FCC RADIO TEST REPORT

FCC ID	:	**2AP7S-6784**
Equipment	:	**Tablet**
Model Name	:	**M8S26G**
Applicant	:	**First Stride LLC** **6385 Old Shady Oak Rd., Ste 250** **Eden Prairie** **Minnesota** **55344**
Standard	:	**FCC Part 15 Subpart E §15.407**

The test was completed on Oct. 23, 2018. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The 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: Joseph Lin

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

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History of this test report

Report No.	Version	Description	Issued Date
FR872106-01D	01	Initial issue of report	Oct. 29, 2018

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)
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
3.5	15.207	AC Conducted Emission	Pass
3.6	15.407(c)	Automatically Discontinue Transmission	Pass
3.7	15.203 15.407(a)	Antenna Requirement	Pass

Reviewed by: Wii Chang

Report Producer: Nancy Yang

1 General Description

1.1 Product Feature of Equipment Under Test

Product Feature	
Equipment	Tablet
Model Name	M8S26G
FCC ID	2AP7S-6784
EUT supports Radios application	WLAN 11b/g/n HT20 WLAN 11a/n HT20/HT40 Bluetooth BR/EDR/LE

1.2 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx/Rx Frequency Range	5180 MHz ~ 5240 MHz
Maximum Output Power to Antenna	802.11a : 14.45 dBm / 0.0279 W 802.11n HT20 : 14.45 dBm / 0.0279 W 802.11n HT40 : 14.49 dBm / 0.0281 W
99% Occupied Bandwidth	802.11a : 16.70 MHz 802.11 n HT20 : 17.70 MHz 802.11 n HT40 : 36.30 MHz
Antenna Type / Gain	Fixed Internal Antenna with gain 0.80 dBi
Type of Modulation	802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)

1.3 Modification of EUT

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

1.4 Testing Location

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and the FCC designation No. TW1190 and TW0007 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC Test.

Test Site	SPORTON INTERNATIONAL INC.		
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	DFS02-HY

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

Test Site	SPORTON INTERNATIONAL INC.
Test Site Location	No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855
Test Site No.	**Sporton Site No.**
	03CH16-HY

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

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

2 Test Configuration of Equipment Under Test

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 (Z 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
	38*	5190	46*	5230
	40	5200	48	5240
	-	-		

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

2.2 Test Mode

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

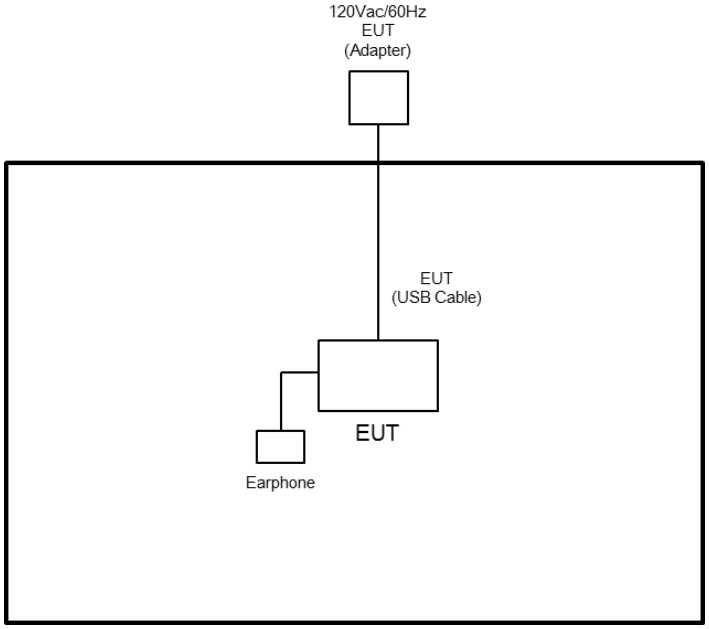
Modulation	Data Rate
802.11a	**6 Mbps**
802.11n HT20	**MCS0**
802.11n HT40	**MCS0**

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

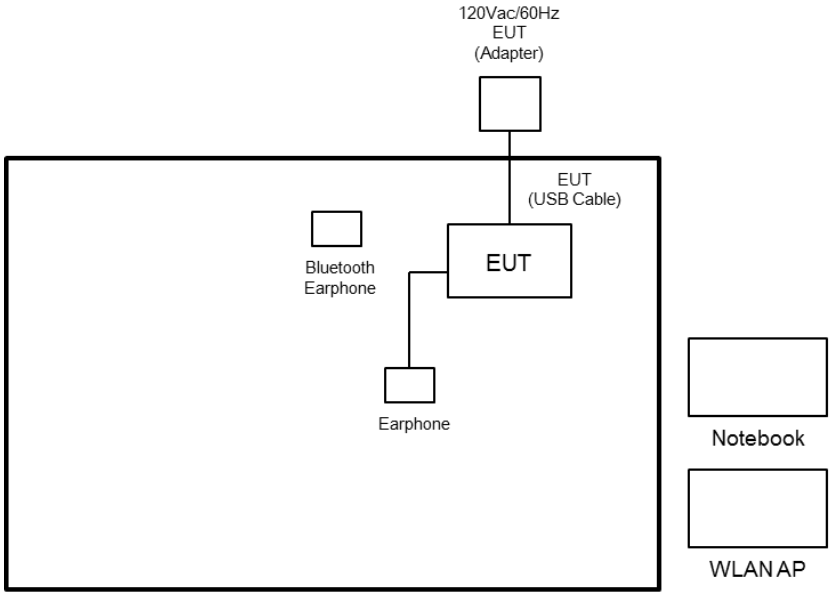
Ch. #		Band I：5150-5250 MHz		
		802.11a	**802.11n HT20**	**802.11n HT40**
L	**Low**	36	36	38
M	**Middle**	44	44	-
H	**High**	48	48	46

2.3 Connection Diagram of Test System

<WLAN Tx Mode>



<AC Conducted Emission Mode>



2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Bluetooth Earphone	Sony Ericsson	MW600	PY7DDA-2029	N/A	N/A
2.	WLAN AP	ASUS	RT-AC66U	MSQ-RTAC66U	N/A	Unshielded, 1.8 m
3.	SD Card	SanDisk	MicroSD HC	FCC DoC	N/A	N/A
4.	Notebook	DELL	Latitude E6320	FCC DoC/ Contains FCC ID: QDS-BRCM1054	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
5.	Earphone	Sony	MH755	N/A	N/A	N/A
6.	Earphone	N/A	N/A	Verification	Unshielded, 1.15m	N/A

2.5 EUT Operation Test Setup

The RF test items, utility “CMD” 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 4.2 dB and 10dB attenuator.

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

= 4.2 + 10 = 14.2 (dB)

3 Test Result

3.1 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.

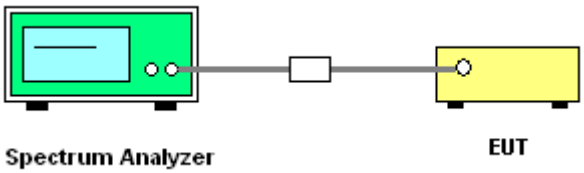
3.1.2 Measuring Instruments

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.

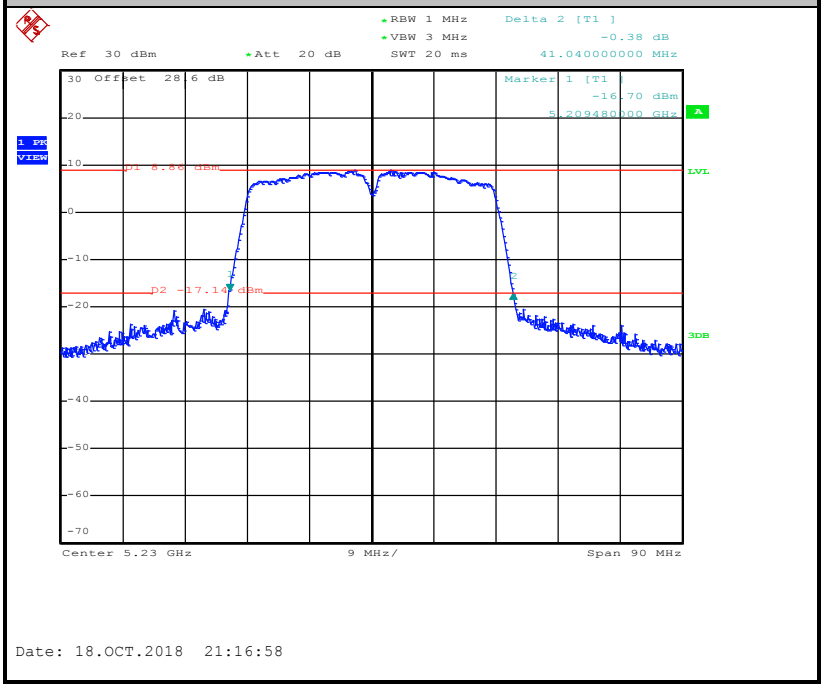
3.1.4 Test Setup



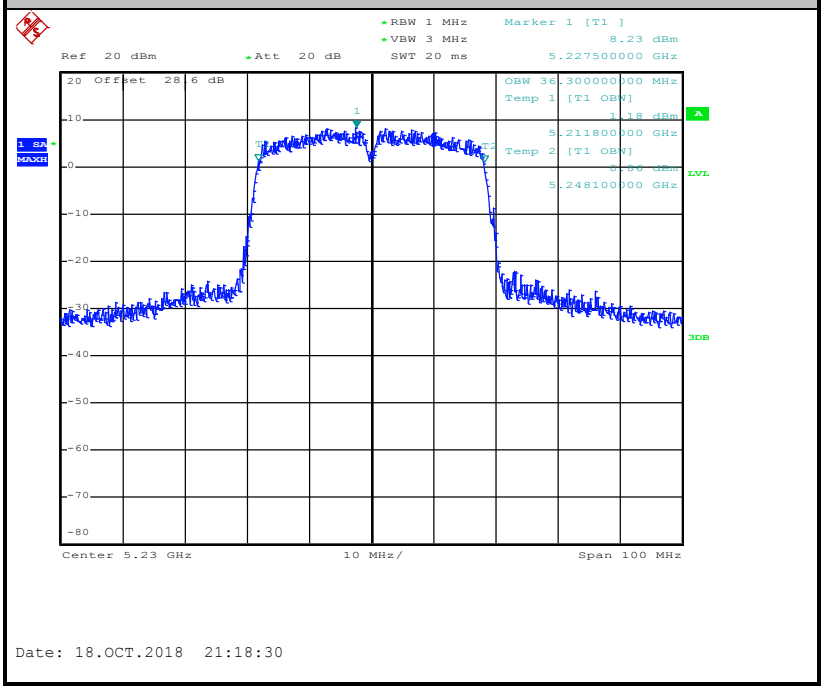
3.1.5 Test Result of 26dB & 99% Occupied Bandwidth

Please refer to Appendix A.

Maximum 26dB Bandwidth



Maximum 99% Occupied Bandwidth



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

3.2 Maximum Conducted Output Power Measurement

3.2.1 Limit of Maximum Conducted Output Power

<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.

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

3.2.2 Measuring Instruments

See list of measuring equipment of this test report.

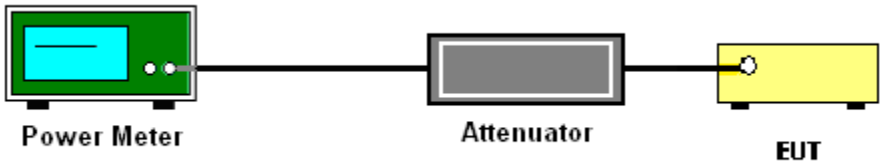
3.2.3 Test Procedures

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

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

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

3.2.4 Test Setup



3.2.5 Test Result of Maximum Conducted Output Power

Please refer to Appendix A.

3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

<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.

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.

