

FCC CO-LOCATION RADIO TEST REPORT

FCC ID :	A4RGGH2X
Equipment :	Phone
Model Name :	GGH2X, GC15S
Applicant :	Google LLC
	1600 Amphitheatre Parkway,
	Mountain View, CA 94043 USA
Standard :	FCC Part 15 Subpart E §15.407

The product was received on Feb. 05, 2024 and testing was performed from Mar. 15, 2024 to Mar. 18, 2024. 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

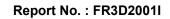
Sporton International Inc. Wensan Laboratory No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.)



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History of this test report

Report No.	Version	Description	Issue Date
FR3D2001I	01	Initial issue of report	May 10, 2024
FR3D2001I	02	Revise Antenna information This report is an updated version, replacing the report issued on May 10, 2024.	May 28, 2024



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	6.47 dB under the limit at 4960.00 MHz
3.2	15.203	Antenna Requirement	Pass	-

Conformity Assessment Condition:

 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.

 The GGH2X and GC15S are 100% identical in Hardware / Software to each other, and only have different model names for marketing segmentation. The test sample are all model GGH2X.

Reviewed by: William Chen

Report Producer: Ming Chen



1 General Description

1.1 Product Feature of Equipment Under Test

Product Feature

General Specs

GSM/WCDMA/LTE/5G NR, Bluetooth, BLE, BLE channel sounding, Thread, Wi-Fi 802.11be, UWB, NFC, WPC Rx, NTN and GNSS

Antenna Type WLAN: <Ant. 3>: IFA Antenna <Ant. 4>: ILA Antenna Bluetooth:

<Ant. 3>: IFA Antenna <Ant. 4>: ILA Antenna

EUT Information List		
S/N Performed Test Item		
41251FDKD0007K 41251FDKD0007Y	Radiated Spurious Emission	

Antenna information (Open Mode)				
2400 MHz ~ 2483.5 MHz	Peak Gain (dBi)	<ant. 3="">: -3.3 <ant. 4="">: -3.5</ant.></ant.>		
5150 MHz ~ 5250 MHz	Peak Gain (dBi)	<ant. 3="">: -2.9 <ant. 4="">: -4.1</ant.></ant.>		
5925 MHz ~ 6425 MHz	Peak Gain (dBi)	<ant. 3="">: -6.6 <ant. 4="">: -3.3</ant.></ant.>		

Antenna information (Close Mode)				
2400 MHz ~ 2483.5 MHz	Peak Gain (dBi)	<ant. 3="">: -4.3</ant.>		
2400 MHZ ~ 2483.5 MHZ	Feak Gaill (UDI)	<ant. 4="">: -1.1</ant.>		
5150 MHz ~ 5250 MHz	Peak Gain (dBi)	<ant. 3="">: -5.9</ant.>		
		<ant. 4="">: -3.6</ant.>		
5025 MUL- C425 MUL-	Deals Cain (dDi)	<ant. 3="">: -7.6</ant.>		
5925 MHz ~ 6425 MHz	Peak Gain (dBi)	<ant. 4="">: -3.4</ant.>		

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.
- 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. The TAF code is not including all the FCC KDB listed without accreditation.

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). 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 (Open and Close) and EUT antenna in three orthogonal axis (X: flat, Y: portrait, Z: landscape) and accessory (Adapter or Earphone), and adjusting the measurement antenna orientation, following C63.10 exploratory test procedures. find X plane close with Adapter as worst plane.

2.1 Carrier Frequency and Channel

2400-2483.5 MHz					
Bluetooth – LE 1Mbps 802.11g					
Channel Channel		Channel	Freq. (MHz)		
39	2480	06	2437		

5150-52	50 MHz	5925-6425 MHz		
802.11a		802.11a		
Channel Freq. (MHz)		Channel	Freq. (MHz)	
36	5180	01	5955	

<Co-Location>

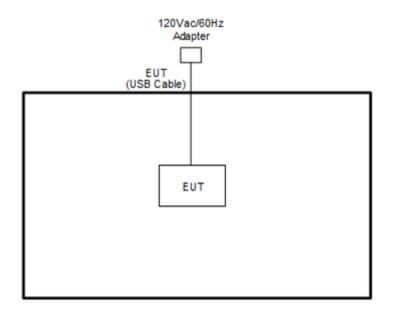
Modulation	Data Rate	Worst Plane	
2.4GHz 802.11g for MIMO <ant. 3+4=""> +</ant.>			
5GHz 802.11a for MIMO <ant. 3+4=""></ant.>	6 Mbps + 6 Mbps	X Plane open with Adapter	
2.4GHz 802.11g for MIMO <ant. 3+4=""> +</ant.>			
6GHz 802.11a for MIMO <ant. 3+4=""></ant.>	6 Mbps + 6 Mbps	X Plane close with Adapter	
Bluetooth – LE for <ant. 3=""> +</ant.>			
5GHz 802.11a for MIMO <ant. 3+4=""></ant.>	GFSK + 6 Mbps	X Plane open with Adapter	

Remark:

- 1. For Radiated Test Cases, the tests were performed with USB Cable 2.
- 2. During the preliminary test, both charging modes (Adapter mode and WPC Rx mode) were verified. It is determined that the adaptor mode is the worst case for official test.



2.2 Connection Diagram of Test System



2.3 Support Unit used in test configuration and system

ltem	Equipment	Brand Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Adapter	Chicony	G9BR1	N/A	N/A	N/A

2.4 EUT Operation Test Setup

The RF test items, utility "RF Compliance 1.2_11-29-23" 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

<For 2402 MHz ~ 2480 MHz>

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. If the output power of this device is measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB.

<For 5150 MHz ~ 5250 MHz>

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

<For 5925 MHz ~ 6425 MHz>

For transmitters operating within the 5.925-7.125 GHz band: Any emissions outside of the 5.925-7.125 GHz band must not exceed an e.i.r.p. of -27 dBm/MHz.

