FCC RF Test Report

APPLICANT	:	Quectel Wireless Solutions Co., Ltd.
EQUIPMENT	:	Smart Module
BRAND NAME	:	Quectel
MODEL NAME	:	SG560D-WF
FCC ID	:	XMR2023SG560DWF
STANDARD	:	FCC Part 15 Subpart C §15.247
CLASSIFICATION	:	(DTS) Digital Transmission System
TEST DATE(S)	:	Sep. 14, 2024 ~ Sep. 30, 2024

We, Sporton International Inc. (Shenzhen), would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

This report contains data that were produced under subcontract by Sporton International Inc. (Kunshan)

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. (Shenzhen), the test report shall not be reproduced except in full.

Jason Jia

Approved by: Jason Jia

Sporton International Inc. (ShenZhen)

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People's Republic of China

TABLE OF CONTENTS

REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR482209C	Rev. 01	Initial issue of report	Oct. 23, 2024

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.247(b)	Power Output Measurement	≤ 30dBm	Pass	-
3.2	15.247(d)	Radiated Band Edges and Radiated Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 4.09 dB at 287.05 MHz
3.3	15.203 & 15.247(b)	Antenna Requirement	15.203 & 15.247(b)	Pass	-

Remark : This is a variant report, the change note could be referred to the Class II Permissive Change letter which is exhibit separately. According to the differences, only the related test cases were verified from original test report (Report Number PD20230213RF03).

Conformity Assessment Condition:
1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacturer who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account. 2. The measurement uncertainty please refer to each test result in the section “Measurement Uncertainty”
Disclaimer:
The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.

1 General Description

1.1 Applicant

Quectel Wireless Solutions Co., Ltd.
Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai 200233, China

1.2 Manufacturer

Quectel Wireless Solutions Co., Ltd.
Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai 200233, China

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Smart Module
Brand Name	Quectel
Model Name	SG560D-WF
FCC ID	XMR2023SG560DWF
SN Code	Conducted: D1C24CG10000191 Conduction: D1C24CG10000046 Radiation: 6d896798
HW Version	R2.0
SW Version	SG560DWFPBR03A01
EUT Stage	Identical Prototype

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx/Rx Channel Frequency Range	2412 MHz ~ 2462 MHz
Maximum (Peak) Output Power to antenna	**<MIMO Ant1 + Ant2>** 802.11b : 21.78 dBm (0.1507 W) 802.11g : 27.49 dBm (0.5610 W) 802.11n HT20 : 26.47 dBm (0.4436 W) 802.11n HT40 : 25.95 dBm (0.3936 W) 802.11ax HE20 : 26.54 dBm (0.4508 W) 802.11ax HE40 : 26.02 dBm (0.3999 W)
Antenna Type / Gain	**<Ant 1> :** Dipole Antenna type with gain 0.2 dBi **<Ant 2> :** Dipole Antenna type with gain 0.2 dBi
Type of Modulation	802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ax : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM / 1024QAM)

Note:

1. The device supports WLAN MIMO CDD mode.
2. For WLAN SISO & MIMO mode, the whole testing has assessed only MIMO mode by referring to the higher normal output power.

1.5 Modification of EUT

No modifications are made to the EUT during all test items.

1.6 Testing Location

Sporton International Inc. (Kunshan) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Test Firm	Sporton International Inc. (Kunshan)		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158		
Test Site No.	**Sporton Site No.**	**FCC Designation No.**	**FCC Test Firm Registration No.**
	TH01-KS	CN1257	314309

Note : Test data subcontracted: conducted test case in section 3.1 of this report

Sporton International Inc. (ShenZhen) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.01.

Test Firm	Sporton International Inc. (ShenZhen)		
Test Site Location	101, 1st Floor, Block B, Building 1, No. 2, Tengfeng 4th Road, Fenghuang Community, Fuyong Street, Baoan District, Shenzhen City, Guangdong Province 518103 People's Republic of China TEL: +86-755-86066985		
Test Site No.	**Sporton Site No.**	**FCC Designation No.**	**FCC Test Firm Registration No.**
	03CH04-SZ	CN1256	421272

1.7 Test Software

Item	Site	Manufacturer	Name	Version
1.	TH01-KS	Tonscend	JS1120-3 test system China_210602	3.3.10
2.	03CH04-SZ	AUDIX	E3	6.2009-8-24

1.8 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- 47 CFR Part 15 Subpart C §15.247
- FCC KDB 558074 D01 15.247 Meas Guidance v05r02
- FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- ANSI C63.10-2013