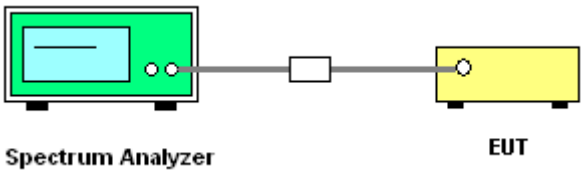
 # Method SA-2 #

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

- Measure the duty cycle.
- Set span to encompass the entire emission bandwidth (EBW) of the signal.
- Set RBW = 1 MHz.
- Set VBW ≥ 3 MHz.
- Number of points in sweep ≥ 2 Span / RBW.
- Sweep time = auto.
- Detector = RMS
- Trace average at least 100 traces in power averaging mode.
- Add 10 log(1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times. For example, add 10 log(1/0.25) = 6 dB if the duty cycle is 25 percent.

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

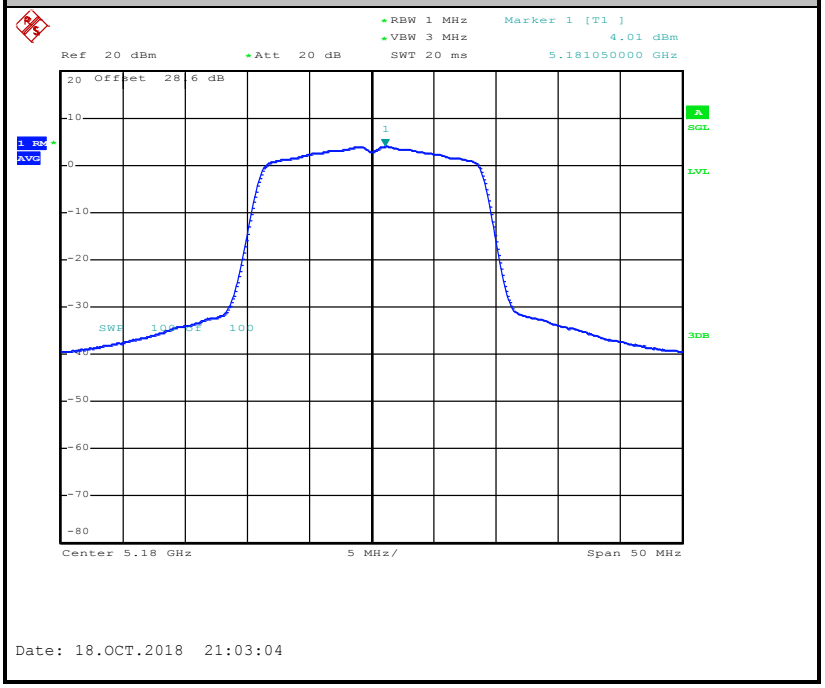
3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.

Worst Case Power Density (dBm/MHz)



Note: Average Power Density (dB) = Measured value+ Duty Factor

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.

(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

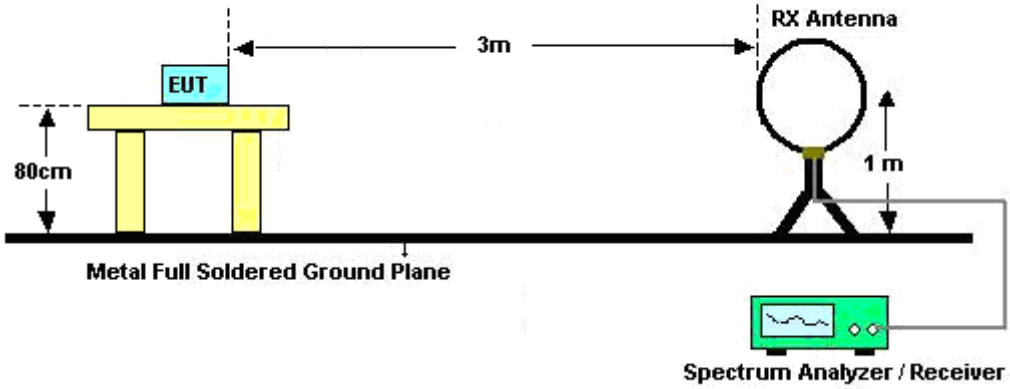
(3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz

- 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.

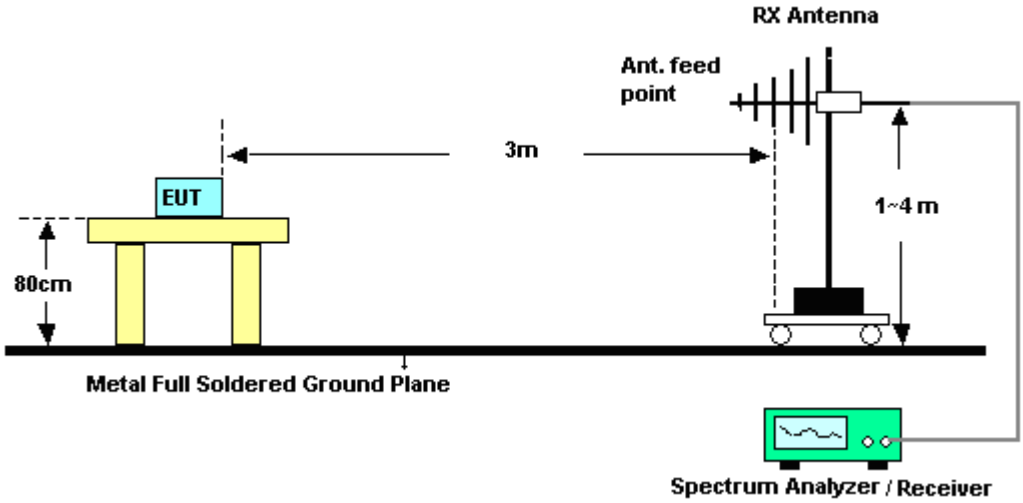
2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband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

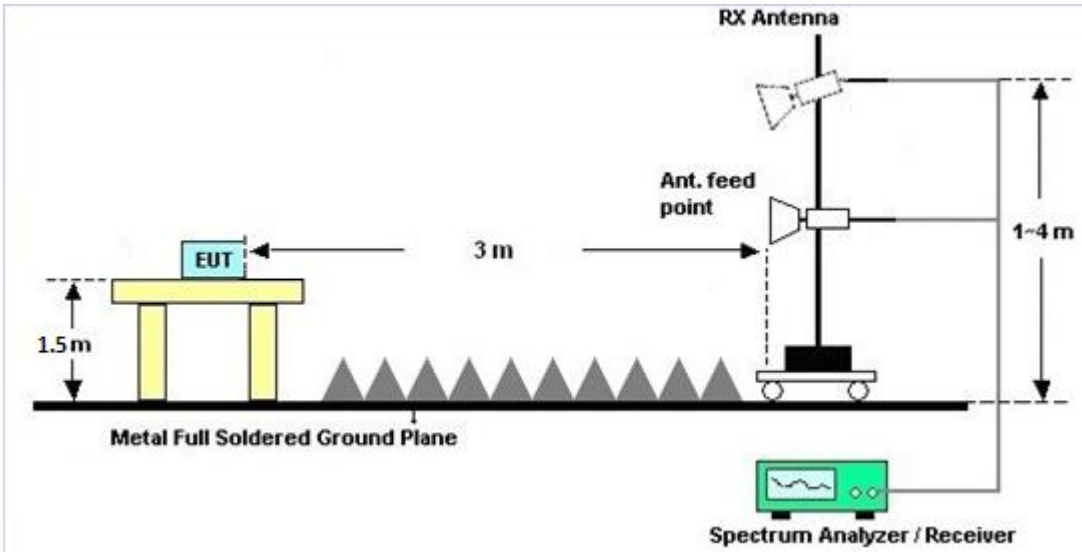
For radiated emissions below 30MHz



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 Radiated Spurious at Band Edges

Please refer to Appendix C and D.

3.4.7 Duty Cycle

Please refer to Appendix E.

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

Please refer to Appendix C and D.

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.

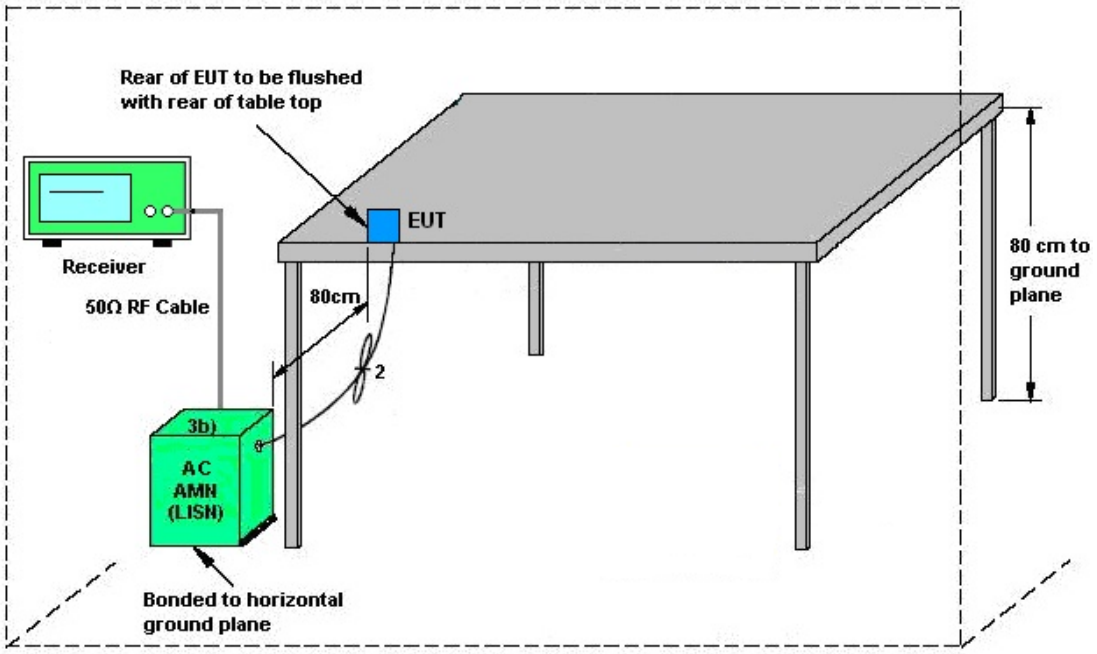
3.5.2 Measuring Instruments

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

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

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

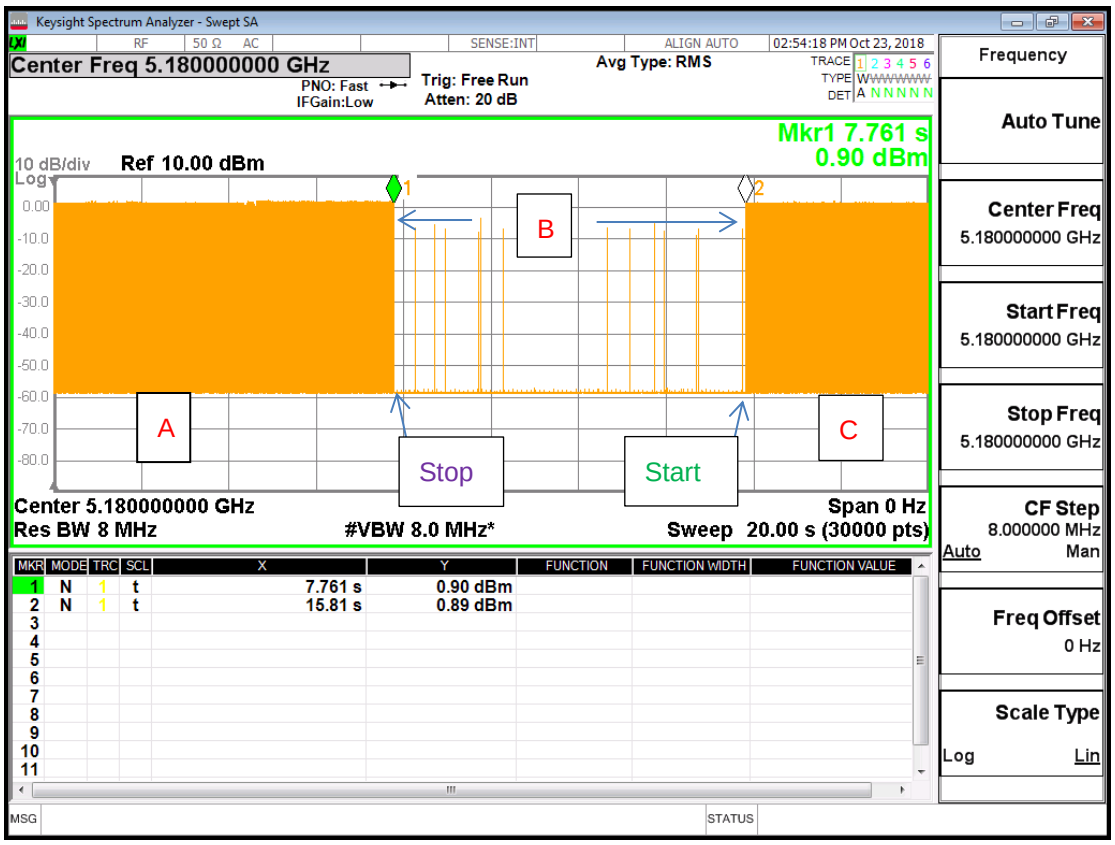
B. Information stop: stop supplying information to the access point.

