



FCC RADIO TEST REPORT

FCC ID : PPD-QCNFA344AH
Equipment : 802.11a/b/g/n/ac + BT 4.1 M.2 2230 Type Card
Brand Name : Qualcomm Atheros
Model Name : QCNFA344A
Applicant : Qualcomm Atheros, Inc.
1700 Technology Drive, San Jose, CA 95110
Manufacturer : Qualcomm Atheros, Inc.
1700 Technology Drive, San Jose, CA 95110
Standard : FCC Part 15 Subpart E §15.407

Equipment: Qualcomm Atheros QCNFA344A tested inside of Lenovo Notebook Computer

The product was received on Jan. 07, 2020 and testing was started from Jan. 28, 2020 and completed on Mar. 18, 2020. We, SPORTON INTERNATIONAL INC., EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

The test results in this partial 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.

Louis Wu

Approved by: Louis Wu

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory

No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan



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History of this test report

Report No.	Version	Description	Issued Date
FR010908-05D	01	Initial issue of report	Mar. 19, 2020
FR010908-05D	02	Revise maximum output power in section 1.2	Apr. 06, 2020

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	15.407(a)	Maximum Conducted Output Power	Pass	-
3.2	15.407(b)	Unwanted Emissions	Pass	Under limit 0.14 dB at 5350.080 MHz
3.3	15.203 15.407(a)	Antenna Requirement	Pass	-

Note: The test plan for power measurement is designated by manufacturer as worst case for Test Lab. measurement. Then, all test cases are performed, based on the worst power measured by Test Lab, and reported accordingly

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

Reviewed by: Wii Chang

Report Producer: Vivian Hsu

1 General Description

1.1 Product Feature of Equipment Under Test

Product Feature	
Equipment	802.11a/b/g/n/ac + BT 4.1 M.2 2230 Type Card
Brand Name	Qualcomm Atheros
Model Name	QCNFA344A
FCC ID	PPD-QCNFA344AH
Sample 1	EUT with Host 1
Sample 2	EUT with Host 2
EUT supports Radios application	WLAN 11a/b/g/n HT20/HT40 WLAN 11ac VHT20/VHT40/VHT80 Bluetooth BR/EDR/LE
EUT Stage	Production Unit

Remark:

1. The above EUT's information was declared by manufacturer.
2. Equipment: Qualcomm Atheros QCNFA344A tested inside of Lenovo Notebook Computer.

The product was installed into Notebook Computer (Brand Name: Lenovo, Model Name: IdeaPad Flex 5 14ARE05) during test, and the host information was recorded in the following table.

Host Information	
Host 1	Host with AWAN Antenna
Host 2	Host with High-Tek Antenna

Antenna Information														
Antenna 1	Manufacturer			AWAN			Antenna 2	Manufacturer			AWAN			
	Ant. Type			PIFA				Ant. Type			PIFA			
	Part Number			025.901MZ.0001				Part Number			025.901N0.0001			
	Min Freq.	Max Freq.	Peak Gain (dBi)	Min Freq.	Max Freq.	Peak Gain (dBi)		Min Freq.	Max Freq.	Peak Gain (dBi)	Min Freq.	Max Freq.	Peak Gain (dBi)	
	2400 MHz	2483.5 MHz	1.23	5470 MHz	5725 MHz	-3.97		2400 MHz	2483.5 MHz	0.73	5470 MHz	5725 MHz	-2.16	
	5150 MHz	5250 MHz	-0.12	5725 MHz	5850 MHz	-3.33		5150 MHz	5250 MHz	-0.88	5725 MHz	5850 MHz	-0.77	
Antenna 1	Manufacturer			High-tek			Antenna 2	Manufacturer			High-tek			
	Ant. Type			PIFA				Ant. Type			PIFA			
	Part Number			025.901N3.0001				Part Number			025.901N4.0001			
	Min Freq.	Max Freq.	Peak Gain (dBi)	Min Freq.	Max Freq.	Peak Gain (dBi)		Min Freq.	Max Freq.	Peak Gain (dBi)	Min Freq.	Max Freq.	Peak Gain (dBi)	
	2400 MHz	2483.5 MHz	2.95	5470 MHz	5725 MHz	2.03		2400 MHz	2483.5 MHz	1.27	5470 MHz	5725 MHz	-0.76	
	5150 MHz	5250 MHz	1.24	5725 MHz	5850 MHz	2.54		5150 MHz	5250 MHz	0.83	5725 MHz	5850 MHz	-0.06	
Antenna 1	Manufacturer			High-tek			Antenna 2	Manufacturer			High-tek			
	Ant. Type			PIFA				Ant. Type			PIFA			
	Part Number			025.901N3.0001				Part Number			025.901N4.0001			
	Min Freq.	Max Freq.	Peak Gain (dBi)	Min Freq.	Max Freq.	Peak Gain (dBi)		Min Freq.	Max Freq.	Peak Gain (dBi)	Min Freq.	Max Freq.	Peak Gain (dBi)	
	2400 MHz	2483.5 MHz	2.95	5470 MHz	5725 MHz	2.03		2400 MHz	2483.5 MHz	1.27	5470 MHz	5725 MHz	-0.76	
	5150 MHz	5250 MHz	1.24	5725 MHz	5850 MHz	2.54		5150 MHz	5250 MHz	0.83	5725 MHz	5850 MHz	-0.06	
	5250 MHz	5350 MHz	0.5					5250 MHz	5350 MHz	0.83				
Remark: All the tests were performed with "High-tek Antenna" as representative.														

1.2 Product Specification of Equipment Under Test

Standards-related Product Specification			
Tx/Rx Frequency Range	5180 MHz ~ 5240 MHz 5260 MHz ~ 5320 MHz 5500 MHz ~ 5720 MHz		
Maximum Output Power	<5180 MHz ~ 5240 MHz> MIMO < Ant. 1+2> 802.11a : 14.72 dBm / 0.0296 W 802.11n HT20 : 14.62 dBm / 0.0290 W 802.11n HT40 : 14.72 dBm / 0.0296 W 802.11ac VHT20: 14.43 dBm / 0.0277 W 802.11ac VHT40: 14.62 dBm / 0.0290 W 802.11ac VHT80: 10.31 dBm / 0.0107 W <5260 MHz ~ 5320 MHz> MIMO < Ant. 1+2> 802.11a : 14.81 dBm / 0.0303 W 802.11n HT20 : 14.71 dBm / 0.0296 W 802.11n HT40 : 14.67 dBm / 0.0293 W 802.11ac VHT20: 14.61 dBm / 0.0289 W 802.11ac VHT40: 14.42 dBm / 0.0277 W 802.11ac VHT80: 13.06 dBm / 0.0202 W <5500 MHz ~ 5720 MHz> MIMO < Ant. 1+2> 802.11a : 15.51 dBm / 0.0356 W 802.11n HT20 : 15.41 dBm / 0.0348 W 802.11n HT40 : 15.41 dBm / 0.0348 W 802.11ac VHT20: 15.16 dBm / 0.0328 W 802.11ac VHT40: 15.12 dBm / 0.0325 W 802.11ac VHT80: 15.17 dBm / 0.0329 W		
Type of Modulation	802.11a/n : OFDM (BPSK/QPSK/16QAM/64QAM) 802.11ac : OFDM (BPSK/QPSK/16QAM/64QAM/256QAM)		
Antenna Function Description		Ant. 1	Ant. 2
	802.11 n/ac MIMO	V	V

Note: MIMO Ant. 1+2 is a calculated result from sum of the power MIMO Ant. 1 and MIMO Ant. 2.

1.3 Modification of EUT

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

1.4 Testing Location

Test Site	SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory
Test Site Location	No.52 , Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan
Test Site No.	Sporton Site No.
	TH05-HY

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

Test Site	SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory
Test Site Location	No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City, Taiwan
Test Site No.	Sporton Site No.
	03CH13-HY

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

FCC designation No.: TW1190 and TW0007

1.5 Applicable Standards

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

- ♦ FCC Part 15 Subpart E
- ♦ FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
- ♦ FCC KDB 414788 D01 Radiated Test Site v01r01.
- ♦ FCC KDB 662911 D01 Multiple Transmitter Output 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

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:, radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).

2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5150-5250 MHz Band 1 (U-NII-1)	36	5180	-	-
	38*	5190	-	-
	-	-	-	-
	42 [#]	5210	-	-
Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5250-5350 MHz Band 2 (U-NII-2A)	52	5260	-	-
	-	-	62*	5310
	-	-	64	5320
	58 [#]	5290	-	-
Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5470-5725 MHz Band 3 (U-NII-2C)	100	5500	-	-
	102*	5510	116	5580
	-	-	-	-
	106 [#]	5530	134*	5670
	-	-	-	-
	-	-	140	5700



Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
TDWR Channel	118*	5590	124	5620
	120	5600	126*	5630
	122 [#]	5610	128	5640

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
Straddle Channel	138 [#]	5690	144	5720
	142*	5710		

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.

MIMO Mode

Modulation	Data Rate
802.11a	6 Mbps
802.11n HT20	MCS0
802.11n HT40	MCS0
802.11ac VHT20	MCS0
802.11ac VHT40	MCS0
802.11ac VHT80	MCS0

Remark: For Radiated Test Cases, the tests were performed with Adapter 2, Battery 1.

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

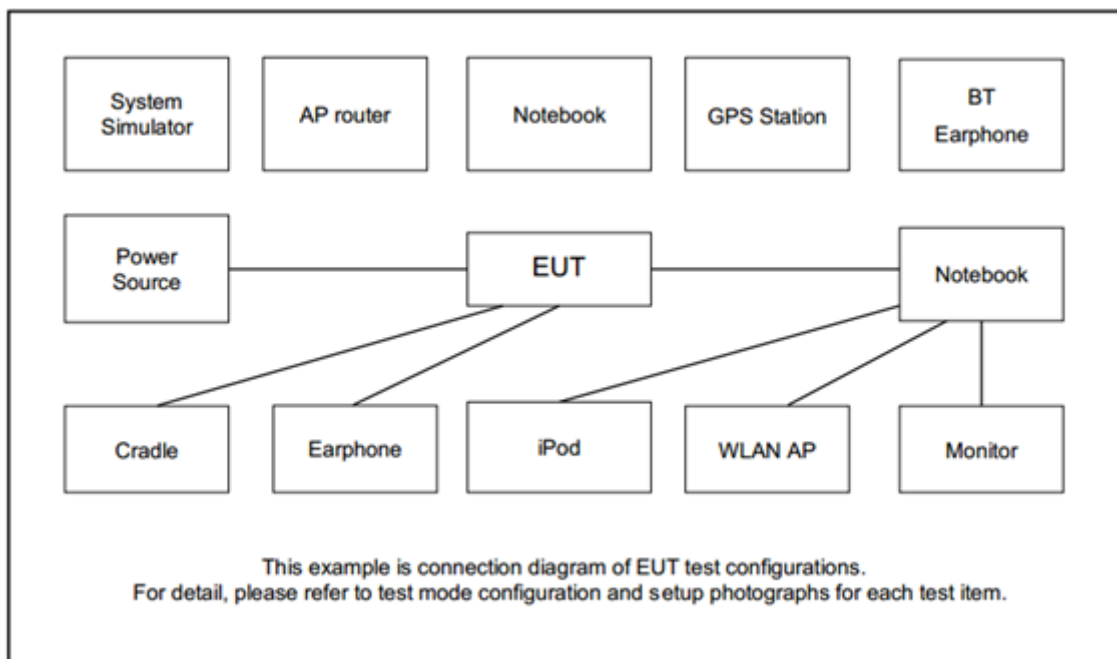
Ch. #		Band I : 5150-5250 MHz	Band II : 5250-5350 MHz	Band III : 5470-5725MHz
		802.11n HT40	802.11n HT40	802.11n HT40
L	Low	38	-	102
M	Middle	-	-	-
H	High	-	62	134

Ch. #		Band I : 5150-5250 MHz	Band II : 5250-5350 MHz	Band III : 5470-5725MHz
		802.11ac VHT80	802.11ac VHT80	802.11ac VHT80
L	Low	-	-	106
M	Middle	42	58	-
H	High	-	-	-

Remark:

1. For radiation spurious emission, the final modulation and the worst data rate was reference the max RF conducted power.
2. The test plans were by manufacturer definition.

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.	iPod Earphone	Apple	N/A	Verification	Unshielded, 1.0 m	N/A

2.5 EUT Operation Test Setup

The RF test items, utility "QCARCT_V3.0 169.0" was installed in EUT 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.

3 Test Result

3.1 Maximum Conducted Output Power Measurement

3.1.1 Limit of Maximum Conducted Output Power

<FCC 14-30 CFR 15.407>

For the 5.15–5.25 GHz bands:

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

For the 5.25–5.725 GHz bands:

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

For Straddle Channel, according to KDB 789033 D02 General UNII Test Procedures New Rules v02r01, if the power and PSD of the devices are uniform and comply with the lower limits specified for the U-NII-2 bands, a single measurement over the entire emission bandwidth can be performed to show compliance.

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.

3.1.2 Measuring Instruments

See list of measuring equipment of this test report.

3.1.3 Test Procedures

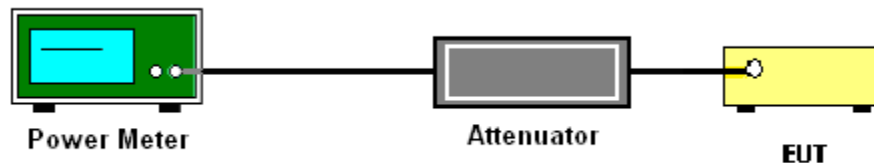
The testing follows Method PM-G of FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.

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

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

For Straddle Channel, according to KDB 789033 D02 General UNII Test Procedures New Rules v02r01, if the power and PSD of the devices are uniform and comply with the lower limits specified for the U-NII-2 bands, a single measurement over the entire emission bandwidth can be performed to show compliance.

