



FCC CO-LOCATION RADIO TEST REPORT

FCC ID : 2AG7G-F1A
Equipment : Plume Adaptive WiFi
Brand Name : Plume Design Inc
Model Name : F1A
Applicant : Plume Design Inc
290 S California Ave, Suite 200, Palo Alto, CA 94306, USA
Manufacturer : Plume Design Inc
290 S California Ave, Suite 200, Palo Alto, CA 94306, USA
Standard : FCC Part 15 Subpart E §15.407

The product was received on Jul. 30, 2020 and testing was started from Sep. 01, 2020 and completed on Sep. 11, 2020. We, SPORTON INTERNATIONAL INC., EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Louis Wu

Approved by: Louis Wu

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory

No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)



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	6
1.4 Applicable Standards.....	6
2 Test Configuration of Equipment Under Test	7
2.1 Carrier Frequency and Channel	7
2.2 Test Mode.....	7
2.3 Connection Diagram of Test System.....	8
2.4 EUT Operation Test Setup	8
3 Test Result	9
3.1 Unwanted Emissions Measurement	9
3.2 Antenna Requirements.....	12
4 List of Measuring Equipment.....	13
5 Uncertainty of Evaluation	14
Appendix A. Radiated Spurious Emission	
Appendix B. Radiated Spurious Emission Plots	
Appendix C. Duty Cycle Plots	
Appendix D. Setup Photographs	



History of this test report

Report No.	Version	Description	Issued Date
FR031701E	01	Initial issue of report	Sep. 22, 2020
FR031701E	02	Revise Antenna type	Sep. 25, 2020
FR031701E	03	Revise Equipment Name	Nov. 04, 2020

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	15.407(b)	Unwanted Emissions	Pass	Under limit 1.24 dB at 5469.360 MHz
3.2	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.

Reviewed by: Wii Chang

Report Producer: Yimin Ho

1 General Description

1.1 Product Feature of Equipment Under Test

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

Product Specification subjective to this standard	
Antenna Type	WLAN <2400 MHz ~ 2483.5 MHz> <Ant. 1>: PIFA Antenna <Ant. 2>: PIFA Antenna <5180 MHz ~ 5320 MHz> <Ant. 1>: IFA/Slot Antenna <Ant. 2>: IFA/Slot Antenna <Ant. 3>: IFA/Slot Antenna <Ant. 4>: IFA/Slot Antenna <5500 MHz ~ 5825 MHz> <Ant. 1>: IFA/Slot Antenna <Ant. 2>: IFA/Slot Antenna Bluetooth: Slot Antenna UWB: <Ant. 1>: IFA Antenna <Ant. 2>: IFA 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 INC. EMC & Wireless Communications Laboratory
Test Site Location	No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855
Test Site No.	Sporton Site No.
	03CH16-HY

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

FCC designation No.: TW0007

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 Publication No. 558074 D01 DTS Meas. Guidance v05r02
- ♦ 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.
3. The TAF code is not including all the FCC KDB listed without accreditation.

2 Test Configuration of Equipment Under Test

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: radiation emission (1GHz 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.

2.1 Carrier Frequency and Channel

2400-2483.5 MHz		5250-5350 MHz		5470-5725 MHz	
802.11ax HE20		802.11ax HE20		802.11a	
Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
11	2462	64	5320	100	5500

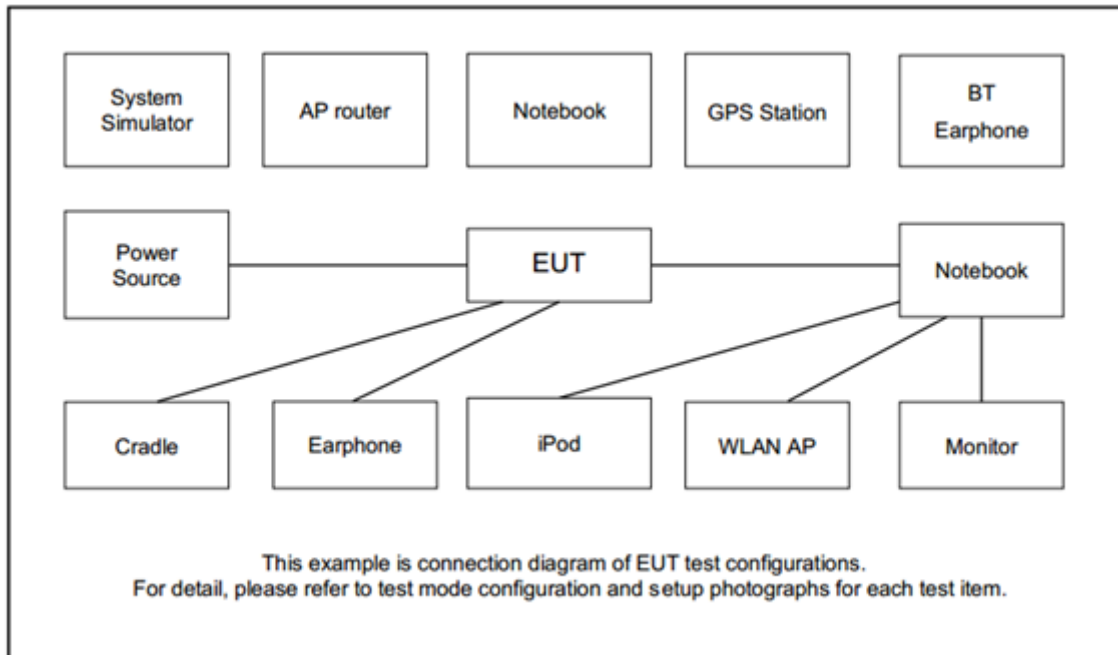
2.2 Test Mode

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

<Co-Location>

Modulation	Data Rate
2.4GHz 802.11ax HE20 + 5GHz 802.11ax HE20 + 5GHz 802.11a	MCS3 + MCS0 + 6Mbps

2.3 Connection Diagram of Test System



2.4 EUT Operation Test Setup

The RF test items, utility “accessMTool_V3.1.0.1” 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.

