



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 Jul. 06, 2022 and testing was performed from Jul. 11, 2022 to Jul. 26, 2022. 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 test results in this variant report apply exclusively to the tested model / sample. Without written approval from Sporton International (USA) Inc., the test report shall not be reproduced except in full.

Approved by: Neil Kao

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



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History of this test report

Report No.	Version	Description	Issue Date
FR200117001-08C	01	Initial issue of report	Aug. 08, 2022
FR200117001-08C	02	Revised the section 1.4	Aug. 22, 2022

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
-	15.403(i)	6dB & 26dB Bandwidth	Not Required	-
-	2.1049	99% Occupied Bandwidth	Not Required	-
3.1	15.407(a)	Maximum Conducted Output Power	Pass	-
-	15.407(a)	Power Spectral Density	Not Required	-
3.2	15.407(b)	Unwanted Emissions	Pass	5.76 dB under the limit at 11940.000 MHz
-	15.207	AC Conducted Emission	Not Required	-
3.3	15.203 15.407(a)	Antenna Requirement	Pass	-

Note:

1. Not required means after assessing, test items are not necessary to carry out.
2. This is a variant report in which the section 1.1 can be referred for detailed product information and the change notes. All the test cases performed and presented in this test report are basically the worst cases identified from the original report (Sporton Report Number FR200117001F) in order to validate the representativeness of the original report in the light of the change notes declared by the manufacturer.

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. Please refer to the section " Uncertainty of Evaluation " for measurement uncertainty.

Comments and Explanations:

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



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 Feature	
Antenna Type	WLAN <Ant. 1>: Internal Antenna <Ant. 2>: Internal Antenna Bluetooth: Metal Antenna Zigbee: Metal Antenna

Antenna information		
5725 MHz ~ 5850 MHz	Peak Gain (dBi)	Ant. 1: 2.5 dBi Ant. 2: 1.0 dBi

Remark:

1. The EUT's information above is declared by manufacturer. Please refer to Comments and Explanations in report summary.
2. R550 is a product previously certified, according to the manufacturer's declaration, due to components shortage, some changes of passive components have been made to the PCB.

Hereunder is the main change list:

1. Change Wi-Fi Diplexer which needs RF schematic, layout and BOM change, needs add another two filter on 2G circuit to align with new diplexer.
2. Digital component replacements are made that require schematic, layout and BOM change.

The new design will be electrically identical to the original one as declared by the manufacturer.

- Dimensions of the PCB board and enclosure remains the same, slight change on the layout.
- Transmitting frequency does not change.
- Output power does not exceed the original modular approval.
- I/O ports are identical to original product and internal clocks are not touched.

As requested by the manufacturer, spot checks on RF portion including power check and the worst cases of radiated spurious emission identified from the original test reports are required to be performed, while EMC will be fully retested to substantiate there is no degradation of the RF parameters, no RF power increase in order to maintain the representativeness of the original test reports issued for the initial design.

1.2 Modification of EUT

No modifications made to the EUT during the testing.



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, 03CH02-CA

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

FCC Designation No.: US1250

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

Remark:

1. All the test items were validated and recorded in accordance with the standards without any modification during the testing.
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: radiation emission (1 GHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, the measured emission level of the EUT was maximized by rotating the EUT on a turntable, adjusting the orientation of the EUT and EUT antenna in three orthogonal axis (X: flat, Y: portrait, Z: landscape), and adjusting the measurement antenna orientation, following C63.10 exploratory test procedures and find Y plane as worst plane.

2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5725-5850 MHz Band 4 (U-NII-3)	149	5745	157	5785
	151*	5755	159*	5795
	153	5765	161	5805
	155#	5775	165	5825

Note:

1. The above Frequency and Channel with "*" are 802.11n HT40 and 802.11ac VHT40 and 802.11ax HE40.
2. The above Frequency and Channel with "#" are 802.11ac VHT80 and 802.11ax HE80.

2.2 Test Mode

The final test modes consider the modulation and the worst data rates as shown in the table below.

