FCC RADIO TEST REPORT

FCC ID	:	**S9GR550**
Equipment	:	**Wireless Access Point**
Brand Name	:	**Ruckus**
Model Name	:	**R550**
Applicant	:	**Ruckus Wireless Inc.** **350 W. Java Dr., Sunnyvale CA 94089 USA**
Manufacturer	:	**Ruckus Wireless Inc.** **350 W. Java Dr., Sunnyvale CA 94089 USA**
Standard	:	**FCC Part 15 Subpart E §15.407**

The product was received on Jan. 22, 2020 and testing was started from Jan. 27, 2020 and completed on Mar. 10, 2020. We, Sporton International (USA) 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 A2LA or any agency of government.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International (USA) Inc., the test report shall not be reproduced except in full.

Approved by: Ken Chen

Sporton International (USA) Inc.
1175 Montague Expressway, Milpitas, CA 95035

Table of Contents

History of this test report **3**
Summary of Test Result **4**
1 General Description **5**
1.1 Product Feature of Equipment Under Test 5
1.2 Modification of EUT 5
1.3 Testing Location 5
1.4 Applicable Standards 5
2 Test Configuration of Equipment Under Test **6**
2.1 Carrier Frequency and Channel 6
2.2 Test Mode 7
2.3 Connection Diagram of Test System 8
2.4 Support Unit used in test configuration and system 8
2.5 EUT Operation Test Setup 9
2.6 Measurement Results Explanation Example 9
3 Test Result **10**
3.1 26dB & 99% Occupied Bandwidth Measurement 10
3.2 Maximum Conducted Output Power Measurement 12
3.3 Power Spectral Density Measurement 13
3.4 Unwanted Emissions Measurement 17
3.5 AC Conducted Emission Measurement 21
3.6 Automatically Discontinue Transmission 23
3.7 Antenna Requirements 24
4 List of Measuring Equipment **25**
5 Uncertainty of Evaluation **26**
Appendix A. Conducted Test Results
Appendix B. AC Conducted Emission Test Result
Appendix C. Radiated Spurious Emission
Appendix D. Radiated Spurious Emission Plots
Appendix E. Duty Cycle Plots
Appendix F. Setup Photographs

History of this test report

Report No.	Version	Description	Issued Date
FR200117001D	01	Initial issue of report	Mar. 25, 2020
FR200117001D	02	Revising antenna gain information.	Apr. 17, 2020

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 0.16 dB at 5150.000 MHz
3.5	15.207	AC Conducted Emission	Pass	Under limit 2.48 dB at 0.461 MHz
3.6	15.407(c)	Automatically Discontinue Transmission	Pass	-
3.7	15.203 15.407(a)	Antenna Requirement	Pass	-

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

1 General Description

1.1 Product Feature of Equipment Under Test

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

Product Specification subjective to this standard	
Antenna Type	WLAN: <Ant. 1> Internal Antenna <Ant. 2> Internal Antenna Bluetooth: Metal Antenna Zigbee: Metal Antenna

1.2 Modification of EUT

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

1.3 Testing Location

Test Site	Sporton International (USA) Inc.		
Test Site Location	1175 Montague Expressway, Milpitas, CA 95035 TEL : 408 9043300		
Test Site No.	**Sporton Site No.**		
	TH01-CA	CO01-CA	03CH02-CA

1.4 Applicable Standards

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

- FCC Part 15 Subpart E
- FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
- FCC KDB 414788 D01 Radiated Test Site v01r01.
- 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 (Y 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, 802.11ac VHT40 and 802.11ax HE80.
2. The above Frequency and Channel in "#" were 802.11ac VHT80 and 802.11ax HE80.

2.2 Test Mode

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

MIMO Mode

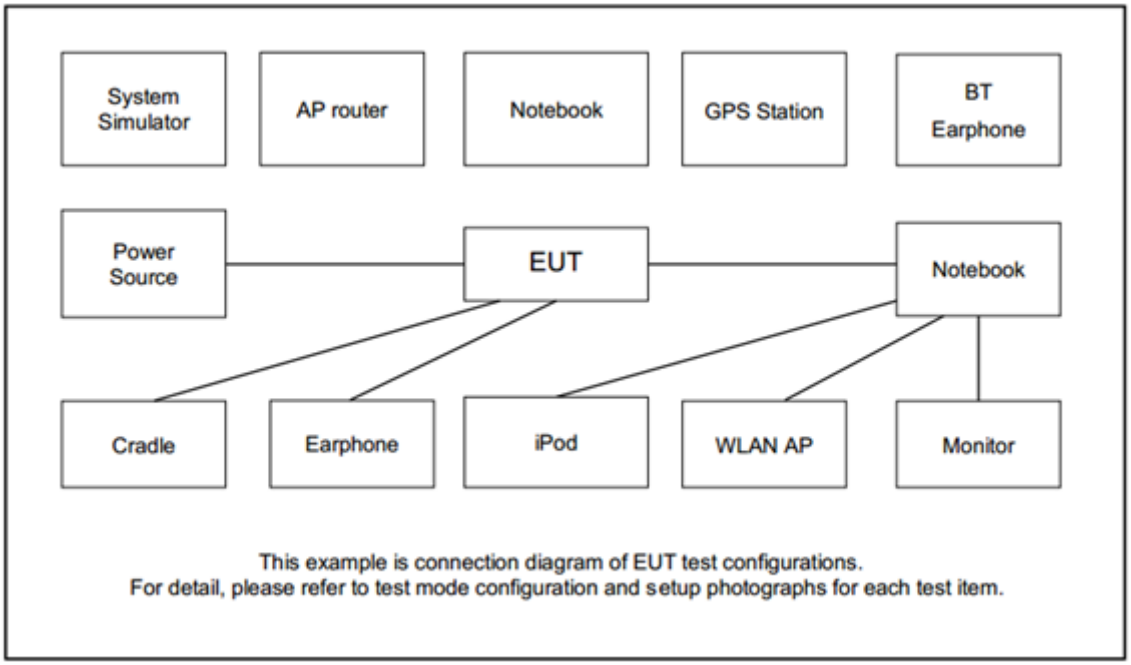
Modulation	Data Rate
802.11a	6 Mbps
802.11n HT20 (Covered by HE20)	MCS0
802.11n HT40 (Covered by HE40)	MCS0
802.11ac VHT20 (Covered by HE20)	MCS0
802.11ac VHT40 (Covered by HE40)	MCS0
802.11ac VHT80 (Covered by HE80)	MCS0
802.11ax HE20	MCS0
802.11ax HE40	MCS0
802.11ax HE80	MCS0

Test Cases	
AC Conducted Emission	Mode 1 : WLAN (2.4GHz) Idle + WLAN (5GHz) Link + Zigbee Idle + PoE + LAN Link

Ch. #		Band I：5150-5250 MHz			
		802.11a	802.11ax HE20	802.11ax HE40	802.11ax HE80
L	Low	36	36	38	-
M	Middle	-	-	-	42
H	High	48	48	46	-

Remark: For radiation spurious emission, the final modulation and the worst data rate was reference the max RF conducted power.

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.	System Simulator	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m
2.	Laptop	DELL	P79G	FCC DoC	N/A	N/A
3.	Laptop	DELL	E6430	N/A	N/A	N/A
4.	USB Flash drive	SanDisk	N/A	N/A	N/A	N/A
5.	Notebook	HP	15t-cu000	QDS-BRCM1019	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
6.	PoE Adapter	Ruckus Wireless Inc.	N/A	N/A	N/A	N/A
7.	Adapter	Ruckus Wireless Inc.	APH-5020	N/A	N/A	N/A

2.5 EUT Operation Test Setup

The RF test items, utility “Putty” was installed in Notebook which was programmed in order to make the EUT get into the engineering modes to provide channel selection, power level, data rate and the application type and for continuous transmitting signals.

2.6 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example :

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 4.2 dB and 10dB attenuator.

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

= 4.2 + 10 = 14.2 (dB)

3 Test Result

3.1 26dB & 99% Occupied Bandwidth Measurement

3.1.1 Description of 26dB & 99% Occupied Bandwidth

This section is for reporting purpose only.

There is no restriction limits for bandwidth.

3.1.2 Measuring Instruments

See list of measuring equipment of this test report.

3.1.3 Test Procedures

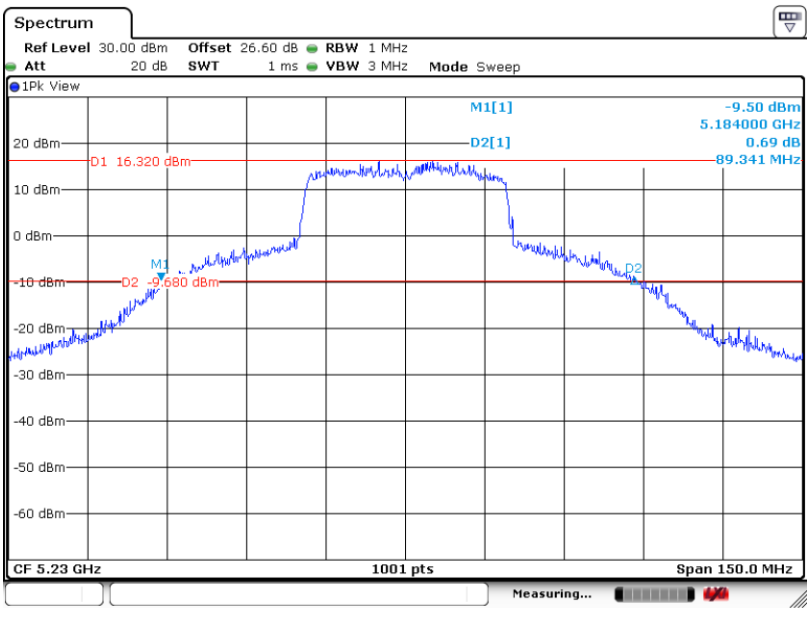
1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01. Section C) Emission bandwidth
2. Set RBW = approximately 1% of the emission bandwidth.
3. Set the VBW > RBW.
4. Detector = Peak.
5. Trace mode = max hold
6. Measure the maximum width of the emission that is 26 dB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

3.1.4 Test Setup

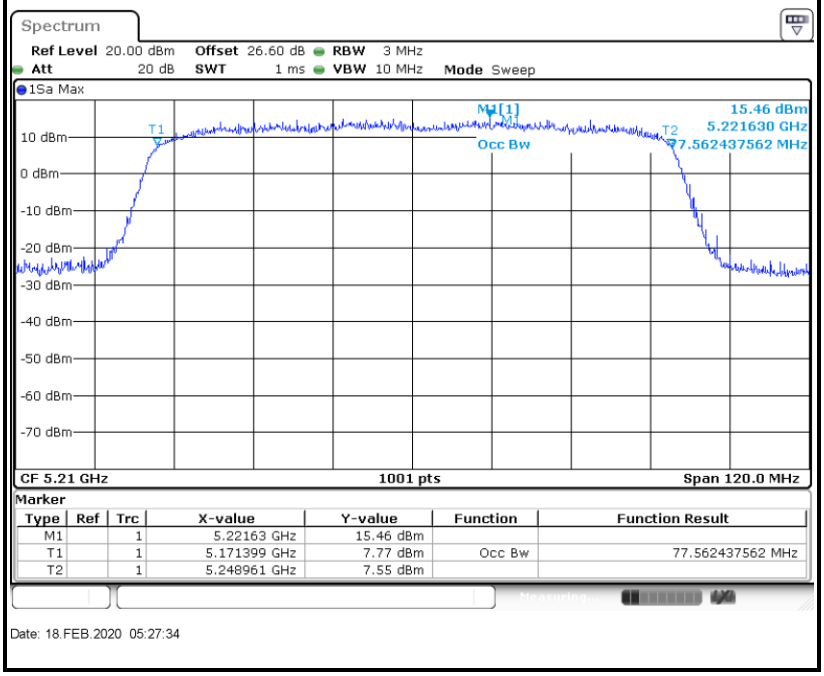
3.1.5 Test Result of 26dB & 99% Occupied Bandwidth

Please refer to Appendix A.

Maximum 26dB Bandwidth



Maximum 99% Occupied Bandwidth



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

3.2 Maximum Conducted Output Power Measurement

3.2.1 Limit of Maximum Conducted Output Power

<FCC 14-30 CFR 15.407>

For the 5.15–5.25 GHz bands:

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

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

3.2.2 Measuring Instruments

See list of measuring equipment of this test report.

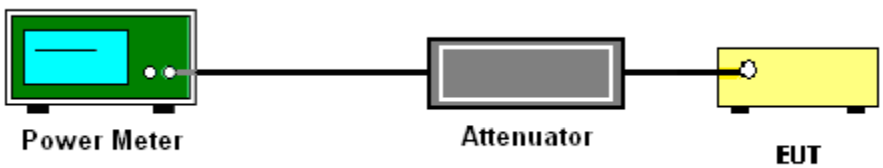
3.2.3 Test Procedures

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

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

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

3.2.4 Test Setup



3.2.5 Test Result of Maximum Conducted Output Power

Please refer to Appendix A.

3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

<FCC 14-30 CFR 15.407>

For the 5.15–5.25 GHz bands:

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

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

3.3.2 Measuring Instruments

See list of measuring equipment of this test report.

3.3.3 Test Procedures

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

Section F) Maximum power spectral density.

 # Method SA-3 #

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

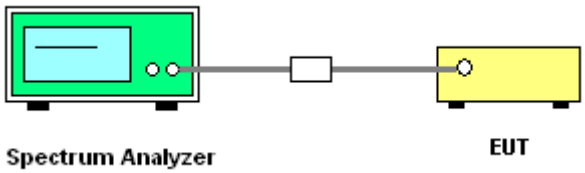
- Set span to encompass the entire emission bandwidth (EBW) of the signal.
- Set RBW = 1 MHz.
- Set VBW ≥ 3 MHz
- Number of points in sweep ≥ 2 Span / RBW.
- Sweep time ≤ (number of points in sweep) × T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.
- Detector = power averaging (rms).
- Trace mode = max hold.
- Allow max hold to run for at least 60 seconds, or longer as needed to allow the trace to stabilize.

1. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
2. Each plot has already offset with cable loss, and attenuator loss. Measure the PPSD and record it.
3. 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.

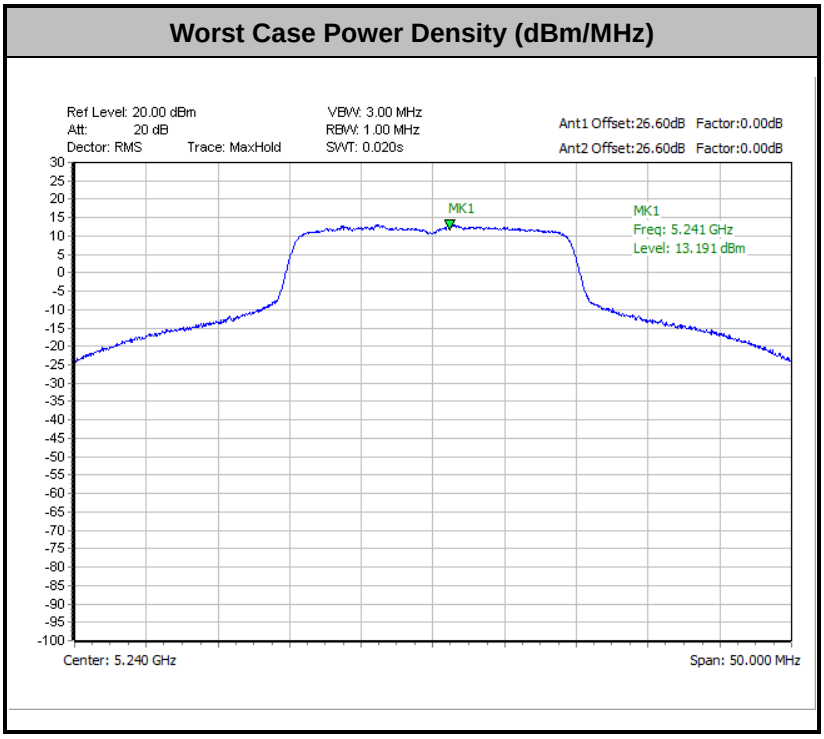
3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

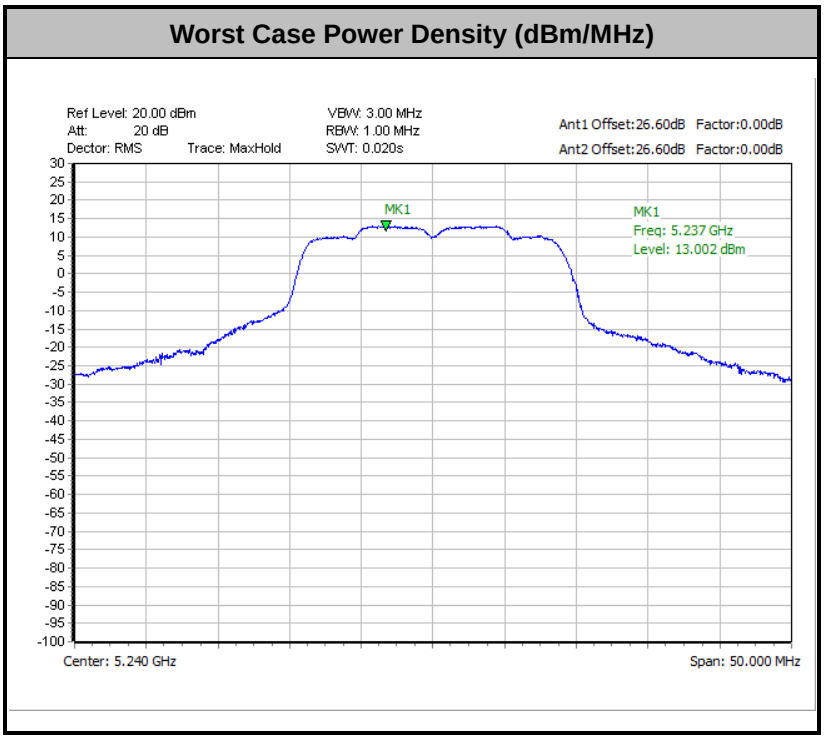
Please refer to Appendix A.

