



FCC RADIO TEST REPORT

FCC ID : UDX-60076027
Equipment : LTE & Wi-Fi Router
Brand Name : CISCO
Model Name : MX68CW-HW-NA
Applicant : Cisco Systems, Inc.
170 West Tasman Drive, San Jose, CA 95134
Standard : FCC Part 15 Subpart E §15.407

The product was received on Mar. 16, 2018 and testing was started from Mar. 29, 2018 and completed on Aug. 03, 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: Jones Tsai

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
FR831635B	01	Initial issue of report	Sep. 05, 2018

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	15.403(i)	26dB Bandwidth	Pass	-
3.1	2.1049	99% Occupied Bandwidth	Reporting only	-
3.2	15.407(a)	Maximum Conducted Output Power	Pass	-
3.3	15.407(a)	Power Spectral Density	Pass	-
3.4	15.407(b)	Unwanted Emissions	Pass	Under limit 0.40 dB at 5146.120 MHz
3.5	15.207	AC Conducted Emission	Pass	Under limit 21.24 dB at 19.415 MHz
3.6	15.407(c)	Automatically Discontinue Transmission	Pass	-
3.7	15.203 15.407(a)	Antenna Requirement	Pass	-

Reviewed by: Joseph Lin

Report Producer: Natasha Hsieh



1 General Description

1.1 Product Feature of Equipment Under Test

GSM/WCDMA/LTE, Wi-Fi 2.4GHz 802.11b/g/n/ac, and Wi-Fi 5GHz 802.11a/n/ac

Product Specification subjective to this standard	
Antenna Type	WWAN: Main: Dipole Antenna Aux.: Dipole Antenna WLAN: Ant. 1: Dipole Antenna Ant. 2: Dipole Antenna

1.2 Modification of EUT

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

1.3 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

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.	
	03CH10-HY	

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



1.4 Applicable Standards

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

- ♦ FCC Part 15 Subpart E
- ♦ FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
- ♦ FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- ♦ ANSI C63.10-2013

Remark:

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

2 Test Configuration of Equipment Under Test

- a. The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction emission (150 kHz to 30 MHz), radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (X plane) were recorded in this report.
- b. AC power line Conducted Emission was tested under maximum output power.

2.1 Carrier Frequency and Channel

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

CDD Mode

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

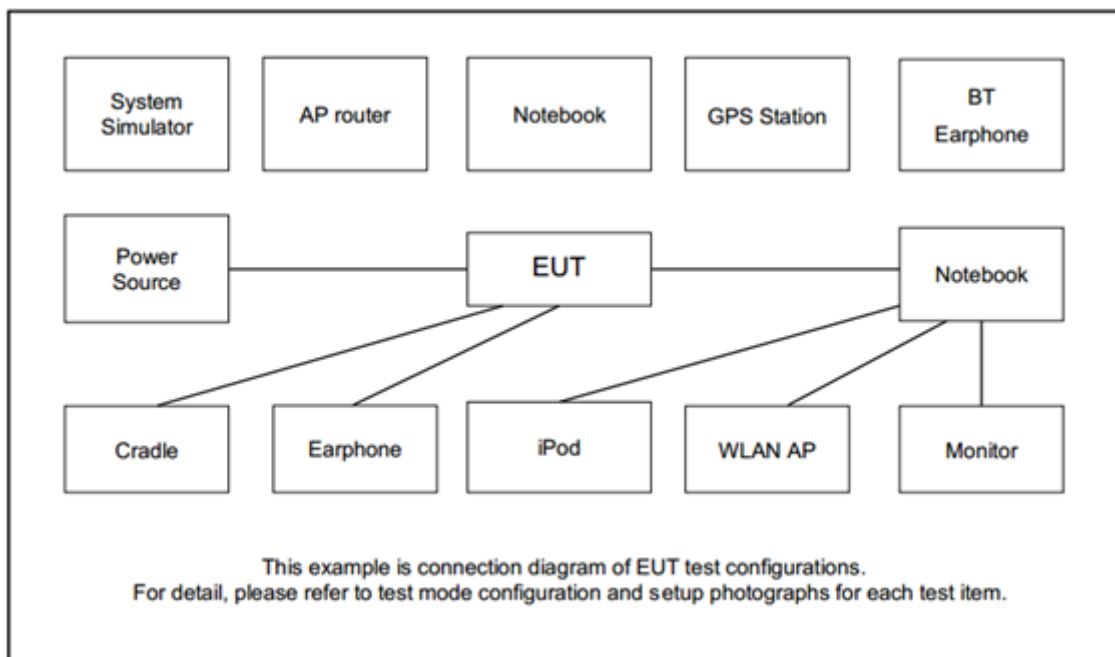
TXBF Mode (Power Only)

Modulation	Data Rate
802.11n HT20	MCS0
802.11n HT40	MCS0
802.11ac VHT20	MCS0
802.11ac VHT40	MCS0
802.11ac VHT80	MCS0

Test Cases	
AC Conducted Emission	Mode 1 :WLAN (5GHz) Link + RJ-45 (LAN) Link + RJ-45 (WAN) Link + USB Link + Adapter + POE

Ch. #		Band I : 5150-5250 MHz			
		802.11a	802.11n HT20	802.11n HT40	802.11ac VHT80
L	Low	36	36	38	-
M	Middle	44	44	-	42
H	High	48	48	46	-

2.3 Connection Diagram of Test System



2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Notebook	ASUS	P2430U	FCC DoC	N/A	AC I/P : Unshielded, 1.2m DC O/P : Shielded, 1.8m
2.	Notebook	DELL	Latitude E3340	FCC DoC/ Contains FCC ID: PD97260NGU	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
3.	Notebook	DELL	Latitude E6320	FCC DoC/ Contains FCC ID: QDS-BRCM1054	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
4.	USB Flash Drive	Transcend	N/A	FCC DoC	N/A	N/A



2.5 EUT Operation Test Setup

The RF test items, utility “QRCT” 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.

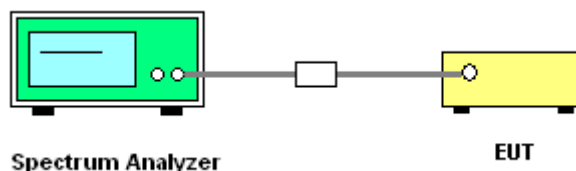
3.1.2 Measuring Instruments

See list of measuring equipment of this test report.

3.1.3 Test Procedures

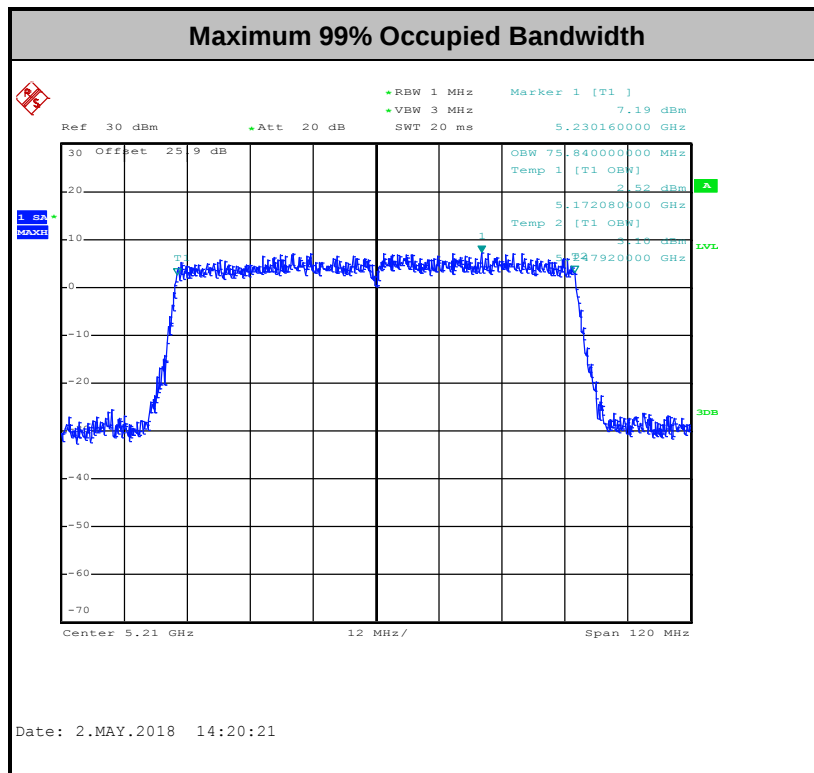
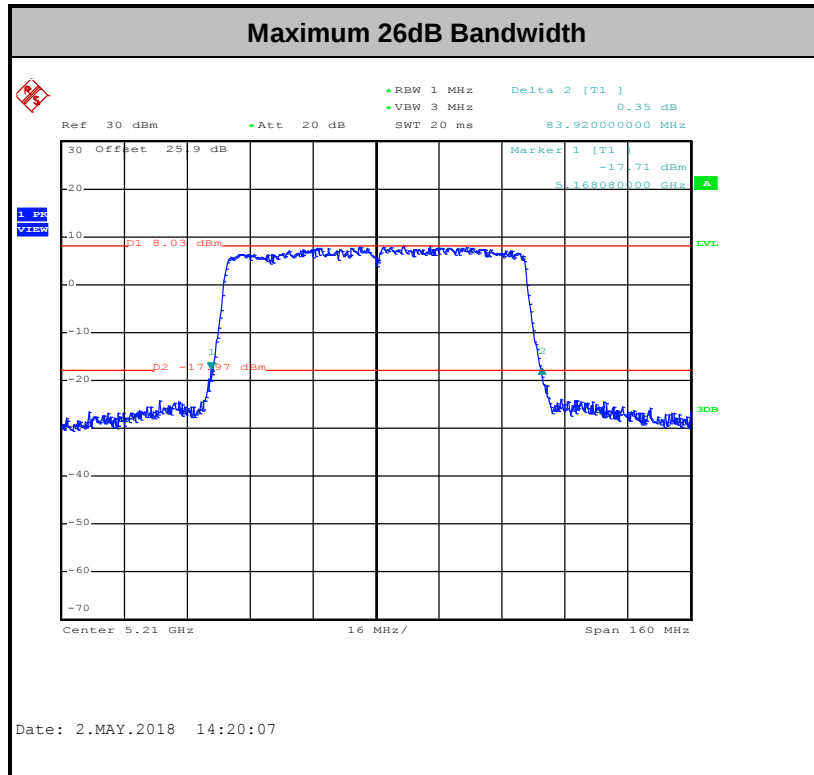
1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01. Section C) Emission bandwidth
2. Set RBW = approximately 1% of the emission bandwidth.
3. Set the VBW > RBW.
4. Detector = Peak.
5. Trace mode = max hold
6. Measure the maximum width of the emission that is 26 dB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

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

3.2.2 Measuring Instruments

See list of measuring equipment of this test report.

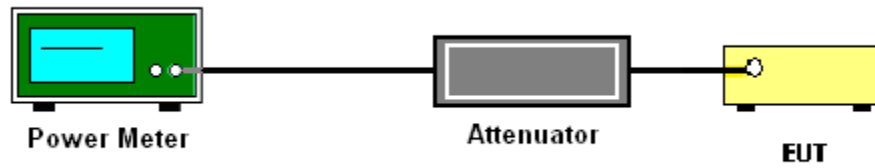
3.2.3 Test Procedures

The testing follows Method PM 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).

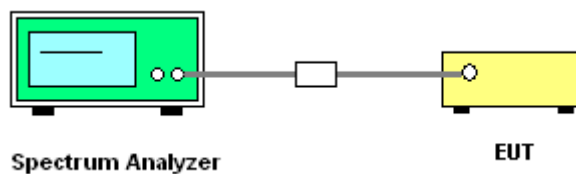
- Measure the duty cycle.
 - Set span to encompass the entire emission bandwidth (EBW) of the signal.
 - Set RBW = 1 MHz.
 - Set VBW $\geq$ 3 MHz.
 - Number of points in sweep $\geq$ 2 Span / RBW.
 - Sweep time = auto.
 - Detector = RMS
 - Trace average at least 100 traces in power averaging mode.
 - 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. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

Method (a): Measure and sum the spectra across the outputs.

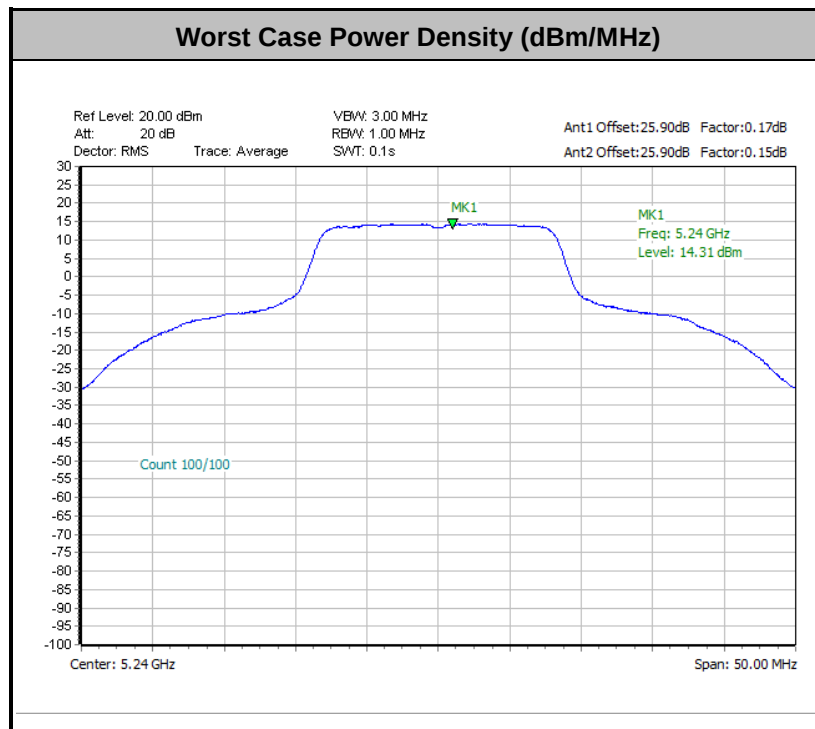
The total final Power Spectral Density is from a device with 2 transmitter outputs. The spectrum measurements of the individual outputs are all performed with the same span and number of points; the spectrum value in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 to obtain the value for the first frequency bin of the summed spectrum.

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.