3.1.4 Test Setup



3.1.5 Test Result of Maximum Conducted Output Power

Please refer to Appendix A.

3.2 Unwanted Emissions Measurement

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

3.2.1 Limit of Unwanted Emissions

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

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

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

- (2) Unwanted spurious emissions fallen in restricted bands shall comply with the general field strength limits as below table:

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

Note: The following formula is used to convert the EIRP to field strength.

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



EIRP (dBm)	Field Strength at 3m (dBμV/m)
- 27	68.3

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

- (i) Sections 15.407(b)(1-3) specifies the unwanted emissions limit 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.
- (ii) Section 15.407(b)(4) specifies the unwanted emissions limit for the U-NII-3 band. A band emissions mask is specified in Section 15.407(b)(4)(i). The emission limits are based on the use of a peak detector.

3.2.2 Measuring Instruments

See list of measuring equipment of this test report.

3.2.3 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 Peak Unwanted Emissions Measurements Above 1000 MHz

- RBW = 1 MHz
- VBW $\geq$ 3 MHz
- Detector = Peak
- Sweep time = auto
- Trace mode = max hold

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

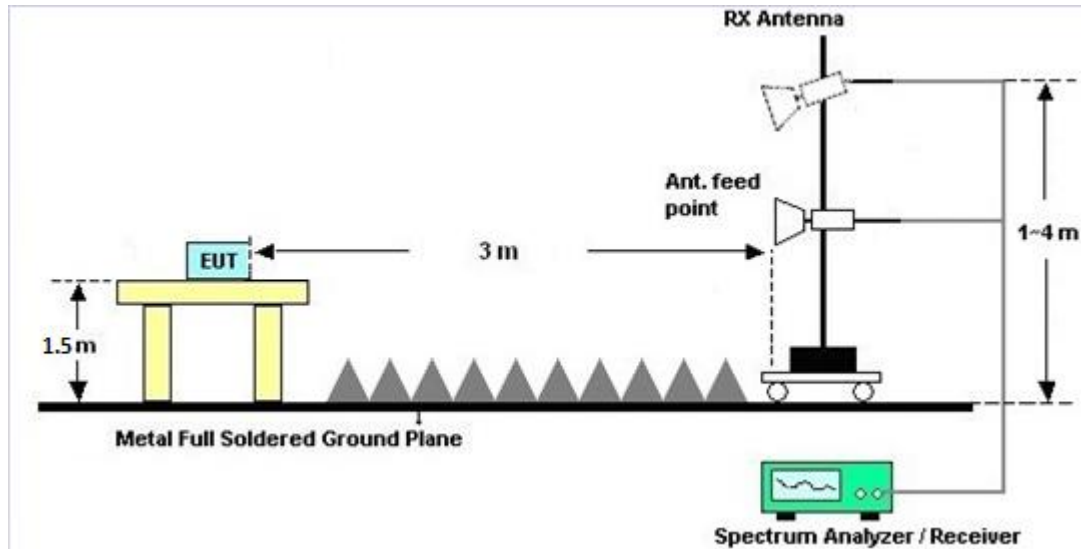
- RBW = 1 MHz
- VBW = 10 Hz, when duty cycle is no less than 98 percent.
- VBW $\geq$ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.



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.

3.2.4 Test Setup

For radiated emissions above 1GHz



3.2.5 Test Results of Radiated Spurious Emissions

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

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

3.2.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix B and C.

3.2.7 Duty Cycle

Please refer to Appendix D.

3.2.8 Test Result of Radiated Spurious Emissions

Please refer to Appendix B and C.

3.3 Antenna Requirements

3.3.1 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.

3.3.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.3.3 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.

			DG for Power (dBi)	DG for PSD (dBi)	Power Limit Reduction (dB)	PSD Limit Reduction (dB)
	Ant. 1 (dBi)	Ant. 2 (dBi)				
Band I	1.24	0.83	1.24	4.05	0.00	0.00
Band II	0.50	0.83	0.83	3.68	0.00	0.00
Band III	2.03	-0.76	2.03	3.76	0.00	0.00

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

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



4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Hygrometer	Testo	608-H2	41410069	N/A	Jun. 17, 2019	Jan. 28, 2020~ Mar. 15, 2020	Jun. 16, 2020	Conducted (TH05-HY)
Power Sensor	DARE	RPR3006W	16I00054S NO10	10MHz~6GHz	Dec. 23, 2019	Jan. 28, 2020~ Mar. 15, 2020	Dec. 22, 2020	Conducted (TH05-HY)
Signal Analyzer	Rohde & Schwarz	FSV40	101566	10Hz~40GHz	Jul. 15, 2019	Jan. 28, 2020~ Mar. 15, 2020	Jul. 14, 2020	Conducted (TH05-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP40	100055	9kHz-40GHz	Aug. 14, 2019	Jan. 28, 2020~ Mar. 15, 2020	Aug. 13, 2020	Conducted (TH05-HY)
Switch Box & RF Cable	Burgeon	ETF-058	EC120838 2	N/A	Mar. 27, 2019	Jan. 28, 2020~ Mar. 15, 2020	Mar. 26, 2020	Conducted (TH05-HY)
Horn Antenna	SCHWARZBE CK	BBHA 9120 D	9120D-124 1	1GHz ~ 18GHz	Jul. 02, 2019	Feb. 13, 2020~ Mar. 18, 2020	Jul. 01, 2020	Radiation (03CH13-HY)
SHF-EHF Horn Antenna	SCHWARZBE CK	BBHA 9170	BBHA9170 576	18GHz- 40GHz	May 14, 2019	Feb. 13, 2020~ Mar. 18, 2020	May 13, 2020	Radiation (03CH13-HY)
Preamplifier	Keysight	83017A	MY532701 47	1GHz~26.5GHz	Mar. 15, 2019	Feb. 13, 2020~ Feb. 14, 2020	Mar. 14, 2020	Radiation (03CH13-HY)
Preamplifier	MITEQ	AMF-7D-0010 1800-30-10P	1590074	1GHz~18GHz	May 20, 2019	Feb. 13, 2020~ Mar. 18, 2020	May 19, 2020	Radiation (03CH13-HY)
Preamplifier	EMEC	EM18G40G	060715	18GHz ~ 40GHz	Dec. 13, 2019	Feb. 13, 2020~ Mar. 18, 2020	Dec. 12, 2020	Radiation (03CH13-HY)
Spectrum Analyzer	Keysight	N9010A	MY553705 26	10Hz~44GHz	Mar. 19, 2019	Feb. 13, 2020~ Feb. 14, 2020	Mar. 18, 2020	Radiation (03CH13-HY)
Spectrum Analyzer	Keysight	N9010A	MY542004 86	10Hz~44GHz	Oct. 28, 2019	Mar. 18, 2020	Oct. 27, 2020	Radiation (03CH13-HY)
Controller	EMEC	EM1000	N/A	Control Turn table & Ant Mast	N/A	Feb. 13, 2020~ Mar. 18, 2020	N/A	Radiation (03CH13-HY)
Antenna Mast	EMEC	AM-BS-4500- B	N/A	1m~4m	N/A	Feb. 13, 2020~ Mar. 18, 2020	N/A	Radiation (03CH13-HY)
Turn Table	EMEC	TT2000	N/A	0~360 Degree	N/A	Feb. 13, 2020~ Mar. 18, 2020	N/A	Radiation (03CH13-HY)
Software	AUDIX	E3 6.2009-8-24c	RK-001124	N/A	N/A	Feb. 13, 2020~ Mar. 18, 2020	N/A	Radiation (03CH13-HY)
Filter	Wainwright	WHKX8-5872. 5-6750-18000 -40ST	SN5	6.75GHz High Pass Filter	Mar. 13, 2019	Feb. 13, 2020~ Feb. 14, 2020	Mar. 12, 2020	Radiation (03CH13-HY)
Filter	Wainwright	WHKX8-5872. 5-6750-18000 -40SS	SN3	6.75GHz High Pass Filter	Sep. 16, 2019	Mar. 18, 2020	Sep. 15, 2020	Radiation (03CH13-HY)



5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.5
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Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.8
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Appendix A. Test Result of Conducted Test Items

Test Engineer:	Rebecca Lee	Temperature:	21~25	°C
Test Date:	2020/1/28~2020/03/15	Relative Humidity:	51~54	%

TEST RESULTS DATA
Average Power Table

TEST RESULTS DATA
Average Power Table

FCC Band II MIMO													
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Conducted Power (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)		EIRP Power Limit (dBm)	Pass/Fail
					Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2		
11a	6Mbps	2	52	5260	11.90	11.30	14.62	23.98		0.83		26.99	Pass
11a	6Mbps	2	60	5300	11.80	11.50	14.66	23.98		0.83		26.99	Pass
11a	6Mbps	2	64	5320	12.00	11.60	14.81	23.98		0.83		26.99	Pass
HT20	MCS0	2	52	5260	11.70	11.20	14.47	23.98		0.83		26.99	Pass
HT20	MCS0	2	60	5300	11.70	11.40	14.56	23.98		0.83		26.99	Pass
HT20	MCS0	2	64	5320	11.90	11.50	14.71	23.98		0.83		26.99	Pass
HT40	MCS0	2	54	5270	11.90	11.40	14.67	23.98		0.83		26.99	Pass
HT40	MCS0	2	62	5310	11.70	11.50	14.61	23.98		0.83		26.99	Pass
VHT20	MCS0	2	52	5260	11.60	11.10	14.37	23.98		0.83		26.99	Pass
VHT20	MCS0	2	60	5300	11.60	11.10	14.37	23.98		0.83		26.99	Pass
VHT20	MCS0	2	64	5320	11.80	11.40	14.61	23.98		0.83		26.99	Pass
VHT40	MCS0	2	54	5270	11.70	11.10	14.42	23.98		0.83		26.99	Pass
VHT40	MCS0	2	62	5310	11.50	11.20	14.36	23.98		0.83		26.99	Pass
VHT80	MCS0	2	58	5290	10.00	10.10	13.06	23.98		0.83		26.99	Pass

TEST RESULTS DATA
Average Power Table

FCC Band III MIMO													
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Conducted Power (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)		EIRP Power Limit (dBm)	Pass/Fail
					Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2		
11a	6Mbps	2	100	5500	12.50	11.90	15.22	23.98		2.03		26.99	Pass
11a	6Mbps	2	116	5580	12.50	11.80	15.17	23.98		2.03		26.99	Pass
11a	6Mbps	2	140	5700	12.50	12.00	15.27	23.98		2.03		26.99	Pass
HT20	MCS0	2	100	5500	12.40	11.80	15.12	23.98		2.03		26.99	Pass
HT20	MCS0	2	116	5580	12.20	11.70	14.97	23.98		2.03		26.99	Pass
HT20	MCS0	2	140	5700	12.20	12.00	15.11	23.98		2.03		26.99	Pass
HT40	MCS0	2	102	5510	9.50	9.10	12.31	23.98		2.03		26.99	Pass
HT40	MCS0	2	110	5550	12.50	11.90	15.22	23.98		2.03		26.99	Pass
HT40	MCS0	2	134	5670	12.50	12.30	15.41	23.98		2.03		26.99	Pass
VHT20	MCS0	2	100	5500	12.30	11.40	14.88	23.98		2.03		26.99	Pass
VHT20	MCS0	2	116	5580	12.00	11.30	14.67	23.98		2.03		26.99	Pass
VHT20	MCS0	2	140	5700	12.00	11.80	14.91	23.98		2.03		26.99	Pass
VHT40	MCS0	2	102	5510	9.40	9.00	12.21	23.98		2.03		26.99	Pass
VHT40	MCS0	2	110	5550	12.40	11.80	15.12	23.98		2.03		26.99	Pass
VHT40	MCS0	2	134	5670	12.40	11.70	15.07	23.98		2.03		26.99	Pass
VHT80	MCS0	2	106	5530	9.10	8.00	11.60	23.98		2.03		26.99	Pass
VHT80	MCS0	2	122	5610	12.30	12.00	15.16	23.98		2.03		26.99	Pass

FCC Band III straddle channel MIMO													
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Conducted Power (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)		EIRP Power Limit (dBm)	Pass/Fail
					Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2		
11a	6Mbps	2	144	5720	12.50	12.50	15.51	23.98		2.03		26.99	Pass
HT20													



Appendix B. Radiated Spurious Emission

Test Engineer :	Jummy Chung, Karl Hou, Wilson Wu	Temperature :	21.5~23.5°C
		Relative Humidity :	49.5~55.5%



