FCC RADIO TEST REPORT

FCC ID	**:**	**Z64-CC3235MOD**
Equipment	**:**	**Dual-Band Wi-Fi® Module**
Brand Name	**:**	**Texas Instruments**
Model Name	**:**	**CC3235MODSM2MOB, CC3235MODSF12MOB**
Marketing Name	**:**	**SimpleLink™ Wi-Fi® CC3235MOD Dual-Band Wireless Microcontroller Module**
Applicant	**:**	**Texas Instruments Incorported 12500 TI BLVD., Dallas Texas, 75243**
Manufacturer	**:**	**Texas Instruments Incorported 12500 TI BLVD., Dallas Texas, 75243**
Standard	**:**	**FCC Part 15 Subpart E §15.407**

The product was received on Dec. 19, 2018 and testing was started from May 16, 2019 and completed on Jun. 28, 2019. We, SPORTON INTERNATIONAL INC., EMC & Wireless Communications Laboratory, 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 report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

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

Approved by: Jones Tsai

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory
No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)

Table of Contents

History of this test report

Report No.	Version	Description	Issued Date
FR8D1930B	01	Initial issue of report	Jul. 19, 2019

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	15.403(i)	26dB Bandwidth	Pass	-
3.1	2.1049	99% Occupied Bandwidth	Reporting only	-
3.2	15.407(a)	Maximum Conducted Output Power	Pass	-
3.3	15.407(a)	Power Spectral Density	Pass	-
3.4	15.407(b)	Unwanted Emissions	Pass	Under limit 0.68 dB at 97.90 MHz
3.5	15.207	AC Conducted Emission	Pass	Under limit 20.88 dB at 0.15225 MHz
3.6	15.407(c)	Automatically Discontinue Transmission	Pass	-
3.7	15.203 15.407(a)	Antenna Requirement	Pass	-

Declaration of Conformity:
The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.
Comments and Explanations:
The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

Reviewed by: Wii Chang
Report Producer: Yimin Ho

1 General Description

1.1 Product Feature of Equipment Under Test

Wi-Fi 2.4GHz 802.11b/g/n and Wi-Fi 5GHz 802.11a

Antenna Information					
	Antenna Type	Brand Name	Model	2.4GHz Gain(dBi)	5GHz Gain(dBi)
1.	Chip	Pulse	W3078	1.7	4.3
2.		Yageo	ANT5320LL04R2455A	2.17	3.51
3.		Ethertronics	M830520	1	2.6
4.	PCB		1000423	-0.6	4.5
5.		Laird	CAF94504	2	4
6.			CAF94505	2	4
7.	Dipole	LSR	001-0012	2	2
8.			080-0013	2	2
9.			080-0014	2	2
10.	PIFA		001-0016	2.5	3
11.			001-0021	2.5	3
Note: The EUT used a dual-band chip antenna (Antenna 3 from Ethertronics)					

1.2 Modification of EUT

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

1.3 Testing Location

Test Site	SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory	
Test Site Location	No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan 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

Test Site	SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory
Test Site Location	No. 58, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978
Test Site No.	**Sporton Site No.**
	03CH15-HY

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

FCC designation No.: TW1190 and TW0007

1.4 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 v02r01.
- FCC KDB 414788 D01 Radiated Test Site v01r01.
- ANSI C63.10-2013

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

a. 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: conduction emission (150 kHz to 30 MHz), radiation 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.

b. AC power line Conducted Emission was tested under maximum output power.

2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5150-5250 MHz Band 1 (U-NII-1)	36	5180	44	5220
	40	5200	48	5240

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5250-5350 MHz Band 2 (U-NII-2A)	52	5260	60	5300
	56	5280	64	5320

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5470-5725 MHz Band 3 (U-NII-2C)	100	5500	116	5580
	104	5520	132	5660
	108	5540	136	5680
	112	5560	140	5700

2.2 Test Mode

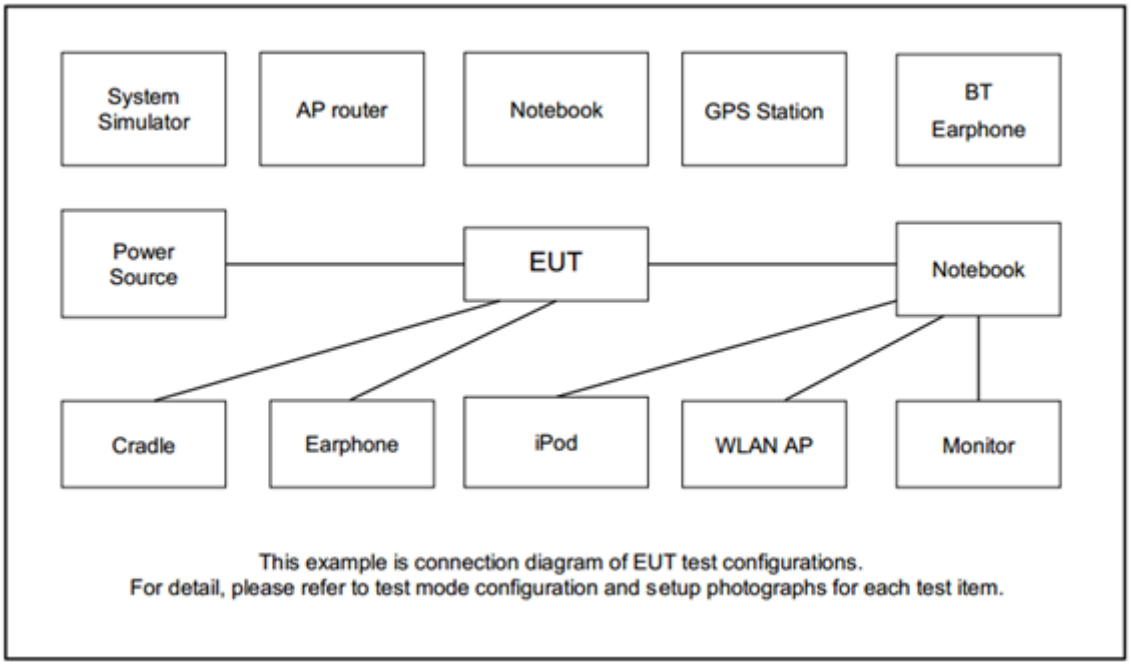
Final test modes are considering the modulation and worse data rates as below table.

Modulation	Data Rate
802.11a	6 Mbps

Test Cases	
AC Conducted Emission	Mode 1 : WLAN (5GHz) Link + USB Cable (Charging from Notebook)

Ch. #		Band I：5150-5250 MHz	Band II：5250-5350 MHz	Band III：5470-5725MHz
		802.11a	802.11a	802.11a
L	Low	36	52	100
M	Middle	44	60	116
H	High	48	64	140

2.3 Connection Diagram of Test System



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,1.8m
2.	Notebook	Dell	Latitude E3340	FCC DoC	N/A	AC I/P：Unshielded, 1.2m DC O/P：Shielded, 1.8m
3.	Notebook	Lenovo	L570	FCC DoC	N/A	AC I/P：Unshielded, 1.2m DC O/P：Shielded, 1.8m
4.	iPod	Apple	A1285	DoC	Shielded, 1.0m	N/A

2.5 EUT Operation Test Setup

The RF test items, utility “CC31XX/CC32XX Radio Tool v1.0.3.10” was installed in Notebook which was programmed in order to make the EUT get into the engineering modes to provide channel selection, power level, data rate and the application type and for continuous transmitting 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 2.40 dB and 10.00dB attenuator.

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

= 2.40 + 10.00 = 12.40(dB)

3 Test Result

3.1 26dB & 99% Occupied Bandwidth Measurement

3.1.1 Description of 26dB & 99% Occupied Bandwidth

This section is for reporting purpose only.

There is no restriction limits for bandwidth.

3.1.2 Measuring Instruments

See list of measuring equipment of this test report.

3.1.3 Test Procedures

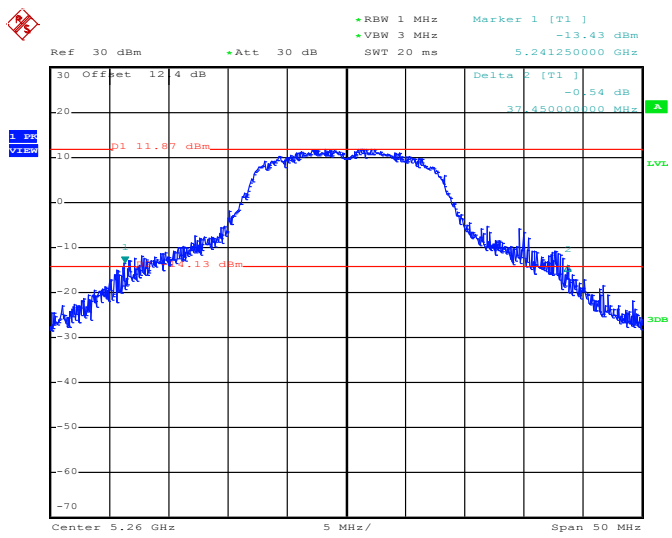
1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01. Section C) Emission bandwidth
2. Set RBW = approximately 1% of the emission bandwidth.
3. Set the VBW > RBW.
4. Detector = Peak.
5. Trace mode = max hold
6. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.
7. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) is set 1-5% of the emission bandwidth and set the Video bandwidth (VBW) ≥ 3 * RBW.
8. Measure and record the results in the test report.

3.1.4 Test Setup

3.1.5 Test Result of 26dB & 99% Occupied Bandwidth

Please refer to Appendix A.

Maximum 26dB Bandwidth



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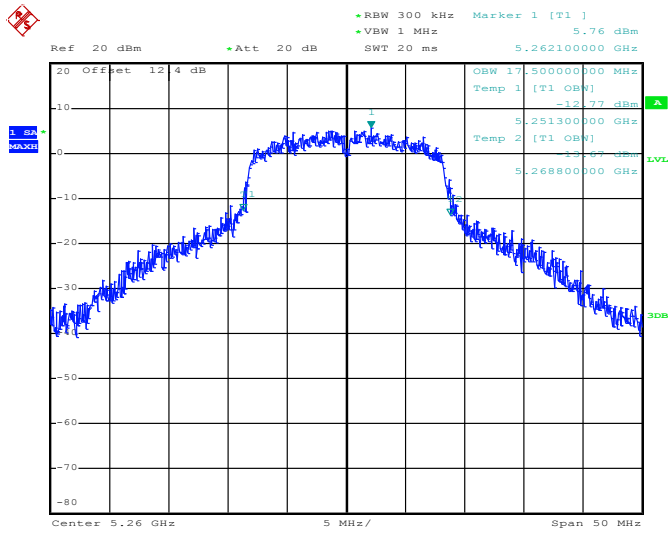
Maximum 99% Occupied Bandwidth



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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

<FCC 14-30 CFR 15.407>

For the 5.15–5.25 GHz bands:

■ For mobile and portable client devices in the 5.15–5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW. For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

For the 5.25–5.725 GHz bands:

■ The maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm 10 log B, where B is the 26 dB emission bandwidth in megahertz.

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

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

3.2.2 Measuring Instruments

See list of measuring equipment of this test report.

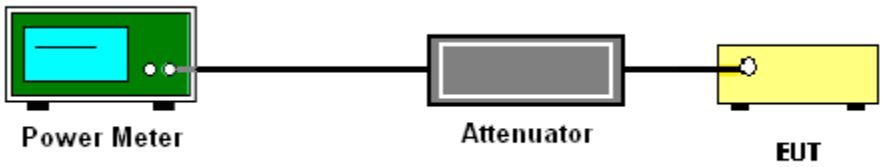
3.2.3 Test Procedures

The testing follows Method PM-G of FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.

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

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

3.2.4 Test Setup



3.2.5 Test Result of Maximum Conducted Output Power

Please refer to Appendix A.

3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

<FCC 14-30 CFR 15.407>

For the 5.15–5.25 GHz bands:

For mobile and portable client devices in the 5.15–5.25 GHz band, the maximum power spectral density shall not exceed 11 dBm in any 1.0 MHz band. For an indoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1.0 MHz band.

For the 5.25–5.725 GHz bands:

The maximum power spectral density shall not exceed 11 dBm in any 1.0 MHz 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

See list of measuring equipment of this test report.

3.3.3 Test Procedures

The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.

Section F) Maximum power spectral density.

 # Method SA-3 #

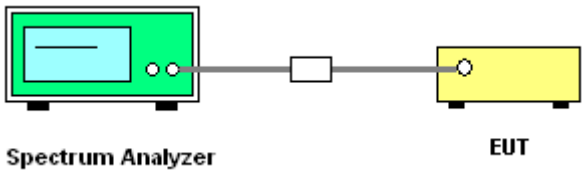
(power averaging (rms) detection with max hold):

- Set span to encompass the entire emission bandwidth (EBW) of the signal.
- Set RBW = 1 MHz.
- Set VBW ≥ 3 MHz
- Number of points in sweep ≥ 2 Span / RBW.
- Sweep time ≤ (number of points in sweep) × T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.
- Detector = power averaging (rms).
- Trace mode = max hold.

Allow max hold to run for at least 60 seconds, or longer as needed to allow the trace to stabilize.

1. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
2. Each plot has already offset with cable loss, and attenuator loss. Measure the PPSD and record it.

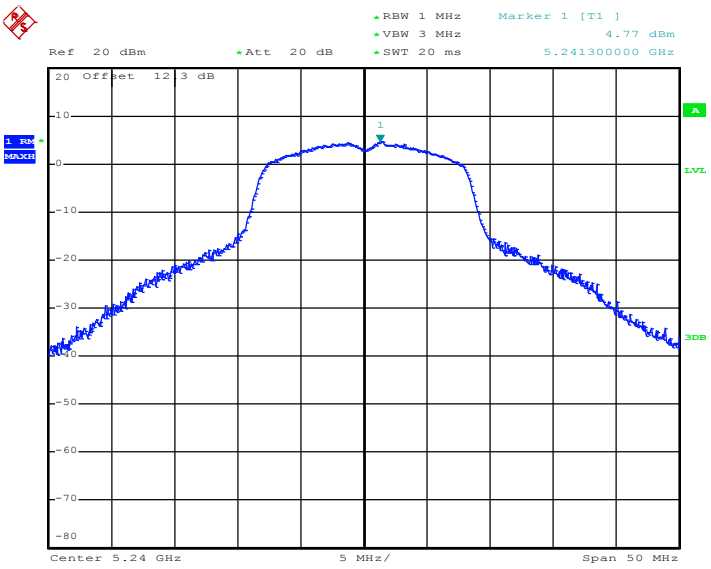
3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.

Worst Case Power Density (dBm/MHz)



3.4 Unwanted Emissions Measurement

This section is to measure unwanted emissions through radiated measurement for band edge spurious emissions and out of band emissions measurement.

3.4.1 Limit of Unwanted Emissions

(1) For transmitters operating in the 5150-5250 MHz band: all emissions outside of the 5150-5350 MHz band shall not exceed an EIRP of –27dBm/MHz.

For transmitters operating in the 5250-5350 MHz band: all emissions outside of the 5150-5350 MHz band shall not exceed an EIRP of -27 dBm/MHz. Devices operating in the 5250-5350 MHz band that generate emissions in the 5150-5250 MHz band must meet all applicable technical requirements for operation in the 5150-5250 MHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5150-5250 MHz band.

For transmitters operating in the 5470-5600 MHz and 5650-5725MHz band: all emissions outside of the 5470-5600 MHz and 5650-5725MHz band shall not exceed an EIRP of -27 dBm/MHz.

(2) Unwanted spurious emissions fallen in restricted bands shall comply with the general field strength limits 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)
- 27	68.3

(3) KDB789033 D02 v02r01 G)2)c)

(i) Section 15.407(b)(1) to (b)(3) specify the unwanted emission limits for the U-NII-1 and U-NII-2 bands. As specified, emissions above 1000 MHz that are outside of the restricted bands are subject to a peak emission limit of -27 dBm/MHz.3

(ii) Section 15.407(b)(4) specifies the unwanted emission limit for the U-NII-3 band. A band emissions mask is specified in Section 15.407(b)(4)(i). The emission limits are in terms of a Peak detector. An alternative to the band emissions mask is specified in Section 15.407(b)(4)(ii). The alternative limits are based on the highest antenna gain specified in the filing. There are also marketing and importation restrictions for the devices using the alternative limit.[4]

Note 3: An out-of-band emission that complies with both the average and peak limits of Section 15.209 is not required to satisfy the -27 dBm/MHz peak emission limit.

Note 4: Only devices with antenna gains of 10 dBi or less may be approved using the emission limits specified in Section 15.247(d) till March 2, 2018; all other devices operating in this band must use the mask specified in Section 15.407(b)(4)(i).

3.4.2 Measuring Instruments

See list of measuring equipment of this test report.

3.4.3 Test Procedures

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01. 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

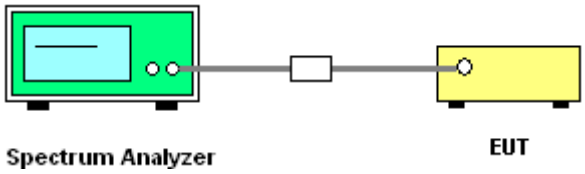
(3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz

- 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.