3 Test Result

3.1 Unwanted Emissions Measurement

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

3.1.1 Limit of Unwanted Emissions

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

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

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

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

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

- (2) 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.

3.1.2 Measuring Instruments

See list of measuring equipment of this test report.

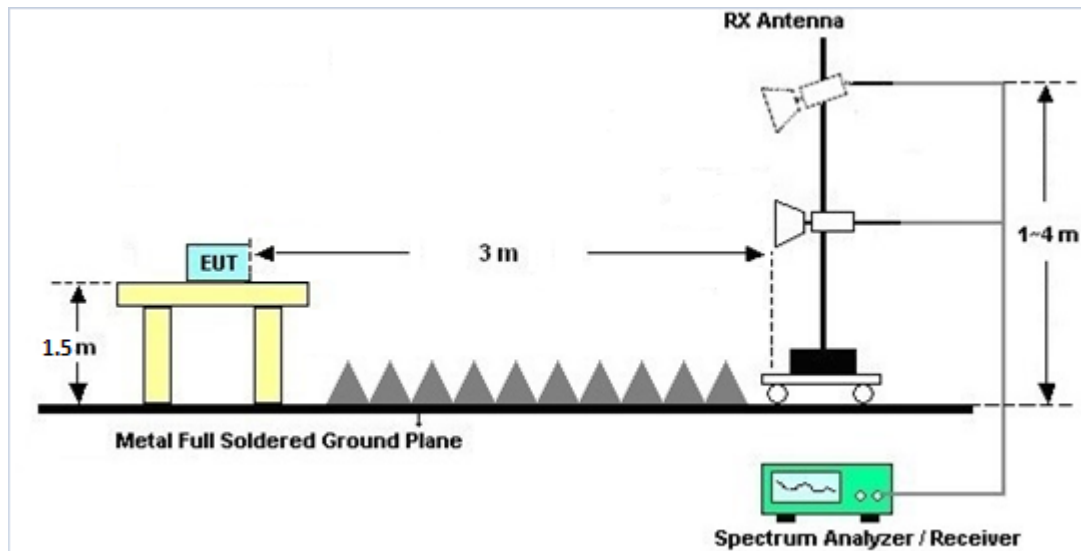


3.1.3 Test Procedures

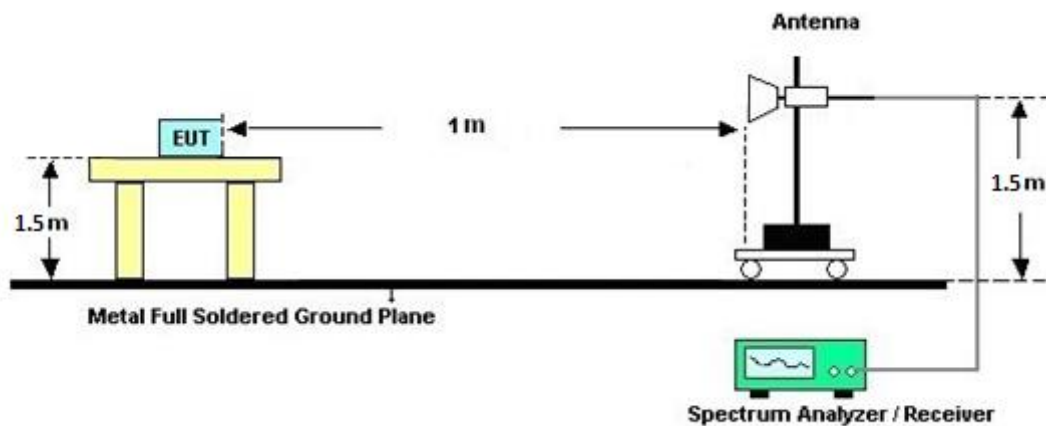
1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
Section G) Unwanted emissions measurement.
(1) Procedure for Peak Unwanted Emissions Measurements Above 1000 MHz
 - RBW = 1 MHz
 - VBW $\geq$ 3 MHz
 - Detector = Peak
 - Sweep time = auto
 - Trace mode = max hold(2) Procedures for Average Unwanted Emissions Measurements Above 1000MHz
 - RBW = 1 MHz
 - VBW = 10 Hz, when duty cycle is no less than 98 percent.
 - VBW $\geq$ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.
2. The EUT was placed on a turntable with 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 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.

3.1.4 Test Setup

For radiated emissions from 1GHz to 18GHz



For radiated emissions above 18GHz



3.1.5 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix A and B.

3.1.6 Duty Cycle

Please refer to Appendix C.

3.1.7 Test Result of Radiated Spurious Emissions

Please refer to Appendix A and B.



3.2 Antenna Requirements

3.2.1 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.

3.2.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.2.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.



