CERTIFICATION TEST REPORT

Report Number. : 4791377016-E8V2

Applicant	:	SAMSUNG ELECTRONICS CO., LTD. 129 SAMSUNG-RO, YEONGTONG-GU, SUWON-SI, GYEONGGI-DO, 16677, KOREA
Model	:	SM-A166M/DS, SM-A166M
FCC ID	:	A3LSMA166M
EUT Description	:	GSM/WCDMA/LTE/5G NR Phone + BT/BLE, DTS/UNII a/b/g/n/ac and NFC
Test Standard(s)	:	FCC 47 CFR PART 15 SUBPART E

Date Of Issue:
2024-08-23

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
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IAS ACCREDITED Testing Laboratory

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	2024-08-16	Initial issue	Myeongjun Kwon
V2	2024-08-23	Updated to address TCB's question	Myeongjun Kwon

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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 and NFC.
MODEL NUMBER:	SM-A166M/DS, SM-A166M
SERIAL NUMBER:	R3CX50MNLFY (CONDUCTED); R3CX50MNK5Z, R3CX50MNJQV (RADIATED)
DATE TESTED:	2024-07-03 – 2024-08-23

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:

Myeongjun Kwon
Suwon Lab Engineer
UL KOREA LTD.

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. ANSI C63.10-2020.

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.

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, and NFC. This test report addresses the NII (WLAN) operational mode.

Representative model	Difference	Derivative model
		SM-A166M
SM-A166M/DS	Hardware	SIM tray is single SIM
	Software	Dual SIM not supported

The model SM-A166M/DS was used for final testing and is representative of the test results in this report.

MAXIMUM OUTPUT POWER

The transmitter has a maximum total conducted average output power as follows:

Band	Frequency Range [MHz]	Mode	Output Power [dBm]	Output Power [mW]
UNII-1	5180 - 5240	802.11a SISO	15.60	36.31
		802.11n(HT20) SISO	14.50	28.18
	5190 - 5230	802.11n(HT40) SISO	12.80	19.05
	5210	802.11ac(VHT80) SISO	10.06	10.14
UNII-2A	5260 - 5320	802.11a SISO	15.55	35.89
		802.11n(HT20) SISO	14.15	26.00
	5190 - 5230	802.11n(HT40) SISO	12.75	18.84
	5270 - 5310	802.11ac(VHT80) SISO	10.55	11.35
UNII-2C	5500 - 5720	802.11a SISO	14.55	28.51
		802.11n(HT20) SISO	13.11	20.46
	5510 - 5710	802.11n(HT40) SISO	12.80	19.05
	5530 - 5690	802.11ac(VHT80) SISO	11.29	13.46
UNII-3	5745 - 5825	802.11a SISO	16.31	42.76
		802.11n(HT20) SISO	15.10	32.36
	5755 - 5795	802.11n(HT40) SISO	12.65	18.41
	5775	802.11ac(VHT80) SISO	10.40	10.96

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]
UNII 1	5150 - 5250	-6.30
UNII 2A	5250 - 5350	-5.80
UNII 2C	5470 - 5725	-5.70
UNII 3	5725 - 5850	-6.30

“BT/WIFI _2.4GHz, 5GHz (SUB2)” as indicated in antenna specification are written as ANT1 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	SISO	802.11a 1TX	
802.11n HT20		802.11n HT20 1TX	
802.11ac VHT20		802.11ac VHT20 1TX	802.11n HT20 1TX
802.11n HT40		802.11n HT40 1TX	
802.11ac VHT40		802.11ac VHT40 1TX	802.11n HT40 1TX
802.11ac VHT80		802.11ac VHT80 1TX	

5.4. WORST-CASE CONFIGURATION AND MODE

The fundamentals of the EUT were investigated in three orthogonal orientations X, Y and Z on 1TX SISO mode. It was determined that X orientation was the worst-case for 1TX SISO mode.

Worst case of antenna axis: X

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 1TX SISO 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 1TX 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 1TX, 802.11ac 1TX.

For Radiated band-edge test, 802.11a 1TX, 802.11n 1TX, 802.11ac 1TX.

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

Based on the baseline scan, the worst-case data rates were:
802.11a mode: 6 Mbps 1TX
802.11n HT20 mode: MCS0 1TX
802.11n HT40 mode: MCS0 1TX
802.11ac VHT80 mode: MCS0 1TX

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5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Charger	SAMSUNG	EP-TA800	R37TC7A00JBDKA	N/A
Data Cable	SAMSUNG	EP-DN980	GH39-02115A	N/A

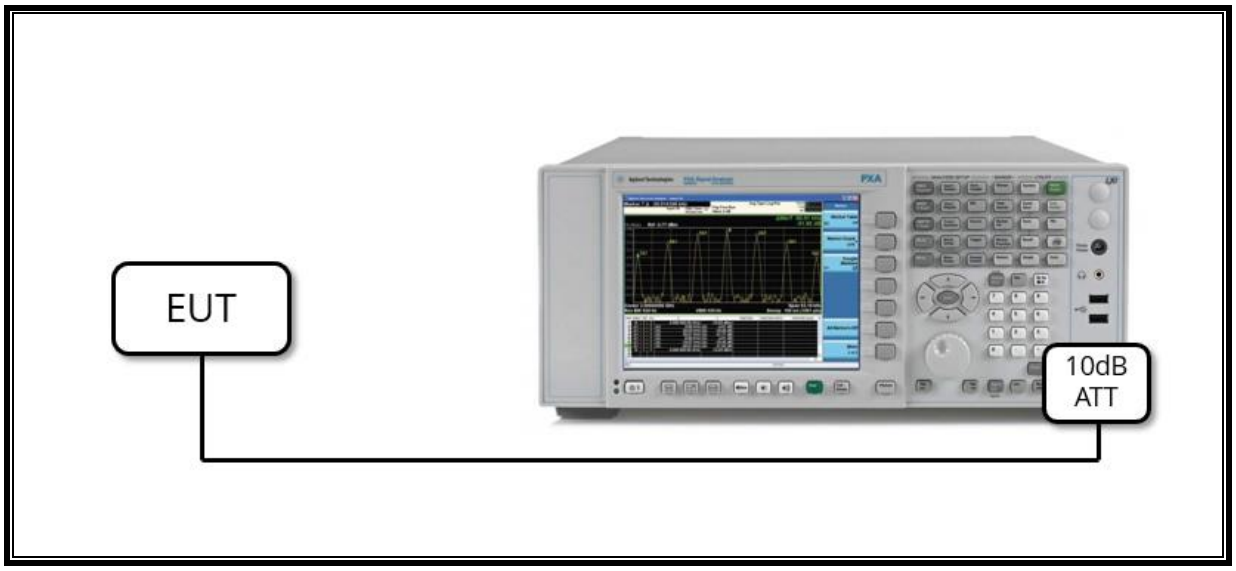
I/O CABLE

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

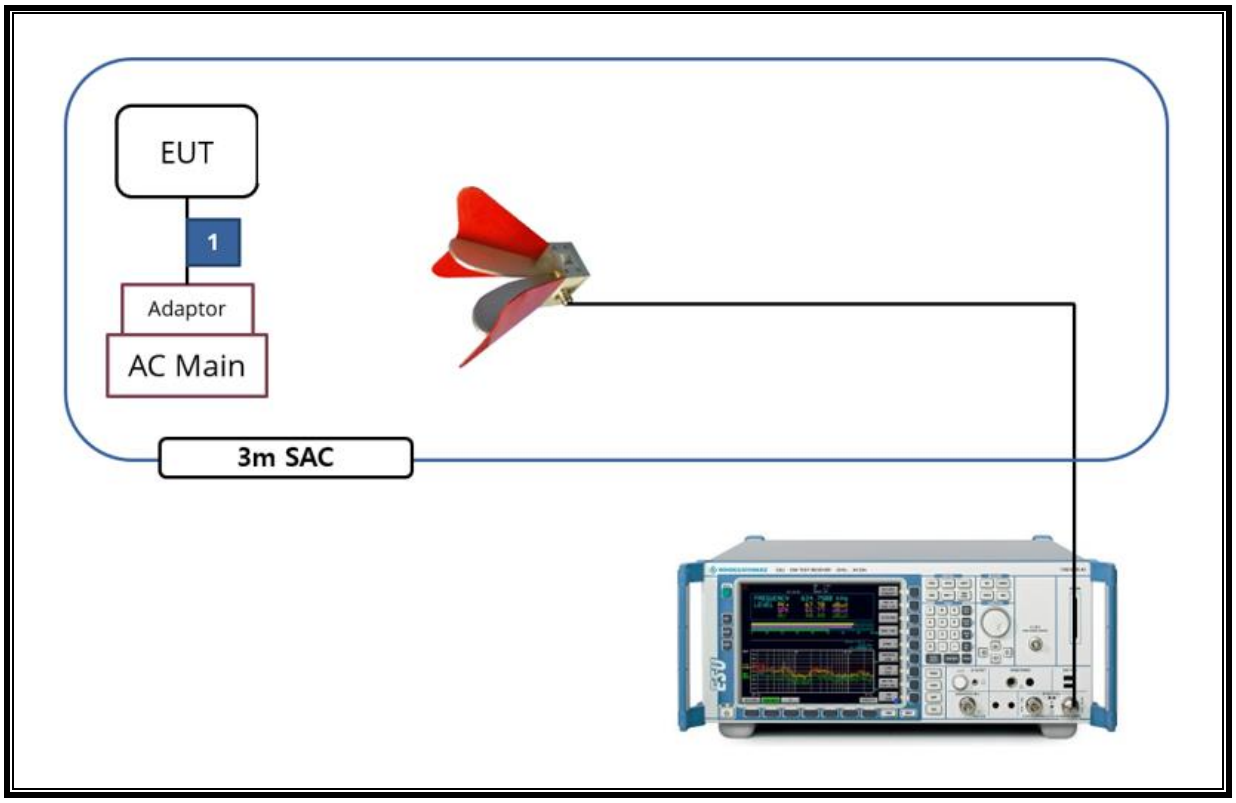
TEST SETUP

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

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	VULB 9163	749	2026-08-12
Antenna, Horn, 18 GHz	ETS	3117	00168717	2026-07-17
Antenna, Horn, 18 GHz	ETS	3117	00218957	N/A
Antenna, Horn, 40 GHz	ETS	3116C	00166155	2026-07-23
Preamplifier	ETS	3116C-PA	00168841	2025-07-25
Preamplifier, 1000 MHz	Sonoma	310N	341282	2025-07-22
Preamplifier, 18 GHz	B&Z Technologies, LLC	BZR-01001800-231040-181515	23576	2025-07-25
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	2029169	2025-07-23
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54170614	2025-07-24
Spectrum Analyzer, 44 GHz	KEYSIGHT	N9040B	MY60080268	2025-01-03
Average Power Sensor	Agilent / HP	U2000A	MY54270007	2025-07-23
Average Power Sensor	Agilent / HP	U2000A	MY54260010	2025-07-23
Attenuator	PASTERNACK	PE7087-10	A001	2025-07-23
Attenuator	PASTERNACK	PE7087-10	A008	2025-07-23
Attenuator	PASTERNACK	PE7004-10	2	2025-07-23
Attenuator	PASTERNACK	PE7087-10	A009	2025-07-23
EMI Test Receive, 40 GHz	R&S	ESU40	100439	2025-07-23
EMI Test Receive, 40 GHz	R&S	ESU40	100457	2025-07-22
EMI Test Receive, 3 GHz	R&S	ESR 3	101832	2025-07-22
Notch Filter	Micro-Tronics	BRM50702-02	G037	2025-07-24
Notch Filter	Micro-Tronics	BRM50716-2	006	2025-07-23
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	020	2025-07-23
High Pass Filter 3GHz	Micro-Tronics	HPM17543	20	2025-07-23
High Pass Filter 6GHz	Micro-Tronics	HPS17542	009	2025-07-22
LISN	R&S	ENV216	101836	2025-07-22
Antenna, Loop, 9kHz-30MHz	R&S	HFH2-Z2	100418	2025-09-07
Termination	WEINSCHEL	M1406A	T09	2025-07-23
Attenuator	WEINSCHEL	WA76-30-21	A015	2025-07-23

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)(1)(iv) & (a)(2)	PSD (5.150-5.250 5.250-5.350 & 5.470-5.725)	< 11dBm/MHz		Complies
15.407 (a)(3)(i)	PSD (5.725-5.850)`	< 30dBm/500kHz		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]

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., ANSI C63.10-2020, Section 12.5.2.

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 C63.10-2020, Section 6.2.

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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 SISO	2.792	2.881	0.969	96.911	0.14
802.11n(HT20) SISO	5.132	5.221	0.983	98.295	0.00
802.11n(HT40) SISO	4.751	4.858	0.978	97.797	0.10
802.11ac(VHT80) SISO	2.220	2.327	0.954	95.402	0.20

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

LIMITS

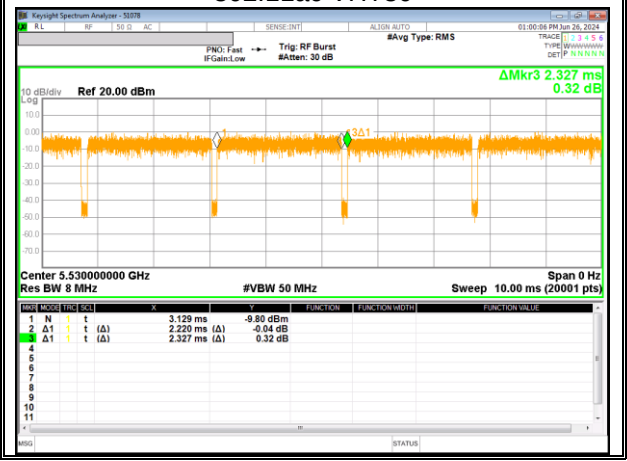
None; for reporting purposes only.

PROCEDURE

KDB 789033 D02 v02r01 Zero-Span Spectrum Analyzer Method.

DUTY CYCLE SAMPLE PLOTS

802.11ac VHT80



26 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

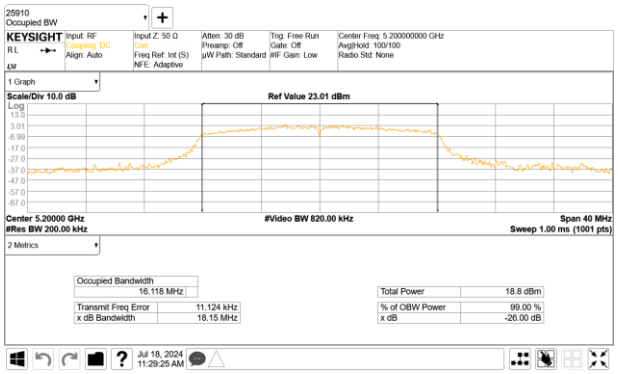
Reference to 789033 D02 General UNII Test Procedures New Rules v02r01: The transmitter output is connected to a spectrum analyzer with the RBW set to 1% to 5% of EBW, the VBW > RBW, peak detector and max hold.

RESULTS

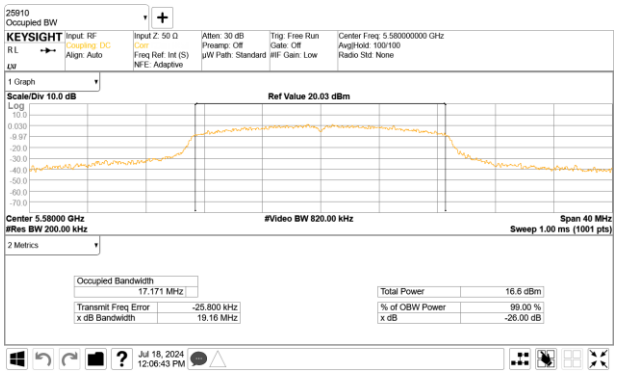
- Please refer to the next page

WORST CASE TEST PLOTS

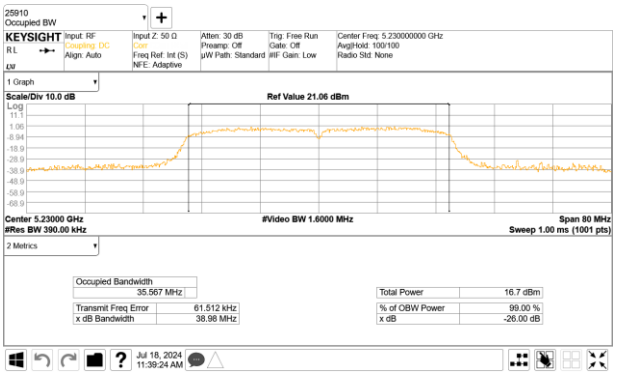
802.11a / ANT1 / 5200 MHz



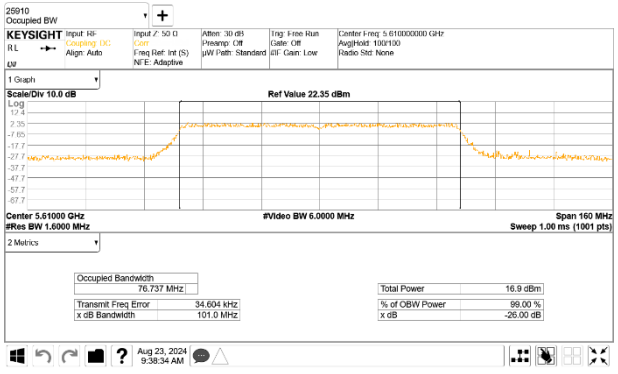
802.11n HT20 / ANT1 / 5580 MHz



802.11n HT40 / ANT1 / 5230 MHz



802.11ac VHT80 / ANT1 / 5610 MHz



9.1.1. 802.11a

Band	Channel	Center Freq. [MHz]	26 dB BW [MHz]	Worst	99% BW [MHz]
			ANT1		ANT1
UNII-1Note	36	5180	18.45	18.15	16.10
	40	5200	18.15		16.12
	48	5240	18.31		16.10
UNII-2A Note	52	5260	18.36	18.20	16.12
	60	5300	18.20		16.09
	64	5320	18.40		16.04
UNII-2C	100	5500	18.55	18.46	
	116	5580	18.46		
	140	5700	18.69		