EIRP (dBm)	Field Strength at 3m (dBµV/m)
- 27 (RMS)	68.3
- 7 (Peak)	88.3

According 987594 D02 U-NII 6GHz EMC Measurement v01 section G:

Unwanted emissions outside of restricted bands are measured with a RMS detector. In addition, 15.35(b) applies where the peak emissions must be limited to no more than 20 dB above the average limit



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

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

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

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

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

 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

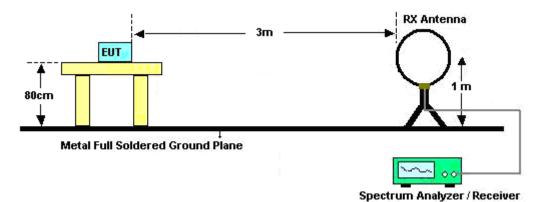
- RBW = 1 MHz
- VBW = 10 Hz, when duty cycle is no less than 98 percent.
- VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.
- 2. The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



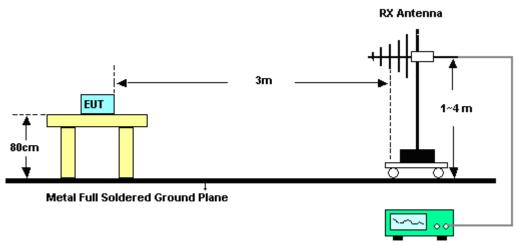
7. Radiated testing above 1 GHz is performed by adjusting the antenna tower from 1 m to 4 m and by rotating the turn table from 0 degree to 360 degrees to find the peak maximum hold reading for scanning all frequencies. When there is no suspected emission found and the harmonic emission level is with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

3.1.4 Test Setup

For radiated emissions below 30MHz

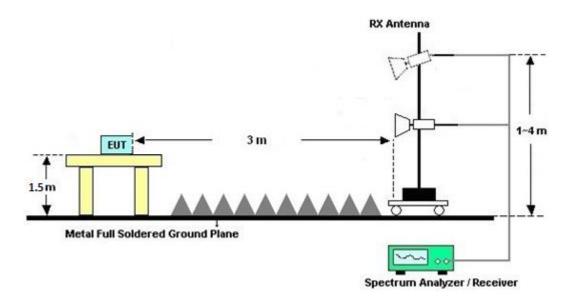


For radiated emissions from 30MHz to 1GHz

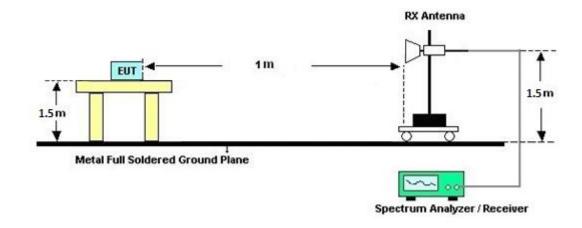


Spectrum Analyzer / Receiver

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. 12, 2023	Mar. 15, 2024~ Mar. 18, 2024	Sep. 11, 2024	Radiation (03CH16-HY)
SHF-EHF Horn Antenna	SCHWARZBE CK	BBHA9170	00993	18GHz-40GHz	Nov. 24, 2023	Mar. 15, 2024~ Mar. 18, 2024	Nov. 23, 2024	Radiation (03CH16-HY)
Bilog Antenna	TESEQ	CBL 6111D & 00802N1D01N- 06	47020 & 06	30MHz to 1GHz	Oct. 07, 2023	Mar. 15, 2024~ Mar. 18, 2024	Oct. 06, 2024	Radiation (03CH16-HY)
Horn Antenna	SCHWARZBE CK	BBHA 9120 D	9120D-1522	1G~18GHz	Mar. 23, 2023	Mar. 15, 2024~ Mar. 18, 2024	Mar. 22, 2024	Radiation (03CH16-HY)
Amplifier	SONOMA	310N	371607	9kHz~1GHz	Jul. 03, 2023	Mar. 15, 2024~ Mar. 18, 2024	Jul. 02, 2024	Radiation (03CH16-HY)
Preamplifier	Keysight	83017A	MY53270264	1GHz~26.5GHz	Dec. 07, 2023	Mar. 15, 2024~ Mar. 18, 2024	Dec. 06, 2024	Radiation (03CH16-HY)
Preamplifier	EMEC	EM1G18G	060812	1GHz~18GHz	Dec. 25, 2023	Mar. 15, 2024~ Mar. 18, 2024	Dec. 24, 2024	Radiation (03CH16-HY)
Preamplifier	EMEC	EM18G40G	060801	18GHz~40GHz	Jun. 27, 2023	Mar. 15, 2024~ Mar. 18, 2024	Jun. 26, 2024	Radiation (03CH16-HY)
Filter	Wainwright	WLK4-1000-15 30-8000-40SS	SN17	1.53GHz Low Pass Filter	Jan. 15, 2024	Mar. 15, 2024~ Mar. 18, 2024	Jan. 14, 2025	Radiation (03CH16-HY)
Filter	Wainwright	WHKX12-2700- 3000-18000-60 ST	SN3	3GHz High Pass Filter	Jun. 29, 2023	Mar. 15, 2024~ Mar. 18, 2024	Jun. 28, 2024	Radiation (03CH16-HY)
Filter	Wainwright	WHKX8-5872.5 -6750-18000-40 ST	SN27	6.75GHz High Pass Filter	Nov. 13, 2023	Mar. 15, 2024~ Mar. 18, 2024	Nov. 12, 2024	Radiation (03CH16-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	803951/2	9K~30M	Mar. 06, 2024	Mar. 15, 2024~ Mar. 18, 2024	Mar. 05, 2025	Radiation (03CH16-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102/SUCOFLE X 104	EC-A5-300-5 757,805935/4 ,802434/4	30MHz~18GHz	Aug. 08, 2023	Mar. 15, 2024~ Mar. 18, 2024	Aug. 07, 2024	Radiation (03CH16-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	804011/2,804 012/2	18-40GHz	Jan. 02, 2024	Mar. 15, 2024~ Mar. 18, 2024	Jan. 01, 2025	Radiation (03CH16-HY)
Software	Audix	E3 6.2009-8-24	RK-001136	N/A	N/A	Mar. 15, 2024~ Mar. 18, 2024	N/A	Radiation (03CH16-HY)
Controller	ChainTek	3000-1	N/A	Control Turn table & Ant Mast	N/A	Mar. 15, 2024~ Mar. 18, 2024	N/A	Radiation (03CH16-HY)
Antenna Mast	ChainTek	MBS-520-1	N/A	1m~4m	N/A	Mar. 15, 2024~ Mar. 18, 2024	N/A	Radiation (03CH16-HY)
Turn Table	ChainTek	T-200-S-1	N/A	0~360 Degree	N/A	Mar. 15, 2024~ Mar. 18, 2024	N/A	Radiation (03CH16-HY)



5 Measurement Uncertainty

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

Measuring Uncertainty for a Level of Confidence	6.5 dB
of 95% (U = 2Uc(y))	0.3 UB

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

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

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

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

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

Measuring Uncertainty for a Level of Confidence	5.5 dB
of 95% (U = 2Uc(y))	5.5 UB



Appendix A. Radiated Spurious Emission

Test Engineer :	Bill Chang, Gary Guo and Steven Wu	Temperature :	18.2~20.2°C
Test Engineer .		Relative Humidity :	54.2~56.1%