Worst Case Power Density (dBm/MHz)

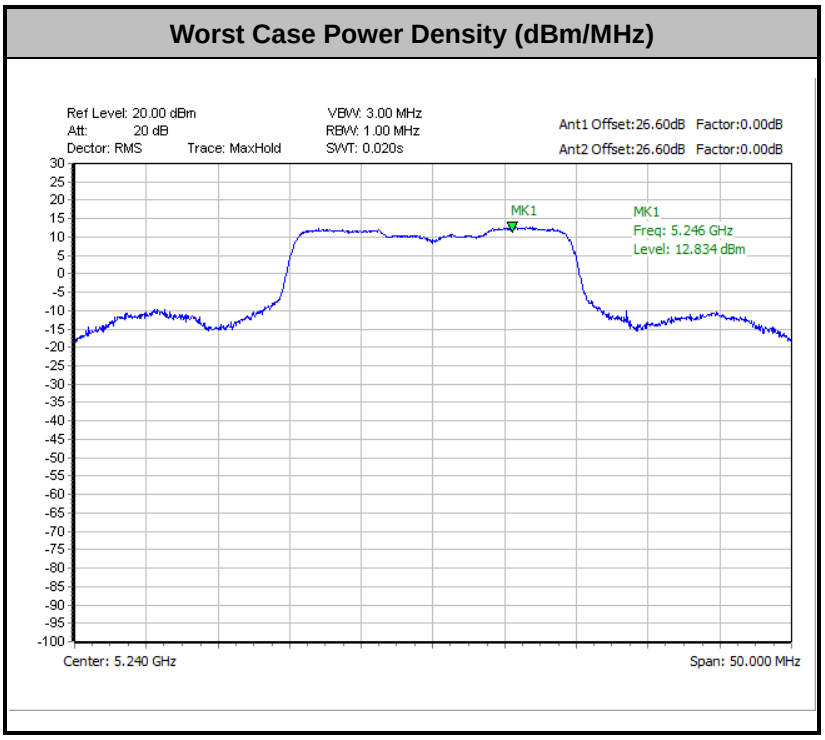


Note: Average Power Density (dB) = Measured value+ Duty Factor

<For Band-edge Unmodulated>



<For Middle Unmodulated>



3.4 Unwanted Emissions Measurement

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

3.4.1 Limit of Unwanted Emissions

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

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

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

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

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

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

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

(i) 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.

3.4.2 Measuring Instruments

See list of measuring equipment of this test report.

3.4.3 Test Procedures

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01. Section G) Unwanted emissions measurement.

   (1) Procedure for Unwanted Emissions Measurements Below 1000MHz

   - RBW = 120 kHz
   - VBW = 300 kHz
   - Detector = Peak
   - Trace mode = max hold

   (2) Procedure for Peak Unwanted Emissions Measurements Above 1000 MHz

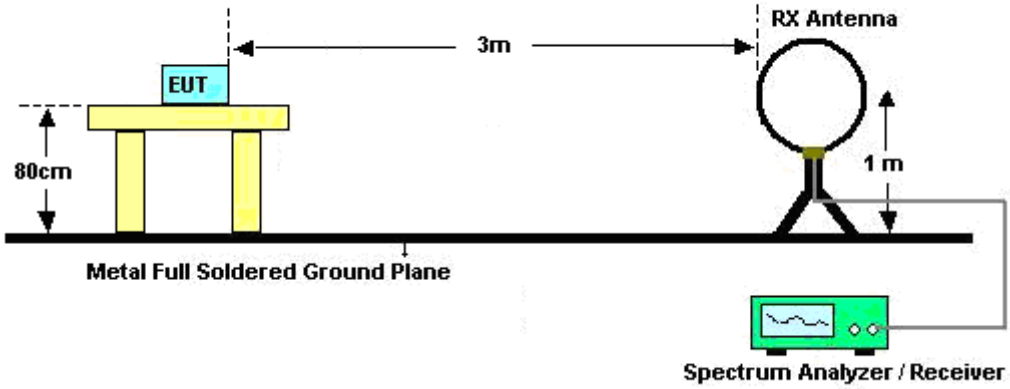
   - RBW = 1 MHz
   - VBW ≥ 3 MHz
   - Detector = Peak
   - Sweep time = auto
   - Trace mode = max hold

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

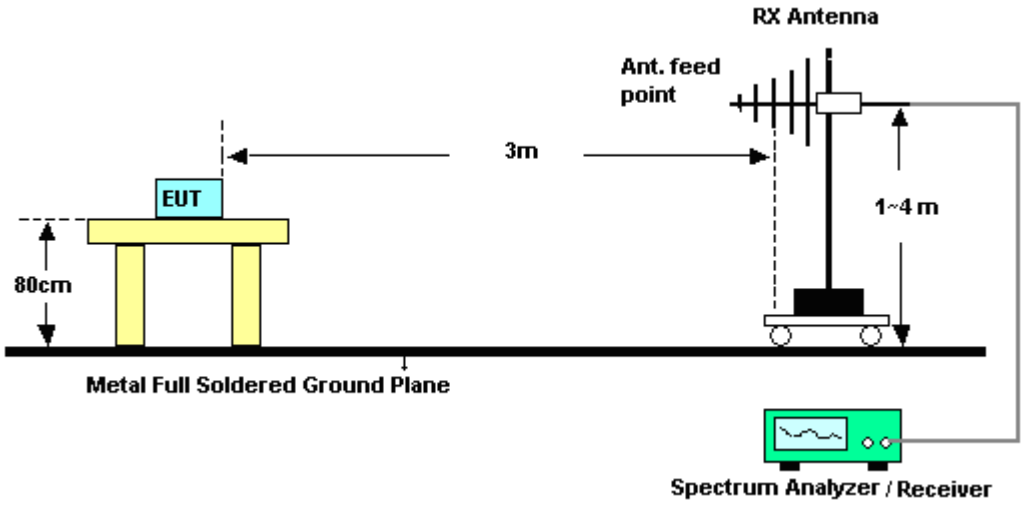
   - RBW = 1 MHz
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.
2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband antenna and its height is adjusted between one meter and four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT was arranged to its worst case and then adjust the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

3.4.4 Test Setup

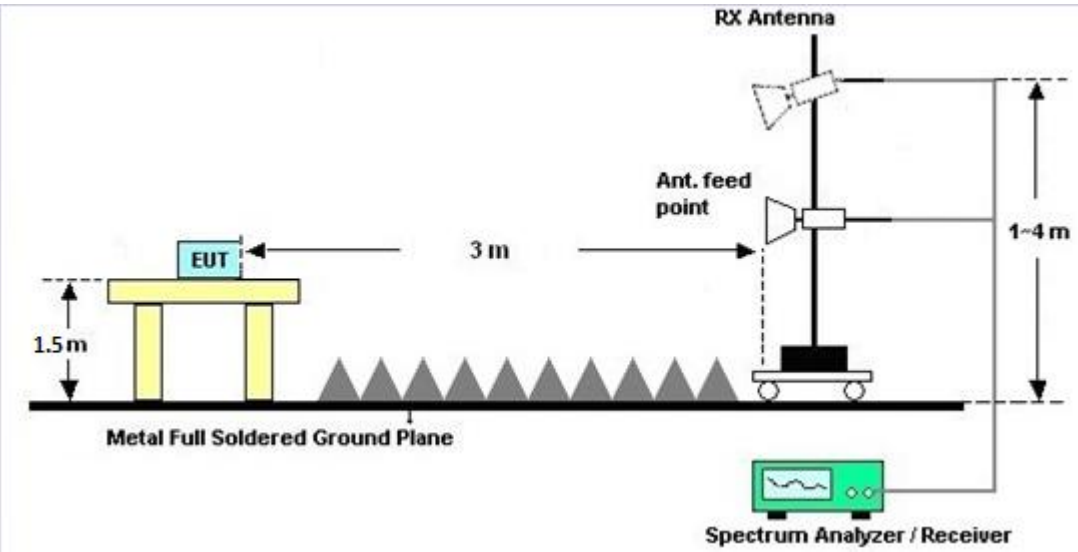
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.4.5 Test Results of Radiated Spurious Emissions (9 kHz ~ 30 MHz)

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

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

3.4.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix C and D.

3.4.7 Duty Cycle

Please refer to Appendix E.

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

Please refer to Appendix C and D.

3.5 AC Conducted Emission Measurement

3.5.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of emission (MHz)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

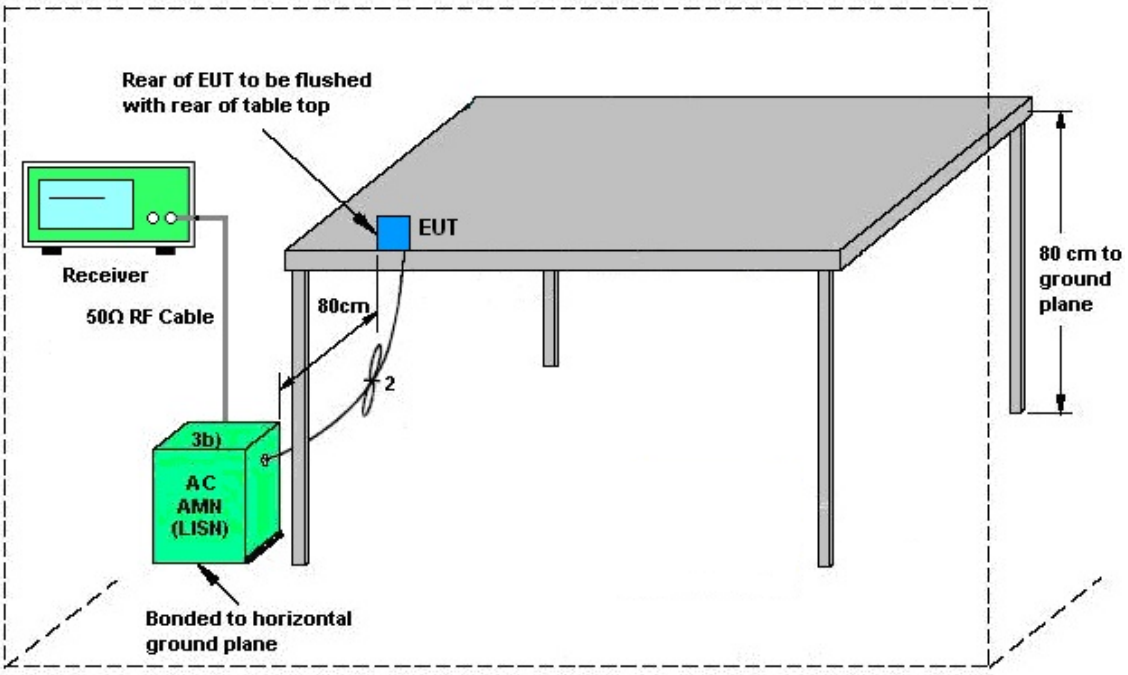
3.5.2 Measuring Instruments

See list of measuring equipment of this test report.

3.5.3 Test Procedures

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

3.5.4 Test Setup



AMN = Artificial mains network (LISN)
AE = Associated equipment
EUT = Equipment under test
ISN = Impedance stabilization network

3.5.5 Test Result of AC Conducted Emission

Please refer to Appendix B.

3.6 Automatically Discontinue Transmission

3.6.1 Limit of Automatically Discontinue Transmission

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

3.6.2 Measuring Instruments

See list of measuring equipment of this test report.

3.6.3 Test Result of Automatically Discontinue Transmission

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

Two antenna has different polarization, one is horizontal and the other one is vertical.

Horizontal antenna gain = 1.0 dBi

Vertical antenna gain = 2.5 dBi

Which use the larger one to calculate the EIRP.

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Bilog Antenna	TESEQ	6111D	50392	30MHz~1GHz	May 15, 2019	Feb. 06, 2020~ Mar. 10, 2020	May 14, 2020	Radiation (03CH02-CA)
Horn Antenna	SCHWARZBECK	BBHA 9120D	01894	1GHz~18GHz	Jul. 22, 2019	Feb. 06, 2020~ Mar. 10, 2020	Jul. 21, 2020	Radiation (03CH02-CA)
Amplifier	SONOMA	310N	372241	N/A	Jul. 26, 2019	Feb. 06, 2020~ Mar. 10, 2020	Jul. 25, 2020	Radiation (03CH02-CA)
Preamplifier	Keysight	83017A	MY53270321	1GHz~26.5GHz	Jul. 26, 2019	Feb. 06, 2020~ Mar. 10, 2020	Jul. 25, 2020	Radiation (03CH02-CA)
Preamplifier	Jet-Power	JPA0118-55-303	1710001800055007	1GHz~18GHz	Apr. 01, 2019	Feb. 06, 2020~ Mar. 10, 2020	Mar. 31, 2020	Radiation (03CH02-CA)
Spectrum Analyzer	Keysight	N9010A	MY57420221	10Hz~44GHz	Sep. 11, 2019	Feb. 06, 2020~ Mar. 10, 2020	Sep. 10, 2020	Radiation (03CH02-CA)
Filter	Wainwright	WLK12-1200-1272-11000-40SS	SN2	1.2G Low Pass	Aug. 02, 2019	Feb. 06, 2020~ Mar. 10, 2020	Aug. 01, 2020	Radiation (03CH02-CA)
Filter	Wainwright	WHKX12-2700-3000-18000-60ST	SN10	3G Highpass	Aug. 02, 2019	Feb. 06, 2020~ Mar. 10, 2020	Aug. 01, 2020	Radiation (03CH02-CA)
Hygrometer	TESEO	608-H1	45142602	N/A	Jul. 25, 2019	Feb. 06, 2020~ Mar. 10, 2020	Jul. 24, 2020	Radiation (03CH02-CA)
Controller	ChainTek	3000-1	N/A	Control Turn table & Ant Mast	N/A	Feb. 06, 2020~ Mar. 10, 2020	N/A	Radiation (03CH02-CA)
Antenna Mast	ChainTek	MBS-520-1	N/A	1m~4m	N/A	Feb. 06, 2020~ Mar. 10, 2020	N/A	Radiation (03CH02-CA)
Turn Table	ChainTek	T-200-S-1	N/A	0~360 Degree	N/A	Feb. 06, 2020~ Mar. 10, 2020	N/A	Radiation (03CH02-CA)
Hygrometer	Testo	608-H1	45142595	N/A	Aug. 07, 2019	Jan. 27, 2020~ Feb. 22, 2020~	Aug. 06, 2020	Conducted (TH01-CA)
Power Sensor	DARE	RPR3006W	RPR6W-1901027	50MHz~18GHz	Jun. 27, 2019	Jan. 27, 2020~ Feb. 22, 2020~	Jun. 26, 2020	Conducted (TH01-CA))
Spectrum Analyzer	Rohde & Schwarz	FSV 40	100895	10Hz~40GHz	Aug. 29, 2019	Jan. 27, 2020~ Feb. 22, 2020~	Aug. 28, 2020	Conducted (TH01-CA)
Switch Box & RF Cable	EM	EMSW18	SW1070902	N/A	N/A	Jan. 27, 2020~ Feb. 22, 2020~	N/A	Conducted (TH01-CA)
LISN	TESEQ	NNB51	47407	N/A	Jun. 26, 2019	Feb. 25, 2020	Jun. 25, 2020	Conduction (CO01-CA)
EMI Test Receiver	R&S	ESR7	102177	9KHz~7GHz	Jun. 27, 2019	Feb. 25, 2020	Jun. 26, 2020	Conduction (CO01-CA)
Pulse limiter with 10dB attenuation	R&S	VTSD 9561-F N	9561-F-N00412	N/A	Jun. 11, 2019	Feb. 25, 2020	Jun. 10, 2020	Conduction (CO01-CA)
Test Software	EMC32	N/A	N/A	N/A	N/A	Feb. 25, 2020	N/A	Conduction (CO01-CA)

5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**1.7**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.4**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**6.5**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**6.3**

Report Number : FR200117001D

TEST RESULTS DATA
26dB and 99% OBW

Band I MIMO														
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	18.53	16.58	33.32	22.38	-		22.20			
11a	6Mbps	2	40	5200	27.57	16.63	41.36	22.93	-		22.21			
11a	6Mbps	2	48	5240	20.53	16.63	34.52	22.53	-		22.21			

