Band Edge @ 3m)

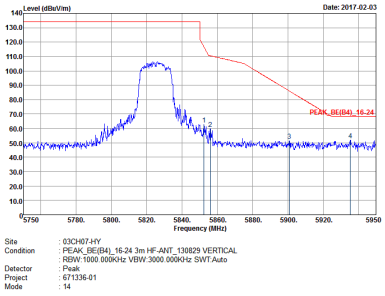
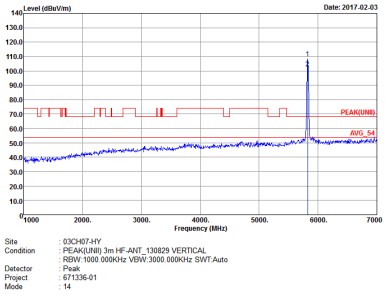
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT20 CH149 5745MHz	
1	Horizontal	Fundamental
Peak		

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

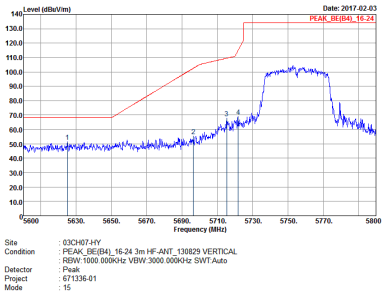
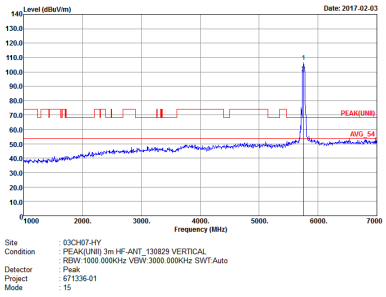
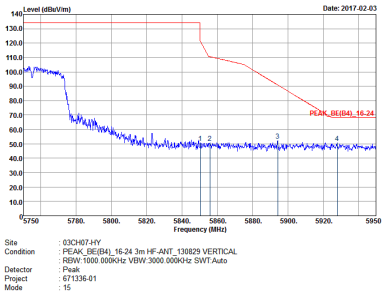
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT20 CH157 5785MHz	
1	Vertical	Fundamental
Peak		
Peak		Left blank

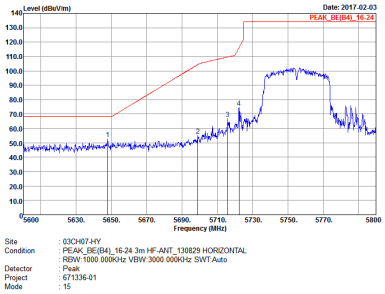
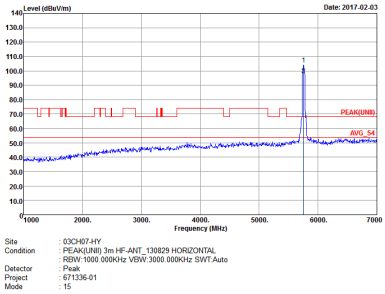
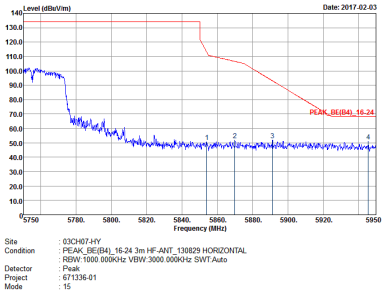
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT20 CH165 5825MHz	
1	Horizontal	Fundamental
Peak		