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

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

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

5180MHz



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

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
Power Meter	Anritsu	ML2495A	1132003	N/A	Aug. 16, 2018	Sep. 28, 2018~ Oct. 18, 2018	Aug. 15, 2019	Conducted (TH05-HY)
Power Sensor	Anritsu	MA2411B	1126017	300MHz~40GHz	Aug. 16, 2018	Sep. 28, 2018~ Oct. 18, 2018	Aug. 15, 2019	Conducted (TH05-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP30	101067	9kHz ~ 30GHz	Nov. 13, 2017	Sep. 28, 2018~ Oct. 18, 2018	Nov. 12, 2018	Conducted (TH05-HY)
Switch Box & RF Cable	Burgeon	ETF-058	EC1300484	N/A	Mar. 01, 2018	Sep. 28, 2018~ Oct. 18, 2018	Feb. 28, 2019	Conducted (TH05-HY)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Oct. 21, 2018	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102388	9KHz~3.6GHz	Dec. 08, 2017	Oct. 21, 2018	Dec. 07, 2018	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Nov. 30, 2017	Oct. 21, 2018	Nov. 29, 2018	Conduction (CO05-HY)
Software	Rohde & Schwarz	EMC32 V10.30	N/A	N/A	N/A	Oct. 21, 2018	N/A	Conduction (CO05-HY)
LF Cable	HUBER + SUHNER	RG-214/U	LF01	N/A	Jan. 03, 2018	Oct. 21, 2018	Jan. 02, 2019	Conduction (CO05-HY)
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100851	N/A	Jan. 03, 2018	Oct. 21, 2018	Jan. 02, 2019	Conduction (CO05-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~30 MHz	Nov. 23, 2017	Oct. 04, 2018 ~ Oct. 18, 2018	Nov. 22, 2018	Radiation (03CH16-HY)
Amplifier	SONOMA	310N	187312	9kHz~1GHz	Jan. 16, 2018	Oct. 04, 2018 ~ Oct. 18, 2018	Jan. 15, 2019	Radiation (03CH16-HY)
Bilog Antenna	TESEQ	CBL6111D&00802N1D01N-06	47020&06	30MHz to 1GHz	Nov. 20, 2017	Oct. 04, 2018 ~ Oct. 18, 2018	Nov. 19, 2018	Radiation (03CH16-HY)
EMI Test Receiver	Keysight	N9038A (MXE)	MY57290111	3Hz~26.5GHz	Nov. 02, 2017	Oct. 04, 2018 ~ Oct. 18, 2018	Nov. 01, 2018	Radiation (03CH16-HY)
Spectrum Analyzer	Agilent	N9030A	MY52350276	3Hz~44GHz	Mar. 27, 2018	Oct. 04, 2018 ~ Oct. 18, 2018	Mar. 26, 2019	Radiation (03CH16-HY)
Preamplifier	Jet-Power	JPA0118-55-303	1710001800054001	1GHz~18GHz	Apr. 16, 2018	Oct. 04, 2018 ~ Oct. 18, 2018	Apr. 15, 2019	Radiation (03CH16-HY)
Preamplifier	Keysight	83017A	MY53270264	1GHz ~ 26.5GHz	Dec. 05, 2017	Oct. 04, 2018 ~ Oct. 18, 2018	Dec. 04, 2018	Radiation (03CH16-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1522	1G~18GHz	May 10, 2018	Oct. 04, 2018 ~ Oct. 18, 2018	May 09, 2019	Radiation (03CH16-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY9837/4PE	9kHz-30MHz	Mar. 14, 2018	Oct. 04, 2018 ~ Oct. 18, 2018	Mar. 13, 2019	Radiation (03CH16-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170576	18GHz ~ 40GHz	Nov. 27, 2017	Oct. 04, 2018 ~ Oct. 18, 2018	Nov. 26, 2018	Radiation (03CH16-HY)
Preamplifier	EMEC	EM18G40G	060715	18GHz ~ 40GHz	Dec. 05, 2017	Oct. 04, 2018 ~ Oct. 18, 2018	Dec. 04, 2018	Radiation (03CH16-HY)
Antenna Mast	ChainTek	MBS-520-1	N/A	1m~4m	N/A	Oct. 04, 2018 ~ Oct. 18, 2018	N/A	Radiation (03CH16-HY)
Turn Table	ChainTek	T-200-S-1	N/A	0~360 Degree	N/A	Oct. 04, 2018 ~ Oct. 18, 2018	N/A	Radiation (03CH16-HY)
Software	AUDIX	E3 6.2009-8-24	RK001136	N/A	N/A	Oct. 04, 2018 ~ Oct. 18, 2018	N/A	Radiation (03CH16-HY)
Filter	Woken	WHKX8-5872.5-6750-18000-40ST	SN3	6.75GHz High Pass	Sep. 18, 2018	Oct. 04, 2018~ Oct. 18, 2018	Sep. 17, 2019	Radiation (03CH16-HY)
Filter	Wainwright	WHKX12-2700-3000-18000-60SS	SN2	3G High Pass	Sep. 18, 2018	Oct. 04, 2018~ Oct. 18, 2018	Sep. 17, 2019	Radiation (03CH16-HY)
Spectrum Analyzer	Keysight	N9010A	MY57120184	10Hz~7GHz	Nov. 08, 2017	Oct. 23, 2018	Nov. 07, 2018	DFS (DFS02-HY)

5 Uncertainty of Evaluation

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

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

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

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

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.8

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	3.9

Appendix A. Test Result of Conducted Test Items

Test Engineer:	Shiming Liu/AnAn Wu	Temperature:	21~25	°C
Test Date:	2018/9/28~2018/10/18	Relative Humidity:	51~54	%

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	16.70	-	21.30	-	-		22.23	-		
11a	6Mbps	1	44	5220	16.65	-	21.05	-	-		22.21	-		
11a	6Mbps	1	48	5240	16.70	-	21.40	-	-		22.23	-		
HT20	MCS0	1	36	5180	17.70	-	21.35	-	-		22.48	-		
HT20	MCS0	1	44	5220	17.70	-	21.30	-	-		22.48	-		
HT20	MCS0	1	48	5240	17.70	-	21.60	-	-		22.48	-		
HT40	MCS0	1	38	5190	36.20	-	40.86	-	-		23.01	-		
HT40	MCS0	1	46	5230	36.30	-	41.04	-	-		23.01	-		

Report Number : FR872106-01D

TEST RESULTS DATA
Average Power Table

FCC Band I															
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)		Average Conducted Power (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)			Pass/Fail
					Ant 1	Ant 2	Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2		
11a	6Mbps	1	36	5180	0.00	-	14.45	-		24.00	-	0.80	-		Pass
11a	6Mbps	1	44	5220	0.00	-	14.40	-		24.00	-	0.80	-		Pass
11a	6Mbps	1	48	5240	0.00	-	14.43	-		24.00	-	0.80	-		Pass
HT20	MCS0	1	36	5180	0.00	-	14.45	-		24.00	-	0.80	-		Pass
HT20	MCS0	1	44	5220	0.00	-	14.42	-		24.00	-	0.80	-		Pass
HT20	MCS0	1	48	5240	0.00	-	14.43	-		24.00	-	0.80	-		Pass
HT40	MCS0	1	38	5190	0.00	-	13.46	-		24.00	-	0.80	-		Pass
HT40	MCS0	1	46	5230	0.00	-	14.49	-		24.00	-	0.80	-		Pass

Report Number : FR872106-01D

TEST RESULTS DATA
Power Spectral Density

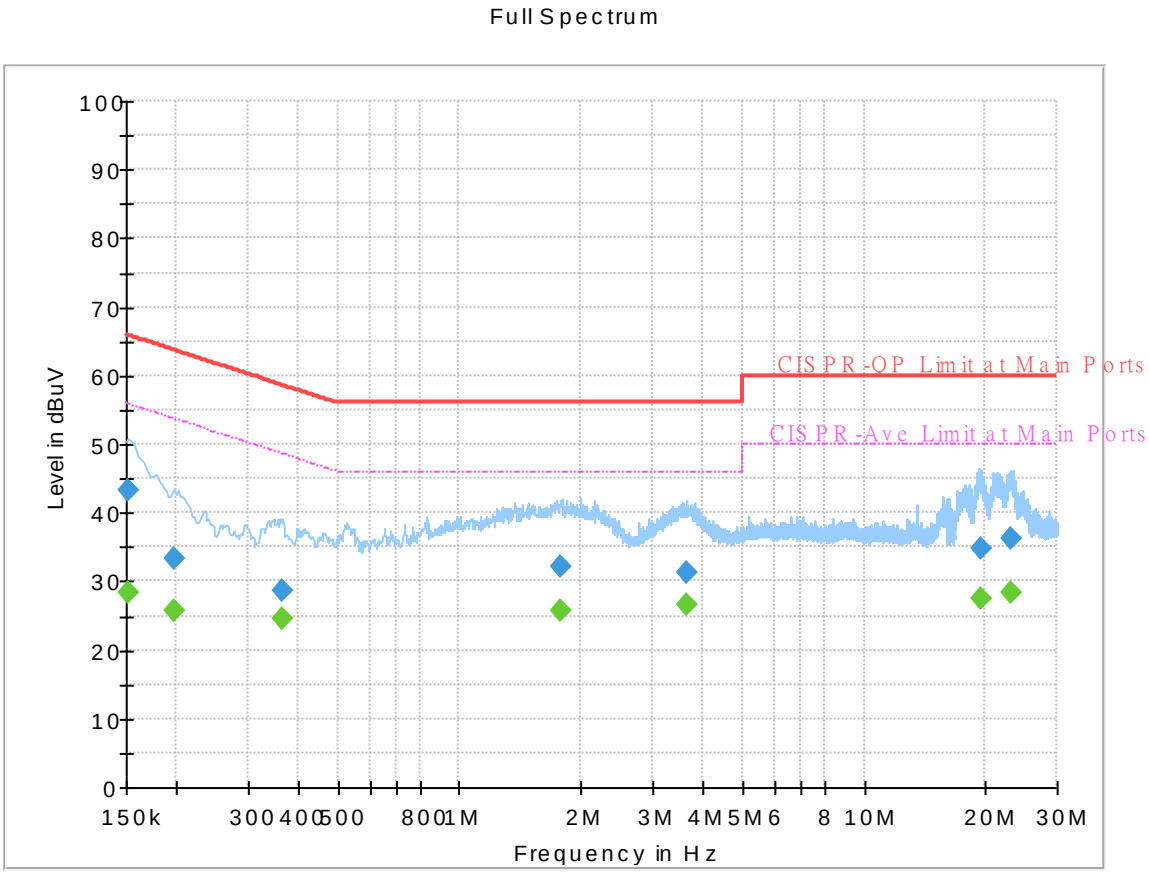
FCC Band I															
Mod.	Data Rate	N_{TX}	CH.	Freq. (MHz)	Duty Factor (dB)		Average Power Density (dBm/MHz)			Average PSD Limit (dBm/MHz)		DG (dBi)			Pass /Fail
					Ant 1	Ant 2	Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2		
11a	6Mbps	1	36	5180	0.00	-	4.00	-		11.00	-	0.80	-		Pass
11a	6Mbps	1	44	5220	0.00	-	3.99	-		11.00	-	0.80	-		Pass
11a	6Mbps	1	48	5240	0.00	-	3.84	-		11.00	-	0.80	-		Pass
HT20	MCS0	1	36	5180	0.00	-	4.01	-		11.00	-	0.80	-		Pass
HT20	MCS0	1	44	5220	0.00	-	3.65	-		11.00	-	0.80	-		Pass
HT20	MCS0	1	48	5240	0.00	-	3.60	-		11.00	-	0.80	-		Pass
HT40	MCS0	1	38	5190	0.00	-	-0.46	-		11.00	-	0.80	-		Pass
HT40	MCS0	1	46	5230	0.00	-	0.20	-		11.00	-	0.80	-		Pass