WLAN (2.4GHz) 802.11g_Tx_CH06 + WLAN (5GHz) 802.11a_Tx_CH36

2.4GHz 2400~2483.5MHz

WIFI	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
3+4		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V
	*	2437	115.12	41.12	74	99.46	27.6	17.96	29.9	-	-	Р	Н
		4874	56.88	-17.12	74	42.37	32.65	11.3	29.44	302	158	Р	Н
		4874	47.17	-6.83	54	32.66	32.65	11.3	29.44	302	158	А	Н
	*	5180	107.23	39.03	68.2	91.78	33	11.84	29.39	-	-	Ρ	Н
		7311	45.54	-28.46	74	59.85	36.88	14.26	65.45	-	-	Ρ	Н
		10360	46.24	-21.96	68.2	57.51	38.7	16.56	66.53	-	-	Ρ	Н
		15540	46.88	-27.12	74	55.32	37.54	20.36	66.34	-	-	Ρ	Н
802.11g													Н
CH 06													Н
2437MHz													Н
+	*	2437	109.13	35.13	74	93.47	27.6	17.96	29.9			Ρ	V
802.11a		4874	55.71	-18.29	74	41.2	32.65	11.3	29.44	198	213	Ρ	V
CH 36		4874	46.22	-7.78	54	31.71	32.65	11.3	29.44	198	213	А	V
5180MHz	*	5180	105.93	37.73	68.2	90.48	33	11.84	29.39	-	-	Ρ	V
		7311	46.58	-27.42	74	60.89	36.88	14.26	65.45	-	-	Р	V
		10360	46.41	-21.79	68.2	57.68	38.7	16.56	66.53	-	-	Р	V
		15540	52.11	-21.89	74	60.55	37.54	20.36	66.34	100	58	Р	V
		15540	41.37	-12.63	54	49.81	37.54	20.36	66.34	100	58	А	V
													V
													V
													V
	1. No	o other spurious	s found.	1	1	1	1		1	1	1	1	1
	2. All	results are PA	.SS against F	eak and	Average lim	it line.							
Remark	3. Th	e emission pos	sition marked	as "-" m	eans no sus	pected em	ission found	d with suf	ficient mar	gin agai	nst limit	line or	· noise
	flo	or only.											

WIFI 802.11g (Harmonic @ 3m)