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

9.1.2. 802.11n HT20

Band	Channel	Center Freq. [MHz]	26 dB BW [MHz]	Worst	99% BW [MHz]
			ANT1		ANT1
UNII-1Note	36	5180	19.20	19.20	17.17
	40	5200	19.21		17.19
	48	5240	19.40		17.17
UNII-2A Note	52	5260	19.22	19.22	17.17
	60	5300	19.50		17.18
	64	5320	19.73		17.15
UNII-2C	100	5500	19.21	19.16	
	116	5580	19.16		
	140	5700	19.28		

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

9.1.3. 802.11n HT40

Band	Channel	Center Freq. [MHz]	26 dB BW [MHz]	Worst	99% BW [MHz]
			ANT1		ANT1
UNII-1 Note	38	5190	39.71	38.98	35.76
	46	5230	38.98		35.57
UNII-2A Note	54	5270	39.26	39.26	35.67
	62	5310	39.50		35.62
UNII-2C	102	5510	39.24	38.98	
	110	5550	39.60		
	134	5670	38.98		

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

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9.1.4. 802.11ac VHT80

Band	Channel	Center Freq. [MHz]	26 dB BW [MHz]	Worst	99% BW [MHz]
			ANT1		ANT1
UNII-1 Note	42	5210	87.88	87.88	76.48
UNII-2A Note	58	5290	91.91	91.91	76.60
UNII-2C	106	5530	87.75	101.00	
	122	5610	101.00		

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

9.1.5. STRADDLE CHANNEL

Mode	Channel	Center Freq. [MHz]	26 dB BW [MHz]	
			ANT1	
			UNII-2C	UNII-3
802.11a	Straddle	5720	14.28	4.28
802.11n HT20	Straddle	5720	14.60	4.56
802.11n HT40	Straddle	5710	34.60	4.76
802.11ac VHT80	Straddle	5690	77.72	7.88

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

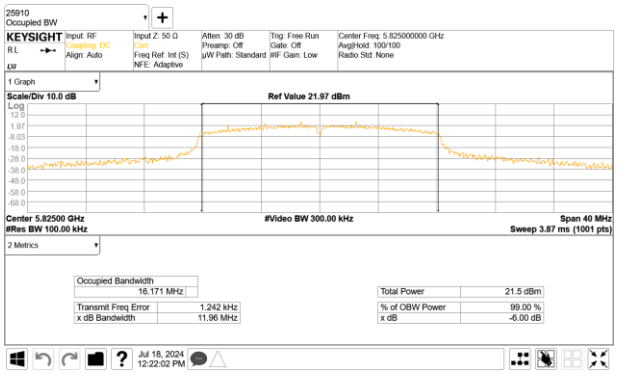
Reference to 789033 D02 General UNII Test Procedures New Rules v02r01: The transmitter output is connected to a spectrum analyzer with the RBW set to100KHz, the VBW >= 3 x RBW, peak detector and max hold.

RESULTS

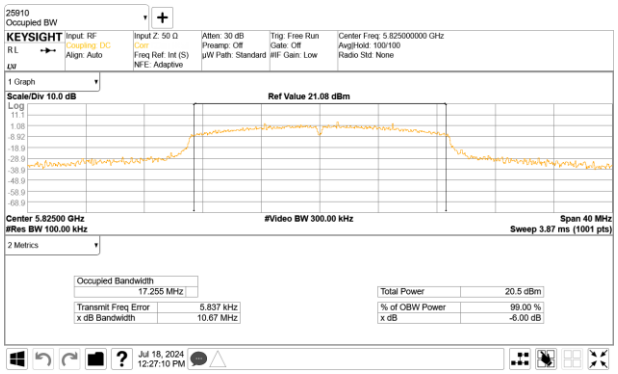
- Please refer to the next page

WORST CASE TEST PLOTS

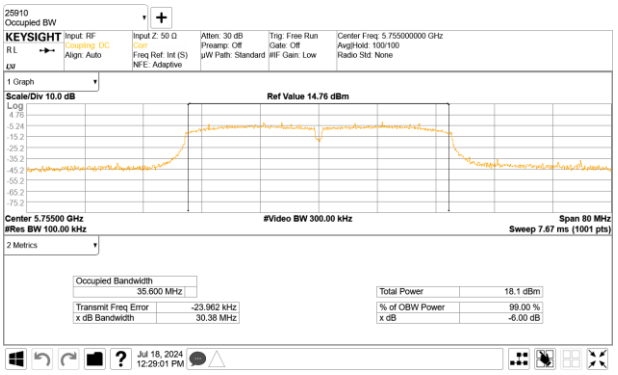
802.11a / ANT1 / 5825 MHz



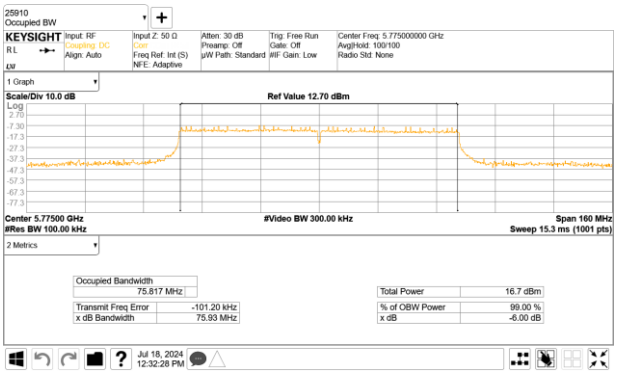
802.11n HT20 / ANT1 / 5825 MHz



802.11n HT40 / ANT1 / 5755 MHz

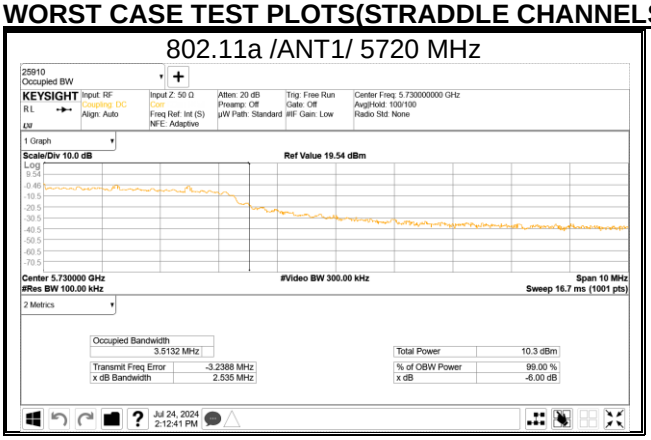


802.11ac VHT80 / ANT1 / 5775 MHz



WORST CASE TEST PLOTS(STRADDLE CHANNELS)

802.11a /ANT1/ 5720 MHz



10.1.1. STRADDLE CHANNEL

Mode	Channel	Center Freq. [MHz]	6 dB BW [MHz]
			UNII-3
			ANT1
802.11a	Straddle	5720	2.54
802.11n HT20	Straddle	5720	2.90
802.11n HT40	Straddle	5710	2.54
802.11ac VHT80	Straddle	5690	3.15

10.1.2. UNII-3 BAND

Mode	Channel	Center Freq. [MHz]	6 dB BW [MHz]	Worst	Minimum Limit [MHz]
			ANT1		
802.11a	149	5745	15.27	11.96	0.5
	157	5785	13.81		
	165	5825	11.96		
802.11n HT20	149	5745	15.07	10.67	
	157	5785	10.90		
	165	5825	10.67		
802.11n HT40	151	5755	30.38	30.38	
	159	5795	35.08		
802.11ac VHT80	155	5775	75.93	75.93	

10.2. OUTPUT POWER AND PPSD

LIMITS

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

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.

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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).

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]	ANT Gain [dBi]
UNII 1 5150 - 5250	-6.30
UNII 2A 5250 - 5350	-5.80
UNII 2C 5470 - 5725	-5.70
UNII 3 5725 - 5850	-6.30

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10.2.1. 802.11a MODE

Output Power Results

Band	Channel	Center Freq. [MHz]	Average Power [dBm]	Corr'd Power [dBm]	Limit [dBm]
			ANT1		
UNII-1	36	5180	15.60	15.60	23.98
	40	5200	15.55	15.55	
	48	5240	15.43	15.43	
UNII-2A	52	5260	15.33	15.33	23.60
	60	5300	15.55	15.55	
	64	5320	15.20	15.20	
UNII-2C	100	5500	14.55	14.55	22.55
	116	5580	14.20	14.20	
	140	5700	14.20	14.20	
	144	5720	14.46	14.46	
UNII-3	149	5745	15.81	15.81	30.00
	157	5785	15.93	15.93	
	165	5825	16.31	16.31	

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

PSD Results

Band	Channel	Center Freq. [MHz]	Meas PSD [dBm/MHz]	DCCF.	Corr'd PSD [dBm]	Limit [dBm/ MHz]
			ANT1			
UNII-1	36	5180	4.39	0.14	4.53	11.00
	40	5200	4.44	0.14	4.58	
	48	5240	4.87	0.14	5.01	
UNII-2A	52	5260	4.37	0.14	4.51	11.00
	60	5300	4.42	0.14	4.56	
	64	5320	4.70	0.14	4.84	
UNII-2C	100	5500	3.74	0.14	3.88	11.00
	116	5580	3.07	0.14	3.21	
	140	5700	2.92	0.14	3.06	
UNII-2C&3	144 Straddle	5720	3.67	0.14	3.81	11.00 or 30.00/500kHz
UNII-3	149	5745	3.09	0.14	3.23	30.00/500kHz
	157	5785	2.61	0.14	2.75	
	165	5825	2.70	0.14	2.84	

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

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10.2.2. 802.11n HT20 MODE

Output Power Results

Band	Channel	Center Freq. [MHz]	Average Power [dBm]	Corr'd Power [dBm]	Limit [dBm]
			ANT1		
UNII-1	36	5180	14.50	14.50	23.98
	40	5200	14.26	14.26	
	48	5240	14.04	14.04	
UNII-2A	52	5260	14.12	14.12	23.84
	60	5300	14.15	14.15	
	64	5320	14.01	14.01	
UNII-2C	100	5500	12.90	12.90	22.64
	116	5580	12.85	12.85	
	140	5700	12.70	12.70	
UNII-2C&3	144 Straddle	5720	13.11	13.11	
UNII-3	149	5745	14.60	14.60	30.00
	157	5785	14.74	14.74	
	165	5825	15.10	15.10	

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

PSD Results

Band	Channel	Center Freq. [MHz]	Meas PSD [dBm/MHz]	DCCF.	Corr'd PSD [dBm]	Limit [dBm/ MHz]
			ANT1			
UNII-1	36	5180	3.24	0.00	3.24	11.00
	40	5200	3.29	0.00	3.29	
	48	5240	3.50	0.00	3.50	
UNII-2A	52	5260	3.55	0.00	3.55	11.00
	60	5300	3.70	0.00	3.70	
	64	5320	3.57	0.00	3.57	
UNII-2C	100	5500	2.66	0.00	2.66	11.00
	116	5580	2.04	0.00	2.04	
	140	5700	1.84	0.00	1.84	
UNII-2C&3	144 Straddle	5720	2.25	0.00	2.25	11.00 or 30.00/500kHz
UNII-3	149	5745	1.91	0.00	1.91	30.00/500kHz
	157	5785	1.12	0.00	1.12	
	165	5825	2.01	0.00	2.01	

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

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10.2.3. 802.11n HT40 MODE

Output Power Results

Band	Channel	Center Freq. [MHz]	Average Power [dBm]	Corr'd Power [dBm]	Limit [dBm]
			ANT1		
UNII-1	38	5190	12.80	12.80	23.98
	46	5230	12.74	12.74	
UNII-2A	54	5270	12.75	12.75	23.98
	62	5310	12.60	12.60	
UNII-2C	102	5510	11.75	11.75	23.98
	110	5550	12.80	12.80	
	134	5670	12.54	12.54	
UNII-2C&3	142 Straddle	5710	12.20	12.20	
UNII-3	151	5755	12.18	12.18	30.00
	159	5795	12.65	12.65	

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

PSD Results

Band	Channel	Center Freq. [MHz]	Meas PSD [dBm/MHz]	DCCF.	Corr'd PSD [dBm]	Limit [dBm/ MHz]
			ANT1			
UNII-1	38	5190	-3.60	0.10	-3.50	11.00
	46	5230	-3.09	0.10	-2.99	
UNII-2A	54	5270	-3.05	0.10	-2.95	11.00
	62	5310	-2.41	0.10	-2.31	
UNII-2C	102	5510	-4.04	0.10	-3.94	11.00
	110	5550	-3.45	0.10	-3.35	
	134	5670	-3.15	0.10	-3.05	
UNII-2C&3	142 Straddle	5710	-3.67	0.10	-3.57	11.00 or 30.00/500kHz
UNII-3	151	5755	-5.82	0.10	-5.72	30.00/500kHz
	159	5795	-6.14	0.10	-6.04	

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

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10.2.4. 802.11ac VHT80 MODE

Output Power Results

Band	Channel	Center Freq. [MHz]	Average Power [dBm]	Corr'd Power [dBm]	Limit [dBm]
			ANT1		
UNII-1	42	5210	10.06	10.06	23.98
UNII-2A	58	5290	10.55	10.55	23.98
UNII-2C	106	5530	9.10	9.10	23.98
	122	5610	11.29	11.29	
UNII-2C&3	138 Straddle	5690	10.80	10.80	23.98
UNII-3	155	5775	10.40	10.40	30.00

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

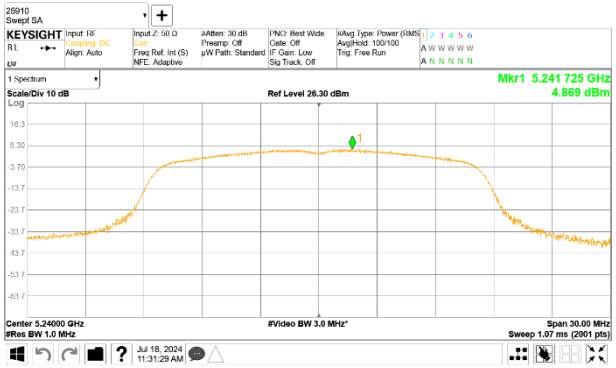
PSD Results

Band	Channel	Center Freq. [MHz]	Meas PSD [dBm/MHz]	DCCF.	Corr'd PSD [dBm]	Limit [dBm/ MHz]
			ANT1			
UNII-1	42	5210	-9.33	0.20	-9.13	11.00
UNII-2A	58	5290	-7.88	0.20	-7.68	11.00
UNII-2C	106	5530	-10.81	0.20	-10.61	11.00
	122	5610	-8.71	0.20	-8.51	
UNII-2C&3	138 Straddle	5690	-8.17	0.20	-7.97	11.00 or 30.00/500kHz
UNII-3	155	5775	-11.24	0.20	-11.04	30.00/500kHz

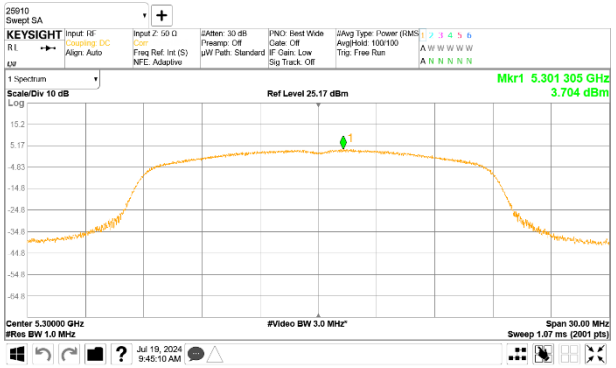
* Calculation of PSD: Corr'd PSD = Meas PSD + Duty CF[dB]

10.2.5. OUTPUT POWER AND PPSD PLOTS(WORST CASE)

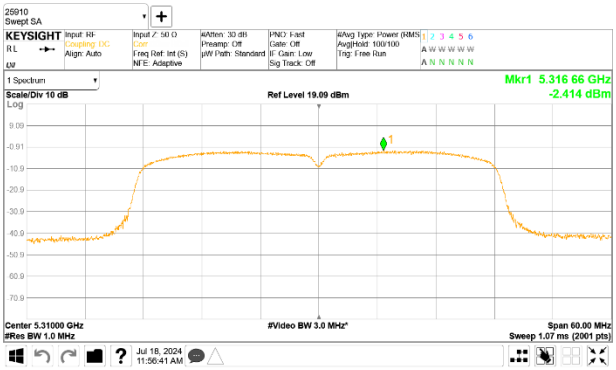
802.11a / ANT1 / 5240 MHz



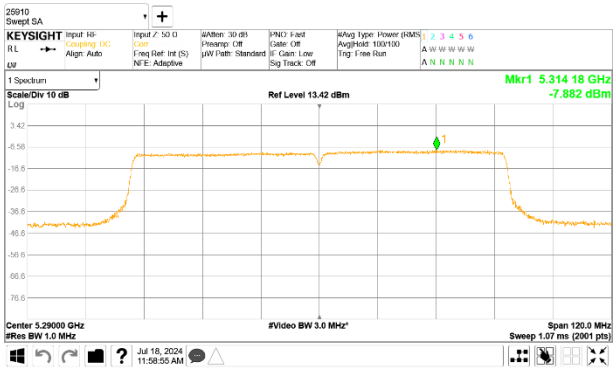
802.11n HT20 / ANT1 / 5300 MHz



802.11n HT40 / ANT1 / 5310 MHz



802.11ac VHT80 / ANT1 / 5290 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) 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.
(6) 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.
(7) The provisions of §15.205 apply to intentional radiators operating under this section.
(8) 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

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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.