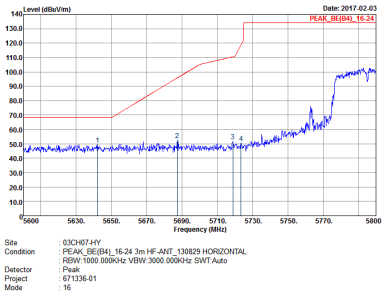
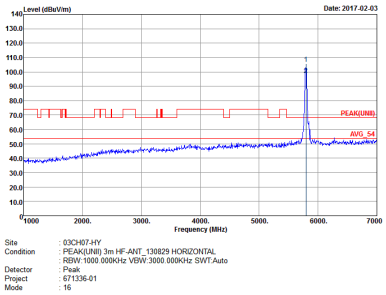
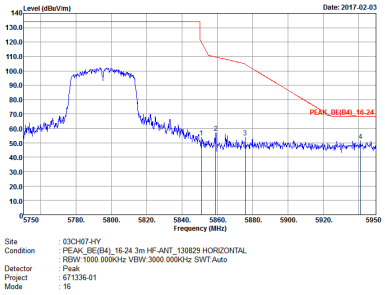
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT20 CH165 5825MHz	
1	Vertical	Fundamental
Peak		

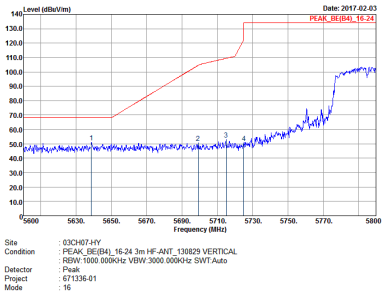
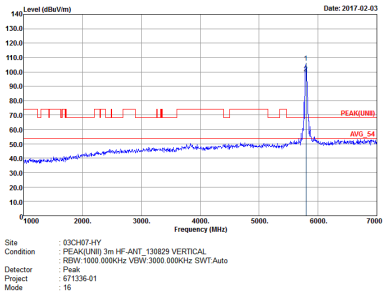
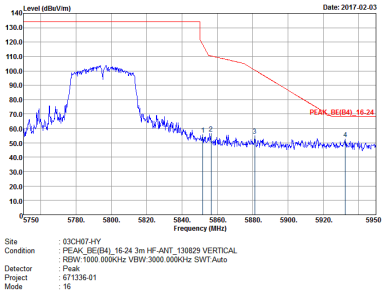
Band 4 5725~5850MHz

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

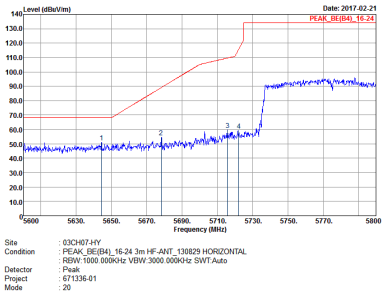
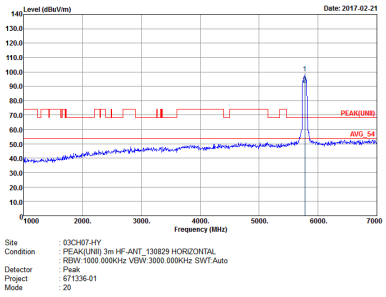
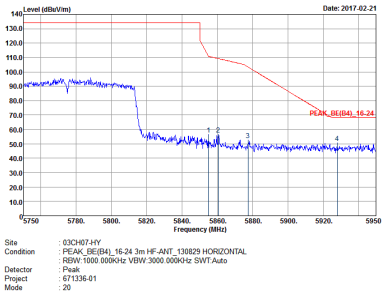
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT40 CH151 5755MHz	
1	Vertical	Fundamental
Peak		
Peak		Left blank

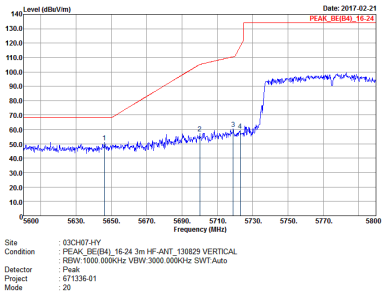
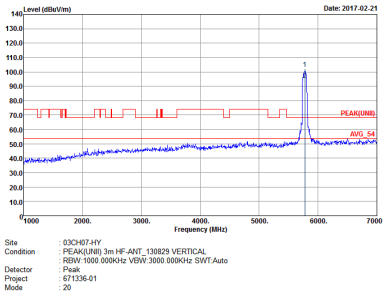
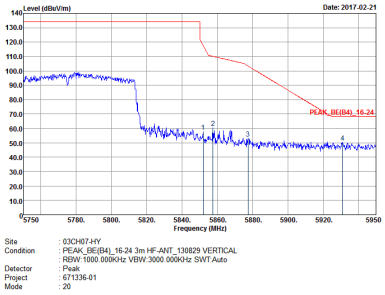
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT40 CH159 5795MHz	
1	Horizontal	Fundamental
Peak		
Peak		Left blank