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

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

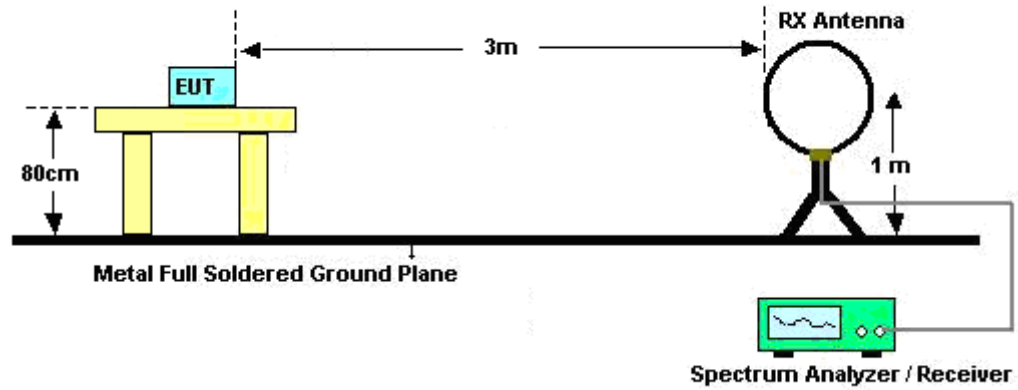
1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01. Section G) Unwanted emissions measurement.
 - (1) Procedure for Unwanted Emissions Measurements Below 1000MHz
 - RBW = 120 kHz
 - VBW = 300 kHz
 - Detector = Peak
 - Trace mode = max hold
 - (2) Procedure for Peak 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

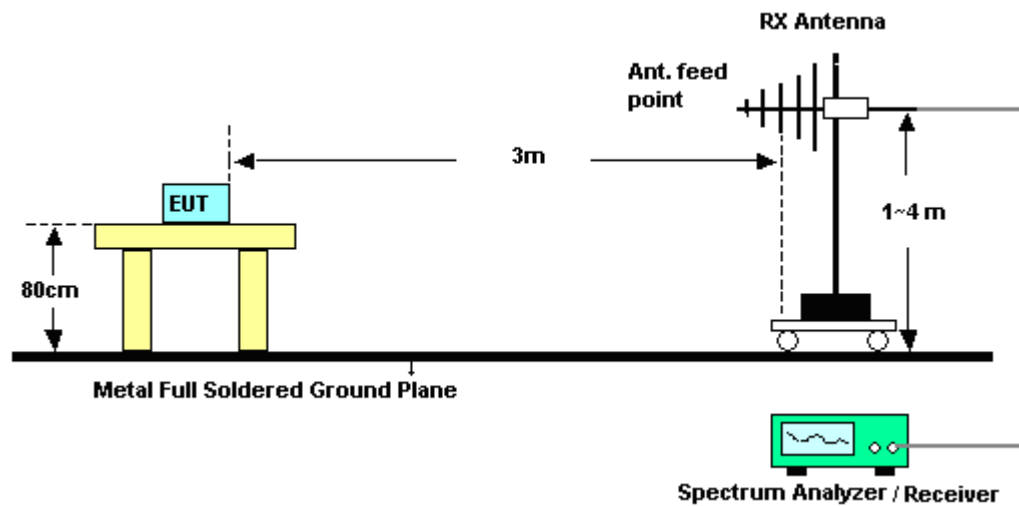
- RBW = 1 MHz
 - VBW = 10 Hz, when duty cycle is no less than 98 percent.
 - $VBW \geq 1/T$, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.
2. 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

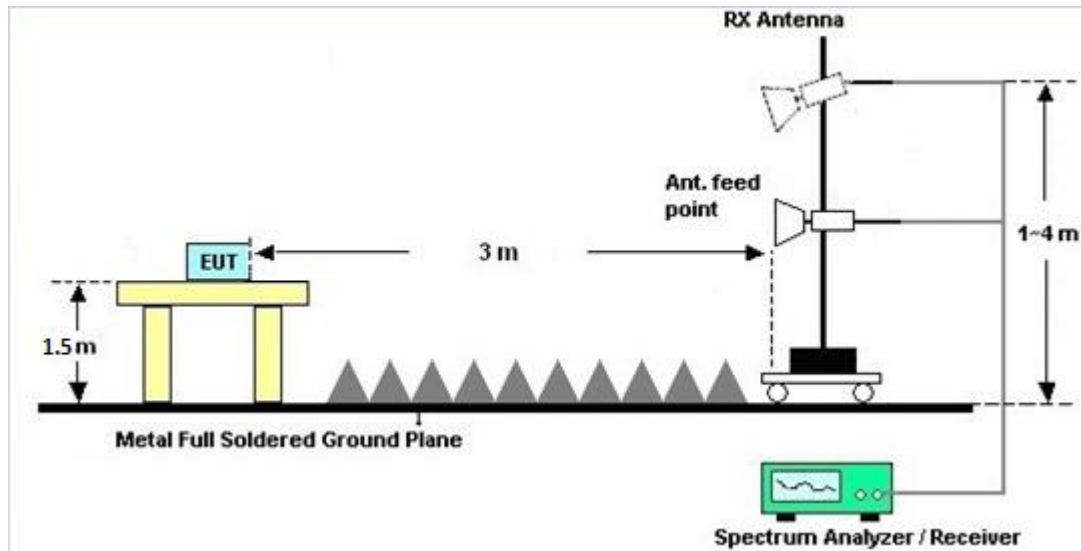
For radiated emissions below 30MHz



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.

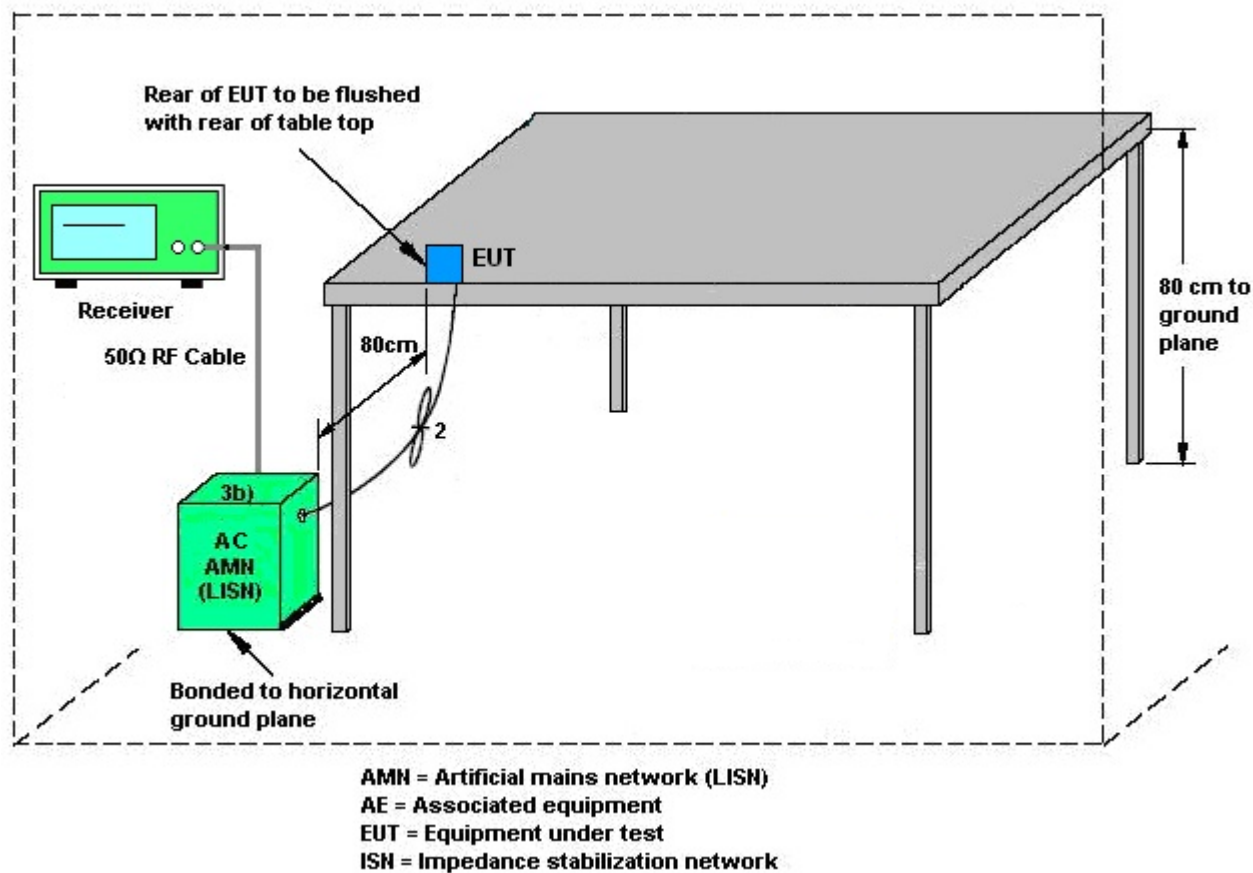
3.5.2 Measuring Instruments

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



3.5.5 Test Result of AC Conducted Emission

Please refer to Appendix B.

3.6 Automatically Discontinue Transmission

3.6.1 Limit of Automatically Discontinue Transmission

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

3.6.2 Measuring Instruments

See list of measuring equipment of this test report.

3.6.3 Test Result of Automatically Discontinue Transmission

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

3.7 Antenna Requirements

3.7.1 Standard Applicable

If transmitting antenna directional gain is greater than 6 dBi, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.7.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.7.3 Antenna Gain

<CDD Modes >

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

For CDD transmissions, directional gain is calculated as

Directional gain = GANT + Array Gain, where Array Gain is as follows.

For power spectral density (PSD) measurements on all devices,

Array Gain = $10 \log(\text{NANT}/\text{NSS}=1)$ dB.

For power measurements on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for $\text{NANT} \leq 4$.

Directional gain may be calculated by using the formulas applicable to equal gain antennas with GANT set equal to the gain of the antenna having the highest gain;

The EUT supports CDD mode.

For power, the directional gain GANT is set equal to the antenna having the highest gain, i.e., F)2)f)i).

For PSD, the directional gain calculation is following F)2)f)ii) of KDB 662911 D01 v02r01.

The power and PSD limit should be modified if the directional gain of EUT is over 6 dBi,

The directional gain "DG" is calculated as following table.

<CDD Modes>						
			DG	DG	Power	PSD
			for	for	Limit	Limit
	Ant. 1	Ant. 2	Power	PSD	Reduction	Reduction
	(dBi)	(dBi)	(dBi)	(dBi)	(dB)	(dB)
Band I	4.32	5.84	5.84	8.12	0.00	2.12

Power limit reduction = Composite gain – 6dBi, (min = 0)

PSD limit reduction = Composite gain + PSD Array gain – 6dBi, (min = 0)

TXBF modes

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

For CDD transmissions, directional gain is calculated as

$$DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$$

where

Each antenna is driven by no more than one spatial stream;

N_{SS} = the number of independent spatial streams of data;

N_{ANT} = the total number of antennas

$g_{j,k} = 10^{G_k / 20}$ if the k th antenna is being fed by spatial stream j , or zero if it is not;
 G_k is the gain in dBi of the k th antenna.

The EUT supports beamforming for 802.11ac modes.

The directional gain calculation is following F)2)e)ii) of KDB 662911 D01 v02r01.

The power and PSD limit should be modified if the directional gain of EUT is over 6 dBi,

The directional gain "DG" is calculated as following table.

			DG	DG	Power	PSD
			for	for	Limit	Limit
	Ant 1	Ant 2	Power	PSD	Reduction	Reduction
	(dBi)	(dBi)	(dBi)	(dBi)	(dB)	(dB)
Band I	4.32	5.84	8.12	8.12	2.12	2.12

$Power\ Limit\ Reduction = DG(Power) - 6dBi, (min = 0)$

$PSD\ Limit\ Reduction = DG(PSD) - 6dBi, (min = 0)$



4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Power Meter	Anritsu	ML2495A	1240001	N/A	Sep. 07, 2017	Mar. 29, 2018~ Aug. 03, 2018	Sep. 06, 2018	Conducted (TH05-HY)
Power Sensor	Anritsu	MA2411B	1207349	300MHz~40GHz	Sep. 07, 2017	Mar. 29, 2018~ Aug. 03, 2018	Sep. 06, 2018	Conducted (TH05-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP30	101067	9kHz ~ 30GHz	Nov. 13, 2017	Mar. 29, 2018~ Aug. 03, 2018	Nov. 12, 2018	Conducted (TH05-HY)
Switch Box & RF Cable	Burgeon	ETF-058	EC130048 4	N/A	Mar. 01, 2018	Mar. 29, 2018~ Aug. 03, 2018	Feb. 28, 2019	Conducted (TH05-HY)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Jul. 23, 2018	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102388	3.6GHz	Dec. 08, 2017	Jul. 23, 2018	Dec. 07, 2018	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Nov. 30, 2017	Jul. 23, 2018	Nov. 29, 2018	Conduction (CO05-HY)
Software	Rohde & Schwarz	EMC32 V10.30	N/A	N/A	N/A	Jul. 23, 2018	N/A	Conduction (CO05-HY)
LF Cable	HUBER + SUHNER	RG-214/U	LF01	N/A	Jan. 03, 2018	Jul. 23, 2018	Jan. 02, 2019	Conduction (CO05-HY)
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100851	N/A	Jan. 03, 2018	Jul. 23, 2018	Jan. 02, 2019	Conduction (CO05-HY)
Amplifier	SONOMA	310N	187311	9kHz~1GHz	Oct. 19, 2017	Apr. 12, 2018~ Jun. 06, 2018	Oct. 18, 2018	Radiation (03CH10-HY)
Amplifier	MITEQ	TTA1840-35- HG	1871923	18GHz~40GHz, VSWR : 2.5:1 max	Jul. 18, 2017	Apr. 12, 2018~ Jun. 06, 2018	Jul. 17, 2018	Radiation (03CH10-HY)
Bilog Antenna	TESEQ	CBL 6111D&00800 N1D01N-06	35413&02	30MHz~1GHz	Dec. 18, 2017	Apr. 12, 2018~ Jun. 06, 2018	Dec. 17, 2018	Radiation (03CH10-HY)
Horn Antenna	SCHWARZBE CK	BBHA 9120 D	9120D-132 5	1GHz ~ 18GHz	Sep. 27, 2017	Apr. 12, 2018~ Jun. 06, 2018	Sep. 26, 2018	Radiation (03CH10-HY)
Preamplifier	Keysight	83017A	MY532700 78	1GHz~26.5GHz	Oct. 25, 2017	Apr. 12, 2018~ Jun. 06, 2018	Oct. 24, 2018	Radiation (03CH10-HY)
Preamplifier	Jet-Power	JPA00101800 -30-10P	160118000 2	1GHz~18GHz	Jul. 31, 2017	Apr. 12, 2018~ Jun. 06, 2018	Jul. 30, 2018	Radiation (03CH10-HY)



Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	Keysight	N9010A	MY54200485	10Hz ~ 44GHz	Oct. 31, 2017	Apr. 12, 2018~Jun. 06, 2018	Oct. 30, 2018	Radiation (03CH10-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1~4m	N/A	Apr. 12, 2018~Jun. 06, 2018	N/A	Radiation (03CH10-HY)
Turn Table	EMEC	TT 2200	N/A	0~360 Degree	N/A	Apr. 12, 2018~Jun. 06, 2018	N/A	Radiation (03CH10-HY)
Software	Audix	E3 6.2009-8-24	RK-001042	N/A	N/A	Apr. 12, 2018~Jun. 06, 2018	N/A	Radiation (03CH10-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~30 MHz	Nov. 23, 2017	Apr. 12, 2018~Jun. 06, 2018	Nov. 22, 2018	Radiation (03CH10-HY)
Filter	Woken	WHKX8-5872. 5-6750-18000 -40ST	SN3	6.75G High Pass	Sep. 18, 2017	Apr. 12, 2018~Jun. 06, 2018	Sep. 17, 2018	Radiation (03CH10-HY)
Filter	Wainwright	WHKX12-270 0-3000-18000 -60ST	SN2	3 GHz Highpass	Jul. 17, 2017	Apr. 12, 2018~Jun. 06, 2018	Jul. 18, 2018	Radiation (03CH10-HY)
Filter	Wainwright	WLKS1200-1 2SS	SN2	1.2G Low Pass	Jul. 17, 2017	Apr. 12, 2018~Jun. 06, 2018	Jul. 16, 2018	Radiation (03CH10-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY24971/ 4,MY2865 5/4	9K-30M	Jan. 02, 2018	Apr. 12, 2018~Jun. 06, 2018	Jan. 01, 2019	Radiation (03CH10-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104 / 102	MY11692/ 4PE, MY11693/ 4PE, MY2855/2	30M-1G	Nov. 14, 2017	Apr. 12, 2018~Jun. 06, 2018	Nov. 13, 2018	Radiation (03CH10-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104 / 102	MY11692/ 4PE, MY11693/ 4PE, MY2855/2	1G-18G	Nov. 14, 2017	Apr. 12, 2018~Jun. 06, 2018	Nov. 13, 2018	Radiation (03CH10-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	800740/2	30M~40G	Oct. 17, 2017	Apr. 12, 2018~Jun. 06, 2018	Oct. 16, 2018	Radiation (03CH10-HY)
EMI Test Receiver	Agilent	N9038A(MXE)	MY53290053	20Hz to 26.5GHz	Jan. 16, 2018	Apr. 12, 2018~Jun. 06, 2018	Jan. 15, 2019	Radiation (03CH10-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170584	18GHz- 40GHz	Nov. 27, 2017	Apr. 12, 2018~Jun. 06, 2018	Nov. 26, 2018	Radiation (03CH10-HY)

5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	2.7
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.6
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Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.9
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Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.2
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Appendix A. Test Result of Conducted Test Items**<CDD Mode>**

Test Engineer:	Allen Lin/Shiming Liu	Temperature:	21~25	°C
Test Date:	2018/3/29~2018/8/3	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	2	36	5180	17.25	17.30	21.55	22.65	-		22.37		
11a	6Mbps	2	44	5220	17.85	21.70	33.70	40.50	-		22.52		
11a	6Mbps	2	48	5240	18.05	19.75	33.70	40.40	-		22.56		
HT20	MCS0	2	36	5180	18.30	18.40	22.50	25.10	-		22.62		
HT20	MCS0	2	44	5220	18.85	20.50	35.55	40.90	-		22.75		
HT20	MCS0	2	48	5240	18.80	19.90	35.40	39.10	-		22.74		
HT40	MCS0	2	38	5190	36.20	36.30	40.68	40.86	-		23.01		
HT40	MCS0	2	46	5230	36.70	38.00	65.45	74.94	-		23.01		
VHT80	MCS0	2	42	5210	75.84	75.84	83.84	83.92	-		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	Power Setting	
					Ant 1	Ant 2	Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2			
11a	6Mbps	2	36	5180	0.17	0.15	18.47	18.52	21.50	30.00		5.84		Pass	18.5	
11a	6Mbps	2	44	5220	0.17	0.15	20.97	20.90	23.94	30.00		5.84			Pass	21
11a	6Mbps	2	48	5240	0.17	0.15	20.95	20.85	23.91	30.00		5.84			Pass	21
HT20	MCS0	2	36	5180	0.10	0.10	18.70	18.82	21.77	30.00		5.84			Pass	19
HT20	MCS0	2	44	5220	0.10	0.10	20.73	20.82	23.79	30.00		5.84			Pass	21
HT20	MCS0	2	48	5240	0.10	0.10	20.80	20.66	23.74	30.00		5.84			Pass	21
HT40	MCS0	2	38	5190	0.11	0.11	16.30	16.11	19.21	30.00		5.84			Pass	16.5
HT40	MCS0	2	46	5230	0.11	0.11	20.25	20.36	23.31	30.00		5.84			Pass	20.5
VHT20	MCS0	2	36	5180	0.10	0.10	18.68	18.81	21.76	30.00		5.84			Pass	19
VHT20	MCS0	2	44	5220	0.10	0.10	20.66	20.81	23.75	30.00		5.84			Pass	21
VHT20	MCS0	2	48	5240	0.10	0.10	20.76	20.65	23.72	30.00		5.84		Pass	21	
VHT40	MCS0	2	38	5190	0.14	0.14	16.08	16.26	19.18	30.00		5.84		Pass	16.5	
VHT40	MCS0	2	46	5230	0.14	0.14	20.14	20.21	23.19	30.00		5.84		Pass	20.5	
VHT80	MCS0	2	42	5210	0.26	0.26	15.42	15.36	18.40	30.00		5.84		Pass	18	

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
					Ant 1	Ant 2	Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2		
11a	6Mbps	2	36	5180	0.17	0.15			11.42	14.88		8.12		Pass	
11a	6Mbps	2	44	5220	0.17	0.15			14.30	14.88		8.12		Pass	
11a	6Mbps	2	48	5240	0.17	0.15			14.31	14.88		8.12		Pass	
HT20	MCS0	2	36	5180	0.10	0.10			11.63	14.88		8.12		Pass	
HT20	MCS0	2	44	5220	0.10	0.10			14.04	14.88		8.12		Pass	
HT20	MCS0	2	48	5240	0.10	0.10			14.08	14.88		8.12		Pass	
HT40	MCS0	2	38	5190	0.11	0.11			6.45	14.88		8.12		Pass	
HT40	MCS0	2	46	5230	0.11	0.11			11.07	14.88		8.12		Pass	
VHT80	MCS0	2	42	5210	0.26	0.26			2.41	14.88		8.12		Pass	

<TXBF Mode>

Test Engineer:	Allen Lin/Shiming Liu	Temperature:	21~25	°C
Test Date:	2018/3/29~2018/8/2	Relative Humidity:	51~54	%

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	Power Setting	
					Ant 1	Ant 2	Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2				
HT20	MCS0	2	36	5180	0.10	0.10	15.69	15.81	18.76	27.88		8.12			Pass		16
HT20	MCS0	2	44	5220	0.10	0.10	17.72	17.81	20.78	27.88		8.12			Pass		18
HT20	MCS0	2	48	5240	0.10	0.10	17.79	17.65	20.73	27.88		8.12			Pass		18
HT40	MCS0	2	38	5190	0.11	0.11	13.29	13.10	16.20	27.88		8.12			Pass		13.5
HT40	MCS0	2	46	5230	0.11	0.11	17.24	17.35	20.30	27.88		8.12			Pass		17.5
VHT20	MCS0	2	36	5180	0.10	0.10	15.67	15.80	18.75	27.88		8.12			Pass		16
VHT20	MCS0	2	44	5220	0.10	0.10	17.65	17.80	20.74	27.88		8.12			Pass		18
VHT20	MCS0	2	48	5240	0.10	0.10	17.75	17.64	20.71	27.88		8.12			Pass		18
VHT40	MCS0	2	38	5190	0.14	0.14	13.07	13.25	16.17	27.88		8.12			Pass	13.5	
VHT40	MCS0	2	46	5230	0.14	0.14	17.13	17.20	20.18	27.88		8.12			Pass	17.5	
VHT80	MCS0	2	42	5210	0.26	0.26	12.41	12.35	15.39	27.88		8.12			Pass	15	



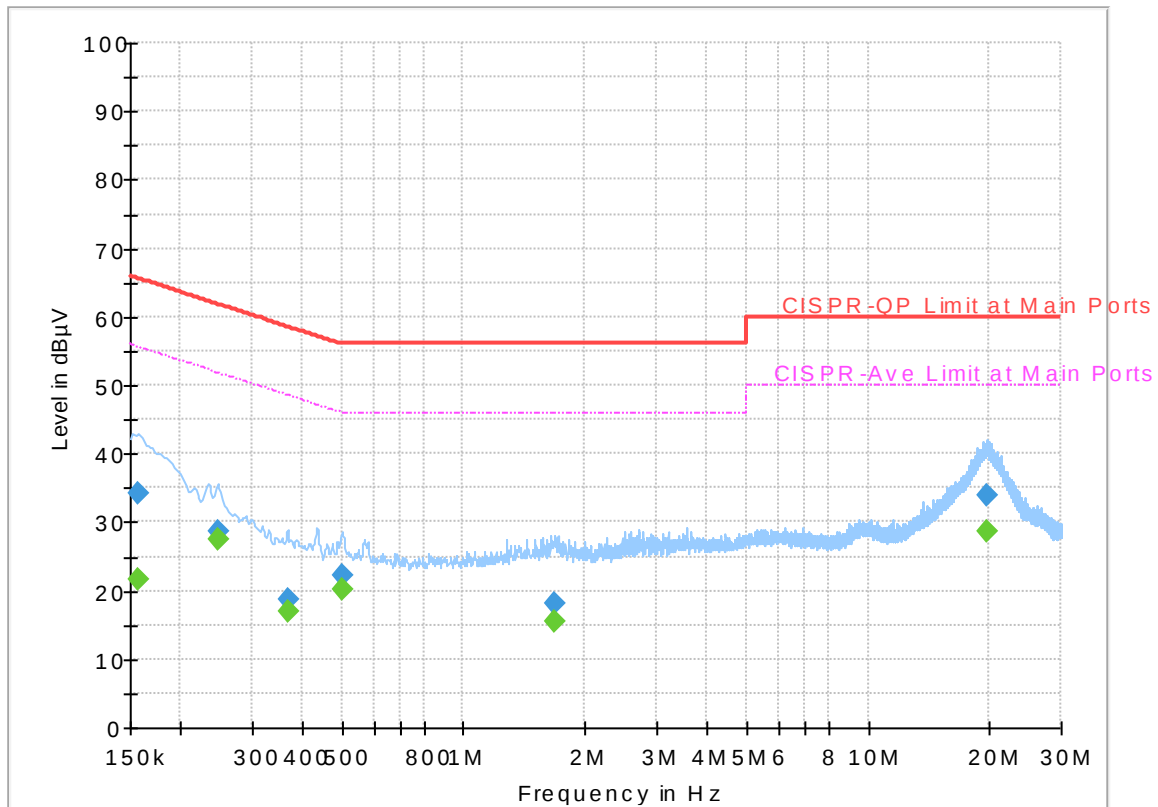
Appendix B. AC Conducted Emission Test Results

Test Engineer :	Kai-Chun Chu	Temperature :	25~27°C
		Relative Humidity :	50~52%

EUT Information

Report NO : 831635
Test Mode : Mode 1
Test Voltage : 120Vac/60Hz
Phase : Line

Full Spectrum



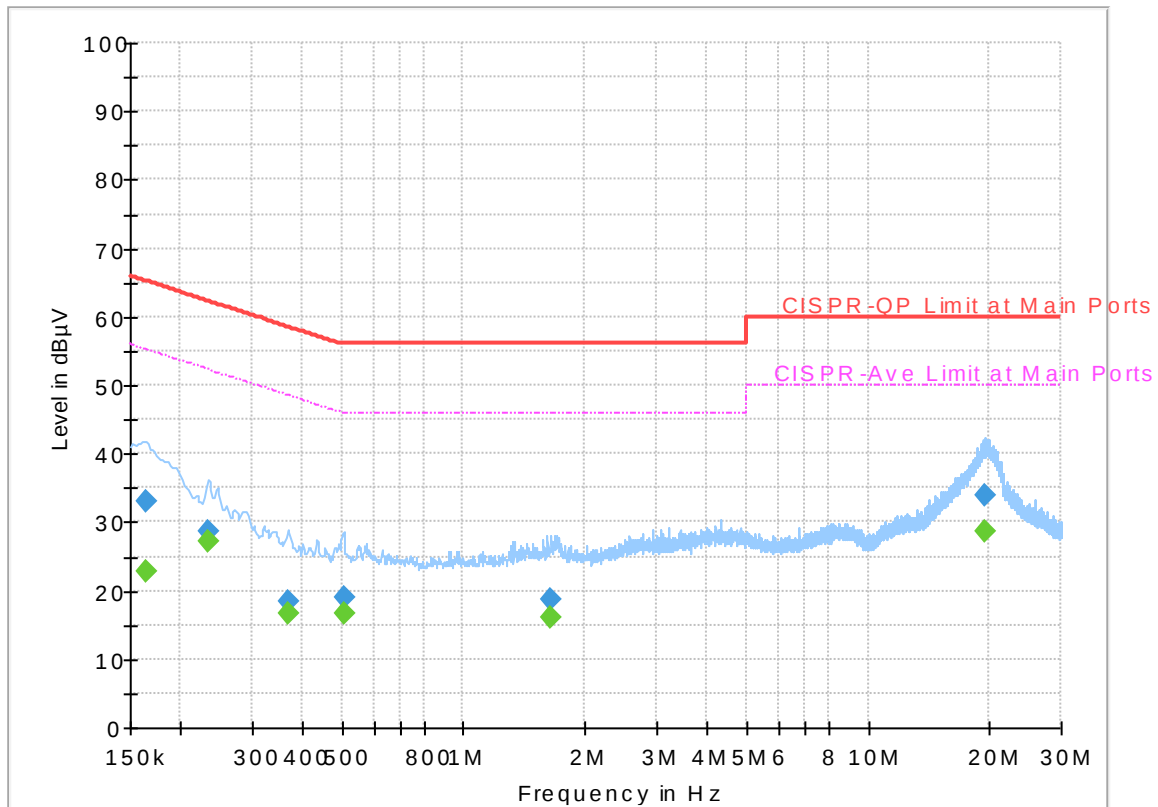
Final_Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Line	Filter	Corr. (dB)
0.156750	---	21.63	55.63	34.00	L1	OFF	19.5
0.156750	34.35	---	65.63	31.28	L1	OFF	19.5
0.246750	---	27.55	51.87	24.32	L1	OFF	19.5
0.246750	28.64	---	61.87	33.23	L1	OFF	19.5
0.368250	---	16.89	48.54	31.65	L1	OFF	19.5
0.368250	18.58	---	58.54	39.96	L1	OFF	19.5
0.501000	---	20.10	46.00	25.90	L1	OFF	19.5
0.501000	22.09	---	56.00	33.91	L1	OFF	19.5
1.680000	---	15.44	46.00	30.56	L1	OFF	19.6
1.680000	18.10	---	56.00	37.90	L1	OFF	19.6
19.695750	---	28.75	50.00	21.25	L1	OFF	19.8
19.695750	33.85	---	60.00	26.15	L1	OFF	19.8

EUT Information

Report NO : 831635
Test Mode : Mode 1
Test Voltage : 120Vac/60Hz
Phase : Neutral

Full Spectrum



Final_Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Line	Filter	Corr. (dB)
0.163500	---	22.90	55.28	32.38	N	OFF	19.5
0.163500	33.00	---	65.28	32.28	N	OFF	19.5
0.233250	---	27.20	52.33	25.13	N	OFF	19.5
0.233250	28.57	---	62.33	33.76	N	OFF	19.5
0.368250	---	16.58	48.54	31.96	N	OFF	19.5
0.368250	18.42	---	58.54	40.12	N	OFF	19.5
0.505500	---	16.58	46.00	29.42	N	OFF	19.5
0.505500	19.00	---	56.00	37.00	N	OFF	19.5
1.637250	---	16.22	46.00	29.78	N	OFF	19.6
1.637250	18.70	---	56.00	37.30	N	OFF	19.6
19.414500	---	28.76	50.00	21.24	N	OFF	19.9
19.414500	33.80	---	60.00	26.20	N	OFF	19.9



