

CO-LOCATION RADIO TEST REPORT

Product : 802.11ax/ac/a/b/g/n 2T2R Wi-Fi USB Module

Model Name : WUBT-281AX [PU]

Series Model : WUBT-281AX [MU], WUBT-281AX [M9W],
WUBT-281AX [P9W]

FCC ID : RYK-WUBT281AX

Test Regulation : FCC 47 CFR PART 15 Subpart C (Section 15.247)
FCC 47 CFR PART 15 Subpart E (Section 15.407)

Received Date : 2026/1/12

Test Date : 2026/01/19 ~ 2026/02/10

Issued Date : 2026/7/28

Applicant : SparkLAN Communications, Inc.
5F, No. 199, Ruihu St., Neihu Dist., Taipei City 114067, Taiwan

Issued By : Underwriters Laboratories Taiwan Co., Ltd.
Building A, B and E, No. 372-7, Sec. 4, Zhongxing Rd.,
Zhudong Township, Hsinchu County, Taiwan



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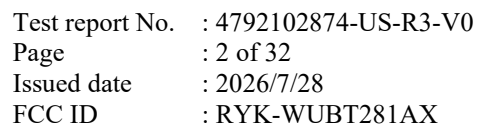
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Doc No: Form-ULID-004737 (DCS:17-EM-F0876) / 7.0



Original Test Report No.: 4792102874-US-R3-V0

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Table of Contents

1. Attestation of Test Results	4
2. Summary of Test Results	5
3. Test Methodology and Reference Procedures.....	6
4. Facilities and Accreditation	6
5. Measurement Uncertainty	7
6. Equipment under Test.....	8
6.1. Description of EUT	8
6.2. Test Condition.....	9
6.3. Description of Available Antennas	10
6.4. Test Mode Applicability and Tested Channel Detail.....	11
7. Test Equipment	12
8. Description of Test Setup	13
9. Test Results	15
9.1. Radiated Spurious Emission	15
9.2. AC Power Line Conducted Emission	29

1. Attestation of Test Results

APPLICANT: SparkLAN Communications, Inc.
5F, No. 199, Ruihu St., Neihu Dist., Taipei City 114067, Taiwan

MANUFACTURER: SparkLAN Communications, Inc.
5F, No. 199, Ruihu St., Neihu Dist., Taipei City 114067, Taiwan

EUT DESCRIPTION: 802.11ax/ac/a/b/g/n 2T2R Wi-Fi USB Module

BRAND: SparkLAN

MODEL: WUBT-281AX [PU]

SERIES MODEL: WUBT-281AX [MU], WUBT-281AX [M9W],
WUBT-281AX [P9W]

SAMPLE STAGE: Engineering Verification Test Sample

DATE of TESTED: 2026/01/19 ~ 2026/02/10

APPLICABLE STANDARDS	
STANDARD	Test Results
FCC 47 CFR PART 15 Subpart C (Section 15.247)	PASS
FCC 47 CFR PART 15 Subpart E (Section 15.407)	PASS

Underwriters Laboratories Taiwan Co., 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 Underwriters Laboratories Taiwan Co., Ltd. based on interpretations and/or observations of test results. 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 Underwriters Laboratories Taiwan Co., Ltd. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Underwriters Laboratories Taiwan Co., 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 NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Prepared By:



Sally Lu
Project Handler

Date : 2026/7/28

Approved and Authorized By:



Kent Liu
Senior Laboratory Engineer

Date : 2026/7/28

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2. Summary of Test Results

Summary of Test Results		
FCC Clause	Test Items	Result
15.205 / 15.209 / 15.247(d) / 15.407(b) (1/2/3/4(i/ii)/9) /15.407(b)(5)(8)	Radiated Spurious Emission	PASS
15.247(d)	Antenna Port Emission	PASS
15.207 15.407(b)(9)	AC Power Conducted Emission	PASS

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3. Test Methodology and Reference Procedures

The tests documented in this report were performed in accordance with 47 CFR FCC Part 2, KDB558074 D01 Meas Guidance v05r02, KDB 789033 D02 General UNII Test Procedure New Rules v02r01, KDB414788 D01 Radiated Test Site v01r01, ANSI C63.10-2020+Cor.1-2023+C63.10a-2024+Errata to C63.10a-2024.

4. Facilities and Accreditation

Test Location	Underwriters Laboratories Taiwan Co., Ltd.
Address	Building A, B and E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan
Accreditation Certificate	Underwriters Laboratories Taiwan Co., Ltd. is accredited by TAF, Laboratory Code 3398.

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5. Measurement Uncertainty

For statement of conformity, Simple acceptance (Section 3.1.4 of IEC Guide 115) was applied as decision rule for measurement in this test report.

The following uncertainties have been calculated to provide a confidence level of 95 % using a coverage factor $k=2$.

Determining compliance based on the results of the compliance measurement, not considering measurement instrumentation uncertainty.

Measurement	Frequency	Uncertainty
Conducted disturbance at mains terminals ports	150kHz ~ 30MHz	3.0 dB
RF Conducted	9 kHz - 40GHz	2.4 dB
Radiated disturbance below 30MHz	9 kHz - 30 MHz	1.9 dB
Radiated disturbance below 1 GHz	30MHz ~ 1GHz	5.6 dB
Radiated disturbance above 1 GHz	1GHz ~ 40GHz	4.6 dB

The EUT support table is constructed of high-density Expandable Polystyrene (EPS) with dimensions of $1\text{ m} \times 1.5\text{ m}$.

The Measurement Uncertainty (MU) report is prepared in accordance with CISPR 16-4-2:2011-06; the potential impact of the setup table material has been evaluated and included as a component of the overall uncertainty value.

6. Equipment under Test

6.1. Description of EUT

Product	802.11ax/ac/a/b/g/n 2T2R Wi-Fi USB Module
Brand Name	SparkLAN
Model Name	WUBT-281AX [PU]
Series Model	WUBT-281AX [MU], WUBT-281AX [M9W], WUBT-281AX [P9W]
Normal Voltage	5Vdc from Host

Operating Frequency	2.4G WiFi: 2412MHz ~ 2462MHz 5G WiFi: 5180 ~ 5240MHz, 5260 ~ 5320MHz, 5500 ~ 5720MHz, 5745 ~ 5825MHz
Sample ID	Conducted Test:9323067
	Radiated Test:9323067

Note:

1. For this report measurement uncertainty, statement of conformity, determining compliance, it is necessary to refer to the original measurement report of EUT.
2. The above EUT information is declared by manufacturer and for more detailed features description, please refer the manufacturer's or user's manual, the laboratory shall not be held responsible.