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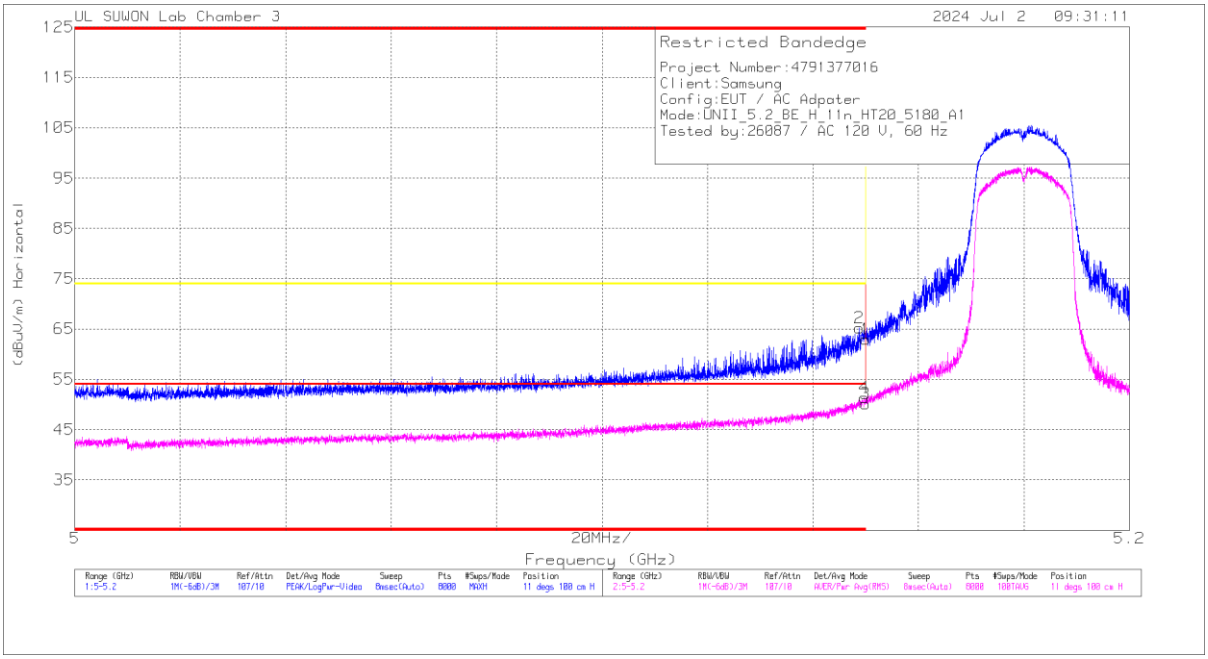
11.1. TX ABOVE 1GHz 1TX MODE IN THE 5.2GHz BAND

BANDEDGE (WORST CASE: 802.11n HT20 / 5180 MHz)

HORIZONTAL PEAK AND AVERAGE DATA



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	Antenna_957_Factor (dB/m)	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	49.12	Pk	34.4	-20.6	0	62.92	-	-	74	-11.08	11	100	H
2	* 5.14882	51.55	Pk	34.4	-20.7	0	65.25	-	-	74	-8.75	11	100	H
3	* 5.14999	36.37	RMS	34.4	-20.6	0	50.17	54	-3.83	-	-	11	100	H
4	* 5.14977	37.6	RMS	34.4	-20.6	0	51.4	54	-2.6	-	-	11	100	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	ANT1	* 5.14999	48.48	Pk	34.40	-20.60	0.00	62.28	-	-	74.00	-11.72	0	100	H
			* 5.14834	50.95	Pk	34.40	-20.80	0.00	64.55	-	-	74.00	-9.45	0	100	H
			* 5.14999	36.48	RMS	34.40	-20.60	0.14	50.42	54.00	-3.58	-	-	0	100	H
			* 5.14912	37.19	RMS	34.40	-20.70	0.14	51.03	54.00	-2.97	-	-	0	100	H
			* 5.14999	44.89	Pk	34.40	-20.60	0.00	58.69	-	-	74.00	-15.31	232	101	V
			* 5.14837	46.77	Pk	34.40	-20.80	0.00	60.37	-	-	74.00	-13.63	232	101	V
			* 5.14999	33.36	RMS	34.40	-20.60	0.14	47.30	54.00	-6.70	-	-	232	100	V
			* 5.14954	33.63	RMS	34.40	-20.70	0.14	47.47	54.00	-6.53	-	-	232	100	V
802.11n (HT20)	5180	ANT1	* 5.14999	49.12	Pk	34.40	-20.60	0.00	62.92	-	-	74.00	-11.08	11	100	H
			* 5.14882	51.55	Pk	34.40	-20.70	0.00	65.25	-	-	74.00	-8.75	11	100	H
			* 5.14999	36.37	RMS	34.40	-20.60	0.00	50.17	54.00	-3.83	-	-	11	100	H
			* 5.14977	37.60	RMS	34.40	-20.60	0.00	51.40	54.00	**-2.60**	-	-	11	100	H
			* 5.14999	45.58	Pk	34.40	-20.60	0.00	59.38	-	-	74.00	-14.62	234	100	V
			* 5.14912	47.50	Pk	34.40	-20.70	0.00	61.20	-	-	74.00	-12.80	234	100	V
			* 5.14999	32.46	RMS	34.40	-20.60	0.00	46.26	54.00	-7.74	-	-	234	100	V
			* 5.14989	34.18	RMS	34.40	-20.60	0.00	47.98	54.00	-6.02	-	-	234	100	V
802.11n (HT40)	5190	ANT1	* 5.14999	46.97	Pk	34.40	-20.60	0.00	60.77	-	-	74.00	-13.23	12	100	H
			* 5.14432	51.20	Pk	34.40	-20.80	0.00	64.80	-	-	74.00	-9.20	12	100	H
			* 5.14999	34.41	RMS	34.40	-20.60	0.10	48.31	54.00	-5.69	-	-	12	100	H
			* 5.14907	35.78	RMS	34.40	-20.70	0.10	49.58	54.00	-4.42	-	-	12	100	H
			* 5.14999	41.98	Pk	34.40	-20.60	0.00	55.78	-	-	74.00	-18.22	234	100	V
			* 5.14844	46.39	Pk	34.40	-20.80	0.00	59.99	-	-	74.00	-14.01	234	100	V
			* 5.14999	31.42	RMS	34.40	-20.60	0.10	45.32	54.00	-8.68	-	-	234	100	V
			* 5.14867	32.60	RMS	34.40	-20.70	0.10	46.40	54.00	-7.60	-	-	234	100	V
802.11ac (VHT80)	5210	ANT1	* 5.14999	47.96	Pk	34.40	-20.60	0.00	61.76	-	-	74.00	-12.24	11	100	H
			* 5.14444	52.01	Pk	34.40	-20.80	0.00	65.61	-	-	74.00	**-8.39**	11	100	H
			* 5.14999	35.06	RMS	34.40	-20.60	0.20	49.06	54.00	-4.94	-	-	11	100	H
			* 5.13597	37.03	RMS	34.40	-20.70	0.20	50.93	54.00	-3.07	-	-	11	100	H
			* 5.14999	43.00	Pk	34.40	-20.60	0.00	56.80	-	-	74.00	-17.20	234	100	V
			* 5.14477	47.20	Pk	34.40	-20.80	0.00	60.80	-	-	74.00	-13.20	234	100	V
			* 5.14999	31.81	RMS	34.40	-20.60	0.20	45.81	54.00	-8.19	-	-	234	100	V
			* 5.14194	33.21	RMS	34.40	-20.80	0.20	47.01	54.00	-6.99	-	-	234	100	V

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

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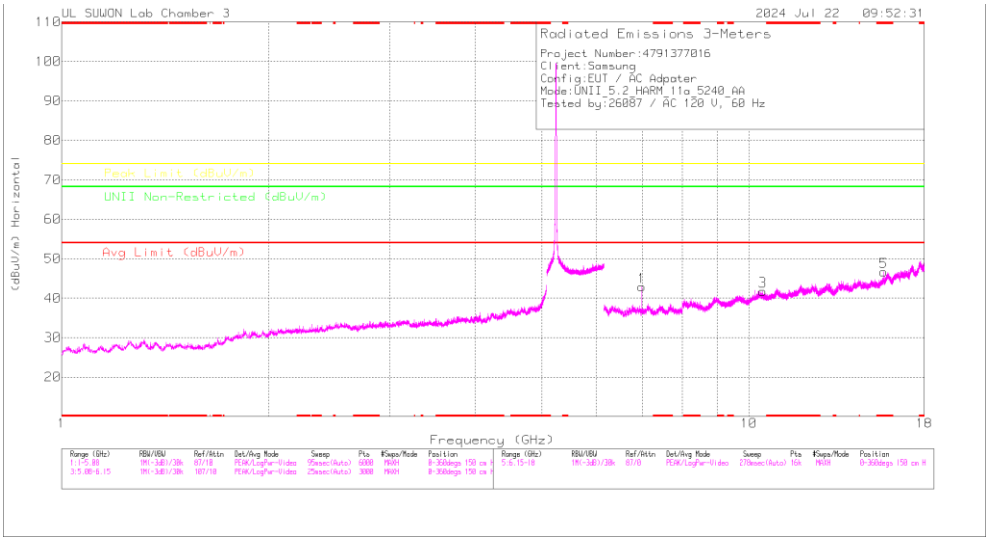
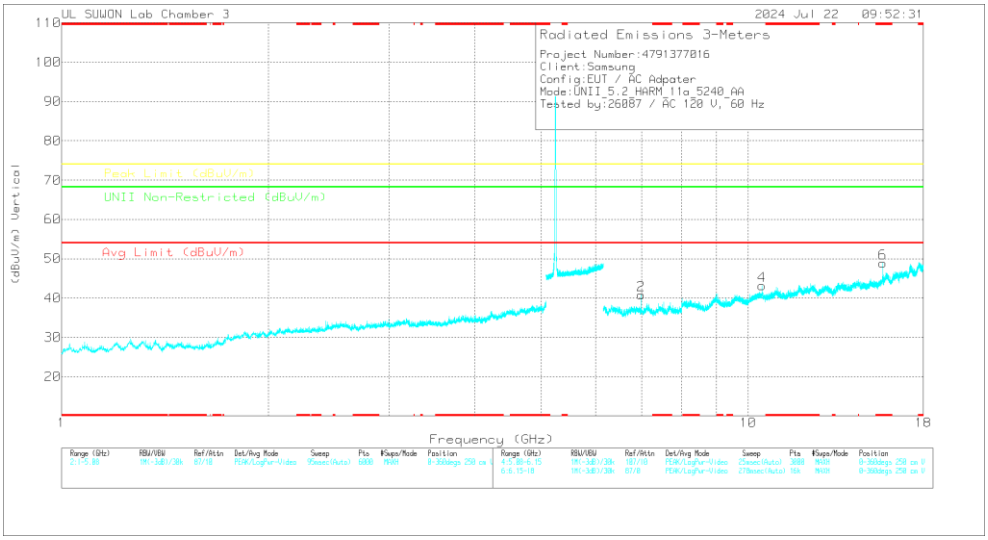
HARMONICS AND SPURIOUS EMISSIONS(WORST CASE: 802.11a / 5240 MHz)

5240 MHz HORIZONTAL



5240 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.

5240 MHz DATA

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	Antenna_957_Factor (dB/m)	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
6.98636	41.19	PK-U	36	-26.4	0	50.79	-	-	-	-	68.2	-17.41	297	104	H
6.98653	40.31	PK-U	36	-26.4	0	49.91	-	-	-	-	68.2	-18.29	278	103	V
10.48281	35.66	PK-U	37.6	-21.2	0	52.06	-	-	-	-	68.2	-16.14	338	100	H
10.47847	36.07	PK-U	37.6	-21.1	0	52.57	-	-	-	-	68.2	-15.63	183	112	V
* 15.72505	40.88	PK-U	40.5	-20.6	0	60.78	-	-	74	-13.22	-	-	57	100	H
* 15.7205	27.66	ADR	40.4	-20.5	.14	47.7	54	-6.3	-	-	-	-	57	100	H
* 15.7248	42.97	PK-U	40.4	-20.6	0	62.77	-	-	74	-11.23	-	-	29	101	V
* 15.7192	29.74	ADR	40.4	-20.5	.14	49.78	54	-4.22	-	-	-	-	29	101	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	ANT1	6.907	42.73	PK-U	36.00	-26.40	0.00	52.33	-	-	-	-	68.20	-15.87	302	108	H
			6.907	42.01	PK-U	36.00	-26.40	0.00	51.61	-	-	-	-	68.20	-16.59	273	100	V
			10.358	36.68	PK-U	37.50	-21.00	0.00	53.18	-	-	-	-	68.20	-15.02	0	100	H
			10.360	34.39	PK-U	37.50	-21.00	0.00	50.89	-	-	-	-	68.20	-17.31	0	100	V
			* 15.54506	41.01	PK-U	40.10	-21.10	0.00	60.01	-	-	74.00	-13.99	-	-	53	106	H
			* 15.53897	27.88	ADR	40.10	-21.00	0.14	47.12	54.00	-6.88	-	-	-	-	53	106	H
			* 15.54007	42.85	PK-U	40.10	-21.00	0.00	61.95	-	-	74.00	-12.05	-	-	42	104	V
			* 15.54032	29.44	ADR	40.10	-21.00	0.14	48.68	54.00	-5.32	-	-	-	-	42	104	V
	5200	ANT1	6.933	42.76	PK-U	36.00	-26.40	0.00	52.36	-	-	-	-	68.20	-15.84	301	106	H
			6.933	41.19	PK-U	36.00	-26.40	0.00	50.79	-	-	-	-	68.20	-17.41	278	101	V
			10.405	36.14	PK-U	37.50	-20.90	0.00	52.74	-	-	-	-	68.20	-15.46	346	100	H
			10.396	38.38	PK-U	37.50	-20.80	0.00	55.08	-	-	-	-	68.20	**-13.12**	165	101	V
			* 15.60434	40.24	PK-U	40.20	-20.80	0.00	59.64	-	-	74.00	-14.36	-	-	57	100	H
			* 15.5997	26.87	ADR	40.20	-20.80	0.14	46.41	54.00	-7.59	-	-	-	-	57	100	H
			* 15.6002	41.94	PK-U	40.20	-20.80	0.00	61.34	-	-	74.00	-12.66	-	-	26	100	V
			* 15.6004	28.54	ADR	40.20	-20.80	0.14	48.08	54.00	-5.92	-	-	-	-	26	100	V
	5240	ANT1	6.986	41.19	PK-U	36.00	-26.40	0.00	50.79	-	-	-	-	68.20	-17.41	297	104	H
			6.987	40.31	PK-U	36.00	-26.40	0.00	49.91	-	-	-	-	68.20	-18.29	278	103	V
			10.483	35.66	PK-U	37.60	-21.20	0.00	52.06	-	-	-	-	68.20	-16.14	338	100	H
			10.478	36.07	PK-U	37.60	-21.10	0.00	52.57	-	-	-	-	68.20	-15.63	183	112	V
			* 15.72505	40.88	PK-U	40.50	-20.60	0.00	60.78	-	-	74.00	-13.22	-	-	57	100	H
			* 15.7205	27.66	ADR	40.40	-20.50	0.14	47.70	54.00	-6.30	-	-	-	-	57	100	H
			* 15.7248	42.97	PK-U	40.40	-20.60	0.00	62.77	-	-	74.00	**-11.23**	-	-	29	101	V
			* 15.7192	29.74	ADR	40.40	-20.50	0.14	49.78	54.00	**-4.22**	-	-	-	-	29	101	V

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

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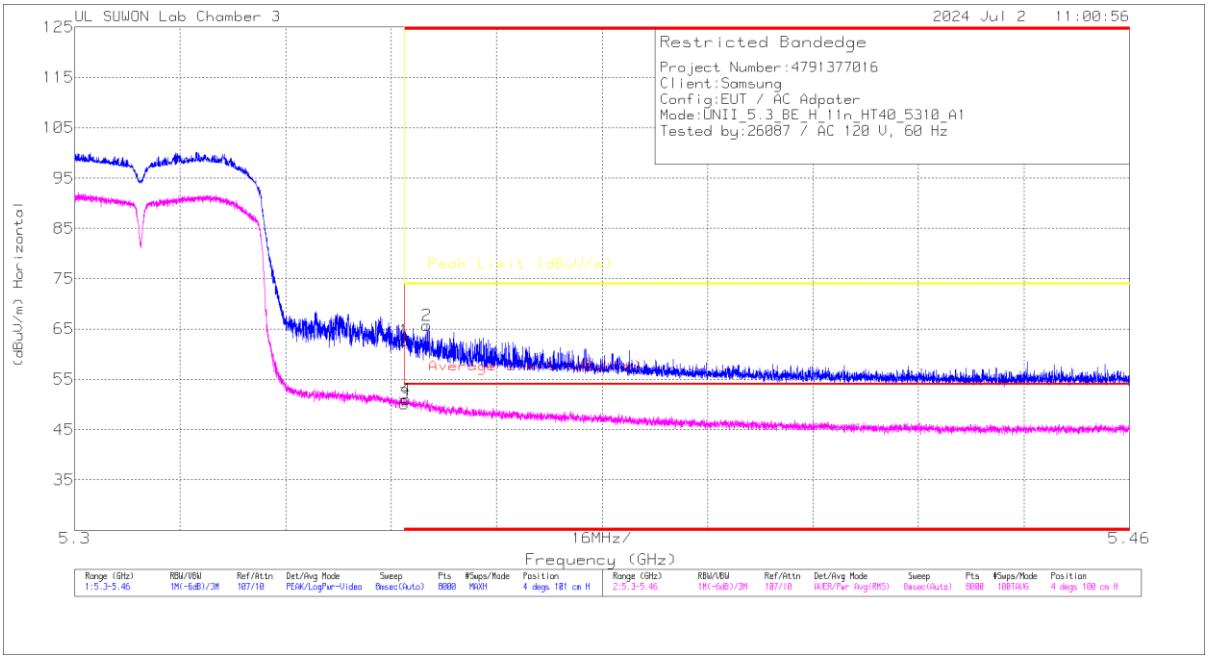
11.2. TX ABOVE 1GHz 1TX MODE IN THE 5.3GHz BAND

BANDEDGE (WORST CASE: 802.11n HT40 / 5310 MHz Upper)

