FCC CO-LOCATION RADIO TEST REPORT

FCC ID	:	**2AUS4-NFL1**
Equipment	:	**Accessory for video conferencing device**
Brand Name	:	**neat.**
Model Name	:	**NF-L1**
Applicant	:	**Neatframe Limited** **Cannon Green, 27 Bush Lane, London, EC4R 0AA, United Kingdom**
Manufacturer	:	**Neatframe Limited** **Cannon Green, 27 Bush Lane, London, EC4R 0AA, United Kingdom**
Standard	:	**FCC Part 15 Subpart E §15.407**

The product was received on Jul. 31, 2023 and testing was performed from Aug. 02, 2023 to Sep. 29, 2023. We, Sporton International Inc. Wensan 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 from Sporton International Inc. Wensan Laboratory, the test report shall not be reproduced except in full.

Louis Wu

Approved by: Louis Wu

Sporton International Inc. Wensan Laboratory
No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.)

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History of this test report

Report No.	Version	Description	Issue Date
FR371809G	01	Initial issue of report	Oct. 03, 2023

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	15.247(d) 15.407(b)	Unwanted Emissions	Pass	0.79 dB under the limit at 50.25 MHz
3.2	15.203	Antenna Requirement	Pass	-

Conformity Assessment Condition:

1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacturer who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.
2. The measurement uncertainty please refer to each test result in the section “Measurement Uncertainty”.

Disclaimer:

The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.

Reviewed by: Keven Cheng

Report Producer: Lucy Wu

1 General Description

1.1 Product Feature of Equipment Under Test

Product Feature
General Specs WLAN 11 a/b/g/n HT20/HT40 WLAN 11ac VHT20/VHT40/VHT80/VHT160 WLAN 11ax HE20/HE40/HE80/HE160 Bluetooth BR/EDR/LE **Antenna Type** WLAN: PIFA Antenna Bluetooth: PIFA Antenna

Antenna information		
2400 MHz ~ 2483.5 MHz	Peak Gain (dBi)	<Ant. 1>: 4.0 <Ant. 2>: 3.9
5150 MHz ~ 5250 MHz	Peak Gain (dBi)	<Ant. 1>: 3.5 <Ant. 2>: 4.0

Remark: The EUT's information above is declared by manufacturer. Please refer to Disclaimer in report summary.

1.2 Modification of EUT

No modifications made to the EUT during the testing.

1.3 Testing Location

Test Site	Sporton International Inc. Wensan Laboratory
Test Site Location	No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, 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.: TW3786

1.4 Applicable Standards

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

- FCC Part 15 Subpart E
- FCC Part 15 Subpart C §15.247
- FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
- FCC KDB Publication No. 558074 D01 15.247 Meas Guidance v05r02
- FCC KDB 414788 D01 Radiated Test Site v01r01.
- ANSI C63.10-2013

Remark:

1. All the test items were validated and recorded in accordance with the standards without any modification during the testing.
2. The TAF code is not including all the FCC KDB listed without accreditation.
3. 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: radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).

b. The EUT Support multi-link operation in WLAN 2.4GHz + WLAN 5GHz and WLAN 2.4GHz + WLAN 6GHz, after verified, the worst case is operation in WLAN 2.4GHz + WLAN 5GHz. Therefore, only performed the WLAN 2.4GHz + WLAN 5GHz test results in this report.