Appendix B. AC Conducted Emission Test Results

Test Engineer :	Rick Lin	**Temperature :**	21~24℃
		Relative Humidity :	51~53%

EUT Information

Report NO :	872106-01
Test Mode :	Mode 1
Test Voltage :	120Vac/60Hz
Phase :	Line

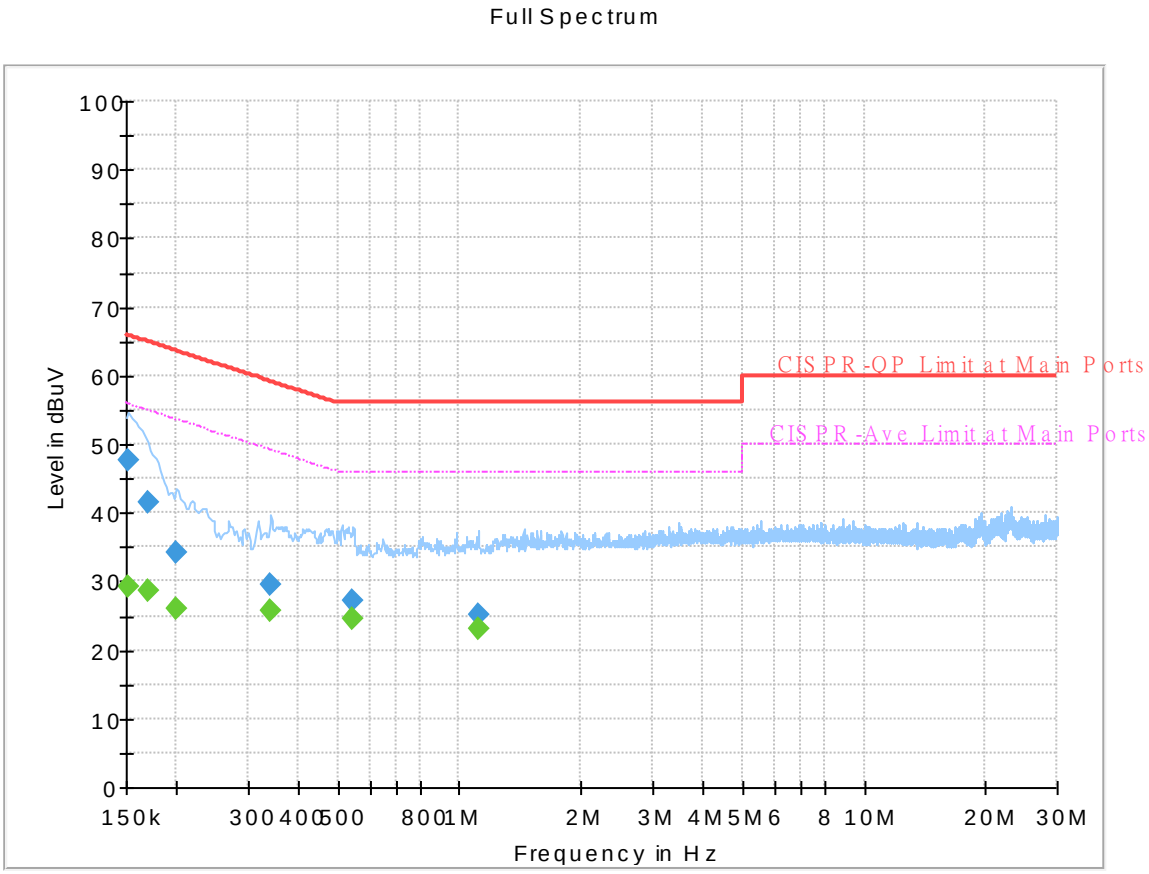


Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.152250	---	28.40	55.88	27.48	L1	OFF	19.5
0.152250	43.24	---	65.88	22.64	L1	OFF	19.5
0.197250	---	25.69	53.73	28.04	L1	OFF	19.5
0.197250	33.25	---	63.73	30.48	L1	OFF	19.5
0.366000	---	24.55	48.59	24.04	L1	OFF	19.5
0.366000	28.72	---	58.59	29.87	L1	OFF	19.5
1.772250	---	25.69	46.00	20.31	L1	OFF	19.6
1.772250	32.14	---	56.00	23.86	L1	OFF	19.6
3.637500	---	26.46	46.00	19.54	L1	OFF	19.7
3.637500	31.16	---	56.00	24.84	L1	OFF	19.7
19.554000	---	27.54	50.00	22.46	L1	OFF	20.2
19.554000	34.76	---	60.00	25.24	L1	OFF	20.2
23.082000	---	28.42	50.00	21.58	L1	OFF	20.3
23.082000	36.18	---	60.00	23.82	L1	OFF	20.3

EUT Information

Report NO :	872106-01
Test Mode :	Mode 1
Test Voltage :	120Vac/60Hz
Phase :	Neutral



Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.152250	---	29.30	55.88	26.58	N	OFF	19.5
0.152250	47.58	---	65.88	18.30	N	OFF	19.5
0.170250	---	28.74	54.95	26.21	N	OFF	19.5
0.170250	41.42	---	64.95	23.53	N	OFF	19.5
0.199500	---	26.12	53.63	27.51	N	OFF	19.5
0.199500	34.10	---	63.63	29.53	N	OFF	19.5
0.341250	---	25.70	49.17	23.47	N	OFF	19.5
0.341250	29.61	---	59.17	29.56	N	OFF	19.5
0.546000	---	24.43	46.00	21.57	N	OFF	19.5
0.546000	27.23	---	56.00	28.77	N	OFF	19.5
1.115250	---	23.16	46.00	22.84	N	OFF	19.6
1.115250	25.05	---	56.00	30.95	N	OFF	19.6

Appendix C. Radiated Spurious Emission

Test Engineer :	Yun Huang, J.C. Liang, CR Liao, and Andy Liu	Temperature :	22~25°C
		Relative Humidity :	50~54%

Band 1 - 5150~5250MHz

WIFI 802.11a (Band Edge @ 3m)

WIFI	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a CH 36 5180MHz		5128.18	56.94	-17.06	74	41.52	31.55	13.25	29.38	281	217	P	H
		5146.9	46.49	-7.51	54	31.1	31.56	13.21	29.38	281	217	A	H
	*	5180	108.42	-	-	93.11	31.57	13.13	29.39	281	217	P	H
	*	5180	101.3	-	-	85.99	31.57	13.13	29.39	281	217	A	H
		5145.34	56.57	-17.43	74	41.18	31.56	13.21	29.38	100	133	P	V
		5147.16	46.21	-7.79	54	30.82	31.56	13.21	29.38	100	133	A	V
	*	5180	108.6	-	-	93.29	31.57	13.13	29.39	100	133	P	V
	*	5180	101.4	-	-	86.09	31.57	13.13	29.39	100	133	A	V
802.11a CH 44 5220MHz		5134.42	55.53	-18.47	74	40.12	31.55	13.24	29.38	100	247	P	H
		5140.14	45.71	-8.29	54	30.31	31.56	13.22	29.38	100	247	A	H
	*	5220	107.57	-	-	92.3	31.59	13.07	29.39	100	247	P	H
	*	5220	100.4	-	-	85.13	31.59	13.07	29.39	100	247	A	H
		5351.08	53.73	-20.27	74	38.52	31.64	12.98	29.41	100	247	P	H
		5372.64	43.03	-10.97	54	27.82	31.65	12.97	29.41	100	247	A	H
		5143.52	54.44	-19.56	74	39.04	31.56	13.22	29.38	104	120	P	V
		5140.14	45.09	-8.91	54	29.69	31.56	13.22	29.38	104	120	A	V
	*	5220	108.02	-	-	92.75	31.59	13.07	29.39	104	120	P	V
	*	5220	100.79	-	-	85.52	31.59	13.07	29.39	104	120	A	V
		5383.28	53.54	-20.46	74	38.35	31.65	12.96	29.42	104	120	P	V
		5372.36	43.28	-10.72	54	28.07	31.65	12.97	29.41	104	120	A	V

802.11a CH 48 5240MHz	*	5240	108.17	-	-	92.91	31.6	13.05	29.39	100	244	P	H
	*	5240	100.69	-	-	85.43	31.6	13.05	29.39	100	244	A	H
		5351.64	53.61	-20.39	74	38.4	31.64	12.98	29.41	100	244	P	H
		5392.52	43.09	-10.91	54	27.9	31.66	12.95	29.42	100	244	A	H
	*	5240	108.36	-	-	93.1	31.6	13.05	29.39	100	126	P	V
	*	5240	100.91	-	-	85.65	31.6	13.05	29.39	100	126	A	V
		5358.36	54.06	-19.94	74	38.85	31.64	12.98	29.41	100	126	P	V
		5392.52	43.66	-10.34	54	28.47	31.66	12.95	29.42	100	126	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	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		10360	45.89	-22.31	68.2	49.78	39.43	17.48	60.8	100	0	P	H
		15540	44.45	-29.55	74	44.65	39.06	21.51	60.77	100	0	P	H
		10360	45.56	-22.64	68.2	49.45	39.43	17.48	60.8	100	0	P	V
		15540	44.74	-29.26	74	44.94	39.06	21.51	60.77	100	0	P	V
802.11a CH 44 5220MHz		10440	45.61	-22.59	68.2	49.45	39.53	17.55	60.92	100	0	P	H
		15660	44.69	-29.31	74	45.21	38.62	21.53	60.67	100	0	P	H
		10440	45.39	-22.81	68.2	49.23	39.53	17.55	60.92	100	0	P	V
		15660	44.2	-29.8	74	44.72	38.62	21.53	60.67	100	0	P	V
802.11a CH 48 5240MHz		10480	45.59	-22.61	68.2	49.4	39.58	17.58	60.97	100	0	P	H
		15720	44.43	-29.57	74	45.1	38.41	21.54	60.62	100	0	P	H
		10480	45.57	-22.63	68.2	49.38	39.58	17.58	60.97	100	0	P	V
		15720	46.05	-27.95	74	46.72	38.41	21.54	60.62	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11n HT20 (Band Edge @ 3m)

