

EMC Test Report

Applicant: Quectel Wireless Solutions Co., Ltd.
Address: Building 5, Shanghai Business Park Phase III (Area B), No.1016
Tianlin Road, Minhang District, Shanghai, 200233 China
Product: Wi-Fi & Bluetooth Module
Model No.: FCM362K
Brand Name: QUECTEL
FCC ID: XMR2023FCM362K
Standards: FCC CFR47 Part 15B
Report No.: PD20250012-E3A
Issue Date: 2025/04/29
Test Result: PASS *

* Testing performed at Hefei Panwin Technology Co., Ltd. on the above equipment indicates the product meets the requirements of the relevant standards.



Reviewed By: Magic Tian



Approved By: Alec Yang

Hefei Panwin Technology Co., Ltd.

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Revision History

Report No.	Version	Description	Issue Date	Note
PD20250012-E3A	01	Initial Report	2025/04/29	Valid

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Test Summary

NO.	Test Item	Clause in FCC Rules	Results	Remarks
1	Radiated Emission	FCC Part 15.109, ANSI C63.4-2014	Pass	/
2	Conducted Emission	FCC Part 15.107, ANSI C63.4-2014	NA	Note 1
Date of Testing: 2025/03/04 to 2025/03/18 Date of Sample Received: 2025/01/26				
<ul style="list-style-type: none"> ■ The samples tested have been evaluated in accordance with the procedures given in the application standards in Section 3 of this report and have been shown to comply with the applicable technical standards. ■ All indications of PASS/FAIL in this report are based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. <p>Note 1: This test is applicable for the AC power lines only, and this sample is powered by DC.</p>				

1 General Information

1.1 Notes of the Test Report

This report is invalid without signature of auditor and approver or with any alterations. The report shall not be partially reproduced without written approval of the testing company. Entrusted test results are only responsible for incoming samples. If there is any objection to the testing report, it shall be raised to the testing company within 15 days from the date of receiving the report. In the test results, "NA" means "not applicable", and the test items marked with "Δ" are subcontracted projects.

1.2 Test Facility

A2LA (Certificate Number: 6849.01)

Hefei Panwin Technology Co., Ltd. has been accredited by American Association for Laboratory Accreditation to perform measurement.

FCC (Designation Number: CN1361, Test Firm Registration Number: 473156)

Hefei Panwin Technology Co., Ltd. has been accredited on the US Federal Communications Commission list of test facilities recognized to perform measurements.

1.3 Testing Laboratory

Company Name	Hefei Panwin Technology Co., Ltd.
Address	Floor 1, Zone E, Plant 2#, Mingzhu Industrial Park, 106 Chuangxin Avenue, High-tech Zone, Hefei City, Anhui Province, China
Telephone	+86-0551-63811775
Post Code	230031

2 Description of Equipment under Test

Client Information

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

General Technologies

Product	Wi-Fi & Bluetooth Module		
Model	FCM362K		
SN	D1M24J70J000136		
Hardware Version	R1.1		
Software Version	FCM362KAAR03A03M04		
Power Supply	External power supply, Typ. 3.3V DC		
Antenna Type	PCB Antenna		
Frequency Band	Band	TX(MHz)	RX(MHz)
	Bluetooth & Bluetooth LE	2402 to 2480	2402 to 2480
	Wi-Fi 802.11 a/b/g/n/ac/ax	2412 to 2462	2412 to 2462
		5150 to 5250	5150 to 5250
		5250 to 5350	5250 to 5350
		5470 to 5725	5470 to 5725
	5725 to 5850	5725 to 5850	
Note 1: The declared of product specification for EUT and/or Antenna presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.			

3 Application Standards

Test Standards

No.	Identity	Document Title
1	FCC CFR47 Part 15B	Unintentional Radiators
2	ANSI C63.4-2014	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

4 System Test Configuration

4.1 EUT Test Mode

The system was configured for testing in a typical Mode (as normally used by a typical user).

NO.	Test Mode
1	External power supply + EVB + Wi-Fi 2.4G Receive
2	External power supply + EVB + Wi-Fi 5G Receive
3	External power supply + EVB + Bluetooth Receive

Note: During the test, the preliminary test was performed in all modes with all frequency bands, mode 1 was the worst condition for EMI test.