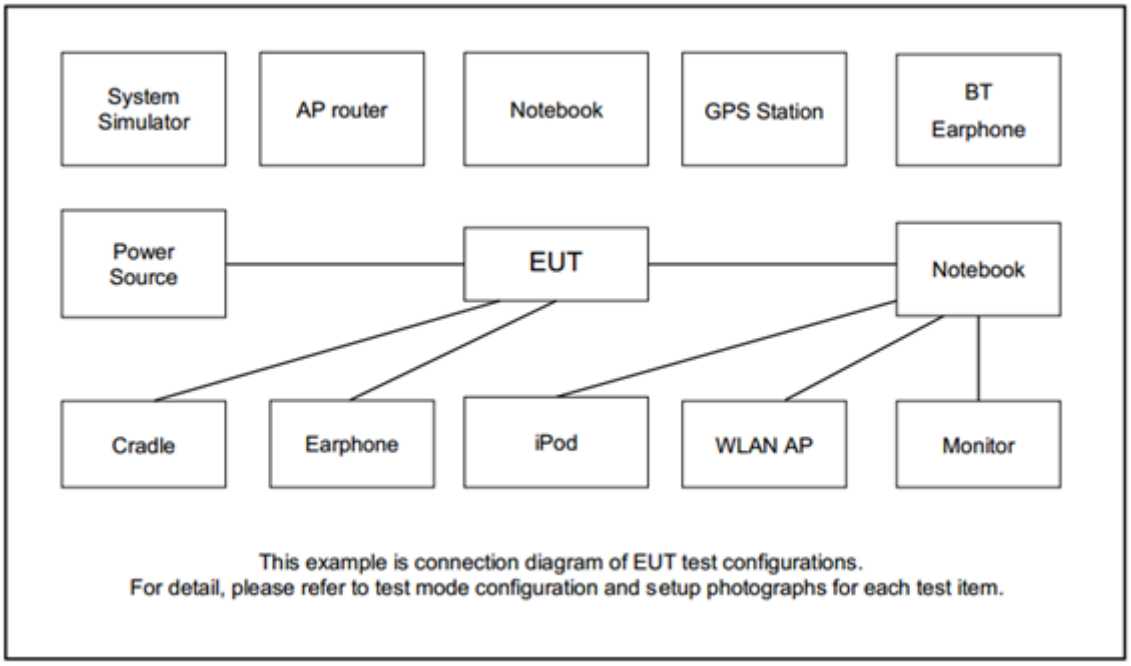
2.1 Carrier Frequency and Channel

2400-2483.5 MHz		5150-5250 MHz	
802.11ax HE40		802.11ax HE80	
Channel	Freq. (MHz)	Channel	Freq. (MHz)
03	2422	42	5210

<Co-Location>

Modulation	Data Rate
2.4GHz 802.11ax HE40 + 5GHz 802.11ax HE80	MCS0 + MCS0

2.2 Connection Diagram of Test System



2.3 Support Unit used in test configuration and system

Item	Equipment	Brand Name	Model Name	FCC ID	Data Cable	Power Cord
1.	POE Adapter	PHIHONG	POE16R-1AFG6	FCC DoC	N/A	N/A

2.4 EUT Operation Test Setup

The RF test items, utility “QRCT Version 4.0.211.0” 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.

$$E=\frac{1000000\sqrt{30P}}{3}$$ μV/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

Please refer to the measuring equipment list in 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 Unwanted Emissions Measurements Below 1000 MHz
   - RBW = 120 kHz
   - VBW = 300 kHz
   - Detector = Peak
   - Trace mode = max hold

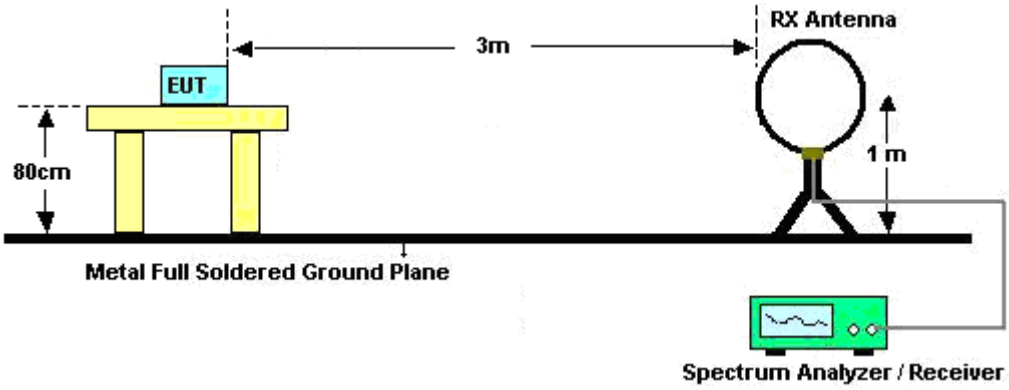
   (2) Procedure for Peak Unwanted Emissions Measurements Above 1000 MHz
   - RBW = 1 MHz
   - VBW ≥ 3 MHz
   - Detector = Peak
   - Sweep time = auto
   - Trace mode = max hold

   (3) Procedures for Average Unwanted Emissions Measurements Above 1000 MHz
   - 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 is placed on a turntable with 0.8 meter for frequency below 1 GHz and 1.5 meter for frequency above 1 GHz respectively above ground.
3. The EUT is set 3 meters away from the receiving antenna which is 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 is 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. Radiated testing below 1 GHz is performed by adjusting the antenna tower from 1 m to 4 m and by rotating the turn table from 0 degree to 360 degrees to find the peak maximum hold reading. When there is no suspected emission found and the emission level is with at least 6 dB margin against QP limit line, the position is marked as “-“.

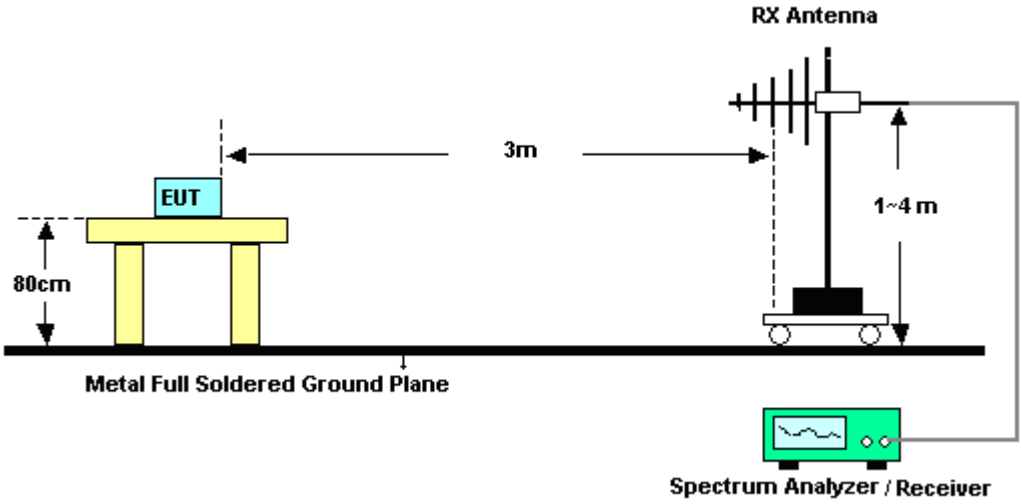
7. Radiated testing above 1 GHz is performed by adjusting the antenna tower from 1 m to 4 m and by rotating the turn table from 0 degree to 360 degrees to find the peak maximum hold reading for scanning all frequencies. When there is no suspected emission found and the harmonic emission level is with at least 6 dB margin against average limit line, the position is marked as "-".

