CERTIFICATION TEST REPORT

Report Number. : 4791196626-E8V2

Applicant	:	SAMSUNG ELECTRONICS CO., LTD. 129 SAMSUNG-RO, YEONGTONG-GU, SUWON-SI, GYEONGGI-DO, 16677, KOREA
Model	:	SM-F956B, SM-F956B/DS
FCC ID	:	A3LSMF956B
EUT Description	:	GSM/WCDMA/LTE/5G NR Phone + BT/BLE, DTS/UNII a/b/g/n/ac/ax, NFC, WPT and UWB
Test Standard(s)	:	FCC 47 CFR PART 15 SUBPART E

Date Of Issue:
2024-05-14

Prepared by:
UL KOREA LTD.
26th floor, 152, Teheran-ro, Gangnam-gu Seoul, 06236, Korea

Suwon Test Site: UL KOREA LTD. Suwon Laboratory
218 Maeyeong-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16675, Korea
TEL: (031) 337-9902
FAX: (031) 213-5433

IAS ACCREDITED Testing Laboratory

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	2024-05-02	Initial issue	Dexter(Hyunsik) Yun
V2	2024-05-14	Updated to address TCB's question	Dexter(Hyunsik) Yun

UL KOREA LTD. Suwon Laboratory FORM ID: FCC_15E(05)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

TABLE OF CONTENTS

UL KOREA LTD. Suwon Laboratory FORM ID: FCC_15E(05)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

UL KOREA LTD. Suwon Laboratory FORM ID: FCC_15E(05)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

UL KOREA LTD. Suwon Laboratory FORM ID: FCC_15E(05)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	SAMSUNG ELECTRONICS CO., LTD.
EUT DESCRIPTION:	GSM/WCDMA/LTE/5G NR Phone + BT/BLE, DTS/UNII a/b/g/n/ac/ax, NFC, WPT and UWB
MODEL NUMBER:	SM-F956B, SM-F956B/DS
SERIAL NUMBER:	7b456b5547507ece, 7b456b5517507ece (CONDUCTED, Original); R3CX10W6K4M, R3CX309QRBH (RADIATED, Original); R3CX403NAWN (RADIATED, Spot-check);
DATE TESTED:	2024-02-20 ~ 2024-04-25 (Original); 2024-04-19 ~ 2024-05-02 (Spot-check)

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart E	Complies

UL KOREA LTD. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL KOREA LTD. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL KOREA LTD. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL KOREA LTD. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by IAS, any agency of the Federal Government, or any agency of any government.

Approved & Released For
UL KOREA LTD. By:

Seokhwan Hong
Suwon Lab Engineer
UL KOREA LTD.

Tested By:

Dexter(Hyunsik) Yun
Suwon Lab Engineer
UL KOREA LTD.

1.1. INTRODUCTION OF TEST DATA REUSE

This report referenced from the FCC ID: A3LSMF956U NII WLAN (FCC 47 CFR Part 15E). And the applicant takes full responsibility that the test data as referenced in this report represent compliance for this FCC ID.

1.2. DIFFERENCE

The A3LSMF956B model shares the same enclosure and circuit board except WWAN bands as A3LSMF956U. The WLAN antennas and surrounding circuitry and layout are identical between these two units.

After confirming through preliminary radiated emissions that the performance of the A3LSMF956B remains representative of A3LSMF956U. The test data of A3LSMF956U being submitted for this application to cover WLAN features.

1.3. DEVIATION CRITERIA

Spot check may be considered acceptable when the deviation d_{dB} from the reference data satisfies the following condition:

$$d_{dB} = | V_{dB} - R_{dB} | \leq (3 + M_{dB}/20)\ dB \quad , \text{for } 0 \leq M_{dB} \leq 60\ dB$$

$$d_{dB} = | V_{dB} - R_{dB} | = 6\ dB \quad , \text{for } M_{dB} > 60\ dB$$

Where relevant, the following sample calculation is provided:

CRITERIA = 3 + (Test limit - Measured original value)/20

3 + (54 dBuV/m - 33.68 dBuV/m)/20 = 4.02 dB

1.4. SPOT CHECK VERIFICATION DATA

(Worst case of the radiated band-edge and radiated spurious emissions)

Feature	Band	Test Item	Mode	Frequency	Test Limit	Original model	Spot check model	Deviation	Remark
						SM-F956U Results	SM-F956B Results		
						FCC ID : A3LSMF956U	FCC ID : A3LSMF956B		
NII WLAN (5GHz)	1	Band-edge	802.11ac VHT80	5210 MHz	54.0 dBuV/m	51.84 dBuV/m	49.62 dBuV/m	-2.22 dB	-
		Spurious	802.11a	7252 MHz	54.0 dBuV/m	48.05 dBuV/m	44.88 dBuV/m	-3.17 dB	Criteria Value: 3.30 dB, Passed
	2A	Band-edge	802.11ac VHT160 Upper	5250 MHz	54.0 dBuV/m	51.92 dBuV/m	48.98 dBuV/m	-2.94 dB	-
		Spurious	802.11a	7448 MHz	54.0 dBuV/m	47.52 dBuV/m	44.36 dBuV/m	-3.16 dB	Criteria Value: 3.32 dB, Passed
	2C	Band-edge	802.11ac VHT80	5530 MHz	54.0 dBuV/m	51.94 dBuV/m	49.46 dBuV/m	-2.48 dB	-
		Spurious	802.11a	7700 MHz	54.0 dBuV/m	45.49 dBuV/m	44.24 dBuV/m	-1.25 dB	-
	3	Band-edge	802.11ac VHT160 Lower	5815 MHz	-27.00 dBm	-29.51 dBm	-30.34 dBm	-0.83 dB	-
		Spurious	802.11a	8043 MHz	54.0 dBuV/m	40.12 dBuV/m	38.95 dBuV/m	-1.17 dB	-
	4	Band-edge	802.11n HT20	5885 MHz	89.9 dBuV/m	77.25 dBuV/m	74.37 dBuV/m	-2.88 dB	-
		Spurious	802.11a	8239 MHz	54.0 dBuV/m	38.62 dBuV/m	38.25 dBuV/m	-0.37 dB	-
NII WLAN ax (5GHz)	1	Band-edge	802.11ax HE80 SU	5210 MHz	54.0 dBuV/m	51.84 dBuV/m	50.79 dBuV/m	-1.05 dB	-
		Spurious	802.11ax HE20 0RU	7252 MHz	54.0 dBuV/m	43.53 dBuV/m	40.33 dBuV/m	-3.20 dB	Criteria value: 3.52 dB, Passed
	2A	Band-edge	802.11ax HE80 SU	5290 MHz	54.0 dBuV/m	51.87 dBuV/m	49.22 dBuV/m	-2.65 dB	-
		Spurious	802.11ax HE20 0RU	7448 MHz	54.0 dBuV/m	44.00 dBuV/m	42.24 dBuV/m	-1.76 dB	-
	2C	Band-edge	802.11ax HE80 SU	5530 MHz	54.0 dBuV/m	50.24 dBuV/m	47.31 dBuV/m	-2.93 dB	-
		Spurious	802.11ax HE20 0RU	7700 MHz	54.0 dBuV/m	43.23 dBuV/m	40.96 dBuV/m	-2.27 dB	-
	3	Band-edge	802.11ax HE160 Lower	5815 MHz	-27.00 dBm	-30.40 dBm	-32.21 dBm	-1.81 dB	-
		Spurious	802.11ax HE20 0RU	8043 MHz	54.0 dBuV/m	39.20 dBuV/m	37.65 dBuV/m	-1.55 dB	-
	4	Band-edge	802.11ax HE20	5885 MHz	90.0 dBuV/m	87.42 dBuV/m	85.56 dBuV/m	-1.86 dB	-
		Spurious	802.11ax HE20 8RU	8239 MHz	54.0 dBuV/m	37.67 dBuV/m	37.49 dBuV/m	-0.18 dB	-

Comparison of two models, deviation is within FCC Technical Limits.

1.5. REFERENCE DETAIL

Reference application that contains the reused reference data in the individual test reports:

Equipment Class	Reference FCC ID (Parent)	Application Type	Reference Test report number	Exhibit Type	Variant Test Report Number	Data Re-used
DTS	A3LSMF956U	Original Grant	4791196575-E8 (BLE)	Test Report	4791196626-E6 (BLE)	All
DSS	A3LSMF956U	Original Grant	4791196575-E9 (Bluetooth)	Test Report	4791196626-E7 (Bluetooth)	All
NII	A3LSMF956U	Original Grant	4791196575-E10 (802.11a/n/ac/ax)	Test Report	4791196626-E8 (802.11a/n/ac/ax)	All
6CD	A3LSMF956U	Original Grant	4791196575-E11 (802.11a/ax)	Test Report	4791196626-E9 (802.11a/ax)	All

UL KOREA LTD. Suwon Laboratory FORM ID: FCC_15E(05)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with following methods.

1. FCC CFR 47 Part 2.
2. FCC CFR 47 Part 15.
3. KDB 789033 D02 General UNII Test Procedures New Rules v02r01
4. KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02
5. KDB 905462 D03 UNII Clients Without Radar Detection New Rules v01r02
6. KDB 662911 D01 v02r01
7. KDB 291074 D02 v01
8. KDB 484596 D01 Referencing Test Data v02r03
9. ANSI C63.10-2013.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea. Line conducted emissions are measured only at the 218 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

218 Maeyeong-ro
☒ Chamber 1(3m semi-anechoic chamber)
☒ Chamber 2(3m semi-anechoic chamber)
☒ Chamber 3(3m semi-anechoic chamber)
☐ Chamber 4(3m Full-anechoic chamber)
☐ Chamber 5(3m Full-anechoic chamber)

UL KOREA LTD. is accredited by IAS, Laboratory Code TL-637. The full scope of accreditation can be viewed at https://www.iasonline.org/wp-content/uploads/2017/05/TL-637-cert-New.pdf.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)
36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

AC Corrected Reading (dBuV) = Measured Voltage (dBuV) + Extension Cord Loss (dB) + Cable Loss (dB)
44.72 dBuV = 34.72 dBuV + 9.9 dB + 0.1 dB

4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	2.79 dB
Radiated Disturbance, 9 kHz to 30 MHz	1.69 dB
Radiated Disturbance, 30 MHz to 1 GHz	4.07 dB
Radiated Disturbance, 1 GHz to 18 GHz	4.99 dB
Radiated Disturbance, Above 18 GHz	5.96 dB

Uncertainty figures are valid to a confidence level of 95%.

4.4. DECISION RULE

Decision rule for statement(s) of conformity is based on Clause 4.4.3 in IEC Guide 115:2023.

UL KOREA LTD. Suwon Laboratory FORM ID: FCC_15E(05)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a GSM/WCDMA/LTE/5G NR Phone + BT/BLE, DTS/UNII a/b/g/n/ac/ax, NFC, WPT and UWB. This test report addresses the NII (WLAN) operational mode.

Representative model	Difference	Derivative model
		SM-F956B/DS
SM-F956B	Hardware	Different Sim Tray
	Software	Same as SM-F956B

The model SM-F956B was used for final testing and is representative of the test results in this report.

WiFi operating mode

Frequency rage	Mode	ANT1	ANT2
5GHz (5180 MHz ~ 5885 MHz)	802.11a MIMO	TX/RX	TX/RX
	802.11n MIMO	TX/RX	TX/RX
	802.11ac MIMO	TX/RX	TX/RX
	802.11ax MIMO	TX/RX	TX/RX

Simultaneous TX Condition

Simultaneous Tx Condition - RSDB

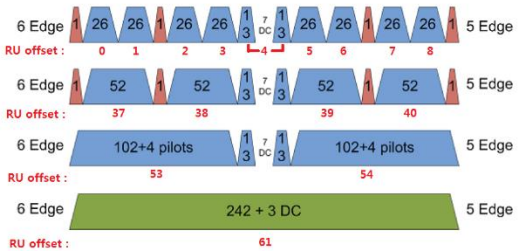
Mode	# of TX	5GHz WLAN		2.4GHz WLAN		Test Case
		ANT1	ANT2	ANT1	ANT2	
2.4GHz MIMO + 5GHz MIMO	**4**	**O**	**O**	**O**	**O**	**O**
2.4GHz MIMO + 6GHz MIMO	**4**	**O**	**O**	**O**	**O**	**O**

Note. Simultaneous transmission with the Bluetooth and Wi-Fi were investigated, and no noticeable emission was found

802.11ax RU allocations

- HE 20 Mode -

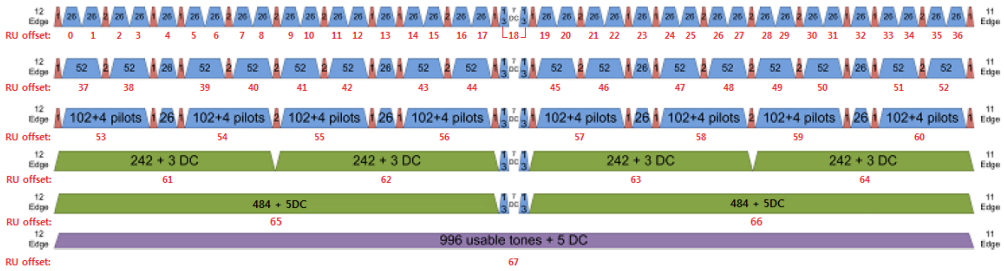
20 MHz



- HE 40 Mode -

40 MHz

- HE 80(996T) & 160 Mode(996T + 996T) -



Test RU offset for tones in each modes

Mode	Tones	RU offset
HE20	26T	0
		4
		8
	52T	37
		38
		40
	106T	53
		54
	242T / SU Note	61 / -
HE40	26T	0
		9
		17
	52T	37
		41
		44
	106T	53
		54
		56
	242T	61
		62
	484T / SU Note	63 / -
HE80	26T	0
		18
		36
	52T	37
		45
		52
	106T	53
		57
		60
	242T	61
		62
		64
	484T	65
		66
	996T / SU Note	67 / -

Note: Full RU(Resource Unit) mode and SU(Single Unit) mode have no difference in physical waveform. This report has been reported the SU mode with highest output power in MIMO.

UL KOREA LTD. Suwon Laboratory FORM ID: FCC_15E(05)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

Mode	80 + 80 MHz	Tones	RU offset
HE160	Lower 80 MHz	26T	0
			18
			36
	Upper 80 MHz		0
			18
			36
	Lower 80 MHz	52T	37
			45
			52
	Upper 80 MHz		37
			45
			52
	Lower 80 MHz	106T	53
			57
			60
	Upper 80 MHz		53
			57
			60
	Lower 80 MHz	242T	61
			62
			64
	Upper 80 MHz		61
			62
			64
	Lower 80 MHz	484T	65
			66
	Upper 80 MHz		65
			66
	Lower 80 MHz	996T	67
	Upper 80 MHz		67
	-	SU Note	-

Note: Full RU(Resource Unit) 996T + 996T mode and SU(Single Unit) mode have no difference in physical waveform. This report has been reported the SU mode with highest output power in MIMO.

Band portion of RU allocation about straddle channels

Mode	Channel	Tones	RU offset	Portion
HE20	Straddle 5720 MHz	26T	6	UNII 2C & UNII 3
		242T / SU	61 / -	
HE40	Straddle 5710 MHz	26T	15	UNII 2C & UNII 3
		484T / SU	65 / -	
HE80	Straddle 5690 MHz	26T	34	UNII 2C & UNII 3
		996T / SU	67 / -	

Note: In case of RU straddle channel, test was performed overlapping RU position.

UL KOREA LTD. Suwon Laboratory FORM ID: FCC_15E(05)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

MAXIMUM OUTPUT POWER

The transmitter has a maximum total conducted average output power as follows except UNII-4 listed is based on EIRP as noted:

Band	Frequency Range [MHz]	Mode	Output Power [dBm]	Output Power [mW]
UNII-1	5180 - 5240	802.11a MIMO	20.36	108.64
		802.11n(HT20) MIMO	20.43	110.41
		802.11ax(HE20) MIMO	20.42	110.15
	5190 - 5230	802.11n(HT40) MIMO	20.38	109.14
		802.11ax(HE40) MIMO	20.63	115.61
	5210	802.11ac(VHT80) MIMO	18.11	64.71
		802.11ax(HE80) MIMO	17.81	60.39
UNII-2A	5260 - 5320	802.11a MIMO	20.33	107.89
		802.11n(HT20) MIMO	20.32	107.65
		802.11ax(HE20) MIMO	20.39	109.40
	5190 - 5230	802.11n(HT40) MIMO	20.39	109.40
		802.11ax(HE40) MIMO	20.54	113.24
	5270 - 5310	802.11ac(VHT80) MIMO	18.49	70.63
		802.11ax(HE80) MIMO	18.56	71.78
	5250Note1	802.11ac(VHT160) MIMO	18.28	67.30
		802.11ax(HE160) MIMO	18.49	70.63
UNII-2C	5500 - 5720	802.11a MIMO	20.19	104.47
		802.11n(HT20) MIMO	20.18	104.23
		802.11ax(HE20) MIMO	20.26	106.17
	5510 - 5710	802.11n(HT40) MIMO	20.24	105.68
		802.11ax(HE40) MIMO	20.48	111.69
	5530 - 5690	802.11ac(VHT80) MIMO	20.13	103.04
		802.11ax(HE80) MIMO	20.34	108.14
	5570	802.11ac(VHT160) MIMO	16.27	42.36
		802.11ax(HE160) MIMO	16.54	45.08
UNII-3	5745 - 5825	802.11a MIMO	20.12	102.80
		802.11n(HT20) MIMO	20.10	102.33
		802.11ax(HE20) MIMO	20.18	104.23
	5755 - 5795	802.11n(HT40) MIMO	20.19	104.47
		802.11ax(HE40) MIMO	20.35	108.39
	5775	802.11ac(VHT80) MIMO	19.93	98.40
		802.11ax(HE80) MIMO	20.14	103.28
UNII-4	5845 - 5885	802.11a MIMO	20.30	107.15
		802.11n(HT20) MIMO	20.30	107.15
		802.11ax(HE20) MIMO	20.34	108.14
	5835 - 5875	802.11n(HT40) MIMO	20.43	110.41
		802.11ax(HE40) MIMO	20.60	114.82
	5855	802.11ac(VHT80) MIMO	20.14	103.28
		802.11ax(HE80) MIMO	19.99	99.77
	5815Note2	802.11ac(VHT160) MIMO	19.15	82.22
		802.11ax(HE160) MIMO	18.83	76.38

Note1. Overlap channel(UNII-1 & 2A)
Note2. Overlap channel(UNII-3 & 4)

UL KOREA LTD. Suwon Laboratory FORM ID: FCC_15E(05)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

5.2. DESCRIPTION OF AVAILABLE ANTENNAS

An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. 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 provisions of this section.

The internal antenna was Permanently attached.
Therefore this E.U.T Complies with the requirement of §15.203.

The radio utilizes a internal antenna, with a maximum gain of:

UNII Band	Frequency Range[MHz]	ANT1 Gain [dBi]	ANT2 Gain [dBi]	Correlated Chains Directional Gain[dBi]
UNII 1	5150 - 5250	-4.21	-2.40	-0.25
UNII 2A	5250 - 5350	-3.21	-2.21	0.31
UNII 2C	5470 - 5725	-2.64	-2.41	0.49
UNII 3	5725 - 5850	-2.41	-3.16	0.23
UNII 4	5850 - 5925	-2.33	-2.95	0.38

Directional gain for the MIMO operations is determined using KDB 662911 D01 Multiple Transmitter Output section F (2)(d)(1) for *Unequal antenna gains, with equal transmit powers*. The gain is calculated using the formula for correlated transmissions across the two transmit antennas.
Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2 / N_{ANT}$] dBi.
Sample calculation for this device with $N_{ANT} = 2$
UNII-1 band's Directional gain = 10 log[$(10^{-4.21/20} + 10^{-2.40/20})^2 / 2$] = -0.25 dBi

"SUB4" and "SUB1" as indicated in antenna specification are written as ANT1 and ANT2 in this report.

5.3. List of test reduction and modes covering other modes:

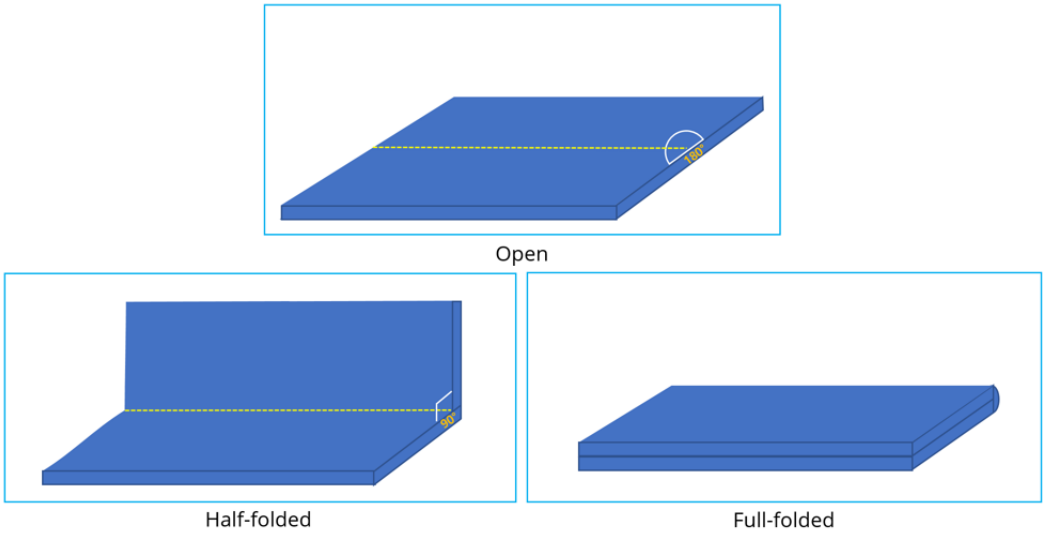
The output power on covered modes is equal to or less than one referenced.

Authorized Frequency Band			
Mode	**Antenna Stream**	**Mode**	**Covered by**
802.11a	MIMO	802.11a 2TX	
802.11n HT20		802.11n HT20 2TX	
802.11ac VHT20		802.11ac VHT20 2TX	802.11n HT20 2TX
802.11ax HE20(SU)		802.11ax HE20 RU(242T) 2TX	802.11ax HE20 SU 2TX
802.11n HT40		802.11n HT40 2TX	
802.11ac VHT40		802.11ac VHT40 2TX	802.11n HT40 2TX
802.11ax HE40(SU)		802.11ax HE40 RU(484T) 2TX	802.11ax HE40 SU 2TX
802.11ac VHT80		802.11ac VHT80 2TX	
802.11ax HE80(SU)		802.11ax HE80 RU(996T) 2TX	802.11ax HE80 SU 2TX
802.11ac VHT160		802.11ac VHT160 2TX	
802.11ax HE160(SU)		802.11ax HE160 RU(996T*2) 2TX	802.11ax HE160 SU 2TX

5.4. WORST-CASE CONFIGURATION AND MODE

Both SISO and MIMO have been investigated and confirmed MIMO was the worst case set for radiated band edge and spurious emission tests.

i. Worst case of antenna axis: X
ii. Foldable condition: Open



The fundamentals of the EUT were investigated in three orthogonal orientations X, Y and Z on 2TX MIMO mode. It was determined that X orientation and Open condition were the worst-case for 2TX MIMO mode.

Radiated and power line conducted tests were performed with EUT connected to AC power adapter as the worst-case configuration. Radiated harmonics spurious 1~18 GHz Low/Mid/High channels,18-40GHz were performed with the EUT set at the 2TX MIMO mode. Radiated emission below 1GHz and power line conducted emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

For Radiated spurious test, 802.11a 2TX mode has equal or higher output power and PSD results than other modes and therefore, it was set for full test. Spot-check was performed in 802.11n 2TX, 802.11ac 2TX or 802.11ax 2TX.

For Radiated band-edge test, 802.11a 2TX, 802.11n 2TX, 802.11ac 2TX, 802.11ax 2TX SU mode were fully tested except 802.11ax 2TX partial RU modes. 802.11ax SU mode resulted in radiated band-edge test is worse than partial RU modes; therefore, only SU mode was reported.

Simultaneous transmission with the Bluetooth and Wi-Fi were investigated, and no noticeable emission was found.

For 802.11ax mode, output power and PSD tests were investigated between all different tones and found that SU mode had the highest output power and RU 26T has the highest PSD readings; and therefore, conducted tests were performed on SU mode and RU 26T mode.

In case of 6dB Bandwidth, it was tested at the RU allocation with lowest tones number, RU 26Tones as the worst-case scenario.

Based on the baseline scan, the worst-case data rates were:
802.11a mode: 6 Mbps 2Tx
802.11n HT20 mode: MCS0 2Tx
802.11n HT40 mode: MCS0 2Tx
802.11ac VHT80 mode: MCS0 2Tx
802.11ac VHT160 mode: MCS0 2Tx
802.11ax HE20 mode: MCS0 2Tx
802.11ax HE40 mode: MCS0 2Tx
802.11ax HE80 mode: MCS0 2Tx
802.11ax HE160 mode: MCS0 2Tx

UL KOREA LTD. Suwon Laboratory FORM ID: FCC_15E(05)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Charger	SAMSUNG	EP-TA800	R37N9QP6H09DK3	N/A
Data Cable	SAMSUNG	EP-DN980	GH39-02111A	N/A

I/O CABLE

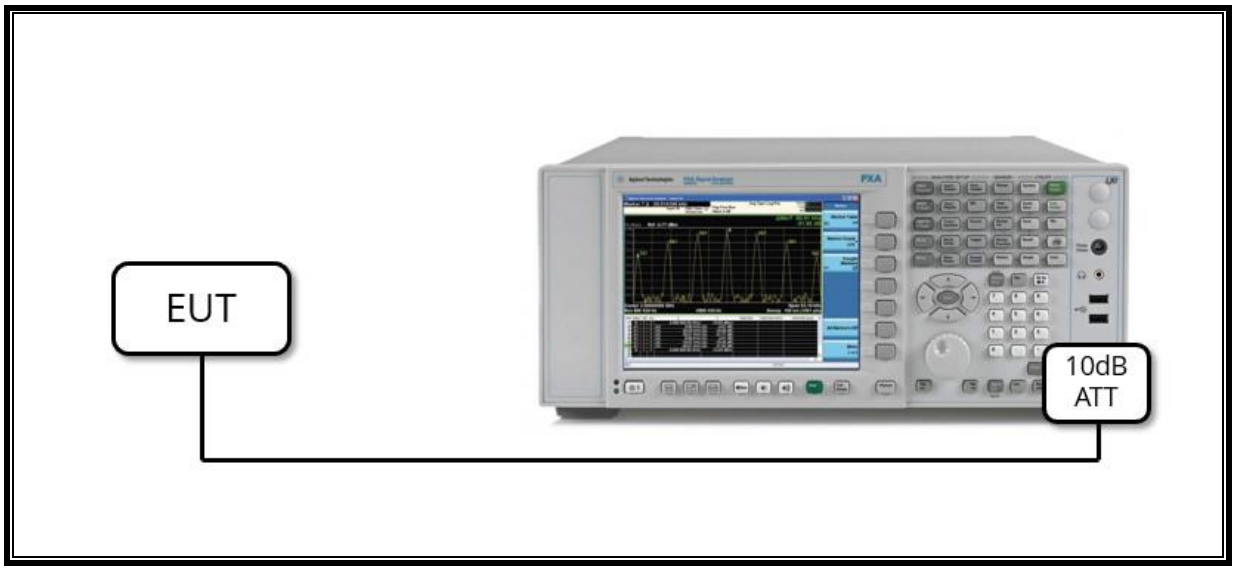
I/O Cable List						
Cable No.	**Port**	**# of identical ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	DC Power	1	C Type	Shielded	1.0 m	N/A

TEST SETUP

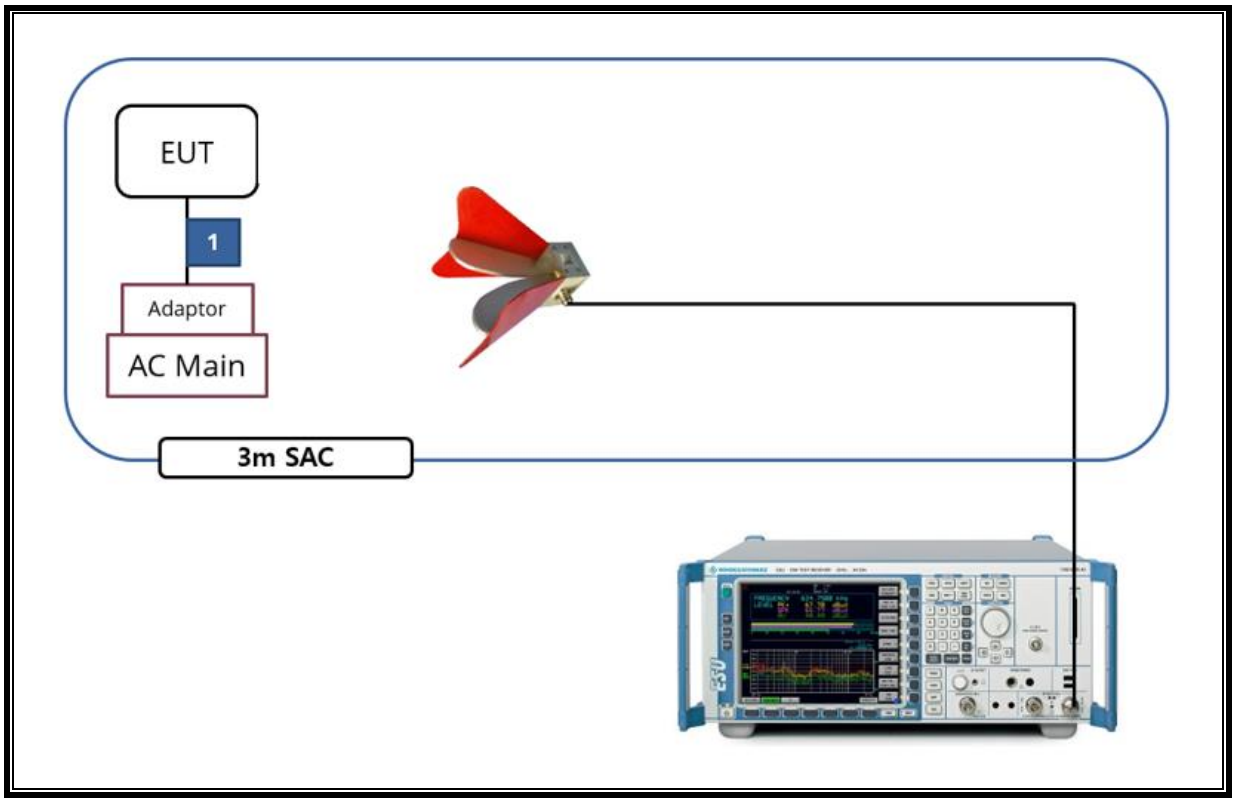
The EUT is a stand-alone unit during the tests.
Test software exercised the EUT to enable NII mode.

UL KOREA LTD. Suwon Laboratory FORM ID: FCC_15E(05)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

SETUP DIAGRAM FOR TESTS (CONDUCTED TEST SETUP)



SETUP DIAGRAM FOR TESTS (RADIATED TEST SETUP)



6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

Test Equipment List				
Description	**Manufacturer**	**Model**	**S/N**	**Cal Due**
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	749	2024-08-15
Antenna, Horn, 18 GHz	ETS	3117	00168717	2024-08-21
Antenna, Horn, 18 GHz	ETS	3117	00218957	2025-01-08
Antenna, Horn, 40 GHz	ETS	3116C	00166155	2024-08-02
Preamplifier	ETS	3115-PA	00167475	2024-07-25
Preamplifier	ETS	3116C-PA	00168841	2024-07-25
Preamplifier, 1000 MHz	Sonoma	310N	341282	2024-07-24
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1896138	2024-07-25
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	2029169	2024-07-24
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54170614	2024-07-25
Spectrum Analyzer, 44 GHz	KEYSIGHT	N9040B	MY60080268	2025-01-03
Average Power Sensor	Agilent / HP	U2000	MY54270007	2024-07-23
Average Power Sensor	Agilent / HP	U2000	MY54260010	2024-07-24
Attenuator	PASTERNACK	PE7087-10	A001	2024-07-23
Attenuator	PASTERNACK	PE7087-10	A008	2024-07-27
Attenuator	PASTERNACK	PE7004-10	2	2024-07-23
Attenuator	PASTERNACK	PE7087-10	A009	2024-07-24
EMI Test Receive, 40 GHz	R&S	ESU40	100439	2024-07-23
EMI Test Receive, 40 GHz	R&S	ESU40	100457	2024-07-24
EMI Test Receive, 3 GHz	R&S	ESR3	101832	2024-07-23
Notch Filter	Micro-Tronics	BRM50702-02	G037	2024-07-24
Notch Filter	Micro-Tronics	BRM50716-2	006	2024-07-24
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	020	2024-07-24
High Pass Filter 3GHz	Micro-Tronics	HPM17543	020	2024-07-24
High Pass Filter 6GHz	Micro-Tronics	HPS17542	009	2024-07-23
LISN	R&S	ENV-216	101836	2024-07-23
Antenna, Loop, 9kHz-30MHz	R&S	HFH2-Z2	100418	2025-09-06
Termination	WEINSCHEL	M1406A	T09	2024-07-23
Attenuator	WEINSCHEL	WA76-30-21	A015	2024-07-24

UL Software			
Description	**Manufacturer**	**Model**	**Version**
Radiated software	UL	UL EMC	Ver 9.5
AC Line Conducted software	UL	UL EMC	Ver 9.5

7. SUMMARY TABLE

FCC Part Section	Test Description	Test Limit	Test Condition	Test Result
15.407(e)	6dB Band width (5.8GHz)	> 500kHz	Conducted	Complies
15.407 (a)(1)(iv)	TX Cond. Power (5.150-5.250)	< 24dBm		Complies
15.407 (a)(2)	TX Cond. Power (5.250-5.350 & 5.470-5.725)	< 24dBm or 11+10Log(26dB BW)		Complies
15.407 (a)(3)(i)	TX Cond. Power (5.725-5.850)	< 30dBm		Complies
15.407 (a)(3)(iii)	TX Cond. Power (5.850-5.895)	< 30dBm e.i.r.p.		Complies
15.407 (a)(1)(iv) & (a)(2)	PSD (5.150-5.250 5.250-5.350 & 5.470-5.725)	< 11dBm/MHz		Complies
15.407 (a)(3)	PSD (5.725-5.850)	< 30dBm/500kHz		Complies
15.407 (a)(3)(iii)	PSD (5.850-5.895)	< 14dBm/MHz e.i.r.p.		Complies
15.207 (a)	AC Power Line conducted emissions	Section 13	Radiated	Complies
15.407 (b) & 15.209	Radiated Spurious Emission	< 74dBuV/m PK < 54dBuV/m AV		Complies
15.407 (h)(2)	Dynamic Frequency Selection	N/A	Condcuted	Complies[Note]

Note. This EUT does not support channel puncturing.

8. MEASUREMENT METHODS

On-Time and Duty Cycle : KDB 789033 D02 v02r01, Section II.B.

6dB Emission BW : KDB 789033 D02 v02r01, Section II.C.2.

26dB Emission BW : KDB 789033 D02 v02r01, Section II.C.1.

99% Occupied BW : KDB 789033 D02 v02r01, Section II.D.

Conducted Output Power : KDB 789033 D02 v02r01, Section II.E.3.a(Method PM)

Conducted Output Power for Straddle Channel (ch144/142/138 for 20/40/80MHz BW):

KDB 789033 D02 v02r01, Section II.E.2.b(Method SA-1)

Power Spectral Density : KDB 789033 D02 v02r01, Section II.F.

Unwanted emissions in restricted bands : KDB 789033 D02 v02r01, Section II.G.3 – II.G.6.

Unwanted emissions in non-restricted bands : KDB 789033 D02 v02r01, Section II.G.3 – II.G.6.

AC Power Line Conducted Emission : ANSI C63.10-2013, Section 6.2.

UL KOREA LTD. Suwon Laboratory FORM ID: FCC_15E(05)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

9. REFERENCE MEASUREMENTS RESULTS

9.1. ON TIME AND DUTY CYCLE RESULTS

Mode	On Time [ms]	Period [ms]	Duty Cycle X [Linear]	Duty Cycle X [%]	Duty Cycle Correction Factor[dB]
802.11a MIMO	2.827	2.927	0.966	96.584	0.15
802.11n(HT20) MIMO	5.027	5.128	0.980	98.030	-
802.11n(HT40) MIMO	5.346	5.445	0.982	98.182	-
802.11ac(VHT80) MIMO	1.679	1.778	0.944	94.432	0.25
802.11ac(VHT160) MIMO	1.752	1.850	0.947	94.703	0.24

Mode	ANT.	Tone	On Time [ms]	Period [ms]	Duty Cycle X [Linear]	Duty Cycle X [%]	Duty Cycle Correction Factor[dB]
802.11ax HE20	MIMO	26T	2.595	2.615	0.992	99.235	-
		SU	5.451	5.470	0.997	99.653	-
802.11ax HE40	MIMO	26T	2.595	2.615	0.992	99.235	-
		SU	5.452	5.470	0.997	99.671	-
802.11ax HE80	MIMO	26T	2.595	2.613	0.993	99.311	-
		SU	5.451	5.471	0.996	99.634	-
802.11ax HE160	MIMO	26T	2.595	2.614	0.993	99.273	-
		SU	5.451	5.470	0.997	99.653	-

Note. If the duty cycle is over 98%, compensation is not included in average measurement.

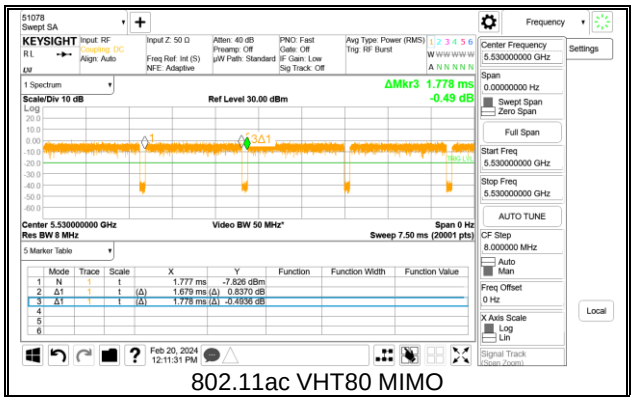
LIMITS

None; for reporting purposes only.

PROCEDURE

KDB 789033 D02 v02r01 Zero-Span Spectrum Analyzer Method.