Appendix C. Radiated Spurious Emission

Test Engineer :	Daniel Lee and JC Liang	Temperature :	18 ~ 22°C
		Relative Humidity :	48 ~ 52%



Band 1 - 5150~5250MHz

WIFI 802.11a (Band Edge @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a CH 36 5180MHz		5147.94	57.21	-16.79	74	49.63	31.68	8.38	32.48	100	75	P	H
		5148.46	49.81	-4.19	54	42.23	31.68	8.38	32.48	100	75	A	H
	*	5180	111.53	-	-	103.9	31.72	8.39	32.48	100	75	P	H
	*	5180	103.76	-	-	96.13	31.72	8.39	32.48	100	75	A	H
													H
													H
		5147.68	60.64	-13.36	74	53.06	31.68	8.38	32.48	305	141	P	V
		5147.42	52.42	-1.58	54	44.84	31.68	8.38	32.48	305	141	A	V
	*	5180	115.91	-	-	108.28	31.72	8.39	32.48	305	141	P	V
	*	5180	107.91	-	-	100.28	31.72	8.39	32.48	305	141	A	V
													V
													V
802.11a CH 44 5220MHz		5130.52	55.22	-18.78	74	47.67	31.66	8.37	32.48	160	0	P	H
		5125.06	48	-6	54	40.45	31.66	8.37	32.48	160	0	A	H
	*	5220	111.51	-	-	103.86	31.76	8.37	32.48	160	0	P	H
	*	5220	103.99	-	-	96.34	31.76	8.37	32.48	160	0	A	H
		5387.48	48.28	-25.72	74	40.73	31.96	8.08	32.49	160	0	P	H
		5415.76	40.93	-13.07	54	33.33	32	8.1	32.5	160	0	A	H
		5127.14	55.94	-18.06	74	48.39	31.66	8.37	32.48	310	356	P	V
		5127.14	49.74	-4.26	54	42.19	31.66	8.37	32.48	310	356	A	V
	*	5220	115.33	-	-	107.68	31.76	8.37	32.48	310	356	P	V
	*	5220	107.64	-	-	99.99	31.76	8.37	32.48	310	356	A	V
		5350.52	50.43	-23.57	74	42.85	31.92	8.15	32.49	310	356	P	V
		5400.08	44.32	-9.68	54	36.79	31.98	8.05	32.5	310	356	A	V



802.11a CH 48 5240MHz		5144.82	55.43	-18.57	74	47.85	31.68	8.38	32.48	188	17	P	H
		5149.5	47.6	-6.4	54	40.02	31.68	8.38	32.48	188	17	A	H
	*	5240	113.53	-	-	105.89	31.78	8.34	32.48	188	17	P	H
	*	5240	105.46	-	-	97.82	31.78	8.34	32.48	188	17	A	H
		5459.16	49.72	-24.28	74	41.99	32.04	8.19	32.5	188	17	P	H
		5428.92	41.76	-12.24	54	34.14	32.02	8.1	32.5	188	17	A	H
		5145.34	56.72	-17.28	74	49.14	31.68	8.38	32.48	385	359	P	V
		5146.12	49.61	-4.39	54	42.03	31.68	8.38	32.48	385	359	A	V
	*	5240	116.56	-	-	108.92	31.78	8.34	32.48	385	359	P	V
	*	5240	108.22	-	-	100.58	31.78	8.34	32.48	385	359	A	V
		5410.16	51.3	-22.7	74	43.77	31.98	8.05	32.5	385	359	P	V
		5439.84	43.94	-10.06	54	36.27	32.02	8.15	32.5	385	359	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 1 5150~5250MHz

WIFI 802.11a (Harmonic @ 3m)

WIFI Ant. 1+2	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	44.9	-29.1	74	60.12	39.49	11.78	66.49	100	0	P	H
		15540	42.63	-31.37	74	53.9	38.32	15.57	65.16	100	0	P	H
													H
													H
		10360	44.7	-29.3	74	59.92	39.49	11.78	66.49	100	0	P	V
		15540	42.82	-31.18	74	54.09	38.32	15.57	65.16	100	0	P	V
													V
													V
802.11a CH 44 5220MHz		10440	45.97	-28.03	74	55.98	39.59	12.15	61.75	100	0	P	H
		15660	43.61	-30.39	74	50.99	38.06	15.98	61.42	100	0	P	H
													H
													H
		10440	47.08	-26.92	74	57.09	39.59	12.15	61.75	100	0	P	V
		15660	43.53	-30.47	74	50.91	38.06	15.98	61.42	100	0	P	V
													V
													V
802.11a CH 48 5240MHz		10480	46.34	-27.66	74	56.18	39.67	12.2	61.71	100	0	P	H
		15720	44.13	-29.87	74	51.71	37.91	15.99	61.48	100	0	P	H
													H
													H
		10480	46.32	-27.68	74	56.16	39.67	12.2	61.71	100	0	P	V
		15720	43.73	-30.27	74	51.31	37.91	15.99	61.48	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+2	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		5145.6	61.87	-12.13	74	54.29	31.68	8.38	32.48	106	312	P	H
		5147.68	51.75	-2.25	54	44.17	31.68	8.38	32.48	106	312	A	H
	*	5180	114.46	-	-	106.83	31.72	8.39	32.48	106	312	P	H
	*	5180	106.05	-	-	98.42	31.72	8.39	32.48	106	312	A	H
													H
													H
		5146.64	63.34	-10.66	74	55.76	31.68	8.38	32.48	317	1	P	V
		5146.12	53.6	-0.4	54	46.02	31.68	8.38	32.48	317	1	A	V
	*	5180	116.75	-	-	109.12	31.72	8.39	32.48	317	1	P	V
	*	5180	108.88	-	-	101.25	31.72	8.39	32.48	317	1	A	V
													V
													V
802.11n HT20 CH 44 5220MHz		5122.2	52.11	-21.89	74	44.59	31.64	8.36	32.48	111	315	P	H
		5123.24	44.9	-9.1	54	37.36	31.66	8.36	32.48	111	315	A	H
	*	5220	111.74	-	-	104.09	31.76	8.37	32.48	111	315	P	H
	*	5220	103.93	-	-	96.28	31.76	8.37	32.48	111	315	A	H
		5366.2	48.54	-25.46	74	40.98	31.94	8.11	32.49	111	315	P	H
		5350	39.81	-14.19	54	32.23	31.92	8.15	32.49	111	315	A	H
		5127.92	57.33	-16.67	74	49.78	31.66	8.37	32.48	388	345	P	V
		5129.22	49.08	-4.92	54	41.53	31.66	8.37	32.48	388	345	A	V
	*	5220	114.89	-	-	107.24	31.76	8.37	32.48	388	345	P	V
	*	5220	107.13	-	-	99.48	31.76	8.37	32.48	388	345	A	V
		5420.52	49.85	-24.15	74	42.25	32	8.1	32.5	388	345	P	V
		5419.96	41.68	-12.32	54	34.08	32	8.1	32.5	388	345	A	V



802.11n HT20 CH 48 5240MHz		5140.4	54.27	-19.73	74	46.7	31.68	8.37	32.48	121	317	P	H
		5143	45.84	-8.16	54	38.26	31.68	8.38	32.48	121	317	A	H
	*	5240	112.9	-	-	105.26	31.78	8.34	32.48	121	317	P	H
	*	5240	104.44	-	-	96.8	31.78	8.34	32.48	121	317	A	H
		5409.32	48.25	-25.75	74	40.72	31.98	8.05	32.5	121	317	P	H
		5440.12	40.29	-13.71	54	32.62	32.02	8.15	32.5	121	317	A	H
		5144.82	55.6	-18.4	74	48.02	31.68	8.38	32.48	364	360	P	V
		5150	48.37	-5.63	54	40.79	31.68	8.38	32.48	364	360	A	V
	*	5240	114.95	-	-	107.31	31.78	8.34	32.48	364	360	P	V
	*	5240	107.49	-	-	99.85	31.78	8.34	32.48	364	360	A	V
		5357.52	50.27	-23.73	74	42.69	31.92	8.15	32.49	364	360	P	V
		5423.88	43.43	-10.57	54	35.83	32	8.1	32.5	364	360	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+2	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	45.26	-28.74	74	55.49	39.49	12.09	61.81	100	0	P	H
		15540	44.28	-29.72	74	51.33	38.32	15.96	61.33	100	0	P	H
													H
													H
		10360	45.67	-28.33	74	55.9	39.49	12.09	61.81	100	0	P	V
		15540	44.91	-29.09	74	51.96	38.32	15.96	61.33	100	0	P	V
													V
													V
802.11n HT20 CH 44 5220MHz		10440	45.25	-28.75	74	55.26	39.59	12.15	61.75	100	0	P	H
		15660	43.45	-30.55	74	50.83	38.06	15.98	61.42	100	0	P	H
													H
													H
		10440	45.24	-28.76	74	55.25	39.59	12.15	61.75	100	0	P	V
		15660	43.04	-30.96	74	50.42	38.06	15.98	61.42	100	0	P	V
													V
													V
802.11n HT20 CH 48 5240MHz		10480	45.17	-28.83	74	55.01	39.67	12.2	61.71	100	0	P	H
		15720	44.99	-29.01	74	52.57	37.91	15.99	61.48	100	0	P	H
													H
													H
		10480	47.33	-26.67	74	57.17	39.67	12.2	61.71	100	0	P	V
		15720	44.13	-29.87	74	51.71	37.91	15.99	61.48	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 HT40 (Band Edge @ 3m)

WIFI Ant. 1+2	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		5149.76	55.4	-18.6	74	47.82	31.68	8.38	32.48	100	314	P	H
		5149.76	48.31	-5.69	54	40.73	31.68	8.38	32.48	100	314	A	H
	*	5190	109.93	-	-	102.3	31.72	8.39	32.48	100	314	P	H
	*	5190	101.43	-	-	93.8	31.72	8.39	32.48	100	314	A	H
		5354.44	48.48	-25.52	74	40.9	31.92	8.15	32.49	100	314	P	H
		5379.92	41.35	-12.65	54	33.8	31.96	8.08	32.49	100	314	A	H
		5149.76	59.99	-14.01	74	52.41	31.68	8.38	32.48	400	19	P	V
		5150	52.82	-1.18	54	45.24	31.68	8.38	32.48	400	19	A	V
	*	5190	113.15	-	-	105.52	31.72	8.39	32.48	400	19	P	V
	*	5190	104.95	-	-	97.32	31.72	8.39	32.48	400	19	A	V
		5418.84	49.26	-24.74	74	41.66	32	8.1	32.5	400	19	P	V
		5379.92	43.08	-10.92	54	35.53	31.96	8.08	32.49	400	19	A	V
802.11n HT40 CH 46 5230MHz		5128.96	52.63	-21.37	74	45.08	31.66	8.37	32.48	186	18	P	H
		5135.98	44.66	-9.34	54	37.11	31.66	8.37	32.48	186	18	A	H
	*	5230	107.69	-	-	100.02	31.78	8.37	32.48	186	18	P	H
	*	5230	100.13	-	-	92.46	31.78	8.37	32.48	186	18	A	H
		5360.6	48.23	-25.77	74	40.67	31.94	8.11	32.49	186	18	P	H
		5426.12	40.62	-13.38	54	33.02	32	8.1	32.5	186	18	A	H
		5143	53.52	-20.48	74	45.94	31.68	8.38	32.48	384	0	P	V
		5139.62	46.37	-7.63	54	38.8	31.68	8.37	32.48	384	0	A	V
	*	5230	111.91	-	-	104.24	31.78	8.37	32.48	384	0	P	V
	*	5230	103.4	-	-	95.73	31.78	8.37	32.48	384	0	A	V
		5351.36	50.29	-23.71	74	42.71	31.92	8.15	32.49	384	0	P	V
		5439.84	42.19	-11.81	54	34.52	32.02	8.15	32.5	384	0	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+2	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	45.35	-28.65	74	55.52	39.51	12.11	61.79	100	0	P	H
		15570	45.14	-28.86	74	52.28	38.25	15.97	61.36	100	0	P	H
													H
													H
		10380	45.52	-28.48	74	55.69	39.51	12.11	61.79	100	0	P	V
		15570	44.09	-29.91	74	51.23	38.25	15.97	61.36	100	0	P	V
													V
													V
802.11n HT40 CH 46 5230MHz		10460	46.46	-27.54	74	56.41	39.62	12.17	61.74	100	0	P	H
		15690	43.89	-30.11	74	51.38	37.98	15.98	61.45	100	0	P	H
													H
													H
		10460	46.08	-27.92	74	56.03	39.62	12.17	61.74	100	0	P	V
		15690	43.84	-30.16	74	51.33	37.98	15.98	61.45	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+2	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)
802.11ac VHT80 CH 42 5210MHz		5126.88	61.56	-12.44	74	54.01	31.66	8.37	32.48	100	310	P	H
		5128.44	50.69	-3.31	54	43.14	31.66	8.37	32.48	100	310	A	H
	*	5210	104.71	-	-	97.03	31.76	8.4	32.48	100	310	P	H
	*	5210	96.9	-	-	89.22	31.76	8.4	32.48	100	310	A	H
		5356.96	51.42	-22.58	74	43.84	31.92	8.15	32.49	100	310	P	H
		5350.52	43.87	-10.13	54	36.29	31.92	8.15	32.49	100	310	A	H
		5142.22	62.82	-11.18	74	55.25	31.68	8.37	32.48	337	11	P	V
		5140.92	51.54	-2.46	54	43.97	31.68	8.37	32.48	337	11	A	V
	*	5210	107.98	-	-	100.3	31.76	8.4	32.48	337	11	P	V
	*	5210	100.07	-	-	92.39	31.76	8.4	32.48	337	11	A	V
		5356.4	55.95	-18.05	74	48.37	31.92	8.15	32.49	337	11	P	V
		5356.12	45.95	-8.05	54	38.37	31.92	8.15	32.49	337	11	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+2	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)
802.11ac VHT80 CH 42 5210MHz		10420	45.02	-28.98	74	55.08	39.57	12.14	61.77	100	0	P	H
		15630	44.16	-29.84	74	51.5	38.1	15.97	61.41	100	0	P	H
													H
													H
		10420	44.94	-29.06	74	55	39.57	12.14	61.77	100	0	P	V
		15630	43.71	-30.29	74	51.05	38.1	15.97	61.41	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Emission below 1GHz

WIFI 802.11n HT20 (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+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11n HT20 LF		30	21.87	-18.13	40	29.4	24.57	0.68	32.78	-	-	P	H
		125.04	30.13	-13.37	43.5	43.69	17.71	1.42	32.69	-	-	P	H
		250.05	26.39	-19.61	46	38.41	18.51	2.08	32.61	-	-	P	H
		374.9	43.57	-2.43	46	52.81	20.93	2.43	32.6	100	5	QP	H
		500.2	44.71	-1.29	46	50.64	23.86	2.85	32.64	100	334	QP	H
		699.7	37.77	-8.23	46	40.55	26.62	3.38	32.78	-	-	P	H
													H
													H
													H
													H
													H
													H
		48.63	22.63	-17.37	40	39.29	15.19	0.91	32.76	-	-	P	V
		173.37	23.6	-19.9	43.5	38.98	15.44	1.84	32.66	-	-	P	V
		250.05	23.83	-22.17	46	35.85	18.51	2.08	32.61	-	-	P	V
		374.9	41.37	-4.63	46	50.61	20.93	2.43	32.6	-	-	P	V
		500.2	44.89	-1.11	46	50.82	23.86	2.85	32.64	100	358	QP	V
		624.8	42.9	-3.1	46	46.49	26.01	3.21	32.81	-	-	P	V
													V
													V
												V	
												V	
												V	
												V	
												V	
Remark	1. No other spurious found. 2. All results are PASS against limit line.												