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

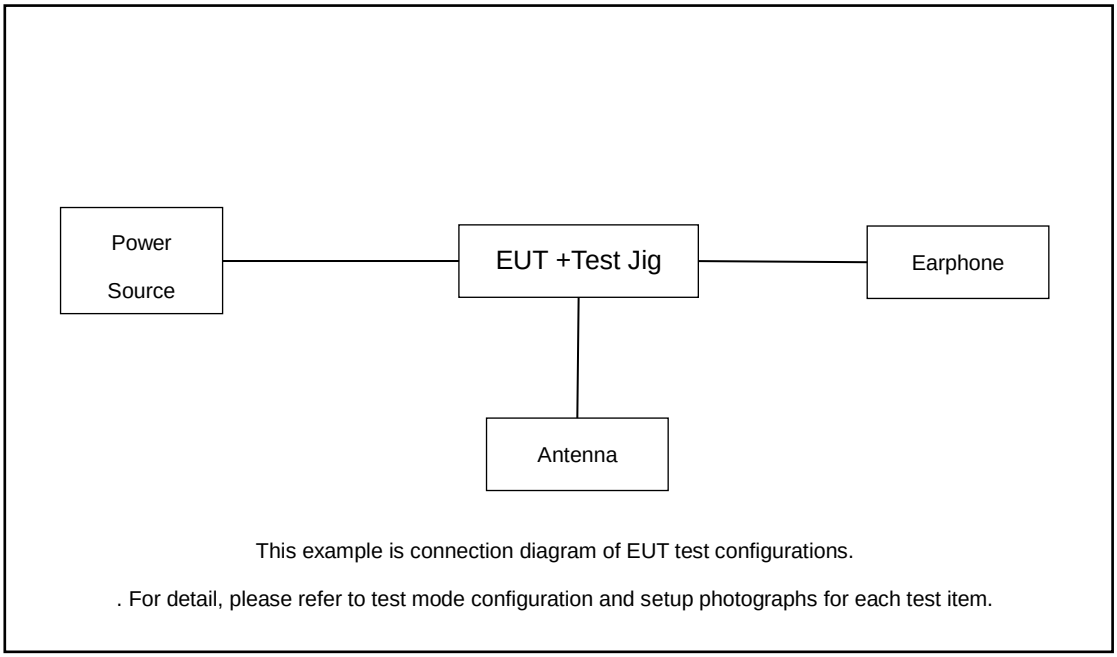
The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (Y plane) were recorded in this report.

2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
2400-2483.5 MHz	1	2412	7	2442
	2	2417	8	2447
	3	2422	9	2452
	4	2427	10	2457
	5	2432	11	2462
	6	2437	-	-

2.2 Connection Diagram of Test System

Radiated Emission:



This example is connection diagram of EUT test configurations.

. For detail, please refer to test mode configuration and setup photographs for each test item.

2.3 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Test Jig	N/A	N/A	N/A	N/A	N/A
2.	Antenna	N/A	N/A	N/A	N/A	N/A
3.	Earphone	N/A	N/A	N/A	N/A	N/A

2.4 EUT Operation Test Setup

For WLAN RF test items, an engineering test program was provided and enabled to make EUT continuous transmit.

3 Test Result

3.1 Output Power Measurement

3.1.1 Limit of Output Power

For systems using digital modulation in the 2400-2483.5MHz, the limit for peak output power is 30dBm. If transmitting antenna with directional gain greater than 6dBi is used, the peak output power from the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the antenna exceeds 6 dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

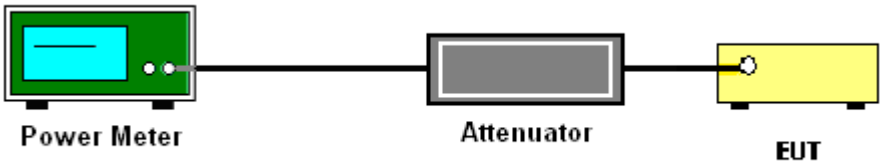
3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.1.3 Test Procedures

1. The testing follows the Measurement Procedure of ANSI C63.10-2013 clause 11.9.1.3 PKPM1 Peak power meter or ANSI C63.10-2013 clause 11.9.2.3.1 Method AVGPM method.
2. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Measure the conducted output power and record the results in the test report.
5. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