DUTY CYCLE SAMPLE PLOTS



802.11ac VHT80 MIMO

9.2. 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

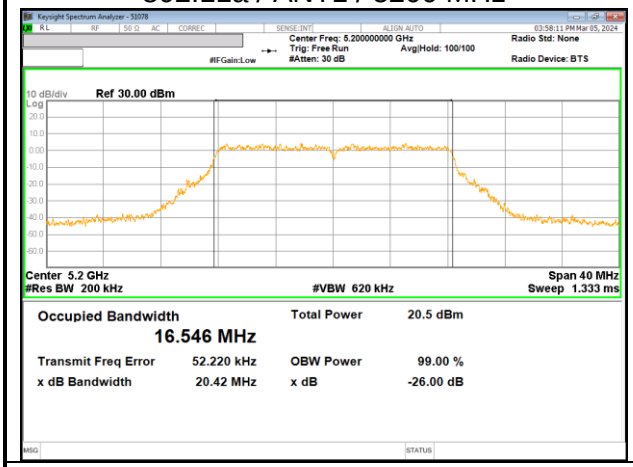
Reference to 789033 D02 General UNII Test Procedures New Rules v02r01: The transmitter output is connected to a spectrum analyzer with the RBW set to approximately 1% of EBW, the VBW > RBW, peak detector and max hold.

RESULTS

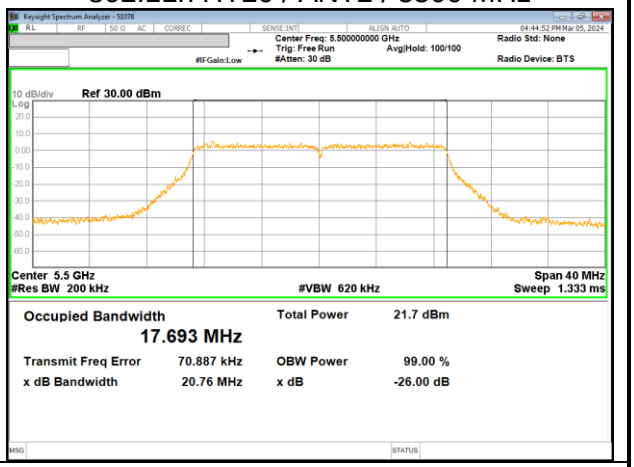
- Please refer to the next page

WORST CASE TEST PLOTS

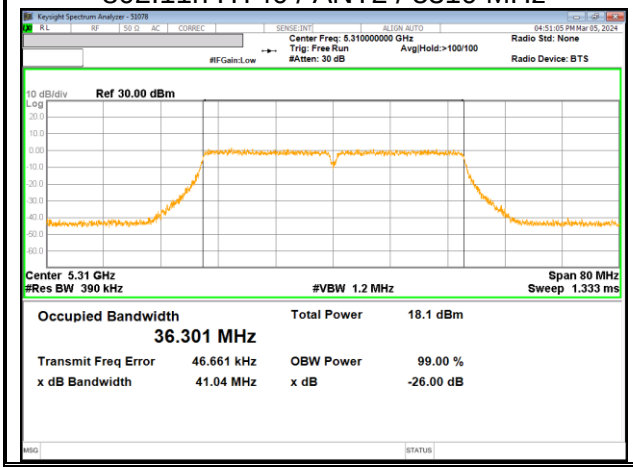
802.11a / ANT1 / 5200 MHz



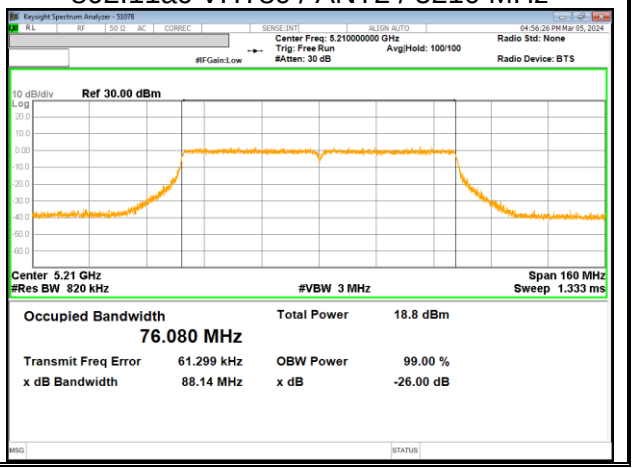
802.11n HT20 / ANT2 / 5500 MHz



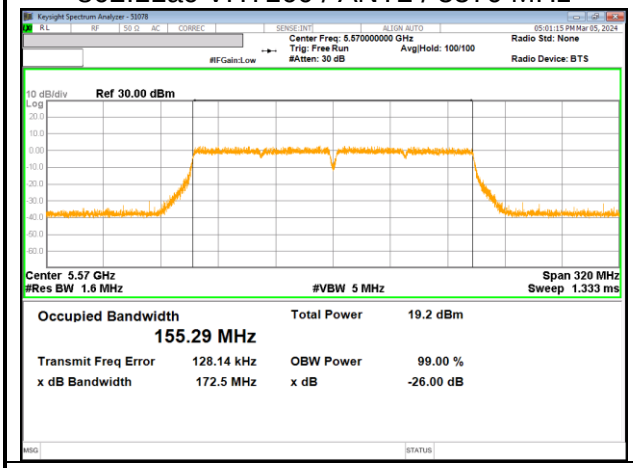
802.11n HT40 / ANT2 / 5310 MHz



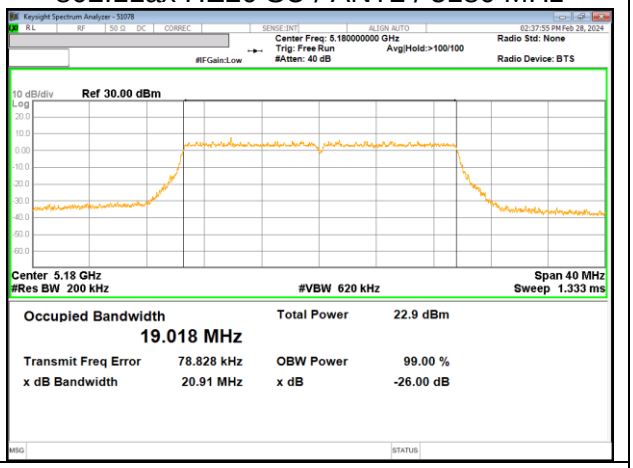
802.11ac VHT80 / ANT2 / 5210 MHz



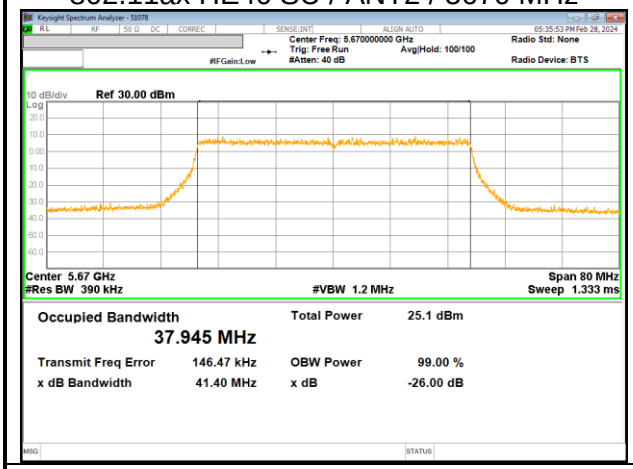
802.11ac VHT160 / ANT2 / 5570 MHz



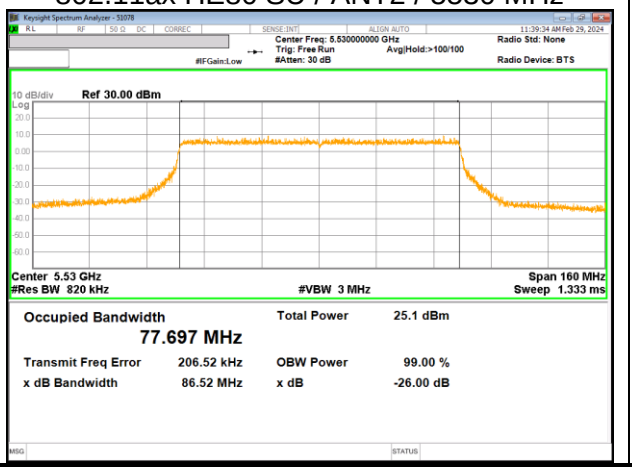
802.11ax HE20 SU / ANT2 / 5180 MHz



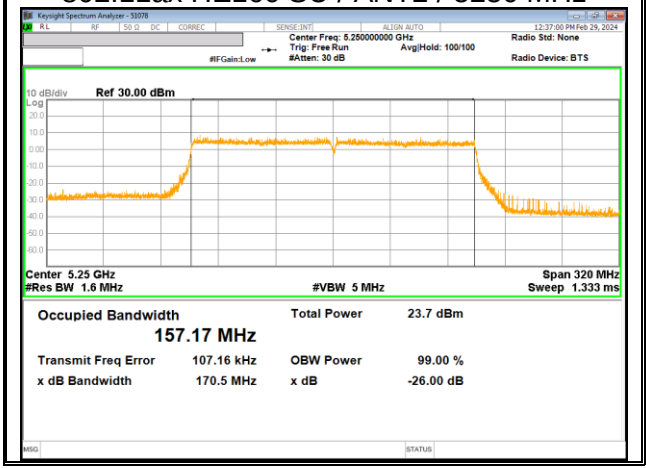
802.11ax HE40 SU / ANT2 / 5670 MHz



802.11ax HE80 SU / ANT2 / 5530 MHz



802.11ax HE160 SU / ANT2 / 5250 MHz



9.2.1. 802.11a

Band	Channel	Center Freq. [MHz]	26 dB BW [MHz]		Worst	99% BW [MHz]	
			ANT1	ANT2		ANT1	ANT2
UNII-1[Note]	36	5180	20.72	20.75	20.42	16.54	16.56
	40	5200	20.42	20.59		16.55	16.58
	48	5240	20.83	20.83		16.54	16.55
UNII-2A [Note]	52	5260	20.76	20.99	20.48	16.57	16.57
	60	5300	20.48	20.69		16.56	16.57
	64	5320	20.83	20.92		16.56	16.56
UNII-2C	100	5500	20.91	21.22	20.82		
	116	5580	20.90	21.09			
	140	5700	20.91	20.82			

Note. As a result of 99% bandwidth test, the bandwidth of UNII-1 does not interfere with UNII-2A.

9.2.2. 802.11n HT20

Band	Channel	Center Freq. [MHz]	26 dB BW [MHz]		Worst	99% BW [MHz]	
			ANT1	ANT2		ANT1	ANT2
UNII-1 [Note]	36	5180	20.88	21.34	20.86	17.71	17.71
	40	5200	20.86	20.90		17.70	17.72
	48	5240	20.89	21.07		17.71	17.72
UNII-2A [Note]	52	5260	20.96	21.07	20.86	17.70	17.70
	60	5300	21.33	21.03		17.72	17.71
	64	5320	21.14	20.86		17.71	17.71
UNII-2C	100	5500	21.02	20.76	20.76		
	116	5580	20.77	20.91			
	140	5700	20.90	21.13			

Note. As a result of 99% bandwidth test, the bandwidth of UNII-1 does not interfere with UNII-2A.

9.2.3. 802.11n HT40

Band	Channel	Center Freq. [MHz]	26 dB BW [MHz]		Worst	99% BW [MHz]	
			ANT1	ANT2		ANT1	ANT2
UNII-1 [Note]	38	5190	42.06	41.86	41.48	36.33	36.31
	46	5230	41.80	41.48		36.32	36.33
UNII-2A [Note]	54	5270	42.25	41.85	41.04	36.32	36.31
	62	5310	41.76	41.04		36.32	36.30
UNII-2C	102	5510	42.37	41.73	41.41		
	110	5550	42.15	41.81			
	134	5670	41.41	41.69			

Note. As a result of 99% bandwidth test, the bandwidth of UNII-1 does not interfere with UNII-2A.

9.2.4. 802.11ac VHT80

Band	Channel	Center Freq. [MHz]	26 dB BW [MHz]		Worst	99% BW [MHz]	
			ANT1	ANT2		ANT1	ANT2
UNII-1 Note	42	5210	90.76	88.14	88.14	76.24	76.08
UNII-2A Note	58	5290	90.38	90.50	90.38	76.14	76.07
UNII-2C	106	5530	88.83	89.85	88.33		
	122	5610	90.68	88.33			

Note. As a result of 99% bandwidth test, the bandwidth of UNII-1 does not interfere with UNII-2A.

9.2.5. 802.11ac VHT160

Band	Channel	Center Freq. [MHz]	26 dB BW [MHz]		Worst	99% BW [MHz]	
			ANT1	ANT2		ANT1	ANT2
UNII-1&2A	50	5250	174.70	173.80	173.80		
UNII-2C	114	5570	176.90	172.50	172.50		

9.2.6. 802.11ax HE20

Band	Channel	Center Freq. [MHz]	26 dB BW [MHz]		Worst	99% BW [MHz](Note)	
			ANT1	ANT2		ANT1	ANT2
UNII-1 Note	36	5180	21.55	20.91	20.91	19.04	19.02
	40	5200	21.63	21.23		19.02	19.03
	48	5240	21.62	21.71		19.02	19.04
UNII-2A Note	52	5260	21.50	21.53	21.31	19.02	19.03
	60	5300	21.44	21.46		19.03	19.03
	64	5320	21.43	21.31		19.02	19.03
UNII-2C	100	5500	21.46	21.80	21.33		
	116	5580	21.46	21.43			
	140	5700	21.35	21.33			

Note. As a result of 99% bandwidth test, the bandwidth of UNII-1 does not interfere with UNII-2A.

9.2.7. 802.11ax HE40

Band	Channel	Center Freq. [MHz]	26 dB BW [MHz]		Worst	99% BW [MHz](Note)	
			ANT1	ANT2		ANT1	ANT2
UNII-1 Note	38	5190	42.49	41.79	41.79	37.93	37.95
	46	5230	41.93	41.81		37.94	37.96
UNII-2A Note	54	5270	42.15	42.22	41.93	37.95	37.99
	62	5310	42.04	41.93		37.94	37.98
UNII-2C	102	5510	41.62	41.52	41.40		
	110	5550	41.82	41.86			
	134	5670	42.02	41.40			

Note. As a result of 99% bandwidth test, the bandwidth of UNII-1 does not interfere with UNII-2A.

9.2.8. 802.11ax HE80

Band	Channel	Center Freq. [MHz]	26 dB BW [MHz]		Worst	99% BW [MHz](Note)	
			ANT1	ANT2		ANT1	ANT2
UNII-1 Note	42	5210	87.99	87.63	87.63	77.74	77.80
UNII-2A Note	58	5290	88.02	86.82	86.82	77.72	77.70
UNII-2C	106	5530	87.71	86.52	86.52		
	122	5610	89.14	87.75			

Note. As a result of 99% bandwidth test, the bandwidth of UNII-1 does not interfere with UNII-2A.

9.2.9. 802.11ax HE160

Band	Channel	Center Freq. [MHz]	26 dB BW [MHz]		Worst	99% BW [MHz](Note)	
			ANT1	ANT2		ANT1	ANT2
UNII-1&2A	50	5250	170.50	170.50	170.50		
UNII-2C	114	5570	172.70	172.00	172.00		

9.2.10. STRADDLE CHANNEL

Mode	Channel	Center Freq. [MHz]	26 dB BW [MHz]			
			ANT1		ANT2	
			UNII-2C	UNII-3	UNII-2C	UNII-3
802.11a	Straddle	5720	15.38	5.60	15.43	5.68
802.11n HT20	Straddle	5720	15.54	5.60	15.58	5.47
802.11n HT40	Straddle	5710	35.72	6.60	35.95	6.08
802.11ac VHT80	Straddle	5690	80.47	10.20	79.51	8.31
802.11ax HE20(SU)	Straddle	5720	15.59	6.02	15.60	5.94
802.11ax HE40(SU)	Straddle	5710	36.24	6.05	35.93	5.94
802.11ax HE80(SU)	Straddle	5690	75.86	5.75	78.66	9.24

9.2.11. 802.11ax HE20(RU)

Band Mode	Center Freq. [MHz]	Tones	RU offset	26 dB BW [MHz]		99% BW [MHz]	
				ANT1	ANT2	ANT1	ANT2
UNII-1 Note	5180	26T	0	20.04	19.67	18.43	18.21
			4	18.63	18.14	17.24	17.07
			8	19.83	19.65	18.25	18.25
	5200		0	19.97	19.57	18.39	18.21
			4	18.59	18.17	17.22	17.10
			8	19.82	19.53	18.26	18.24
	5240		0	19.96	19.55	18.36	18.21
			4	18.61	18.12	17.23	17.04
			8	19.74	19.62	18.23	18.28
UNII-2A Note	5260	26T	0	20.01	19.66	18.39	18.26
			4	18.56	18.19	17.24	17.11
			8	19.83	19.64	18.29	18.25
	5300		0	19.86	19.55	18.38	18.22
			4	18.65	18.11	17.24	17.11
			8	19.86	19.61	18.32	18.23
	5320		0	19.87	19.49	18.37	18.20
			4	18.60	18.15	17.25	17.12
			8	19.86	19.63	18.32	18.23
UNII-2C	5500	26T	0	19.98	19.77		
			4	18.55	18.15		
			8	19.79	19.60		
	5580		0	19.98	19.65		
			4	18.62	18.12		
			8	19.97	19.62		
	5700		0	19.84	19.59		
			4	18.44	18.17		
			8	19.81	19.64		

Note. As a result of 99% bandwidth test, the bandwidth of UNII-1 does not interfere with UNII-2A.

9.2.12. 802.11ax HE40(RU)

Band	Center Freq. [MHz]	Tones	RU offset	26 dB BW [MHz]		99% BW [MHz]	
				ANT1	ANT2	ANT1	ANT2
UNII-1 Note	5190	26T	0	20.00	19.67	18.44	18.14
			9	22.22	21.35	20.08	19.42
			17	20.58	20.18	18.52	18.33
	5230		0	20.32	19.58	18.52	18.13
			9	22.67	21.35	20.47	19.42
			17	20.69	20.30	18.69	18.48
UNII-2A Note	5270	26T	0	19.98	19.80	18.36	18.15
			9	22.17	21.33	20.20	19.32
			17	20.59	20.12	18.52	18.39
	5310		0	20.16	19.79	18.52	18.19
			9	22.61	21.32	20.58	19.39
			17	20.29	20.23	18.67	18.40
UNII-2C	5510	26T	0	20.24	20.05		
			9	21.84	21.12		
			17	20.35	20.18		
	5550		0	20.27	19.80		
			9	23.27	21.20		
			17	20.09	20.07		
	5670		0	20.31	19.65		
			9	22.94	21.14		
			17	20.46	20.13		

Note. As a result of 99% bandwidth test, the bandwidth of UNII-1 does not interfere with UNII-2A.

9.2.13. 802.11ax HE80(RU)

Band	Center Freq. [MHz]	Tones	RU offset	26 dB BW [MHz]		99% BW [MHz]	
				ANT1	ANT2	ANT1	ANT2
UNII-1 Note	5210	26T	0	23.77	21.23	20.47	19.10
			18	78.57	78.07	75.21	74.69
			36	22.90	22.06	20.08	19.56
UNII-2A Note	5290	26T	0	23.56	21.37	20.44	19.10
			18	78.50	78.07	75.29	74.65
			36	23.40	22.05	20.52	19.56
UNII-2C	5530	26T	0	23.67	21.06		
			18	78.51	78.13		
			36	22.95	22.03		
	5610	26T	0	22.82	21.16		
			18	78.50	77.87		
			36	23.38	21.89		

Note. As a result of 99% bandwidth test, the bandwidth of UNII-1 does not interfere with UNII-2A.

9.2.14. 802.11ax HE160(RU)

Band	Center Freq. [MHz]	Tones	RU offset	26 dB BW [MHz]		99% BW [MHz]	
				ANT1	ANT2	ANT1	ANT2
UNII-1&2A	5250	26T	0 L	27.53	25.33	26.90	21.36
			0 U	30.14	24.77	26.25	23.15
			36 U	30.75	25.71	26.14	21.87
UNII-2C	5570	26T	0 L	27.63	24.81		
			0 U	29.32	26.03		
			36 U	28.27	25.12		

9.2.15. 802.11ax STRADDLE CHANNEL(RU)

Band	Mode	Center Freq. [MHz]	Tones	RU offset	26 dB BW [MHz]			
					ANT1		ANT2	
					UNII-2C	UNII-3	UNII-2C	UNII-3
Straddle Channel	HE20	5720	26T	6	14.06	4.39	13.99	4.13
	HE40	5710		15	14.98	4.35	14.14	4.10
	HE80	5690		34	16.54	5.11	14.30	4.34

10. ANTENNA PORT TEST RESULTS

10.1. 6 dB BANDWIDTH

LIMITS

FCC §15.407
The minimum 6 dB bandwidth shall be at least 500 kHz.

TEST PROCEDURE

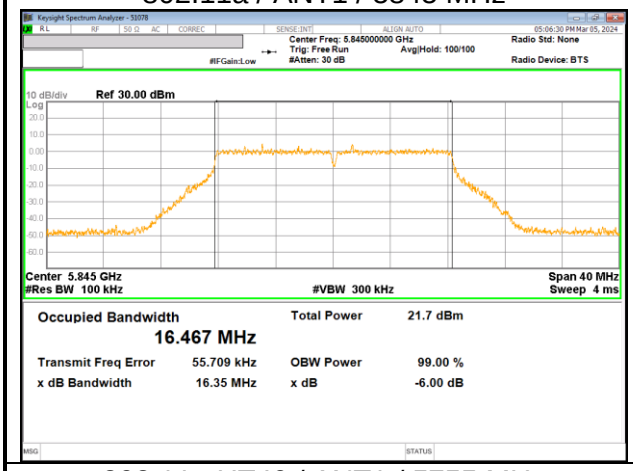
Reference to 789033 D02 General UNII Test Procedures New Rules v02r01: The transmitter output is connected to a spectrum analyzer with the RBW set to100KHz, the VBW >= 3 x RBW, peak detector and max hold.

RESULTS

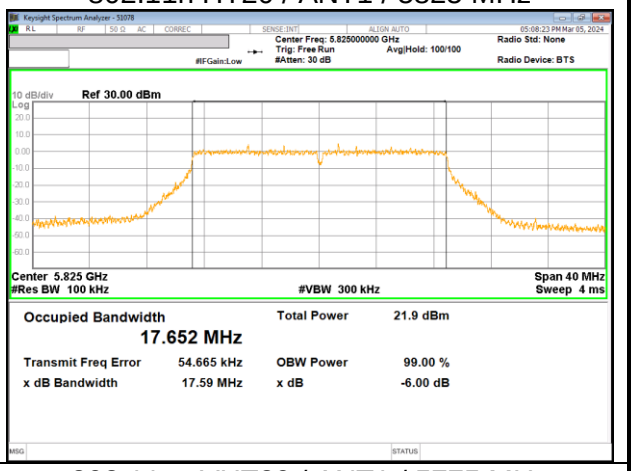
- Please refer to the next page

WORST CASE TEST PLOTS

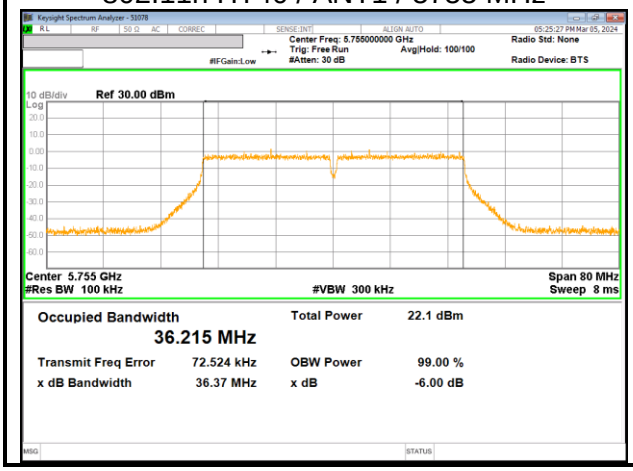
802.11a / ANT1 / 5845 MHz



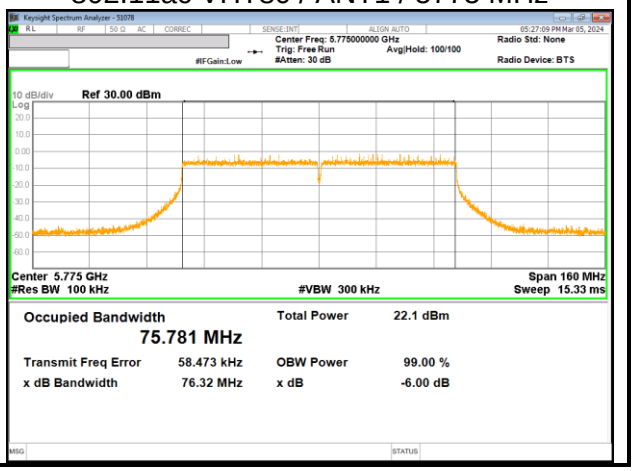
802.11n HT20 / ANT1 / 5825 MHz



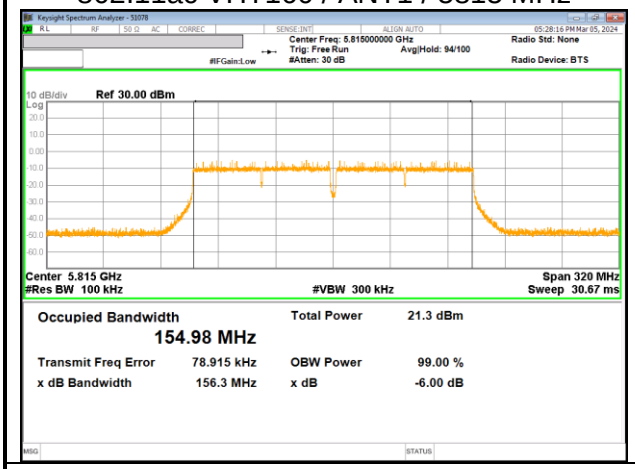
802.11n HT40 / ANT1 / 5755 MHz



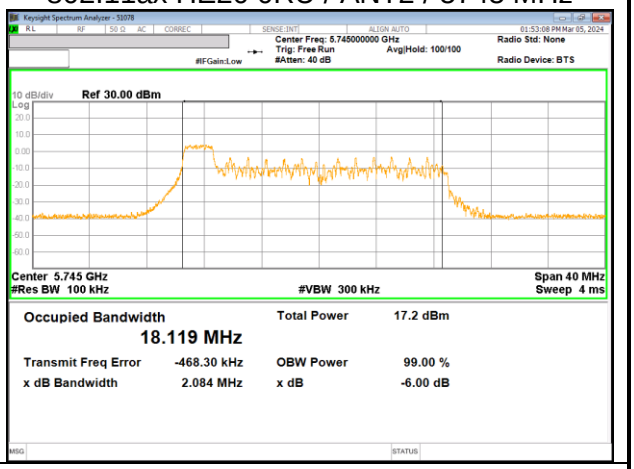
802.11ac VHT80 / ANT1 / 5775 MHz



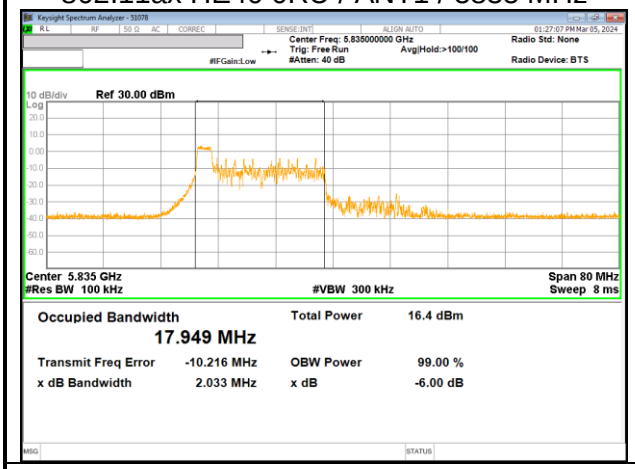
802.11ac VHT160 / ANT1 / 5815 MHz



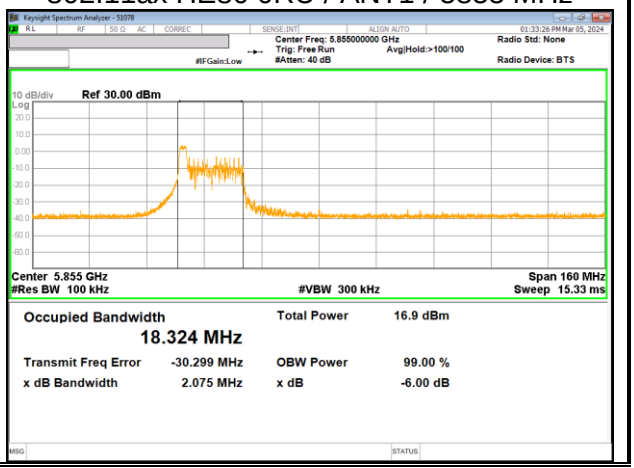
802.11ax HE20 0RU / ANT2 / 5745 MHz



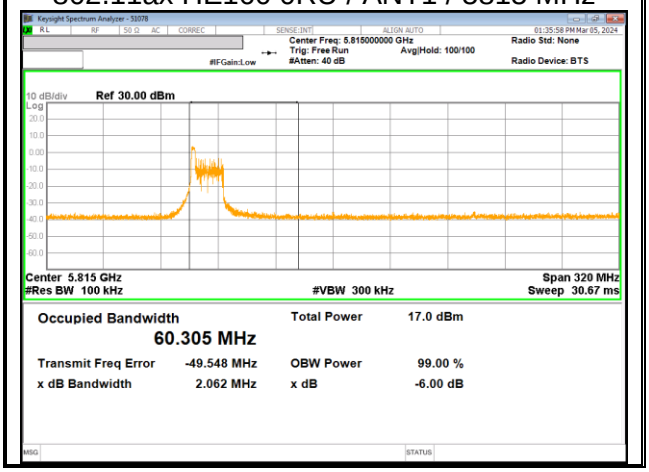
802.11ax HE40 0RU / ANT1 / 5835 MHz



802.11ax HE80 0RU / ANT1 / 5855 MHz

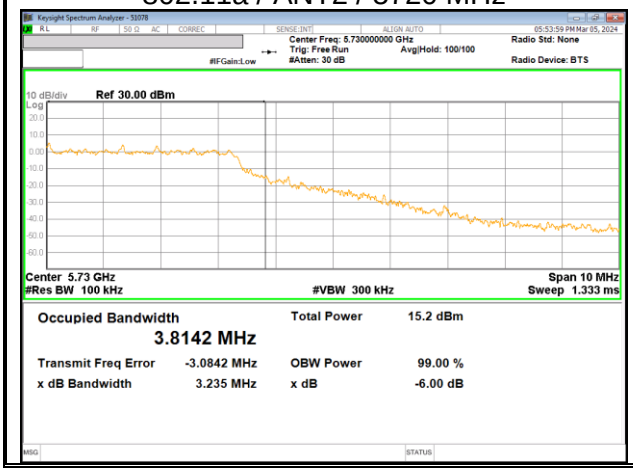


802.11ax HE160 0RU / ANT1 / 5815 MHz

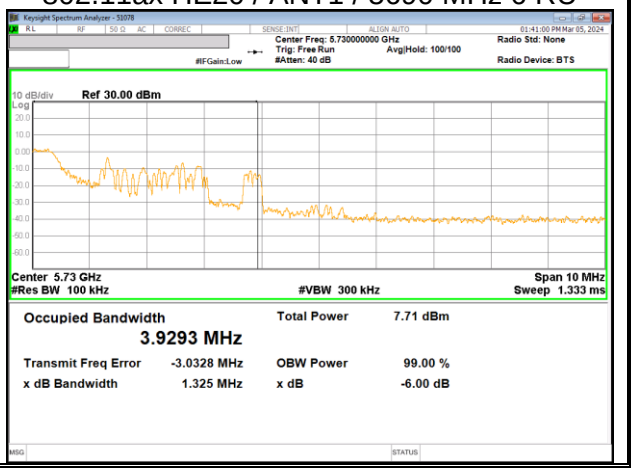


WORST CASE TEST PLOTS(STRADDLE CHANNELS)

802.11a / ANT2 / 5720 MHz



802.11ax HE20 / ANT1 / 5690 MHz 6 RU



10.1.1. STRADDLE CHANNEL

Mode	Channel	Center Freq. [MHz]	6 dB BW [MHz]	
			UNII-3	
			ANT1	ANT2
802.11a	Straddle	5720	3.25	3.24
802.11n HT20	Straddle	5720	3.85	3.85
802.11n HT40	Straddle	5710	3.29	3.27
802.11ac VHT80	Straddle	5690	3.25	3.24
802.11ax HE20(SU)	Straddle	5720	4.55	4.54
802.11ax HE40(SU)	Straddle	5710	4.09	4.23
802.11ax HE80(SU)	Straddle	5690	4.13	4.16

Band	Mode	Center Freq. [MHz]	Tones	RU offset	6 dB BW [MHz]	
					UNII-3	
					ANT1	ANT2
Straddle Channel	**HE20**	5720	26T	6	1.33	2.56
	HE40	5710		15	3.58	3.59
	HE80	5690		34	3.82	3.58

10.1.2. UNII-3 & 4 BAND

Mode	Channel	Center Freq. [MHz]	6 dB BW [MHz]		Worst	Minimum Limit [MHz]
			ANT1	ANT2		
802.11a	149	5745	16.36	16.36	16.35	0.5
	157	5785	16.36	16.37		
	165	5825	16.37	16.39		
	169	5845	16.35	16.36		
	173	5865	16.39	16.37		
	177	5885	16.37	16.38		
802.11n HT20	149	5745	17.60	17.65	17.59	
	157	5785	17.59	17.61		
	165	5825	17.59	17.59		
	169	5845	17.59	17.59		
	173	5865	17.62	17.60		
	177	5885	17.59	17.61		
802.11n HT40	151	5755	36.37	36.44	36.37	
	159	5795	36.38	36.39		
	167	5835	36.41	36.39		
	175	5875	36.37	36.38		
802.11ac VHT80	155	5775	76.32	76.34	76.32	
	171	5855	76.33	76.35		
802.11ac VHT160	163	5815	156.30	156.40	156.30	
802.11ax HE20(SU)	149	5745	18.99	18.94	18.93	
	157	5785	18.97	18.98		
	165	5825	18.96	18.93		
	169	5845	18.98	19.03		
	173	5865	18.93	18.97		
	177	5885	19.00	18.97		
802.11ax HE40(SU)	151	5755	38.20	38.02	38.02	
	159	5795	38.09	38.02		
	167	5835	38.31	38.32		
	175	5875	38.14	38.20		
802.11ax HE80(SU)	155	5775	78.09	78.00	78.00	
	171	5855	78.15	78.07		
802.11ax HE160(SU)	163	5815	157.90	157.80	157.80	

10.1.3. UNII-3 & 4 BAND(RU)

Mode	Channel	Center Freq. [MHz]	Tones	RU offset	6 dB BW [MHz]		Minimum Limit [MHz]
					ANT1	ANT2	
HE20	149	5745	26T	0	2.09	2.08	0.5
	157	5785			2.10	2.11	
	165	5825			2.09	2.11	
	169	5845			2.13	2.08	
	173	5865			2.09	2.08	
	177	5885			2.14	2.08	
	Minimum 6dB Bandwidth				2.08		
HE40	151	5755	26T	0	2.07	2.09	
	159	5795			2.05	2.08	
	167	5835			2.03	2.09	
	175	5875			2.07	2.08	
	Minimum 6dB Bandwidth				2.03		
HE80	155	5775	26T	0	2.12	2.10	
	171	5855			2.08	2.10	
	Minimum 6dB Bandwidth				2.08		
HE160	163	5815	26T	0	2.06	2.08	
	Minimum 6dB Bandwidth				2.06		

10.2. OUTPUT POWER AND PPSD

LIMITS

FCC §15.407 (a)(1)(iv), (a)(2), (a)(3)(i), (a)(3)(iii)

FCC

For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the band 5.725-5.850 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For client devices operating under the control of an indoor access point in the 5.850-5.895 GHz band, the maximum power spectral density must not exceed 14 dBm e.i.r.p. in any 1-megahertz band, and the maximum e.i.r.p. over the frequency band of operation must not exceed 30 dBm. Client devices operating on a channel that spans the 5.725-5.850 GHz and 5.850-5.895 GHz bands must not exceed an e.i.r.p. of 30 dBm.

UL KOREA LTD. Suwon Laboratory FORM ID: FCC_15E(05)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

TEST PROCEDURE

KDB 789033 Method PM is used for output power. Duty correction factor has already been applied to the power meter and the average power value is measured.

KDB 789033 Method SA-2 is used for PSD. RBW set to 1MHz(500kHz for the band 5.725-5.85 GHz, the VBW >= 3 x RBW, RMS detector and trace averaging).

Straddle Channel(UNII-2C&3)

KDB 789033 Method PM is used for output power of straddle channel.
(verification that both limit of UNII-2C and UNII-3 power are satisfied)

KDB 789033 Method SA-2 is used for PSD of straddle channel. RBW set to 1MHz, VBW >= 3 x RBW, RMS detector and trace averaging. Peak marker value of the spectrum is used for PSD. Considering the PSD's RBW setting and test limit, the UNII-2C measurement method (RBW 1MHz) covers UNII-3 (RBW 500kHz).

Straddle Channel(UNII-3&4)

KDB 789033 Method PM is used for total power of straddle channel.
(verification that both limit of UNII-3 and UNII-4 power & e.i.r.p. are satisfied)

KDB 789033 Method SA-2 is used for PSD of straddle channel. RBW set to 1MHz, VBW >= 3 x RBW, RMS detector and trace averaging. Peak marker value of the spectrum is used for PSD. Considering the PSD's RBW setting and test limit, the UNII-4 measurement method (RBW 1MHz) covers UNII-3 (RBW 500kHz).

DIRECTIONAL ANTENNA GAIN

For OUTPUT POWER and PSD: The TX chains are correlated and the antenna gains are unequal among the chains. The directional gain is:

Frequency Band [MHz]	ANT1 Gain [dBi]	ANT2 Gain [dBi]	Correlated Chains Directional Gain [dBi]
UNII 1 5150 - 5250	-4.21	-2.40	-0.25
UNII 2A 5250 - 5350	-3.21	-2.21	0.31
UNII 2C 5470 - 5725	-2.64	-2.41	0.49
UNII 3 5725 - 5850	-2.41	-3.16	0.23
UNII 4 5850 - 5925	-2.33	-2.95	0.38

Note. Since the correrated gain does not exceed 6dBi, bands except for UNII-4 do not consider the antenna gain.