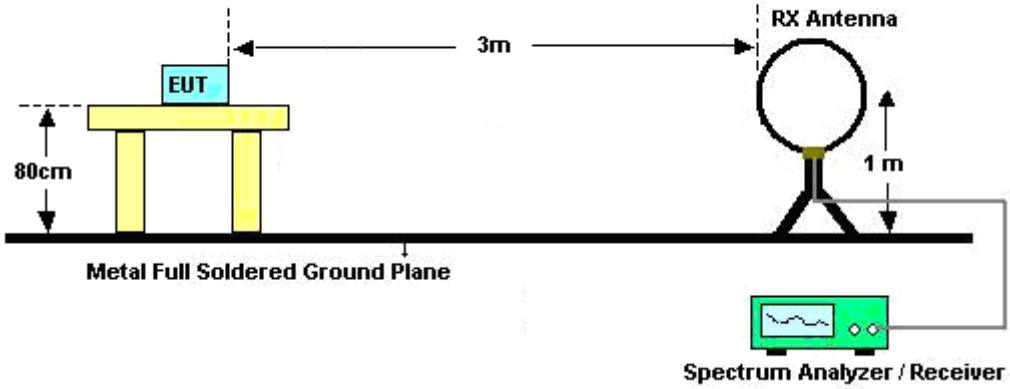
2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband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

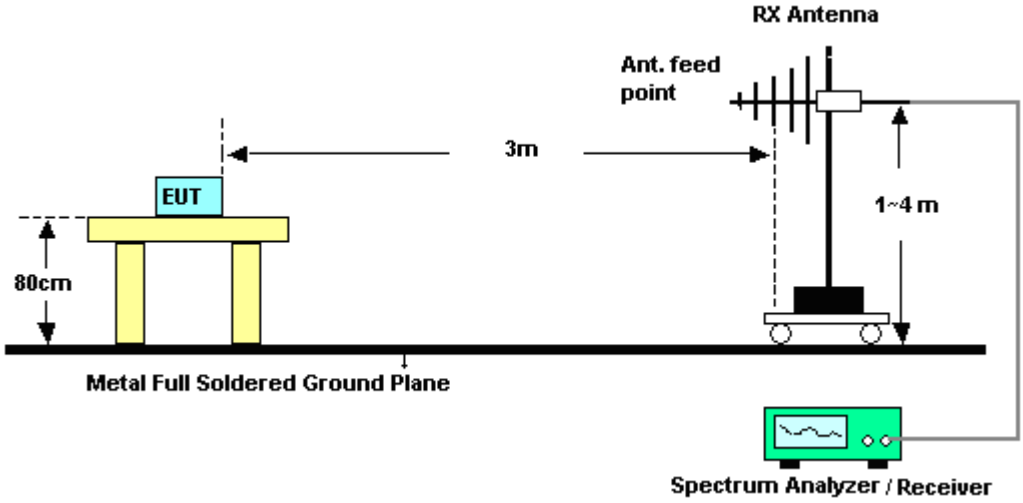
For Conducted Measurement Setup:



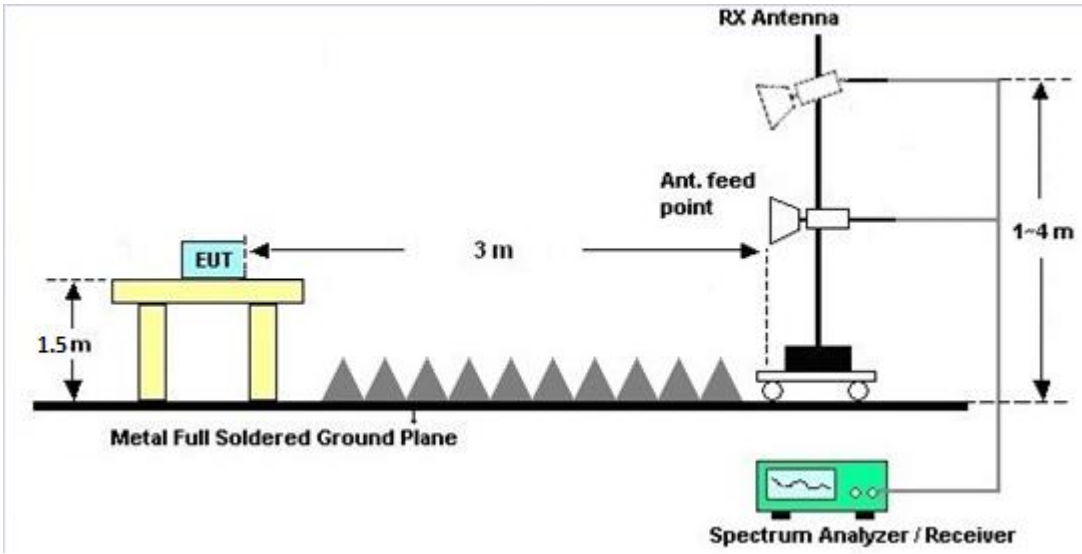
For radiated emissions below 30MHz



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 was not reported.

There is a comparison data of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result came out very similar.

3.4.6 Test Result of Conduced Spurious at Band Edges in the Restricted Band

Please refer to Appendix C and D.

3.4.7 Test Result of Conduced Spurious Emission in the Restricted Band

Please refer to Appendix C and D.

3.4.8 Test Result of Cabinet Radiated Spurious at Band Edges

Please refer to Appendix E and F.

3.4.9 Test Result of Cabinet Radiated Spurious Emissions (30MHz ~ 10th Harmonic)

Please refer to Appendix E and F.

3.4.10 Duty Cycle

Please refer to Appendix G.

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.

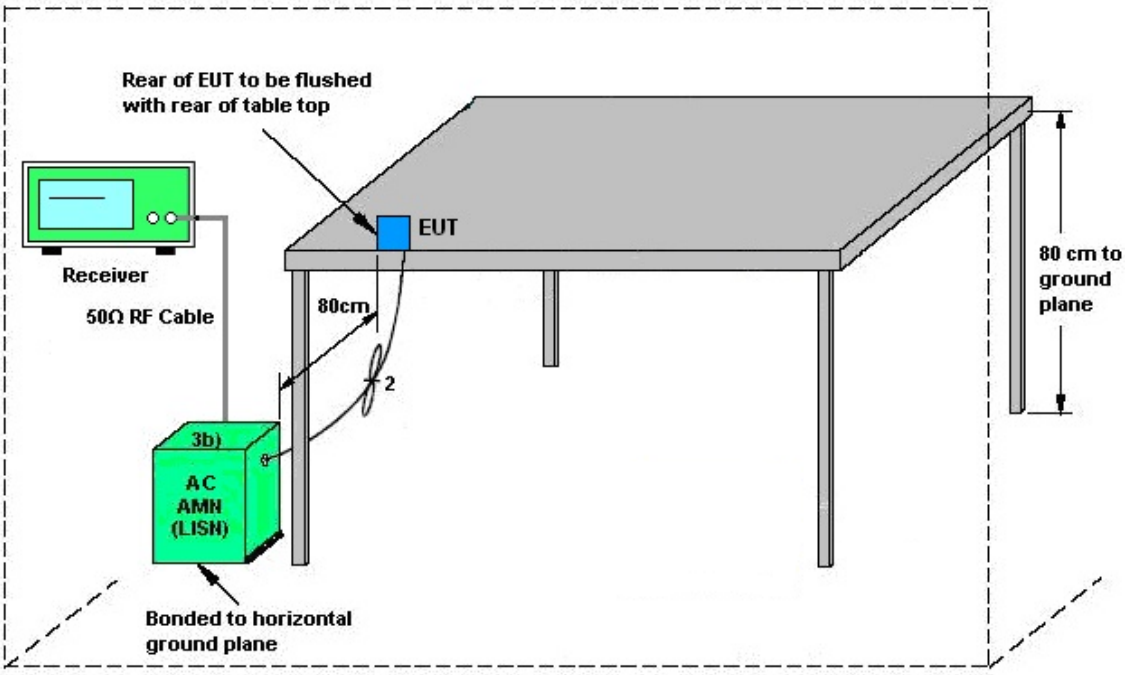
3.5.2 Measuring Instruments

See list of measuring equipment 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

Please refer to Appendix B.

3.6 Automatically Discontinue Transmission

3.6.1 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.

3.6.2 Measuring Instruments

See list of measuring equipment of this test report.

3.6.3 Test Result of Automatically Discontinue Transmission

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

3.7 Antenna Requirements

3.7.1 Standard Applicable

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.

3.7.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.7.3 Antenna Gain

The antenna peak gain of EUT 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
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~30 MHz	Jan. 07, 2019	Jun. 20, 2019~ Jun. 28, 2019	Jan. 06, 2020	Radiation (03CH15-HY)
Bilog Antenna	TESEQ	CBL6111D&00800N1D01N-06	41912&05	30MHz to 1GHz	Feb. 12, 2019	Jun. 20, 2019~ Jun. 28, 2019	Feb. 11, 2020	Radiation (03CH15-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-1620	1G~18GHz	Oct. 17, 2018	Jun. 20, 2019~ Jun. 28, 2019	Oct. 16, 2019	Radiation (03CH15-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170584	18GHz- 40GHz	Dec. 05, 2018	Jun. 20, 2019~ Jun. 28, 2019	Dec. 04, 2019	Radiation (03CH15-HY)
Amplifier	SONOMA	310N	363440	9kHz~1GHz	Dec. 28, 2018	Jun. 20, 2019~ Jun. 28, 2019	Dec. 27, 2019	Radiation (03CH15-HY)
Preamplifier	Jet-Power	JPA0118-55-303	17100018000550006	1GHz~18GHz	Jul. 10, 2018	Jun. 20, 2019~ Jun. 28, 2019	Jul. 09, 2019	Radiation (03CH15-HY)
Preamplifier	Keysight	83017A	MY53270195	1GHz~26.5GHz	Aug. 23, 2018	Jun. 20, 2019~ Jun. 28, 2019	Aug. 22, 2019	Radiation (03CH15-HY)
Preamplifier	EMEC	EM18G40G	060715	18GHz ~ 40GHz	Dec. 06, 2018	Jun. 20, 2019~ Jun. 28, 2019	Dec. 05, 2019	Radiation (03CH15-HY)
EMI Test Receiver	Keysight	N9038A (MXE)	MY54130085	20Hz ~ 8.4GHz	Nov. 01, 2018	Jun. 20, 2019~ Jun. 28, 2019	Oct. 31, 2019	Radiation (03CH15-HY)
Spectrum Analyzer	Agilent	E4446A	MY50180136	3Hz~44GHz	Apr. 29, 2019	Jun. 20, 2019~ Jun. 28, 2019	Apr. 28, 2020	Radiation (03CH15-HY)
Antenna Mast	ChainTek	MBS-520-1	N/A	1m~4m	N/A	Jun. 20, 2019~ Jun. 28, 2019	N/A	Radiation (03CH15-HY)
Turn Table	ChainTek	T-200-S-1	N/A	0~360 Degree	N/A	Jun. 20, 2019~ Jun. 28, 2019	N/A	Radiation (03CH15-HY)
Software	Audix	E3 6.2009-8-24(k5)	RK-000451	N/A	N/A	Jun. 20, 2019~ Jun. 28, 2019	N/A	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY36980/4	30M-18G	Apr. 15, 2019	Jun. 20, 2019~ Jun. 28, 2019	Apr. 14, 2020	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY9838/4	30M-18G	Apr. 15, 2019	Jun. 20, 2019~ Jun. 28, 2019	Apr. 14, 2020	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY802430/4	30M~18GHz	May 13, 2019	Jun. 20, 2019~ Jun. 28, 2019	May 12, 2020	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	MY2859/2	30MHz-40GHz	Mar. 13, 2019	Jun. 20, 2019~ Jun. 28, 2019	Mar. 12, 2020	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	MY4274/2	30MHz-40GHz	Mar. 13, 2019	Jun. 20, 2019~ Jun. 28, 2019	Mar. 12, 2020	Radiation (03CH15-HY)
Filter	Wainwright	WLK4-1000-1530-8000-40SS	SN11	1G Low Pass	Sep. 16, 2018	Jun. 20, 2019~ Jun. 28, 2019	Sep. 15, 2019	Radiation (03CH15-HY)
Filter	Wainwright	WHKX8-5872.5-6750-18000-40ST	SN3	6.75 GHz Highpass	Sep. 16, 2018	Jun. 20, 2019~ Jun. 28, 2019	Sep. 15, 2019	Radiation (03CH15-HY)

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Power Sensor	DARE	RPR3006W	13I00030SNO32	9kHz~6GHz	Dec. 03, 2018	Jun. 05, 2019~ Jun. 27, 2019	Dec. 02, 2019	Conducted (TH05-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP40	100057	9kHz-40GHz	Nov. 21, 2018	Jun. 05, 2019~ Jun. 27, 2019	Nov. 20, 2019	Conducted (TH05-HY)
Switch Box & RF Cable	Burgeon	ETF-058	EC1208382	N/A	Mar. 27, 2019	Jun. 05, 2019~ Jun. 27, 2019	Mar. 26, 2020	Conducted (TH05-HY)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	May 16, 2019	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102388	9KHz~3.6GHz	Nov. 12, 2018	May 16, 2019	Nov. 11, 2019	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Nov. 14, 2018	May 16, 2019	Nov. 13, 2019	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100081	9kHz~30MHz	Nov. 09, 2018	May 16, 2019	Nov. 08, 2019	Conduction (CO05-HY)
Software	Rohde & Schwarz	EMC32 V10.30	N/A	N/A	N/A	May 16, 2019	N/A	Conduction (CO05-HY)
LF Cable	HUBER + SUHNER	RG-214/U	LF01	N/A	Dec. 31, 2018	May 16, 2019	Dec. 30, 2019	Conduction (CO05-HY)
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100851	N/A	Dec. 31, 2018	May 16, 2019	Dec. 30, 2019	Conduction (CO05-HY)

5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.2dB**

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

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

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

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

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

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

Appendix A. Test Result of Conducted Test Items

Test Engineer:	Leo Lee	Temperature:	21~25	°C
Test Date:	2019/6/5~2019/6/27	Relative Humidity:	51~54	%

Report Number : FR8D1930B

TEST RESULTS DATA
26dB and 99% OBW

Band I														
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Bandwidth (MHz)		26 dB Bandwidth (MHz)		IC 99% Bandwidth Power Limit (dBm)		IC 99% Bandwidth EIRP Limit (dBm)			Note
					Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2		
11a	6Mbps	1	36	5180	16.65	-	34.50	-	-		22.21	-		
11a	6Mbps	1	44	5220	17.45	-	37.15	-	-		22.42	-		
11a	6Mbps	1	48	5240	17.45	-	36.65	-	-		22.42	-		

Report Number : FR8D1930B

TEST RESULTS DATA
Average Power Table

FCC Band I													
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Conducted Power (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)			Pass/Fail
					Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2		
11a	6Mbps	1	36	5180	12.50	-		24.00	-	4.50	-		Pass
11a	6Mbps	1	44	5220	14.30	-		24.00	-	4.50	-		Pass
11a	6Mbps	1	48	5240	13.60	-		24.00	-	4.50	-		Pass

TEST RESULTS DATA
Power Spectral Density

FCC Band I													
Mod.	Data Rate	N_{TX}	CH.	Freq. (MHz)	Average Power Density (dBm/MHz)			Average PSD Limit (dBm/MHz)		DG (dBi)			Pass /Fail
					Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2		
11a	6Mbps	1	36	5180	2.70	-		11.00	-	4.50	-		Pass
11a	6Mbps	1	44	5220	4.57	-		11.00	-	4.50	-		Pass
11a	6Mbps	1	48	5240	4.77	-		11.00	-	4.50	-		Pass

Report Number : FR8D1930B

TEST RESULTS DATA
26dB and 99% OBW

Band II															
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Bandwidth (MHz)		26 dB Bandwidth (MHz)		IC 99% Bandwidth Power Limit (dBm)		IC 99% Bandwidth EIRP Limit (dBm)		FCC 26dB Bandwidth Power Limit (dBm)		Note
					Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	
11a	6Mbps	1	52	5260	17.50	-	37.45	-	23.43	-	29.43	-	23.98	-	
11a	6Mbps	1	60	5300	16.55	-	28.55	-	23.19	-	29.19	-	23.98	-	
11a	6Mbps	1	64	5320	16.55	-	27.75	-	23.19	-	29.19	-	23.98	-	

Report Number : FR8D1930B

TEST RESULTS DATA
Average Power Table

FCC Band II													
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Conducted Power (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)		EIRP Power Limit (dBm)	Pass/Fail
					Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2		
11a	6Mbps	1	52	5260	13.60	-		23.98	-	4.50	-	26.99	Pass
11a	6Mbps	1	60	5300	11.50	-		23.98	-	4.50	-	26.99	Pass
11a	6Mbps	1	64	5320	11.40	-		23.98	-	4.50	-	26.99	Pass