6.2. Test Condition

Test Item	Test Site No.	Environmental	Input Power	Test Date	Tested by
Radiated Spurious Emission	966-2	22~26°C/ 62~68%RH	5Vdc	2026/01/19~ 2026/02/10	Eric Peng
AC power Line Conducted Emission	SR1	23°C/ 67%RH	120Vac/ 60Hz	2026/02/02	Eric Peng

FCC Test Firm Registration Number: 498077

Sample Calculation:

Radiated Spurious Emission:

- Where relevant, the follow sample calculation is provided:
Result Value (dBuV/m) = Reading Value (dBuV) + Correction Factor (dB/m).
Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) - Preamp Factor (dB).
Example: Result Value (34.5dBuV/m) = Reading Value (40.1dBuV) + Antenna Factor (18.7dB/m) + Cable Loss (4.2dB) - Preamp Factor (28.5dB).

AC power Line Conducted Emission:

- Where relevant, the follow sample calculation is provided:
Result Value (dBuV) = Reading Value (dBuV) + Correction Factor (dB).
Correction Factor (dB) = Insertion loss(dB) + Cable loss(dB).
Example: Result Value (53.7dBuV) = Reading Value (35.1dBuV) + Insertion loss(18.1dB) + Cable loss(0.5dB).

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6.3. Description of Available Antennas

Ant. No.	Transmitter Circuit	Frequency Range	Brand Name	Model Name	Maximum Gain (dBi)	Ant. Type	Connector Type
1	Chain0+1	2.4GHz 5GHz	SparkLAN	AD-103AG	2.02 2.03	Dipole	RP-SMA
2	Chain0+1	2.4GHz 5GHz	SparkLAN	AD-305N	5 5.53	Dipole	RP-SMA
3	Chain0+1	2.4GHz 5GHz	SparkLAN	AD-303N	3.14 3.45	Dipole	RP-SMA
4	Chain0+1	2.4GHz 5GHz	SparkLAN	AD-302N	3.14 2.87	Dipole	RP-SMA
5	Chain0+1	2.4GHz 5GHz	SparkLAN	AD-315N	3 5	Dipole	i-pex(MHF)
6	Chain0	2.4GHz 5GHz	SparkLAN	ANTENNA-L	-13.74 4.86	PCB	N/A
7	Chain1	2.4GHz 5GHz	SparkLAN	ANTENNA-R	-13.33 6.05	PCB	N/A

Note: The above antenna information was provided from customer and for more detailed features description, please refer the manufacturer's specification or user's manual, the laboratory shall not be held responsible.

6.4. Test Mode Applicability and Tested Channel Detail

Simultaneously transmission condition:

Condition	Technology	
1	WLAN (2.4GHz)	WLAN (5GHz)

Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.

7. Test Equipment

Test Equipment List					
Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Expired date
Radiated Spurious Emission					
Spectrum Analyzer	Keysight	N9010A	MY56070818	2025/3/12	2026/3/11
EMI Test Receiver	Rohde & Schwarz	ESR7	101754	2025/12/9	2026/12/8
Loop Antenna	ETS lindgren	6502	00213440	2025/11/14	2026/11/13
Trilog-Broadband Antenna with 5dB Attenuator	Schwarzbeck & EMCI	VULB 9168 & N-6-05	774 & AT-N0538	2025/12/23	2026/12/22
Horn Antenna (1-18 GHz)	Schwarzbeck	BBHA 9120 D	01690	2025/11/18	2026/11/17
Horn Antenna (18-40 GHz)	Schwarzbeck	BBHA 9170	781	2025/12/2	2026/12/1
Preamplifier (30-1000 MHz)	EMCI	EMC330E	980405	2025/5/12	2026/5/11
Preamplifier (1-18 GHz)	EMCI	EMC051835BE	980406	2025/12/26	2026/12/25
Preamplifier (18-40GHz)	EMCI	EMC184040SEE	980426	2025/4/7	2026/4/6
Cables (9k-18 GHz)	Hanyitek	K1K50-UP0264-K1K50-2500	170214-4 & 170425-2	2025/11/21	2026/11/20
Cables (18-40GHz)	Hanyitek	K1K50-UP0264-K1K50-2500	170214-1 & 170214-2	2025/11/21	2026/11/20
AC power Line Conducted Emission					
EMI Test Receiver	Rohde & Schwarz	ESR7	101753	2025/9/18	2026/9/17
Two-Line V-Network	Rohde & Schwarz	ENV216	102136	2025/5/27	2026/5/26
Impuls-Begrenzer Pulse Limiter	Rohde & Schwarz	ESH3-Z2	102219-Qt	2025/8/27	2026/8/26
Cables	TITAN	CFD200	T0732ACFD 20020A300-2	2025/4/21	2026/4/20

UL Software		
Description	Name	Version
Radiated measurement	e3	6.191211 (V6)
AC power Line Conducted Emission	EZ_EMCI	UL-3A1.2

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8. Description of Test Setup

Tx Mode

Support Equipment

ID	Equipment	Brand Name	Model Name	S/N	Remark
A	Laptop	DELL	Latitude E5470	3JFKWF2	Provide by Lab

I/O Cables

ID	Equipment	Brand Name	Model Name	Length (m)	Remark
1	USB Type A Male to Female	i-wiz	US-44	0.8	Provided by Lab

