

CERTIFICATION TEST REPORT

Report Number. : S-4791427005-E8V2

Applicant : SAMSUNG ELECTRONICS CO., LTD.
129 SAMSUNG-RO, YEONGTONG-GU, SUWON-SI,
GYEONGGI-DO, 16677, KOREA

Model : SM-A165M/DS, SM-A165M

FCC ID : A3LSMA165M

EUT Description : GSM/WCDMA/LTE 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:

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Prepared by:

UL KOREA LTD.

26th floor, 152, Teheran-ro, Gangnam-gu Seoul, 06236, Korea

Suwon Test Site: UL KOREA LTD. Suwon Laboratory

218 Maeyeong-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16675, Korea

TEL: (031) 337-9902

FAX: (031) 213-5433

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	2024-09-13	Initial issue	Myeongjun Kwon
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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SAMSUNG ELECTRONICS CO., LTD.

EUT DESCRIPTION: GSM/WCDMA/LTE Phone + BT/BLE, DTS/UNII a/b/g/n/ac and NFC.

MODEL NUMBER: SM-A165M/DS, SM-A165M

SERIAL NUMBER: R38X7005NNF, R38X7005NPM (CONDUCTED);
R38X7005NXA, R38X7005NWB (RADIATED)

DATE TESTED: 2024-08-12 - 2024-09-13

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:

$$\begin{aligned} \text{Field Strength (dBuV/m)} &= \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \\ &\text{Cable Loss (dB)} - \text{Preamplifier Gain (dB)} \\ 36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} &= 28.9 \text{ dBuV/m} \end{aligned}$$

$$\begin{aligned} \text{AC Corrected Reading (dBuV)} &= \text{Measured Voltage (dBuV)} + \text{Extension Cord} \\ &\text{Loss (dB)} + \text{Cable Loss (dB)} \\ 44.72 \text{ dBuV} &= 34.72 \text{ dBuV} + 9.9 \text{ dB} + 0.1 \text{ dB} \end{aligned}$$

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 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-A165M
SM-A165M/DS	Hardware	SIM tray is single SIM
	Software	Dual SIM not supported

The model SM-A165M/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	15.95	39.36
		802.11ac(VHT20) SISO	15.89	38.82
	5190 - 5230	802.11n(HT40) SISO	13.90	24.55
		802.11ac(VHT80) SISO	12.23	16.71
UNII-2A	5260 - 5320	802.11a SISO	16.12	40.93
		802.11ac(VHT20) SISO	16.02	39.99
	5190 - 5230	802.11n(HT40) SISO	14.07	25.53
		802.11ac(VHT80) SISO	11.80	15.14
UNII-2C	5500 - 5720	802.11a SISO	16.40	43.65
		802.11ac(VHT20) SISO	16.21	41.78
	5510 - 5710	802.11n(HT40) SISO	13.76	23.77
		802.11ac(VHT80) SISO	12.10	16.22
UNII-3	5745 - 5825	802.11a SISO	16.29	42.56
		802.11ac(VHT20) SISO	16.26	42.27
	5755 - 5795	802.11n(HT40) SISO	13.79	23.93
		802.11ac(VHT80) SISO	11.98	15.78

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	-2.80
UNII 2A	5250 - 5350	-2.28
UNII 2C	5470 - 5725	-1.84
UNII 3	5725 - 5850	-1.75

“Antenna A(WiFi)” 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 1TX
802.11ac VHT20		802.11ac VHT20 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
802.11ac VHT20 mode: MCS0 1TX
802.11n HT40 mode: MCS0 1TX
802.11ac VHT80 mode: MCS0 1TX

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

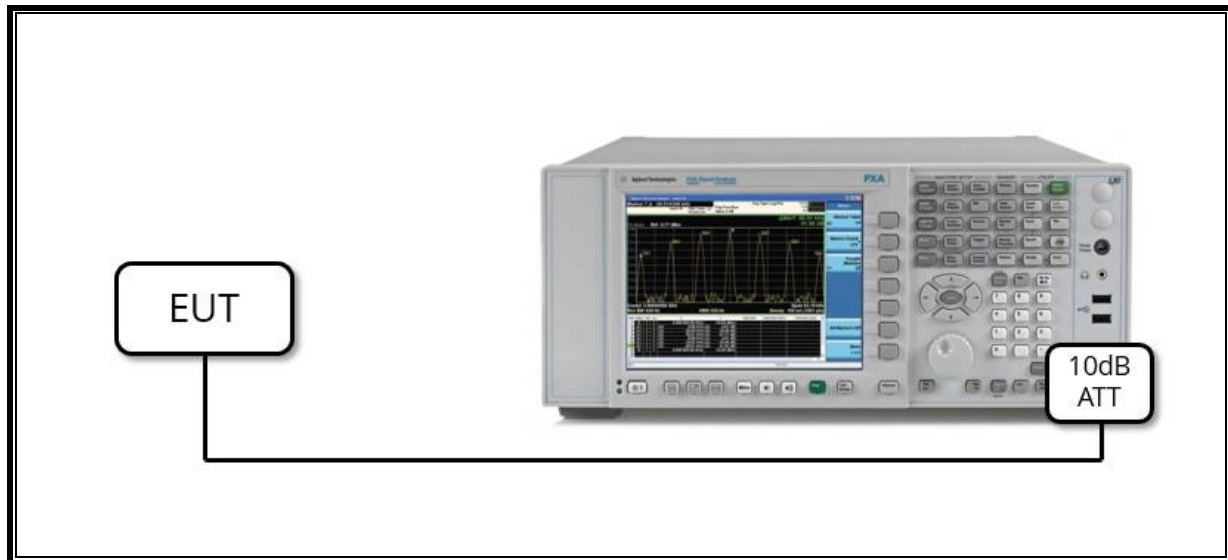
I/O CABLE

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

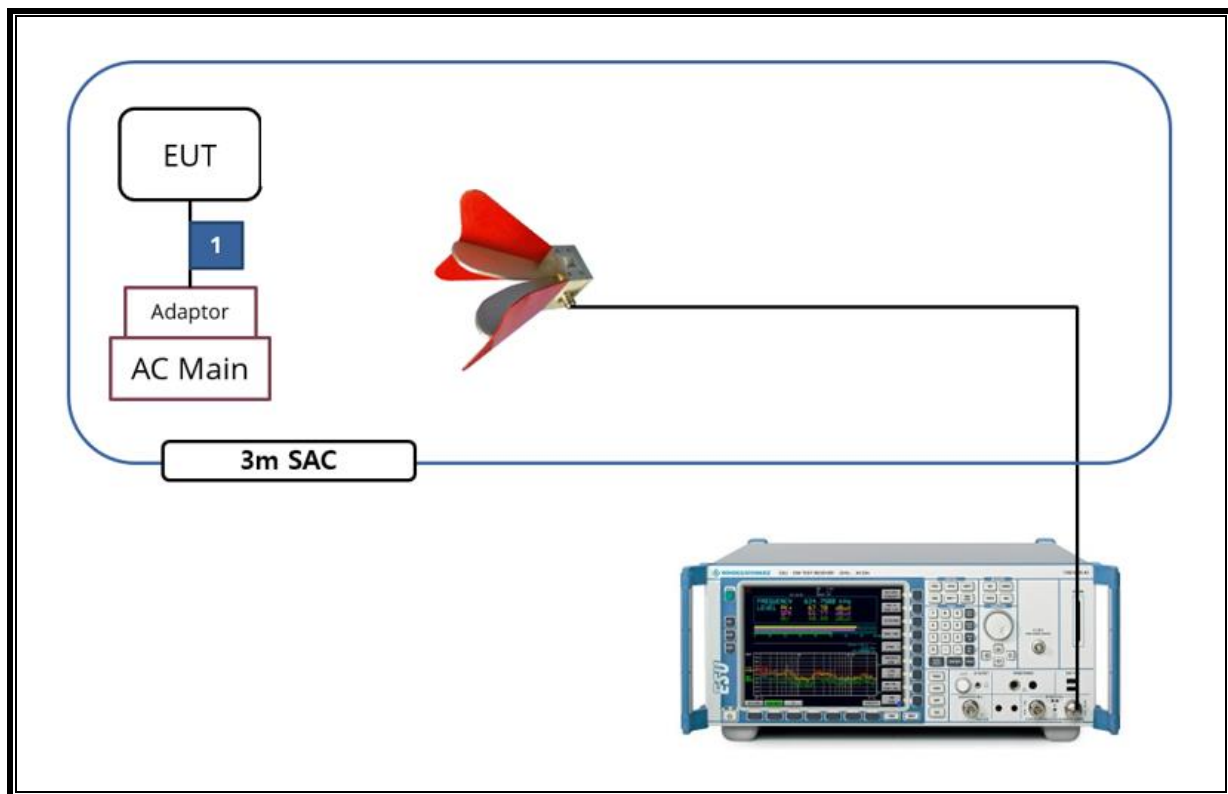
TEST SETUP

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
RF Switching Unit	TA Engineering	TA-018S-16	SW-1	N/A
Average Power Sensor	Agilent / HP	U2000A	MY54270007	2025-07-23
Average Power Sensor	Agilent / HP	U2000A	MY54260010	2025-07-23
Attenuator	PASTERNAK	PE7087-10	A001	2025-07-23
Attenuator	PASTERNAK	PE7087-10	A008	2025-07-23
Attenuator	PASTERNAK	PE7004-10	2	2025-07-23
Attenuator	PASTERNAK	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	WEINSCHL	M1406A	T09	2025-07-23
Attenuator	WEINSCHL	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.

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	2.755	2.798	0.985	98.452	0.00
802.11ac(VHT20) SISO	1.312	1.356	0.967	96.711	0.14
802.11n(HT40) SISO	0.648	0.692	0.936	93.570	0.29
802.11ac(VHT80) SISO	0.324	0.368	0.881	88.091	0.55

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

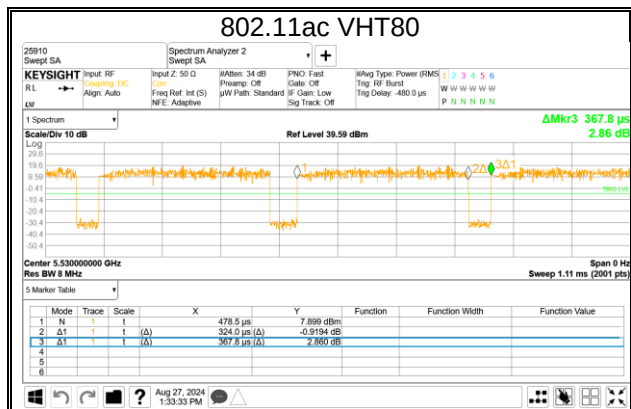
LIMITS

None; for reporting purposes only.

PROCEDURE

KDB 789033 D02 v02r01 Zero-Span Spectrum Analyzer Method.

DUTY CYCLE SAMPLE PLOTS



9.2. 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

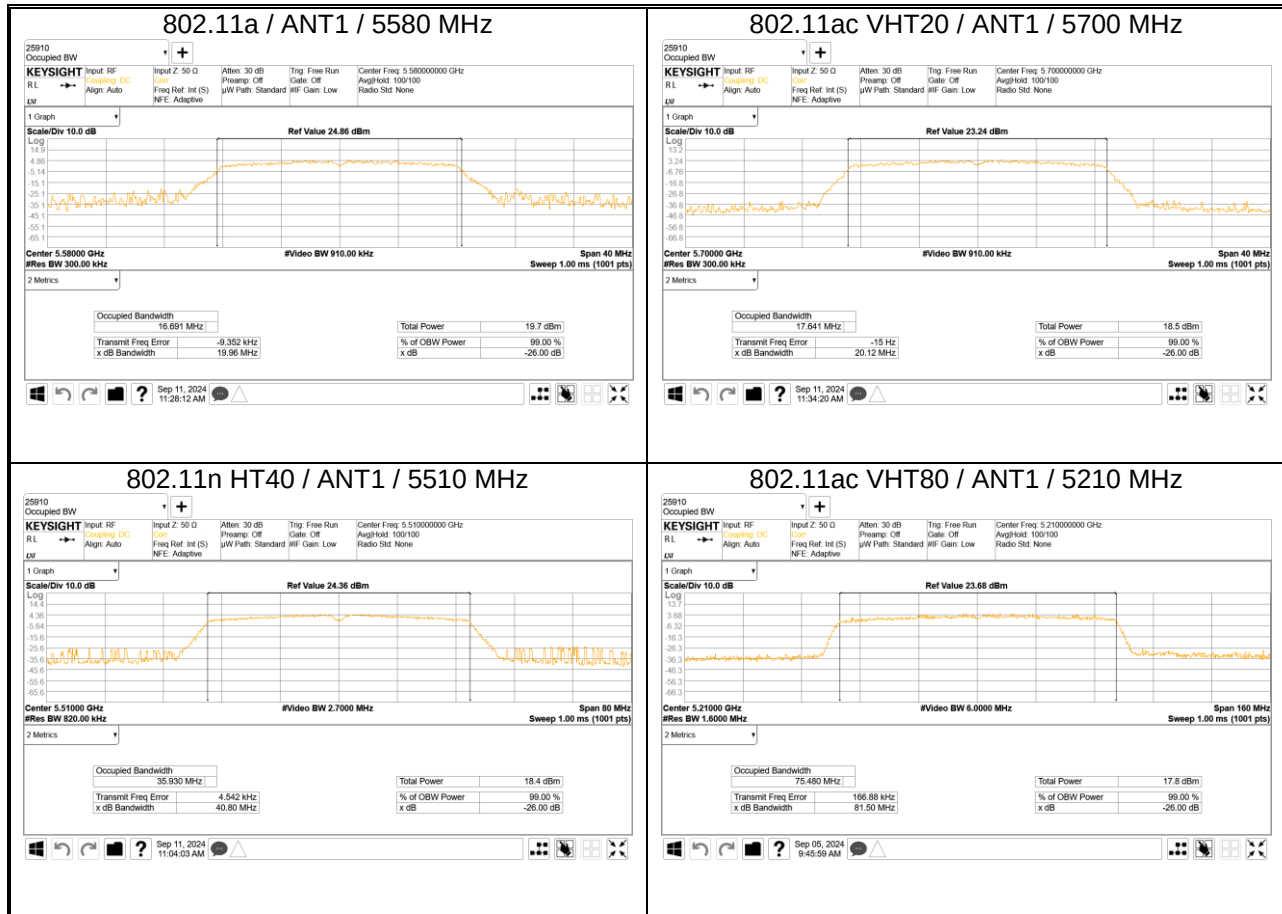
TEST PROCEDURE

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

RESULTS

- Please refer to the next page

WORST CASE TEST PLOTS



9.2.1. 802.11a

Band	Channel	Center Freq. [MHz]	26 dB BW [MHz]	Worst	99% BW [MHz]
			ANT1		ANT1
UNII-1 ^{Note}	36	5180	19.97	19.97	16.69
	40	5200	24.48		16.64
	48	5240	20.37		16.69
UNII-2A ^{Note}	52	5260	20.08	20.08	16.66
	60	5300	22.28		16.76
	64	5320	21.78		16.66
UNII-2C	100	5500	22.24	19.96	
	116	5580	19.96		
	140	5700	20.89		

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

9.2.2. 802.11n HT20

Band	Channel	Center Freq. [MHz]	26 dB BW [MHz]	Worst	99% BW [MHz]
			ANT1		ANT1
UNII-1 ^{Note}	36	5180	20.23	20.23	17.68
	40	5200	20.42		17.64
	48	5240	20.39		17.70
UNII-2A ^{Note}	52	5260	20.40	20.38	17.67
	60	5300	20.40		17.65
	64	5320	20.38		17.68
UNII-2C	100	5500	20.68	20.12	
	116	5580	20.30		
	140	5700	20.12		

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

9.2.3. 802.11n HT40

Band	Channel	Center Freq. [MHz]	26 dB BW [MHz]	Worst	99% BW [MHz]
			ANT1		ANT1
UNII-1 ^{Note}	38	5190	52.60	40.87	36.03
	46	5230	40.87		36.02
UNII-2A ^{Note}	54	5270	40.93	40.93	36.05
	62	5310	41.04		36.04
UNII-2C	102	5510	40.80	40.80	
	110	5550	40.81		
	134	5670	40.83		

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

9.2.4. 802.11ac VHT80

Band	Channel	Center Freq. [MHz]	26 dB BW [MHz]	Worst	99% BW [MHz]
			ANT1		ANT1
UNII-1 ^{Note}	42	5210	81.50	81.50	75.48
UNII-2A ^{Note}	58	5290	81.63	81.63	75.32
UNII-2C	106	5530	81.58	81.58	
	122	5610	81.91		

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

9.2.5. STRADDLE CHANNEL

Mode	Channel	Center Freq. [MHz]	26 dB BW [MHz]	
			ANT1	
			UNII-2C	UNII-3
802.11a	Straddle	5720	15.08	5.24
802.11ac VHT20	Straddle	5720	15.24	5.32
802.11n HT40	Straddle	5710	35.48	5.64
802.11ac VHT80	Straddle	5690	75.80	5.96

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 to 100kHz, the VBW $\geq 3 \times$ RBW, peak detector and max hold.