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

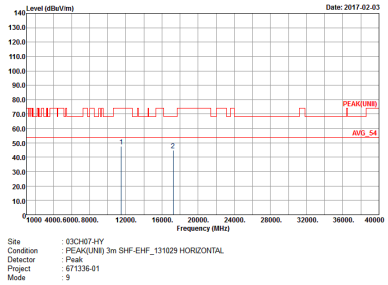
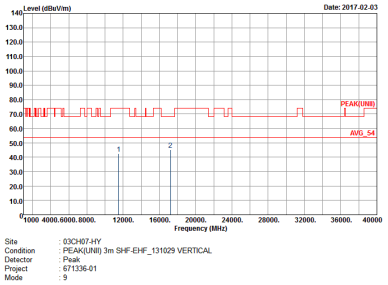
WIFI 802.11ac VHT80 (Band Edge @ 3m)

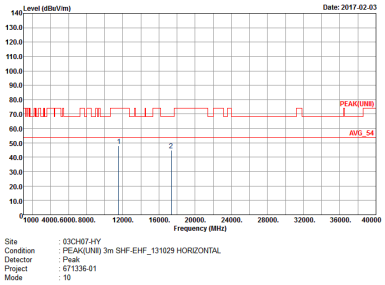
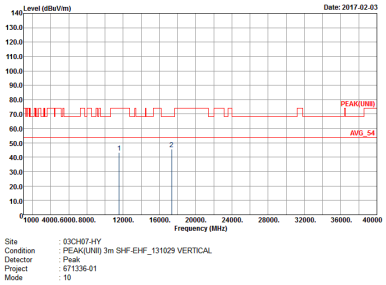
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ac VHT80 CH155 5775MHz	
1	Horizontal	Fundamental
Peak		
Peak		Left blank

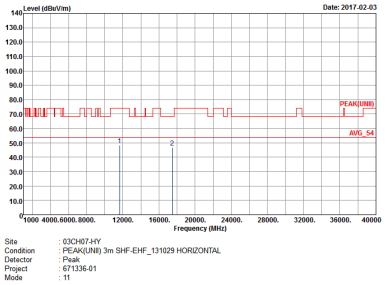
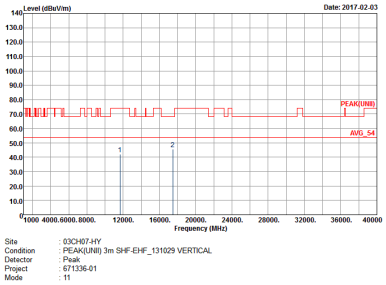
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ac VHT80 CH155 5775MHz	
1	Vertical	Fundamental
Peak		
Peak		Left blank

Band 4 - 5725~5850MHz

WIFI 802.11a (Harmonic @ 3m)

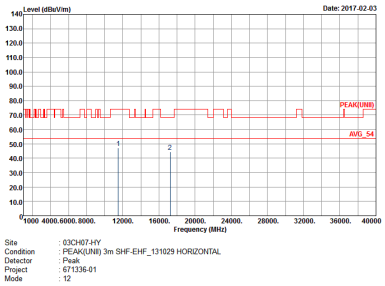
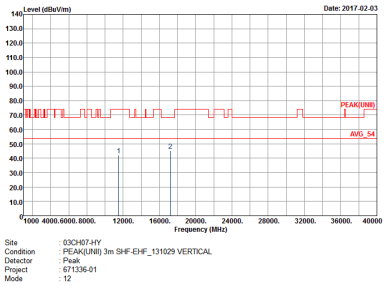
WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11a CH149 5745MHz	
1	Horizontal	Vertical
Peak Avg.		