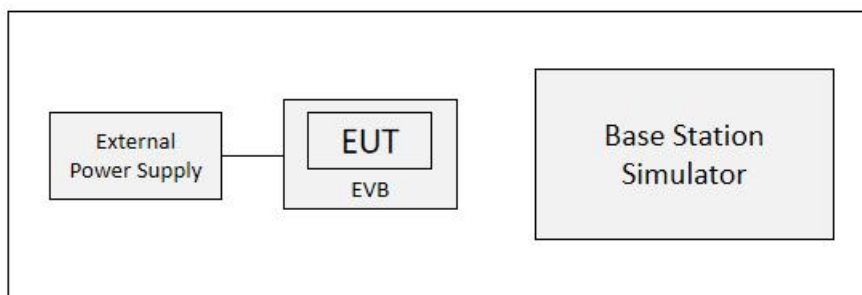
4.2 Support Equipment List

Equipment	Manufacturer	Description	Model	Serial Number
Base Station Simulator	R&S	/	CMW500	PWC0012
EVB	Quectel	/	/	/

4.3 Equipment Classification

<input type="checkbox"/>	Class A
<input checked="" type="checkbox"/>	Class B

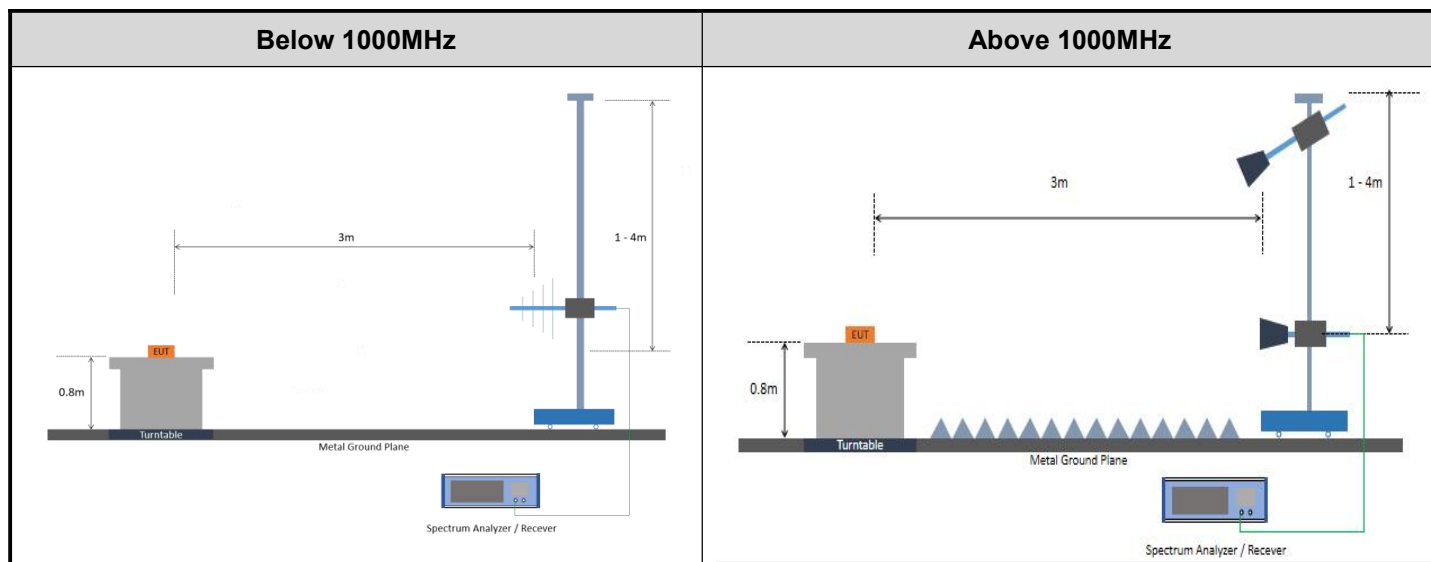
4.4 Block Diagram of Test Setup



5 Emission Test

5.1 Radiated Emission

5.1.1 Test System Diagram



Remark: Antenna Tower meets ANSI C63.4 requirements for measurements above 1 GHz by keeping the antenna aimed at the EUT during the antenna's ascent/ descent along the antenna mast.