TEST RESULTS DATA
Average Power Table

FCC Band I MIMO													
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Conducted Power (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)			Pass/Fail
					Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2		
11a	6Mbps	2	36	5180	18.83	20.11	22.53	30.00		2.50			Pass
11a	6Mbps	2	40	5200	19.92	20.81	23.40	30.00		2.50			Pass
11a	6Mbps	2	48	5240	19.92	20.91	23.45	30.00		2.50			Pass
HT20	MCS0	2	36	5180	17.68	19.40	21.63	30.00		2.50			Pass
HT20	MCS0	2	40	5200	21.11	20.79	23.96	30.00		2.50			Pass
HT20	MCS0	2	48	5240	19.83	20.87	23.39	30.00		2.50			Pass
HT40	MCS0	2	38	5190	14.67	15.83	18.30	30.00		2.50			Pass
HT40	MCS0	2	46	5230	20.77	21.64	24.24	30.00		2.50			Pass
VHT20	MCS0	2	36	5180	17.61	19.33	21.56	30.00		2.50			Pass
VHT20	MCS0	2	40	5200	21.04	20.74	23.90	30.00		2.50			Pass
VHT20	MCS0	2	48	5240	19.77	20.83	23.34	30.00		2.50			Pass
VHT40	MCS0	2	38	5190	14.63	15.78	18.25	30.00		2.50			Pass
VHT40	MCS0	2	46	5230	20.74	21.61	24.21	30.00		2.50			Pass
VHT80	MCS0	2	42	5210	15.92	17.44	19.76	30.00		2.50			Pass

TEST RESULTS DATA
Power Spectral Density

FCC Band I MIMO													
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Power Density (dBm/MHz)			Average PSD Limit (dBm/MHz)		DG (dBi)			Pass /Fail
					Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2		
11a	6Mbps	2	36	5180			12.16	17.00		2.50			Pass
11a	6Mbps	2	40	5200			13.04	17.00		2.50			Pass
11a	6Mbps	2	48	5240			12.85	17.00		2.50			Pass

TEST RESULTS DATA
26dB and 99% OBW

Band I MIMO															
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	RU Config.	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		
HE20	MCS0	2	36	5180	Full	19.13	19.03	28.02	23.33	-		22.79			
HE20	MCS0	2	40	5200	Full	21.98	19.13	41.56	23.68	-		22.82			
HE20	MCS0	2	48	5240	Full	19.98	19.03	37.91	23.93	-		22.79			
HE40	MCS0	2	38	5190	Full	37.86	37.76	41.90	42.08	-		23.01			
HE40	MCS0	2	46	5230	Full	56.34	38.16	89.34	45.40	-		23.01			
HE80	MCS0	2	42	5210	Full	77.56	77.56	82.16	82.00	-		23.01			

TEST RESULTS DATA
Average Power Table

FCC Band I MIMO														
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	RU Config.	Average Conducted Power (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)			Pass/Fail
						Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2		
HE20	MCS0	2	36	5180	Full	17.77	19.44	21.70	30.00		2.50			Pass
HE20	MCS0	2	40	5200	Full	21.16	20.87	24.03	30.00		2.50			Pass
HE20	MCS0	2	48	5240	Full	19.89	20.94	23.46	30.00		2.50			Pass
HE40	MCS0	2	38	5190	Full	14.71	15.88	18.34	30.00		2.50			Pass
HE40	MCS0	2	46	5230	Full	20.82	21.71	24.30	30.00		2.50			Pass
HE80	MCS0	2	42	5210	Full	15.99	17.48	19.81	30.00		2.50			Pass

TEST RESULTS DATA
Power Spectral Density

FCC Band I MIMO													
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	RU Config.	Average Power Density (dBm/MHz)			Average PSD Limit (dBm/MHz)		DG (dBi)		Pass /Fail
						Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2	
HE20	MCS0	2	36	5180	Full			11.46	17.00		2.50		Pass
HE20	MCS0	2	40	5200	Full			13.08	17.00		2.50		Pass
HE20	MCS0	2	48	5240	Full			13.19	17.00		2.50		Pass
HE40	MCS0	2	38	5190	Full			4.83	17.00		2.50		Pass
HE40	MCS0	2	46	5230	Full			9.83	17.00		2.50		Pass
HE80	MCS0	2	42	5210	Full			2.41	17.00		2.50		Pass

TEST RESULTS DATA
Average Power Table

<Band-edge Unmodulated>

FCC Band I MIMO														
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	RU Config.	Average Conducted Power (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)			Pass/Fail
						Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2		
HE20	MCS0	2	36	5180	Full	15.15	16.94	19.15	30.00		2.50			Pass
HE20	MCS0	2	40	5200	Full	16.75	18.53	20.74	30.00		2.50			Pass
HE20	MCS0	2	48	5240	Full	17.46	18.85	21.22	30.00		2.50			Pass
HE40	MCS0	2	38	5190	Full	11.81	13.42	15.70	30.00		2.50			Pass
HE40	MCS0	2	46	5230	Full	16.55	18.41	20.59	30.00		2.50			Pass
HE80	MCS0	2	42	5210	Full	12.89	14.77	16.94	30.00		2.50			Pass

TEST RESULTS DATA
Power Spectral Density

FCC Band I MIMO													
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	RU Config.	Average Power Density (dBm/MHz)			Average PSD Limit (dBm/MHz)		DG (dBi)		Pass /Fail
						Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2	
HE20	MCS0	2	36	5180	Full			11.31	17.00		2.50		Pass
HE20	MCS0	2	40	5200	Full			12.80	17.00		2.50		Pass
HE20	MCS0	2	48	5240	Full			13.00	17.00		2.50		Pass
HE40	MCS0	2	38	5190	Full			4.51	17.00		2.50		Pass
HE40	MCS0	2	46	5230	Full			9.49	17.00		2.50		Pass
HE80	MCS0	2	42	5210	Full			2.15	17.00		2.50		Pass

TEST RESULTS DATA
Average Power Table

<Middle Unmodulated>

FCC Band I MIMO														
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	RU Config.	Average Conducted Power (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)			Pass/Fail
						Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2		
HE20	MCS0	2	36	5180	Full	10.86	13.85	15.62	30.00		2.50			Pass
HE20	MCS0	2	40	5200	Full	17.60	19.37	21.58	30.00		2.50			Pass
HE20	MCS0	2	48	5240	Full	17.19	19.53	21.53	30.00		2.50			Pass
HE40	MCS0	2	38	5190	Full	11.78	13.90	15.98	30.00		2.50			Pass
HE40	MCS0	2	46	5230	Full	16.54	18.19	20.45	30.00		2.50			Pass
HE80	MCS0	2	42	5210	Full	10.51	12.35	14.54	30.00		2.50			Pass

TEST RESULTS DATA
Power Spectral Density

FCC Band I MIMO														
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	RU Config.	Average Power Density (dBm/MHz)			Average PSD Limit (dBm/MHz)		DG (dBi)			Pass /Fail
						Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2		
HE20	MCS0	2	36	5180	Full			6.53	17.00		2.50			Pass
HE20	MCS0	2	44	5220	Full			12.61	17.00		2.50			Pass
HE20	MCS0	2	48	5240	Full			12.83	17.00		2.50			Pass
HE40	MCS0	2	38	5190	Full			4.79	17.00		2.50			Pass
HE40	MCS0	2	46	5230	Full			9.43	17.00		2.50			Pass
HE80	MCS0	2	42	5210	Full			0.77	17.00		2.50			Pass

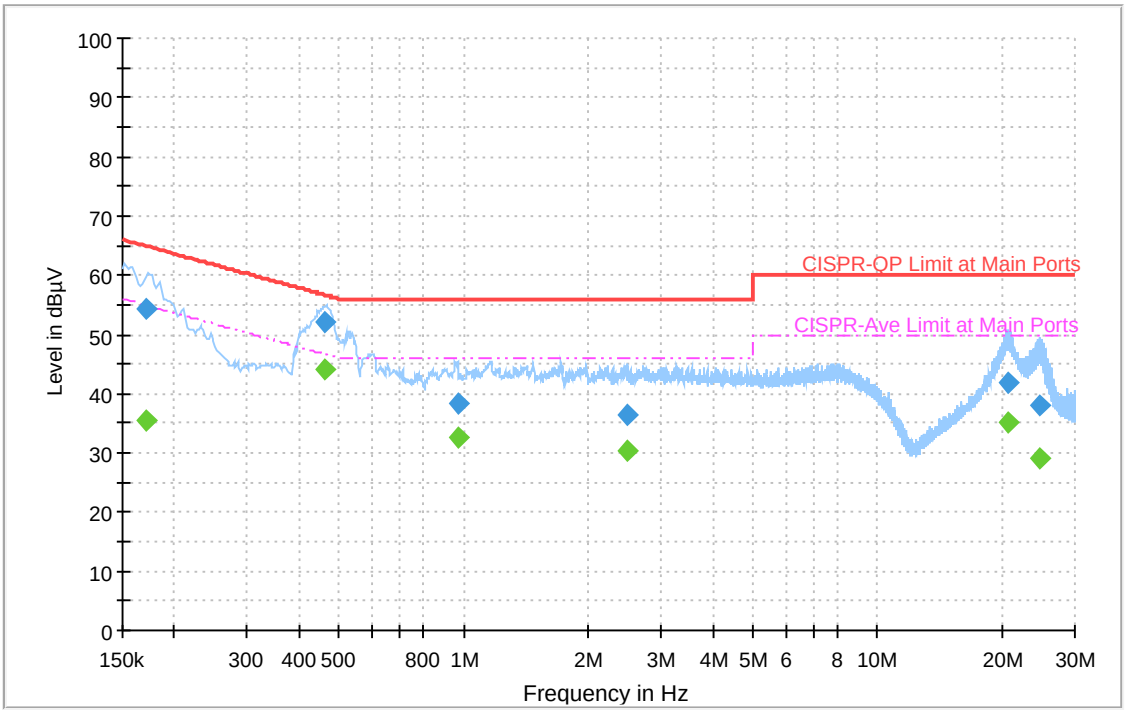
Appendix B. AC Conducted Emission Test Results

Test Engineer :	JC Liang	**Temperature :**	24~26℃
		Relative Humidity :	22~25%

EUT Information

Site:	CO01-CA
Project:	200117001
Power:	120Vac/60Hz
Mode:	1

Full Spectrum



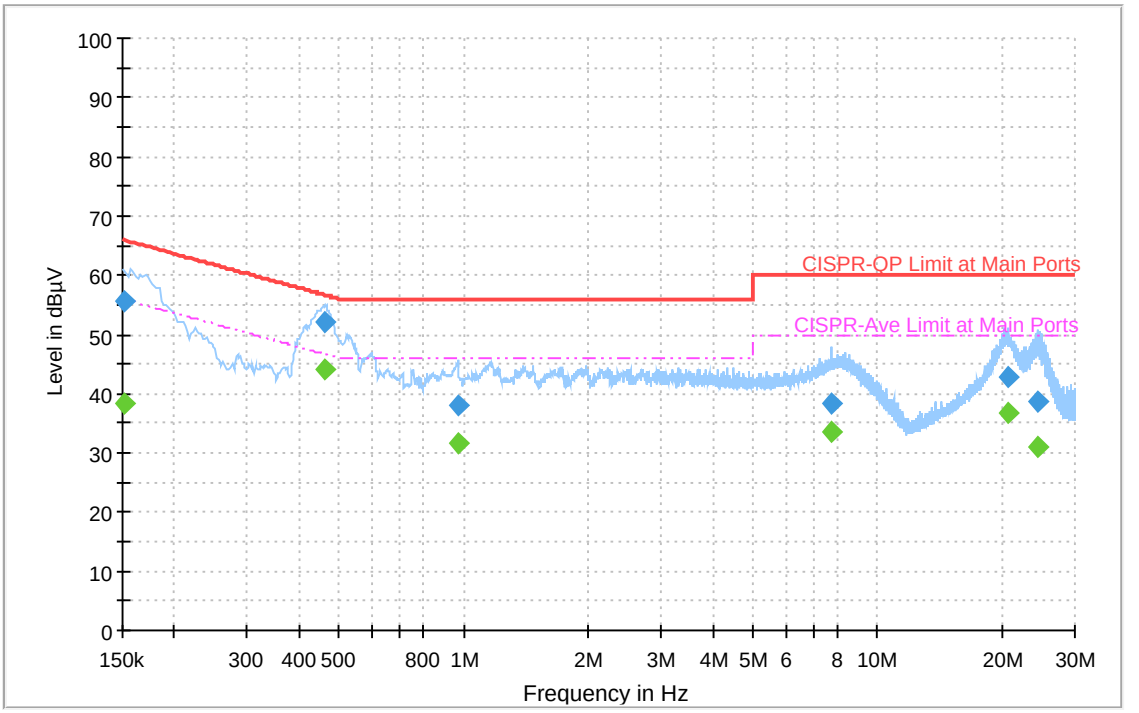
Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.170250	---	35.62	54.95	19.33	L1	OFF	20.3
0.170250	54.31	---	64.95	10.64	L1	OFF	20.3
0.460500	---	44.12	46.68	2.56	L1	OFF	20.4
0.460500	51.95	---	56.68	4.73	L1	OFF	20.4
0.971250	---	32.49	46.00	13.51	L1	OFF	20.4
0.971250	38.47	---	56.00	17.53	L1	OFF	20.4
2.484330	---	30.21	46.00	15.79	L1	OFF	20.4
2.484330	36.36	---	56.00	19.64	L1	OFF	20.4
20.640750	---	35.14	50.00	14.86	L1	OFF	20.7
20.640750	41.76	---	60.00	18.24	L1	OFF	20.7
24.702000	---	29.18	50.00	20.82	L1	OFF	20.8
24.702000	37.87	---	60.00	22.13	L1	OFF	20.8

EUT Information

Site:	CO01-CA
Project:	200117001
Power:	120Vac/60Hz
Mode:	1

Full Spectrum



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.152250	---	38.43	55.88	17.45	N	OFF	20.3
0.152250	55.63	---	65.88	10.25	N	OFF	20.3
0.460500	---	44.20	46.68	2.48	N	OFF	20.4
0.460500	51.93	---	56.68	4.75	N	OFF	20.4
0.971250	---	31.73	46.00	14.27	N	OFF	20.4
0.971250	37.90	---	56.00	18.10	N	OFF	20.4
7.741500	---	33.48	50.00	16.52	N	OFF	20.5
7.741500	38.49	---	60.00	21.51	N	OFF	20.5
20.715000	---	36.76	50.00	13.24	N	OFF	20.7
20.715000	42.79	---	60.00	17.21	N	OFF	20.7
24.384750	---	30.98	50.00	19.02	N	OFF	20.8
24.384750	38.52	---	60.00	21.48	N	OFF	20.8

Appendix C. Radiated Spurious Emission

Test Engineer :	Calvin Wu, Leo Luo, and Jacky Hong	Temperature :	19~22°C
		Relative Humidity :	36~45%