10.2.1. 802.11a MODE

Output Power Results

Band	Channel	Center Freq. [MHz]	Average Power [dBm]		Direct. Gain [dBi]	Corr'd Power [dBm]	Limit [dBm]
			ANT1	ANT2			
UNII-1	36	5180	16.13	16.80		19.49	23.98
	40	5200	17.04	17.52		20.30	
	48	5240	17.38	17.32		20.36	
UNII-2A	52	5260	17.21	17.42		20.33	23.98
	60	5300	16.90	17.19		20.06	
	64	5320	15.93	16.59		19.28	
UNII-2C	100	5500	17.10	17.17		20.15	23.98
	116	5580	17.20	17.16		20.19	
	140	5700	16.99	17.15		20.08	
UNII-2C&3	144 Straddle	5720	17.08	17.24		20.17	23.98 or 30.00
UNII-3	149	5745	16.98	17.24		20.12	30.00
	157	5785	16.90	17.20		20.06	
	165	5825	16.85	16.96		19.92	
UNII-3&4	169	5845	16.92	16.91		19.93	30.00
		5845	16.92	16.91	0.38	20.31	30.00(e.i.r.p)
UNII-4	173	5865	16.88	16.93	0.38	20.30	30.00(e.i.r.p)
	177	5885	16.71	16.95	0.38	20.22	

* Calculation of Output Power : Average Power = Meas Power + Duty CF[dB]
Corr'd Power = Ant1 Average Power + Ant2 Average Power(in case of UNII-4: added directional gain)

PSD Results

Band	Channel	Center Freq. [MHz]	Meas PSD [dBm/MHz]		DCCF.	Direct. Gain [dBi]	Corr'd PSD [dBm]	Limit [dBm/ MHz]
			ANT1	ANT2				
UNII-1	36	5180	5.22	5.92	0.15		8.74	11.00
	40	5200	6.04	6.93	0.15		9.67	
	48	5240	6.81	6.85	0.15		9.99	
UNII-2A	52	5260	6.40	6.88	0.15		9.81	11.00
	60	5300	5.98	6.74	0.15		9.54	
	64	5320	5.18	5.93	0.15		8.73	
UNII-2C	100	5500	6.30	6.51	0.15		9.57	11.00
	116	5580	6.26	6.73	0.15		9.66	
	140	5700	6.12	6.65	0.15		9.55	
UNII-2C&3	144 Straddle	5720	6.32	6.86	0.15		9.76	11.00 or 30.00/500kHz
UNII-3	149	5745	3.07	3.63	0.15		6.52	30.00/500kHz
	157	5785	3.03	3.58	0.15		6.47	
	165	5825	2.92	3.36	0.15		6.30	
UNII-3&4	169	5845	6.16	6.19	0.15		9.33	30.00/500kHz
		5845	6.16	6.19	0.15	0.38	9.71	14.00(e.i.r.p.)
UNII-4	173	5865	6.09	6.48	0.15	0.38	9.83	14.00(e.i.r.p.)
	177	5885	6.03	6.46	0.15	0.38	9.79	

* Calculation of PSD: Corr'd PSD = Ant1 PSD + Ant2 PSD + Duty CF [dB] (in case of UNII-4: added directional gain)

UL KOREA LTD. Suwon Laboratory FORM ID: FCC_15E(05)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

10.2.2. 802.11n HT20 MODE

Output Power Results

Band	Channel	Center Freq. [MHz]	Average Power [dBm]		Direct. Gain [dBi]	Corr'd Power [dBm]	Limit [dBm]
			ANT1	ANT2			
UNII-1	36	5180	17.33	17.50		20.43	23.98
	40	5200	17.05	17.48		20.28	
	48	5240	17.33	17.30		20.33	
UNII-2A	52	5260	17.22	17.39		20.32	23.98
	60	5300	16.88	17.20		20.05	
	64	5320	17.11	17.42		20.28	
UNII-2C	100	5500	17.10	17.14		20.13	23.98
	116	5580	17.15	17.18		20.18	
	140	5700	17.05	17.20		20.14	
UNII-2C&3	144 Straddle	5720	17.15	17.23		20.20	23.98 or 30.00
UNII-3	149	5745	16.95	17.22		20.10	30.00
	157	5785	16.88	17.19		20.05	
	165	5825	16.90	16.92		19.92	
UNII-3&4	169	5845	16.90	16.91		19.92	30.00
		5845	16.90	16.91	0.38	20.30	$30.00_{(e.i.r.p)}$
UNII-4	173	5865	16.85	16.84	0.38	20.24	$30.00_{(e.i.r.p)}$
	177	5885	16.80	16.87	0.38	20.23	

* Calculation of Output Power : Average Power = Meas Power + Duty CF[dB]
Corr'd Power = Ant1 Average Power + Ant2 Average Power(in case of UNII-4: added directional gain)

PSD Results

Band	Channel	Center Freq. [MHz]	Meas PSD [dBm/MHz]		DCCF.	Direct. Gain [dBi]	Corr'd PSD [dBm]	Limit [dBm/ MHz]
			ANT1	ANT2				
UNII-1	36	5180	6.26	6.79	0.00		9.54	11.00
	40	5200	5.93	6.74	0.00		9.36	
	48	5240	6.36	6.37	0.00		9.38	
UNII-2A	52	5260	6.15	6.80	0.00		9.49	11.00
	60	5300	5.88	6.55	0.00		9.24	
	64	5320	6.23	6.56	0.00		9.41	
UNII-2C	100	5500	6.03	6.19	0.00		9.12	11.00
	116	5580	6.35	6.48	0.00		9.43	
	140	5700	6.04	6.37	0.00		9.21	
UNII-2C&3	144 Straddle	5720	5.80	6.21	0.00		9.02	11.00 or $30.00_{/500kHz}$
UNII-3	149	5745	2.84	3.37	0.00		6.12	$30.00_{/500kHz}$
	157	5785	2.84	3.42	0.00		6.15	
	165	5825	2.92	3.20	0.00		6.07	
UNII-3&4	169	5845	6.26	6.28	0.00		9.28	$30.00_{/500kHz}$
		5845	6.26	6.28	0.00	0.38	9.66	$14.00_{(e.i.r.p.)}$
UNII-4	173	5865	6.09	6.31	0.00	0.38	9.59	$14.00_{(e.i.r.p.)}$
	177	5885	5.79	6.02	0.00	0.38	9.30	

* Calculation of PSD: Corr'd PSD = Ant1 PSD + Ant2 PSD + Duty CF [dB] (in case of UNII-4: added directional gain)

UL KOREA LTD. Suwon Laboratory FORM ID: FCC_15E(05)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

10.2.3. 802.11n HT40 MODE

Output Power Results

Band	Channel	Center Freq. [MHz]	Average Power [dBm]		Direct. Gain [dBi]	Corr'd Power [dBm]	Limit [dBm]
			ANT1	ANT2			
UNII-1	38	5190	15.06	15.79		18.45	23.98
	46	5230	17.26	17.47		20.38	
UNII-2A	54	5270	17.23	17.52		20.39	23.98
	62	5310	14.37	14.98		17.70	
UNII-2C	102	5510	15.11	15.26		18.20	23.98
	110	5550	17.11	17.35		20.24	
	134	5670	17.05	17.31		20.19	
UNII-2C&3	142 Straddle	5710	17.11	17.22		20.18	23.98 or 30.00
UNII-3	151	5755	17.01	17.34		20.19	30.00
	159	5795	17.04	17.23		20.15	
UNII-3&4	167	5835	17.01	17.06		20.05	30.00
		5835	17.01	17.06	0.38	20.43	30.00(e.i.r.p)
UNII-4	175	5875	17.09	16.84	0.38	20.36	30.00(e.i.r.p)

* Calculation of Output Power : Average Power = Meas Power + Duty CF[dB]
Corr'd Power = Ant1 Average Power + Ant2 Average Power(in case of UNII-4: added directional gain)

PSD Results

Band	Channel	Center Freq. [MHz]	Meas PSD [dBm/MHz]		DCCF.	Direct. Gain [dBi]	Corr'd PSD [dBm]	Limit [dBm/ MHz]
			ANT1	ANT2				
UNII-1	38	5190	0.97	1.68	0.00		4.35	11.00
	46	5230	3.21	3.63	0.00		6.43	
UNII-2A	54	5270	3.06	3.70	0.00		6.40	11.00
	62	5310	0.39	0.96	0.00		3.70	
UNII-2C	102	5510	2.99	3.75	0.00		6.40	11.00
	110	5550	3.22	3.58	0.00		6.41	
	134	5670	3.01	3.62	0.00		6.34	
UNII-2C&3	142 Straddle	5710	3.24	3.40	0.00		6.33	11.00 or 30.00/500kHz
UNII-3	151	5755	0.05	0.39	0.00		3.23	30.00/500kHz
	159	5795	-0.02	0.28	0.00		3.14	
UNII-3&4	167	5835	3.07	3.46	0.00		6.28	30.00/500kHz
		5835	3.07	3.46	0.00	0.38	6.66	14.00(e.i.r.p.)
UNII-4	175	5875	3.05	2.92	0.00	0.38	6.38	14.00(e.i.r.p.)

* Calculation of PSD: Corr'd PSD = Ant1 PSD + Ant2 PSD + Duty CF [dB] (in case of UNII-4: added directional gain)

10.2.4. 802.11ac VHT80 MODE

Output Power Results

Band	Channel	Center Freq. [MHz]	Average Power [dBm]		Direct. Gain [dBi]	Corr'd Power [dBm]	Limit [dBm]
			ANT1	ANT2			
UNII-1	42	5210	14.70	15.47		18.11	23.98
UNII-2A	58	5290	15.11	15.82		18.49	23.98
UNII-2C	106	5530	14.98	15.63		18.33	23.98
	122	5610	17.02	17.21		20.13	
UNII-2C&3	138 Straddle	5690	16.98	17.10		20.05	23.98 or 30.00
UNII-3	155	5775	16.80	17.04		19.93	30.00
UNII-3&4	171	5855	16.78	16.72		19.76	30.00
		5855	16.78	16.72	0.38	20.14	30.00$_{(e.i.r.p)}$

* Calculation of Output Power : Average Power = Meas Power + Duty CF[dB]
Corr'd Power = Ant1 Average Power + Ant2 Average Power(in case of UNII-4: added directional gain)

PSD Results

Band	Channel	Center Freq. [MHz]	Meas PSD [dBm/MHz]		DCCF.	Direct. Gain [dBi]	Corr'd PSD [dBm]	Limit [dBm/ MHz]
			ANT1	ANT2				
UNII-1	42	5210	-2.71	-1.80	0.25		1.03	11.00
UNII-2A	58	5290	-1.49	-0.95	0.25		2.05	11.00
UNII-2C	106	5530	-2.48	-1.69	0.25		1.19	11.00
	122	5610	-0.30	0.09	0.25		3.16	
UNII-2C&3	138 Straddle	5690	-0.24	0.26	0.25		3.28	11.00 or 30.00$_{/500kHz}$
UNII-3	155	5775	-3.55	-3.13	0.25		-0.08	30.00$_{/500kHz}$
UNII-3&4	171	5855	-0.41	0.04	0.25		3.08	30.00$_{/500kHz}$
		5855	-0.41	0.04	0.25	0.38	3.46	14.00$_{(e.i.r.p.)}$

* Calculation of PSD: Corr'd PSD = Ant1 PSD + Ant2 PSD + Duty CF [dB] (in case of UNII-4: added directional gain)

10.2.5. 802.11ac VHT160 MODE

Output Power Results

Band	Channel	Center Freq. [MHz]	Average Power [dBm]		Direct. Gain [dBi]	Corr'd Power [dBm]	Limit [dBm]
			ANT1	ANT2			
UNII-1&2A	50	5250	15.12	15.41		18.28	23.98
UNII-2C	114	5570	13.21	13.31		16.27	23.98
UNII-3&4	163	5815	16.00	16.28		19.15	30.00
	163	5815	15.48	15.77	0.38	19.02	30.00(e.i.r.p)

* Calculation of Output Power : Average Power = Meas Power + Duty CF[dB]
Corr'd Power = Ant1 Average Power + Ant2 Average Power(in case of UNII-4: added directional gain)

PSD Results

Band	Channel	Center Freq. [MHz]	Meas PSD [dBm/MHz]		DCCF.	Direct. Gain [dBi]	Corr'd PSD [dBm]	Limit [dBm/ MHz]
			ANT1	ANT2				
UNII-1&2A	50	5250	-5.20	-4.27	0.24		-1.46	11.00
UNII-2C	114	5570	-7.29	-7.12	0.24		-3.95	11.00
UNII-3&4	163	5815	-4.39	-4.21	0.24		-1.05	30.00/500kHz
	163	5815	-4.39	-4.21	0.24	0.38	-0.67	14.00(e.i.r.p.)

* Calculation of PSD: Corr'd PSD = Ant1 PSD + Ant2 PSD + Duty CF [dB] (in case of UNII-4: added directional gain)

10.2.6. 802.11ax HE20 MODE

Output Power Results

Band	Channel	Center Freq. [MHz]	Tones	RU offset	Average Power [dBm]		Corr'd Power [dBm]	Limit [dBm]
					ANT1	ANT2		
UNII-1	36	5180	26T	0	9.33	9.74	12.55	23.98
				4	9.03	9.23	12.14	
				8	9.51	9.54	12.54	
			SU	-	14.97	15.84	18.44	
	40	5200	26T	0	9.10	9.74	12.44	
				4	8.74	9.26	12.02	
				8	9.22	9.55	12.40	
			SU	-	17.14	17.61	20.39	
	48	5240	26T	0	9.59	9.29	12.45	
				4	9.13	8.79	11.97	
				8	9.54	9.05	12.31	
			SU	-	17.40	17.41	20.42	
UNII-2A	52	5260	26T	0	9.44	9.54	12.50	23.58
				4	9.02	9.04	12.04	
				8	9.35	9.31	12.34	
			SU	-	17.26	17.50	20.39	
	60	5300	26T	0	9.39	9.35	12.38	
				4	8.90	8.80	11.86	
				8	9.24	9.03	12.15	
			SU	-	16.92	17.26	20.10	
	64	5320	26T	0	9.33	9.70	12.53	
				4	8.80	9.20	12.01	
				8	9.12	9.45	12.30	
			SU	-	15.40	15.98	18.71	
UNII-2C	100	5500	26T	0	9.00	9.31	12.17	23.58
				4	8.55	8.84	11.71	
				8	8.96	9.13	12.06	
			SU	-	17.13	17.23	20.19	
	116	5580	26T	0	9.10	9.27	12.20	
				4	8.70	8.82	11.77	
				8	9.11	9.14	12.14	
			SU	-	17.24	17.25	20.26	
	140	5700	26T	0	8.97	9.37	12.18	
				4	8.64	8.88	11.77	
				8	9.02	9.21	12.13	
			SU	-	17.03	17.22	20.14	

* Calculation of Output Power : Average Power = Meas Power + Duty CF[dB]

Band	Channel	Center Freq. [MHz]	Tones	RU offset	Average Power [dBm]		Corr'd Power [dBm]	Limit [dBm]
					ANT1	ANT2		
UNII-2C & 3	144 Straddle	5720	26T	0	9.16	9.15	12.17	23.58 or 30.00
				4	8.80	8.70	11.76	
				8	9.26	9.02	12.15	
			SU	-	17.12	17.28	20.21	
UNII-3	149	5745	26T	0	9.08	9.33	12.22	30.00
				4	8.70	8.86	11.79	
				8	9.18	9.20	12.20	
			SU	-	17.03	17.31	20.18	
	157	5785	26T	0	8.99	9.32	12.17	
				4	8.62	8.83	11.74	
				8	9.06	9.16	12.12	
			SU	-	16.90	17.26	20.09	
	165	5825	26T	0	8.87	9.13	12.01	
				4	8.50	8.65	11.59	
				8	8.93	8.98	11.97	
			SU	-	16.90	17.03	19.98	

Band	Channel	Center Freq. [MHz]	Tones	RU offset	Average Power [dBm]		Direct. Gain [dBi]	Corr'd Power [dBm]	Limit [dBm]
					ANT1	ANT2			
UNII-3&4	169 Overlap	5845	26T	0	8.94	9.07		12.02	30.00 or 30.00 e.i.r.p[Note]
				4	8.55	8.64		11.61	
				8	8.98	8.93	0.38	12.35	
			SU	-	16.95	16.99	0.38	20.36	
UNII-4	173	5865	26T	0	8.96	9.02	0.38	12.38	30.00 e.i.r.p.
				4	8.57	8.56	0.38	11.96	
				8	8.94	8.92	0.38	12.32	
			SU	-	16.92	16.97	0.38	20.34	
	177	5885	26T	0	9.42	9.09	0.38	12.65	
				4	9.02	8.70	0.38	12.25	
				8	9.51	9.02	0.38	12.66	
			SU	-	16.80	17.01	0.38	20.30	

* Calculation of Output Power : Average Power = Meas Power + Duty CF[dB]
Corr'd Power = Ant1 Average Power + Ant2 Average Power(in case of UNII-4: added directional gain)

PSD Results

Band	Channel	Center Freq. [MHz]	Tones	RU offset	Meas PSD [dBm/MHz]		Corr'd PSD [dBm/MHz]	PSD Limit [dBm/MHz]
					ANT1	ANT2		
UNII-1	36	5180	26T	0	6.66	7.24	9.97	11.00
				4	5.26	5.92	8.61	
				8	6.68	7.40	10.06	
			SU	-	3.44	4.23	6.86	
	40	5200	26T	0	6.45	7.38	9.95	
				4	5.19	5.71	8.47	
				8	6.55	7.25	9.92	
			SU	-	4.88	5.47	8.19	
	48	5240	26T	0	6.78	6.86	9.83	
				4	5.35	5.06	8.22	
				8	6.64	6.77	9.71	
			SU	-	5.46	5.45	8.46	
UNII-2A	52	5260	26T	0	6.67	7.30	10.00	11.00
				4	5.31	5.33	8.33	
				8	6.73	7.04	9.90	
			SU	-	5.18	5.63	8.42	
	60	5300	26T	0	6.69	6.84	9.78	
				4	5.03	5.37	8.21	
				8	6.42	6.66	9.56	
			SU	-	5.19	5.64	8.43	
	64	5320	26T	0	6.60	7.19	9.91	
				4	5.10	5.65	8.39	
				8	6.42	7.03	9.75	
			SU	-	3.56	4.27	6.94	
UNII-2C	100	5500	26T	0	5.79	6.77	9.32	11.00
				4	4.63	5.17	7.92	
				8	5.74	6.55	9.18	
			SU	-	5.49	5.46	8.49	
	116	5580	26T	0	6.88	6.74	9.82	
				4	5.38	5.21	8.31	
				8	7.04	6.74	9.90	
			SU	-	5.56	5.69	8.64	
	140	5700	26T	0	5.92	6.88	9.44	
				4	4.43	5.72	8.13	
				8	6.04	6.81	9.45	
			SU	-	5.24	5.33	8.30	
UNII-2C & 3	144 Straddle	5720	26T	0	7.22	6.71	9.98	11.00 or 30.00/500kHz
				4	5.62	5.27	8.46	
				8	7.17	6.71	9.96	
			SU	-	5.10	5.59	8.36	

* Calculation of PSD: Corr'd PSD = Ant1 PSD + Ant2 PSD + Duty CF [dB]

Band	Channel	Center Freq. [MHz]	Tones	RU offset	Meas PSD [dBm]		Direct. Gain [dBi]	Corr'd PSD [dBm]	PSD Limit [dBm]
					ANT1	ANT2			
UNII-3	149	5745	26T	0	3.97	4.13		7.06	30.00 /500kHz
				4	3.03	3.61		6.34	
				8	3.97	3.97		6.98	
			SU	-	2.07	2.40		5.24	
	157	5785	26T	0	3.56	4.02		6.81	
				4	3.23	3.39		6.32	
				8	3.82	3.92		6.88	
			SU	-	1.86	2.64		5.28	
	165	5825	26T	0	3.68	3.82		6.76	
				4	2.98	3.04		6.02	
				8	3.50	3.65		6.58	
			SU	-	1.83	2.25		5.05	
UNII-3&4	169	5845	26T	0	6.41	6.80		9.62	30.00 /500kHz
				4	4.94	5.19		8.08	
				8	6.42	6.56	0.38	9.88	14.00 /MHz e.i.r.p.
			SU	-	4.99	5.44	0.38	8.61	14.00 /MHz e.i.r.p
UNII-4	173	5865	26T	0	6.53	6.55	0.38	9.93	14.00 /MHz e.i.r.p
				4	5.01	5.04	0.38	8.41	
				8	6.46	6.61	0.38	9.93	
			SU	-	5.07	5.23	0.38	8.54	
	177	5885	26T	0	6.48	6.47	0.38	9.86	
				4	5.02	5.30	0.38	8.55	
				8	6.53	6.46	0.38	9.89	
			SU	-	4.74	5.42	0.38	8.48	

* Calculation of PSD: Corr'd PSD = Ant1 PSD + Ant2 PSD + Duty CF [dB] (in case of UNII-4: added directional gain)

10.2.7. 802.11ax HE40 MODE

Output Power Results

Band	Channel	Center Freq. [MHz]	Tones	RU offset	Average Power [dBm]		Corr'd Power [dBm]	Limit [dBm]
					ANT1	ANT2		
UNII-1	38	5190	26T	0	8.99	9.67	12.35	23.98
				9	8.80	9.53	12.19	
				17	9.10	9.51	12.32	
			SU	-	14.64	15.38	18.04	
	46	5230	26T	0	9.17	9.35	12.27	
				9	9.05	9.18	12.13	
				17	9.18	9.15	12.18	
			SU	-	17.46	17.77	20.63	
UNII-2A	54	5270	26T	0	9.25	9.48	12.38	23.96
				9	9.15	9.32	12.25	
				17	9.18	9.25	12.23	
			SU	-	17.31	17.74	20.54	
	62	5310	26T	0	9.20	9.38	12.30	
				9	9.05	9.20	12.14	
				17	9.08	9.17	12.14	
			SU	-	14.84	15.49	18.19	
UNII-2C	102	5510	26T	0	8.83	9.19	12.02	23.93
				9	8.65	9.04	11.86	
				17	8.85	9.11	11.99	
			SU	-	15.25	15.90	18.60	
	110	5550	26T	0	8.90	9.22	12.07	
				9	8.70	9.07	11.90	
				17	8.91	9.12	12.03	
			SU	-	17.30	17.51	20.42	
	134	5670	26T	0	8.80	9.31	12.07	
				9	8.55	9.10	11.84	
				17	8.82	9.18	12.01	
			SU	-	17.36	17.57	20.48	
UNII-2C & 3	142 Straddle	5710	26T	0	8.90	9.27	12.10	23.93 or 30.00
				9	8.66	9.12	11.91	
				17	8.92	9.17	12.06	
			SU	-	17.28	17.54	20.42	

* Calculation of Output Power : Average Power = Meas Power + Duty CF[dB]
Corr'd Power = Ant1 Average Power + Ant2 Average Power

Band	Channel	Center Freq. [MHz]	Tones	RU offset	Average Power [dBm]		Corr'd Power [dBm]	Limit [dBm]
					ANT1	ANT2		
UNII-3	151	5755	26T	0	8.90	9.18	12.05	30.00
				9	8.70	9.03	11.88	
				17	8.94	9.06	12.01	
			SU	-	17.12	17.54	20.35	
	159	5795	26T	0	8.75	9.12	11.95	
				9	8.52	8.91	11.73	
				17	8.74	8.98	11.87	
			SU	-	17.18	17.50	20.35	

Band	Channel	Center Freq. [MHz]	Tones	RU offset	Average Power [dBm]		Direct. Gain [dBi]	Corr'd Power [dBm]	Limit [dBm]
					ANT1	ANT2			
UNII-3&4	167 Overlap	5835	26T	0	8.85	8.99		11.93	30.00 or 30.00 e.i.r.p[Note]
				9	8.62	8.78		11.71	
				17	8.85	8.84	0.38	12.24	
			SU	-	17.19	17.33	0.38	20.65	
UNII-4	175	5875	26T	0	9.27	8.91	0.38	12.48	30.00 e.i.r.p.
				9	9.10	8.71	0.38	12.30	
				17	9.32	8.84	0.38	12.48	
			SU	-	17.25	17.16	0.38	20.60	

* Calculation of Output Power : Average Power = Meas Power + Duty CF[dB]
Corr'd Power = Ant1 Average Power + Ant2 Average Power(in case of UNII-4: added directional gain)

UL KOREA LTD. Suwon Laboratory FORM ID: FCC_15E(05)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

PSD Results

Band	Channel	Center Freq. [MHz]	Tones	RU offset	Meas PSD [dBm/MHz]		Corr'd PSD [dBm/MHz]	PSD Limit [dBm/MHz]
					ANT1	ANT2		
UNII-1	38	5190	26T	0	6.25	7.30	9.82	11.00
				9	6.01	7.29	9.71	
				17	6.55	7.07	9.83	
			SU	-	-0.60	0.47	2.98	
	46	5230	26T	0	6.57	6.75	9.67	
				9	6.43	6.82	9.64	
				17	6.55	6.42	9.49	
			SU	-	2.07	2.88	5.50	
UNII-2A	54	5270	26T	0	6.60	7.01	9.82	11.00
				9	6.40	6.87	9.65	
				17	6.41	6.81	9.62	
			SU	-	2.24	3.10	5.70	
	62	5310	26T	0	6.59	6.87	9.74	
				9	6.44	6.94	9.71	
				17	6.47	6.67	9.58	
			SU	-	0.03	0.78	3.43	
UNII-2C	102	5510	26T	0	5.52	6.45	9.02	11.00
				9	5.51	6.30	8.93	
				17	5.74	6.32	9.05	
			SU	-	0.32	1.31	3.85	
	118	5590	26T	0	5.61	6.43	9.05	
				9	5.40	6.70	9.11	
				17	5.65	6.31	9.00	
			SU	-	2.14	2.74	5.46	
	134	5670	26T	0	5.76	7.05	9.46	
				9	5.43	6.72	9.13	
				17	5.65	6.65	9.19	
			SU	-	2.19	2.86	5.55	
UNII-2C & 3	142 Straddle	5710	26T	0	5.97	6.83	9.43	11.00 or 30.00/500kHz
				9	5.57	6.67	9.16	
				17	5.80	6.75	9.31	
			SU	-	2.19	2.82	5.53	

* Calculation of PSD: Corr'd PSD = Ant1 PSD + Ant2 PSD + Duty CF [dB]

Band	Channel	Center Freq. [MHz]	Tones	RU offset	Meas PSD [dBm]		Direct. Gain [dBi]	Corr'd PSD [dBm]	PSD Limit [dBm]
					ANT1	ANT2			
UNII-3	151	5755	26T	0	3.64	4.03		6.85	30.00 /500kHz
				9	3.46	3.74		6.61	
				17	3.73	3.77		6.76	
			SU	-	-0.87	0.17		2.69	
	159	5795	26T	0	3.55	3.90		6.73	
				9	3.05	3.52		6.31	
				17	3.46	3.71		6.59	
			SU	-	-0.71	-0.29		2.52	
UNII-3&4	167	5835	26T	0	6.37	6.44		9.42	30.00 /500kHz
				9	6.00	6.36		9.19	
				17	6.27	6.47	0.38	9.76	14.00 /MHz e.i.r.p.
			SU	-	2.31	2.49	0.38	5.79	14.00 /MHz e.i.r.p
UNII-4	175	5875	26T	0	6.62	6.40	0.38	9.90	14.00 /MHz e.i.r.p
				9	6.47	6.41	0.38	9.83	
				17	6.67	6.36	0.38	9.90	
			SU	-	2.24	2.36	0.38	5.69	

* Calculation of PSD: Corr'd PSD = Ant1 PSD + Ant2 PSD + Duty CF [dB] (in case of UNII-4: added directional gain)

UL KOREA LTD. Suwon Laboratory FORM ID: FCC_15E(05)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

10.2.8. 802.11ax HE80 MODE

Output Power Results

Band	Channel	Center Freq. [MHz]	Tones	RU offset	Average Power [dBm]		Corr'd Power [dBm]	Limit [dBm]
					ANT1	ANT2		
UNII-1	42	5210	26T	0	8.73	9.16	11.96	23.98
				18	8.90	9.07	12.00	
				36	8.87	9.02	11.96	
			SU	-	14.51	15.08	17.81	
UNII-2A	58	5290	26T	0	9.38	9.54	12.47	23.98
				18	9.41	9.37	12.40	
				36	9.35	9.24	12.31	
			SU	-	15.33	15.76	18.56	
UNII-2C	106	5530	26T	0	9.18	9.47	12.34	23.98
				18	9.07	9.35	12.22	
				36	9.15	9.38	12.28	
			SU	-	15.05	15.09	18.08	
	122	5610	26T	0	9.14	9.60	12.39	
				18	9.07	9.50	12.30	
				36	9.03	9.42	12.24	
			SU	-	17.21	17.45	20.34	
UNII-2C & 3	138 Straddle	5690	26T	0	9.36	9.60	12.49	23.98 or 30.00
				18	9.23	9.40	12.33	
				36	9.26	9.41	12.35	
			SU	-	17.10	17.35	20.24	
UNII-3	155	5775	26T	0	9.26	9.52	12.40	30.00
				18	9.16	9.41	12.30	
				36	9.09	9.33	12.22	
			SU	-	16.96	17.30	20.14	
UNII-3&4	171	5855	26T	0	9.12	9.27	12.21	30.00 or 30.00 e.i.r.p[Note]
				18	9.03	9.09	12.07	
				36	9.08	9.09	12.10	
			SU	-	16.96	17.00	19.99	

* Calculation of Output Power : Average Power = Meas Power + Duty CF[dB]
Corr'd Power = Ant1 Average Power + Ant2 Average Power(in case of UNII-4: added directional gain)

PSD Results

Band	Channel	Center Freq. [MHz]	Tones	RU offset	Meas PSD [dBm/MHz]		Corr'd PSD [dBm/MHz]	PSD Limit [dBm/MHz]
					ANT1	ANT2		
UNII-1	42	5210	26T	0	6.04	6.43	9.25	11.00
				18	5.07	5.14	8.11	
				36	6.19	6.26	9.23	
			SU	-	-3.86	-2.91	-0.35	
UNII-2A	58	5290	26T	0	6.51	7.07	9.81	11.00
				18	5.75	5.95	8.86	
				36	6.53	6.62	9.59	
			SU	-	-2.66	-1.94	0.73	
UNII-2C	106	5530	26T	0	6.12	6.76	9.46	11.00
				18	4.87	5.79	8.37	
				36	6.20	7.20	9.74	
			SU	-	-2.94	-2.76	0.16	
	122	5610	26T	0	6.93	6.90	9.93	
				18	5.80	5.68	8.75	
				36	6.72	7.04	9.89	
			SU	-	-0.77	-0.31	2.48	
UNII-2C & 3	138 Straddle	5690	26T	0	6.27	7.14	9.74	11.00 or 30.00/500kHz
				18	4.98	5.87	8.46	
				36	6.15	7.04	9.63	
			SU	-	-0.92	-0.23	2.45	

Band	Channel	Center Freq. [MHz]	Tones	RU offset	Meas PSD [dBm]		Direct. Gain [dBi]	Corr'd PSD [dBm]	PSD Limit [dBm]
					ANT1	ANT2			
UNII-3	155	5775	26T	0	3.66	3.95		6.82	30.00 /500kHz
				18	3.62	3.96		6.80	
				36	3.69	3.85		6.78	
			SU	-	-3.94	-3.59		-0.75	
UNII-3&4	171	5855	26T	0	6.46	6.82		9.65	30.00 /500kHz
				18	5.23	5.61		8.43	14.00 /MHz e.i.r.p.
				36	6.39	6.66	0.38	9.92	
			SU	-	-0.89	-0.72	0.38	2.59	14.00 /MHz e.i.r.p

* Calculation of PSD: Corr'd PSD = Ant1 PSD + Ant2 PSD + Duty CF [dB] (in case of UNII-4: added directional gain)

UL KOREA LTD. Suwon Laboratory FORM ID: FCC_15E(05)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

10.2.9. 802.11ax HE160 MODE

Output Power Results

Band	Channel	Center Freq. [MHz]	Tones	RU offset	Average Power [dBm]		Corr'd Power [dBm]	Limit [dBm]
					ANT1	ANT2		
UNII-1&2A	50	5250	26T	0(LB)	9.36	9.29	12.34	23.98
				0(UB)	9.73	9.49	12.62	
				36(BU)	9.52	9.15	12.35	
			SU	-	15.34	15.61	18.49	
UNII-2C	114	5570	26T	0(LB)	9.26	9.28	12.28	23.98
				0(UB)	9.31	9.48	12.41	
				36(UB)	9.20	9.24	12.23	
			SU	-	13.55	13.51	16.54	
UNII-3&4	163	5815	26T	0(LB)	9.09	9.30	12.21	30.00 or 30.00 e.i.r.p[Note]
				0(UB)	9.07	9.35	12.22	
				36(UB)	8.98	9.11	12.06	
			SU	-	15.65	15.98	18.83	

* Calculation of Output Power : Average Power = Meas Power + Duty CF[dB]
Corr'd Power = Ant1 Average Power + Ant2 Average Power(in case of UNII-4: added directional gain)

PSD Results

Band	Channel	Center Freq. [MHz]	Tones	RU offset	Meas PSD [dBm/MHz]		Corr'd PSD [dBm/MHz]	PSD Limit [dBm/MHz]
					ANT1	ANT2		
UNII-1&2A	50	5250	26T	0(LB)	6.26	6.36	9.32	11.00
				0(UB)	6.82	6.66	9.75	
				36(UB)	6.64	6.24	9.46	
			SU	-	-5.70	-5.07	-2.36	
UNII-2C	114	5570	26T	0(LB)	6.56	6.77	9.68	11.00
				0(UB)	6.49	6.72	9.62	
				36(UB)	6.58	6.77	9.69	
			SU	-	-5.41	-5.15	-2.27	

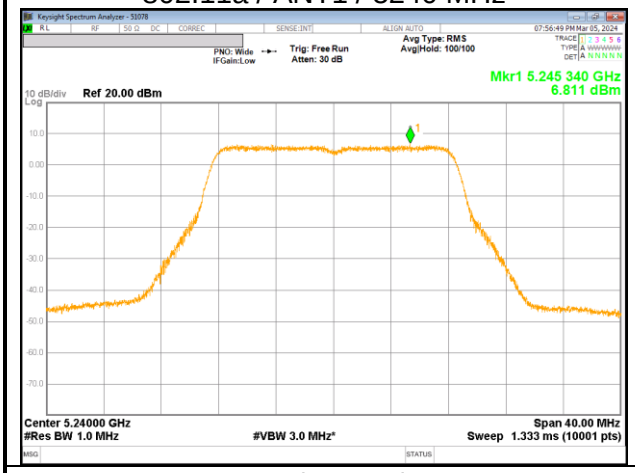
Band	Channel	Center Freq. [MHz]	Tones	RU offset	Meas PSD [dBm]		Direct. Gain [dBi]	Corr'd PSD [dBm]	PSD Limit [dBm]
					ANT1	ANT2			
UNII-3&4	171	5815	26T	0(LB)	6.58	6.53		9.56	30.00 /500kHz
				0(UB)	6.40	6.53		9.48	
				36(UB)	6.04	6.41	0.38	9.62	14.00 /MHz e.i.r.p
			SU	-	-4.84	-4.48	0.38	-1.26	14.00 /MHz e.i.r.p

* Calculation of PSD: Corr'd PSD = Ant1 PSD + Ant2 PSD + Duty CF [dB] (in case of UNII-4: added directional gain)
Note. LB=Lower band(Lower 996T),UB=Upper band(Upper 996T), L=Lower side, U=Upper side

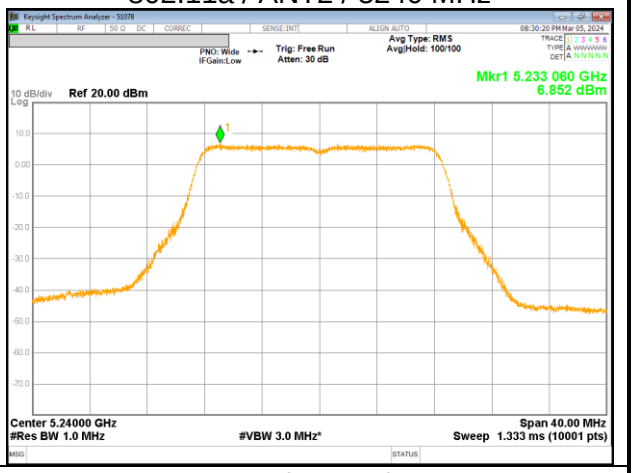
UL KOREA LTD. Suwon Laboratory FORM ID: FCC_15E(05)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