TEST RESULTS DATA
Power Spectral Density

Band II													
Mod.	Data Rate	N_{TX}	CH.	Freq. (MHz)	Average Power Density (dBm/MHz)			Average PSD Limit (dBm/MHz)		DG (dBi)			Pass /Fail
					Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2		
11a	6Mbps	1	52	5260	4.48	-		11.00	-	4.50	-		Pass
11a	6Mbps	1	60	5300	1.70	-		11.00	-	4.50	-		Pass
11a	6Mbps	1	64	5320	1.87	-		11.00	-	4.50	-		Pass

TEST RESULTS DATA
26dB and 99% OBW

Band III																
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Bandwidth In U-NII 2C (MHz)		26 dB Bandwidth In U-NII 2C (MHz)		IC 99% Bandwidth Power Limit (dBm)		IC 99% Bandwidth EIRP Limit (dBm)		FCC 26dB Bandwidth Power Limit (dBm)		6 dB Bandwidth for Straddle Channel (MHz)	
					Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2
11a	6Mbps	1	100	5500	16.55	-	33.85	-	23.19	-	29.19	-	23.98	-	----	----
11a	6Mbps	1	116	5580	16.60	-	31.25	-	23.20	-	29.20	-	23.98	-	----	----
11a	6Mbps	1	140	5700	16.55	-	25.00	-	23.19	-	29.19	-	23.98	-	----	----

Report Number : FR8D1930B

TEST RESULTS DATA
Average Power Table

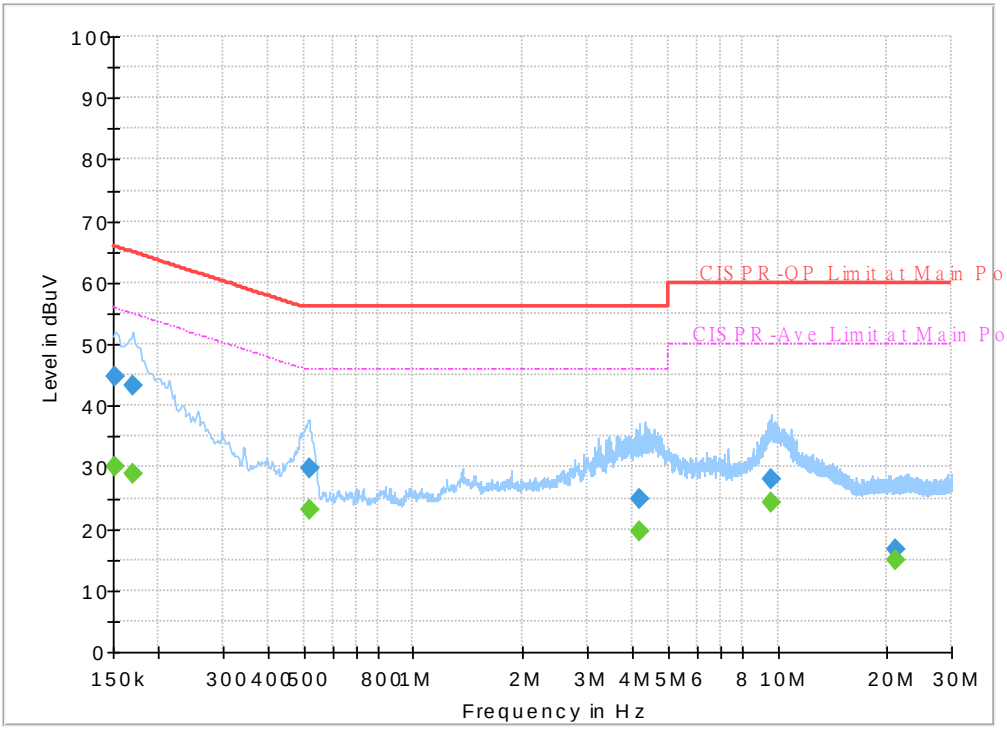
FCC Band III											
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Conducted Power (dBm)			FCC Conducted Power Limit (dBm)	DG (dBi)	EIRP Power Limit (dBm)	Pass/Fail
					Ant 1	Ant 2	SUM	Ant 1	Ant 1		
11a	6Mbps	1	100	5500	12.80	-		23.98	4.50	26.99	Pass
11a	6Mbps	1	116	5580	13.30	-		23.98	4.50	26.99	Pass
11a	6Mbps	1	140	5700	10.00	-		23.98	4.50	26.99	Pass

TEST RESULTS DATA
Power Spectral Density

Band III													
Mod.	Data Rate	N_{TX}	CH.	Freq. (MHz)	Average Power Density (dBm/MHz)			Average PSD Limit (dBm/MHz)		DG (dBi)			Pass /Fail
					Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2		
11a	6Mbps	1	100	5500	3.16	-		11.00	-	4.50	-		Pass
11a	6Mbps	1	116	5580	4.06	-		11.00	-	4.50	-		Pass
11a	6Mbps	1	140	5700	0.23	-		11.00	-	4.50	-		Pass

Appendix B. AC Conducted Emission Test Results

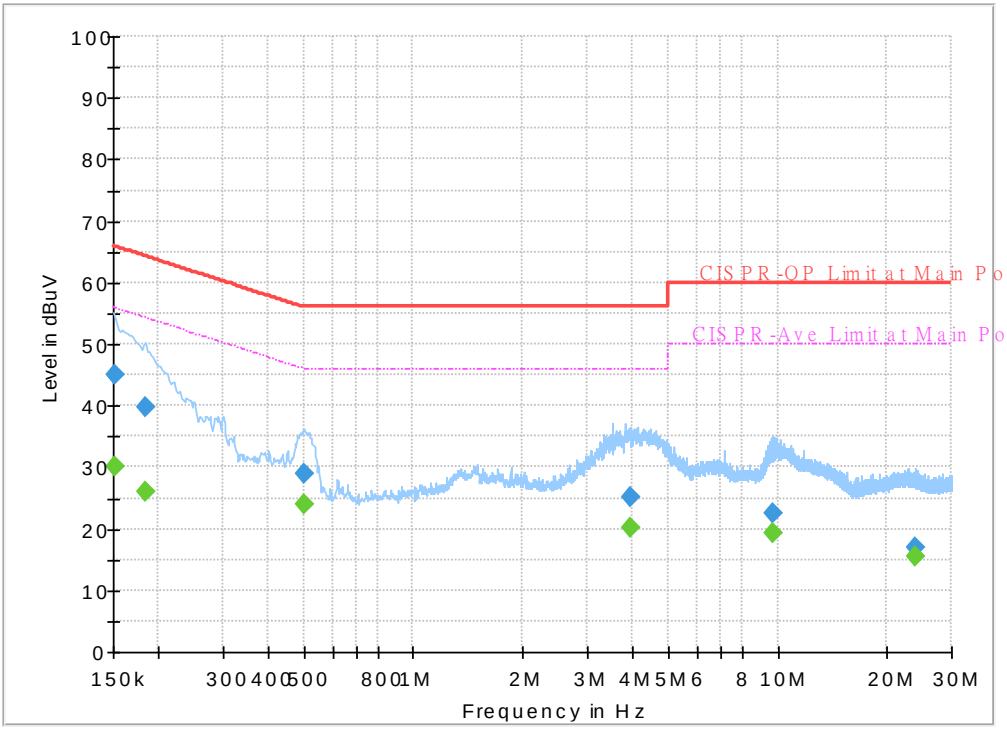
Test Engineer :	Jimmy Chang	**Temperature :**	24~26℃
		Relative Humidity :	51~53%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line



Final Result

Frequency	QuasiPeak	CAverage	Limit	Margin	Line	Filter	Corr.
0.152250	44.75	---	65.88	21.13	L1	OFF	19.5
0.152250	---	30.19	55.88	25.69	L1	OFF	19.5
0.170250	43.16	---	64.95	21.79	L1	OFF	19.5
0.170250	---	28.90	54.95	26.05	L1	OFF	19.5
0.519000	29.84	---	56.00	26.16	L1	OFF	19.5
0.519000	---	23.07	46.00	22.93	L1	OFF	19.5
4.159500	24.86	---	56.00	31.14	L1	OFF	19.6
4.159500	---	19.66	46.00	26.34	L1	OFF	19.6
9.609000	27.93	---	60.00	32.07	L1	OFF	19.7
9.609000	---	24.39	50.00	25.61	L1	OFF	19.7
21.025500	16.63	---	60.00	43.37	L1	OFF	19.8
21.025500	---	15.05	50.00	34.95	L1	OFF	19.8

Test Engineer :	Jimmy Chang	Temperature :	24~26℃
		Relative Humidity :	51~53%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral



Final Result

Frequency	QuasiPeak	CAverage	Limit	Margin	Line	Filter	Corr.
0.152250	45.00	---	65.88	20.88	N	OFF	19.5
0.152250	---	30.09	55.88	25.79	N	OFF	19.5
0.183750	39.82	---	64.31	24.49	N	OFF	19.5
0.183750	---	25.92	54.31	28.39	N	OFF	19.5
0.501000	28.96	---	56.00	27.04	N	OFF	19.5
0.501000	---	23.85	46.00	22.15	N	OFF	19.5
3.925500	25.12	---	56.00	30.88	N	OFF	19.6
3.925500	---	20.32	46.00	25.68	N	OFF	19.6
9.685500	22.46	---	60.00	37.54	N	OFF	19.7
9.685500	---	19.42	50.00	30.58	N	OFF	19.7
23.844750	16.95	---	60.00	43.05	N	OFF	20.0
23.844750	---	15.41	50.00	34.59	N	OFF	20.0

Appendix C. Conducted Spurious Emission

Test Engineer :	Karl Hou	Temperature :	23~25°C
		Relative Humidity :	52~58%

Band 1 - 5150~5250MHz

WIFI 802.11a (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBm)	Over Limit (dB)	Limit Line (dBm)	Read Level (dBm)	Antenna Gain (dBi)	Path Loss (dB)	MIMO Factor (dB)	Grounding Factor (dB)	Peak Avg. (P/A)
802.11a CH 36 5180MHz		5133.38	-36.57	-15.37	-21.2	-44.22	4.5	3.15	0	0	P
		5149.24	-45.98	-4.78	-41.2	-53.63	4.5	3.15	0	0	A
	*	5180	12.91	-	-	5.25	4.5	3.16	0	0	P
	*	5180	5.5	-	-	-2.16	4.5	3.16	0	0	A
802.11a CH 44 5220MHz		5138.06	-36.57	-15.37	-21.2	-44.22	4.5	3.15	0	0	P
		5135.72	-47.7	-6.5	-41.2	-55.35	4.5	3.15	0	0	A
	*	5220	14.47	-	-	6.79	4.5	3.18	0	0	P
	*	5220	7.11	-	-	-0.57	4.5	3.18	0	0	A
		5352.76	-42.57	-21.37	-21.2	-50.33	4.5	3.26	0	0	P
		5354.44	-48.49	-7.29	-41.2	-56.25	4.5	3.26	0	0	A
802.11a CH 48 5240MHz		5145.08	-39.98	-18.78	-21.2	-47.63	4.5	3.15	0	0	P
		5150	-48.21	-7.01	-41.2	-55.86	4.5	3.15	0	0	A
	*	5240	14.36	-	-	6.68	4.5	3.18	0	0	P
	*	5240	7.02	-	-	-0.66	4.5	3.18	0	0	A
		5353.04	-40.79	-19.59	-21.2	-48.55	4.5	3.26	0	0	P
		5353.6	-47.1	-5.9	-41.2	-54.86	4.5	3.26	0	0	A
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.										

Band 1 5150~5250MHz

WIFI 802.11a (Harmonic @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Gain	Path Loss	MIMO Factor	Grounding Factor	Peak Avg.
1		(MHz)	(dBm)	(dB)	(dBm)	(dBm)	(dBi)	(dB)	(dB)	(dB)	(P/A)
802.11a CH 36 5180MHz		7251	-56.31	-35.11	-21.2	-65.86	4.5	5.05	0	0	P
		8290.3	-61.58	-40.38	-21.2	-71.22	4.5	5.14	0	0	P
		10360	-49.95	-22.95	-27	-60.29	4.5	5.84	0	0	P
		11401.3	-61.53	-40.33	-21.2	-72.13	4.5	6.1	0	0	P
		15540	-64.73	-43.53	-21.2	-76.27	4.5	7.04	0	0	P
802.11a CH 44 5220MHz		7311.1	-54.07	-32.87	-21.2	-63.68	4.5	5.11	0	0	P
		8351.5	-63.09	-41.89	-21.2	-72.73	4.5	5.14	0	0	P
		10440	-53.6	-26.6	-27	-63.98	4.5	5.88	0	0	P
		11488	-57.06	-35.86	-21.2	-67.67	4.5	6.11	0	0	P
		15660	-62.34	-41.14	-21.2	-73.94	4.5	7.1	0	0	P
802.11a CH 48 5240MHz		7331.5	-52.51	-31.31	-21.2	-62.16	4.5	5.15	0	0	P
		8382.1	-62.89	-41.69	-21.2	-72.54	4.5	5.15	0	0	P
		10480	-47.39	-20.39	-27	-57.78	4.5	5.89	0	0	P
		11528.8	-56.72	-35.52	-21.2	-67.33	4.5	6.11	0	0	P
		15720	-64.66	-43.46	-21.2	-76.3	4.5	7.14	0	0	P

Remark

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

Band 2 - 5250~5350MHz

WIFI 802.11a (Band Edge @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	MIMO	Grounding	Peak
Ant.				Limit	Line	Level	Gain	Loss	Factor	Factor	Avg.
1		(MHz)	(dBm)	(dB)	(dBm)	(dBm)	(dBi)	(dB)	(dB)	(dB)	(P/A)
802.11a CH 52 5260MHz		5149.94	-40.79	-19.59	-21.2	-48.44	4.5	3.15	0	0	P
		5147.9	-49.23	-8.03	-41.2	-56.88	4.5	3.15	0	0	A
	*	5260	14.56	-	-	6.85	4.5	3.21	0	0	P
	*	5260	7.14	-	-	-0.57	4.5	3.21	0	0	A
		5355.84	-39.92	-18.72	-21.2	-47.68	4.5	3.26	0	0	P
		5351.52	-45.68	-4.48	-41.2	-53.44	4.5	3.26	0	0	A
802.11a CH 60 5300MHz		5149.94	-49.03	-27.83	-21.2	-56.68	4.5	3.15	0	0	P
		5142.8	-55.73	-14.53	-41.2	-63.38	4.5	3.15	0	0	A
	*	5300	12.48	-	-	4.75	4.5	3.23	0	0	P
	*	5300	4.99	-	-	-2.74	4.5	3.23	0	0	A
		5355.36	-38.58	-17.38	-21.2	-46.34	4.5	3.26	0	0	P
		5391.84	-46.67	-5.47	-41.2	-54.45	4.5	3.28	0	0	A
802.11a CH 64 5320MHz	*	5320	12.26	-	-	4.53	4.5	3.23	0	0	P
	*	5320	4.74	-	-	-2.99	4.5	3.23	0	0	A
		5408.8	-39.84	-18.64	-21.2	-47.62	4.5	3.28	0	0	P
		5400.32	-46.18	-4.98	-41.2	-53.96	4.5	3.28	0	0	A

Remark

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

Band 2 5250~5350MHz

WIFI 802.11a (Harmonic @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Gain	Path Loss	MIMO Factor	Grounding Factor	Peak Avg.
1		(MHz)	(dBm)	(dB)	(dBm)	(dBm)	(dBi)	(dB)	(dB)	(dB)	(P/A)
802.11a CH 52 5260MHz		7362.1	-54.88	-33.68	-21.2	-64.56	4.5	5.18	0	0	P
		8417.8	-64.69	-43.49	-21.2	-74.34	4.5	5.15	0	0	P
		10520	-46.62	-19.62	-27	-57.03	4.5	5.91	0	0	P
		11569.6	-58.95	-37.75	-21.2	-69.56	4.5	6.11	0	0	P
		15780	-60.65	-39.45	-21.2	-72.31	4.5	7.16	0	0	P
802.11a CH 60 5300MHz		7418.2	-53.87	-32.67	-21.2	-63.6	4.5	5.23	0	0	P
		8479	-55	-33.8	-21.2	-64.61	4.5	5.11	0	0	P
		10600	-59.52	-38.32	-21.2	-69.96	4.5	5.94	0	0	P
		11656.3	-56.74	-35.54	-21.2	-67.35	4.5	6.11	0	0	P
		15900	-66.28	-45.08	-21.2	-77.99	4.5	7.21	0	0	P
802.11a CH 64 5320MHz		7443.7	-55.38	-34.18	-21.2	-65.09	4.5	5.21	0	0	P
		10640	-54.31	-33.11	-21.2	-64.77	4.5	5.96	0	0	P
		11702.2	-56.07	-34.87	-21.2	-66.67	4.5	6.1	0	0	P
		15960	-63.98	-42.78	-21.2	-75.73	4.5	7.25	0	0	P
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.										