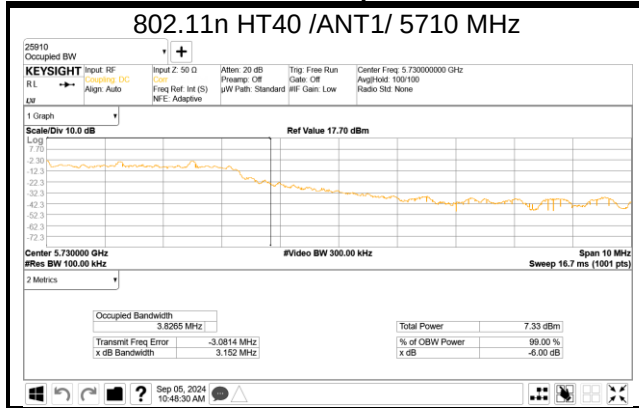
RESULTS

- Please refer to the next page

WORST CASE TEST PLOTS



WORST CASE TEST PLOTS(STRADDLE CHANNELS)



10.1.1. STRADDLE CHANNEL

Mode	Channel	Center Freq. [MHz]	6 dB BW [MHz]
			UNII-3
			ANT1
802.11a	Straddle	5720	3.16
802.11ac VHT20	Straddle	5720	3.35
802.11n HT40	Straddle	5710	3.15
802.11ac VHT80	Straddle	5690	3.17

10.1.2. UNII-3 BAND

Mode	Channel	Center Freq. [MHz]	6 dB BW [MHz]	Worst	Minimum Limit [MHz]
			ANT1		
802.11a	149	5745	15.77	15.34	0.5
	157	5785	15.44		
	165	5825	15.34		
802.11ac VHT20	149	5745	13.94	13.94	
	157	5785	15.16		
	165	5825	15.03		
802.11n HT40	151	5755	35.14	35.10	
	159	5795	35.10		
802.11ac VHT80	155	5775	75.24	75.24	

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 $11 \text{ dBm} + 10 \log B$, 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.

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 $\geq 3 \times$ 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 $\geq 3 \times$ 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	-2.80
UNII 2A 5250 - 5350	-2.28
UNII 2C 5470 - 5725	-1.84
UNII 3 5725 - 5850	-1.75

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	15.86	15.86	23.98
	40	5200	15.91	15.91	
	48	5240	15.95	15.95	
UNII-2A	52	5260	16.03	16.03	23.60
	60	5300	16.12	16.12	
	64	5320	16.12	16.12	
UNII-2C	100	5500	16.40	16.40	22.55
	116	5580	15.80	15.80	
	140	5700	14.58	14.58	
	144	5720	15.78	15.78	
UNII-3	149	5745	16.22	16.22	30.00
	157	5785	16.29	16.29	
	165	5825	16.22	16.22	

* 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	4.73	0.00	4.73	11.00
	40	5200	5.21	0.00	5.21	
	48	5240	5.21	0.00	5.21	
UNII-2A	52	5260	5.95	0.00	5.95	11.00
	60	5300	5.72	0.00	5.72	
	64	5320	5.72	0.00	5.72	
UNII-2C	100	5500	6.13	0.00	6.13	11.00
	116	5580	5.34	0.00	5.34	
	140	5700	5.33	0.00	5.33	
UNII-2C&3	144 Straddle	5720	5.45	0.00	5.45	11.00 or 30.00/500kHz
UNII-3	149	5745	3.70	0.00	3.70	30.00/500kHz
	157	5785	2.83	0.00	2.83	
	165	5825	3.02	0.00	3.02	

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

10.2.2. 802.11ac VHT20 MODE

Output Power Results

Band	Channel	Center Freq. [MHz]	Average Power [dBm]	Corr'd Power [dBm]	Limit [dBm]
			ANT1		
UNII-1	36	5180	15.71	15.71	23.98
	40	5200	15.80	15.80	
	48	5240	15.89	15.89	
UNII-2A	52	5260	15.94	15.94	23.84
	60	5300	16.02	16.02	
	64	5320	16.00	16.00	
UNII-2C	100	5500	16.21	16.21	22.64
	116	5580	15.70	15.70	
	140	5700	14.01	14.01	
UNII-2C&3	144 Straddle	5720	15.68	15.68	30.00
UNII-3	149	5745	16.26	16.26	
	157	5785	16.18	16.18	
	165	5825	16.11	16.11	

* 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	4.29	0.14	4.44	11.00
	40	5200	4.40	0.14	4.54	
	48	5240	4.89	0.14	5.03	
UNII-2A	52	5260	4.87	0.14	5.01	11.00
	60	5300	5.26	0.14	5.41	
	64	5320	5.07	0.14	5.21	
UNII-2C	100	5500	5.48	0.14	5.63	11.00
	116	5580	4.46	0.14	4.61	
	140	5700	3.24	0.14	3.38	
UNII-2C&3	144 Straddle	5720	4.54	0.14	4.68	11.00 or 30.00/500kHz
UNII-3	149	5745	2.64	0.14	2.79	30.00/500kHz
	157	5785	2.25	0.14	2.40	
	165	5825	2.17	0.14	2.32	

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

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	13.77	13.77	23.98
	46	5230	13.90	13.90	
UNII-2A	54	5270	14.01	14.01	23.98
	62	5310	14.07	14.07	
UNII-2C	102	5510	12.48	12.48	23.98
	110	5550	13.75	13.75	
	134	5670	13.76	13.76	
UNII-2C&3	142 Straddle	5710	13.72	13.72	30.00
UNII-3	151	5755	13.79	13.79	
	159	5795	13.73	13.73	

* 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	-2.44	0.29	-2.16	11.00
	46	5230	-2.33	0.29	-2.05	
UNII-2A	54	5270	-1.48	0.29	-1.19	11.00
	62	5310	-0.67	0.29	-0.38	
UNII-2C	102	5510	-2.29	0.29	-2.00	11.00
	110	5550	-2.63	0.29	-2.34	
	134	5670	-3.04	0.29	-2.75	
UNII-2C&3	142 Straddle	5710	-2.26	0.29	-1.97	11.00 or 30.00/500kHz
UNII-3	151	5755	-4.27	0.29	-3.98	30.00/500kHz
	159	5795	-5.29	0.29	-5.00	

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

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	12.23	12.23	23.98
UNII-2A	58	5290	11.80	11.80	23.98
UNII-2C	106	5530	12.10	12.10	23.98
	122	5610	11.60	11.60	
UNII-2C&3	138 Straddle	5690	12.09	12.09	23.98
UNII-3	155	5775	11.98	11.98	30.00

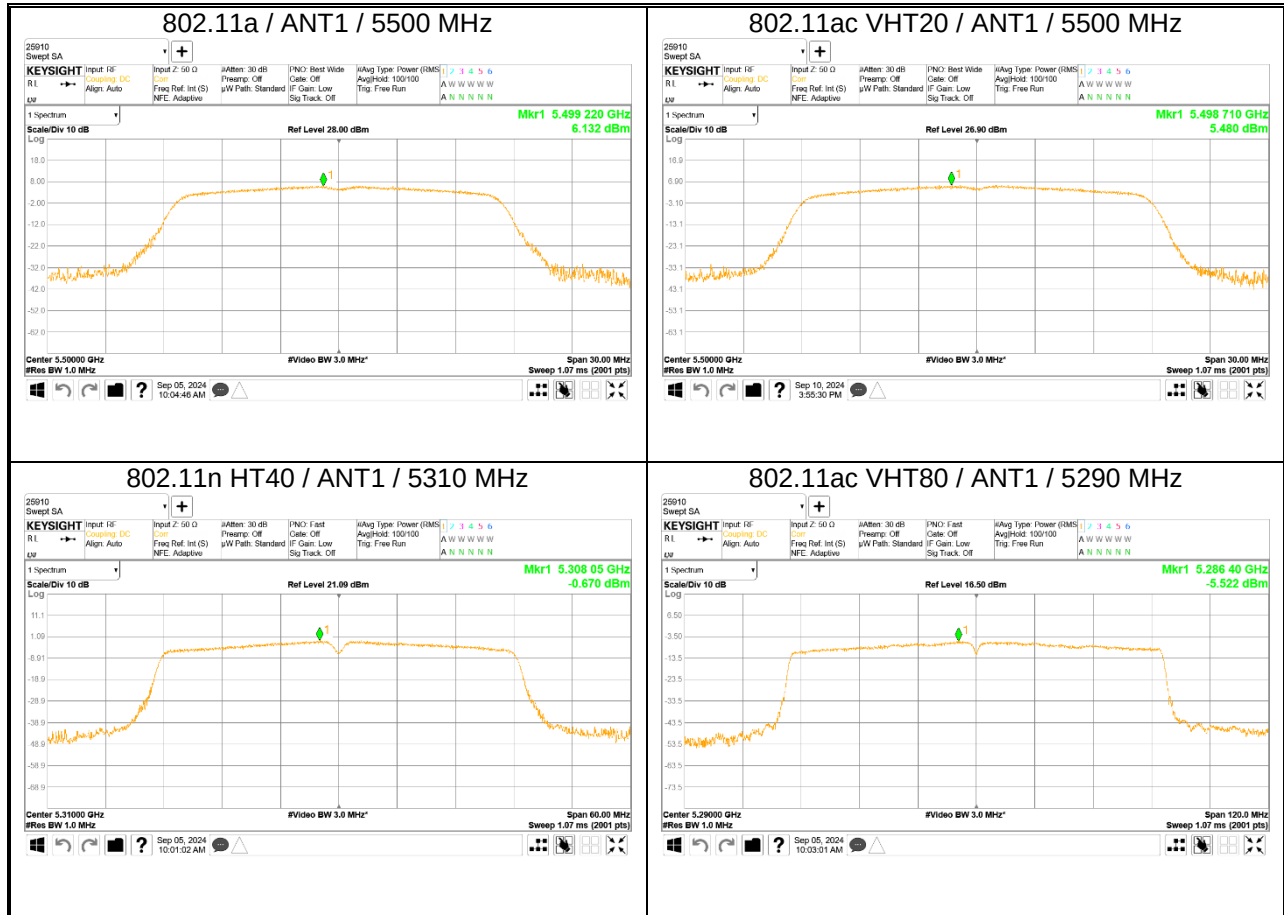
* Calculation of Output Power : Average Power = Meas Power + Duty CF[dB]

PSD Results

Band	Channel	Center Freq. [MHz]	Meas PSD [dBm/MHz]	DCCF.	Corr'd PSD [dBm]	Limit [dBm/MHz]
			ANT1			
UNII-1	42	5210	-6.83	0.55	-6.28	11.00
UNII-2A	58	5290	-5.52	0.55	-4.97	11.00
UNII-2C	106	5530	-6.24	0.55	-5.69	11.00
	122	5610	-6.99	0.55	-6.44	
UNII-2C&3	138 Straddle	5690	-6.28	0.55	-5.73	11.00 or 30.00/500kHz
UNII-3	155	5775	-8.40	0.55	-7.85	30.00/500kHz

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

10.2.5. OUTPUT POWER AND PPSD PLOTS(WORST CASE)



29

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)

$$E[\text{dBuV/m}] = \text{EIRP}[\text{dBm}] + 95.2 = -27\text{dBm} + 95.2 = 68.2\text{dBuV/m}$$

$$E[\text{dBuV/m}] = \text{EIRP}[\text{dBm}] + 95.2 = -17\text{dBm} + 95.2 = 78.2\text{dBuV/m}$$

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane for below 1GHz and 150 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.

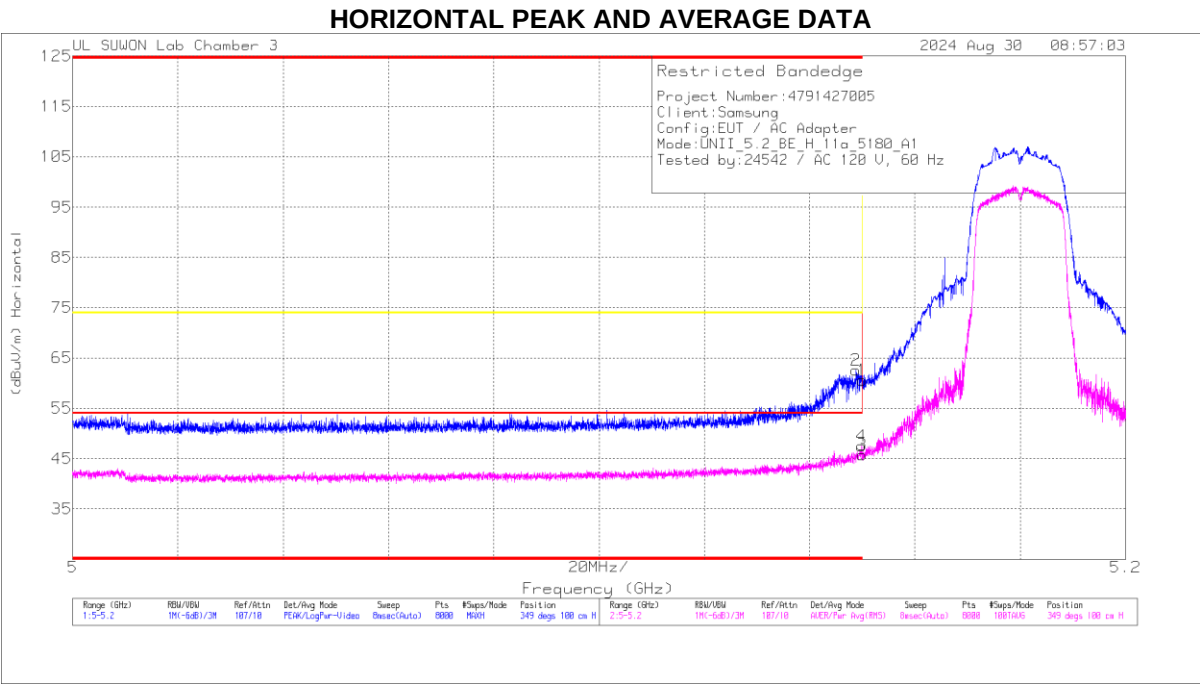
Note : Emission was pre-scanned from 9kHz to 30MHz; No emissions were detected which was at least 20dB below the specification limit (consider distance correction factor).
Per FCC part 15.31(o), test results were not reported.

Although these tests were performed other than open field test site, adequate comparison measurements were confirmed against 30 m open area 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.

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

BANDEDGE (WORST CASE: 802.11a / 5180 MHz)



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	Antenna_907_Factor(dB /m)	10dB_Path Loss(dB)	DC Corr (dB)	Corrected Reading (dBm/m)	Average Limit (dBm/m)	Margin (dB)	Peak Limit (dBm/m)	Pk Margin (dB)	Acimuth (Degs)	Height (cm)	Polarity
1	* 5.14999	46.84	Pk	34.4	-20.6	0	60.64	-	-	74	-13.36	349	100	H
2	* 5.14882	48.93	Pk	34.4	-20.7	0	62.63	-	-	74	-11.37	349	100	H
3	* 5.14999	31.97	RMS	34.4	-20.6	0	45.77	54	-8.23	-	-	349	100	H
4	* 5.14984	33.73	RMS	34.4	-20.6	0	47.53	54	-6.47	-	-	349	100	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

