

TEST REPORT

Application No.: SUCR2407000251MO
Applicant: Quectel Wireless Solutions Co., Ltd.
Address of Applicant: Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai, China 200233
Manufacturer: Quectel Wireless Solutions Co., Ltd.
Address of Manufacturer: Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai, China 200233
EUT Description: Wi-Fi & Bluetooth Module
Model No.: AF67E
Trade Mark: Quectel
FCC ID: XMR202406AF67E
Standards: 47 CFR Part 2.1091
FCC KDB 447498 D01 v06
Date of Receipt: July 12, 2024
Date of Issue: September 11, 2024

Test Result:	PASS*
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* In the configuration tested, the EUT complied with the standards specified above.

Prepared by: Nature Shen/ Project Manager

Approved by: Cloud Peng/ Technical Manager

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SGS-CSTC Standards Technical Services (Suzhou) Co., Ltd

Report No.: SUCR240700025107

Rev.: 01

Page: 2 of 8

1 Version

<i>Revision Record</i>				
<i>Version</i>	<i>Chapter</i>	<i>Date</i>	<i>Modifier</i>	<i>Remark</i>
01		September 11, 2024		Original

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SGS-CSTC Standards Technical Services (Suzhou) Co., Ltd.
Wireless Laboratory

South of No. 6 Plant, No. 1, Runsheng Road, Suzhou Industrial Park, Suzhou Area, China (Jiangsu) Pilot Free Trade Zone 215000 t (86-512) 62992980 www.ssgroup.com.cn

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Page: 3 of 8

Contents

1	Version	2
2	General Information.....	4
2.1	Client Information	4
2.2	Test Facility	4
2.3	General Description of EUT	5
3	RF Exposure Evaluation	6
3.1	RF Exposure Compliance Requirement	6

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2 General Information

2.1 Client Information

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

2.2 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **A2LA (Certificate No. 6336.01)**

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 6336.01.

- **Innovation, Science and Economic Development Canada**

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0120.

IC#: 27594.

- **FCC –Designation Number: CN1312**

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. has been recognized as an accredited testing laboratory.

Designation Number: CN1312.

Test Firm Registration Number: 717327

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2.3 General Description of EUT

EUT Description:	Wi-Fi & Bluetooth Module
Model No.:	AF67E
Trade Mark:	Quectel
Hardware Version:	R1.0
Software Version:	NA
Power Supply:	1.8V
Antenna Type:	External Antenna
Antenna Gain:	Bluetooth: -0.1dBi (Ant1);
	WiFi 2.4G: -0.1dBi (Ant1); -0.1dBi (Ant2);
	5150MHz to 5250MHz: -0.9dBi (Ant1); -0.9dBi (Ant2);
	5250MHz to 5350MHz: -1.4dBi (Ant1); -1.4dBi (Ant2);
	5470MHz to 5725MHz: -0.3dBi (Ant1); -0.3dBi (Ant2);
	5725MHz to 5850MHz: 0.4dBi (Ant1); 0.4dBi (Ant2);
	Note: The antenna gain are derived from the gain information report provided by the manufacturer.
Remark:	As above information is provided and confirmed by the applicant. SGS is not liable to the accuracy, suitability, reliability or/and integrity of the information.

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3 RF Exposure Evaluation

3.1 RF Exposure Compliance Requirement

3.1.1 Limits

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/f ²)	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/f ²)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

F=frequency in MHz
 *=Plane-wave equivalent power density
 RF exposure compliance will need to be determined with respect to 1.1307(c) and (d) of the FCC rules. The emissions should be within the limits at 300kHz in Table 1 of 1.1310(use the 300kHz limits for 150kHz:614V/m,1.63A/m).

Friis Formula

Friis transmission formula: $Pd = (Pout * G) / (4 * Pi * R^2)$

Where

Pd = power density in mW/cm²

Pout = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

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R = distance between observation point and center of the radiator in cm

Pd is the limit of MPE, 1 mW/cm². If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

3.1.2 Test Procedure

Software provided by client enabled the EUT to transmit data at lowest, middle and highest channel individually

3.1.3 EUT RF Exposure Evaluation

Output Power Into Antenna & RF Exposure Evaluation Distance:

This confirmed that the device comply with MPE limit.

Band	Frequency	Max power (dBm)	Ant Gain (dBi)	EIRP (dBm)	Max EIRP (mW)	Limit (mW)	Distance R (cm)	Result	Ratio
Bluetooth	2402.0	8	-0.1	7.9	6.17	3060	20	Pass	0.0020
Wifi 2.4GHz	2412.0	19	-0.1	18.9	77.62	3060	20	Pass	0.0254
Wifi 5GHz B1	5180.0	18	-0.9	17.1	51.29	3060	20	Pass	0.0168
Wifi 5GHz B2	5260.0	18	-1.4	16.6	45.71	3060	20	Pass	0.0149
Wifi 5GHz B3	5500.0	18	-0.3	17.7	58.88	3060	20	Pass	0.0192
Wifi 5GHz B4	5745.0	18	0.4	18.4	69.18	3060	20	Pass	0.0226

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3.1.4 Exposure calculations for multiple sources

To ensure compliance with the MPE for a controlled environment, the sum of the ratios of the power density to the corresponding MPE should not exceed unity. That is

$$\sum_{i=1}^n \frac{S_i}{MPE_i} \leq 1$$

The product also has multiple transmitters The Simultaneous Transmission Possibilities are as below:

Simultaneous Tx Combination	Configuration
1	Bluetooth+WiFi 2.4G+WiFi 5G

No.	Mode	Max EIRP (mW)	Limit (mW)	Result Ratio	Total Ratio	Limit	Result
1	Bluetooth	6.17	3060	0.0020	0.0500	1.0000	Pass
	WiFi 2.4G	77.62	3060	0.0254			
	WiFi 5G	69.18	3060	0.0226			

---End of Report---

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