MIMO Mode

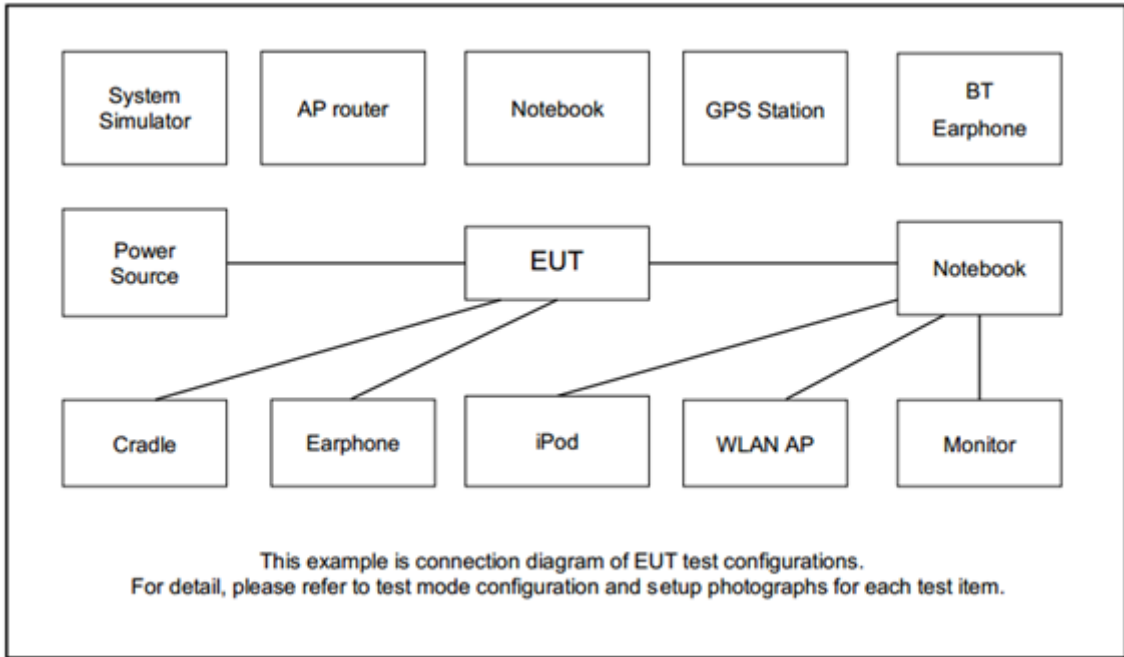
Modulation	Data Rate
802.11a	6 Mbps
802.11ax HE40	MCS0
802.11ax HE80	MCS0

Remark: The conducted power level of each chain in MIMO mode is equal or higher than SISO mode.

Ch. #	Band IV : 5725-5850 MHz		
	802.11a	802.11ax HE40	802.11ax HE80
L Low	149	151	-
M Middle	-	-	155
H High	-	-	-

Remark: For radiation spurious emission, the modulation and the data rate picked for testing are determined by the Max. RF conducted power.

2.3 Connection Diagram of Test System



2.4 Support Unit used in test configuration and system

Item	Equipment	Brand Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Notebook	Lenovo	SL11H55466	N/A	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m

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.

3 Test Result

3.1 Maximum Conducted Output Power Measurement

3.1.1 Limit of Maximum Conducted Output Power

For the band 5.725–5.85 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.

3.1.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

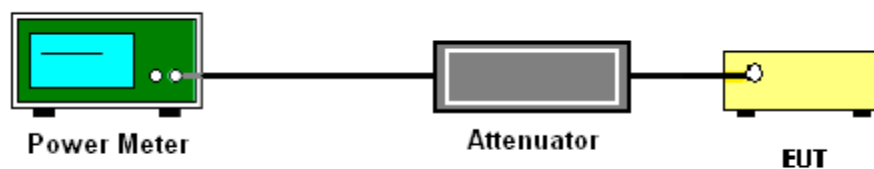
3.1.3 Test Procedures

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

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

1. Measurement is performed using a wideband RF power meter.
2. The EUT is configured to transmit at its maximum power control level.
3. Measure the average power of the transmitter.
4. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.
5. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01

3.1.4 Test Setup



3.1.5 Test Result of Maximum Conducted Output Power

Please refer to Appendix A.