Band 3 - 5470~5725MHz

WIFI 802.11a (Band Edge @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	MIMO	Grounding	Peak
Ant.				Limit	Line	Level	Gain	Loss	Factor	Factor	Avg.
1		(MHz)	(dBm)	(dB)	(dBm)	(dBm)	(dBi)	(dB)	(dB)	(dB)	(P/A)
802.11a CH 100 5500MHz		5453.84	-34.88	-13.68	-21.2	-42.65	4.5	3.27	0	0	P
		5469.84	-34.83	-7.83	-27	-42.6	4.5	3.27	0	0	P
		5459.28	-44.38	-3.18	-41.2	-52.15	4.5	3.27	0	0	A
	*	5500	13.76	-	-	5.99	4.5	3.27	0	0	P
	*	5500	6.19	-	-	-1.58	4.5	3.27	0	0	A
802.11a CH 116 5580MHz		5455.36	-42.41	-21.21	-21.2	-50.18	4.5	3.27	0	0	P
		5465.2	-40.77	-13.77	-27	-48.54	4.5	3.27	0	0	P
		5458	-51.4	-10.2	-41.2	-59.17	4.5	3.27	0	0	A
	*	5580	14.49	-	-	6.73	4.5	3.26	0	0	P
	*	5580	7.06	-	-	-0.7	4.5	3.26	0	0	A
		5730.35	-41.9	-14.9	-27	-49.77	4.5	3.37	0	0	P
802.11a CH 140 5700MHz	*	5700	9.92	-	-	2.08	4.5	3.34	0	0	P
	*	5700	2.26	-	-	-5.58	4.5	3.34	0	0	A
		5725.72	-34.16	-7.16	-27	-42	4.5	3.34	0	0	P

Remark

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

Band 3 - 5470~5725MHz

WIFI 802.11a (Harmonic @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Gain	Path Loss	MIMO Factor	Grounding Factor	Peak Avg.
1		(MHz)	(dBm)	(dB)	(dBm)	(dBm)	(dBi)	(dB)	(dB)	(dB)	(P/A)
802.11a CH 100 5500MHz		7698.7	-49.92	-28.72	-21.2	-59.48	4.5	5.06	0	0	P
		11000	-56.15	-34.95	-21.2	-66.77	4.5	6.12	0	0	P
		16500	-64.92	-37.92	-27	-76.9	4.5	7.48	0	0	P
802.11a CH 116 5580MHz		11160	-56.04	-34.84	-21.2	-66.65	4.5	6.11	0	0	P
		16740	-67.66	-40.66	-27	-79.73	4.5	7.57	0	0	P
802.11a CH 140 5700MHz		9121.6	-63.24	-42.04	-21.2	-73.08	4.5	5.34	0	0	P
		11400	-57.03	-35.83	-21.2	-67.63	4.5	6.1	0	0	P
		17100	-64.6	-37.6	-27	-76.81	4.5	7.71	0	0	P
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.										

Emission below 1GHz

5GHz WIFI 802.11a (LF @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	MIMO	Grounding	Peak
Ant.				Limit	Line	Level	Gain	Loss	Factor	Factor	Avg.
1		(MHz)	(dBm)	(dB)	(dBm)	(dBm)	(dBi)	(dB)	(dB)	(dB)	(P/A)
5GHz 802.11a LF		73.74	-85.12	-29.92	-55.2	-94.75	4.5	0.43	0	4.7	P
		107.49	-84.15	-32.45	-51.7	-93.83	4.5	0.48	0	4.7	P
		185.52	-82.88	-31.18	-51.7	-92.79	4.5	0.71	0	4.7	P
		516.3	-82.11	-32.91	-49.2	-92.28	4.5	0.97	0	4.7	P
		776	-82.44	-33.24	-49.2	-92.9	4.5	1.26	0	4.7	P
		878.9	-81.88	-32.68	-49.2	-92.42	4.5	1.34	0	4.7	P

Remark

1. No other spurious found.
2. All results are PASS against Peak and Average 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	Path	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. Path Loss(dB) = Cable loss(dB) + Filter loss(dB) + Attenuator loss(dB)
2. Level(dBμV/m) = Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
3. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Path 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) + Path 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 D. Conducted Spurious Emission Plots

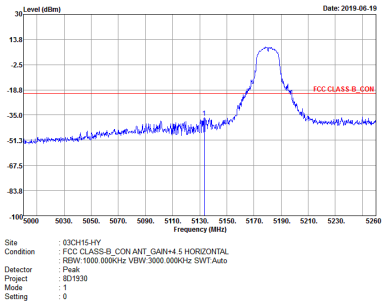
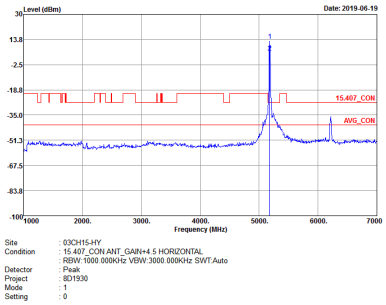
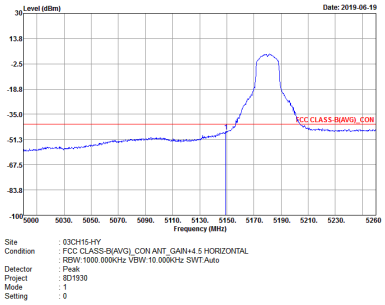
Test Engineer :	Karl Hou	**Temperature :**	23~25°C
		Relative Humidity :	52~58%

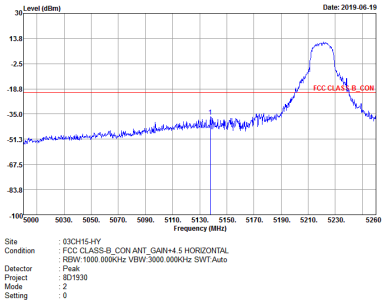
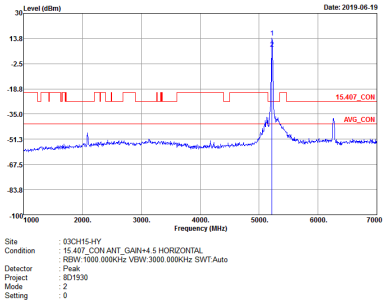
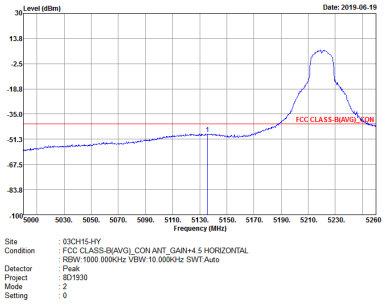
Note symbol

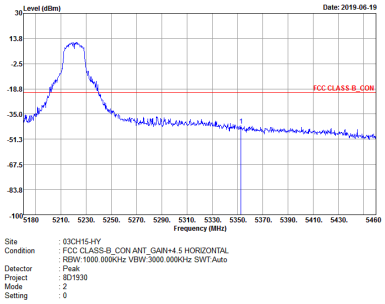
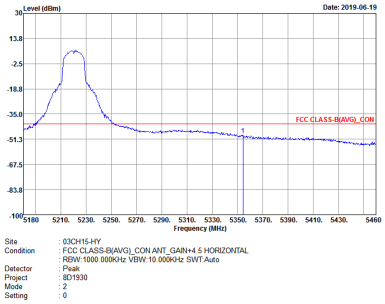
-L	**Low channel location**
-R	**High channel location**

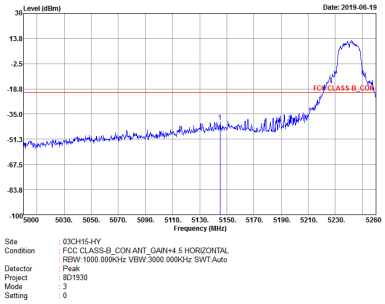
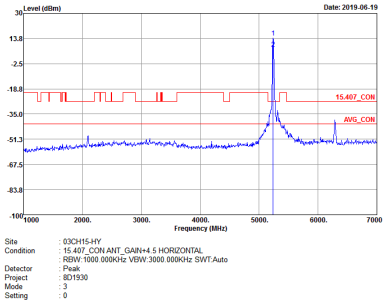
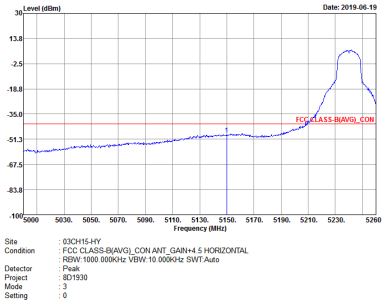
Band 1 - 5150~5250MHz

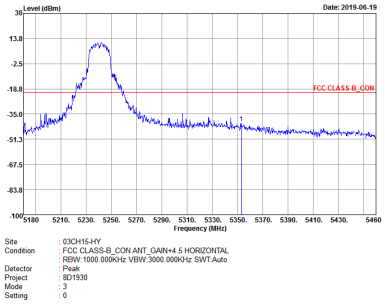
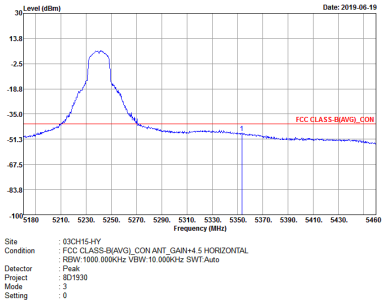
WIFI 802.11a (Band Edge @ 3m)

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

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

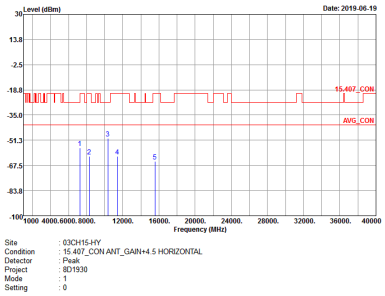
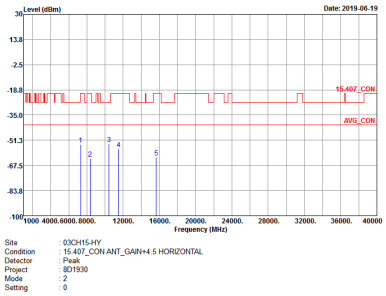
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11a CH44 5220MHz - R	
1	CSE	Fundamental
Peak		Left blank
Avg.		Left blank

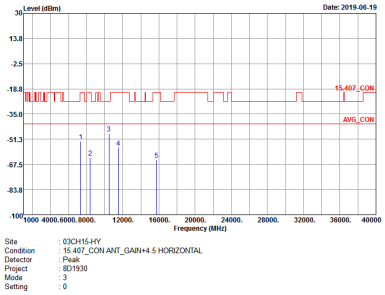
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11a CH48 5220MHz - L	
1	CSE	Fundamental
Peak		
Avg.		Left blank

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

Band 1 - 5150~5250MHz

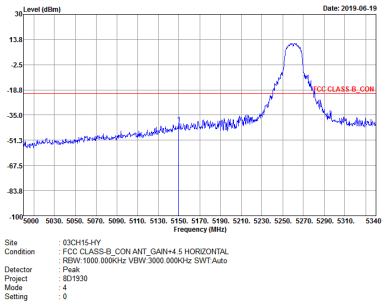
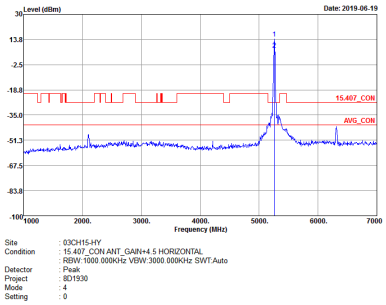
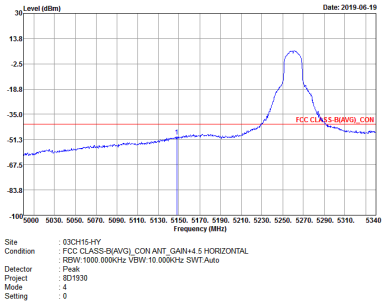
WIFI 802.11a (Harmonic @ 3m)

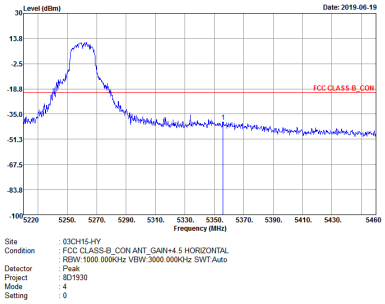
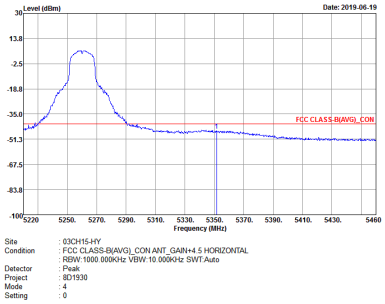
WIFI	Band 1 5150~5250MHz Harmonic @ 3m	
ANT	802.11a	
1	CH36 5180MHz	CH44 5220MHz
Peak Avg.		

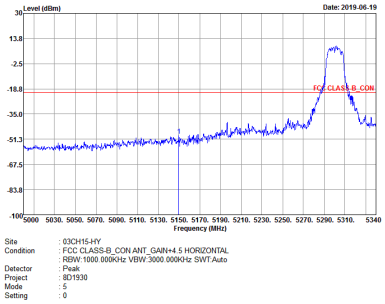
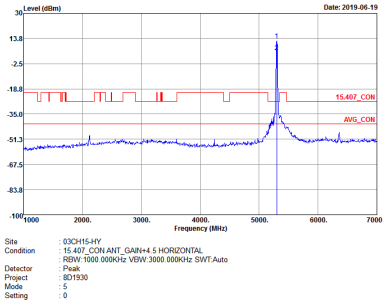
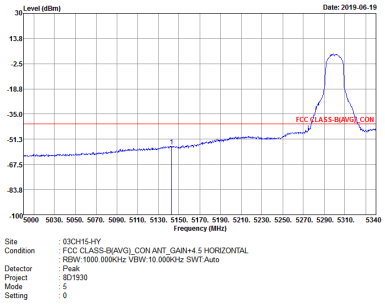
WIFI	Band 1 5150~5250MHz Harmonic @ 3m	
ANT	802.11a	
1	CH48 5240MHz	
Peak Avg.		Left blank

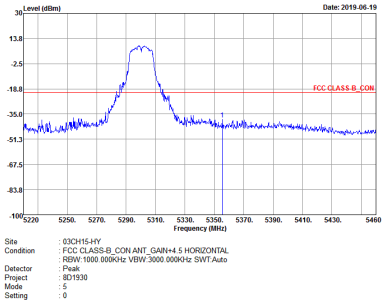
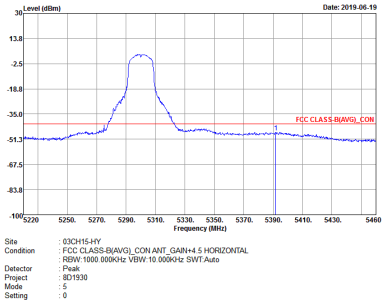
Band 2 - 5250~5350MHz

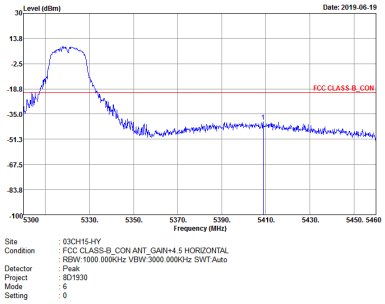
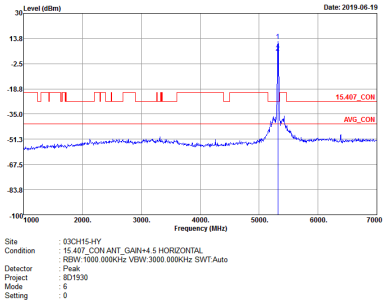
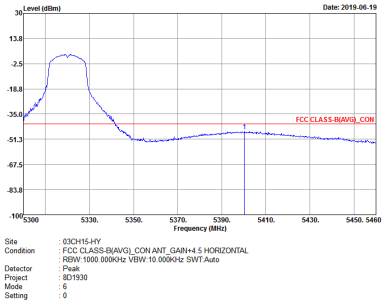
WIFI 802.11a (Band Edge @ 3m)

WIFI	Band 2 5250~5350MHz Band Edge @ 3m	
ANT	802.11a CH52 5260MHz - L	
1	CSE	Fundamental
Peak		
Avg.		Left blank

WIFI	Band 2 5250~5350MHz Band Edge @ 3m	
ANT	802.11a CH52 5260MHz - R	
1	CSE	Fundamental
Peak		Left blank
Avg.		Left blank

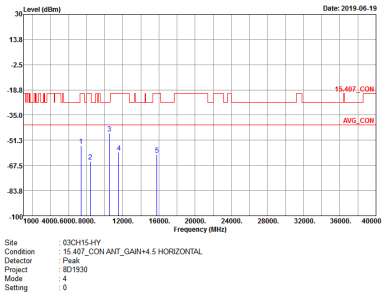
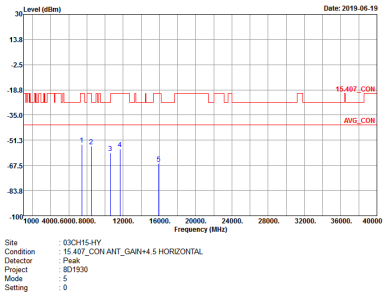
WIFI	Band 2 5250~5350MHz Band Edge @ 3m	
ANT	802.11a CH60 5300MHz - L	
1	CSE	Fundamental
Peak		
Avg.		Left blank