WIFI	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)
802.11n HT20 CH 36 5180MHz		5136.76	56.99	-17.01	74	41.59	31.55	13.23	29.38	100	246	P	H
		5149.76	45.65	-8.35	54	30.27	31.56	13.2	29.38	100	246	A	H
	*	5180	107.18	-	-	91.87	31.57	13.13	29.39	100	246	P	H
	*	5180	99.87	-	-	84.56	31.57	13.13	29.39	100	246	A	H
		5103.48	56.78	-17.22	74	41.3	31.54	13.31	29.37	100	127	P	V
		5150	45.85	-8.15	54	30.47	31.56	13.2	29.38	100	127	A	V
	*	5180	107.6	-	-	92.29	31.57	13.13	29.39	100	127	P	V
	*	5180	100.34	-	-	85.03	31.57	13.13	29.39	100	127	A	V
802.11n HT20 CH 44 5220MHz		5118.04	53.93	-20.07	74	38.47	31.55	13.28	29.37	100	240	P	H
		5140.14	45.01	-8.99	54	29.61	31.56	13.22	29.38	100	240	A	H
	*	5220	107.38	-	-	92.11	31.59	13.07	29.39	100	240	P	H
	*	5220	99.99	-	-	84.72	31.59	13.07	29.39	100	240	A	H
		5409.32	53.63	-20.37	74	38.41	31.66	12.98	29.42	100	240	P	H
		5372.64	42.8	-11.2	54	27.59	31.65	12.97	29.41	100	240	A	H
		5067.08	54.74	-19.26	74	39.18	31.53	13.4	29.37	101	120	P	V
		5139.88	45.19	-8.81	54	29.79	31.56	13.22	29.38	101	120	A	V
	*	5220	108.15	-	-	92.88	31.59	13.07	29.39	101	120	P	V
	*	5220	100.77	-	-	85.5	31.59	13.07	29.39	101	120	A	V
		5369	53.47	-20.53	74	38.26	31.65	12.97	29.41	101	120	P	V
		5371.8	43.45	-10.55	54	28.24	31.65	12.97	29.41	101	120	A	V
802.11n HT20 CH 48 5240MHz	*	5240	107.89	-	-	92.63	31.6	13.05	29.39	100	250	P	H
	*	5240	100.49	-	-	85.23	31.6	13.05	29.39	100	250	A	H
		5423.88	54.1	-19.9	74	38.82	31.67	13.03	29.42	100	250	P	H
		5391.68	43.29	-10.71	54	28.09	31.66	12.96	29.42	100	250	A	H
	*	5240	108.09	-	-	92.83	31.6	13.05	29.39	100	125	P	V
	*	5240	100.69	-	-	85.43	31.6	13.05	29.39	100	125	A	V
		5410.72	53.56	-20.44	74	38.33	31.66	12.99	29.42	100	125	P	V
		5391.68	43.77	-10.23	54	28.57	31.66	12.96	29.42	100	125	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11n HT20 (Harmonic @ 3m)

WIFI	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)
802.11n HT20 CH 36 5180MHz		10360	45.75	-22.45	68.2	49.64	39.43	17.48	60.8	100	0	P	H
		15540	45.24	-28.76	74	45.44	39.06	21.51	60.77	100	0	P	H
		10360	45.4	-22.8	68.2	49.29	39.43	17.48	60.8	100	0	P	V
		15540	44.85	-29.15	74	45.05	39.06	21.51	60.77	100	0	P	V
802.11n HT20 CH 44 5220MHz		10440	45.5	-22.7	68.2	49.34	39.53	17.55	60.92	100	0	P	H
		15660	43.27	-30.73	74	43.79	38.62	21.53	60.67	100	0	P	H
		10440	45.17	-23.03	68.2	49.01	39.53	17.55	60.92	100	0	P	V
		15660	43.74	-30.26	74	44.26	38.62	21.53	60.67	100	0	P	V
802.11n HT20 CH 48 5240MHz		10480	45.78	-22.42	68.2	49.59	39.58	17.58	60.97	100	0	P	H
		15720	44.41	-29.59	74	45.08	38.41	21.54	60.62	100	0	P	H
		10480	45.9	-22.3	68.2	49.71	39.58	17.58	60.97	100	0	P	V
		15720	44.51	-29.49	74	45.18	38.41	21.54	60.62	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11n HT40 (Band Edge @ 3m)

WIFI	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)
802.11n HT40 CH 38 5190MHz		5150	62.66	-11.34	74	47.28	31.56	13.2	29.38	100	240	P	H
		5150	51.43	-2.57	54	36.05	31.56	13.2	29.38	100	240	A	H
	*	5190	104.23	-	-	88.94	31.58	13.1	29.39	100	240	P	H
	*	5190	96.85	-	-	81.56	31.58	13.1	29.39	100	240	A	H
		5355.84	53.48	-20.52	74	38.27	31.64	12.98	29.41	100	240	P	H
		5358.92	42.46	-11.54	54	27.25	31.64	12.98	29.41	100	240	A	H
		5150	61.29	-12.71	74	45.91	31.56	13.2	29.38	102	135	P	V
		5150	51.08	-2.92	54	35.7	31.56	13.2	29.38	102	135	A	V
	*	5190	104.14	-	-	88.85	31.58	13.1	29.39	102	135	P	V
	*	5190	96.39	-	-	81.1	31.58	13.1	29.39	102	135	A	V
		5360.88	55.24	-18.76	74	40.03	31.64	12.98	29.41	102	135	P	V
		5366.76	42.33	-11.67	54	27.12	31.65	12.97	29.41	102	135	A	V
802.11n HT40 CH 46 5230MHz		5142.74	56.53	-17.47	74	41.13	31.56	13.22	29.38	100	242	P	H
		5082.16	44.24	-9.76	54	28.72	31.53	13.36	29.37	100	242	A	H
	*	5230	105.1	-	-	89.84	31.59	13.06	29.39	100	242	P	H
	*	5230	97.48	-	-	82.22	31.59	13.06	29.39	100	242	A	H
		5386.08	53.64	-20.36	74	38.45	31.65	12.96	29.42	100	242	P	H
		5379.36	43.42	-10.58	54	28.23	31.65	12.96	29.42	100	242	A	H
		5072.28	55.66	-18.34	74	40.11	31.53	13.39	29.37	100	120	P	V
		5148.46	44.07	-9.93	54	28.69	31.56	13.2	29.38	100	120	A	V
	*	5230	105.43	-	-	90.17	31.59	13.06	29.39	100	120	P	V
	*	5230	97.8	-	-	82.54	31.59	13.06	29.39	100	120	A	V
		5363.68	53.46	-20.54	74	38.25	31.65	12.97	29.41	100	120	P	V
		5377.12	43.56	-10.44	54	28.37	31.65	12.96	29.42	100	120	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11n HT40 (Harmonic @ 3m)

WIFI	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)
802.11n HT40 CH 38 5190MHz		10380	45.72	-22.48	68.2	49.59	39.46	17.5	60.83	100	0	P	H
		15570	44.6	-29.4	74	44.87	38.95	21.52	60.74	100	0	P	H
		10380	46.04	-22.16	68.2	49.91	39.46	17.5	60.83	100	0	P	V
		15570	44.11	-29.89	74	44.38	38.95	21.52	60.74	100	0	P	V
802.11n HT40 CH 46 5230MHz		10460	45.99	-22.21	68.2	49.82	39.55	17.56	60.94	100	0	P	H
		15690	45.51	-28.49	74	46.1	38.52	21.54	60.65	100	0	P	H
		10460	45.47	-22.73	68.2	49.3	39.55	17.56	60.94	100	0	P	V
		15690	44.87	-29.13	74	45.46	38.52	21.54	60.65	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 802.11n HT40 (LF @ 3m)

WIFI	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11n HT40 LF		30.27	22.56	-17.44	40	28.5	26.2	0.32	32.46	-	-	P	H
		96.69	22.79	-20.71	43.5	38.37	15.81	1.04	32.43	-	-	P	H
		159.6	26.12	-17.38	43.5	39.89	17.1	1.55	32.42	-	-	P	H
		673.8	28.98	-17.02	46	31.23	26.34	4.09	32.68	-	-	P	H
		829.2	31.16	-14.84	46	30.45	28.45	4.52	32.26	-	-	P	H
		905.5	33.3	-12.7	46	31.35	29.13	4.64	31.82	100	0	P	H
		32.7	26.03	-13.97	40	33.75	24.46	0.27	32.45	100	0	P	V
		39.72	25.02	-14.98	40	36.59	20.4	0.48	32.45	-	-	P	V
		51.33	23.32	-16.68	40	40.09	14.79	0.89	32.45	-	-	P	V
		580	28.37	-17.63	46	32.06	25.28	3.73	32.7	-	-	P	V
		839	30.72	-15.28	46	29.77	28.57	4.59	32.21	-	-	P	V
		940.5	32	-14	46	28.97	29.91	4.62	31.5	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

Note symbol

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

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

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	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. Radiated Spurious Emission

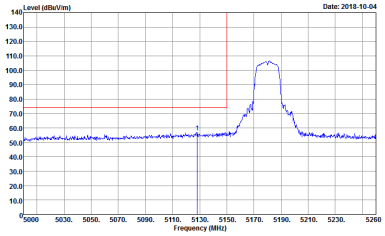
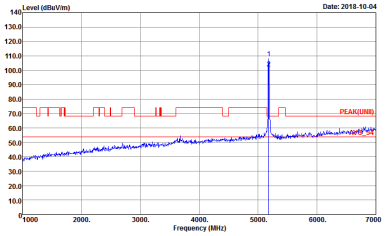
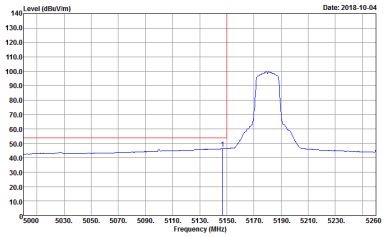
Test Engineer :	Yun Huang, J.C. Liang, CR Liao, and Andy Liu	**Temperature :**	20~25°C
		Relative Humidity :	50~54%

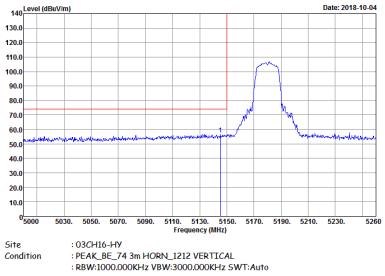
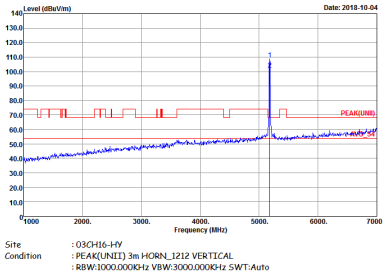
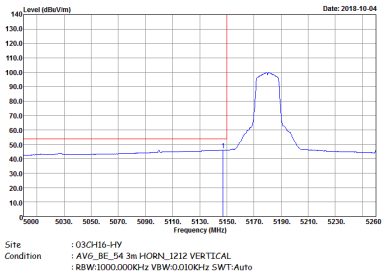
Note symbol

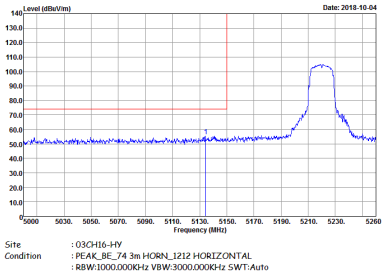
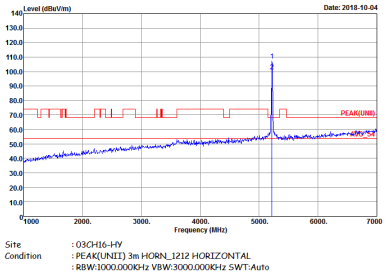
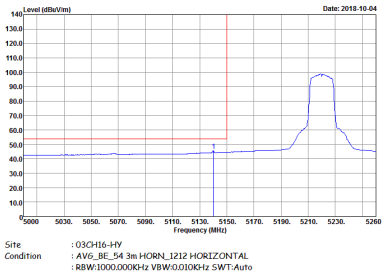
-L	**Low channel location**
-R	**High channel location**

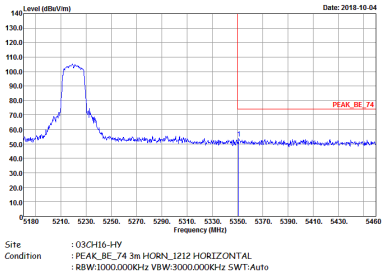
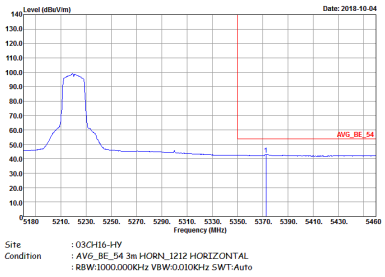
Band 1 - 5150~5250MHz