3.2 Unwanted Emissions Measurement

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

3.2.1 Limit of Unwanted Emissions

(1) For transmitters operating in the 5.725-5.85 GHz band:

15.407(b)(4)(i) All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

(2) Unwanted spurious emissions falls 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.

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

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

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

(i) Sections 15.407(b)(1-3) specifies the unwanted emissions limit for the U-NII-1 and U-NII-2 bands. As specified, emissions above 1000 MHz that are outside of the restricted bands are subject to a peak emission limit of -27 dBm/MHz.

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



3.2.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

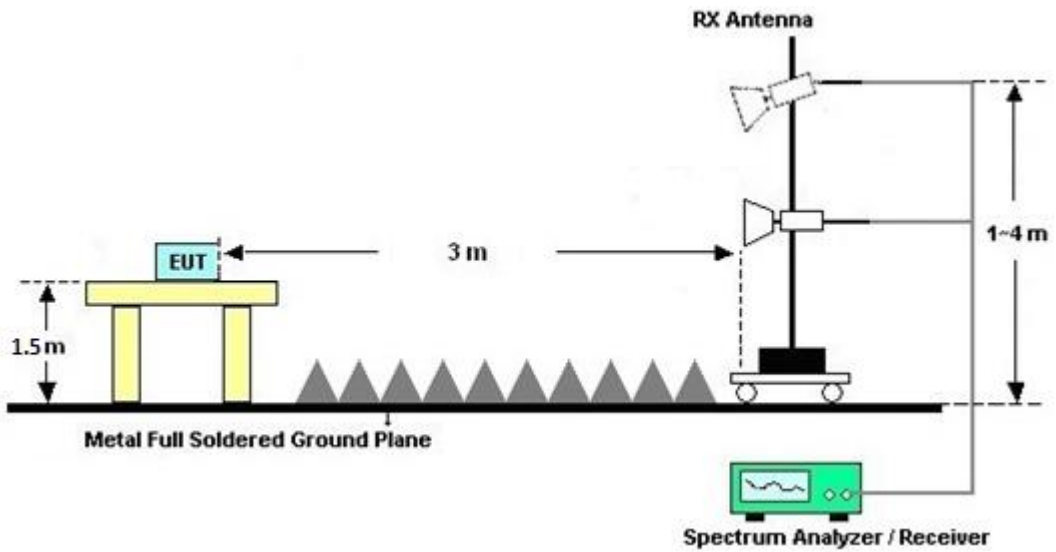
3.2.3 Test Procedures

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01. Section G) Unwanted emissions measurement.
 - (1) Procedure for Peak Unwanted Emissions Measurements Above 1000 MHz
 - RBW = 1 MHz
 - VBW \geq 3 MHz
 - Detector = Peak
 - Sweep time = auto
 - Trace mode = max hold
 - (2) Procedures for Average Unwanted Emissions Measurements Above 1000 MHz
 - 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 is placed on a turntable with 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 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 “-“.

3.2.4 Test Setup

For radiated test above 1GHz



3.2.5 Test Result of Radiated Band Edges

Please refer to Appendix B and C.

3.2.6 Duty Cycle

Please refer to Appendix D.

3.2.7 Test Result of Unwanted Radiated Emission

Please refer to Appendix B and C.