3.1.4 Test Setup



3.1.5 Test Result of Peak Output Power

2.4GHz Band MIMO																
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak Conducted Power (dBm)			Conducted Power Limit (dBm)		DG (dBi)		EIRP Power (dBm)		EIRP Power Limit (dBm)		Pass /Fail
					Ant1	Ant2	SUM	Ant1	Ant2	Ant1	Ant2	Ant1	Ant2	Ant1	Ant2	
11b	1Mbps	2	1	2412	18.46	19.06	21.78	30.00		0.20		21.98		36.00		Pass
11b	1Mbps	2	6	2437	18.54	18.63	21.60	30.00		0.20		21.80		36.00		Pass
11b	1Mbps	2	11	2462	18.41	18.92	21.68	30.00		0.20		21.88		36.00		Pass
11g	6Mbps	2	1	2412	24.38	24.41	27.41	30.00		0.20		27.61		36.00		Pass
11g	6Mbps	2	6	2437	24.76	24.18	27.49	30.00		0.20		27.69		36.00		Pass
11g	6Mbps	2	11	2462	24.12	24.62	27.39	30.00		0.20		27.59		36.00		Pass
HT20	MCS0	2	1	2412	22.99	23.11	26.06	30.00		0.20		26.26		36.00		Pass
HT20	MCS0	2	6	2437	23.62	23.30	26.47	30.00		0.20		26.67		36.00		Pass
HT20	MCS0	2	11	2462	23.18	23.13	26.17	30.00		0.20		26.37		36.00		Pass
HT40	MCS0	2	3	2422	22.92	22.91	25.93	30.00		0.20		26.13		36.00		Pass
HT40	MCS0	2	6	2437	23.03	22.85	25.95	30.00		0.20		26.15		36.00		Pass
HT40	MCS0	2	9	2452	22.88	22.74	25.82	30.00		0.20		26.02		36.00		Pass

2.4GHz Band MIMO																	
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	RU Config.	Peak Conducted Power (dBm)			Conducted Power Limit (dBm)		DG (dBi)		EIRP Power (dBm)		EIRP Power Limit (dBm)		Pass /Fail
						Ant1	Ant2	SUM	Ant1	Ant2	Ant1	Ant2	Ant1	Ant2	Ant1	Ant2	
HE20	MCS0	2	1	2412	Full	23.06	23.14	26.11	30.00		0.20		26.31		36.00		Pass
HE20	MCS0	2	6	2437	Full	23.69	23.36	26.54	30.00		0.20		26.74		36.00		Pass
HE20	MCS0	2	11	2462	Full	23.34	23.19	26.28	30.00		0.20		26.48		36.00		Pass
HE40	MCS0	2	3	2422	Full	23.01	22.94	25.99	30.00		0.20		26.19		36.00		Pass
HE40	MCS0	2	6	2437	Full	23.09	22.93	26.02	30.00		0.20		26.22		36.00		Pass
HE40	MCS0	2	9	2452	Full	23.06	22.83	25.96	30.00		0.20		26.16		36.00		Pass

3.1.6 Test Result of Average Output Power (Reporting Only)

2.4GHz Band MIMO																			
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)		Average Conducted Power with duty factor (dBm)			Conducted Power Limit (dBm)		DG (dBi)		EIRP Power (dBm)		EIRP Power Limit (dBm)		Pass /Fail	Power Setting
					Ant1	Ant2	Ant1	Ant2	SUM	Ant1	Ant2	Ant1	Ant2	Ant1	Ant2	Ant1	Ant2		
11b	1Mbps	2	1	2412	0.07	0.09	15.91	16.58	19.27	30.00		0.20		19.47		36.00		Pass	16.50
11b	1Mbps	2	6	2437	0.07	0.09	16.15	16.18	19.18	30.00		0.20		19.38		36.00		Pass	16.50
11b	1Mbps	2	11	2462	0.07	0.09	15.83	16.41	19.14	30.00		0.20		19.34		36.00		Pass	16.50
11g	6Mbps	2	1	2412	0.03	0.03	16.52	16.57	19.56	30.00		0.20		19.76		36.00		Pass	16.50
11g	6Mbps	2	6	2437	0.03	0.03	16.77	16.32	19.56	30.00		0.20		19.76		36.00		Pass	16.50
11g	6Mbps	2	11	2462	0.03	0.03	16.44	16.56	19.51	30.00		0.20		19.71		36.00		Pass	16.50
HT20	MCS0	2	1	2412	0.00	0.00	13.91	13.89	16.91	30.00		0.20		17.11		36.00		Pass	14.50
HT20	MCS0	2	6	2437	0.00	0.00	14.70	14.20	17.47	30.00		0.20		17.67		36.00		Pass	15.00
HT20	MCS0	2	11	2462	0.00	0.00	14.62	14.55	17.60	30.00		0.20		17.80		36.00		Pass	15.00
HT40	MCS0	2	3	2422	0.00	0.00	14.77	14.69	17.74	30.00		0.20		17.94		36.00		Pass	15.00
HT40	MCS0	2	6	2437	0.00	0.00	14.95	14.76	17.87	30.00		0.20		18.07		36.00		Pass	15.00
HT40	MCS0	2	9	2452	0.00	0.00	14.85	14.82	17.85	30.00		0.20		18.05		36.00		Pass	15.00