10.2.10. OUTPUT POWER AND PPSD PLOTS(WORST CASE)

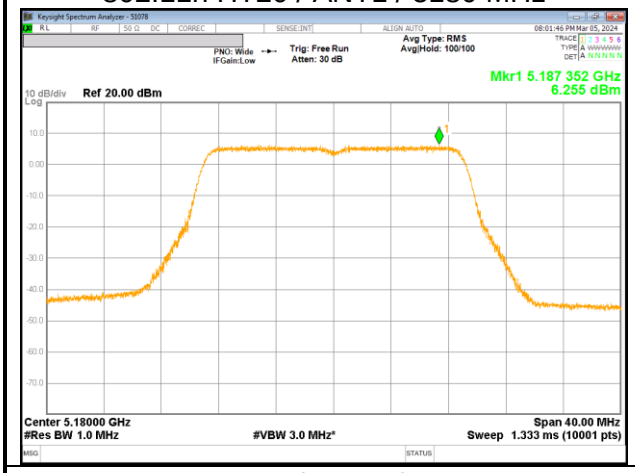
802.11a / ANT1 / 5240 MHz



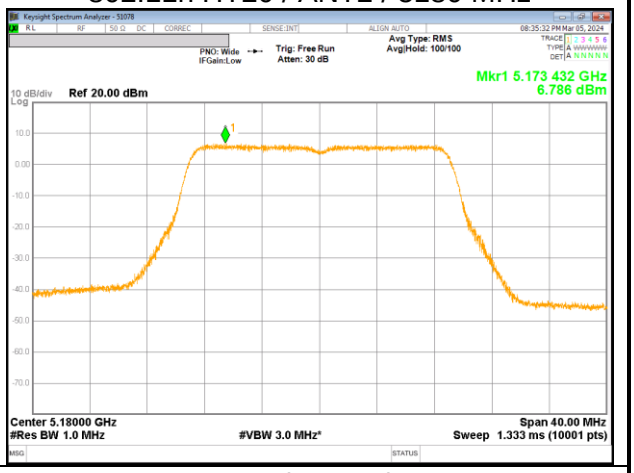
802.11a / ANT2 / 5240 MHz



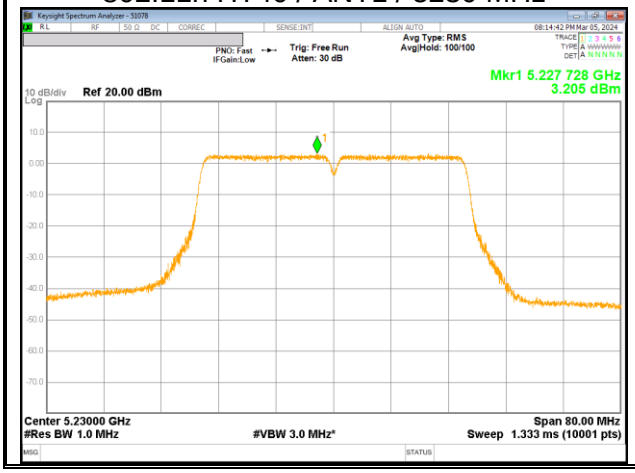
802.11n HT20 / ANT1 / 5180 MHz



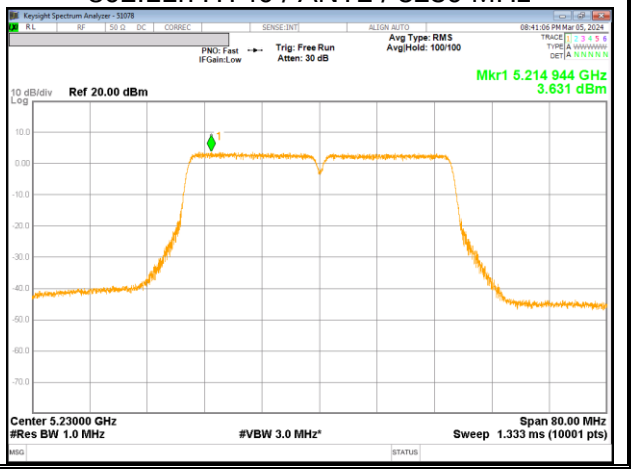
802.11n HT20 / ANT2 / 5180 MHz



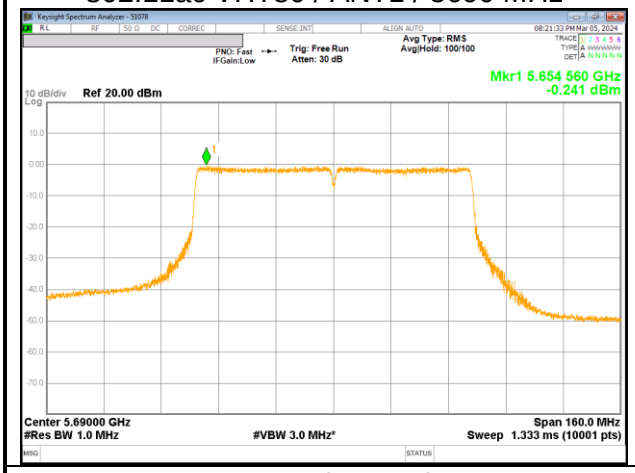
802.11n HT40 / ANT1 / 5230 MHz



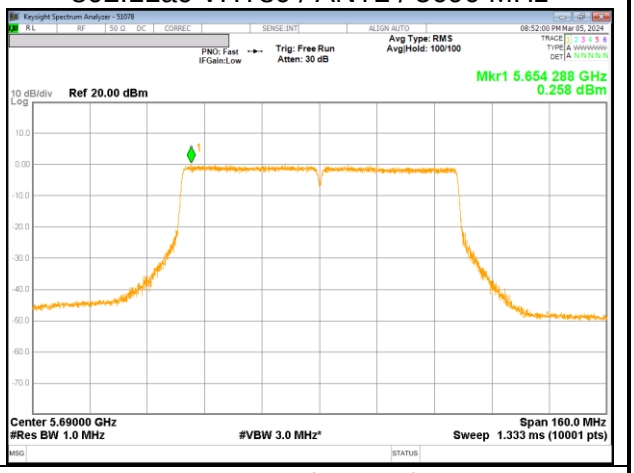
802.11n HT40 / ANT2 / 5230 MHz



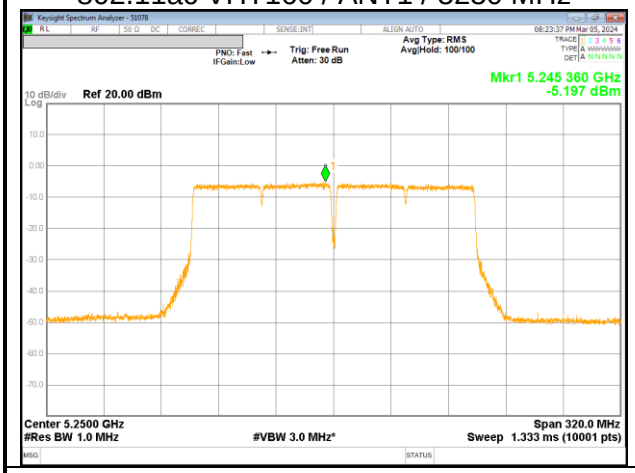
802.11ac VHT80 / ANT1 / 5690 MHz



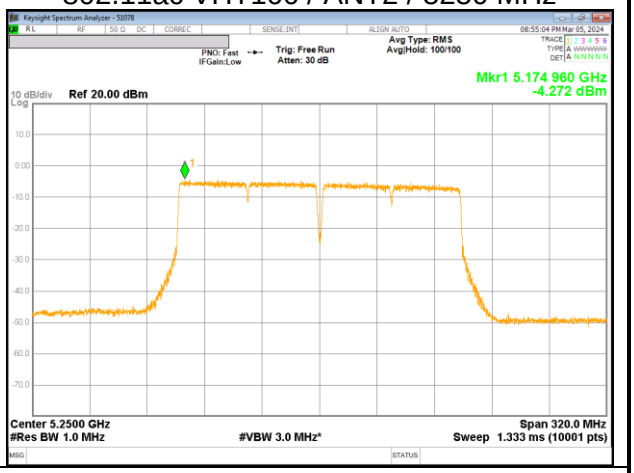
802.11ac VHT80 / ANT2 / 5690 MHz



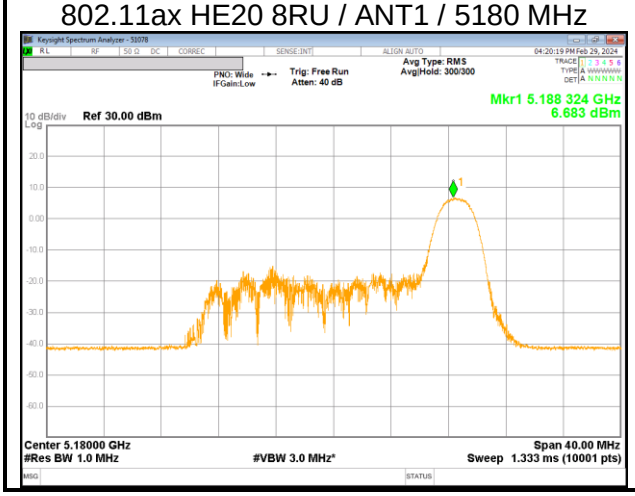
802.11ac VHT160 / ANT1 / 5250 MHz



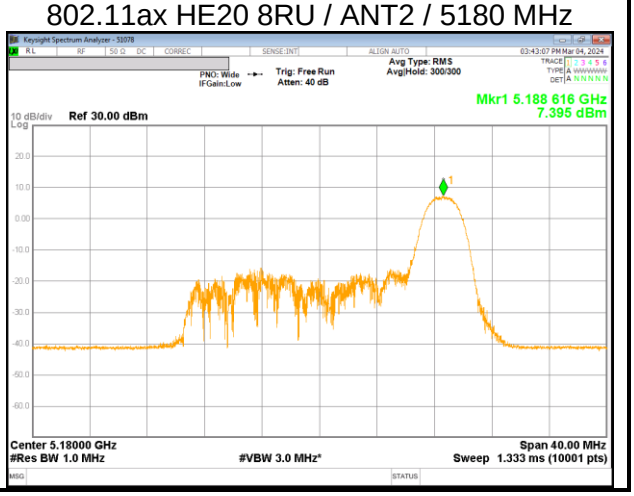
802.11ac VHT160 / ANT2 / 5250 MHz



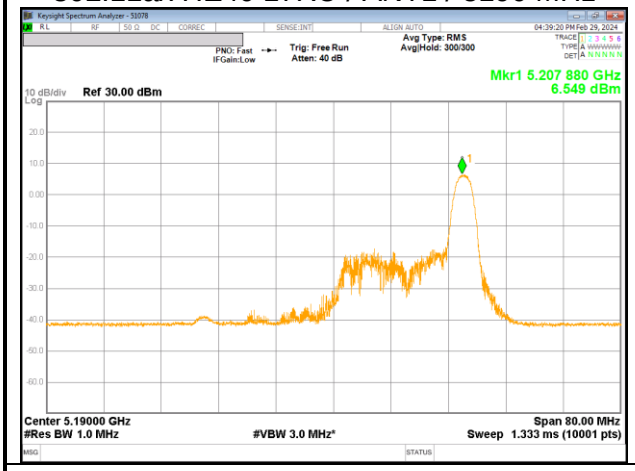
802.11ax HE20 8RU / ANT1 / 5180 MHz



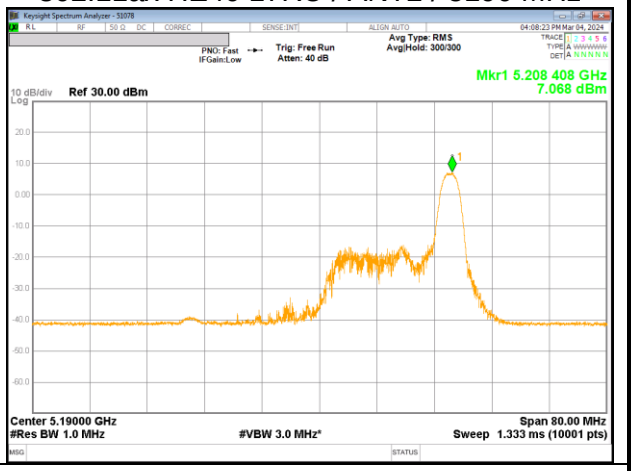
802.11ax HE20 8RU / ANT2 / 5180 MHz



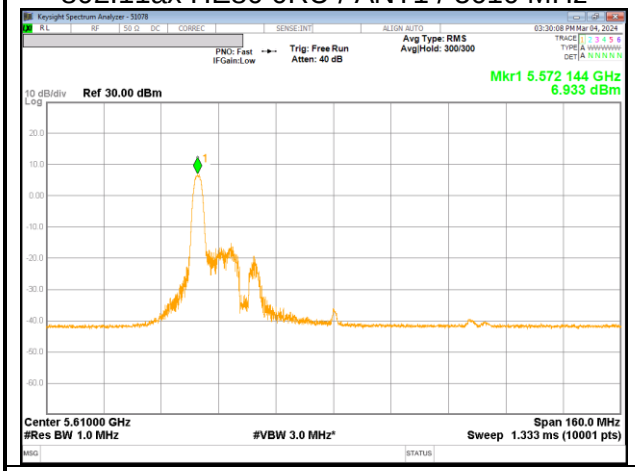
802.11ax HE40 17RU / ANT1 / 5190 MHz



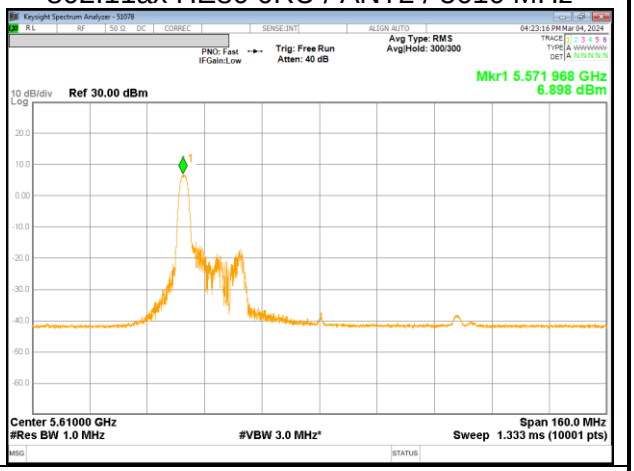
802.11ax HE40 17RU / ANT2 / 5190 MHz



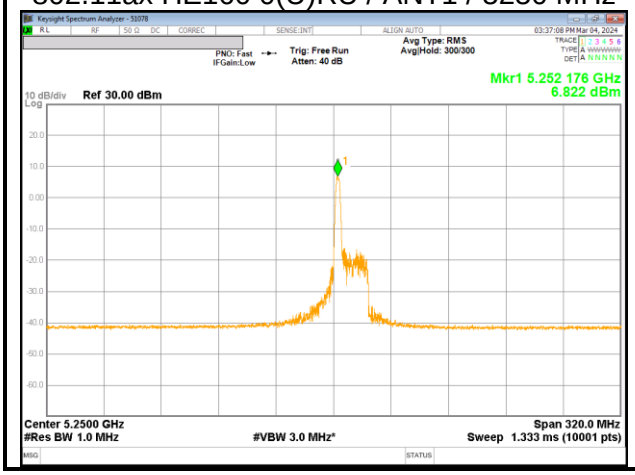
802.11ax HE80 0RU / ANT1 / 5610 MHz



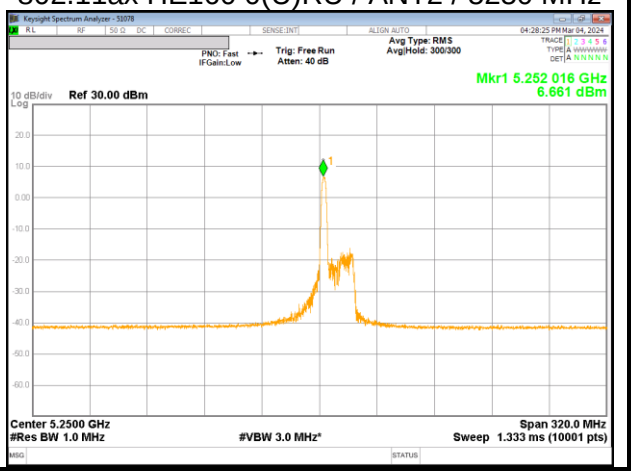
802.11ax HE80 0RU / ANT2 / 5610 MHz



802.11ax HE160 0(U)RU / ANT1 / 5250 MHz



802.11ax HE160 0(U)RU / ANT2 / 5250 MHz



11. TRANSMITTER ABOVE 1 GHz

LIMITS

FCC §15.205 and §15.209

Limits for radiated disturbance of an intentional radiator		
Frequency range (MHz)	Limits (μV/m)	Measurement Distance (m)
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

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g. §§ 15.231 and 15.241.

FCC Part 15.205 (a) : Only spurious emissions are permitted in any of the frequency bands listed below :

MHz	MHz	MHz	MHz	GHz	GHz
0.009 ~ 0.110	8.41425 ~ 8.41475	108 ~ 121.94	1300 ~ 1427	4.5 ~ 5.15	14.47 ~ 14.5
0.495 ~ 0.505	12.29 ~ 12.293	123 ~ 138	1435 ~ 1626.5	5.35 ~ 5.46	15.35 ~ 16.2
2.1735 ~ 2.1905	12.51975 ~ 12.52025	149.9 ~ 150.05	1645.5 ~ 1646.5	7.25 ~ 7.75	17.7 ~ 21.4
4.125 ~ 4.128	12.57675 ~ 12.57725	156.52475 ~ 156.52525	1660 ~ 1710	8.025 ~ 8.5	22.01 ~ 23.12
4.17725 ~ 4.17775	13.36 ~ 13.41	156.7 ~ 156.9	1718.8 ~ 1722.2	9.0 ~ 9.2	23.6 ~ 24.0
4.20725 ~ 4.20775	16.42 ~ 16.423	162.0125 ~ 167.17	2200 ~ 2300	9.3 ~ 9.5	31.2 ~ 31.8
6.215 ~ 6.218	16.69475 ~ 16.69525	167.72 ~ 173.2	2310 ~ 2390	10.6 ~ 12.7	36.43 ~ 36.5
6.26775 ~ 6.26825	16.80425 ~ 16.80475	240 ~ 285	2483.5 ~ 2500	13.25 ~ 13.4	Above 38.6
6.31175 ~ 6.31225	25.5 ~ 25.67	322 ~ 335.4	2655 ~ 2900		
8.291 ~ 8.294	37.5 ~ 38.25	399.90 ~ 410	3260 ~ 3267		
8.362 ~ 8.366	73 ~ 74.6	608 ~ 614	3332 ~ 3339		
8.37625 ~ 8.38675	74.8 ~ 75.2	960 ~ 1240	3345.8 ~ 3358		
			3600 ~ 4400		

▪ FCC Part 15.205(b) : The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in §15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in §15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in §15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in §15.35 apply to these measurements.

FCC §15.407 (b)

(b) Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
(2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
(3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
(4) For transmitters operating solely in the 5.725–5.850 GHz band:
(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.
(5)For transmitters operating solely in the 5.850-5.895 GHz band or operating on a channel that spans across 5.725-5.895 GHz:
(ii) For a client device, all emissions at or above 5.895 GHz shall not exceed an e.i.r.p. of −5 dBm/MHz and shall decrease linearly to an e.i.r.p. of −27 dBm/MHz at or above 5.925 GHz.
(iii) For a client device or indoor access point or subordinate device, all emissions below 5.725 GHz shall not exceed an e.i.r.p. of −27 dBm/MHz at 5.65 GHz increasing linearly to 10 dBm/MHz at 5.7 GHz, and from 5.7 GHz increasing linearly to a level of 15.6 dBm/MHz at 5.72 GHz, and from 5.72 GHz increasing linearly to a level of 27 dBm/MHz at 5.725 GHz.
(6) The emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary,
provided the measured energy is integrated to show the total power over 1 MHz.
(7) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209. Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in §15.207.
(8) The provisions of §15.205 apply to intentional radiators operating under this section.
(9) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the upper and lower frequency band edges as the design of the equipment permits.

Note

- Limit translation to field strength level (FCC §15.407)

E[dBuV/m] = EIRP[dBm] + 95.2 = -27dBm + 95.2 = 68.2dBuV/m

E[dBuV/m] = EIRP[dBm] + 95.2 = -17dBm + 95.2 = 78.2dBuV/m

UL KOREA LTD. Suwon Laboratory FORM ID: FCC_15E(05)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane for below 1GHz and 100 cm for above 1GHz. EUT is set 3 meters away from the receiving antenna and scan from 1m to 4m to find out the highest emission.
The EUT is configured in accordance with ANSI C63.10. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

Reference to KDB 789033 D02 v02r01 UNII part G) 6) c) Method AD:
For measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz for peak measurements and add duty cycle factor to the reading offset for average measurements.In UNII-4, unwanted emissions outside of restricted bands are measured with an RMS detector.

Pre-scans to detect harmonic and spurious emissions, the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 30 kHz for peak measurements.

The spectrum from 1GHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.
(From 30MHz to 1GHz, test was performed with the EUT set to transmit at the channel with highest output power)

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

Note : Emission was pre-scanned from 9kHz to 30MHz; No emissions were detected which was at least 20dB below the specification limit (consider distance correction factor).
Per FCC part 15.31(o), test results were not reported.

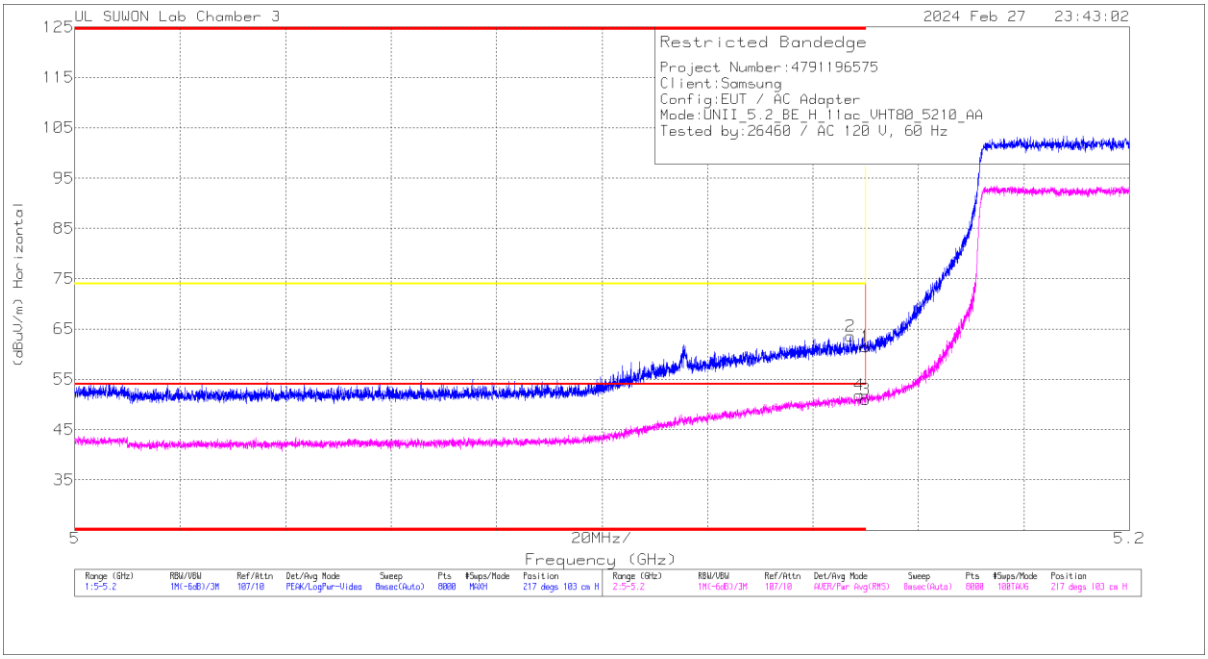
Although these tests were performed other than open field test site, adequate comparison measurements were confirmed against 30 m open are test site.
Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the one of tests made in an open field based on KDB 414788.

UL KOREA LTD. Suwon Laboratory FORM ID: FCC_15E(05)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

11.1. TX ABOVE 1GHz 2Tx MODE IN THE 5.2GHz BAND

BANDEDGE (WORST CASE: 802.11ac VHT80 / 5210 MHz)

HORIZONTAL PEAK AND AVERAGE DATA



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	Antenna_957_Factor(dB)	10dB_Path Loss(dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 5.14999	47.68	Pk	34.4	-20.6	0	61.48	-	-	74	-12.52	217	103	H
2	* 5.14707	50	Pk	34.4	-20.8	0	63.6	-	-	74	-10.4	217	103	H
3	* 5.14999	36.93	RMS	34.4	-20.6	.25	50.98	54	-3.02	-	-	217	103	H
4	* 5.14872	37.89	RMS	34.4	-20.7	.25	51.84	54	-2.16	-	-	217	103	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
RMS - RMS detection

BANDEDGE TEST DATA

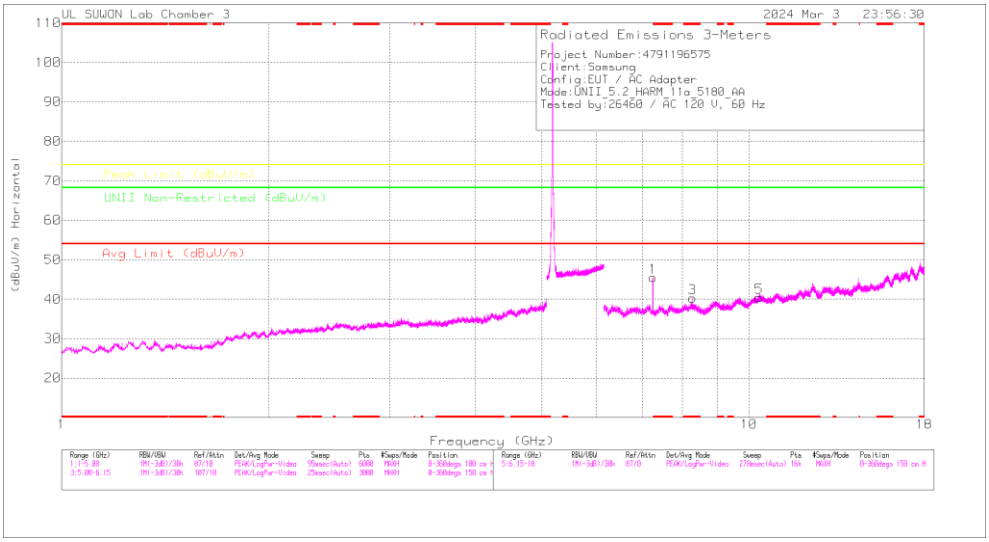
Mode	Freq. [MHz]	Antenna	Frequency [GHz]	Reading [dBuV]	Detector Mode	ANT Factor [dB/m]	Loss [dB]	DC Corr [dB]	Result [dBuV/m]	AV Limit [dBuV/m]	AV Margin [dB]	PK Limit [dBuV/m]	PK Margin [dB]	Azimuth [Degs]	Height [cm]	Polarity
802.11a	5180	MIMO	* 5.14999	48.39	Pk	34.40	-20.60	0.00	62.19	-	-	74.00	-11.81	216	100	H
			* 5.14902	52.09	Pk	34.40	-20.70	0.00	65.79	-	-	74.00	-8.21	216	100	H
			* 5.14999	36.78	RMS	34.40	-20.60	0.15	50.73	54.00	-3.27	-	-	216	100	H
			* 5.14942	37.28	RMS	34.40	-20.70	0.15	51.13	54.00	-2.87	-	-	216	100	H
			* 5.14999	43.38	Pk	34.40	-20.60	0.00	57.18	-	-	74.00	-16.82	156	195	V
			* 5.14902	45.56	Pk	34.40	-20.70	0.00	59.26	-	-	74.00	-14.74	156	195	V
			* 5.14999	32.40	RMS	34.40	-20.60	0.15	46.35	54.00	-7.65	-	-	156	195	V
			* 5.14987	33.21	RMS	34.40	-20.60	0.15	47.16	54.00	-6.84	-	-	156	195	V
802.11n (HT20)	5180	MIMO	* 5.14999	47.43	Pk	34.40	-20.60	0.00	61.23	-	-	74.00	-12.77	308	100	H
			* 5.14892	48.74	Pk	34.40	-20.70	0.00	62.44	-	-	74.00	-11.56	308	100	H
			* 5.14999	36.07	RMS	34.40	-20.60	0.00	49.87	54.00	-4.13	-	-	308	100	H
			* 5.14957	37.00	RMS	34.40	-20.70	0.00	50.70	54.00	-3.30	-	-	308	100	H
			* 5.14999	42.10	Pk	34.40	-20.60	0.00	55.90	-	-	74.00	-18.10	131	100	V
			* 5.14904	44.21	Pk	34.40	-20.70	0.00	57.91	-	-	74.00	-16.09	131	100	V
			* 5.14999	31.98	RMS	34.40	-20.60	0.00	45.78	54.00	-8.22	-	-	131	100	V
			* 5.14957	32.31	RMS	34.40	-20.70	0.00	46.01	54.00	-7.99	-	-	131	100	V
802.11n (HT40)	5190	MIMO	* 5.14999	46.79	Pk	34.40	-20.60	0.00	60.59	-	-	74.00	-13.41	215	100	H
			* 5.14707	49.86	Pk	34.40	-20.80	0.00	63.46	-	-	74.00	-10.54	215	100	H
			* 5.14999	34.95	RMS	34.40	-20.60	0.00	48.75	54.00	-5.25	-	-	215	100	H
			* 5.14992	36.32	RMS	34.40	-20.60	0.00	50.12	54.00	-3.88	-	-	215	100	H
			* 5.14999	46.49	Pk	34.40	-20.60	0.00	60.29	-	-	74.00	-13.71	173	345	V
			* 5.14804	47.39	Pk	34.40	-20.80	0.00	60.99	-	-	74.00	-13.01	173	345	V
			* 5.14999	33.40	RMS	34.40	-20.60	0.00	47.20	54.00	-6.80	-	-	173	345	V
			* 5.14954	34.12	RMS	34.40	-20.70	0.00	47.82	54.00	-6.18	-	-	173	345	V
802.11ac (VHT80)	5210	MIMO	* 5.14999	47.68	Pk	34.40	-20.60	0.00	61.48	-	-	74.00	-12.52	217	103	H
			* 5.14707	50.00	Pk	34.40	-20.80	0.00	63.60	-	-	74.00	-10.40	217	103	H
			* 5.14999	36.93	RMS	34.40	-20.60	0.25	50.98	54.00	-3.02	-	-	217	103	H
			* 5.14872	37.89	RMS	34.40	-20.70	0.25	51.84	54.00	**-2.16**	-	-	217	103	H
			* 5.14999	45.91	Pk	34.40	-20.60	0.00	59.71	-	-	74.00	-14.29	173	342	V
			* 5.14667	47.62	Pk	34.40	-20.80	0.00	61.22	-	-	74.00	-12.78	173	342	V
			* 5.14999	34.17	RMS	34.40	-20.60	0.25	48.22	54.00	-5.78	-	-	173	342	V
			* 5.14957	36.34	RMS	34.40	-20.70	0.25	50.29	54.00	-3.71	-	-	173	342	V
802.11ac (VHT160)	5250 Lower	MIMO	* 5.14999	47.31	Pk	34.40	-20.60	0.00	61.11	-	-	74.00	-12.89	217	103	H
			* 5.14989	54.21	Pk	34.40	-20.60	0.00	68.01	-	-	74.00	**-5.99**	217	103	H
			* 5.14999	36.16	RMS	34.40	-20.60	0.24	50.20	54.00	-3.80	-	-	217	103	H
			* 5.14229	37.55	RMS	34.40	-20.80	0.24	51.39	54.00	-2.61	-	-	217	103	H
			* 5.14999	39.31	Pk	34.40	-20.60	0.00	53.11	-	-	74.00	-20.89	137	100	V
			* 5.14847	44.05	Pk	34.40	-20.80	0.00	57.65	-	-	74.00	-16.35	137	100	V
			* 5.14999	29.80	RMS	34.40	-20.60	0.24	43.84	54.00	-10.16	-	-	137	100	V
			* 5.14619	30.96	RMS	34.40	-20.80	0.24	44.80	54.00	-9.20	-	-	137	100	V
802.11ax (HE20)	5180	MIMO	* 5.14999	49.10	Pk	34.40	-20.60	0.00	62.90	-	-	74.00	-11.10	219	100	H
			* 5.14977	50.83	Pk	34.40	-20.60	0.00	64.63	-	-	74.00	-9.37	219	100	H
			* 5.14999	36.77	RMS	34.40	-20.60	0.00	50.57	54.00	-3.43	-	-	219	100	H
			* 5.14979	36.94	RMS	34.40	-20.60	0.00	50.74	54.00	-3.26	-	-	219	100	H
			* 5.14999	44.95	Pk	34.40	-20.60	0.00	58.75	-	-	74.00	-15.25	175	342	V
			* 5.14882	47.66	Pk	34.40	-20.70	0.00	61.36	-	-	74.00	-12.64	175	342	V
			* 5.14999	33.09	RMS	34.40	-20.60	0.00	46.89	54.00	-7.11	-	-	175	342	V
			* 5.14952	34.10	RMS	34.40	-20.70	0.00	47.80	54.00	-6.20	-	-	175	342	V
802.11ax (HE40)	5190	MIMO	* 5.14999	47.73	Pk	34.40	-20.60	0.00	61.53	-	-	74.00	-12.47	220	100	H
			* 5.14817	49.11	Pk	34.40	-20.80	0.00	62.71	-	-	74.00	-11.29	220	100	H
			* 5.14999	35.97	RMS	34.40	-20.60	0.00	49.77	54.00	-4.23	-	-	220	100	H
			* 5.14984	37.27	RMS	34.40	-20.60	0.00	51.07	54.00	-2.93	-	-	220	100	H
			* 5.14999	45.65	Pk	34.40	-20.60	0.00	59.45	-	-	74.00	-14.55	173	367	V
			* 5.14432	47.48	Pk	34.40	-20.80	0.00	61.08	-	-	74.00	-12.92	173	367	V
			* 5.14999	34.64	RMS	34.40	-20.60	0.00	48.44	54.00	-5.56	-	-	173	367	V
			* 5.14984	35.59	RMS	34.40	-20.60	0.00	49.39	54.00	-4.61	-	-	173	367	V
802.11ax (HE80)	5210	MIMO	* 5.14999	46.93	Pk	34.40	-20.60	0.00	60.73	-	-	74.00	-13.27	217	100	H
			* 5.14654	50.68	Pk	34.40	-20.80	0.00	64.28	-	-	74.00	-9.72	217	100	H
			* 5.14999	37.34	RMS	34.40	-20.60	0.00	51.14	54.00	-2.86	-	-	217	100	H
			* 5.14982	38.04	RMS	34.40	-20.60	0.00	51.84	54.00	**-2.16**	-	-	217	100	H
			* 5.14999	46.71	Pk	34.40	-20.60	0.00	60.51	-	-	74.00	-13.49	175	366	V
			* 5.14922	48.15	Pk	34.40	-20.70	0.00	61.85	-	-	74.00	-12.15	175	366	V
			* 5.14999	34.88	RMS	34.40	-20.60	0.00	48.68	54.00	-5.32	-	-	175	366	V
			* 5.14957	36.31	RMS	34.40	-20.70	0.00	50.01	54.00	-3.99	-	-	175	366	V
802.11ax (HE160)	5250 Lower	MIMO	* 5.14999	46.65	Pk	34.40	-20.60	0.00	60.45	-	-	74.00	-13.55	217	100	H
			* 5.11536	50.49	Pk	34.30	-20.80	0.00	63.99	-	-	74.00	-10.01	217	100	H
			* 5.14999	36.08	RMS	34.40	-20.60	0.00	49.88	54.00	-4.12	-	-	217	100	H
			* 5.14924	37.51	RMS	34.40	-20.70	0.00	51.21	54.00	-2.79	-	-	217	100	H
			* 5.14999	45.02	Pk	34.40	-20.60	0.00	58.82	-	-	74.00	-15.18	174	365	V
			* 5.14474	47.02	Pk	34.40	-20.80	0.00	60.62	-	-	74.00	-13.38	174	365	V
			* 5.14999	35.09	RMS	34.40	-20.60	0.00	48.89	54.00	-5.11	-	-	174	365	V
			* 5.14959	35.45	RMS	34.40	-20.70	0.00	49.15	54.00	-4.85	-	-	174	365	V

Note1. Pk - Peak detector, RMS - RMS detectior
Note2. * - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

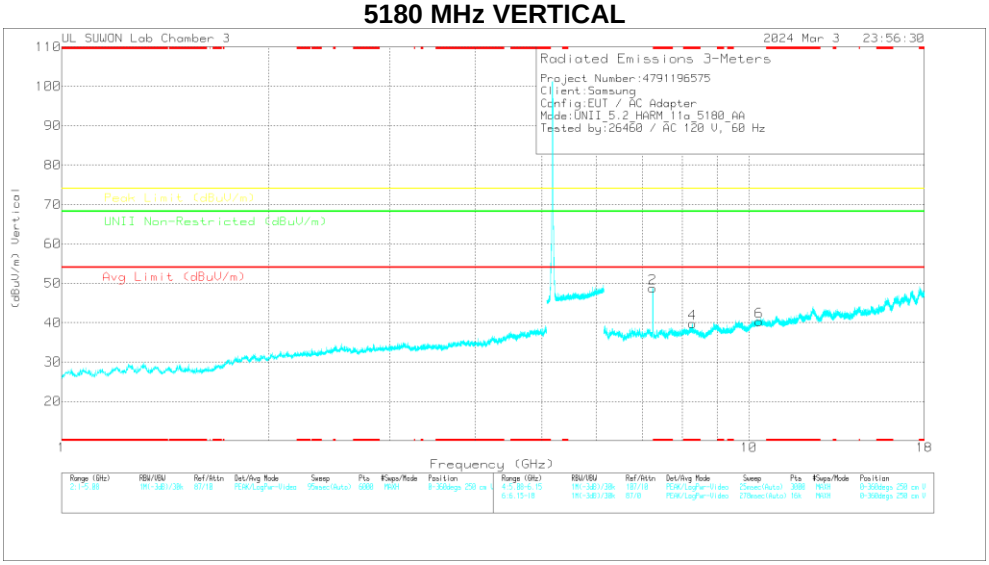
UL KOREA LTD. Suwon Laboratory FORM ID: FCC_15E(05)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

HARMONICS AND SPURIOUS EMISSIONS(WORST CASE: 802.11a / 5200 MHz)

5180 MHz HORIZONTAL



5180 MHz VERTICAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

5180 MHz DATA

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	Antenna_957_Factor(dB)	6GHz_HP_Path Loss(dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	UNII Non-Restricted (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 7.25737	46.02	PK-U	35.8	-25.6	0	56.22	-	-	74	-17.78	-	-	199	100	H
* 7.25689	35.23	ADR	35.8	-25.6	.15	45.58	54	-8.42	-	-	-	-	199	100	H
* 7.25829	47.78	PK-U	35.8	-25.6	0	57.98	-	-	74	-16.02	-	-	90	272	V
* 7.25856	37.7	ADR	35.8	-25.6	.15	48.05	54	-5.95	-	-	-	-	90	272	V
* 8.28781	37.6	PK-U	36	-23.8	0	49.8	-	-	74	-24.2	-	-	199	101	H
* 8.2879	27.93	ADR	36	-23.8	.15	40.28	54	-13.72	-	-	-	-	199	101	H
* 8.28807	36.7	PK-U	36	-23.8	0	48.9	-	-	74	-25.1	-	-	172	254	V
* 8.28812	26.43	ADR	36	-23.8	.15	38.78	54	-15.22	-	-	-	-	172	254	V
10.35948	33.62	PK-U	37.5	-21	0	50.12	-	-	-	-	68.2	-18.08	0	100	H
10.35554	34.39	PK-U	37.5	-21.1	0	50.79	-	-	-	-	68.2	-17.41	0	100	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK-U - U-NII: Maximum Peak
ADR - U-NII AD primary method, RMS average