3.3 Antenna Requirements

3.3.1 Standard Applicable

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

3.3.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.3.3 Antenna Gain

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
Hygrometer	Testo	608-H1	45142595	N/A	Aug. 30, 2021	Jul. 11, 2022	Aug. 29, 2022	Conducted (TH01-CA)
Power Sensor	EM Electronics Corporation	RPR3006W	RPR6W-1901026	10MHz-6GHz	May 10, 2022	Jul. 11, 2022	May 09, 2023	Conducted (TH01-CA)
Switch Box & RF Cable	EM Electronics	EMSW18	SW1070902	N/A	Aug. 03, 2021	Jul. 11, 2022	Aug. 02, 2022	Conducted (TH01-CA)
Spectrum Analyzer	Rohde & Schwarz	FSL6	101303	9kHz-6GHz	May 31, 2022	Jul. 11, 2022	May 30, 2023	Conducted (TH01-CA)
Horn Antenna	SCHWARZBECK	BBHA 9120D	01895	1GHz~18GHz	Aug. 25, 2021	Jul. 12, 2022~ Jul. 26, 2022	Aug. 24, 2022	Radiation (03CH02-CA)
Preamplifier	Keysight	83017A	MY53270323	1GHz~26.5GHz	May 11, 2022	Jul. 12, 2022~ Jul. 26, 2022	May 10, 2023	Radiation (03CH02-CA)
Preamplifier	E-instrument	ERA-100M-18G-56-01-A70	EC1900251	1GHz~18GHz	May 10, 2022	Jul. 12, 2022~ Jul. 26, 2022	May 09, 2023	Radiation (03CH02-CA)
RF Cable	HUBER+SUHNER	SUCOFLEX 102	8024032/2, 802406/2, 802875/2	N/A	Jun. 22, 2022	Jul. 12, 2022~ Jul. 26, 2022	Jun. 21, 2023	Radiation (03CH02-CA)
Spectrum Analyzer	Keysight	N9010A	MY57420221	10Hz~44GHz	Sep. 22, 2021	Jul. 12, 2022~ Jul. 26, 2022	Sep. 21, 2022	Radiation (03CH02-CA)
Filter	Wainwright	WHKX8-5872.5-6750-18000-40ST	SN8	6.75GHz High Pass Filter	Jul. 22, 2021	Jul. 12, 2022~ Jul. 20, 2022	Jul. 21, 2022	Radiation (03CH02-CA)
Filter	Wainwright	WHKX8-5872.5-6750-18000-40ST	SN8	6.75GHz High Pass Filter	Jul. 21, 2022	Jul. 21, 2022~ Jul. 26, 2022	Jul. 20, 2023	Radiation (03CH02-CA)
Hygrometer	TESEO	608-H1	45142602	N/A	Aug. 04, 2021	Jul. 12, 2022~ Jul. 26, 2022	Aug. 03, 2022	Radiation (03CH02-CA)
Controller	ChainTek	EM-1000	060876	NA	N/A	Jul. 12, 2022~ Jul. 26, 2022	N/A	Radiation (03CH02-CA)
Antenna Mast	ChainTek	MBS-520-1	N/A	1m~4m	N/A	Jul. 12, 2022~ Jul. 26, 2022	N/A	Radiation (03CH02-CA)
Turn Table	ChainTek	T-200-S-1	N/A	0~360 Degree	N/A	Jul. 12, 2022~ Jul. 26, 2022	N/A	Radiation (03CH02-CA)
Software	Audix	E3	N/A	N/A	N/A	Jul. 12, 2022~ Jul. 26, 2022	N/A	Radiation (03CH02-CA)



5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	6.2 dB
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Appendix A. Test Result of Conducted Test Items

Test Engineer:	Liliana Gonzalez	Temperature:	23.2~23.8	°C
Test Date:	2022/7/11	Relative Humidity:	51.1~52	%

TEST RESULTS DATA
Average Power Table

Band IV 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	149	5745	20.51	21.78	24.20	30.00		2.50		Pass

TEST RESULTS DATA
Average Power Table

Band IV 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	
HE40	MCS0	2	151	5755	Full	20.53	21.75	24.19	30.00		2.50		Pass
HE80	MCS0	2	155	5775	Full	18.98	19.87	22.46	30.00		2.50		Pass