2.4GHz Band MIMO																				
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	RU Config.	Duty Factor (dB)		Average Conducted Power with duty factor (dBm)			Conducted Power Limit (dBm)		DG (dBi)		EIRP Power (dBm)		EIRP Power Limit (dBm)		Pass /Fail	Power Setting
						Ant1	Ant2	Ant1	Ant2	SUM	Ant1	Ant2	Ant1	Ant2	Ant1	Ant2	Ant1	Ant2		
HE20	MCS0	2	1	2412	Full	0.00	0.00	13.95	13.93	16.95	30.00		0.20		17.15		36.00		Pass	14.50
HE20	MCS0	2	6	2437	Full	0.00	0.00	14.81	14.23	17.54	30.00		0.20		17.74		36.00		Pass	15.00
HE20	MCS0	2	11	2462	Full	0.00	0.00	14.64	14.59	17.63	30.00		0.20		17.83		36.00		Pass	15.00
HE40	MCS0	2	3	2422	Full	0.00	0.00	14.85	14.76	17.82	30.00		0.20		18.02		36.00		Pass	15.00
HE40	MCS0	2	6	2437	Full	0.00	0.00	15.02	14.83	17.94	30.00		0.20		18.14		36.00		Pass	15.00
HE40	MCS0	2	9	2452	Full	0.00	0.00	14.92	14.88	17.91	30.00		0.20		18.11		36.00		Pass	15.00

3.2 Radiated Band Edges and Spurious Emission Measurement

3.2.1 Limit of Radiated band edge and Spurious Emission Measurement

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. If the output power of this device was measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB. In addition, radiated emissions which fall in the restricted bands must also comply with the limits as below.

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

3.2.2 Measuring Instruments

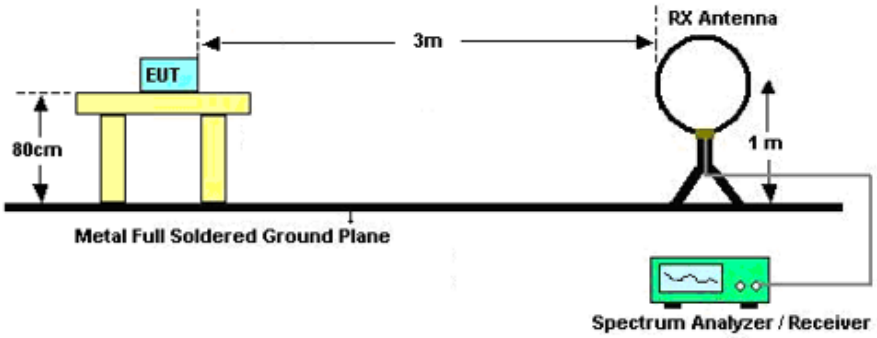
The measuring equipment is listed in the section 4 of this test report.

3.2.3 Test Procedures

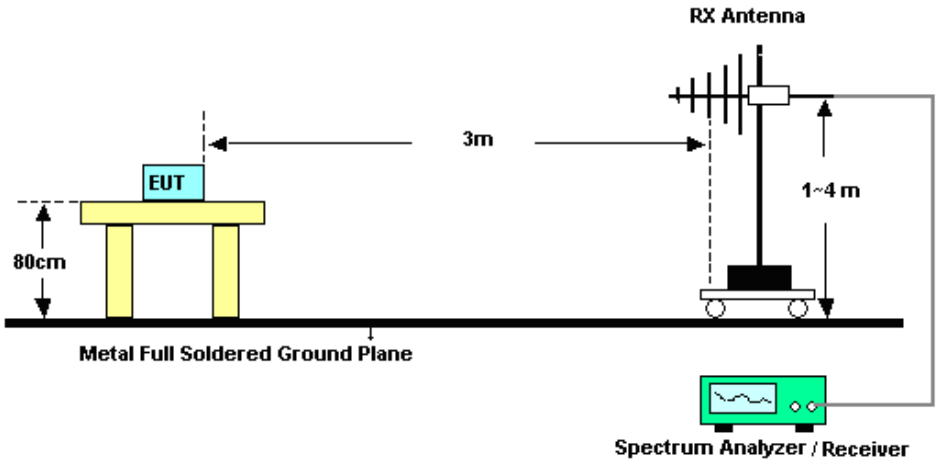
1. The testing follows ANSI C63.10-2013 clause 11.11 & 11.12
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
6. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than peak limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
8. Use the following spectrum analyzer settings:
   (1) Span shall wide enough to fully capture the emission being measured;
   (2) Set RBW=100 kHz for f < 1 GHz; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold;
   (3) Set RBW = 1 MHz, VBW= 3MHz for f ≥ 1 GHz for peak measurement.
   For average measurement:
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