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		5134.42	59.34	-14.66	74	47.98	32	6.06	26.7	320	144	P	H
		5149.76	48.77	-5.23	54	37.41	32	6.06	26.7	320	144	A	H
	*	5180	108.71	-	-	97.52	31.82	6.07	26.7	320	144	P	H
	*	5180	101.5	-	-	90.31	31.82	6.07	26.7	320	144	A	H
													H
													H
		5150	55.97	-18.03	74	44.6	32	6.07	26.7	400	151	P	V
		5149.24	48.88	-5.12	54	37.52	32	6.06	26.7	400	151	A	V
	*	5180	108.3	-	-	97.11	31.82	6.07	26.7	400	151	P	V
	*	5180	100.75	-	-	89.56	31.82	6.07	26.7	400	151	A	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		5149.5	61.79	-12.21	74	50.41	32	6.08	26.7	353	148	P	H
		5150	52.48	-1.52	54	41.1	32	6.08	26.7	353	148	A	H
	*	5190	101.43	-	-	90.27	31.76	6.1	26.7	353	148	P	H
	*	5190	94.27	-	-	83.11	31.76	6.1	26.7	353	148	A	H
		5390.56	51.36	-22.64	74	40.37	31.56	6.12	26.69	353	148	P	H
		5457.76	42.61	-11.39	54	31.3	31.82	6.18	26.69	353	148	A	H
		5150	58.02	-15.98	74	46.64	32	6.08	26.7	329	164	P	V
		5149.5	52.05	-1.95	54	40.67	32	6.08	26.7	329	164	A	V
	*	5190	100.7	-	-	89.54	31.76	6.1	26.7	329	164	P	V
	*	5190	93.21	-	-	82.05	31.76	6.1	26.7	329	164	A	V
		5446	50.04	-23.96	74	38.78	31.78	6.17	26.69	329	164	P	V
		5440.96	42.56	-11.44	54	31.33	31.76	6.16	26.69	329	164	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 (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		5146.12	60.69	-13.31	74	49.31	32	6.08	26.7	351	147	P	H
		5144.82	52.84	-1.16	54	41.46	32	6.08	26.7	351	147	A	H
	*	5210	97.16	-	-	86.11	31.64	6.11	26.7	351	147	P	H
	*	5210	89.34	-	-	78.29	31.64	6.11	26.7	351	147	A	H
		5430.32	50.57	-23.43	74	39.39	31.72	6.15	26.69	351	147	P	H
		5351.36	43.09	-10.91	54	32.26	31.41	6.12	26.7	351	147	A	H
		5146.64	58.9	-15.1	74	47.52	32	6.08	26.7	329	164	P	V
		5147.42	51.9	-2.1	54	40.52	32	6.08	26.7	329	164	A	V
	*	5210	96.5	-	-	85.45	31.64	6.11	26.7	329	164	P	V
	*	5210	87.92	-	-	76.87	31.64	6.11	26.7	329	164	A	V
		5454.96	51.17	-22.83	74	39.88	31.81	6.17	26.69	329	164	P	V
		5452.16	42.88	-11.12	54	31.6	31.8	6.17	26.69	329	164	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 2 - 5250~5350MHz

WIFI 802.11a (Band Edge @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a CH 64 5320MHz	*	5320	106.36	-	-	95.49	31.4	6.17	26.7	400	134	P	H
	*	5320	98.9	-	-	88.03	31.4	6.17	26.7	400	134	A	H
		5351.52	56.14	-17.86	74	45.23	31.41	6.2	26.7	400	134	P	H
		5351.36	46.68	-7.32	54	35.77	31.41	6.2	26.7	400	134	A	H
													H
													H
	*	5320	106.94	-	-	96.07	31.4	6.17	26.7	312	157	P	V
	*	5320	99.59	-	-	88.72	31.4	6.17	26.7	312	157	A	V
		5350.08	59.18	-14.82	74	48.28	31.4	6.2	26.7	312	157	P	V
		5350.24	47.93	-6.07	54	37.03	31.4	6.2	26.7	312	157	A	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

**Band 2 5250~5350MHz****WIFI 802.11a (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 52 5260MHz		10520	49.16	-19.04	68.2	56.06	39.98	10	56.88	100	0	P	H
		15780	45.49	-28.51	74	50.97	38.1	12.78	56.36	100	0	P	H
													H
													H
		10520	50.27	-17.93	68.2	57.17	39.98	10	56.88	100	0	P	V
		15780	45.22	-28.78	74	50.7	38.1	12.78	56.36	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

**Band 2 5250~5350MHz****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 62 5310MHz		5053.04	51.25	-22.75	74	40.09	31.81	6.06	26.71	333	142	P	H
		5143.48	43.53	-10.47	54	32.17	32	6.06	26.7	333	142	A	H
	*	5310	105.02	-	-	94.16	31.4	6.16	26.7	333	142	P	H
	*	5310	98.01	-	-	87.15	31.4	6.16	26.7	333	142	A	H
		5353.44	64.58	-9.42	74	53.67	31.41	6.2	26.7	333	142	P	H
		5351.28	53.76	-0.24	54	42.85	31.41	6.2	26.7	333	142	A	H
		5000.68	51.89	-22.11	74	40.95	31.6	6.05	26.71	325	157	P	V
		5051.34	43.43	-10.57	54	32.27	31.81	6.06	26.71	325	157	A	V
	*	5310	102.73	-	-	91.87	31.4	6.16	26.7	325	157	P	V
	*	5310	95.72	-	-	84.86	31.4	6.16	26.7	325	157	A	V
		5350.8	67.83	-6.17	74	56.93	31.4	6.2	26.7	325	157	P	V
		5350.8	52.68	-1.32	54	41.78	31.4	6.2	26.7	325	157	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

**Band 2 5250~5350MHz****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 58 5290MHz		5072.42	53.19	-20.81	74	41.97	31.89	6.04	26.71	340	145	P	H
		5149.94	45.56	-8.44	54	34.18	32	6.08	26.7	340	145	A	H
	*	5290	100.24	-	-	89.43	31.4	6.11	26.7	340	145	P	H
	*	5290	92.89	-	-	82.08	31.4	6.11	26.7	340	145	A	H
		5351.52	63.57	-10.43	74	52.74	31.41	6.12	26.7	340	145	P	H
		5350.08	53.86	-0.14	54	43.04	31.4	6.12	26.7	340	145	A	H
		5148.58	53.07	-20.93	74	41.69	32	6.08	26.7	334	162	P	V
		5147.22	45.44	-8.56	54	34.06	32	6.08	26.7	334	162	A	V
	*	5290	98.94	-	-	88.13	31.4	6.11	26.7	334	162	P	V
	*	5290	91.1	-	-	80.29	31.4	6.11	26.7	334	162	A	V
		5352.72	59.44	-14.56	74	48.61	31.41	6.12	26.7	334	162	P	V
		5350.08	52.53	-1.47	54	41.71	31.4	6.12	26.7	334	162	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

**Band 2 5250~5350MHz****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 58 5290MHz		10580	46.71	-21.49	68.2	53.6	39.92	10.03	56.84	100	0	P	H
		15870	45.08	-28.92	74	50.7	37.82	12.82	56.26	100	0	P	H
													H
													H
		10580	47.37	-20.83	68.2	54.26	39.92	10.03	56.84	100	0	P	V
		15870	44.49	-29.51	74	50.11	37.82	12.82	56.26	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

**Band 3 - 5470~5725MHz****WIFI 802.11a (Harmonic @ 3m)**

WIFI Ant. 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 116 5580MHz		11160	48.79	-25.21	74	55.01	39.92	10.3	56.44	100	0	P	H
		16740	47.55	-20.65	68.2	50.6	40.1	12.74	55.89	100	0	P	H
													H
													H
		11160	48.82	-25.18	74	55.04	39.92	10.3	56.44	100	0	P	V
		16740	47.4	-20.8	68.2	50.45	40.1	12.74	55.89	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 3 - 5470~5725MHz
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 102 5510MHz		5449.6	61.99	-12.01	74	50.71	31.8	6.17	26.69	355	144	P	H
		5466.4	65.94	-2.26	68.2	54.61	31.83	6.19	26.69	355	144	P	H
		5459.92	48.22	-5.78	54	36.91	31.82	6.18	26.69	355	144	A	H
	*	5510	104.07	-	-	92.64	31.9	6.23	26.7	355	144	P	H
	*	5510	96.24	-	-	84.81	31.9	6.23	26.7	355	144	A	H
		5749.565	51.56	-16.64	68.2	39.89	32.2	6.38	26.91	355	144	P	H
		5412.4	54.76	-19.24	74	43.67	31.65	6.13	26.69	337	157	P	V
		5469.52	57.35	-10.85	68.2	46.01	31.84	6.19	26.69	337	157	P	V
		5458.24	46.95	-7.05	54	35.64	31.82	6.18	26.69	337	157	A	V
	*	5510	102.22	-	-	90.79	31.9	6.23	26.7	337	157	P	V
	*	5510	94.19	-	-	82.76	31.9	6.23	26.7	337	157	A	V
		5753.345	51.58	-16.62	68.2	39.9	32.21	6.38	26.91	337	157	P	V
802.11n HT40 CH 134 5670MHz		5371	49.88	-24.12	74	38.88	31.48	6.22	26.7	285	148	P	H
		5460.95	48.9	-19.3	68.2	37.51	31.82	6.26	26.69	285	148	P	H
		5453.95	42.74	-11.26	54	31.36	31.81	6.26	26.69	285	148	A	H
	*	5670	105.56	-	-	94.14	31.88	6.38	26.84	285	148	P	H
	*	5670	99.02	-	-	87.6	31.88	6.38	26.84	285	148	A	H
		5732.87	51.3	-16.9	68.2	39.6	32.13	6.46	26.89	285	148	P	H
		5454.65	50.06	-23.94	74	38.68	31.81	6.26	26.69	400	168	P	V
		5465.85	48.48	-19.72	68.2	37.08	31.83	6.26	26.69	400	168	P	V
		5457.45	42.4	-11.6	54	31.02	31.81	6.26	26.69	400	168	A	V
	*	5670	100.45	-	-	89.03							



Band 3 - 5470~5725MHz
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 106 5530MHz		5458.96	61.05	-12.95	74	49.74	31.82	6.18	26.69	351	142	P	H
		5469.04	62.44	-5.76	68.2	51.1	31.84	6.19	26.69	351	142	P	H
		5459.92	53.65	-0.35	54	42.34	31.82	6.18	26.69	351	142	A	H
	*	5530	101.01	-	-	89.58	31.9	6.25	26.72	351	142	P	H
	*	5530	92.7	-	-	81.27	31.9	6.25	26.72	351	142	A	H
		5749.565	51.52	-16.68	68.2	39.85	32.2	6.38	26.91	351	142	P	H
		5459.92	59.4	-14.6	74	48.09	31.82	6.18	26.69	354	158	P	V
		5467.12	61.68	-6.52	68.2	50.35	31.83	6.19	26.69	354	158	P	V
		5459.92	52.28	-1.72	54	40.97	31.82	6.18	26.69	354	158	A	V
	*	5530	99.66	-	-	88.23	31.9	6.25	26.72	354	158	P	V
	*	5530	90.61	-	-	79.18	31.9	6.25	26.72	354	158	A	V
		5730.035	51.8	-16.4	68.2	40.2	32.12	6.37	26.89	354	158	P	V
802.11ac VHT80 CH 122 5610MHz		5412.3	51.96	-22.04	74	40.76	31.65	6.24	26.69	283	148	P	H
		5466.9	54.29	-13.91	68.2	42.89	31.83	6.26	26.69	283	148	P	H
		5456.4	45.56	-8.44	54	34.18	31.81	6.26	26.69	283	148	A	H
	*	5610	103.05	-	-	91.73	31.8	6.31	26.79	283	148	P	H
	*	5610	97.33	-	-	86.01	31.8	6.31	26.79	283	148	A	H
		5760.59	55.6	-12.6	68.2	43.81	32.22	6.49	26.92	283	148	P	H
		5451.85	50.75	-23.25	74	39.38	31.8	6.26	26.69	320	152	P	V
		5468.3	51.29	-16.91	68.2	39.88	31.84	6.26	26.69	320	152	P	V
		5458.85	44.66	-9.34	54	33.27	31.82	6.26	26.69	320	152	A	V
	*	5610											



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”.



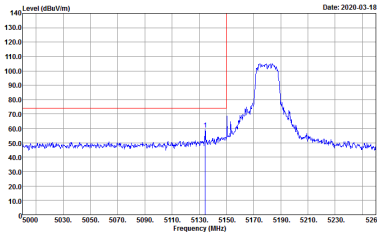
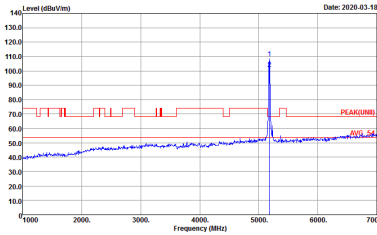
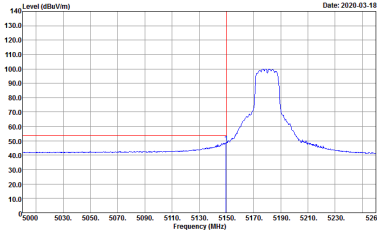
Appendix C. Radiated Spurious Emission

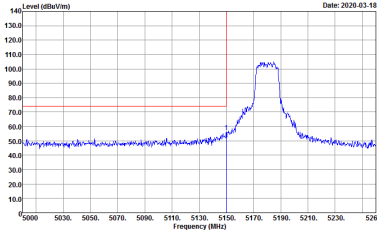
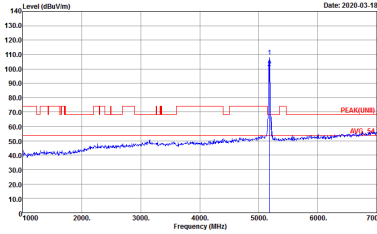
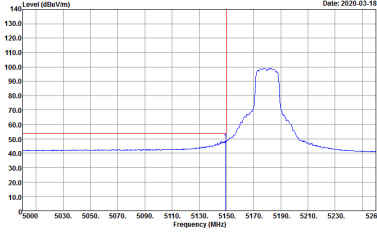
Test Engineer :	Jummy Chung, Karl Hou, Wilson Wu	Temperature :	21.5~23.5°C
		Relative Humidity :	49.5~55.5%

Note symbol

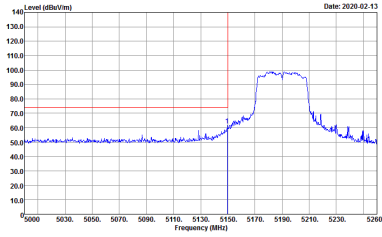
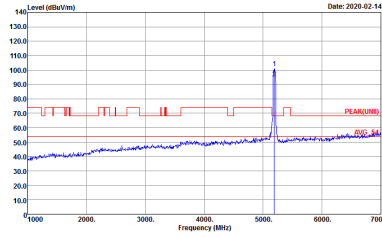
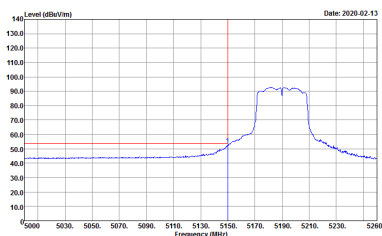
-L	Low channel location
-R	High channel location