HORIZONTAL PEAK AND AVERAGE DATA



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	Antenna_957_Factor (dB/m)	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	48.47	Pk	34.7	-20.4	0	62.77	-	-	74	-11.23	4	101	H
2	* 5.35341	51.26	Pk	34.7	-20.3	0	65.66	-	-	74	-8.34	4	101	H
3	* 5.35001	35.76	RMS	34.7	-20.4	.1	50.16	54	-3.84	-	-	4	100	H
4	* 5.35027	36.64	RMS	34.7	-20.4	.1	51.04	54	-2.96	-	-	4	100	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	ANT1	* 5.35001	48.40	Pk	34.70	-20.40	0.00	62.70	-	-	74.00	-11.30	357	111	H
			* 5.35043	49.99	Pk	34.70	-20.40	0.00	64.29	-	-	74.00	-9.71	357	111	H
			* 5.35001	35.86	RMS	34.70	-20.40	0.14	50.30	54.00	-3.70	-	-	357	111	H
			* 5.35133	36.43	RMS	34.70	-20.30	0.14	50.97	54.00	-3.03	-	-	357	111	H
			* 5.35001	44.43	Pk	34.70	-20.40	0.00	58.73	-	-	74.00	-15.27	247	399	V
			* 5.35021	45.88	Pk	34.70	-20.40	0.00	60.18	-	-	74.00	-13.82	247	399	V
			* 5.35001	31.59	RMS	34.70	-20.40	0.14	46.03	54.00	-7.97	-	-	247	399	V
			* 5.35093	32.58	RMS	34.70	-20.40	0.14	47.02	54.00	-6.98	-	-	247	399	V
802.11n (HT20)	5320	ANT1	* 5.35001	47.17	Pk	34.70	-20.40	0.00	61.47	-	-	74.00	-12.53	0	101	H
			* 5.35193	49.33	Pk	34.70	-20.30	0.00	63.73	-	-	74.00	-10.27	0	101	H
			* 5.35001	35.52	RMS	34.70	-20.40	0.00	49.82	54.00	-4.18	-	-	0	100	H
			* 5.35037	35.88	RMS	34.70	-20.40	0.00	50.18	54.00	-3.82	-	-	0	100	H
			* 5.35001	44.14	Pk	34.70	-20.40	0.00	58.44	-	-	74.00	-15.56	247	398	V
			* 5.35179	44.57	Pk	34.70	-20.30	0.00	58.97	-	-	74.00	-15.03	247	398	V
			* 5.35001	31.10	RMS	34.70	-20.40	0.00	45.40	54.00	-8.60	-	-	247	398	V
			* 5.35023	32.12	RMS	34.70	-20.40	0.00	46.42	54.00	-7.58	-	-	247	398	V
802.11n (HT40)	5310	ANT1	* 5.35001	48.47	Pk	34.70	-20.40	0.00	62.77	-	-	74.00	-11.23	4	101	H
			* 5.35341	51.26	Pk	34.70	-20.30	0.00	65.66	-	-	74.00	**-8.34**	4	101	H
			* 5.35001	35.76	RMS	34.70	-20.40	0.10	50.16	54.00	-3.84	-	-	4	100	H
			* 5.35027	36.64	RMS	34.70	-20.40	0.10	51.04	54.00	**-2.96**	-	-	4	100	H
			* 5.35001	42.40	Pk	34.70	-20.40	0.00	56.70	-	-	74.00	-17.30	247	400	V
			* 5.35099	45.63	Pk	34.70	-20.40	0.00	59.93	-	-	74.00	-14.07	247	400	V
			* 5.35001	31.84	RMS	34.70	-20.40	0.10	46.24	54.00	-7.76	-	-	247	400	V
			* 5.35069	32.50	RMS	34.70	-20.40	0.10	46.90	54.00	-7.10	-	-	247	400	V
802.11ac (VHT80)	5290	ANT1	* 5.35001	46.52	Pk	34.70	-20.40	0.00	60.82	-	-	74.00	-13.18	0	100	H
			* 5.35381	49.15	Pk	34.70	-20.30	0.00	63.55	-	-	74.00	-10.45	0	100	H
			* 5.35001	34.86	RMS	34.70	-20.40	0.20	49.36	54.00	-4.64	-	-	0	100	H
			* 5.35875	36.28	RMS	34.70	-20.30	0.20	50.88	54.00	-3.12	-	-	0	100	H
			* 5.35001	43.09	Pk	34.70	-20.40	0.00	57.39	-	-	74.00	-16.61	247	400	V
			* 5.35059	44.24	Pk	34.70	-20.40	0.00	58.54	-	-	74.00	-15.46	247	400	V
			* 5.35001	30.32	RMS	34.70	-20.40	0.20	44.82	54.00	-9.18	-	-	247	400	V
			* 5.35019	31.60	RMS	34.70	-20.40	0.20	46.10	54.00	-7.90	-	-	247	400	V

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

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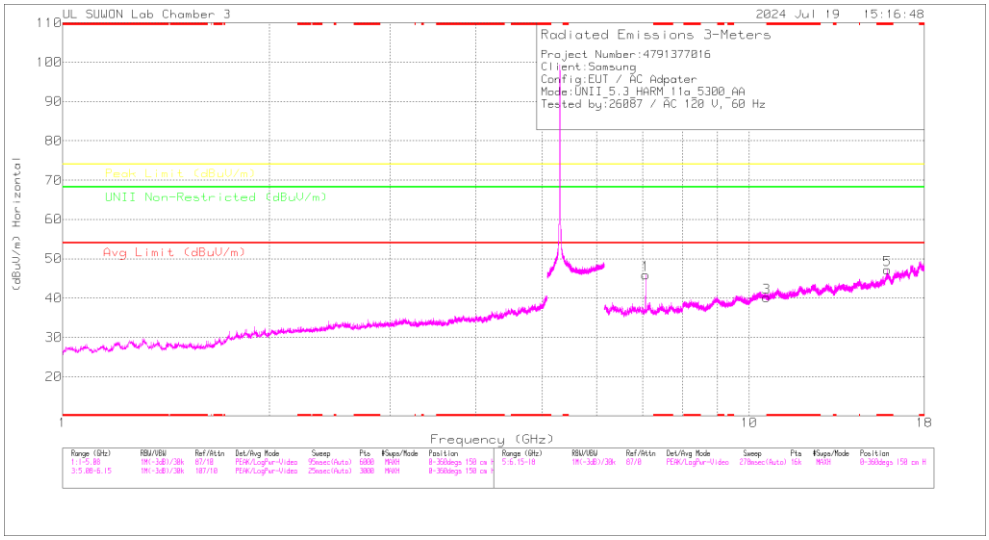
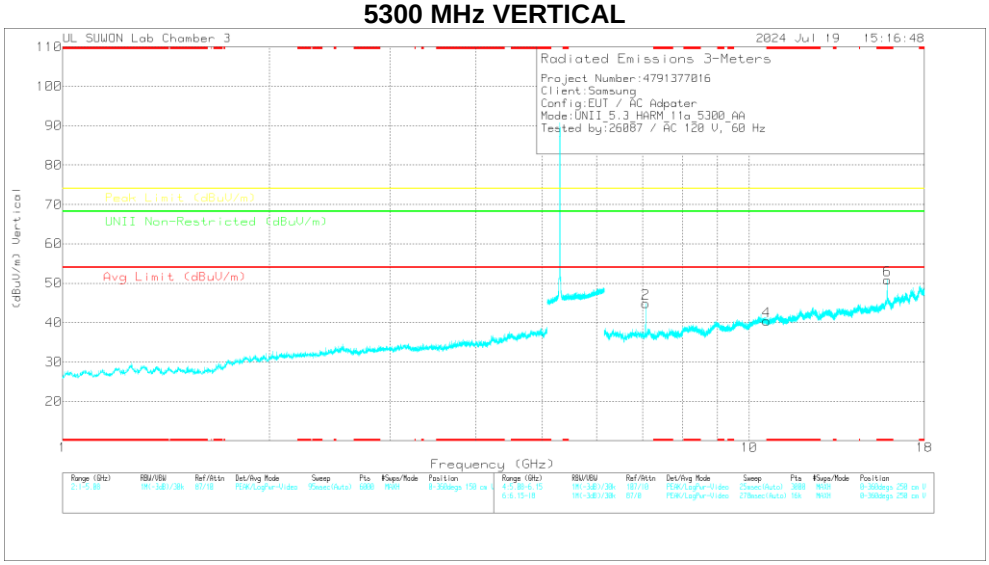
HARMONICS AND SPURIOUS EMISSIONS(WORST CASE: 802.11a / 5300 MHz)

5300 MHz HORIZONTAL



5300 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.

5300 MHz DATA

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	Antenna_957_Factor (dB/m)	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
7.06666	42.27	PK-U	35.9	-26.2	0	51.97	-	-	-	-	68.2	-16.23	299	113	H
7.06675	42.02	PK-U	35.9	-26.2	0	51.72	-	-	-	-	68.2	-16.48	262	101	V
* 10.6011	33.39	PK-U	37.7	-21.2	0	49.89	-	-	74	-24.11	-	-	0	100	H
* 10.60181	34.28	PK-U	37.7	-21.2	0	50.78	-	-	74	-23.22	-	-	0	100	V
* 15.90438	39.44	PK-U	40.8	-19.9	0	60.34	-	-	74	-13.66	-	-	54	101	H
* 15.90093	26.51	ADR	40.8	-19.9	.14	47.55	54	-6.45	-	-	-	-	54	101	H
* 15.90463	42.68	PK-U	40.8	-19.9	0	63.58	-	-	74	-10.42	-	-	14	104	V
* 15.90034	28.74	ADR	40.8	-19.9	.14	49.78	54	-4.22	-	-	-	-	14	104	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	ANT1	7.013	40.42	PK-U	36.00	-26.40	0.00	50.02	-	-	-	-	68.20	-18.18	298	115	H
			7.013	39.86	PK-U	36.00	-26.40	0.00	49.46	-	-	-	-	68.20	-18.74	265	100	V
			10.520	35.00	PK-U	37.60	-21.10	0.00	51.50	-	-	-	-	68.20	-16.70	341	100	H
			10.520	36.09	PK-U	37.60	-21.10	0.00	52.59	-	-	-	-	68.20	**-15.61**	265	106	V
			* 15.78439	40.84	PK-U	40.60	-20.50	0.00	60.94	-	-	74.00	-13.06	-	-	56	100	H
			* 15.77759	27.16	ADR	40.60	-20.60	0.14	47.30	54.00	-6.70	-	-	-	-	56	100	H
			* 15.78399	42.16	PK-U	40.60	-20.50	0.00	62.26	-	-	74.00	-11.74	-	-	19	103	V
			* 15.78054	29.24	ADR	40.60	-20.50	0.14	49.48	54.00	-4.52	-	-	-	-	19	103	V
	5300	ANT1	7.067	42.27	PK-U	35.90	-26.20	0.00	51.97	-	-	-	-	68.20	-16.23	299	113	H
			7.067	42.02	PK-U	35.90	-26.20	0.00	51.72	-	-	-	-	68.20	-16.48	262	101	V
			* 10.6011	33.39	PK-U	37.70	-21.20	0.00	49.89	-	-	74.00	-24.11	-	-	0	100	H
			* 10.60181	34.28	PK-U	37.70	-21.20	0.00	50.78	-	-	74.00	-23.22	-	-	0	100	V
			* 15.90438	39.44	PK-U	40.80	-19.90	0.00	60.34	-	-	74.00	-13.66	-	-	54	101	H
			* 15.90093	26.51	ADR	40.80	-19.90	0.14	47.55	54.00	-6.45	-	-	-	-	54	101	H
			* 15.90463	42.68	PK-U	40.80	-19.90	0.00	63.58	-	-	74.00	**-10.42**	-	-	14	104	V
			* 15.90034	28.74	ADR	40.80	-19.90	0.14	49.78	54.00	**-4.22**	-	-	-	-	14	104	V
	5320	ANT1	7.093	35.41	PK	35.90	-26.10	0.00	45.21	-	-	-	-	68.20	-22.99	0-360	150	H
			* 10.64069	23.93	PK	37.70	-21.10	0.00	40.53	-	-	74.00	-33.47	-	-	0-360	150	H
			* 15.96093	26.19	PK	40.90	-19.80	0.00	47.29	-	-	74.00	-26.71	-	-	0-360	150	H
			7.093	34.36	PK	35.90	-26.10	0.00	44.16	-	-	-	-	68.20	-24.04	0-360	250	V
			* 10.64069	24.63	PK	37.70	-21.10	0.00	41.23	-	-	74.00	-32.77	-	-	0-360	250	V
			* 15.95797	30.78	PK	40.90	-19.70	0.00	51.98	-	-	74.00	-22.02	-	-	0-360	250	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

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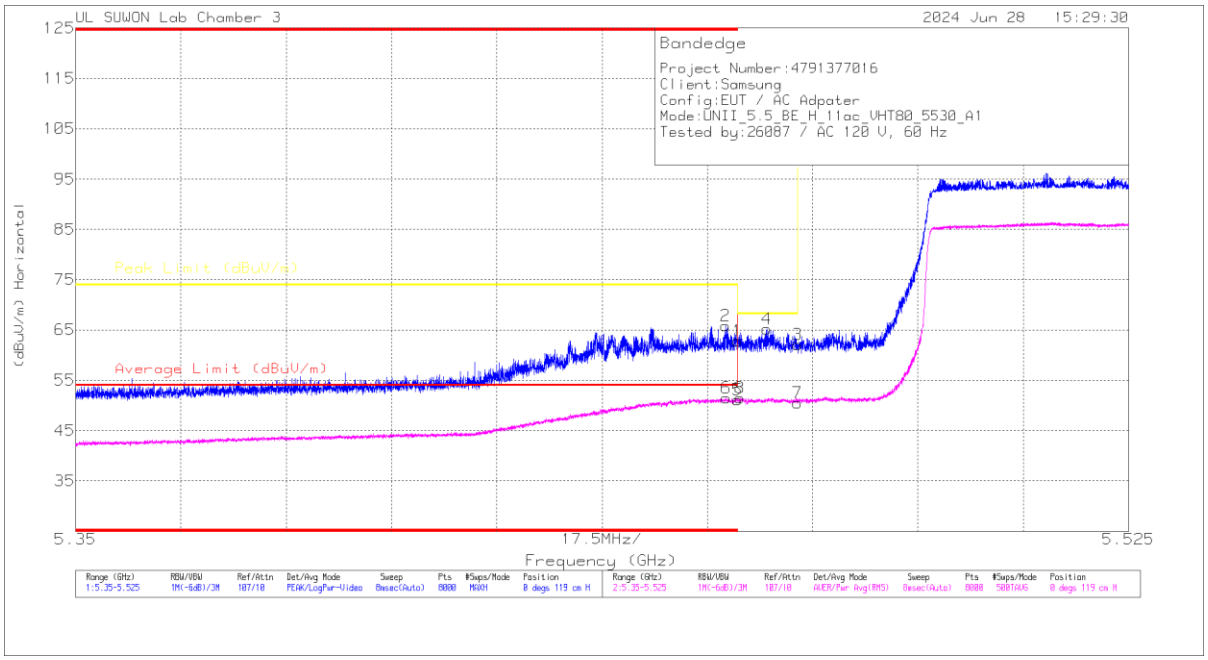
11.3. TX ABOVE 1GHz 1TX MODE IN THE 5.5 GHz BAND

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/m)	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	48	Pk	34.9	-20.1	0	62.8	-	-	74	-11.2	0	119	H
2	* 5.45799	51.05	Pk	34.9	-20.1	0	65.85	-	-	74	-8.15	0	119	H
3	5.46998	47.4	Pk	34.9	-20.2	0	62.1	-	-	68.2	-6.1	0	119	H
4	5.46486	50.46	Pk	34.9	-20.2	0	65.16	-	-	68.2	-3.04	0	119	H
5	* 5.45998	36.17	RMS	34.9	-20.1	.2	51.17	54	-2.83	-	-	0	119	H
6	* 5.45812	36.5	RMS	34.9	-20.1	.2	51.5	54	-2.5	-	-	0	119	H
7	5.46998	35.59	RMS	34.9	-20.2	.2	50.49	-	-	-	-	0	119	H
8	5.4604	36.65	RMS	34.9	-20.2	.2	51.55	-	-	-	-	0	119	H