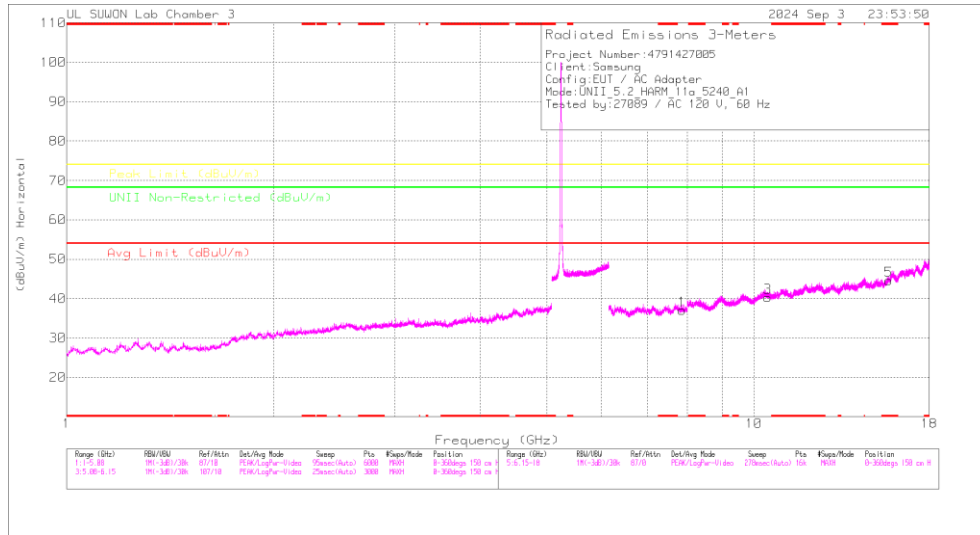
BANDEDGE TEST DATA

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	46.84	Pk	34.40	-20.60	0.00	60.64	-	-	74.00	-13.36	349	100	H
			* 5.14882	48.93	Pk	34.40	-20.70	0.00	62.63	-	-	74.00	-11.37	349	100	H
			* 5.14999	31.97	RMS	34.40	-20.60	0.00	45.77	54.00	-8.23	-	-	349	100	H
			* 5.14984	33.73	RMS	34.40	-20.60	0.00	47.53	54.00	-6.47	-	-	349	100	H
			* 5.14999	40.22	Pk	34.40	-20.60	0.00	54.02	-	-	74.00	-19.98	76	111	V
			* 5.14952	42.70	Pk	34.40	-20.70	0.00	56.40	-	-	74.00	-17.60	76	111	V
			* 5.14999	28.65	RMS	34.40	-20.60	0.00	42.45	54.00	-11.55	-	-	76	111	V
			* 5.14977	29.25	RMS	34.40	-20.60	0.00	43.05	54.00	-10.95	-	-	76	111	V
			* 5.14999	45.91	Pk	34.40	-20.60	0.00	59.71	-	-	74.00	-14.29	349	100	H
802.11ac (VHT20)	5180	ANT1	* 5.14462	49.41	Pk	34.40	-20.80	0.00	63.01	-	-	74.00	-10.99	349	100	H
			* 5.14999	32.33	RMS	34.40	-20.60	0.14	46.27	54.00	-7.73	-	-	349	100	H
			* 5.14929	33.08	RMS	34.40	-20.70	0.14	46.92	54.00	-7.08	-	-	349	100	H
			* 5.14999	40.76	Pk	34.40	-20.60	0.00	54.56	-	-	74.00	-19.44	75	100	V
			* 5.14967	42.75	Pk	34.40	-20.60	0.00	56.55	-	-	74.00	-17.45	75	100	V
			* 5.14999	28.17	RMS	34.40	-20.60	0.14	42.11	54.00	-11.89	-	-	75	100	V
			* 5.14914	29.56	RMS	34.40	-20.70	0.14	43.40	54.00	-10.60	-	-	75	100	V
			* 5.14999	50.11	Pk	34.40	-20.60	0.00	63.91	-	-	74.00	-10.09	345	100	H
			* 5.14997	51.06	Pk	34.40	-20.60	0.00	64.86	-	-	74.00	-9.14	345	100	H
802.11n (HT40)	5190	ANT1	* 5.14999	32.05	RMS	34.40	-20.60	0.29	46.14	54.00	-7.86	-	-	345	100	H
			* 5.14964	33.32	RMS	34.40	-20.70	0.29	47.31	54.00	-6.69	-	-	345	100	H
			* 5.14999	40.00	Pk	34.40	-20.60	0.00	53.80	-	-	74.00	-20.20	78	100	V
			* 5.14997	45.40	Pk	34.40	-20.60	0.00	59.20	-	-	74.00	-14.80	78	100	V
			* 5.14999	28.33	RMS	34.40	-20.60	0.29	42.42	54.00	-11.58	-	-	78	100	V
			* 5.00111	29.22	RMS	34.30	-20.80	0.29	43.01	54.00	-10.99	-	-	78	100	V
			* 5.14999	40.72	Pk	34.40	-20.60	0.00	54.52	-	-	74.00	-19.48	345	100	H
			* 5.14869	43.90	Pk	34.40	-20.70	0.00	57.60	-	-	74.00	-16.40	345	100	H
			* 5.14989	30.70	RMS	34.40	-20.60	0.55	45.05	54.00	-8.95	-	-	345	100	H
802.11ac (VHT80)	5210	ANT1	* 5.14924	32.57	RMS	34.40	-20.70	0.55	46.82	54.00	-7.18	-	-	345	100	H
			* 5.14999	38.01	Pk	34.40	-20.60	0.00	51.81	-	-	74.00	-22.19	86	100	V
			* 5.00313	40.67	Pk	34.30	-20.90	0.00	54.07	-	-	74.00	-19.93	86	100	V
			* 5.14999	27.87	RMS	34.40	-20.60	0.55	42.22	54.00	-11.78	-	-	86	100	V
			* 5.00928	29.21	RMS	34.30	-20.90	0.55	43.16	54.00	-10.84	-	-	86	100	V

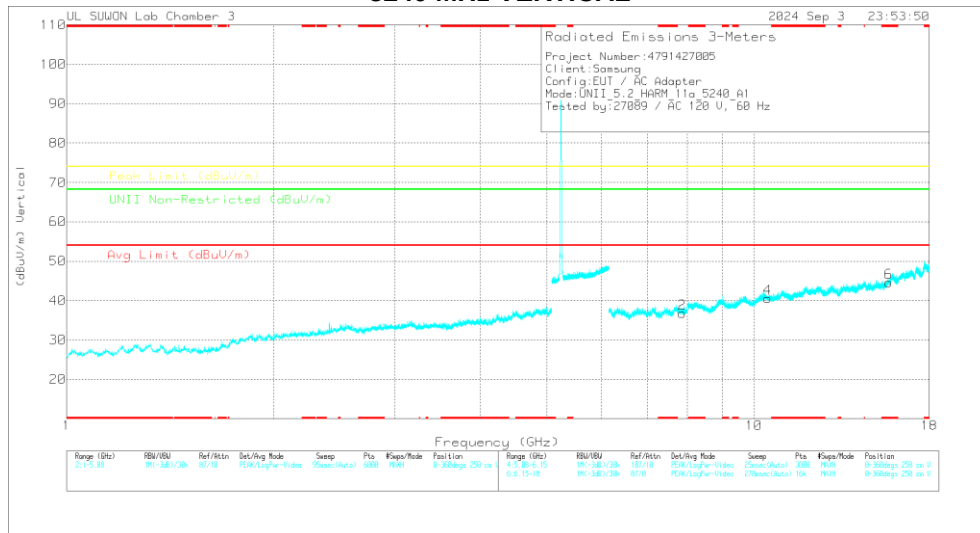
Note1. Pk - Peak detector, RMS - RMS detector

Note2. * - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

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)	Power Reading (dBm)	Det	Antenna Ref. Factor(dB)	Antenna Ref. Path Loss(dB)	DC Corr (dB)	Corrected Reading (dBm)	Avg Limit (dBm)	Margin (dB)	Peak Limit (dBm)	Margin (dB)	UNII Non-Restricted (dBm)	Margin (dB)	Antenna (dBi)	Height (m)	Polarity
7.85834	36.25	PK-U	35.9	-24.6	0	47.55	-	-	-	-	68.2	-20.65	0	100	H
7.86437	35.63	PK-U	35.9	-24.5	0	47.23	-	-	-	-	68.2	-20.97	0	100	V
10.47567	35	PK-U	37.6	-21.1	0	51.5	-	-	-	-	68.2	-16.7	0	100	H
10.48485	34.69	PK-U	37.6	-21.2	0	51.09	-	-	-	-	68.2	-17.11	0	100	V
* 15.72212	37.25	PK-U	40.4	-20.6	0	57.05	-	-	74	-16.95	-	-	0	100	H
* 15.72996	34.63	PK-U	40.5	-20.6	0	54.73	-	-	74	-19.27	-	-	0	100	V
* 15.72212	29.11	ADR	40.4	-20.6	0	44.91	54	-9.09	-	-	-	-	0	100	H
* 15.72996	22.72	ADR	40.5	-20.6	0	42.62	54	-11.38	-	-	-	-	0	100	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK-U - U-NII: Maximum Peak

ADR - U-NII AD primary method, RMS average

HARMONICS AND SPURIOUS EMISSIONS TEST DATA

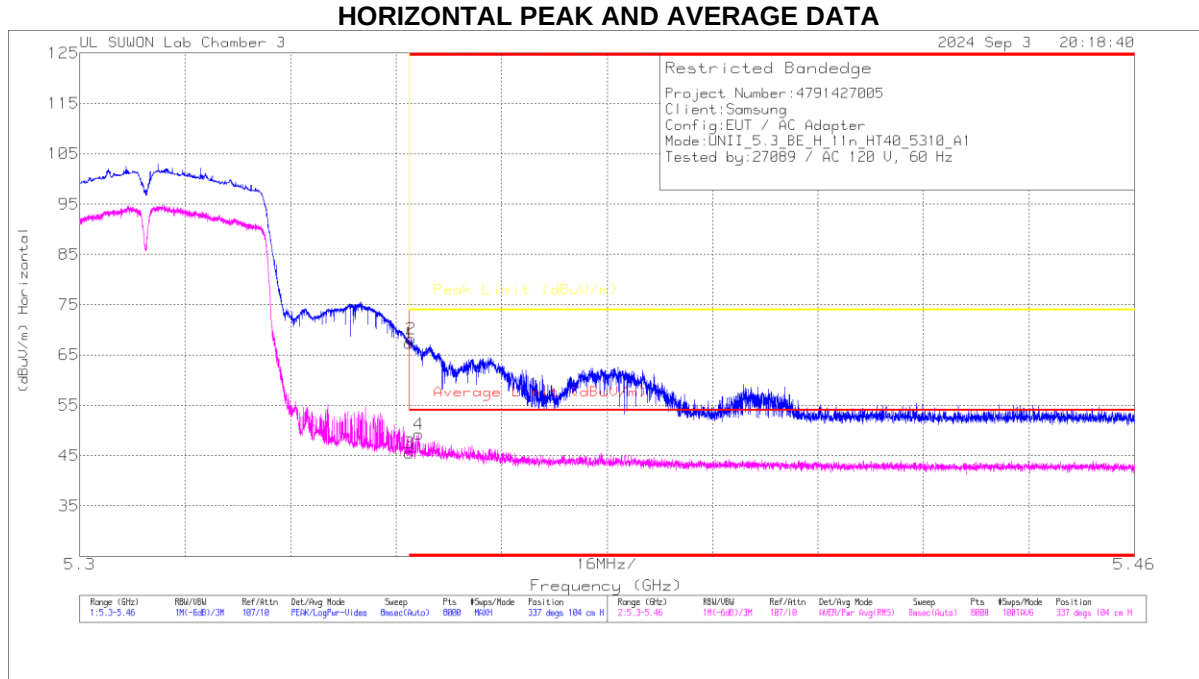
Mode	Freq. [MHz]	Antenna	Frequency [GHz]	Reading [dBuV]	Detector Mode	ANT Factor [dB/m]	Loss [dB]	DC Corr [dB]	Result dBuV/m	AV Limit dBuV/m	AV Margin [dB]	PK Limit dBuV/m	PK Margin [dB]	Non-Restricted [dBuV/m]	Margin [dB]	Azimuth [Degs]	Height [cm]	Polarity
802.11a	5180	ANT1	7.773	36.86	PK-U	35.90	-24.70	0.00	48.06	-	-	-	-	68.20	-20.14	0	100	H
			7.767	37.22	PK-U	35.90	-24.60	0.00	48.52	-	-	-	-	68.20	-19.68	0	100	V
			10.356	35.31	PK-U	37.50	-21.10	0.00	51.71	-	-	-	-	68.20	-16.49	0	100	H
			10.362	35.15	PK-U	37.50	-21.00	0.00	51.65	-	-	-	-	68.20	-16.55	0	100	V
			* 15.53847	36.69	PK-U	40.10	-21.00	0.00	55.79	-	-	74.00	-18.21	-	-	0	100	H
			* 15.53305	35.15	PK-U	40.10	-21.00	0.00	54.25	-	-	74.00	-19.75	-	-	0	100	V
			* 15.53847	24.24	ADR	40.10	-21.00	0.00	43.34	54.00	-10.66	-	-	-	-	0	100	H
			* 15.53305	23.18	ADR	40.10	-21.00	0.00	42.28	54.00	-11.72	-	-	-	-	0	100	V
	5200	ANT1	7.791	36.30	PK-U	35.90	-24.70	0.00	47.50	-	-	-	-	68.20	-20.70	0	100	H
			7.802	36.29	PK-U	35.90	-24.60	0.00	47.59	-	-	-	-	68.20	-20.61	0	100	V
			10.393	35.45	PK-U	37.50	-20.90	0.00	52.05	-	-	-	-	68.20	-16.15	0	100	H
			10.407	34.82	PK-U	37.50	-20.90	0.00	51.42	-	-	-	-	68.20	-16.78	0	100	V
			* 15.60249	36.51	PK-U	40.20	-20.80	0.00	55.91	-	-	74.00	-18.09	-	-	0	100	H
			* 15.60296	34.10	PK-U	40.20	-20.80	0.00	53.50	-	-	74.00	-20.50	-	-	0	100	V
			* 15.60249	25.06	ADR	40.20	-20.80	0.00	44.46	54.00	-9.54	-	-	-	-	0	100	H
			* 15.60296	22.78	ADR	40.20	-20.80	0.00	42.18	54.00	-11.82	-	-	-	-	0	100	V
	5240	ANT1	7.858	36.25	PK-U	35.90	-24.60	0.00	47.55	-	-	-	-	68.20	-20.65	0	100	H
			7.864	35.83	PK-U	35.90	-24.50	0.00	47.23	-	-	-	-	68.20	-20.97	0	100	V
			10.476	35.00	PK-U	37.60	-21.10	0.00	51.50	-	-	-	-	68.20	-16.70	0	100	H
			10.485	34.69	PK-U	37.60	-21.20	0.00	51.09	-	-	-	-	68.20	-17.11	0	100	V
			* 15.72212	37.25	PK-U	40.40	-20.60	0.00	57.05	-	-	74.00	-16.95	-	-	0	100	H
			* 15.72996	34.83	PK-U	40.50	-20.60	0.00	54.73	-	-	74.00	-19.27	-	-	0	100	V
			* 15.72212	25.11	ADR	40.40	-20.60	0.00	44.91	54.00	-9.09	-	-	-	-	0	100	H
			* 15.72996	22.72	ADR	40.50	-20.60	0.00	42.62	54.00	-11.38	-	-	-	-	0	100	V
802.11ac VHT80 Spot-check	5210	ANT1	7.823	36.60	PK-U	35.90	-24.60	0.00	47.90	-	-	-	-	68.20	-20.30	0	100	H
			7.809	37.17	PK-U	35.90	-24.60	0.00	48.47	-	-	-	-	68.20	-19.73	0	100	V
			10.413	34.99	PK-U	37.50	-21.00	0.00	51.49	-	-	-	-	68.20	-16.71	0	100	H
			10.414	34.84	PK-U	37.50	-21.00	0.00	51.34	-	-	-	-	68.20	-16.86	0	100	V
			* 15.63943	34.11	PK-U	40.30	-20.50	0.00	53.91	-	-	74.00	-20.09	-	-	0	100	H
			* 15.62635	34.18	PK-U	40.30	-20.60	0.00	53.88	-	-	74.00	-20.12	-	-	0	100	V
			* 15.63943	22.15	ADR	40.30	-20.50	0.00	41.95	54.00	-12.05	-	-	-	-	0	100	H
			* 15.62635	22.19	ADR	40.30	-20.60	0.00	41.89	54.00	-12.11	-	-	-	-	0	100	V

Note1. PK-U - U-NII: Maximum Peak

Note2. * - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

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

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



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 (m)	Polarity
1	* 5.35001	53.04	PK	34.7	-20.4	0	67.34	-	-	74	-6.66	337	104	H
2	* 5.35033	53.05	PK	34.7	-20.4	0	68.15	-	-	74	-5.85	337	104	H
3	* 5.35001	30.94	RMS	34.7	-20.4	-29	45.53	54	-8.47	-	-	337	104	H
4	* 5.35145	34.57	RMS	34.7	-20.3	-29	49.26	54	-4.74	-	-	337	104	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK - Peak detector

RMS - RMS detection

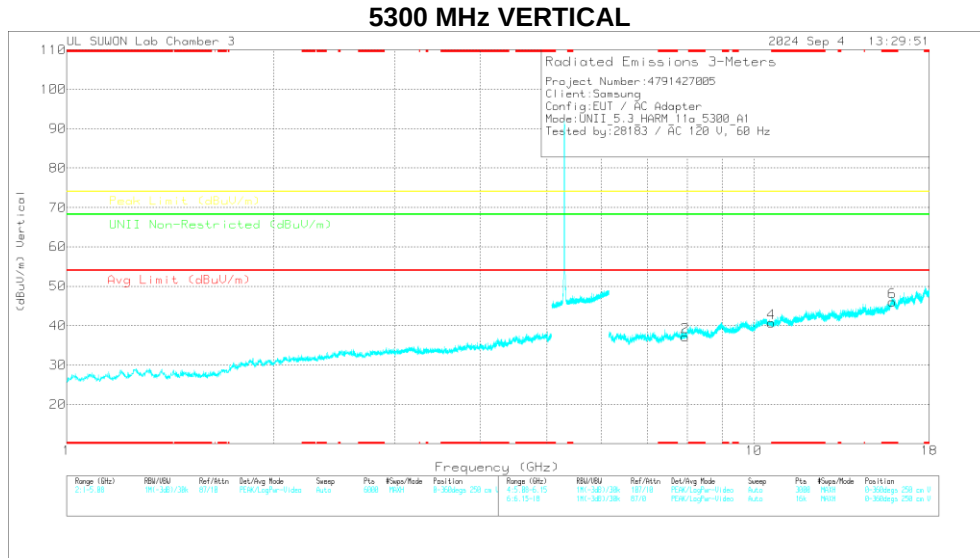
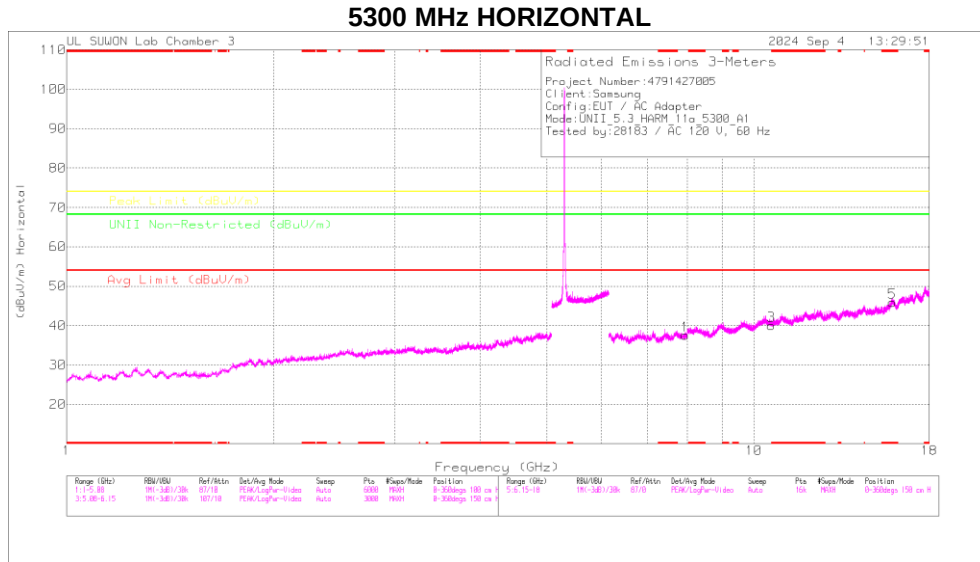
BANDEDGE TEST DATA