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

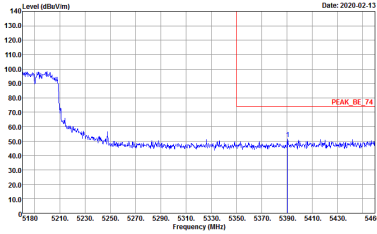
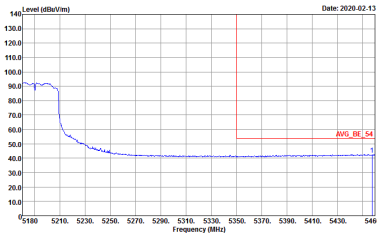
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11a CH36 5180MHz	
1+2	Horizontal	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1241 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 010908-05 Power : 13 Mode : 11a_Ch36	 Site : 03CH13-HY Condition : PEAK(UNIT) 3m HORN_91200_1241 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 010908-05 Power : 13 Mode : 11a_Ch36
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_91200_1241 HORIZONTAL RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 010908-05 Power : 13 Mode : 11a_Ch36	Left blank

WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11a CH36 5180MHz	
1+2	Vertical	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1241 VERTICAL Detector : Peak Project : 010908-05 Power : 13 Mode : 11a_Ch36	 Site : 03CH13-HY Condition : PEAK(UNIT) 3m HORN_91200_1241 VERTICAL Detector : Peak Project : 010908-05 Power : 13 Mode : 11a_Ch36
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_91200_1241 VERTICAL Detector : Peak Project : 010908-05 Power : 13 Mode : 11a_Ch36	Left blank

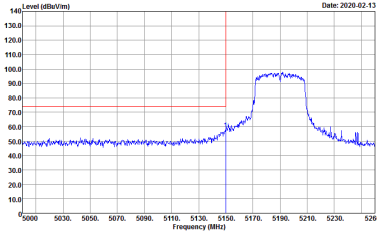
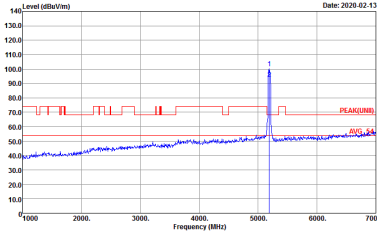
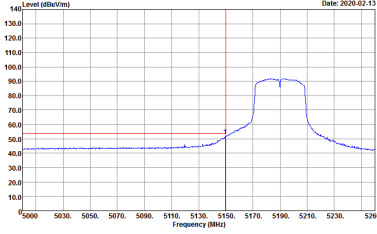
Band 1 5150~5250MHz
WIFI 802.11n HT40 (Band Edge @ 3m)

WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT40 CH38 5190MHz - L	
1+2	Horizontal	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1241 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 010908-05	 Site : 03CH13-HY Condition : PEAK(UNIT) 3m HORN_91200_1241 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 010908-05
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_91200_1241 HORIZONTAL RBW:1000.000KHz VBW:3.000KHz SWT:Auto Detector : Peak Project : 010908-05	Left blank

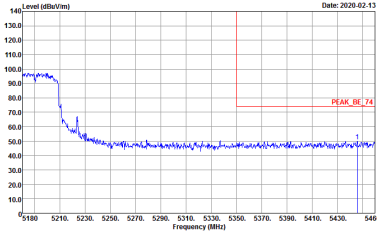
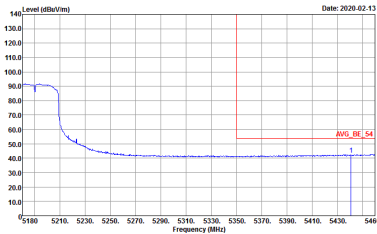


WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT40 CH38 5190MHz - R	
1+2	Horizontal	Fundamental
Peak	 Site : 03CH13-HV Condition : PEAK_BE_74 3m HORN_91200_1241 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 010908-05	Left blank
Avg.	 Site : 03CH13-HV Condition : AVG_BE_54 3m HORN_91200_1241 HORIZONTAL RBW:1000.000KHz VBW:3.000KHz SWT:Auto Detector : Peak Project : 010908-05	Left blank



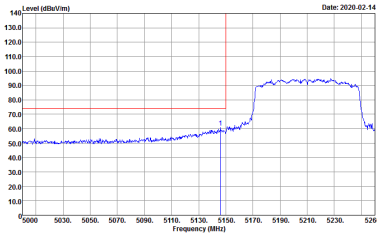
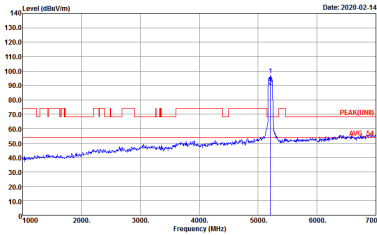
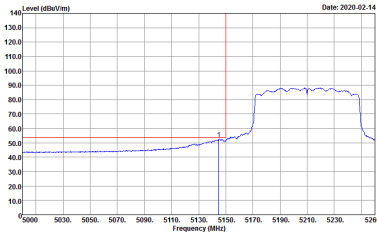
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT40 CH38 5190MHz - L	
1+2	Vertical	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1241 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 010908-05	 Site : 03CH13-HY Condition : PEAK(UNII) 3m HORN_91200_1241 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 010908-05
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_91200_1241 VERTICAL RBW:1000.000KHz VBW:3.000KHz SWT:Auto Detector : Peak Project : 010908-05	Left blank

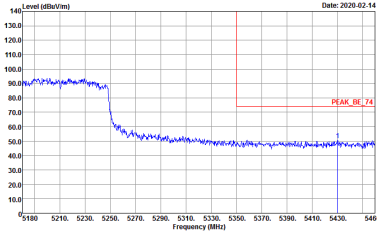
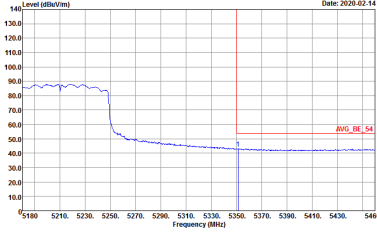


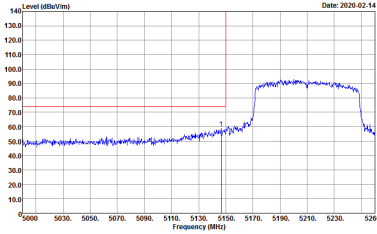
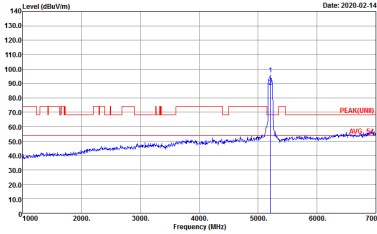
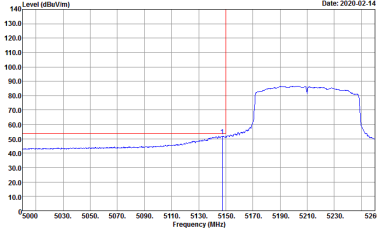
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT40 CH38 5190MHz - R	
1+2	Vertical	Fundamental
Peak	 Site : 03CH13-HV Condition : PEAK_BE_74 3m HORN_91200_1241 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 010908-05	Left blank
Avg.	 Site : 03CH13-HV Condition : AVG_BE_54 3m HORN_91200_1241 VERTICAL RBW:1000.000KHz VBW:3.000KHz SWT:Auto Detector : Peak Project : 010908-05	Left blank



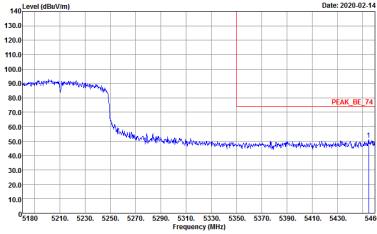
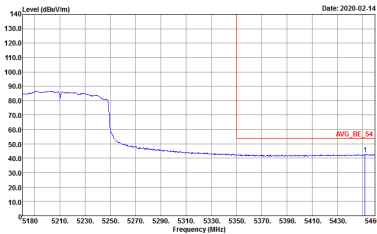
Band 1 5150~5250MHz
WIFI 802.11ac VHT80 (Band Edge @ 3m)

WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ac VHT80 CH42 5210MHz - L	
1+2	Horizontal	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1241 HORIZONTAL Detector : Peak Project : 010908-05 Setting : 9	 Site : 03CH13-HY Condition : PEAK(UNIT) 3m HORN_91200_1241 HORIZONTAL Detector : Peak Project : 010908-05 Setting : 9
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_91200_1241 HORIZONTAL Detector : Peak Project : 010908-05 Setting : 9	Left blank

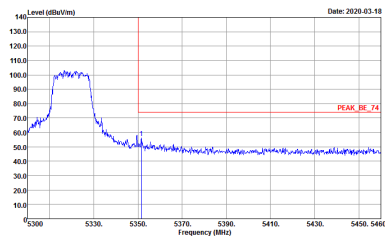
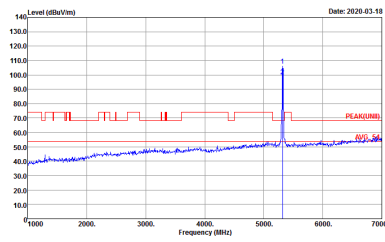
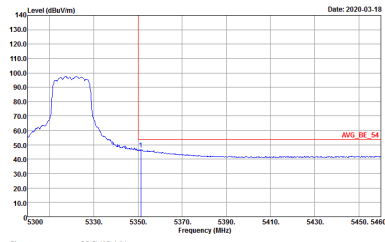
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ac VHT80 CH42 5210MHz - R	
1+2	Horizontal	Fundamental
Peak	 Site : 03CH13-HV Condition : PEAK_BE_74 3m HORN_91200_1241 HORIZONTAL Detector : Peak Project : 010908-05 Setting : 9	Left blank
Avg.	 Site : 03CH13-HV Condition : AVG_BE_54 3m HORN_91200_1241 HORIZONTAL Detector : Peak Project : 010908-05 Setting : 9	Left blank

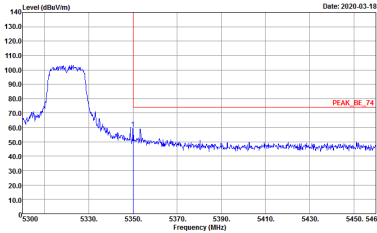
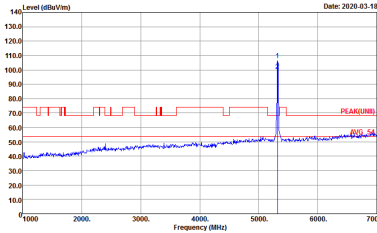
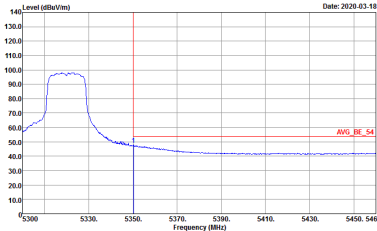
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ac VHT80 CH42 5210MHz - L	
1+2	Vertical	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1241 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 010908-05 Setting : 9	 Site : 03CH13-HY Condition : PEAK(UNII) 3m HORN_91200_1241 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 010908-05 Setting : 9
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_91200_1241 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 010908-05 Setting : 9	Left blank



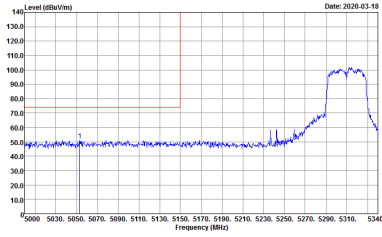
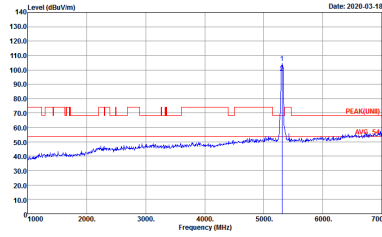
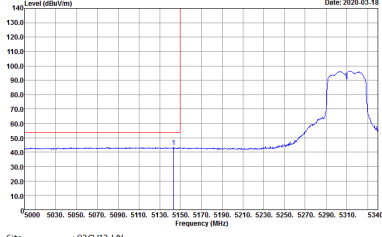
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ac VHT80 CH42 5210MHz - R	
1+2	Vertical	Fundamental
Peak	 Site : 03CH13-HV Condition : PEAK_BE_74 3m HORN_91200_1241 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 010908-05 Setting : 9	Left blank
Avg.	 Site : 03CH13-HV Condition : AVG_BE_54 3m HORN_91200_1241 VERTICAL RBW:1000.000KHz VBW:3.000KHz SWT:Auto Detector : Peak Project : 010908-05 Setting : 9	Left blank

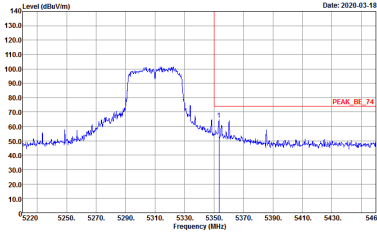
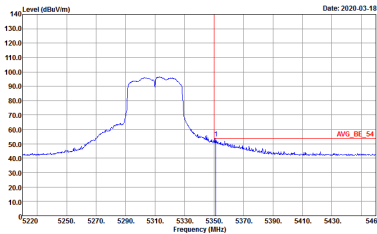
Band 2 - 5250~5350MHz
WIFI 802.11a (Band Edge @ 3m)