5.1.2 Test Equipment

Instrument	Manufacturer	Model	Asset No.	Cal. Interval	Cal. Due Date
EMI Test Receiver	R&S	ESR7	PWB0023	1 Year	2025/09/11
Spectrum Analyzer	R&S	FSV3044	PWB0024	1 Year	2025/09/11
TRILOG Broadband Antenna	Schwarzbeck	VULB9162	PWB0029	1 Year	2025/09/09
Double-Ridged Guide Antenna	ETS-Lindgren	3117	PWB0031	1 Year	2025/09/26
k Type Horn Antenna	Steatite Antennas	QMS-00880	PWB0035	1 Year	2025/09/08
3m Semi Anechoic Chamber	ETS.LINDGREN	Fact 3-2m	PWB0003	3 Years	2026/06/05
Pre-Amplifier	R&S	SCU18F	PWB0034	1 Year	2025/09/11
Pre-Amplifier	R&S	SCU40F1	PWB0036	1 Year	2025/09/11
Pre-Amplifier	COM-MW	DLNA8	PWB0094	1 Year	2025/09/11
Pre-Amplifier	R&S	OSP220 (OSP-B155G)	PWB0042	1 Year	2025/09/11
Test Software	Tonscend	JS32	/	/	/

5.1.3 Limits

Class B limit

Frequency range (MHz)	Quasi-peak limits (dBμV/m)	Measurement distance (m)
30 to 88	40	3
88 to 216	43.5	3
216 to 960	46	3
960 to 1000	54	3
Note 1: The lower limit shall apply at the transition frequency.		
Note 2: Additional provisions may be required for cases where interference occurs.		

Frequency range (GHz)	Average limit (dBμV/m)	Peak limit (dBμV/m)	Measurement distance(m)
1 to 5 th harmonic of the highest frequency or 40GHz, whichever is lower	54	74	3
Note 1: The lower limit shall apply at the transition frequency.			
Note 2: Additional provisions may be required for cases where interference occurs.			

Remark: E field strength (dBμV/m) = 20 log E field strength (μV/m)

5.1.4 Test Procedure

The EUT is placed on a non-metallic table 0.8m above the horizontal metal reference ground plane. The distance between EUT and receive antenna should be 3 meters. During the test, the EUT was operating in its typical mode. The test method is according to ANSI C63.4-2014. Sweep the whole frequency Band through the range from 30MHz to 5th harmonic of the carrier. During the test, the height of receive antenna shall be moved from 1 to 4 meters, and the antenna shall be performed under horizontal and vertical polarization. The turn table shall be rotated from 0 to 360 degrees for detecting the maximum of radiated signal level.

The data of cable loss and antenna factor has been calibrated in full testing frequency range before the testing. During the test, the EUT is worked at maximum output power.

Below 1GHz, RBW is set to 100 kHz and VBW is set to 300kHz. Above 1GHz, RBW is set to 1MHz and VBW is set to 3MHz.

Required highest frequency for radiated measurement

Highest internal frequency (F _x)	Highest measured frequency
$F_x \leq 1.705 \text{ MHz}$	30 MHz
$1.705 \text{ MHz} < F_x \leq 108 \text{ MHz}$	1000 MHz
$108 \text{ MHz} < F_x \leq 500 \text{ MHz}$	2000 MHz
$500 \text{ MHz} < F_x \leq 1 \text{ GHz}$	5000 MHz
$1 \text{ GHz} < F_x$	5 th harmonic of the highest frequency or 40GHz, which is lower
NOTE 1: F _x is highest fundamental frequency generated or used within the EUT or highest frequency at which it operates.	