4 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1522	1G~18GHz	Sep. 19, 2019	Sep. 01, 2020~ Sep. 11, 2020	Sep. 18, 2020	Radiation (03CH16-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170980	18GHz~40GHz	Jan. 10, 2020	Sep. 01, 2020~ Sep. 11, 2020	Jan. 09, 2021	Radiation (03CH16-HY)
Preamplifier	Jet-Power	JPA0118-55-303	1710001800055006	1GHz~18GHz	May 07, 2020	Sep. 01, 2020~ Sep. 11, 2020	May 06, 2021	Radiation (03CH16-HY)
Preamplifier	EMEC	EM18G40G	060715	18GHz ~40GHz	Dec. 13, 2019	Sep. 01, 2020~ Sep. 11, 2020	Dec. 12, 2020	Radiation (03CH16-HY)
Preamplifier	Keysight	83017A	MY53270264	1GHz~26.5GHz	Dec. 11, 2019	Sep. 01, 2020~ Sep. 11, 2020	Dec.10, 2020	Radiation (03CH16-HY)
EMI Test Receiver	Keysight	N9038A (MXE)	MY57290111	3Hz~26.5GHz	Dec. 05, 2019	Sep. 01, 2020~ Sep. 11, 2020	Dec. 04, 2020	Radiation (03CH16-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY11680/4PE	NA	Aug. 30, 2019	Sep. 01, 2020~ Sep. 11, 2020	Aug. 28, 2021	Radiation (03CH16-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY11688/4PE	NA	Aug. 30, 2019	Sep. 01, 2020~ Sep. 11, 2020	Aug. 28, 2021	Radiation (03CH16-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	EC-A5-300-5757	NA	Aug. 30, 2019	Sep. 01, 2020~ Sep. 11, 2020	Aug. 28, 2021	Radiation (03CH16-HY)
Hygrometer	TECPEL	DTM-303B	TP162965	N/A	Oct. 25, 2019	Sep. 01, 2020~ Sep. 11, 2020	Oct. 24, 2020	Radiation (03CH16-HY)
Software	Audix	E3 6.2009-8-24	RK-001136	N/A	N/A	Sep. 01, 2020~ Sep. 11, 2020	N/A	Radiation (03CH16-HY)
Controller	ChainTek	3000-1	N/A	Control Turn table & Ant Mast	N/A	Sep. 01, 2020~ Sep. 11, 2020	N/A	Radiation (03CH16-HY)
Antenna Mast	ChainTek	MBS-520-1	N/A	1m~4m	N/A	Sep. 01, 2020~ Sep. 11, 2020	N/A	Radiation (03CH16-HY)
Turn Table	ChainTek	T-200-S-1	N/A	0~360 Degree	N/A	Sep. 01, 2020~ Sep. 11, 2020	N/A	Radiation (03CH16-HY)



5 Uncertainty of Evaluation

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

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

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.7
--	-----



Appendix A. Radiated Spurious Emission

Test Engineer :	Andy Yang, Karl Hou and CR Liao	Temperature :	20~25°C
		Relative Humidity :	50~65%

2.4GHz 2400~2483.5MHz

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.
Simultaneously		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
Ant 1+2 11ax(HE20) Ch11 + Ant 1+2+3+4 11ax(HE20) Ch64 + Ant 1+2 11a Ch100	*	2462	114.82	-	-	98.43	27.58	18.62	29.81	257	356	P	H
	*	2462	107.01	-	-	90.62	27.58	18.62	29.81	257	356	A	H
		2485.44	62.6	-11.4	74	46.22	27.53	18.67	29.82	257	356	P	H
		2484.84	51.28	-2.72	54	34.9	27.53	18.67	29.82	257	356	A	H
													H
													H
	*	2462	112.74	-	-	96.35	27.58	18.62	29.81	250	328	P	V
	*	2462	105.68	-	-	89.29	27.58	18.62	29.81	250	328	A	V
		2484.84	62.27	-11.73	74	45.89	27.53	18.67	29.82	250	328	P	V
		2485	51.06	-2.94	54	34.68	27.53	18.67	29.82	250	328	A	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 2 - 5250~5350MHz

WIFI 802.11ax HE20 Full (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.	
Simultaneously		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
Ant 1+2 11ax(HE20) Ch11 + Ant 1+2+3+4 11ax(HE20) Ch64 + Ant 1+2 11a Ch100	*	5320	114.8	-	-	99.17	31.26	13.33	28.96	226	265	P	H
	*	5320	105.47	-	-	89.84	31.26	13.33	28.96	226	265	A	H
		5356.16	56.35	-17.65	74	40.73	31.22	13.39	28.99	226	265	P	H
		5350.88	46.4	-7.6	54	30.8	31.2	13.38	28.98	226	265	A	H
													H
													H
													H
													H
	*	5320	117.69	-	-	102.06	31.26	13.33	28.96	213	247	P	V
	*	5320	108.06	-	-	92.43	31.26	13.33	28.96	213	247	A	V
		5352.48	58.02	-15.98	74	42.41	31.21	13.38	28.98	213	247	P	V
		5352.48	47.22	-6.78	54	31.61	31.21	13.38	28.98	213	247	A	V
													V
													V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 3 - 5470~5725MHz

WIFI 802.11a (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.	
Simultaneously		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
Ant 1+2 11ax(HE20) Ch11 + Ant 1+2+3+4 11ax(HE20) Ch64 + Ant 1+2 11a Ch100		5460.08	57.18	-11.02	68.2	41.09	31.62	13.52	29.05	200	37	P	H
		5469.36	66.96	-1.24	68.2	50.85	31.64	13.53	29.06	200	37	P	H
		5460	47.45	-6.55	54	31.36	31.62	13.52	29.05	200	37	A	H
	*	5500	116.62	-	-	100.44	31.7	13.56	29.08	200	37	P	H
	*	5500	109.51	-	-	93.33	31.7	13.56	29.08	200	37	A	H
													H
													H
													H
		5459.92	56.66	-17.34	74	40.57	31.62	13.52	29.05	366	9	P	V
		5470	66.27	-1.93	68.2	50.16	31.64	13.53	29.06	366	9	P	V
		5458.16	45.55	-8.45	54	29.46	31.62	13.52	29.05	366	9	A	V
	*	5500	113.87	-	-	97.69	31.7	13.56	29.08	366	9	P	V
	*	5500	106.68	-	-	90.5	31.7	13.56	29.08	366	9	A	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Colocation