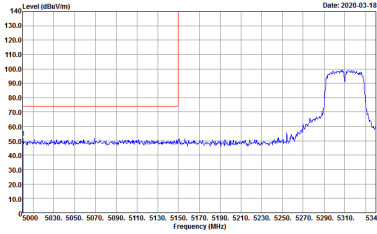
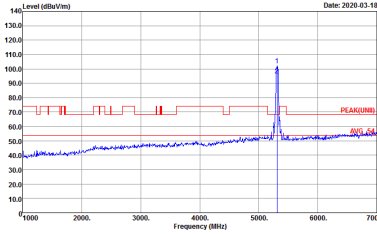
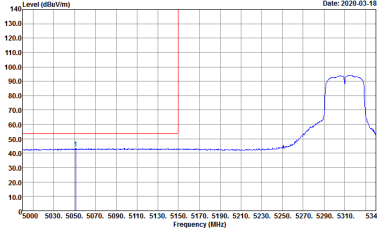
WIFI	Band 2 5250~5350MHz Band Edge @ 3m	
ANT	802.11a CH64 5320MHz	
1+2	Horizontal	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1241 HORIZONTAL Detector : Peak Project : 010908-05 Mode : 5 Power : 11a_Tx_Ch64 : 12.5	 Site : 03CH13-HY Condition : PEAK(FUND) 3m HORN_91200_1241 HORIZONTAL Detector : Peak Project : 010908-05 Mode : 5 Power : 11a_Tx_Ch64 : 12.5
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_91200_1241 HORIZONTAL Detector : Peak Project : 010908-05 Mode : 5 Power : 11a_Tx_Ch64 : 12.5	Left blank

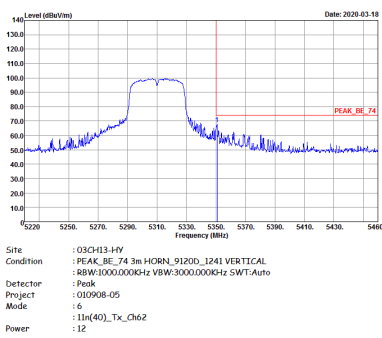
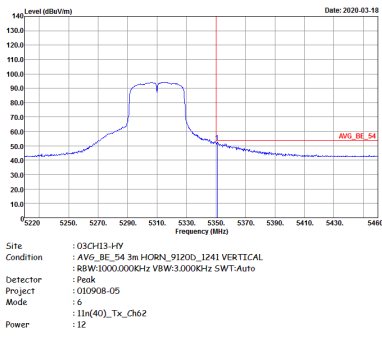
WIFI	Band 2 5250~5350MHz Band Edge @ 3m	
ANT	802.11a CH64 5320MHz	
1+2	Vertical	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1241 VERTICAL Detector : Peak Project : 010908-05 Mode : 5 Power : 11a_Tx_Ch64 : 12.5	 Site : 03CH13-HY Condition : PEAK(UNIT) 3m HORN_91200_1241 VERTICAL Detector : Peak Project : 010908-05 Mode : 5 Power : 11a_Tx_Ch64 : 12.5
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_91200_1241 VERTICAL Detector : Peak Project : 010908-05 Mode : 5 Power : 11a_Tx_Ch64 : 12.5	Left blank

Band 2 5250~5350MHz
WIFI 802.11n HT40 (Band Edge @ 3m)

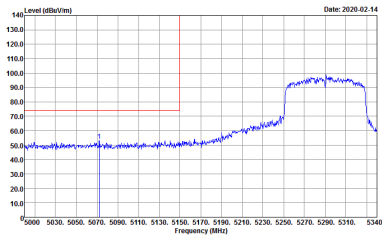
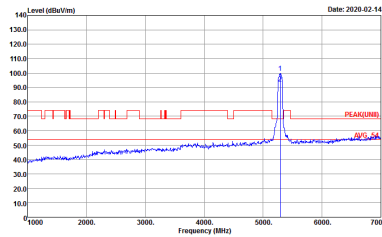
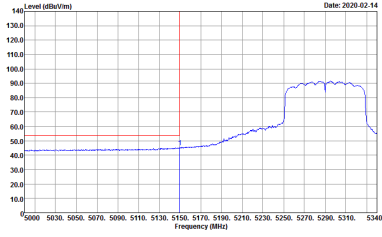
WIFI	Band 2 5250~5350MHz Band Edge @ 3m	
ANT	802.11n HT40 CH62 5310 - L	
1+2	Horizontal	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1241 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 010908-05 Mode : 6 : 11n(40)_Tx_Ch62 Power : 12	 Site : 03CH13-HY Condition : PEAK(UNIT) 3m HORN_91200_1241 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 010908-05 Mode : 6 : 11n(40)_Tx_Ch62 Power : 12
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_91200_1241 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 010908-05 Mode : 6 : 11n(40)_Tx_Ch62 Power : 12	Left blank

WIFI	Band 2 5250~5350MHz Band Edge @ 3m	
ANT	802.11n HT40 CH62 5310 - R	
1+2	Horizontal	Fundamental
Peak	 Site : 03CH13-HV Condition : PEAK_BE_74 3m HORN_91200_1241 HORIZONTAL Detector : Peak Project : 010908-05 Mode : 6 In(40)_Tx_Ch62 Power : 12	Left blank
Avg.	 Site : 03CH13-HV Condition : AVG_BE_54 3m HORN_91200_1241 HORIZONTAL Detector : Peak Project : 010908-05 Mode : 6 In(40)_Tx_Ch62 Power : 12	Left blank

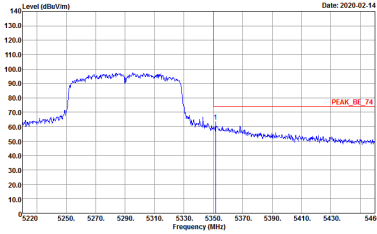
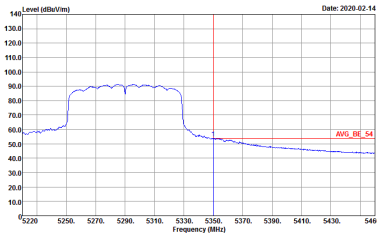
WIFI	Band 2 5250~5350MHz Band Edge @ 3m	
ANT	802.11n HT40 CH62 5310 - L	
1+2	Vertical	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_9120D_1241 VERTICAL Detector : Peak Project : 010908-05 Mode : 6 Power : 11n(40)_Tx_Ch62 Power : 12	 Site : 03CH13-HY Condition : PEAK(UNII) 3m HORN_9120D_1241 VERTICAL Detector : Peak Project : 010908-05 Mode : 6 Power : 11n(40)_Tx_Ch62 Power : 12
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_9120D_1241 VERTICAL Detector : Peak Project : 010908-05 Mode : 6 Power : 11n(40)_Tx_Ch62 Power : 12	Left blank

WIFI	Band 2 5250~5350MHz Band Edge @ 3m	
ANT	802.11n HT40 CH62 5310 - R	
1+2	Vertical	Fundamental
Peak		Left blank
Avg.		Left blank

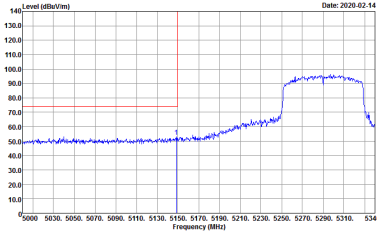
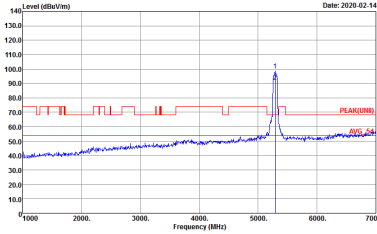
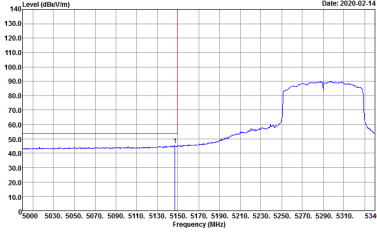
Band 2 5250~5350MHz
WIFI 802.11ac VHT80 (Band Edge @ 3m)

WIFI	Band 2 5250~5350MHz Band Edge @ 3m	
ANT	802.11ac VHT80 CH58 5290MHz - L	
1+2	Horizontal	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1241 HORIZONTAL Detector : Peak Project : 010908-05	 Site : 03CH13-HY Condition : PEAK(UNIT) 3m HORN_91200_1241 HORIZONTAL Detector : Peak Project : 010908-05
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_91200_1241 HORIZONTAL Detector : Peak Project : 010908-05	Left blank

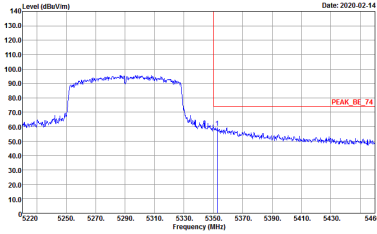
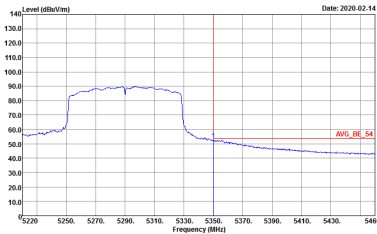


WIFI	Band 2 5250~5350MHz Band Edge @ 3m	
ANT	802.11ac VHT80 CH58 5290MHz - R	
1+2	Horizontal	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1241 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 010908-05	Left blank
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_91200_1241 HORIZONTAL RBW:1000.000KHz VBW:3.000KHz SWT:Auto Detector : Peak Project : 010908-05	Left blank



WIFI	Band 2 5250~5350MHz Band Edge @ 3m	
ANT	802.11ac VHT80 CH58 5290MHz - L	
1+2	Vertical	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1241 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 010908-05	 Site : 03CH13-HY Condition : PEAK(UNII) 3m HORN_91200_1241 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 010908-05
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_91200_1241 VERTICAL RBW:1000.000KHz VBW:3.000KHz SWT:Auto Detector : Peak Project : 010908-05	Left blank



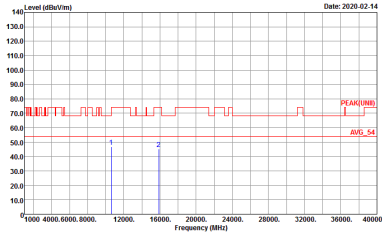
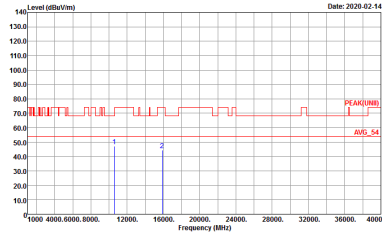
WIFI	Band 2 5250~5350MHz Band Edge @ 3m	
ANT	802.11ac VHT80 CH58 5290MHz - R	
1+2	Vertical	Fundamental
Peak	 Site : 03CH13-HV Condition : PEAK_BE_74 3m HORN_91200_1241 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 010908-05	Left blank
Avg.	 Site : 03CH13-HV Condition : AVG_BE_54 3m HORN_91200_1241 VERTICAL RBW:1000.000KHz VBW:3.000KHz SWT:Auto Detector : Peak Project : 010908-05	Left blank



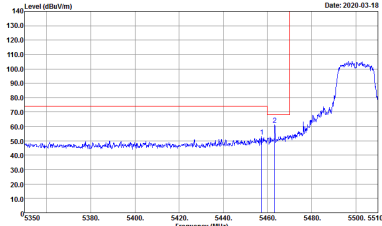
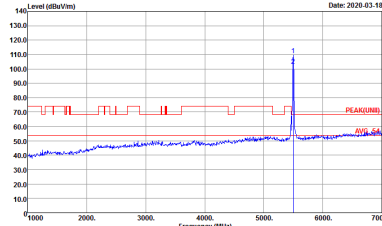
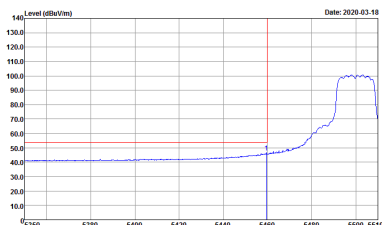
Band 2 - 5250~5350MHz
WIFI 802.11a (Harmonic @ 3m)

WIFI	Band 2 5250~5350MHz Harmonic @ 3m	
ANT	802.11a CH52 5260MHz	
1+2	Horizontal	Vertical
Peak Avg.	Site : 03CH13-HY Condition : PEAK(UNII) 3m HORN_91200_1241 HORIZONTAL Detector : Peak Project : 010908-05 Mode : 4 Power : 10.5	Site : 03CH13-HY Condition : PEAK(UNII) 3m HORN_91200_1241 VERTICAL Detector : Peak Project : 010908-05 Mode : 4 Power : 10.5

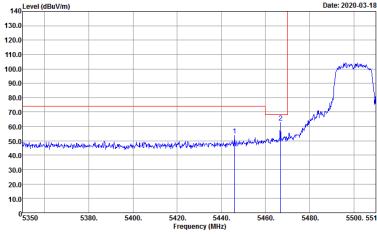
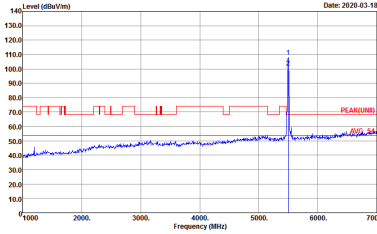
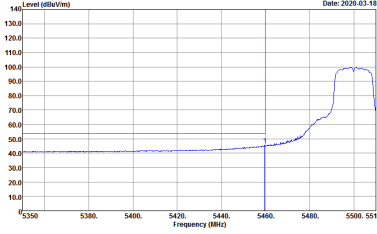
Band 2 5250~5350MHz
WIFI 802.11ac VHT80 (Harmonic @ 3m)

WIFI	Band 2 5250~5350MHz Harmonic @ 3m	
ANT	802.11ac VHT80 CH58 5290MHz	
1+2	Horizontal	Vertical
Peak Avg.	 Site : 03CH13-HY Condition : PEAK(UWB) 3m HORN_91200_1241 HORIZONTAL Detector : Peak Project : 010908-05 Mode : 7 Power : 11	 Site : 03CH13-HY Condition : PEAK(UWB) 3m HORN_91200_1241 VERTICAL Detector : Peak Project : 010908-05 Mode : 7 Power : 11