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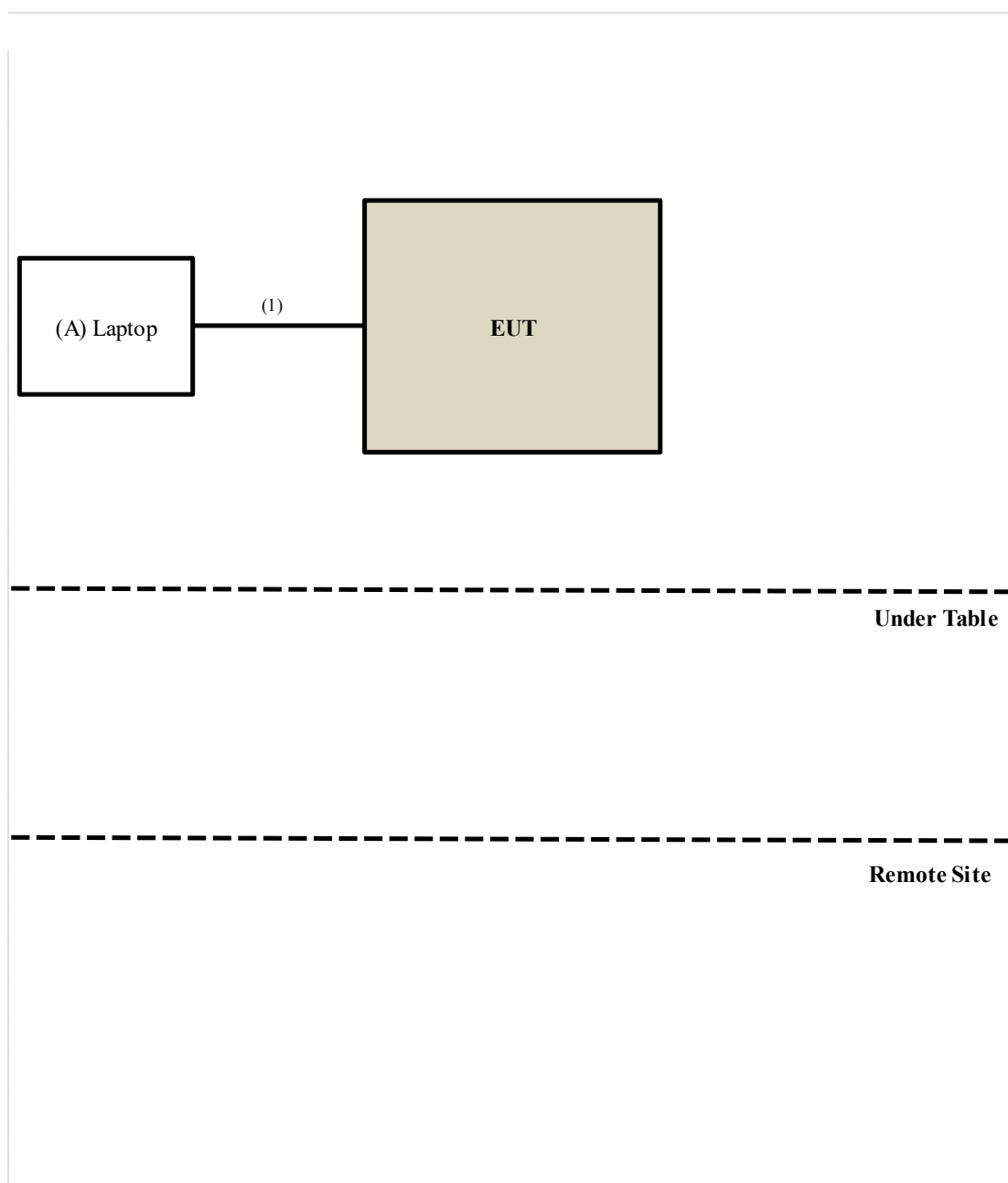
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Test Setup

Controlled using a bespoke application (AX Series MP Toolkit Version mp_v1.0.54) on a test Notebook. The application was used to enable a continuous transmission mode and to select the test channels, data rates, modulation schemes and power setting as required.

Setup Diagram for Test

Tx Mode



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9. Test Results

9.1. Radiated Spurious Emission

Requirements

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20dB below the highest level of the desired power:

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

Note:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

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Limits of unwanted emission out of the restricted bands

Applicable To		Limit	
789033 D02 General UNII Test Procedure New Rules v02r01		Field Strength at 3m	
		PK:74 (dBμV/m)	AV:54 (dBμV/m)
Frequency Band	Applicable To	EIRP Limit	Equivalent Field Strength at 3m
5150~5250 MHz	15.407(b)(1)	PK:-27 (dBm/MHz)	PK:68.2(dBμV/m)
5250~5350 MHz	15.407(b)(2)		
5470~5725 MHz	15.407(b)(3)		
5725~5850 MHz	15.407(b)(4)(i)	PK:-27 (dBm/MHz) ^{*1} PK:10 (dBm/MHz) ^{*2} PK:15.6 (dBm/MHz) ^{*3} PK:27 (dBm/MHz) ^{*4}	PK: 68.2(dBμV/m) ^{*1} PK:105.2 (dBμV/m) ^{*2} PK: 110.8(dBμV/m) ^{*3} PK:122.2 (dBμV/m) ^{*4}
*1 beyond 75 MHz or more above of the band edge. *2 below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above. *3 below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above. *4 from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.			

Note:

The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

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

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Test Procedures

[For 9 kHz ~ 30 MHz]

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. For measurement below 30MHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peak detector is lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

[For above 30 MHz]

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. For measurement below 1GHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peak detector is lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
- f. The test-receiver system was set to peak and average detects function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

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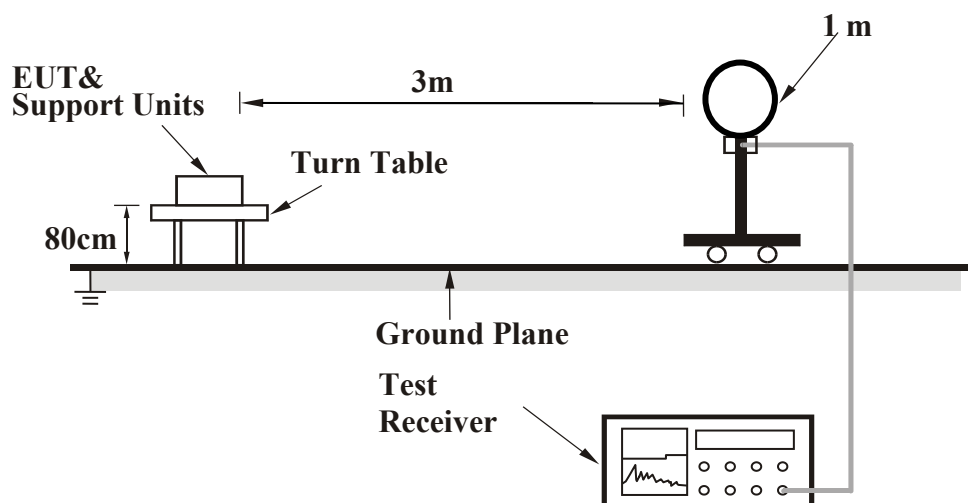
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Note:

- The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
- The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
- The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle $< 98\%$) or 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz, for $1/T$ (Duty cycle $< 98\%$) video bandwidth detail information refer to main report duty cycle test result.
- All modes of operation were investigated (includes all external accessories) and the worst-case emissions are reported, the other emission levels were low against the limit.
- Test data of Result value (dBuV/m) = Reading value (dBuV) + Correction Factor (dB/m).
- Test data of Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
- Test data of Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
- Test data of Notation "@" = Fundamental Frequency
- Test data of Notation "*" = The peak result under 20 dB above and complies with AVG limit, AVG result is deemed to comply with AVG limit.