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

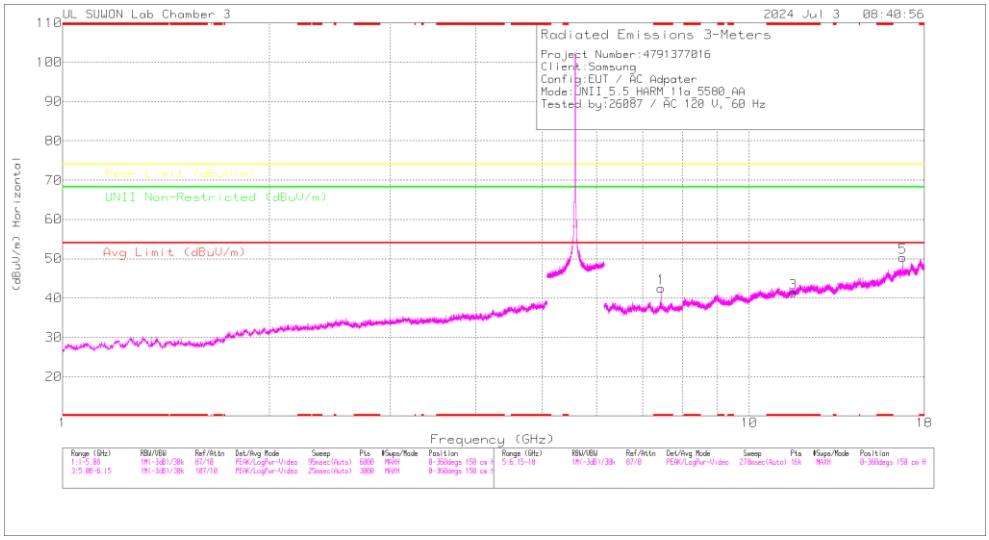
BANDEDGE TEST DATA

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	ANT1	* 5.45998	44.15	Pk	34.90	-20.10	0.00	58.95	-	-	74.00	-15.05	0	118	H
			* 5.45657	49.62	Pk	34.90	-20.20	0.00	64.32	-	-	74.00	-9.68	0	118	H
			5.46998	50.11	Pk	34.90	-20.20	0.00	64.81	-	-	68.20	-3.39	0	118	H
			5.46838	50.59	Pk	34.90	-20.20	0.00	65.29	-	-	68.20	**-2.91**	0	118	H
			* 5.45998	34.02	RMS	34.90	-20.10	0.14	48.96	54.00	-5.04	-	-	0	118	H
			* 5.45897	35.03	RMS	34.90	-20.10	0.14	49.97	54.00	-4.03	-	-	0	118	H
			5.46998	35.69	RMS	34.90	-20.20	0.14	50.53	-	-	-	-	0	118	H
			5.46996	36.71	RMS	34.90	-20.20	0.14	51.55	-	-	-	-	0	118	H
			* 5.45998	39.98	Pk	34.90	-20.10	0.00	54.78	-	-	74.00	-19.22	246	392	V
			* 5.4586	42.06	Pk	34.90	-20.10	0.00	56.86	-	-	74.00	-17.14	246	392	V
			5.46998	43.02	Pk	34.90	-20.20	0.00	57.72	-	-	68.20	-10.48	246	392	V
			5.46952	45.25	Pk	34.90	-20.20	0.00	59.95	-	-	68.20	-8.25	246	392	V
			* 5.45998	28.81	RMS	34.90	-20.10	0.14	43.75	54.00	-10.25	-	-	246	392	V
			* 5.45311	29.92	RMS	34.90	-20.10	0.14	44.86	54.00	-9.14	-	-	246	392	V
			5.46998	30.38	RMS	34.90	-20.20	0.14	45.22	-	-	-	-	246	392	V
			5.46893	31.39	RMS	34.90	-20.20	0.14	46.23	-	-	-	-	246	392	V
	5700	ANT1	5.72500	46.16	Pk	35.00	-19.80	0.00	61.36	-	-	68.20	-6.84	0	100	H
			5.72552	49.94	Pk	35.00	-19.80	0.00	65.14	-	-	68.20	-3.06	0	100	H
			5.72500	40.38	Pk	35.00	-19.80	0.00	55.58	-	-	68.20	-12.62	234	103	V
			5.72585	46.36	Pk	35.00	-19.80	0.00	61.56	-	-	68.20	-6.64	234	103	V
802.11n (HT20)	5500	ANT1	* 5.45998	41.53	Pk	34.90	-20.10	0.00	56.33	-	-	74.00	-17.67	0	117	H
			* 5.45178	47.07	Pk	34.90	-20.10	0.00	61.87	-	-	74.00	-12.13	0	117	H
			5.46998	42.65	Pk	34.90	-20.20	0.00	57.35	-	-	68.20	-10.85	0	117	H
			5.46976	46.72	Pk	34.90	-20.20	0.00	61.42	-	-	68.20	-6.78	0	117	H
			* 5.45998	31.51	RMS	34.90	-20.10	0.00	46.31	54.00	-7.69	-	-	0	117	H
			* 5.45434	32.13	RMS	34.90	-20.10	0.00	46.93	54.00	-7.07	-	-	0	117	H
			5.46998	32.46	RMS	34.90	-20.20	0.00	47.16	-	-	-	-	0	117	H
			5.46773	32.77	RMS	34.90	-20.20	0.00	47.47	-	-	-	-	0	117	H
			* 5.45998	37.62	Pk	34.90	-20.10	0.00	52.42	-	-	74.00	-21.58	244	392	V
			* 5.40117	41.35	Pk	34.80	-20.20	0.00	55.95	-	-	74.00	-18.05	244	392	V
			5.46998	39.72	Pk	34.90	-20.20	0.00	54.42	-	-	68.20	-13.78	244	392	V
			5.46727	41.66	Pk	34.90	-20.20	0.00	56.36	-	-	68.20	-11.84	244	392	V
			* 5.45998	27.97	RMS	34.90	-20.10	0.00	42.77	54.00	-11.23	-	-	244	392	V
			* 5.36564	29.48	RMS	34.70	-20.30	0.00	43.88	54.00	-10.12	-	-	244	392	V
			5.46998	28.72	RMS	34.90	-20.20	0.00	43.42	-	-	-	-	244	392	V
			5.46646	29.37	RMS	34.90	-20.20	0.00	44.07	-	-	-	-	244	392	V
	5700	ANT1	5.72500	43.83	Pk	35.00	-19.80	0.00	59.03	-	-	68.20	-9.17	3	100	H
			5.73452	46.07	Pk	35.00	-19.80	0.00	61.27	-	-	68.20	-6.93	3	100	H
			5.72500	38.85	Pk	35.00	-19.80	0.00	54.05	-	-	68.20	-14.15	233	104	V
			5.72963	41.87	Pk	35.00	-19.80	0.00	57.07	-	-	68.20	-11.13	233	104	V
802.11n (HT40)	5510	ANT1	* 5.45998	48.20	Pk	34.90	-20.10	0.00	63.00	-	-	74.00	-11.00	0	118	H
			* 5.45974	49.50	Pk	34.90	-20.10	0.00	64.30	-	-	74.00	-9.70	0	118	H
			5.46998	45.79	Pk	34.90	-20.20	0.00	60.49	-	-	68.20	-7.71	0	118	H
			5.46431	49.41	Pk	34.90	-20.20	0.00	64.11	-	-	68.20	-4.09	0	118	H
			* 5.45998	31.99	RMS	34.90	-20.10	0.10	46.89	54.00	-7.11	-	-	0	118	H
			* 5.45674	33.39	RMS	34.90	-20.20	0.10	48.19	54.00	-5.81	-	-	0	118	H
			5.46998	35.10	RMS	34.90	-20.20	0.10	49.90	-	-	-	-	0	118	H
			5.46963	34.92	RMS	34.90	-20.20	0.10	49.72	-	-	-	-	0	118	H
			* 5.45998	40.40	Pk	34.90	-20.10	0.00	55.20	-	-	74.00	-18.80	245	392	V
			* 5.45972	43.44	Pk	34.90	-20.10	0.00	58.24	-	-	74.00	-15.76	245	392	V
			5.46998	41.14	Pk	34.90	-20.20	0.00	55.84	-	-	68.20	-12.36	245	392	V
			5.46827	44.64	Pk	34.90	-20.20	0.00	59.34	-	-	68.20	-8.86	245	392	V
			* 5.45998	28.71	RMS	34.90	-20.10	0.10	43.61	54.00	-10.39	-	-	245	392	V
			* 5.45981	29.54	RMS	34.90	-20.10	0.10	44.44	54.00	-9.56	-	-	245	392	V
			5.46998	30.26	RMS	34.90	-20.20	0.10	45.06	-	-	-	-	245	392	V
			5.46948	31.34	RMS	34.90	-20.20	0.10	46.14	-	-	-	-	245	392	V
	5670	ANT1	5.72500	41.69	Pk	35.00	-19.80	0.00	56.89	-	-	68.20	-11.31	359	114	H
			5.72694	46.37	Pk	35.00	-19.80	0.00	61.57	-	-	68.20	-6.63	359	114	H
			5.72500	39.69	Pk	35.00	-19.80	0.00	54.89	-	-	68.20	-13.31	238	105	V
			5.72853	41.89	Pk	35.00	-19.80	0.00	57.09	-	-	68.20	-11.11	238	105	V
802.11ac (VHT80)	5530	ANT1	* 5.45998	48.00	Pk	34.90	-20.10	0.00	62.80	-	-	74.00	-11.20	0	119	H
			* 5.45799	51.05	Pk	34.90	-20.10	0.00	65.85	-	-	74.00	-8.15	0	119	H
			5.46998	47.40	Pk	34.90	-20.20	0.00	62.10	-	-	68.20	-6.10	0	119	H
			5.46486	50.46	Pk	34.90	-20.20	0.00	65.16	-	-	68.20	-3.04	0	119	H
			* 5.45998	36.17	RMS	34.90	-20.10	0.20	51.17	54.00	-2.83	-	-	0	119	H
			* 5.45812	36.50	RMS	34.90	-20.10	0.20	51.50	54.00	**-2.50**	-	-	0	119	H
			5.46998	35.59	RMS	34.90	-20.20	0.20	50.49	-	-	-	-	0	119	H
			5.46040	36.65	RMS	34.90	-20.20	0.20	51.55	-	-	-	-	0	119	H
			* 5.45998	44.28	Pk	34.90	-20.10	0.00	59.08	-	-	74.00	-14.92	244	393	V
			* 5.45821	45.42	Pk	34.90	-20.10	0.00	60.22	-	-	74.00	-13.78	244	393	V
			5.46998	44.60	Pk	34.90	-20.20	0.00	59.30	-	-	68.20	-8.90	244	393	V
			5.46202	45.82	Pk	34.90	-20.20	0.00	60.52	-	-	68.20	-7.68	244	393	V
			* 5.45998	30.64	RMS	34.90	-20.10	0.20	45.64	54.00	-8.36	-	-	244	393	V
			* 5.45902	31.81	RMS	34.90	-20.10	0.20	46.81	54.00	-7.19	-	-	244	393	V
			5.46998	32.02	RMS	34.90	-20.20	0.20	46.92	-	-	-	-	244	393	V
			5.46576	32.82	RMS	34.90	-20.10	0.20	47.82	-	-	-	-	244	393	V
	5610	ANT1	5.72500	40.83	Pk	35.00	-19.80	0.00	56.03	-	-	68.20	-12.17	5	105	H
			5.73294	44.24	Pk	35.00	-19.80	0.00	59.44	-	-	68.20	-8.76	5	105	H
			5.72500	36.89	Pk	35.00	-19.80	0.00	52.09	-	-	68.20	-16.11	261	388	V
			5.77323	40.14	Pk	35.00	-19.70	0.00	55.44	-	-	68.20	-12.76	261	388	V

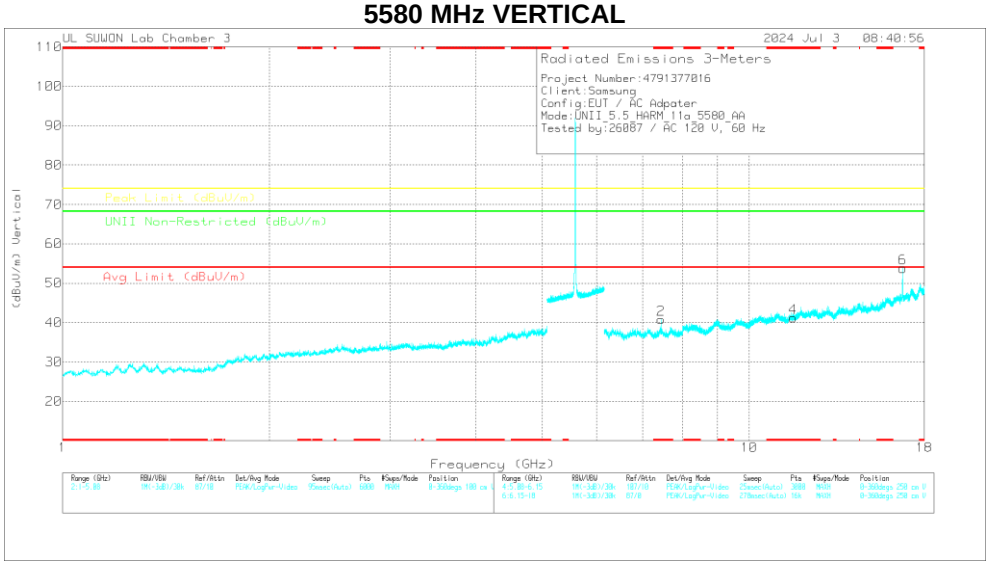
Note1. Pk - Peak detector, RMS - RMS detectior
Note2. * - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

HARMONICS AND SPURIOUS EMISSIONS(WORST CASE: 802.11a / 5580 MHz)

5580 MHz HORIZONTAL



5580 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.

5580 MHz DATA

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	Antenna_957_Factor (dB/m)	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
* 7.44003	38.98	PK-U	35.7	-24.9	0	49.78	-	-	74	-24.22	-	-	286	104	H
* 7.43995	31.08	ADR	35.7	-24.9	.14	42.02	54	-11.98	-	-	-	-	286	104	H
* 7.43996	39.14	PK-U	35.7	-24.9	0	49.94	-	-	74	-24.06	-	-	248	100	V
* 7.44004	31.17	ADR	35.7	-24.9	.14	42.11	54	-11.89	-	-	-	-	248	100	V
* 11.59905	34.37	PK-U	38.3	-21.6	0	51.07	-	-	74	-22.93	-	-	0	100	H
* 11.60135	34.4	PK-U	38.3	-21.6	0	51.1	-	-	74	-22.9	-	-	0	101	V
16.74434	38.59	PK-U	41.8	-18.3	0	62.09	-	-	-	-	68.2	-6.11	4	108	H
PLS 16															
16.74025	43.12	PK-U	41.8	-18.2	0	66.72	-	-	-	-	68.2	-1.48	47	101	V
PLS 15															
16.7402	42.6	PK-U	41.8	-18.2	0	66.2	-	-	-	-	68.2	-2	47	101	V
PLS 14															
16.74519	41.5	PK-U	41.8	-18.3	0	65	-	-	-	-	68.2	-3.2	47	101	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	ANT1	* 7.33297	39.41	PK-U	35.80	-25.40	0.00	49.81	-	-	74.00	-24.19	-	-	288	100	H
			* 7.33322	32.38	ADR	35.80	-25.40	0.14	42.92	54.00	-11.08	-	-	-	-	288	100	H
			* 7.33345	40.15	PK-U	35.80	-25.40	0.00	50.55	-	-	74.00	-23.45	-	-	243	100	V
			* 7.33329	33.29	ADR	35.80	-25.40	0.14	43.83	54.00	-10.17	-	-	-	-	243	100	V
			* 10.99999	34.21	PK-U	38.00	-21.10	0.00	51.11	-	-	74.00	-22.89	-	-	0	100	H
			* 11.00186	35.01	PK-U	38.00	-21.00	0.00	52.01	-	-	74.00	-21.99	-	-	0	100	V
			16.506	37.15	PK-U	41.60	-18.70	0.00	60.05	-	-	-	-	68.20	-8.15	46	101	H
			16.505	40.32	PK-U	41.60	-18.70	0.00	63.22	-	-	-	-	68.20	-4.98	43	104	V
	5580	ANT1	* 7.44003	38.98	PK-U	35.70	-24.90	0.00	49.78	-	-	74.00	-24.22	-	-	286	104	H
			* 7.43995	31.08	ADR	35.70	-24.90	0.14	42.02	54.00	-11.98	-	-	-	-	286	104	H
			* 7.43996	39.14	PK-U	35.70	-24.90	0.00	49.94	-	-	74.00	-24.06	-	-	248	100	V
			* 7.44004	31.17	ADR	35.70	-24.90	0.14	42.11	54.00	-11.89	-	-	-	-	248	100	V
			* 11.59905	34.37	PK-U	38.30	-21.60	0.00	51.07	-	-	74.00	-22.93	-	-	0	100	H
			* 11.60135	34.40	PK-U	38.30	-21.60	0.00	51.10	-	-	74.00	-22.90	-	-	0	101	V
			16.744	38.59	PK-U	41.80	-18.30	0.00	62.09	-	-	-	-	68.20	-6.11	4	108	H
			16.745	41.50	PK-U	41.80	-18.30	0.00	65.00	-	-	-	-	68.20	**-3.20**	47	101	V
	5700	ANT1	* 7.59989	38.90	PK-U	35.80	-25.00	0.00	49.70	-	-	74.00	-24.30	-	-	289	116	H
			* 7.59995	31.80	ADR	35.80	-25.00	0.14	42.74	54.00	-11.26	-	-	-	-	289	116	H
			* 7.59989	39.86	PK-U	35.80	-25.00	0.00	50.66	-	-	74.00	-23.34	-	-	280	103	V
			* 7.6	32.94	ADR	35.80	-25.00	0.14	43.88	54.00	**-10.12**	-	-	-	-	280	103	V
			* 11.39596	33.50	PK-U	38.10	-21.40	0.00	50.20	-	-	74.00	-23.80	-	-	0	100	H
			* 11.39342	33.35	PK-U	38.10	-21.30	0.00	50.15	-	-	74.00	-23.85	-	-	0	100	V
			17.105	33.92	PK-U	41.40	-17.30	0.00	58.02	-	-	-	-	68.20	-10.18	96	127	H
			17.105	39.85	PK-U	41.40	-17.30	0.00	63.95	-	-	-	-	68.20	-4.25	41	106	V
	5720	ANT1	* 7.62661	38.95	PK-U	35.80	-24.90	0.00	49.85	-	-	74.00	-24.15	-	-	290	118	H
			* 7.62662	30.77	ADR	35.80	-24.90	0.14	41.81	54.00	-12.19	-	-	-	-	290	118	H
			* 7.62684	38.85	PK-U	35.80	-24.90	0.00	49.75	-	-	74.00	-24.25	-	-	296	100	V
			* 7.62667	32.09	ADR	35.80	-24.90	0.14	43.13	54.00	-10.87	-	-	-	-	296	100	V
			* 11.43632	33.10	PK-U	38.20	-21.30	0.00	50.00	-	-	74.00	-24.00	-	-	0	100	H
			* 11.40303	32.99	PK-U	38.10	-21.30	0.00	49.79	-	-	74.00	-24.21	-	-	0	100	V
			17.172	33.36	PK-U	41.30	-17.00	0.00	57.66	-	-	-	-	68.20	-10.54	38	385	H
			17.164	38.88	PK-U	41.30	-17.00	0.00	63.18	-	-	-	-	68.20	-5.02	43	110	V
802.11n HT20 Spot-check	5580	ANT1	* 7.44013	39.03	PK-U	35.70	-24.90	0.00	49.83	-	-	74.00	-24.17	-	-	290	109	H
			* 7.44009	30.87	ADR	35.70	-24.90	0.00	41.67	54.00	-12.33	-	-	-	-	290	109	H
			* 7.44002	39.36	PK-U	35.70	-24.90	0.00	50.16	-	-	74.00	-23.84	-	-	255	100	V
			* 7.44002	31.35	ADR	35.70	-24.90	0.00	42.15	54.00	-11.85	-	-	-	-	255	100	V
			* 11.59926	35.40	PK-U	38.30	-21.60	0.00	52.10	-	-	74.00	-21.90	-	-	0	100	H
			* 11.59841	34.37	PK-U	38.30	-21.60	0.00	51.07	-	-	74.00	-22.93	-	-	0	100	V
			16.742	36.60	PK-U	41.80	-18.20	0.00	60.20	-	-	-	-	68.20	-8.00	23	100	H
			16.742	40.60	PK-U	41.80	-18.20	0.00	64.20	-	-	-	-	68.20	-4.00	37	100	V
802.11n HT40 Spot-check	5590	ANT1	* 7.45308	39.23	PK-U	35.70	-25.00	0.00	49.93	-	-	74.00	-24.07	-	-	290	108	H
			* 7.45325	30.83	ADR	35.70	-25.00	0.10	41.63	54.00	-12.37	-	-	-	-	290	108	H
			* 7.45342	39.30	PK-U	35.70	-25.00	0.00	50.00	-	-	74.00	-24.00	-	-	255	100	V
			* 7.45319	30.91	ADR	35.70	-25.00	0.10	41.71	54.00	-12.29	-	-	-	-	255	100	V
			* 11.8008	35.08	PK-U	38.50	-21.50	0.00	52.08	-	-	74.00	-21.92	-	-	0	100	H
			* 11.80003	34.52	PK-U	38.50	-21.50	0.00	51.52	-	-	74.00	-22.48	-	-	0	100	V
			16.766	32.62	PK-U	41.80	-18.20	0.00	56.22	-	-	-	-	68.20	-11.98	76	291	H
			16.760	36.42	PK-U	41.80	-18.20	0.00	60.02	-	-	-	-	68.20	-8.18	34	100	V
802.11ac VHT80 Spot-check	5610	ANT1	* 8.41683	36.28	PK-U	36.00	-23.60	0.00	48.68	-	-	74.00	-25.32	-	-	0	100	H
			* 8.41503	36.27	PK-U	36.00	-23.60	0.00	48.67	-	-	74.00	-25.33	-	-	0	100	V
			* 11.22098	35.74	PK-U	38.10	-21.30	0.00	52.54	-	-	74.00	**-21.46**	-	-	0	100	H
			* 11.22179	34.56	PK-U	38.10	-21.30	0.00	51.36	-	-	74.00	-22.64	-	-	0	100	V
			16.831	32.42	PK-U	41.80	-17.90	0.00	56.32	-	-	-	-	68.20	-11.88	0	100	H
			16.830	33.09	PK-U	41.80	-17.90	0.00	56.99	-	-	-	-	68.20	-11.21	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