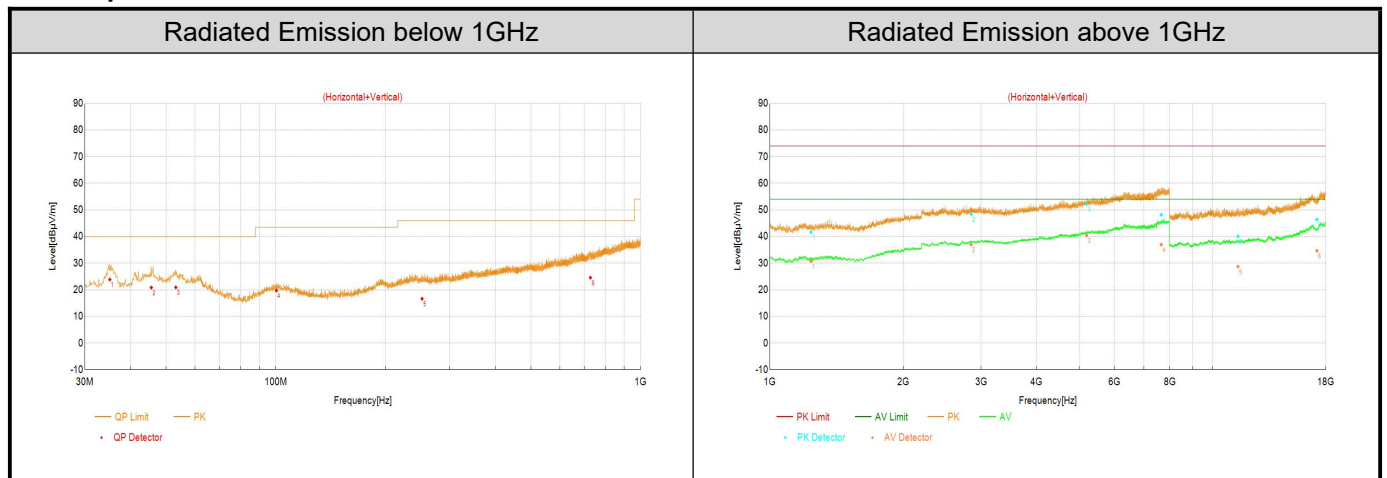
5.1.5 Test Result

Test Site	3m Semi Anechoic Chamber	Test Time	2025/03/04 to 2025/03/18
Engineer	Jack Wen	Test Mode	Mode 1

Ambient condition

Temperature	Relative humidity	Pressure
20.3 to 22.9℃	38 to 55%RH	100.92 to 102.45kPa

Test Graph



Test Data

Radiated Emission Below 1GHz

Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity
35.10	41.60	23.88	-17.72	40.00	16.12	100	360	QP	Vertical
45.60	36.07	20.86	-15.21	40.00	19.14	100	360	QP	Vertical
53.23	36.15	20.93	-15.22	40.00	19.07	100	342	QP	Vertical
100.39	36.79	19.74	-17.05	43.50	23.76	200	7	QP	Horizontal
251.71	30.37	16.66	-13.71	46.00	29.34	100	28	QP	Horizontal
728.23	31.08	24.59	-6.49	46.00	21.41	100	316	QP	Horizontal

Remark:

- Factor=Antenna factor + insertion loss (cable loss + amplifier gain)
- Level=Reading+Factor
- Margin=Limit-Level

Radiated Emission Above 1GHz

Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity
1238.01	37.30	41.65	4.35	74.00	32.35	200	102	PK	Horizontal
1238.01	26.41	30.76	4.35	54.00	23.24	200	102	AV	Horizontal
2846.34	35.03	48.43	13.40	74.00	25.57	100	166	PK	Horizontal
2846.34	23.62	37.02	13.40	54.00	16.98	100	166	AV	Horizontal
5193.61	42.94	52.21	9.27	74.00	21.79	200	165	PK	Vertical
5193.61	31.24	40.51	9.27	54.00	13.49	200	165	AV	Vertical
7653.21	33.97	48.17	14.20	74.00	25.83	100	346	PK	Horizontal
7653.21	22.78	36.98	14.20	54.00	17.02	100	346	AV	Horizontal
11404.8	24.21	40.08	15.87	74.00	33.92	100	248	PK	Horizontal
11404.8	12.88	28.75	15.87	54.00	25.25	100	248	AV	Horizontal
17195.2	22.11	46.38	24.27	74.00	27.62	100	69	PK	Vertical
17195.2	10.42	34.69	24.27	54.00	19.31	100	69	AV	Vertical