3.2.4 Test Setup

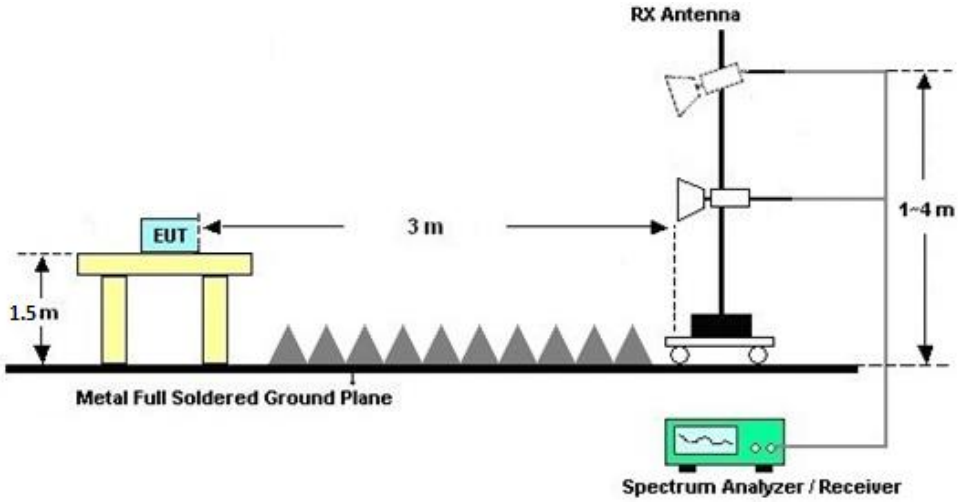
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.2.5 Test Results of Radiated Spurious Emissions (9kHz ~ 30MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

3.2.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix A.

3.2.7 Duty Cycle

Please refer to Appendix B.

3.2.8 Test Result of Radiated Spurious Emission (30MHz ~ 10th Harmonic or 40GHz, whichever is lower)

Please refer to Appendix A.

3.3 Antenna Requirements

3.3.1 Standard Applicable

If directional gain of transmitting Antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. The use of a permanently attached Antenna or of an Antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the rule.

3.3.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.3.3 Antenna Gain

<CDD Modes >

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

For CDD transmissions, directional gain is calculated as

Directional gain = G_{ANT} + Array Gain, where Array Gain is as follows.

For power spectral density (PSD) measurements on all devices,

Array Gain = 10 log(N_{ANT}/N_{SS}=1) dB.

For power measurements on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$.

Directional gain may be calculated by using the formulas applicable to equal gain antennas with G_{ANT} set equal to the gain of the antenna having the highest gain;

The EUT supports CDD mode.

For power, the directional gain G_{ANT} is set equal to the antenna having the highest gain, i.e., F)2)f)i).

For PSD, the directional gain calculation is following F)2)f)ii) of KDB 662911 D01 v02r01.

The power and PSD limit should be modified if the directional gain of EUT is over 6 dBi,

The directional gain “DG” is calculated as following table.

<CDD Modes>

	Ant. 1 (dBi)	Ant. 2 (dBi)	DG for Power (dBi)	DG for PSD (dBi)	Power Limit Reduction (dB)	PSD Limit Reduction (dB)
2.4 GHz	0.20	0.20	0.20	3.21	0.00	0.00

Power Limit Reduction = DG(Power) – 6dBi, (min = 0)

PSD Limit Reduction = DG(PSD) – 6dBi, (min = 0)

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Oct. 11, 2023	Sep. 30, 2024	Oct. 10, 2024	Conducted (TH01-KS)
Pulse Power Senor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 02, 2024	Sep. 30, 2024	Jan. 01, 2025	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 02, 2024	Sep. 30, 2024	Jan. 01, 2025	Conducted (TH01-KS)
EMI Test Receiver	R&S	ESR7	101404	9kHz~7GHz	Oct. 18, 2023	Sep. 14, 2024~ Sep. 15, 2024	Oct. 17, 2024	Radiation (03CH04-SZ)
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY55150213	10Hz~44GHz	Jul. 03, 2024	Sep. 14, 2024~ Sep. 15, 2024	Jul. 02, 2025	Radiation (03CH04-SZ)
Loop Antenna	R&S	HFH2-Z2E	101141	9kHz~30MHz	Dec. 29, 2023	Sep. 14, 2024~ Sep. 15, 2024	Dec. 28, 2024	Radiation (03CH04-SZ)
Bilog Antenna	TeseQ	CBL6111D	41909	30MHz~1GHz	May 09, 2024	Sep. 14, 2024~ Sep. 15, 2024	May 08, 2025	Radiation (03CH04-SZ)
Double Ridge Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-1474	1GHz~18GHz	Jul. 07, 2023	Sep. 14, 2024~ Sep. 15, 2024	Jul. 06, 2025	Radiation (03CH04-SZ)
Horn Antenna	SCHWARZBECK	BBHA9170	9170#679	15GHz~40GHz	Jul. 04, 2024	Sep. 14, 2024~ Sep. 15, 2024	Jul. 03, 2025	Radiation (03CH04-SZ)
Amplifier	Burgeon	BPA-530	102211	0.01Hz ~3000MHz	Oct. 18, 2023	Sep. 14, 2024~ Sep. 15, 2024	Oct. 17, 2024	Radiation (03CH04-SZ)
HF Amplifier	MITEQ	AMF-7D-00101800-30-10P-R	1943528	1GHz~18GHz	Oct. 18, 2023	Sep. 14, 2024~ Sep. 15, 2024	Oct. 17, 2024	Radiation (03CH04-SZ)
HF Amplifier	MITEQ	TTA1840-35-HG	1871923	18GHz~40GHz	Jul. 03, 2024	Sep. 14, 2024~ Sep. 15, 2024	Jul. 02, 2025	Radiation (03CH04-SZ)
Amplifier	Agilent Technologies	83017A	MY57280136	500MHz~26.5GHz	Jul. 03, 2024	Sep. 14, 2024~ Sep. 15, 2024	Jul. 02, 2025	Radiation (03CH04-SZ)
AC Power Source	APC	AFV-S-600B	F119050019	N/A	Oct. 18, 2023	Sep. 14, 2024~ Sep. 15, 2024	Oct. 17, 2024	Radiation (03CH04-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	Sep. 14, 2024~ Sep. 15, 2024	NCR	Radiation (03CH04-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	Sep. 14, 2024~ Sep. 15, 2024	NCR	Radiation (03CH04-SZ)