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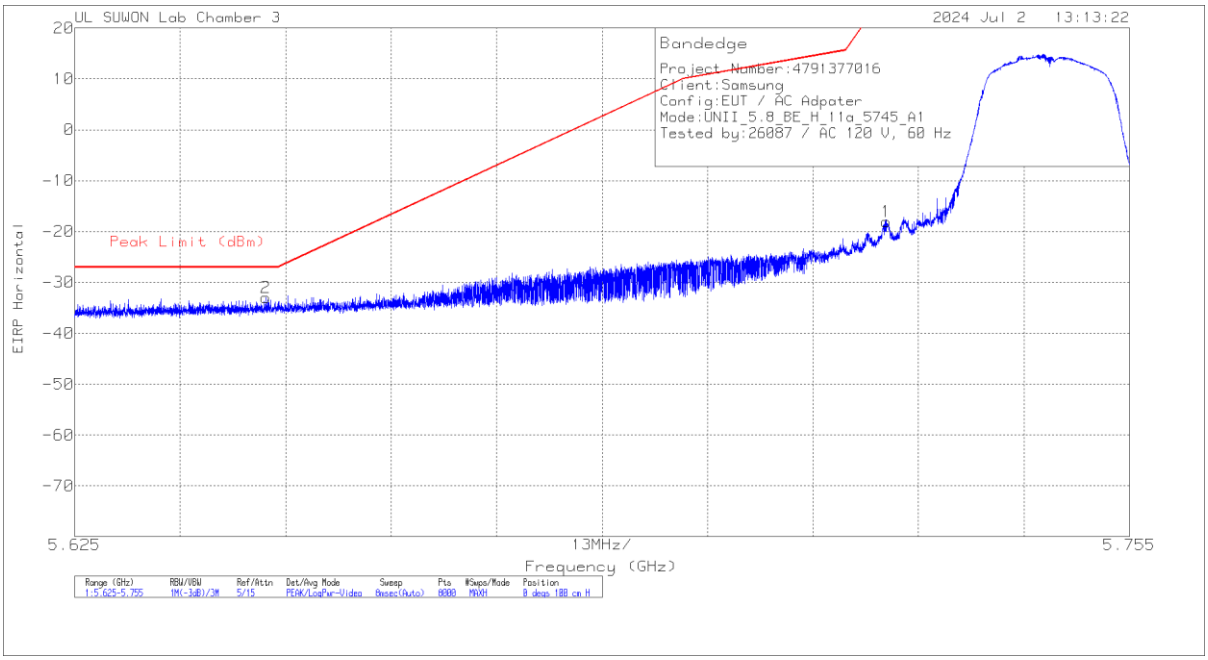
11.4. TX ABOVE 1GHz 1TX MODE IN THE 5.8 GHz BAND

BANDEDGE (WORST CASE: 802.11a / 5745 MHz

HORIZONTAL PEAK DATA



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	Antenna_957_Factor(dB/m)	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	-44.93	Pk	34.9	-19.8	11.8	0	-18.03	27	-45.03	0	100	H
2	5.64858	-59.62	Pk	34.9	-20	11.8	0	-32.92	-27	-5.92	0	100	H

Pk - Peak detector

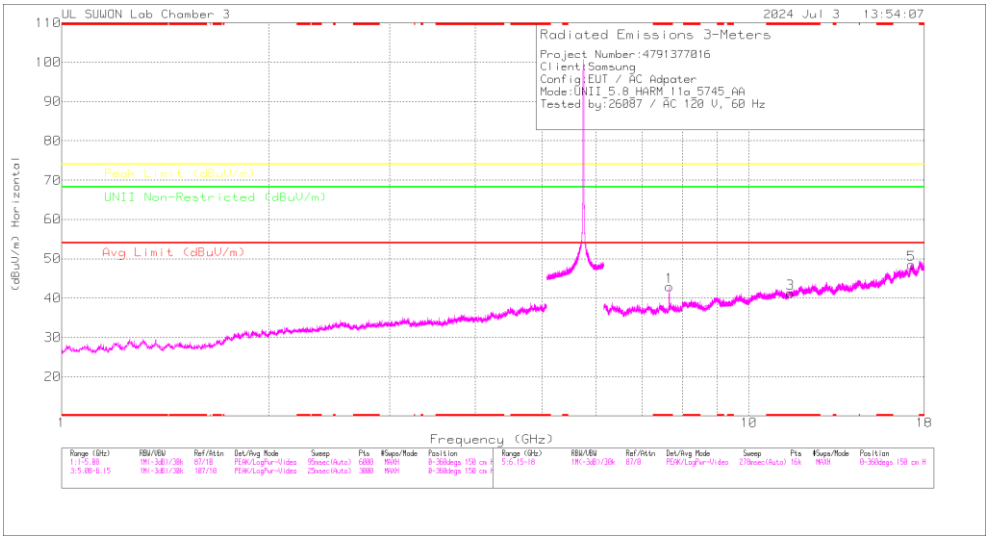
BANDEDGE TEST DATA

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	ANT1	5.72500	-44.93	Pk	34.90	-19.80	11.80	0.00	-18.03	27.00	-45.03	0	100	H
			5.64858	-59.62	Pk	34.90	-20.00	11.80	0.00	-32.92	-27.00	**-5.92**	0	100	H
			5.72500	-53.01	Pk	34.90	-19.80	11.80	0.00	-26.11	27.00	-53.11	236	100	V
			5.63951	-62.13	Pk	34.90	-20.00	11.80	0.00	-35.43	-27.00	-8.43	236	100	V
	5825	ANT1	5.85001	-55.25	Pk	35.20	-19.60	11.80	0.00	-27.85	26.99	-54.84	2	113	H
			5.92977	-62.24	Pk	35.50	-19.40	11.80	0.00	-34.34	-27.00	-7.34	2	113	H
			5.85001	-60.25	Pk	35.20	-19.60	11.80	0.00	-32.85	26.99	-59.84	234	100	V
			5.95719	-63.35	Pk	35.60	-19.30	11.80	0.00	-35.25	-27.00	-8.25	234	100	V
802.11n (HT20)	5745	ANT1	5.72500	-49.97	Pk	34.90	-19.80	11.80	0.00	-23.07	27.00	-50.07	0	103	H
			5.64081	-59.84	Pk	34.90	-20.00	11.80	0.00	-33.14	-27.00	-6.14	0	103	H
			5.72500	-56.09	Pk	34.90	-19.80	11.80	0.00	-29.19	27.00	-56.19	235	100	V
			5.65006	-62.10	Pk	34.90	-19.90	11.80	0.00	-35.30	-26.96	-8.34	235	100	V
	5825	ANT1	5.85001	-51.64	Pk	35.20	-19.60	11.80	0.00	-24.24	26.99	-51.23	1	132	H
			5.98342	-62.46	Pk	35.70	-19.30	11.80	0.00	-34.26	-27.00	-7.26	1	132	H
			5.85001	-59.16	Pk	35.20	-19.60	11.80	0.00	-31.76	26.99	-58.75	211	108	V
			5.94137	-63.07	Pk	35.60	-19.30	11.80	0.00	-34.97	-27.00	-7.97	211	108	V
802.11n (HT40)	5755	ANT1	5.72500	-53.14	Pk	34.90	-19.80	11.80	0.00	-26.24	27.00	-53.24	2	100	H
			5.64939	-61.81	Pk	34.90	-19.90	11.80	0.00	-35.01	-27.00	-8.01	2	100	H
			5.72500	-60.40	Pk	34.90	-19.80	11.80	0.00	-33.50	27.00	-60.50	235	102	V
			5.64868	-62.22	Pk	34.90	-20.00	11.80	0.00	-35.52	-27.00	-8.52	235	102	V
	5795	ANT1	5.85001	-61.04	Pk	35.20	-19.60	11.80	0.00	-33.64	26.99	-60.63	0	111	H
			5.98320	-62.45	Pk	35.70	-19.30	11.80	0.00	-34.25	-27.00	-7.25	0	111	H
			5.85001	-63.45	Pk	35.20	-19.60	11.80	0.00	-36.05	26.99	-63.04	208	100	V
			5.96810	-63.03	Pk	35.60	-19.30	11.80	0.00	-34.93	-27.00	-7.93	208	100	V
802.11ac (VHT80)	5775 (Lower Side)	ANT1	5.72500	-56.80	Pk	34.90	-19.80	11.80	0.00	-29.90	27.00	-56.90	0	108	H
			5.62968	-61.00	Pk	34.90	-20.00	11.80	0.00	-34.30	-27.00	-7.30	0	108	H
			5.72500	-62.02	Pk	34.90	-19.80	11.80	0.00	-35.12	27.00	-62.12	234	100	V
			5.63586	-62.60	Pk	34.90	-19.90	11.80	0.00	-35.80	-27.00	-8.80	234	100	V
	5775 (Upper Side)	ANT1	5.85001	-57.83	Pk	35.20	-19.60	11.80	0.00	-30.43	26.99	-57.42	5	103	H
			5.96257	-62.91	Pk	35.60	-19.40	11.80	0.00	-34.91	-27.00	-7.91	5	103	H
			5.85001	-61.93	Pk	35.20	-19.60	11.80	0.00	-34.53	26.99	-61.52	205	100	V
			5.95637	-63.35	Pk	35.60	-19.30	11.80	0.00	-35.25	-27.00	-8.25	205	100	V

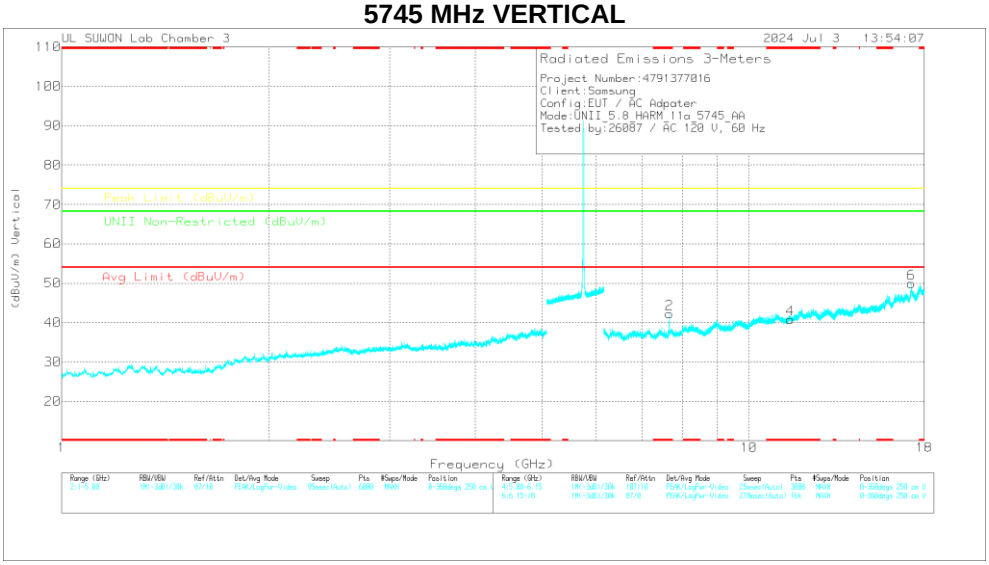
Note. Pk - Peak detector

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

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	Antenna_957_Factor (dB/m)	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
1	* 7.65949	31.86	PK	35.8	-24.7	0	42.96	-	-	74	-31.04	-	-	0-360	150	H
3	* 11.49098	24.38	PK	38.2	-21.4	0	41.18	-	-	74	-32.82	-	-	0-360	150	H
5	17.24451	23.84	PK	41.1	-16.4	0	48.54	-	-	-	-	68.2	-19.66	0-360	150	H
2	* 7.65949	31.16	PK	35.8	-24.7	0	42.26	-	-	74	-31.74	-	-	0-360	250	V
4	* 11.49098	23.98	PK	38.2	-21.4	0	40.78	-	-	74	-33.22	-	-	0-360	250	V
6	17.24155	25.2	PK	41.1	-16.4	0	49.9	-	-	-	-	68.2	-18.3	0-360	250	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	ANT1	* 7.65973	39.20	PK-U	35.80	-24.70	0.00	50.30	-	-	74.00	-23.70	-	-	279	101	V
			* 7.65994	31.89	ADR	35.80	-24.70	0.14	43.13	54.00	**-10.87**	-	-	-	-	279	101	V
			* 7.66018	39.51	PK-U	35.80	-24.70	0.00	50.61	-	-	74.00	-23.39	-	-	40	106	H
			* 7.66009	31.53	ADR	35.80	-24.70	0.14	42.77	54.00	-11.23	-	-	-	-	40	106	H
			* 11.49314	33.70	PK-U	38.20	-21.40	0.00	50.50	-	-	74.00	-23.50	-	-	0	100	V
			* 11.49271	32.99	PK-U	38.20	-21.40	0.00	49.79	-	-	74.00	-24.21	-	-	0	100	H
			17.239	34.11	PK-U	41.10	-16.50	0.00	58.71	-	-	-	-	68.20	-9.49	3	108	H
			17.241	38.97	PK-U	41.10	-16.50	0.00	63.57	-	-	-	-	68.20	**-4.63**	42	102	V
	5785	ANT1	* 7.71315	39.06	PK-U	35.90	-24.70	0.00	50.26	-	-	74.00	-23.74	-	-	25	101	H
			* 7.71334	30.62	ADR	35.90	-24.70	0.14	41.96	54.00	-12.04	-	-	-	-	25	101	H
			* 7.71325	39.05	PK-U	35.90	-24.70	0.00	50.25	-	-	74.00	-23.75	-	-	283	103	V
			* 7.71339	31.59	ADR	35.90	-24.70	0.14	42.93	54.00	-11.07	-	-	-	-	283	103	V
			* 11.57046	34.74	PK-U	38.20	-21.50	0.00	51.44	-	-	74.00	-22.56	-	-	0	100	H
			* 11.57237	34.43	PK-U	38.20	-21.50	0.00	51.13	-	-	74.00	-22.87	-	-	0	100	V
			14.464	36.41	PK-U	39.60	-22.10	0.00	53.91	-	-	-	-	68.20	-14.29	0	100	H
			14.462	36.25	PK-U	39.60	-22.10	0.00	53.75	-	-	-	-	68.20	-14.45	0	100	V
	5825	ANT1	7.766	38.25	PK-U	35.90	-24.70	0.00	49.45	-	-	-	-	68.20	-18.75	16	143	H
			7.766	38.34	PK-U	35.90	-24.70	0.00	49.54	-	-	-	-	68.20	-18.66	278	100	V
			* 11.65087	34.79	PK-U	38.30	-21.60	0.00	51.49	-	-	74.00	-22.51	-	-	0	100	H
			* 11.64926	35.27	PK-U	38.30	-21.60	0.00	51.97	-	-	74.00	**-22.03**	-	-	0	100	V
			14.564	36.10	PK-U	39.70	-23.00	0.00	52.80	-	-	-	-	68.20	-15.40	0	100	H
			14.562	35.76	PK-U	39.70	-23.00	0.00	52.46	-	-	-	-	68.20	-15.74	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