Note symbol

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

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

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(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

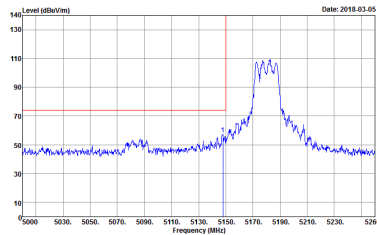
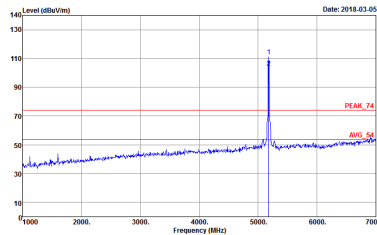
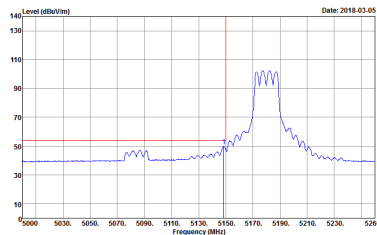
Test Engineer :	Daniel Lee and JC Liang	Temperature :	18 ~ 22°C
		Relative Humidity :	48 ~ 52%

Note symbol

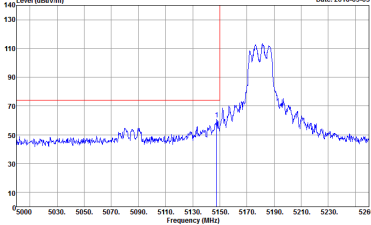
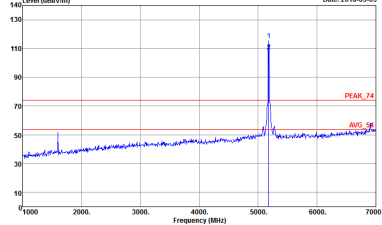
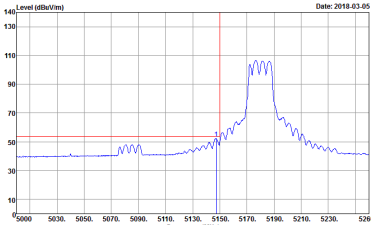
-L	Low channel location
-R	High channel location



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

WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11a CH36 5180MHz	
1+2	Horizontal	Fundamental
Peak	 Site : 03CH10-HY Condition : PEAK_BE_74 3m HORN 9120D-HF HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 831635 Setting : 20.5	 Site : 03CH10-HY Condition : PEAK_74 3m HORN 9120D-HF HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 831635 Setting : 20.5
Avg.	 Site : 03CH10-HY Condition : AVG_BE_54 3m HORN 9120D-HF HORIZONTAL RBW:1000.000KHz VBW:1000KHz SWT:Auto Detector : Peak Project : 831635 Setting : 20.5	Left blank

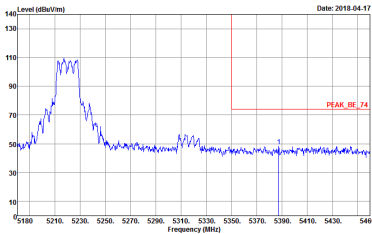
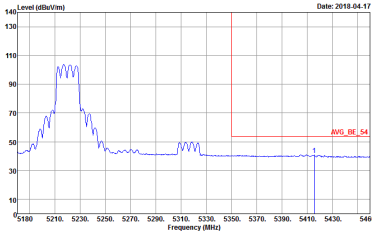


WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11a CH36 5180MHz	
1+2	Vertical	Fundamental
Peak	 Site : 03CH10-HY Condition : PEAK_BE_74 3m HORN 9120D-HF VERTICAL Detector : Peak Project : 831635 Setting : 20.5	 Site : 03CH10-HY Condition : PEAK_74 3m HORN 9120D-HF VERTICAL Detector : Peak Project : 831635 Setting : 20.5
Avg.	 Site : 03CH10-HY Condition : AVG_BE_54 3m HORN 9120D-HF VERTICAL Detector : Peak Project : 831635 Setting : 20.5	Left blank

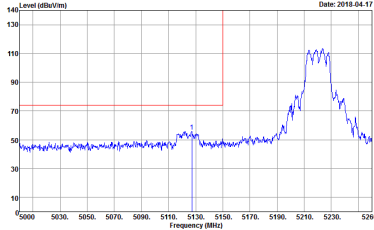
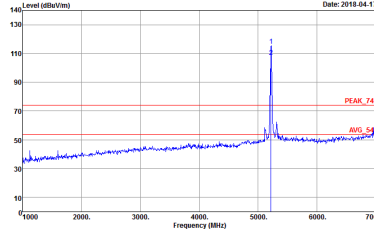
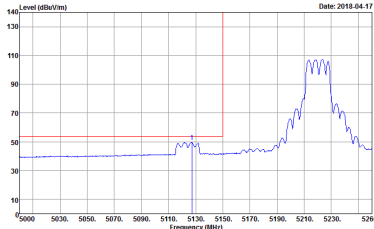


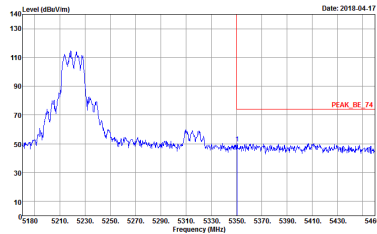
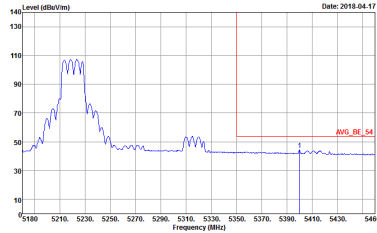
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11a CH44 5220MHz - L	
1+2	Horizontal	Fundamental
Peak	Site : 03CH10-HY Condition : PEAK_BE_74 3m HORN 9120D-HF HORIZONTAL Detector : Peak Project : 831635	Site : 03CH10-HY Condition : PEAK_74 3m HORN 9120D-HF HORIZONTAL Detector : Peak Project : 831635
Avg.	Site : 03CH10-HY Condition : AVG_BE_54 3m HORN 9120D-HF HORIZONTAL Detector : Peak Project : 831635	Left blank



WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11a CH44 5220MHz - R	
1+2	Horizontal	Fundamental
Peak	 Site : 03CH10-HY Condition : PEAK_BE_74 3m HORN 9120D-HF HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 831635	Left blank
Avg.	 Site : 03CH10-HY Condition : AVG_BE_54 3m HORN 9120D-HF HORIZONTAL RBW:1000.000KHz VBW:1000KHz SWT:Auto Detector : Peak Project : 831635	Left blank

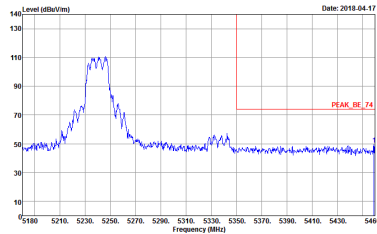
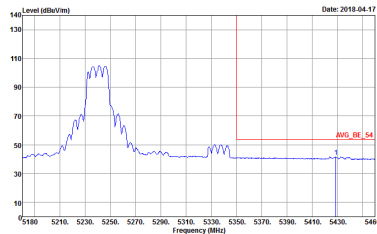


WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11a CH44 5220MHz - L	
1+2	Vertical	Fundamental
Peak	 Site : 03CH10-HY Condition : PEAK_BE_74 3m HORN 9120D-HF VERTICAL Detector : Peak Project : 831635	 Site : 03CH10-HY Condition : PEAK_74 3m HORN 9120D-HF VERTICAL Detector : Peak Project : 831635
Avg.	 Site : 03CH10-HY Condition : AVG_BE_54 3m HORN 9120D-HF VERTICAL Detector : Peak Project : 831635	Left blank

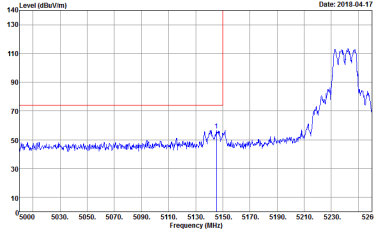
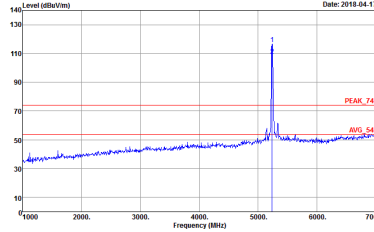
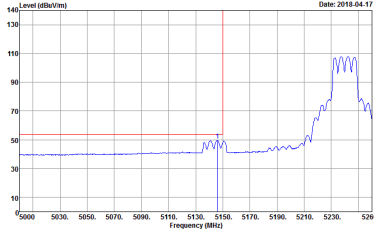
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11a CH44 5220MHz - R	
1+2	Vertical	Fundamental
Peak	 Site : 03CH10-HY Condition : PEAK_BE_74 3m HORN 9120D-HF VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 831635	Left blank
Avg.	 Site : 03CH10-HY Condition : AVG_BE_54 3m HORN 9120D-HF VERTICAL RBW:1000.000KHz VBW:1000KHz SWT:Auto Detector : Peak Project : 831635	Left blank



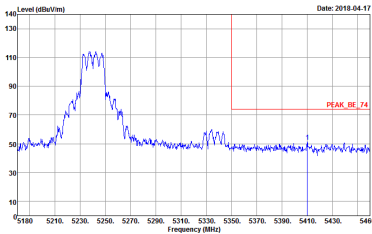
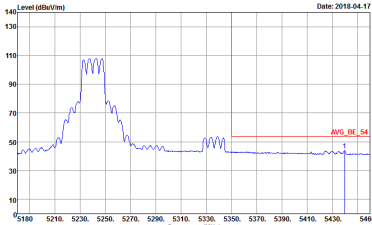
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11a CH48 5240MHz - L	
1+2	Horizontal	Fundamental
Peak	Site : 03CH10-HY Condition : PEAK_BE_74 3m HORN 9120D-HF HORIZONTAL Detector : Peak Project : 831635	Site : 03CH10-HY Condition : PEAK_74 3m HORN 9120D-HF HORIZONTAL Detector : Peak Project : 831635
Avg.	Site : 03CH10-HY Condition : AVG_BE_54 3m HORN 9120D-HF HORIZONTAL Detector : Peak Project : 831635	Left blank

WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11a CH48 5240MHz - R	
1+2	Horizontal	Fundamental
Peak	 Site : 03CH10-HY Condition : PEAK_BE_74 3m HORN 91200-HF HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 831635	Left blank
Avg.	 Site : 03CH10-HY Condition : AVG_BE_54 3m HORN 91200-HF HORIZONTAL RBW:1000.000KHz VBW:1000KHz SWT:Auto Detector : Peak Project : 831635	Left blank



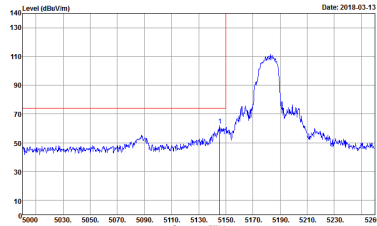
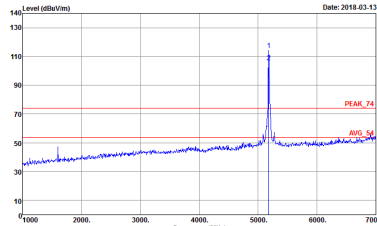
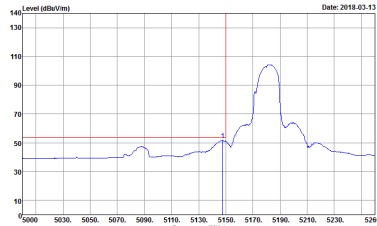
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11a CH48 5240MHz - L	
1+2	Vertical	Fundamental
Peak	 Site : 03CH10-HY Condition : PEAK_BE_74 3m HORN 9120D-HF VERTICAL Detector : Peak Project : 831635	 Site : 03CH10-HY Condition : PEAK_74 3m HORN 9120D-HF VERTICAL Detector : Peak Project : 831635
Avg.	 Site : 03CH10-HY Condition : AVG_BE_54 3m HORN 9120D-HF VERTICAL Detector : Peak Project : 831635	Left blank



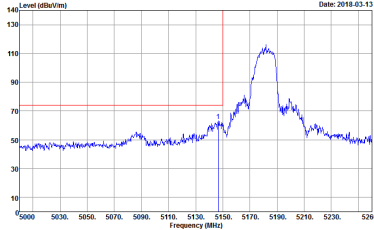
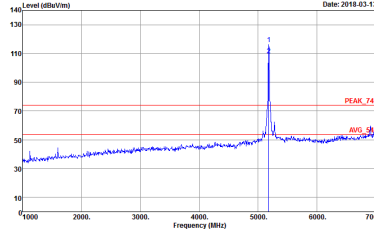
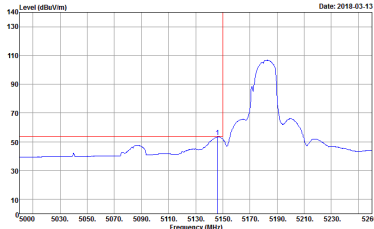
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11a CH48 5240MHz - R	
1+2	Vertical	Fundamental
Peak	 Site : 03CH10-HY Condition : PEAK_BE_74 3m HORN 9120D-HF VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 831635	Left blank
Avg.	 Site : 03CH10-HY Condition : AVG_BE_54 3m HORN 9120D-HF VERTICAL RBW:1000.000KHz VBW:1000KHz SWT:Auto Detector : Peak Project : 831635	Left blank



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+2	Horizontal	Fundamental
Peak	 Site : 03CH10-HY Condition : PEAK_BE_74 3m HORN 9120D-HF HORIZONTAL Detector : Peak Project : 831635 Setting : Z1	 Site : 03CH10-HY Condition : PEAK_74 3m HORN 9120D-HF HORIZONTAL Detector : Peak Project : 831635 Setting : Z1
Avg.	 Site : 03CH10-HY Condition : AVG_BE_54 3m HORN 9120D-HF HORIZONTAL Detector : Peak Project : 831635 Setting : Z1	Left blank

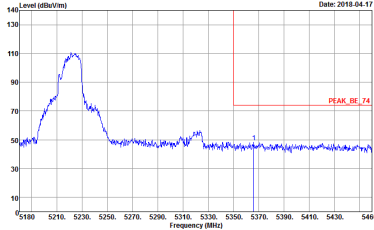
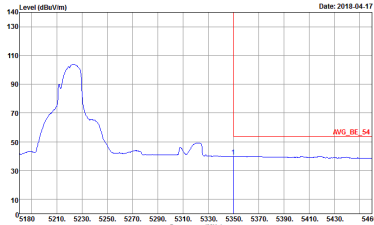


WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT20 CH36 5180MHz	
1+2	Vertical	Fundamental
Peak	 Site : 03CH10-HY Condition : PEAK_BE_74 3m HORN 9120D-HF VERTICAL Detector : Peak Project : 831635 Setting : Z1	 Site : 03CH10-HY Condition : PEAK_74 3m HORN 9120D-HF VERTICAL Detector : Peak Project : 831635 Setting : Z1
Avg.	 Site : 03CH10-HY Condition : AVG_BE_54 3m HORN 9120D-HF VERTICAL Detector : Peak Project : 831635 Setting : Z1	Left blank

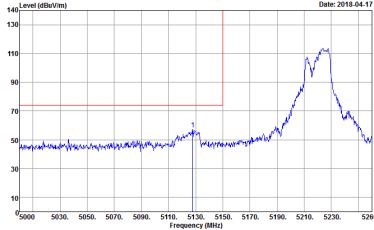
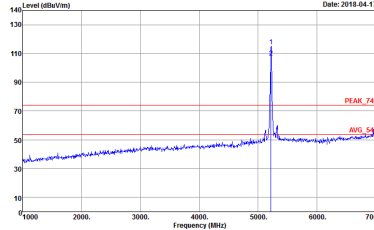
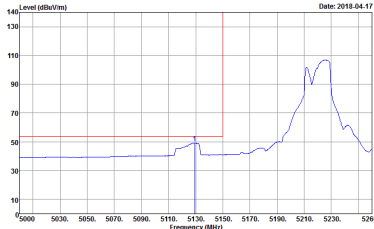


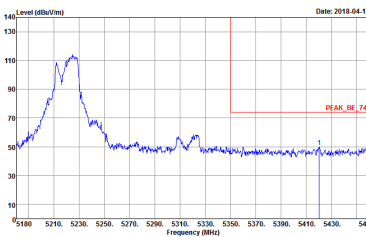
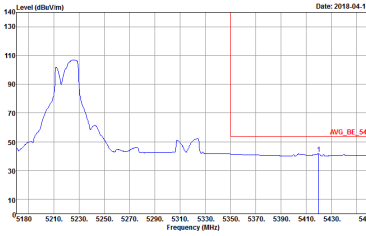
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT20 CH44 5220MHz - L	
1+2	Horizontal	Fundamental
Peak	Site : 03CH10-HY Condition : PEAK_BE_74 3m HORN 9120D-HF HORIZONTAL Detector : Peak Project : 831635	Site : 03CH10-HY Condition : PEAK_74 3m HORN 9120D-HF HORIZONTAL Detector : Peak Project : 831635
Avg.	Site : 03CH10-HY Condition : AVG_BE_54 3m HORN 9120D-HF HORIZONTAL Detector : Peak Project : 831635	Left blank



WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT20 CH44 5220MHz - R	
1+2	Horizontal	Fundamental
Peak	 Site : 03CH10-HY Condition : PEAK_BE_74 3m HORN 91200-HF HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 831635	Left blank
Avg.	 Site : 03CH10-HY Condition : AVG_BE_54 3m HORN 91200-HF HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 831635	Left blank

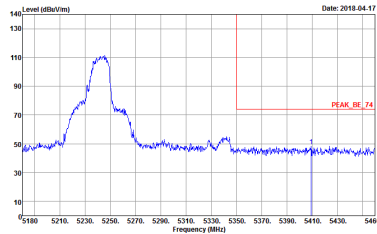
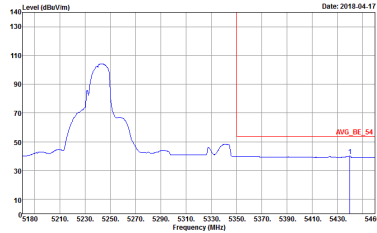


WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT20 CH44 5220MHz - L	
1+2	Vertical	Fundamental
Peak	 Site : 03CH10-HY Condition : PEAK_BE_74 3m HORN 9120D-HF VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak 831635	 Site : 03CH10-HY Condition : PEAK_74 3m HORN 9120D-HF VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak 831635
Avg.	 Site : 03CH10-HY Condition : AVG_BE_54 3m HORN 9120D-HF VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak 831635	Left blank

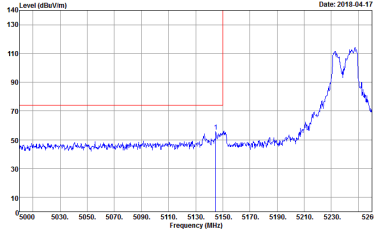
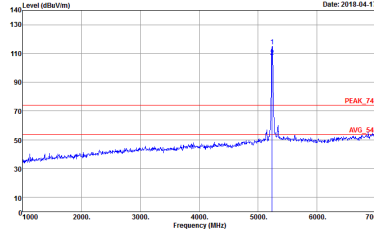
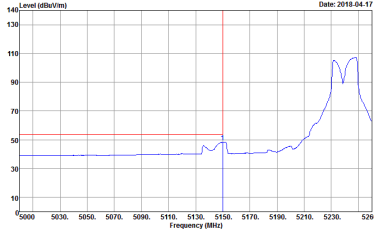
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT20 CH44 5220MHz - R	
1+2	Vertical	Fundamental
Peak	 Site : 03CH10-HY Condition : PEAK_BE_74 3m HORN 9120D-HF VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 831635	Left blank
Avg.	 Site : 03CH10-HY Condition : AVG_BE_54 3m HORN 9120D-HF VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 831635	Left blank



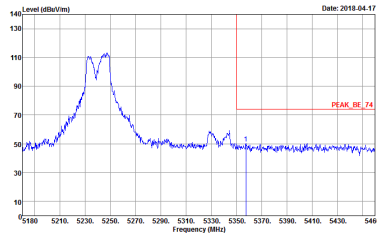
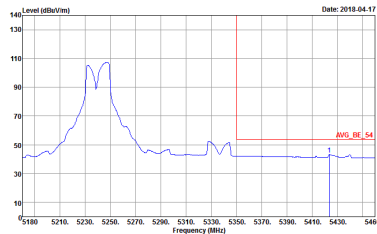
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT20 CH48 5240MHz - L	
1+2	Horizontal	Fundamental
Peak	Site : 03CH10-HY Condition : PEAK_BE_74 3m HORN 9120D-HF HORIZONTAL Detector : Peak Project : 831635	Site : 03CH10-HY Condition : PEAK_74 3m HORN 9120D-HF HORIZONTAL Detector : Peak Project : 831635
Avg.	Site : 03CH10-HY Condition : AVG_BE_54 3m HORN 9120D-HF HORIZONTAL Detector : Peak Project : 831635	Left blank

WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT20 CH48 5240MHz - R	
1+2	Horizontal	Fundamental
Peak	 Site : 03CH10-HY Condition : PEAK_BE_74 3m HORN 9120D-HF HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 831635	Left blank
Avg.	 Site : 03CH10-HY Condition : AVG_BE_54 3m HORN 9120D-HF HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 831635	Left blank



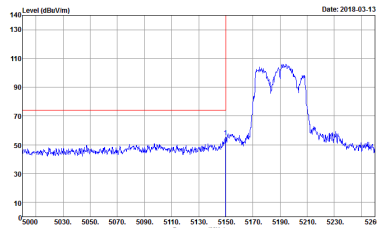
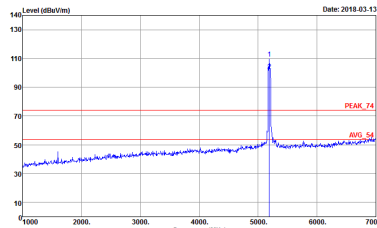
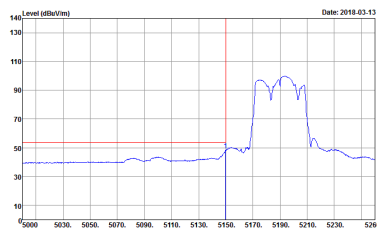
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT20 CH48 5240MHz - L	
1+2	Vertical	Fundamental
Peak	 Site : 03CH10-HY Condition : PEAK_BE_74 3m HORN 9120D-HF VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak 831635	 Site : 03CH10-HY Condition : PEAK_74 3m HORN 9120D-HF VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak 831635
Avg.	 Site : 03CH10-HY Condition : AVG_BE_54 3m HORN 9120D-HF VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak 831635	Left blank



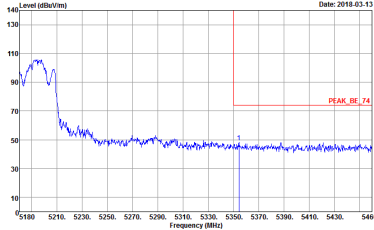
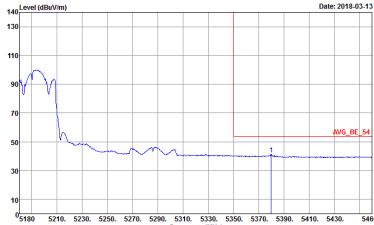
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT20 CH48 5240MHz - R	
1+2	Vertical	Fundamental
Peak	 Site : 03CH10-HY Condition : PEAK_BE_74 3m HORN 9120D-HF VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 831635	Left blank
Avg.	 Site : 03CH10-HY Condition : AVG_BE_54 3m HORN 9120D-HF VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 831635	Left blank



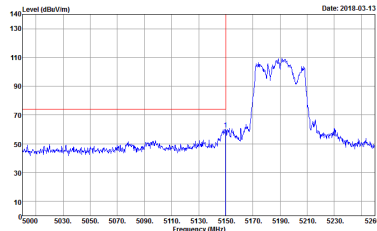
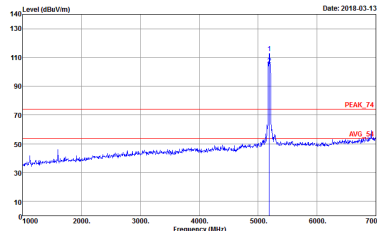
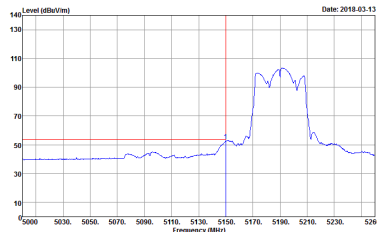
Band 1 5150~5250MHz
WIFI 802.11n HT40 (Band Edge @ 3m)

WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT40 CH38 5190MHz - L	
1+2	Horizontal	Fundamental
Peak	 Site : 03CH10-HY Condition : PEAK_BE_74 3m HORN 9120D-HF HORIZONTAL Detector : Peak Project : 831635 Setting : 18.5	 Site : 03CH10-HY Condition : PEAK_74 3m HORN 9120D-HF HORIZONTAL Detector : Peak Project : 831635 Setting : 18.5
Avg.	 Site : 03CH10-HY Condition : AVG_BE_54 3m HORN 9120D-HF HORIZONTAL Detector : Peak Project : 831635 Setting : 18.5	Left blank

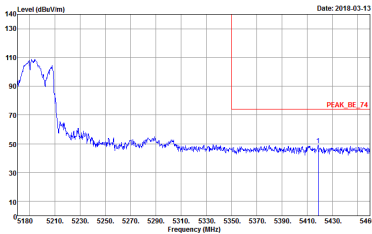
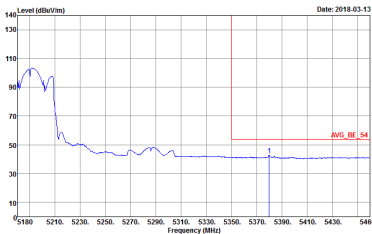


WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT40 CH38 5190MHz - R	
1+2	Horizontal	Fundamental
Peak	 Site : 03CH10-HY Condition : PEAK_BE_74 3m HORN 9120D-HF HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 831635 Setting : 18.5	Left blank
Avg.	 Site : 03CH10-HY Condition : AVG_BE_54 3m HORN 9120D-HF HORIZONTAL RBW:1000.000KHz VBW:1000KHz SWT:Auto Detector : Peak Project : 831635 Setting : 18.5	Left blank

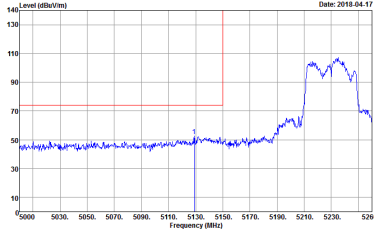
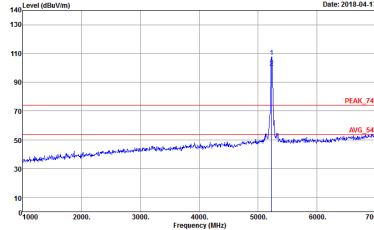
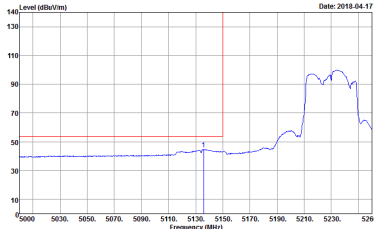


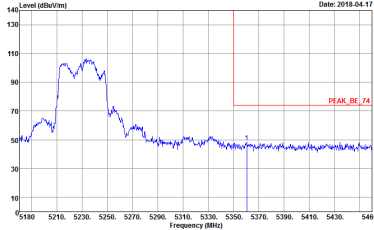
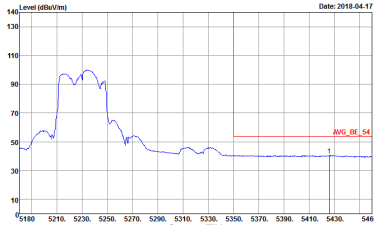
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT40 CH38 5190MHz - L	
1+2	Vertical	Fundamental
Peak	 Site : 03CH10-HY Condition : PEAK_BE_74 3m HORN 9120D-HF VERTICAL Detector : Peak Project : 831635 Setting : 18.5	 Site : 03CH10-HY Condition : PEAK_74 3m HORN 9120D-HF VERTICAL Detector : Peak Project : 831635 Setting : 18.5
Avg.	 Site : 03CH10-HY Condition : AVG_BE_54 3m HORN 9120D-HF VERTICAL Detector : Peak Project : 831635 Setting : 18.5	Left blank



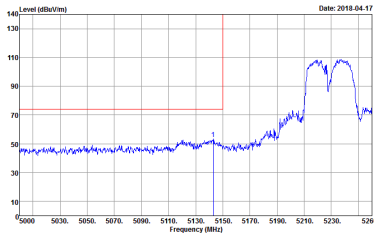
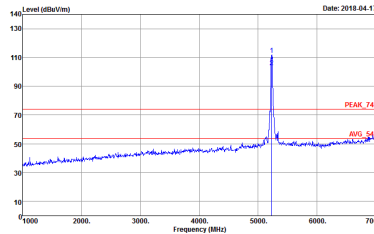
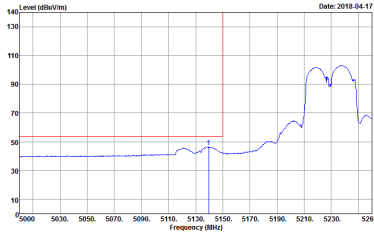
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT40 CH38 5190MHz - R	
1+2	Vertical	Fundamental
Peak	 Site : 03CH10-HY Condition : PEAK_BE_74 3m HORN 9120D-HF VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 831635 Setting : 18.5	Left blank
Avg.	 Site : 03CH10-HY Condition : AVG_BE_54 3m HORN 9120D-HF VERTICAL RBW:1000.000KHz VBW:1000KHz SWT:Auto Detector : Peak Project : 831635 Setting : 18.5	Left blank