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	46.98	Pk	34.70	-20.40	0.00	61.28	-	-	74.00	-12.72	346	111	H
			* 5.35253	49.53	Pk	34.70	-20.30	0.00	63.93	-	-	74.00	-10.07	346	111	H
			* 5.35001	31.17	RMS	34.70	-20.40	0.00	45.47	54.00	-8.53	-	-	346	111	H
			* 5.35219	32.72	RMS	34.70	-20.30	0.00	47.12	54.00	-6.88	-	-	346	111	H
			* 5.35001	41.92	Pk	34.70	-20.40	0.00	56.22	-	-	74.00	-17.78	275	378	V
			* 5.35253	44.96	Pk	34.70	-20.30	0.00	59.36	-	-	74.00	-14.64	275	378	V
			* 5.35001	28.75	RMS	34.70	-20.40	0.00	43.05	54.00	-10.95	-	-	275	378	V
			* 5.35245	29.65	RMS	34.70	-20.30	0.00	44.05	54.00	-9.95	-	-	275	378	V
802.11ac (VHT20)	5320	ANT1	* 5.35001	47.84	Pk	34.70	-20.40	0.00	62.14	-	-	74.00	-11.96	346	106	H
			* 5.35105	51.60	Pk	34.70	-20.30	0.00	66.00	-	-	74.00	-8.00	346	106	H
			* 5.35001	32.28	RMS	34.70	-20.40	0.14	46.72	54.00	-7.28	-	-	346	106	H
			* 5.35099	34.14	RMS	34.70	-20.40	0.14	48.58	54.00	-5.42	-	-	346	106	H
			* 5.35001	43.07	Pk	34.70	-20.40	0.00	57.37	-	-	74.00	-16.63	255	378	V
			* 5.35137	47.04	Pk	34.70	-20.30	0.00	61.44	-	-	74.00	-12.56	255	378	V
			* 5.35001	27.86	RMS	34.70	-20.40	0.14	42.30	54.00	-11.70	-	-	255	378	V
			* 5.35053	29.84	RMS	34.70	-20.40	0.14	44.25	54.00	-9.72	-	-	255	378	V
802.11n (HT40)	5310	ANT1	* 5.35001	53.04	Pk	34.70	-20.40	0.00	67.34	-	-	74.00	-6.66	337	104	H
			* 5.35033	53.85	Pk	34.70	-20.40	0.00	68.15	-	-	74.00	-5.85	337	104	H
			* 5.35001	30.94	RMS	34.70	-20.40	0.29	45.53	54.00	-8.47	-	-	337	104	H
			* 5.35145	34.57	RMS	34.70	-20.30	0.29	49.26	54.00	-4.74	-	-	337	104	H
			* 5.35001	46.80	Pk	34.70	-20.40	0.00	61.10	-	-	74.00	-12.90	257	378	V
			* 5.35009	48.15	Pk	34.70	-20.40	0.00	62.45	-	-	74.00	-11.55	257	378	V
			* 5.35001	29.88	RMS	34.70	-20.40	0.29	44.47	54.00	-9.53	-	-	257	378	V
			* 5.35027	30.43	RMS	34.70	-20.40	0.29	45.02	54.00	-8.98	-	-	257	378	V
802.11ac (VHT80)	5290	ANT1	* 5.35001	42.91	Pk	34.70	-20.40	0.00	57.21	-	-	74.00	-16.79	341	103	H
			* 5.35275	44.48	Pk	34.70	-20.30	0.00	58.88	-	-	74.00	-15.12	341	103	H
			* 5.35001	31.93	RMS	34.70	-20.40	0.55	46.78	54.00	-7.22	-	-	341	103	H
			* 5.35019	32.19	RMS	34.70	-20.40	0.55	47.04	54.00	-6.96	-	-	341	103	H
			* 5.35001	39.19	Pk	34.70	-20.40	0.00	53.49	-	-	74.00	-20.51	230	108	V
			* 5.35203	40.39	Pk	34.70	-20.30	0.00	54.79	-	-	74.00	-19.21	230	108	V
			* 5.35001	27.86	RMS	34.70	-20.40	0.55	42.71	54.00	-11.29	-	-	230	108	V
			* 5.35113	29.04	RMS	34.70	-20.30	0.55	43.99	54.00	-10.01	-	-	230	108	V

Note1. Pk - Peak detector, RMS - RMS detector

Note2. * - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

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



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)	Meas. Reading (dBuV/m)	Det	Antenna_967_Factor(dB/m)	60Hz_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)	Altitude (m)	Height (m)	Polarity
7.95589	36.53	PK-U	35.9	-24.4	0	48.13	-	-	-	-	68.2	-20.07	0	100	H
7.95777	36.25	PK-U	35.9	-24.4	0	47.75	-	-	-	-	68.2	-20.45	0	100	V
* 10.60066	34.05	PK-U	37.7	-21.2	0	50.35	-	-	74	-23.45	-	-	0	100	H
* 10.60099	33.82	PK-U	37.7	-21.2	0	50.32	-	-	74	-23.68	-	-	0	100	V
* 15.90144	36.69	PK-U	40.8	-19.9	0	57.59	-	-	74	-16.41	-	-	0	100	H
* 15.89991	34.24	PK-U	40.8	-19.9	0	55.14	-	-	74	-18.86	-	-	0	100	V
* 15.90144	24.36	ADR	40.8	-19.9	0	45.26	54	-8.74	-	-	-	-	0	100	H
* 15.89991	22.42	ADR	40.8	-19.9	0	43.32	54	-10.68	-	-	-	-	0	100	V

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

HARMONICS AND SPURIOUS EMISSIONS TEST DATA

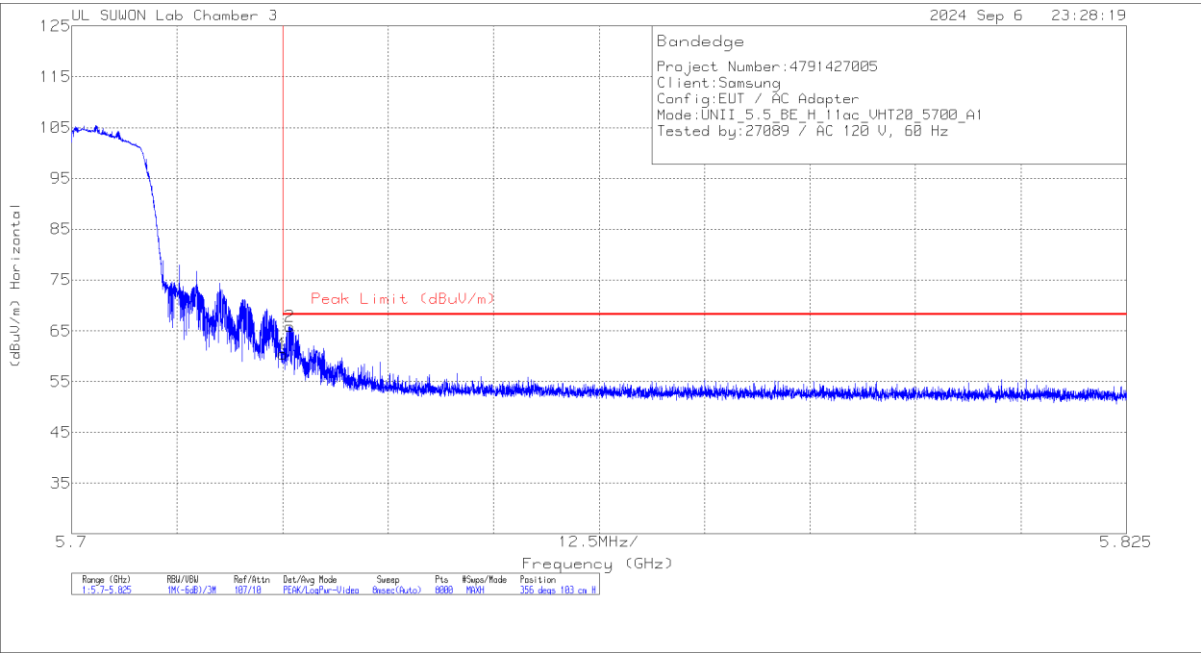
Mode	Freq. [MHz]	Antenna	Frequency [GHz]	Reading [dBuV]	Detector Mode	ANT Factor [dB/m]	Loss [dB]	DC Corr [dB]	Result dBuV/m	AV Limit dBuV/m	AV Margin [dB]	PK Limit dBuV/m	PK Margin [dB]	Non-Restricted [dBuV/m]	Margin [dB]	Azimuth [Degs]	Height [cm]	Polarity
802.11a	5260	ANT1	7.894	36.25	PK-U	35.90	-24.50	0.00	47.65	-	-	-	-	68.20	-20.55	0	100	H
			7.888	36.54	PK-U	35.90	-24.50	0.00	47.94	-	-	-	-	68.20	-20.26	0	100	V
			10.512	34.57	PK-U	37.60	-21.10	0.00	51.01	-	-	-	-	68.20	-17.19	0	100	H
			10.520	33.98	PK-U	37.60	-21.10	0.00	50.48	-	-	-	-	68.20	-17.72	0	100	V
			* 15.78287	36.47	PK-U	40.60	-20.50	0.00	56.57	-	-	74.00	-17.43	-	-	0	100	H
			* 15.78477	34.48	PK-U	40.60	-20.50	0.00	54.58	-	-	74.00	-19.42	-	-	0	100	V
			* 15.78287	24.42	ADR	40.60	-20.50	0.00	44.52	54.00	-9.48	-	-	-	-	0	100	H
			* 15.78477	22.40	ADR	40.60	-20.50	0.00	42.50	54.00	-11.50	-	-	-	-	0	100	V
	5300	ANT1	7.956	36.63	PK-U	35.90	-24.40	0.00	48.13	-	-	-	-	68.20	-20.07	0	100	H
			7.958	36.25	PK-U	35.90	-24.40	0.00	47.75	-	-	-	-	68.20	-20.45	0	100	V
			* 10.60068	34.05	PK-U	37.70	-21.20	0.00	50.55	-	-	74.00	-23.45	-	-	0	100	H
			* 10.60099	33.82	PK-U	37.70	-21.20	0.00	50.32	-	-	74.00	-23.68	-	-	0	100	V
			* 15.90144	36.69	PK-U	40.80	-19.90	0.00	57.59	-	-	74.00	-16.41	-	-	0	100	H
			* 15.89991	34.24	PK-U	40.80	-19.90	0.00	55.14	-	-	74.00	-18.86	-	-	0	100	V
			* 15.90144	24.36	ADR	40.80	-19.90	0.00	45.26	54.00	-8.74	-	-	-	-	0	100	H
			* 15.89991	22.42	ADR	40.80	-19.90	0.00	43.32	54.00	-10.68	-	-	-	-	0	100	V
	5320	ANT1	7.981	36.29	PK-U	35.90	-24.40	0.00	47.79	-	-	-	-	68.20	-20.41	0	100	H
			7.981	36.39	PK-U	35.90	-24.40	0.00	47.89	-	-	-	-	68.20	-20.31	0	100	V
			* 10.64138	33.91	PK-U	37.70	-21.10	0.00	50.51	-	-	74.00	-23.49	-	-	0	100	H
			* 10.63849	33.26	PK-U	37.70	-21.10	0.00	49.86	-	-	74.00	-24.14	-	-	0	100	V
			* 15.96208	36.26	PK-U	40.90	-19.80	0.00	57.36	-	-	74.00	-16.64	-	-	0	100	H
			* 15.96085	34.27	PK-U	40.90	-19.80	0.00	55.37	-	-	74.00	-18.63	-	-	0	100	V
			* 15.96208	24.11	ADR	40.90	-19.80	0.00	45.21	54.00	-8.79	-	-	-	-	0	100	H
			* 15.96085	22.56	ADR	40.90	-19.80	0.00	43.66	54.00	-10.34	-	-	-	-	0	100	V
802.11n (HT40) Spot-Check	5310	ANT1	7.957	36.39	PK-U	35.90	-24.40	0.00	47.89	-	-	-	-	68.20	-20.31	0	100	H
			7.972	36.29	PK-U	35.90	-24.30	0.00	47.86	-	-	-	-	68.20	-20.34	0	100	V
			* 10.62656	33.48	PK-U	37.70	-21.10	0.00	50.08	-	-	74.00	-23.92	-	-	0	100	H
			* 10.61499	33.48	PK-U	37.70	-21.20	0.00	49.98	-	-	74.00	-24.02	-	-	0	100	V
			* 15.93505	34.56	PK-U	40.90	-19.90	0.00	55.56	-	-	74.00	-18.44	-	-	0	100	H
			* 15.92481	34.68	PK-U	40.80	-19.90	0.00	55.58	-	-	74.00	-18.42	-	-	0	100	V
			* 15.93505	22.11	ADR	40.90	-19.90	0.00	43.11	54.00	-10.89	-	-	-	-	0	100	H
			* 15.92481	22.19	ADR	40.80	-19.90	0.00	43.09	54.00	-10.91	-	-	-	-	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

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

BANDEDGE (WORST CASE: 802.11ac VHT20 / 5700 MHz)

HORIZONTAL PEAK AND AVERAGE DATA



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	Antenna_957_F actor (dB/m)	10dB_Path Loss (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.725	45.27	Pk	35	-19.8	0	60.47	68.2	-7.73	356	103	H
2	5.72582	50.64	Pk	35	-19.8	0	65.84	68.2	-2.36	356	103	H