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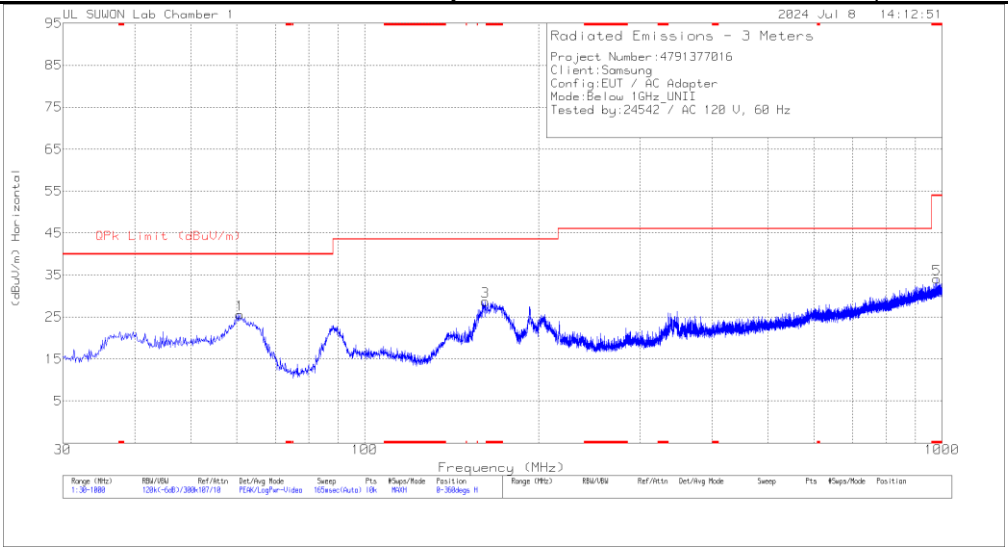
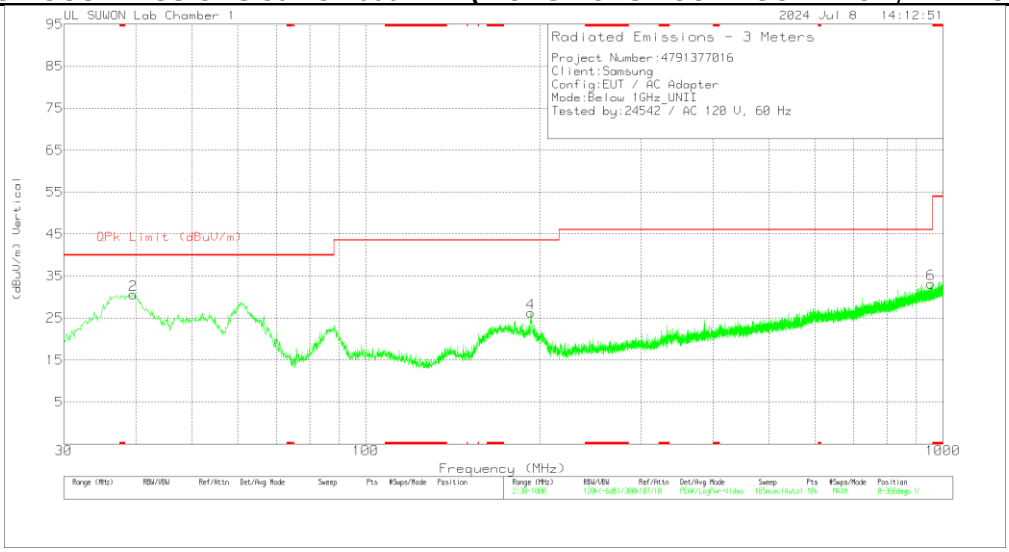
12. WORST-CASE BELOW 1 GHz

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 Correction Factor(dB/m)	Path Loss(dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	60.749	38.17	Pk	18.2	-30.7	0	25.67	40	-14.33	0-360	300	H
3	161.726	43.98	Pk	14.3	-29.6	0	28.68	43.52	-14.84	0-360	100	H
5	* 979.048	31.21	Pk	27.2	-24.3	0	34.11	53.97	-19.86	0-360	300	H
2	39.603	43.42	Pk	18.3	-31.1	0	30.62	40	-9.38	0-360	200	V
4	193.348	38.71	Pk	16.8	-29.3	0	26.21	43.52	-17.31	0-360	200	V
6	954.022	30.76	Pk	27	-24.6	0	33.16	46.02	-12.86	0-360	300	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

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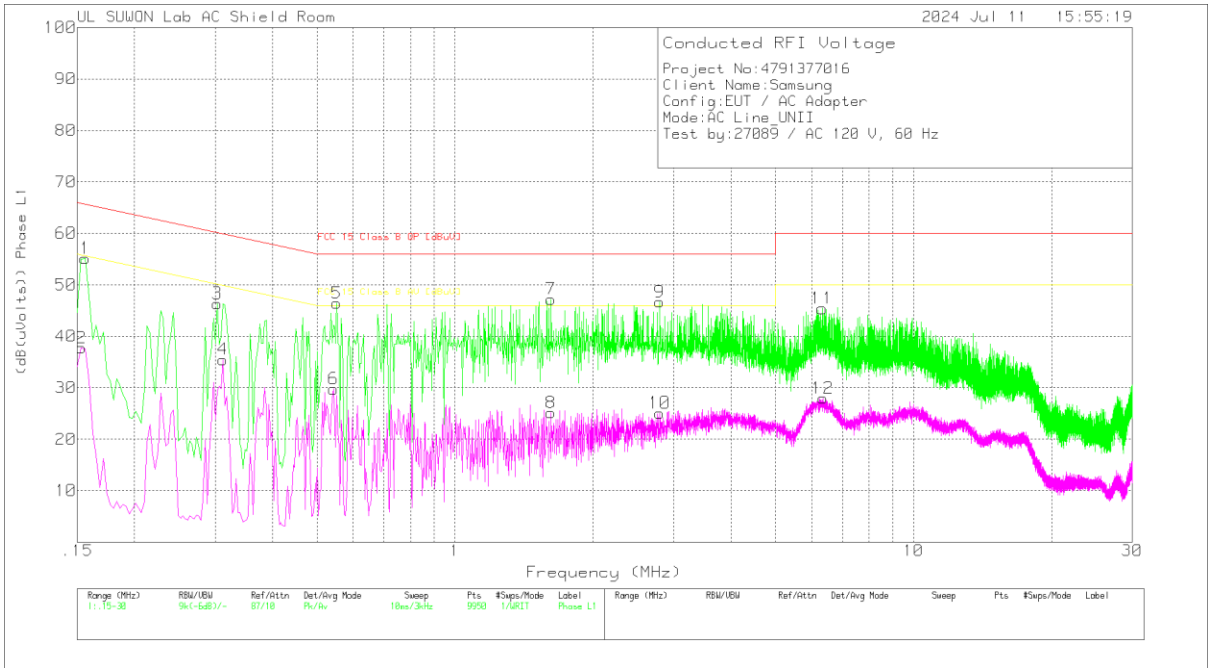
WORST EMISSIONS

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 [dBuV]	FCC 15 Class B QP [dBuV]	Margin (dB)	FCC 15 Class B AV [dBuV]	Margin (dB)
1	.156	45.23	Pk	9.8	.1	55.13	65.67	-10.54	-	-
2	.153	27.83	Av	9.8	.1	37.73	-	-	55.84	-18.11
3	.303	36.55	Pk	9.7	.1	46.35	60.16	-13.81	-	-
4	.312	25.69	Av	9.7	.1	35.49	-	-	49.92	-14.43
5	.552	36.53	Pk	9.8	.1	46.43	56	-9.57	-	-
6	.543	19.77	Av	9.9	.1	29.77	-	-	46	-16.23
7	1.62	37.42	Pk	9.7	.1	47.22	56	-8.78	-	-
8	1.62	15.36	Av	9.7	.1	25.16	-	-	46	-20.84
9	2.796	36.85	Pk	9.7	.1	46.65	56	-9.35	-	-
10	2.796	15.26	Av	9.7	.1	25.06	-	-	46	-20.94
11	6.321	35.42	Pk	9.8	.2	45.42	60	-14.58	-	-
12	6.342	17.97	Av	9.8	.2	27.97	-	-	50	-22.03

Pk - Peak detector
Av - Average detection

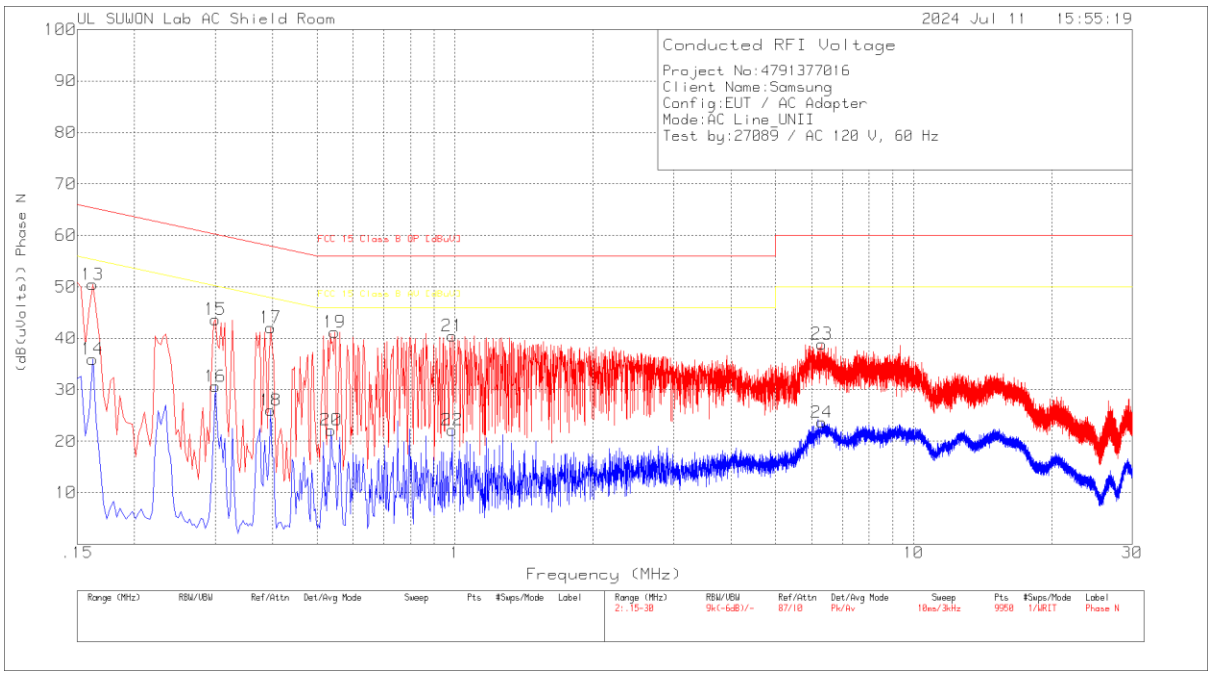
Quasi-Peak Emissions

Range 1: Phase L1 .15 - 30MHz

Frequency (MHz)	Meter Reading (dBuV)	Det	101836_With EX_L1 [dB]	Cable Loss [dB]	Corrected Reading [dBuV]	FCC 15 Class B QP [dBuV]	Margin (dB)	FCC 15 Class B AV [dBuV]	Margin (dB)
.55215	29.3	Qp	9.8	.1	39.2	56	-16.8	-	-
1.61925	28.17	Qp	9.7	.1	37.97	56	-18.03	-	-
2.79675	26.93	Qp	9.7	.1	36.73	56	-19.27	-	-

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 [dBuV]	FCC 15 Class B QP [dBuV]	Margin (dB)	FCC 15 Class B AV [dBuV]	Margin (dB)
13	.162	40.45	Pk	9.9	.1	50.45	65.36	-14.91	-	-
14	.162	25.96	Av	9.9	.1	35.96	-	-	55.36	-19.4
15	.3	33.85	Pk	9.7	.1	43.65	60.24	-16.59	-	-
16	.3	20.85	Av	9.7	.1	30.65	-	-	50.24	-19.59
17	.396	32.16	Pk	9.8	.1	42.06	57.94	-15.88	-	-
18	.396	16.09	Av	9.8	.1	25.99	-	-	47.94	-21.95
19	.546	31.19	Pk	9.9	.1	41.19	56	-14.81	-	-
20	.537	12.16	Av	9.9	.1	22.16	-	-	46	-23.84
21	.987	30.55	Pk	9.8	.1	40.45	56	-15.55	-	-
22	.987	12.29	Av	9.8	.1	22.19	-	-	46	-23.81
23	6.312	28.88	Pk	9.8	.2	38.88	60	-21.12	-	-
24	6.309	13.68	Av	9.8	.2	23.68	-	-	50	-26.32

Pk - Peak detector
Av - Average detection

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 SISO 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: N/A	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

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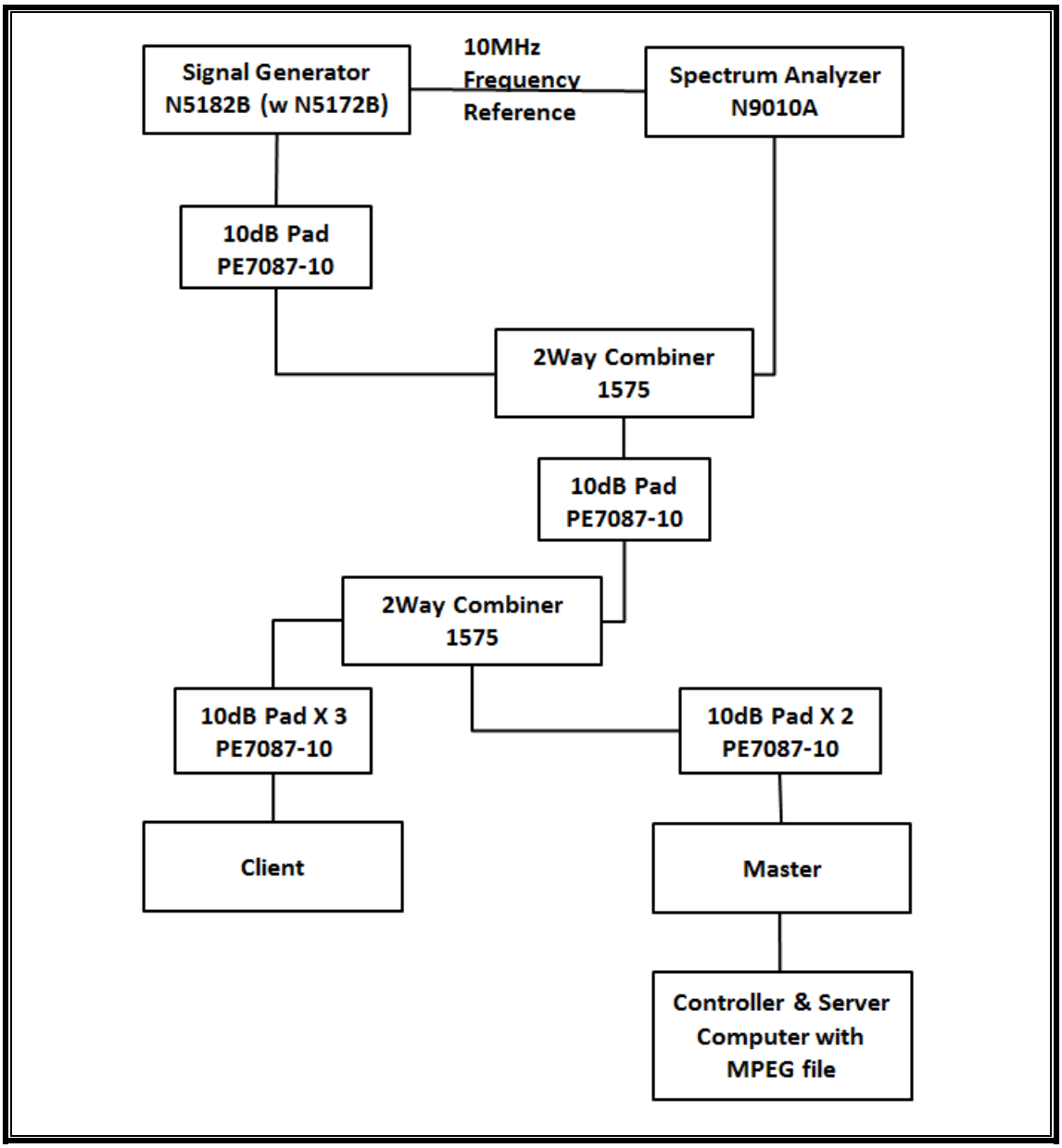
14.1.2. TEST AND MEASUREMENT SYSTEM

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.

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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.

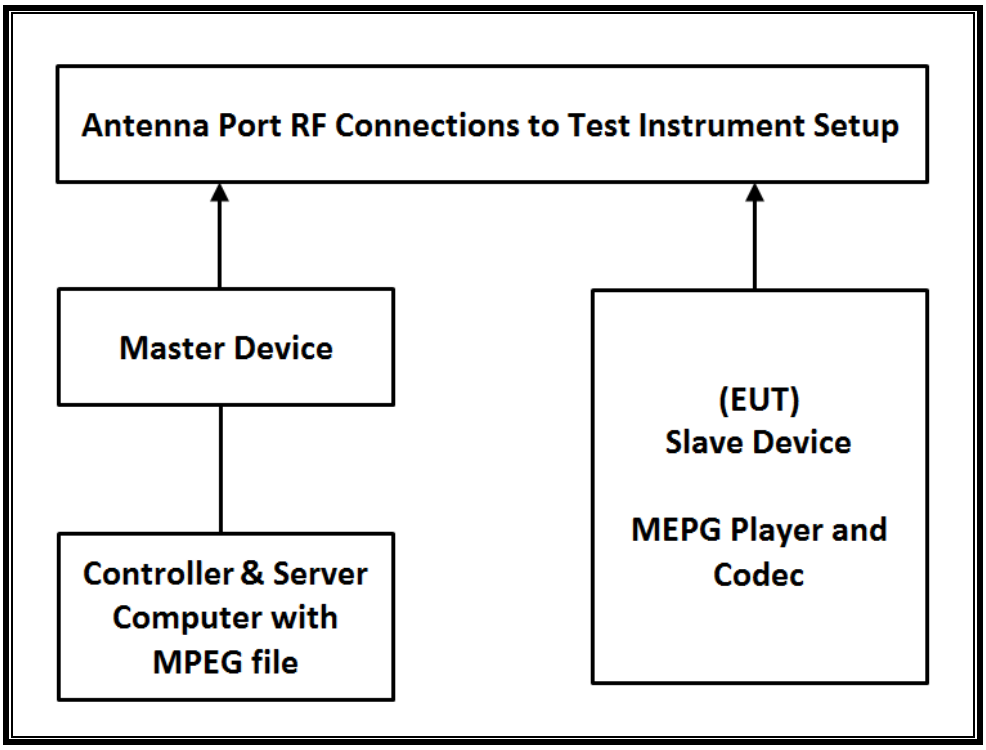
TEST AND MEASUREMENT EQUIPMENT

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	07-24-24
Vector Signal Generator, 6GHz	Agilent / HP	N5182B	MY53051241	07-24-24
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 VHT80) within these bands is 11.29 dBm in the 5250-5350 MHz band and 5470-5725 MHz band.