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		5148.46	57.1	-16.9	74	44.04	32	10.99	29.93	384	193	P	H
		5150	48.95	-5.05	54	35.89	32	10.99	29.93	384	193	A	H
	*	5180	115.97	-	-	103.01	31.81	11.08	29.93	384	193	P	H
	*	5180	108.02	-	-	95.06	31.81	11.08	29.93	384	193	A	H
													H
		5150	62.34	-11.66	74	49.3	31.98	10.99	29.93	195	130	P	V
		5149.76	53.47	-0.53	54	40.43	31.98	10.99	29.93	195	130	A	V
	*	5180	119.62	-	-	106.63	31.84	11.08	29.93	195	130	P	V
	*	5180	112.26	-	-	99.27	31.84	11.08	29.93	195	130	A	V
													V
802.11a CH 48 5240MHz		5149.24	54.41	-19.59	74	41.35	32	10.99	29.93	269	117	P	H
		5147.68	44.86	-9.14	54	31.79	32.01	10.99	29.93	269	117	A	H
	*	5240	118.8	-	-	106.02	31.51	11.19	29.92	269	117	P	H
	*	5240	110.77	-	-	97.99	31.51	11.19	29.92	269	117	A	H
		5359.48	57.29	-16.71	74	44.39	31.47	11.34	29.91	269	117	P	H
		5424.72	45.16	-8.84	54	32.03	31.63	11.41	29.91	269	117	A	H
		5148.46	55.82	-18.18	74	42.78	31.98	10.99	29.93	100	130	P	V
		5146.9	46.31	-7.69	54	33.28	31.98	10.98	29.93	100	130	A	V
	*	5240	120.5	-	-	107.66	31.57	11.19	29.92	100	130	P	V
	*	5240	113.86	-	-	101.02	31.57	11.19	29.92	100	130	A	V
		5436.48	56.48	-17.52	74	43.26	31.71	11.42	29.91	100	130	P	V
		5434.8	46.51	-7.49	54	33.31	31.7	11.41	29.91	100	130	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	47.85	-20.35	68.2	50.43	39.41	16.51	58.5	100	0	P	H
		15540	46.37	-27.63	74	49.72	37.89	20	61.24	100	0	P	H
													H
													H
		10360	48.34	-19.86	68.2	50.83	39.5	16.51	58.5	100	0	P	V
		15540	45.74	-28.26	74	49.06	37.92	20	61.24	100	0	P	V
													V
													V
802.11a CH 48 5240MHz		10480	46.24	-21.96	68.2	48.62	39.69	16.6	58.67	100	0	P	H
		15720	45.61	-28.39	74	49.05	37.45	20.1	60.99	100	0	P	H
													H
													H
		10480	46.99	-21.21	68.2	49.3	39.76	16.6	58.67	100	0	P	V
		15720	44.86	-29.14	74	48.2	37.55	20.1	60.99	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 802.11ax HE20 Full (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)
		5145.6	55.42	-18.58	74	42.36	32.01	10.98	29.93	400	201	P	H
		5146.12	47.86	-6.14	54	34.8	32.01	10.98	29.93	400	201	A	H
	*	5180	116.54	-	-	103.58	31.81	11.08	29.93	400	201	P	H
	*	5180	106.26	-	-	93.3	31.81	11.08	29.93	400	201	A	H
802.11ax													H
HE20 Full													H
CH 36		5148.98	60.74	-13.26	74	47.7	31.98	10.99	29.93	272	226	P	V
5180MHz		5150	53.03	-0.97	54	39.99	31.98	10.99	29.93	272	226	A	V
	*	5180	117.77	-	-	104.78	31.84	11.08	29.93	272	226	P	V
	*	5180	108.44	-	-	95.45	31.84	11.08	29.93	272	226	A	V
													V
													V
		5143	53.19	-20.81	74	40.13	32.02	10.97	29.93	253	256	P	H
		5145.08	44.46	-9.54	54	31.4	32.01	10.98	29.93	253	256	A	H
	*	5240	118.8	-	-	106.02	31.51	11.19	29.92	253	256	P	H
	*	5240	109.65	-	-	96.87	31.51	11.19	29.92	253	256	A	H
802.11ax		5380.76	54.78	-19.22	74	41.8	31.52	11.37	29.91	253	256	P	H
HE20 Full		5431.16	45.01	-8.99	54	31.86	31.65	11.41	29.91	253	256	A	H
CH 48		5115.7	55.41	-18.59	74	42.46	31.99	10.89	29.93	103	127	P	V
5240MHz		5141.7	45.45	-8.55	54	32.43	31.98	10.97	29.93	103	127	A	V
	*	5240	121.12	-	-	108.28	31.57	11.19	29.92	103	127	P	V
	*	5240	112.1	-	-	99.26	31.57	11.19	29.92	103	127	A	V
		5430.04	54.87	-19.13	74	41.69	31.68	11.41	29.91	103	127	P	V
		5430.04	45.91	-8.09	54	32.73	31.68	11.41	29.91	103	127	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11ax HE20 Full (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)
		10360	47.53	-20.67	68.2	50.11	39.41	16.51	58.5	100	0	P	H
		15540	46.05	-27.95	74	49.4	37.89	20	61.24	100	0	P	H
802.11ax													H
HE20 Full													H
CH 36		10360	46.9	-21.3	68.2	49.39	39.5	16.51	58.5	100	0	P	V
5180MHz		15540	46.09	-27.91	74	49.41	37.92	20	61.24	100	0	P	V
													V
													V
		10480	48.1	-20.1	68.2	50.48	39.69	16.6	58.67	100	0	P	H
		15720	45.12	-28.88	74	48.56	37.45	20.1	60.99	100	0	P	H
802.11ax													H
HE20 Full													H
CH 48		10480	47.99	-20.21	68.2	50.3	39.76	16.6	58.67	100	0	P	V
5240MHz		15720	45.02	-28.98	74	48.36	37.55	20.1	60.99	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 802.11ax HE40 Full (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)
		5148.98	59.78	-14.22	74	46.72	32	10.99	29.93	246	255	P	H
		5150	52.2	-1.8	54	39.14	32	10.99	29.93	246	255	A	H
	*	5190	112.17	-	-	99.24	31.74	11.11	29.92	246	255	P	H
	*	5190	103.28	-	-	90.35	31.74	11.11	29.92	246	255	A	H
802.11ax		5440.12	52.18	-21.82	74	38.99	31.67	11.42	29.9	246	255	P	H
HE40 Full		5452.44	43.45	-10.55	54	30.22	31.7	11.43	29.9	246	255	A	H
CH 38		5146.64	62.23	-11.77	74	49.2	31.98	10.98	29.93	100	132	P	V
5190MHz		5150	53.84	-0.16	54	40.8	31.98	10.99	29.93	100	132	A	V
	*	5190	114.91	-	-	101.93	31.79	11.11	29.92	100	132	P	V
	*	5190	105.35	-	-	92.37	31.79	11.11	29.92	100	132	A	V
		5412.96	53.86	-20.14	74	40.76	31.61	11.4	29.91	100	132	P	V
		5452.44	43.9	-10.1	54	30.59	31.78	11.43	29.9	100	132	A	V
		5148.72	58.45	-15.55	74	45.41	31.98	10.99	29.93	105	121	P	V
		5150	50.68	-3.32	54	37.64	31.98	10.99	29.93	105	121	A	V
	*	5230	119.83	-	-	106.96	31.61	11.18	29.92	105	121	P	V
	*	5230	109.87	-	-	97	31.61	11.18	29.92	105	121	A	V
802.11ax		5364.24	54.97	-19.03	74	42.09	31.44	11.35	29.91	105	121	P	V
HE40 Full		5416.04	45.95	-8.05	54	32.84	31.62	11.4	29.91	105	121	A	V
CH 46		5147.42	56.8	-17.2	74	43.74	32.01	10.98	29.93	256	258	P	H
5230MHz		5147.68	47.43	-6.57	54	34.36	32.01	10.99	29.93	256	258	A	H
	*	5230	117.36	-	-	104.55	31.55	11.18	29.92	256	258	P	H
	*	5230	108.06	-	-	95.25	31.55	11.18	29.92	256	258	A	H
		5351.92	54.15	-19.85	74	41.28	31.45	11.33	29.91	256	258	P	H
		5353.88	44.45	-9.55	54	31.57	31.46	11.33	29.91	256	258	A	H
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11ax HE40 Full (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)
		10380	47.74	-20.46	68.2	50.29	39.45	16.53	58.53	100	0	P	H
		15570	45.2	-28.8	74	48.6	37.79	20.01	61.2	100	0	P	H
802.11ax													H
HE40 Full													H
CH 38		10380	46.65	-21.55	68.2	49.15	39.5	16.53	58.53	100	0	P	V
5190MHz		15570	45.2	-28.8	74	48.56	37.83	20.01	61.2	100	0	P	V
													V
													V
		10460	47.22	-20.98	68.2	49.64	39.64	16.58	58.64	100	0	P	H
		15690	45.55	-28.45	74	49.01	37.49	20.08	61.03	100	0	P	H
802.11ax													H
HE40 Full													H
CH 46		10460	46.61	-21.59	68.2	48.95	39.72	16.58	58.64	100	0	P	V
5230MHz		15690	44.15	-29.85	74	47.51	37.59	20.08	61.03	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 802.11ax HE80 Full (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)
		5142.74	61.9	-12.1	74	48.84	32.02	10.97	29.93	255	120	P	H
		5144.82	53.04	-0.96	54	39.98	32.01	10.98	29.93	255	120	A	H
	*	5210	112.52	-	-	99.65	31.64	11.15	29.92	255	120	P	H
	*	5210	102.02	-	-	89.15	31.64	11.15	29.92	255	120	A	H
802.11ax		5354.16	55.28	-18.72	74	42.4	31.46	11.33	29.91	255	120	P	H
HE80 Full		5354.16	45.46	-8.54	54	32.58	31.46	11.33	29.91	255	120	A	H
CH 42		5124.8	64.38	-9.62	74	51.4	31.99	10.92	29.93	100	124	P	V
5210MHz		5145.08	52.84	-1.16	54	39.81	31.98	10.98	29.93	100	124	A	V
	*	5210	111.99	43.79	68.2	99.06	31.7	11.15	29.92	100	124	P	V
	*	5210	102.49	-	-	89.56	31.7	11.15	29.92	100	124	A	V
		5420.24	53.19	-	-	40.06	31.64	11.4	29.91	100	124	P	V
		5351.92	44.69	-9.31	54	31.86	31.41	11.33	29.91	100	124	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11ax HE80 Full (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)
		10420	46.89	-21.31	68.2	49.38	39.54	16.56	58.59	100	0	P	H
		15630	45.13	-28.87	74	48.57	37.64	20.04	61.12	100	0	P	H
802.11ax													H
HE80 Full													H
CH 42		10420	46.46	-21.74	68.2	48.91	39.58	16.56	58.59	100	0	P	V
5210MHz		15630	45.01	-28.99	74	48.39	37.7	20.04	61.12	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Emission above 18GHz

5GHz WIFI SHF

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)
SHF		39296	50.72	-23.28	74	37.88	44.1	22.83	54.09	100	0	P	H
													H
		39516	50.2	-23.8	74	36.76	44.31	22.94	53.81	100	0	P	V
													V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

Emission below 1GHz

5GHz WIFI (LF)

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)
LF		32.91	22.26	-17.74	40	30.13	23.62	0.98	32.47	-	-	P	H
		105.66	22.98	-20.52	43.5	37.04	16.67	1.69	32.42	-	-	P	H
		129.91	26.23	-17.27	43.5	39.06	17.69	1.9	32.42	-	-	P	H
		680.87	26.79	-19.21	46	28.56	26.42	4.32	32.51	-	-	P	H
		843.83	30.7	-15.3	46	28.99	28.85	4.82	31.96	-	-	P	H
		959.26	35.4	-10.6	46	30.42	30.99	5.08	31.09	100	0	P	H
		30	26.27	-13.73	40	33.12	24.7	0.93	32.48	-	-	P	V
		56.19	26.93	-13.07	40	45.88	11.98	1.51	32.44	-	-	P	V
		122.15	29.06	-14.44	43.5	42.1	17.6	1.78	32.42	-	-	P	V
		639.16	27.58	-18.42	46	29.61	26.48	4.06	32.57	-	-	P	V
		750.71	29.35	-16.65	46	29.09	28.19	4.46	32.39	-	-	P	V
		938.89	33.63	-12.37	46	29.48	30.46	4.99	31.3	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

<Band-edge Unmodulated>

Band 1 - 5150~5250MHz

WIFI 802.11ax HE20 Full (Band Edge @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1+2		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
		5146.9	66.33	-7.67	74	53.27	32.01	10.98	29.93	375	112	P	H
		5145.86	51.69	-2.31	54	38.63	32.01	10.98	29.93	375	112	A	H
	*	5180	118.98	-	-	106.02	31.81	11.08	29.93	375	112	P	H
	*	5180	110.51	-	-	97.55	31.81	11.08	29.93	375	112	A	H
802.11ax													H
HE20 Full													H
CH 36		5144.04	63.08	-10.92	74	50.06	31.98	10.97	29.93	305	115	P	V
5180MHz		5149.24	52.49	-1.51	54	39.45	31.98	10.99	29.93	305	115	A	V
	*	5180	119.21	-	-	106.22	31.84	11.08	29.93	305	115	P	V
	*	5180	110.63	-	-	97.64	31.84	11.08	29.93	305	115	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 802.11ax HE40 Full (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)
		5140.4	67.29	-6.71	74	54.24	32.02	10.96	29.93	100	238	P	H
		5149.76	49.39	-4.61	54	36.33	32	10.99	29.93	100	238	A	H
	*	5190	111.27	-	-	98.34	31.74	11.11	29.92	100	238	P	H
	*	5190	101.38	-	-	88.45	31.74	11.11	29.92	100	238	A	H
802.11ax		5456.36	53.68	-20.32	74	40.44	31.71	11.43	29.9	100	238	P	H
HE40 Full		5450.76	43.96	-10.04	54	30.73	31.7	11.43	29.9	100	238	A	H
CH 38		5131.3	63.04	-10.96	74	50.05	31.98	10.94	29.93	101	128	P	V
5190MHz		5150	52.79	-1.21	54	39.75	31.98	10.99	29.93	101	128	A	V
	*	5190	114.47	-	-	101.49	31.79	11.11	29.92	101	128	P	V
	*	5190	105.54	-	-	92.56	31.79	11.11	29.92	101	128	A	V
		5454.96	54.47	-19.53	74	41.16	31.78	11.43	29.9	101	128	P	V
		5457.48	45.05	-8.95	54	31.73	31.79	11.43	29.9	101	128	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11ax HE80 Full (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)
802.11ax HE80 Full CH 42 5210MHz		5115.96	65.43	-8.57	74	52.4	32.07	10.89	29.93	271	283	5115.96	H
		5149.5	53.76	-0.24	54	40.7	32	10.99	29.93	271	283	5149.5	H
	*	5210	108.89	-	-	96.02	31.64	11.15	29.92	271	283	5210	H
	*	5210	99.71	-	-	86.84	31.64	11.15	29.92	271	283	5210	H
		5433.12	54.3	-19.7	74	41.15	31.65	11.41	29.91	271	283	5433.12	H
		5459.72	44.62	-9.38	54	31.37	31.72	11.43	29.9	271	283	5459.72	H
		5150	59.54	-14.46	74	46.5	31.98	10.99	29.93	302	319	5150	V
		5150	53.79	-0.21	54	40.75	31.98	10.99	29.93	302	319	5150	V
	*	5210	108.28	-	-	95.35	31.7	11.15	29.92	302	319	5210	V
	*	5210	99.88	-	-	86.95	31.7	11.15	29.92	302	319	5210	V
		5446.56	54.69	-19.31	74	41.42	31.75	11.42	29.9	302	319	5446.56	V
		5350.8	45.25	-8.75	54	32.43	31.4	11.33	29.91	302	319	5350.8	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

<Middle Unmodulated>

Band 1 - 5150~5250MHz

WIFI 802.11ax HE20 Full (Band Edge @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1+2		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
		5150	69.07	-4.93	74	56.01	32	10.99	29.93	400	360	P	H
		5149.24	53.71	-0.29	54	40.65	32	10.99	29.93	400	360	A	H
	*	5180	113.49	-	-	100.53	31.81	11.08	29.93	400	360	P	H
	*	5180	104.37	-	-	91.41	31.81	11.08	29.93	400	360	A	H
802.11ax													H
HE20 Full													H
CH 36		5147.68	68.74	-5.26	74	55.7	31.98	10.99	29.93	285	293	P	V
5180MHz		5147.68	53.7	-0.3	54	40.66	31.98	10.99	29.93	285	293	A	V
	*	5180	112.24	-	-	99.25	31.84	11.08	29.93	285	293	P	V
	*	5180	103.58	-	-	90.59	31.84	11.08	29.93	285	293	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 802.11ax HE40 Full (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)
		5148.2	63.11	-10.89	74	50.05	32	10.99	29.93	347	360	P	H
		5147.94	53.55	-0.45	54	40.49	32	10.99	29.93	347	360	A	H
	*	5190	113.15	-	-	100.22	31.74	11.11	29.92	347	360	P	H
	*	5190	102.69	-	-	89.76	31.74	11.11	29.92	347	360	A	H
802.11ax		5448.24	53.62	-20.38	74	40.4	31.7	11.42	29.9	347	360	P	H
HE40 Full		5454.12	44.35	-9.65	54	31.11	31.71	11.43	29.9	347	360	A	H
CH 38		5148.72	67.76	-6.24	74	54.72	31.98	10.99	29.93	294	291	P	V
5190MHz		5145.6	53.05	-0.95	54	40.02	31.98	10.98	29.93	294	291	A	V
	*	5190	112.94	-	-	99.96	31.79	11.11	29.92	294	291	P	V
	*	5190	102.21	-	-	89.23	31.79	11.11	29.92	294	291	A	V
		5400.36	55	-19	74	41.97	31.55	11.39	29.91	294	291	P	V
		5456.64	44.36	-9.64	54	31.04	31.79	11.43	29.9	294	291	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11ax HE80 Full (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)
802.11ax HE80 Full CH 42 5210MHz		5149.24	66.92	-7.08	74	53.86	32	10.99	29.93	393	360	Peak	H
		5116.74	52.52	-1.48	54	39.49	32.07	10.89	29.93	393	360	Average	H
	*	5210	108.75	-	-	95.88	31.64	11.15	29.92	393	360	Peak	H
	*	5210	98.79	-	-	85.92	31.64	11.15	29.92	393	360	Average	H
		5358.92	54.57	-19.43	74	41.67	31.47	11.34	29.91	393	360	Peak	H
		5355.84	47.04	-6.96	54	34.16	31.46	11.33	29.91	393	360	Average	H
		5147.68	65.34	-8.66	74	52.3	31.98	10.99	29.93	294	289	Peak	V
		5148.98	50.92	-3.08	54	37.88	31.98	10.99	29.93	294	289	Average	V
	*	5210	109.19	-	-	96.26	31.7	11.15	29.92	294	289	Peak	V
	*	5210	99.57	-	-	86.64	31.7	11.15	29.92	294	289	Average	V
		5362.56	56.15	-17.85	74	43.28	31.44	11.34	29.91	294	289	Peak	V
		5363.68	47.9	-6.1	54	35.03	31.44	11.34	29.91	294	289	Average	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Note symbol

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

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

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

1. Path Loss(dB) = Cable loss(dB) + Filter loss(dB) + Attenuator loss(dB)
2. Level(dBμV/m) = Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
3. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 54.51(dBμV) – 35.86 (dB)

= 55.45 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 55.45(dBμV/m) – 74(dBμV/m)

= -18.55(dB)

For Average Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)

= 43.54 (dBμV/m)

2. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

= 43.54(dBμV/m) – 54(dBμV/m)

= -10.46(dB)

Both peak and average measured complies with the limit line, so test result is "PASS".