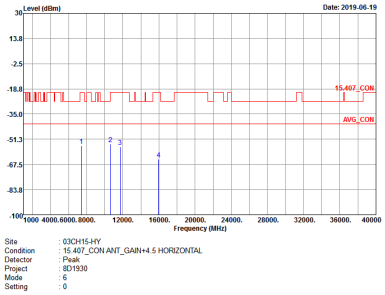
WIFI	Band 2 5250~5350MHz Band Edge @ 3m	
ANT	802.11a CH60 5300MHz - R	
1	CSE	Fundamental
Peak		Left blank
Avg.		Left blank

WIFI	Band 2 5250~5350MHz Band Edge @ 3m	
ANT	802.11a CH64 5320MHz	
1	CSE	Fundamental
Peak		
Avg.		Left blank

Band 2 - 5250~5350MHz

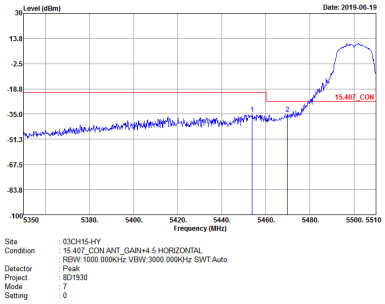
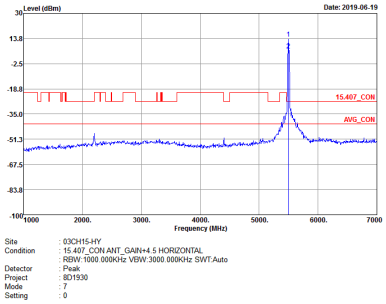
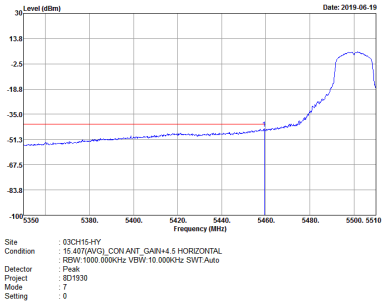
WIFI 802.11a (Harmonic @ 3m)

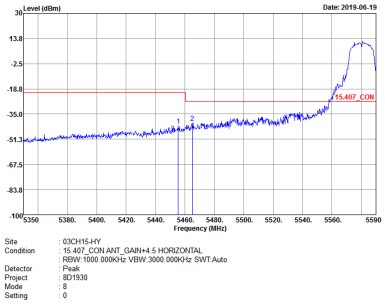
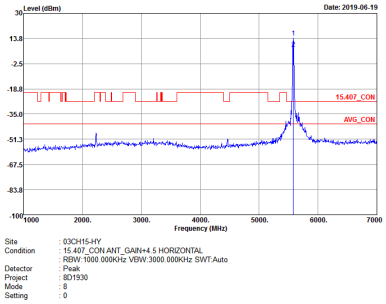
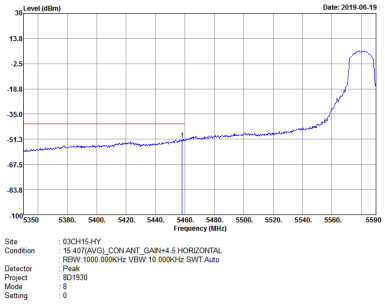
WIFI	Band 2 5250~5350MHz Band Edge @ 3m	
ANT	802.11a	
1	CH52 5260MHz	CH60 5300MHz
Peak Avg.		

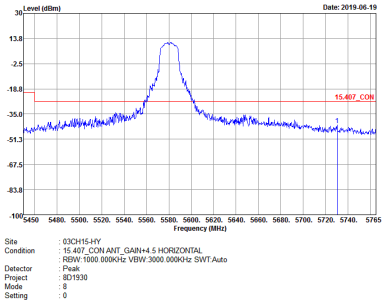
WIFI	Band 2 5250~5350MHz Band Edge @ 3m	
ANT	802.11a	
1	CH64 5320MHz	
Peak Avg.		Left blank

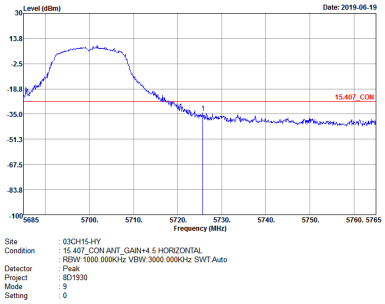
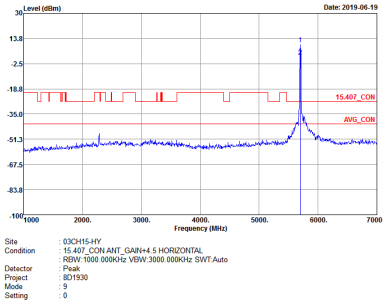
Band 3 - 5470~5725MHz

WIFI 802.11a (Band Edge @ 3m)

WIFI	Band 3 5470~5725MHz Band Edge @ 3m	
ANT	802.11a CH100 5500MHz	
1	CSE	Fundamental
Peak		
Avg.		Left blank

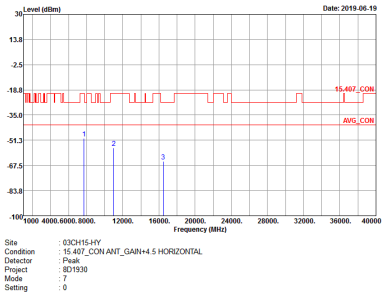
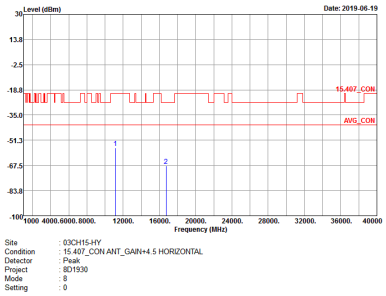
WIFI	Band 3 5470~5725MHz Band Edge @ 3m	
ANT	802.11a CH116 5580MHz - L	
1	CSE	Fundamental
Peak		
Avg.		Left blank

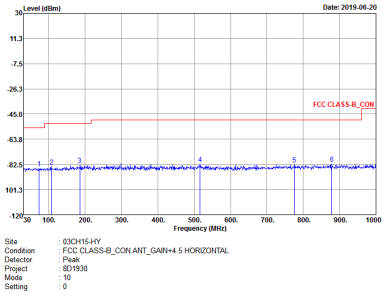
WIFI	Band 3 5470~5725MHz Band Edge @ 3m	
ANT	802.11a CH116 5580MHz - R	
1	CSE	Fundamental
Peak		Left blank

WIFI	Band 3 5470~5725MHz Band Edge @ 3m	
ANT	802.11a CH140 5700MHz	
1	CSE	Fundamental
Peak		

Band 3 - 5470~5725MHz

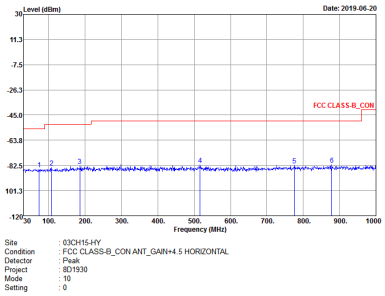
WIFI 802.11a (Harmonic @ 3m)

WIFI	Band 3 5470~5725MHz Band Edge @ 3m	
ANT	802.11a	
1	CH100 5500MHz	CH116 5580MHz
Peak Avg.		

WIFI	Band 3 5470~5725MHz Band Edge @ 3m	
ANT	802.11a	
1	CH140 5700MHz	
Peak Avg.		Left blank

Emission below 1GHz

5GHz WIFI 802.11a LF

WIFI	5GHz WIFI	
ANT	802.11a	
1	LF	
QP / Peak		Left blank

Appendix E. Cabinet Radiated Spurious Emission

Test Engineer :	Karl Hou, Big Show Wang	Temperature :	23~26°C
		Relative Humidity :	50~65%

Band 1 - 5150~5250MHz

WIFI 802.11a (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)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 36 5180MHz		5147.68	50.52	-23.48	74	39.74	31.8	9.25	30.27	100	286	P	H
		5088.14	44.26	-9.74	54	33.45	31.9	9.19	30.28	100	286	A	H
	*	5180	92.46	-	-	81.77	31.67	9.29	30.27	100	286	P	H
	*	5180	86.09	-	-	75.4	31.67	9.29	30.27	100	286	A	H
		5059.02	50.32	-23.68	74	39.55	31.9	9.15	30.28	319	153	P	V
		5111.54	43.59	-10.41	54	32.79	31.87	9.21	30.28	319	153	A	V
	*	5180	94.24	-	-	83.55	31.67	9.29	30.27	319	153	P	V
	*	5180	87.61	-	-	76.92	31.67	9.29	30.27	319	153	A	V
802.11a CH 44 5220MHz		5105.3	50.85	-23.15	74	40.02	31.9	9.21	30.28	100	282	P	H
		5030.42	43.49	-10.51	54	32.85	31.8	9.12	30.28	100	282	A	H
	*	5220	91.29	-	-	80.71	31.53	9.32	30.27	100	282	P	H
	*	5220	84.77	-	-	74.19	31.53	9.32	30.27	100	282	A	H
		5357.24	49.88	-24.12	74	39.32	31.4	9.43	30.27	100	282	P	H
		5413.24	43.04	-10.96	54	32.18	31.63	9.49	30.26	100	282	A	H
		5115.96	50.56	-23.44	74	39.75	31.87	9.22	30.28	307	158	P	V
		5107.38	44.01	-9.99	54	33.21	31.87	9.21	30.28	307	158	A	V
	*	5220	94.28	-	-	83.69	31.53	9.33	30.27	307	158	P	V
	*	5220	87.58	-	-	76.99	31.53	9.33	30.27	307	158	A	V
		5412.12	49.75	-24.25	74	38.9	31.63	9.48	30.26	307	158	P	V
		5447.4	43.25	-10.75	54	32.26	31.7	9.55	30.26	307	158	A	V

802.11a CH 48 5240MHz		5112.32	50.36	-23.64	74	39.56	31.87	9.21	30.28	100	282	P	H
		5142.48	43.67	-10.33	54	32.89	31.8	9.25	30.27	100	282	A	H
	*	5240	90.79	-	-	80.32	31.4	9.34	30.27	100	282	P	H
	*	5240	82.43	-	-	71.96	31.4	9.34	30.27	100	282	A	H
		5442.08	50.06	-23.94	74	39.11	31.67	9.54	30.26	100	282	P	H
		5456.08	43.25	-10.75	54	32.24	31.7	9.57	30.26	100	282	A	H
		5087.88	50.67	-23.33	74	39.86	31.9	9.19	30.28	324	158	P	V
		5139.36	43.57	-10.43	54	32.77	31.83	9.24	30.27	324	158	A	V
	*	5240	94.01	-	-	83.47	31.47	9.34	30.27	324	158	P	V
	*	5240	85.3	-	-	74.76	31.47	9.34	30.27	324	158	A	V
		5423.88	50.45	-23.55	74	39.57	31.63	9.51	30.26	324	158	P	V
		5448.24	42.95	-11.05	54	31.96	31.7	9.55	30.26	324	158	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11a (Harmonic @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Path 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 36 5180MHz		7250	56.79	-11.41	68.2	67.19	36.2	11.13	58.62	291	115	P	H
		7250	45.41	-8.59	54	55.81	36.2	11.13	58.62	291	115	A	H
		10360	47.57	-20.63	68.2	55.77	39.37	13.11	61.14	100	0	P	H
		15540	44.93	-29.07	74	52.61	37.93	16.4	62.62	100	0	P	H
		7250	57.54	-10.66	68.2	67.94	36.2	11.13	58.62	101	313	P	V
		7250	48.73	-5.27	54	59.13	36.2	11.13	58.62	101	313	A	V
		10365	48.92	-19.28	68.2	57.13	39.37	13.11	61.15	100	0	P	V
		15540	45.62	-28.38	74	53.3	37.93	16.4	62.62	100	0	P	V
802.11a CH 44 5220MHz		7310	54.02	-19.98	74	64.41	36.2	11.17	58.59	318	120	P	H
		7310	45.97	-8.03	54	56.36	36.2	11.17	58.59	318	120	A	H
		10440	47.06	-21.14	68.2	55.11	39.53	13.15	61.23	100	0	P	H
		15660	44.54	-29.46	74	52.38	37.45	16.49	62.45	100	0	P	H
		7310	54.97	-19.03	74	65.36	36.2	11.17	58.59	100	311	P	V
		7310	47.02	-6.98	54	57.41	36.2	11.17	58.59	100	311	A	V
		8350	48.9	-25.1	74	59.17	36.3	11.88	59.02	100	0	P	V
		10440	50.37	-17.83	68.2	58.42	39.53	13.15	61.23	100	0	P	V
		15660	45.83	-28.17	74	53.67	37.45	16.49	62.45	100	0	P	V
802.11a CH 48 5240MHz		7335	55.62	-18.38	74	65.94	36.27	11.19	58.58	400	123	P	H
		7335	49.74	-4.26	54	60.06	36.27	11.19	58.58	400	123	A	H
		10480	46.63	-21.57	68.2	54.64	39.58	13.17	61.27	100	0	P	H
		15720	45.07	-28.93	74	52.92	37.3	16.53	62.36	100	0	P	H
		7330	55.77	-18.23	74	66.12	36.23	11.19	58.58	266	347	P	V
		7330	50.5	-3.5	54	60.85	36.23	11.19	58.58	266	347	A	V
		8385	49.21	-24.79	74	59.44	36.37	11.89	59.07	100	0	P	V
		10480	50.42	-17.78	68.2	58.43	39.58	13.17	61.27	100	0	P	V
		15720	45.68	-28.32	74	53.53	37.3	16.53	62.36	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 2 - 5250~5350MHz

WIFI 802.11a (Band Edge @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	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 52 5260MHz		5047.6	51.81	-22.19	74	41.05	31.9	9.14	30.28	100	281	P	H
		5009.86	43.42	-10.58	54	32.9	31.7	9.1	30.28	100	281	A	H
	*	5260	91.38	-	-	80.89	31.4	9.36	30.27	100	281	P	H
	*	5260	84.42	-	-	73.93	31.4	9.36	30.27	100	281	A	H
		5388.48	49.99	-24.01	74	39.27	31.53	9.45	30.26	100	281	P	H
		5454	43.5	-10.5	54	32.49	31.7	9.57	30.26	100	281	A	H
		5083.3	50.17	-23.83	74	39.37	31.9	9.18	30.28	288	166	P	V
		5110.84	43.36	-10.64	54	32.56	31.87	9.21	30.28	288	166	A	V
	*	5260	93.61	-	-	83.13	31.4	9.35	30.27	288	166	P	V
	*	5260	86.15	-	-	75.67	31.4	9.35	30.27	288	166	A	V
		5436.72	50.3	-23.7	74	39.36	31.67	9.53	30.26	288	166	P	V
		5352.48	43.42	-10.58	54	32.87	31.4	9.42	30.27	288	166	A	V
802.11a CH 60 5300MHz		5102.34	50.07	-23.93	74	39.25	31.9	9.2	30.28	101	281	P	H
		5055.08	43.37	-10.63	54	32.6	31.9	9.15	30.28	101	281	A	H
	*	5300	87.86	-	-	77.34	31.4	9.39	30.27	101	281	P	H
	*	5300	81.4	-	-	70.88	31.4	9.39	30.27	101	281	A	H
		5398.56	51.08	-22.92	74	40.28	31.6	9.46	30.26	101	281	P	H
		5418	42.95	-11.05	54	32.08	31.63	9.5	30.26	101	281	A	H
		5120.7	50.69	-23.31	74	39.88	31.87	9.22	30.28	268	159	P	V
		5054.74	43.44	-10.56	54	32.67	31.9	9.15	30.28	268	159	A	V
	*	5300	90.76	-	-	80.25	31.4	9.38	30.27	268	159	P	V
	*	5300	83.93	-	-	73.42	31.4	9.38	30.27	268	159	A	V
		5380.08	50.62	-23.38	74	39.9	31.53	9.45	30.26	268	159	P	V
		5451.12	43.37	-10.63	54	32.37	31.7	9.56	30.26	268	159	A	V

802.11a CH 64 5320MHz	*	5320	90.87	-	-	80.34	31.4	9.4	30.27	296	158	P	V
	*	5320	84.36	-	-	73.83	31.4	9.4	30.27	296	158	A	V
		5441.12	50.41	-23.59	74	39.46	31.67	9.54	30.26	296	158	P	V
		5430.56	43.31	-10.69	54	32.38	31.67	9.52	30.26	296	158	A	V
	*	5320	87.83	-	-	77.3	31.4	9.4	30.27	100	280	P	H
	*	5320	81.36	-	-	70.83	31.4	9.4	30.27	100	280	A	H
		5402.08	49.92	-24.08	74	39.12	31.6	9.46	30.26	100	280	P	H
		5448.96	43.38	-10.62	54	32.38	31.7	9.56	30.26	100	280	A	H
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 2 5250~5350MHz