BLE(1M)_Tx_CH39 + WLAN (5GHz) 802.11a_Tx_CH36

	(MHz) 2480 4960 4960 5180 7440 10360	(dBµV/m) 113.02 57.62 47.53 106.81	(dB) 39.02 -16.38 -6.47	Line (dBµV/m) 74 74	Level (dBμV) 97.23 42.62	Factor (dB/m) 27.7	Loss (dB) 17.98	Factor (dB) 29.89	Pos (cm) 400	Pos (deg) 0	Avg. (P/A) P	
	2480 4960 4960 5180 7440	113.02 57.62 47.53	39.02 -16.38	74 74	97.23							
	4960 4960 5180 7440	57.62 47.53	-16.38	74		27.7	17.98	29.89	400	0	Р	
	4960 5180 7440	47.53			42.62					•	+	Н
	5180 7440		-6.47		42.02	32.88	11.54	29.42	153	251	Р	Н
	7440	106.81		54	32.53	32.88	11.54	29.42	153	251	А	Н
			38.61	68.2	91.36	33	11.84	29.39	-	-	Р	Н
	10360	43.81	-30.19	74	58.41	36.44	14.43	65.47	-	-	Р	н
	10000	47.19	-21.01	68.2	58.46	38.7	16.56	66.53	-	-	Р	Н
	15540	46.47	-27.53	74	54.91	37.54	20.36	66.34	-	-	Р	Н
												Н
												Н
												Н
												н
												н
*	2480	110.09	36.09	74	94.3	27.7	17.98	29.89	100	0	Р	V
	4960	57.18	-16.82	74	42.18	32.88	11.54	29.42	104	310	Р	V
	4960	47.24	-6.76	54	32.24	32.88	11.54	29.42	104	310	Α	V
*	5180	105.15	36.95	68.2	89.7	33	11.84	29.39	-	-	Р	V
	7440	44.19	-29.81	74	58.79	36.44	14.43	65.47	-	-	Р	V
	10360	46.58	-21.62	68.2	57.85	38.7	16.56	66.53	-	-	Р	V
	15540	46.74	-27.26	74	55.18	37.54	20.36	66.34	-	-	Р	V
												V
												V
												V
												V
												V
No	other spuriou	s found.	<u> </u>							<u> </u>		<u> </u>
	•		Peak and	Average lim	it line.							
	e emission pos	sition marked	as "-" m	eans no sus	pected emi	ssion found	d with suff	icient mar	ain adai	inst limit	line or	noise
	*	2480 4960 * 5180 7440 10360 15540 No other spuriou All results are PA	2400 110.09 4960 57.18 4960 47.24 * 5180 105.15 7440 44.19 10360 46.58 15540 46.74 10000 10000 10000 10000 10000 10000 10000 10000 10000 10000 10000 10000 10000 10000 10000 10000 10000 10000 10000 10000 10000 10000 10000 10000 10000 10000 10000 10000 10000 10000 10000 10000 10000 10000 10000 100000 10000 10000 10000 10000 10000 10000 10000 10000 10000 10000 10000 10000 10000 10000 10000 100000 <	2480 110.03 30.03 4960 57.18 -16.82 4960 47.24 -6.76 * 5180 105.15 36.95 7440 44.19 -29.81 10360 46.58 -21.62 15540 46.74 -27.26 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 <	2460 110.09 50.09 14 4960 57.18 -16.82 74 4960 47.24 -6.76 54 * 5180 105.15 36.95 68.2 7440 44.19 -29.81 74 10360 46.58 -21.62 68.2 15540 46.74 -27.26 74 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 </td <td>2460 110.09 50.09 14 94.3 4960 57.18 -16.82 74 42.18 4960 47.24 -6.76 54 32.24 * 5180 105.15 36.95 68.2 89.7 7440 44.19 -29.81 74 58.79 10360 46.58 -21.62 68.2 57.85 15540 46.74 -27.26 74 55.18 15540 46.74 -27.26 74 55.18 15540 46.74 -27.26 74 55.18</td> <td>2480 110.03 30.03 14 34.3 21.1 4960 57.18 -16.82 74 42.18 32.88 4960 47.24 -6.76 54 32.24 32.88 * 5180 105.15 36.95 68.2 89.7 33 7440 44.19 -29.81 74 58.79 36.44 10360 46.58 -21.62 68.2 57.85 38.7 15540 46.74 -27.26 74 55.18 37.54 105 105 100 100 100 100 10360 46.74 -27.26 74 55.18 37.54 105 105 100 100 100 100 100 100 100 100 100 100 100 10360 46.74 -27.26 74 55.18 37.54 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 <t< td=""><td>2460 110.03 30.03 114 34.3 21.1 11.30 4960 57.18 -16.82 74 42.18 32.88 11.54 4960 47.24 -6.76 54 32.24 32.88 11.54 * 5180 105.15 36.95 68.2 89.7 33 11.84 7440 44.19 -29.81 74 58.79 36.44 14.43 10360 46.58 -21.62 68.2 57.85 38.7 16.56 15540 46.74 -27.26 74 55.18 37.54 20.36 105 105 100 100 100 100 100 100 10360 46.74 -27.26 74 55.18 37.54 20.36 105 105 100 100 100 100 100 100 105 105 100 100 100 100 100 100 100 105 105 100 100 100 100 100 100 100</td><td>2400 110.03 30.03 14 34.3 21.1 11.33 23.33 4960 57.18 -16.82 74 42.18 32.88 11.54 29.42 4960 47.24 -6.76 54 32.24 32.88 11.54 29.42 * 5180 105.15 36.95 68.2 89.7 33 11.84 29.39 7440 44.19 -29.81 74 58.79 36.44 14.43 65.47 10360 46.58 -21.62 68.2 57.85 38.7 16.56 66.53 15540 46.74 -27.26 74 55.18 37.54 20.36 66.34 15540 46.74 -27.26 74 55.18 37.54 20.36 66.34 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 <t< td=""><td>2460 110.05 30.05 14 34.3 21.1 11.50 23.35 100 4960 57.18 -16.82 74 42.18 32.88 11.54 29.42 104 4960 47.24 -6.76 54 32.24 32.88 11.54 29.42 104 * 5180 105.15 36.95 68.2 89.7 33 11.84 29.39 - 7440 44.19 -29.81 74 58.79 36.44 14.43 65.47 - 10360 46.58 -21.62 68.2 57.85 38.7 16.56 66.53 - 10360 46.74 -27.26 74 55.18 37.54 20.36 66.34 - 15540 46.74 -27.26 74 55.18 37.54 20.36 66.34 - 1050 1051 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101</td><td>2400 110.05 30.05 114 34.3 21.1 117.80 22.05 100 0 4960 57.18 -16.82 74 42.18 32.88 11.54 29.42 104 310 4960 47.24 -6.76 54 32.24 32.88 11.54 29.42 104 310 * 5180 105.15 36.95 68.2 89.7 33 11.84 29.39 - - 7440 44.19 -29.81 74 58.79 36.44 14.43 65.47 - - 10360 46.58 -21.62 68.2 57.85 38.7 16.56 66.53 - - 15540 46.74 -27.26 74 55.18 37.54 20.36 66.34 - - 15540 46.74 -27.26 74 55.18 37.54 20.36 66.34 - - 100 100 100 100 100 100 100 100 100 100 100 100 100</td><td>2400 110.09 30.09 14 34.3 21.1 11.90 29.09 100 0 1 4960 57.18 -16.82 74 42.18 32.88 11.54 29.42 104 310 P 4960 47.24 -6.76 54 32.24 32.88 11.54 29.42 104 310 A * 5180 105.15 36.95 68.2 89.7 33 11.84 29.39 - - P 7440 44.19 -29.81 74 58.79 36.44 14.43 65.47 - P 10360 46.58 -21.62 68.2 57.85 38.7 16.56 66.53 - P 15540 46.74 -27.26 74 55.18 37.54 20.36 66.34 - - P 15540 46.74 -27.26 74 55.18 37.54 20.36 66.34 - - P 15540 155 155 155 155 155 155 155</td></t<></td></t<></td>	2460 110.09 50.09 14 94.3 4960 57.18 -16.82 74 42.18 4960 47.24 -6.76 54 32.24 * 5180 105.15 36.95 68.2 89.7 7440 44.19 -29.81 74 58.79 10360 46.58 -21.62 68.2 57.85 15540 46.74 -27.26 74 55.18 15540 46.74 -27.26 74 55.18 15540 46.74 -27.26 74 55.18	2480 110.03 30.03 14 34.3 21.1 4960 57.18 -16.82 74 42.18 32.88 4960 47.24 -6.76 54 32.24 32.88 * 5180 105.15 36.95 68.2 89.7 33 7440 44.19 -29.81 74 58.79 36.44 10360 46.58 -21.62 68.2 57.85 38.7 15540 46.74 -27.26 74 55.18 37.54 105 105 100 100 100 100 10360 46.74 -27.26 74 55.18 37.54 105 105 100 100 100 100 100 100 100 100 100 100 100 10360 46.74 -27.26 74 55.18 37.54 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 <t< td=""><td>2460 110.03 30.03 114 34.3 21.1 11.30 4960 57.18 -16.82 74 42.18 32.88 11.54 4960 47.24 -6.76 54 32.24 32.88 11.54 * 5180 105.15 36.95 68.2 89.7 33 11.84 7440 44.19 -29.81 74 58.79 36.44 14.43 10360 46.58 -21.62 68.2 57.85 38.7 16.56 15540 46.74 -27.26 74 55.18 37.54 20.36 105 105 100 100 100 100 100 100 10360 46.74 -27.26 74 55.18 37.54 20.36 105 105 100 100 100 100 100 100 105 105 100 100 100 100 100 100 100 105 105 100 100 100 100 100 100 100</td><td>2400 110.03 30.03 14 34.3 21.1 11.33 23.33 4960 57.18 -16.82 74 42.18 32.88 11.54 29.42 4960 47.24 -6.76 54 32.24 32.88 11.54 29.42 * 5180 105.15 36.95 68.2 89.7 33 11.84 29.39 7440 44.19 -29.81 74 58.79 36.44 14.43 65.47 10360 46.58 -21.62 68.2 57.85 38.7 16.56 66.53 15540 46.74 -27.26 74 55.18 37.54 20.36 66.34 15540 46.74 -27.26 74 55.18 37.54 20.36 66.34 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 <t< td=""><td>2460 110.05 30.05 14 34.3 21.1 11.50 23.35 100 4960 57.18 -16.82 74 42.18 32.88 11.54 29.42 104 4960 47.24 -6.76 54 32.24 32.88 11.54 29.42 104 * 5180 105.15 36.95 68.2 89.7 33 11.84 29.39 - 7440 44.19 -29.81 74 58.79 36.44 14.43 65.47 - 10360 46.58 -21.62 68.2 57.85 38.7 16.56 66.53 - 10360 46.74 -27.26 74 55.18 37.54 20.36 66.34 - 15540 46.74 -27.26 74 55.18 37.54 20.36 66.34 - 1050 1051 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101</td><td>2400 110.05 30.05 114 34.3 21.1 117.80 22.05 100 0 4960 57.18 -16.82 74 42.18 32.88 11.54 29.42 104 310 4960 47.24 -6.76 54 32.24 32.88 11.54 29.42 104 310 * 5180 105.15 36.95 68.2 89.7 33 11.84 29.39 - - 7440 44.19 -29.81 74 58.79 36.44 14.43 65.47 - - 10360 46.58 -21.62 68.2 57.85 38.7 16.56 66.53 - - 15540 46.74 -27.26 74 55.18 37.54 20.36 66.34 - - 15540 46.74 -27.26 74 55.18 37.54 20.36 66.34 - - 100 100 100 100 100 100 100 100 100 100 100 100 100</td><td>2400 110.09 30.09 14 34.3 21.1 11.90 29.09 100 0 1 4960 57.18 -16.82 74 42.18 32.88 11.54 29.42 104 310 P 4960 47.24 -6.76 54 32.24 32.88 11.54 29.42 104 310 A * 5180 105.15 36.95 68.2 89.7 33 11.84 29.39 - - P 7440 44.19 -29.81 74 58.79 36.44 14.43 65.47 - 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7440 44.19 -29.81 74 58.79 36.44 14.43 65.47 - 10360 46.58 -21.62 68.2 57.85 38.7 16.56 66.53 - 10360 46.74 -27.26 74 55.18 37.54 20.36 66.34 - 15540 46.74 -27.26 74 55.18 37.54 20.36 66.34 - 1050 1051 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101</td><td>2400 110.05 30.05 114 34.3 21.1 117.80 22.05 100 0 4960 57.18 -16.82 74 42.18 32.88 11.54 29.42 104 310 4960 47.24 -6.76 54 32.24 32.88 11.54 29.42 104 310 * 5180 105.15 36.95 68.2 89.7 33 11.84 29.39 - - 7440 44.19 -29.81 74 58.79 36.44 14.43 65.47 - - 10360 46.58 -21.62 68.2 57.85 38.7 16.56 66.53 - - 15540 46.74 -27.26 74 55.18 37.54 20.36 66.34 - - 15540 46.74 -27.26 74 55.18 37.54 20.36 66.34 - - 100 100 100 100 100 100 100 100 100 100 100 100 100</td><td>2400 110.09 30.09 14 34.3 21.1 11.90 29.09 100 0 1 4960 57.18 -16.82 74 42.18 32.88 11.54 29.42 104 310 P 4960 47.24 -6.76 54 32.24 32.88 11.54 29.42 104 310 A * 5180 105.15 36.95 68.2 89.7 33 11.84 29.39 - - P 7440 44.19 -29.81 74 58.79 36.44 14.43 65.47 - 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- 15540 46.74 -27.26 74 55.18 37.54 20.36 66.34 - - 100 100 100 100 100 100 100 100 100 100 100 100 100	2400 110.09 30.09 14 34.3 21.1 11.90 29.09 100 0 1 4960 57.18 -16.82 74 42.18 32.88 11.54 29.42 104 310 P 4960 47.24 -6.76 54 32.24 32.88 11.54 29.42 104 310 A * 5180 105.15 36.95 68.2 89.7 33 11.84 29.39 - - P 7440 44.19 -29.81 74 58.79 36.44 14.43 65.47 - P 10360 46.58 -21.62 68.2 57.85 38.7 16.56 66.53 - P 15540 46.74 -27.26 74 55.18 37.54 20.36 66.34 - - P 15540 46.74 -27.26 74 55.18 37.54 20.36 66.34 - - P 15540 155 155 155 155 155 155 155