3.1.4 Test Setup

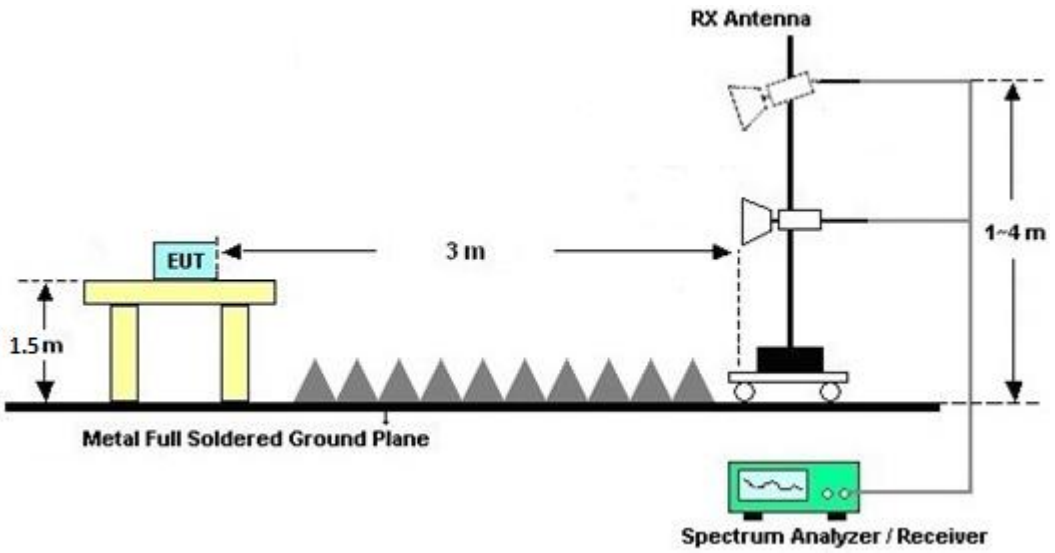
For radiated emissions below 30MHz



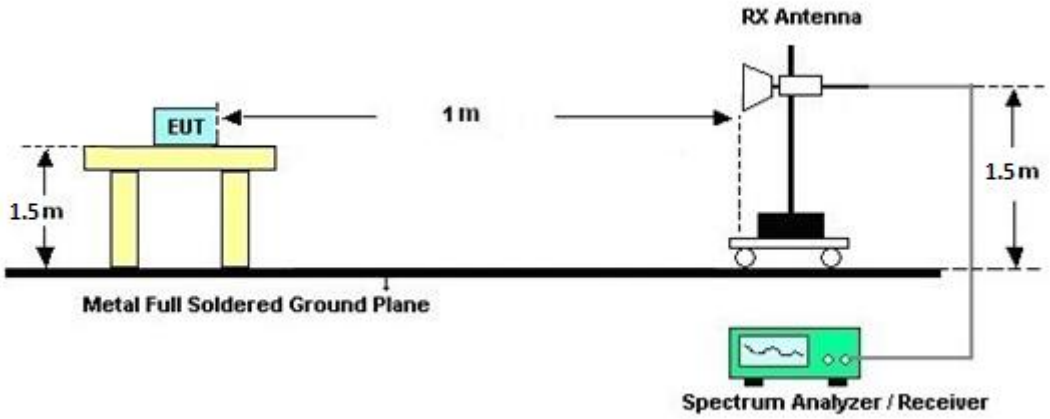
For radiated emissions from 30MHz to 1GHz



For radiated test from 1GHz to 18GHz



For radiated test above 18GHz



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

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

There is adequate comparison measurement 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.

3.1.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix A and B.

3.1.7 Duty Cycle

Please refer to Appendix C.

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

Please refer to Appendix A and B.

3.2 Antenna Requirements

3.2.1 Standard Applicable

The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the rule.

