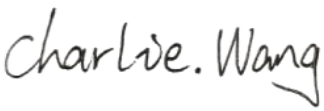
RF Test Report

Applicant:	Quectel Wireless Solutions Co., Ltd.
Address:	Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai, China, 200233
Product:	Wi-Fi & Bluetooth Module
Model No.:	AF61Y
Brand Name:	QUECTEL
FCC ID:	XMR2024AF61Y
Standards:	FCC CFR47 Part 2.1091
Report No.:	PD20230182RF13
Issue Date:	2024/04/23
Test Result:	PASS *

* **The above equipment has been tested and compliance with the requirement of the relative standards by Hefei Panwin Technology Co., Ltd.**



Reviewed By: Charlie Wang **Approved By:** Alec Yang

Hefei Panwin Technology Co., Ltd.

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Revision History

Report No.	Version	Description	Issue Date	Note
PD20230182RF13	01	Initial Report	2024/04/23	Valid

Remark:

We, Hefei Panwin Technology Co., Ltd., would like to declare that the tested sample has been evaluated in accordance with the procedures given in FCC CFR47 Part 2.1091 and shown compliance with the applicable technical standards. The evaluation related to FCC CFR47 Part 2 is not within the scope of A2LA accreditation.

CONTENTS

1 Test Laboratory

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 Testing Laboratory

Company Name	Hefei Panwin Technology Co., Ltd.
Address	Floor 1, Zone E, Plant 2#, Mingzhu Industrial Park, No.106 Chuangxin Avenue, High-tech Zone, Hefei City, Anhui Province,China
Telephone	+86-0551-63811775
Post Code	230031

2 General Description of Equipment under Test

2.1 Details of Application

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

2.2 Details of EUT

Product	Wi-Fi & Bluetooth Module
Model	AF61Y
HW Version	R1.0
SW Version	NA
Antenna Type	External Antenna
Mode of Operation	Bluetooth Bluetooth LE Wi-Fi 2.4G Wi-Fi 5G
Max. Conducted Power	Bluetooth: 7.39dBm Bluetooth LE: 7.33dBm Wi-Fi 2.4G: 23.31dBm Wi-Fi 5G: 16.22dBm
Max Gain	Bluetooth & Bluetooth LE & Wi-Fi 2.4G: -0.10dBi Wi-Fi 5G: 5150MHz to 5250MHz: -0.90dBi Wi-Fi 5G: 5250MHz to 5350MHz: -1.40dB Wi-Fi 5G: 5470MHz to 5725MHz: -0.30dBi Wi-Fi 5G: 5725MHz to 5850MHz: 0.40dBi
Rated Power Supply Voltage	Typical VDD_CORE: 1.8V Typical VDD_IO: 1.8V Typical VDD_PA: 2.2V
Note : 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 Test Condition

3.1 Laboratory Environment

Temperature	Min.= 18℃, Max.=25℃
Relative Humidity	Min.= 30%, Max.=70%
Ground System Resistance	< 1 Ω

- Ambient noise is checked and found very low and in compliance with requirement of standards.
- Reflection of surrounding objects is minimized and in compliance with requirement of standards.

4 Maximum Permissible Exposure (EMF)

According to ANSI/IEEE C95.1-1992, the criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation as specified in §1.1310.

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3-3.0	614	1.63	*(100)	6
3.0-30	1842/f	4.89/f	*(900/f2)	6
30-300	61.4	0.163	1.0	6
300-1500			f/300	6
1500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f2)	30
30-300	27.5	0.073	0.2	30
300-1500			f/1500	30
1500-100,000			1.0	30

The MPE was calculated at 20 cm to show compliance with the power density limit.
The following formula was used to calculate the Power Density:

$$S = PG/ 4\Pi R^2$$

Where:

S = Power density (in appropriate units, e.g. mW/cm^2)

P = Time-average maximum tune up procedure (in appropriate units, e.g., mW)

G = The numeric gain of the antenna

R = Distance to the center of radiation of the antenna (20 cm = limit for MPE)

Appendix A – Test Results

A.1 Maximum Measured Conducted Output Power and Antenna Gain

Band	TX Freq. (MHz)	Max. Conducted Power (dBm)	Antenna Gain (dBi)
Bluetooth	2402 to 2480	7.39	-0.10
Bluetooth LE	2402 to 2480	7.33	-0.10
Wi-Fi 2.4G_MIMO	2412 to 2462	23.31	-0.10
Wi-Fi 5G_CDD	5150 to 5850	16.22	0.40

A.2 Test Results of Maximum Permissible Exposure

Band	Max. Conducted Power (dBm)	Antenna Gain (dBi)	Maximum EIRP(dBm)	PG (mW)	Test Result (mW/cm^2)	Limit Value (mW/cm^2)	Result Ratio
Bluetooth	7.39	-0.10	7.29	5.36	0.001	1.000	0.001
Bluetooth LE	7.33	-0.10	7.23	5.28	0.001	1.000	0.001
Wi-Fi 2.4G_ant0	20.06	-0.10	19.96	99.08	0.020	1.000	0.020
Wi-Fi 2.4G_ant1	20.52	-0.10	20.42	110.15	0.022	1.000	0.022
Wi-Fi 2.4G_total	-	-	-	-	-	-	0.042
Wi-Fi 5G_ant0	13.01	0.40	13.41	21.93	0.004	1.000	0.004
Wi-Fi 5G_ant1	13.41	0.40	13.81	24.04	0.005	1.000	0.005
Wi-Fi 5G_total	-	-	-	-	-	-	0.009

So the simultaneous transmitting antenna pairs as below:

The EMF Ratio = **Test Result** / **Limit Value**

∑ **of EMF Ratios** = Bluetooth + Wi-Fi 2.4G + Wi-Fi 5G
= 0.001 + 0.042 + 0.009 = 0.052 < 1

Note: For mobile or fixed location transmitters, minimum separation distance is 20cm, even if calculations indicate EMF distance is less.

Conclusion:
According to 47 CFR §2.1091, the RF exposure analysis concludes that the RF Exposure is FCC compliant.

Appendix B – The EUT Appearance

Refer to “Attachment 1: External Photograph” and “ Attachment 2: Internal Photograph” file.

****** End of the Report ******