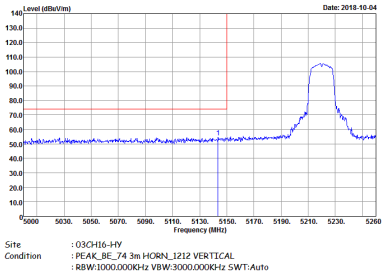
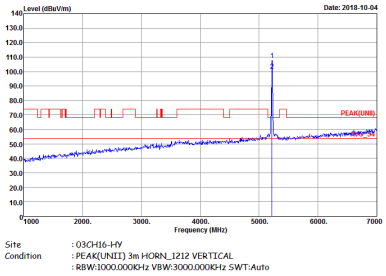
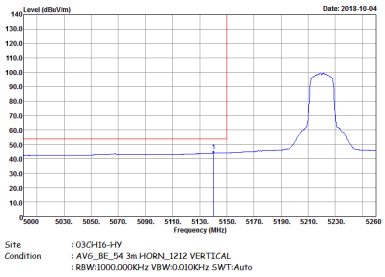
WIFI 802.11a (Band Edge @ 3m)

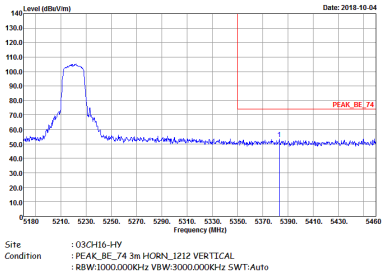
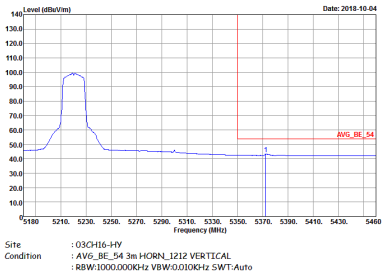
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
	802.11a CH36 5180MHz	
	Horizontal	Fundamental
Peak	 Site : 03CH16-HY Condition : PEAK_BE_74 3m HORN_1212 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH16-HY Condition : PEAK(UNII) 3m HORN_1212 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Avg.	 Site : 03CH16-HY Condition : AVG_BE_54 3m HORN_1212 HORIZONTAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto	Left blank

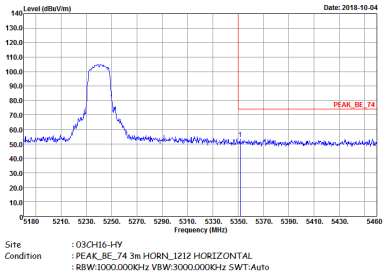
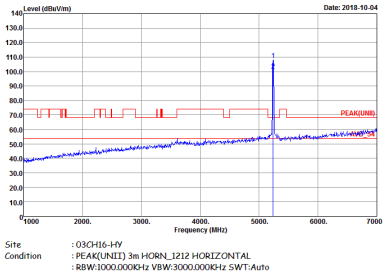
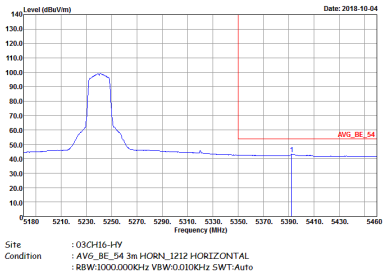
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
	802.11a CH36 5180MHz	
	Vertical	Fundamental
Peak		
Avg.		Left blank

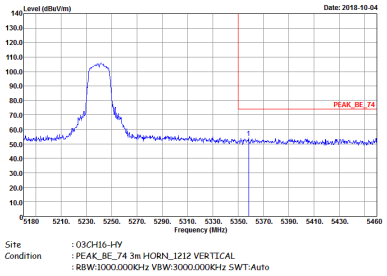
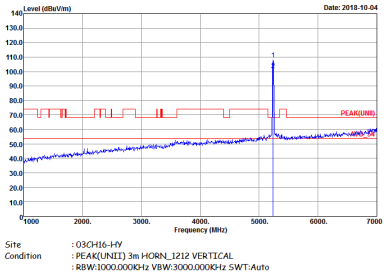
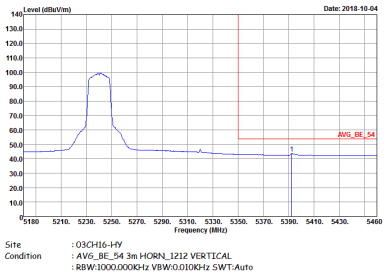
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
	802.11a CH44 5220MHz - L	
	Horizontal	Fundamental
Peak		
Avg.		Left blank

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

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

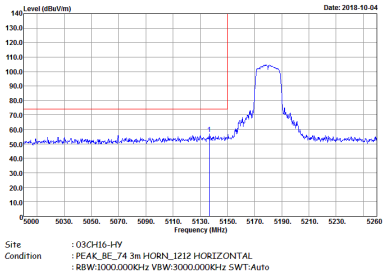
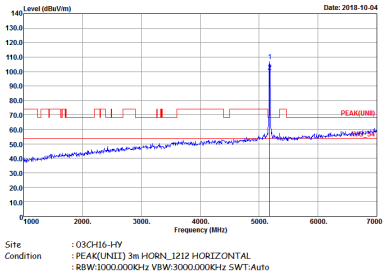
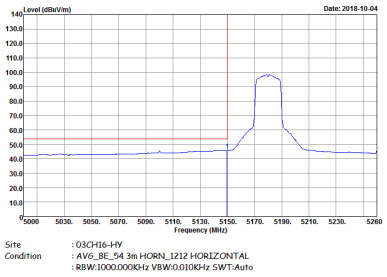
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
	802.11a CH44 5220MHz - R	
	Vertical	Fundamental
Peak		Left blank
Avg.		Left blank

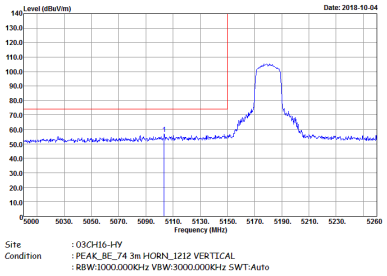
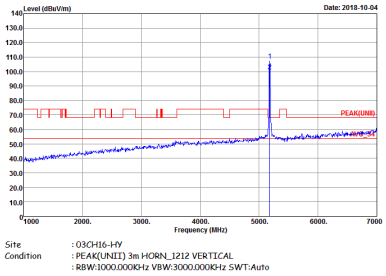
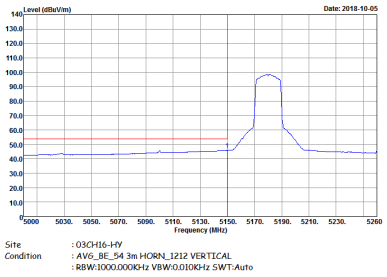
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
	802.11a CH48 5240MHz - L	
	Horizontal	Fundamental
Peak		
Avg.		Left blank

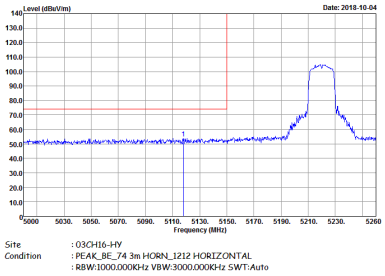
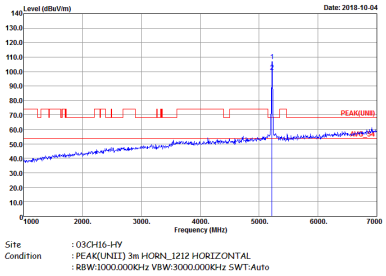
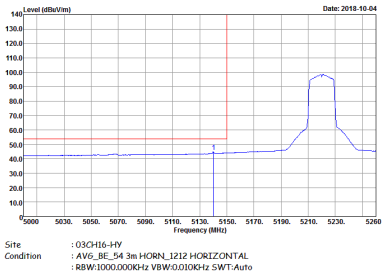
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
	802.11a CH48 5240MHz - L	
	Vertical	Fundamental
Peak		
Avg.		Left blank

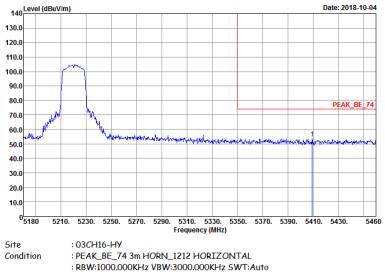
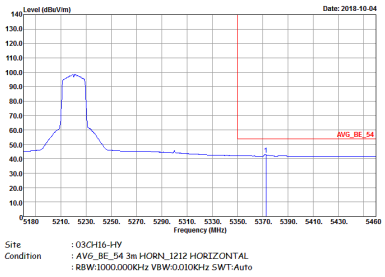
Band 1 5150~5250MHz

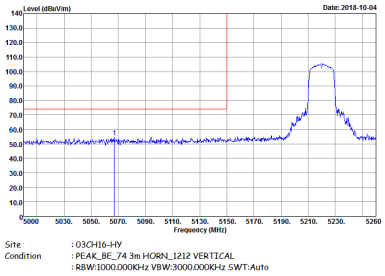
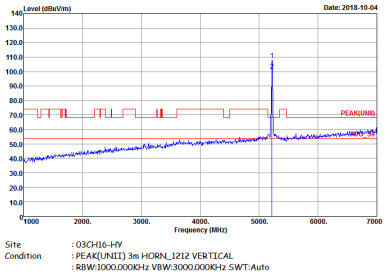
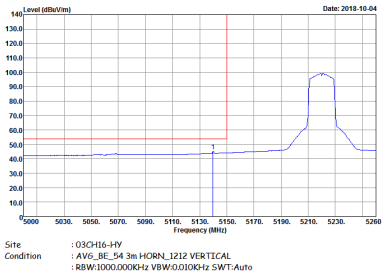
WIFI 802.11n HT20 (Band Edge @ 3m)

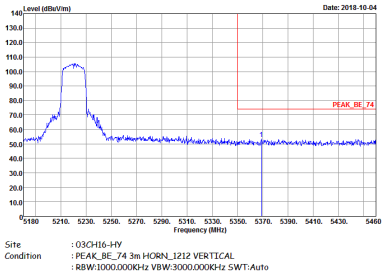
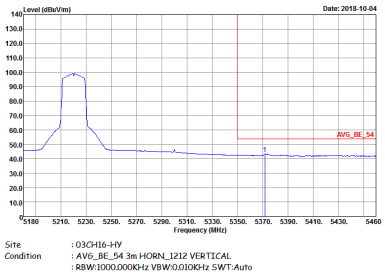
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
	802.11n HT20 CH36 5180MHz	
	Horizontal	Fundamental
Peak		
Avg.		Left blank

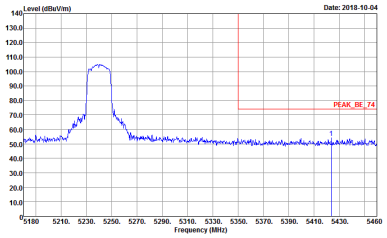
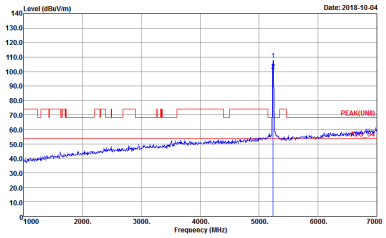
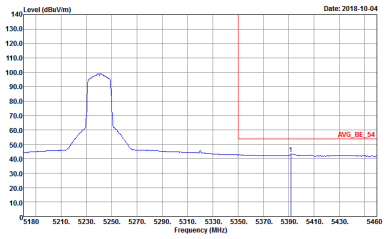
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
	802.11n HT20 CH36 5180MHz	
	Vertical	Fundamental
Peak		
Avg.		Left blank