WIFI 802.11a (Harmonic @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Path 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 52 5260MHz		7365	54.84	-19.16	74	65.12	36.3	11.98	58.56	100	122	P	H
		7365	47.11	-6.89	54	57.39	36.3	11.98	58.56	100	122	A	H
		8415	45.75	-28.25	74	55.95	36.43	12.49	59.12	100	0	P	H
		10520	48.66	-19.54	68.2	56.59	39.63	13.69	61.25	100	0	P	H
		15780	44.27	-29.73	74	51.97	37.3	17.27	62.27	100	0	P	H
		7365	56.28	-17.72	74	66.56	36.3	11.98	58.56	100	347	P	V
		7365	48.85	-5.15	54	59.13	36.3	11.98	58.56	100	347	A	V
		8415	49.08	-24.92	74	59.28	36.43	12.49	59.12	100	0	P	V
		9500	47.82	-20.38	68.2	56.4	38.3	13.22	60.1	100	0	P	V
		10520	50.39	-17.81	68.2	58.32	39.63	13.18	61.25	100	0	P	V
		15780	45.6	-28.4	74	53.3	37.3	16.58	62.27	100	0	P	V
802.11a CH 60 5300MHz		7420	48.64	-25.36	74	58.64	36.57	11.97	58.54	100	0	P	H
		10600	48.11	-25.89	74	55.7	39.8	13.71	61.1	100	0	P	H
		15900	44.57	-29.43	74	52.29	37	17.38	62.1	100	0	P	H
		7420	53.82	-20.18	74	63.82	36.57	11.97	58.54	100	350	P	V
		7420	45.7	-8.3	54	55.7	36.57	11.97	58.54	100	350	A	V
		8480	49.91	-24.09	74	59.99	36.63	12.52	59.23	100	0	P	V
		10600	47.79	-26.21	74	55.38	39.8	13.71	61.1	100	0	P	V
		15900	44.21	-29.79	74	51.93	37	17.38	62.1	100	0	P	V
802.11a CH 64 5320MHz		7450	48.24	-25.76	74	58.22	36.6	11.94	58.52	100	0	P	H
		10640	48.88	-25.12	74	56.39	39.8	13.72	61.03	100	0	P	H
		15960	44.35	-29.65	74	52.1	36.93	17.33	62.01	100	0	P	H
		7450	53.89	-20.11	74	63.87	36.6	11.94	58.52	100	349	P	V
		7450	45.58	-8.42	54	55.56	36.6	11.94	58.52	100	349	A	V
		8510	50.82	-17.38	68.2	60.77	36.77	12.54	59.26	100	0	P	V
		10640	49.94	-24.06	74	57.45	39.8	13.72	61.03	100	0	P	V
		15960	44.78	-29.22	74	52.53	36.93	17.33	62.01	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 3 - 5470~5725MHz

WIFI 802.11a (Band Edge @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	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 100 5500MHz		5427.76	50.28	-23.72	74	39.4	31.63	9.51	30.26	100	307	P	H
		5467.6	50.46	-17.74	68.2	39.43	31.7	9.59	30.26	100	307	P	H
		5422.16	43.32	-10.68	54	32.45	31.63	9.5	30.26	100	307	A	H
	*	5500	88.73	-	-	77.62	31.7	9.67	30.26	100	307	P	H
	*	5500	82.2	-	-	71.09	31.7	9.67	30.26	100	307	A	H
		5418.64	50.58	-23.42	74	39.71	31.63	9.5	30.26	276	161	P	V
		5465.04	49.57	-18.63	68.2	38.54	31.7	9.59	30.26	276	161	P	V
		5457.2	43.49	-10.51	54	32.48	31.7	9.57	30.26	276	161	A	V
	*	5500	90.66	-	-	79.55	31.7	9.67	30.26	276	161	P	V
	*	5500	84.3	-	-	73.19	31.7	9.67	30.26	276	161	A	V
802.11a CH 116 5580MHz		5384.32	50.56	-23.44	74	39.84	31.53	9.45	30.26	100	306	P	H
		5462.56	50.11	-18.09	68.2	39.09	31.7	9.58	30.26	100	306	P	H
		5458.96	42.98	-11.02	54	31.97	31.7	9.57	30.26	100	306	A	H
	*	5580	89.6	-	-	78.29	31.8	9.81	30.3	100	306	P	H
	*	5580	83.21	-	-	71.9	31.8	9.81	30.3	100	306	A	H
		5748.62	50.47	-17.73	68.2	39	32	9.86	30.39	100	306	P	H
		5366.32	51.07	-22.93	74	40.44	31.47	9.43	30.27	315	166	P	V
		5460	50.41	-17.79	68.2	39.39	31.7	9.58	30.26	315	166	P	V
		5428.96	43.47	-10.53	54	32.54	31.67	9.52	30.26	315	166	A	V
	*	5580	91.02	-	-	79.71	31.8	9.81	30.3	315	166	P	V
	*	5580	84.42	-	-	73.11	31.8	9.81	30.3	315	166	A	V
		5754.92	50.84	-17.36	68.2	39.29	32.07	9.87	30.39	315	166	P	V

802.11a CH 140 5700MHz	*	5700	86.3	-	-	75	31.8	9.86	30.36	100	306	P	H
	*	5700	79.8	-	-	68.5	31.8	9.86	30.36	100	306	A	H
		5756.76	51.06	-17.14	68.2	39.51	32.07	9.87	30.39	100	306	P	H
	*	5700	89.28	-	-	77.92	31.87	9.86	30.37	100	306	P	V
	*	5700	82.31	-	-	70.95	31.87	9.86	30.37	100	306	A	V
		5733.32	50.34	-17.86	68.2	38.93	31.93	9.86	30.38	100	306	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 3 - 5470~5725MHz

WIFI 802.11a (Harmonic @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Path 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 100 5500MHz		7700	49.69	-24.31	74	59.69	36.3	12.18	58.48	100	0	P	H
		11000	49.91	-24.09	74	56	40.4	13.86	60.35	100	0	P	H
		16500	45.91	-22.29	68.2	50.05	38.6	17.55	60.29	100	0	P	H
		7700	54.76	-19.24	74	64.76	36.3	12.18	58.48	100	351	P	V
		7700	47.49	-6.51	54	57.49	36.3	12.18	58.48	100	351	A	V
		8800	51.24	-16.96	68.2	60.15	37.5	12.78	59.19	100	0	P	V
		11000	49.97	-24.03	74	56.06	40.4	13.86	60.35	100	0	P	V
		16500	45.29	-22.91	68.2	49.43	38.6	17.55	60.29	100	0	P	V
802.11a CH 116 5580MHz		11160	49.21	-24.79	74	55.87	39.93	14.14	60.73	100	0	P	H
		16740	49.01	-19.19	68.2	51.31	39.78	17.92	60	100	0	P	H
		7810	53.03	-15.17	68.2	63	36.33	12.17	58.47	100	0	P	V
		8925	50.66	-17.54	68.2	59.78	37.3	12.75	59.17	100	0	P	V
		11160	52.85	-21.15	74	59.51	39.93	14.14	60.73	400	304	P	V
		11160	45.81	-8.19	54	52.47	39.93	14.14	60.73	400	304	A	V
		16740	48.19	-20.01	68.2	50.49	39.78	17.92	60	100	0	P	V
802.11a CH 140 5700MHz		11400	49.71	-24.29	74	56.48	40	14.53	61.3	100	0	P	H
		17100	50.02	-18.18	68.2	50.9	40.5	18.24	59.62	100	0	P	H
		11400	49.25	-24.75	74	56.02	40	14.53	61.3	100	0	P	V
		17100	49.33	-18.87	68.2	50.21	40.5	18.24	59.62	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Emission below 1GHz

WIFI 802.11a (LF @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	QP	
1		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/Q)	(H/V)
802.11a LF		97.9	42.82	-0.68	43.5	58.29	15.7	1.34	32.51	200	21	Q	H
		143.49	37.29	-6.21	43.5	50.67	17.5	1.62	32.5	-	-	P	H
		316.15	42.21	-3.79	46	53.03	19.42	2.3	32.54	100	318	Q	H
		525.67	43.45	-2.55	46	48.93	24.1	3	32.58	187	46	Q	H
		719.67	32.94	-13.06	46	34.66	27.18	3.46	32.36	-	-	P	H
		832.19	33.34	-12.66	46	32.99	28.59	3.78	32.02	-	-	P	H
		97.9	37.31	-6.19	43.5	52.78	15.7	1.34	32.51	100	0	P	V
		142.52	28.16	-15.34	43.5	41.55	17.5	1.61	32.5	-	-	P	V
		252.13	30.29	-15.71	46	41.81	18.86	2.14	32.52	-	-	P	V
		313.24	31.87	-14.13	46	42.75	19.36	2.3	32.54	-	-	P	V
		515.97	39.63	-6.37	46	45.16	24.1	2.94	32.57	-	-	P	V
		573.2	33.83	-12.17	46	37.07	26.17	3.18	32.59	-	-	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/Q	**P**eak or **A**verage or **Q**uasi-Peak
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	Path	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. Path Loss(dB) = Cable loss(dB) + Filter loss(dB) + Attenuator loss(dB)
2. Level(dBµV/m) = Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBµV) - Preamp Factor(dB)
3. Over Limit(dB) = Level(dBµV/m) – Limit Line(dBµV/m)

For Peak Limit @ 2390MHz:

1. Level(dBµV/m)

= Antenna Factor(dB/m) + Path 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) + Path 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 F. Cabinet Radiated Spurious Emission Plots

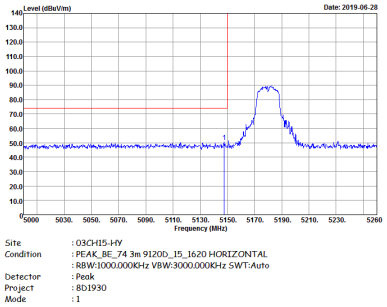
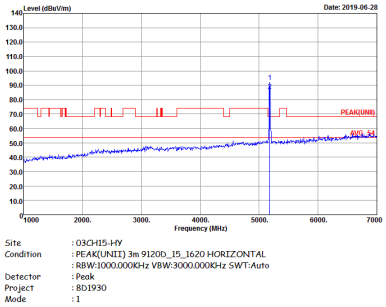
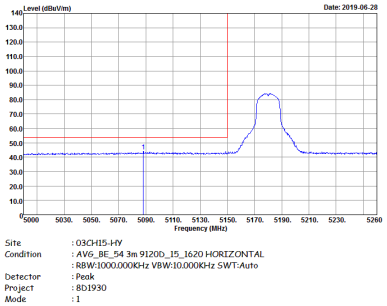
Test Engineer :	Karl Hou, Big Show Wang	**Temperature :**	23~26°C
		Relative Humidity :	50~65%

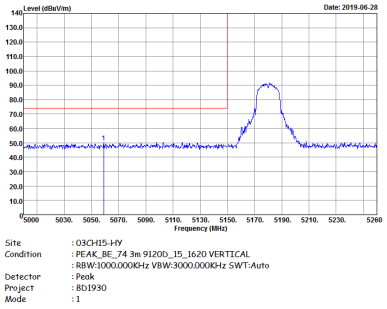
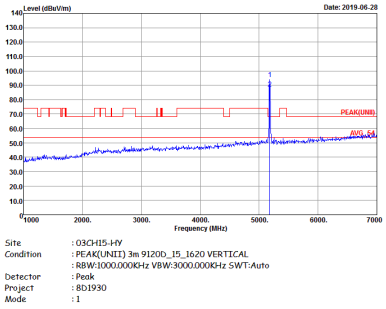
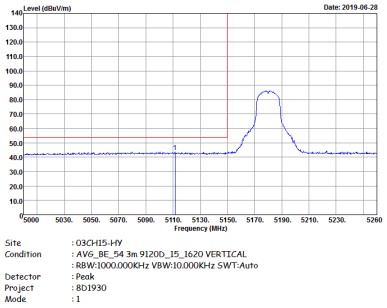
Note symbol

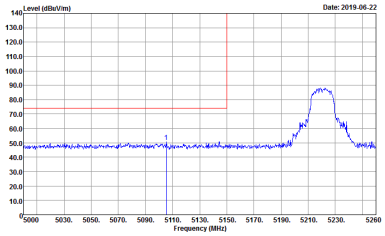
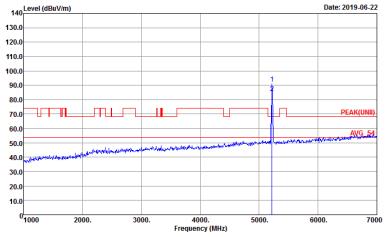
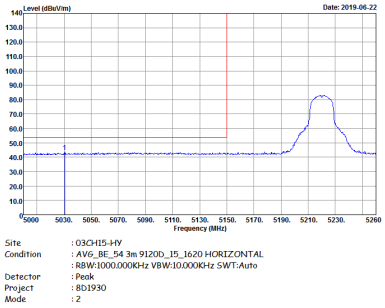
-L	**Low channel location**
-R	**High channel location**

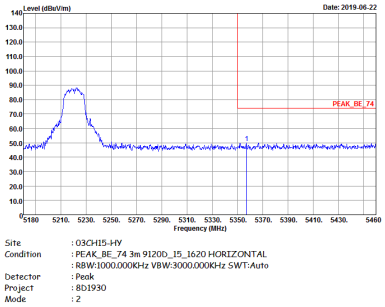
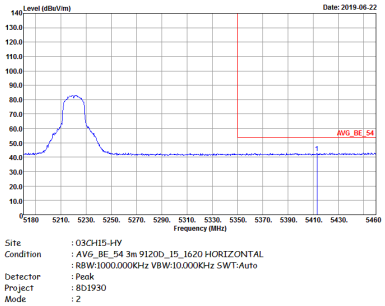
Band 1 - 5150~5250MHz

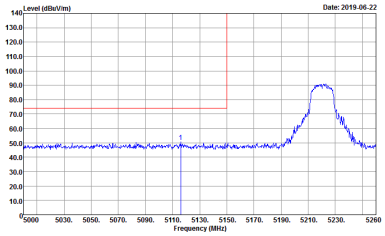
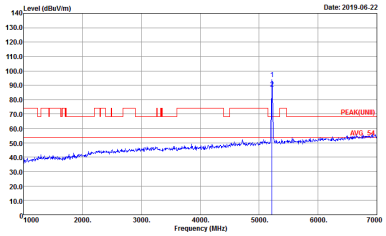
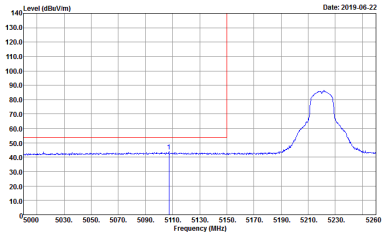
WIFI 802.11a (Band Edge @ 3m)

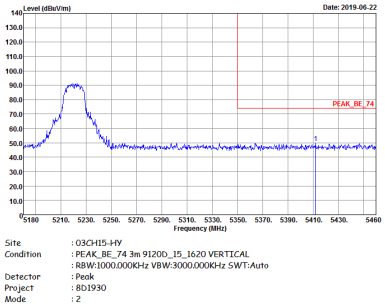
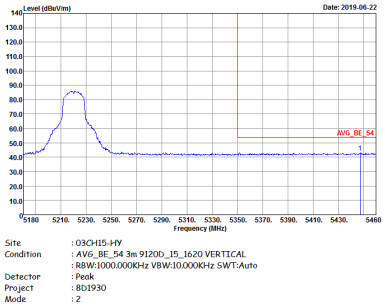
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11a CH36 5180MHz	
1	Horizontal	Fundamental
Peak		
Avg.		Left blank

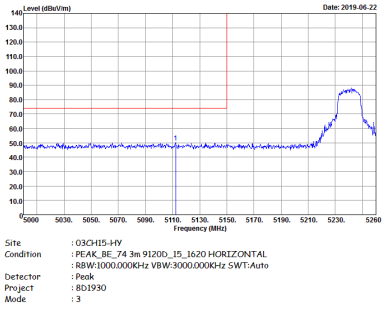
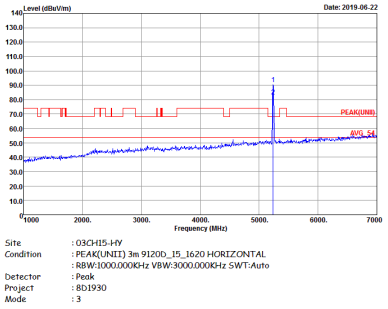
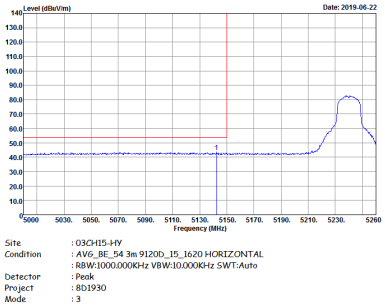
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11a CH36 5180MHz	
1	Vertical	Fundamental
Peak		
Avg.		Left blank