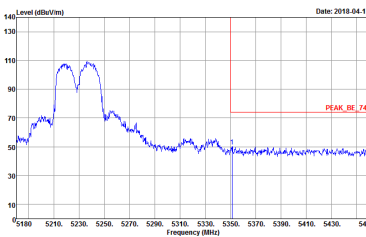
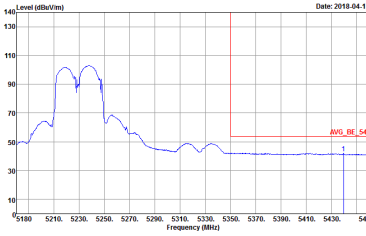


WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT40 CH46 5230MHz - L	
1+2	Horizontal	Fundamental
Peak	 Site : 03CH10-HY Condition : PEAK_BE_74 3m HORN 9120D-HF HORIZONTAL Detector : Peak Project : 831635	 Site : 03CH10-HY Condition : PEAK_74 3m HORN 9120D-HF HORIZONTAL Detector : Peak Project : 831635
Avg.	 Site : 03CH10-HY Condition : AVG_BE_54 3m HORN 9120D-HF HORIZONTAL Detector : Peak Project : 831635	Left blank

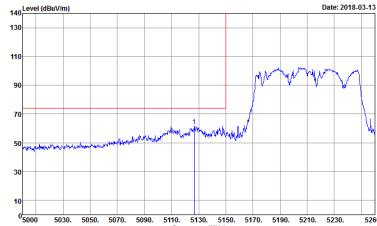
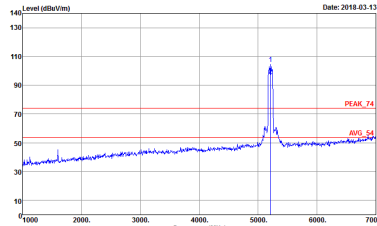
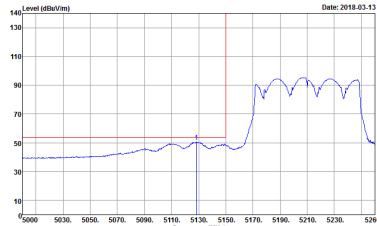
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT40 CH46 5230MHz - R	
1+2	Horizontal	Fundamental
Peak	 Site : 03CH10-HY Condition : PEAK_BE_74 3m HORN 9120D-HF HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 831635	Left blank
Avg.	 Site : 03CH10-HY Condition : AVG_BE_54 3m HORN 9120D-HF HORIZONTAL RBW:1000.000KHz VBW:1000KHz SWT:Auto Detector : Peak Project : 831635	Left blank

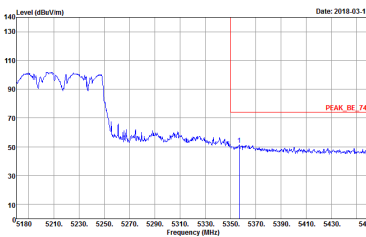
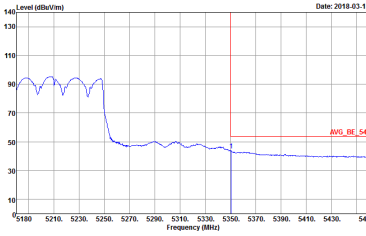


WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT40 CH46 5230MHz - L	
1+2	Vertical	Fundamental
Peak	 Site : 03CH10-HY Condition : PEAK_BE_74 3m HORN 9120D-HF VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak 831635	 Site : 03CH10-HY Condition : PEAK_74 3m HORN 9120D-HF VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak 831635
Avg.	 Site : 03CH10-HY Condition : AVG_BE_54 3m HORN 9120D-HF VERTICAL Detector : RBW:1000.000KHz VBW:1000KHz SWT:Auto Project : Peak 831635	Left blank

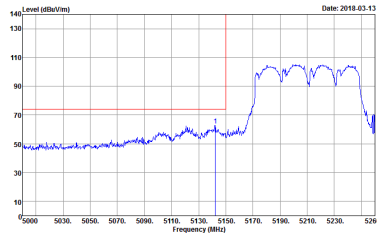
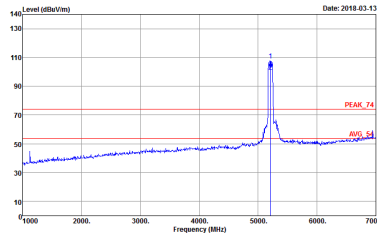
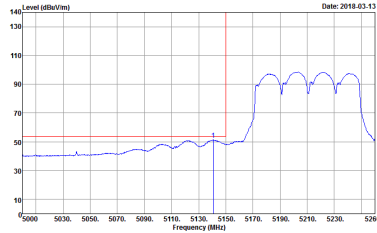
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT40 CH46 5230MHz - R	
1+2	Vertical	Fundamental
Peak	 Site : 03CH10-HY Condition : PEAK_BE_74 3m HORN 91200-HF VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 831635	Left blank
Avg.	 Site : 03CH10-HY Condition : AVG_BE_54 3m HORN 91200-HF VERTICAL RBW:1000.000KHz VBW:1000KHz SWT:Auto Detector : Peak Project : 831635	Left blank

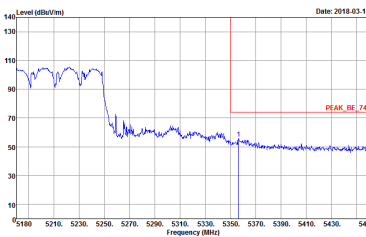
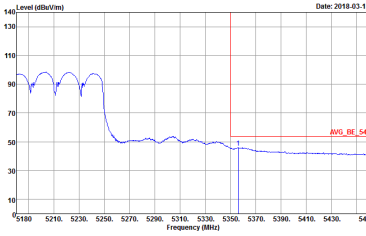
Band 1 5150~5250MHz
WIFI 802.11ac VHT80 (Band Edge @ 3m)

WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ac VHT80 CH42 5210MHz - L	
1+2	Horizontal	Fundamental
Peak	 Site : 03CH10-HY Condition : PEAK_BE_74 3m HORN 9120D-HF HORIZONTAL Detector : Peak Project : 831635 Setting : 18	 Site : 03CH10-HY Condition : PEAK_74 3m HORN 9120D-HF HORIZONTAL Detector : Peak Project : 831635 Setting : 18
Avg.	 Site : 03CH10-HY Condition : AVG_BE_54 3m HORN 9120D-HF HORIZONTAL Detector : Peak Project : 831635 Setting : 18	Left blank

WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ac VHT80 CH42 5210MHz - R	
1+2	Horizontal	Fundamental
Peak	 Site : 03CH10-HY Condition : PEAK_BE_74 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 831635 Setting : 18	Left blank
Avg.	 Site : 03CH10-HY Condition : AVG_BE_54 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 831635 Setting : 18	Left blank



WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ac VHT80 CH42 5210MHz - L	
1+2	Vertical	Fundamental
Peak	 Site : 03CH10-HY Condition : PEAK_BE_74 3m HORN 9120D-HF VERTICAL Detector : Peak Project : 831635 Setting : 18	 Site : 03CH10-HY Condition : PEAK_74 3m HORN 9120D-HF VERTICAL Detector : Peak Project : 831635 Setting : 18
Avg.	 Site : 03CH10-HY Condition : AVG_BE_54 3m HORN 9120D-HF VERTICAL Detector : Peak Project : 831635 Setting : 18	Left blank

WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ac VHT80 CH42 5210MHz - R	
1+2	Vertical	Fundamental
Peak	 Site : 03CH10-HY Condition : PEAK_BE_74 3m HORN 91200-HF VERTICAL Detector : Peak Project : 831635 Setting : 18	Left blank
Avg.	 Site : 03CH10-HY Condition : AVG_BE_54 3m HORN 91200-HF VERTICAL Detector : Peak Project : 831635 Setting : 18	Left blank



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

WIFI	Band 1 5150~5250MHz Harmonic @ 3m	
ANT	802.11a CH36 5180MHz	
1+2	Horizontal	Vertical
Peak Avg.	Site : 03CH10-HY Condition : PEAK_74 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 831635 Setting : 20.5	Site : 03CH10-HY Condition : PEAK_74 3m HORN 91200-HF VERTICAL Detector : Peak Project : 831635 Setting : 20.5



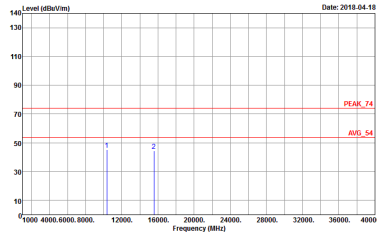
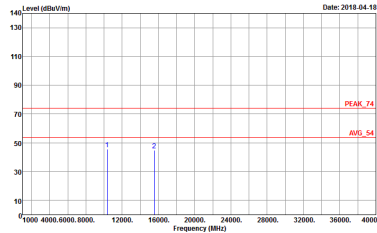
WIFI	Band 1 5150~5250MHz Harmonic @ 3m	
ANT	802.11a CH44 5220MHz	
1+2	Horizontal	Vertical
Peak Avg.	Level (dBuV/m) Date: 2018-04-18 PEAK_74 AVG_54 Site : 03CH10-11Y Condition : PEAK_74 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 831635	Level (dBuV/m) Date: 2018-04-18 PEAK_74 AVG_54 Site : 03CH10-11Y Condition : PEAK_74 3m HORN 91200-HF VERTICAL Detector : Peak Project : 831635



WIFI	Band 1 5150~5250MHz Harmonic @ 3m	
ANT	802.11a CH48 5240MHz	
1+2	Horizontal	Vertical
Peak Avg.	Level (dBuV/m) Date: 2018-04-18 Frequency (MHz) Site : 03CH10-11Y Condition : PEAK_74 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 831635	Level (dBuV/m) Date: 2018-04-18 Frequency (MHz) Site : 03CH10-11Y Condition : PEAK_74 3m HORN 91200-HF VERTICAL Detector : Peak Project : 831635



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

WIFI	Band 1 5150~5250MHz Harmonic @ 3m	
ANT	802.11n HT20 CH36 5180MHz	
1+2	Horizontal	Vertical
Peak Avg.	 Site : 03CH10-HY Condition : PEAK_74 3m HORN 9120D-HF HORIZONTAL Detector : Peak Project : 831635 Setting : Z1	 Site : 03CH10-HY Condition : PEAK_74 3m HORN 9120D-HF VERTICAL Detector : Peak Project : 831635 Setting : Z1



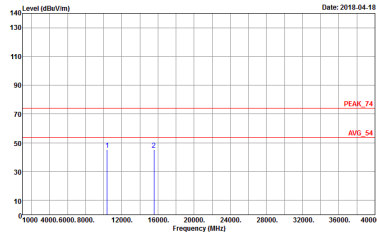
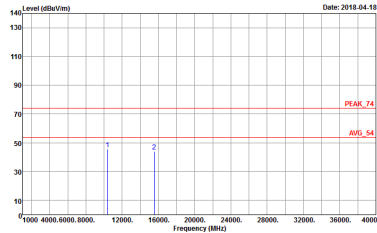
WIFI	Band 1 5150~5250MHz Harmonic @ 3m	
ANT	802.11n HT20 CH44 5220MHz	
1+2	Horizontal	Vertical
Peak Avg.	Level (dBuV/m) Date: 2018-04-18 Frequency (MHz) Site : 03CH10-11Y Condition : PEAK_74 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 831635	Level (dBuV/m) Date: 2018-04-18 Frequency (MHz) Site : 03CH10-11Y Condition : PEAK_74 3m HORN 91200-HF VERTICAL Detector : Peak Project : 831635



WIFI	Band 1 5150~5250MHz Harmonic @ 3m	
ANT	802.11n HT20 CH48 5240MHz	
1+2	Horizontal	Vertical
Peak Avg.	Level (dBuV/m) Date: 2018-04-18 Frequency (MHz) Site : 03CH10-11Y Condition : PEAK_74 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 831635	Level (dBuV/m) Date: 2018-04-18 Frequency (MHz) Site : 03CH10-11Y Condition : PEAK_74 3m HORN 91200-HF VERTICAL Detector : Peak Project : 831635



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

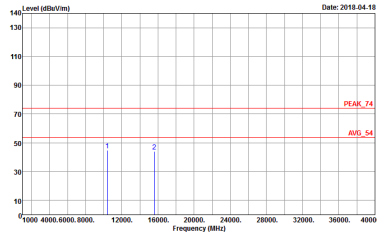
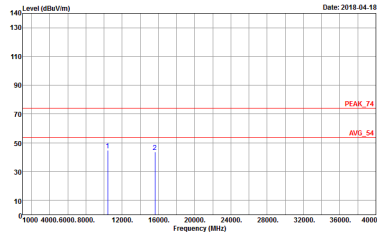
WIFI	Band 1 5150~5250MHz Harmonic @ 3m	
ANT	802.11n HT40 CH38 5190MHz	
1+2	Horizontal	Vertical
Peak Avg.	 Site : 03CH10-HY Condition : PEAK_74 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 831635 Setting : 18.5	 Site : 03CH10-HY Condition : PEAK_74 3m HORN 91200-HF VERTICAL Detector : Peak Project : 831635 Setting : 18.5



WIFI	Band 1 5150~5250MHz Harmonic @ 3m	
ANT	802.11n HT40 CH46 5230MHz	
1+2	Horizontal	Vertical
Peak Avg.	Level (dBuV/m) Date: 2018-04-18 Frequency (MHz) Site : 03CH10-11Y Condition : PEAK_74 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 831635	Level (dBuV/m) Date: 2018-04-18 Frequency (MHz) Site : 03CH10-11Y Condition : PEAK_74 3m HORN 91200-HF VERTICAL Detector : Peak Project : 831635

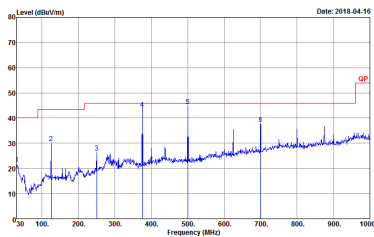
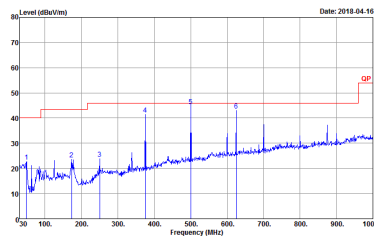


Band 1 5150~5250MHz
WIFI 802.11ac VHT80 (Harmonic @ 3m)

WIFI	Band 1 5150~5250MHz Harmonic @ 3m	
ANT	802.11ac VHT80 CH42 5210MHz	
1+2	Horizontal	Vertical
Peak Avg.	 Site : 03CH10-HY Condition : PEAK_74 3m HORN 9120D-HF HORIZONTAL Detector : Peak Project : 831635 Setting : 18	 Site : 03CH10-HY Condition : PEAK_74 3m HORN 9120D-HF VERTICAL Detector : Peak Project : 831635 Setting : 18



Emission below 1GHz
5GHz WIFI 802.11n HT20 (LF)

WIFI	5GHz WIFI	
ANT	802.11n HT20 LF	
1+2	Horizontal	Vertical
QP / Peak	 Site : 03CH10-HY Condition : QP 3m BE-LOG 6111D-LF HORIZONTAL Detector : Peak Project : 831635	 Site : 03CH10-HY Condition : QP 3m BE-LOG 6111D-LF VERTICAL Detector : Peak Project : 831635