(Harmonic @ 3m)



WLAN (2.4GHz) 802.11g_Tx_CH06 + WLAN (6GHz) 802.11a_Tx_CH01

WIFI	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
3+4		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
	*	2437	114.49	40.49	74	98.83	27.6	17.96	29.9	400	0	Ρ	Н
		4872	56.12	-17.88	74	41.62	32.64	11.3	29.44	382	131	Р	Н
		4872	46.25	-7.75	54	31.75	32.64	11.3	29.44	382	131	А	Н
	*	5955	111.74	43.54	68.2	94.14	34.18	12.86	29.44	-	-	Р	н
		7311	45.48	-28.52	74	59.79	36.88	14.26	65.45	-	-	Р	Н
		11910	47.42	-26.58	74	56.87	38.72	17.81	65.98	-	-	Ρ	Н
		17865	51.21	-22.79	74	52.76	41.31	22.24	65.1	156	79	Р	Н
		17865	40.34	-13.66	54	41.89	41.31	22.24	65.1	156	79	А	Н
802.11g													Н
CH 06													Н
2437MHz													Н
+													Н
802.11a	*	2437	110.33	36.33	74	94.67	27.6	17.96	29.9	100	0	Р	V
CH 01		4874	57.03	-16.97	74	42.52	32.65	11.3	29.44	213	62	Ρ	V
5955MHz		4874	46.89	-7.11	54	32.38	32.65	11.3	29.44	213	62	Α	V
	*	5955	107.67	39.47	68.2	90.07	34.18	12.86	29.44	-	-	Р	V
		7311	45.86	-28.14	74	60.17	36.88	14.26	65.45	-	-	Ρ	V
		11910	47.25	-26.75	74	56.7	38.72	17.81	65.98	-	-	Ρ	V
		17865	50.46	-23.54	74	52.01	41.31	22.24	65.1	100	176	Ρ	V
		17865	40.76	-13.24	54	42.31	41.31	22.24	65.1	100	176	Α	V
													V
													V
													V
													V
	1. No	o other spurious	s found.	_							_	_	_
Remark	2. All	results are PA	SS against F	Peak and	Average lim	it line.							
Neillain	3. Th	e emission pos	ition marked	l as "-" m	eans no sus	pected em	ission found	d with suf	ficient mar	gin aga	inst limit	line or	noise
	flo	or only.											

(Harmonic @ 3m)

Emission below 1GHz

BLE(1M)_Tx_CH39 + WLAN (5GHz) 802.11a_Tx_CH36

(LF @ 3m)

WIFI	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
3+4		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
		31.35	22.58	-17.42	40	30.41	23.86	0.76	32.45	-	-	Ρ	Н
		95.61	36.33	-7.17	43.5	51.98	15.38	1.39	32.42	-	-	Р	н
		289.2	23.54	-22.46	46	34.3	19.09	2.56	32.41	-	-	Р	Н
		514.2	25.31	-20.69	46	30.74	23.92	3.31	32.66	-	-	Ρ	Н
		621.3	28.68	-17.32	46	31.53	26.04	3.82	32.71	-	-	Ρ	Н
		896.4	34.54	-11.46	46	32.97	28.92	4.6	31.95	-	-	Р	н
													Н
													Н
BLE													Н
CH 39													Н
2480MHz													Н
+													Н
802.11a		87.78	27.85	-12.15	40	44.46	14.5	1.29	32.4	-	-	Ρ	V
CH 36		93.72	36.45	-7.05	43.5	52.43	15.07	1.36	32.41	-	-	Ρ	V
5180MHz		289.47	20.3	-25.7	46	31.06	19.09	2.56	32.41	-	-	Ρ	V
LF		499.5	25.1	-20.9	46	30.64	23.92	3.25	32.71	-	-	Р	V
		702.5	28.67	-17.33	46	30.7	26.56	4.16	32.75	-	-	Р	V
		953.1	34.76	-11.24	46	30.59	30.79	4.87	31.49	-	-	Р	V
													V
													V
													V
													V
													V
													V