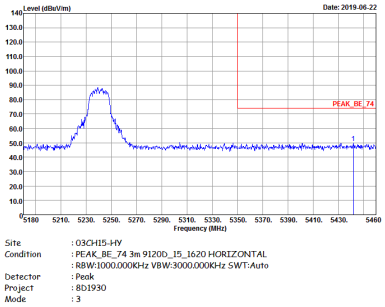
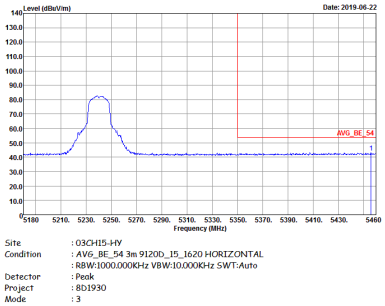
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11a CH44 5220MHz - L	
1	Horizontal	Fundamental
Peak		
Avg.		Left blank

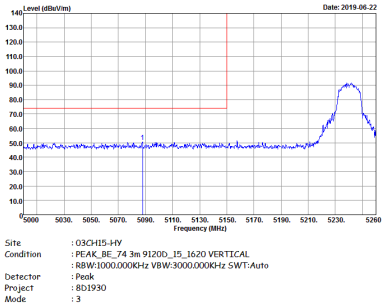
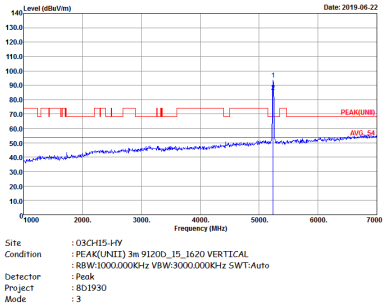
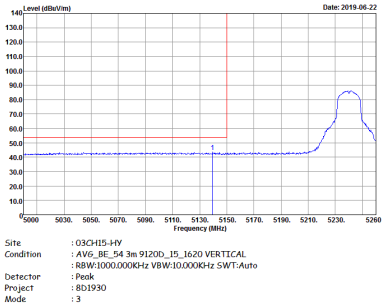
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11a CH44 5220MHz - R	
1	Horizontal	Fundamental
Peak		Left blank
Avg.		Left blank

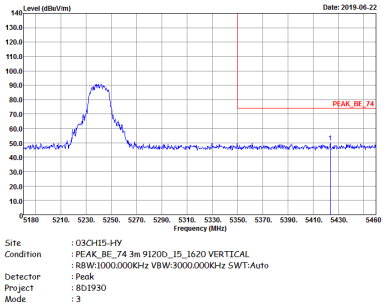
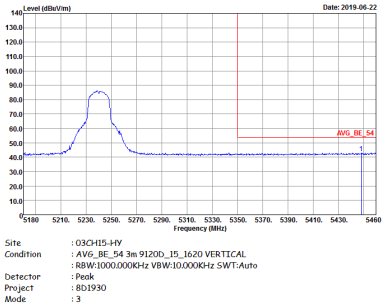
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11a CH44 5220MHz - L	
1	Vertical	Fundamental
Peak	 Site : 03CH15-HY Condition : PEAK_BE_74 3m 9120D_15_1620 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 8D1930 Mode : 2	 Site : 03CH15-HY Condition : PEAK(UNII) 3m 9120D_15_1620 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 8D1930 Mode : 2
Avg.	 Site : 03CH15-HY Condition : AVG_BE_54 3m 9120D_15_1620 VERTICAL : RBW:1000.000KHz VBW:10.000KHz SWT:Auto Detector : Peak Project : 8D1930 Mode : 2	Left blank

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

WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11a CH48 5240MHz - L	
1	Horizontal	Fundamental
Peak		
Avg.		Left blank

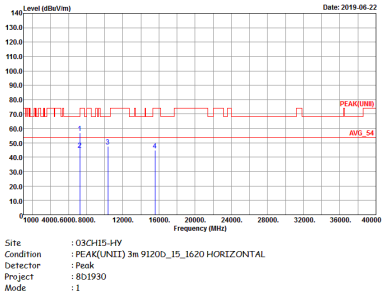
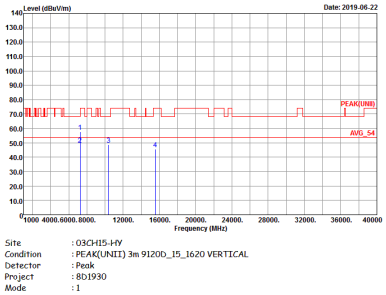
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11a CH48 5240MHz - R	
1	Horizontal	Fundamental
Peak		Left blank
Avg.		Left blank

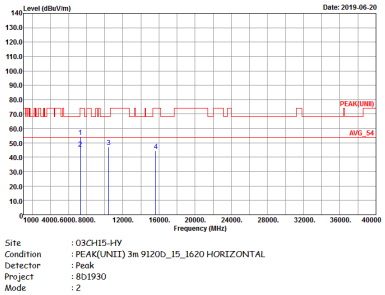
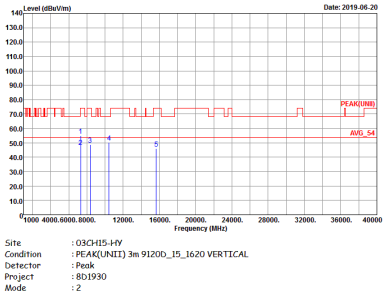
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11a CH48 5240MHz - L	
1	Vertical	Fundamental
Peak		
Avg.		Left blank

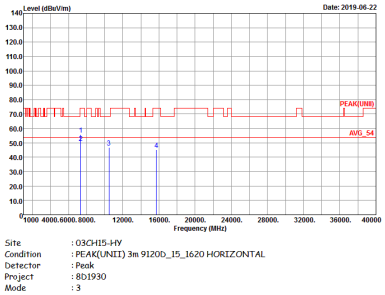
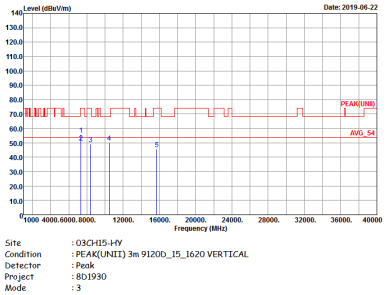
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11a CH48 5240MHz - R	
1	Vertical	Fundamental
Peak		Left blank
Avg.		Left blank

Band 1 - 5150~5250MHz

WIFI 802.11a (Harmonic @ 3m)

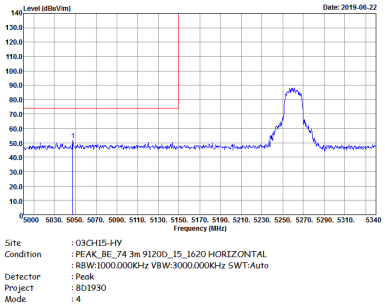
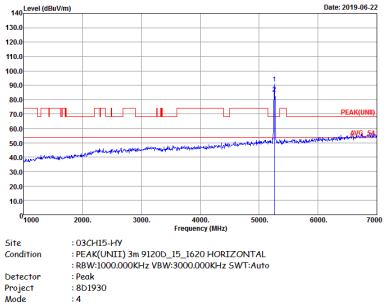
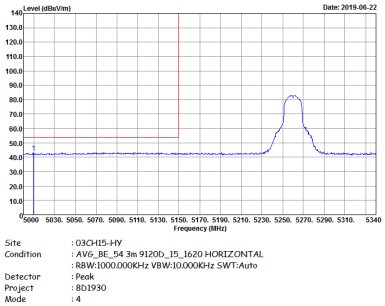
WIFI	Band 1 5150~5250MHz Harmonic @ 3m	
ANT	802.11a CH36 5180MHz	
1	Horizontal	Vertical
Peak Avg.		

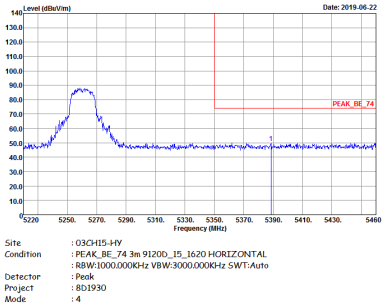
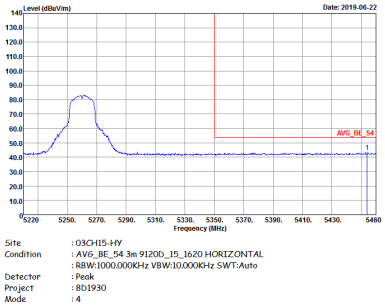
WIFI	Band 1 5150~5250MHz Harmonic @ 3m	
ANT	802.11a CH44 5220MHz	
1	Horizontal	Vertical
Peak Avg.		

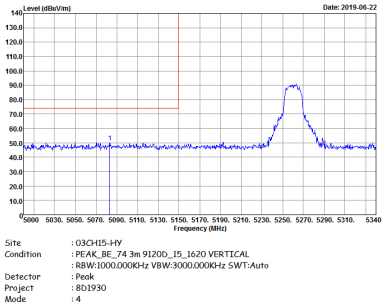
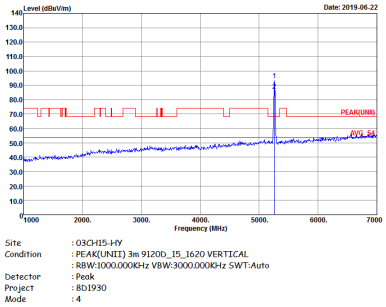
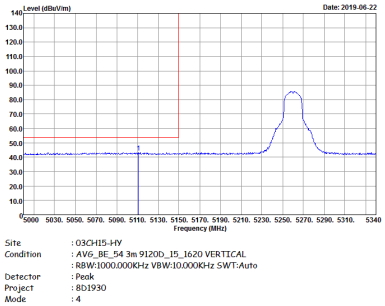
WIFI	Band 1 5150~5250MHz Harmonic @ 3m	
ANT	802.11a CH48 5240MHz	
1	Horizontal	Vertical
Peak Avg.		

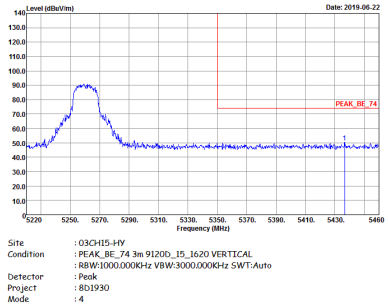
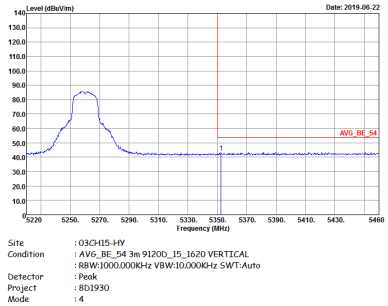
Band 2 - 5250~5350MHz

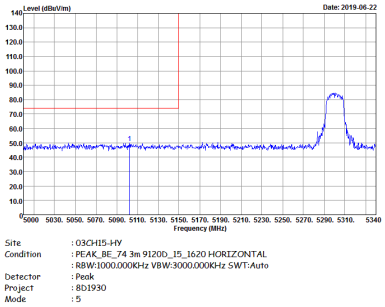
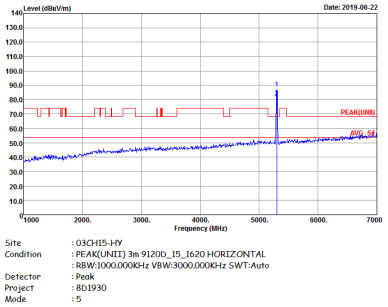
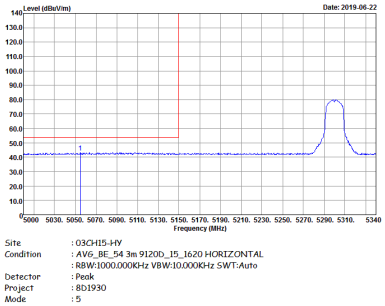
WIFI 802.11a (Band Edge @ 3m)

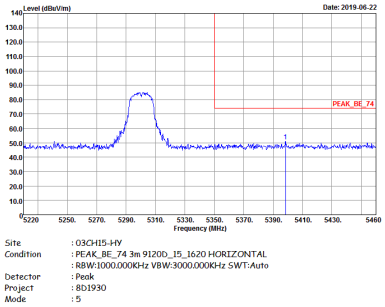
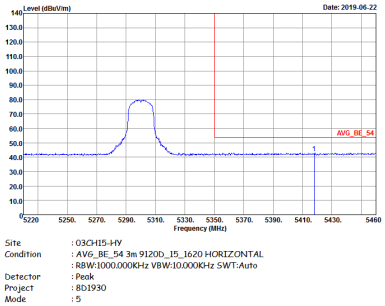
WIFI	Band 2 5250~5350MHz Band Edge @ 3m	
ANT	802.11a CH52 5260MHz - L	
1	Horizontal	Fundamental
Peak		
Avg.		Left blank

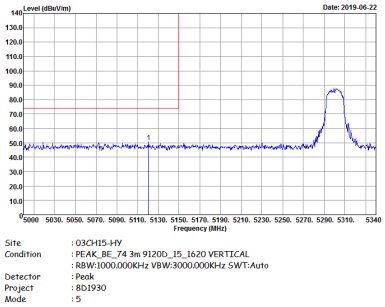
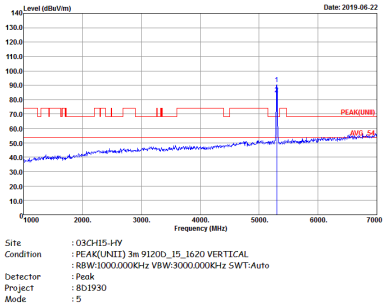
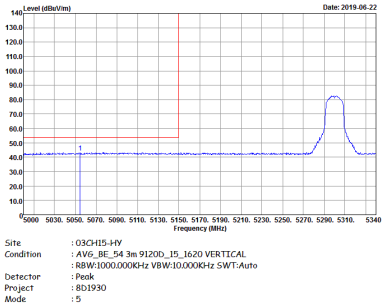
WIFI	Band 2 5250~5350MHz Band Edge @ 3m	
ANT	802.11a CH52 5260MHz - R	
1	Horizontal	Fundamental
Peak		Left blank
Avg.		Left blank

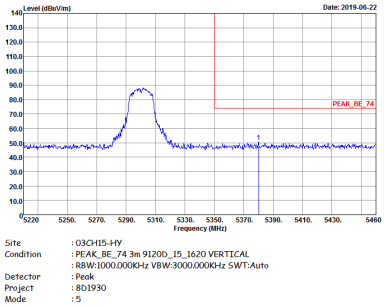
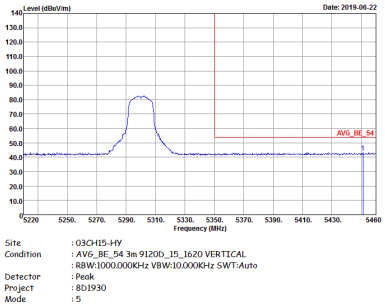
WIFI	Band 2 5250~5350MHz Band Edge @ 3m	
ANT	802.11a CH52 5260MHz - L	
1	Vertical	Fundamental
Peak		
Avg.		Left blank

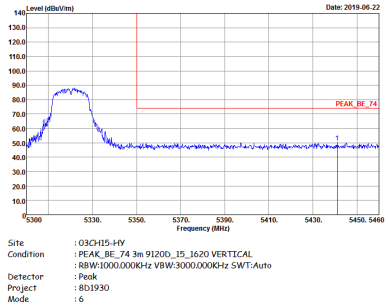
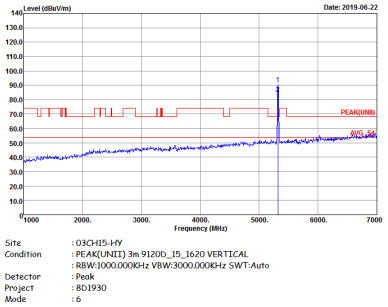
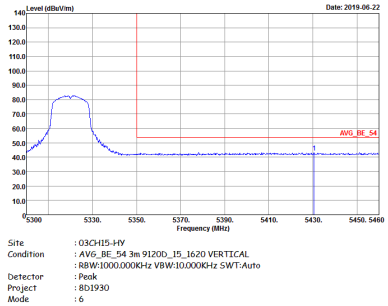
WIFI	Band 2 5250~5350MHz Band Edge @ 3m	
ANT	802.11a CH52 5260MHz - R	
1	Vertical	Fundamental
Peak		Left blank
Avg.		Left blank

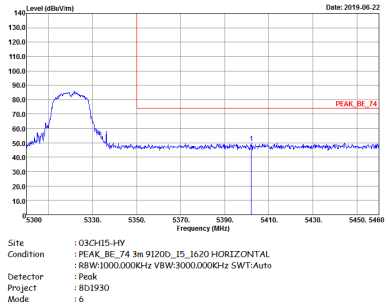
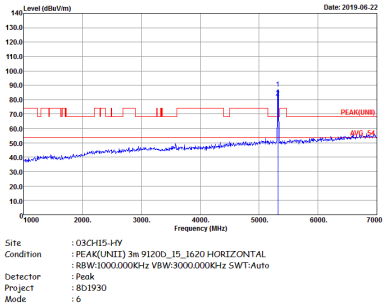
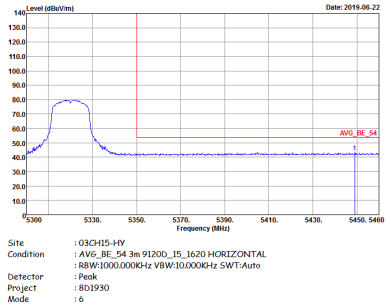
WIFI	Band 2 5250~5350MHz Band Edge @ 3m	
ANT	802.11a CH60 5300MHz - L	
1	Horizontal	Fundamental
Peak		
Avg.		Left blank