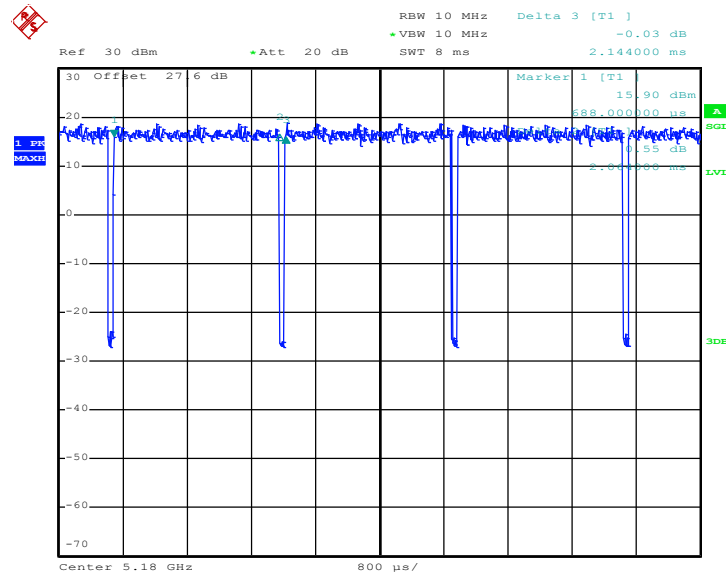
Appendix E. Duty Cycle Plots

Antenna	Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting	Duty Factor(dB)
1+2	802.11a for Ant. 1	96.27	2064.00	0.48	1kHz	0.17
1+2	802.11a for Ant. 2	96.63	2064.00	0.48	1kHz	0.15
1+2	5GHz 802.11n HT20 for Ant. 1	97.66	5000.00	0.20	300Hz	0.10
1+2	5GHz 802.11n HT20 for Ant. 2	97.64	4960.00	0.20	300Hz	0.10
1+2	5GHz 802.11n HT40 for Ant. 1	97.60	2440.00	0.41	1kHz	0.11
1+2	5GHz 802.11n HT40 for Ant. 2	97.60	2440.00	0.41	1kHz	0.11
1+2	5GHz 802.11ac VHT20 for Ant. 1	97.66	5000.00	0.20	300Hz	0.10
1+2	5GHz 802.11ac VHT20 for Ant. 2	97.66	5000.00	0.20	300Hz	0.10
1+2	5GHz 802.11ac VHT40 for Ant. 1	96.83	2440.00	0.41	1kHz	0.14
1+2	5GHz 802.11ac VHT40 for Ant. 2	96.81	2430.00	0.41	1kHz	0.14
1+2	5GHz 802.11ac VHT80 for Ant. 1	94.26	1150.00	0.87	1kHz	0.26
1+2	5GHz 802.11ac VHT80 for Ant. 2	94.26	1150.00	0.87	1kHz	0.26



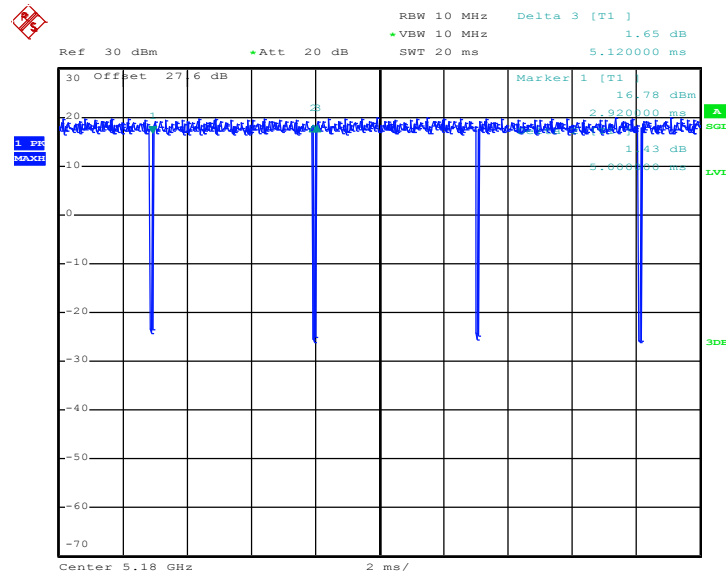
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802.11a



Date: 29.MAR.2018 03:04:17

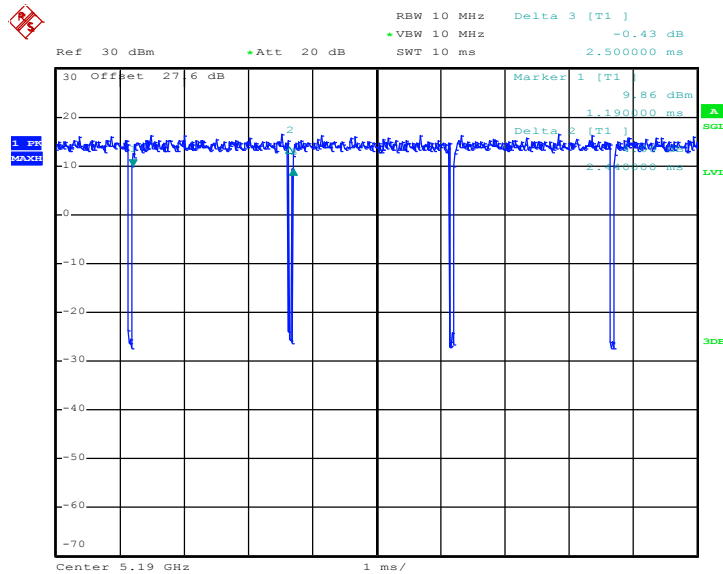
802.11n HT20



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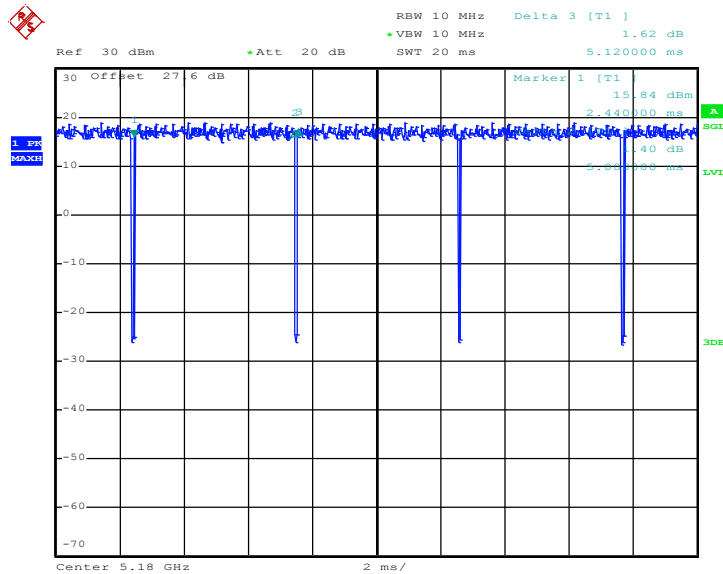


802.11n HT40



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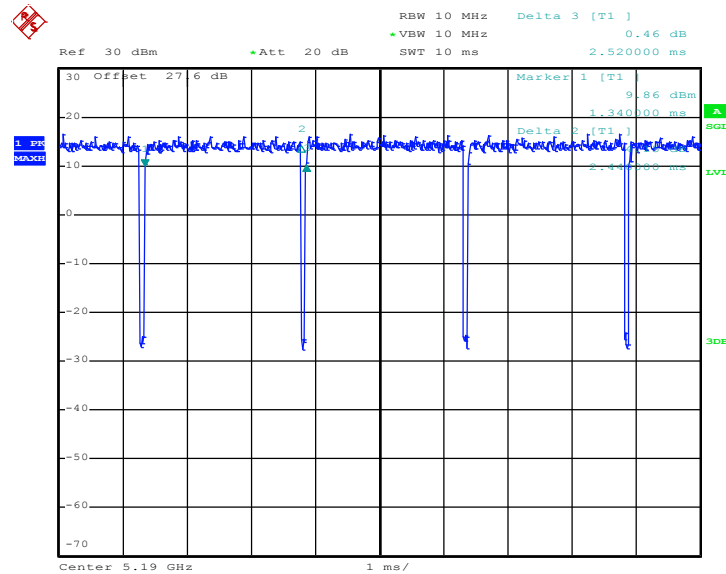
802.11ac VHT20



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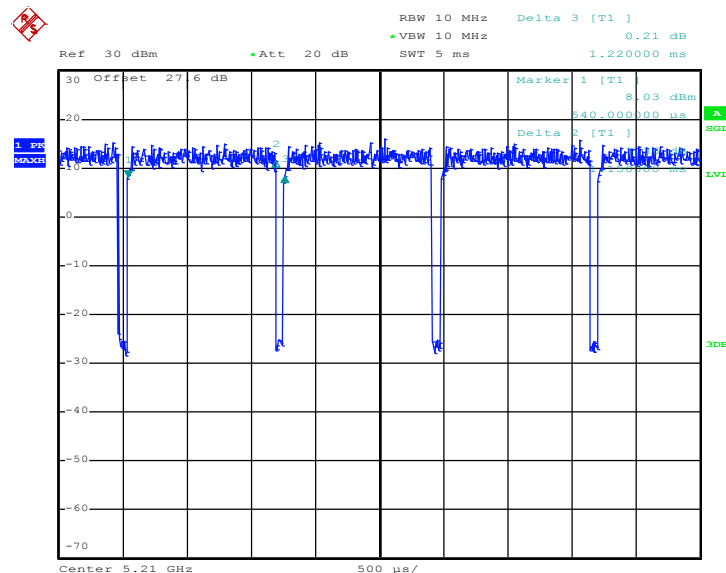


802.11ac VHT40

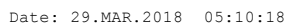
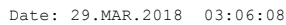


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802.11ac VHT80

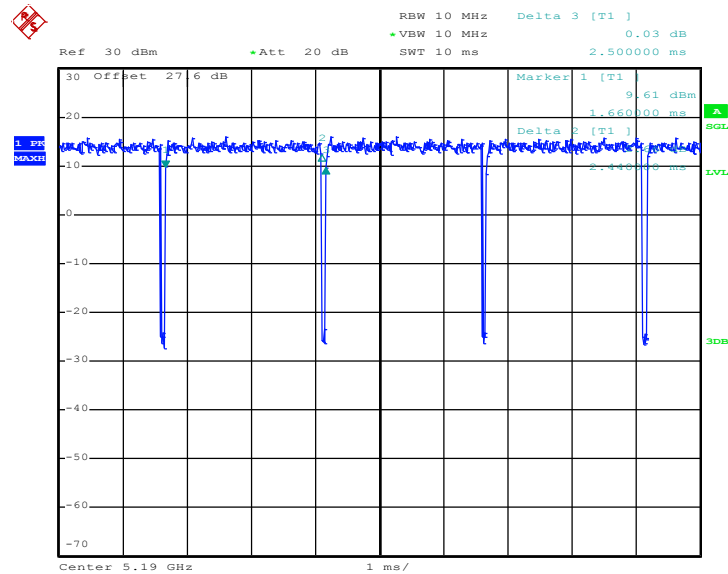


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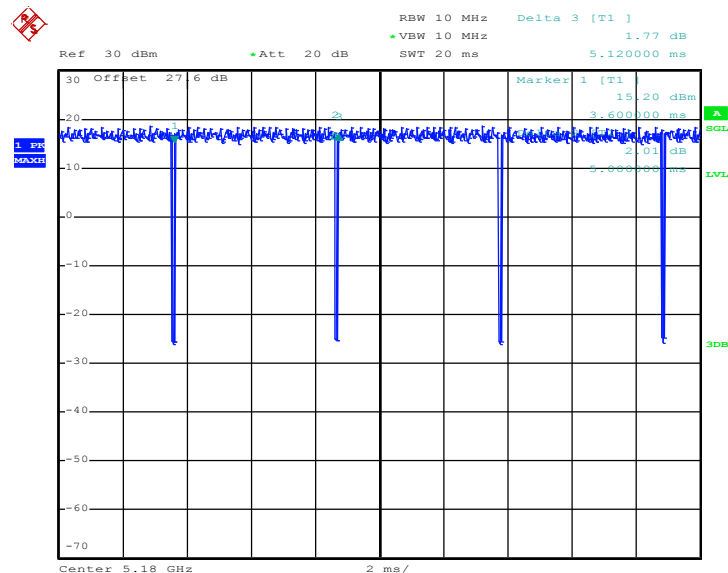


802.11n HT40



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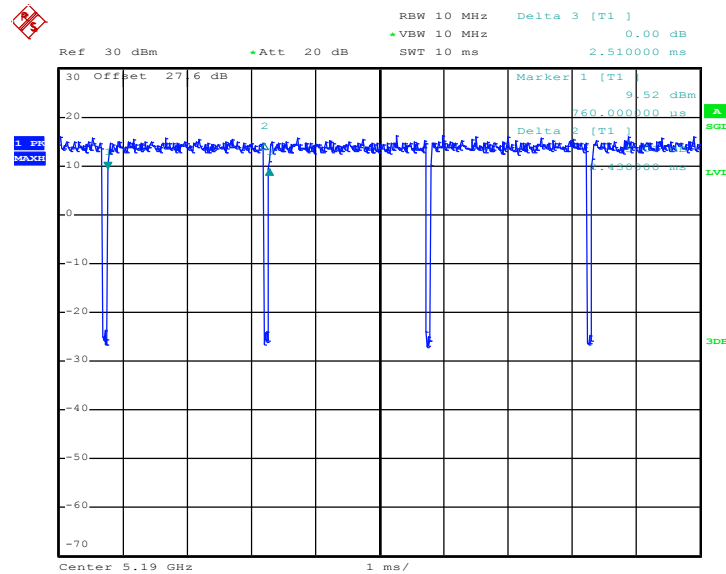
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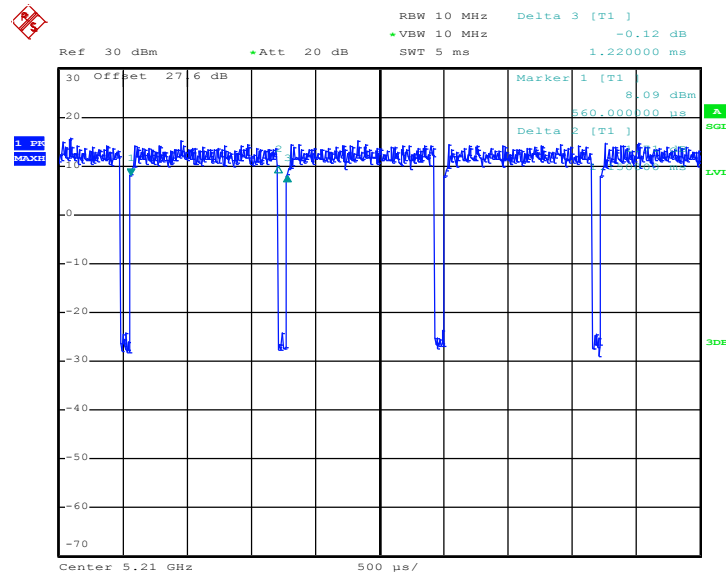


802.11ac VHT40



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802.11ac VHT80



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