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

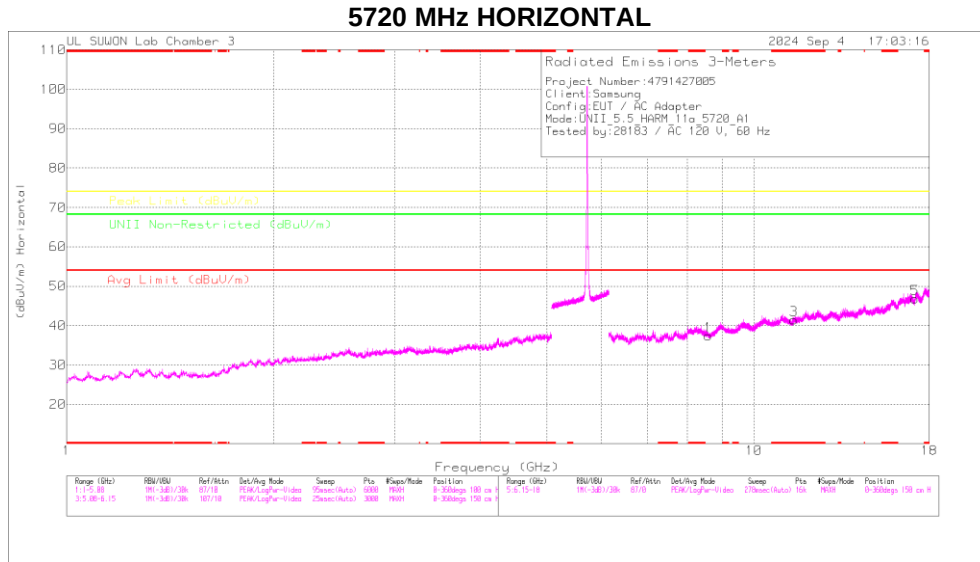
BANDEDGE TEST DATA

Mode	Freq. [MHz]	Antenna	Frequency [GHz]	Reading [dBuV]	Detector Mode	ANT Factor [dB/m]	Loss [dB]	DC Corr [dB]	Result [dBuV/m]	AV Limit [dBuV/m]	AV Margin [dB]	PK Limit [dBuV/m]	PK Margin [dB]	Azimuth [Degs]	Height [cm]	Polarity
802.11a	5500	ANT1	* 5.45998	44.55	Pk	34.90	-20.10	0.00	59.35	-	-	74.00	-14.65	342	100	H
			* 5.45922	46.61	Pk	34.90	-20.10	0.00	61.41	-	-	74.00	-12.59	342	100	H
			5.46998	49.96	Pk	34.90	-20.20	0.00	63.66	-	-	68.20	-4.54	342	100	H
			5.46816	50.37	Pk	34.90	-20.20	0.00	65.07	-	-	68.20	-3.13	342	100	H
			* 5.45998	32.40	RMS	34.90	-20.10	0.00	47.20	54.00	-6.80	-	-	342	100	H
			* 5.45902	32.80	RMS	34.90	-20.10	0.00	47.60	54.00	-6.40	-	-	342	100	H
			5.46998	35.80	RMS	34.90	-20.20	0.00	50.50	-	-	-	-	342	100	H
			5.46996	36.15	RMS	34.90	-20.20	0.00	50.85	-	-	-	-	342	100	H
			* 5.45998	38.65	Pk	34.90	-20.10	0.00	53.45	-	-	74.00	-20.55	275	393	V
			* 5.45895	41.03	Pk	34.90	-20.10	0.00	55.83	-	-	74.00	-18.17	275	393	V
			5.46998	43.06	Pk	34.90	-20.20	0.00	57.76	-	-	68.20	-10.44	275	393	V
			5.46932	45.45	Pk	34.90	-20.20	0.00	60.15	-	-	68.20	-8.05	275	393	V
			* 5.45998	28.19	RMS	34.90	-20.10	0.00	42.99	54.00	-11.01	-	-	275	393	V
			* 5.45814	29.08	RMS	34.90	-20.10	0.00	43.88	54.00	-10.12	-	-	275	393	V
			5.46998	30.71	RMS	34.90	-20.20	0.00	45.41	-	-	-	-	275	393	V
			5.46978	31.80	RMS	34.90	-20.20	0.00	46.50	-	-	-	-	275	393	V
	5700	ANT1	5.72500	46.90	Pk	35.00	-19.80	0.00	62.10	-	-	68.20	-6.10	351	100	H
			5.72541	49.57	Pk	35.00	-19.80	0.00	64.77	-	-	68.20	-3.43	351	100	H
			5.72500	44.45	Pk	35.00	-19.80	0.00	59.65	-	-	68.20	-8.55	232	100	V
			5.72561	45.07	Pk	35.00	-19.80	0.00	60.27	-	-	68.20	-7.93	232	100	V
			* 5.45998	44.25	Pk	34.90	-20.10	0.00	59.05	-	-	74.00	-14.95	343	100	H
			* 5.45784	45.80	Pk	34.90	-20.10	0.00	60.60	-	-	74.00	-13.40	343	100	H
802.11ac (VHT20)	5500	ANT1	5.46998	48.33	Pk	34.90	-20.20	0.00	63.03	-	-	68.20	-5.17	343	100	H
			5.46937	50.34	Pk	34.90	-20.20	0.00	65.04	-	-	68.20	-3.16	343	100	H
			* 5.45998	30.52	RMS	34.90	-20.10	0.14	45.46	54.00	-8.54	-	-	343	100	H
			* 5.45952	31.95	RMS	34.90	-20.10	0.14	46.89	54.00	-7.11	-	-	343	100	H
			5.46998	33.79	RMS	34.90	-20.20	0.14	48.63	-	-	-	-	343	100	H
			5.46956	35.09	RMS	34.90	-20.20	0.14	49.93	-	-	-	-	343	100	H
			* 5.45998	39.30	Pk	34.90	-20.10	0.00	54.10	-	-	74.00	-19.90	255	395	V
			* 5.35575	39.84	Pk	34.70	-20.30	0.00	54.24	-	-	74.00	-19.76	255	395	V
			5.46998	41.02	Pk	34.90	-20.20	0.00	55.72	-	-	68.20	-12.48	255	395	V
			5.46738	44.94	Pk	34.90	-20.20	0.00	59.64	-	-	68.20	-8.56	255	395	V
			* 5.45998	27.71	RMS	34.90	-20.10	0.14	42.65	54.00	-11.35	-	-	255	395	V
			* 5.45989	28.58	RMS	34.90	-20.10	0.14	43.52	54.00	-10.48	-	-	255	395	V
			5.46998	29.52	RMS	34.90	-20.20	0.14	44.36	-	-	-	-	255	395	V
			5.46783	30.62	RMS	34.90	-20.20	0.14	45.46	-	-	-	-	255	395	V
	5700	ANT1	5.72500	45.27	Pk	35.00	-19.80	0.00	60.47	-	-	68.20	-7.73	356	103	H
			5.72582	50.64	Pk	35.00	-19.80	0.00	65.84	-	-	68.20	-2.36	356	103	H
			5.72500	40.53	Pk	35.00	-19.80	0.00	55.73	-	-	68.20	-12.47	237	100	V
			5.72616	46.25	Pk	35.00	-19.80	0.00	61.45	-	-	68.20	-6.75	237	100	V
			* 5.45998	43.22	Pk	34.90	-20.10	0.00	58.02	-	-	74.00	-15.98	349	100	H
			* 5.45331	45.21	Pk	34.90	-20.10	0.00	60.01	-	-	74.00	-13.99	349	100	H
802.11n (HT40)	5510	ANT1	5.46998	48.96	Pk	34.90	-20.20	0.00	63.66	-	-	68.20	-4.54	349	100	H
			5.46974	50.36	Pk	34.90	-20.20	0.00	65.06	-	-	68.20	-3.14	349	100	H
			* 5.45998	28.38	RMS	34.90	-20.10	0.29	43.47	54.00	-10.53	-	-	349	100	H
			* 5.45709	29.89	RMS	34.90	-20.10	0.29	44.98	54.00	-9.02	-	-	349	100	H
			5.46998	29.71	RMS	34.90	-20.20	0.29	44.70	-	-	-	-	349	100	H
			5.46954	31.76	RMS	34.90	-20.20	0.29	46.75	-	-	-	-	349	100	H
			* 5.45998	38.82	Pk	34.90	-20.10	0.00	53.62	-	-	74.00	-20.38	275	395	V
			* 5.45856	41.06	Pk	34.90	-20.10	0.00	55.86	-	-	74.00	-18.14	275	395	V
			5.46998	45.78	Pk	34.90	-20.20	0.00	60.48	-	-	68.20	-7.72	275	395	V
			5.46963	45.34	Pk	34.90	-20.20	0.00	60.04	-	-	68.20	-8.16	275	395	V
			* 5.45998	27.30	RMS	34.90	-20.10	0.29	42.39	54.00	-11.61	-	-	275	395	V
			* 5.45827	28.26	RMS	34.90	-20.10	0.29	43.35	54.00	-10.65	-	-	275	395	V
			5.46998	27.50	RMS	34.90	-20.20	0.29	42.49	-	-	-	-	275	395	V
			5.46904	29.02	RMS	34.90	-20.20	0.29	44.01	-	-	-	-	275	395	V
	5670	ANT1	5.72500	46.95	Pk	35.00	-19.80	0.00	62.15	-	-	68.20	-6.05	351	108	H
			5.72524	47.85	Pk	35.00	-19.80	0.00	63.05	-	-	68.20	-5.15	351	108	H
			5.72500	43.12	Pk	35.00	-19.80	0.00	58.32	-	-	68.20	-9.88	235	100	V
			5.72549	43.73	Pk	35.00	-19.80	0.00	58.93	-	-	68.20	-9.27	235	100	V
			* 5.45998	38.07	Pk	34.90	-20.10	0.00	52.87	-	-	74.00	-21.13	341	116	H
			* 5.44941	41.77	Pk	34.90	-20.20	0.00	56.47	-	-	74.00	-17.53	341	116	H
802.11ac (VHT80)	5530	ANT1	5.46998	41.18	Pk	34.90	-20.20	0.00	55.88	-	-	68.20	-12.32	341	116	H
			5.46313	43.21	Pk	34.90	-20.20	0.00	57.91	-	-	68.20	-10.29	341	116	H
			* 5.45998	29.31	RMS	34.90	-20.10	0.55	44.66	54.00	-9.34	-	-	341	116	H
			* 5.45856	30.61	RMS	34.90	-20.10	0.55	45.96	54.00	-8.04	-	-	341	116	H
			5.46998	31.17	RMS	34.90	-20.20	0.55	46.42	-	-	-	-	341	116	H
			5.46937	31.20	RMS	34.90	-20.20	0.55	46.45	-	-	-	-	341	116	H
			* 5.45998	38.70	Pk	34.90	-20.10	0.00	53.50	-	-	74.00	-20.50	275	395	V
			* 5.4406	39.36	Pk	34.90	-20.10	0.00	54.16	-	-	74.00	-19.84	275	395	V
			5.46998	37.94	Pk	34.90	-20.20	0.00	52.64	-	-	68.20	-15.56	275	395	V
			5.46959	39.83	Pk	34.90	-20.20	0.00	54.53	-	-	68.20	-13.67	275	395	V
			* 5.45998	26.74	RMS	34.90	-20.10	0.55	42.09	54.00	-11.91	-	-	275	395	V
			* 5.45827	28.46	RMS	34.90	-20.10	0.55	43.81	54.00	-10.19	-	-	275	395	V
			5.46998	28.19	RMS	34.90	-20.20	0.55	43.44	-	-	-	-	275	395	V
			5.46924	29.05	RMS	34.90	-20.20	0.55	44.30	-	-	-	-	275	395	V
	5610	ANT1	5.72500	36.79	Pk	35.00	-19.80	0.00	51.99	-	-	68.20	-16.21	351	111	H
			5.73941	40.18	Pk	35.00	-19.80	0.00	55.38	-	-	68.20	-12.82	351	111	H
			5.72500	38.78	Pk	35.00	-19.80	0.00	53.98	-	-	68.20	-14.22	239	100	V
			5.74893	39.34	Pk	35.00	-19.80	0.00	54.54	-	-	68.20	-13.66	239	100	V

Note1. Pk - Peak detector, RMS - RMS detector

Note2. * - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

HARMONICS AND SPURIOUS EMISSIONS(WORST CASE: 802.11a / 5720 MHz)



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

5720 MHz DATA

Radiated Emissions

Frequency (GHz)	Meas. Reading (dBuV)	Det	Antenna_3d7_Factor(dB)	GHz_HF_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)	Actuals (dBps)	Height (cm)	Polarity
8.57223	35.52	PK-U	-36	-23.4	0	48.12	-	-	-	-	68.2	-20.08	0	100	H
8.57607	35.12	PK-U	-36	-23.4	0	47.72	-	-	-	-	68.2	-20.48	0	100	V
* 11.44442	33.5	PK-U	-36.2	-21.2	0	50.5	-	-	74	-23.5	-	-	0	100	H
* 11.43437	33.3	PK-U	-36.2	-21.3	0	50.2	-	-	74	-23.8	-	-	0	100	V
17.15519	33.56	PK-U	-41.3	-17.1	0	57.76	-	-	-	-	68.2	-10.44	0	100	H
17.16022	33.42	PK-U	-41.3	-17	0	57.72	-	-	-	-	68.2	-10.48	0	100	V

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

HARMONICS AND SPURIOUS EMISSIONS TEST DATA

Mode	Freq. [MHz]	Antenna	Frequency [GHz]	Reading [dBuV]	Detector Mode	ANT Factor [dB/m]	Loss [dB]	DC Corr [dB]	Result [dBuV/m]	AV Limit [dBuV/m]	AV Margin [dB]	PK Limit [dBuV/m]	PK Margin [dB]	Non-Restricted [dBuV/m]	Margin [dB]	Azimuth [Degs]	Height [cm]	Polarity
802.11a	5500	ANT1	* 8.24839	37.42	PK-U	36.00	-23.80	0.00	49.62	-	-	74.00	-24.38	-	-	0	100	H
			* 8.25064	36.92	PK-U	36.00	-23.80	0.00	49.12	-	-	74.00	-24.88	-	-	0	100	V
			* 11.00134	34.40	PK-U	38.00	-21.00	0.00	51.40	-	-	74.00	-22.60	-	-	0	100	H
			* 10.99828	34.55	PK-U	38.00	-21.10	0.00	51.45	-	-	74.00	-22.55	-	-	0	100	V
			16.502	34.39	PK-U	41.60	-18.80	0.00	57.19	-	-	-	-	68.20	-11.01	0	100	H
			16.501	33.50	PK-U	41.60	-18.70	0.00	56.40	-	-	-	-	68.20	-11.80	0	100	V
	5580	ANT1	* 8.3705	36.71	PK-U	36.00	-23.70	0.00	49.01	-	-	74.00	-24.99	-	-	0	100	H
			* 8.37208	36.38	PK-U	36.00	-23.70	0.00	48.68	-	-	74.00	-25.32	-	-	0	100	V
			* 11.16104	35.18	PK-U	38.10	-21.40	0.00	51.88	-	-	74.00	-22.12	-	-	0	100	H
			* 11.16187	35.14	PK-U	38.10	-21.40	0.00	51.84	-	-	74.00	-22.16	-	-	0	100	V
			16.752	32.55	PK-U	41.80	-18.20	0.00	56.15	-	-	-	-	68.20	-12.05	0	100	H
			16.752	32.17	PK-U	41.80	-18.20	0.00	55.77	-	-	-	-	68.20	-12.43	0	100	V
	5700	ANT1	8.542	35.30	PK-U	36.00	-23.60	0.00	47.70	-	-	-	-	68.20	-20.50	0	100	H
			8.552	35.34	PK-U	36.00	-23.40	0.00	47.94	-	-	-	-	68.20	-20.26	0	100	V
			* 11.39929	33.81	PK-U	38.10	-21.30	0.00	50.61	-	-	74.00	-23.39	-	-	0	100	H
			* 11.40033	34.32	PK-U	38.10	-21.30	0.00	51.12	-	-	74.00	-22.88	-	-	0	100	V
			17.100	32.53	PK-U	41.40	-17.30	0.00	56.63	-	-	-	-	68.20	-11.57	0	100	H
			17.102	32.81	PK-U	41.40	-17.30	0.00	56.91	-	-	-	-	68.20	-11.29	0	100	V
	5720	ANT1	8.572	35.52	PK-U	36.00	-23.40	0.00	48.12	-	-	-	-	68.20	-20.08	0	100	H
			8.576	35.12	PK-U	36.00	-23.40	0.00	47.72	-	-	-	-	68.20	-20.48	0	100	V
			* 11.44442	33.50	PK-U	38.20	-21.20	0.00	50.50	-	-	74.00	-23.50	-	-	0	100	H
			* 11.43437	33.30	PK-U	38.20	-21.30	0.00	50.20	-	-	74.00	-23.80	-	-	0	100	V
			17.155	33.56	PK-U	41.30	-17.10	0.00	57.76	-	-	-	-	68.20	-10.44	0	100	H
			17.160	33.42	PK-U	41.30	-17.00	0.00	57.72	-	-	-	-	68.20	-10.48	0	100	V

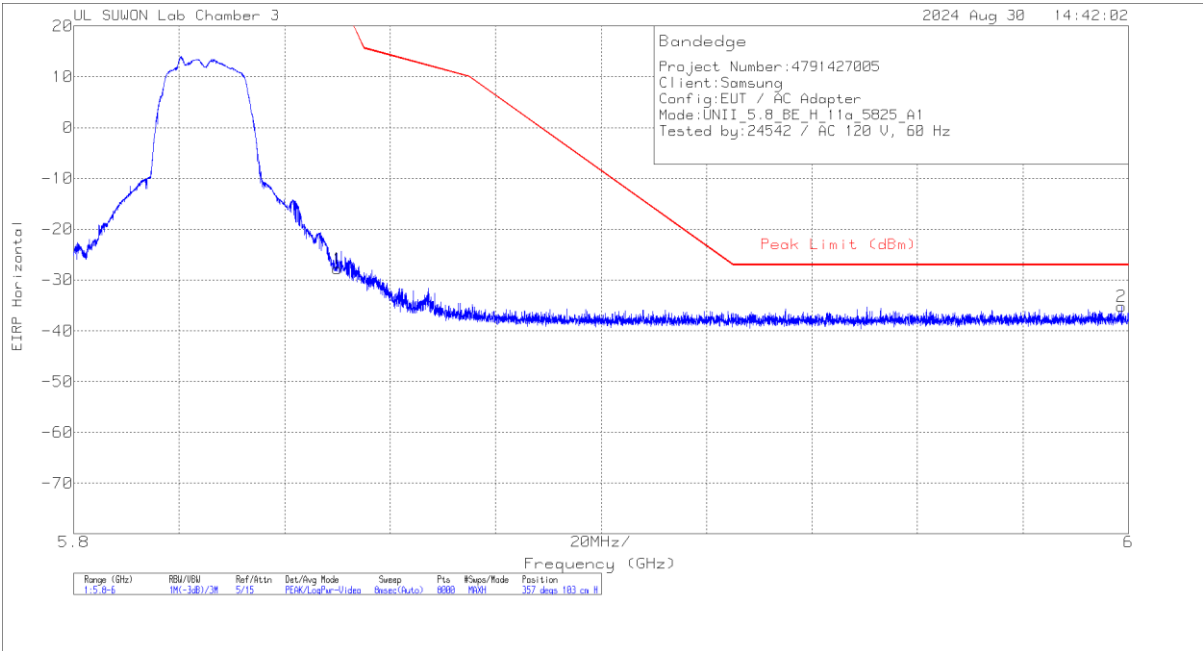
Note1. PK-U - U-NII: Maximum Peak / ADR - U-NII AD primary method, RMS average