Test Setup

<Frequency Range 9 kHz ~ 30 MHz>

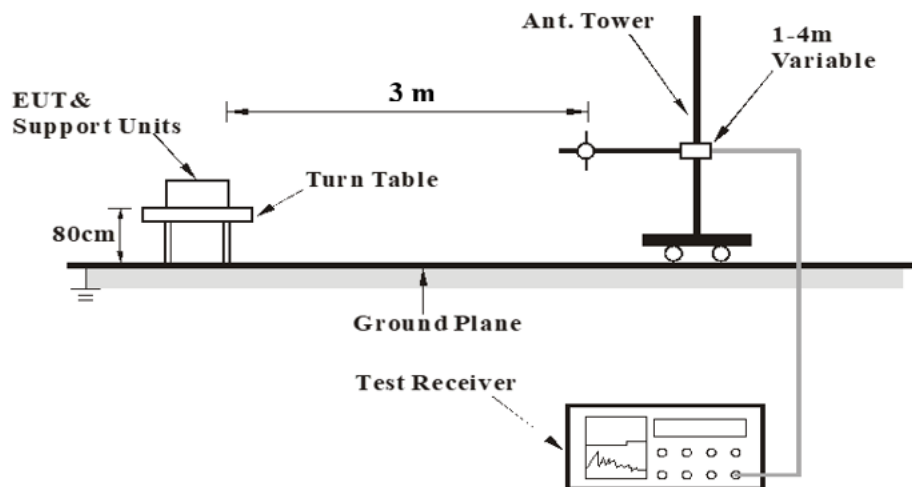


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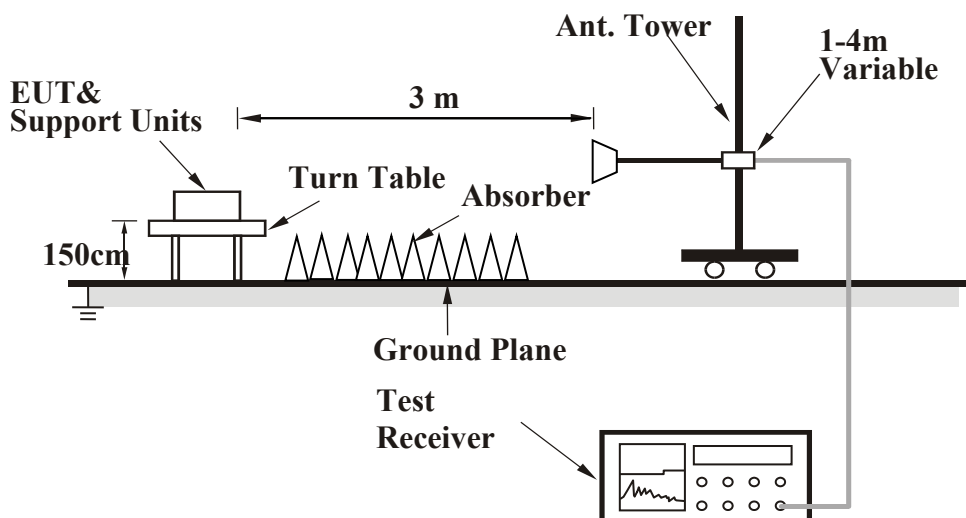
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<Frequency Range 30 MHz ~ 1 GHz >



<Frequency Range above 1 GHz>



For the actual test configuration, please refer to the Setup Configurations.

Test Data

WUBT-281AX [MU]

Above 1 GHz

Mode	2.4G 802.11g & 5G 802.11a	Channel	11g CH6 & 11a CH157
------	---------------------------	---------	---------------------

Polarization	Notation	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
Horizontal		4874	43.74	4.4	48.14	74	-25.86	PK
	*	11570	31.9	21.26	53.16	74	-20.84	PK
		14485	28.59	27.98	56.57	74	-17.43	PK
		14485	20.92	27.98	48.9	54	-5.1	AVG
		14500	27.98	28	55.98	68.2	-12.22	PK
		14500	19.53	28	47.53	54	-6.47	AVG
		15370	29.46	26.29	55.75	74	-18.25	PK
		15370	20.57	26.29	46.86	54	-7.14	AVG
		15520	29.09	25.84	54.93	74	-19.07	PK
		15520	21.66	25.84	47.5	54	-6.5	AVG
		17059	33.95	5.36	39.31	68.2	-28.89	PK
	*	17355	34.94	4.91	39.85	68.2	-28.35	PK
		19496	34.07	3.99	38.06	74	-35.94	PK
		21933	33.28	6.24	39.52	68.2	-28.68	PK
	*	23140	34.37	8.82	43.19	68.2	-25.01	PK
		24370	32.22	11.82	44.04	68.2	-24.16	PK
	*	28925	32.97	11.63	44.6	68.2	-23.6	PK
	*	34710	35.9	12.17	48.07	68.2	-20.13	PK
		39280	38.08	17.31	55.39	74	-18.61	PK
		39280	28.19	17.31	45.5	54	-8.5	AVG
Vertical		4874	46.2	4.4	50.6	74	-23.4	PK
		11570	35.47	21.26	56.73	74	-17.27	PK
		11570	30.32	21.26	51.58	54	-2.42	AVG
		14470	28.55	27.97	56.52	68.2	-11.68	PK
		14470	20	27.97	47.97	54	-6.03	AVG
		14485	29.31	27.98	57.29	74	-16.71	PK
		14485	20.25	27.98	48.23	54	-5.77	AVG
		15385	29.19	26.22	55.41	74	-18.59	PK
		15385	20.17	26.22	46.39	54	-7.61	AVG
		15520	28.51	25.84	54.35	74	-19.65	PK
		15520	20.83	25.84	46.67	54	-7.33	AVG
		17059	33.98	5.36	39.34	68.2	-28.86	PK
	*	17355	34.93	4.91	39.84	68.2	-28.36	PK
		19496	35.43	3.99	39.42	74	-34.58	PK
		21933	33.77	6.24	40.01	68.2	-28.19	PK
	*	23140	33.98	8.82	42.8	68.2	-25.4	PK
		24370	31.64	11.82	43.46	68.2	-24.74	PK
	*	28925	33.7	11.63	45.33	68.2	-22.87	PK
	*	34710	35.74	12.17	47.91	68.2	-20.29	PK
		39616	37.71	17.46	55.17	74	-18.83	PK
		39616	27.91	17.46	45.37	54	-8.63	AVG

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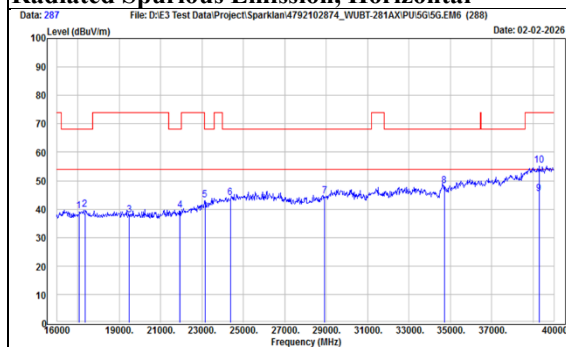
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Doc No: Form-ULID-004737 (DCS:17-EM-F0876) / 7.0

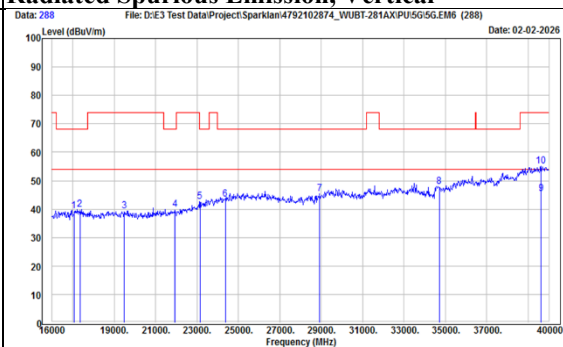
Co-location, 2.4G 802.11g & 5G 802.11a (Ch 11g CH6 & 11a CH157)