Appendix B. Radiated Spurious Emission

Test Engineer :	Fu Chen	Temperature :	20~23°C
		Relative Humidity :	42~47%



Band 4 - 5725~5850MHz

WIFI 802.11a (Harmonic @ 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)	
802.11a CH 149 5745MHz		11490	55.78	-18.22	74	65.41	40.16	17.95	67.74	364	130	P	H	
		11490	48.24	-5.76	54	57.87	40.16	17.95	67.74	364	130	A	H	
		12027	50.07	-23.93	74	59.97	39.22	18.5	67.62	-	-	P	H	
		12027	38.43	-15.57	54	48.33	39.22	18.5	67.62	-	-	A	H	
		14491	52.01	-21.99	74	57.62	41.94	20.43	67.98	-	-	P	H	
		14491	41.89	-12.11	54	47.5	41.94	20.43	67.98	-	-	A	H	
		17235	51.99	-16.21	68.2	58.36	40.73	21.61	68.71	-	-	P	H	
		17978	59.82	-14.18	74	59.45	48.25	22.1	69.98	-	-	P	H	
		17978	48.86	-5.14	54	48.49	48.25	22.1	69.98	-	-	A	H	
														H
														H
														H
														H
			11490	55.64	-18.36	74	65.35	40.08	17.95	67.74	400	153	P	V
			11490	48.07	-5.93	54	57.78	40.08	17.95	67.74	400	153	A	V
			12214	49.57	-24.43	74	58.75	39.23	18.68	67.09	-	-	P	V
			12214	39.14	-14.86	54	48.32	39.23	18.68	67.09	-	-	A	V
			14491	51.22	-22.78	74	56.82	41.95	20.43	67.98	-	-	P	V
			14491	42.05	-11.95	54	47.65	41.95	20.43	67.98	-	-	A	V
			17235	51.82	-16.38	68.2	57.99	40.93	21.61	68.71	-	-	P	V
		18000	61.07	-12.93	74	59.64	49.04	22.11	69.72	-	-	P	V	
		18000	49.72	-4.28	54	48.29	49.04	22.11	69.72	-	-	A	V	
													V	
													V	
													V	

Remark	<ol style="list-style-type: none"> No other spurious found. All results are PASS against Peak and Average limit line. The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only. The emission level close to 18GHz is checked that the average emission level is noise floor only.
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Band 4 5725~5850MHz

WIFI 802.11ax HE40_Full (Band Edge @ 3m)

WIFI	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.	
Ant.		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)	
802.11ax HE40 Full CH 151 5755MHz		5648.2	52.82	-15.38	68.2	39.61	31.96	11.65	30.4	367	253	P	H	
		5698.4	63.11	-40.91	104.02	49.83	31.98	11.72	30.42	367	253	P	H	
		5719.4	69.59	-41.04	110.63	56.21	32.05	11.75	30.42	367	253	P	H	
		5721.8	69.39	-45.51	114.9	56.01	32.05	11.75	30.42	367	253	P	H	
		5146	54.77	-19.23	74	41.96	32.04	11.12	30.35	-	-	P	H	
		5146	46.25	-7.75	54	33.44	32.04	11.12	30.35	-	-	A	H	
		5434	54.23	-19.77	74	41.35	31.8	11.44	30.36	-	-	P	H	
		5434	46.16	-7.84	54	33.28	31.8	11.44	30.36	-	-	A	H	
	*	5755	113.57	-	-	-	100.02	32.17	11.8	30.42	367	253	P	H
	*	5755	103.79	-	-	-	90.24	32.17	11.8	30.42	367	253	A	H
		5852.8	54.86	-60.96	115.82	40.94	32.47	11.92	30.47	367	253	P	H	
		5858.2	55.35	-54.55	109.9	41.42	32.47	11.93	30.47	367	253	P	H	
		5912.8	54.01	-23.19	77.2	40.01	32.51	11.99	30.5	367	253	P	H	
		5942.2	54.44	-13.76	68.2	40.34	32.59	12.02	30.51	367	253	P	H	
		5632.8	54.1	-14.1	68.2	40.95	31.91	11.63	30.39	167	247	P	V	
		5692.6	66.79	-32.95	99.74	53.53	31.97	11.71	30.42	167	247	P	V	
		5720	80.24	-30.56	110.8	66.87	32.04	11.75	30.42	167	247	P	V	
		5720	80.24	-30.56	110.8	66.87	32.04	11.75	30.42	167	247	P	V	
		4900	53.3	-20.7	74	41.55	31.28	10.87	30.4	-	-	P	V	
		4900	44.94	-9.06	54	33.19	31.28	10.87	30.4	-	-	A	V	
		5428	54.11	-19.89	74	41.29	31.75	11.43	30.36	-	-	P	V	
		5428	46.63	-7.37	54	33.81	31.75	11.43	30.36	-	-	A	V	
	*	5755	116.31	-	-	-	102.77	32.16	11.8	30.42	167	247	P	V
*	5755	106.76	-	-	-	93.22	32.16	11.8	30.42	167	247	A	V	
	5850.4	57.23	-64.06	121.29	43.31	32.47	11.92	30.47	167	247	P	V		
	5859.8	57.73	-51.72	109.45	43.8	32.48	11.93	30.48	167	247	P	V		
	5882.6	55.1	-44.46	99.56	41.13	32.51	11.95	30.49	167	247	P	V		
	5943.2	54.2	-14	68.2	40.1	32.59	12.02	30.51	167	247	P	V		