Note2. * - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

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

BANDEDGE (WORST CASE: 802.11a / 5825 MHz)

HORIZONTAL PEAK DATA



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	Antenna_957_F actor(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	5.85001	-55.15	Pk	35.2	-19.6	11.8	0	-27.75	26.99	-54.74	357	103	H
2	5.99867	-63.44	Pk	35.7	-19.2	11.8	0	-35.14	-27	-8.14	357	103	H

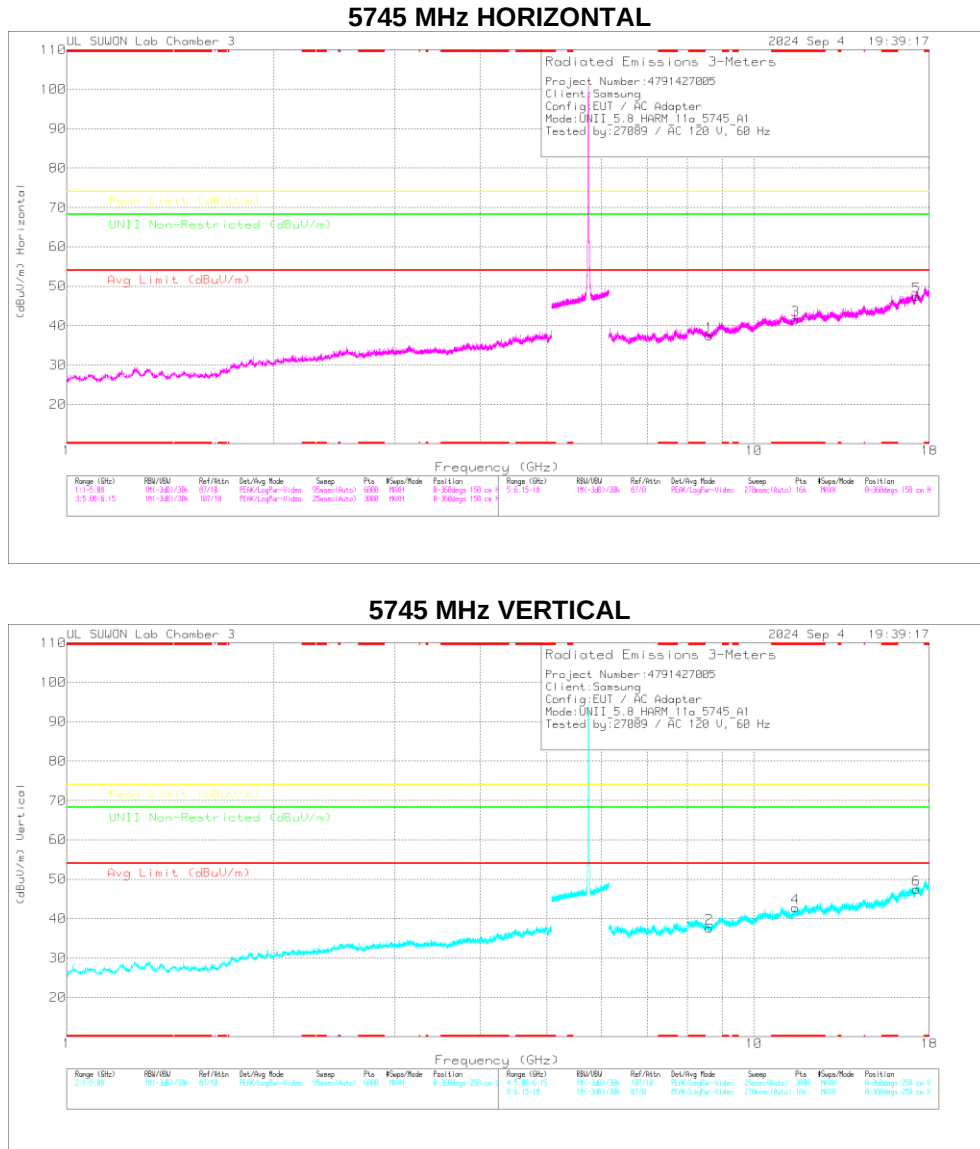
Pk - Peak detector

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	-47.26	Pk	34.90	-19.80	11.80	0.00	-20.36	27.00	-47.36	355	100	H
			5.64933	-63.52	Pk	34.90	-19.90	11.80	0.00	-36.72	-27.00	-9.72	355	100	H
			5.72500	-51.57	Pk	34.90	-19.80	11.80	0.00	-24.67	27.00	-51.67	273	376	V
			5.63304	-63.60	Pk	34.90	-20.00	11.80	0.00	-36.90	-27.00	-9.90	273	376	V
	5825	ANT1	5.85001	-55.15	Pk	35.20	-19.60	11.80	0.00	-27.75	26.99	-54.74	357	103	H
			5.99867	-63.44	Pk	35.70	-19.20	11.80	0.00	-35.14	-27.00	-8.14	357	103	H
			5.85001	-58.46	Pk	35.20	-19.60	11.80	0.00	-31.06	26.99	-58.05	237	108	V
			5.95802	-63.59	Pk	35.60	-19.30	11.80	0.00	-35.49	-27.00	-8.49	237	108	V
802.11ac (VHT20)	5745	ANT1	5.72500	-48.03	Pk	34.90	-19.80	11.80	0.00	-21.13	27.00	-48.13	358	108	H
			5.64541	-63.27	Pk	34.90	-20.00	11.80	0.00	-36.57	-27.00	-9.57	358	108	H
			5.72500	-51.57	Pk	34.90	-19.80	11.80	0.00	-24.67	27.00	-51.67	235	101	V
			5.63916	-63.67	Pk	34.90	-20.00	11.80	0.00	-36.97	-27.00	-9.97	235	101	V
	5825	ANT1	5.85001	-53.99	Pk	35.20	-19.60	11.80	0.00	-26.59	26.99	-53.58	352	105	H
			5.93429	-63.48	Pk	35.50	-19.50	11.80	0.00	-35.68	-27.00	-8.68	352	105	H
			5.85001	-54.68	Pk	35.20	-19.60	11.80	0.00	-27.28	26.99	-54.27	235	105	V
			5.97687	-64.39	Pk	35.70	-19.30	11.80	0.00	-36.19	-27.00	-9.19	235	105	V
802.11n (HT40)	5755	ANT1	5.72500	-46.43	Pk	34.90	-19.80	11.80	0.00	-19.53	27.00	-46.53	356	108	H
			5.64627	-62.15	Pk	34.90	-20.00	11.80	0.00	-35.45	-27.00	-8.45	356	108	H
			5.72500	-51.66	Pk	34.90	-19.80	11.80	0.00	-24.76	27.00	-51.76	235	100	V
			5.64510	-63.96	Pk	34.90	-20.00	11.80	0.00	-37.26	-27.00	-10.26	235	100	V
	5795	ANT1	5.85001	-60.79	Pk	35.20	-19.60	11.80	0.00	-33.39	26.99	-60.38	357	113	H
			5.98970	-63.54	Pk	35.70	-19.30	11.80	0.00	-35.34	-27.00	-8.34	357	113	H
			5.85001	-61.90	Pk	35.20	-19.60	11.80	0.00	-34.50	26.99	-61.49	234	100	V
			5.98690	-63.94	Pk	35.70	-19.30	11.80	0.00	-35.74	-27.00	-8.74	234	100	V
802.11ac (VHT80)	5775 (Lower Side)	ANT1	5.72500	-60.30	Pk	34.90	-19.80	11.80	0.00	-33.40	27.00	-60.40	352	100	H
			5.64234	-64.05	Pk	34.90	-20.00	11.80	0.00	-37.35	-27.00	-10.35	352	100	H
			5.72500	-63.24	Pk	34.90	-19.80	11.80	0.00	-36.34	27.00	-63.34	235	100	V
			5.64132	-63.57	Pk	34.90	-20.00	11.80	0.00	-36.87	-27.00	-9.87	235	100	V
	5775 (Upper Side)	ANT1	5.85001	-64.00	Pk	35.20	-19.60	11.80	0.00	-36.60	26.99	-63.59	357	113	H
			5.98645	-63.61	Pk	35.70	-19.20	11.80	0.00	-35.31	-27.00	-8.31	357	113	H
			5.85001	-65.35	Pk	35.20	-19.60	11.80	0.00	-37.95	26.99	-64.94	233	100	V
			5.95609	-63.38	Pk	35.60	-19.30	11.80	0.00	-35.28	-27.00	-8.28	233	100	V

Note. Pk - Peak detector

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



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

5745 MHz DATA

Radiated Emissions

Frequency (GHz)	Meas. Reading (dBuV)	Det	Antenna_9ET_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)	Altitude (m)	Height (cm)	Polarity
8.62672	35.18	PK-U	36.1	-23.4	0	47.88	-	-	-	-	68.2	-20.32	0	100	H
8.62121	35.43	PK-U	36	-23.4	0	48.03	-	-	-	-	68.2	-20.17	0	100	V
*11.49673	33.93	PK-U	36.2	-21.4	0	50.73	-	-	74	-23.27	-	-	0	100	H
*11.49942	33.52	PK-U	36.2	-21.4	0	50.32	-	-	74	-23.68	-	-	0	100	V
17.22866	33.48	PK-U	41.1	-16.6	0	57.98	-	-	-	-	68.2	-10.22	0	100	H
17.22956	34.09	PK-U	41.1	-16.6	0	58.59	-	-	-	-	68.2	-9.61	0	100	V

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

HARMONICS AND SPURIOUS EMISSIONS TEST DATA

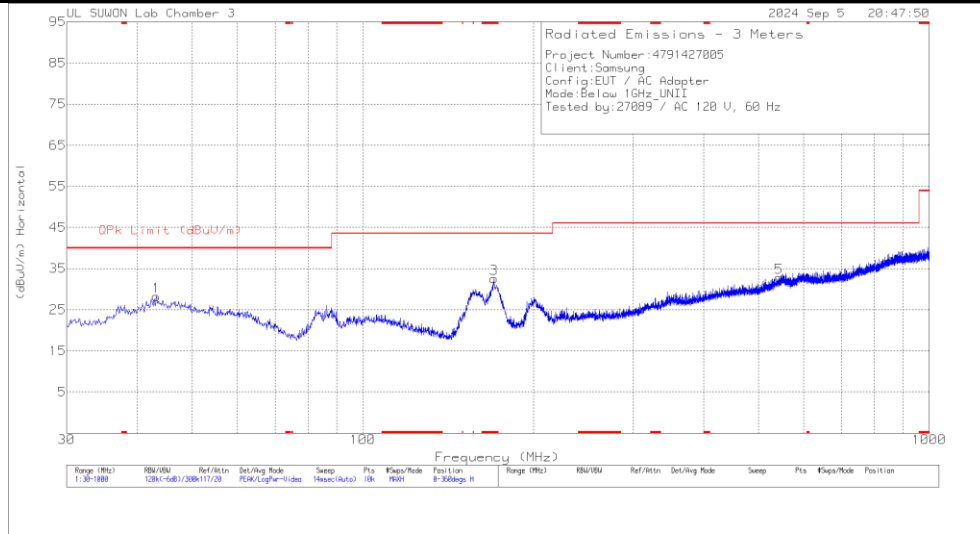
Mode	Freq. [MHz]	Antenna	Frequency [GHz]	Reading [dBuV]	Detector Mode	ANT Factor [dB/m]	Loss [dB]	DC Corr [dB]	Result dBuV/m	AV Limit dBuV/m	AV Margin [dB]	PK Limit dBuV/m	PK Margin [dB]	Non-Restricted [dBuV/m]	Margin [dB]	Azimuth [Degs]	Height [cm]	Polarity
802.11a	5745	ANT1	8.627	35.18	PK-U	36.10	-23.40	0.00	47.88	-	-	-	-	68.20	-20.32	0	100	H
			8.621	35.43	PK-U	36.00	-23.40	0.00	48.03	-	-	-	-	68.20	-20.17	0	100	V
			* 11.49673	33.93	PK-U	38.20	-21.40	0.00	50.73	-	-	74.00	-23.27	-	-	0	100	H
			* 11.49942	33.52	PK-U	38.20	-21.40	0.00	50.32	-	-	74.00	-23.68	-	-	0	100	V
			17.229	33.48	PK-U	41.10	-16.60	0.00	57.98	-	-	-	-	68.20	-10.22	0	100	H
			17.230	34.09	PK-U	41.10	-16.60	0.00	58.59	-	-	-	-	68.20	-9.61	0	100	V
			8.686	34.84	PK-U	36.10	-23.20	0.00	47.74	-	-	-	-	68.20	-20.46	0	100	H
			8.670	35.11	PK-U	36.10	-23.20	0.00	48.01	-	-	-	-	68.20	-20.19	0	100	V
	5785	ANT1	* 11.57567	35.15	PK-U	38.30	-21.50	0.00	51.95	-	-	74.00	-22.05	-	-	0	100	H
			* 11.57281	35.12	PK-U	38.20	-21.50	0.00	51.82	-	-	74.00	-22.18	-	-	0	100	V
			17.359	33.31	PK-U	41.10	-16.60	0.00	57.81	-	-	-	-	68.20	-10.39	0	100	H
			17.363	32.87	PK-U	41.10	-16.60	0.00	57.37	-	-	-	-	68.20	-10.83	0	100	V
			8.741	35.64	PK-U	36.10	-23.10	0.00	48.64	-	-	-	-	68.20	-19.56	0	100	H
			8.741	35.58	PK-U	36.10	-23.10	0.00	48.58	-	-	-	-	68.20	-19.62	0	100	V
			* 11.65592	35.57	PK-U	38.30	-21.70	0.00	52.17	-	-	74.00	-21.83	-	-	0	100	H
			* 11.65417	35.10	PK-U	38.30	-21.60	0.00	51.80	-	-	74.00	-22.20	-	-	0	100	V
	5825	ANT1	17.481	32.54	PK-U	41.20	-16.40	0.00	57.34	-	-	-	-	68.20	-10.86	0	100	H
			17.470	32.44	PK-U	41.10	-16.20	0.00	57.34	-	-	-	-	68.20	-10.86	0	100	V
			8.612	34.04	PK-U	36.00	-23.40	0.00	46.64	-	-	-	-	68.20	-21.56	0	100	H
			8.625	34.48	PK-U	36.00	-23.40	0.00	47.08	-	-	-	-	68.20	-21.12	0	100	V
			* 11.49354	33.17	PK-U	38.20	-21.40	0.00	49.97	-	-	74.00	-24.03	-	-	0	100	H
			* 11.49777	33.67	PK-U	38.20	-21.40	0.00	50.67	-	-	74.00	-23.33	-	-	0	100	V
			17.225	32.83	PK-U	41.10	-16.70	0.00	57.23	-	-	-	-	68.20	-10.97	0	100	H
			17.226	33.13	PK-U	41.10	-16.70	0.00	57.53	-	-	-	-	68.20	-10.67	0	100	V
802.11ac (VHT20) Spot-Check	5745	ANT1	8.612	34.04	PK-U	36.00	-23.40	0.00	46.64	-	-	-	-	68.20	-21.56	0	100	H
			8.625	34.48	PK-U	36.00	-23.40	0.00	47.08	-	-	-	-	68.20	-21.12	0	100	V
			* 11.49354	33.17	PK-U	38.20	-21.40	0.00	49.97	-	-	74.00	-24.03	-	-	0	100	H
			* 11.49777	33.67	PK-U	38.20	-21.40	0.00	50.67	-	-	74.00	-23.33	-	-	0	100	V
			17.225	32.83	PK-U	41.10	-16.70	0.00	57.23	-	-	-	-	68.20	-10.97	0	100	H
			17.226	33.13	PK-U	41.10	-16.70	0.00	57.53	-	-	-	-	68.20	-10.67	0	100	V

Note1. PK-U - U-NII: Maximum Peak / ADR - U-NII AD primary method, RMS average

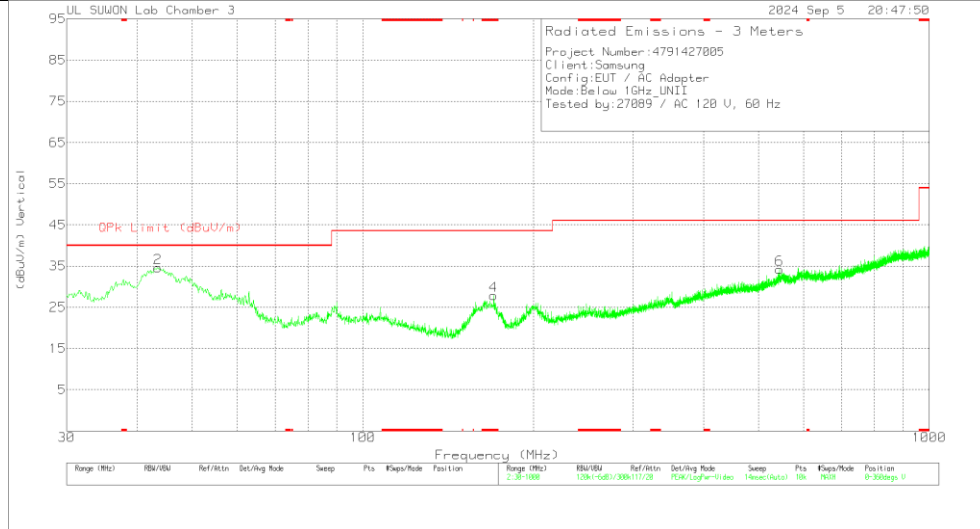
Note2. * - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

12. WORST-CASE BELOW 1 GHz

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



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



Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Antenna_845_F actor(dBm)	Below_1G_Path Loss(dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	43.1934	40.88	Pk	19.4	-32	0	28.28	40	-11.72	0-360	200	H
3	* 170.4705	48.95	Pk	14.6	-30.9	0	32.65	43.52	-10.87	0-360	100	H
5	543.1829	39.56	Pk	23	-29.7	0	32.86	46.02	-13.16	0-360	200	H
2	43.4359	47.19	Pk	19.4	-32	0	34.59	40	-5.41	0-360	100	V
4	* 170.1795	44.12	Pk	14.6	-30.9	0	27.82	43.52	-15.7	0-360	100	V
6	543.765	40.91	Pk	23	-29.7	0	34.21	46.02	-11.81	0-360	100	V

Pk - Peak detector

Radiated Emissions

Frequency (MHz)	Meter Reading (dBuV)	Det	Antenna_845_F actor(dBm)	Below_1G_Path Loss(dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
43.4359	36.79	Qp	19.4	-32	0	24.19	40	-15.81	215	101	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Qp - Quasi-Peak detector

13. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)
IC RSS-GEN Clause 8.8

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

⁺ Decreases with the logarithm of the frequency.