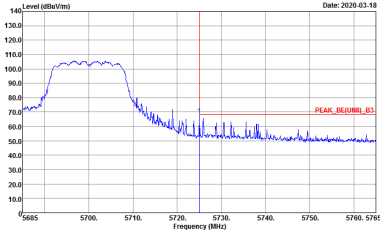
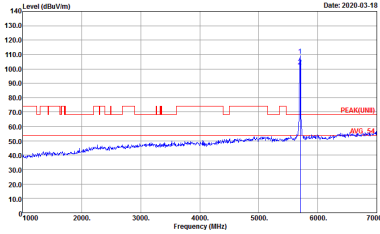
Band 3 - 5470~5725MHz
WIFI 802.11a (Band Edge @ 3m)

WIFI	Band 3 5470~5725MHz Band Edge @ 3m	
ANT	802.11a CH100 5500MHz	
1+2	Horizontal	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE(UNIT1)_B3 3m HORN_91200_1241 HORIZONTAL Detector : Peak Project : 010908-05 Mode : B Power : 11a_Tx_Ch100 : 13.5	 Site : 03CH13-HY Condition : PEAK(UNIT1) 3m HORN_91200_1241 HORIZONTAL Detector : Peak Project : 010908-05 Mode : B Power : 11a_Tx_Ch100 : 13.5
Avg.	 Site : 03CH13-HY Condition : AVG_BE(UNIT1)_B3 3m HORN_91200_1241 HORIZONTAL Detector : Peak Project : 010908-05 Mode : B Power : 11a_Tx_Ch100 : 13.5	Left blank

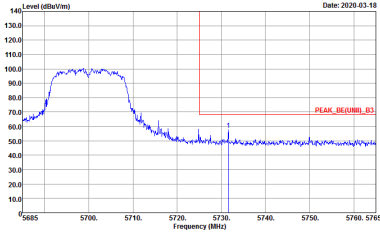
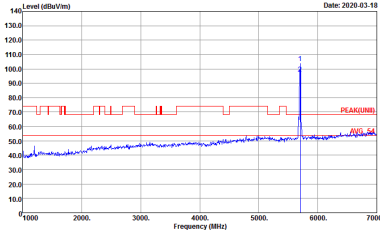


WIFI	Band 3 5470~5725MHz Band Edge @ 3m	
ANT	802.11a CH100 5500MHz	
1+2	Vertical	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE(UNIT1)_B3 3m HORN_91200_1241 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 010908-05 Mode : B 11a_Tx_Ch100 Power : 13.5	 Site : 03CH13-HY Condition : PEAK(UNIT1) 3m HORN_91200_1241 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 010908-05 Mode : B 11a_Tx_Ch100 Power : 13.5
Avg.	 Site : 03CH13-HY Condition : AVG_BE(UNIT1)_B3 3m HORN_91200_1241 VERTICAL RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 010908-05 Mode : B 11a_Tx_Ch100 Power : 13.5	Left blank

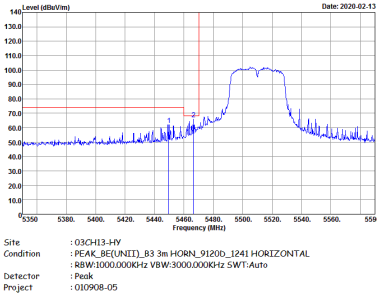
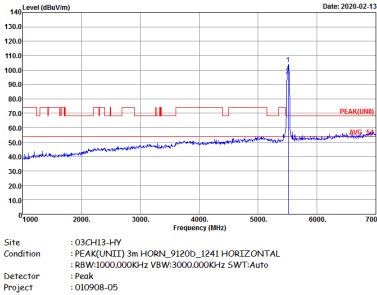
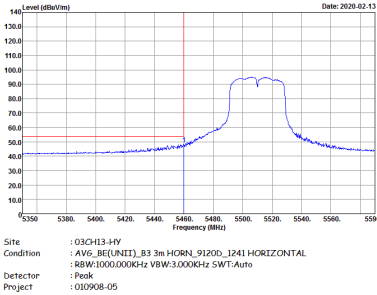


WIFI	Band 3 5470~5725MHz Band Edge @ 3m	
ANT	802.11a CH140 5700MHz	
1+2	Horizontal	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE(UNIT)_B3 3m HORN_91200_1241 HORIZONTAL Detector : Peak Project : 010908-05 Mode : 10 Power : 11a_Tx_Ch140 : 13.5	 Site : 03CH13-HY Condition : PEAK(UNIT) 3m HORN_91200_1241 HORIZONTAL Detector : Peak Project : 010908-05 Mode : 10 Power : 11a_Tx_Ch140 : 13.5

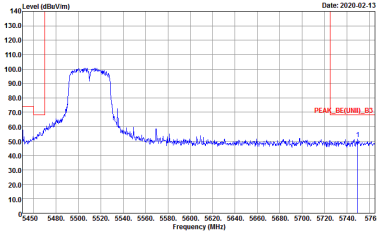


WIFI	Band 3 5470~5725MHz Band Edge @ 3m	
ANT	802.11a CH140 5700MHz	
1+2	Vertical	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE(UNIT)_B3 3m HORN_91200_1241 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 010908-05 Mode : 10 11a_Tx_Ch140 Power : 13.5	 Site : 03CH13-HY Condition : PEAK(UNIT) 3m HORN_91200_1241 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 010908-05 Mode : 10 11a_Tx_Ch140 Power : 13.5

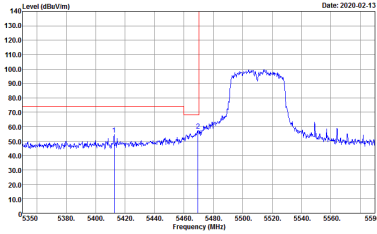
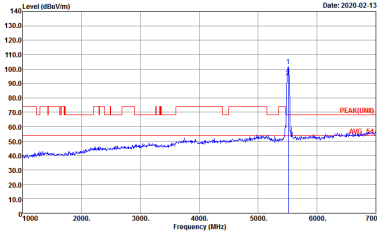
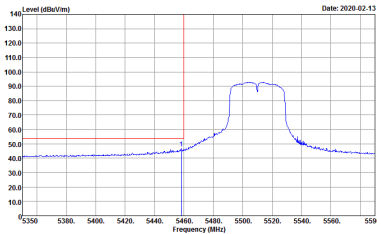
Band 3 5470~5725MHz
WIFI 802.11n HT40 (Band Edge @ 3m)

WIFI	Band 3 5470~5725MHz Band Edge @ 3m	
ANT	802.11n HT40 CH102 5510MHz - L	
1+2	Horizontal	Fundamental
Peak		
Avg.		Left blank

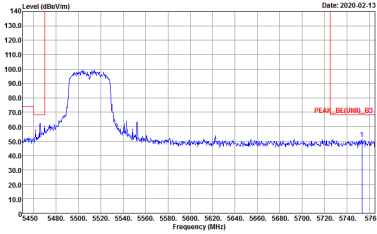


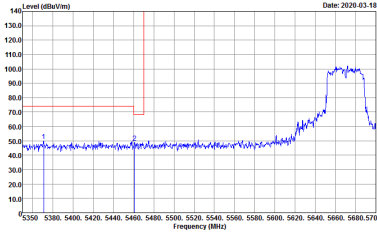
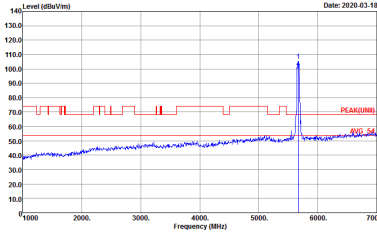
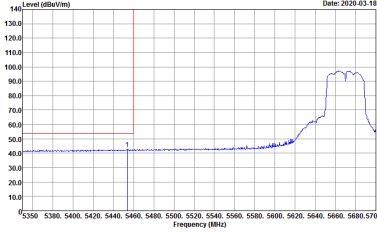
WIFI	Band 3 5470~5725MHz Band Edge @ 3m	
ANT	802.11n HT40 CH102 5510MHz - R	
1+2	Horizontal	Fundamental
Peak	 Site : 09CH13-HV Condition : PEAK_BE(UNIT)_B3 3m HORN_91200_1241 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 010908-05	Left blank

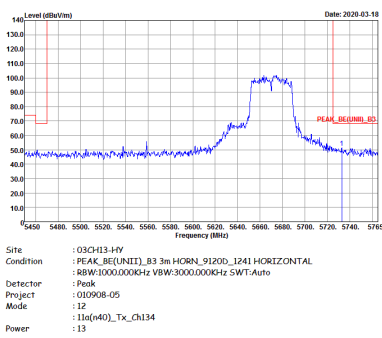


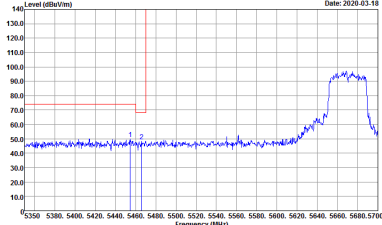
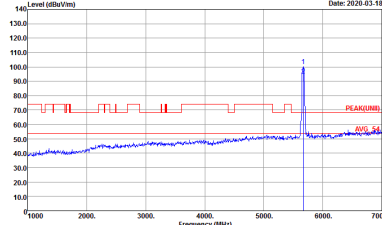
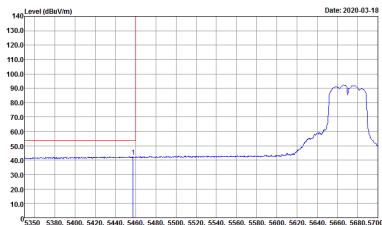
WIFI	Band 3 5470~5725MHz Band Edge @ 3m	
ANT	802.11n HT40 CH102 5510MHz - L	
1+2	Vertical	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE(UNIT)_B3 3m HORN_91200_1241 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 010908-05	 Site : 03CH13-HY Condition : PEAK(UNIT) 3m HORN_91200_1241 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 010908-05
Avg.	 Site : 03CH13-HY Condition : AVG_BE(UNIT)_B3 3m HORN_91200_1241 VERTICAL RBW:1000.000KHz VBW:3.000KHz SWT:Auto Detector : Peak Project : 010908-05	Left blank

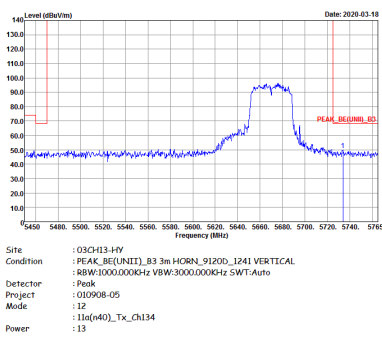


WIFI	Band 3 5470~5725MHz Band Edge @ 3m	
ANT	802.11n HT40 CH102 5510MHz - R	
1+2	Vertical	Fundamental
Peak	 Site : 09CH13-HV Condition : PEAK_BE(UNIT)_B3 3m HORN_91200_1241 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 010908-05	Left blank

WIFI	Band 3 5470~5725MHz Band Edge @ 3m	
ANT	802.11n HT40 CH134 5670MHz - L	
1+2	Horizontal	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE(UNIT)_B3 3m HORN_91200_1241 HORIZONTAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak Mode : 010908-05 Power : 12 : 11a(n40)_Tx_Ch134 : 13	 Site : 03CH13-HY Condition : PEAK(UNIT) 3m HORN_91200_1241 HORIZONTAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak Mode : 010908-05 Power : 12 : 11a(n40)_Tx_Ch134 : 13
Avg.	 Site : 03CH13-HY Condition : AVG_BE(UNIT)_B3 3m HORN_91200_1241 HORIZONTAL Detector : RBW:1000.000KHz VBW:3.000KHz SWT:Auto Project : Peak Mode : 010908-05 Power : 12 : 11a(n40)_Tx_Ch134 : 13	Left blank

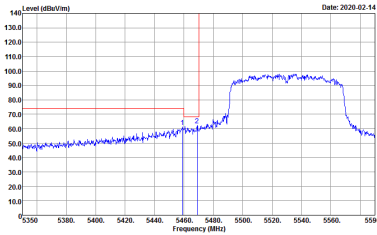
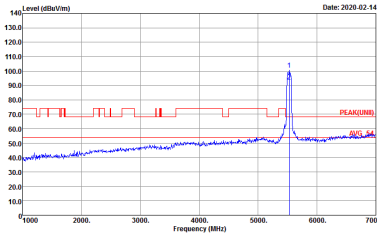
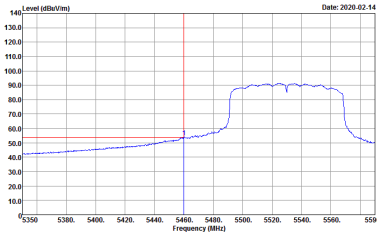
WIFI	Band 3 5470~5725MHz Band Edge @ 3m	
ANT	802.11n HT40 CH134 5670MHz - R	
1+2	Horizontal	Fundamental
Peak		Left blank

WIFI	Band 3 5470~5725MHz Band Edge @ 3m	
ANT	802.11n HT40 CH134 5670MHz - L	
1+2	Vertical	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE(UNIT1)_B3 3m HORN_91200_1241 VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak Mode : 010908-05 Power : 12 : 11a(n40)_Tx_Ch134 : 13	 Site : 03CH13-HY Condition : PEAK(UNIT1) 3m HORN_91200_1241 VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak Mode : 010908-05 Power : 12 : 11a(n40)_Tx_Ch134 : 13
Avg.	 Site : 03CH13-HY Condition : AVG_BE(UNIT1)_B3 3m HORN_91200_1241 VERTICAL Detector : RBW:1000.000KHz VBW:3.000KHz SWT:Auto Project : Peak Mode : 010908-05 Power : 12 : 11a(n40)_Tx_Ch134 : 13	Left blank

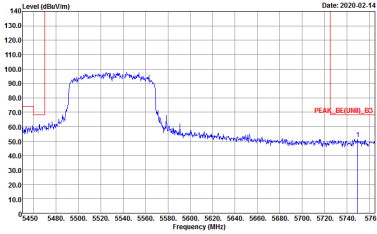
WIFI	Band 3 5470~5725MHz Band Edge @ 3m	
ANT	802.11n HT40 CH134 5670MHz - R	
1+2	Vertical	Fundamental
Peak		Left blank