HARMONICS AND SPURIOUS EMISSIONS TEST DATA

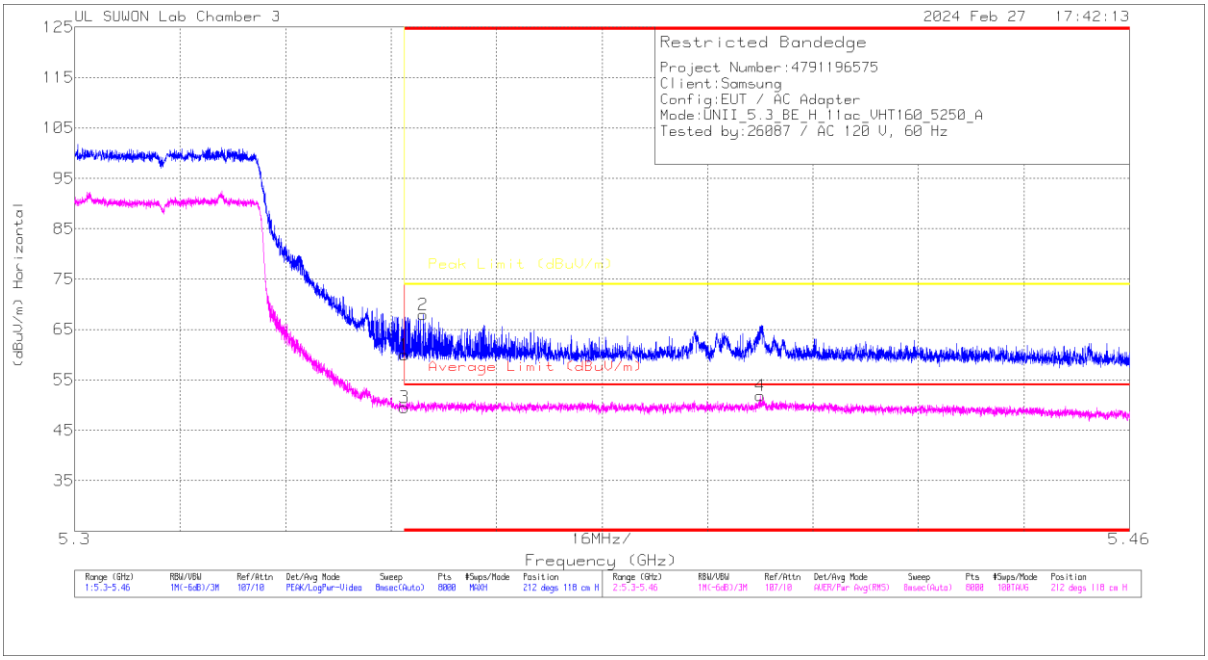
Mode	Freq. [MHz]	Antenna	Frequency [GHz]	Reading [dBuV]	Detector Mode	ANT Factor [dB/m]	Loss [dB]	DC Corr [dB]	Result [dBuV/m]	AV Limit [dBuV/m]	AV Margin [dB]	PK Limit [dBuV/m]	PK Margin [dB]	Non-Restricted [dBuV/m]	Margin [dB]	Azimuth [Degs]	Height [cm]	Polarity
802.11a	5180	MIMO	* 7.25737	46.02	PK-U	35.80	-25.60	0.00	56.22	-	-	74.00	-17.78	-	-	199	100	H
			* 7.25689	35.23	ADR	35.80	-25.60	0.15	45.58	54.00	-8.42	-	-	-	-	199	100	H
			* 7.25829	47.78	PK-U	35.80	-25.60	0.00	57.98	-	-	74.00	-16.02	-	-	90	272	V
			* 7.25856	37.70	ADR	35.80	-25.60	0.15	48.05	54.00	**-5.95**	-	-	-	-	90	272	V
			* 8.28781	37.60	PK-U	36.00	-23.80	0.00	49.80	-	-	74.00	-24.20	-	-	199	101	H
			* 8.2879	27.93	ADR	36.00	-23.80	0.15	40.28	54.00	-13.72	-	-	-	-	199	101	H
			* 8.28807	36.70	PK-U	36.00	-23.80	0.00	48.90	-	-	74.00	-25.10	-	-	172	254	V
			* 8.28812	26.43	ADR	36.00	-23.80	0.15	38.78	54.00	-15.22	-	-	-	-	172	254	V
			10.359	33.62	PK-U	37.50	-21.00	0.00	50.12	-	-	-	-	68.20	-18.08	0	100	H
			10.356	34.39	PK-U	37.50	-21.10	0.00	50.79	-	-	-	-	68.20	-17.41	0	100	V
	5200	MIMO	* 7.28522	47.12	PK-U	35.80	-25.60	0.00	57.32	-	-	74.00	-16.68	-	-	202	108	H
			* 7.28467	36.74	ADR	35.80	-25.60	0.15	47.09	54.00	-6.91	-	-	-	-	202	108	H
			* 7.28417	45.42	PK-U	35.80	-25.60	0.00	55.62	-	-	74.00	-18.38	-	-	172	100	V
			* 7.28471	35.24	ADR	35.80	-25.60	0.15	45.59	54.00	-8.41	-	-	-	-	172	100	V
			* 8.32028	36.62	PK-U	36.00	-23.80	0.00	48.82	-	-	74.00	-25.18	-	-	212	104	H
			* 8.32011	26.97	ADR	36.00	-23.80	0.15	39.32	54.00	-14.68	-	-	-	-	212	104	H
			* 8.32023	36.37	PK-U	36.00	-23.80	0.00	48.57	-	-	74.00	-25.43	-	-	161	101	V
			* 8.31999	26.03	ADR	36.00	-23.80	0.15	38.38	54.00	-15.62	-	-	-	-	161	101	V
			10.398	34.02	PK-U	37.50	-20.80	0.00	50.72	-	-	-	-	68.20	-17.48	0	100	H
			10.399	34.11	PK-U	37.50	-20.80	0.00	50.81	-	-	-	-	68.20	**-17.39**	0	100	V
	5240	MIMO	* 7.34032	46.61	PK-U	35.80	-25.40	0.00	57.01	-	-	74.00	-16.99	-	-	200	103	H
			* 7.34052	36.20	ADR	35.80	-25.40	0.15	46.75	54.00	-7.25	-	-	-	-	200	103	H
			* 7.33053	44.77	PK-U	35.80	-25.40	0.00	55.17	-	-	74.00	-18.83	-	-	168	100	V
			* 7.34	34.53	ADR	35.80	-25.40	0.15	45.08	54.00	-8.92	-	-	-	-	168	100	V
			* 8.38374	37.45	PK-U	36.00	-23.70	0.00	49.75	-	-	74.00	-24.25	-	-	211	105	H
			* 8.38382	26.87	ADR	36.00	-23.70	0.15	39.32	54.00	-14.68	-	-	-	-	211	105	H
			* 8.38343	35.94	PK-U	36.00	-23.70	0.00	48.24	-	-	74.00	-25.76	-	-	328	101	V
			* 8.38403	25.86	ADR	36.00	-23.70	0.15	38.31	54.00	-15.69	-	-	-	-	328	101	V
			10.478	34.04	PK-U	37.60	-21.10	0.00	50.54	-	-	-	-	68.20	-17.66	0	100	H
			10.478	33.91	PK-U	37.60	-21.10	0.00	50.41	-	-	-	-	68.20	-17.79	0	100	V
802.11n HT20 Spot-check	5180	MIMO	* 7.25415	45.88	PK-U	35.80	-25.60	0.00	56.08	-	-	74.00	-17.92	-	-	207	171	H
			* 7.25075	34.81	ADR	35.80	-25.70	0.00	44.91	54.00	-9.09	-	-	-	-	207	171	H
			* 7.25611	47.83	PK-U	35.80	-25.60	0.00	58.03	-	-	74.00	**-15.97**	-	-	88	251	V
			* 7.25681	36.84	ADR	35.80	-25.60	0.00	47.04	54.00	-6.96	-	-	-	-	88	251	V
			* 8.2876	37.64	PK-U	36.00	-23.80	0.00	49.84	-	-	74.00	-24.16	-	-	207	126	H
			* 8.28793	28.64	ADR	36.00	-23.80	0.00	40.84	54.00	-13.16	-	-	-	-	207	126	H
			* 8.28795	36.63	PK-U	36.00	-23.80	0.00	48.83	-	-	74.00	-25.17	-	-	174	265	V
			* 8.28795	26.79	ADR	36.00	-23.80	0.00	38.99	54.00	-15.01	-	-	-	-	174	265	V
			10.359	34.08	PK-U	37.50	-21.00	0.00	50.58	-	-	-	-	68.20	-17.62	0	100	H
			10.364	33.76	PK-U	37.50	-21.00	0.00	50.26	-	-	-	-	68.20	-17.94	0	100	V
802.11n HT40 Spot-check	5190	MIMO	* 7.28317	41.40	PK-U	35.80	-25.60	0.00	51.60	-	-	74.00	-22.40	-	-	207	113	H
			* 7.28347	31.23	ADR	35.80	-25.60	0.00	41.43	54.00	-12.57	-	-	-	-	207	113	H
			* 7.25034	42.14	PK-U	35.80	-25.70	0.00	52.24	-	-	74.00	-21.76	-	-	86	224	V
			* 7.25036	32.18	ADR	35.80	-25.70	0.00	42.28	54.00	-11.72	-	-	-	-	86	224	V
			* 8.30373	36.67	PK-U	36.00	-23.80	0.00	48.87	-	-	74.00	-25.13	-	-	211	111	H
			* 8.30385	26.82	ADR	36.00	-23.80	0.00	39.02	54.00	-14.98	-	-	-	-	211	111	H
			* 8.30405	36.92	PK-U	36.00	-23.80	0.00	49.12	-	-	74.00	-24.88	-	-	162	100	V
			* 8.30403	26.52	ADR	36.00	-23.80	0.00	38.72	54.00	-15.28	-	-	-	-	162	100	V
			10.379	33.48	PK-U	37.50	-20.80	0.00	50.18	-	-	-	-	68.20	-18.02	0	100	H
			10.382	33.94	PK-U	37.50	-20.70	0.00	50.74	-	-	-	-	68.20	-17.46	0	100	V
802.11ac VHT80 Spot-check	5210	MIMO	* 7.31116	39.20	PK-U	35.80	-25.60	0.00	49.40	-	-	74.00	-24.60	-	-	207	120	H
			* 7.26171	28.46	ADR	35.80	-25.60	0.25	38.91	54.00	-15.09	-	-	-	-	207	120	H
			* 7.29984	38.39	PK-U	35.80	-25.60	0.00	48.59	-	-	74.00	-25.41	-	-	168	104	V
			* 7.29235	27.16	ADR	35.80	-25.60	0.25	37.61	54.00	-16.39	-	-	-	-	168	104	V
			* 8.33548	37.35	PK-U	36.00	-23.70	0.00	49.65	-	-	74.00	-24.35	-	-	208	155	H
			* 8.33605	28.37	ADR	36.00	-23.70	0.25	40.92	54.00	-13.08	-	-	-	-	208	155	H
			* 8.33575	36.84	PK-U	36.00	-23.70	0.00	49.14	-	-	74.00	-24.86	-	-	158	101	V
			* 8.33583	27.55	ADR	36.00	-23.70	0.25	40.10	54.00	-13.90	-	-	-	-	158	101	V
			10.418	33.54	PK-U	37.50	-21.00	0.00	50.04	-	-	-	-	68.20	-18.16	0	100	H
			10.419	34.09	PK-U	37.50	-21.10	0.00	50.49	-	-	-	-	68.20	-17.71	0	100	V
802.11ac VHT160 Spot-check	5250	MIMO	6.300	40.69	PK-U	36.00	-27.20	0.00	49.49	-	-	-	-	68.20	-18.71	309	117	H
			6.300	39.53	PK-U	36.00	-27.30	0.00	48.23	-	-	-	-	68.20	-19.97	260	398	V
			* 7.29463	38.26	PK-U	35.80	-25.60	0.00	48.46	-	-	74.00	-25.54	-	-	209	113	H
			* 7.422	26.76	ADR	35.70	-24.90	0.24	37.80	54.00	-16.20	-	-	-	-	209	113	H
			* 7.36811	39.39	PK-U	35.80	-25.30	0.00	49.89	-	-	74.00	-24.11	-	-	71	266	V
			* 7.30068	27.85	ADR	35.80	-25.60	0.24	38.29	54.00	-15.71	-	-	-	-	71	266	V
			* 8.39999	36.78	PK-U	36.00	-23.70	0.00	49.08	-	-	74.00	-24.92	-	-	207	155	H
			* 8.40014	28.10	ADR	36.00	-23.70	0.24	40.64	54.00	-13.36	-	-	-	-	207	155	H
			* 8.39957	36.34	PK-U	36.00	-23.70	0.00	48.64	-	-	74.00	-25.36	-	-	158	103	V
			* 8.4	26.50	ADR	36.00	-23.70	0.24	39.04	54.00	-14.96	-	-	-	-	158	103	V
			10.499	33.52	PK-U	37.60	-21.20	0.00	49.92	-	-	-	-	68.20	-18.28	0	100	H
			10.496	33.77	PK-U	37.60	-21.10	0.00	50.27	-	-	-	-	68.20	-17.93	0	100	V
802.11ax HE20 RU mode 26 Tone offset 0 Spot-check	5180	MIMO	* 7.26038	42.95	PK-U	35.80	-25.60	0.00	53.15	-	-	74.00	-20.85	-	-	207	120	H
			* 7.26015	33.33	ADR	35.80	-25.60	0.00	43.53	54.00	-10.47	-	-	-	-	207	120	H
			* 7.26073	42.02	PK-U	35.80	-25.60	0.00	52.22	-	-	74.00	-21.78	-	-	171	101	V
			* 7.26037	31.96	ADR	35.80	-25.60	0.00	42.16	54.00	-11.84	-	-	-	-	171	101	V
			* 8.28799	38.16	PK-U	36.00	-23.80	0.00	50.36	-	-	74.00	-23.64	-	-	205	166	H
			* 8.28795	31.01	ADR	36.00	-23.80	0.00	43.21	54.00	-10.79	-	-	-	-	205	166	H
			* 8.28782	37.16	PK-U	36.00	-23.80	0.00	49.36	-	-	74.00	-24.64	-	-	159	101	V
			* 8.28791	28.70	ADR	36.00	-23.80	0.00	40.90	54.00	-13.10	-	-	-	-	159	101	V
			10.361	34.05	PK-U	37.50	-21.00	0.00	50.55	-	-	-	-	68.20	-17.65	0	100	H
			10.365	33.89	PK-U	37.50	-20.90	0.00	50.49	-	-	-	-	68.20	-17.71	0	100	V

Note1. PK-U - U-NII: Maximum Peak
Note2. * - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

11.2. TX ABOVE 1GHz 2Tx MODE IN THE 5.3GHz BAND

BANDEDGE (WORST CASE: 802.11ac VHT160 / 5290 MHz Upper)

HORIZONTAL PEAK AND AVERAGE DATA



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	Antenna_957_Factor(dB)	10dB_Path Loss(dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 5.35001	45.67	Pk	34.7	-20.4	0	59.97	-	-	74	-14.03	212	118	H
2	* 5.35285	53.57	Pk	34.7	-20.3	0	67.97	-	-	74	-6.03	212	118	H
3	* 5.35001	35.03	RMS	34.7	-20.4	.24	49.57	54	-4.43	-	-	212	118	H
4	* 5.40402	37.08	RMS	34.8	-20.2	.24	51.92	54	-2.08	-	-	212	118	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
RMS - RMS detection

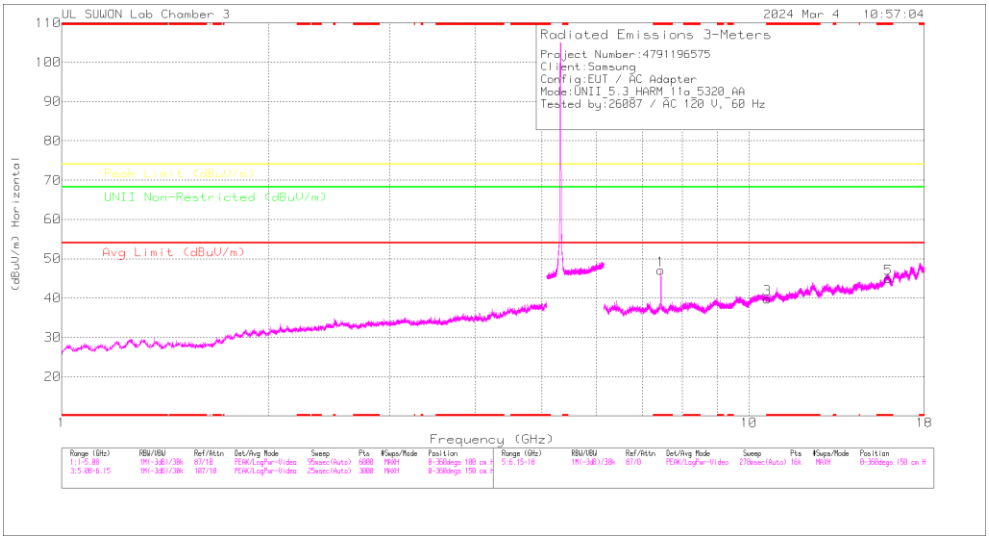
BANDEDGE TEST DATA

Mode	Freq. [MHz]	Antenna	Frequency [GHz]	Reading [dBuV]	Detector Mode	ANT Factor [dB/m]	Loss [dB]	DC Corr [dB]	Result [dBuV/m]	AV Limit [dBuV/m]	AV Margin [dB]	PK Limit [dBuV/m]	PK Margin [dB]	Azimuth [Degs]	Height [cm]	Polarity
802.11a	5320	MIMO	* 5.35001	47.22	Pk	34.70	-20.40	0.00	61.52	-	-	74.00	-12.48	207	100	H
			* 5.35269	50.61	Pk	34.70	-20.30	0.00	65.01	-	-	74.00	-8.99	207	100	H
			* 5.35001	36.26	RMS	34.70	-20.40	0.15	50.71	54.00	-3.29	-	-	207	100	H
			* 5.35115	36.86	RMS	34.70	-20.30	0.15	51.41	54.00	-2.59	-	-	207	100	H
			* 5.35001	37.58	Pk	34.70	-20.40	0.00	51.88	-	-	74.00	-22.12	138	100	V
			* 5.38351	40.46	Pk	34.80	-20.20	0.00	55.06	-	-	74.00	-18.94	138	100	V
			* 5.35001	28.46	RMS	34.70	-20.40	0.15	42.91	54.00	-11.09	-	-	138	100	V
			* 5.35247	29.23	RMS	34.70	-20.30	0.15	43.78	54.00	-10.22	-	-	138	100	V
802.11n (HT20)	5320	MIMO	* 5.35001	48.17	Pk	34.70	-20.40	0.00	62.47	-	-	74.00	-11.53	54	100	H
			* 5.35153	51.35	Pk	34.70	-20.30	0.00	65.75	-	-	74.00	-8.25	54	100	H
			* 5.35001	37.11	RMS	34.70	-20.40	0.00	51.41	54.00	-2.59	-	-	54	100	H
			* 5.35049	37.31	RMS	34.70	-20.40	0.00	51.61	54.00	-2.39	-	-	54	100	H
			* 5.35001	41.47	Pk	34.70	-20.40	0.00	55.77	-	-	74.00	-18.23	124	108	V
			* 5.35591	44.04	Pk	34.70	-20.30	0.00	58.44	-	-	74.00	-15.56	124	108	V
			* 5.35001	29.15	RMS	34.70	-20.40	0.00	43.45	54.00	-10.55	-	-	124	108	V
			* 5.35039	31.58	RMS	34.70	-20.40	0.00	45.88	54.00	-8.12	-	-	124	108	V
802.11n (HT40)	5310	MIMO	* 5.35001	48.25	Pk	34.70	-20.40	0.00	62.55	-	-	74.00	-11.45	212	139	H
			* 5.35099	50.95	Pk	34.70	-20.40	0.00	65.25	-	-	74.00	-8.75	212	139	H
			* 5.35001	37.42	RMS	34.70	-20.40	0.00	51.72	54.00	-2.28	-	-	212	139	H
			* 5.35049	37.26	RMS	34.70	-20.40	0.00	51.56	54.00	-2.44	-	-	212	139	H
			* 5.35001	41.33	Pk	34.70	-20.40	0.00	55.63	-	-	74.00	-18.37	138	100	V
			* 5.35143	42.71	Pk	34.70	-20.30	0.00	57.11	-	-	74.00	-16.89	138	100	V
			* 5.35001	29.59	RMS	34.70	-20.40	0.00	43.89	54.00	-10.11	-	-	138	100	V
			* 5.35205	30.78	RMS	34.70	-20.30	0.00	45.18	54.00	-8.82	-	-	138	100	V
802.11ac (VHT80)	5290	MIMO	* 5.35001	45.89	Pk	34.70	-20.40	0.00	60.19	-	-	74.00	-13.81	213	129	H
			* 5.35941	49.41	Pk	34.70	-20.30	0.00	63.81	-	-	74.00	-10.19	213	129	H
			* 5.35001	35.67	RMS	34.70	-20.40	0.25	50.22	54.00	-3.78	-	-	213	129	H
			* 5.35023	36.76	RMS	34.70	-20.40	0.25	51.31	54.00	-2.69	-	-	213	129	H
			* 5.35001	42.49	Pk	34.70	-20.40	0.00	56.79	-	-	74.00	-17.21	136	108	V
			* 5.35131	44.79	Pk	34.70	-20.30	0.00	59.19	-	-	74.00	-14.81	136	108	V
			* 5.35001	31.23	RMS	34.70	-20.40	0.25	45.78	54.00	-8.22	-	-	136	108	V
			* 5.35205	32.83	RMS	34.70	-20.30	0.25	47.48	54.00	-6.52	-	-	136	108	V
802.11ac (VHT160)	5250 Upper	MIMO	* 5.35001	45.67	Pk	34.70	-20.40	0.00	59.97	-	-	74.00	-14.03	212	118	H
			* 5.35285	53.57	Pk	34.70	-20.30	0.00	67.97	-	-	74.00	**-6.03**	212	118	H
			* 5.35001	35.03	RMS	34.70	-20.40	0.24	49.57	54.00	-4.43	-	-	212	118	H
			* 5.40402	37.08	RMS	34.80	-20.20	0.24	51.92	54.00	**-2.08**	-	-	212	118	H
			* 5.35001	40.19	Pk	34.70	-20.40	0.00	54.49	-	-	74.00	-19.51	134	108	V
			* 5.35101	49.03	Pk	34.70	-20.30	0.00	63.43	-	-	74.00	-10.57	134	108	V
			* 5.35001	30.54	RMS	34.70	-20.40	0.24	45.08	54.00	-8.92	-	-	134	108	V
			* 5.36341	30.85	RMS	34.70	-20.20	0.24	45.59	54.00	-8.41	-	-	134	108	V
802.11ax (HE20)	5320	MIMO	* 5.35001	46.76	Pk	34.70	-20.40	0.00	61.06	-	-	74.00	-12.94	214	100	H
			* 5.35323	48.37	Pk	34.70	-20.30	0.00	62.77	-	-	74.00	-11.23	214	100	H
			* 5.35001	34.88	RMS	34.70	-20.40	0.00	49.18	54.00	-4.82	-	-	214	100	H
			* 5.35021	35.83	RMS	34.70	-20.40	0.00	50.13	54.00	-3.87	-	-	214	100	H
			* 5.35001	44.60	Pk	34.70	-20.40	0.00	58.90	-	-	74.00	-15.10	180	359	V
			* 5.35059	46.94	Pk	34.70	-20.40	0.00	61.24	-	-	74.00	-12.76	180	359	V
			* 5.35001	33.42	RMS	34.70	-20.40	0.00	47.72	54.00	-6.28	-	-	180	359	V
			* 5.35095	33.56	RMS	34.70	-20.40	0.00	47.86	54.00	-6.14	-	-	180	359	V
802.11ax (HE40)	5310	MIMO	* 5.35001	47.83	Pk	34.70	-20.40	0.00	62.13	-	-	74.00	-11.87	214	100	H
			* 5.35355	48.81	Pk	34.70	-20.30	0.00	63.21	-	-	74.00	-10.79	214	100	H
			* 5.35001	36.14	RMS	34.70	-20.40	0.00	50.44	54.00	-3.56	-	-	214	100	H
			* 5.35075	36.56	RMS	34.70	-20.40	0.00	50.86	54.00	-3.14	-	-	214	100	H
			* 5.35001	45.50	Pk	34.70	-20.40	0.00	59.80	-	-	74.00	-14.20	171	358	V
			* 5.35227	48.08	Pk	34.70	-20.30	0.00	62.48	-	-	74.00	-11.52	171	358	V
			* 5.35001	34.54	RMS	34.70	-20.40	0.00	48.84	54.00	-5.16	-	-	171	358	V
			* 5.35019	35.45	RMS	34.70	-20.40	0.00	49.75	54.00	-4.25	-	-	171	358	V
802.11ax (HE80)	5290	MIMO	* 5.35001	48.68	Pk	34.70	-20.40	0.00	62.98	-	-	74.00	-11.02	220	100	H
			* 5.35187	49.34	Pk	34.70	-20.30	0.00	63.74	-	-	74.00	-10.26	220	100	H
			* 5.35001	36.67	RMS	34.70	-20.40	0.00	50.97	54.00	-3.03	-	-	220	100	H
			* 5.35123	37.47	RMS	34.70	-20.30	0.00	51.87	54.00	-2.13	-	-	220	100	H
			* 5.35001	46.47	Pk	34.70	-20.40	0.00	60.77	-	-	74.00	-13.23	168	360	V
			* 5.35069	48.72	Pk	34.70	-20.40	0.00	63.02	-	-	74.00	-10.98	168	360	V
			* 5.35001	35.16	RMS	34.70	-20.40	0.00	49.46	54.00	-4.54	-	-	168	360	V
			* 5.35007	36.67	RMS	34.70	-20.40	0.00	50.97	54.00	-3.03	-	-	168	360	V
802.11ax (HE160)	5250 Upper	MIMO	* 5.35001	51.95	Pk	34.70	-20.40	0.00	66.25	-	-	74.00	-7.75	215	100	H
			* 5.35033	52.20	Pk	34.70	-20.40	0.00	66.50	-	-	74.00	-7.50	215	100	H
			* 5.35001	36.46	RMS	34.70	-20.40	0.00	50.76	54.00	-3.24	-	-	215	100	H
			* 5.35715	37.37	RMS	34.70	-20.30	0.00	51.77	54.00	-2.23	-	-	215	100	H
			* 5.35001	44.91	Pk	34.70	-20.40	0.00	59.21	-	-	74.00	-14.79	168	358	V
			* 5.35011	50.12	Pk	34.70	-20.40	0.00	64.42	-	-	74.00	-9.58	168	358	V
			* 5.35001	34.68	RMS	34.70	-20.40	0.00	48.98	54.00	-5.02	-	-	168	358	V
			* 5.35203	35.89	RMS	34.70	-20.30	0.00	50.29	54.00	-3.71	-	-	168	358	V

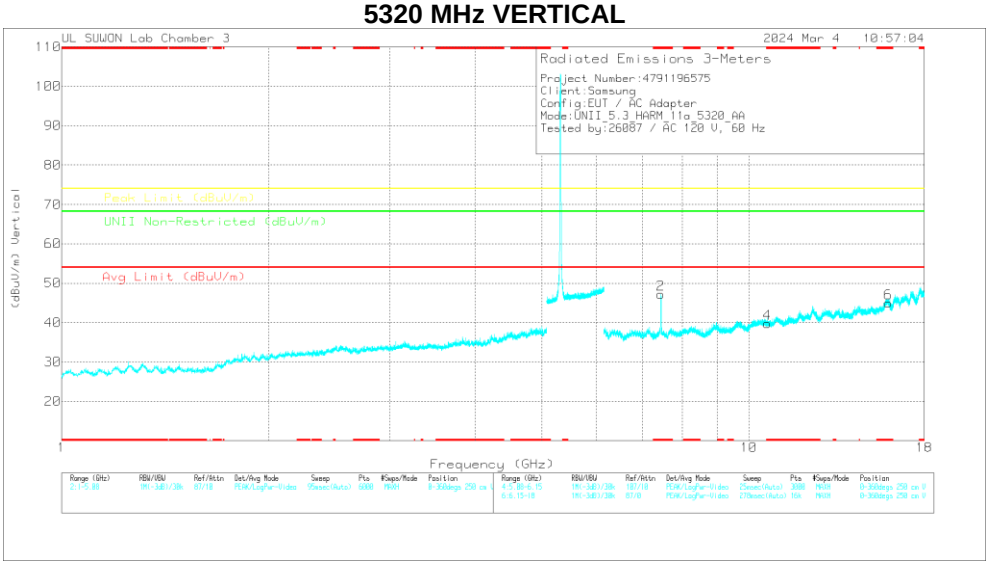
Note1. Pk - Peak detector, RMS - RMS detectior
Note2. * - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

HARMONICS AND SPURIOUS EMISSIONS(WORST CASE: 802.11a / 5320 MHz)

5320 MHz HORIZONTAL



5320 MHz VERTICAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

5320 MHz DATA

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	Antenna_967_Factor(dB)	6GHz_HP_Path Loss(dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	UNII Non-Restricted (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 7.45303	46.3	PK-U	35.7	-25	0	57	-	-	74	-17	-	-	206	105	H
* 7.44244	36.33	ADR	35.7	-24.9	.15	47.28	54	-6.72	-	-	-	-	206	105	H
* 7.45225	46.54	PK-U	35.7	-25	0	57.24	-	-	74	-16.76	-	-	210	108	V
* 7.44226	36.57	ADR	35.7	-24.9	.15	47.52	54	-6.48	-	-	-	-	210	108	V
* 10.63489	33.01	PK-U	37.7	-21.1	0	49.61	-	-	74	-24.39	-	-	0	100	H
* 10.63642	32.9	PK-U	37.7	-21.1	0	49.5	-	-	74	-24.5	-	-	0	100	V
* 15.96938	33.8	PK-U	40.9	-19.8	0	54.9	-	-	74	-19.1	-	-	0	100	H
* 15.96573	33.98	PK-U	40.9	-19.8	0	55.08	-	-	74	-18.92	-	-	0	100	V
* 15.96938	21.17	ADR	40.9	-19.8	.15	42.42	54	-11.58	-	-	-	-	0	100	H
* 15.96573	21.26	ADR	40.9	-19.8	.15	42.51	54	-11.49	-	-	-	-	0	100	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK-U - U-NII: Maximum Peak
ADR - U-NII AD primary method, RMS average

HARMONICS AND SPURIOUS EMISSIONS TEST DATA

Mode	Freq. [MHz]	Antenna	Frequency [GHz]	Reading [dBuV]	Detector Mode	ANT Factor [dB/m]	Loss [dB]	DC Corr [dB]	Result [dBuV/m]	AV Limit [dBuV/m]	AV Margin [dB]	PK Limit [dBuV/m]	PK Margin [dB]	Non-Restricted [dBuV/m]	Margin [dB]	Azimuth [Degs]	Height [cm]	Polarity
802.11a	5260	MIMO	* 7.35903	46.26	PK-U	35.80	-25.30	0.00	56.76	-	-	74.00	-17.24	-	-	207	110	H
			* 7.35839	36.52	ADR	35.80	-25.40	0.15	47.07	54.00	-6.93	-	-	-	-	207	110	H
			* 7.35818	46.68	PK-U	35.80	-25.40	0.00	57.08	-	-	74.00	-16.92	-	-	208	110	V
			* 7.35834	35.98	ADR	35.80	-25.40	0.15	46.53	54.00	-7.47	-	-	-	-	208	110	V
			10.518	33.53	PK-U	37.60	-21.10	0.00	50.03	-	-	-	-	68.20	-18.17	0	100	H
			10.520	34.42	PK-U	37.60	-21.10	0.00	50.92	-	-	-	-	68.20	**-17.28**	0	100	V
			* 15.78513	34.54	PK-U	40.60	-20.50	0.00	54.64	-	-	74.00	-19.36	-	-	0	100	H
			* 15.7785	34.43	PK-U	40.60	-20.60	0.00	54.43	-	-	74.00	-19.57	-	-	0	100	V
			* 15.78513	22.12	ADR	40.60	-20.50	0.15	42.37	54.00	-11.63	-	-	-	-	0	100	H
			* 15.7785	22.44	ADR	40.60	-20.60	0.15	42.59	54.00	-11.41	-	-	-	-	0	100	V
	5300	MIMO	* 7.41377	46.20	PK-U	35.70	-24.90	0.00	57.00	-	-	74.00	-17.00	-	-	210	108	H
			* 7.41445	36.34	ADR	35.70	-24.90	0.15	47.29	54.00	-6.71	-	-	-	-	210	108	H
			* 7.41414	45.57	PK-U	35.70	-24.90	0.00	56.37	-	-	74.00	-17.63	-	-	211	108	V
			* 7.41382	36.00	ADR	35.70	-24.90	0.15	46.95	54.00	-7.05	-	-	-	-	211	108	V
			10.593	33.31	PK-U	37.70	-21.20	0.00	49.81	-	-	-	-	68.20	-18.39	0	100	H
			10.595	33.49	PK-U	37.70	-21.20	0.00	49.99	-	-	-	-	68.20	-18.21	0	100	V
			* 15.89631	34.43	PK-U	40.80	-19.90	0.00	55.33	-	-	74.00	-18.67	-	-	0	100	H
			* 15.90269	34.03	PK-U	40.80	-19.90	0.00	54.93	-	-	74.00	-19.07	-	-	0	100	V
			* 15.89631	22.08	ADR	40.80	-19.90	0.15	43.13	54.00	-10.87	-	-	-	-	0	100	H
			* 15.90269	22.33	ADR	40.80	-19.90	0.15	43.38	54.00	-10.62	-	-	-	-	0	100	V
	5320	MIMO	* 7.45303	46.30	PK-U	35.70	-25.00	0.00	57.00	-	-	74.00	-17.00	-	-	206	105	H
			* 7.44244	36.33	ADR	35.70	-24.90	0.15	47.28	54.00	-6.72	-	-	-	-	206	105	H
			* 7.45225	46.54	PK-U	35.70	-25.00	0.00	57.24	-	-	74.00	**-16.76**	-	-	210	108	V
			* 7.44226	36.57	ADR	35.70	-24.90	0.15	47.52	54.00	**-6.48**	-	-	-	-	210	108	V
			* 10.63489	33.01	PK-U	37.70	-21.10	0.00	49.61	-	-	74.00	-24.39	-	-	0	100	H
			* 10.63642	32.90	PK-U	37.70	-21.10	0.00	49.50	-	-	74.00	-24.50	-	-	0	100	V
			* 15.96938	33.80	PK-U	40.90	-19.80	0.00	54.90	-	-	74.00	-19.10	-	-	0	100	H
			* 15.96573	33.98	PK-U	40.90	-19.80	0.00	55.08	-	-	74.00	-18.92	-	-	0	100	V
			* 15.96938	21.17	ADR	40.90	-19.80	0.15	42.42	54.00	-11.58	-	-	-	-	0	100	H
			* 15.96573	21.26	ADR	40.90	-19.80	0.15	42.51	54.00	-11.49	-	-	-	-	0	100	V
802.11ax HE20 RU mode 26 Tone offset 0 Spot-check	5320	MIMO	* 7.45594	43.34	PK-U	35.70	-25.00	0.00	54.04	-	-	74.00	-19.96	-	-	210	111	H
			* 7.45634	33.30	ADR	35.70	-25.00	0.00	44.00	54.00	-10.00	-	-	-	-	210	111	H
			* 7.45702	42.72	PK-U	35.70	-25.00	0.00	53.42	-	-	74.00	-20.58	-	-	163	100	V
			* 7.45634	32.16	ADR	35.70	-25.00	0.00	42.86	54.00	-11.14	-	-	-	-	163	100	V
			8.512	36.30	PK-U	36.00	-23.50	0.00	48.80	-	-	-	-	68.20	-19.40	201	102	H
			8.512	36.41	PK-U	36.00	-23.50	0.00	48.91	-	-	-	-	68.20	-19.29	176	254	V
			* 10.6387	33.59	PK-U	37.70	-21.10	0.00	50.19	-	-	74.00	-23.81	-	-	0	100	H
			* 10.64038	33.22	PK-U	37.70	-21.10	0.00	49.82	-	-	74.00	-24.18	-	-	0	100	V

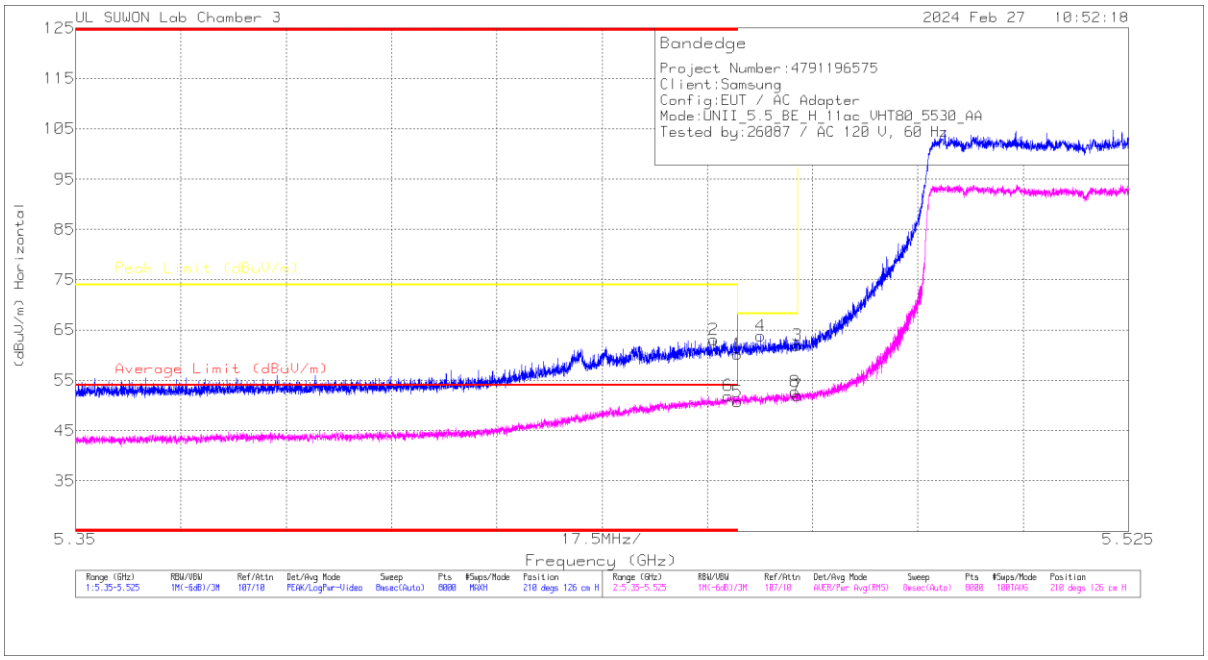
Note1. PK-U - U-NII: Maximum Peak / ADR - U-NII AD primary method, RMS average
Note2. * - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

UL KOREA LTD. Suwon Laboratory FORM ID: FCC_15E(05)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

11.3. TX ABOVE 1GHz 2Tx MODE IN THE 5.5 GHz BAND

BANDEDGE (WORST CASE: 802.11ac VHT80 / 5530 MHz)

HORIZONTAL PEAK AND AVERAGE DATA



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	Antenna_957_Factor(dB)	10dB_Path Loss(dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 5.45998	45.48	Pk	34.9	-20.1	0	60.28	-	-	74	-13.72	210	126	H
2	* 5.45604	48.37	Pk	34.9	-20.2	0	63.07	-	-	74	-10.93	210	126	H
3	5.46998	47.26	Pk	34.9	-20.2	0	61.96	-	-	68.2	-6.24	210	126	H
4	5.46388	49.15	Pk	34.9	-20.2	0	63.85	-	-	68.2	-4.35	210	126	H
5	* 5.45998	35.74	RMS	34.9	-20.1	.25	50.79	54	-3.21	-	-	210	126	H
6	* 5.45845	36.89	RMS	34.9	-20.1	.25	51.94	54	-2.06	-	-	210	126	H
7	5.46998	37.08	RMS	34.9	-20.2	.25	52.03	-	-	-	-	210	126	H
8	5.46961	37.75	RMS	34.9	-20.2	.25	52.7	-	-	-	-	210	126	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
RMS - RMS detection