NCR: No Calibration Required

5 Measurement Uncertainty

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.10-2013. All the measurement uncertainty value were shown with a coverage K=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

Uncertainty of Conducted Measurement

Conducted Power	**±0.50 dB**

Uncertainty of Radiated Emission Measurement (9 KHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.1 dB**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.1 dB**

Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.8 dB**

Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.1 dB**

---------- THE END ----------

Appendix A. Radiated Spurious Emission Test Data

Test Engineer :	Wenbo Xiao	Relative Humidity :	48~49%
		Temperature :	24℃~25℃

Radiated Spurious Emission Test Modes

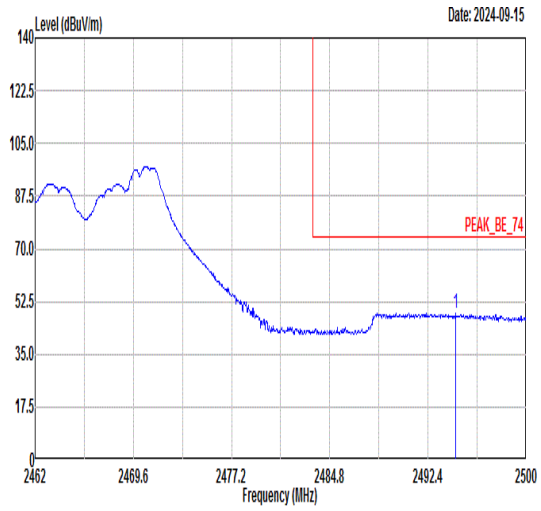
Mode	Band (MHz)	Antenna	Modulation	Channel	Frequency	Data Rate	RU	Remark
Mode 1	2400-2483.5	CDD 1+2	802.11ax HE20	11	2462	MCS0	Single RU 26/8	-
Mode 2	2400-2483.5	CDD 1+2	802.11ax HE20	11	2462	MCS0	Single RU 26/8	LF

Summary of each worse mode

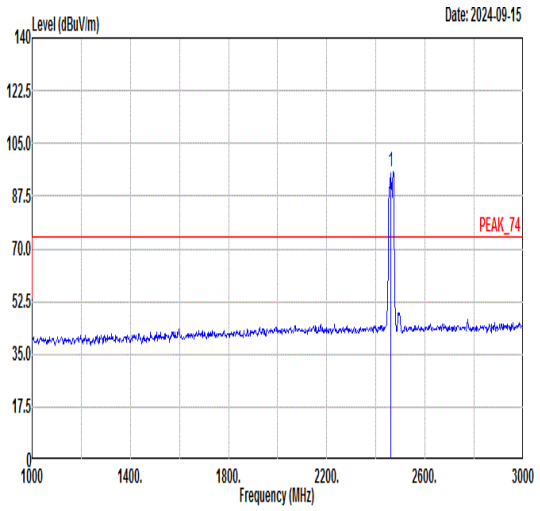
Mode	Modulation	Ch.	Freq. (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol.	Peak Avg.	Result	Remark
1	802.11ax HE20	11	2492.55	37.45	54.00	-16.55	H	AVERAGE	Pass	Band Edge
	802.11ax HE20	11	-	-	-	-	-	-	-	Harmonic
2	802.11ax HE20	11	287.05	41.91	46.00	-4.09	H	PEAK	Pass	LF

