



FCC RF Test Report

APPLICANT : Compal Electronics, INC.
EQUIPMENT : VOICE HUB GATEWAY
BRAND NAME : Compal
MODEL NAME : DBX81
MARKETING NAME : VOICE HUB GATEWAY
FCC ID : GKR-DBX81WBZ
STANDARD : FCC Part 15 Subpart E §15.407
CLASSIFICATION : (NII) Unlicensed National Information Infrastructure

The product was received on Nov. 21, 2017 and testing was completed on Mar. 28, 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 test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by: Joseph Lin / Supervisor

Approved by: Jones Tsai / Manager



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR7N2101E	Rev. 01	Initial issue of report	Jan. 18, 2018
FR7N2101E	Rev. 02	Updating FCC ID	Mar. 30, 2018



SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	2.1049 15.403(i)	26dB & 99% Bandwidth	-	Pass	-
3.2	15.407(a)	Maximum Conducted Output Power	≤ 24 dBm	Pass	-
3.3	15.407(a)	Power Spectral Density	≤ 11 dBm	Pass	-
3.4	15.407(b)	Unwanted Emissions	15.407(b) & 15.209(a)	Pass	Under limit 0.34 dB at 5150.000 MHz
3.5	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 13.30 dB at 0.150 MHz
3.6	15.407(c)	Automatically Discontinue Transmission	Discontinue Transmission	Pass	-
3.7	15.203 & 15.407(a)	Antenna Requirement	N/A	Pass	-



1 General Description

1.1 Applicant

Compal Electronics, INC.

No. 581 ruiguang rd.,Neihu District, Taipei City 11492, Taiwan (R.O.C.)

1.2 Manufacturer

Compal Electronics, Inc. Pingzhen plant

3-4F., No. 8-1 & No. 8, Nandong Rd., Pingzhen Dist., Taoyuan City, 32455, Taiwan (R.O.C.)

1.3 Product Feature of Equipment Under Test

Bluetooth, Wi-Fi 2.4GHz 802.11b/g/n, Wi-Fi 5GHz 802.11a/n/ac, and Zigbee

Product Specification subjective to this standard	
Sample 1	Sample with 1st antenna (SN:DC33002250U)
Sample 2	Sample with 2nd antenna (SN:DC33002600U)
Antenna Type	WLAN: PIFA Antenna Bluetooth: PIFA Antenna Zigbee: PIFA Antenna

1.4 Modification of EUT

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



1.5 Testing Location

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

Test Site	SPORTON INTERNATIONAL INC.		
Test Site Location	No. 52, Hwa Ya 1 st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978		
Test Site No.	Sporton Site No.		
	TH05-HY	CO05-HY	03CH07-HY

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

1.6 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ FCC Part 15 Subpart E
- ♦ FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
- ♦ ANSI C63.10-2013

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



2 Test Configuration of Equipment Under Test

- 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
	38*	5190	46*	5230
	40	5200	48	5240
	42 [#]	5210		

Note:

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



2.2 Test Mode

Final test 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
802.11ac VHT20 (Covered by HT20)	MCS0
802.11ac VHT40 (Covered by HT40)	MCS0
802.11ac VHT80	MCS0

Test Cases	
AC Conducted Emission	Mode 1 : WLAN (5GHz) Tx + Adapter for Sample 1



<For Sample 1>

Ch. #		Band I : 5150-5250 MHz	
		802.11a	
L	Low	36	
M	Middle	44	
H	High	48	

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

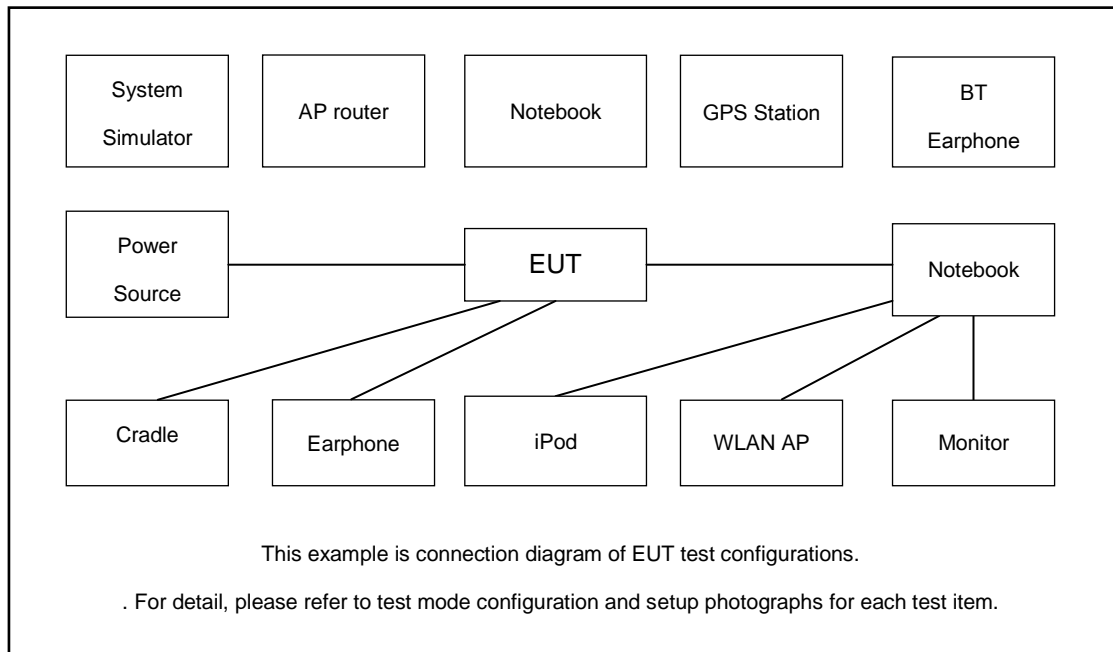
Ch. #		Band I : 5150-5250 MHz	
		802.11n HT40	
L	Low	38	
M	Middle	-	
H	High	46	

Ch. #		Band I : 5150-5250 MHz	
		802.11ac VHT80	
L	Low	-	
M	Middle	42	
H	High	-	

<For Sample 2>

Ch. #		Band I : 5150-5250 MHz	
		802.11a	
L	Low	36	
M	Middle	-	
H	High	-	

2.3 Connection Diagram of Test System



2.4 Support Unit used in test configuration and system

Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
Notebook	DELL	Latitude E6320	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m



2.5 EUT Operation Test Setup

The RF test items, utility “Vysor” 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.

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

3 Test Result

3.1 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.

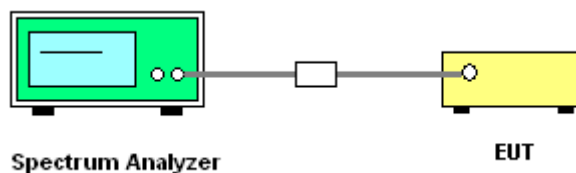
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

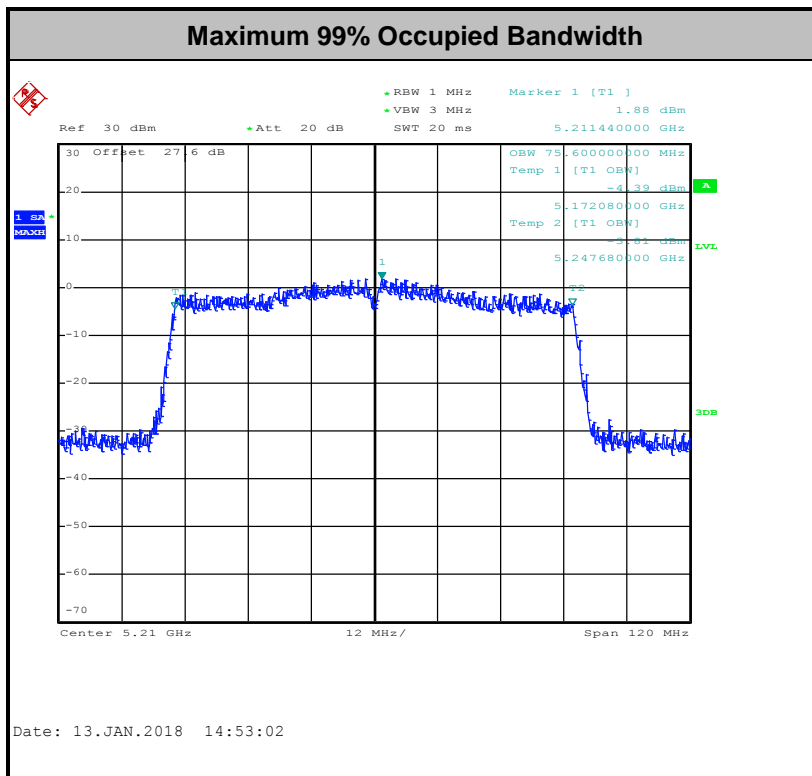
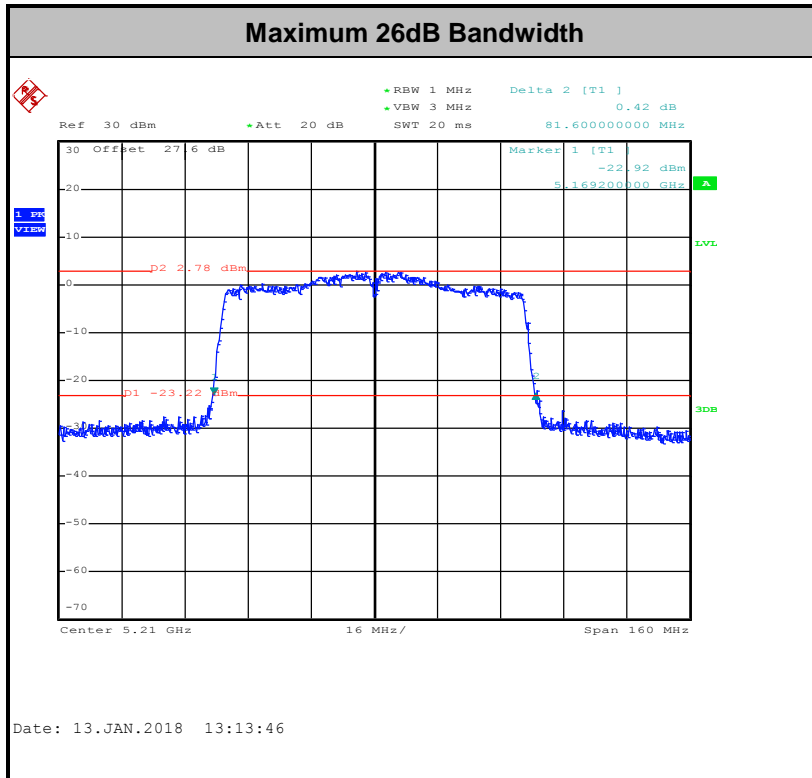
1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01. Section C) Emission bandwidth
2. Set RBW = approximately 1% of the emission bandwidth.
3. Set the VBW > RBW.
4. Detector = Peak.
5. Trace mode = max hold
6. Measure the maximum width of the emission that is 26 dB 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 1MHz and set the Video bandwidth (VBW) $\geq 3 * RBW$.
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.



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 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.

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

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

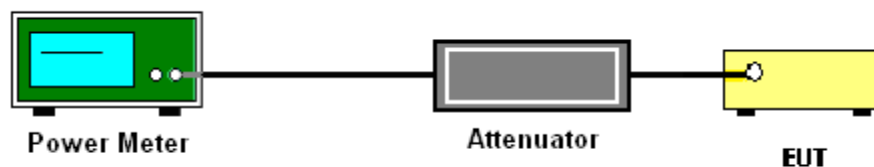
3.2.3 Test Procedures

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

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

3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

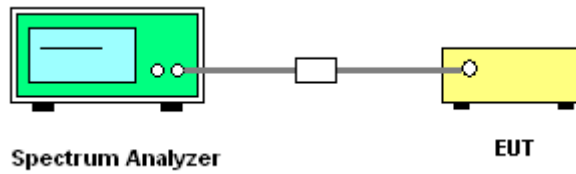
The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01. Section F) Maximum power spectral density.

Method SA-2

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

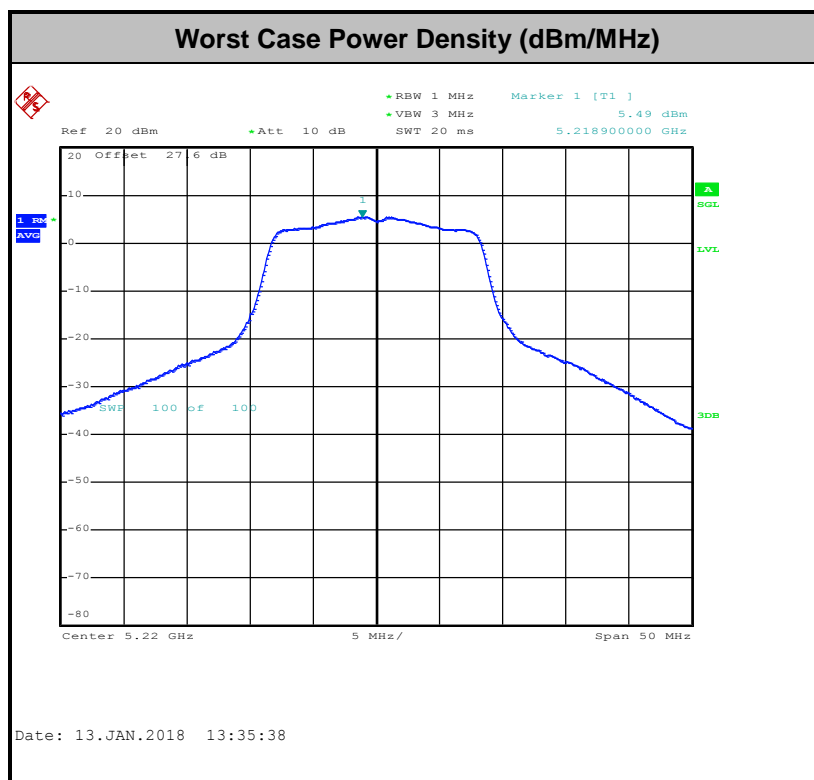
- Measure the duty cycle.
 - Set span to encompass the entire emission bandwidth (EBW) of the signal.
 - Set RBW = 1 MHz.
 - Set VBW \geq 3 MHz.
 - Number of points in sweep \geq 2 Span / RBW.
 - Sweep time = auto.
 - Detector = RMS
 - Trace average at least 100 traces in power averaging mode.
 - Add $10 \log(1/x)$, 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.