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	Peak or Average
H/V	Horizontal or Vertical

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

вт	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
ВТ		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	Р	н
CH 00													
2402MHz		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	А	Н

- 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(dB μ V/m) – Limit Line(dB μ V/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)
- $= 55.45(dB\mu V/m) 74(dB\mu V/m)$
- = -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)
- $= 43.54(dB\mu V/m) 54(dB\mu V/m)$
- = -10.46(dB)

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



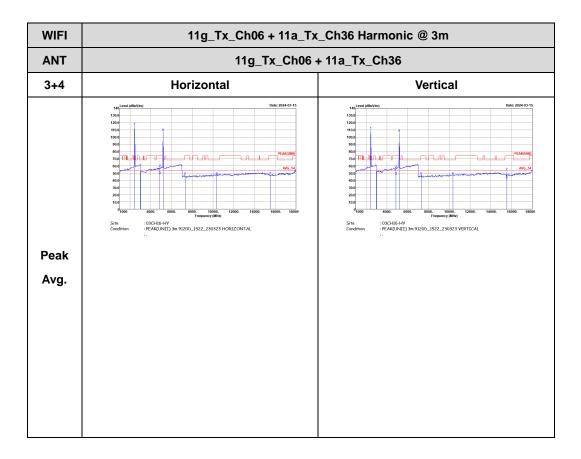
Appendix B. Radiated Spurious Emission Plots

Test Engineer :	Bill Chang, Gary Guo and Steven Wu	Temperature :	18.2~20.2°C
Test Engineer .		Relative Humidity :	54.2~56.1%

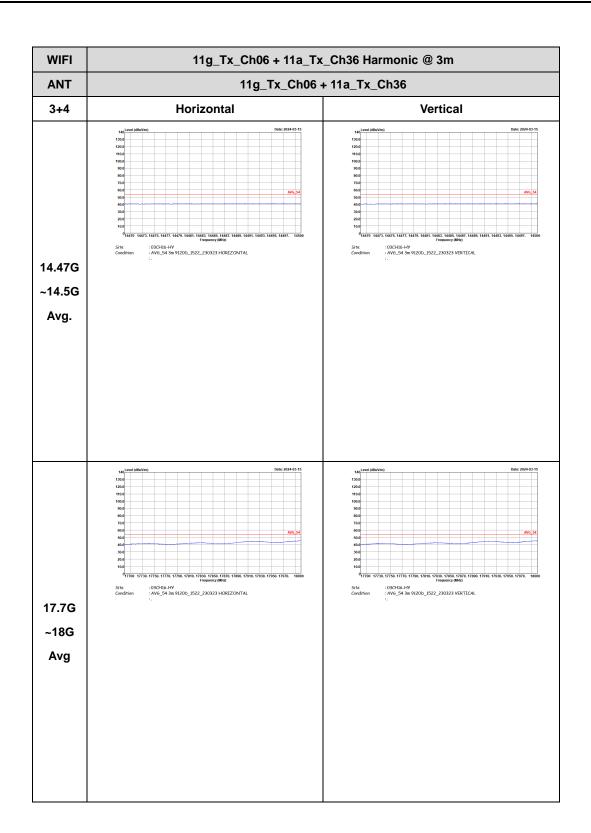
WLAN (2.4GHz) 802.11g_Tx_CH06 + WLAN (5GHz) 802.11a_Tx_CH36

2.4GHz 2400~2483.5MHz

WIFI 802.11g (Harmonic @ 3m)



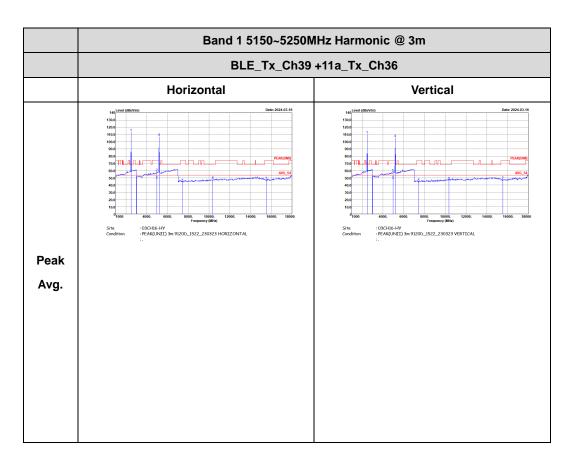


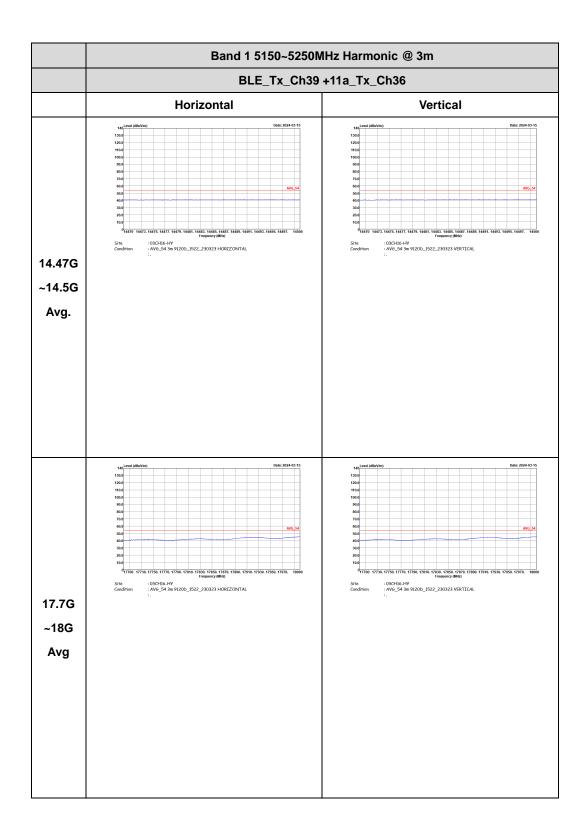


Band 1 - 5150~5250MHz

BLE(1M)_Tx_CH39 + WLAN (5GHz) 802.11a_Tx_CH36

(Harmonic @ 3m)