TEST PROCEDURE

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

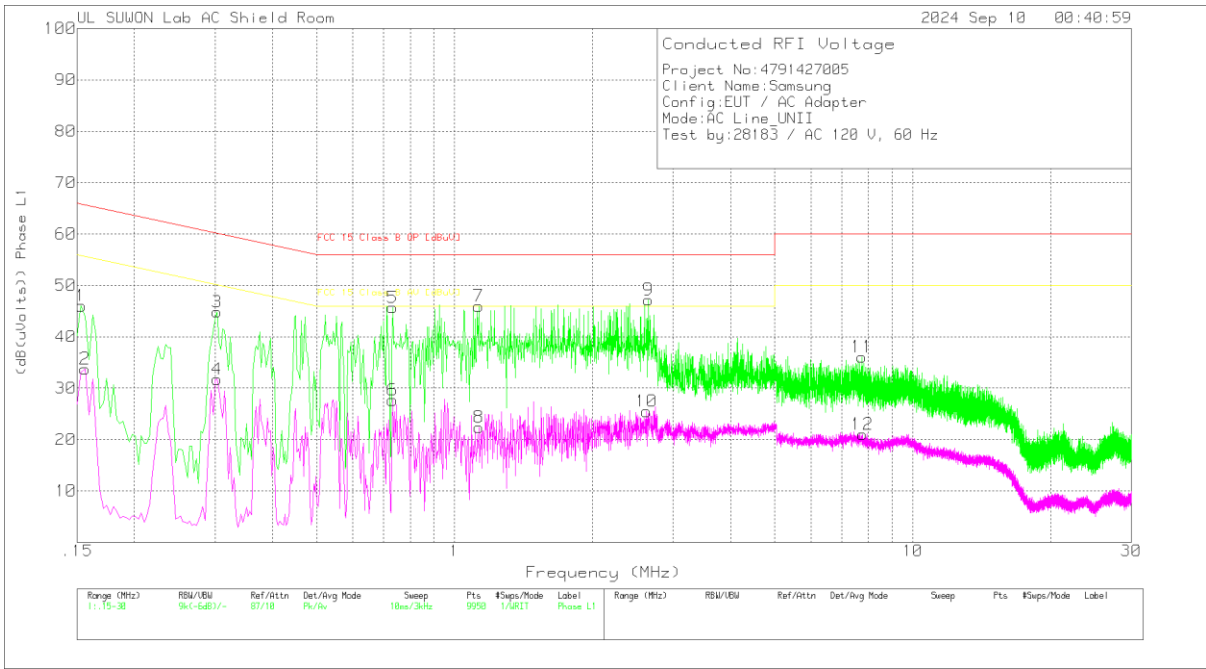
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

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

RESULTS

WORST EMISSIONS

LINE 1 DATA



Trace Markers

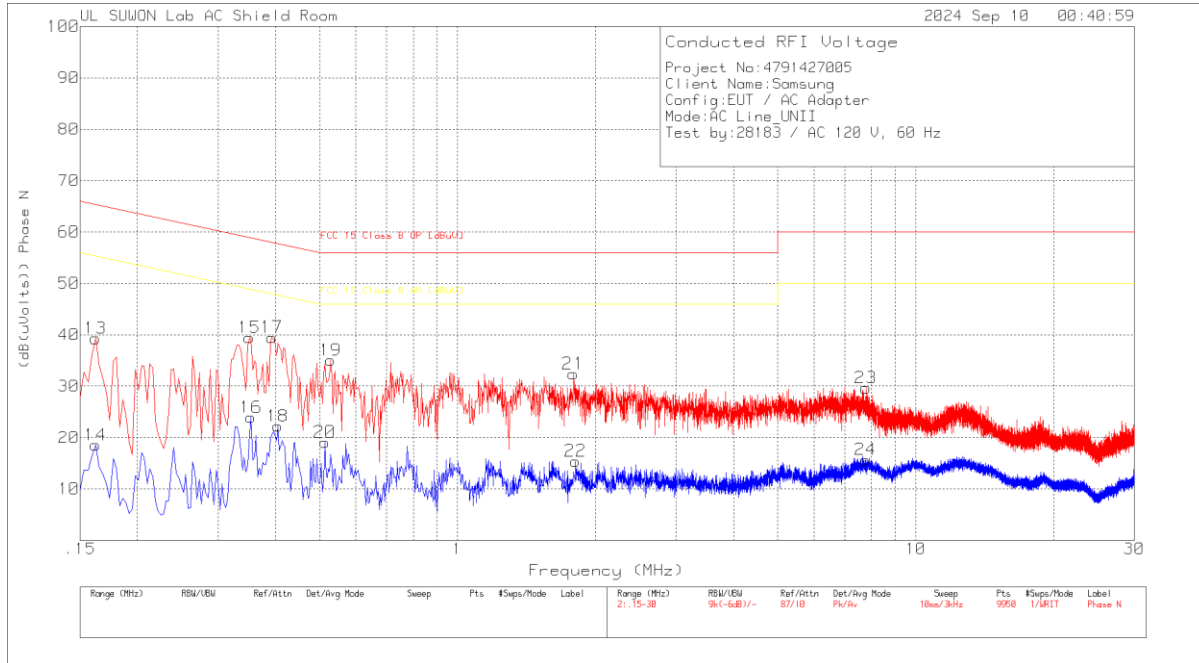
Range 1: Phase L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101836_Wit h 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	.153	36.13	Pk	9.8	.1	46.03	65.84	-19.81	-	-
2	.156	23.84	Av	9.8	.1	33.74	-	-	55.67	-21.93
3	.303	35.02	Pk	9.7	.1	44.82	60.16	-15.34	-	-
4	.303	21.93	Av	9.7	.1	31.73	-	-	50.16	-18.43
5	.732	35.77	Pk	9.8	.1	45.67	56	-10.33	-	-
6	.732	17.78	Av	9.8	.1	27.68	-	-	46	-18.32
7	1.128	36.16	Pk	9.7	.1	45.96	56	-10.04	-	-
8	1.131	12.58	Av	9.7	.1	22.38	-	-	46	-23.62
9	2.646	37.38	Pk	9.7	.1	47.18	56	-8.82	-	-
10	2.625	15.68	Av	9.7	.1	25.48	-	-	46	-20.52
11	7.749	26.08	Pk	9.8	.2	36.08	60	-23.92	-	-
12	7.761	11.01	Av	9.8	.2	21.01	-	-	50	-28.99

Pk - Peak detector

Av - Average detection

LINE 2 DATA



Trace Markers

Range 2: Phase N .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101836_Wit h 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	29.31	Pk	9.9	.1	39.31	65.36	-26.05	-	-
14	.162	8.54	Av	9.9	.1	18.54	-	-	55.36	-36.82
15	.351	29.54	Pk	9.8	.1	39.44	58.94	-19.5	-	-
16	.354	14.02	Av	9.8	.1	23.92	-	-	48.87	-24.95
17	.393	29.6	Pk	9.8	.1	39.5	58	-18.5	-	-
18	.405	12.3	Av	9.8	.1	22.2	-	-	47.75	-25.55
19	.528	25.05	Pk	9.9	.1	35.05	56	-20.95	-	-
20	.513	9.08	Av	9.9	.1	19.08	-	-	46	-26.92
21	1.788	22.59	Pk	9.7	.1	32.39	56	-23.61	-	-
22	1.809	5.62	Av	9.7	.1	15.42	-	-	46	-30.58
23	7.782	19.64	Pk	9.8	.2	29.64	60	-30.36	-	-
24	7.77	5.68	Av	9.8	.2	15.68	-	-	50	-34.32

Pk - Peak detector

Av - Average detection

Quasi-Peak Emissions

Range 1: Phase L1 .15 - 30MHz

Frequency (MHz)	Meter Reading (dBuV)	Det	101836_Wit h 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)
2.646	20.83	Qp	9.7	.1	30.63	56	-25.37	-	-

Qp - Quasi-Peak detector

14. DYNAMIC FREQUENCY SELECTION

14.1. OVERVIEW

14.1.1. LIMITS

FCC

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

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

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

Table 2: Applicability of DFS requirements during normal operation

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

Additional requirements for devices with multiple bandwidth modes	Master Device or Client with Radar DFS	Client (without DFS)
U-NII Detection Bandwidth and Statistical Performance Check	All BW modes must be tested	Not required
Channel Move Time and Channel Closing Transmission Time	Test using widest BW mode available	Test using the widest BW mode available for the link
All other tests	Any single BW mode	Not required

Note: Frequencies selected for statistical performance check (Section 7.8.4) should include several frequencies within the radar detection bandwidth and frequencies near the edge of the radar detection bandwidth. For 802.11 devices it is suggested to select frequencies in all 20 MHz channel blocks and a null frequency between the bonded 20 MHz channel blocks.

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

Maximum Transmit Power	Value (see notes)
E.I.R.P. $\geq$ 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
<i>Non-occupancy period</i>	30 minutes
<i>Channel Availability Check Time</i>	60 seconds
<i>Channel Move Time</i>	10 seconds (See Note 1)
<i>Channel Closing Transmission Time</i>	200 milliseconds + approx. 60 milliseconds over remaining 10 second period. (See Notes 1 and 2)
<i>U-NII Detection Bandwidth</i>	Minimum 100% of the U- NII 99% transmission power bandwidth. (See Note 3)
Note 1: <i>Channel Move Time</i> and the <i>Channel Closing Transmission Time</i> should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst. Note 2: The <i>Channel Closing Transmission Time</i> is comprised of 200 milliseconds starting at the beginning of the <i>Channel Move Time</i> plus any additional intermittent control signals required to facilitate a <i>Channel</i> 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 <i>U-NII Detection Bandwidth</i> detection test, radar type 0 should be used. For each frequency step the minimum percentage of detection is 90 percent. Measurements are performed with no data traffic.	

Table 5 – Short Pulse Radar Test Waveforms

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

Table 6 – Long Pulse Radar Test Signal

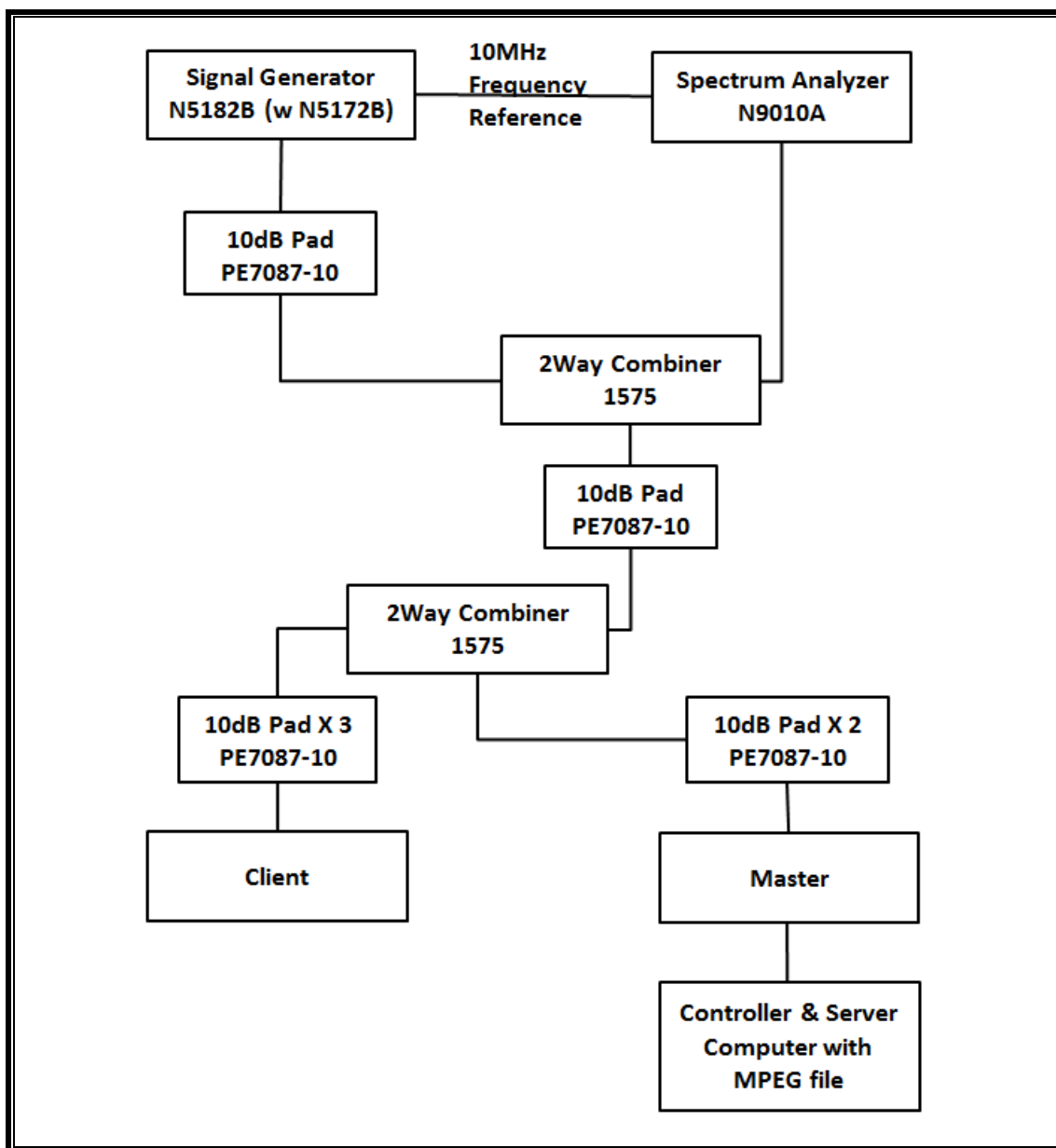
Radar Waveform Type	Pulse Width (μsec)	Chirp Width (MHz)	PRI (μsec)	Pulses per Burst	Number of Bursts	Minimum Percentage of Successful Detection	Minimum Trials
5	50-100	5-20	1000-2000	1-3	8-20	80%	30

Table 7 – Frequency Hopping Radar Test Signal

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

14.1.2. TEST AND MEASUREMENT SYSTEM

CONDUCTED METHOD SYSTEM BLOCK DIAGRAM



SYSTEM OVERVIEW

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

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

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

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

SYSTEM CALIBRATION

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

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

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

ADJUSTMENT OF DISPLAYED TRAFFIC LEVEL

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

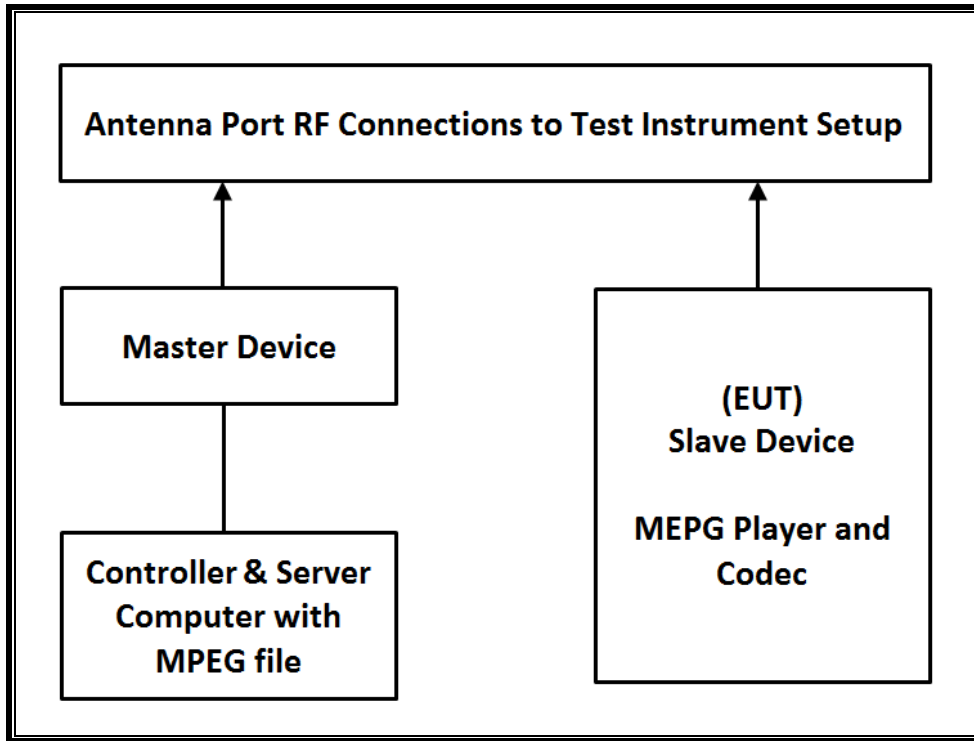
TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST				
Description	Manufacturer	Model	S/N	Next Cal Due
Spectrum Analyzer, 7 GHz	Agilent / HP	N9010A	MY54200580	07-23-25
Vector Signal Generator, 6GHz	Agilent / HP	N5182B	MY53051241	07-24-25
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 12.10 dBm in the 5250-5350 MHz band and 5470-5725 MHz band.