Appendix D. Radiated Spurious Emission

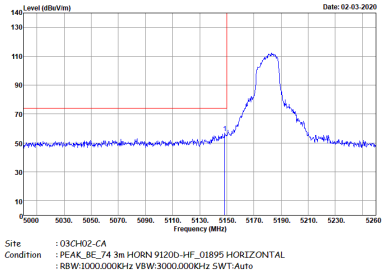
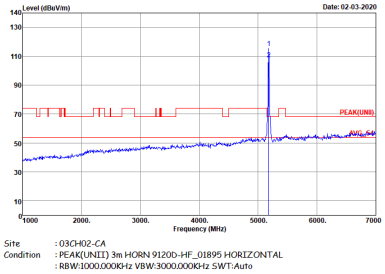
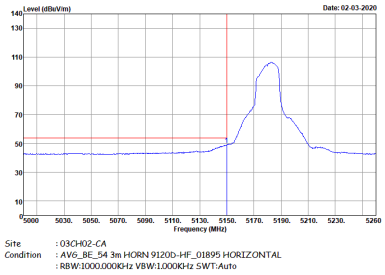
Test Engineer :	Calvin Wu, Leo Luo, and Jacky Hong	**Temperature :**	19~22°C
		Relative Humidity :	36~45%

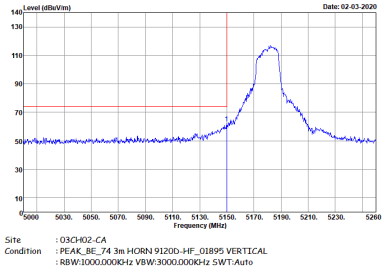
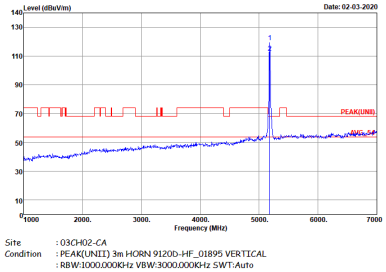
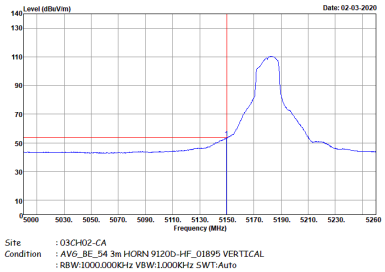
Note symbol

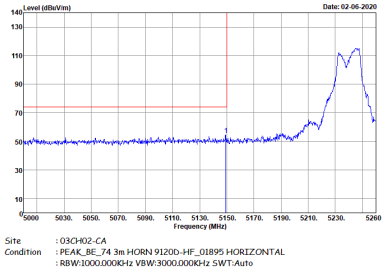
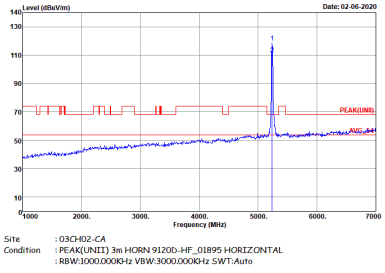
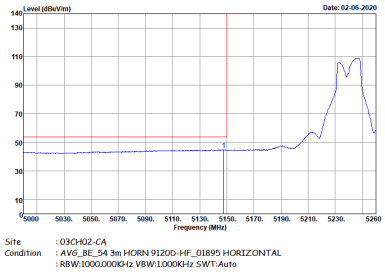
-L	**Low channel location**
-R	**High channel location**

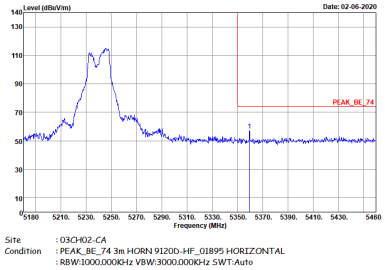
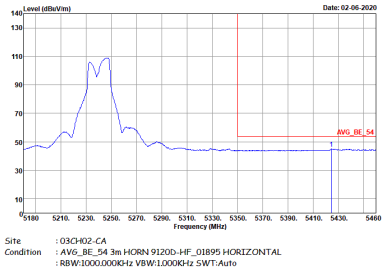
Band 1 - 5150~5250MHz

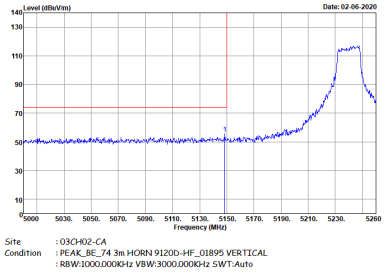
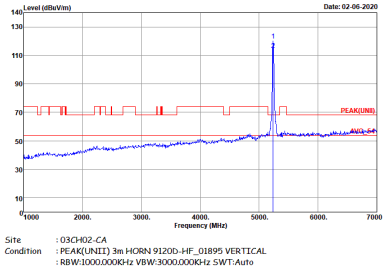
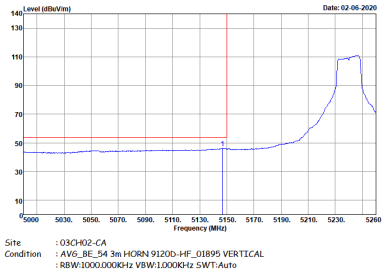
WIFI 802.11a (Band Edge @ 3m)

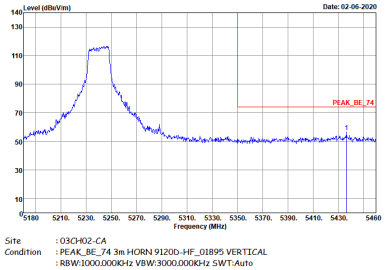
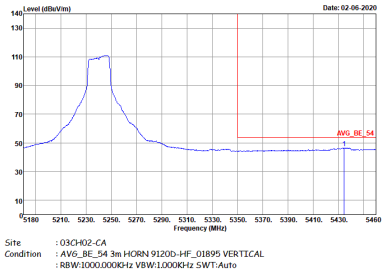
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11a CH36 5180MHz	
1+2	Horizontal	Fundamental
Peak		
Avg.		Left blank

WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11a CH36 5180MHz	
1+2	Vertical	Fundamental
Peak		
Avg.		Left blank

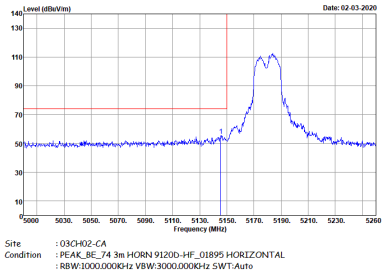
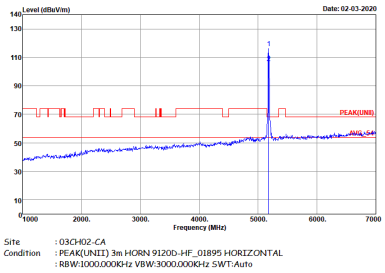
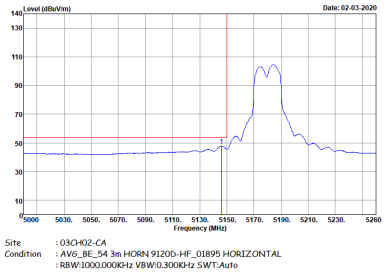
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11a CH48 5240MHz - L	
1+2	Horizontal	Fundamental
Peak		
Avg.		Left blank

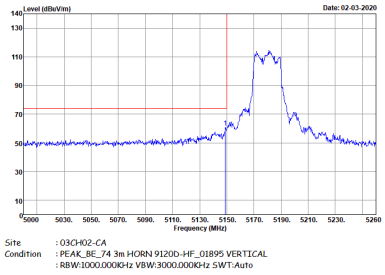
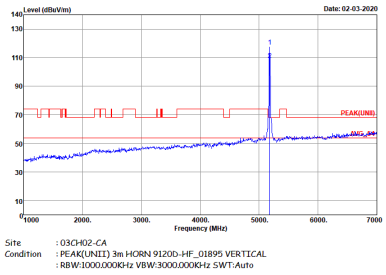
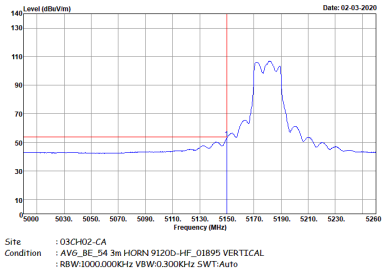
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11a CH48 5240MHz - R	
1+2	Horizontal	Fundamental
Peak		Left blank
Avg.		Left blank

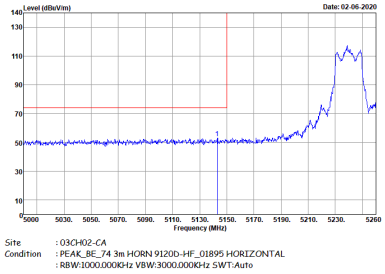
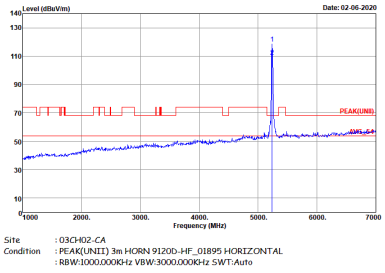
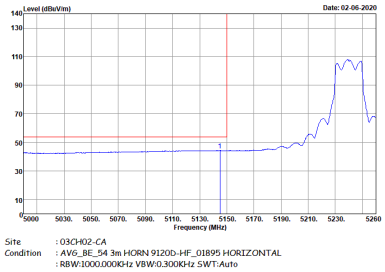
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11a CH48 5240MHz - L	
1+2	Vertical	Fundamental
Peak		
Avg.		Left blank

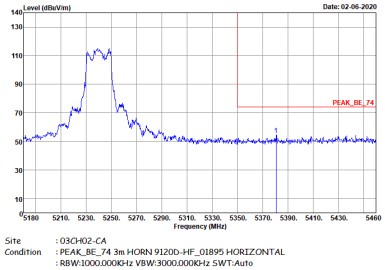
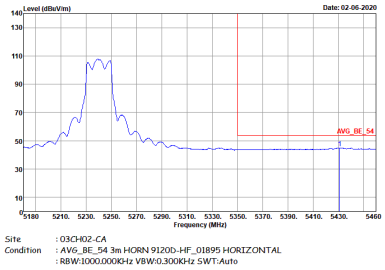
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11a CH48 5240MHz - R	
1+2	Vertical	Fundamental
Peak		Left blank
Avg.		Left blank

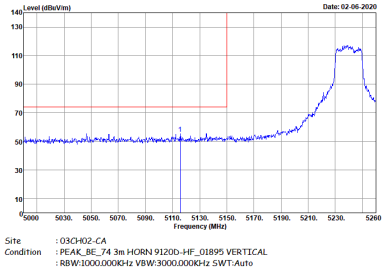
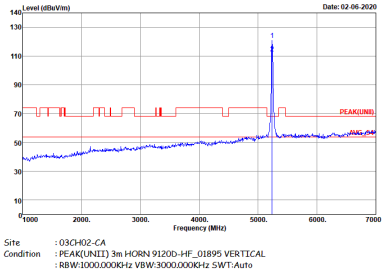
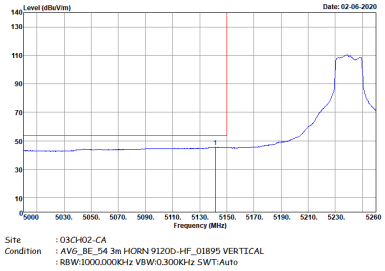
WIFI 802.11ax HE20 Full (Band Edge @ 3m)

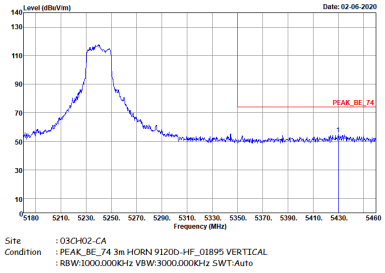
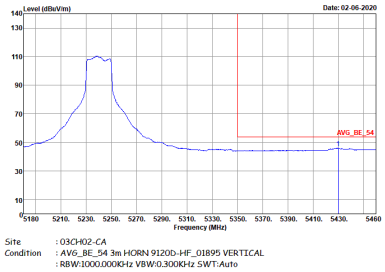
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ax HE20 Full CH36 5180MHz	
1+2	Horizontal	Fundamental
Peak		
Avg.		Left blank

WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ax HE20 Full CH36 5180MHz	
1+2	Vertical	Fundamental
Peak		
Avg.		Left blank

WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ax HE20 Full CH48 5240MHz - L	
1+2	Horizontal	Fundamental
Peak		
Avg.		Left blank

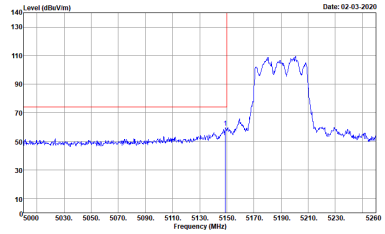
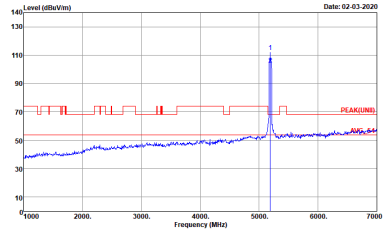
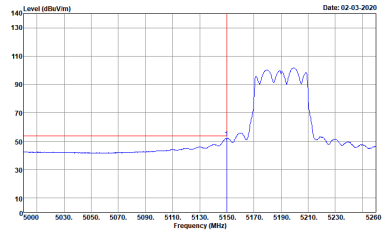
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ax HE20 Full CH48 5240MHz - R	
1+2	Horizontal	Fundamental
Peak		Left blank
Avg.		Left blank

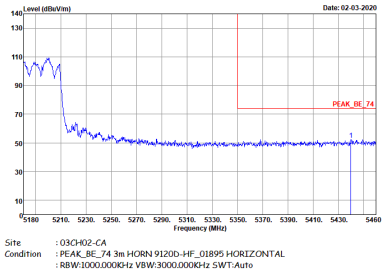
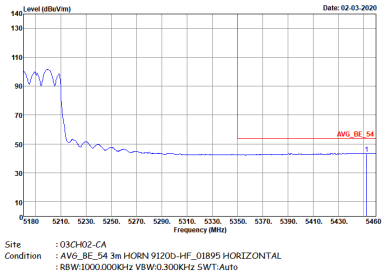
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ax HE20 Full CH48 5240MHz - L	
1+2	Vertical	Fundamental
Peak		
Avg.		Left blank

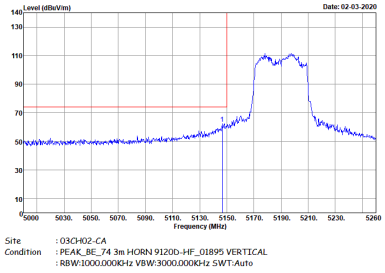
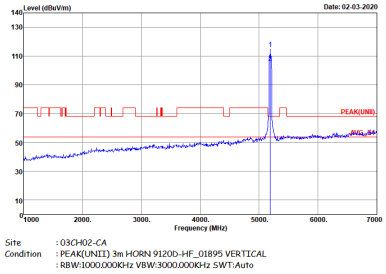
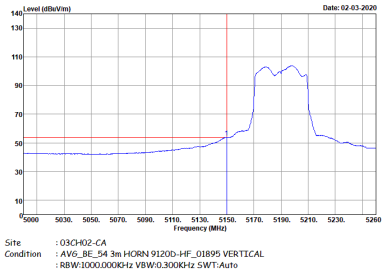
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ax HE20 Full CH48 5240MHz - R	
1+2	Vertical	Fundamental
Peak		Left blank
Avg.		Left blank

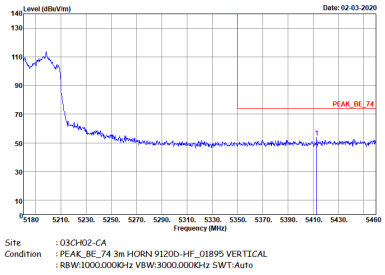
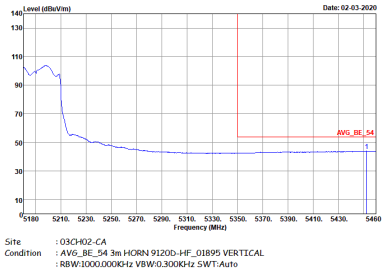
Band 1 5150~5250MHz

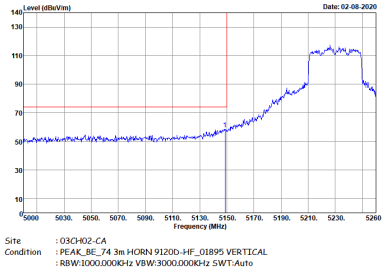
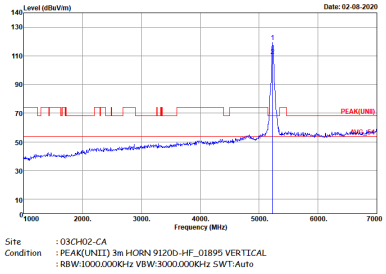
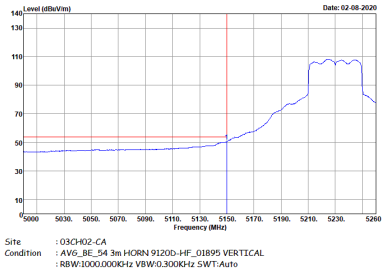
WIFI 802.11ax HE40 Full (Band Edge @ 3m)