Colocation (Harmonic @ 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.	
Simultaneously		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
Ant 1+2 11ax(HE20) Ch11 + Ant 1+2+3+4 11ax(HE20) Ch64 + Ant 1+2 11a Ch100		2857	59.06	-14.94	74	50.77	28.31	9.52	29.54	250	261	P	H
		2857	47.46	-6.54	54	39.17	28.31	9.52	29.54	250	261	A	H
		4924	57.71	-16.29	74	40.95	31.1	12.86	28.75	100	0	P	H
		4924	45.63	-8.37	54	28.87	31.1	12.86	28.75	100	0	A	H
		7386	47.71	-26.29	74	52.91	36.53	15.94	58.46	100	0	P	H
		10640	53.3	-20.7	74	54.85	40	19.08	61.1	398	302	P	H
		10640	44.38	-9.62	54	45.93	40	19.08	61.1	398	302	A	H
		11000	51.32	-22.68	74	52.27	40.4	19.28	61.1	400	303	P	H
		11000	41.41	-12.59	54	42.36	40.4	19.28	61.1	400	303	A	H
		15960	47.26	-26.74	74	47.38	37.04	23.06	60.69	100	0	P	H
		16500	49.42	-18.78	68.2	45.7	38.8	23.84	59.4	100	0	P	H
		2857	59.12	-14.88	74	50.83	28.31	9.52	29.54	213	247	P	V
		2857	47.88	-6.12	54	39.59	28.31	9.52	29.54	213	247	A	V
		4924	57.31	-16.69	74	40.55	31.1	12.86	28.75	100	0	P	V
		4924	45.66	-8.34	54	28.9	31.1	12.86	28.75	100	0	A	V
		7386	47.15	-26.85	74	52.35	36.53	15.94	58.46	100	0	P	V
		10640	55.39	-18.61	74	56.94	40	19.08	61.1	167	207	P	V
		10640	46.08	-7.92	54	47.63	40	19.08	61.1	167	207	A	V
		11000	51.04	-22.96	74	51.99	40.4	19.28	61.1	159	207	P	V
		11000	41.26	-12.74	54	42.21	40.4	19.28	61.1	159	207	A	V
		15960	49.49	-24.51	74	49.61	37.04	23.06	60.69	100	0	P	V
		16500	49.73	-18.47	68.2	46.01	38.8	23.84	59.4	100	0	P	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.
-	The signal is Unintentional Radiators .
P/A	Peak or Average
H/V	Horizontal or Vertical

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

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

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

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)
 = Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
 = 32.22(dB/m) + 4.58(dB) + 54.51(dBμV) – 35.86 (dB)
 = 55.45 (dBμV/m)
2. Over Limit(dB)
 = Level(dBμV/m) – Limit Line(dBμV/m)
 = 55.45(dBμV/m) – 74(dBμV/m)
 = -18.55(dB)

For Average Limit @ 2390MHz:

1. Level(dBμV/m)
 = Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
 = 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)
 = 43.54 (dBμV/m)
2. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)
 = 43.54(dBμV/m) – 54(dBμV/m)
 = -10.46(dB)

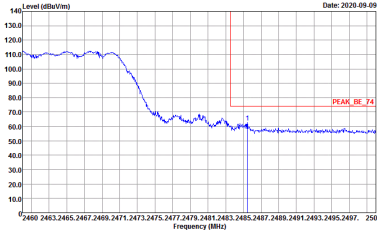
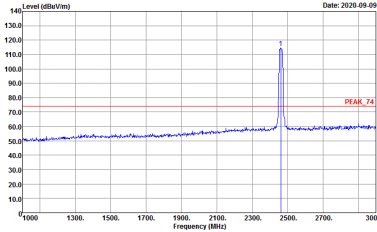
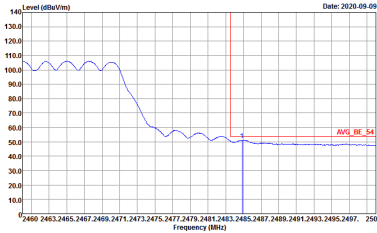
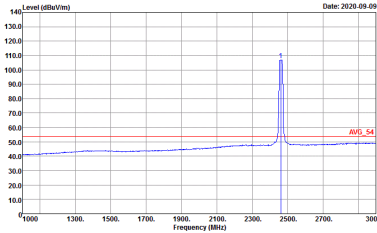
Both peak and average measured complies with the limit line, so test result is “PASS”.

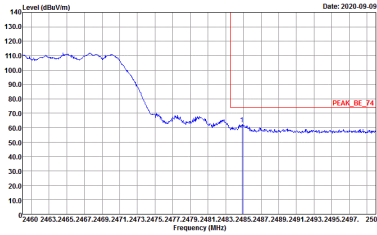
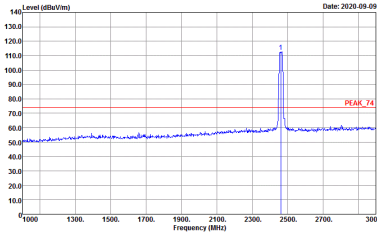
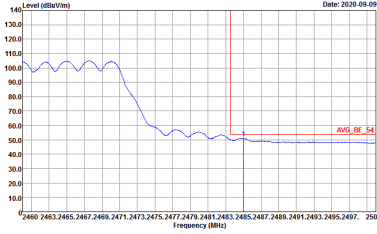
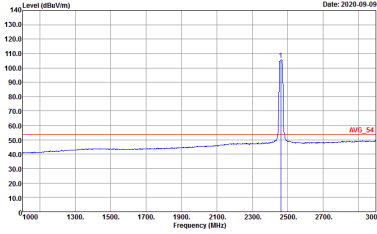