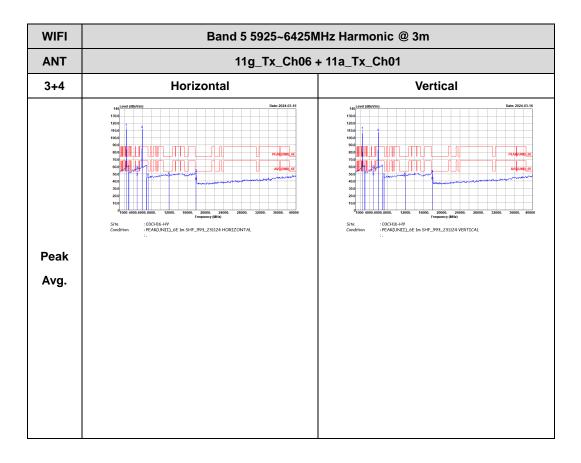




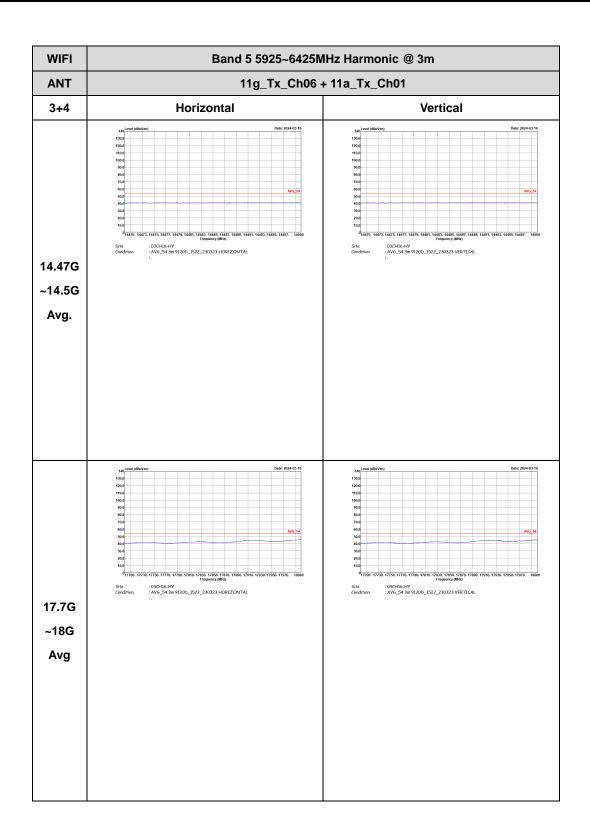
Band 5 - 5925~6425MHz

WLAN (2.4GHz) 802.11g_Tx_CH06 + WLAN (6GHz) 802.11a_Tx_CH01

(Harmonic @ 3m)



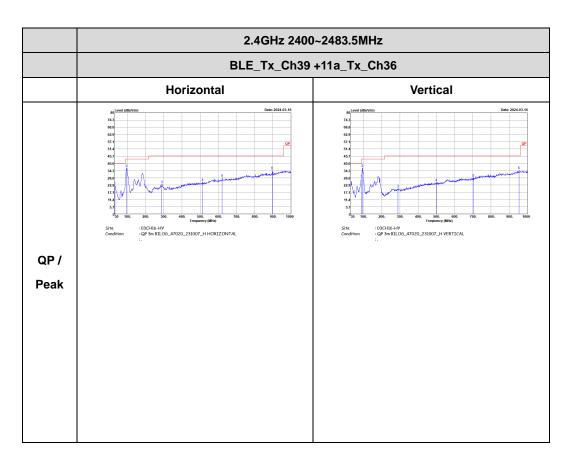




Emission below 1GHz

BLE(1M)_Tx_CH39 + WLAN (5GHz) 802.11a_Tx_CH36

(LF)





Appendix C. Duty Cycle Plots

<Mode 1>

Antenna	Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting
3+4	2.4GHz 802.11g	99.51	-	-	10Hz
3+4	5GHz 802.11a	99.51	-	-	10Hz

MIMO <Ant. 3+4>

2.4GHz 80	2.4GHz 802.11g								5GHz 802.11a								
pectrum Analyzer 1 vept SA	+					Frequency	*	Spectrum Anal Swept SA	/zer 1	+					Frequer	ncy 🔹 🗦	
EYSIGHT Input: RF Couping DC Align: Off	Input Z. 50 Ω Corr CCorr Freq Ref. Int (S)	#Atten: 20 dB	PNO: Fast Gate: Off IF Gain: Low Sig Track: Off	#Avg Type: Po Ting: Free Run	ower (RMS 1 2 3 4 5 6 N WWWWWW PPPPPF	2.43700000 GH2			Input: RF Coupling: DC Align: Off	Input Z: 50 Ω Corr CCorr Freq Ref. Int (#Atten: 20 dB	PNO: Fast Gate: Off IF Gain: Low Sig Track: Off	#Avg Type: Pow Tng: Free Run	er (RMS <mark>123456</mark> WW WWWW PPPPPP	0.18000000 GH2	Settings	
Spectrum v cale/Div 10 dB	Re	ef Level 116.99 d	BμV	Δ	Mkr3 4.090 ms 0.37 dE	Span 0.00000000 Hz Swept Span Zero Span		1 Spectrum Scale/Div 10 o	r B		Ref Level 116.9	9 dBµV	ΔΝ	kr3 4.085 ms 0.55 dB	Span 0.00000000 Hz Swept Span Zero Span		
07 7.0 7.0 7.0	Xa	<u>(3</u> 44				Full Span Start Freq 2.437000000 GHz		107 97.0 87.0 77.0	X2	un an	t istaal ee ste se	3∆4	enand services data and	natula a dalla dalla da seria da seria	Full Span Start Freq 5,18000000 GHz	1	
						2.437000000 GHz Stop Freq 2.437000000 GHz		57.0 47.0 37.0 27.0							5.18000000 GHz Stop Freq 5.180000000 GHz		
enter 2.437000000 GHz s BW 8 MHz Marker Table T				Swee	Span 0 H ep 20.0 ms (2001 pts			Center 5.1800 Res BW 8 MH 5 Marker Table					Sweep	Span 0 Hz 5 10.0 ms (2001 pts)	AUTO TUNE CF Step 8.000000 MHz		
Mode Trace Scale 1 Δ2 1 1 2 F 1 1 3 Δ4 1 1	 (Δ) 4.070 ms (Z 5.140 ms (Δ) 4.090 ms (Z 	Δ) 3.443 dB 85.81 dBµV Δ) 0.3675 dB	Function F	unction Width	Function Value	Auto Man Freq Offset 0 Hz		Mode 1 Δ2 2 F 3 Δ4	Trace Scal 1 t 1 t	 (Δ) 4.065 1.175 (Δ) 4.085 	Y ms (Δ) 2.084 dB ms 86.55 dBµ\ ms (Δ) 0.5468 dB		Function Width	Function Value	Auto Man Freq Offset 0 Hz		
4 F 1 t 5 6		85.81 dBµV				X Axis Scale Log Lin		4 F 5 6		1.175					X Axis Scale Log Lin		
1 n C I I	? Mar 16, 2024 12:56:23 AM	\mathbf{D}			N - X	Signal Track (Span Zoom)		1	2	? Mar 16, 202 12:42:08 AM				N - X	Signal Track (Span Zoom)		