Radiated Spurious Emission, Horizontal



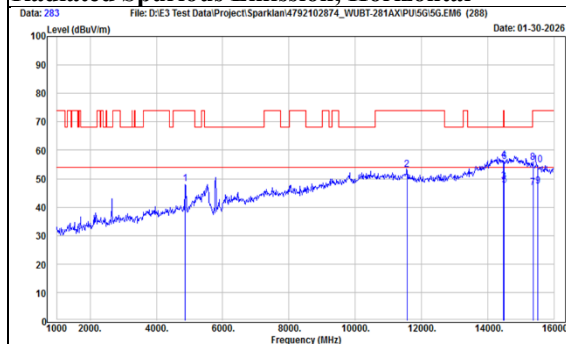
Co-location, 2.4G 802.11g & 5G 802.11a (Ch 11g CH6 & 11a CH157)

Radiated Spurious Emission, Vertical



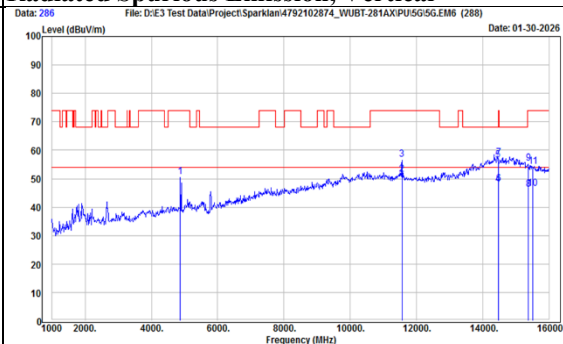
Co-location, 2.4G 802.11g & 5G 802.11a (Ch 11g CH6 & 11a CH157)

Radiated Spurious Emission, Horizontal



Co-location, 2.4G 802.11g & 5G 802.11a (Ch 11g CH6 & 11a CH157)

Radiated Spurious Emission, Vertical



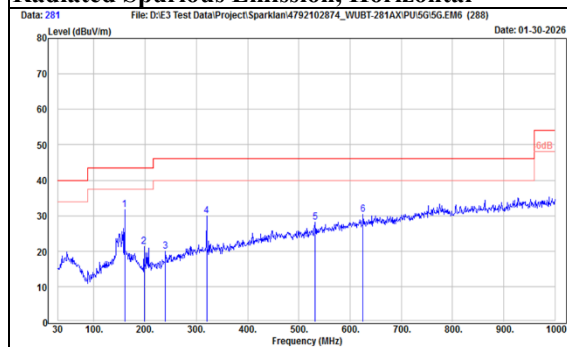
Below 1 GHz

Mode	2.4G 802.11g & 5G 802.11a	Channel	11g CH6 & 11a CH157
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Polarization	Notation @	Frequency (MHz)	Reading (dBUV)	Correct (dB/m)	Result (dBUV/m)	Limit (dBUV/m)	Margin (dB)	Remark
Horizontal		159.98	43.02	-11.38	31.64	43.5	-11.86	PK
		197.81	35.69	-14.39	21.3	43.5	-22.2	PK
		239.52	32.48	-12.48	20	46	-26	PK
		320.03	39.43	-9.49	29.94	46	-16.06	PK
		532.46	32.26	-4.08	28.18	46	-17.82	PK
		625.58	31.97	-1.67	30.3	46	-15.7	PK
Vertical		39.7	38.11	-12.65	25.46	40	-14.54	PK
		159.98	42.04	-11.38	30.66	43.5	-12.84	PK
		320.03	39.06	-9.49	29.57	46	-16.43	PK
		457.77	30.55	-5.48	25.07	46	-20.93	PK
		571.26	32.9	-3.08	29.82	46	-16.18	PK
		776.9	33.01	1.25	34.26	46	-11.74	PK

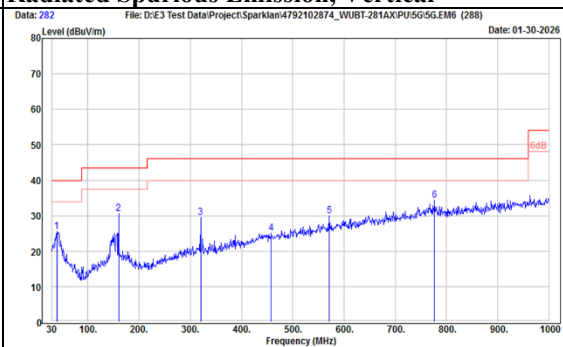
Co-location, 2.4G 802.11g & 5G 802.11a (Ch 11g CH6 & 11a CH157)

Radiated Spurious Emission, Horizontal



Co-location, 2.4G 802.11g & 5G 802.11a (Ch 11g CH6 & 11a CH157)

Radiated Spurious Emission, Vertical



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WUBT-281AX [PU]

Above 1 GHz

Mode	2.4G 802.11g & 5G 802.11a	Channel	11g CH6 & 11a CH157
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Polarization	Notation	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
Horizontal		4874	44.82	4.4	49.22	74	-24.78	PK
	*	11570	31.79	21.26	53.05	74	-20.95	PK
		14485	28.5	27.98	56.48	74	-17.52	PK
		14485	20.84	27.98	48.82	54	-5.18	AVG
		14500	28.03	28	56.03	68.2	-12.17	PK
		14500	19.63	28	47.63	54	-6.37	AVG
		15370	29.4	26.29	55.69	74	-18.31	PK
		15370	20.73	26.29	47.02	54	-6.98	AVG
		15520	29.18	25.84	55.02	74	-18.98	PK
		15520	21.64	25.84	47.48	54	-6.52	AVG
		17059	32.83	5.36	38.19	68.2	-30.01	PK
	*	17355	34.68	4.91	39.59	68.2	-28.61	PK
		19496	34.03	3.99	38.02	74	-35.98	PK
		21933	32.68	6.24	38.92	68.2	-29.28	PK
	*	23140	32.87	8.82	41.69	68.2	-26.51	PK
		24370	32.07	11.82	43.89	68.2	-24.31	PK
	*	28925	32.74	11.63	44.37	68.2	-23.83	PK
	*	34710	35.97	12.17	48.14	68.2	-20.06	PK
		39616	37.72	17.46	55.18	74	-18.82	PK
		39616	27.91	17.46	45.37	54	-8.63	AVG
Vertical		4874	46.13	4.4	50.53	74	-23.47	PK
		11570	35.41	21.26	56.67	74	-17.33	PK
		11570	30.41	21.26	51.67	54	-2.33	AVG
		14470	28.37	27.97	56.34	68.2	-11.86	PK
		14470	20.1	27.97	48.07	54	-5.93	AVG
		14485	29.35	27.98	57.33	74	-16.67	PK
		14485	20.14	27.98	48.12	54	-5.88	AVG
		15385	29.02	26.22	55.24	74	-18.76	PK
		15385	20.19	26.22	46.41	54	-7.59	AVG
		15520	28.33	25.84	54.17	74	-19.83	PK
		15520	20.7	25.84	46.54	54	-7.46	AVG
		17059	34.09	5.36	39.45	68.2	-28.75	PK
	*	17355	34.27	4.91	39.18	68.2	-29.02	PK
		19496	34.77	3.99	38.76	74	-35.24	PK
		21933	32.02	6.24	38.26	68.2	-29.94	PK
	*	23140	33.37	8.82	42.19	68.2	-26.01	PK
		24370	30.78	11.82	42.6	68.2	-25.6	PK
	*	28925	33.59	11.63	45.22	68.2	-22.98	PK
	*	34710	35.42	12.17	47.59	68.2	-20.61	PK
		39616	37.62	17.46	55.08	74	-18.92	PK
		39616	27.71	17.46	45.17	54	-8.83	AVG