Appendix B. Radiated Spurious Emission Plots

Test Engineer :	Andy Yang, Karl Hou and CR Liao	Temperature :	20~25°C
		Relative Humidity :	50~65%

2.4GHz 2400~2483.5MHz
WIFI 802.11ax HE20 Full (Band Edge @ 3m)

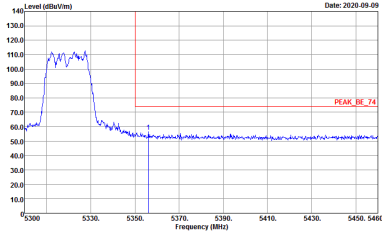
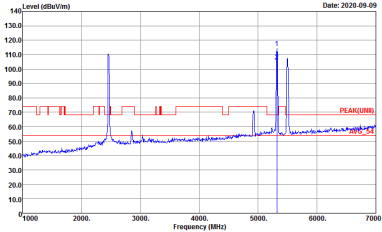
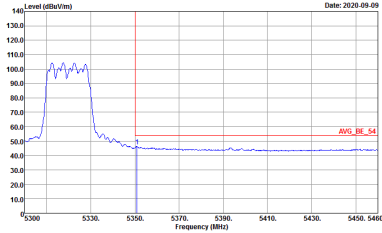
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	802.11ax HE20 Full CH11 2462MHz	
ANT	Simultaneously	
1+2	Horizontal	Fundamental
Peak	 Site : 03CH16-HY Condition : PEAK_BE_74 3m 91200_1522 HORIZONTAL Detector : Peak Project : 031701	 Site : 03CH16-HY Condition : PEAK_74 3m 91200_1522 HORIZONTAL Detector : Peak Project : 031701
	 Site : 03CH16-HY Condition : AVG_BE_54 3m 91200_1522 HORIZONTAL Detector : Peak Project : 031701	 Site : 03CH16-HY Condition : AVG_54 3m 91200_1522 HORIZONTAL Detector : Peak Project : 031701
Avg.		

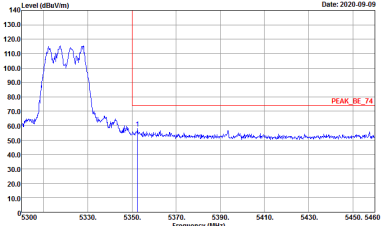
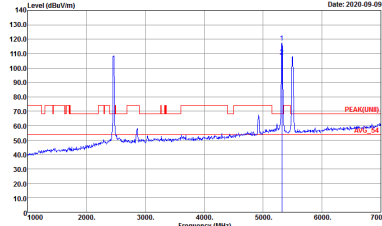
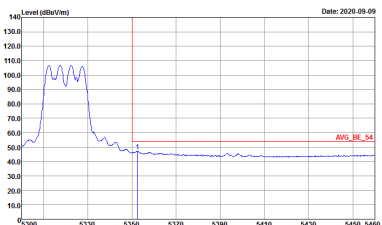
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	802.11ax HE20 Full CH11 2462MHz	
ANT	Simultaneously	
1+2	Vertical	Fundamental
Peak	 Site : 03CH16-HY Condition : PEAK_BE_74 3m 91200_1522 VERTICAL Detector : Peak Project : 031701	 Site : 03CH16-HY Condition : PEAK_74 3m 91200_1522 VERTICAL Detector : Peak Project : 031701
Avg.	 Site : 03CH16-HY Condition : AVG_BE_54 3m 91200_1522 VERTICAL Detector : Peak Project : 031701	 Site : 03CH16-HY Condition : AVG_54 3m 91200_1522 VERTICAL Detector : Peak Project : 031701



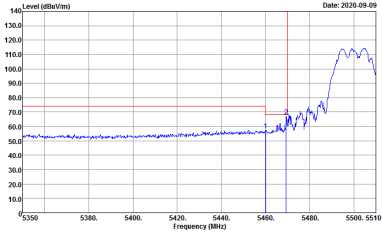
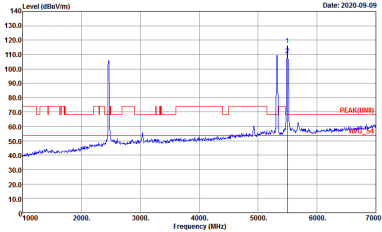
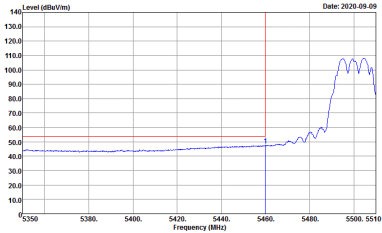
Band 2 - 5250~5350MHz

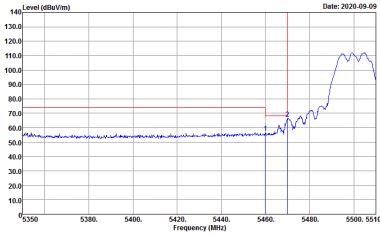
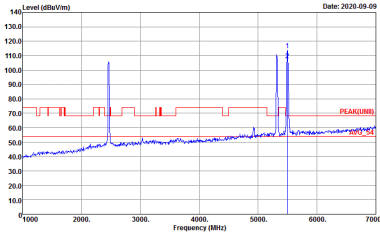
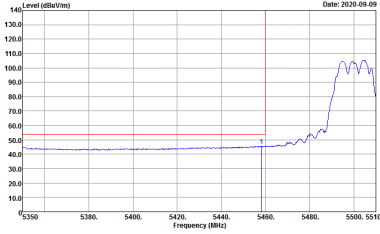
WIFI 802.11ax HE20 Full (Band Edge @ 3m)