The antenna assembly utilized two antenna.
Gain of ANT1 : -5.80 dBi for UNII 2A and -5.70 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.

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

UNIFORM CHANNEL SPREADING

This requirement is not applicable to Slave radio devices.

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.

14.2. RESULTS FOR 80 MHz BANDWIDTH (UNII-2A BAND)

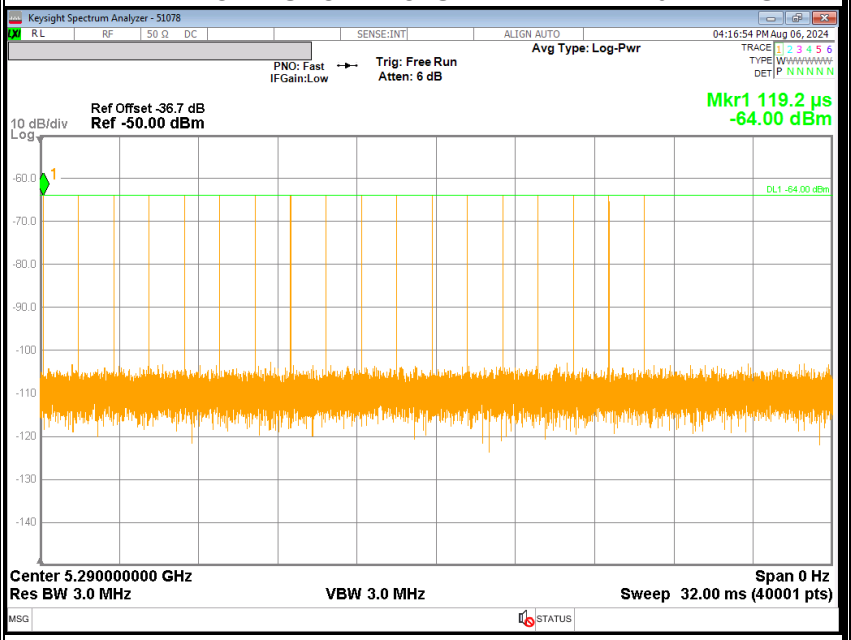
14.2.1. TEST CHANNEL

All tests were performed at a channel center frequency of 5290 MHz.

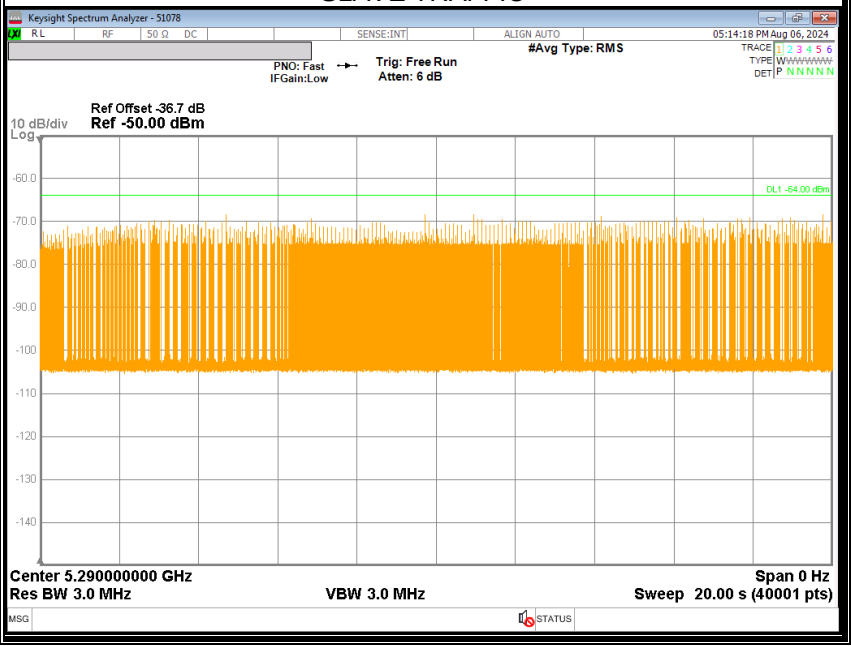
14.2.2. RADAR WAVEFORM AND TRAFFIC

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)
0.770	10

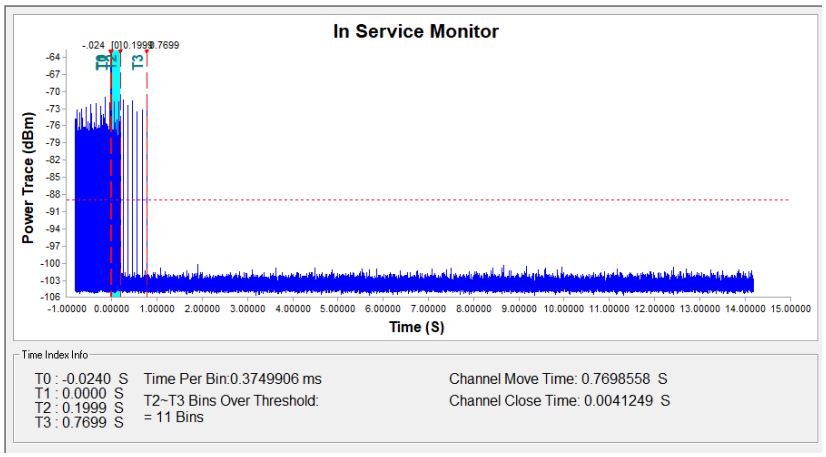
Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
4.125	60

MOVE TIME & CHANNEL CLOSING TIME

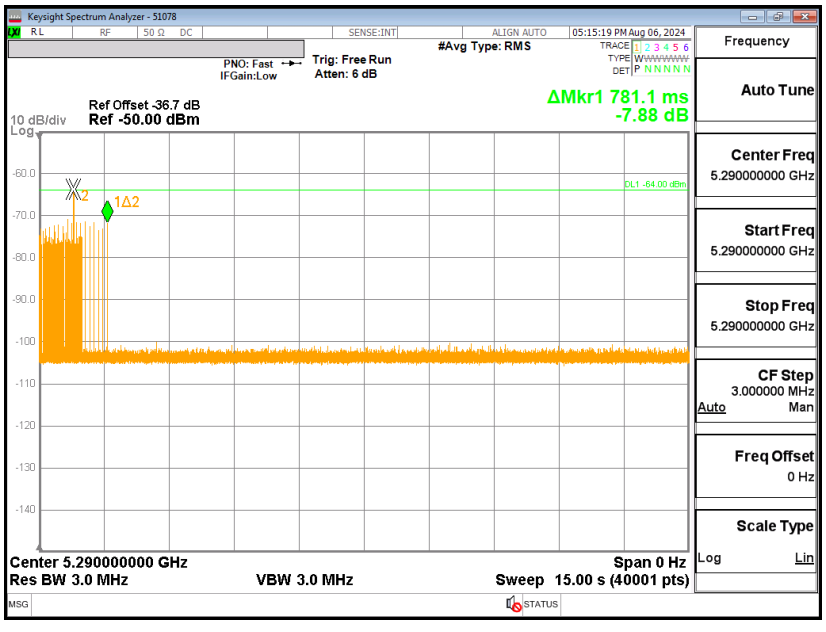
AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

No transmissions are observed during the aggregate monitoring period.

MOVE TIME & AGGREGATE CHANNEL CLOSING TRANSMISSION TIME



MOVE TIME & CLOSING TIME AT IN SERVICE MONITOR

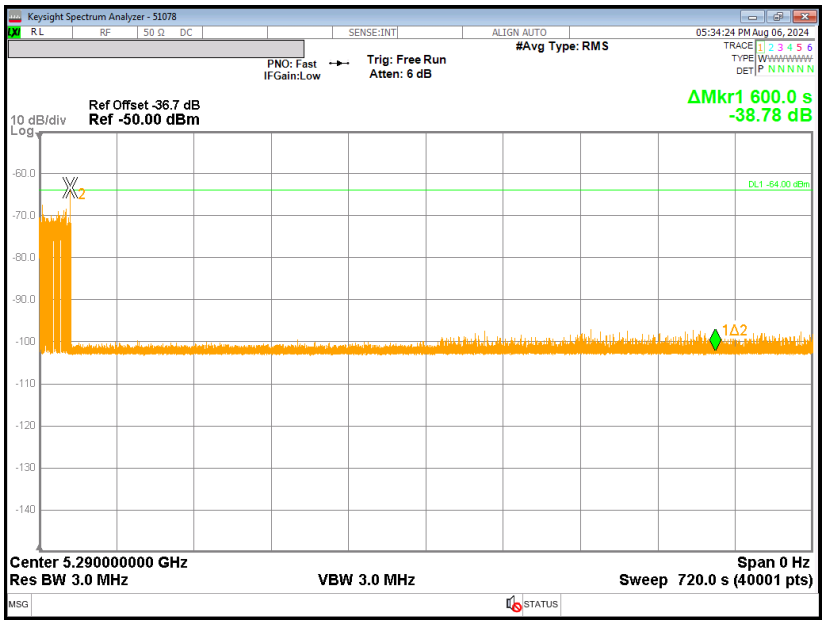


NON-OCCUPANCY PERIOD

RESULTS

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

10-MINUTE BEACON MONITORING PERIOD



14.1. RESULTS FOR 80 MHz BANDWIDTH (UNII-2C BAND)

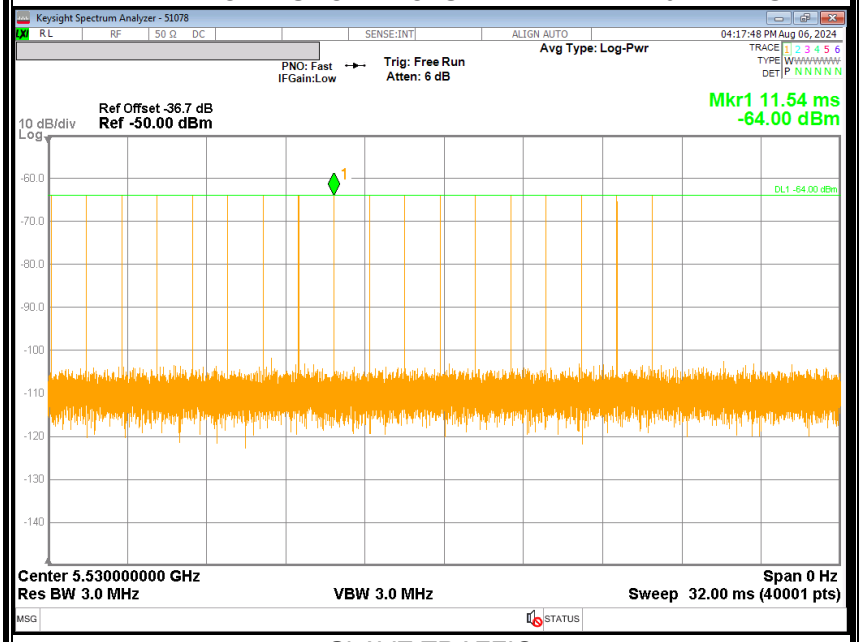
14.1.1. TEST CHANNEL

All tests were performed at a channel center frequency of 5530 MHz.

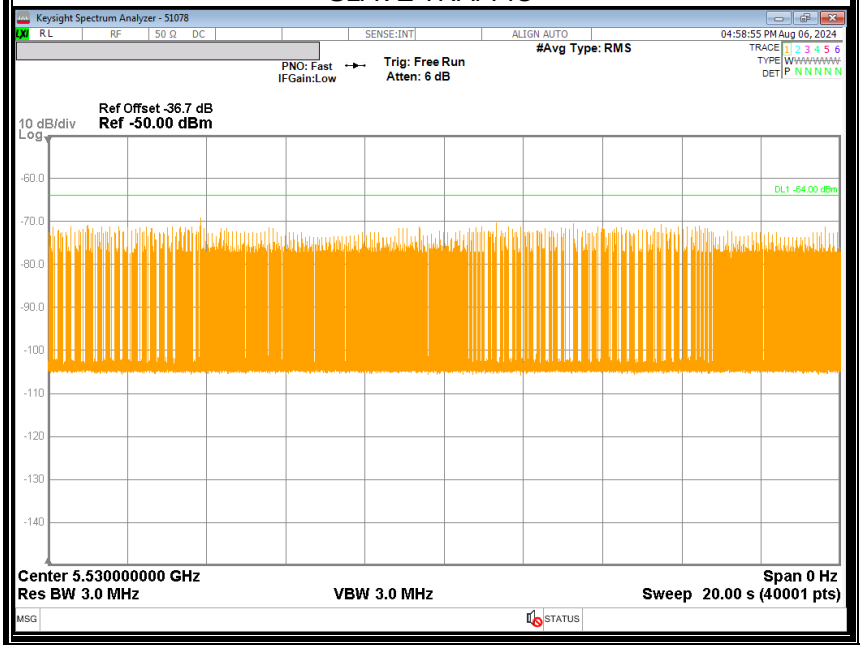
14.1.2. RADAR WAVEFORM AND TRAFFIC

RADAR WAVEFORM

RADAR WAVEFORM:SHORT PULSE RADAR TYPE 0 AT MASTER



SLAVE TRAFFIC



14.1.3. OVERLAPPING CHANNEL TESTS

RESULTS

These tests are not applicable.

14.1.4. 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)
0.803	10

Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
4.875	60

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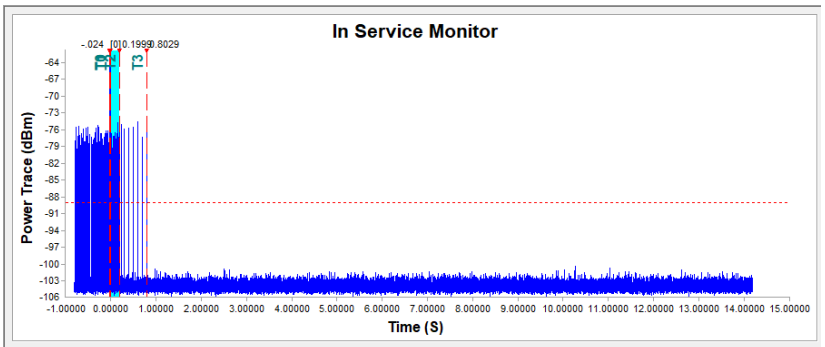
MOVE TIME & CHANNEL CLOSING TIME

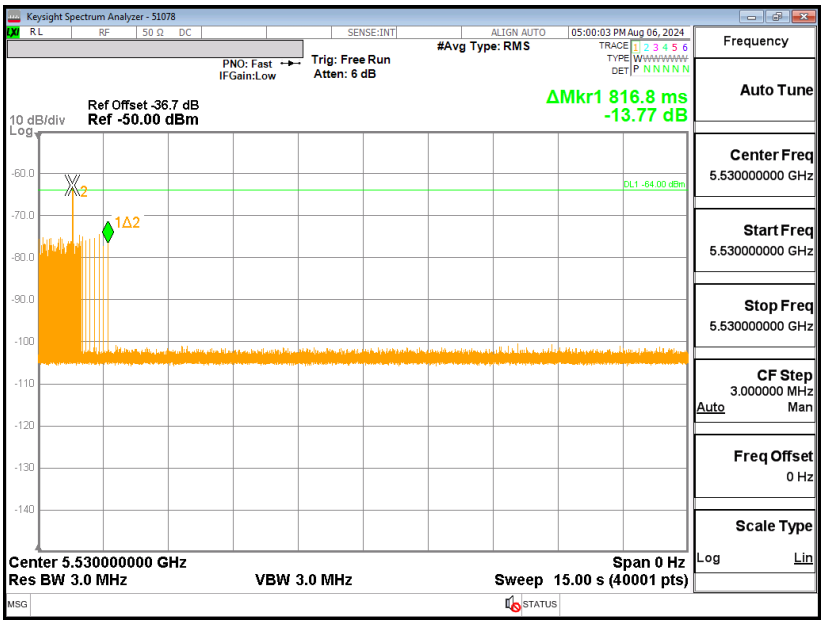
AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

No transmissions are observed during the aggregate monitoring period.

MOVE TIME & AGGREGATE CHANNEL CLOSING TRANSMISSION TIME



MOVE TIME & CLOSING TIME AT IN SERVICE MONITOR

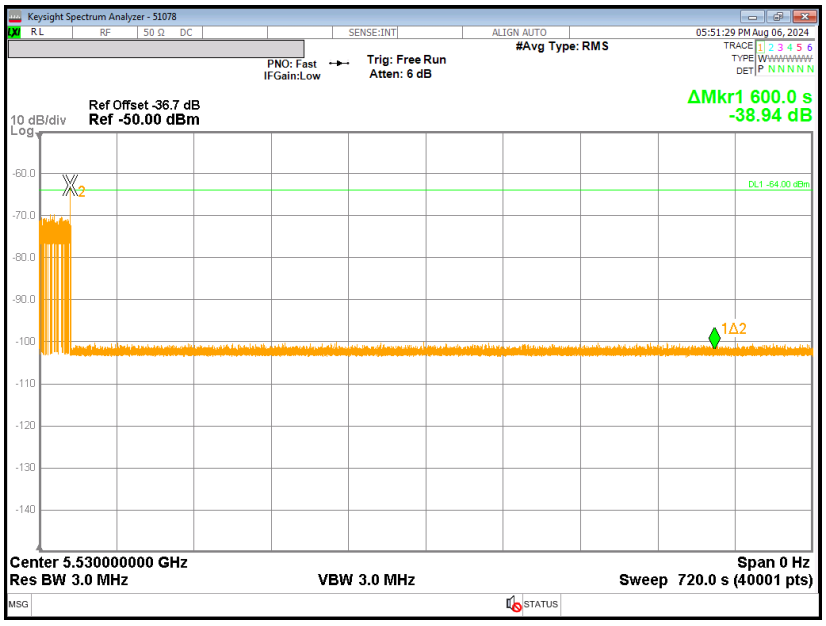


NON-OCCUPANCY PERIOD

RESULTS

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

10-MINUTE BEACON MONITORING PERIOD



END OF TEST REPORT