BANDEDGE TEST DATA

Mode	Freq. [MHz]	Antenna	Frequency [GHz]	Reading [dBuV]	Detector Mode	ANT Factor [dB/m]	Loss [dB]	DC Corr [dB]	Result [dBuV/m]	AV Limit [dBuV/m]	AV Margin [dB]	PK Limit [dBuV/m]	PK Margin [dB]	Azimuth [Degs]	Height [cm]	Polarity
802.11a	5500	MIMO	* 5.45998	40.15	Pk	34.90	-20.10	0.00	54.95	-	-	74.00	-19.05	218	100	H
			* 5.45178	42.78	Pk	34.90	-20.10	0.00	57.58	-	-	74.00	-16.42	218	100	H
			5.46998	42.39	Pk	34.90	-20.20	0.00	57.09	-	-	68.20	-11.11	218	100	H
			5.46672	46.80	Pk	34.90	-20.20	0.00	61.50	-	-	68.20	-6.70	218	100	H
			* 5.45998	30.03	RMS	34.90	-20.10	0.15	44.98	54.00	-9.02	-	-	218	100	H
			* 5.44399	31.10	RMS	34.90	-20.10	0.15	46.05	54.00	-7.95	-	-	218	100	H
			5.46998	31.42	RMS	34.90	-20.20	0.15	46.27	-	-	-	-	218	100	H
			5.46727	32.77	RMS	34.90	-20.20	0.15	47.62	-	-	-	-	218	100	H
			* 5.45998	38.60	Pk	34.90	-20.10	0.00	53.40	-	-	74.00	-20.60	129	106	V
			* 5.44981	40.10	Pk	34.90	-20.20	0.00	54.80	-	-	74.00	-19.20	129	106	V
			5.46998	39.63	Pk	34.90	-20.20	0.00	54.33	-	-	68.20	-13.87	129	106	V
			5.46963	42.05	Pk	34.90	-20.20	0.00	56.75	-	-	68.20	-11.45	129	106	V
			* 5.45998	27.13	RMS	34.90	-20.10	0.15	42.08	54.00	-11.92	-	-	129	106	V
			* 5.45151	29.48	RMS	34.90	-20.10	0.15	44.43	54.00	-9.57	-	-	129	106	V
			5.46998	29.28	RMS	34.90	-20.20	0.15	44.13	-	-	-	-	129	106	V
			5.46985	29.58	RMS	34.90	-20.20	0.15	44.43	-	-	-	-	129	106	V
	5700	MIMO	5.72500	43.84	Pk	35.00	-19.80	0.00	59.04	-	-	68.20	-9.16	204	104	H
			5.72532	48.23	Pk	35.00	-19.80	0.00	63.43	-	-	68.20	-4.77	204	104	H
			5.72500	39.32	Pk	35.00	-19.80	0.00	54.52	-	-	68.20	-13.68	128	103	V
			5.72688	41.40	Pk	35.00	-19.80	0.00	56.60	-	-	68.20	-11.60	128	103	V
802.11n (HT20)	5500	MIMO	* 5.45998	45.15	Pk	34.90	-20.10	0.00	59.95	-	-	74.00	-14.05	217	100	H
			* 5.45167	46.20	Pk	34.90	-20.10	0.00	61.00	-	-	74.00	-13.00	217	100	H
			5.46998	50.78	Pk	34.90	-20.20	0.00	65.48	-	-	68.20	-2.72	217	100	H
			5.46860	51.03	Pk	34.90	-20.20	0.00	65.73	-	-	68.20	-2.47	217	100	H
			* 5.45998	33.84	RMS	34.90	-20.10	0.00	48.64	54.00	-5.36	-	-	217	100	H
			* 5.45841	34.57	RMS	34.90	-20.10	0.00	49.37	54.00	-4.63	-	-	217	100	H
			5.46998	38.29	RMS	34.90	-20.20	0.00	52.99	-	-	-	-	217	100	H
			5.46913	38.56	RMS	34.90	-20.20	0.00	53.26	-	-	-	-	217	100	H
			* 5.45998	42.12	Pk	34.90	-20.10	0.00	56.92	-	-	74.00	-17.08	160	334	V
			* 5.45644	43.53	Pk	34.90	-20.20	0.00	58.23	-	-	74.00	-15.77	160	334	V
			5.46998	47.10	Pk	34.90	-20.20	0.00	61.80	-	-	68.20	-6.40	160	334	V
			5.46740	47.80	Pk	34.90	-20.20	0.00	62.50	-	-	68.20	-5.70	160	334	V
			* 5.45998	31.55	RMS	34.90	-20.10	0.00	46.35	54.00	-7.65	-	-	160	334	V
			* 5.45965	31.70	RMS	34.90	-20.10	0.00	46.50	54.00	-7.50	-	-	160	334	V
			5.46998	34.27	RMS	34.90	-20.20	0.00	48.97	-	-	-	-	160	334	V
			5.46974	34.80	RMS	34.90	-20.20	0.00	49.50	-	-	-	-	160	334	V
	5700	MIMO	5.72500	45.21	Pk	35.00	-19.80	0.00	60.41	-	-	68.20	-7.79	327	111	H
			5.72516	47.56	Pk	35.00	-19.80	0.00	62.76	-	-	68.20	-5.44	327	111	H
			5.72500	39.39	Pk	35.00	-19.80	0.00	54.59	-	-	68.20	-13.61	126	117	V
			5.72872	42.86	Pk	35.00	-19.80	0.00	58.06	-	-	68.20	-10.14	126	117	V
802.11n (HT40)	5510	MIMO	* 5.45998	47.03	Pk	34.90	-20.10	0.00	61.83	-	-	74.00	-12.17	207	106	H
			* 5.45816	48.28	Pk	34.90	-20.10	0.00	63.08	-	-	74.00	-10.92	207	106	H
			5.46998	48.74	Pk	34.90	-20.20	0.00	63.44	-	-	68.20	-4.76	207	106	H
			5.46718	51.09	Pk	34.90	-20.20	0.00	65.79	-	-	68.20	**-2.41**	207	106	H
			* 5.45998	35.50	RMS	34.90	-20.10	0.00	50.30	54.00	-3.70	-	-	207	106	H
			* 5.45858	35.97	RMS	34.90	-20.10	0.00	50.77	54.00	-3.23	-	-	207	106	H
			5.46998	37.22	RMS	34.90	-20.20	0.00	51.92	-	-	-	-	207	106	H
			5.46724	38.36	RMS	34.90	-20.20	0.00	53.06	-	-	-	-	207	106	H
			* 5.45998	39.79	Pk	34.90	-20.10	0.00	54.59	-	-	74.00	-19.41	124	106	V
			* 5.45609	41.86	Pk	34.90	-20.20	0.00	56.56	-	-	74.00	-17.44	124	106	V
			5.46998	42.61	Pk	34.90	-20.20	0.00	57.31	-	-	68.20	-10.89	124	106	V
			5.46980	45.06	Pk	34.90	-20.20	0.00	59.76	-	-	68.20	-8.44	124	106	V
			* 5.45998	29.44	RMS	34.90	-20.10	0.00	44.24	54.00	-9.76	-	-	124	106	V
			* 5.45261	30.25	RMS	34.90	-20.10	0.00	45.05	54.00	-8.95	-	-	124	106	V
			5.46998	32.42	RMS	34.90	-20.20	0.00	47.12	-	-	-	-	124	106	V
			5.46972	32.33	RMS	34.90	-20.20	0.00	47.03	-	-	-	-	124	106	V
	5670	MIMO	5.72500	42.44	Pk	35.00	-19.80	0.00	57.64	-	-	68.20	-10.56	205	100	H
			5.73504	44.67	Pk	35.00	-19.80	0.00	59.87	-	-	68.20	-8.33	205	100	H
			5.72500	40.00	Pk	35.00	-19.80	0.00	55.20	-	-	68.20	-13.00	190	282	V
			5.72588	43.16	Pk	35.00	-19.80	0.00	58.36	-	-	68.20	-9.84	190	282	V
802.11ac (VHT80)	5530	MIMO	* 5.45998	45.48	Pk	34.90	-20.10	0.00	60.28	-	-	74.00	-13.72	210	126	H
			* 5.45604	48.37	Pk	34.90	-20.20	0.00	63.07	-	-	74.00	-10.93	210	126	H
			5.46998	47.26	Pk	34.90	-20.20	0.00	61.96	-	-	68.20	-6.24	210	126	H
			5.46388	49.15	Pk	34.90	-20.20	0.00	63.85	-	-	68.20	-4.35	210	126	H
			* 5.45998	35.74	RMS	34.90	-20.10	0.25	50.79	54.00	-3.21	-	-	210	126	H
			* 5.45845	36.89	RMS	34.90	-20.10	0.25	51.94	54.00	**-2.06**	-	-	210	126	H
			5.46998	37.08	RMS	34.90	-20.20	0.25	52.03	-	-	-	-	210	126	H
			5.46961	37.75	RMS	34.90	-20.20	0.25	52.70	-	-	-	-	210	126	H
			* 5.45998	42.23	Pk	34.90	-20.10	0.00	57.03	-	-	74.00	-16.97	168	318	V
			* 5.45825	44.26	Pk	34.90	-20.10	0.00	59.06	-	-	74.00	-14.94	168	318	V
			5.46998	43.62	Pk	34.90	-20.20	0.00	58.32	-	-	68.20	-9.88	168	318	V
			5.46641	46.72	Pk	34.90	-20.20	0.00	61.42	-	-	68.20	-6.78	168	318	V
			* 5.45998	32.45	RMS	34.90	-20.10	0.25	47.50	54.00	-6.50	-	-	168	318	V
			* 5.45799	32.92	RMS	34.90	-20.10	0.25	47.97	54.00	-6.03	-	-	168	318	V
			5.46998	33.43	RMS	34.90	-20.20	0.25	48.38	-	-	-	-	168	318	V
			5.46854	34.18	RMS	34.90	-20.20	0.25	49.13	-	-	-	-	168	318	V
	5610	MIMO	5.72500	40.19	Pk	35.00	-19.80	0.00	55.39	-	-	68.20	-12.81	204	100	H
			5.72922	42.34	Pk	35.00	-19.80	0.00	57.54	-	-	68.20	-10.66	204	100	H
			5.72500	37.91	Pk	35.00	-19.80	0.00	53.11	-	-	68.20	-15.09	134	100	V
			5.75510	39.70	Pk	35.00	-19.70	0.00	55.00	-	-	68.20	-13.20	134	100	V

Mode	Freq. [MHz]	Antenna	Frequency [GHz]	Reading [dBuV]	Detector Mode	ANT Factor [dB/m]	Loss [dB]	DC Corr [dB]	Result [dBuV/m]	AV Limit [dBuV/m]	AV Margin [dB]	PK Limit [dBuV/m]	PK Margin [dB]	Azimuth [Degs]	Height [cm]	Polarity
802.11ac (VHT160)	5570 Lower	MIMO	* 5.45998	40.93	Pk	34.90	-20.10	0.00	55.73	-	-	74.00	-18.27	209	124	H
			* 5.45482	49.84	Pk	34.90	-20.10	0.00	64.64	-	-	74.00	-9.36	209	124	H
			5.46998	40.63	Pk	34.90	-20.20	0.00	55.33	-	-	68.20	-12.87	209	124	H
			5.46768	50.98	Pk	34.90	-20.20	0.00	65.68	-	-	68.20	-2.52	209	124	H
			* 5.45998	31.03	RMS	34.90	-20.10	0.24	46.07	54.00	-7.93	-	-	209	124	H
			* 5.45585	33.07	RMS	34.90	-20.20	0.24	48.01	54.00	-5.99	-	-	209	124	H
			5.46998	31.71	RMS	34.90	-20.20	0.24	46.65	-	-	-	-	209	124	H
			5.46875	32.59	RMS	34.90	-20.20	0.24	47.53	-	-	-	-	209	124	H
			* 5.45998	38.37	Pk	34.90	-20.10	0.00	53.17	-	-	74.00	-20.83	162	317	V
			* 5.45305	47.68	Pk	34.90	-20.10	0.00	62.48	-	-	74.00	-11.52	162	317	V
			5.46998	39.49	Pk	34.90	-20.20	0.00	54.19	-	-	68.20	-14.01	162	317	V
			5.46921	50.70	Pk	34.90	-20.20	0.00	65.40	-	-	68.20	-2.80	162	317	V
			* 5.45998	28.60	RMS	34.90	-20.10	0.24	43.64	54.00	-10.36	-	-	162	317	V
			* 5.43506	30.70	RMS	34.90	-20.20	0.24	45.64	54.00	-8.36	-	-	162	317	V
			5.46998	31.55	RMS	34.90	-20.20	0.24	46.49	-	-	-	-	162	317	V
			5.46797	30.41	RMS	34.90	-20.20	0.24	45.35	-	-	-	-	162	317	V
	5570 Upper	MIMO	5.72501	40.05	Pk	35.00	-19.80	0.00	55.25	-	-	68.20	-12.95	205	101	H
			5.72695	44.94	Pk	35.00	-19.80	0.00	60.14	-	-	68.20	-8.06	205	101	H
			5.72501	36.79	Pk	35.00	-19.80	0.00	51.99	-	-	68.20	-16.21	134	100	V
			5.72641	40.22	Pk	35.00	-19.80	0.00	55.42	-	-	68.20	-12.78	134	100	V
802.11ax (HE20)	5500	MIMO	* 5.45998	42.75	Pk	34.90	-20.10	0.00	57.55	-	-	74.00	-16.45	212	120	H
			* 5.45814	45.73	Pk	34.90	-20.10	0.00	60.53	-	-	74.00	-13.47	212	120	H
			5.46998	48.98	Pk	34.90	-20.20	0.00	63.68	-	-	68.20	-4.52	212	120	H
			5.46851	48.20	Pk	34.90	-20.20	0.00	62.90	-	-	68.20	-5.30	212	120	H
			* 5.45998	32.82	RMS	34.90	-20.10	0.00	47.62	54.00	-6.38	-	-	212	120	H
			* 5.45856	32.64	RMS	34.90	-20.10	0.00	47.44	54.00	-6.56	-	-	212	120	H
			5.46998	33.84	RMS	34.90	-20.20	0.00	48.54	-	-	-	-	212	120	H
			5.46902	35.17	RMS	34.90	-20.20	0.00	49.87	-	-	-	-	212	120	H
			* 5.45998	37.78	Pk	34.90	-20.10	0.00	52.58	-	-	74.00	-21.42	129	110	V
			* 5.44318	40.37	Pk	34.90	-20.10	0.00	55.17	-	-	74.00	-18.83	129	110	V
			5.46998	40.14	Pk	34.90	-20.20	0.00	54.84	-	-	68.20	-13.36	129	110	V
			5.46882	42.07	Pk	34.90	-20.20	0.00	56.77	-	-	68.20	-11.43	129	110	V
			* 5.45998	28.55	RMS	34.90	-20.10	0.00	43.35	54.00	-10.65	-	-	129	110	V
			* 5.45307	29.32	RMS	34.90	-20.10	0.00	44.12	54.00	-9.88	-	-	129	110	V
			5.46998	29.55	RMS	34.90	-20.20	0.00	44.25	-	-	-	-	129	110	V
			5.46965	30.29	RMS	34.90	-20.20	0.00	44.99	-	-	-	-	129	110	V
	5700	MIMO	5.72500	45.72	Pk	35.00	-19.80	0.00	60.92	-	-	68.20	-7.28	214	143	H
			5.72541	47.94	Pk	35.00	-19.80	0.00	63.14	-	-	68.20	-5.06	214	143	H
			5.72500	40.68	Pk	35.00	-19.80	0.00	55.88	-	-	68.20	-12.32	129	118	V
			5.72566	42.93	Pk	35.00	-19.80	0.00	58.13	-	-	68.20	-10.07	129	118	V
802.11ax (HE40)	5510	MIMO	* 5.45998	42.83	Pk	34.90	-20.10	0.00	57.63	-	-	74.00	-16.37	214	120	H
			* 5.45935	44.21	Pk	34.90	-20.10	0.00	59.01	-	-	74.00	-14.99	214	120	H
			5.46998	46.18	Pk	34.90	-20.20	0.00	60.88	-	-	68.20	-7.32	214	120	H
			5.46967	48.58	Pk	34.90	-20.20	0.00	63.28	-	-	68.20	-4.92	214	120	H
			* 5.45998	31.72	RMS	34.90	-20.10	0.00	46.52	54.00	-7.48	-	-	214	120	H
			* 5.45908	32.50	RMS	34.90	-20.10	0.00	47.30	54.00	-6.70	-	-	214	120	H
			5.46998	34.59	RMS	34.90	-20.20	0.00	49.29	-	-	-	-	214	120	H
			5.46991	36.15	RMS	34.90	-20.20	0.00	50.85	-	-	-	-	214	120	H
			* 5.45998	38.92	Pk	34.90	-20.10	0.00	53.72	-	-	74.00	-20.28	130	107	V
			* 5.45871	41.26	Pk	34.90	-20.10	0.00	56.06	-	-	74.00	-17.94	130	107	V
			5.46998	39.47	Pk	34.90	-20.20	0.00	54.17	-	-	68.20	-14.03	130	107	V
			5.46871	41.90	Pk	34.90	-20.20	0.00	56.60	-	-	68.20	-11.60	130	107	V
			* 5.45998	27.95	RMS	34.90	-20.10	0.00	42.75	54.00	-11.25	-	-	130	107	V
			* 5.45878	29.18	RMS	34.90	-20.10	0.00	43.98	54.00	-10.02	-	-	130	107	V
			5.46998	29.54	RMS	34.90	-20.20	0.00	44.24	-	-	-	-	130	107	V
			5.46996	30.59	RMS	34.90	-20.20	0.00	45.29	-	-	-	-	130	107	V
	5670	MIMO	5.72500	42.80	Pk	35.00	-19.80	0.00	58.00	-	-	68.20	-10.20	209	100	H
			5.72719	46.00	Pk	35.00	-19.80	0.00	61.20	-	-	68.20	-7.00	209	100	H
			5.72500	38.30	Pk	35.00	-19.80	0.00	53.50	-	-	68.20	-14.70	131	101	V
			5.72658	40.97	Pk	35.00	-19.80	0.00	56.17	-	-	68.20	-12.03	131	101	V
802.11ax (HE80)	5530	MIMO	* 5.45998	45.96	Pk	34.90	-20.10	0.00	60.76	-	-	74.00	-13.24	213	159	H
			* 5.45661	46.61	Pk	34.90	-20.20	0.00	61.31	-	-	74.00	-12.69	213	159	H
			5.46998	44.79	Pk	34.90	-20.20	0.00	59.49	-	-	68.20	-8.71	213	159	H
			5.46565	47.81	Pk	34.90	-20.10	0.00	62.61	-	-	68.20	-5.59	213	159	H
			* 5.45998	34.79	RMS	34.90	-20.10	0.00	49.59	54.00	-4.41	-	-	213	159	H
			* 5.45972	35.44	RMS	34.90	-20.10	0.00	50.24	54.00	-3.76	-	-	213	159	H
			5.46998	35.41	RMS	34.90	-20.20	0.00	50.11	-	-	-	-	213	159	H
			5.46604	35.94	RMS	34.90	-20.10	0.00	50.74	-	-	-	-	213	159	H
			* 5.45998	42.90	Pk	34.90	-20.10	0.00	57.70	-	-	74.00	-16.30	131	108	V
			* 5.45919	44.01	Pk	34.90	-20.10	0.00	58.81	-	-	74.00	-15.19	131	108	V
			5.46998	43.84	Pk	34.90	-20.20	0.00	58.54	-	-	68.20	-9.66	131	108	V
			5.46819	44.66	Pk	34.90	-20.20	0.00	59.36	-	-	68.20	-8.84	131	108	V
			* 5.45998	30.86	RMS	34.90	-20.10	0.00	45.66	54.00	-8.34	-	-	131	108	V
			* 5.45911	32.49	RMS	34.90	-20.10	0.00	47.29	54.00	-6.71	-	-	131	108	V
			5.46998	32.53	RMS	34.90	-20.20	0.00	47.23	-	-	-	-	131	108	V
			5.46639	33.09	RMS	34.90	-20.20	0.00	47.79	-	-	-	-	131	108	V
	5610	MIMO	5.72500	41.46	Pk	35.00	-19.80	0.00	56.66	-	-	68.20	-11.54	215	114	H
			5.73480	43.90	Pk	35.00	-19.80	0.00	59.10	-	-	68.20	-9.10	215	114	H
			5.72500	37.94	Pk	35.00	-19.80	0.00	53.14	-	-	68.20	-15.06	135	100	V
			5.80356	40.73	Pk	35.10	-19.60	0.00	56.23	-	-	68.20	-11.97	135	100	V

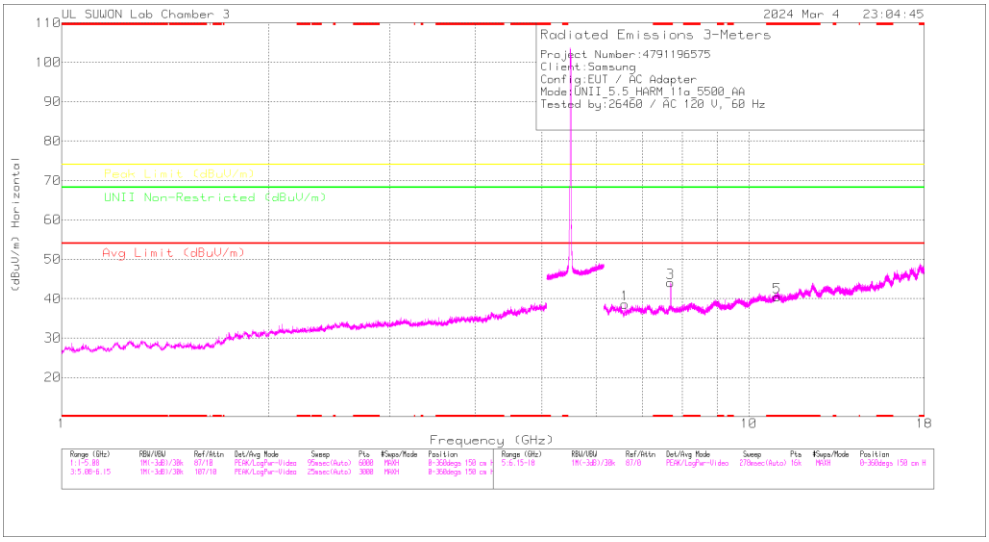
Mode	Freq. [MHz]	Antenna	Frequency [GHz]	Reading [dBuV]	Detector Mode	ANT Factor [dB/m]	Loss [dB]	DC Corr [dB]	Result [dBuV/m]	AV Limit [dBuV/m]	AV Margin [dB]	PK Limit [dBuV/m]	PK Margin [dB]	Azimuth [Degs]	Height [cm]	Polarity
802.11ax (HE160)	5570 Lower	MIMO	* 5.45998	43.63	Pk	34.90	-20.10	0.00	58.43	-	-	74.00	-15.57	213	100	H
			* 5.44263	48.85	Pk	34.90	-20.10	0.00	63.65	-	-	74.00	-10.35	213	100	H
			5.46998	44.23	Pk	34.90	-20.20	0.00	58.93	-	-	68.20	-9.27	213	100	H
			5.46985	49.01	Pk	34.90	-20.20	0.00	63.71	-	-	68.20	-4.49	213	100	H
			* 5.45998	34.36	RMS	34.90	-20.10	0.00	49.16	54.00	-4.84	-	-	213	100	H
			* 5.43821	35.22	RMS	34.90	-20.10	0.00	50.02	54.00	-3.98	-	-	213	100	H
			5.46998	33.81	RMS	34.90	-20.20	0.00	48.51	-	-	-	-	213	100	H
			5.46718	34.71	RMS	34.90	-20.20	0.00	49.41	-	-	-	-	213	100	H
			* 5.45998	38.45	Pk	34.90	-20.10	0.00	53.25	-	-	74.00	-20.75	127	110	V
			* 5.45219	44.39	Pk	34.90	-20.10	0.00	59.19	-	-	74.00	-14.81	127	110	V
			5.46998	39.23	Pk	34.90	-20.20	0.00	53.93	-	-	68.20	-14.27	127	110	V
			5.46994	45.23	Pk	34.90	-20.20	0.00	59.93	-	-	68.20	-8.27	127	110	V
			* 5.45998	29.13	RMS	34.90	-20.10	0.00	43.93	54.00	-10.07	-	-	127	110	V
			* 5.44289	30.40	RMS	34.90	-20.10	0.00	45.20	54.00	-8.80	-	-	127	110	V
			5.46998	29.53	RMS	34.90	-20.20	0.00	44.23	-	-	-	-	127	110	V
			5.46967	30.42	RMS	34.90	-20.20	0.00	45.12	-	-	-	-	127	110	V
	5570 Upper	MIMO	5.72501	42.81	Pk	35.00	-19.80	0.00	58.01	-	-	68.20	-10.19	212	103	H
			5.73676	48.28	Pk	35.00	-19.80	0.00	63.48	-	-	68.20	-4.72	212	103	H
			5.72501	38.56	Pk	35.00	-19.80	0.00	53.76	-	-	68.20	-14.44	135	100	V
			5.76087	40.57	Pk	35.00	-19.80	0.00	55.77	-	-	68.20	-12.43	135	100	V

Note1. Pk - Peak detector, RMS - RMS detectior
Note2. * - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

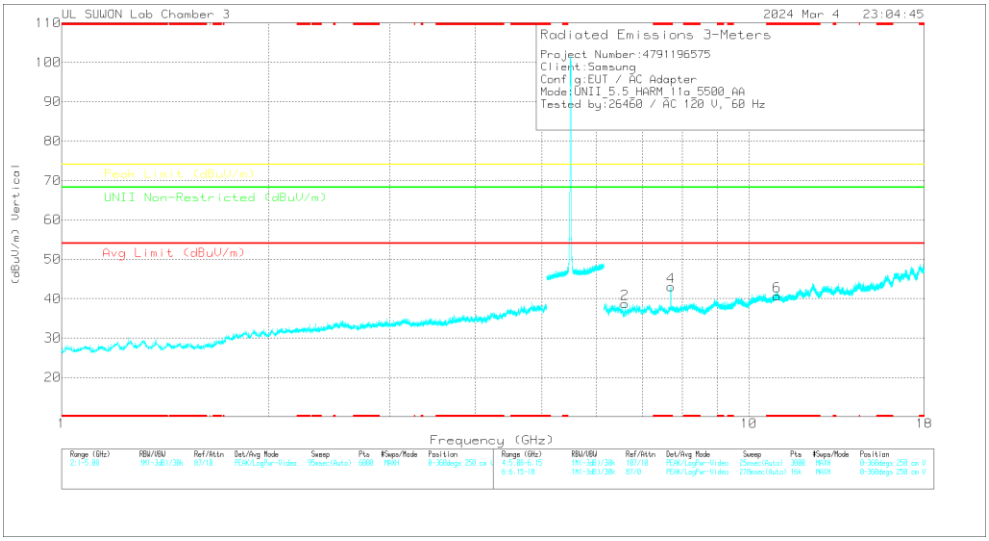
UL KOREA LTD. Suwon Laboratory FORM ID: FCC_15E(05)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

HARMONICS AND SPURIOUS EMISSIONS(WORST CASE: 802.11a / 5500 MHz)

5500 MHz HORIZONTAL



5500 MHz VERTICAL



Note. Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

5500 MHz DATA

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	Antenna_957_Factor(dB)	6GHz_HP_Path Loss(dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	UNII Non-Restricted (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
6.60013	40.9	PK-U	36	-27.2	0	49.7	-	-	-	-	68.2	-18.5	311	103	H
6.59999	41.21	PK-U	36	-27.2	0	50.01	-	-	-	-	68.2	-18.19	183	308	V
* 7.70487	43.61	PK-U	35.9	-24.7	0	54.81	-	-	74	-19.19	-	-	208	100	H
* 7.69348	34.14	ADR	35.9	-24.7	.15	45.49	54	-8.51	-	-	-	-	208	100	H
* 7.69268	41.86	PK-U	35.9	-24.8	0	52.96	-	-	74	-21.04	-	-	161	101	V
* 7.69285	32.07	ADR	35.9	-24.8	.15	43.32	54	-10.68	-	-	-	-	161	101	V
* 11.0022	33.96	PK-U	38	-21	0	50.96	-	-	74	-23.04	-	-	0	100	H
* 11.00184	34.07	PK-U	38	-21	0	51.07	-	-	74	-22.93	-	-	0	100	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK-U - U-NII: Maximum Peak
ADR - U-NII AD primary method, RMS average

HARMONICS AND SPURIOUS EMISSIONS TEST DATA

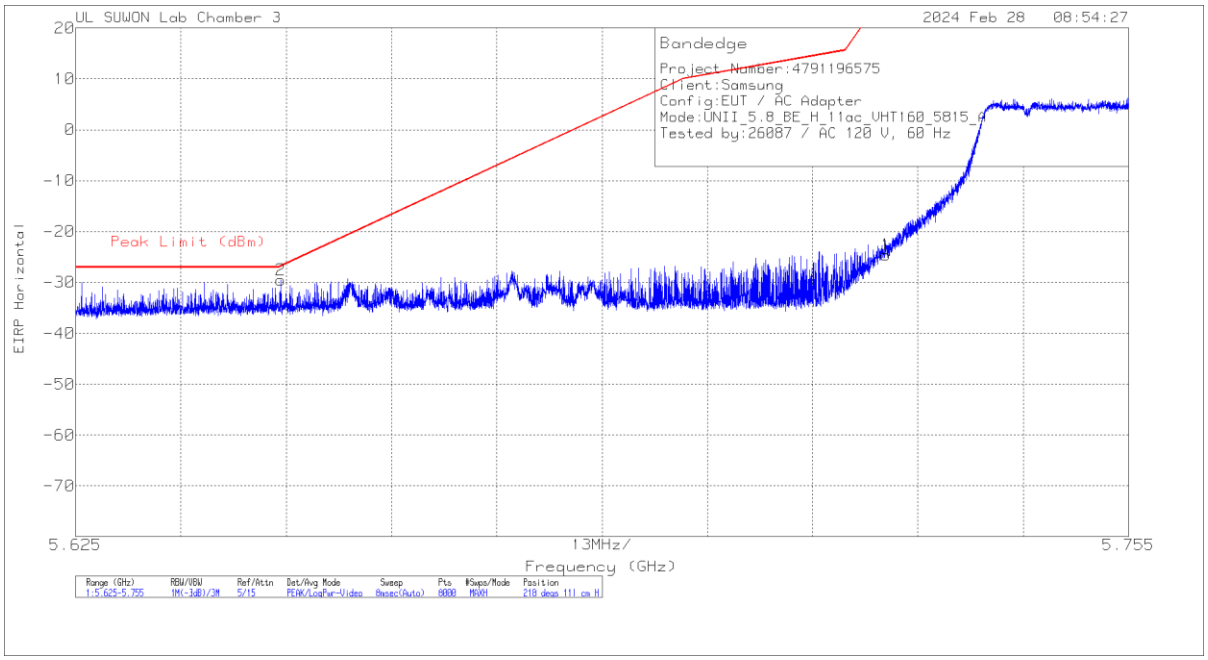
Mode	Freq. [MHz]	Antenna	Frequency [GHz]	Reading [dBuV]	Detector Mode	ANT Factor [dB/m]	Loss [dB]	DC Corr [dB]	Result [dBuV/m]	AV Limit [dBuV/m]	AV Margin [dB]	PK Limit [dBuV/m]	PK Margin [dB]	Non-Restricted [dBuV/m]	Margin [dB]	Azimuth [Degs]	Height [cm]	Polarity
802.11a	5500	MIMO	6.600	40.90	PK-U	36.00	-27.20	0.00	49.70	-	-	-	-	68.20	-18.50	311	103	H
			6.600	41.21	PK-U	36.00	-27.20	0.00	50.01	-	-	-	-	68.20	-18.19	183	308	V
			* 7.70487	43.61	PK-U	35.90	-24.70	0.00	54.81	-	-	74.00	**-19.19**	-	-	208	100	H
			* 7.69348	34.14	ADR	35.90	-24.70	0.15	45.49	54.00	**-8.51**	-	-	-	-	208	100	H
			* 7.69268	41.86	PK-U	35.90	-24.80	0.00	52.96	-	-	74.00	-21.04	-	-	161	101	V
			* 7.69285	32.07	ADR	35.90	-24.80	0.15	43.32	54.00	-10.68	-	-	-	-	161	101	V
			* 11.0022	33.96	PK-U	38.00	-21.00	0.00	50.96	-	-	74.00	-23.04	-	-	0	100	H
			* 11.00184	34.07	PK-U	38.00	-21.00	0.00	51.07	-	-	74.00	-22.93	-	-	0	100	V
	5580	MIMO	6.696	40.45	PK-U	36.00	-27.00	0.00	49.45	-	-	-	-	68.20	-18.75	206	100	H
			6.696	40.36	PK-U	36.00	-27.00	0.00	49.36	-	-	-	-	68.20	-18.84	183	299	V
			7.805	41.43	PK-U	35.90	-24.60	0.00	52.73	-	-	-	-	68.20	**-15.47**	207	101	H
			7.805	40.47	PK-U	35.90	-24.60	0.00	51.77	-	-	-	-	68.20	-16.43	171	103	V
			* 11.15982	34.30	PK-U	38.10	-21.50	0.00	50.90	-	-	74.00	-23.10	-	-	0	100	H
			* 11.1617	34.54	PK-U	38.10	-21.40	0.00	51.24	-	-	74.00	-22.76	-	-	0	100	V
	5700	MIMO	6.841	40.89	PK-U	36.00	-26.60	0.00	50.29	-	-	-	-	68.20	-17.91	203	200	H
			6.840	40.79	PK-U	36.00	-26.60	0.00	50.19	-	-	-	-	68.20	-18.01	182	283	V
			7.986	38.68	PK-U	35.90	-24.40	0.00	50.18	-	-	-	-	68.20	-18.02	198	101	H
			7.983	37.54	PK-U	35.90	-24.40	0.00	49.04	-	-	-	-	68.20	-19.16	347	100	V
			* 11.39921	32.83	PK-U	38.10	-21.30	0.00	49.63	-	-	74.00	-24.37	-	-	0	100	H
			* 11.40141	33.08	PK-U	38.10	-21.30	0.00	49.88	-	-	74.00	-24.12	-	-	0	100	V
	5720	MIMO	6.864	41.09	PK-U	36.00	-26.50	0.00	50.59	-	-	-	-	68.20	-17.61	208	104	H
			6.864	40.10	PK-U	36.00	-26.50	0.00	49.60	-	-	-	-	68.20	-18.60	183	297	V
			8.003	39.32	PK-U	35.90	-24.30	0.00	50.92	-	-	-	-	68.20	-17.28	207	105	H
			8.015	39.00	PK-U	35.90	-24.30	0.00	50.60	-	-	-	-	68.20	-17.60	177	268	V
			* 11.44127	33.19	PK-U	38.20	-21.30	0.00	50.09	-	-	74.00	-23.91	-	-	0	100	H
			* 11.44038	33.35	PK-U	38.20	-21.30	0.00	50.25	-	-	74.00	-23.75	-	-	0	100	V
802.11ax HE20 RU mode 26 Tone offset 0 Spot-check	5500	MIMO	6.600	39.35	PK-U	36.00	-27.20	0.00	48.15	-	-	-	-	68.20	-20.05	315	103	H
			6.600	38.68	PK-U	36.00	-27.20	0.00	47.48	-	-	-	-	68.20	-20.72	153	103	V
			* 7.70804	41.64	PK-U	35.90	-24.70	0.00	52.84	-	-	74.00	-21.16	-	-	203	101	H
			* 7.70828	32.03	ADR	35.90	-24.70	0.00	43.23	54.00	-10.77	-	-	-	-	203	101	H
			* 7.70774	40.10	PK-U	35.90	-24.70	0.00	51.30	-	-	74.00	-22.70	-	-	193	274	V
			* 7.70834	30.13	ADR	35.90	-24.70	0.00	41.33	54.00	-12.67	-	-	-	-	193	274	V
			8.800	36.72	PK-U	36.10	-22.80	0.00	50.02	-	-	-	-	68.20	-18.18	204	103	H
			8.800	35.67	PK-U	36.10	-22.80	0.00	48.97	-	-	-	-	68.20	-19.23	116	105	V

Note1. PK-U - U-NII: Maximum Peak / ADR - U-NII AD primary method, RMS average
Note2. * - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

11.4. TX ABOVE 1GHz 2Tx MODE IN THE 5.8 GHz BAND

BANDEDGE (WORST CASE: 802.11ac VHT160 / 5815 MHz Lower)

HORIZONTAL PEAK DATA



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	Antenna_957_Factor(dB)	10dB_Path Loss(dB)	Conversion Factor (dB)	DC Corr (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.725	-51.54	Pk	34.9	-19.8	11.8	0	-24.64	27	-51.64	218	111	H
2	5.65035	-56.31	Pk	34.9	-19.9	11.8	0	-29.51	-26.74	-2.77	218	111	H