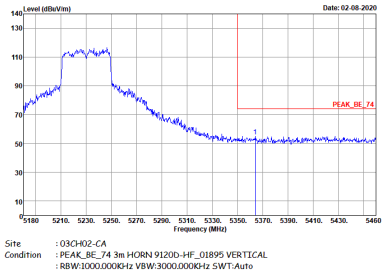
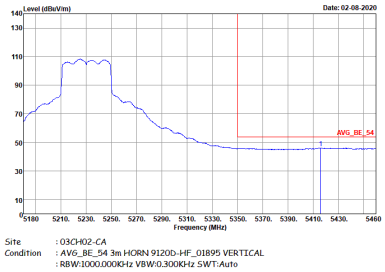
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ax HE40 Full CH38 5190MHz - L	
1+2	Horizontal	Fundamental
Peak		
Avg.		Left blank

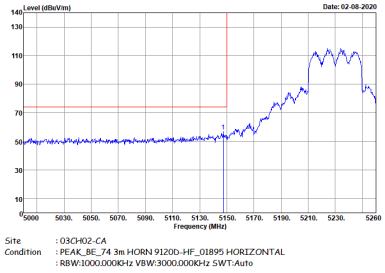
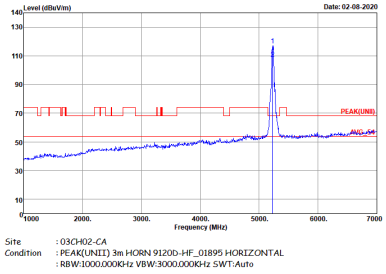
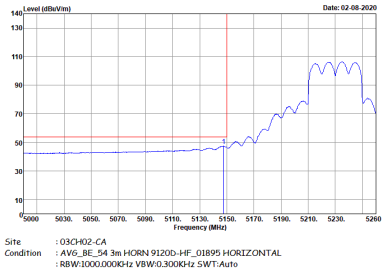
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ax HE40 Full CH38 5190MHz - R	
1+2	Horizontal	Fundamental
Peak		Left blank
Avg.		Left blank

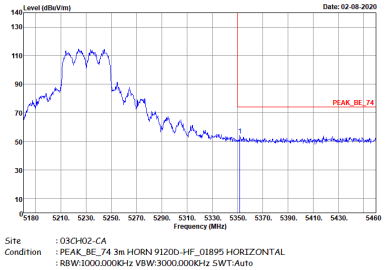
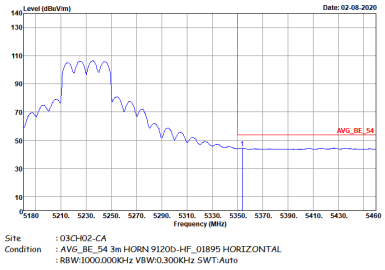
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ax HE40 Full CH38 5190MHz - L	
1+2	Vertical	Fundamental
Peak		
Avg.		Left blank

WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ax HE40 Full CH38 5190MHz - R	
1+2	Vertical	Fundamental
Peak		Left blank
Avg.		Left blank

WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ax HE40 Full CH46 5230MHz - L	
1+2	Horizontal	Fundamental
Peak		
Avg.		Left blank

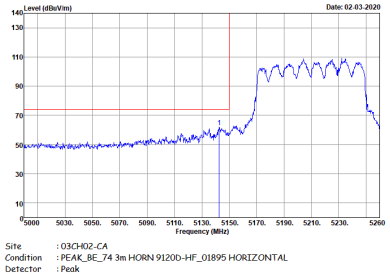
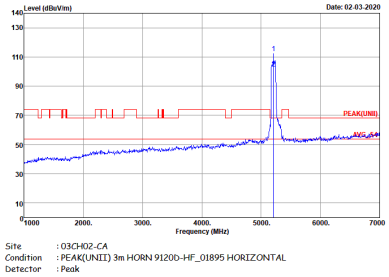
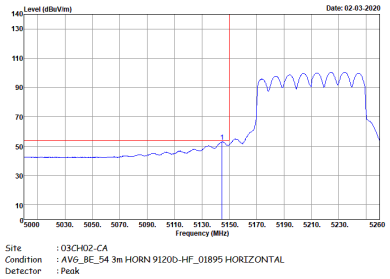
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ax HE40 Full CH46 5230MHz - R	
1+2	Horizontal	Fundamental
Peak		Left blank
Avg.		Left blank

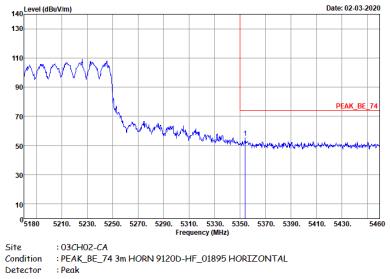
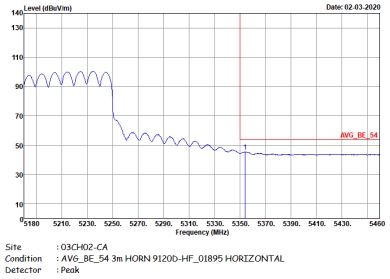
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ax HE40 Full CH46 5230MHz - L	
1+2	Vertical	Fundamental
Peak		
Avg.		Left blank

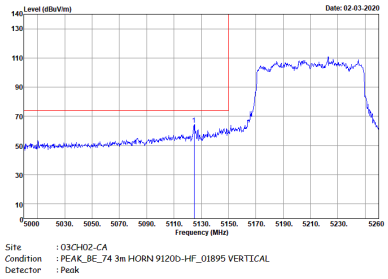
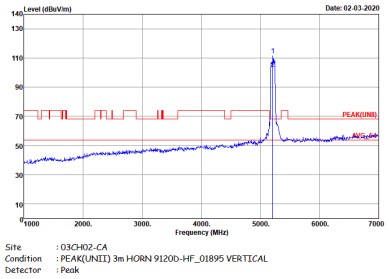
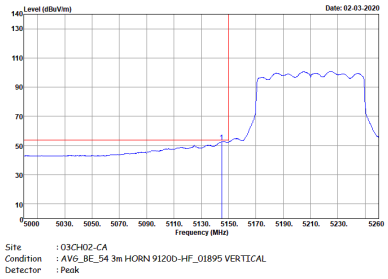
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ax HE40 Full CH46 5230MHz - R	
1+2	Vertical	Fundamental
Peak		Left blank
Avg.		Left blank

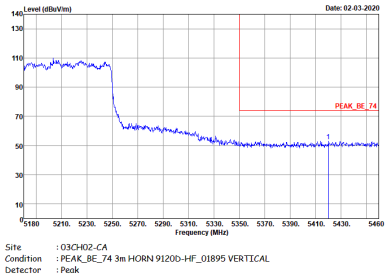
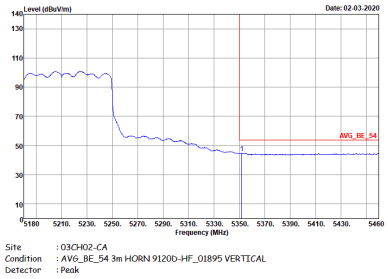
Band 1 5150~5250MHz

WIFI 802.11ax HE80 Full (Band Edge @ 3m)

WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ax HE80 Full CH42 5210MHz - L	
1+2	Horizontal	Fundamental
Peak		
Avg.		Left blank

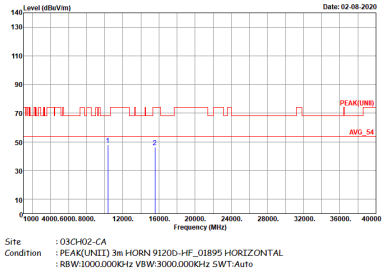
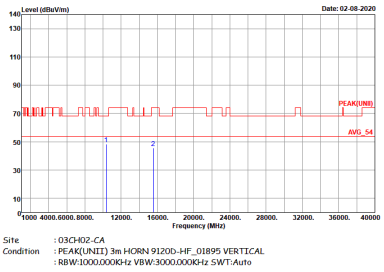
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ax HE80 Full CH42 5210MHz - R	
1+2	Horizontal	Fundamental
Peak		Left blank
Avg.		Left blank

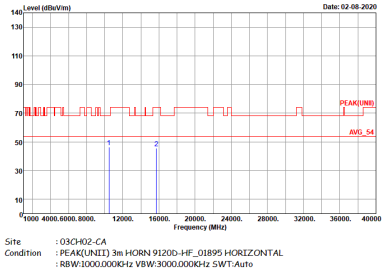
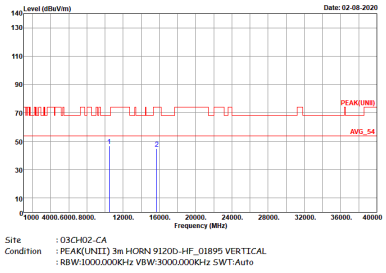
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ax HE80 Full CH42 5210MHz - L	
1+2	Vertical	Fundamental
Peak		
Avg.		Left blank

WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ax HE80 Full CH42 5210MHz - R	
1+2	Vertical	Fundamental
Peak		Left blank
Avg.		Left blank

Band 1 - 5150~5250MHz

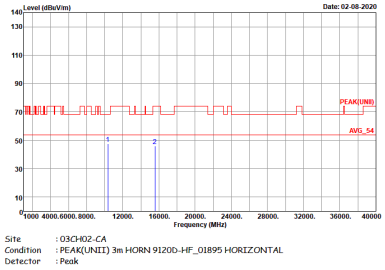
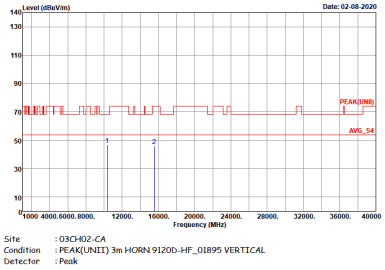
WIFI 802.11a (Harmonic @ 3m)

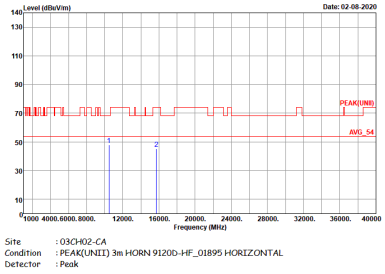
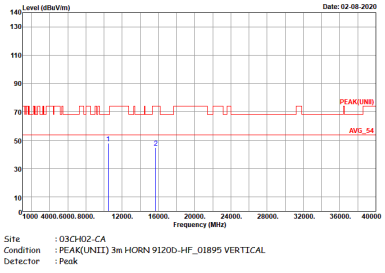
WIFI	Band 1 5150~5250MHz Harmonic @ 3m	
ANT	802.11a CH36 5180MHz	
1+2	Horizontal	Vertical
Peak Avg.	 Site : 03CH02-CA Condition : PEAK(UNII) 3m HORN 9120D-HF_01895 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH02-CA Condition : PEAK(UNII) 3m HORN 9120D-HF_01895 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto

WIFI	Band 1 5150~5250MHz Harmonic @ 3m	
ANT	802.11a CH48 5240MHz	
1+2	Horizontal	Vertical
Peak Avg.		

Band 1 - 5150~5250MHz

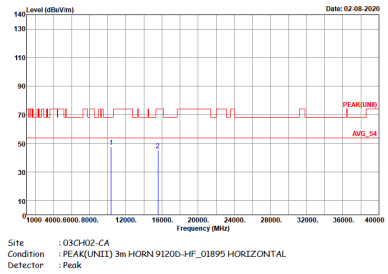
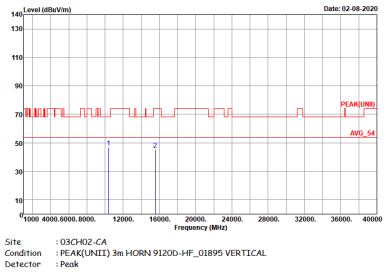
WIFI 802.11ax HE20 Full (Harmonic @ 3m)

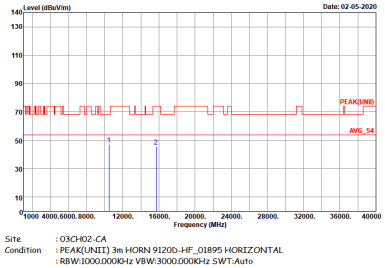
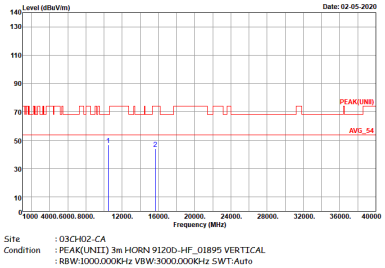
WIFI	Band 1 5150~5250MHz Harmonic @ 3m	
ANT	802.11ax HE20 Full CH36 5180MHz	
1+2	Horizontal	Vertical
Peak Avg.		

WIFI	Band 1 5150~5250MHz Harmonic @ 3m	
ANT	802.11ax HE20 Full CH48 5240MHz	
1+2	Horizontal	Vertical
Peak Avg.		

Band 1 5150~5250MHz

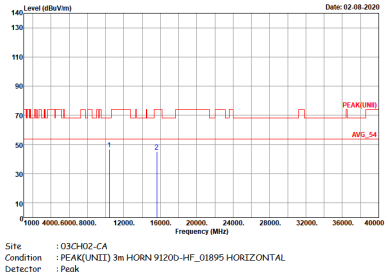
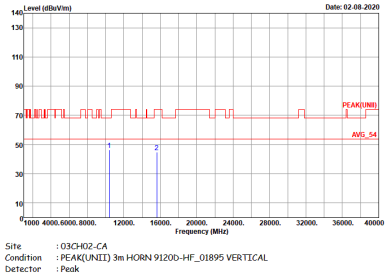
WIFI 802.11ax HE40 Full (Harmonic @ 3m)

WIFI	Band 1 5150~5250MHz Harmonic @ 3m	
ANT	802.11ax HE40 Full CH38 5190MHz	
1+2	Horizontal	Vertical
Peak Avg.		

WIFI	Band 1 5150~5250MHz Harmonic @ 3m	
ANT	802.11ax HE40 Full CH46 5230MHz	
1+2	Horizontal	Vertical
Peak Avg.		

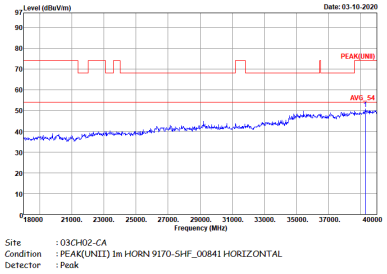
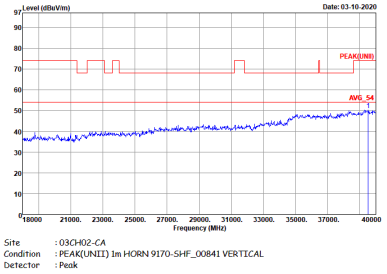
Band 1 5150~5250MHz

WIFI 802.11ax HE80 Full (Harmonic @ 3m)

WIFI	Band 1 5150~5250MHz Harmonic @ 3m	
ANT	802.11ax HE80 Full CH42 5210MHz	
1+2	Horizontal	Vertical
Peak Avg.		

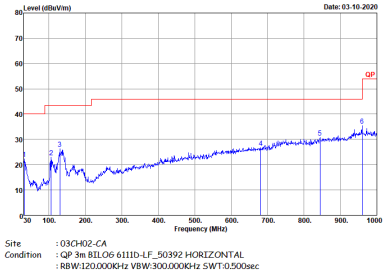
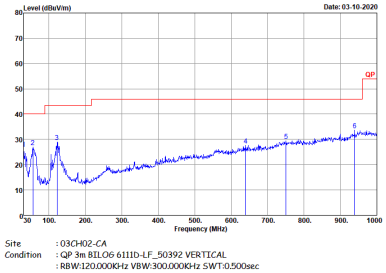
Emission above 18GHz

5GHz WIFI SHF

WIFI	5GHz WIFI	
ANT	SHF	
1+2	Horizontal	Vertical
Peak Avg.		