3.2.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

4 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~30 MHz	Sep. 20, 2022	Aug. 02, 2023~ Sep. 16, 2023	Sep. 19, 2023	Radiation (03CH16-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~30 MHz	Sep. 12, 2023	Sep. 16, 2023~ Sep. 29, 2023	Sep. 11, 2024	Radiation (03CH16-HY)
Preamplifier	EMEC	EM18G40G	060715	18GHz~40GHz	Dec. 07, 2022	Aug. 02, 2023~ Sep. 29, 2023	Dec. 06, 2023	Radiation (03CH16-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA9170	00993	18GHz-40GHz	Nov. 24, 2022	Aug. 02, 2023~ Sep. 29, 2023	Nov. 23, 2023	Radiation (03CH16-HY)
Amplifier	SONOMA	310N	371607	9kHz~1GHz	Jul. 03, 2023	Aug. 02, 2023~ Sep. 29, 2023	Jul. 02, 2024	Radiation (03CH16-HY)
Bilog Antenna	TESEQ	CBL 6111D & 00802N1D01N-06	47020 & 06	30MHz~1GHz	Oct. 08, 2022	Aug. 02, 2023~ Sep. 29, 2023	Oct. 07, 2023	Radiation (03CH16-HY)
EMI Test Receiver	Keysight	N9038A(MXE)	MY57290111	3Hz~26.5GHz	Dec. 15, 2022	Aug. 02, 2023~ Sep. 29, 2023	Dec. 14, 2023	Radiation (03CH16-HY)
EMI Test Receiver	Keysight	N9010B	MY60241055	3Hz~26.5GHz	Jul. 26, 2023	Aug. 02, 2023~ Sep. 29, 2023	Jul. 25, 2024	Radiation (03CH16-HY)
EMI Test Receiver	Keysight	N9038A(MXE)	MY57290111	3Hz~26.5GHz	Dec. 15, 2022	Aug. 02, 2023~ Sep. 29, 2023	Dec. 14, 2023	Radiation (03CH16-HY)
Signal Analyzer	Keysight	N9010B	MY62170278	10Hz~44GHz	Sep. 11, 2022	Aug. 02, 2023~ Sep. 09, 2023	Sep. 10, 2023	Radiation (03CH16-HY)
Signal Analyzer	Keysight	N9010B	MY62170278	10Hz~44GHz	Aug. 31, 2023	Sep. 10, 2023~ Sep. 29, 2023	Aug. 30, 2024	Radiation (03CH16-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1522	1GHz~18GHz	Mar. 23, 2023	Aug. 02, 2023~ Sep. 29, 2023	Mar. 22, 2024	Radiation (03CH16-HY)
Preamplifier	Keysight	83017A	MY53270264	1GHz~26.5GHz	Dec. 09, 2022	Aug. 02, 2023~ Sep. 29, 2023	Dec. 08, 2023	Radiation (03CH16-HY)
Preamplifier	EMEC	EM1G18G	060812	1GHz~18GHz	Dec. 26, 2022	Aug. 02, 2023~ Sep. 29, 2023	Dec. 25, 2023	Radiation (03CH16-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	805935/4	N/A	Aug. 09, 2022	Aug. 02, 2023~ Aug. 07, 2023	Aug. 08, 2023	Radiation (03CH16-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	802434/4	N/A	Aug. 08, 2023	Aug. 08, 2023~ Sep. 29, 2023	Aug. 07, 2024	Radiation (03CH16-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	EC-A5-300-5 757	N/A	Aug. 09, 2022	Aug. 02, 2023~ Aug. 07, 2023	Aug. 08, 2023	Radiation (03CH16-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	EC-A5-300-5 757	N/A	Aug. 08, 2023	Aug. 08, 2023~ Sep. 29, 2023	Aug. 07, 2024	Radiation (03CH16-HY)
Controller	ChainTek	3000-1	N/A	Control Turn table & Ant Mast	N/A	Aug. 02, 2023~ Sep. 29, 2023	N/A	Radiation (03CH16-HY)
Antenna Mast	ChainTek	MBS-520-1	N/A	1m~4m	N/A	Aug. 02, 2023~ Sep. 29, 2023	N/A	Radiation (03CH16-HY)
Turn Table	ChainTek	T-200-S-1	N/A	0~360 Degree	N/A	Aug. 02, 2023~ Sep. 29, 2023	N/A	Radiation (03CH16-HY)
Software	Audix	E3 6.2009-8-24	RK-001136	N/A	N/A	Aug. 02, 2023~ Sep. 29, 2023	N/A	Radiation (03CH16-HY)

5 Measurement Uncertainty

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

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

Uncertainty of Radiated Emission Measurement (1000 MHz ~ 6000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.6 dB

Uncertainty of Radiated Emission Measurement (6000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.5 dB

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.6 dB

Appendix A. Radiated Spurious Emission

Test Engineer :	Steven Wu	Temperature :	20~25°C
		Relative Humidity :	65~68%

WLAN (2.4GHz) 802.11ax HE40 Partial 242RU61_Tx_CH03 + WLAN (5GHz) 802.11ax HE80 Full RU_Tx_CH42

2.4GHz 2400~2483.5MHz

WIFI 802.11ax HE40 Partial 242 (Band Edge @ 3m)