Pk - Peak detector

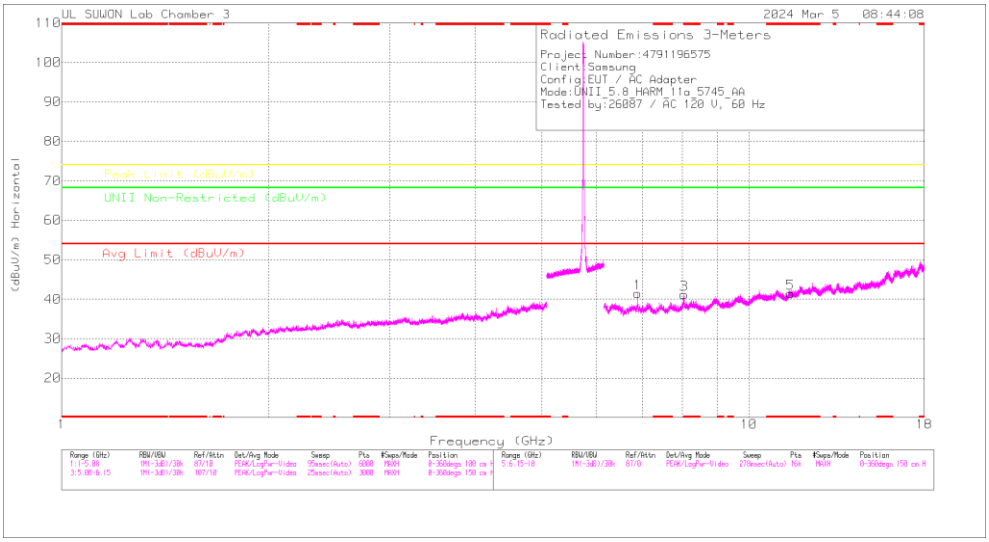
BANDEDGE TEST DATA

Mode	Freq. [MHz]	Antenna	Frequency [GHz]	Reading [dBm]	Detector Mode	ANT Factor [dB/m]	Loss [dB]	Conv. F [dB]	DC Corr [dB]	Result [dBm]	PK Limit [dBm]	PK Margin [dB]	Azimuth [Degs]	Height [cm]	Polarity
802.11a	5745	MIMO	5.72500	-49.86	Pk	34.90	-19.80	11.80	0.00	-22.96	27.00	-49.96	338	110	H
			5.62832	-62.99	Pk	34.90	-20.00	11.80	0.00	-36.29	-27.00	-9.29	338	110	H
			5.72500	-60.63	Pk	34.90	-19.80	11.80	0.00	-33.73	27.00	-60.73	127	100	V
			5.62682	-63.86	Pk	34.90	-20.00	11.80	0.00	-37.16	-27.00	-10.16	127	100	V
802.11n (HT20)	5745	MIMO	5.72500	-55.11	Pk	34.90	-19.80	11.80	0.00	-28.21	27.00	-55.21	217	108	H
			5.64494	-63.36	Pk	34.90	-20.00	11.80	0.00	-36.66	-27.00	-9.66	217	108	H
			5.72500	-55.94	Pk	34.90	-19.80	11.80	0.00	-29.04	27.00	-56.04	185	319	V
			5.63066	-63.75	Pk	34.90	-20.00	11.80	0.00	-37.05	-27.00	-10.05	185	319	V
802.11n (HT40)	5755	MIMO	5.72500	-53.75	Pk	34.90	-19.80	11.80	0.00	-26.85	27.00	-53.85	344	110	H
			5.62734	-62.85	Pk	34.90	-20.00	11.80	0.00	-36.15	-27.00	-9.15	344	110	H
			5.72500	-58.26	Pk	34.90	-19.80	11.80	0.00	-31.36	27.00	-58.36	131	103	V
			5.64284	-62.72	Pk	34.90	-20.00	11.80	0.00	-36.02	-27.00	-9.02	131	103	V
802.11ac (VHT80)	5775 (Lower Side)	MIMO	5.72500	-49.08	Pk	34.90	-19.80	11.80	0.00	-22.18	27.00	-49.18	216	117	H
			5.64410	-62.11	Pk	34.90	-20.00	11.80	0.00	-35.41	-27.00	-8.41	216	117	H
			5.72500	-56.85	Pk	34.90	-19.80	11.80	0.00	-29.95	27.00	-56.95	130	127	V
			5.63878	-63.72	Pk	34.90	-20.00	11.80	0.00	-37.02	-27.00	-10.02	130	127	V
802.11ac (VHT160)	5815 (Lower Side)	MIMO	5.72500	-51.54	Pk	34.90	-19.80	11.80	0.00	-24.64	27.00	-51.64	218	111	H
			5.65035	-56.31	Pk	34.90	-19.90	11.80	0.00	-29.51	-26.74	**-2.77**	218	111	H
			5.72500	-54.31	Pk	34.90	-19.80	11.80	0.00	-27.41	27.00	-54.41	195	277	V
			5.64855	-58.48	Pk	34.90	-20.00	11.80	0.00	-31.78	-27.00	-4.78	195	277	V
802.11ax (HE20)	5745	MIMO	5.72500	-53.32	Pk	34.90	-19.80	11.80	0.00	-26.42	27.00	-53.42	216	117	H
			5.63488	-62.67	Pk	34.90	-19.90	11.80	0.00	-35.87	-27.00	-8.87	216	117	H
			5.72500	-58.24	Pk	34.90	-19.80	11.80	0.00	-31.34	27.00	-58.34	136	100	V
			5.62645	-63.48	Pk	34.90	-20.00	11.80	0.00	-36.78	-27.00	-9.78	136	100	V
802.11ax (HE40)	5755	MIMO	5.72500	-51.61	Pk	34.90	-19.80	11.80	0.00	-24.71	27.00	-51.71	216	116	H
			5.63708	-61.84	Pk	34.90	-20.00	11.80	0.00	-35.14	-27.00	-8.14	216	116	H
			5.72500	-57.91	Pk	34.90	-19.80	11.80	0.00	-31.01	27.00	-58.01	129	111	V
			5.62971	-63.00	Pk	34.90	-20.00	11.80	0.00	-36.30	-27.00	-9.30	129	111	V
802.11ax (HE80)	5775 (Lower Side)	MIMO	5.72500	-49.74	Pk	34.90	-19.80	11.80	0.00	-22.84	27.00	-49.84	215	115	H
			5.64306	-59.49	Pk	34.90	-20.00	11.80	0.00	-32.79	-27.00	-5.79	215	115	H
			5.72500	-59.79	Pk	34.90	-19.80	11.80	0.00	-32.89	27.00	-59.89	135	100	V
			5.63737	-63.24	Pk	34.90	-20.00	11.80	0.00	-36.54	-27.00	-9.54	135	100	V
802.11ax (HE160)	5815 Lower	MIMO	5.72500	-50.51	Pk	34.90	-19.80	11.80	0.00	-23.61	27.00	-50.61	216	115	H
			5.63997	-57.10	Pk	34.90	-20.00	11.80	0.00	-30.40	-27.00	-3.40	216	115	H
			5.72500	-60.74	Pk	34.90	-19.80	11.80	0.00	-33.84	27.00	-60.84	136	103	V
			5.64675	-62.70	Pk	34.90	-20.00	11.80	0.00	-36.00	-27.00	-9.00	136	103	V

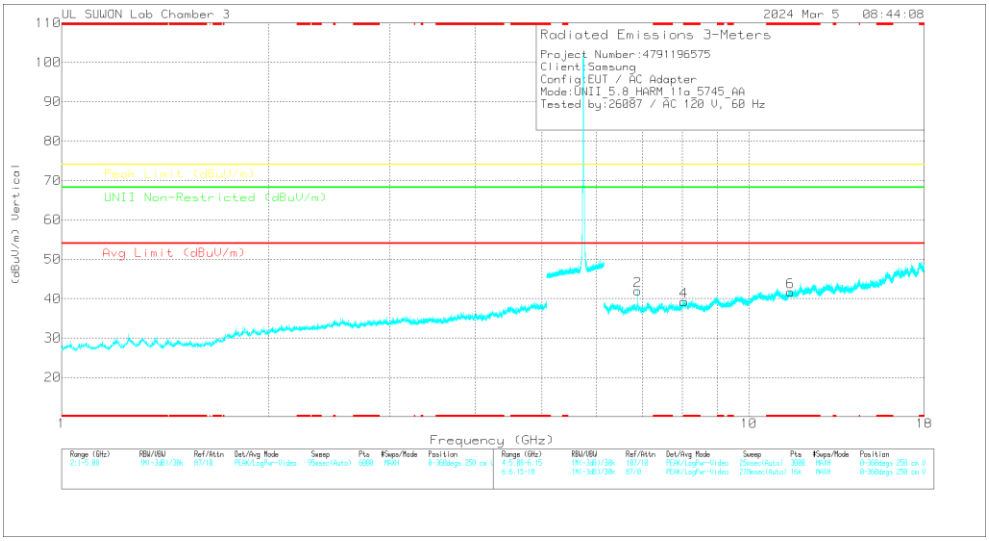
Note. Pk - Peak detector

HARMONICS AND SPURIOUS EMISSIONS(WORST CASE: 802.11a / 5745 MHz)

5745 MHz HORIZONTAL



5745 MHz VERTICAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

5745 MHz DATA

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	Antenna_957_Factor(dB)	6GHz_HP_Path Loss(dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	UNII Non-Restricted (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
6.89425	40.71	PK-U	36	-26.4	0	50.31	-	-	-	-	68.2	-17.89	208	100	H
6.89427	39.84	PK-U	36	-26.4	0	49.44	-	-	-	-	68.2	-18.76	182	286	V
* 8.03703	39.43	PK-U	35.9	-24.2	0	51.13	-	-	74	-22.87	-	-	204	106	H
* 8.03663	28.37	ADR	35.9	-24.3	.15	40.12	54	-13.88	-	-	-	-	204	106	H
* 8.03793	37.15	PK-U	35.9	-24.2	0	48.85	-	-	74	-25.15	-	-	172	271	V
* 8.03683	26.88	ADR	35.9	-24.2	.15	38.73	54	-15.27	-	-	-	-	172	271	V
* 11.49464	33.56	PK-U	38.2	-21.4	0	50.36	-	-	74	-23.64	-	-	0	100	H
* 11.48227	33.82	PK-U	38.2	-21.4	0	50.62	-	-	74	-23.38	-	-	0	100	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK-U - U-NII: Maximum Peak
ADR - U-NII AD primary method, RMS average

HARMONICS AND SPURIOUS EMISSIONS TEST DATA

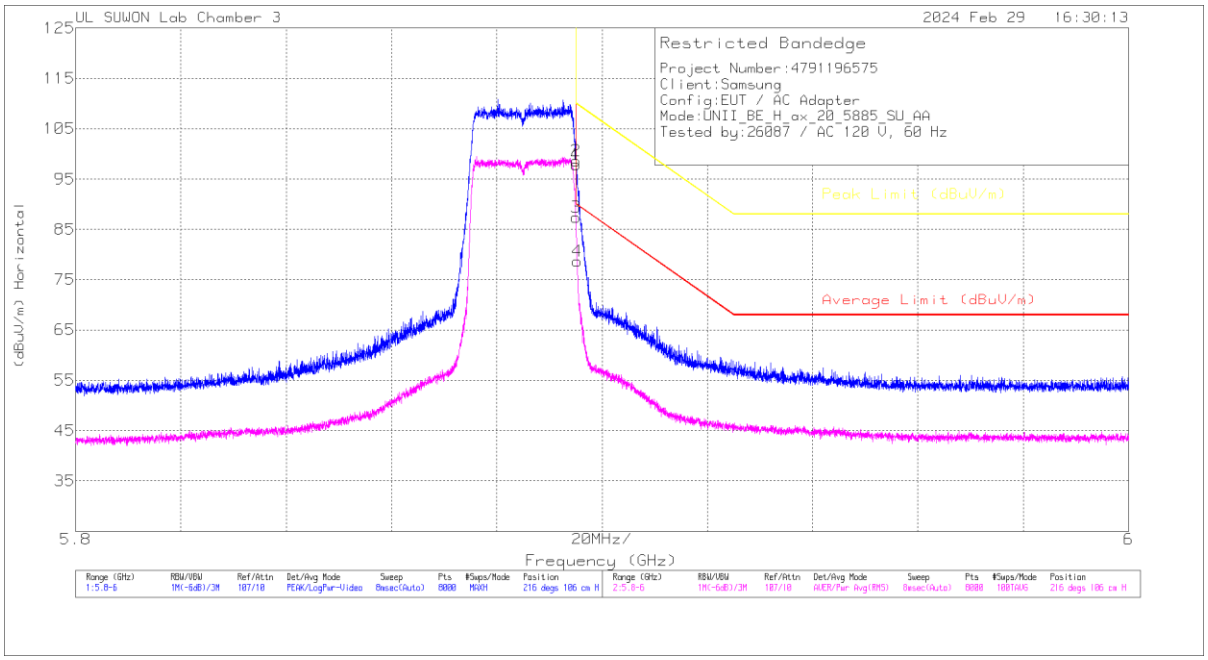
Mode	Freq. [MHz]	Antenna	Frequency [GHz]	Reading [dBuV]	Detector Mode	ANT Factor [dB/m]	Loss [dB]	DC Corr [dB]	Result [dBuV/m]	AV Limit [dBuV/m]	AV Margin [dB]	PK Limit [dBuV/m]	PK Margin [dB]	Non-Restricted [dBuV/m]	Margin [dB]	Azimuth [Degs]	Height [cm]	Polarity
802.11a	5745	MIMO	6.894	40.71	PK-U	36.00	-26.40	0.00	50.31	-	-	-	-	68.20	**-17.89**	208	100	H
			6.894	39.84	PK-U	36.00	-26.40	0.00	49.44	-	-	-	-	68.20	-18.76	182	286	V
			* 8.03703	39.43	PK-U	35.90	-24.20	0.00	51.13	-	-	74.00	-22.87	-	-	204	106	H
			* 8.03663	28.37	ADR	35.90	-24.30	0.15	40.12	54.00	**-13.88**	-	-	-	-	204	106	H
			* 8.03793	37.15	PK-U	35.90	-24.20	0.00	48.85	-	-	74.00	-25.15	-	-	172	271	V
			* 8.03683	26.88	ADR	35.90	-24.20	0.15	38.73	54.00	-15.27	-	-	-	-	172	271	V
			* 11.49464	33.56	PK-U	38.20	-21.40	0.00	50.36	-	-	74.00	-23.64	-	-	0	100	H
			* 11.48227	33.82	PK-U	38.20	-21.40	0.00	50.62	-	-	74.00	-23.38	-	-	0	100	V
	5785	MIMO	6.942	40.54	PK-U	36.00	-26.30	0.00	50.24	-	-	-	-	68.20	-17.96	208	106	H
			6.942	39.23	PK-U	36.00	-26.30	0.00	48.93	-	-	-	-	68.20	-19.27	185	273	V
			* 8.09773	37.79	PK-U	36.00	-24.00	0.00	49.79	-	-	74.00	-24.21	-	-	204	106	H
			* 8.10513	27.23	ADR	36.00	-24.00	0.15	39.38	54.00	-14.62	-	-	-	-	204	106	H
			* 8.10467	36.78	PK-U	36.00	-24.00	0.00	48.78	-	-	74.00	-25.22	-	-	170	250	V
			* 8.09188	25.62	ADR	36.00	-24.10	0.15	37.67	54.00	-16.33	-	-	-	-	170	250	V
			* 11.57429	34.99	PK-U	38.20	-21.50	0.00	51.69	-	-	74.00	-22.31	-	-	0	100	H
			* 11.56769	34.84	PK-U	38.20	-21.60	0.00	51.44	-	-	74.00	-22.56	-	-	0	100	V
	5825	MIMO	6.990	39.92	PK-U	36.00	-26.40	0.00	49.52	-	-	-	-	68.20	-18.68	204	103	H
			6.991	39.83	PK-U	36.00	-26.40	0.00	49.43	-	-	-	-	68.20	-18.77	178	283	V
			* 8.16128	37.45	PK-U	36.00	-23.90	0.00	49.55	-	-	74.00	-24.45	-	-	200	103	H
			* 8.16138	25.99	ADR	36.00	-23.90	0.15	38.24	54.00	-15.76	-	-	-	-	200	103	H
			* 8.18433	36.19	PK-U	36.00	-23.90	0.00	48.29	-	-	74.00	-25.71	-	-	158	101	V
			* 8.16136	24.89	ADR	36.00	-23.90	0.15	37.14	54.00	-16.86	-	-	-	-	158	101	V
			* 11.64444	35.60	PK-U	38.30	-21.60	0.00	52.30	-	-	74.00	**-21.70**	-	-	211	101	H
			* 11.64883	23.12	ADR	38.30	-21.60	0.15	39.97	54.00	-14.03	-	-	-	-	211	101	H
802.11ax HE20 RU mode 26 Tone offset 0 Spot-check	5745	MIMO	6.894	39.76	PK-U	36.00	-26.40	0.00	49.36	-	-	-	-	68.20	-18.84	208	100	H
			6.894	39.32	PK-U	36.00	-26.40	0.00	48.92	-	-	-	-	68.20	-19.28	182	322	V
			* 8.05151	39.00	PK-U	35.90	-24.20	0.00	50.70	-	-	74.00	-23.30	-	-	205	108	H
			* 8.05174	27.50	ADR	35.90	-24.20	0.00	39.20	54.00	-14.80	-	-	-	-	205	108	H
			* 8.05114	37.76	PK-U	35.90	-24.20	0.00	49.46	-	-	74.00	-24.54	-	-	357	103	V
			* 8.05061	25.93	ADR	35.90	-24.20	0.00	37.63	54.00	-16.37	-	-	-	-	357	103	V
			* 9.19108	34.64	PK-U	36.50	-22.40	0.00	48.74	-	-	74.00	-25.26	-	-	4	100	H
			* 9.19194	22.86	ADR	36.50	-22.40	0.00	36.96	54.00	-17.04	-	-	-	-	4	100	H
			* 9.19255	34.50	PK-U	36.50	-22.40	0.00	48.60	-	-	74.00	-25.40	-	-	129	103	V
			* 9.19197	23.11	ADR	36.50	-22.40	0.00	37.21	54.00	-16.79	-	-	-	-	129	103	V

Note1. PK-U - U-NII: Maximum Peak / ADR - U-NII AD primary method, RMS average
Note2. * - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

11.5. TX ABOVE 1GHz 2Tx MODE IN THE 5.9 GHz BAND

BANDEDGE (WORST CASE: 802.11ax HE20 / 5885 MHz)

HORIZONTAL PEAK DATA



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	Antenna_957_Factor(dB)	10dB_Path Loss(dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.89501	81.91	Pk	35.4	-19.4	0	97.91	-	-	109.99	-12.08	216	106	H
2	5.89504	82.57	Pk	35.4	-19.4	0	98.57	-	-	109.97	-11.4	216	106	H
3	5.89501	71.42	RMS	35.4	-19.4	0	87.42	89.99	-2.57	-	-	216	106	H
4	5.89529	62.67	RMS	35.4	-19.4	0	78.67	89.79	-11.12	-	-	216	106	H

Pk - Peak detector
RMS - RMS detection

BANDEDGE TEST DATA

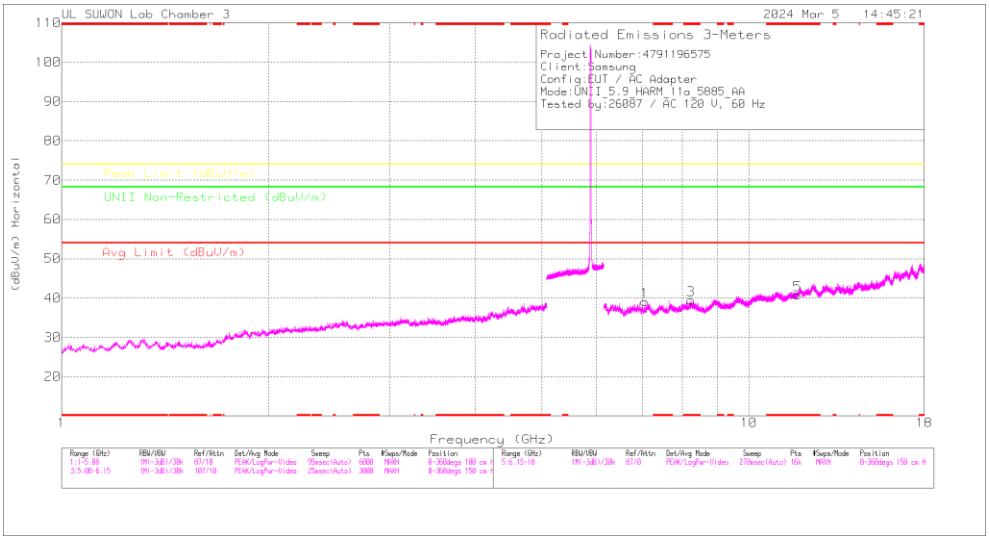
Mode	Freq. [MHz]	Antenna	Frequency [GHz]	Reading [dBuV]	Detector Mode	ANT Factor [dB/m]	Loss [dB]	DC Corr [dB]	Result [dBuV/m]	AV Limit [dBuV/m]	AV Margin [dB]	PK Limit [dBuV/m]	PK Margin [dB]	Azimuth [Degs]	Height [cm]	Polarity
802.11a	5885	MIMO	5.895	70.66	Pk	35.40	-19.40	0.00	86.66	-	-	109.99	-23.33	338	112	H
			5.895	71.74	Pk	35.40	-19.40	0.00	87.74	-	-	109.95	-22.21	338	112	H
			5.895	56.24	RMS	35.40	-19.40	0.15	72.39	89.99	-17.60	-	-	338	112	H
			5.895	56.59	RMS	35.40	-19.40	0.15	72.74	89.97	-17.23	-	-	338	112	H
			5.895	68.62	Pk	35.40	-19.40	0.00	84.62	-	-	109.99	-25.37	102	289	V
			5.895	69.33	Pk	35.40	-19.40	0.00	85.33	-	-	109.88	-24.55	102	289	V
			5.895	54.28	RMS	35.40	-19.40	0.15	70.43	89.99	-19.56	-	-	102	289	V
			5.895	53.84	RMS	35.40	-19.40	0.15	69.99	89.86	-19.87	-	-	102	289	V
802.11n (HT20)	5885	MIMO	5.895	74.79	Pk	35.40	-19.40	0.00	90.79	-	-	109.99	-19.20	217	100	H
			5.895	75.57	Pk	35.40	-19.40	0.00	91.57	-	-	109.94	-18.37	217	100	H
			5.895	60.40	RMS	35.40	-19.40	0.00	76.40	89.99	-13.59	-	-	217	100	H
			5.895	61.02	RMS	35.40	-19.40	0.00	77.02	89.94	-12.92	-	-	217	100	H
			5.895	76.54	Pk	35.40	-19.40	0.00	92.54	-	-	109.99	-17.45	186	304	V
			5.895	75.77	Pk	35.40	-19.40	0.00	91.77	-	-	109.92	-18.15	186	304	V
			5.895	61.25	RMS	35.40	-19.40	0.00	77.25	89.99	-12.74	-	-	186	304	V
			5.895	61.00	RMS	35.40	-19.40	0.00	77.00	89.95	-12.95	-	-	186	304	V
802.11n (HT40)	5875	MIMO	5.895	71.23	Pk	35.40	-19.40	0.00	87.23	-	-	109.99	-22.76	340	115	H
			5.895	71.59	Pk	35.40	-19.40	0.00	87.59	-	-	109.97	-22.38	340	115	H
			5.895	54.78	RMS	35.40	-19.40	0.00	70.78	89.99	-19.21	-	-	340	115	H
			5.895	55.19	RMS	35.40	-19.40	0.00	71.19	89.79	-18.60	-	-	340	115	H
			5.895	70.03	Pk	35.40	-19.40	0.00	86.03	-	-	109.99	-23.96	86	333	V
			5.895	68.44	Pk	35.40	-19.40	0.00	84.44	-	-	109.95	-25.51	86	333	V
			5.895	52.38	RMS	35.40	-19.40	0.00	68.38	89.99	-21.61	-	-	86	333	V
			5.895	53.35	RMS	35.40	-19.40	0.00	69.35	89.90	-20.55	-	-	86	333	V
802.11ac (VHT80)	5855	MIMO	5.895	69.00	Pk	35.40	-19.40	0.00	85.00	-	-	109.99	-24.99	217	117	H
			5.895	69.44	Pk	35.40	-19.40	0.00	85.44	-	-	109.70	-24.26	217	117	H
			5.895	51.58	RMS	35.40	-19.40	0.25	67.83	89.99	-22.16	-	-	217	117	H
			5.932	33.33	RMS	35.50	-19.30	0.25	49.78	68.00	-18.22	-	-	217	117	H
			5.895	69.77	Pk	35.40	-19.40	0.00	85.77	-	-	109.99	-24.22	196	275	V
			5.895	69.88	Pk	35.40	-19.40	0.00	85.88	-	-	109.86	-23.98	196	275	V
			5.895	50.89	RMS	35.40	-19.40	0.25	67.14	89.99	-22.85	-	-	196	275	V
			5.925	32.87	RMS	35.50	-19.40	0.25	49.22	68.17	-18.95	-	-	196	275	V
802.11ac (VHT160)	5815 Upper	MIMO	5.895	68.45	Pk	35.40	-19.40	0.00	84.45	-	-	109.99	-25.54	206	101	H
			5.927	48.87	Pk	35.50	-19.40	0.00	64.97	-	-	88.00	-23.03	206	101	H
			5.895	49.99	RMS	35.40	-19.40	0.24	66.23	89.99	-23.76	-	-	206	100	H
			5.930	33.51	RMS	35.50	-19.40	0.24	49.85	68.00	-18.15	-	-	206	100	H
			5.895	64.51	Pk	35.40	-19.40	0.00	80.51	-	-	109.99	-29.48	196	276	V
			5.928	48.27	Pk	35.50	-19.40	0.00	64.37	-	-	88.00	-23.63	196	276	V
			5.895	47.49	RMS	35.40	-19.40	0.24	63.73	89.99	-26.26	-	-	196	276	V
			5.927	32.60	RMS	35.50	-19.40	0.24	48.94	68.00	-19.06	-	-	196	276	V
802.11ax (HE20)	5885	MIMO	5.895	81.91	Pk	35.40	-19.40	0.00	97.91	-	-	109.99	-12.08	216	106	H
			5.895	82.57	Pk	35.40	-19.40	0.00	98.57	-	-	109.97	**-11.40**	216	106	H
			5.895	71.42	RMS	35.40	-19.40	0.00	87.42	89.99	**-2.57**	-	-	216	106	H
			5.895	62.67	RMS	35.40	-19.40	0.00	78.67	89.79	-11.12	-	-	216	106	H
			5.895	76.23	Pk	35.40	-19.40	0.00	92.23	-	-	109.99	-17.76	194	388	V
			5.895	77.83	Pk	35.40	-19.40	0.00	93.83	-	-	109.95	-16.12	194	388	V
			5.895	66.52	RMS	35.40	-19.40	0.00	82.52	89.99	-7.47	-	-	194	388	V
			5.895	65.80	RMS	35.40	-19.40	0.00	81.80	89.95	-8.15	-	-	194	388	V
802.11ax (HE40)	5875	MIMO	5.895	73.54	Pk	35.40	-19.40	0.00	89.54	-	-	109.99	-20.45	214	106	H
			5.895	75.63	Pk	35.40	-19.40	0.00	91.63	-	-	109.95	-18.32	214	106	H
			5.895	55.80	RMS	35.40	-19.40	0.00	71.80	89.99	-18.19	-	-	214	106	H
			5.925	33.88	RMS	35.50	-19.40	0.00	49.98	68.00	-18.02	-	-	214	106	H
			5.895	72.19	Pk	35.40	-19.40	0.00	88.19	-	-	109.99	-21.80	194	389	V
			5.895	71.65	Pk	35.40	-19.40	0.00	87.65	-	-	109.95	-22.30	194	389	V
			5.895	50.78	RMS	35.40	-19.40	0.00	66.78	89.99	-23.21	-	-	194	389	V
			5.925	30.64	RMS	35.50	-19.40	0.00	46.74	68.36	-21.62	-	-	194	389	V
802.11ax (HE80)	5855	MIMO	5.895	72.33	Pk	35.40	-19.40	0.00	88.33	-	-	109.99	-21.66	216	108	H
			5.925	52.40	Pk	35.50	-19.40	0.00	68.50	-	-	88.00	-19.50	216	108	H
			5.895	52.51	RMS	35.40	-19.40	0.00	68.51	89.99	-21.48	-	-	216	108	H
			5.926	40.44	RMS	35.50	-19.40	0.00	56.54	68.00	-11.46	-	-	216	108	H
			5.895	70.24	Pk	35.40	-19.40	0.00	86.24	-	-	109.99	-23.75	194	389	V
			5.925	48.77	Pk	35.50	-19.40	0.00	64.87	-	-	88.00	-23.13	194	389	V
			5.895	47.53	RMS	35.40	-19.40	0.00	63.53	89.99	-26.46	-	-	194	389	V
			5.928	34.55	RMS	35.50	-19.40	0.00	50.65	68.00	-17.35	-	-	194	389	V
802.11ax (HE160)	5815 Upper	MIMO	5.895	71.50	Pk	35.40	-19.40	0.00	87.50	-	-	109.99	-22.49	214	108	H
			5.926	49.82	Pk	35.50	-19.40	0.00	65.92	-	-	88.00	-22.08	214	108	H
			5.895	49.91	RMS	35.40	-19.40	0.00	65.91	89.99	-24.08	-	-	214	108	H
			5.936	33.44	RMS	35.50	-19.40	0.00	49.54	68.00	-18.46	-	-	214	108	H
			5.895	65.73	Pk	35.40	-19.40	0.00	81.73	-	-	109.99	-28.26	194	387	V
			5.895	66.30	Pk	35.40	-19.40	0.00	82.30	-	-	109.94	-27.64	194	387	V
			5.895	45.98	RMS	35.40	-19.40	0.00	61.98	89.99	-28.01	-	-	194	387	V
			5.928	30.75	RMS	35.50	-19.40	0.00	46.85	68.00	-21.15	-	-	194	387	V

Note1. PK: Maximum Peak / ADR - U-NII AD primary method, RMS average
Note2. * - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

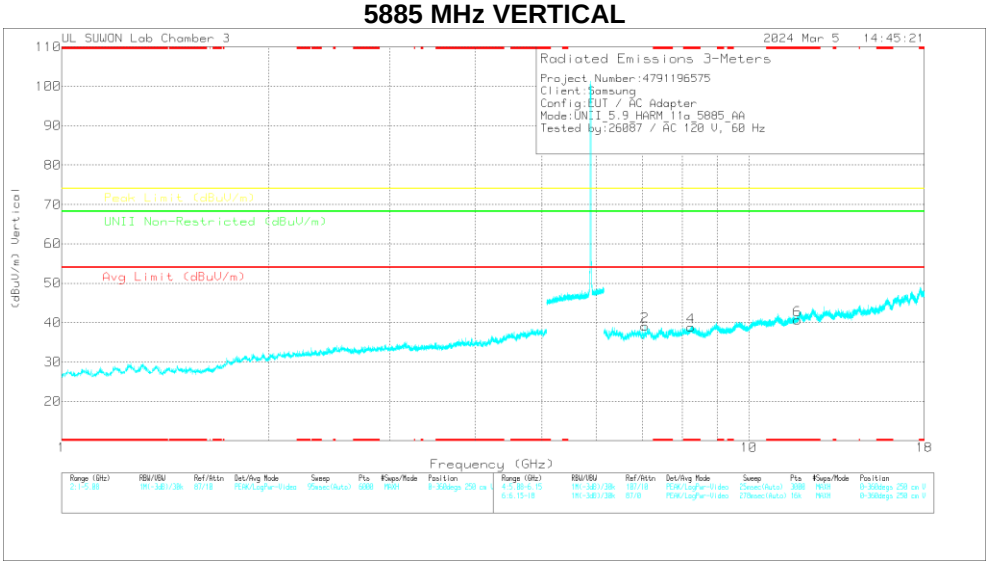
UL KOREA LTD. Suwon Laboratory FORM ID: FCC_15E(05)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

HARMONICS AND SPURIOUS EMISSIONS(WORST CASE: 802.11a / 5885 MHz)

5885 MHz HORIZONTAL



5885 MHz VERTICAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

5885 MHz DATA

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	Antenna_957_Factor(dB)	6GHz_HP_Path Loss(dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	UNII Non-Restricted (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
7.06198	40.1	PK-U	35.9	-26.2	0	49.8	-	-	-	-	68.2	-18.4	207	112	H
7.06186	38.97	PK-U	35.9	-26.2	0	48.67	-	-	-	-	68.2	-19.53	188	320	V
* 8.23806	36.85	PK-U	36	-23.8	0	49.05	-	-	74	-24.95	-	-	203	103	H
* 8.24556	26.27	ADR	36	-23.8	.15	38.62	54	-15.38	-	-	-	-	203	103	H
* 8.23724	36.4	PK-U	36	-23.8	0	48.6	-	-	74	-25.4	-	-	162	101	V
* 8.23515	25.24	ADR	36	-23.8	.15	37.59	54	-16.41	-	-	-	-	162	101	V
* 11.7676	34.32	PK-U	38.4	-21.4	0	51.32	-	-	74	-22.68	-	-	0	100	H
* 11.77083	34.28	PK-U	38.4	-21.4	0	51.28	-	-	74	-22.72	-	-	0	100	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK-U - U-NII: Maximum Peak
ADR - U-NII AD primary method, RMS average

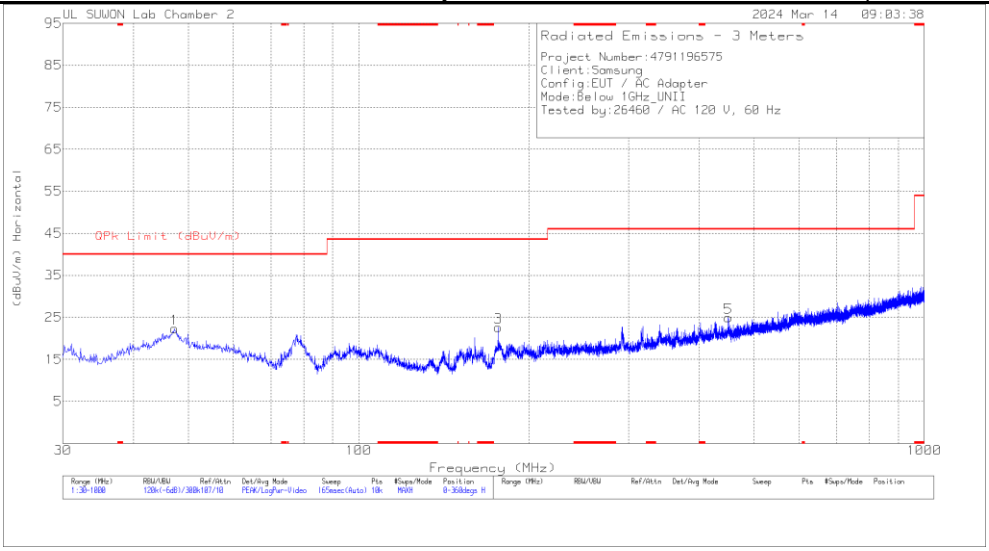
HARMONICS AND SPURIOUS EMISSIONS TEST DATA

Mode	Freq. [MHz]	Antenna	Frequency [GHz]	Reading [dBuV]	Detector Mode	ANT Factor [dB/m]	Loss [dB]	DC Corr [dB]	Result [dBuV/m]	AV Limit [dBuV/m]	AV Margin [dB]	PK Limit [dBuV/m]	PK Margin [dB]	Non-Restricted [dBuV/m]	Margin [dB]	Azimuth [Degs]	Height [cm]	Polarity
802.11a	5845	MIMO	7.015	39.33	PK-U	36.00	-26.40	0.00	48.93	-	-	-	-	68.20	-19.27	217	108	H
			7.014	39.48	PK-U	36.00	-26.40	0.00	49.08	-	-	-	-	68.20	-19.12	185	323	V
			* 8.18937	36.79	PK-U	36.00	-23.80	0.00	48.99	-	-	74.00	-25.01	-	-	204	101	H
			* 8.17608	25.96	ADR	36.00	-23.90	0.15	38.21	54.00	-15.79	-	-	-	-	204	101	H
			* 8.18992	36.43	PK-U	36.00	-23.80	0.00	48.63	-	-	74.00	-25.37	-	-	162	100	V
			* 8.18992	25.05	ADR	36.00	-23.80	0.15	37.40	54.00	-16.60	-	-	-	-	162	100	V
			* 11.686	34.10	PK-U	38.40	-21.50	0.00	51.00	-	-	74.00	-23.00	-	-	0	100	H
			* 11.68957	35.11	PK-U	38.40	-21.50	0.00	52.01	-	-	74.00	**-21.99**	-	-	0	100	V
	5865	MIMO	7.038	39.51	PK-U	35.90	-26.40	0.00	49.01	-	-	-	-	68.20	-19.19	208	126	H
			7.038	38.87	PK-U	35.90	-26.40	0.00	48.37	-	-	-	-	68.20	-19.83	186	333	V
			* 8.20368	36.98	PK-U	36.00	-23.80	0.00	49.18	-	-	74.00	-24.82	-	-	203	103	H
			* 8.20398	25.80	ADR	36.00	-23.80	0.15	38.15	54.00	-15.85	-	-	-	-	203	103	H
			* 8.24164	36.26	PK-U	36.00	-23.80	0.00	48.46	-	-	74.00	-25.54	-	-	158	101	V
			* 8.21757	25.26	ADR	36.00	-23.80	0.15	37.61	54.00	-16.39	-	-	-	-	158	101	V
			* 11.73078	34.14	PK-U	38.40	-21.50	0.00	51.04	-	-	74.00	-22.96	-	-	0	100	H
			* 11.72694	34.77	PK-U	38.40	-21.50	0.00	51.67	-	-	74.00	-22.33	-	-	0	100	V
	5885	MIMO	7.062	40.10	PK-U	35.90	-26.20	0.00	49.80	-	-	-	-	68.20	**-18.40**	207	112	H
			7.062	38.97	PK-U	35.90	-26.20	0.00	48.67	-	-	-	-	68.20	-19.53	188	320	V
			* 8.23806	36.85	PK-U	36.00	-23.80	0.00	49.05	-	-	74.00	-24.95	-	-	203	103	H
			* 8.24556	26.27	ADR	36.00	-23.80	0.15	38.62	54.00	**-15.38**	-	-	-	-	203	103	H
			* 8.23724	36.40	PK-U	36.00	-23.80	0.00	48.60	-	-	74.00	-25.40	-	-	162	101	V
			* 8.23515	25.24	ADR	36.00	-23.80	0.15	37.59	54.00	-16.41	-	-	-	-	162	101	V
			* 11.7676	34.32	PK-U	38.40	-21.40	0.00	51.32	-	-	74.00	-22.68	-	-	0	100	H
			* 11.77083	34.28	PK-U	38.40	-21.40	0.00	51.28	-	-	74.00	-22.72	-	-	0	100	V
802.11ax HE20 RU mode 26 Tone offset 8 Spot-check	5885	MIMO	7.062	39.52	PK-U	35.90	-26.20	0.00	49.22	-	-	-	-	68.20	-18.98	208	107	H
			7.062	39.22	PK-U	35.90	-26.20	0.00	48.92	-	-	-	-	68.20	-19.28	179	277	V
			* 8.23082	36.34	PK-U	36.00	-23.80	0.00	48.54	-	-	74.00	-25.46	-	-	204	100	H
			* 8.23025	25.47	ADR	36.00	-23.80	0.00	37.67	54.00	-16.33	-	-	-	-	204	100	H
			* 8.23071	36.33	PK-U	36.00	-23.80	0.00	48.53	-	-	74.00	-25.47	-	-	158	103	V
			* 8.23054	24.65	ADR	36.00	-23.80	0.00	36.85	54.00	-17.15	-	-	-	-	158	103	V
			* 11.77134	34.44	PK-U	38.40	-21.50	0.00	51.34	-	-	74.00	-22.66	-	-	0	100	H
			* 11.77042	34.18	PK-U	38.40	-21.40	0.00	51.18	-	-	74.00	-22.82	-	-	0	100	V

Note1. PK-U - U-NII: Maximum Peak / ADR - U-NII AD primary method, RMS average
Note2. * - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

12. WORST-CASE BELOW 1 GHz

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)



SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Antenna_749_Factor(dB/m)	Below_1G_Path Loss(dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	47.266	34.01	Pk	20	-31.7	0	22.31	40	-17.69	0-360	200	H
3	176.567	38.24	Pk	15.1	-30.7	0	22.64	43.52	-20.88	0-360	100	H
5	450.592	32.64	Pk	21.9	-29.6	0	24.94	46.02	-21.08	0-360	100	H
2	47.46	38.85	Pk	20	-31.7	0	27.15	40	-12.85	0-360	100	V
4	176.567	36.02	Pk	15.1	-30.7	0	20.42	43.52	-23.1	0-360	100	V
6	450.883	32.03	Pk	21.9	-29.6	0	24.33	46.02	-21.69	0-360	100	V

Pk - Peak detector

13. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)
IC RSS-GEN Clause 8.8

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.10.