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.

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



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

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

3.4.3 Test Procedures

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules 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 \geq 3 MHz
- Detector = Peak
- Sweep time = auto
- Trace mode = max hold

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

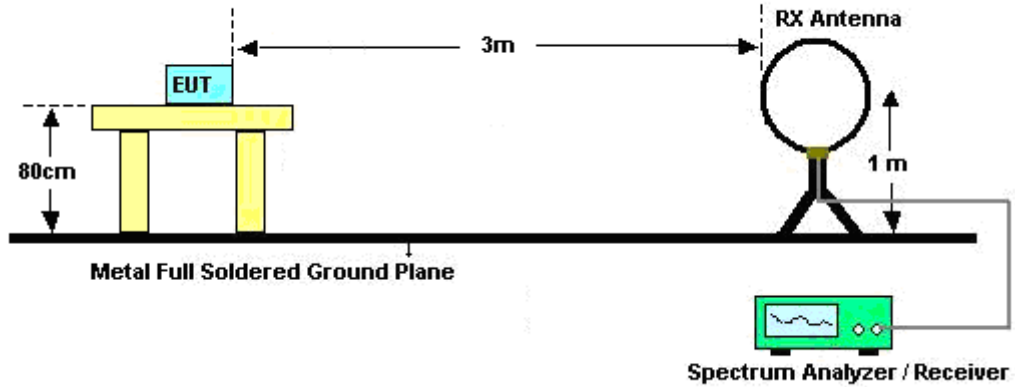
- RBW = 1 MHz
- VBW = 10 Hz, when duty cycle is no less than 98 percent.
- VBW \geq 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.



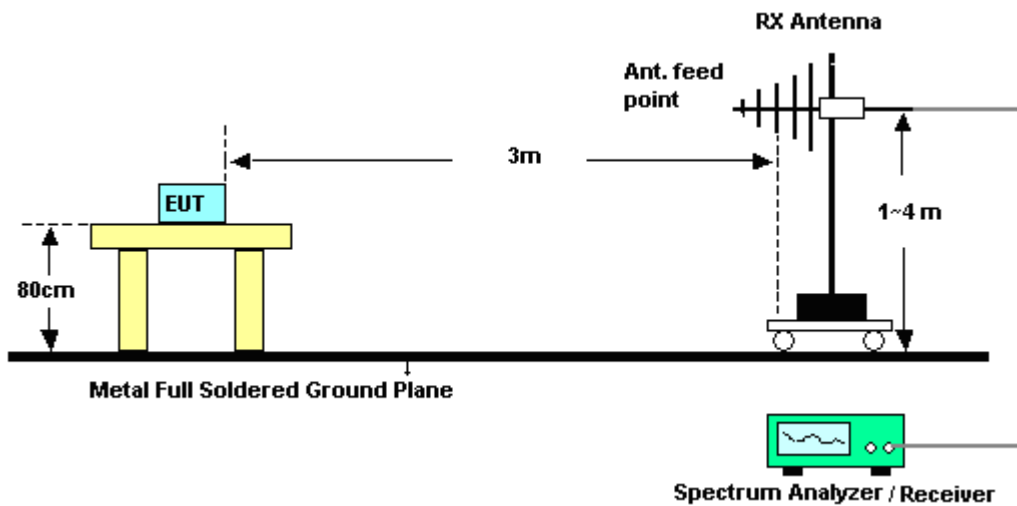
2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband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

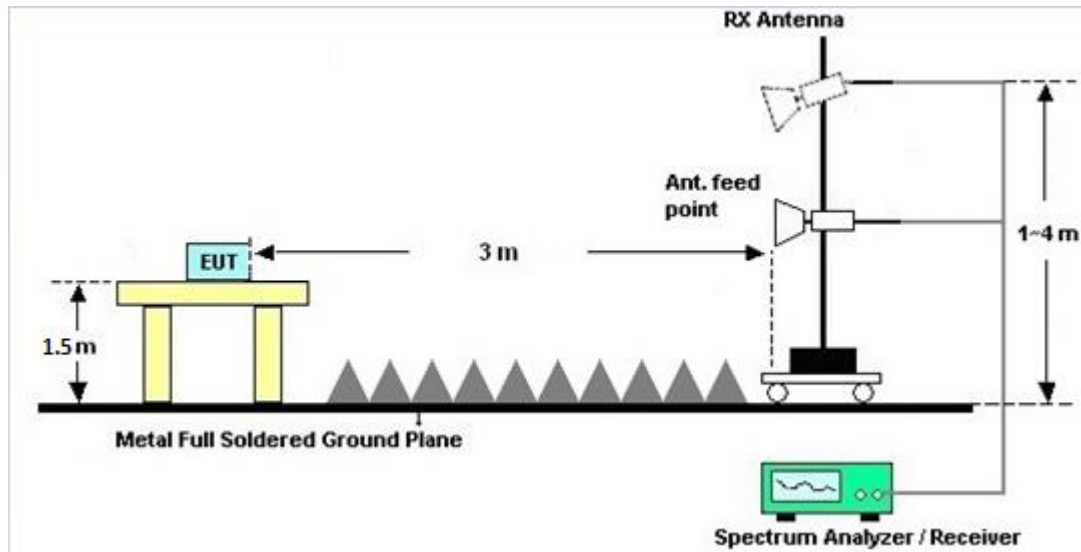
For radiated emissions below 30MHz



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 semi-Anechoic chamber, 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 (dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

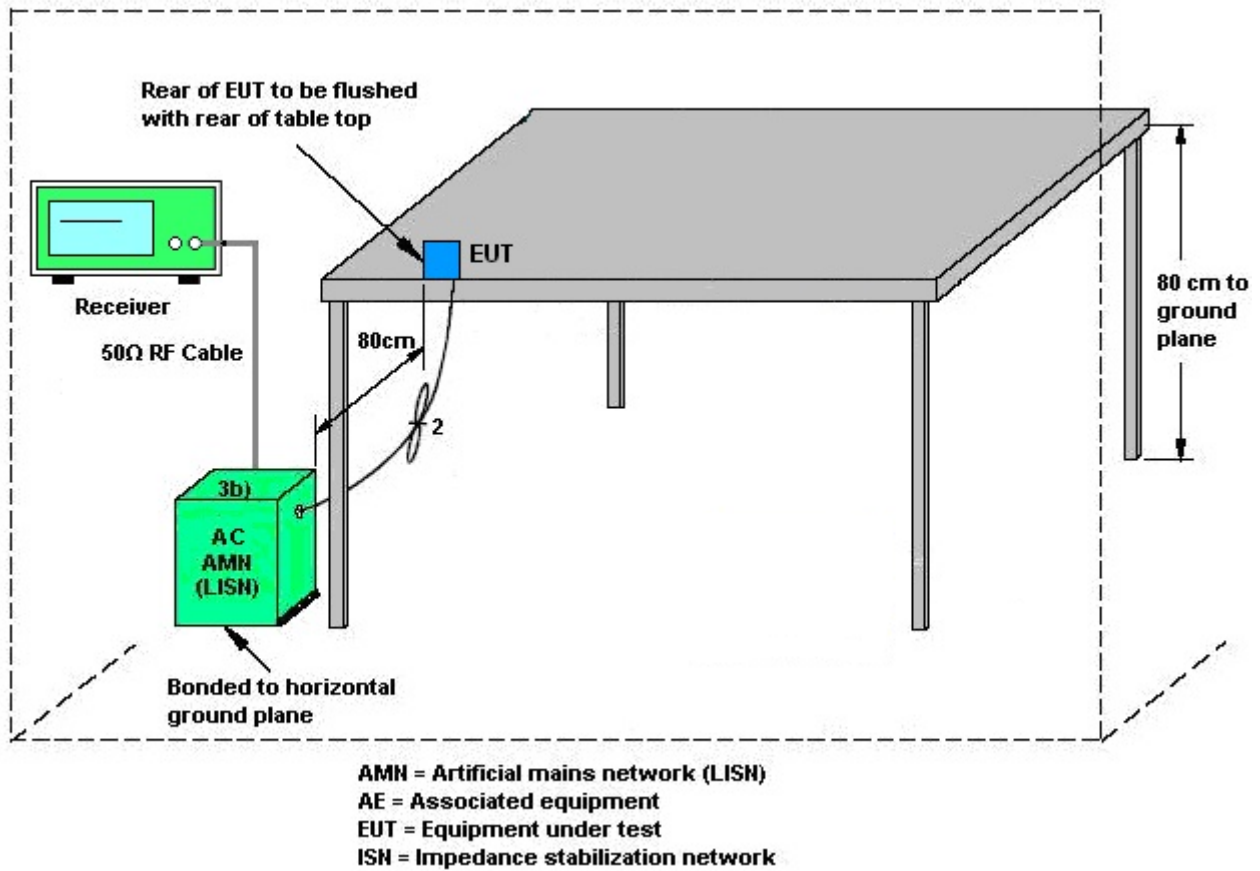
3.5.2 Measuring Instruments

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

3.5.3 Test Procedures

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

3.5.4 Test Setup



3.5.5 Test Result of AC Conducted Emission

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

The measuring equipment is listed in the section 4 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
Power Meter	Anritsu	ML2495A	0932001	N/A	Sep. 26, 2017	Dec. 14, 2017 ~ Jan. 13, 2018	Sep. 25, 2018	Conducted (TH05-HY)
Power Sensor	Anritsu	MA2411B	0846202	300MHz~40GHz	Sep. 26, 2017	Dec. 14, 2017 ~ Jan. 13, 2018	Sep. 25, 2018	Conducted (TH05-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP30	101067	9kHz ~ 30GHz	Nov. 13, 2017	Dec. 14, 2017 ~ Jan. 13, 2018	Nov. 12, 2018	Conducted (TH05-HY)
AC Power Source	ChainTek	APC-1000 W	N/A	N/A	N/A	Dec. 18, 2017 ~ Dec. 19, 2017	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESCI 7	100724	9kHz~7GHz	Sep. 20, 2017	Dec. 18, 2017 ~ Dec. 19, 2017	Sep. 19, 2018	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Nov. 30, 2017	Dec. 18, 2017 ~ Dec. 19, 2017	Nov. 29, 2018	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100081	9kHz~30MHz	Dec. 08, 2017	Dec. 18, 2017 ~ Dec. 19, 2017	Dec. 07, 2018	Conduction (CO05-HY)
<Radiated Band Edges and Spurious Emission Measurement for sample 1>								
Bilog Antenna	TESEQ	CBL 6111D&00800N1D01N-06	35419&03	30MHz to 1GHz	Jan. 07, 2017	Dec. 14, 2017 ~ Dec. 28, 2017	Jan. 06, 2018	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	00075962	1GHz ~ 18GHz	Aug. 23, 2017	Dec. 14, 2017 ~ Dec. 28, 2017	Aug. 22, 2018	Radiation (03CH07-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	Nov. 10, 2017	Dec. 14, 2017 ~ Dec. 28, 2017	Nov. 09, 2019	Radiation (03CH07-HY)
Preamplifier	MITEQ	AMF-7D-00101800-30-10P	1590075	1GHz ~ 18GHz	Apr. 25, 2017	Dec. 14, 2017 ~ Dec. 28, 2017	Apr. 24, 2018	Radiation (03CH07-HY)
Preamplifier	COM-POWER	PA-103A	161241	10MHz-1GHz	Mar. 14, 2017	Dec. 14, 2017 ~ Dec. 28, 2017	Mar. 13, 2018	Radiation (03CH07-HY)
Preamplifier	Agilent	8449B	3008A02362	1GHz~ 26.5GHz	Oct. 30, 2017	Dec. 14, 2017 ~ Dec. 28, 2017	Oct. 29, 2018	Radiation (03CH07-HY)
Spectrum Analyzer	Agilent	N9010A	MY53470118	10Hz~44GHz	Apr. 17, 2017	Dec. 14, 2017 ~ Dec. 28, 2017	Apr. 16, 2018	Radiation (03CH07-HY)
Antenna Mast	Max-Full	MFA520BS	N/A	1m~4m	N/A	Dec. 14, 2017 ~ Dec. 28, 2017	N/A	Radiation (03CH07-HY)
Turn Table	ChainTek	Chaintek 3000	N/A	0~360 Degree	N/A	Dec. 14, 2017 ~ Dec. 28, 2017	N/A	Radiation (03CH07-HY)
Amplifier	MITEQ	TTA1840-35-HG	1871923	18GHz~40GHz, VSWR : 2.5:1 max	Jul. 18, 2017	Dec. 14, 2017 ~ Dec. 28, 2017	Jul. 17, 2018	Radiation (03CH07-HY)
EMI Test Receiver	Agilent	N9038A(MXE)	MY53290053	20Hz to 26.5GHz	Jan. 12, 2017	Dec. 14, 2017 ~ Dec. 28, 2017	Jan. 11, 2018	Radiation (03CH07-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170584	18GHz- 40GHz	Nov. 27, 2017	Dec. 14, 2017 ~ Dec. 28, 2017	Nov. 26, 2018	Radiation (03CH07-HY)



Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
<Radiated Band Edges and Spurious Emission Measurement for sample 2>								
Bilog Antenna	TESEQ	CBL 6111D&008 00N1D01N- 06	35419&03	30MHz to 1GHz	Dec. 18, 2017	Mar. 22, 2018~ Mar. 28, 2018	Dec. 17, 2018	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	00075962	1GHz ~ 18GHz	Aug. 23, 2017	Mar. 22, 2018~ Mar. 28, 2018	Aug. 22, 2018	Radiation (03CH07-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	Nov. 10, 2017	Mar. 22, 2018~ Mar. 28, 2018	Nov. 09, 2018	Radiation (03CH07-HY)
Preamplifier	Agilent	8449B	3008A023 62	1GHz~ 26.5GHz	Oct. 30, 2017	Mar. 22, 2018~ Mar. 28, 2018	Oct. 29, 2018	Radiation (03CH07-HY)
Spectrum Analyzer	Agilent	N9010A	MY534701 18	10Hz~44GHz	Apr. 17, 2017	Mar. 22, 2018~ Mar. 28, 2018	Apr. 16, 2018	Radiation (03CH07-HY)
Antenna Mast	Max-Full	MFA520BS	N/A	1m~4m	N/A	Mar. 22, 2018~ Mar. 28, 2018	N/A	Radiation (03CH07-HY)
Turn Table	ChainTek	Chaintek 3000	N/A	0~360 Degree	N/A	Mar. 22, 2018~ Mar. 28, 2018	N/A	Radiation (03CH07-HY)
Amplifier	MITEQ	TTA1840-3 5-HG	1871923	18GHz~40GHz, VSWR : 2.5:1 max	Jul. 18, 2017	Mar. 22, 2018~ Mar. 28, 2018	Jul. 17, 2018	Radiation (03CH07-HY)
Test Software	Audix	E3 6.2009- 8-24	N/A	N/A	N/A	Mar. 22, 2018~ Mar. 28, 2018	N/A	Radiation (03CH07-HY)



5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	2.70
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.70
---	------

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.50
---	------

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.20
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Appendix A. Test Result of Conducted Test Items

Test Engineer:	Ethan Lin / Luffu Lin	Temperature:	21~25	°C
Test Date:	2017/12/14 ~ 2018/01/13	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)		
11a	6Mbps	1	36	5180	18.80	32.20	-	22.74		
11a	6Mbps	1	44	5220	18.70	32.15	-	22.72		
11a	6Mbps	1	48	5240	18.65	32.40	-	22.71		
HT20	MCS0	1	36	5180	19.30	35.60	-	22.86		
HT20	MCS0	1	44	5220	19.35	34.75	-	22.87		
HT20	MCS0	1	48	5240	19.60	37.70	-	22.92		
HT40	MCS0	1	38	5190	36.60	49.80	-	23.01		
HT40	MCS0	1	46	5230	36.80	64.38	-	23.01		
VHT80	MCS0	1	42	5210	75.60	81.60	-	23.01		

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
11a	6Mbps	1	36	5180	0.14	15.07	24.00	1.71		Pass
11a	6Mbps	1	44	5220	0.14	15.68	24.00	1.71		Pass
11a	6Mbps	1	48	5240	0.14	15.67	24.00	1.71		Pass
HT20	MCS0	1	36	5180	0.13	15.60	24.00	1.71		Pass
HT20	MCS0	1	44	5220	0.13	15.56	24.00	1.71		Pass
HT20	MCS0	1	48	5240	0.13	15.54	24.00	1.71		Pass
HT40	MCS0	1	38	5190	0.27	12.83	24.00	1.71		Pass
HT40	MCS0	1	46	5230	0.27	15.42	24.00	1.71		Pass
VHT20	MCS0	1	36	5180	0.13	15.56	24.00	1.71		Pass
VHT20	MCS0	1	44	5220	0.13	15.54	24.00	1.71		Pass
VHT20	MCS0	1	48	5240	0.13	15.53	24.00	1.71		Pass
VHT40	MCS0	1	38	5190	0.27	12.70	24.00	1.71		Pass
VHT40	MCS0	1	46	5230	0.27	15.38	24.00	1.71		Pass
VHT80	MCS0	1	42	5210	0.53	9.59	24.00	1.71		Pass

TEST RESULTS DATA
Power Spectral Density

FCC Band I										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)	Average Power Density (dBm/MHz)	Average PSD Limit (dBm/MHz)	DG (dBi)	-	Pass/Fail
11a	6Mbps	1	36	5180	0.14	5.31	11.00	1.71		Pass
11a	6Mbps	1	44	5220	0.14	5.63	11.00	1.71		Pass
11a	6Mbps	1	48	5240	0.14	5.34	11.00	1.71		Pass
HT20	MCS0	1	36	5180	0.13	5.00	11.00	1.71		Pass
HT20	MCS0	1	44	5220	0.13	5.20	11.00	1.71		Pass
HT20	MCS0	1	48	5240	0.13	4.92	11.00	1.71		Pass
HT40	MCS0	1	38	5190	0.27	-0.56	11.00	1.71		Pass
HT40	MCS0	1	46	5230	0.27	2.19	11.00	1.71		Pass
VHT80	MCS0	1	42	5210	0.53	-6.19	11.00	1.71		Pass



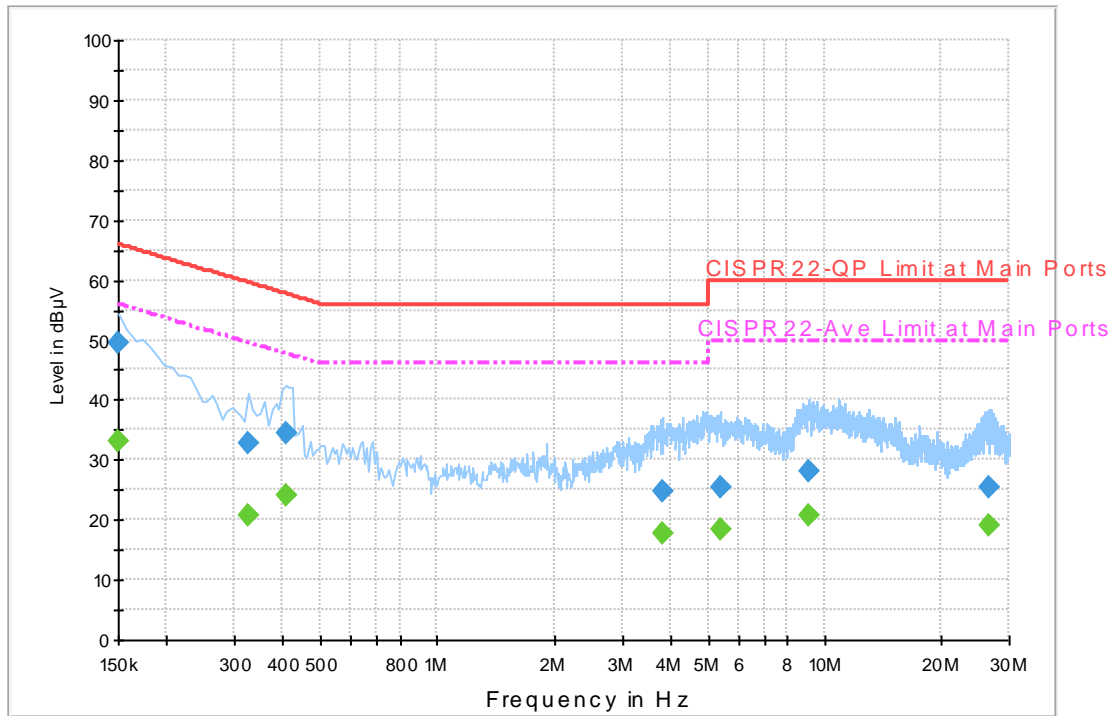
Appendix B. AC Conducted Emission Test Results

Test Engineer :	Shareef Yu	Temperature :	23~25°C
		Relative Humidity :	50~51%

EUT Information

Report NO : 7N2101
 Test Mode : Mode 1
 Test Voltage : 120Vac/60Hz
 Phase : Line

ENV216 Auto Test FCC Power Bar - L



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	49.6	Off	L1	19.5	16.4	66.0
0.326000	32.8	Off	L1	19.5	26.8	59.6
0.406000	34.4	Off	L1	19.5	23.3	57.7
3.822000	24.9	Off	L1	19.5	31.1	56.0
5.374000	25.4	Off	L1	19.6	34.6	60.0
9.086000	28.0	Off	L1	19.7	32.0	60.0
26.766000	25.5	Off	L1	19.8	34.5	60.0

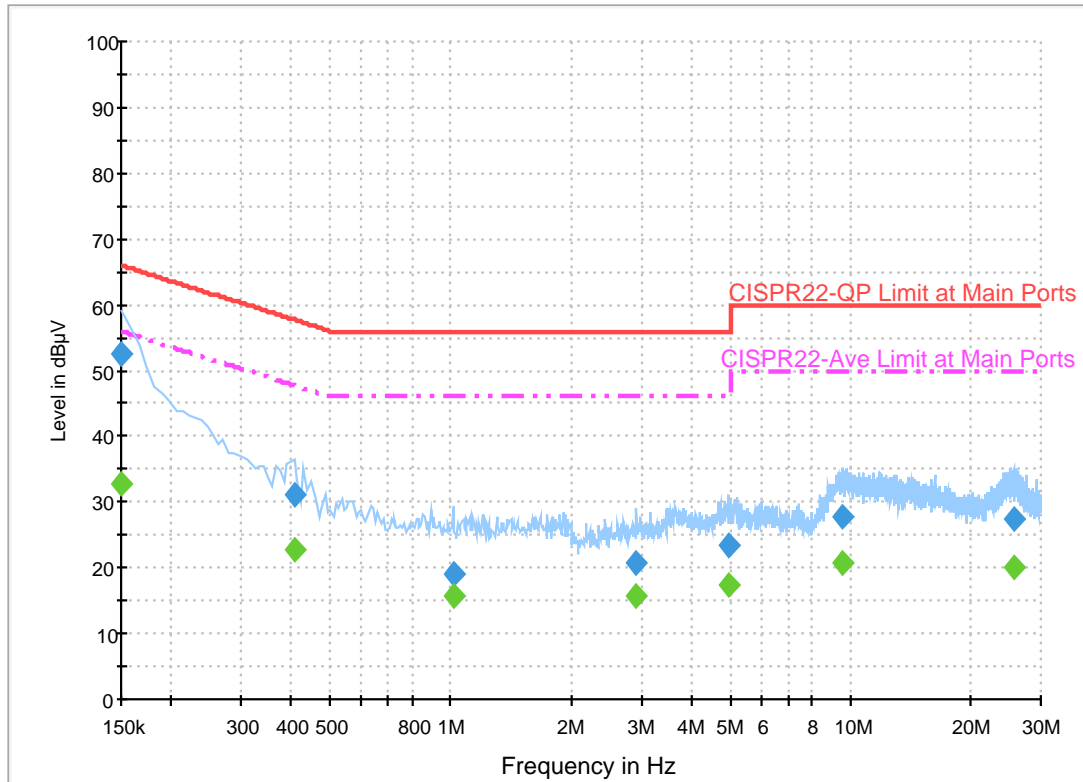
Final Result 2

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	33.1	Off	L1	19.5	22.9	56.0
0.326000	20.8	Off	L1	19.5	28.8	49.6
0.406000	24.1	Off	L1	19.5	23.6	47.7
3.822000	17.9	Off	L1	19.5	28.1	46.0
5.374000	18.3	Off	L1	19.6	31.7	50.0
9.086000	20.9	Off	L1	19.7	29.1	50.0
26.766000	19.0	Off	L1	19.8	31.0	50.0

EUT Information

Report NO : 7N2101
 Test Mode : Mode 1
 Test Voltage : 120Vac/60Hz
 Phase : Neutral

ENV216 Auto Test FCC Power Bar - N



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	52.7	Off	N	19.5	13.3	66.0
0.406000	31.2	Off	N	19.5	26.5	57.7
1.014000	19.1	Off	N	19.5	36.9	56.0
2.918000	20.8	Off	N	19.4	35.2	56.0
4.966000	23.3	Off	N	19.6	32.7	56.0
9.574000	27.8	Off	N	19.7	32.2	60.0
25.550000	27.3	Off	N	20.0	32.7	60.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	32.9	Off	N	19.5	23.1	56.0
0.406000	22.8	Off	N	19.5	24.9	47.7
1.014000	15.8	Off	N	19.5	30.2	46.0
2.918000	15.8	Off	N	19.4	30.2	46.0
4.966000	17.4	Off	N	19.6	28.6	46.0
9.574000	20.6	Off	N	19.7	29.4	50.0
25.550000	20.2	Off	N	20.0	29.8	50.0



Appendix C. Radiated Spurious Emission

Test Engineer :	Jesse Wang, Stan Hsieh, and James Chiu	Temperature :	22~24°C
		Relative Humidity :	51~53%