WIFI ANT 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Margin (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 HE40 Partial 242/61 CH 03 2422MHz		2388.12	65.97	-8.03	74	51.45	27.38	17.61	30.47	299	168	P	H
		2388.26	47.89	-6.11	54	33.37	27.38	17.61	30.47	299	168	A	H
	*	2422	113.63	-	-	98.92	27.52	17.64	30.45	299	168	P	H
	*	2422	104.26	-	-	89.55	27.52	17.64	30.45	299	168	A	H
		2484.88	56.43	-17.57	74	41.43	27.75	17.68	30.43	299	168	P	H
		2484.11	46.4	-7.6	54	31.42	27.74	17.68	30.44	299	168	A	H
		2389.66	64.25	-9.75	74	49.71	27.4	17.61	30.47	164	321	P	V
		2389.94	47.81	-6.19	54	33.27	27.4	17.61	30.47	164	321	A	V
	*	2422	111.39	-	-	96.68	27.52	17.64	30.45	164	321	P	V
	*	2422	102.75	-	-	88.04	27.52	17.64	30.45	164	321	A	V
		2485.37	56.84	-17.16	74	41.84	27.75	17.68	30.43	164	321	P	V
		2484.04	45.9	-8.1	54	30.92	27.74	17.68	30.44	164	321	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)	Margin (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		5124.8	56.02	-17.98	74	41.15	33	11.32	29.45	156	360	P	H
		5147.42	46.92	-7.08	54	32.05	33	11.34	29.47	156	360	A	H
	*	5210	100.43	-	-	85.57	32.98	11.41	29.53	156	360	P	H
		5758	59.83	-8.37	68.2	44.02	33.73	11.98	29.9	302	172	P	H
	*	5210	93.23	-	-	78.37	32.98	11.41	29.53	156	360	A	H
		5390.84	54.12	-19.88	74	39.39	32.9	11.53	29.7	156	360	P	H
		5350	44.58	-9.42	54	29.83	32.9	11.51	29.66	156	360	A	H
													H
		5138.32	59.58	-14.42	74	44.7	33	11.34	29.46	218	127	P	V
		5149.76	49.68	-4.32	54	34.8	33	11.35	29.47	218	127	A	V
	*	5210	105.12	-	-	90.25	32.99	11.4	29.52	218	127	P	V
		5758	60.78	-7.42	68.2	44.97	33.73	11.98	29.9	117	12	P	V
	*	5210	97.06	-	-	82.2	32.98	11.41	29.53	218	127	A	V
		5361.72	55.38	-18.62	74	40.64	32.9	11.51	29.67	218	127	P	V
		5350	46.14	-7.86	54	31.39	32.9	11.51	29.66	218	127	A	V
													V

Remark

1. No other spurious found.
2. All results are PASS against Peak and Average limit line.

WLAN (2.4GHz) 802.11ax HE40 Partial 242RU61_Tx_CH03 + WLAN (5GHz) 802.11ax HE80 Full RU_Tx_CH42 (Harmonic @ 3m)

WIFI	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
ANT					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)
802.11ax HE40 Partial 242/61 CH 03 2422MHz + 802.11ax HE80 Full CH 42 5210MHz		4844	55.73	-18.27	74	41.45	32.56	11.22	29.5	400	351	P	H
		4844	43.49	-10.51	54	29.21	32.56	11.22	29.5	400	351	A	H
		7266	44.54	-29.46	74	59.67	37.04	14.14	66.31	-	-	P	H
		10420	47.73	-20.47	68.2	59.52	38.7	16.64	67.13	-	-	P	H
		15630	45.48	-28.52	74	54.85	37.28	20.1	66.75	-	-	P	H
													H
													H
													H
													H
													H
													H
													H
		4844	56.31	-17.69	74	42.03	32.56	11.22	29.5	201	328	P	V
		4844	43.86	-10.14	54	29.58	32.56	11.22	29.5	201	328	A	V
		7266	44.77	-29.23	74	59.9	37.04	14.14	66.31	-	-	P	V
		10420	46.89	-21.31	68.2	58.68	38.7	16.64	67.13	-	-	P	V
		15630	45.83	-28.17	74	55.2	37.28	20.1	66.75	-	-	P	V
													V
													V
													V
													V
													V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against limit line. 3. The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only.												

Emission below 1GHz

WLAN (2.4GHz) 802.11ax HE40 Partial 242RU61_Tx_CH03 + WLAN (5GHz) 802.11ax HE80 Full RU_Tx_CH42 (LF @ 3m)

WIFI ANT	Note	Frequency	Level	Margin	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)
802.11ax HE40 Partial 242/61 CH 03 2422MHz + 802.11ax HE80 Full CH 42 5210MHz LF		85.35	31.56	-8.44	40	48.62	14.09	1.25	32.4	-	-	P	H
		170.67	31.91	-11.59	43.5	46.86	15.6	1.83	32.38	-	-	P	H
		246.54	31.67	-14.33	46	43.74	18.06	2.29	32.42	-	-	P	H
		415.5	26.87	-19.13	46	33.71	22.58	3.09	32.51	-	-	P	H
		734	29.64	-16.36	46	30.64	27.4	4.19	32.59	-	-	P	H
		955.9	32.22	-13.78	46	28.6	30.29	4.79	31.46	-	-	P	H
													H
													H
													H
													H
													H
		50.25	39.21	-0.79	40	56.51	14.15	1	32.45	100	323	Q	V
		102.9	37.34	-6.16	43.5	51.95	16.33	1.47	32.41	-	-	P	V
		296.76	28.73	-17.27	46	39.35	19.24	2.55	32.41	-	-	P	V
		300	28.72	-17.28	46	39.24	19.32	2.57	32.41	-	-	P	V
		559	27.42	-18.58	46	30.76	25.75	3.49	32.58	-	-	P	V
		948.9	32.34	-13.66	46	28.96	30.15	4.76	31.53	-	-	P	V
													V
													V
													V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against limit line. 3. The emission position marked as "-" means no suspected emission found and emission level has at least 6dB margin against limit or emission is noise floor only.												