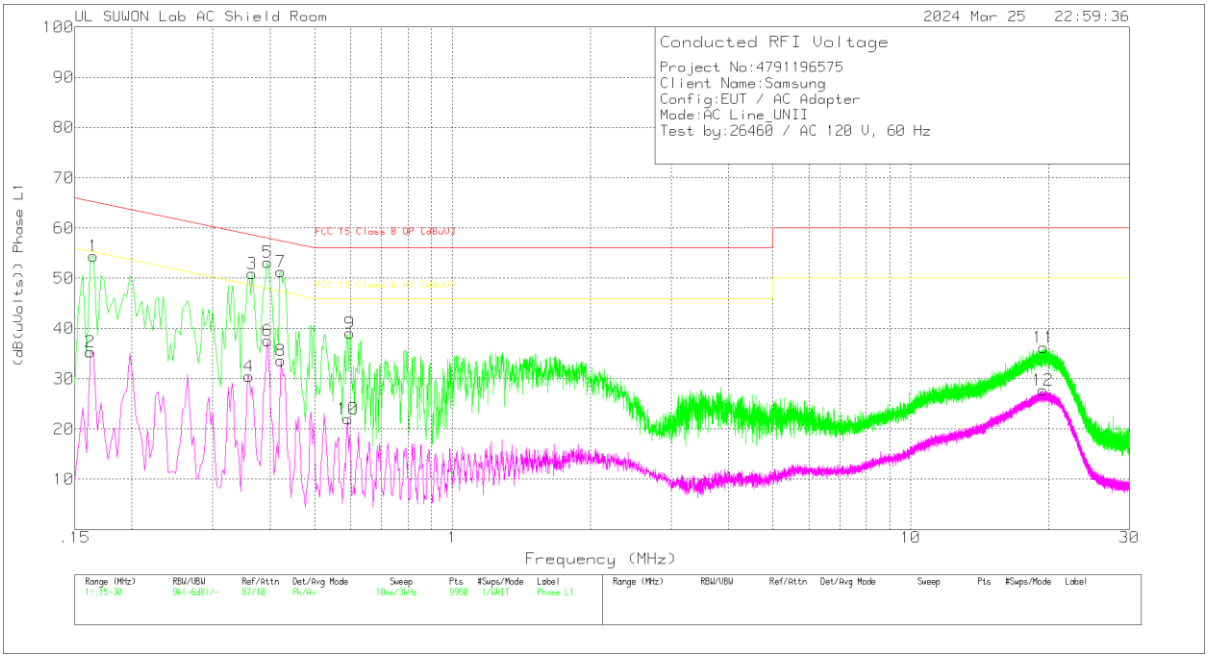
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

Line conducted data is recorded for both NEUTRAL and HOT lines.

RESULTS

WORST EMISSIONS

LINE 1 DATA



Trace Markers

Range 1: Phase L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101836_With EX_L1 [dB]	Cable Loss [dB]	Corrected Reading (dBuVolts)	FCC 15 Class B QP [dBuV]	Margin (dB)	FCC 15 Class B AV [dBuV]	Margin (dB)
1	.165	44.47	Pk	9.9	.1	54.47	65.21	-10.74	-	-
2	.162	25.37	Av	9.9	.1	35.37	-	-	55.36	-19.99
3	.366	41.05	Pk	9.8	.1	50.95	58.59	-7.64	-	-
4	.36	20.6	Av	9.8	.1	30.5	-	-	48.73	-18.23
5	.396	43.22	Pk	9.8	.1	53.12	57.94	-4.82	-	-
6	.396	27.75	Av	9.8	.1	37.65	-	-	47.94	-10.29
7	.423	41.38	Pk	9.8	.1	51.28	57.39	-6.11	-	-
8	.423	23.72	Av	9.8	.1	33.62	-	-	47.39	-13.77
9	.597	29.17	Pk	9.8	.1	39.07	56	-16.93	-	-
10	.591	12.12	Av	9.8	.1	22.02	-	-	46	-23.98
11	19.479	25.68	Pk	10.2	.3	36.18	60	-23.82	-	-
12	19.404	17.22	Av	10.2	.3	27.72	-	-	50	-22.28

Pk - Peak detector
Av - Average detection

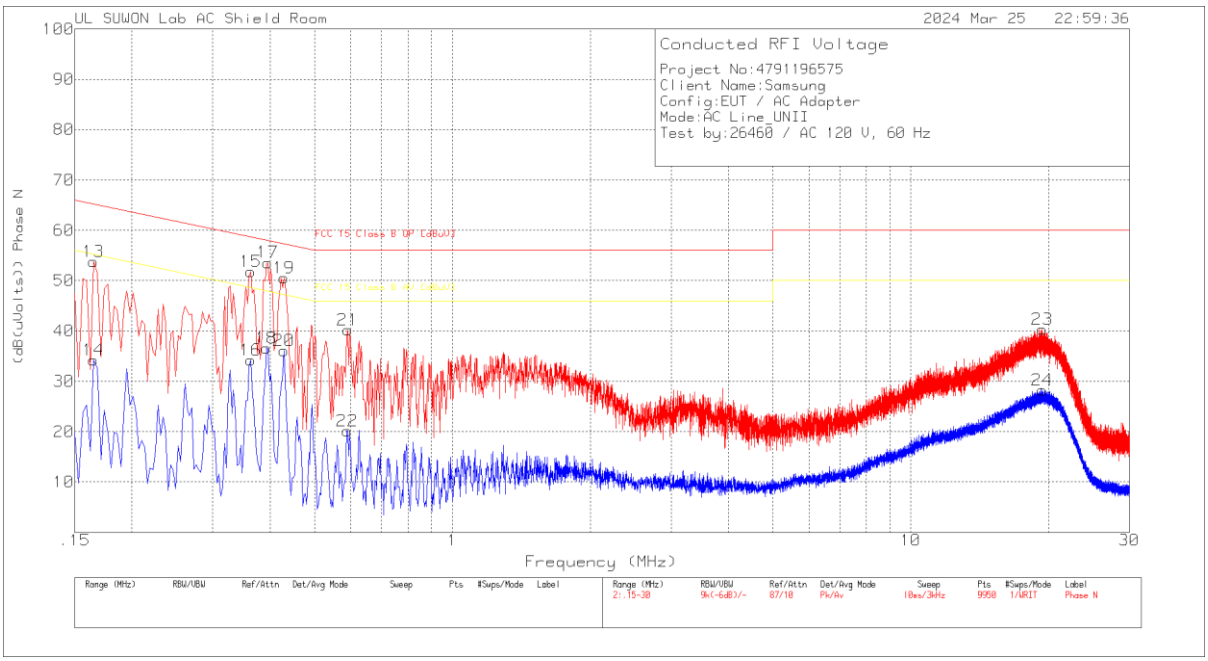
Quasi-Peak Emissions

Range 1: Phase L1 .15 - 30MHz

Frequency (MHz)	Meter Reading (dBuV)	Det	101836_With EX_L1 [dB]	Cable Loss [dB]	Corrected Reading (dBuVolts)	FCC 15 Class B QP [dBuV]	Margin (dB)	FCC 15 Class B AV [dBuV]	Margin (dB)
.366	39.19	Qp	9.8	.1	49.09	58.59	-9.5	-	-
.396	40.76	Qp	9.8	.1	50.66	57.94	-7.28	-	-
.423	37.66	Qp	9.8	.1	47.56	57.39	-9.83	-	-

Qp - Quasi-Peak detector

LINE 2 DATA



Trace Markers

Range 2: Phase N .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101836_With EX_N [dB]	Cable Loss [dB]	Corrected Reading (dBuVolts)	FCC 15 Class B QP [dBuV]	Margin (dB)	FCC 15 Class B AV [dBuV]	Margin (dB)
13	.165	43.85	Pk	9.9	.1	53.85	65.21	-11.36	-	-
14	.165	24.23	Av	9.9	.1	34.23	-	-	55.21	-20.98
15	.363	41.87	Pk	9.8	.1	51.77	58.66	-6.89	-	-
16	.363	24.33	Av	9.8	.1	34.23	-	-	48.66	-14.43
17	.396	43.71	Pk	9.8	.1	53.61	57.94	-4.33	-	-
18	.393	26.69	Av	9.8	.1	36.59	-	-	48	-11.41
19	.429	40.67	Pk	9.8	.1	50.57	57.27	-6.7	-	-
20	.429	26.25	Av	9.8	.1	36.15	-	-	47.27	-11.12
21	.591	30.3	Pk	9.8	.1	40.2	56	-15.8	-	-
22	.5895	10.24	Av	9.8	.1	20.14	-	-	46	-25.86
23	19.374	29.84	Pk	10.2	.3	40.34	60	-19.66	-	-
24	19.377	17.72	Av	10.2	.3	28.22	-	-	50	-21.78

Pk - Peak detector
Av - Average detection

Quasi-Peak Emissions

Range 2: Phase N .15 - 30MHz

Frequency (MHz)	Meter Reading (dBuV)	Det	101836_With EX_N [dB]	Cable Loss [dB]	Corrected Reading (dBuVolts)	FCC 15 Class B QP [dBuV]	Margin (dB)	FCC 15 Class B AV [dBuV]	Margin (dB)
.363	39.96	Qp	9.8	.1	49.86	58.66	-8.8	-	-
.396	41.94	Qp	9.8	.1	51.84	57.94	-6.1	-	-
.429	39.44	Qp	9.8	.1	49.34	57.27	-7.93	-	-

Qp - Quasi-Peak detector

14. DYNAMIC FREQUENCY SELECTION

14.1. OVERVIEW

14.1.1. LIMITS

FCC

§15.407 (h), FCC KDB 905462 D02 “COMPLIANCE MEASUREMENT PROCEDURES FOR UNLICENSED-NATIONAL INFORMATION INFRASTRUCTURE DEVICES OPERATING IN THE 5250-5350 MHz AND 5470-5725 MHz BANDS INCORPORATING DYNAMIC FREQUENCY SELECTION” and KDB 905462 D03 “U-NII CLIENT DEVICES WITHOUT RADAR DETECTION CAPABILITY”.

Table 1: Applicability of DFS requirements prior to use of a channel

Requirement	Operational Mode		
	Master	Client (without radar detection)	Client (with radar detection)
Non-Occupancy Period	Yes	Not required	Yes
DFS Detection Threshold	Yes	Not required	Yes
Channel Availability Check Time	Yes	Not required	Not required
U-NII Detection Bandwidth	Yes	Not required	Yes

Table 2: Applicability of DFS requirements during normal operation

Requirement	Operational Mode		
	Master	Client **(without DFS)**	Client **(with DFS)**
DFS Detection Threshold	Yes	Not required	Yes
Channel Closing Transmission Time	Yes	Yes	Yes
Channel Move Time	Yes	Yes	Yes
U-NII Detection Bandwidth	Yes	Not required	Yes

Additional requirements for devices with multiple bandwidth modes	Master Device or Client with Radar DFS	Client (without DFS)
U-NII Detection Bandwidth and Statistical Performance Check	All BW modes must be tested	Not required
Channel Move Time and Channel Closing Transmission Time	Test using widest BW mode available	Test using the widest BW mode available for the link
All other tests	Any single BW mode	Not required
Note: Frequencies selected for statistical performance check (Section 7.8.4) should include several frequencies within the radar detection bandwidth and frequencies near the edge of the radar detection bandwidth. For 802.11 devices it is suggested to select frequencies in all 20 MHz channel blocks and a null frequency between the bonded 20 MHz channel blocks.		

Table 3: Interference Threshold values, Master or Client incorporating In-Service Monitoring

Maximum Transmit Power	Value (see notes)
E.I.R.P. ≥ 200 mill watt	-64 dBm
E.I.R.P. < 200 mill watt and power spectral density < 10 dBm/MHz	-62 dBm
E.I.R.P. < 200 mill watt that do not meet power spectral density requirement	-64 dBm

Note 1: This is the level at the input of the receiver assuming a 0 dBi receive antenna
Note 2: Throughout these test procedures an additional 1 dB has been added to the amplitude of the test transmission waveforms to account for variations in measurement equipment. This will ensure that the test signal is at or above the detection threshold level to trigger a DFS response.
Note 3: E.I.R.P. is based on the highest antenna gain. For MIMO devices refer to KDB publication 662911 D01.

Table 4: DFS Response requirement values

Parameter	Value
Non-occupancy period	30 minutes
Channel Availability Check Time	60 seconds
Channel Move Time	10 seconds (See Note 1)
Channel Closing Transmission Time	200 milliseconds + approx. 60 milliseconds over remaining 10 second period. (See Notes 1 and 2)
U-NII Detection Bandwidth	Minimum 100% of the U-NII 99% transmission power bandwidth. (See Note 3)

Note 1: *Channel Move Time* and the *Channel Closing Transmission Time* should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst.
Note 2: The *Channel Closing Transmission Time* is comprised of 200 milliseconds starting at the beginning of the *Channel Move Time* plus any additional intermittent control signals required to facilitate a *Channel* move (an aggregate of 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions.
Note 3: During the *U-NII Detection Bandwidth* detection test, radar type 0 should be used. For each frequency step the minimum percentage of detection is 90 percent. Measurements are performed with no data traffic.

Table 5 – Short Pulse Radar Test Waveforms

Radar Type	Pulse Width (usec)	PRI (usec)	Pulses	Minimum Percentage of Successful Detection	Minimum Trials
0	1	1428	18	See Note 1	See Note 1
1	1	Test A: 15 unique PRI values randomly selected from the list of 23 PRI values in table 5a	Roundup: {(1/360) x (19 x 10^6 PRI_{usec})}	60%	30
		Test B: 15 unique PRI values randomly selected within the range of 518-3066 usec. With a minimum increment of 1 usec, excluding PRI values selected in Test A			
2	1-5	150-230	23-29	60%	30
3	6-10	200-500	16-18	60%	30
4	11-20	200-500	12-16	60%	30
Aggregate (Radar Types 1-4)				80%	120

Note 1: Short Pulse Radar Type 0 should be used for the *Detection Bandwidth* test, *Channel Move Time*, and *Channel Closing Time* tests.

Table 6 – Long Pulse Radar Test Signal

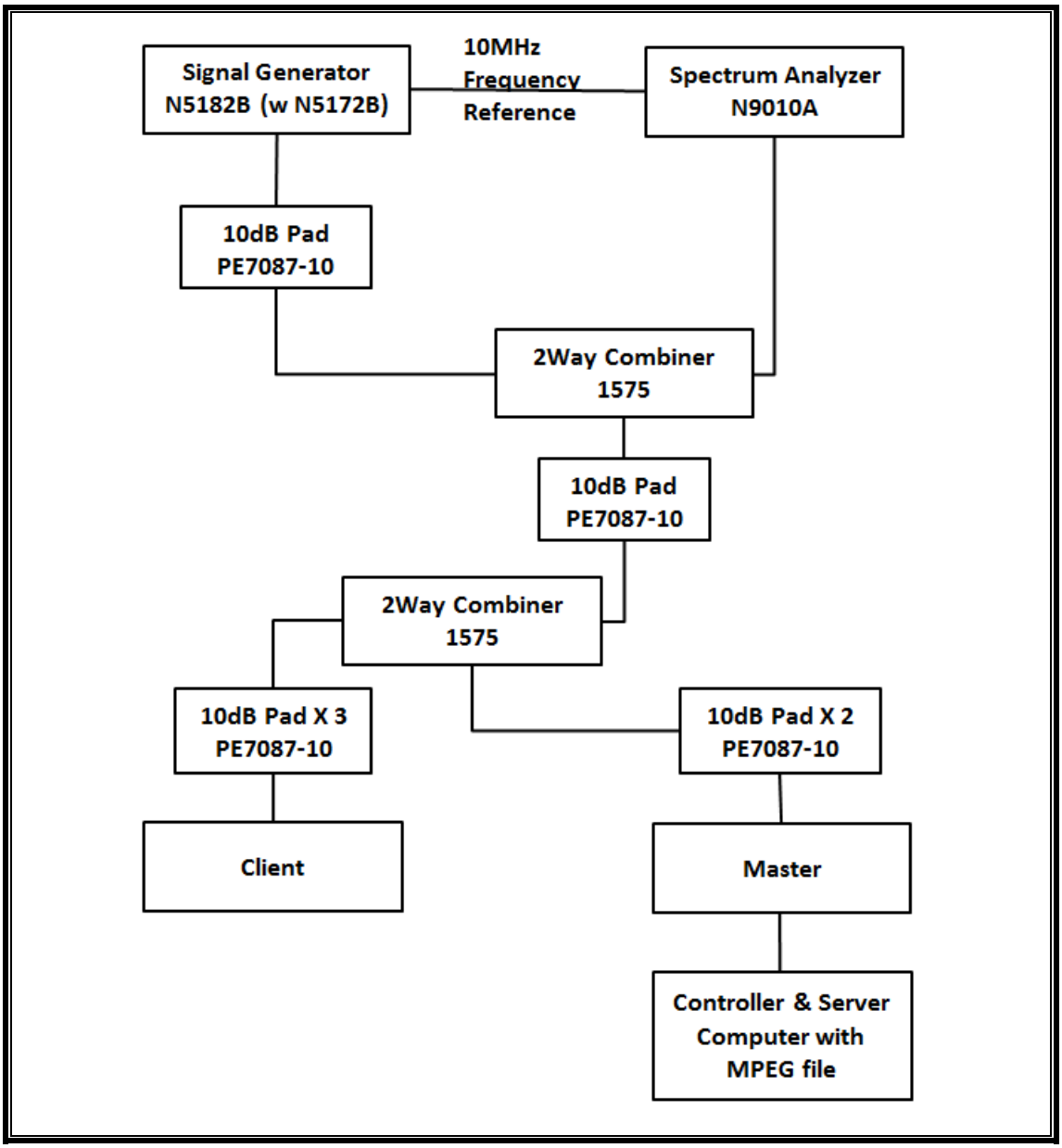
Radar Waveform Type	Pulse Width (µsec)	Chirp Width (MHz)	PRI (µsec)	Pulses per Burst	Number of Bursts	Minimum Percentage of Successful Detection	Minimum Trials
5	50-100	5-20	1000-2000	1-3	8-20	80%	30

Table 7 – Frequency Hopping Radar Test Signal

Radar Waveform Type	Pulse Width (µsec)	PRI (µsec)	Pulses per Hop	Hopping Rate (kHz)	Hopping Sequence Length (msec)	Minimum Percentage of Successful Detection	Minimum Trials
6	1	333	9	0.333	300	70%	30

14.1.2. TEST AND MEASUREMENT SYSTEM

CONDUCTED METHOD SYSTEM BLOCK DIAGRAM



SYSTEM OVERVIEW

The short pulse and long pulse signal generating system utilizes the Keysite Signal Studio for Pulse Building as N5172B. The Vector Signal Generator has been validated by the NTIA. The hopping signal generating system utilizes the CCS simulated hopping method and system, which has been validated by the DoD, FCC and NTIA. The software selects waveform parameters from within the bounds of the signal type on a random basis using uniform distribution.

The short pulse types 1, 2, 3 and 4, and the long pulse type 5 parameters are randomized at run-time.

The hopping type 6 pulse parameters are fixed while the hopping sequence is based on the August 2005 NTIA Hopping Frequency List. The initial starting point randomized at run-time and each subsequent starting point is incremented by 475. Each frequency in the 100-length segment is compared to the boundaries of the EUT Detection Bandwidth and the software creates a hopping burst pattern in accordance with Section 7.4.1.3 Method #2 Simulated Frequency Hopping Radar Waveform Generating Subsystem of KDB 905462 D02. The frequency of the signal generator is incremented in 1 MHz steps from F_L to F_H for each successive trial. This incremental sequence is repeated as required to generate a minimum of 30 total trials and to maintain a uniform frequency distribution over the entire Detection Bandwidth.

The signal monitoring equipment consists of a spectrum analyzer. The aggregate ON time is calculated by multiplying the number of bins above a threshold during a particular observation period by the dwell time per bin, with the analyzer set to peak detection and max hold.

SYSTEM CALIBRATION

A 50-ohm load is connected in place of the spectrum analyzer, and the spectrum analyzer is connected to a horn antenna via a coaxial cable, with the reference level offset set to (horn antenna gain – coaxial cable loss). The signal generator is set to CW mode. The amplitude of the signal generator is adjusted to yield a level of –64 dBm as measured on the spectrum analyzer.

Without changing any of the instrument settings, the spectrum analyzer is reconnected to the Common port of the Spectrum Analyzer Combiner/Divider. The Reference Level Offset of the spectrum analyzer is adjusted so that the displayed amplitude of the signal is –64 dBm.

The spectrum analyzer displays the level of the signal generator as received at the antenna ports of the Master Device. The interference detection threshold may be varied from the calibrated value of –64 dBm and the spectrum analyzer will still indicate the level as received by the Master Device.

UL KOREA LTD. Suwon Laboratory FORM ID: FCC_15E(05)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

ADJUSTMENT OF DISPLAYED TRAFFIC LEVEL

A link is established between the Master and Slave and the distance between the units is adjusted as needed to provide a suitable received level at the Master and Slave devices. The video test file is streamed to generate WLAN traffic. The monitoring antenna is adjusted so that the WLAN traffic level, as displayed on the spectrum analyzer, is at lower amplitude than the radar detection threshold.

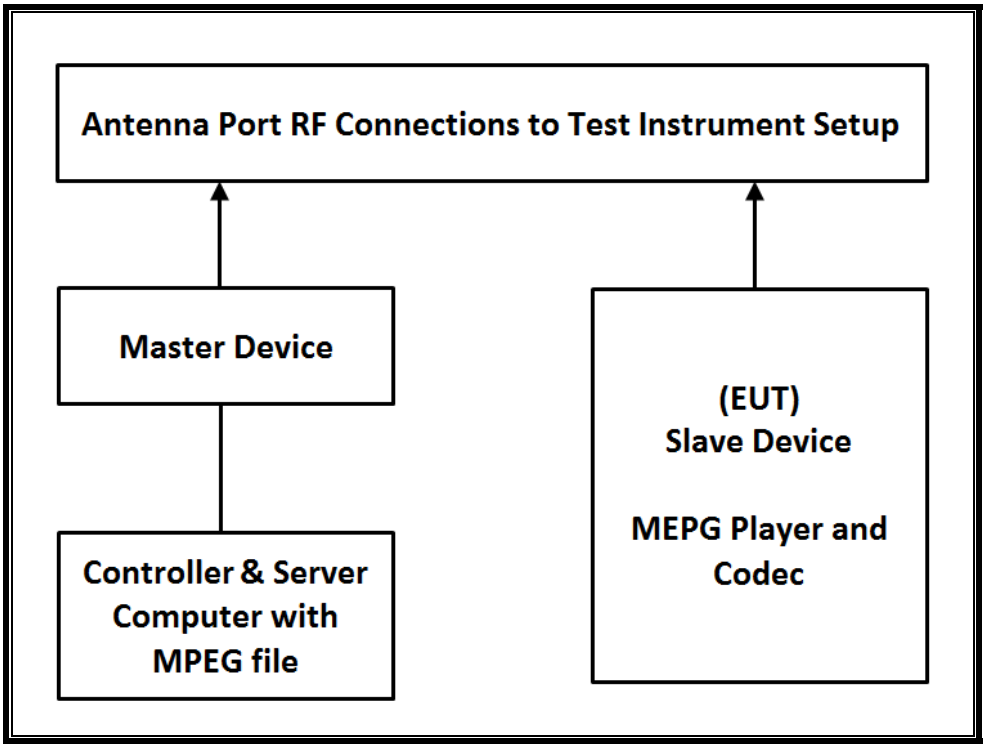
TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the DFS tests documented in this report:

TEST EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**S/N**	**Next Cal Due**
Spectrum Analyzer, 7 GHz	Agilent / HP	N9010A	MY54200580	07-23-24
Vector Signal Generator, 6GHz	Agilent / HP	N5182B	MY53051241	07-23-24
Combiner	WEINSCHEL	WA1534	UL001	01-16-25
Combiner	WEINSCHEL	WA1534	UL003	01-02-25

14.1.3. SETUP OF EUT

CONDUCTED METHOD EUT TEST SETUP



SUPPORT EQUIPMENT

The following support equipment was utilized for the DFS tests documented in this report:

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Wireless Access Point	ASUS	GT-AXE11000	M3IAJF200742	MSQ-RTAXJF00
Notebook PC (Controller/Server)	HP	HP EliteDesk 800 G1 TWR	CZC4125J25	DoC

14.1.4. DESCRIPTION OF EUT

The EUT operates over the 5250-5350 MHz and 5470-5725 MHz ranges.

The EUT is a Slave Device without Radar Detection.

The highest power level of the widest bandwidth (802.11ac VHT160) within these bands is 13.31 dBm in the 5250-5350 MHz band and 5470-5725 MHz band.

The antenna assembly utilized two antenna.
Gain of ANT1 : -3.21 dBi for UNII 2A and -2.64 dBi for UNII 2C.
Gain of ANT2 : -2.21 dBi for UNII 2A and -2.41 dBi for UNII 2C.

The rated output power of the Master unit is > 23dBm (EIRP). Therefore the required interference threshold level is –64 dBm. After correction for procedural adjustments, the required conducted threshold at the antenna port is –64 + 1 = -63 dBm.

The calibrated radiated DFS Detection Threshold level is set to –64 dBm. The tested level is lower than the required level hence it provides a margin to the limit.
The EUT uses one transmitter/receiver chain connected to an antenna to perform radiated tests. WLAN traffic that meets or exceeds the minimum required loading was generated by transferring a data stream from the controller/server PC to the EUT using iPerf version 2.0.5 software package.

TPC is not required since the maximum EIRP is less than 500 mW (27 dBm).
The EUT utilizes the 802.11 architecture. 4 nominal channel bandwidth are implemented: 20 MHz, 40 MHz, 80 MHz and 160 MHz.

The software installed in the access point is 12.4(25d)JA1.

UNIFORM CHANNEL SPREADING

This requirement is not applicable to Slave radio devices.

CHANNEL PUNCTURING(802.11ax)

This EUT does not support channel puncturing.

OVERVIEW OF MASTER DEVICE WITH RESPECT TO §15.407 (h) REQUIREMENTS

The Master Device is a ASUS Access Point, FCC ID: MSQ-RTAXJF00. The minimum antenna gain for the Master Device is 6 dBi.

The rated output power of the Master unit is > 23dBm (EIRP). Therefore the required interference threshold level is –64 dBm. After correction for procedural adjustments, the required radiated threshold at the antenna port is –64 + 1 = -63 dBm.

The calibrated radiated DFS Detection Threshold level is set to –64 dBm. The tested level is lower than the required level hence it provides a margin to the limit.

UL KOREA LTD. Suwon Laboratory FORM ID: FCC_15E(05)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

14.2. RESULTS FOR 160 MHz BANDWIDTH (UNII-2A & 2C BANDS)

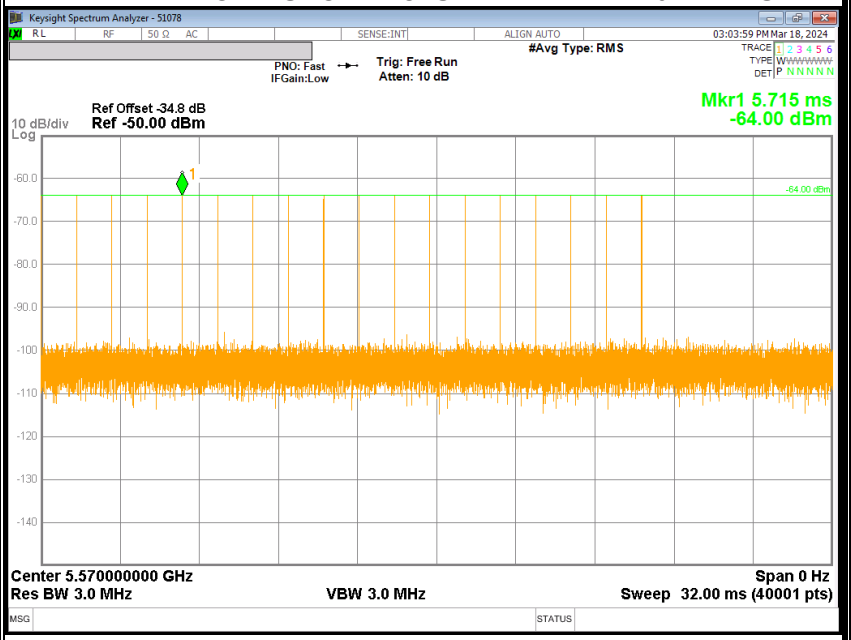
14.2.1. TEST CHANNEL

All tests were performed at a channel center frequency of 5570 MHz.

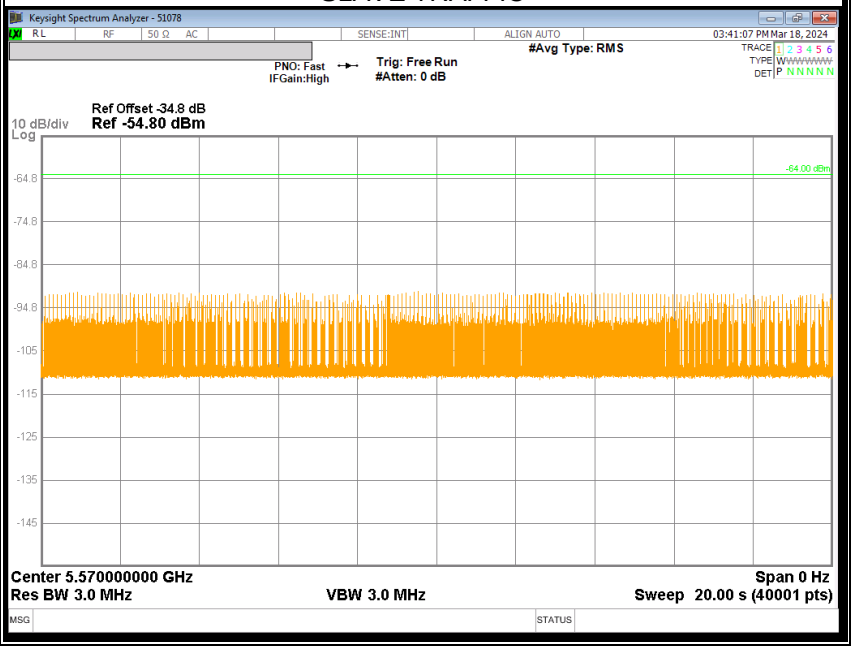
14.2.2. RADAR WAVEFORM AND TRAFFIC

RADAR WAVEFORM

RADAR WAVEFORM:SHORT PULSE RADAR TYPE 0 AT MASTER



SLAVE TRAFFIC



14.2.3. OVERLAPPING CHANNEL TESTS

RESULTS

These tests are not applicable.

14.2.4. MOVE AND CLOSING TIME

REPORTING NOTES

The reference marker is set at the end of last radar pulse.

The delta marker is set at the end of the last WLAN transmission following the radar pulse. This delta is the channel move time.

The aggregate channel closing transmission time is calculated as follows:

Aggregate Transmission Time =
(Number of analyzer bins showing transmission) * (dwell time per bin)

The observation period over which the aggregate time is calculated begins at (Reference Marker + 200 msec) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

Channel Move Time (sec)	Limit (sec)
0.864	10

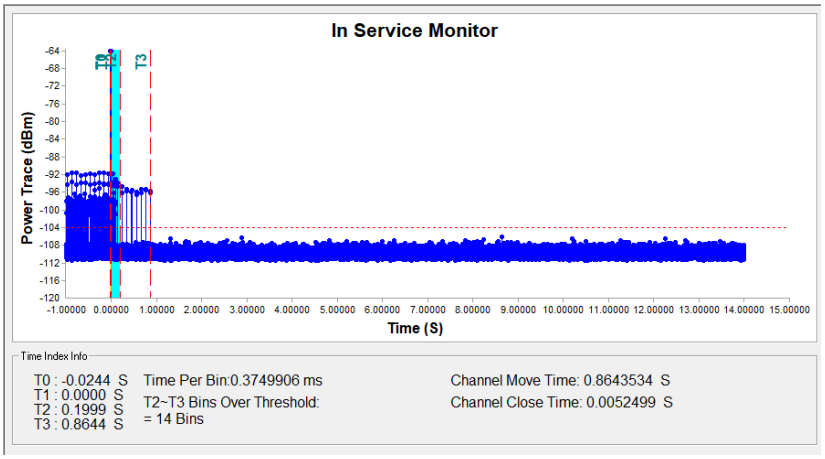
Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
5.250	60

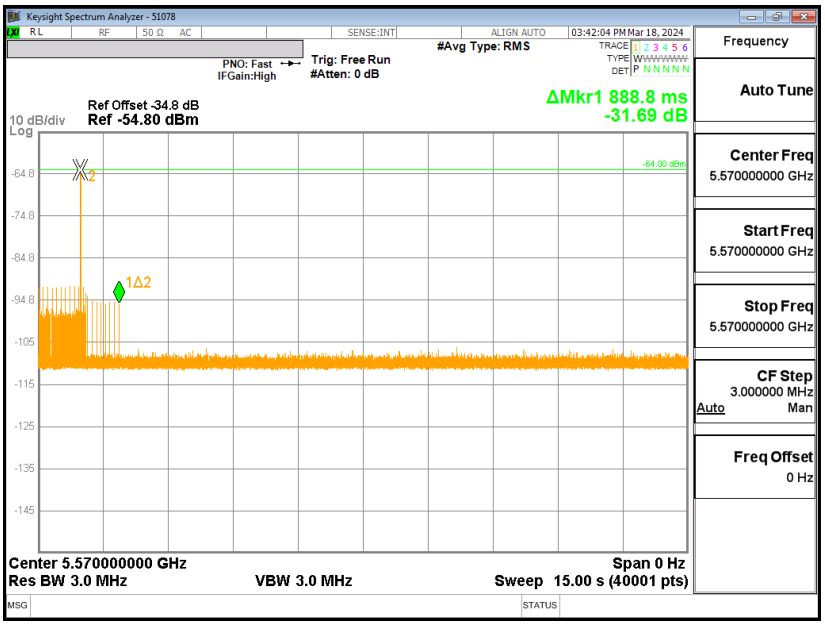
MOVE TIME & CHANNEL CLOSING TIME

AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

No transmissions are observed during the aggregate monitoring period.

MOVE TIME & AGGREGATE CHANNEL CLOSING TRANSMISSION TIME



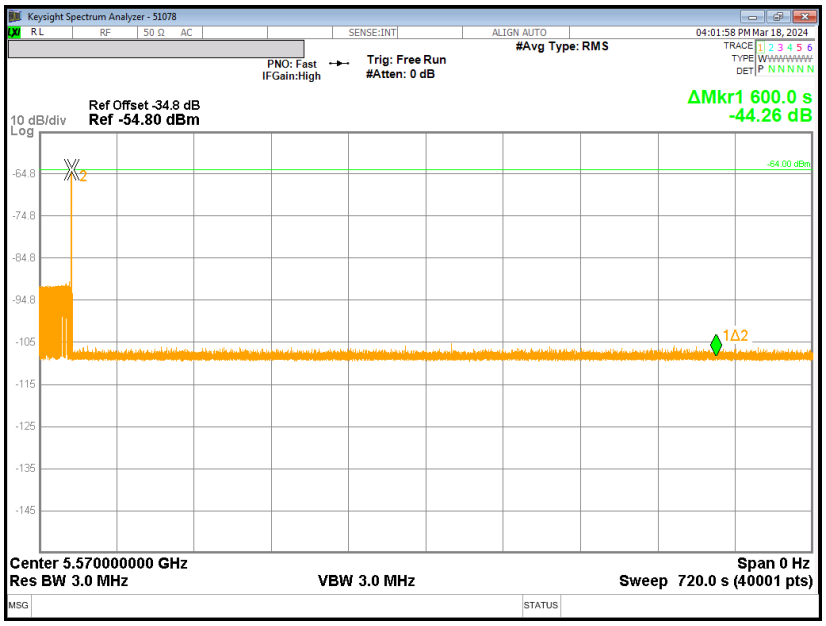


NON-OCCUPANCY PERIOD

RESULTS

No EUT transmissions were observed on the test channel during the 10-minute observation time.

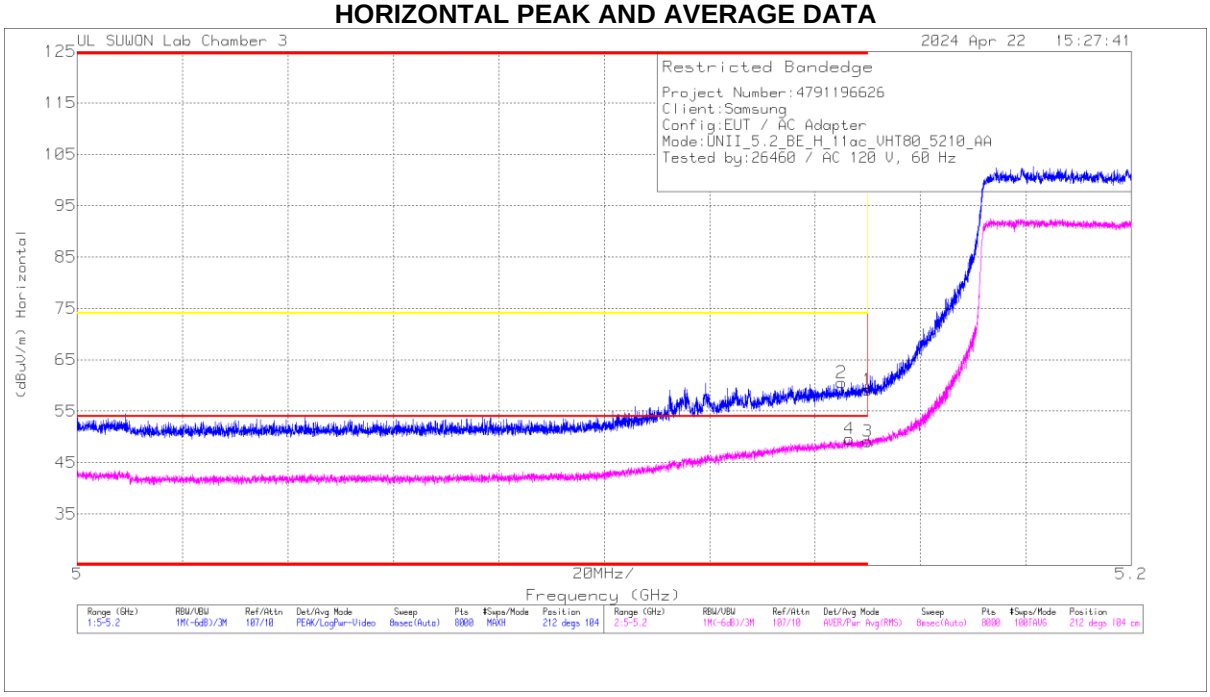
10-MINUTE BEACON MONITORING PERIOD



15. SPOT-CHECK THEST RESULT

BANDEDGE (WORST CASE: 802.11ac VHT80 / 5210 MHz)

HORIZONTAL PEAK AND AVERAGE DATA



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	Antenna_957_Factor(dB)	10dB_Path Loss(dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 5.14999	45.36	Pk	34.4	-20.6	0	59.16	-	-	74	-14.84	212	104	H
2	* 5.14502	46.96	Pk	34.4	-20.8	0	60.56	-	-	74	-13.44	212	104	H
3	* 5.14999	35.1	RMS	34.4	-20.6	.25	49.15	54	-4.85	-	-	212	104	H
4	* 5.14652	35.77	RMS	34.4	-20.8	.25	49.62	54	-4.38	-	-	212	104	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
RMS - RMS detection