WIFI	Band 2 5250~5350MHz Band Edge @ 3m	
ANT	802.11a CH60 5300MHz - R	
1	Horizontal	Fundamental
Peak		Left blank
Avg.		Left blank

WIFI	Band 2 5250~5350MHz Band Edge @ 3m	
ANT	802.11a CH60 5300MHz - L	
1	Vertical	Fundamental
Peak		
Avg.		Left blank

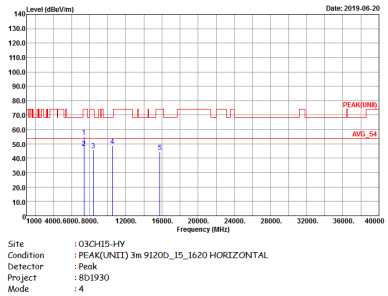
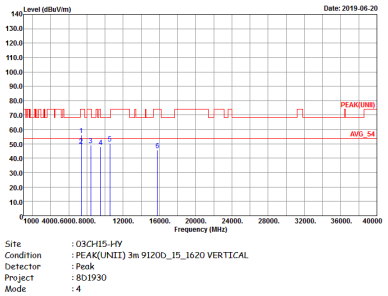
WIFI	Band 2 5250~5350MHz Band Edge @ 3m	
ANT	802.11a CH60 5300MHz - R	
1	Vertical	Fundamental
Peak		Left blank
Avg.		Left blank

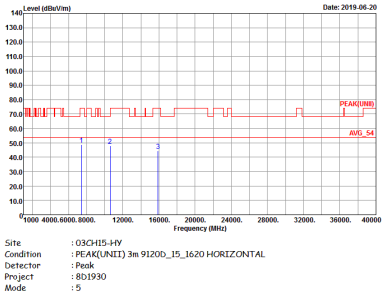
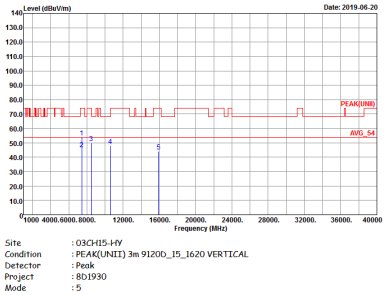
WIFI	Band 2 5250~5350MHz Band Edge @ 3m	
ANT	802.11a CH64 5320MHz	
1	Horizontal	Fundamental
Peak		
Avg.		Left blank

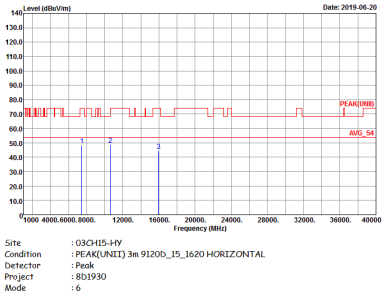
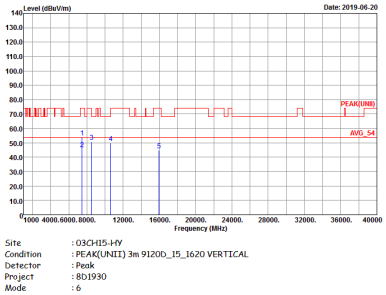
WIFI	Band 2 5250~5350MHz Band Edge @ 3m	
ANT	802.11a CH64 5320MHz	
1	Vertical	Fundamental
Peak		
Avg.		Left blank

Band 2 - 5250~5350MHz

WIFI 802.11a (Harmonic @ 3m)

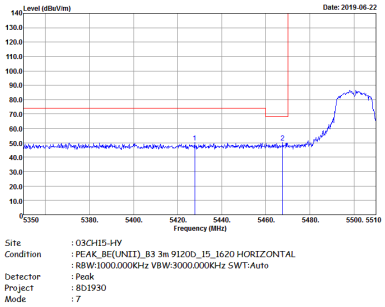
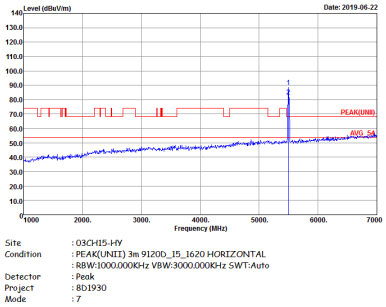
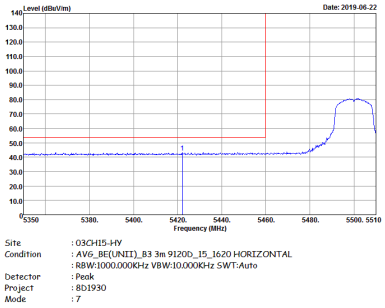
WIFI	Band 2 5250~5350MHz Harmonic @ 3m	
ANT	802.11a CH52 5260MHz	
1	Horizontal	Vertical
Peak Avg.		

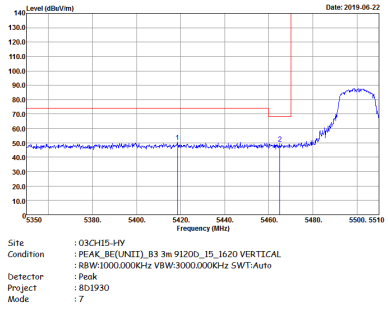
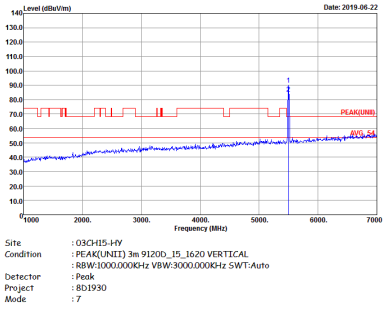
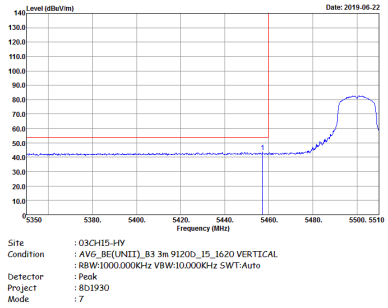
WIFI	Band 2 5250~5350MHz Harmonic @ 3m	
ANT	802.11a CH60 5300MHz	
1	Horizontal	Vertical
Peak Avg.		

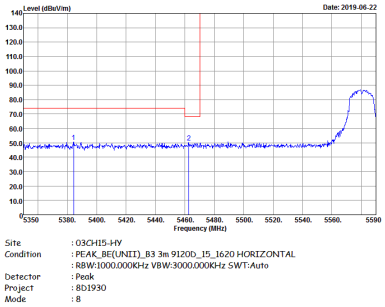
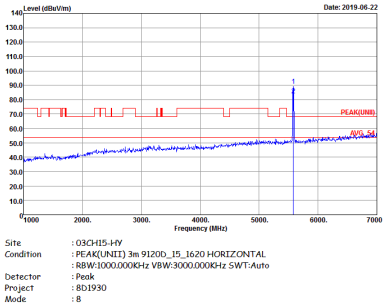
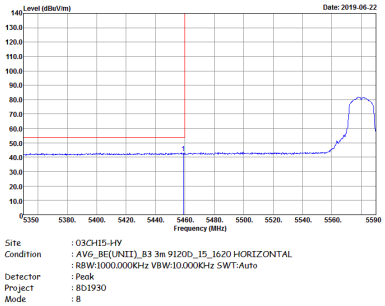
WIFI	Band 2 5250~5350MHz Harmonic @ 3m	
ANT	802.11a CH64 5320MHz	
1	Horizontal	Vertical
Peak Avg.	 Site : 03CH15-HY Condition : PEAK(UNII) 3m 9120D_15_1620 HORIZONTAL Detector : Peak Project : 8D1930 Mode : 6	 Site : 03CH15-HY Condition : PEAK(UNII) 3m 9120D_15_1620 VERTICAL Detector : Peak Project : 8D1930 Mode : 6

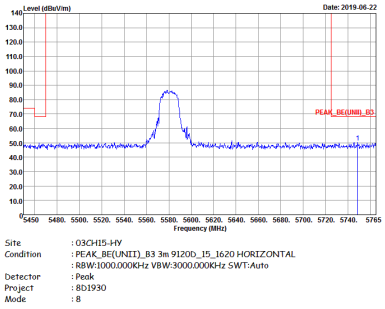
Band 3 - 5470~5725MHz

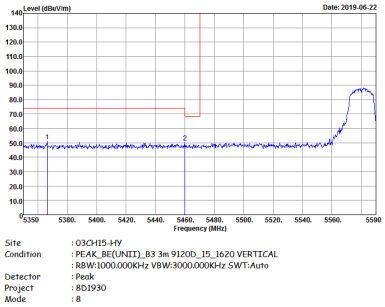
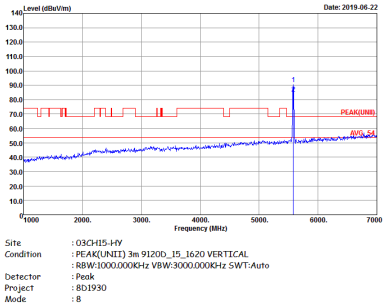
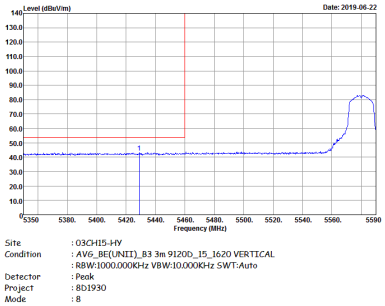
WIFI 802.11a (Band Edge @ 3m)

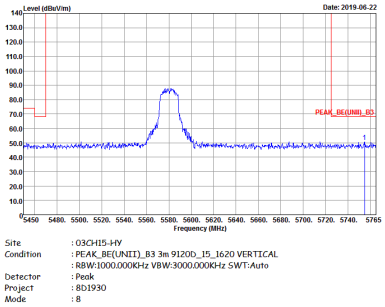
WIFI	Band 3 5470~5725MHz Band Edge @ 3m	
ANT	802.11a CH100 5500MHz	
1	Horizontal	Fundamental
Peak		
Avg.		Left blank

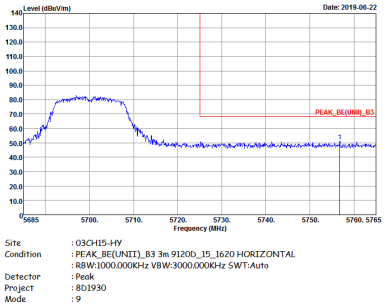
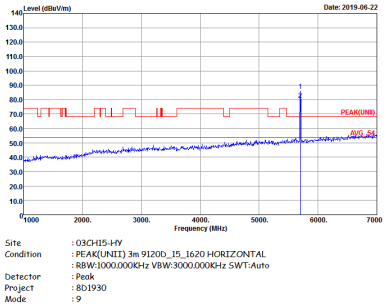
WIFI	Band 3 5470~5725MHz Band Edge @ 3m	
ANT	802.11a CH100 5500MHz	
1	Vertical	Fundamental
Peak		
Avg.		Left blank

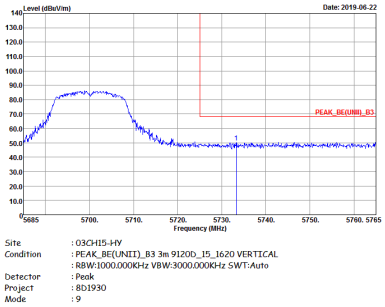
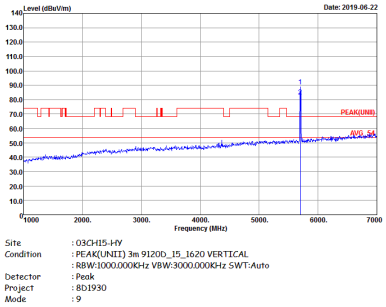
WIFI	Band 3 5470~5725MHz Band Edge @ 3m	
ANT	802.11a CH116 5580MHz - L	
1	Horizontal	Fundamental
Peak		
Avg.		Left blank

WIFI	Band 3 5470~5725MHz Band Edge @ 3m	
ANT	802.11a CH116 5580MHz - R	
1	Horizontal	Fundamental
Peak		Left blank

WIFI	Band 3 5470~5725MHz Band Edge @ 3m	
ANT	802.11a CH116 5580MHz - L	
1	Vertical	Fundamental
Peak		
Avg.		Left blank

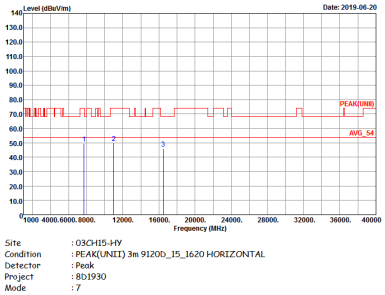
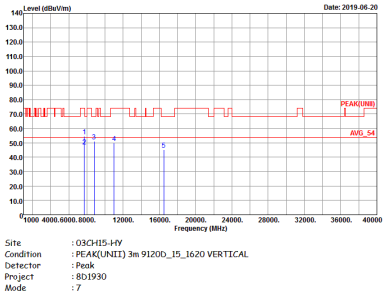
WIFI	Band 3 5470~5725MHz Band Edge @ 3m	
ANT	802.11a CH116 5580MHz - R	
1	Vertical	Fundamental
Peak		Left blank

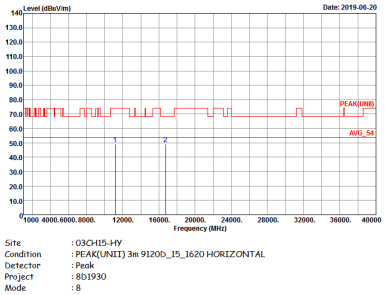
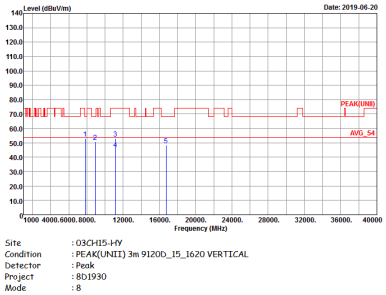
WIFI	Band 3 5470~5725MHz Band Edge @ 3m	
ANT	802.11a CH140 5700MHz	
1	Horizontal	Fundamental
Peak		

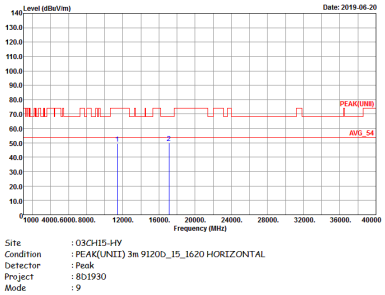
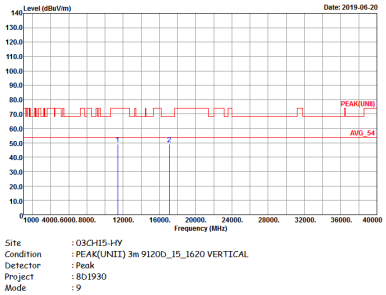
WIFI	Band 3 5470~5725MHz Band Edge @ 3m	
ANT	802.11a CH140 5700MHz	
1	Vertical	Fundamental
Peak		

Band 3 - 5470~5725MHz

WIFI 802.11a (Harmonic @ 3m)

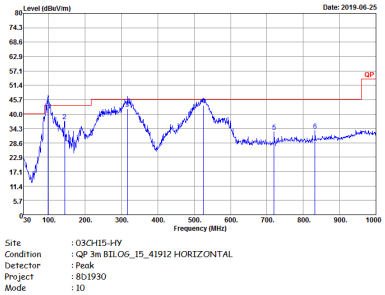
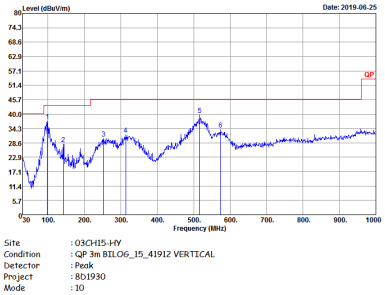
WIFI	Band 3 5470~5725MHz Harmonic @ 3m	
ANT	802.11a CH100 5500MHz	
1	Horizontal	Vertical
Peak Avg.		

WIFI	Band 3 5470~5725MHz Harmonic @ 3m	
ANT	802.11a CH116 5580MHz	
1	Horizontal	Vertical
Peak Avg.		

WIFI	Band 3 5470~5725MHz Harmonic @ 3m	
ANT	802.11a CH140 5700MHz	
1	Horizontal	Vertical
Peak Avg.		

Emission below 1GHz

5GHz WIFI 802.11a (LF)

WIFI	5GHz WIFI	
ANT	802.11a LF	
1	Horizontal	Vertical
QP / Peak		

Appendix G. Duty Cycle Plots

Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting
802.11a	30.30	158	6.33	10kHz

802.11a