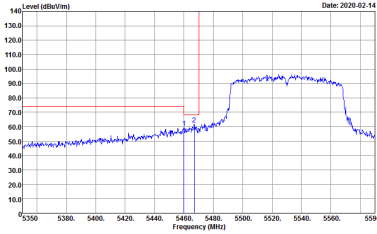
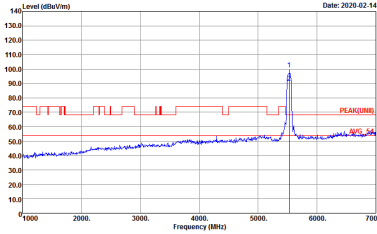
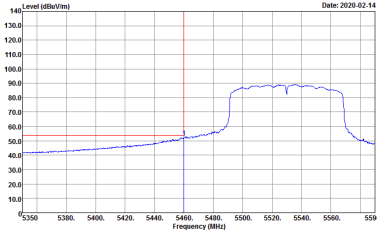
Band 3 5470~5725MHz
WIFI 802.11ac VHT80 (Band Edge @ 3m)

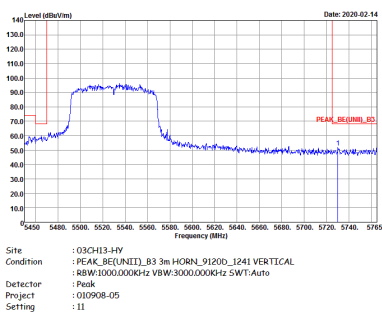
WIFI	Band 3 5470~5725MHz Band Edge @ 3m	
ANT	802.11ac VHT80 CH106 5530MHz - L	
1+2	Horizontal	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE(UNIT)_B3 3m HORN_91200_1241 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 010908-05 Setting : 11	 Site : 03CH13-HY Condition : PEAK(UNIT) 3m HORN_91200_1241 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 010908-05 Setting : 11
Avg.	 Site : 03CH13-HY Condition : AVG_BE(UNIT)_B3 3m HORN_91200_1241 HORIZONTAL RBW:1000.000KHz VBW:3.000KHz SWT:Auto Detector : Peak Project : 010908-05 Setting : 11	Left blank

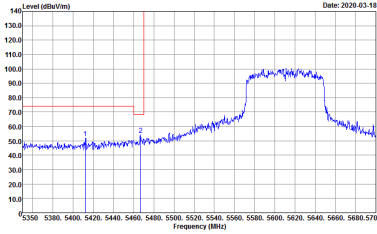
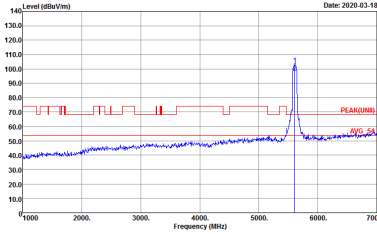
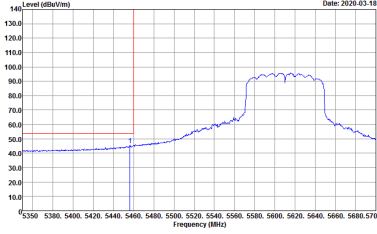


WIFI	Band 3 5470~5725MHz Band Edge @ 3m	
ANT	802.11ac VHT80 CH106 5530MHz - R	
1+2	Horizontal	Fundamental
Peak	 Site : 09CH13-HV Condition : PEAK_BE(UNIT)_B3 3m HORN_91200_1241 HORIZONTAL Detector : Peak Project : 010908-05 Setting : 11	Left blank

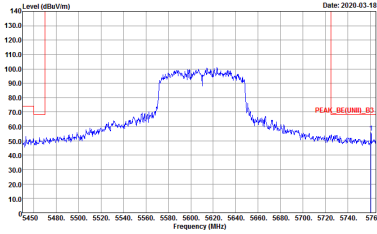


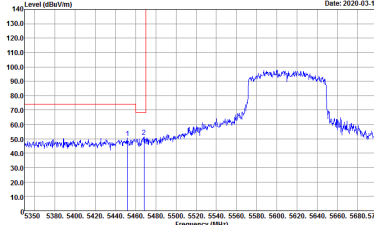
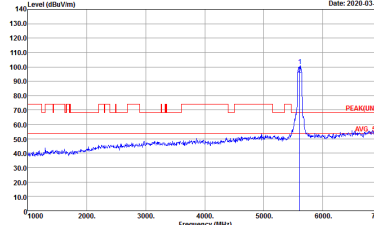
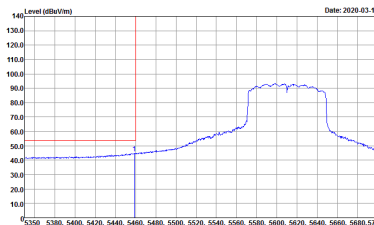
WIFI	Band 3 5470~5725MHz Band Edge @ 3m	
ANT	802.11ac VHT80 CH106 5530MHz - L	
1+2	Vertical	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE(UNIT)_B3 3m HORN_91200_1241 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 010908-05 Setting : 11	 Site : 03CH13-HY Condition : PEAK(UNIT) 3m HORN_91200_1241 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 010908-05 Setting : 11
Avg.	 Site : 03CH13-HY Condition : AVG_BE(UNIT)_B3 3m HORN_91200_1241 VERTICAL RBW:1000.000KHz VBW:3.000KHz SWT:Auto Detector : Peak Project : 010908-05 Setting : 11	Left blank

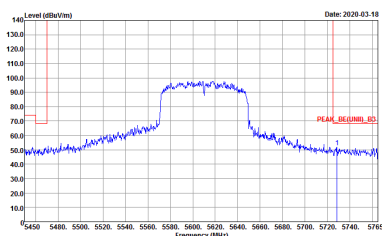
WIFI	Band 3 5470~5725MHz Band Edge @ 3m	
ANT	802.11ac VHT80 CH106 5530MHz - R	
1+2	Vertical	Fundamental
Peak		Left blank

WIFI	Band 3 5470~5725MHz Band Edge @ 3m	
ANT	802.11ac VHT80 CH122 5610MHz - L	
1+2	Horizontal	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE(UNIT1)_B3 3m HORN_91200_1241 HORIZONTAL Detector : Peak Project : 010908-05 Mode : 14 Power : 11ac(80)_Tx_Ch122 : 15.5	 Site : 03CH13-HY Condition : PEAK(UNIT1) 3m HORN_91200_1241 HORIZONTAL Detector : Peak Project : 010908-05 Mode : 14 Power : 11ac(80)_Tx_Ch122 : 15.5
Avg.	 Site : 03CH13-HY Condition : AVG_BE(UNIT1)_B3 3m HORN_91200_1241 HORIZONTAL Detector : Peak Project : 010908-05 Mode : 14 Power : 11ac(80)_Tx_Ch122 : 15.5	Left blank



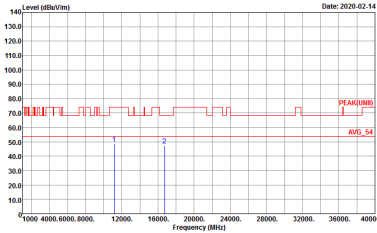
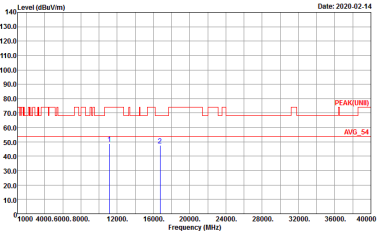
WIFI	Band 3 5470~5725MHz Band Edge @ 3m	
ANT	802.11ac VHT80 CH122 5610MHz - R	
1+2	Horizontal	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE(UNIT)_B3 3m HORN_91200_1241 HORIZONTAL Detector : Peak Project : 010908-05 Mode : 14 Power : 11ac(80)_Tx_Ch122 : 15.5	Left blank

WIFI	Band 3 5470~5725MHz Band Edge @ 3m	
ANT	802.11ac VHT80 CH122 5610MHz - L	
1+2	Vertical	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE(UNIT1)_B3 3m HORN_91200_1241 VERTICAL Detector : Peak Project : 010908-05 Mode : 14 Power : 11ac(80)_Tx_Ch122 : 15.5	 Site : 03CH13-HY Condition : PEAK(UNIT1) 3m HORN_91200_1241 VERTICAL Detector : Peak Project : 010908-05 Mode : 14 Power : 11ac(80)_Tx_Ch122 : 15.5
Avg.	 Site : 03CH13-HY Condition : AVG_BE(UNIT1)_B3 3m HORN_91200_1241 VERTICAL Detector : Peak Project : 010908-05 Mode : 14 Power : 11ac(80)_Tx_Ch122 : 15.5	Left blank

WIFI	Band 3 5470~5725MHz Band Edge @ 3m	
ANT	802.11ac VHT80 CH122 5610MHz - R	
1+2	Vertical	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE(UNIT1)_B3 3m HORN_91200_1241 VERTICAL Detector : Peak Project : 010908-05 Mode : 14 Power : 11ac(80)_Tx_Ch122 : 15.5	Left blank

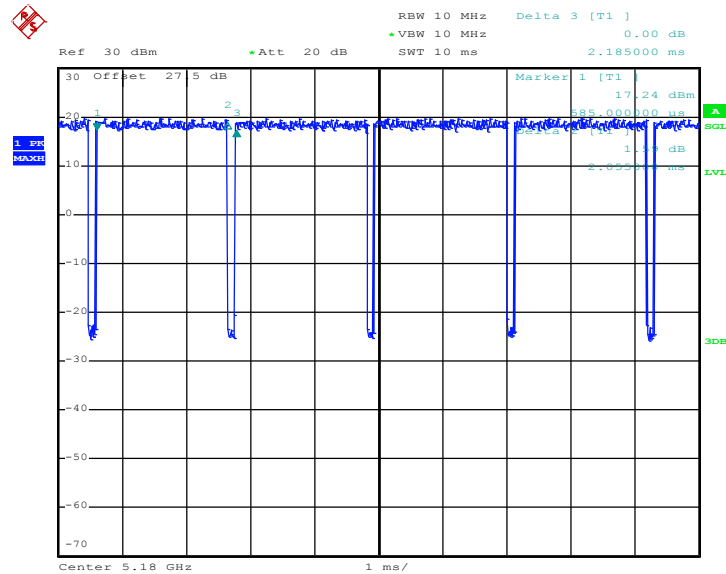


Band 3 - 5470~5725MHz
WIFI 802.11a (Harmonic @ 3m)

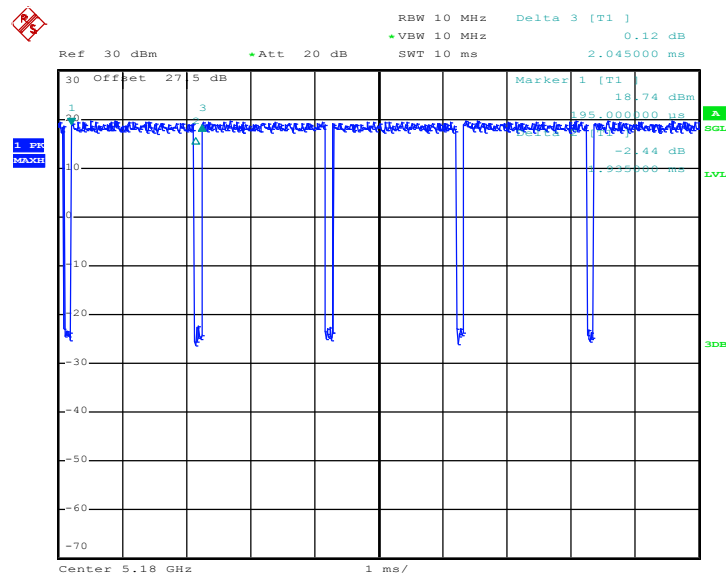
WIFI	Band 3 5470~5725MHz Harmonic @ 3m	
ANT	802.11a CH116 5580MHz	
1+2	Horizontal	Vertical
Peak Avg.	 Site : 03CH13-HY Condition : PEAK(UNII) 3m HORN_91200_1241 HORIZONTAL Detector : Peak Project : 010908-05 Mode : 9 Power : 13	 Site : 03CH13-HY Condition : PEAK(UNII) 3m HORN_91200_1241 VERTICAL Detector : Peak Project : 010908-05 Mode : 9 Power : 13

Appendix D. Duty Cycle Plots

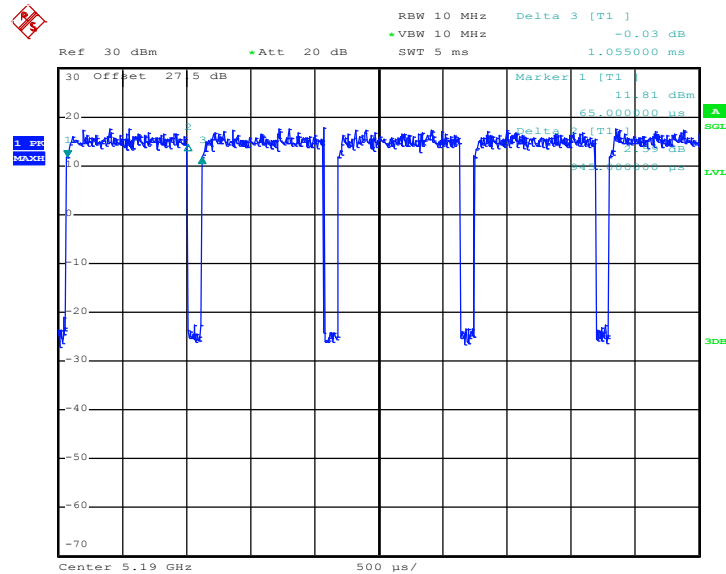
Antenna	Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting	Duty Factor(dB)
1+2	802.11a for Ant. 1	94.05	2055	0.49	1kHz	0.27
1+2	802.11a for Ant. 2	94.93	2060	0.49	1kHz	0.23
1+2	5GHz 802.11n HT20 for Ant. 1	94.62	1935	0.52	1kHz	0.24
1+2	5GHz 802.11n HT20 for Ant. 2	94.62	1935	0.52	1kHz	0.24
1+2	5GHz 802.11n HT40 for Ant. 1	89.57	945	1.06	3kHz	0.48
1+2	5GHz 802.11n HT40 for Ant. 2	89.20	950	1.05	3kHz	0.50
1+2	5GHz 802.11ac VHT20 for Ant. 1	94.36	1925	0.52	1kHz	0.25
1+2	5GHz 802.11ac VHT20 for Ant. 2	94.59	1925	0.52	1kHz	0.24
1+2	5GHz 802.11ac VHT40 for Ant. 1	88.43	955	1.05	3kHz	0.53
1+2	5GHz 802.11ac VHT40 for Ant. 2	89.72	960	1.04	3kHz	0.47
1+2	5GHz 802.11ac VHT80 for Ant. 1	88.32	870	1.15	3kHz	0.54
1+2	5GHz 802.11ac VHT80 for Ant. 2	88.32	870	1.15	3kHz	0.54