WIFI	Band 2 5250~5350MHz Band Edge @ 3m	
	802.11ax HE20 Full CH64 5320MHz	
ANT	Simultaneously	
1+2+3+4	Horizontal	Fundamental
Peak	 Site : 03CH16-HY Condition : PEAK_BE_74 3m 91200_1522 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 031701	 Site : 03CH16-HY Condition : PEAK(FUND) 3m 91200_1522 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 031701
Avg.	 Site : 03CH16-HY Condition : AVG_BE_54 3m 91200_1522 HORIZONTAL RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 031701	Left blank

WIFI	Band 2 5250~5350MHz Band Edge @ 3m	
	802.11ax HE20 Full CH64 5320MHz	
ANT	Simultaneously	
1+2+3+4	Vertical	Fundamental
Peak	 Site : 03CH16-HY Condition : PEAK_BE_74 3m 91200_1522 VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : 031701	 Site : 03CH16-HY Condition : PEAK(FUND) 3m 91200_1522 VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : 031701
Avg.	 Site : 03CH16-HY Condition : AVG_BE_54 3m 91200_1522 VERTICAL Detector : RBW:1000.000KHz VBW:1000KHz SWT:Auto Project : 031701	Left blank

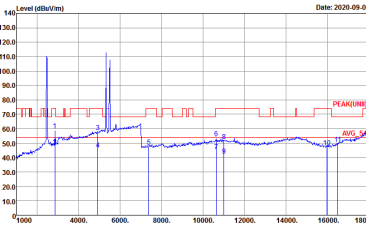
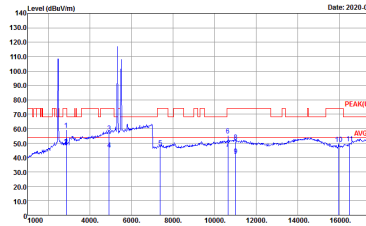
Band 3 - 5470~5725MHz
WIFI 802.11a (Band Edge @ 3m)

WIFI	Band 3 5470~5725MHz Band Edge @ 3m	
	802.11a CH100 5500MHz	
ANT	Simultaneously	
1+2	Horizontal	Fundamental
Peak	 Site : 03CH16-HY Condition : PEAK_BE(UNIT1)_B3 3m 91200_1522 HORIZONTAL Detector : Peak Project : 031701	 Site : 03CH16-HY Condition : PEAK(UNIT1) 3m 91200_1522 HORIZONTAL Detector : Peak Project : 031701
Avg.	 Site : 03CH16-HY Condition : AVG_BE(UNIT1)_B3 3m 91200_1522 HORIZONTAL Detector : Peak Project : 031701	Left blank

WIFI	Band 3 5470~5725MHz Band Edge @ 3m	
	802.11a CH100 5500MHz	
ANT	Simultaneously	
1+2	Vertical	Fundamental
Peak	 Site : 03CH16-HY Condition : PEAK_BE(UNIT)_B3 3m 91200_1522 VERTICAL Detector : Peak Project : 031701	 Site : 03CH16-HY Condition : PEAK(UNIT)_B3 3m 91200_1522 VERTICAL Detector : Peak Project : 031701
Avg.	 Site : 03CH16-HY Condition : AVG_BE(UNIT)_B3 3m 91200_1522 VERTICAL Detector : Peak Project : 031701	Left blank

Colocation

Colocation (Harmonic @ 3m)

WIFI		
ANT	Simultaneously	
	Horizontal	Vertical
Peak Avg.	 Site : 03CH16-HY Condition : PEAK(UNIT) 3m 91200_1522 HORIZONTAL Detector : Peak Project : 031701	 Site : 03CH16-HY Condition : PEAK(UNIT) 3m 91200_1522 VERTICAL Detector : Peak Project : 031701



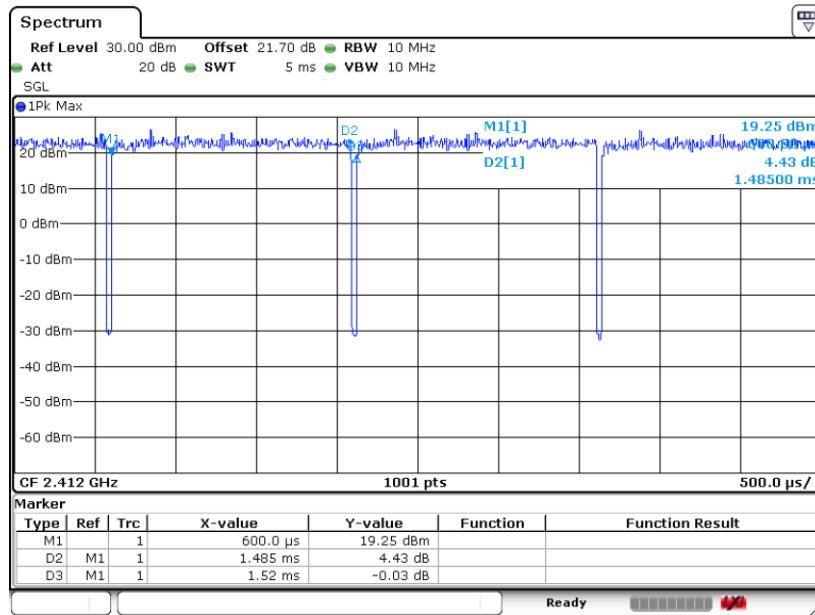
Appendix C. Duty Cycle Plots

Antenna	Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting	Duty Factor(dB)
1+2	2.4GHz 802.11ax HE20 for Ant. 1 Full RU	97.70	1485	0.67	1kHz	0.10
1+2	2.4GHz 802.11ax HE20 for Ant. 2 Full RU	97.70	1485	0.67	1kHz	0.10
1+2	5GHz 802.11a for Ant. 1	94.93	2060	0.49	1kHz	0.23
1+2	5GHz 802.11a for Ant. 2	94.93	2060	0.49	1kHz	0.23
1+2+3+4	5GHz 802.11ax HE20 Full RU for Ant. 1	98.03	-	-	10Hz	0.09
1+2+3+4	5GHz 802.11ax HE20 Full RU for Ant. 2	98.03	-	-	10Hz	0.09
1+2+3+4	5GHz 802.11ax HE20 Full RU for Ant. 3	98.03	-	-	10Hz	0.09
1+2+3+4	5GHz 802.11ax HE20 Full RU for Ant. 4	98.03	-	-	10Hz	0.09