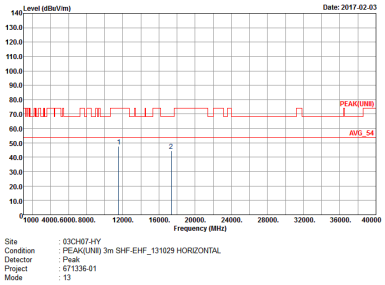
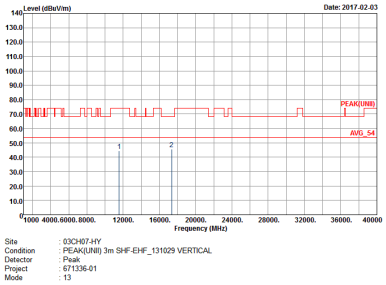
WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11a CH157 5785MHz	
1	Horizontal	Vertical
Peak Avg.		

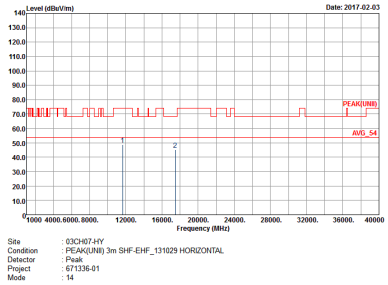
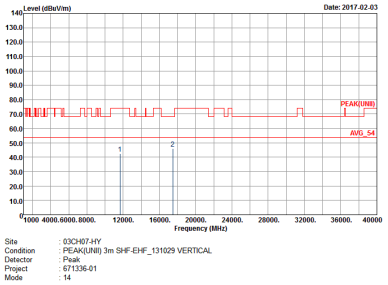
WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11a CH165 5825MHz	
1	Horizontal	Vertical
Peak Avg.		

Band 4 5725~5850MHz

WIFI 802.11n HT20 (Harmonic @ 3m)

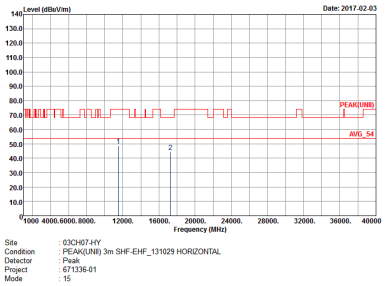
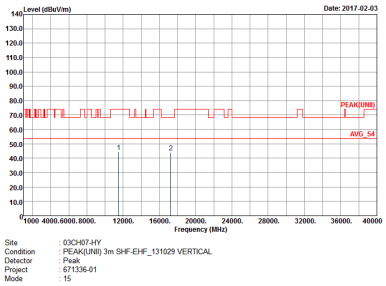
WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11n HT20 CH149 5745MHz	
1	Horizontal	Vertical
Peak Avg.		

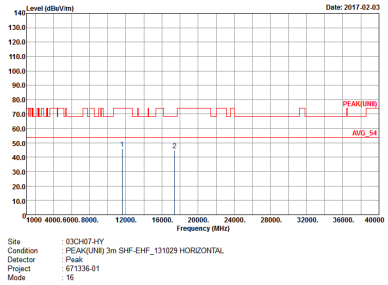
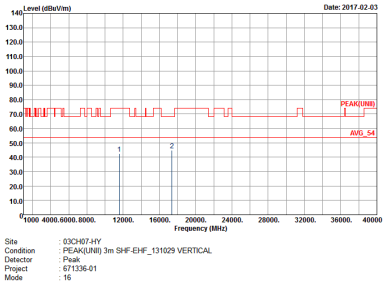
WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11n HT20 CH157 5785MHz	
1	Horizontal	Vertical
Peak Avg.		