Remark:

1. Sweep the whole frequency band through the range from 30MHz to the 5th harmonic of the carrier, the Emissions in the frequency band 18GHz - 40GHz is more than 20dB below the limit are not reported
2. Correction Factor =Antenna factor + Insertion loss (cable loss + amplifier gain)
3. Level=Reading+Factor
4. Margin=Limit-Level

5.1.6 Uncertainty Measurement

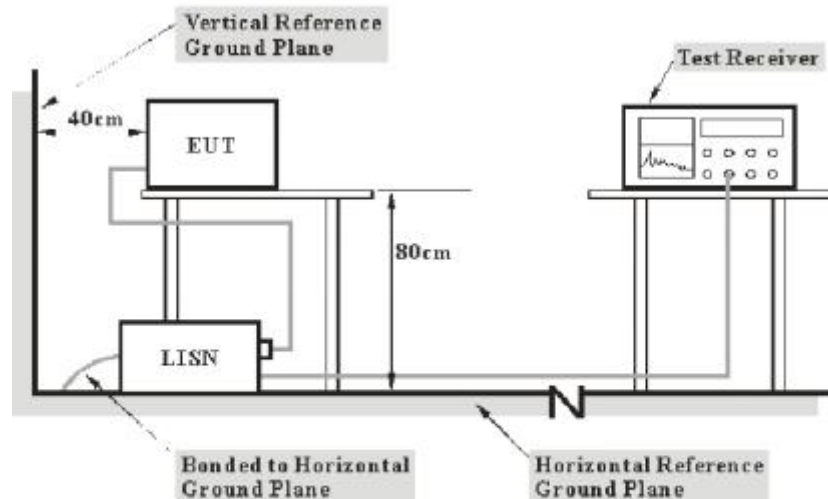
Where relevant,the following measurement uncertainty levels have been estimated for tests performed on the EUT.

The listed uncertainties are the worst case uncertainty for the entire range of measurement. Please note that the uncertainty values are provided for informational purposes only and are not used in determining the PASS/FAIL results. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

CASE	Uncertainty
Radiated Emission	Below 1GHz: 4.88 dB Above 1GHz: 5.06 dB

5.2 Conducted Emission

5.2.1 Test System Diagram



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

5.2.2 Test Equipment

Instrument	Manufacturer	Model	Asset No.	Cal. Interval	Cal. Due Date
EMI Test Receiver	R&S	ESR 3	PWB0061	1 Year	2025/09/11
LISN	R&S	ENV216	PWB0062	1 Year	2025/09/11
Test Software	R&S	ELEKTRA V4.20.2	/	/	/
Shielded Chamber	MIX-BEP	SR 433	PWB0002	3 Years	2027/07/09

5.2.3 Limits

Class B limit (AC port)

Frequency range	Quasi Peak limit dB(μV)	Average limit dB(μV)
0.15MHz – 0.50MHz	66 to 56	56 to 46
0.50MHz – 5MHz	56	46
5MHz – 30MHz	60	50

Note : The lower limit shall apply at the transition frequency.

5.2.4 Test Procedure

The EUT is placed on a non-metallic table of 80cm height above the horizontal metal reference ground plane. During the test, the EUT was operating in its typical mode. The test method is according to ANSI C63.4-2014. Connect the AC power line of the EUT to the L.I.S.N. Use EMI receiver to detect the average and Quasi-peak value. The measurement result should include both L line and N line.

The frequency Band range is from 150 kHz to 30MHz. RBW is set to 9 kHz and VBW is set to 30 kHz on test receiver.

5.2.5 Test Result

NA

5.2.6 Uncertainty Measurement

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT.

The listed uncertainties are the worst case uncertainty for the entire range of measurement. Please note that the uncertainty values are provided for informational purposes only and are not used in determining the PASS/FAIL results.

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

CASE	Uncertainty
Continuous Emission (AC port)	2.92 dB

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

ANNEX A: The EUT Appearance

The EUT Appearance (internal and external photographs) are submitted separately.

ANNEX B: Test Setup Photographs

The Test Setup Photographs are submitted separately.