Mode	1	
	Band Edge	
	2400-2483.5_802.11ax HE20_CH11_Single RU_2462MHz	
ANT	CDD 1+2	
Pol.	Vertical	Fundamental

Peak

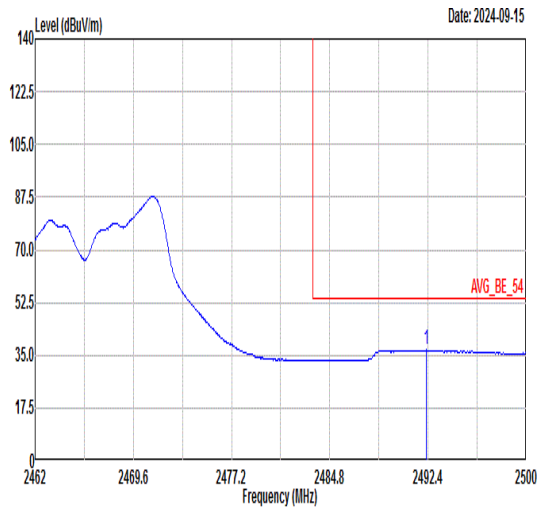


	Freq	Level	Limit Line	Margin	Read Level	Ant Factor	Cable Loss	Preamp Factor	APos	TPos	Remark
	MHz	dBuV/m	dBuV/m	(dB)	dBuV	dB/m	dB	dB	cm	deg	
1	2494.53	48.72	74.00	-25.28	46.15	30.70	5.47	33.60	400	266	PEAK

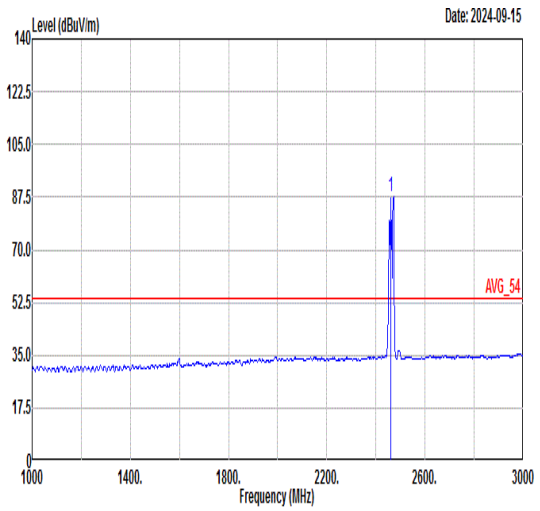


	Freq	Level	Limit Line	Margin	Read Level	Ant Factor	Cable Loss	Preamp Factor	APos	TPos	Remark
	MHz	dBuV/m	dBuV/m	(dB)	dBuV	dB/m	dB	dB	cm	deg	
1	2462.00	95.39	------	------	92.82	30.71	5.44	33.58	400	266	PEAK

Avg



	Freq	Level	Limit Line	Margin	Read Level	Ant Factor	Cable Loss	Preamp Factor	APos	TPos	Remark
	MHz	dBuV/m	dBuV/m	(dB)	dBuV	dB/m	dB	dB	cm	deg	
1	2492.25	36.72	54.00	-17.28	34.15	30.70	5.47	33.60	400	266	AVERAGE

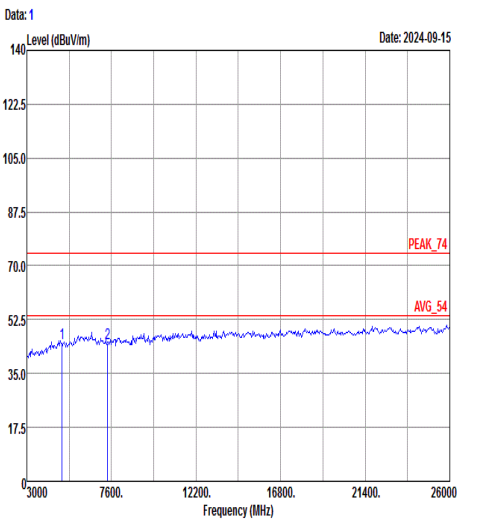


	Freq	Level	Limit Line	Margin	Read Level	Ant Factor	Cable Loss	Preamp Factor	APos	TPos	Remark
	MHz	dBuV/m	dBuV/m	(dB)	dBuV	dB/m	dB	dB	cm	deg	
1	2462.00	87.50	------	------	84.92	30.71	5.45	33.58	400	266	AVERAGE