<For Sample 1>

Band 1 - 5150~5250MHz
WIFI 802.11a (Band Edge @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)	
802.11a CH 36 5180MHz		5147.68	65.13	-8.87	74	53.87	34.41	11.99	35.14	258	13	P	H	
		5150	53.47	-0.53	54	42.21	34.41	11.99	35.14	258	13	A	H	
	*	5180	109.13	-	-	97.82	34.46	11.99	35.14	258	13	P	H	
	*	5180	101.9	-	-	90.59	34.46	11.99	35.14	258	13	A	H	
													H	
														H
			5147.94	63.43	-10.57	74	52.17	34.41	11.99	35.14	106	73	P	V
			5150	53.32	-0.68	54	42.06	34.41	11.99	35.14	106	73	A	V
	*		5180	108.08	-	-	96.77	34.46	11.99	35.14	106	73	P	V
	*		5180	100.15	-	-	88.84	34.46	11.99	35.14	106	73	A	V
														V
														V
802.11a CH 44 5220MHz		5101.4	50.05	-23.95	74	38.9	34.34	11.95	35.14	215	0	P	H	
		5149.5	42.17	-11.83	54	30.91	34.41	11.99	35.14	215	0	A	H	
	*	5220	110.75	-	-	99.35	34.5	12.04	35.14	215	0	P	H	
	*	5220	103.15	-	-	91.75	34.5	12.04	35.14	215	0	A	H	
			5383.56	49.97	-24.03	74	37.73	34.74	12.65	35.15	215	0	P	H
			5405.68	41.66	-12.34	54	29.41	34.76	12.65	35.16	215	0	A	H
			5129.48	49.85	-24.15	74	38.65	34.39	11.95	35.14	100	20	P	V
			5147.68	41.63	-12.37	54	30.37	34.41	11.99	35.14	100	20	A	V
	*		5220	108.58	-	-	97.18	34.5	12.04	35.14	100	20	P	V
	*		5220	101.31	-	-	89.91	34.5	12.04	35.14	100	20	A	V
			5443.76	49.13	-24.87	74	36.85	34.81	12.63	35.16	100	20	P	V
			5405.4	41.24	-12.76	54	28.99	34.76	12.65	35.16	100	20	A	V



802.11a CH 48 5240MHz		5038.22	50.28	-23.72	74	39.29	34.27	11.85	35.13	218	0	P	H
		5053.82	41.61	-12.39	54	30.62	34.27	11.85	35.13	218	0	A	H
	*	5240	110.49	-	-	98.94	34.53	12.16	35.14	218	0	P	H
	*	5240	102.94	-	-	91.39	34.53	12.16	35.14	218	0	A	H
		5369.56	49.21	-24.79	74	37.12	34.71	12.53	35.15	218	0	P	H
		5426.68	41.28	-12.72	54	29.03	34.78	12.63	35.16	218	0	A	H
		5098.28	49.52	-24.48	74	38.42	34.34	11.9	35.14	100	19	P	V
		5148.98	41.01	-12.99	54	29.75	34.41	11.99	35.14	100	19	A	V
	*	5240	108.52	-	-	96.97	34.53	12.16	35.14	100	19	P	V
	*	5240	101.18	-	-	89.63	34.53	12.16	35.14	100	19	A	V
		5388.6	49.01	-24.99	74	36.77	34.74	12.65	35.15	100	19	P	V
		5426.68	41.3	-12.7	54	29.05	34.78	12.63	35.16	100	19	A	V
Remark	<ol style="list-style-type: none"> 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. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 36 5180MHz		10360	42.43	-25.77	68.2	46.09	37.19	17.83	59.31	100	0	P	H
		15540	46.71	-27.29	74	40.57	40.43	22.16	56.87	100	0	P	H
													H
													H
		10360	42.48	-25.72	68.2	46.14	37.19	17.83	59.31	100	0	P	V
		15540	46.07	-27.93	74	39.93	40.43	22.16	56.87	100	0	P	V
													V
													V
802.11a CH 44 5220MHz		10440	44.85	-23.35	68.2	48.27	37.25	17.91	59.25	100	0	P	H
		15660	46.14	-27.86	74	39.69	40.52	22.29	56.78	100	0	P	H
													H
													H
		10440	43	-25.2	68.2	46.42	37.25	17.91	59.25	100	0	P	V
		15660	46.13	-27.87	74	39.68	40.52	22.29	56.78	100	0	P	V
													V
													V
802.11a CH 48 5240MHz		10480	42.84	-25.36	68.2	46.15	37.29	17.94	59.21	100	0	P	H
		15720	45.05	-28.95	74	38.43	40.58	22.37	56.72	100	0	P	H
													H
													H
		10480	42.92	-25.28	68.2	46.23	37.29	17.94	59.21	100	0	P	V
		15720	45.86	-28.14	74	39.24	40.58	22.37	56.72	100	0	P	V
													V
													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 Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)	
802.11n HT20 CH 36 5180MHz		5149.24	59.65	-14.35	74	48.39	34.41	11.99	35.14	255	0	P	H	
		5149.76	52.34	-1.66	54	41.08	34.41	11.99	35.14	255	0	A	H	
	*	5180	108.89	-	-	97.58	34.46	11.99	35.14	255	0	P	H	
	*	5180	101.87	-	-	90.56	34.46	11.99	35.14	255	0	A	H	
													H	
													H	
			5150	59.31	-14.69	74	48.05	34.41	11.99	35.14	100	74	P	V
			5149.24	52.11	-1.89	54	40.85	34.41	11.99	35.14	100	74	A	V
		*	5180	107.77	-	-	96.46	34.46	11.99	35.14	100	74	P	V
		*	5180	100.2	-	-	88.89	34.46	11.99	35.14	100	74	A	V
													V	
													V	
802.11n HT20 CH 44 5220MHz		5147.68	49.47	-24.53	74	38.21	34.41	11.99	35.14	220	0	P	H	
		5149.24	42.41	-11.59	54	31.15	34.41	11.99	35.14	220	0	A	H	
		*	5220	109.92	-	-	98.52	34.5	12.04	35.14	220	0	P	H
		*	5220	102.28	-	-	90.88	34.5	12.04	35.14	220	0	A	H
			5449.36	49.42	-24.58	74	37.12	34.83	12.63	35.16	220	0	P	H
			5405.68	41.5	-12.5	54	29.25	34.76	12.65	35.16	220	0	A	H
			5036.66	49.73	-24.27	74	38.76	34.25	11.85	35.13	106	19	P	V
			5147.68	41.96	-12.04	54	30.7	34.41	11.99	35.14	106	19	A	V
		*	5220	108.85	-	-	97.45	34.5	12.04	35.14	106	19	P	V
		*	5220	101.33	-	-	89.93	34.5	12.04	35.14	106	19	A	V
		5373.48	49.04	-24.96	74	36.95	34.71	12.53	35.15	106	19	P	V	
		5405.4	41.35	-12.65	54	29.1	34.76	12.65	35.16	106	19	A	V	



802.11n HT20 CH 48 5240MHz		5149.5	50.43	-23.57	74	39.17	34.41	11.99	35.14	229	0	P	H
		5054.08	42	-12	54	31.01	34.27	11.85	35.13	229	0	A	H
	*	5240	109.96	-	-	98.41	34.53	12.16	35.14	229	0	P	H
	*	5240	102.49	-	-	90.94	34.53	12.16	35.14	229	0	A	H
		5454.68	49.95	-24.05	74	37.65	34.83	12.63	35.16	229	0	P	H
		5426.4	41.45	-12.55	54	29.2	34.78	12.63	35.16	229	0	A	H
		5108.16	49.86	-24.14	74	38.69	34.36	11.95	35.14	109	18	P	V
		5147.42	41.46	-12.54	54	30.2	34.41	11.99	35.14	109	18	A	V
	*	5240	108.28	-	-	96.73	34.53	12.16	35.14	109	18	P	V
	*	5240	101.01	-	-	89.46	34.53	12.16	35.14	109	18	A	V
		5439.28	48.67	-25.33	74	36.39	34.81	12.63	35.16	109	18	P	V
		5426.12	41.49	-12.51	54	29.24	34.78	12.63	35.16	109	18	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 Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 36 5180MHz		10360	41.94	-26.26	68.2	45.6	37.19	17.83	59.31	100	0	P	H
		15540	46.03	-27.97	74	39.89	40.43	22.16	56.87	100	0	P	H
													H
													H
		10360	41.02	-27.18	68.2	44.68	37.19	17.83	59.31	100	0	P	V
		15540	45.86	-28.14	74	39.72	40.43	22.16	56.87	100	0	P	V
													V
802.11n HT20 CH 44 5220MHz		10440	43.12	-25.08	68.2	46.54	37.25	17.91	59.25	100	0	P	H
		15660	46.77	-27.23	74	40.32	40.52	22.29	56.78	100	0	P	H
													H
													H
		10440	42.18	-26.02	68.2	45.6	37.25	17.91	59.25	100	0	P	V
		15660	45.82	-28.18	74	39.37	40.52	22.29	56.78	100	0	P	V
													V
802.11n HT20 CH 48 5240MHz		10480	42.5	-25.7	68.2	45.81	37.29	17.94	59.21	100	0	P	H
		15720	45.34	-28.66	74	38.72	40.58	22.37	56.72	100	0	P	H
													H
													H
		10480	42.47	-25.73	68.2	45.78	37.29	17.94	59.21	100	0	P	V
		15720	47.11	-26.89	74	40.49	40.58	22.37	56.72	100	0	P	V
													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 Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 38 5190MHz		5142.48	59.08	-14.92	74	47.82	34.41	11.99	35.14	254	0	P	H
		5149.5	52.71	-1.29	54	41.45	34.41	11.99	35.14	254	0	A	H
	*	5190	103.16	-	-	91.8	34.46	12.04	35.14	254	0	P	H
	*	5190	96.97	-	-	85.61	34.46	12.04	35.14	254	0	A	H
		5443.48	50.84	-23.16	74	38.56	34.81	12.63	35.16	254	0	P	H
		5456.36	42.29	-11.71	54	29.99	34.83	12.63	35.16	254	0	A	H
		5145.6	58.3	-15.7	74	47.04	34.41	11.99	35.14	100	74	P	V
		5150	52.37	-1.63	54	41.11	34.41	11.99	35.14	100	74	A	V
	*	5190	102.81	-	-	91.45	34.46	12.04	35.14	100	74	P	V
	*	5190	95.88	-	-	84.52	34.46	12.04	35.14	100	74	A	V
		5407.92	49.62	-24.38	74	37.37	34.76	12.65	35.16	100	74	P	V
		5379.64	42.2	-11.8	54	30.08	34.74	12.53	35.15	100	74	A	V
802.11n HT40 CH 46 5230MHz		5150	54.32	-19.68	74	43.06	34.41	11.99	35.14	230	0	P	H
		5149.76	47.09	-6.91	54	35.83	34.41	11.99	35.14	230	0	A	H
	*	5230	106.74	-	-	95.19	34.53	12.16	35.14	230	0	P	H
	*	5230	99.95	-	-	88.4	34.53	12.16	35.14	230	0	A	H
		5374.04	49.1	-24.9	74	37.01	34.71	12.53	35.15	230	0	P	H
		5351.08	42.63	-11.37	54	30.56	34.69	12.53	35.15	230	0	A	H
		5144.3	53.21	-20.79	74	41.95	34.41	11.99	35.14	108	18	P	V
		5148.98	45.55	-8.45	54	34.29	34.41	11.99	35.14	108	18	A	V
	*	5230	104.87	-	-	93.32	34.53	12.16	35.14	108	18	P	V
	*	5230	98.14	-	-	86.59	34.53	12.16	35.14	108	18	A	V
	5438.44	49.68	-24.32	74	37.4	34.81	12.63	35.16	108	18	P	V	
	5350.24	42.69	-11.31	54	30.62	34.69	12.53	35.15	108	18	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 Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 38 5190MHz		10380	41.45	-26.75	68.2	45.06	37.21	17.83	59.29	100	0	P	H
		15570	45.09	-28.91	74	38.84	40.46	22.2	56.84	100	0	P	H
													H
													H
		10380	41.27	-26.93	68.2	44.88	37.21	17.83	59.29	100	0	P	V
		15570	45.87	-28.13	74	39.62	40.46	22.2	56.84	100	0	P	V
													V
													V
802.11n HT40 CH 46 5230MHz		10460	43.36	-24.84	68.2	46.76	37.26	17.91	59.24	100	0	P	H
		15690	46.28	-27.72	74	39.75	40.55	22.33	56.75	100	0	P	H
													H
													H
		10460	41.82	-26.38	68.2	45.22	37.26	17.91	59.24	100	0	P	V
		15690	45.61	-28.39	74	39.08	40.55	22.33	56.75	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 1 5150~5250MHz
WIFI 802.11ac VHT80 (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT80 CH 42 5210MHz		5144.82	58.71	-15.29	74	47.45	34.41	11.99	35.14	255	0	P	H
		5148.2	53.15	-0.85	54	41.89	34.41	11.99	35.14	255	0	A	H
	*	5210	98.5	-	-	87.1	34.5	12.04	35.14	255	0	P	H
	*	5210	91.84	-	-	80.44	34.5	12.04	35.14	255	0	A	H
		5425.84	50.98	-23.02	74	38.73	34.78	12.63	35.16	255	0	P	H
		5375.72	44.19	-9.81	54	32.1	34.71	12.53	35.15	255	0	A	H
		5147.94	58.03	-15.97	74	46.77	34.41	11.99	35.14	101	74	P	V
		5150	52.62	-1.38	54	41.36	34.41	11.99	35.14	101	74	A	V
	*	5210	97.3	-	-	85.9	34.5	12.04	35.14	101	74	P	V
	*	5210	91.03	-	-	79.63	34.5	12.04	35.14	101	74	A	V
		5425.84	50.19	-23.81	74	37.94	34.78	12.63	35.16	101	74	P	V
	5364.24	44.04	-9.96	54	31.95	34.71	12.53	35.15	101	74	A	V	
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 1 5150~5250MHz

WIFI 802.11ac VHT80 (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)	
802.11ac VHT80 CH 42 5210MHz		10420	42.64	-25.56	68.2	46.15	37.23	17.87	59.27	100	0	P	H	
		15630	46.5	-27.5	74	40.06	40.51	22.29	56.79	100	0	P	H	
													H	
													H	
			10420	42.75	-25.45	68.2	46.26	37.23	17.87	59.27	100	0	P	V
			15630	45.76	-28.24	74	39.32	40.51	22.29	56.79	100	0	P	V
														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	Cable	Preamp	Ant	Table	Peak	Pol.	
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.		
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)	
802.11a LF		40.53	26.7	-13.3	40	37.6	18.85	1.71	31.49	-	-	P	H	
		209.01	36.8	-6.7	43.5	50.38	15.07	2.72	31.44	-	-	P	H	
		237.09	33.81	-12.19	46	45.3	16.8	3.03	31.4	-	-	P	H	
		321	41.01	-4.99	46	49.31	19.4	3.43	31.26	100	0	P	H	
		364.4	36.14	-9.86	46	42.85	20.75	3.57	31.19	-	-	P	H	
		797.7	37.32	-8.68	46	34.78	27.94	4.98	30.59	-	-	P	H	
														H
														H
														H
														H
														H
														H
														H
			39.45	38.2	-1.8	40	48.54	19.4	1.71	31.48	100	119	QP	V
			49.71	33.21	-6.79	40	48.47	14.58	1.71	31.61	-	-	P	V
			209.01	38.6	-4.9	43.5	52.18	15.07	2.72	31.44	-	-	P	V
			321.7	42.93	-3.07	46	51.2	19.43	3.43	31.26	-	-	P	V
			403.6	35.77	-10.23	46	40.99	21.84	3.82	31.12	-	-	P	V
			797.7	38.77	-7.23	46	36.23	27.94	4.98	30.59	-	-	P	V
														V
													V	
													V	
													V	
													V	
													V	
Remark	1. No other spurious found. 2. All results are PASS against limit line.													