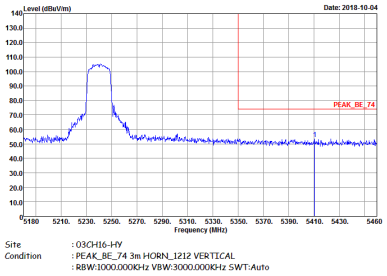
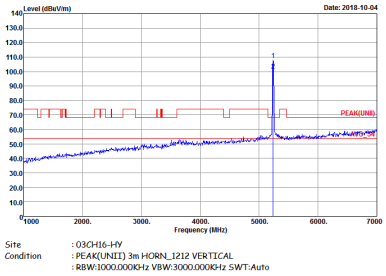
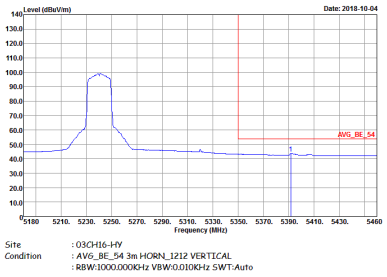
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
	802.11n HT20 CH44 5220MHz - L	
	Horizontal	Fundamental
Peak		
Avg.		Left blank

WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
	802.11n HT20 CH44 5220MHz - R	
	Horizontal	Fundamental
Peak		Left blank
Avg.		Left blank

WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
	802.11n HT20 CH44 5220MHz - L	
	Vertical	Fundamental
Peak		
Avg.		Left blank

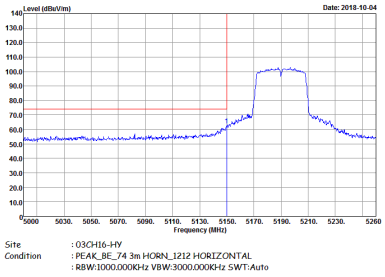
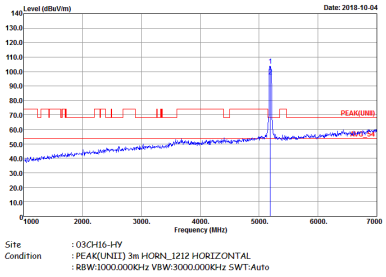
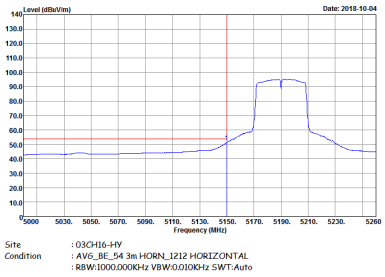
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
	802.11n HT20 CH44 5220MHz - R	
	Vertical	Fundamental
Peak		Left blank
Avg.		Left blank

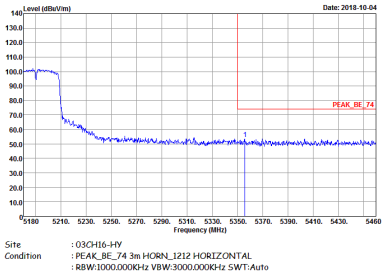
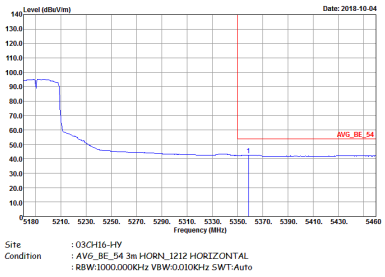
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
	802.11n HT20 CH48 5240MHz - L	
	Horizontal	Fundamental
Peak	 Site : 03CH16-HY Condition : PEAK_BE_74 3m HORN_1212 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH16-HY Condition : PEAK(UNII) 3m HORN_1212 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Avg.	 Site : 03CH16-HY Condition : AVG_BE_54 3m HORN_1212 HORIZONTAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto	Left blank

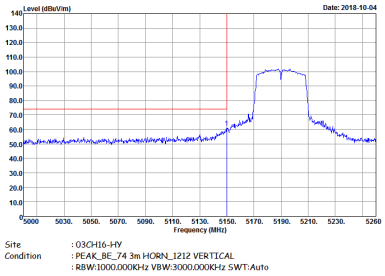
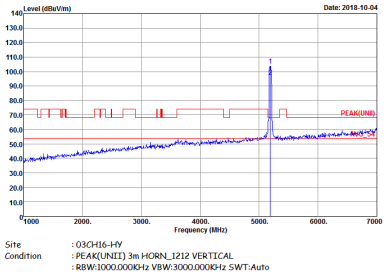
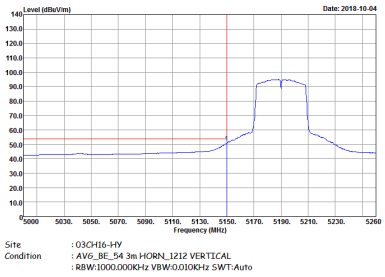
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
	802.11n HT20 CH48 5240MHz - L	
	Vertical	Fundamental
Peak		
Avg.		Left blank

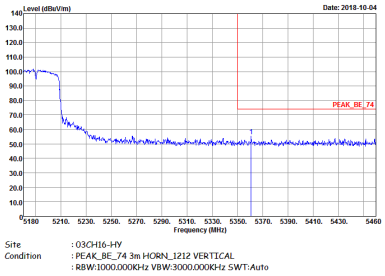
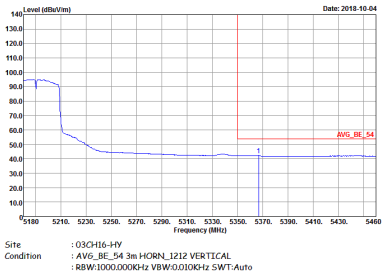
Band 1 5150~5250MHz

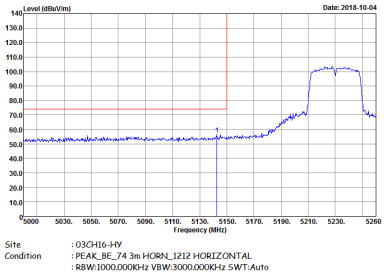
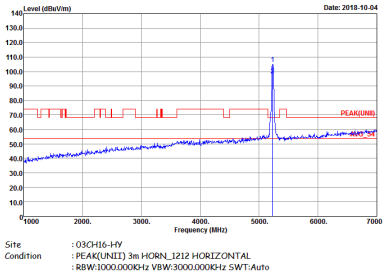
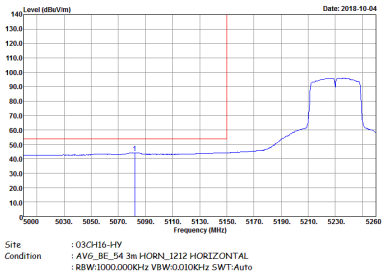
WIFI 802.11n HT40 (Band Edge @ 3m)

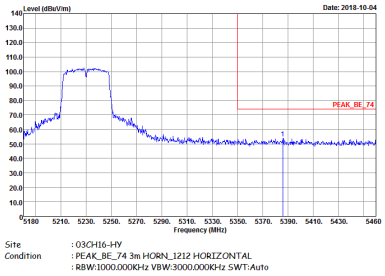
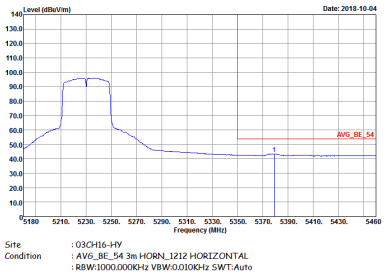
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
	802.11n HT40 CH38 5190MHz - L	
	Horizontal	Fundamental
Peak		
Avg.		Left blank

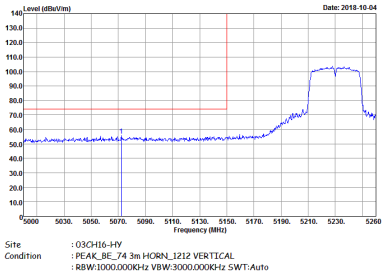
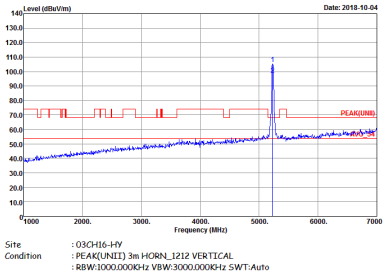
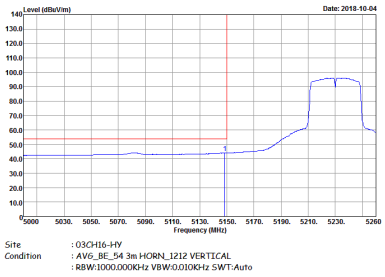
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
	802.11n HT40 CH38 5190MHz - R	
	Horizontal	Fundamental
Peak		Left blank
Avg.		Left blank

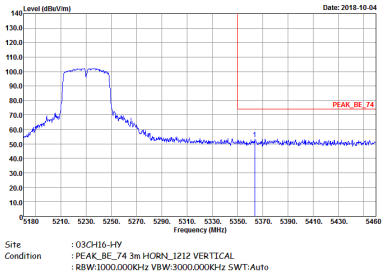
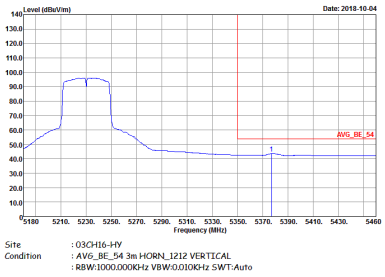
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
	802.11n HT40 CH38 5190MHz - L	
	Vertical	Fundamental
Peak		
Avg.		Left blank

WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
	802.11n HT40 CH38 5190MHz - R	
	Vertical	Fundamental
Peak		Left blank
Avg.		Left blank

WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
	802.11n HT40 CH46 5230MHz - L	
	Horizontal	Fundamental
Peak		
Avg.		Left blank

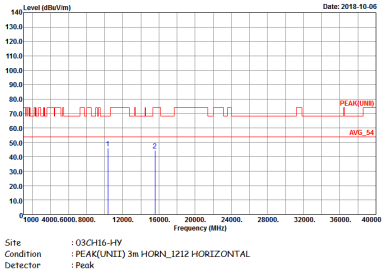
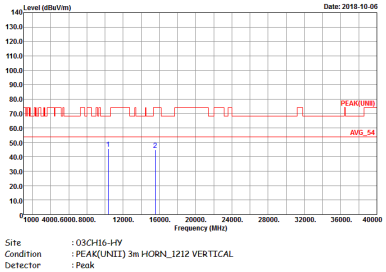
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
	802.11n HT40 CH46 5230MHz - R	
	Horizontal	Fundamental
Peak		Left blank
Avg.		Left blank

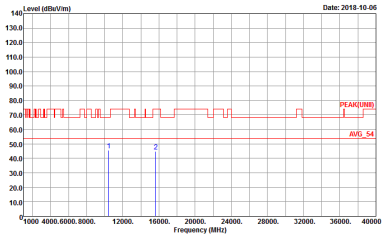
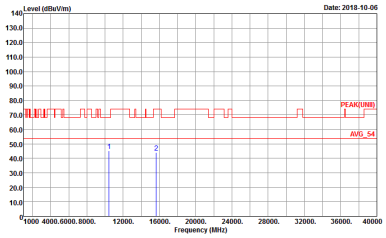
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
	802.11n HT40 CH46 5230MHz - L	
	Vertical	Fundamental
Peak		
Avg.		Left blank

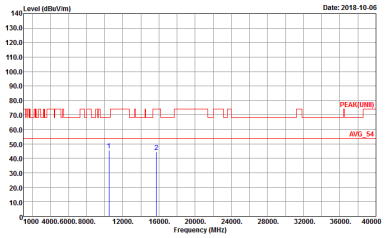
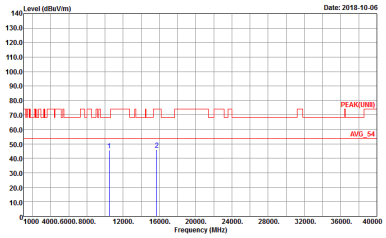
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
	802.11n HT40 CH46 5230MHz - R	
	Vertical	Fundamental
Peak		Left blank
Avg.		Left blank

Band 1 - 5150~5250MHz

WIFI 802.11a (Harmonic @ 3m)

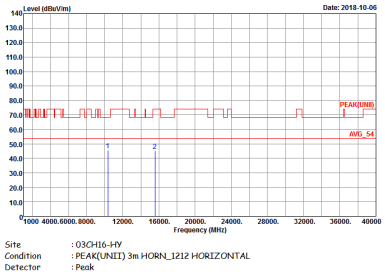
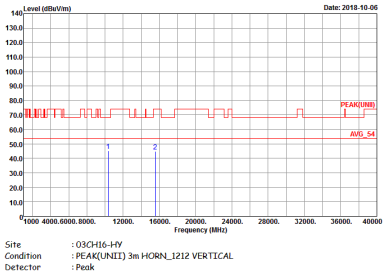
WIFI	Band 1 5150~5250MHz Harmonic @ 3m	
	802.11a CH36 5180MHz	
	Horizontal	Vertical
Peak Avg.		