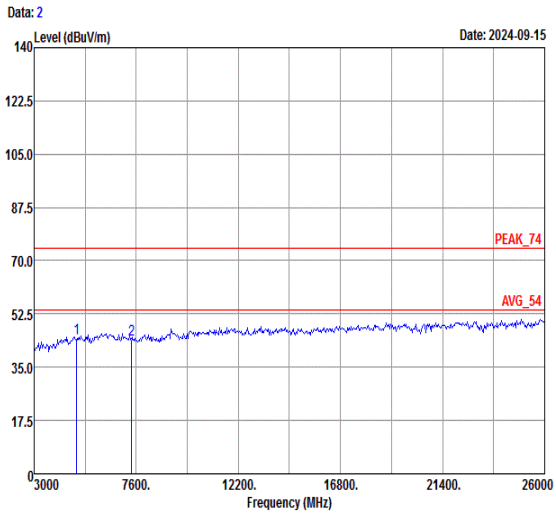
Mode	1	
	Band Edge	
	2400-2483.5_802.11ax HE20_CH11_Single RU_2462MHz	
ANT	CDD 1+2	
Pol.	Horizontal	Vertical

Peak

Avg



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 *	4924.00	44.92	-29.08	74.00	64.70	36.58	8.53	64.89	---	---	Peak
2	7386.00	44.76	-29.24	74.00	62.63	36.81	10.18	64.86	---	---	Peak

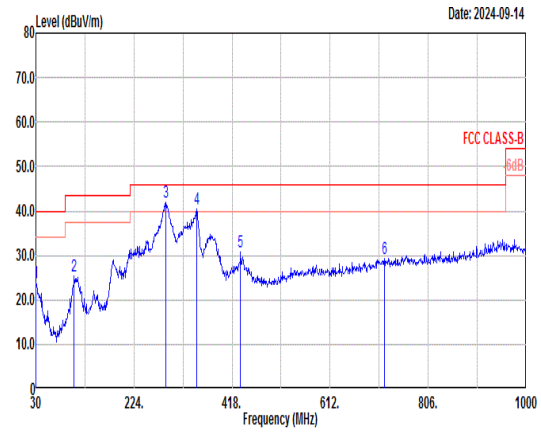


	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 *	4924.00	44.60	-29.40	74.00	64.38	36.58	8.53	64.89	---	---	Peak
2	7386.00	44.19	-29.81	74.00	62.06	36.81	10.18	64.86	---	---	Peak

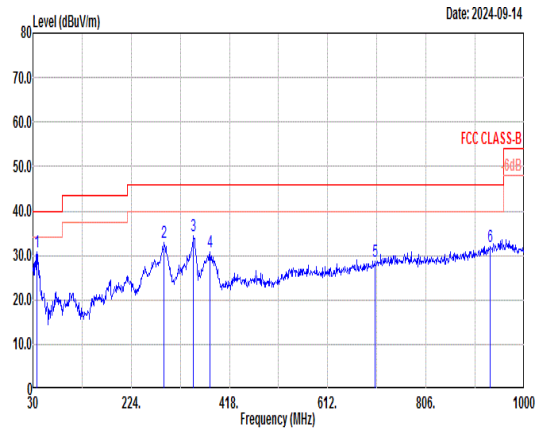
Mode	2
	LF
	2400-2483.5_802.11ax HE20_CH11_Single RU -LF
ANT	CDD 1+2

Pol.	Horizontal	Vertical

QP/ Peak



	Freq	Level	Limit Line	Margin	Read Level	Ant Factor	Cable Loss	Preamp Factor	APos	TPos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg	
1	30.00	23.85	40.00	-16.15	29.72	25.20	0.53	31.60	---	---	Peak
2	105.66	25.51	43.50	-17.99	39.64	16.70	1.05	31.88	---	---	Peak
3	287.05	41.91	46.00	-4.09	52.70	18.98	1.76	31.53	---	---	Peak
4	348.16	40.34	46.00	-5.66	49.35	20.42	1.97	31.40	---	---	Peak
5	434.49	30.88	46.00	-15.12	37.33	22.88	2.17	31.50	---	---	Peak
6	719.67	29.43	46.00	-16.57	30.73	27.10	2.80	31.20	---	---	Peak



	Freq	Level	Limit Line	Margin	Read Level	Ant Factor	Cable Loss	Preamp Factor	APos	TPos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg	
1	37.76	30.82	40.00	-9.18	40.99	21.00	0.59	31.76	---	---	Peak
2	288.99	32.80	46.00	-13.20	43.49	19.06	1.77	31.52	---	---	Peak
3	347.19	34.40	46.00	-11.60	43.46	20.38	1.97	31.41	---	---	Peak
4	380.17	30.84	46.00	-15.16	39.05	21.20	2.05	31.46	---	---	Peak
5	705.12	28.70	46.00	-17.30	30.53	26.60	2.77	31.20	---	---	Peak
6	933.07	32.11	46.00	-13.89	29.81	29.92	3.21	30.83	---	---	Peak

Appendix B. Duty Cycle Plots

Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11ax HE20	100	-	-	10Hz

802.11ax HE20