Remark

- No other spurious found.
- All results are PASS against Peak and Average limit line.
- The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only.



Band 4 5725~5850MHz

WIFI 802.11ax HE80_Full (Band Edge @ 3m)

WIFI	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.	
Ant.		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	Factor	Loss	Factor	Pos	Pos	Avg.		
1+2							(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)	
802.11ax HE80 Full CH 155 5775MHz		5639.4	54.85	-13.35	68.2	41.64	31.97	11.64	30.4	348	250	P	H	
		5679	62.68	-27.02	89.7	49.43	31.97	11.69	30.41	348	250	P	H	
		5718.6	64.86	-45.55	110.41	51.49	32.04	11.75	30.42	348	250	P	H	
		5723.4	65.34	-53.21	118.55	51.95	32.06	11.75	30.42	348	250	P	H	
		5116	54.26	-19.74	74	41.42	32.12	11.08	30.36	-	-	P	H	
		5116	46.45	-7.55	54	33.61	32.12	11.08	30.36	-	-	A	H	
		5434	54.23	-19.77	74	41.35	31.8	11.44	30.36	-	-	P	H	
		5434	46.06	-7.94	54	33.18	31.8	11.44	30.36	-	-	A	H	
	*	5775	110.73	-	-	-	97.1	32.24	11.82	30.43	348	250	P	H
	*	5775	99.49	-	-	-	85.86	32.24	11.82	30.43	348	250	A	H
		5854.6	64.17	-47.54	111.71	50.25	32.47	11.92	30.47	348	250	P	H	
		5863.6	64.63	-43.76	108.39	50.71	32.47	11.93	30.48	348	250	P	H	
		5877.2	61.85	-41.72	103.57	47.92	32.47	11.95	30.49	348	250	P	H	
		5949	53.22	-14.98	68.2	39.09	32.61	12.03	30.51	348	250	P	H	
		5639.2	57.89	-10.31	68.2	44.75	31.91	11.63	30.4	189	247	P	V	
		5697.6	67.1	-36.33	103.43	53.83	31.97	11.72	30.42	189	247	P	V	
		5718.2	68.1	-42.2	110.3	54.73	32.04	11.75	30.42	189	247	P	V	
		5724.8	68.73	-53.01	121.74	55.34	32.06	11.75	30.42	189	247	P	V	
		5128	53.78	-20.22	74	41.02	32.02	11.1	30.36	-	-	P	V	
		5128	45.55	-8.45	54	32.79	32.02	11.1	30.36	-	-	A	V	
		5446	54.15	-19.85	74	41.25	31.81	11.45	30.36	-	-	P	V	
		5446	45.79	-8.21	54	32.89	31.81	11.45	30.36	-	-	A	V	
	*	5775	111.08	-	-	-	97.46	32.23	11.82	30.43	189	247	P	V
	*	5775	101.69	-	-	-	88.07	32.23	11.82	30.43	189	247	A	V
		5855	66.28	-44.52	110.8	52.35	32.48	11.92	30.47	189	247	P	V	
		5855.2	67.64	-43.1	110.74	53.71	32.48	11.92	30.47	189	247	P	V	
	5875.8	65.47	-39.14	104.61	51.51	32.5	11.95	30.49	189	247	P	V		
	5927.4	55.64	-12.56	68.2	41.58	32.56	12.01	30.51	189	247	P	V		

Remark

- No other spurious found.
- All results are PASS against Peak and Average limit line.
- The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or 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 over limit line.
P/A	Peak or Average
H/V	Horizontal or Vertical