MIMO <Ant. 1>
802.11a


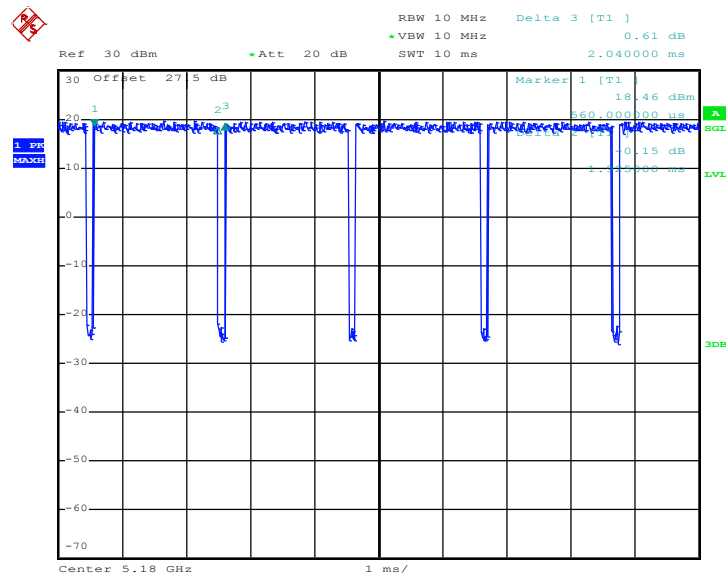
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802.11n HT20


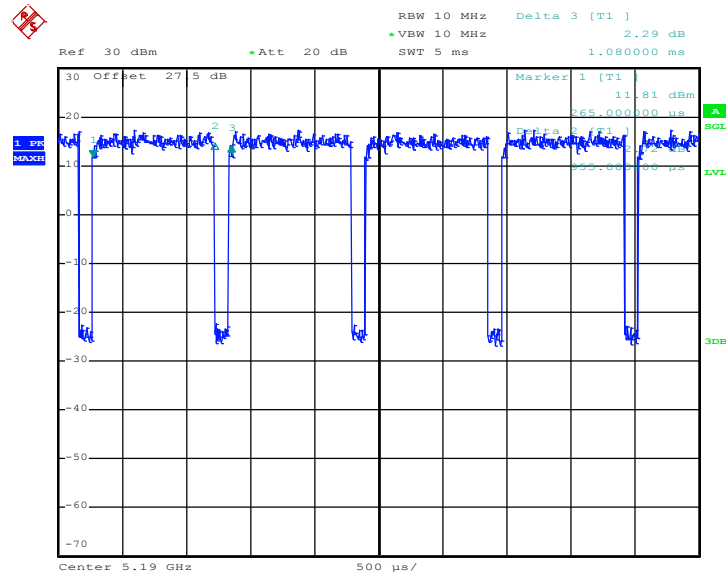
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802.11n HT40


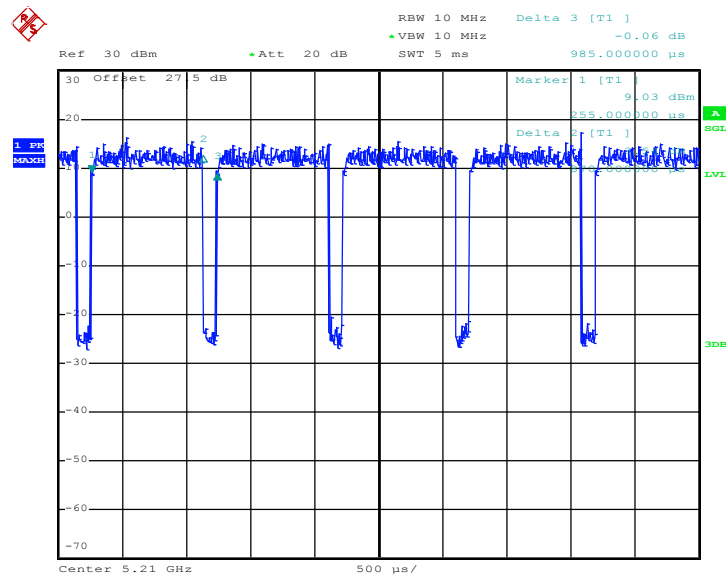
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802.11ac VHT20


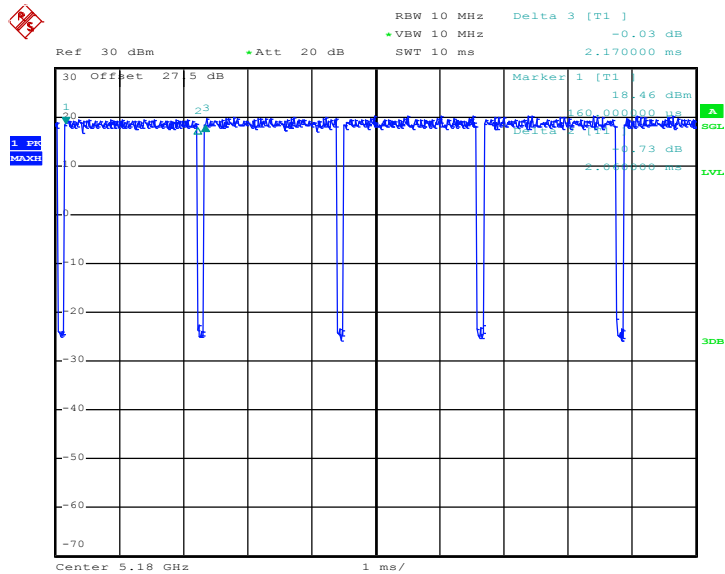
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802.11ac VHT40


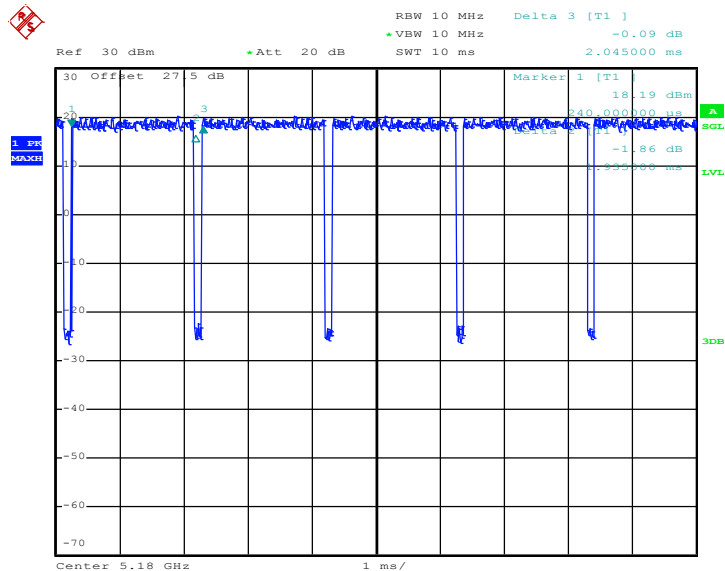
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802.11ac VHT80


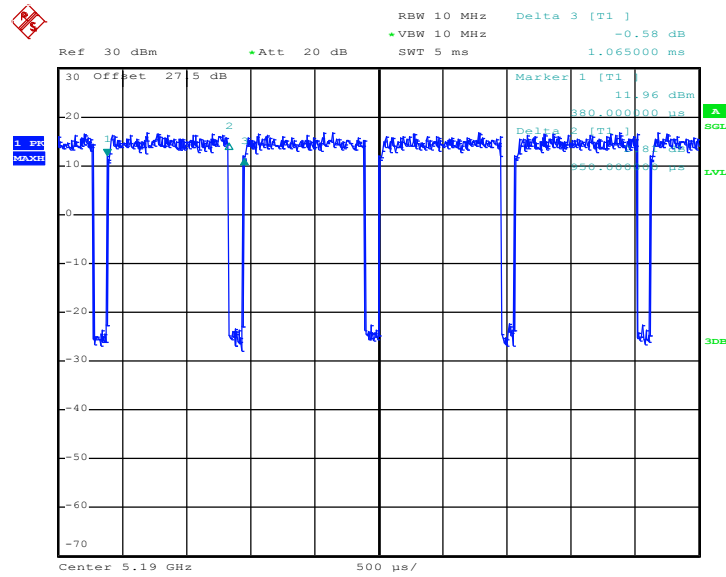
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MIMO < Ant. 2>
802.11a


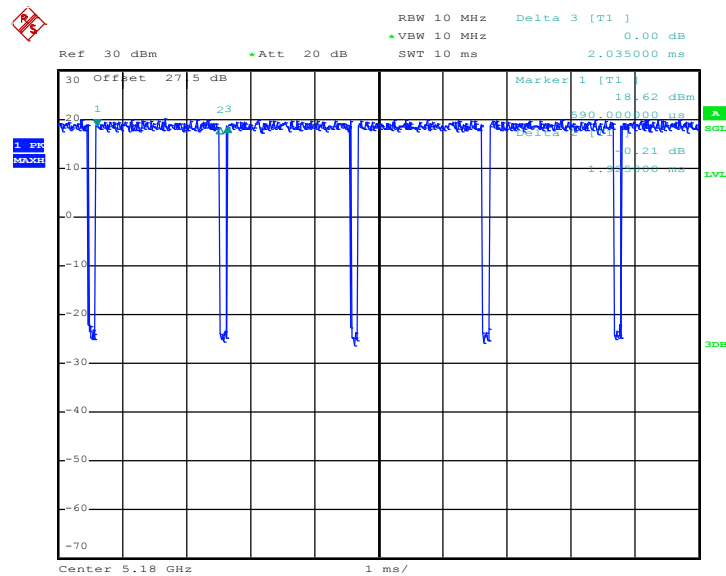
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802.11n HT20


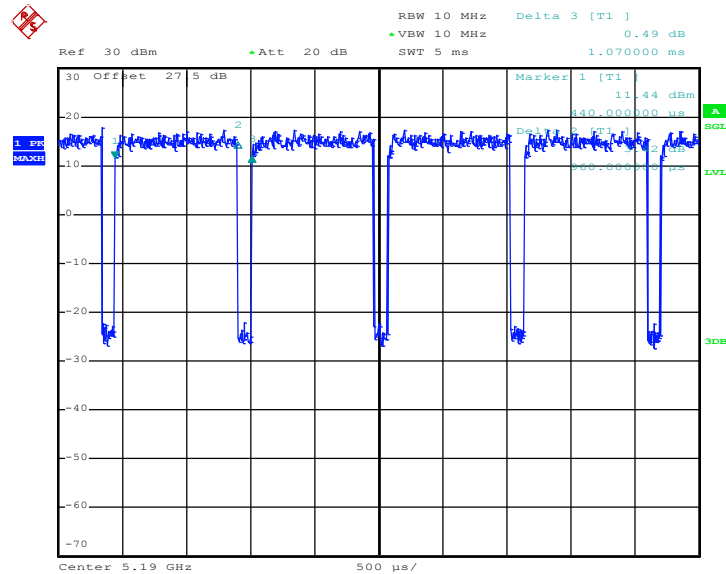
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802.11n HT40


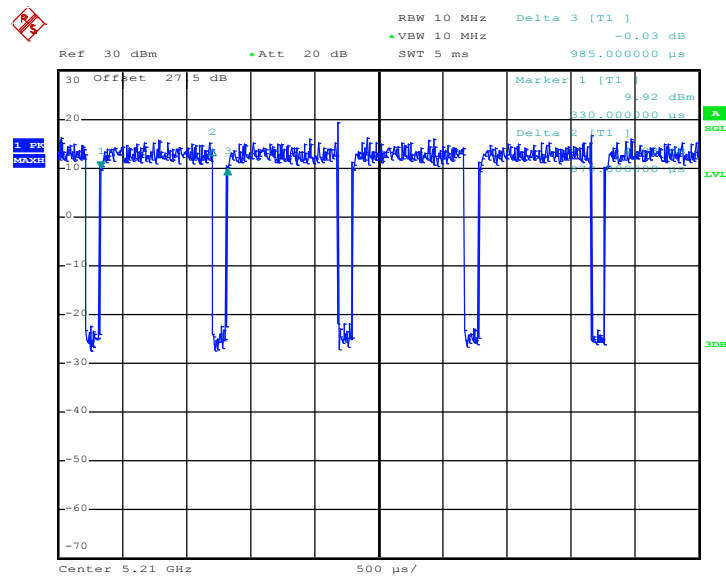
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802.11ac VHT20


Date: 28.JAN.2020 07:30:53

802.11ac VHT40


Date: 28.JAN.2020 07:34:50

802.11ac VHT80


Date: 28.JAN.2020 07:40:34