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 **Margin** 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	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.					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. Margin (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. Margin (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. Margin (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 :	Steven Wu	**Temperature :**	20~25°C
		Relative Humidity :	65~68%

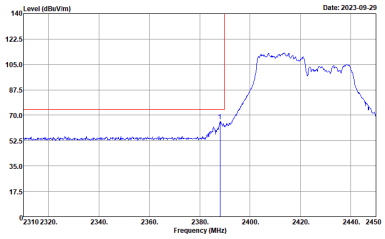
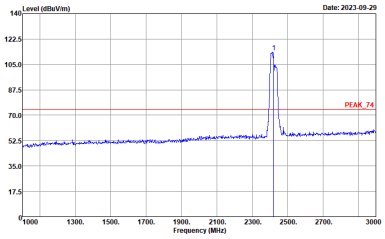
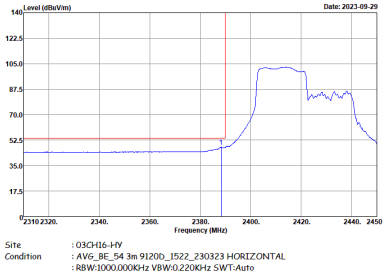
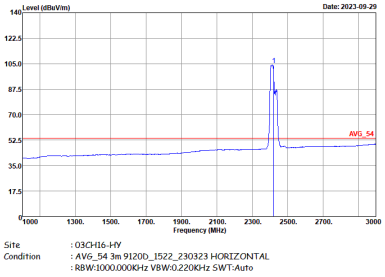
Note symbol

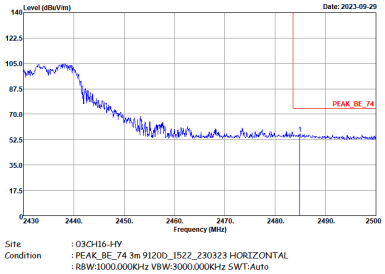
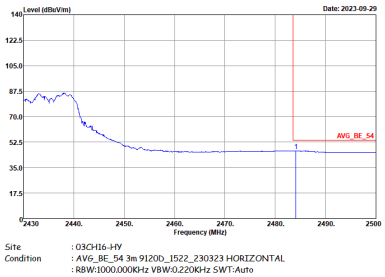
-L	**Low channel location**
-R	**High channel location**

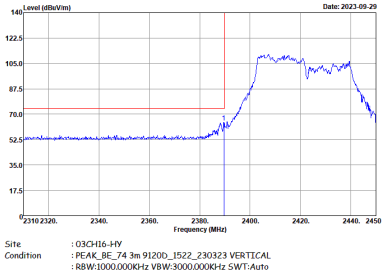
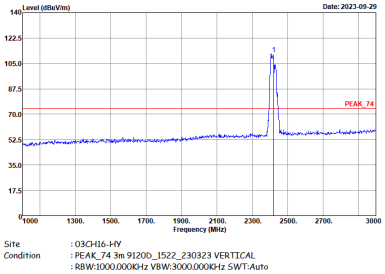
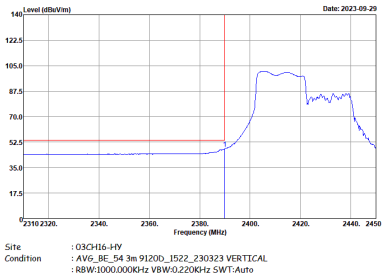
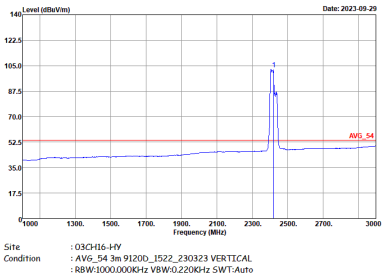
WLAN (2.4GHz) 802.11ax HE40 Partial 242RU61_Tx_CH03 + WLAN (5GHz) 802.11ax HE80 Full RU_Tx_CH42

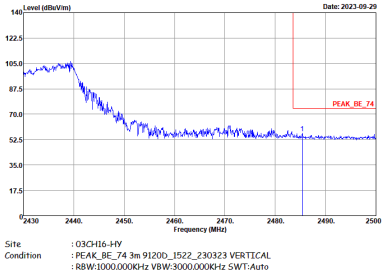
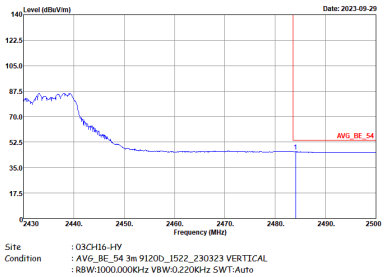
2.4GHz 2400~2483.5MHz

WIFI 802.11ax HE40 CH03 Partial 242RU61 (Band Edge @ 3m)

WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11ax HE40 Partial 242/61 CH03 2422MHz - L	
1+2	Horizontal	Fundamental
Peak		
Avg.		