<Mode 2>

Antenna	Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting
3+4	2.4GHz 802.11g	99.51	-	-	10Hz
3+4	6GHz 802.11a	99.51	-	-	10Hz

MIMO <Ant. 3+4>

2.4GHz 802	.11g				6GHz 802	6GHz 802.11a								
Spectrum Analyzer 1				🔅 Frequency 🔹	Spectrum Analyzer 1 Swept SA	+		Frequency •						
Coupling DC C	iput Z: 50 Ω #Atten: 20 dB forr CCorr req Ref. Int (S)	PNO: Fast Gate: Off IF Gain. Low Sig Track: Off		2.437000000 GHz Setting	KEYSIGHT Input: RF RL ++ Align. Off	Input Z. 50 Ω #Atten: 20 dB PNO: Fasi Corr CCorr Freq Ref. Int (S) IF Gain: L Sig Track:	Trig: Free Run WWWWWW							
1 Spectrum V			ΔMkr3 4.0		1 Spectrum V		ΔMkr3 4.085 ms							
Scale/Div 10 dB	Ref Level 116.99	lBμV		.37 dB Swept Span Zero Span	Scale/Div 10 dB	Ref Level 116.99 dBµV	0.56 dE	Swept Span Zero Span						
97.0 97.0	(<u>2</u>)	مر مرارك و مراولات مردود مورو الماليو		Full Span	97.0	<u>▲3∆4</u>		Full Span						
77.0 67.0				Start Freq 2.437000000 GHz	77 0 X2			Start Freq 5.955000000 GHz						
57.0 47.0 37.0				Stop Freq 2.437000000 GHz	57.0 47.0 37.0			Stop Freq 5.955000000 GHz						
27.0 Center 2.437000000 GHz				pan 0 Hz AUTO TUNE	27.0 Center 5.955000000 GHz		Span 0 H							
tes BW 8 MHz			Sweep 20.0 ms (2001 pts) CF Step 8.000000 MHz	Res BW 8 MHz 5 Marker Table v		Sweep 10.0 ms (2001 pts	CF Step 8.000000 MHz						
Mode Trace Scale	X Y	Function Func	tion Width Function	Value Auto Man	Mode Trace Scale	X Y Function	Function Width Function Value	Auto Man						
$1 \Delta 2$ 1 t (Δ) 2 F 1 t 3 $\Delta 4$ 1 t (Δ)	4.070 ms (Δ) 3.443 dB 5.140 ms 85.81 dBµV 4.090 ms (Δ) 0.3675 dB			Freq Offset	$1 \Delta 2 1 1 1 2 F 1 1 1 1 1 1 1 1 1 1 1 1 1 1$	(Δ) 4.065 ms (Δ) 0.6144 dB 1.040 ms 78.48 dBµV (Δ) 4.085 ms (Δ) 0.5585 dB		Freq Offset 0 Hz						
4 F 1 t 5 6	5.140 ms 85.81 dBµV			X Axis Scale	4 F 1 t 5 6	1.040 ms 78.48 dBµV		X Axis Scale						
∎ ⁻ ⊂ ■ ? ¹	Mar 16, 2024			Signal Track		? Mar 16, 2024		Signal Track						



<Mode 3>

Antenna	Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting
3	Bluetooth - LE for 1Mbps	60.26	376	2.66	2.7KHz
3+4	5GHz 802.11a	99.51	-	-	10Hz

<Ant. 3>

MIMO <Ant. 3+4>

ctrum Analyzer 1						िन्द	Spectrum Analyzer 1				1	
ept SA					C Marke		Swept SA	• +				Frequency
YSIGHT Input: RF Input 2 Coupling: DC Corr C Align: Oll Freq F		PNO: Fast Gate: Off IF Gain: Low Sig Track: Off		123456 WW WWWW PPPPPP			KEYSIGHT Input: RF RL →→ Align. Off	Input Z. 50 Ω #Atten: 20 Corr CCorr Freq Ref. Int (S)	dB PNO: Fast Gate: Off IF Gain: Low Sig Track: Off			Center Frequency 5.18000000 GHz
pectrum v			ΔMkr3	624.0 µs	Marker ∆ Time 624.000 µs	Settings	1 Spectrum v			ΔMkr3 4	.085 ms	Span 0.00000000 Hz
e/Div 10 dB	Ref Level 116.99	dBµV		-0.02 dB	Marker Mode	Peak Search	Scale/Div 10 dB	Ref Level 1	16.99 dBµV		0.55 dB	Swept Span Zero Span
					Normal	Pk Search Config	107 97.0 87.0 Betrinsteate & Actions		3∆4	eneritaristikkeessatioodan		Full Span
X.	γ ^{1Δ2}	3∆4			Oelta (∆)	Properties	87.0 77.0 77.0					Start Freq 5.18000000 GHz
adre of the product	and distant		mounderstandard		Fixed	Marker	57.0					5.180000000 GHz Stop Freq
					● off	Function	37.0					5.18000000 GHz
r 2.48000000 GHz				Span 0 Hz	Deita Marker (Reset Deita)	Marker→	27.0 Center 5.18000000 GHz				Span 0 Hz	AUTO TUNE
BW 8 MHz			Sweep 2.00 m	ns (1001 pts)	Marker Table	Counter	Res BW 8 MHz			Sweep 10.0 ms		CF Step
ker Table 🛛 🔻					On		5 Marker Table 🔹 🔻					8.000000 MHz
Mode Trace Scale Δ2 1 t (Δ)	X Y 376.0 μs (Δ)-0.04851 dB	Function Fi	Inction Width Funct	tion Value	Marker Settings Diagram	1	Mode Trace Sci 1 Δ2 1 1	ale X Y (Δ) 4.065 ms (Δ) 2.08		Function Width Function		Man
F 1 t Δ4 1 t (Δ)	416.0 μs 76.09 dBμV 624.0 μs (Δ)-0.02205 dB				All Markers Off	1	2 F 1 1 3 Δ4 1	1.175 ms 86.55 ((Δ) 4.085 ms (Δ) 0.54€	BµV B dB			Freq Offset 0 Hz
F 1 t	416.0 µs 76.09 dBµV				Couple Markers	Local	4 F 1 t 5	1.175 ms 86.55 e	ΒμV			X Axis Scale
					On		6					Log