<For Sample 2>

Band 1 - 5150~5250MHz
WIFI 802.11a (Band Edge @ 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		5150	65.42	-8.58	74	55.12	34.41	11.03	35.14	264	12	P	H	
		5150	53.66	-0.34	54	43.36	34.41	11.03	35.14	264	12	A	H	
	*	5180	109.75	-	-	99.4	34.46	11.03	35.14	264	12	P	H	
	*	5180	102.77	-	-	92.42	34.46	11.03	35.14	264	12	A	H	
													H	
													H	
			5148.72	63.66	-10.34	74	53.36	34.41	11.03	35.14	100	74	P	V
			5149.5	53.38	-0.62	54	43.08	34.41	11.03	35.14	100	74	A	V
	*		5180	108.04	-	-	97.69	34.46	11.03	35.14	100	74	P	V
	*		5180	100.54	-	-	90.19	34.46	11.03	35.14	100	74	A	V
													V	
												V		
Remark	3. No other spurious found. 4. All results are PASS against Peak and Average limit line.													



Band 1 5150~5250MHz

WIFI 802.11a (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	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	41.59	-26.61	68.2	46.87	37.19	16.84	59.31	100	0	P	H	
		15540	45.16	-28.84	74	41.55	40.43	20.05	56.87	100	0	P	H	
													H	
													H	
			10360	41.51	-26.69	68.2	46.79	37.19	16.84	59.31	100	0	P	V
			15540	44.37	-29.63	74	40.76	40.43	20.05	56.87	100	0	P	V
														V
														V
Remark	3. No other spurious found. 4. 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	Avg.		
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)	
802.11a LF		30	29.24	-10.76	40	35.27	24.6	1.2	31.83	-	-	P	H	
		47.55	27.2	-12.8	40	42.32	15.48	1.2	31.8	-	-	P	H	
		214.41	35.54	-7.96	43.5	49.83	15.2	2.18	31.67	-	-	P	H	
		325.2	42.62	-3.38	46	51.92	19.56	2.76	31.62	100	0	P	H	
		405.7	34.63	-11.37	46	41.29	21.93	3.05	31.64	-	-	P	H	
		797.7	39.32	-6.68	46	38.83	27.96	4.32	31.79	-	-	P	H	
														H
														H
														H
														H
														H
														H
			35.67	39.15	-0.85	40	48.26	21.51	1.2	31.82	100	238	QP	V
			49.98	28.36	-11.64	40	44.71	14.25	1.2	31.8	-	-	P	V
			216.03	35.46	-10.54	46	49.71	15.24	2.18	31.67	-	-	P	V
			324.5	41.22	-4.78	46	50.52	19.56	2.76	31.62	-	-	P	V
			412.7	35.22	-10.78	46	41.55	22.27	3.05	31.65	-	-	P	V
			547.1	35.16	-10.84	46	38.67	24.67	3.57	31.75	-	-	P	V
														V
														V
													V	
													V	
													V	
Remark	3. No other spurious found. 4. All results are PASS against limit line.													



Note symbol

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



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

WIFI	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		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
CH 01													
2412MHz		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 :	Jesse Wang, Stan Hsieh, and James Chiu	Temperature :	22~24°C
		Relative Humidity :	51~53%

Note symbol

-L	Low channel location
-R	High channel location



<For Sample 1>

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	<p>Site : 03CH07-HY Condition : PEAK_BE_74 3m HF_ANT_00075962 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 7N2101 Mode : 1</p>	<p>Site : 03CH07-HY Condition : PEAK_74 3m HF_ANT_00075962 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 7N2101 Mode : 1</p>
Avg.	<p>Site : 03CH07-HY Condition : AVG_BE_54 3m HF_ANT_00075962 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 7N2101 Mode : 1</p>	Left blank

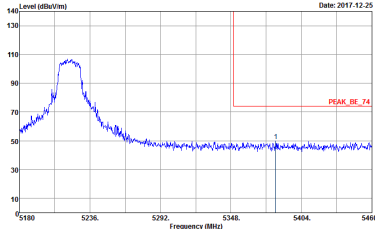
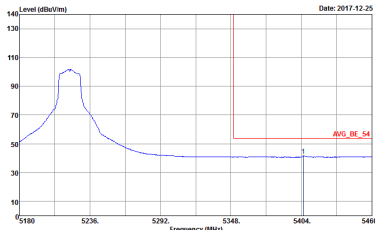


WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11a CH36 5180MHz	
1	Vertical	Fundamental
Peak	<p>Site : 03CH07-HY Condition : PEAK_BE_74 3m HF_ANT_00075962 VERTICAL Detector : Peak Project : 7N2101 Mode : 1</p>	<p>Site : 03CH07-HY Condition : PEAK_74 3m HF_ANT_00075962 VERTICAL Detector : Peak Project : 7N2101 Mode : 1</p>
Avg.	<p>Site : 03CH07-HY Condition : AVG_BE_54 3m HF_ANT_00075962 VERTICAL Detector : Peak Project : 7N2101 Mode : 1</p>	Left blank

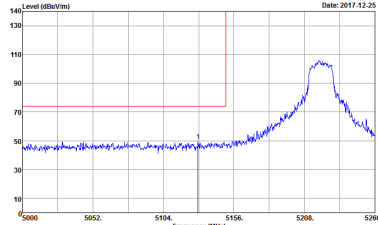
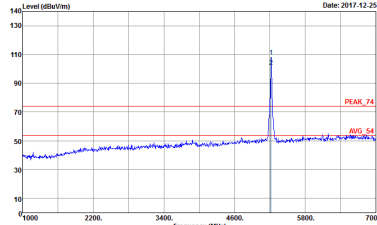
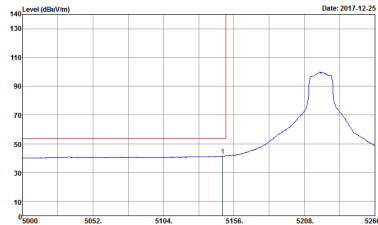


WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11a CH44 5220MHz - L	
1	Horizontal	Fundamental
Peak	<p>Site : 03CH07-HY Condition : PEAK_BE_74 3m HF_ANT_00075962 HORIZONTAL Detector : Peak Project : 7N2101 Mode : Z</p>	<p>Site : 03CH07-HY Condition : PEAK_74 3m HF_ANT_00075962 HORIZONTAL Detector : Peak Project : 7N2101 Mode : Z</p>
Avg.	<p>Site : 03CH07-HY Condition : AVG_BE_54 3m HF_ANT_00075962 HORIZONTAL Detector : Peak Project : 7N2101 Mode : Z</p>	Left blank



WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11a CH44 5220MHz - R	
1	Horizontal	Fundamental
<p>Peak</p>	 <p>Site : 03CH07-HY Condition : PEAK_BE_74 3m HF_ANT_00075962 HORIZONTAL Detector : Peak Project : 7N2101 Mode : Z</p>	<p>Left blank</p>
<p>Avg.</p>	 <p>Site : 03CH07-HY Condition : AVG_BE_54 3m HF_ANT_00075962 HORIZONTAL Detector : Peak Project : 7N2101 Mode : Z</p>	<p>Left blank</p>



WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11a CH44 5220MHz - L	
1	Vertical	Fundamental
Peak	 <p>Site : 03CH07-HY Condition : PEAK_BE_74 3m HF_ANT_00075962 VERTICAL RBW:1000.000kHz VBW:3000.000kHz SWT:Auto Detector : Peak Project : 7N2101 Mode : Z</p>	 <p>Site : 03CH07-HY Condition : PEAK_74 3m HF_ANT_00075962 VERTICAL RBW:1000.000kHz VBW:3000.000kHz SWT:Auto Detector : Peak Project : 7N2101 Mode : Z</p>
Avg.	 <p>Site : 03CH07-HY Condition : Avg_BE_54 3m HF_ANT_00075962 VERTICAL RBW:1000.000kHz VBW:3000.000kHz SWT:Auto Detector : Peak Project : 7N2101 Mode : Z</p>	Left blank

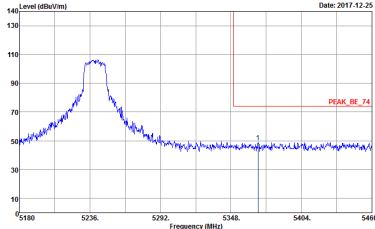
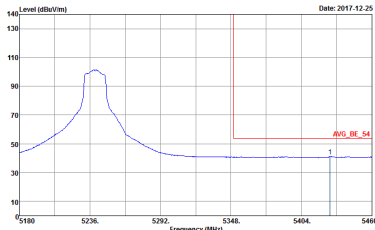


WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11a CH44 5220MHz - R	
1	Vertical	Fundamental
Peak	<p>Site : 03CH07-HY Condition : PEAK_BE_74 3m HF_ANT_00075962 VERTICAL Detector : Peak Project : 7N2101 Mode : Z</p>	Left blank
Avg.	<p>Site : 03CH07-HY Condition : AVG_BE_54 3m HF_ANT_00075962 VERTICAL Detector : Peak Project : 7N2101 Mode : Z</p>	Left blank

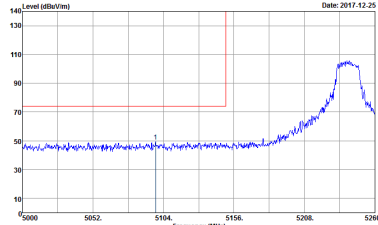
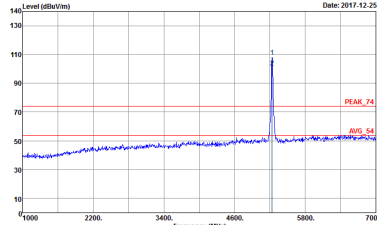
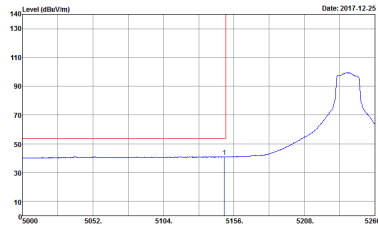


WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11a CH48 5240MHz - L	
1	Horizontal	Fundamental
Peak	<p>Site : 03CH07-HY Condition : PEAK_BE_74 3m HF_ANT_00075962 HORIZONTAL Detector : Peak Project : 7N2101 Mode : 3</p>	<p>Site : 03CH07-HY Condition : PEAK_74 3m HF_ANT_00075962 HORIZONTAL Detector : Peak Project : 7N2101 Mode : 3</p>
Avg.	<p>Site : 03CH07-HY Condition : AVG_BE_54 3m HF_ANT_00075962 HORIZONTAL Detector : Peak Project : 7N2101 Mode : 3</p>	Left blank

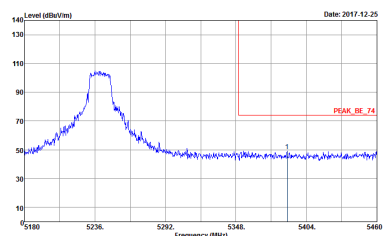
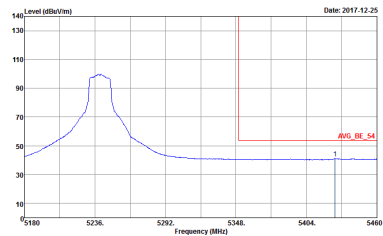


WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11a CH48 5240MHz - R	
1	Horizontal	Fundamental
<p>Peak</p>	 <p>Site : 03CH07-HY Condition : PEAK_BE_74 3m HF_ANT_00075962 HORIZONTAL Detector : Peak Project : 7N2101 Mode : 3</p>	<p>Left blank</p>
<p>Avg.</p>	 <p>Site : 03CH07-HY Condition : AVG_BE_54 3m HF_ANT_00075962 HORIZONTAL Detector : Peak Project : 7N2101 Mode : 3</p>	<p>Left blank</p>



WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11a CH48 5240MHz - L	
1	Vertical	Fundamental
Peak	 <p>Site : 03CH07-HY Condition : PEAK_BE_74 3m HF_ANT_00075962 VERTICAL RBW:1000.000kHz VBW:3000.000kHz SWT:Auto Detector : Peak Project : 7N2101 Mode : 3</p>	 <p>Site : 03CH07-HY Condition : PEAK_74 3m HF_ANT_00075962 VERTICAL RBW:1000.000kHz VBW:3000.000kHz SWT:Auto Detector : Peak Project : 7N2101 Mode : 3</p>
Avg.	 <p>Site : 03CH07-HY Condition : Avg_BE_54 3m HF_ANT_00075962 VERTICAL RBW:1000.000kHz VBW:3000.000kHz SWT:Auto Detector : Peak Project : 7N2101 Mode : 3</p>	Left blank