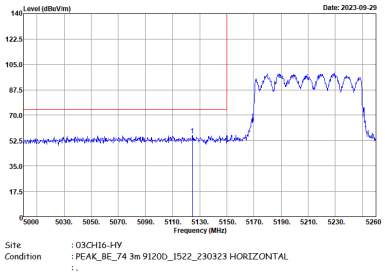
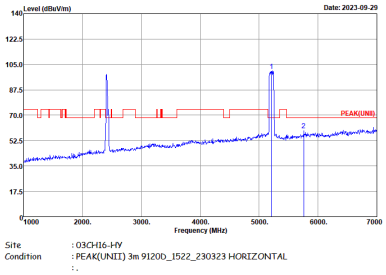
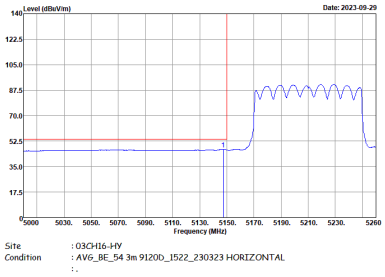
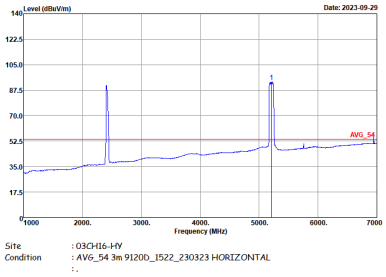
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11ax HE40 Partial 242/61 CH03 2422MHz - R	
1+2	Horizontal	Fundamental
Peak		Left blank
Avg.		Left blank

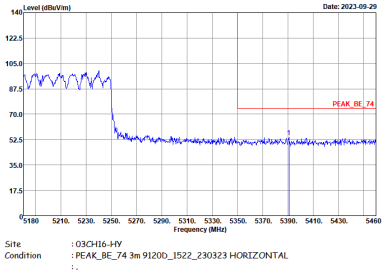
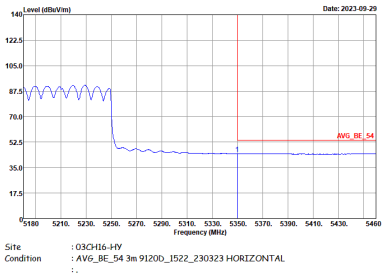
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11ax HE40 Partial 242/61 CH03 2422MHz - L	
1+2	Vertical	Fundamental
Peak		
Avg.		

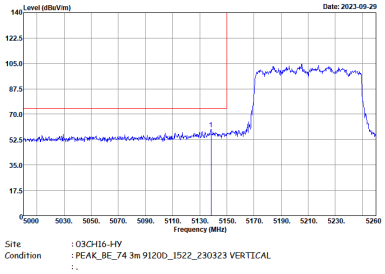
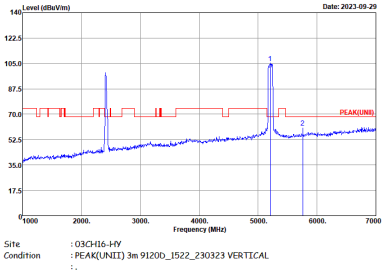
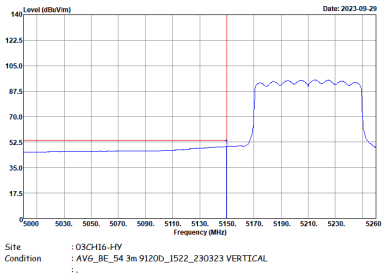
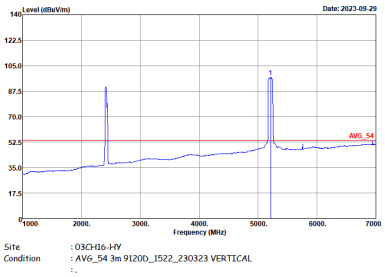
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11ax HE40 Partial 242/61 CH03 2422MHz - R	
1+2	Vertical	Fundamental
Peak		Left blank
Avg.		Left blank

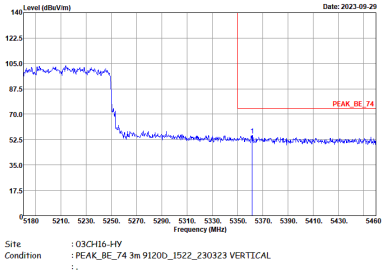
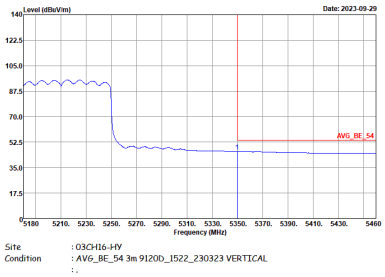
Band 1 - 5150~5250MHz