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

Band 4 5725~5850MHz

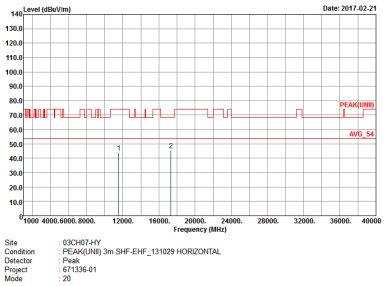
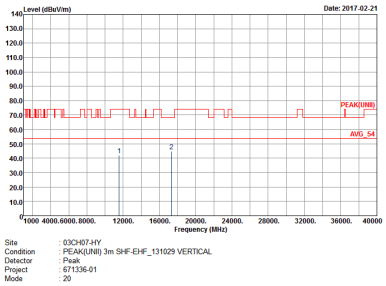
WIFI 802.11n HT40 (Harmonic @ 3m)

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.		

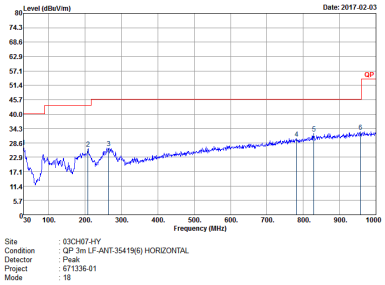
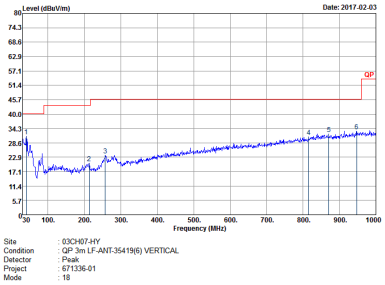
Band 4 5725~5850MHz

WIFI 802.11ac VHT80 (Harmonic @ 3m)

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

Emission below 1GHz

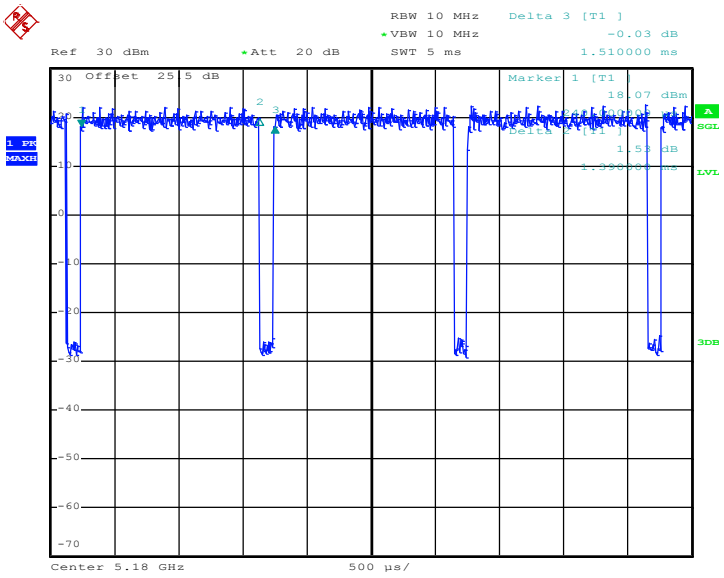
5GHz WIFI 802.11n HT40 (LF)