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)
802.11a CH 149 5745MHz		5650	55.45	-12.75	68.2	54.51	32.22	4.58	35.86	103	308	P	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) – 68.2(dBμV/m)
= -12.75 (dB)

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



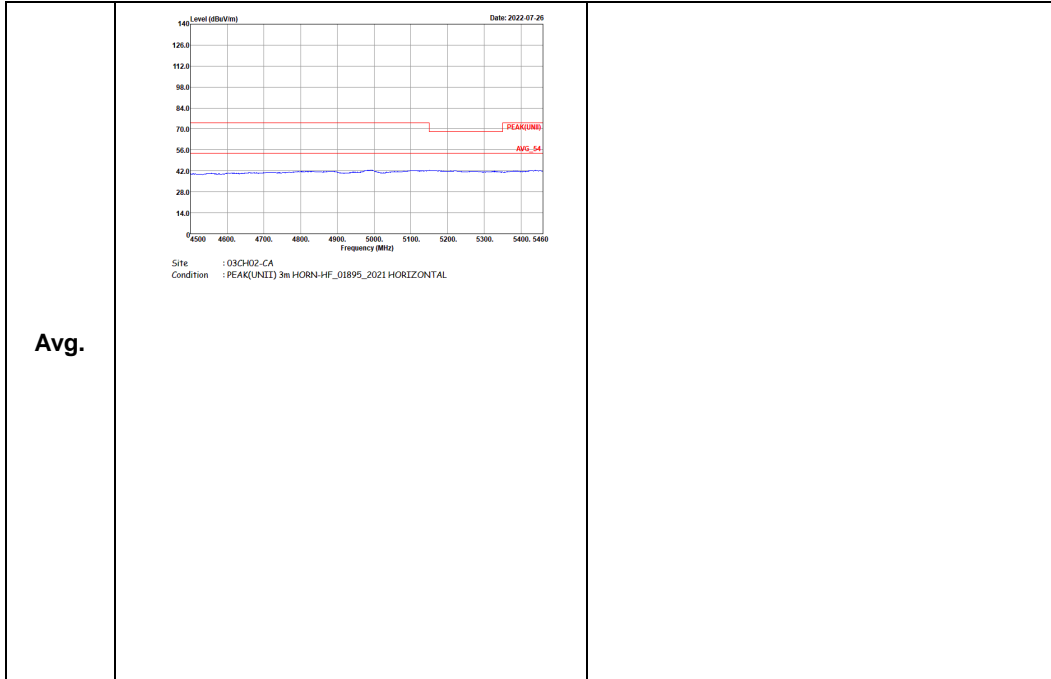
Appendix C. Radiated Spurious Emission Plots

Test Engineer :	Fu Chen	Temperature :	20~23°C
		Relative Humidity :	42~47%



Band 4 - 5725~5850MHz
WIFI 802.11ax HE40 Full (Band Edge @ 3m)

WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ax HE40 Full CH151 5755MHz	
1+2	Horizontal	Fundamental
Peak	<p>Site : 03CH02-CA Condition : PEAK_BE(B4)_16-24 3m HORN-HF_01895_2021 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto</p>	<p>Site : 03CH02-CA Condition : PEAK(LINE) 3m HORN-HF_01895_2021 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto</p>
Peak	<p>Site : 03CH02-CA Condition : PEAK_BE(B4)_16-24 3m HORN-HF_01895_2021 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto</p>	Left blank





WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ax HE40 Full CH151 5755MHz	
1+2	Vertical	Fundamental
Peak	<p>Date: 2022-07-22 PEAK_BE(B4)_16-24</p> <p>Site : 03CH02-CA Condition : PEAK_BE(B4)_16-24 3m HORN-HF_01895_2021 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	<p>Date: 2022-07-22 PEAK(LINE) : 5755.000 : 128.000</p> <p>Site : 03CH02-CA Condition : PEAK(LINE) 3m HORN-HF_01895_2021 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Peak	<p>Date: 2022-07-22 PEAK_BE(B4)_16-24</p> <p>Site : 03CH02-CA Condition : PEAK_BE(B4)_16-24 3m HORN-HF_01895_2021 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	Left blank