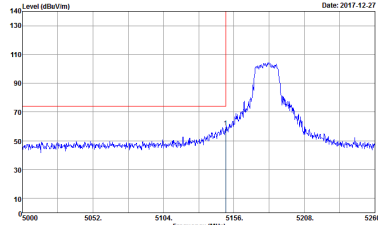
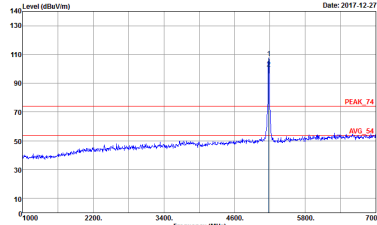
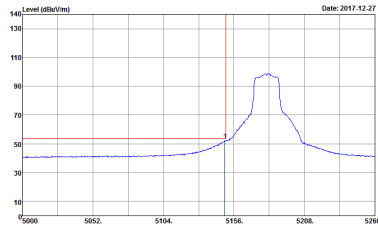
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11a CH48 5240MHz - R	
1	Vertical	Fundamental
<p>Peak</p>	 <p>Site : 03CH07-HY Condition : PEAK_BE_74 3m HF_ANT_00075962 VERTICAL Detector : Peak Project : 7N2101 Mode : 3</p>	<p>Left blank</p>
<p>Avg.</p>	 <p>Site : 03CH07-HY Condition : AVG_BE_54 3m HF_ANT_00075962 VERTICAL Detector : Peak Project : 7N2101 Mode : 3</p>	<p>Left blank</p>



Band 1 5150~5250MHz
WIFI 802.11n HT20 (Band Edge @ 3m)

WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT20 CH36 5180MHz	
1	Horizontal	Fundamental
Peak	<p>Site : 03CH07-HY Condition : PEAK_BE_74 3m HF_ANT_00075962 HORIZONTAL RBW:1000.000kHz VBW:3000.000kHz SWT:Auto Detector : Peak Project : 7N2101 Mode : 4</p>	<p>Site : 03CH07-HY Condition : PEAK_74 3m HF_ANT_00075962 HORIZONTAL RBW:1000.000kHz VBW:3000.000kHz SWT:Auto Detector : Peak Project : 7N2101 Mode : 4</p>
Avg.	<p>Site : 03CH07-HY Condition : AVG_BE_54 3m HF_ANT_00075962 HORIZONTAL RBW:1000.000kHz VBW:10000kHz SWT:Auto Detector : Peak Project : 7N2101 Mode : 4</p>	Left blank

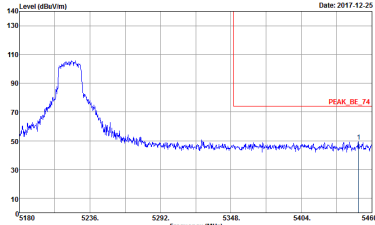
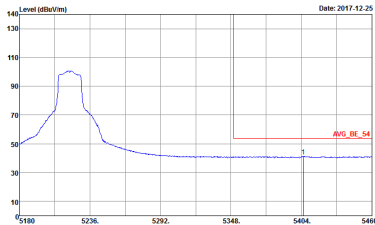


WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT20 CH36 5180MHz	
1	Vertical	Fundamental
Peak	 <p>Site : 03CH07-HY Condition : PEAK_BE_74 3m HF_ANT_00075962 VERTICAL Detector : Peak Project : 7N2101 Mode : 4</p>	 <p>Site : 03CH07-HY Condition : PEAK_74 3m HF_ANT_00075962 VERTICAL Detector : Peak Project : 7N2101 Mode : 4</p>
Avg.	 <p>Site : 03CH07-HY Condition : Avg_BE_54 3m HF_ANT_00075962 VERTICAL Detector : Peak Project : 7N2101 Mode : 4</p>	Left blank



WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT20 CH44 5220MHz - L	
1	Horizontal	Fundamental
Peak	<p>Site : 03CH07-HY Condition : PEAK_BE_74 3m HF_ANT_00075962 HORIZONTAL Detector : Peak Project : 7N2101 Mode : 5</p>	<p>Site : 03CH07-HY Condition : PEAK_74 3m HF_ANT_00075962 HORIZONTAL Detector : Peak Project : 7N2101 Mode : 5</p>
Avg.	<p>Site : 03CH07-HY Condition : AVG_BE_54 3m HF_ANT_00075962 HORIZONTAL Detector : Peak Project : 7N2101 Mode : 5</p>	Left blank

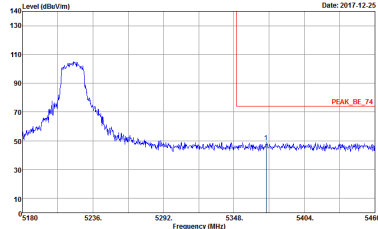
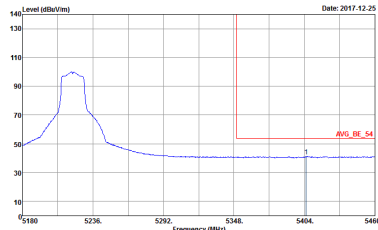


WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT20 CH44 5220MHz - R	
1	Horizontal	Fundamental
<p>Peak</p>	 <p>Site : 03CH07-HY Condition : PEAK_BE_74 3m HF_ANT_00075962 HORIZONTAL Detector : Peak Project : 7N2101 Mode : S</p>	<p>Left blank</p>
<p>Avg.</p>	 <p>Site : 03CH07-HY Condition : AVG_BE_54 3m HF_ANT_00075962 HORIZONTAL Detector : Peak Project : 7N2101 Mode : S</p>	<p>Left blank</p>



WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT20 CH44 5220MHz - L	
1	Vertical	Fundamental
Peak	<p>Site : 03CH07-HY Condition : PEAK_BE_74 3m HF_ANT_00075962 VERTICAL Detector : Peak Project : 7N2101 Mode : 5</p>	<p>Site : 03CH07-HY Condition : PEAK_74 3m HF_ANT_00075962 VERTICAL Detector : Peak Project : 7N2101 Mode : 5</p>
Avg.	<p>Site : 03CH07-HY Condition : AVG_BE_54 3m HF_ANT_00075962 VERTICAL Detector : Peak Project : 7N2101 Mode : 5</p>	Left blank

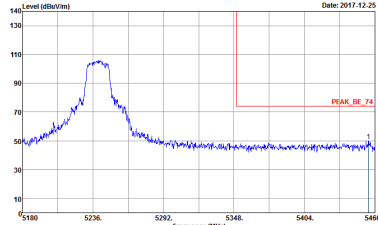
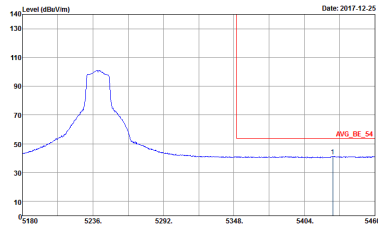


WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT20 CH44 5220MHz - R	
1	Vertical	Fundamental
Peak	 <p>Site : 03CH07-HY Condition : PEAK_BE_74 3m HF_ANT_00075962 VERTICAL Detector : Peak Project : 7N2101 Mode : 5</p>	Left blank
Avg.	 <p>Site : 03CH07-HY Condition : AVG_BE_54 3m HF_ANT_00075962 VERTICAL Detector : Peak Project : 7N2101 Mode : 5</p>	Left blank



WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT20 CH48 5240MHz - L	
1	Horizontal	Fundamental
Peak	<p>Site : 03CH07-HY Condition : PEAK_BE_74 3m HF_ANT_00075962 HORIZONTAL Detector : Peak Project : 7N2101 Mode : 6</p>	<p>Site : 03CH07-HY Condition : PEAK_74 3m HF_ANT_00075962 HORIZONTAL Detector : Peak Project : 7N2101 Mode : 6</p>
Avg.	<p>Site : 03CH07-HY Condition : Avg_BE_54 3m HF_ANT_00075962 HORIZONTAL Detector : Peak Project : 7N2101 Mode : 6</p>	Left blank

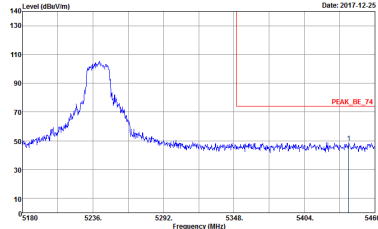
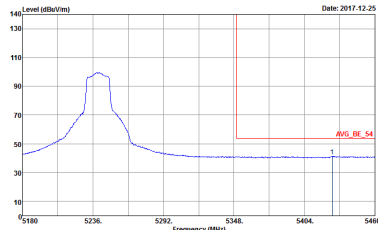


WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT20 CH48 5240MHz - R	
1	Horizontal	Fundamental
<p>Peak</p>	 <p>Site : 03CH07-HY Condition : PEAK_BE_74 3m HF_ANT_00075962 HORIZONTAL Detector : Peak Project : 7N2101 Mode : 6</p>	<p>Left blank</p>
<p>Avg.</p>	 <p>Site : 03CH07-HY Condition : AVG_BE_54 3m HF_ANT_00075962 HORIZONTAL Detector : Peak Project : 7N2101 Mode : 6</p>	<p>Left blank</p>



WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT20 CH48 5240MHz - L	
1	Vertical	Fundamental
Peak	<p>Site : 03CH07-HY Condition : PEAK_BE_74 3m HF_ANT_00075962 VERTICAL Detector : Peak Project : 7N2101 Mode : 6</p>	<p>Site : 03CH07-HY Condition : PEAK_74 3m HF_ANT_00075962 VERTICAL Detector : Peak Project : 7N2101 Mode : 6</p>
Avg.	<p>Site : 03CH07-HY Condition : AVG_BE_54 3m HF_ANT_00075962 VERTICAL Detector : Peak Project : 7N2101 Mode : 6</p>	Left blank



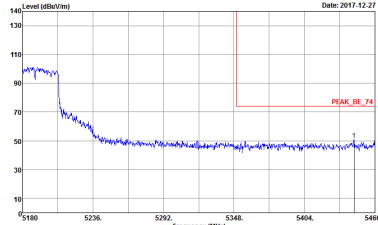
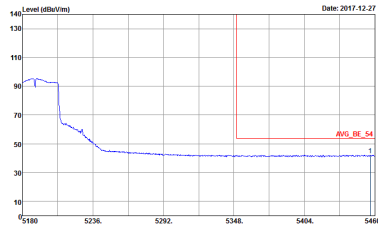
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT20 CH48 5240MHz - R	
1	Vertical	Fundamental
Peak	 <p>Site : 03CH07-HY Condition : PEAK_BE_74 3m HF_ANT_00075962 VERTICAL Detector : Peak Project : 7N2101 Mode : 6</p>	Left blank
Avg.	 <p>Site : 03CH07-HY Condition : AVG_BE_54 3m HF_ANT_00075962 VERTICAL Detector : Peak Project : 7N2101 Mode : 6</p>	Left blank



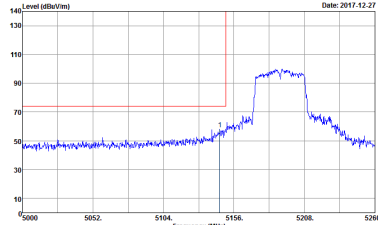
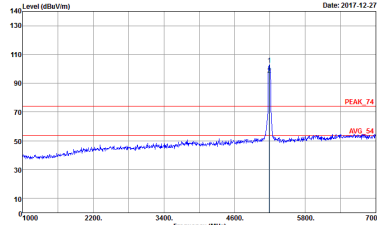
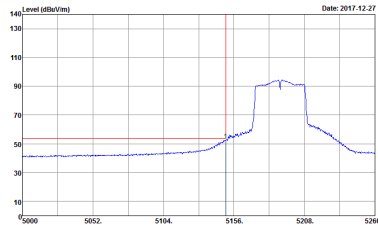
Band 1 5150~5250MHz
WIFI 802.11n HT40 (Band Edge @ 3m)

WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT40 CH38 5190MHz - L	
1	Horizontal	Fundamental
Peak	<p>Site : 03CH07-4HY Condition : PEAK_BE_74 3m HF_ANT_00075962 HORIZONTAL Detector : Peak Project : 7N2101 Mode : 7</p>	<p>Site : 03CH07-4HY Condition : PEAK_74 3m HF_ANT_00075962 HORIZONTAL Detector : Peak Project : 7N2101 Mode : 7</p>
Avg.	<p>Site : 03CH07-4HY Condition : AVG_BE_54 3m HF_ANT_00075962 HORIZONTAL Detector : Peak Project : 7N2101 Mode : 7</p>	Left blank

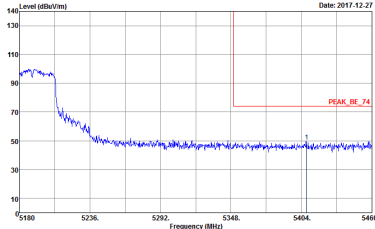
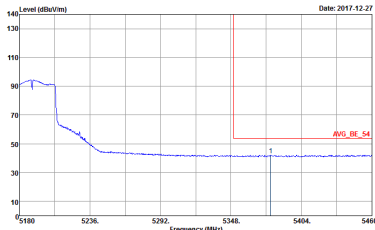


WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT40 CH38 5190MHz - R	
1	Horizontal	Fundamental
<p>Peak</p>	 <p>Site : 03CH07-HY Condition : PEAK_BE_74 3m HF_ANT_00075962 HORIZONTAL Detector : Peak Project : 7N2101 Mode : 7</p>	<p>Left blank</p>
<p>Avg.</p>	 <p>Site : 03CH07-HY Condition : AVG_BE_54 3m HF_ANT_00075962 HORIZONTAL Detector : Peak Project : 7N2101 Mode : 7</p>	<p>Left blank</p>



WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT40 CH38 5190MHz - L	
1	Vertical	Fundamental
Peak	 <p>Site : 03CH07-HY Condition : PEAK_BE_74 3m HF_ANT_00075962 VERTICAL Detector : Peak Project : 7N2101 Mode : 7</p>	 <p>Site : 03CH07-HY Condition : PEAK_74 3m HF_ANT_00075962 VERTICAL Detector : Peak Project : 7N2101 Mode : 7</p>
Avg.	 <p>Site : 03CH07-HY Condition : AVG_BE_54 3m HF_ANT_00075962 VERTICAL Detector : Peak Project : 7N2101 Mode : 7</p>	Left blank



WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT40 CH38 5190MHz - R	
1	Vertical	Fundamental
Peak	 <p>Site : 03CH07-HY Condition : PEAK_BE_74 3m HF_ANT_00075962 VERTICAL Detector : Peak Project : 7N2101 Mode : 7</p>	Left blank
Avg.	 <p>Site : 03CH07-HY Condition : AVG_BE_54 3m HF_ANT_00075962 VERTICAL Detector : Peak Project : 7N2101 Mode : 7</p>	Left blank

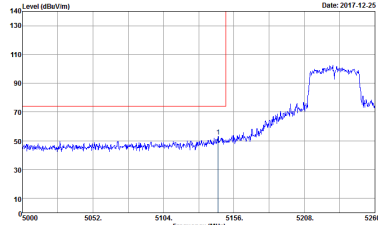
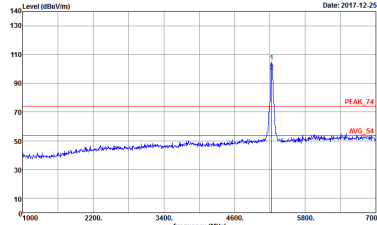
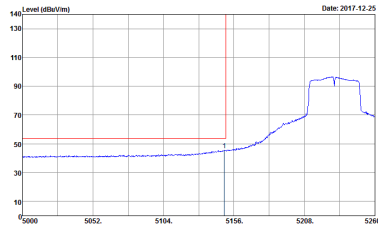


WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT40 CH46 5230MHz - L	
1	Horizontal	Fundamental
Peak	<p>Site : 03CH07-HY Condition : PEAK_BE_74 3m HF_ANT_00075962 HORIZONTAL Detector : Peak Project : 7N2101 Mode : B</p>	<p>Site : 03CH07-HY Condition : PEAK_74 3m HF_ANT_00075962 HORIZONTAL Detector : Peak Project : 7N2101 Mode : B</p>
Avg.	<p>Site : 03CH07-HY Condition : AVG_BE_54 3m HF_ANT_00075962 HORIZONTAL Detector : Peak Project : 7N2101 Mode : B</p>	Left blank



WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT40 CH46 5230MHz - R	
1	Horizontal	Fundamental
Peak	<p>Site : 03CH07-HY Condition : PEAK_BE_74 3m HF_ANT_00075962 HORIZONTAL Detector : Peak Project : 7N2101 Mode : B</p>	Left blank
Avg.	<p>Site : 03CH07-HY Condition : AVG_BE_54 3m HF_ANT_00075962 HORIZONTAL Detector : Peak Project : 7N2101 Mode : B</p>	Left blank



WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT40 CH46 5230MHz - L	
1	Vertical	Fundamental
Peak	 <p>Site : 03CH07-HY Condition : PEAK_BE_74 3m HF_ANT_00075962 VERTICAL Detector : Peak Project : 7N2101 Mode : B</p>	 <p>Site : 03CH07-HY Condition : PEAK_74 3m HF_ANT_00075962 VERTICAL Detector : Peak Project : 7N2101 Mode : B</p>
Avg.	 <p>Site : 03CH07-HY Condition : AVG_BE_54 3m HF_ANT_00075962 VERTICAL Detector : Peak Project : 7N2101 Mode : B</p>	Left blank



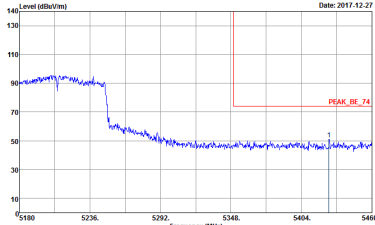
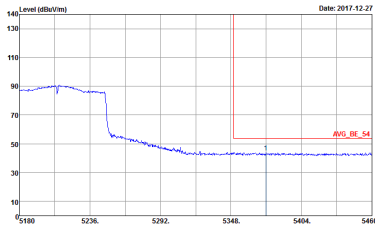
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT40 CH46 5230MHz - R	
1	Vertical	Fundamental
Peak	<p>Site : 03CH07-HY Condition : PEAK_BE_74 3m HF_ANT_00075962 VERTICAL Detector : Peak Project : 7N2101 Mode : B</p>	Left blank
Avg.	<p>Site : 03CH07-HY Condition : AVG_BE_54 3m HF_ANT_00075962 VERTICAL Detector : Peak Project : 7N2101 Mode : B</p>	Left blank



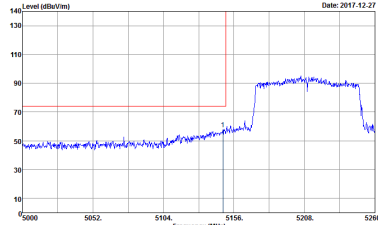
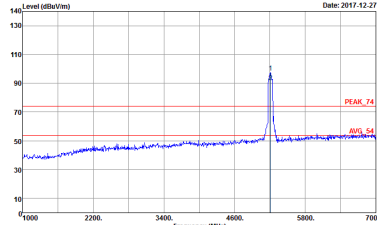
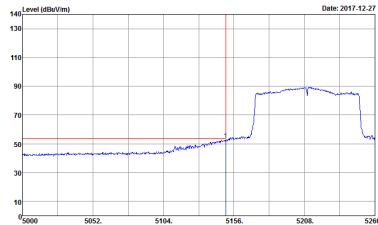
Band 1 5150~5250MHz
WIFI 802.11ac VHT80 (Band Edge @ 3m)

WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ac VHT80 CH42 5210MHz - L	
1	Horizontal	Fundamental
Peak	<p>Site : 03CH07-4HY Condition : PEAK_BE_74 3m HF_ANT_00075962 HORIZONTAL Detector : Peak Project : 7N2101 Mode : 9</p>	<p>Site : 03CH07-4HY Condition : PEAK_74 3m HF_ANT_00075962 HORIZONTAL Detector : Peak Project : 7N2101 Mode : 9</p>
Avg.	<p>Site : 03CH07-4HY Condition : AVG_BE_54 3m HF_ANT_00075962 HORIZONTAL Detector : Peak Project : 7N2101 Mode : 9</p>	Left blank

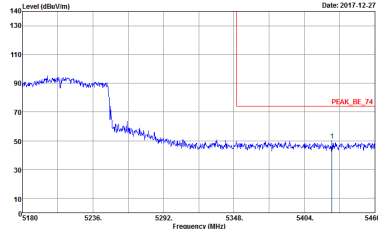
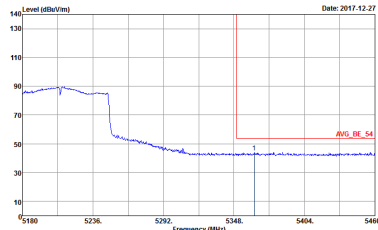


WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ac VHT80 CH42 5210MHz - R	
1	Horizontal	Fundamental
<p>Peak</p>	 <p>Site : 03CH07-HY Condition : PEAK_BE_74 3m HF_ANT_00075962 HORIZONTAL Detector : Peak Project : 7N2101 Mode : 9</p>	<p>Left blank</p>
<p>Avg.</p>	 <p>Site : 03CH07-HY Condition : AVG_BE_54 3m HF_ANT_00075962 HORIZONTAL Detector : Peak Project : 7N2101 Mode : 9</p>	<p>Left blank</p>



WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ac VHT80 CH42 5210MHz - L	
1	Vertical	Fundamental
Peak	 <p>Site : 03CH07-HY Condition : PEAK_BE_74 3m HF_ANT_00075962 VERTICAL Detector : Peak Project : 7N2101 Mode : 9</p>	 <p>Site : 03CH07-HY Condition : PEAK_74 3m HF_ANT_00075962 VERTICAL Detector : Peak Project : 7N2101 Mode : 9</p>
Avg.	 <p>Site : 03CH07-HY Condition : AVG_BE_54 3m HF_ANT_00075962 VERTICAL Detector : Peak Project : 7N2101 Mode : 9</p>	Left blank



WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ac VHT80 CH42 5210MHz - R	
1	Vertical	Fundamental
<p>Peak</p>	 <p>Site : 03CH07-HY Condition : PEAK_BE_74 3m HF_ANT_00075962 VERTICAL Detector : Peak Project : 7N2101 Mode : 9</p>	<p>Left blank</p>
<p>Avg.</p>	 <p>Site : 03CH07-HY Condition : AVG_BE_54 3m HF_ANT_00075962 VERTICAL Detector : Peak Project : 7N2101 Mode : 9</p>	<p>Left blank</p>



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.	<p>Site : 03CH07-4Y Condition : PEAK(LINE) 3m SHF-EHF_131029 HORIZONTAL Detector : Peak Project : 7N2101 Mode : 1</p>	<p>Site : 03CH07-4Y Condition : PEAK(LINE) 3m SHF-EHF_131029 VERTICAL Detector : Peak Project : 7N2101 Mode : 1</p>



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.	<p>Site : 03CH07-HY Condition : PEAK(UNII) 3m SHF-EHF_131029 HORIZONTAL Detector : Peak Project : 7N2101 Mode : 3</p>	<p>Site : 03CH07-HY Condition : PEAK(UNII) 3m SHF-EHF_131029 VERTICAL Detector : Peak Project : 7N2101 Mode : 3</p>



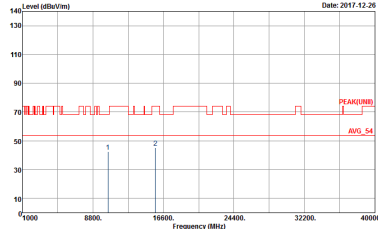
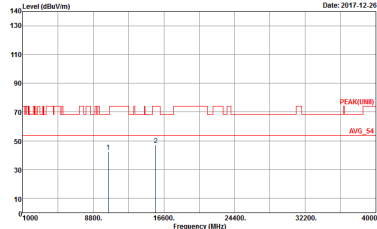
Band 1 5150~5250MHz
WIFI 802.11n HT20 (Harmonic @ 3m)

WIFI	Band 1 5150~5250MHz Harmonic @ 3m	
ANT	802.11n HT20 CH36 5180MHz	
1	Horizontal	Vertical
Peak Avg.	<p>Site : 03CH07-1HY Condition : PEAK(UNIT) 3m SHF-EHF_131029 HORIZONTAL Detector : Peak Project : 7N2101 Mode : 4</p>	<p>Site : 03CH07-1HY Condition : PEAK(UNIT) 3m SHF-EHF_131029 VERTICAL Detector : Peak Project : 7N2101 Mode : 4</p>



WIFI	Band 1 5150~5250MHz Harmonic @ 3m	
ANT	802.11n HT20 CH44 5220MHz	
1	Horizontal	Vertical
<p>Peak Avg.</p>	<p>Site : 03CH07-HY Condition : PEAK(LINEI) 3m SHF-EHF_131029 HORIZONTAL Detector : Peak Project : 7N2101 Mode : 5</p>	<p>Site : 03CH07-HY Condition : PEAK(LINEI) 3m SHF-EHF_131029 VERTICAL Detector : Peak Project : 7N2101 Mode : 5</p>



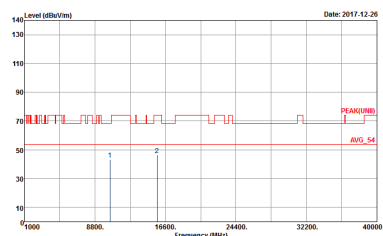
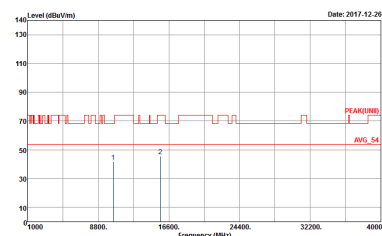
WIFI	Band 1 5150~5250MHz Harmonic @ 3m	
ANT	802.11n HT20 CH48 5240MHz	
1	Horizontal	Vertical
<p>Peak</p> <p>Avg.</p>	 <p>Site : 03CH07-HY Condition : PEAK(LINE) 3m SHF-EHF_131029 HORIZONTAL Detector : Peak Project : 7N2101 Mode : 6</p>	 <p>Site : 03CH07-HY Condition : PEAK(LINE) 3m SHF-EHF_131029 VERTICAL Detector : Peak Project : 7N2101 Mode : 6</p>



Band 1 5150~5250MHz
WIFI 802.11n HT40 (Harmonic @ 3m)

WIFI	Band 1 5150~5250MHz Harmonic @ 3m	
ANT	802.11n HT40 CH38 5190MHz	
1	Horizontal	Vertical
Peak Avg.	<p>Site : 03CH07-4Y Condition : PEAK(UNII) 3m SHF-EHF_131029 HORIZONTAL Detector : Peak Project : 7N2101 Mode : 7</p>	<p>Site : 03CH07-4Y Condition : PEAK(UNII) 3m SHF-EHF_131029 VERTICAL Detector : Peak Project : 7N2101 Mode : 7</p>