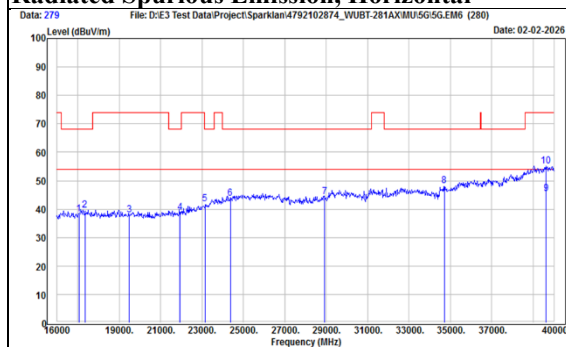
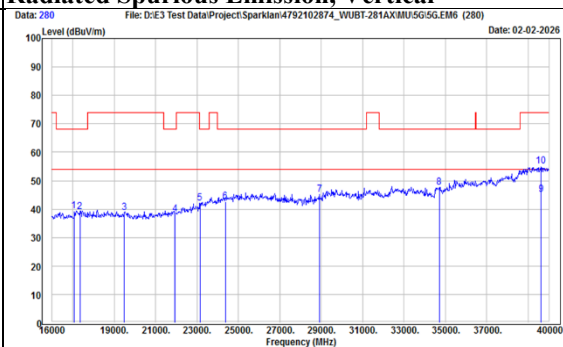
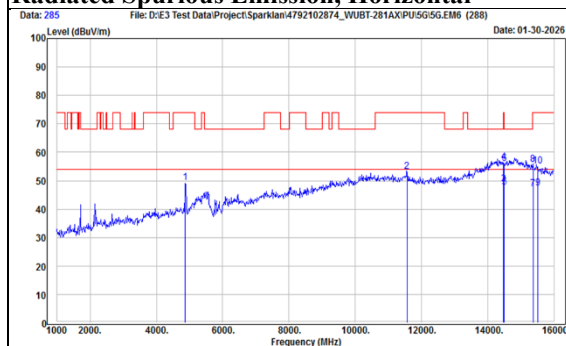
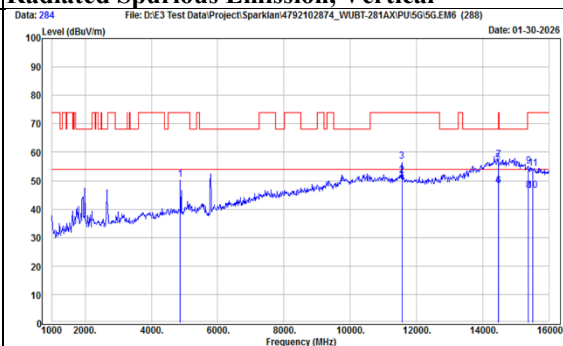
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Co-location, 2.4G 802.11g & 5G 802.11a (11g CH6 & 11a CH157)
Radiated Spurious Emission, Horizontal

Co-location, 2.4G 802.11g & 5G 802.11a (11g CH6 & 11a CH157)
Radiated Spurious Emission, Vertical

Co-location, 2.4G 802.11g & 5G 802.11a (11g CH6 & 11a CH157)
Radiated Spurious Emission, Horizontal

Co-location, 2.4G 802.11g & 5G 802.11a (11g CH6 & 11a CH157)
Radiated Spurious Emission, Vertical


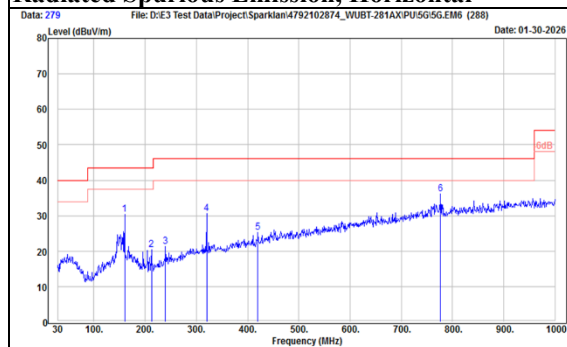
Below 1 GHz

Mode	2.4G 802.11g & 5G 802.11a	Channel	11g CH6 & 11a CH157
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Polarization	Notation @	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
Horizontal		159.98	41.83	-11.38	30.45	43.5	-13.05	PK
		212.36	34.48	-14.19	20.29	43.5	-23.21	PK
		239.52	33.71	-12.48	21.23	46	-24.77	PK
		320.03	40.09	-9.49	30.6	46	-15.4	PK
		419.94	32.05	-6.71	25.34	46	-20.66	PK
		776.9	34.88	1.25	36.13	46	-9.87	PK
Vertical		39.7	37.8	-12.65	25.15	40	-14.85	PK
		159.98	42.08	-11.38	30.7	43.5	-12.8	PK
		320.03	40.67	-9.49	31.18	46	-14.82	PK
		452.92	32.21	-5.58	26.63	46	-19.37	PK
		649.83	32.16	-1.13	31.03	46	-14.97	PK
		776.9	35.32	1.25	36.57	46	-9.43	PK

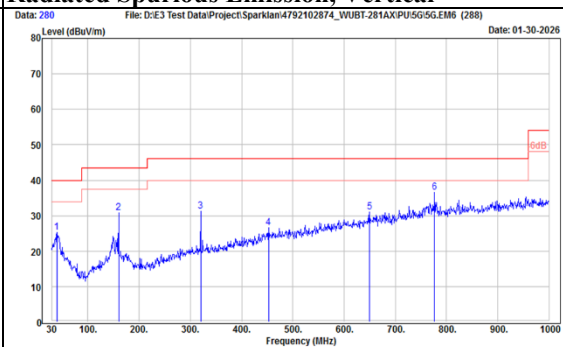
Co-location, 2.4G 802.11g & 5G 802.11a (11g CH6 & 11a CH157)

Radiated Spurious Emission, Horizontal



Co-location, 2.4G 802.11g & 5G 802.11a (11g CH6 & 11a CH157)

Radiated Spurious Emission, Vertical



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9 kHz ~ 30 MHz Data:

For 9 kHz to 30 MHz radiated emission have performed all modes of operation were investigated. The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

No non-compliance noted:

KDB 414788 D01 OATS and Chamber Correlation Justification

- Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.