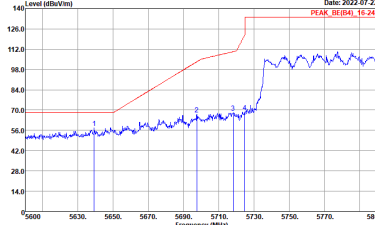
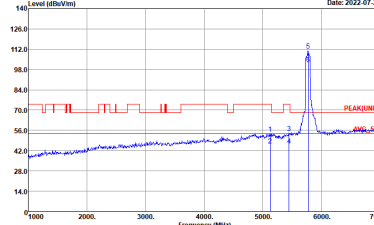



Band 4 5725~5850MHz
WIFI 802.11ax HE80 Full (Band Edge @ 3m)

WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ax HE80 Full CH155 5775MHz	
1+2	Horizontal	Fundamental
Peak	<p>Site : 03CH02-CA Condition : PEAK_BE(B4)_16-24 3m HORN-HF_01895_2021 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto</p>	<p>Site : 03CH02-CA Condition : PEAK(UNIT) 3m HORN-HF_01895_2021 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto</p>
Peak	<p>Site : 03CH02-CA Condition : PEAK_BE(B4)_16-24 3m HORN-HF_01895_2021 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto</p>	Left blank



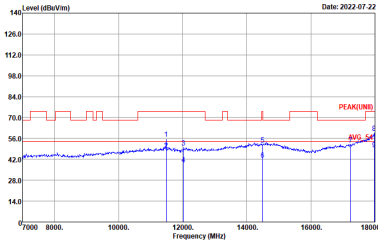
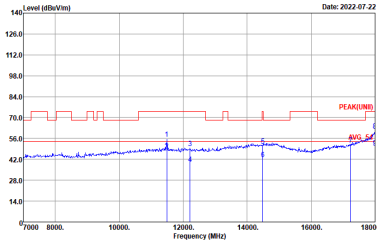
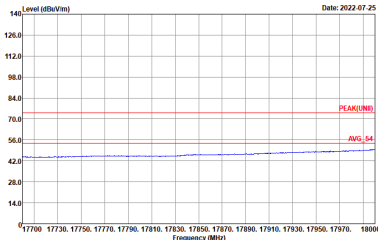
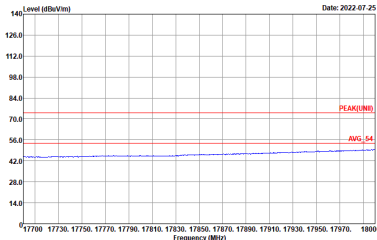


WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ax HE80 Full CH155 5775MHz	
1+2	Vertical	Fundamental
Peak	 <p>Site : 03CH02-CA Condition : PEAK_BE(B4)_16-24 3m HORN-HF_01895_2021 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Site : 03CH02-CA Condition : PEAK(LINE) 3m HORN-HF_01895_2021 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Peak	 <p>Site : 03CH02-CA Condition : PEAK_BE(B4)_16-24 3m HORN-HF_01895_2021 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	Left blank





Band 4 - 5725~5850MHz
WIFI 802.11a (Harmonic @ 3m)

WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11a CH149 5745MHz	
1+2	Horizontal	Vertical
Peak	 <p>Site : 03CH02-CA Condition : PEAK(UNII) 3m HORN-HF_01895_2021 HORIZONTAL</p>	 <p>Site : 03CH02-CA Condition : PEAK(UNII) 3m HORN-HF_01895_2021 VERTICAL</p>
Avg.	 <p>Site : 03CH02-CA Condition : PEAK(UNII) 3m HORN-HF_01895_2021 HORIZONTAL</p>	 <p>Site : 03CH02-CA Condition : PEAK(UNII) 3m HORN-HF_01895_2021 VERTICAL</p>



Appendix D. Duty Cycle Plots

Antenna	Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting
1+2	5GHz 802.11a	94.27	1975	0.51	1kHz
1+2	5GHz 802.11ax HE40 Full RU	95.49	5400	0.19	300Hz
1+2	5GHz 802.11ax HE80 Full RU	96.03	5445	0.18	300Hz

MIMO <Ant. 1+2>