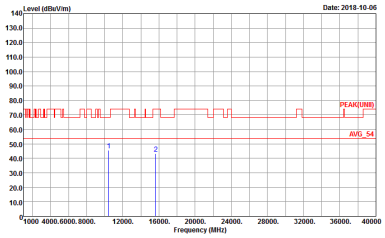
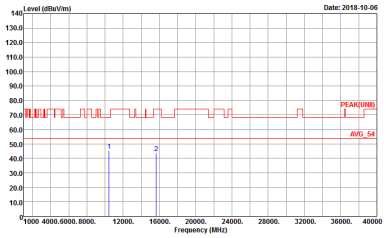
WIFI	Band 1 5150~5250MHz Harmonic @ 3m	
	802.11a CH44 5220MHz	
	Horizontal	Vertical
Peak Avg.	 Site : 03CH16-HY Condition : PEAK(UNII) 3m HORN_1212 HORIZONTAL Detector : Peak	 Site : 03CH16-HY Condition : PEAK(UNII) 3m HORN_1212 VERTICAL Detector : Peak

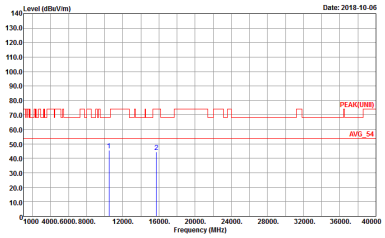
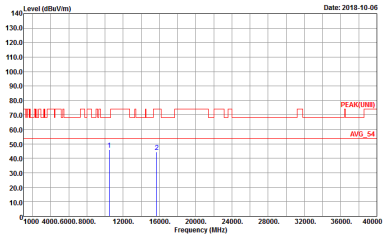
WIFI	Band 1 5150~5250MHz Harmonic @ 3m	
	802.11a CH48 5240MHz	
	Horizontal	Vertical
Peak Avg.	 Site : 03CH16-HY Condition : PEAK(UNII) 3m HORN_1212 HORIZONTAL Detector : Peak	 Site : 03CH16-HY Condition : PEAK(UNII) 3m HORN_1212 VERTICAL Detector : Peak

Band 1 5150~5250MHz

WIFI 802.11n HT20 (Harmonic @ 3m)

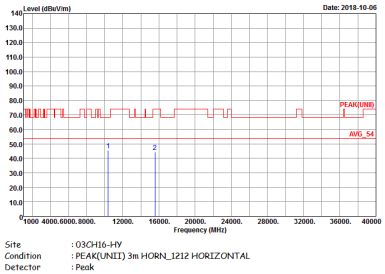
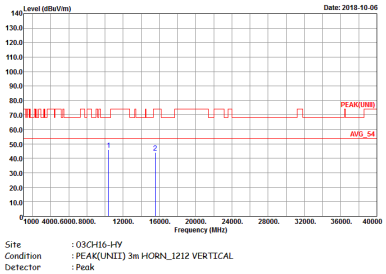
WIFI	Band 1 5150~5250MHz Harmonic @ 3m	
	802.11n HT20 CH36 5180MHz	
	Horizontal	Vertical
Peak Avg.		

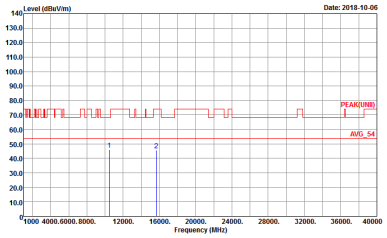
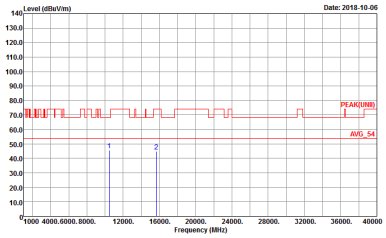
WIFI	Band 1 5150~5250MHz Harmonic @ 3m	
	802.11n HT20 CH44 5220MHz	
	Horizontal	Vertical
Peak Avg.	 Site : 03CH16-HY Condition : PEAK(UNII) 3m HORN_1212 HORIZONTAL Detector : Peak	 Site : 03CH16-HY Condition : PEAK(UNII) 3m HORN_1212 VERTICAL Detector : Peak

WIFI	Band 1 5150~5250MHz Harmonic @ 3m	
	802.11n HT20 CH48 5240MHz	
	Horizontal	Vertical
Peak Avg.	 Site : 03CH16-HY Condition : PEAK(UNII) 3m HORN_1212 HORIZONTAL Detector : Peak	 Site : 03CH16-HY Condition : PEAK(UNII) 3m HORN_1212 VERTICAL Detector : Peak

Band 1 5150~5250MHz

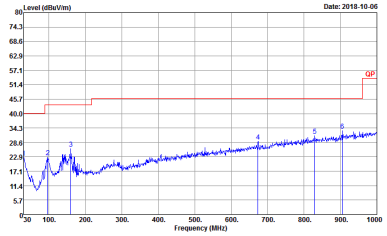
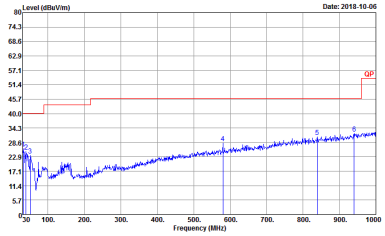
WIFI 802.11n HT40 (Harmonic @ 3m)

WIFI	Band 1 5150~5250MHz Harmonic @ 3m	
	802.11n HT40 CH38 5190MHz	
	Horizontal	Vertical
Peak Avg.		

WIFI	Band 1 5150~5250MHz Harmonic @ 3m	
	802.11n HT40 CH46 5230MHz	
	Horizontal	Vertical
Peak Avg.	 Site : 03CH16-HY Condition : PEAK(UNII) 3m HORN_1212 HORIZONTAL Detector : Peak	 Site : 03CH16-HY Condition : PEAK(UNII) 3m HORN_1212 VERTICAL Detector : Peak

Emission below 1GHz

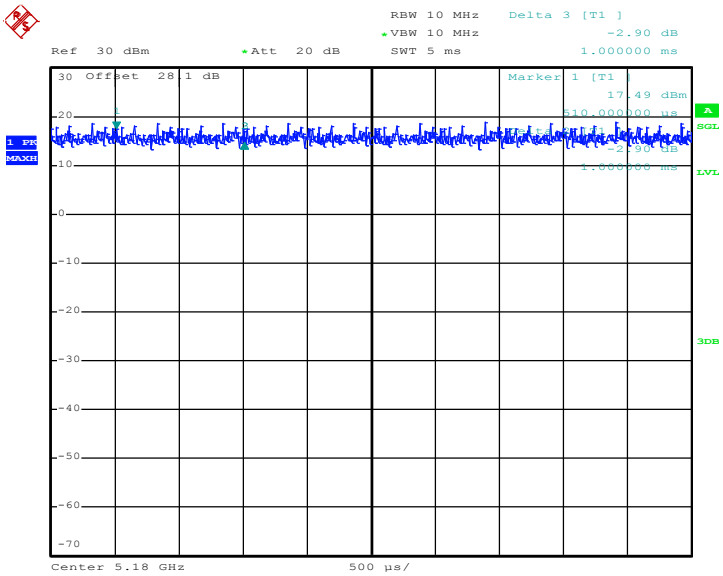
5GHz WIFI 802.11n HT40 (LF)

WIFI	5GHz WIFI	
	802.11n HT40 LF	
	Horizontal	Vertical
QP / Peak	 Site : 03CH16-HY Condition : QP 3m BILOG_47020&06 HORIZONTAL Detector : Peak	 Site : 03CH16-HY Condition : QP 3m BILOG_47020&06 VERTICAL Detector : Peak

Appendix E. Duty Cycle Plots

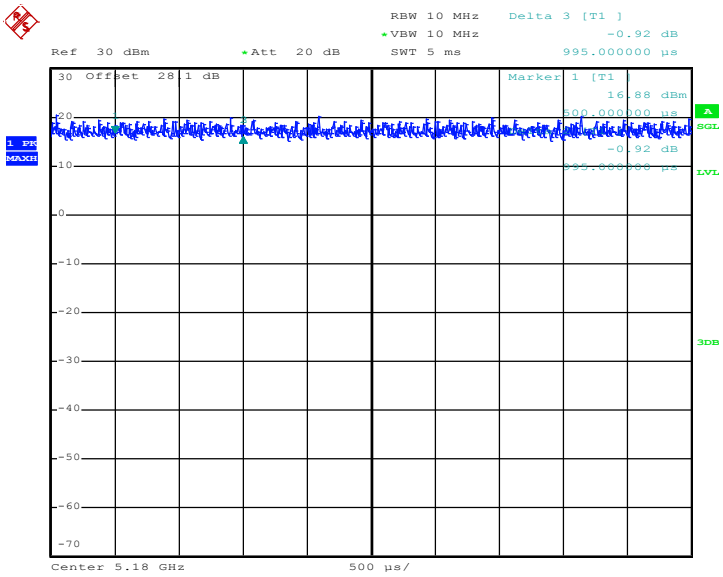
Band	Duty Cycle (%)	T(us)	1/T(kHz)	VBW Setting	Duty Factor (dB)
802.11a	100.00	-	-	10Hz	0.00
5GHz 802.11n HT20	100.00	-	-	10Hz	0.00
5GHz 802.11n HT40	100.00	-	-	10Hz	0.00

802.11a



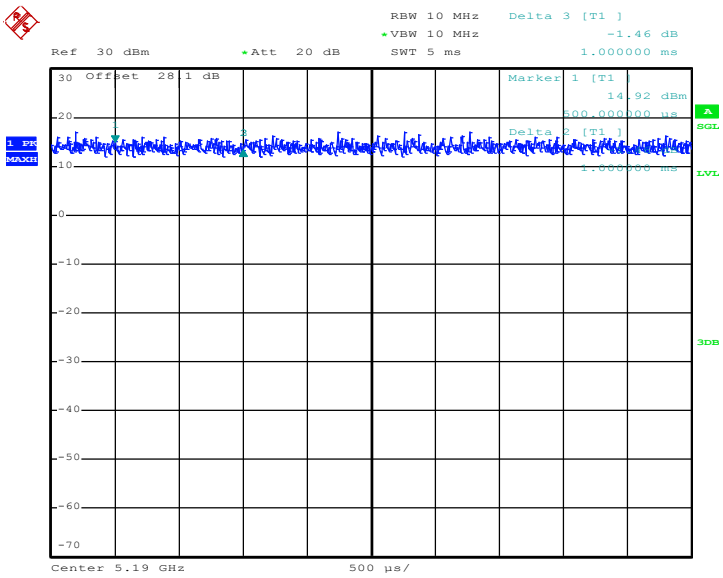
Date: 28.SEP.2018 07:16:27

802.11n HT20



Date: 28.SEP.2018 07:24:13

802.11n HT40



Date: 28.SEP.2018 07:26:47

———THE END———