Emission below 1GHz

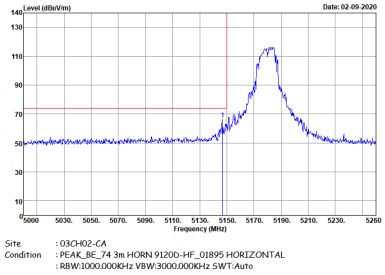
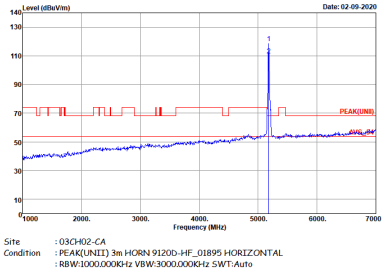
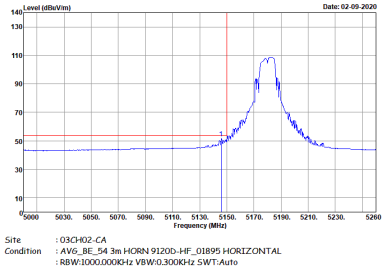
5GHz WIFI (LF)

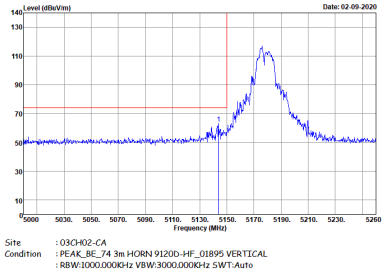
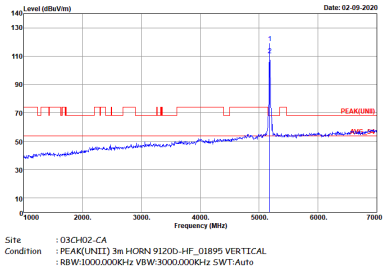
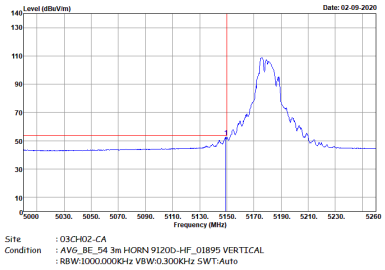
WIFI	5GHz WIFI	
ANT	LF	
1+2	Horizontal	Vertical
QP / Peak		

<Band-edge Unmodulated>

Band 1 5150~5250MHz

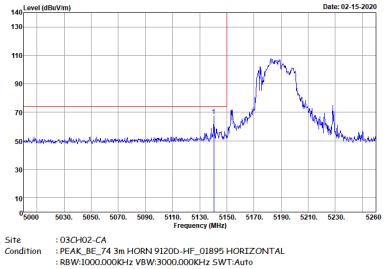
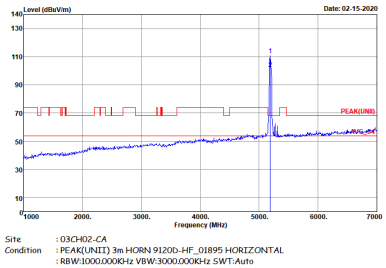
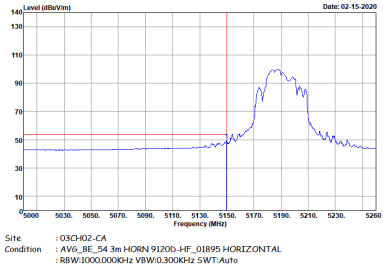
WIFI 802.11ax HE20 Full (Band Edge @ 3m)

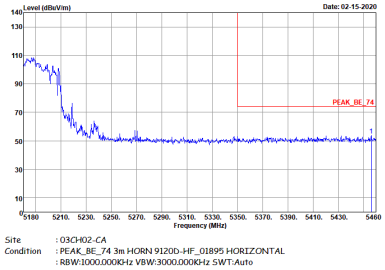
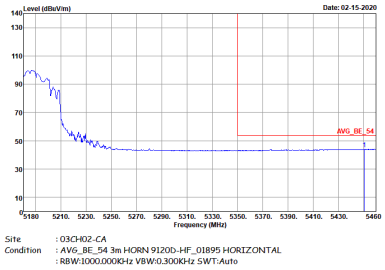
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ax HE20 Full CH36 5180MHz	
1+2	Horizontal	Fundamental
Peak		
Avg.		Left blank

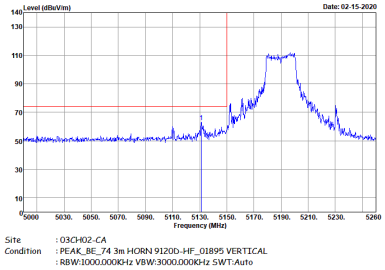
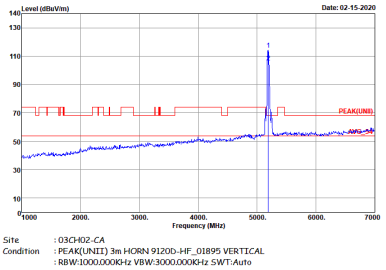
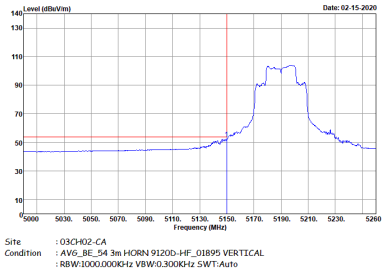
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ax HE20 Full CH36 5180MHz	
1+2	Vertical	Fundamental
Peak		
Avg.		Left blank

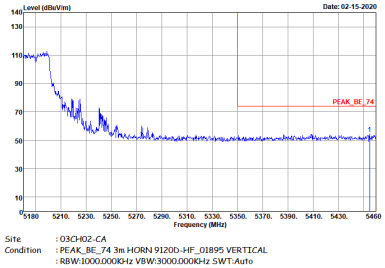
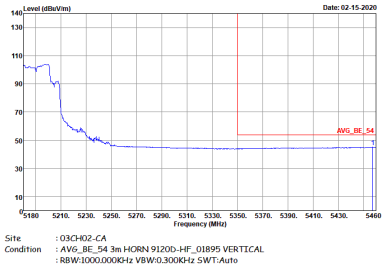
Band 1 5150~5250MHz

WIFI 802.11ax HE40 Full (Band Edge @ 3m)

WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ax HE40 Full CH38 5190MHz - L	
1+2	Horizontal	Fundamental
Peak		
Avg.		Left blank

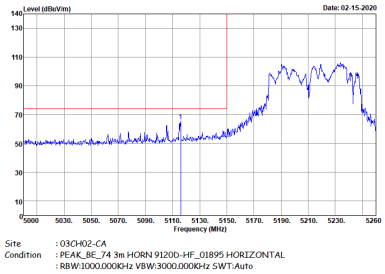
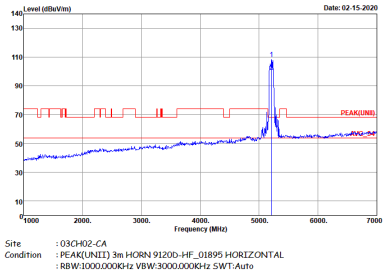
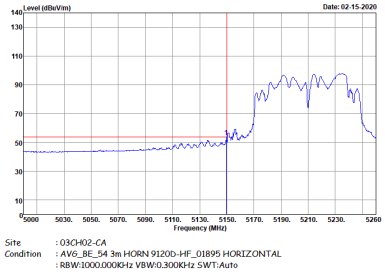
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ax HE40 Full CH38 5190MHz - R	
1+2	Horizontal	Fundamental
Peak		Left blank
Avg.		Left blank

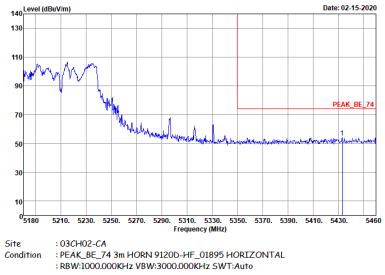
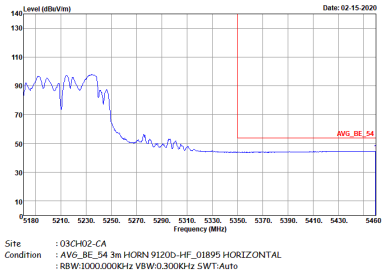
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ax HE40 Full CH38 5190MHz - L	
1+2	Vertical	Fundamental
Peak		
Avg.		Left blank

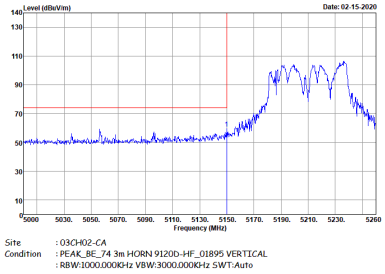
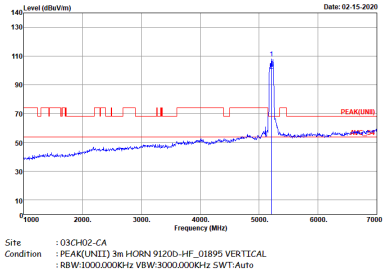
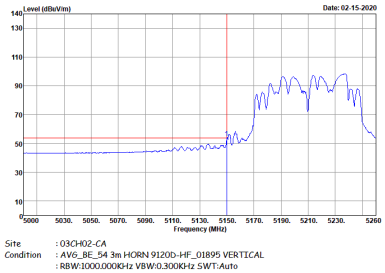
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ax HE40 Full CH38 5190MHz - R	
1+2	Vertical	Fundamental
Peak		Left blank
Avg.		Left blank

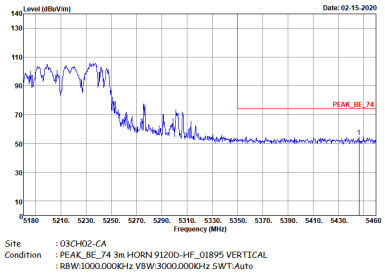
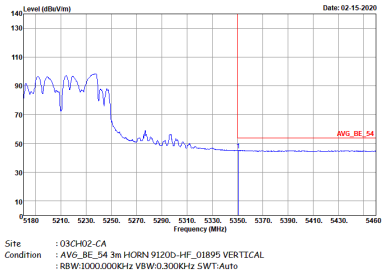
Band 1 5150~5250MHz

WIFI 802.11ax HE80 Full (Band Edge @ 3m)

WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ax HE80 Full CH42 5210MHz - L	
1+2	Horizontal	Fundamental
Peak		
Avg.		Left blank

WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ax HE80 Full CH42 5210MHz - R	
1+2	Horizontal	Fundamental
Peak		Left blank
Avg.		Left blank

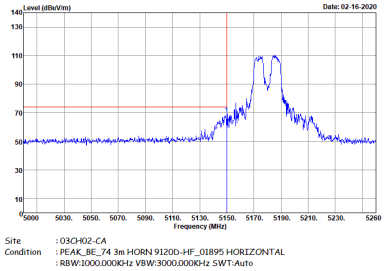
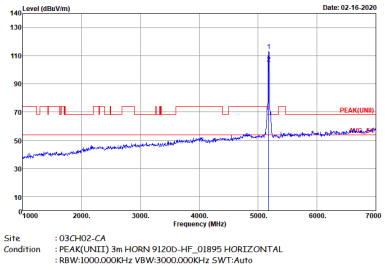
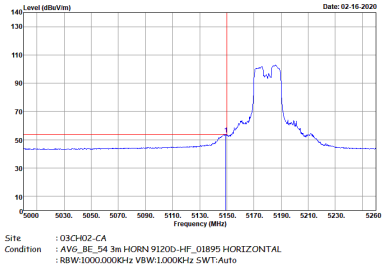
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ax HE80 Full CH42 5210MHz - L	
1+2	Vertical	Fundamental
Peak		
Avg.		Left blank

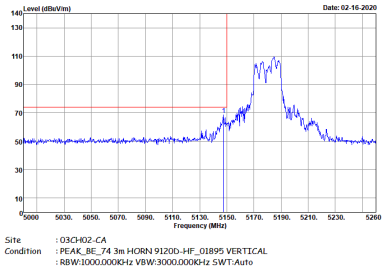
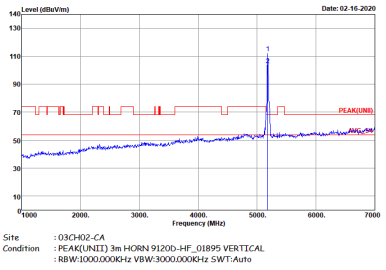
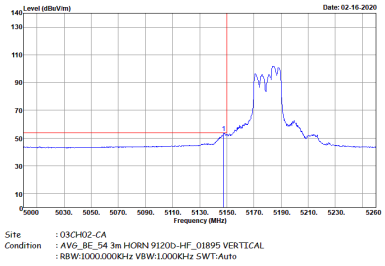
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ax HE80 Full CH42 5210MHz - R	
1+2	Vertical	Fundamental
Peak		Left blank
Avg.		Left blank

<Middle Unmodulated>

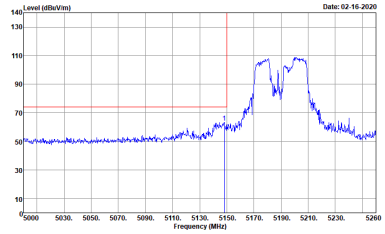
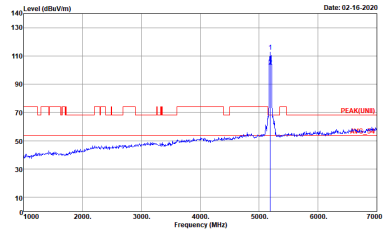
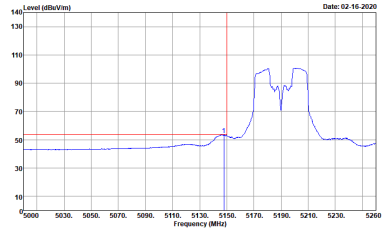
Band 1 5150~5250MHz

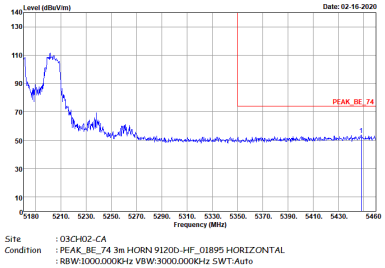
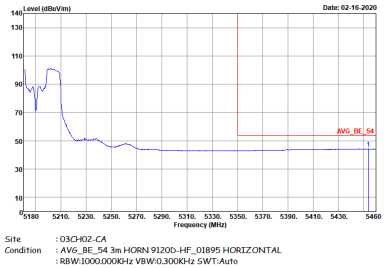
WIFI 802.11ax HE20 Full (Band Edge @ 3m)

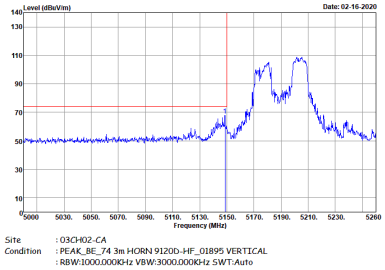
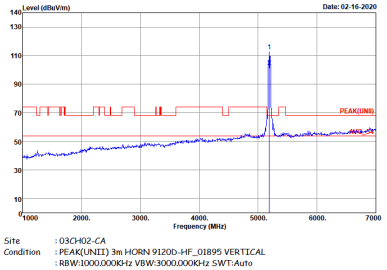
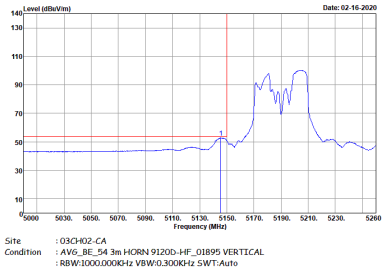
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ax HE20 Full CH36 5180MHz	
1+2	Horizontal	Fundamental
Peak		
Avg.		Left blank

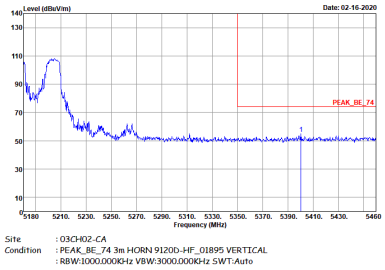
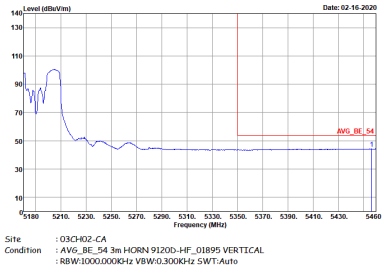
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ax HE20 Full CH36 5180MHz	
1+2	Vertical	Fundamental
Peak		
Avg.		Left blank

Band 1 5150~5250MHz
WIFI 802.11ax HE40 Full (Band Edge @ 3m)

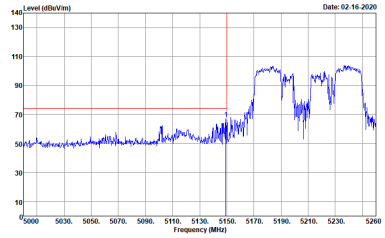
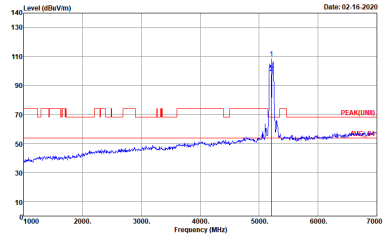
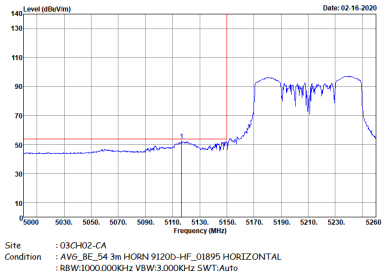
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ax HE40 Full CH38 5190MHz - L	
1+2	Horizontal	Fundamental
Peak		
Avg.		Left blank

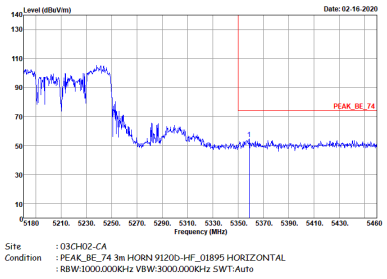
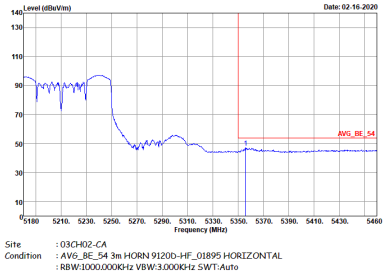
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ax HE40 Full CH38 5190MHz - R	
1+2	Horizontal	Fundamental
Peak		Left blank
Avg.		Left blank