WIFI	Band 1 5150~5250MHz Harmonic @ 3m	
ANT	802.11n HT40 CH46 5230MHz	
1	Horizontal	Vertical
Peak Avg.	 <p>Site : 03CH07-HY Condition : PEAK(LINEI) 3m SHF-EHF_131029 HORIZONTAL Detector : Peak Project : 7N2101 Mode : 8</p>	 <p>Site : 03CH07-HY Condition : PEAK(LINEI) 3m SHF-EHF_131029 VERTICAL Detector : Peak Project : 7N2101 Mode : 8</p>



Band 1 5150~5250MHz
WIFI 802.11ac VHT80 (Harmonic @ 3m)

WIFI	Band 1 5150~5250MHz Harmonic @ 3m	
ANT	802.11ac VHT80 CH42 5210MHz	
1	Horizontal	Vertical
Peak Avg.	<p>Site : 03CH07-4Y Condition : PEAK(UNII) 3m SHF-EHF_131029 HORIZONTAL Detector : Peak Project : 7N2101 Mode : 9</p>	<p>Site : 03CH07-4Y Condition : PEAK(UNII) 3m SHF-EHF_131029 VERTICAL Detector : Peak Project : 7N2101 Mode : 9</p>



Emission below 1GHz
5GHz WIFI 802.11a (LF)

WIFI	5GHz WIFI	
ANT	802.11a LF	
1	Horizontal	Vertical
QP / Peak	<p>Site : 03CH07-1HY Condition : QP 3m LF-ANT-35419(6) HORIZONTAL Detector : Peak Project : 7N2101 Mode : 10</p>	<p>Site : 03CH07-1HY Condition : QP 3m LF-ANT-35419(6) VERTICAL Detector : Peak Project : 7N2101 Mode : 10</p>



<For Sample 2>

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	<p>Site : 03CH07-HY Condition : PEAK_BE_74 3m HF_ANT_00075962 VERTICAL Detector : Peak Project : 7N2101 Mode : 1</p>	<p>Site : 03CH07-HY Condition : PEAK_74 3m HF_ANT_00075962 VERTICAL Detector : Peak Project : 7N2101 Mode : 1</p>
Avg.	<p>Site : 03CH07-HY Condition : AVG_BE_54 3m HF_ANT_00075962 VERTICAL Detector : Peak Project : 7N2101 Mode : 1</p>	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
<p>Peak</p> <p>Avg.</p>	<p>Site : 03CH07-14Y Condition : PEAK(LINII) 3m SHF-EHF_131029 HORIZONTAL Detector : Peak Project : 7N2101 Mode : 1</p>	<p>Site : 03CH07-14Y Condition : PEAK(LINII) 3m HF_ANT_00075962 VERTICAL Detector : Peak Project : 7N2101 Mode : 1</p>



Emission below 1GHz
5GHz WIFI 802.11a (LF)

WIFI	5GHz WIFI	
ANT	802.11a LF	
1	Horizontal	Vertical
QP / Peak	<p>Site : 03CH07-11Y Condition : QP 3m LF-ANT-35419(6) HORIZONTAL Detector : Peak Project : 7N2101 Mode : Z</p>	<p>Site : 03CH07-11Y Condition : QP 3m LF-ANT-35419(6) VERTICAL Detector : Peak Project : 7N2101 Mode : Z</p>

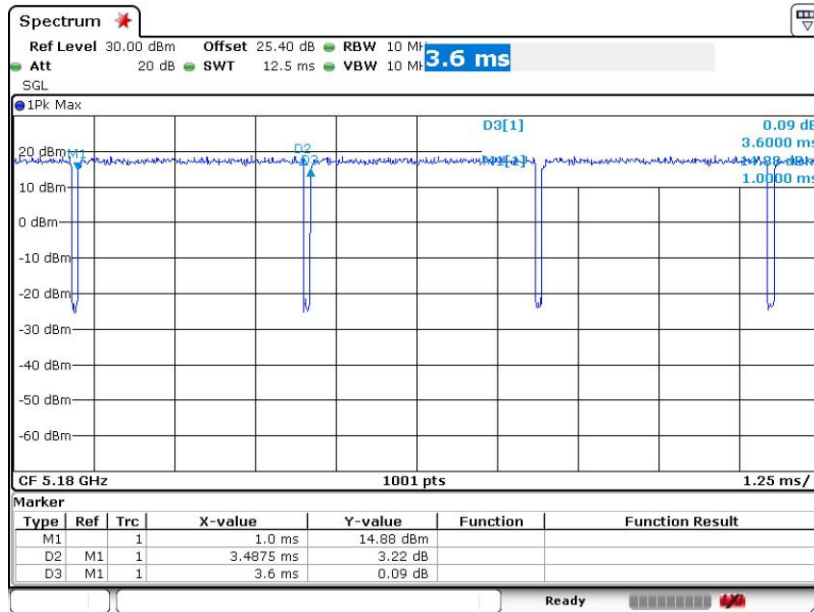


Appendix E. Duty Cycle Plots

Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting
802.11a	96.88	3487.5	0.29	300Hz
5GHz 802.11n HT20	97.03	1307	0.77	1kHz
5GHz 802.11n HT40	93.91	648	1.54	3kHz
5GHz 802.11ac VHT20	97.05	1315	0.76	1kHz
5GHz 802.11ac VHT40	93.97	654	1.53	3kHz
5GHz 802.11ac VHT80	88.53	324	3.09	10kHz

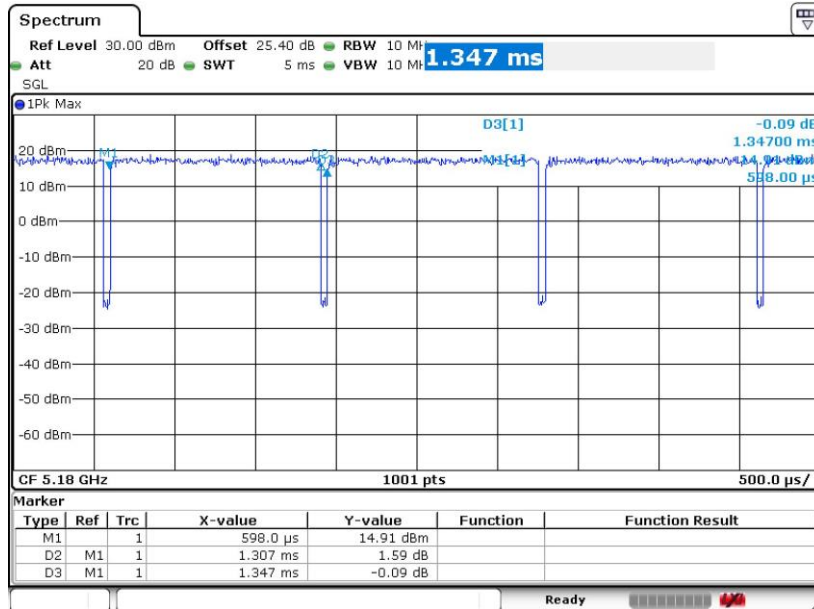


802.11a



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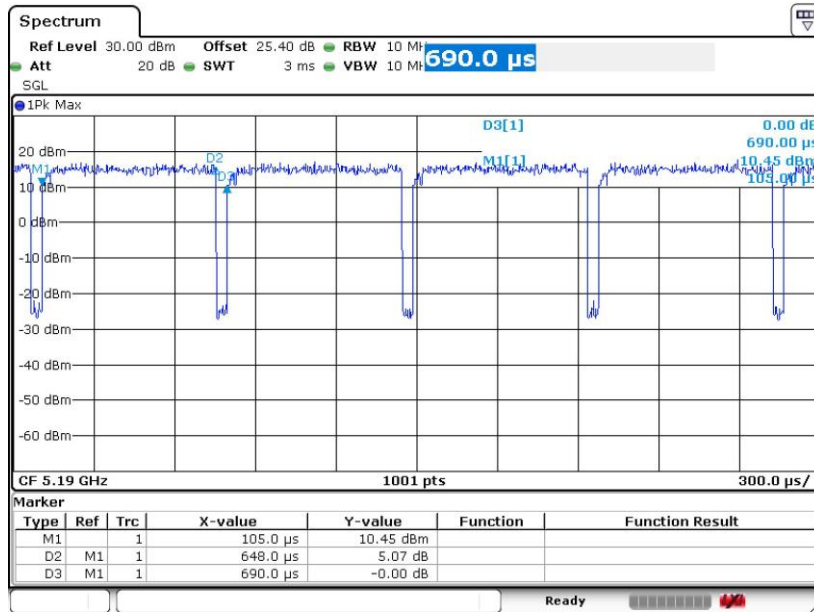
802.11n HT20



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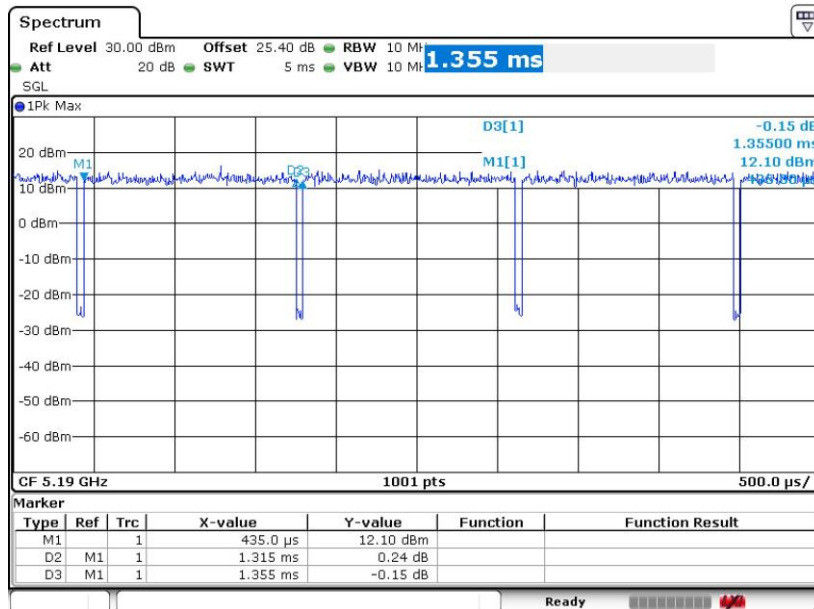


802.11n HT40



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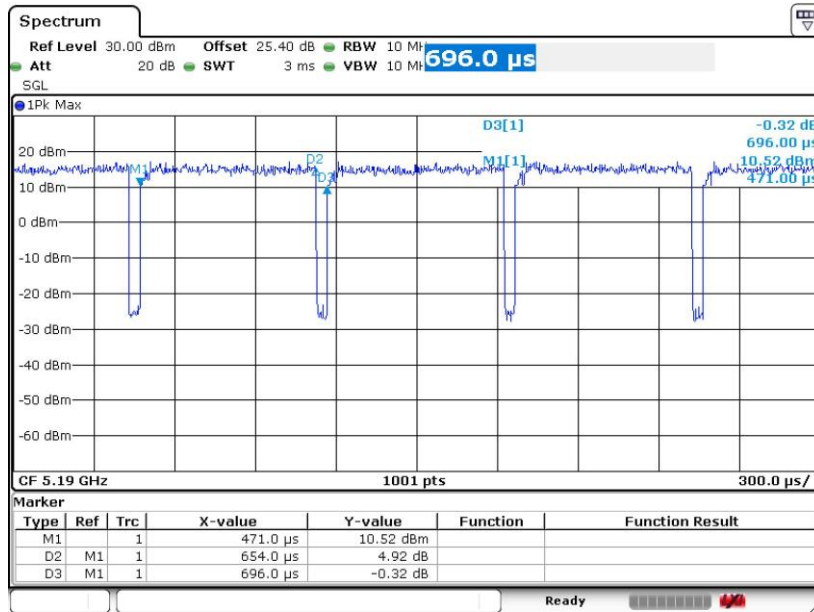
802.11ac VHT20



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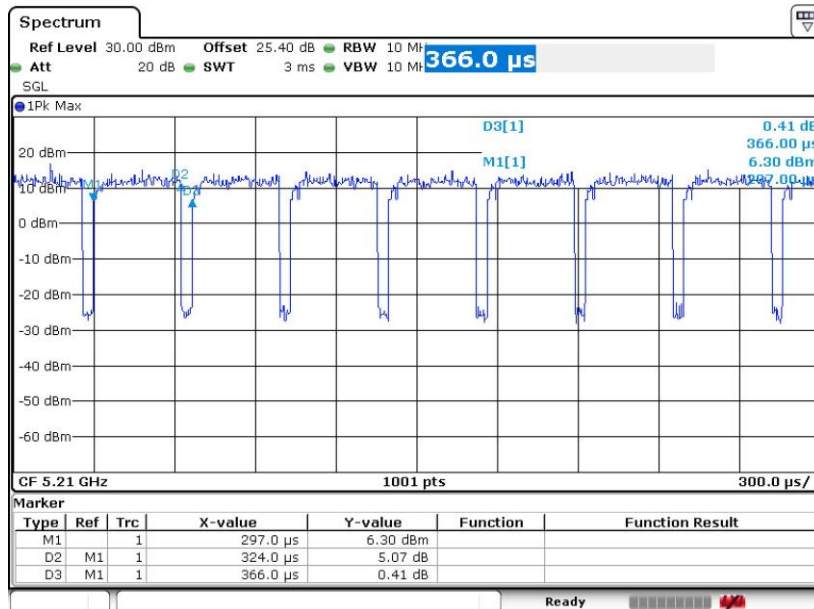


802.11ac VHT40



Date: 14.DEC.2017 10:37:50

802.11ac VHT80



Date: 14.DEC.2017 10:42:04