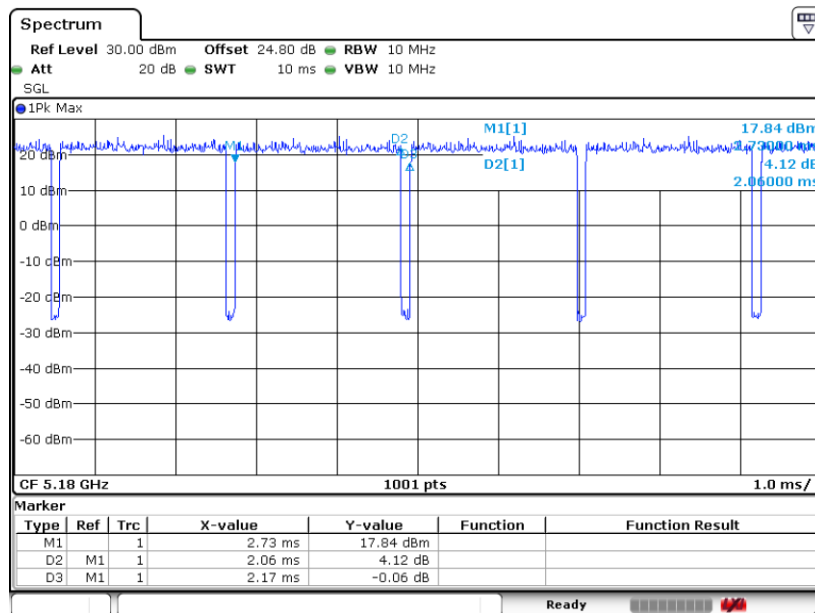
MIMO <Ant. 1>

2.4GHz 802.11ax HE20 Full RU



Date: 5.JUN.2020 14:19:01

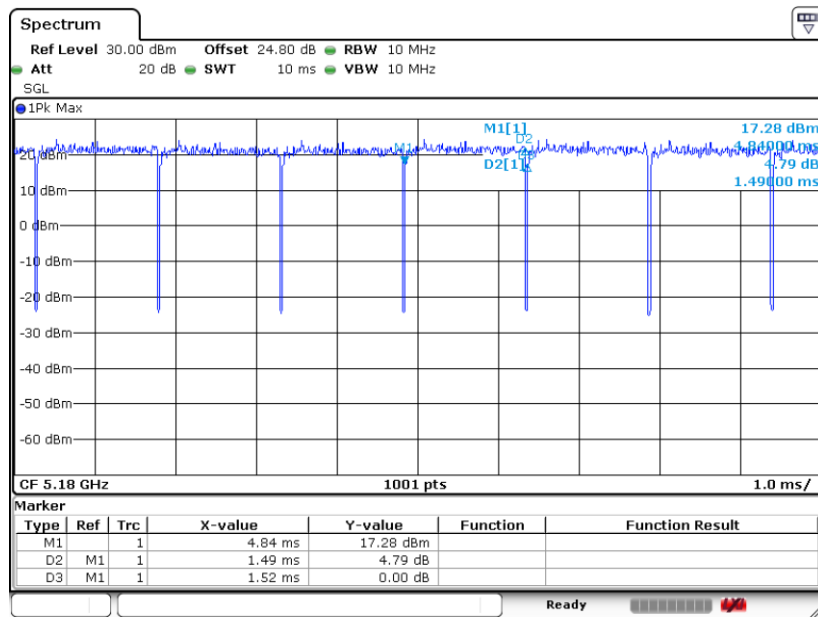
5GHz 802.11a



Date: 16.JUL.2020 10:13:11



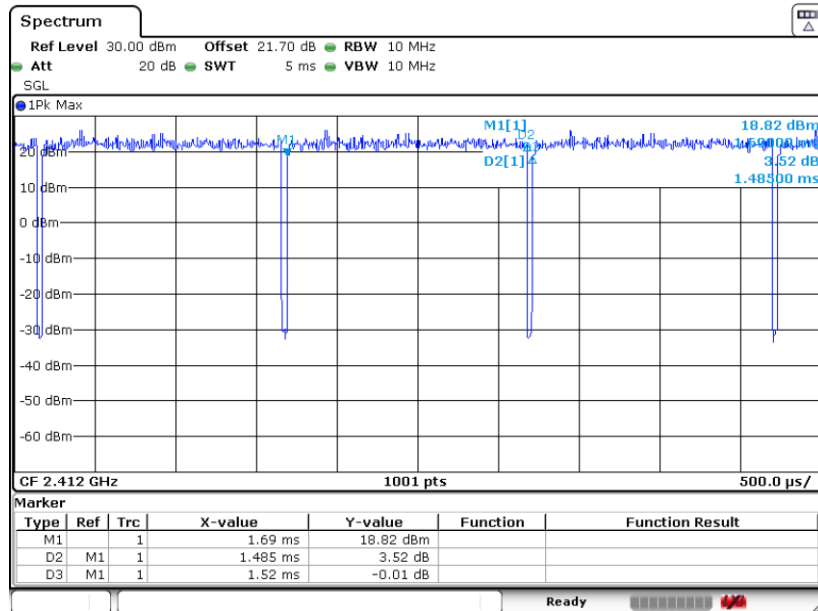
5GHz 802.11ax HE20 Full RU



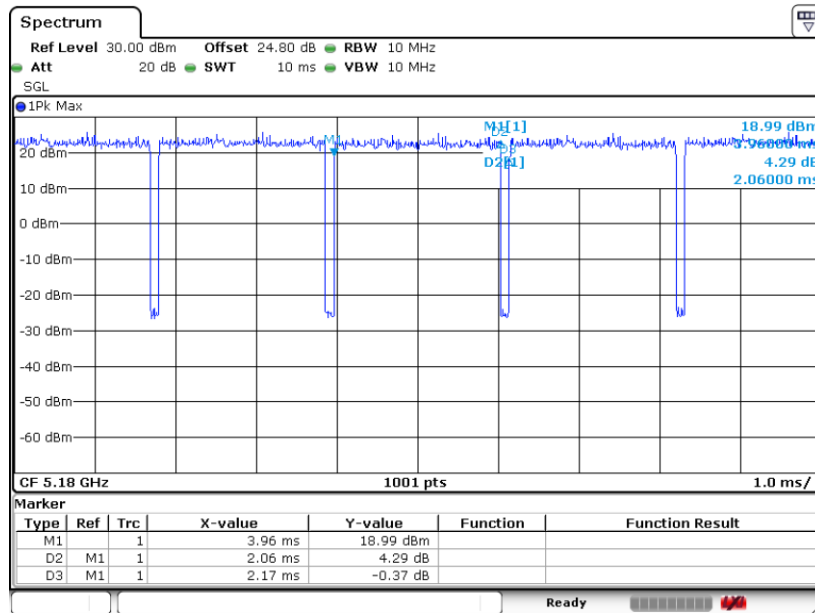
Date: 20.JUL.2020 09:37:02