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

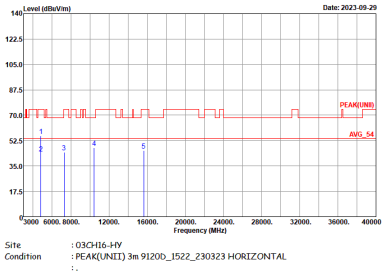
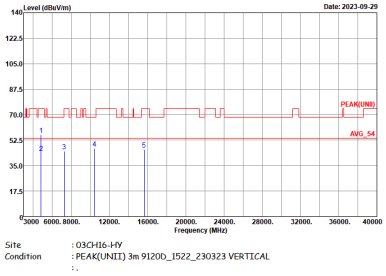
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ax HE80 Full CH42 5210MHz - L	
1+2	Horizontal	Fundamental
Peak		
Avg.		

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.		

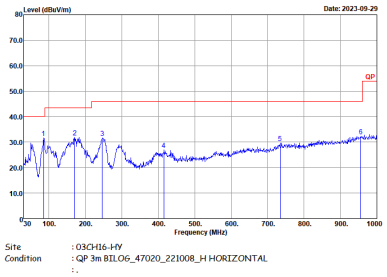
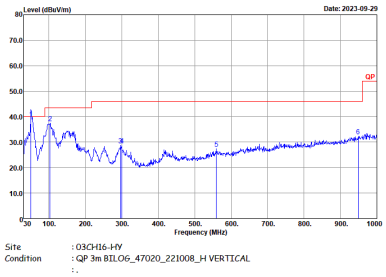
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ax HE80 Full CH42 5210MHz - R	
1+2	Vertical	Fundamental
Peak		Left blank
Avg.		Left blank

WLAN (2.4GHz) 802.11ax HE40 Partial 242RU61_Tx_CH03 + WLAN (5GHz) 802.11ax HE80 Full RU_Tx_CH42 (Harmonic @ 3m)

WIFI	2.4GHz 2400~2483.5MHz +Band 1 - 5150~5250MHz	
ANT	WIFI 802.11ax HE40 CH03 Partial 242 RU + WIFI 802.11ax HE80 CH42 Full	
1+2	Horizontal	Vertical
Peak Avg.		

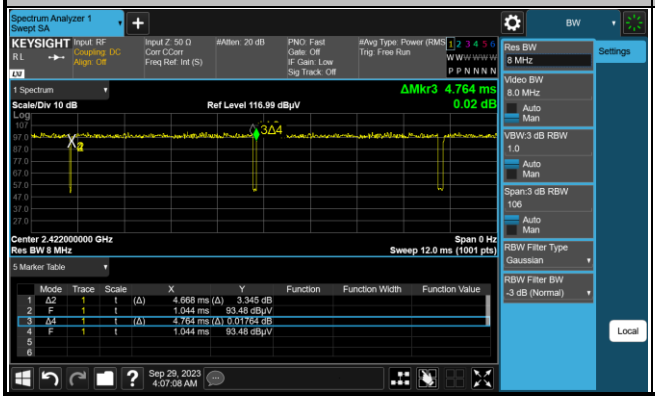
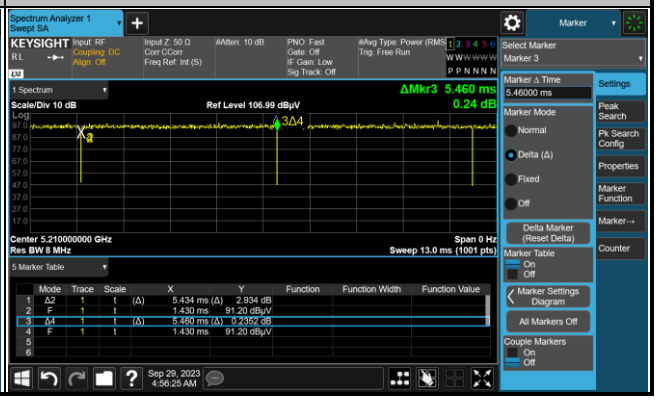
Emission below 1GHz

WLAN (2.4GHz) 802.11ax HE40 Partial 242RU61_Tx_CH03 + WLAN (5GHz) 802.11ax HE80 Full RU_Tx_CH42 (LF)

WIFI	2.4GHz 2400~2483.5MHz +Band 1 - 5150~5250MHz	
ANT	WIFI 802.11ax HE40 CH03 Partial 242 RU + WIFI 802.11ax HE80 CH42 Full	
1+2	Horizontal	Vertical
QP / Peak		

Appendix C. Duty Cycle Plots

Antenna	Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting
1+2	2.4GHz 802.11ax HE40 242 RU	97.98	4668	0.21	220Hz
1+2	5GHz 802.11ax HE80 Full RU	99.52	-	-	10Hz

MIMO <Ant. 1+2>

2.4GHz 802.11ax HE40 242 RU	5GHz 802.11ax HE80 Full RU