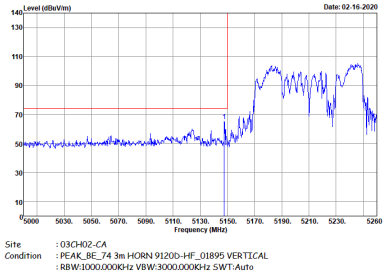
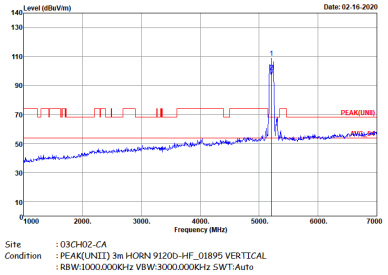
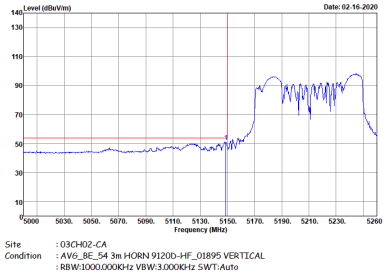
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ax HE40 Full CH38 5190MHz - L	
1+2	Vertical	Fundamental
Peak		
Avg.		Left blank

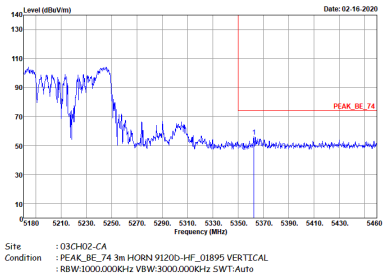
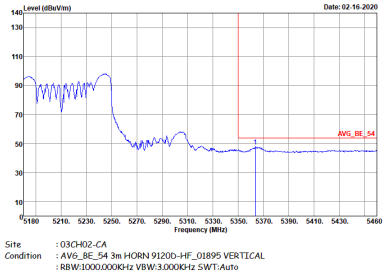
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ax HE40 Full CH38 5190MHz - R	
1+2	Vertical	Fundamental
Peak		Left blank
Avg.		Left blank

Band 1 5150~5250MHz
WIFI 802.11ax HE80 Full (Band Edge @ 3m)

WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ax HE80 Full CH42 5210MHz - L	
1+2	Horizontal	Fundamental
Peak		
Avg.		Left blank

WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ax HE80 Full CH42 5210MHz - R	
1+2	Horizontal	Fundamental
Peak		Left blank
Avg.		Left blank

WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ax HE80 Full CH42 5210MHz - L	
1+2	Vertical	Fundamental
Peak		
Avg.		Left blank

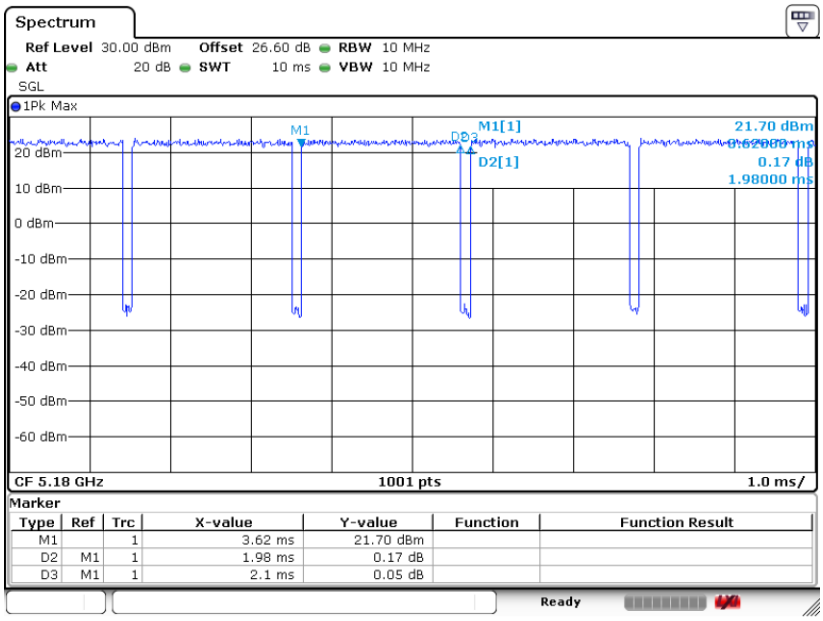
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ax HE80 Full CH42 5210MHz - R	
1+2	Vertical	Fundamental
Peak		Left blank
Avg.		Left blank

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	94.29	1980	0.51	1kHz	0.26
1+2	802.11a for Ant. 2	94.29	1980	0.51	1kHz	0.26
1+2	5GHz 802.11ax HE20 for Ant. 1	96.12	5450	0.18	300Hz	0.17
1+2	5GHz 802.11ax HE20 for Ant. 2	94.95	5450	0.18	300Hz	0.23
1+2	5GHz 802.11ax HE40 for Ant. 1	88.28	5420	0.18	300Hz	0.54
1+2	5GHz 802.11ax HE40 for Ant. 2	90.54	5420	0.18	300Hz	0.43
1+2	5GHz 802.11ax HE80 for Ant. 1	95.25	5410	0.18	300Hz	0.21
1+2	5GHz 802.11ax HE80 for Ant. 2	95.25	5410	0.18	300Hz	0.21

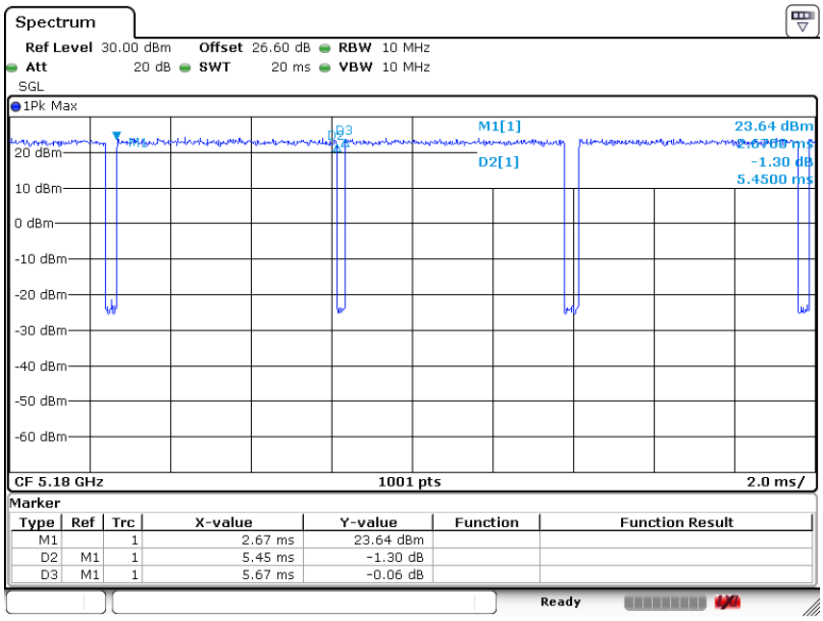
MIMO <Ant. 1>

802.11a



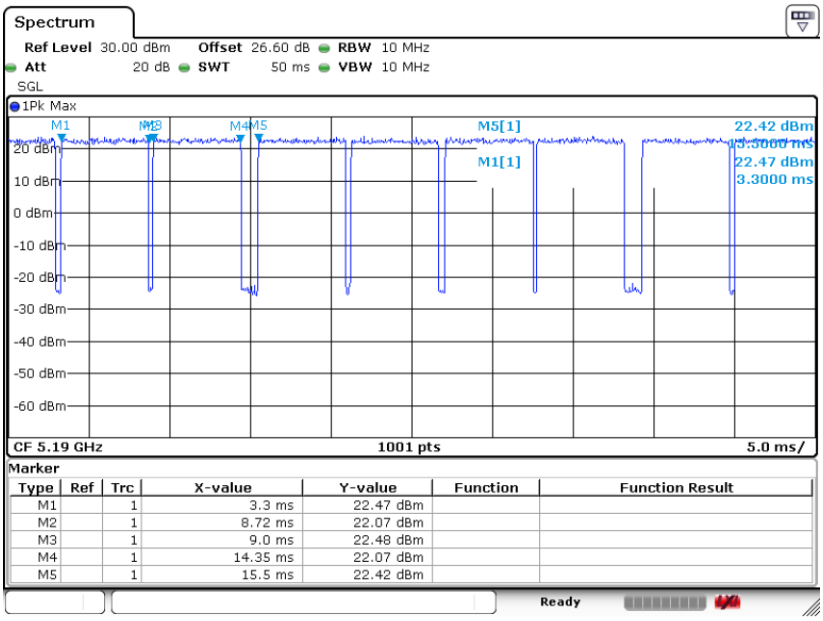
Date: 27.JAN.2020 13:47:01

802.11ax HE20



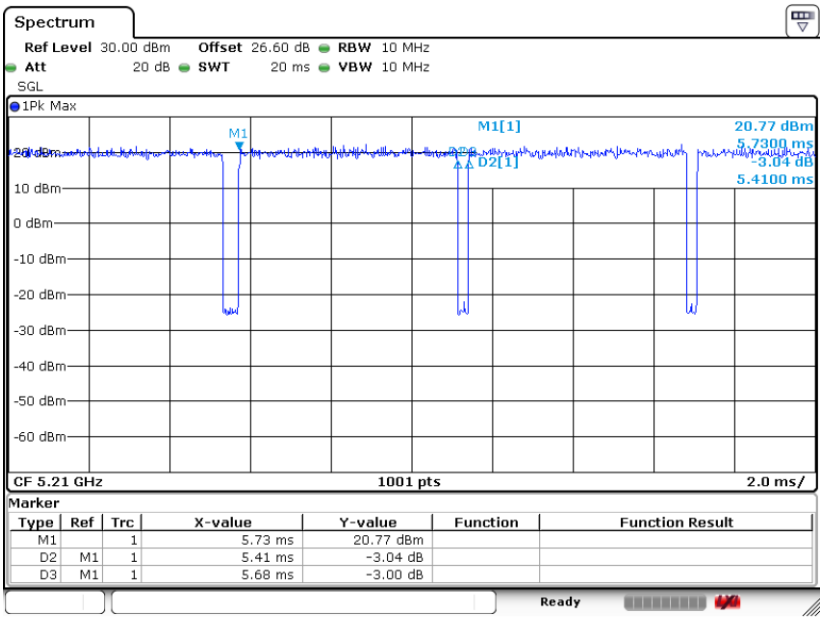
Date: 27.JAN.2020 14:10:09

802.11ax HE40



Date: 27.JAN.2020 14:17:57

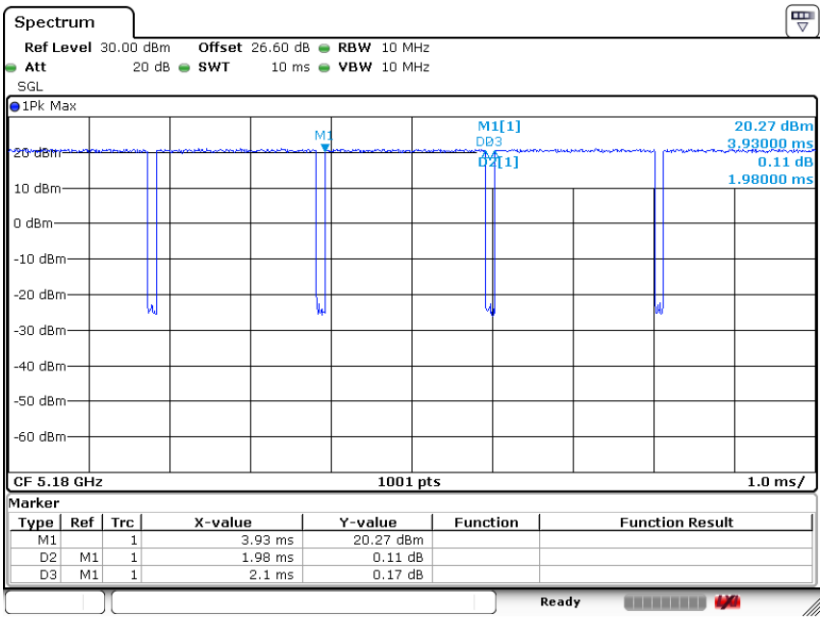
802.11ax HE80



Date: 27.JAN.2020 14:25:23

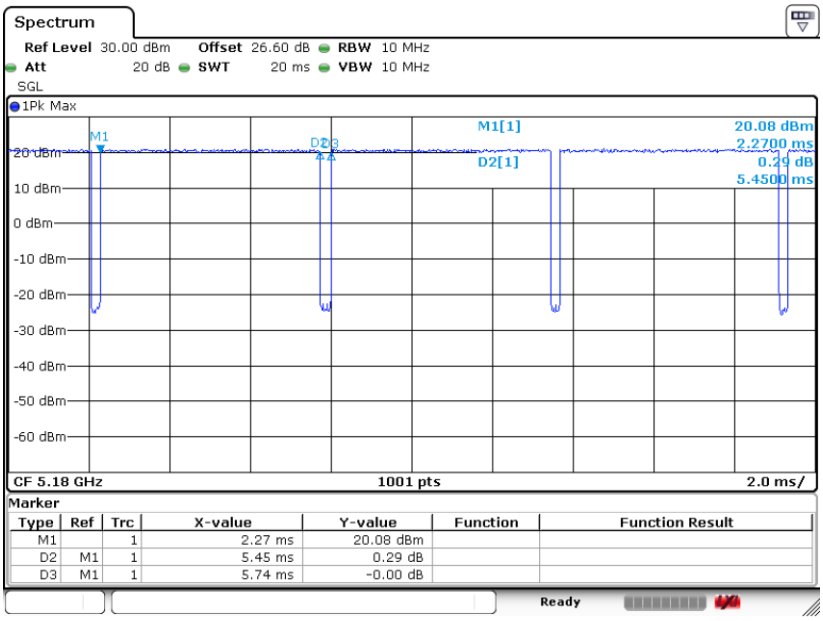
MIMO <Ant. 2>

802.11a



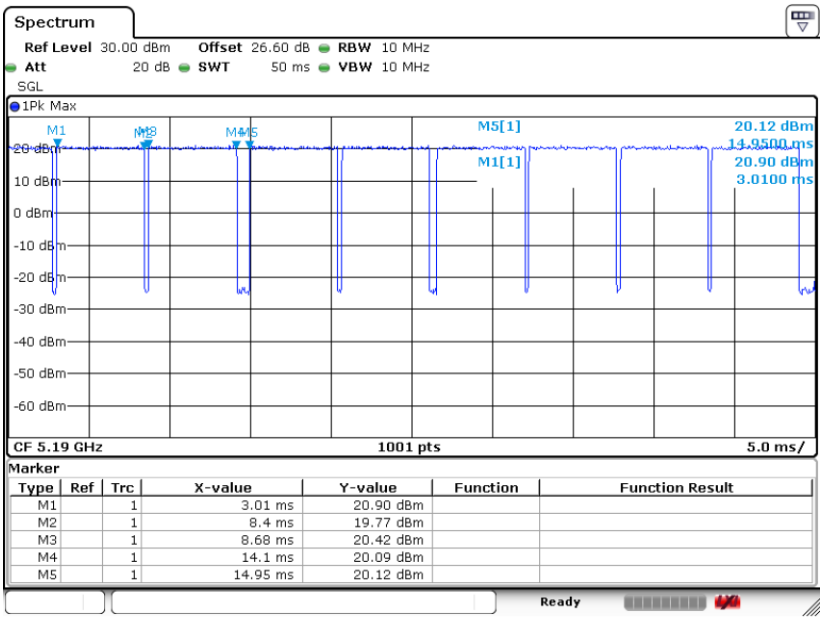
Date: 27.JAN.2020 13:46:39

802.11ax HE20



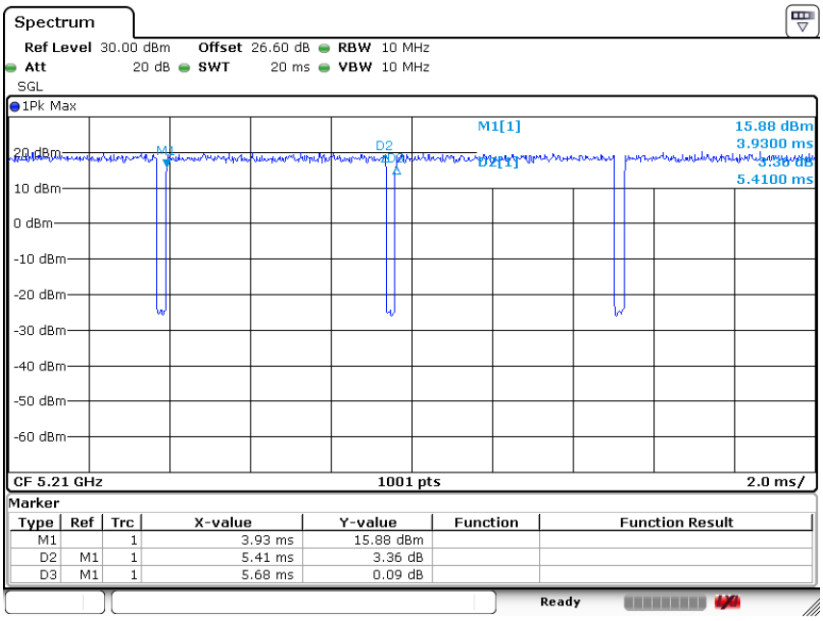
Date: 27.JAN.2020 14:11:15

802.11ax HE40



Date: 27.JAN.2020 14:20:44

802.11ax HE80



Date: 27.JAN.2020 14:22:16