MIMO <Ant. 2>

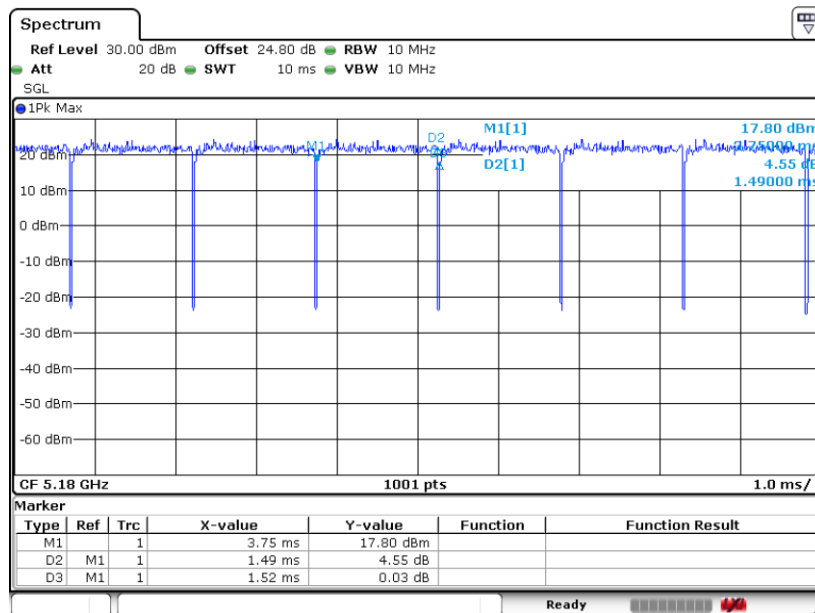
2.4GHz 802.11ax HE20 Full RU



Date: 5.JUN.2020 14:20:50

**5GHz 802.11a**

Date: 16.JUL.2020 10:21:12

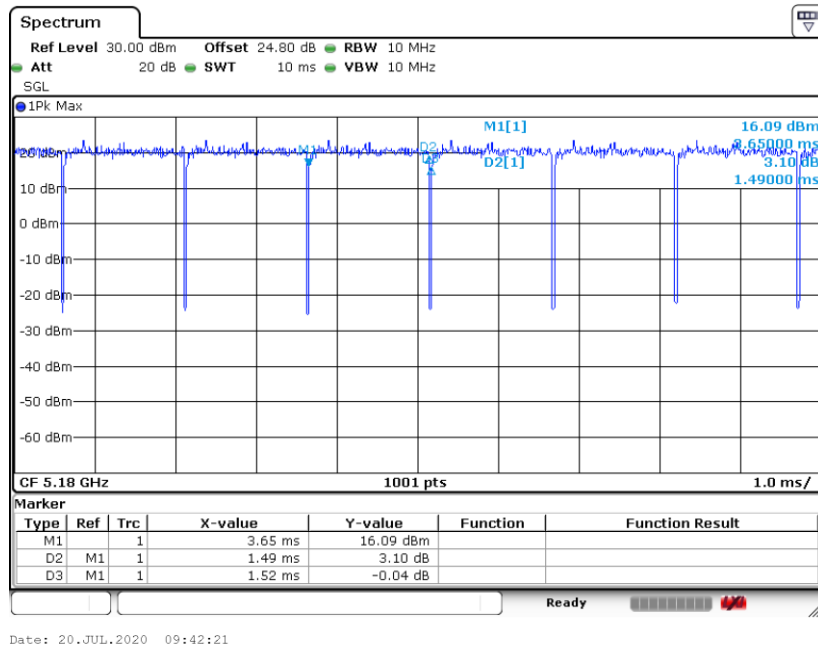
5GHz 802.11ax HE20 Full RU

Date: 20.JUL.2020 09:40:32



MIMO <Ant. 3>

5GHz 802.11ax HE20 Full RU



MIMO <Ant. 4>

5GHz 802.11ax HE20 Full RU