The antenna assembly utilized two antenna.

Gain of ANT1 : -2.28 dBi for UNII 2A and -1.84 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.

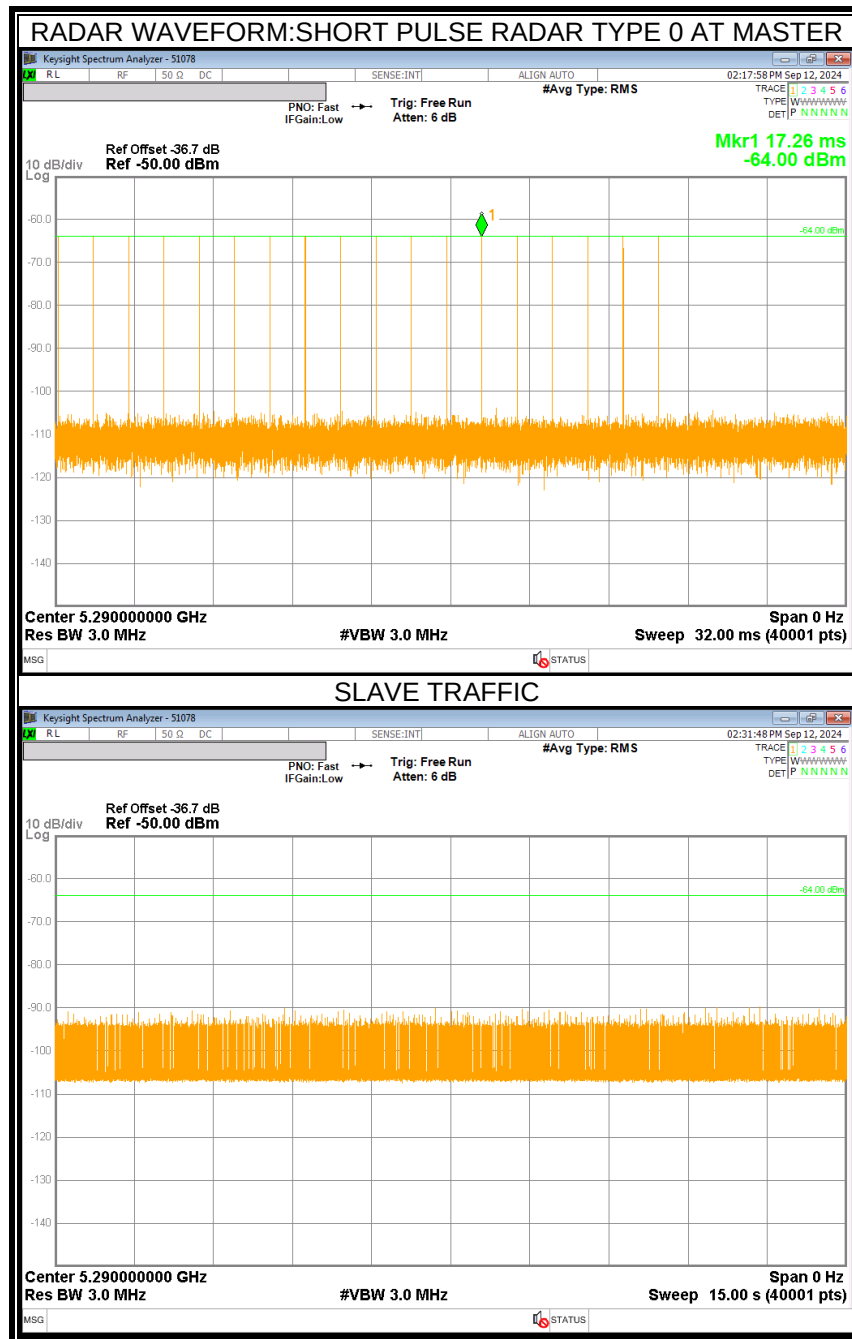
14.2. RESULTS FOR 80 MHz BANDWIDTH (UNII-2A BAND)

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



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

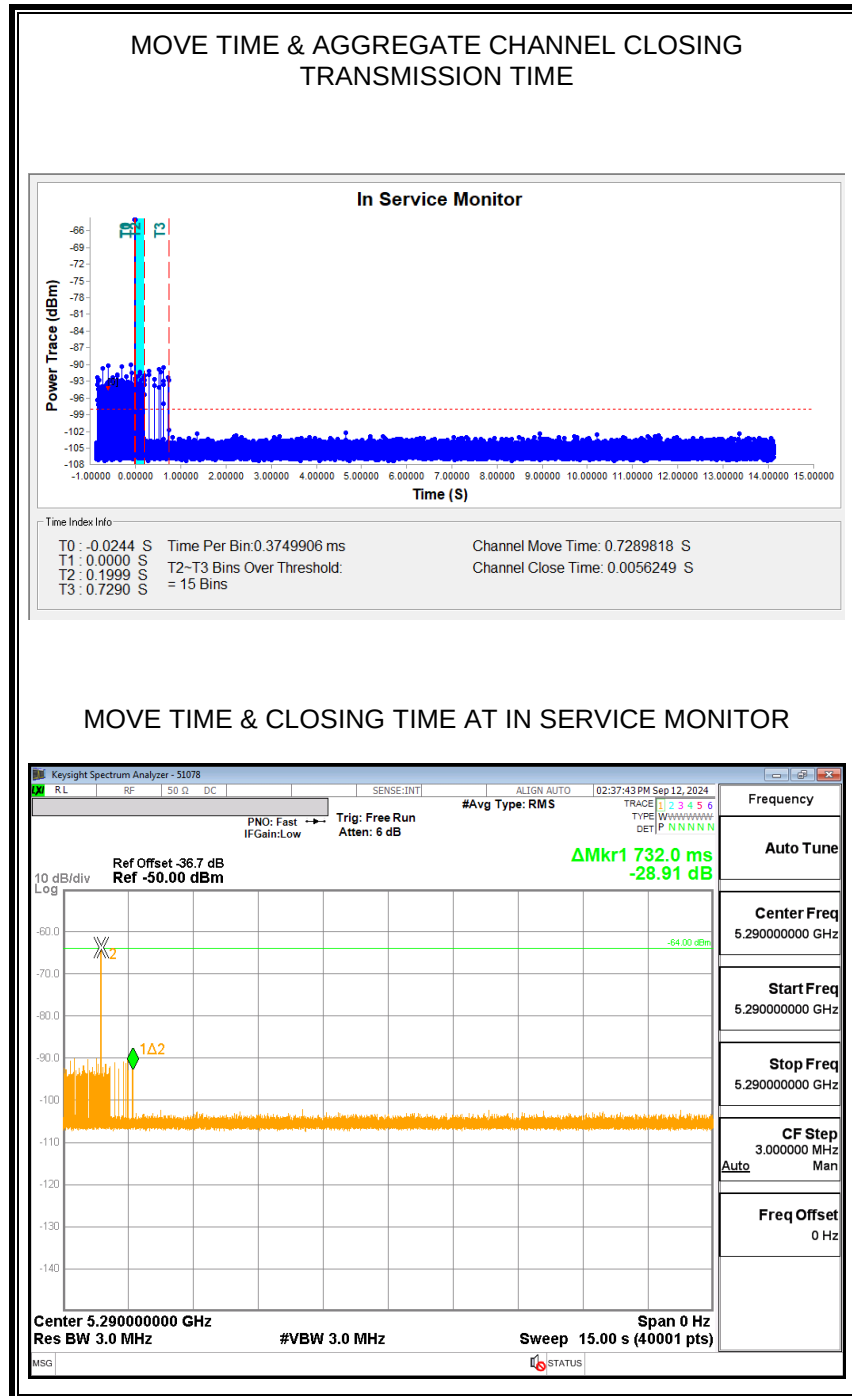
Channel Move Time (sec)	Limit (sec)
0.729	10

Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
5.625	60

MOVE TIME & CHANNEL CLOSING TIME

AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

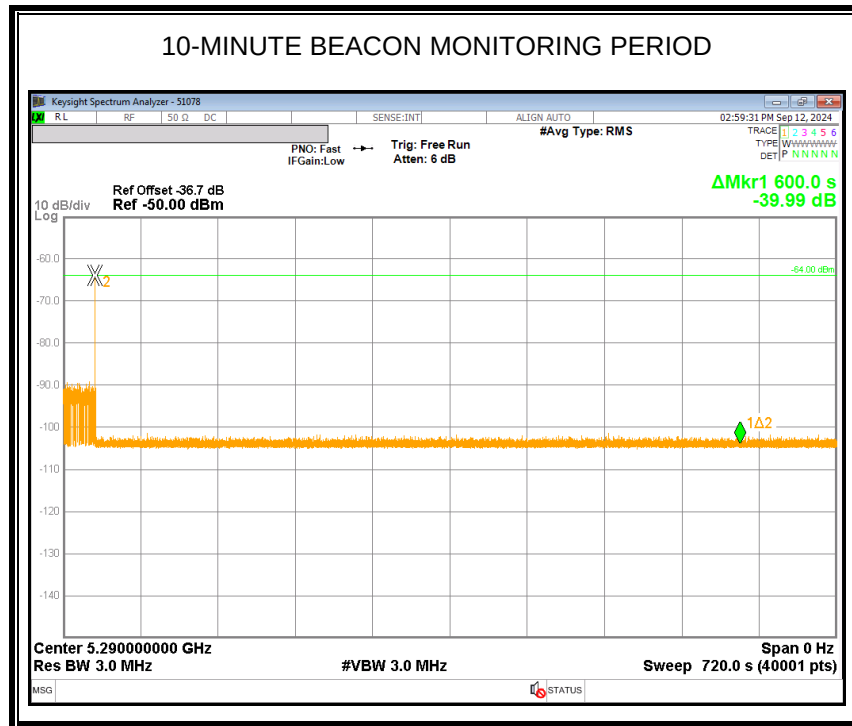
No transmissions are observed during the aggregate monitoring period.



NON-OCCUPANCY PERIOD

RESULTS

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



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



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

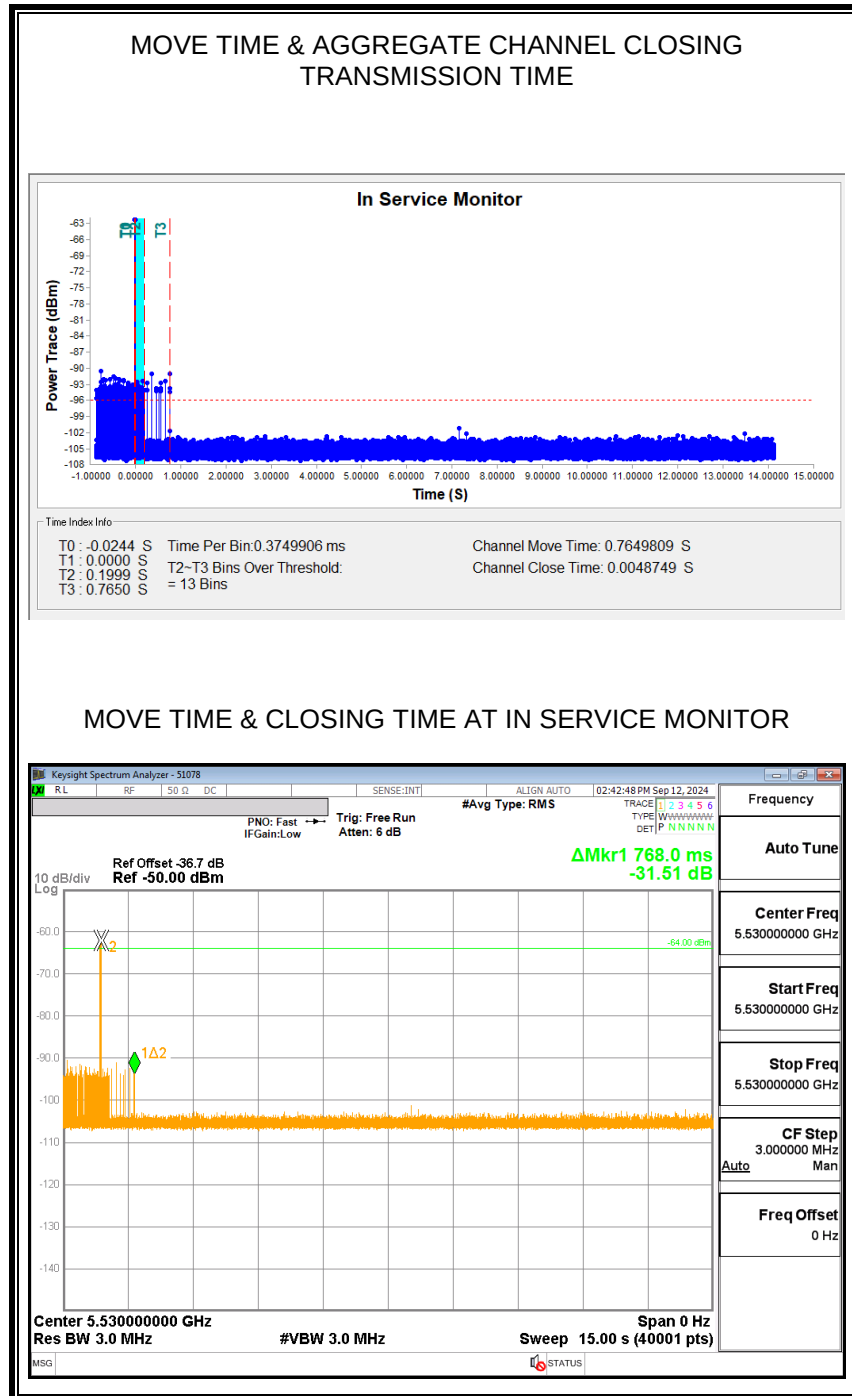
Channel Move Time (sec)	Limit (sec)
0.765	10

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

MOVE TIME & CHANNEL CLOSING TIME

AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

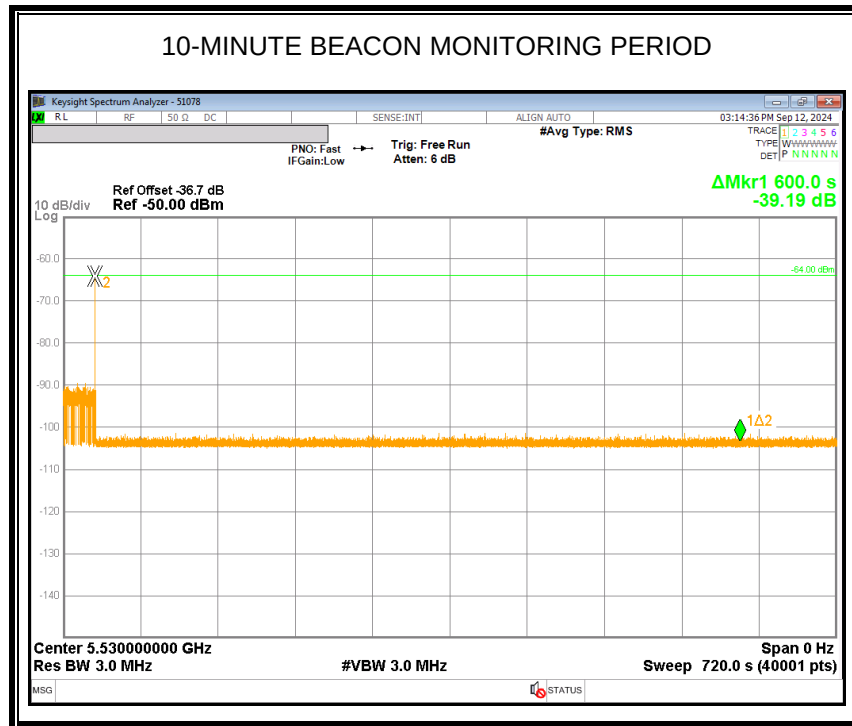
No transmissions are observed during the aggregate monitoring period.



NON-OCCUPANCY PERIOD

RESULTS

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



END OF TEST REPORT