- OATs and chamber correlation testing had been performed and chamber measured test results is the worst case test result.

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

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9.2. Antenna Port Emission

Requirements

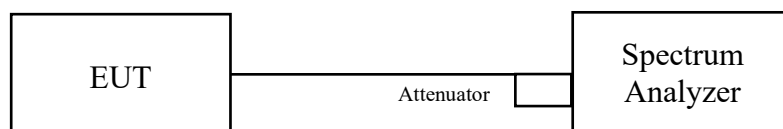
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b) (3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. And all emissions which fall in the restricted bands must comply with the radiated emission limits following section 9.1 limit.

Test procedure

Measurement Procedure REF

1. Set the RBW = 100 kHz.
2. Set the VBW $\geq$ 300 kHz.
3. Set the span from 30MHz to 40GHz
4. Detector = peak.
5. Sweep time = auto couple.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.
8. Use the peak marker function to determine the maximum power level.

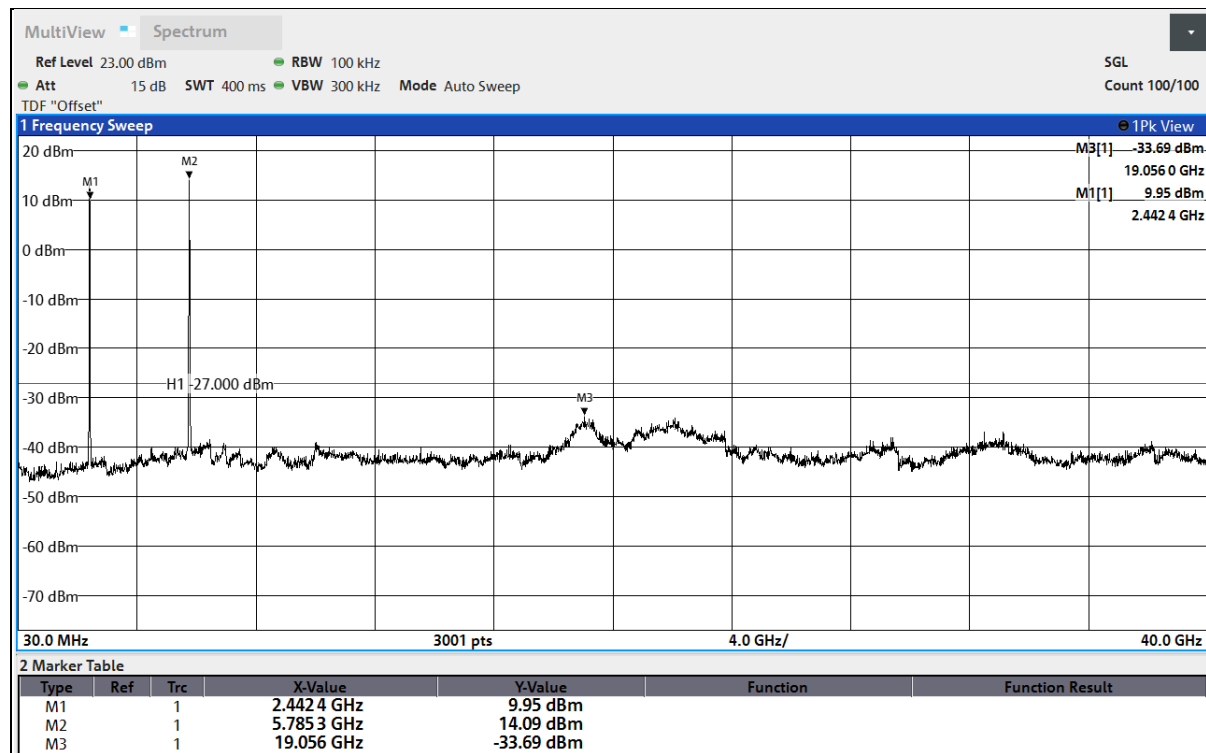
Test Setup



The loss between RF output port of the EUT and the input port of the Spectrum Analyzer has been taken into consideration.

Test Data

Mode	Co-location_TX2437&5785	Channel	11g CH6 & 11a CH157
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9.3. AC Power Line Conducted Emission

Requirements

Frequency (MHz)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30	60	50

Note:

1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

Test Procedures

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.
2. All modes of operation were investigated (includes all external accessories) and the worst-case emissions are reported, the other emission levels were low against the limit.
3. Test data of Result value (dBuV) = Reading value (dBuV) + Correction Factor (dB).
4. Test data of Margin(dB) = Result value (dBuV) - Limit value (dBuV).
5. Test data of Correction Factor (dB) = Insertion loss(dB) + Cable loss(dB).

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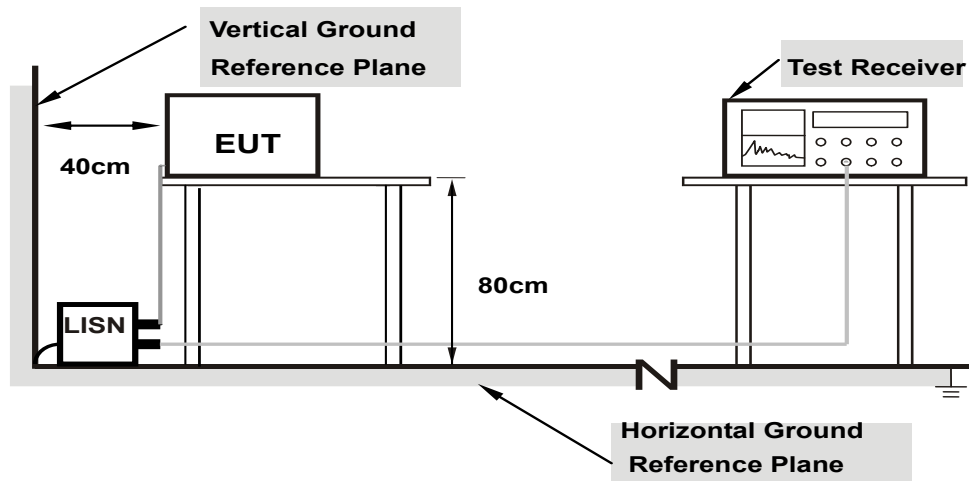
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Test Setup