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

Appendix D. Duty Cycle Plots

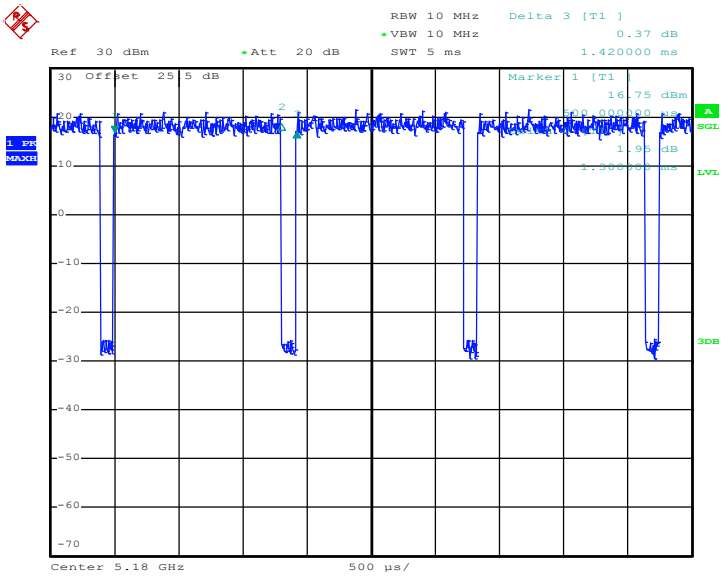
Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting
802.11a	92.05	1390.00	0.72	1kHz
5GHz 802.11n HT20	91.55	1300.00	0.77	1kHz
5GHz 802.11n HT40	85.71	648.00	1.54	3kHz
5GHz 802.11ac VHT80	74.07	320.00	3.13	10kHz

802.11a



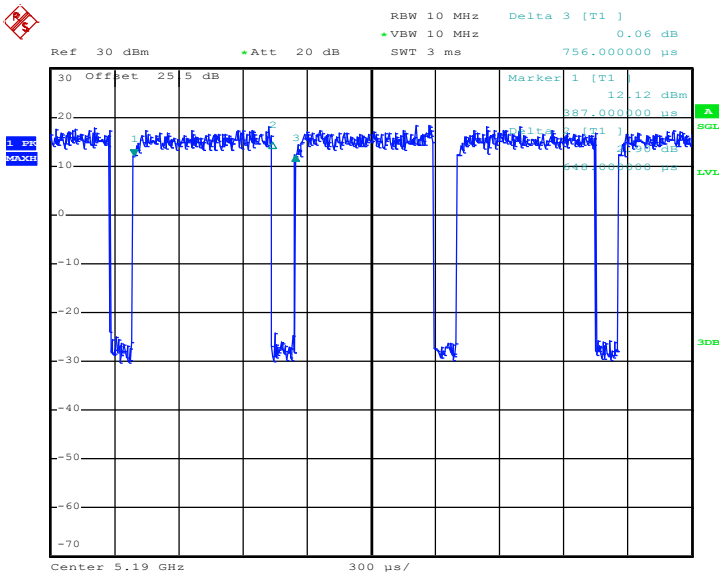
Date: 25.JAN.2017 14:29:07

802.11n HT20



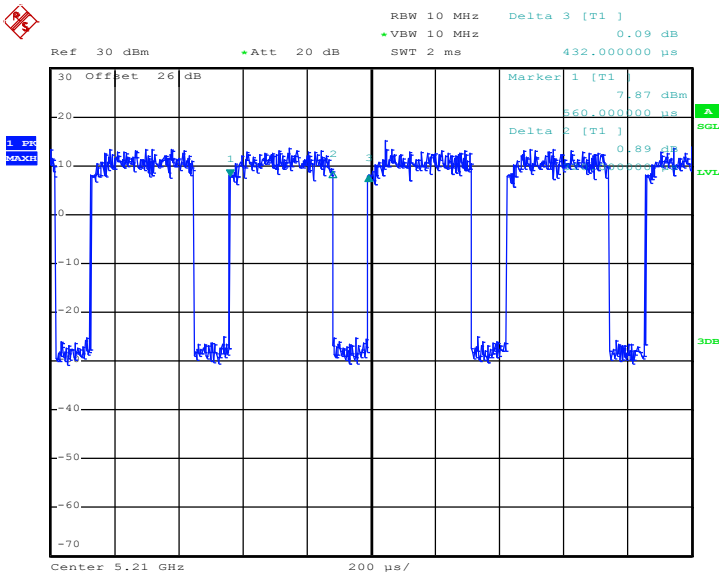
Date: 25.JAN.2017 14:58:01

802.11n HT40



Date: 25.JAN.2017 15:10:21

802.11ac VHT80



Date: 14.FEB.2017 22:32:49