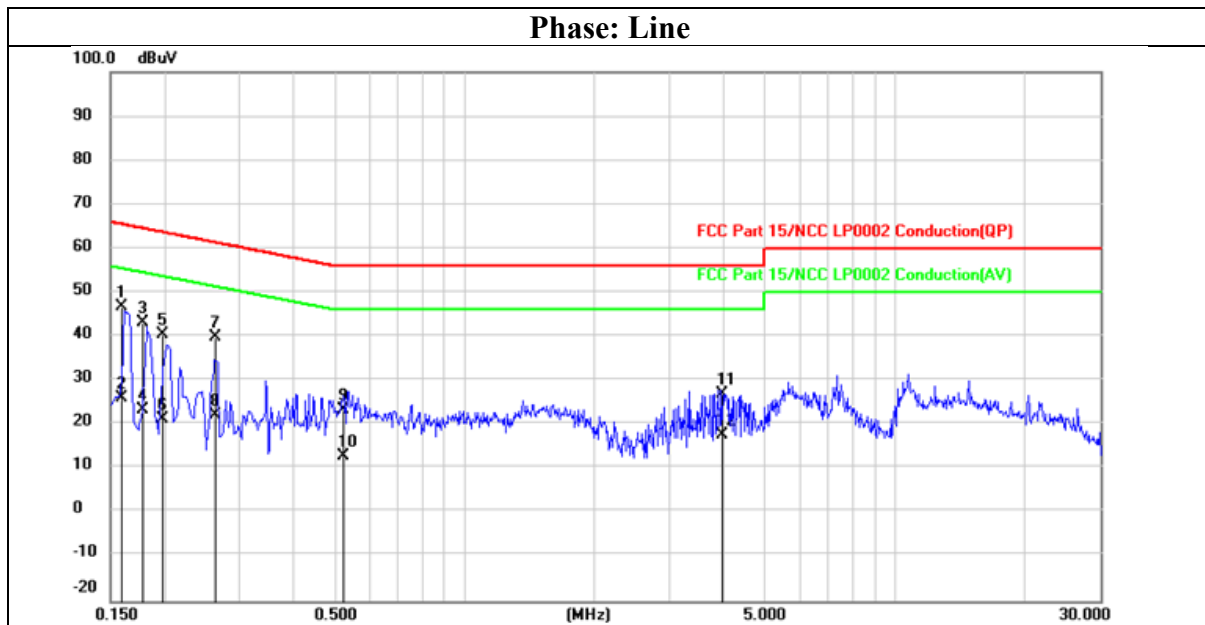


Note: 1.Support units were connected to second LISN.

For the actual test configuration, please refer to the Setup Configurations.

Test Data

Mode	Co-location TX2437&5785	Channel	11g CH6 & 11a CH157
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No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1586	36.89	9.95	46.84	65.54	-18.70	QP
2	0.1586	16.23	9.95	26.18	55.54	-29.36	AVG
3	0.1782	33.10	9.95	43.05	64.57	-21.52	QP
4	0.1782	13.41	9.95	23.36	54.57	-31.21	AVG
5	0.1975	30.59	9.95	40.54	63.72	-23.18	QP
6	0.1975	11.24	9.95	21.19	53.72	-32.53	AVG
7	0.2632	30.03	9.96	39.99	61.33	-21.34	QP
8	0.2632	12.21	9.96	22.17	51.33	-29.16	AVG
9	0.5218	13.28	9.98	23.26	56.00	-32.74	QP
10	0.5218	2.82	9.98	12.80	46.00	-33.20	AVG
11	3.9479	16.83	10.16	26.99	56.00	-29.01	QP
12	3.9479	7.48	10.16	17.64	46.00	-28.36	AVG

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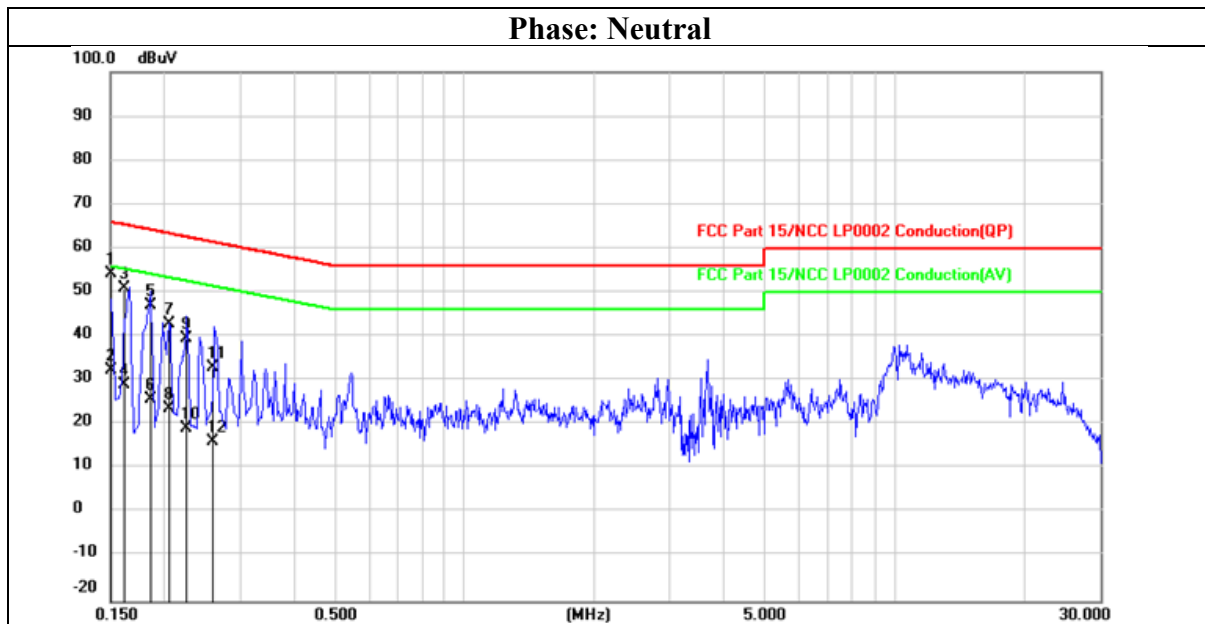
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Mode	Co-location TX2437&5785	Channel	11g CH6 & 11a CH157
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No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1508	44.22	9.94	54.16	65.96	-11.80	QP
2	0.1508	22.27	9.94	32.21	55.96	-23.75	AVG
3	0.1620	40.92	9.94	50.86	65.36	-14.50	QP
4	0.1620	19.07	9.94	29.01	55.36	-26.35	AVG
5	0.1850	37.07	9.93	47.00	64.26	-17.26	QP
6	0.1850	15.83	9.93	25.76	54.26	-28.50	AVG
7	0.2057	32.77	9.93	42.70	63.38	-20.68	QP
8	0.2057	13.71	9.93	23.64	53.38	-29.74	AVG
9	0.2250	29.70	9.93	39.63	62.63	-23.00	QP
10	0.2250	9.17	9.93	19.10	52.63	-33.53	AVG
11	0.2583	23.16	9.94	33.10	61.49	-28.39	QP
12	0.2583	6.08	9.94	16.02	51.49	-35.47	AVG

END OF REPORT

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