

RF Exposure Evaluation Report

Application No.: SUCR2510001019AT
Applicant: Quectel Wireless Solutions Co., Ltd.
Address of Applicant: No. 8 Waipojing Road, Sijing Town, Songjiang District, Shanghai 201601, China
Manufacturer: Quectel Wireless Solutions Co., Ltd.
Address of Manufacturer: No. 8 Waipojing Road, Sijing Town, Songjiang District, Shanghai 201601, China
EUT Description: 5G Edge Computing Box
Model No.: QB560D-WF
Trade Mark: QUECTEL
FCC ID: XMR25QB560DWF
Standards: FCC Rules 47 CFR §2.1091
KDB 447498 D04 interim General RF Exposure Guidance v01
Date of Receipt: 2025-10-21
Date of Issue: 2025-12-02

Test Result:	PASS*
---------------------	--------------

* In the configuration tested, the EUT complied with the standards specified above.

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <http://www.sgs.com/en/Terms-and-Conditions> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <http://www.sgs.com/en/Terms-and-Conditions/Terms-e-Document>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.

Attention: To check the authenticity of testing / inspection report & certificate, please contact us at telephone:(86-755) 8307 1443, or email: CN.Doccheck@sgs.com

Version

Revision Record			
Version	Description	Date	Remark
01	Original	2025-12-02	

Authorized for issue by:			
Tested By		Nature Shen	
		Nature Shen/Project Engineer	
Approved By		Cedar cheng	
		Cedar Cheng /Reviewer	

Contents

Version	2
1 General Information	4
1.1 Client Information	4
1.2 Test Facility	4
1.3 General Description of EUT	5
2 RF Exposure Test Exemptions.....	7
2.1 FCC RF Exposure Test Exemptions for single RF sources.....	7
2.2 RF Exposure Test Exemptions for Simultaneous Transmission.....	9
3 Measurement and Calculation.....	11
3.1 Maximum transmit power.....	11
3.2 RF Exposure Calculation	11

1 General Information

1.1 Client Information

Applicant:	Quectel Wireless Solutions Co., Ltd.
Address of Applicant:	No. 8 Waipojing Road, Sijing Town, Songjiang District, Shanghai 201601, China
Manufacturer:	Quectel Wireless Solutions Co., Ltd.
Address of Manufacturer:	No. 8 Waipojing Road, Sijing Town, Songjiang District, Shanghai 201601, China

1.2 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

1.3 General Description of EUT

Hardware Version:	R1.0
Software Version:	SG560DWFPAR60A06
Antenna Type:	Dipole Antenna
Antenna Gain:	Bluetooth: 4.2dBi(Ant1) WIFI 2.4G: 4.2dBi(Ant1), 4.2dBi(Ant2) 5150MHz to 5250MHz: 3.4dBi(Ant1), 3.4dBi(Ant2) 5250MHz to 5350MHz: 3.4dBi(Ant1), 3.4dBi(Ant2) 5470MHz to 5725MHz: 2.3dBi(Ant1), 2.3dBi(Ant2) 5725MHz to 5850MHz: 2dBi(Ant1); 2dBi(Ant2) UNII-5: 3.4dBi(Ant1), 3.4dBi(Ant2) UNII-6: 3.9dBi(Ant1), 3.9dBi(Ant2) UNII-7: 3.3dBi(Ant1), 3.3dBi(Ant2) UNII-8: 5.3dBi(Ant1), 5.3dBi(Ant2)
	Note: The antenna gain are derived from the gain information report provided by the manufacturer.
Note: *Since the above data and/or information is provided by the client relevant results or conclusions of this report are only made for these data and/or information, SGS is not responsible for the authenticity, integrity and results of the data and information and/or the validity of the conclusion. 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.	

1.4 Separation Distance

Separation distance between the antenna to person (R):	>20cm
Remark: This minimum test separation distance is determined by the smallest distance from the antenna and radiating structures or outer surface of the device, according to the host form factor, exposure conditions and platform requirements, to any part of the body or extremity of a user or bystander. R has been stated in user manual.	

2 RF Exposure Test Exemptions

Test exemptions apply for devices used in general population/uncontrolled exposure environments, according to the SAR-based, or MPE-based exemption thresholds.

2.1 FCC RF Exposure Test Exemptions for single RF sources

2.1.1 Blanket 1 mW Blanket Exemption

The 1 mW Blanket Exemption of §1.1307(b)(3)(i)(A) applies for single fixed, mobile, and portable RF sources with available maximum time-averaged power of no more than 1 mW, regardless of separation distance.

The 1-mW blanket exemption applies at separation distances less than 0.5 cm, including where there is no separation. This exemption shall not be used in conjunction with other exemption criteria other than those for multiple RF sources in paragraph §1.1307(b)(3)(ii)(A).

The 1-mW exemption is independent of service type and covers the full range of 100 kHz to 100 GHz, but it shall not be used in conjunction with other exemption criteria or in devices with higher-power transmitters operating in the same time-averaging period. Exposure from such higher-power transmitters would invalidate the underlying assumption that exposure from the lower-power transmitter is the only contributor to SAR in the relevant volume of tissue.

Medical implant devices may only use this exemption and that in paragraph (b)(3)(ii)(A);

2.1.2 MPE-based Exemption

General frequency and separation-distance dependent MPE-based effective radiated power (ERP) thresholds are in Table B.1 [Table 1 of §1.1307(b)(1)(i)(C)] to support an exemption from further evaluation from 300 kHz through 100 GHz. The minimum separation distance (R in meters) from the body of a nearby person for the frequency (f in MHz) at which the source operates, the ERP (watts) is no more than the calculated value prescribed for that frequency. For the exemption in Table 1 to apply, **R must be at least $\lambda / 2\pi$** , where λ is the free-space operating wavelength in meters. If the ERP of a single RF source is not easily obtained, then the available maximum time-averaged power may be used in lieu of ERP if the physical dimensions of the radiating structure(s) do not exceed the electrical length of $\lambda / 4$ or if the antenna gain is less than that of a half-wave dipole (1.64 linear value).

Table B.1—Thresholds For Single RF Sources Subject to Routine Environmental Evaluation

RF Source Frequency			Minimum Distance			Threshold ERP
f_L MHz		f_H MHz	$\lambda_L / 2\pi$		$\lambda_H / 2\pi$	W
0.3	–	1.34	159 m	–	35.6 m	1,920 R ²
1.34	–	30	35.6 m	–	1.6 m	3,450 R ² /f ²
30	–	300	1.6 m	–	159 mm	3.83 R ²
300	–	1,500	159 mm	–	31.8 mm	0.0128 R ² f
1,500	–	100,000	31.8 mm	–	0.5 mm	19.2R ²
Subscripts L and H are low and high; λ is wavelength. R: Separation distance between the antenna to person						

The table applies to any RF source (i.e. single fixed, mobile, and portable transmitters) and specifies power and distance criteria for each of the five frequency ranges used for the MPE limits. These criteria apply at separation distances from any part of the radiating structure of at least $\lambda/2\pi$. The thresholds are based on the general population MPE limits with a single perfect reflection, outside of the reactive near-field, and in the main beam of the radiator.

Limit calculation				
Frequency range	Frequency(MHz)	$\lambda/2\pi$ (m)	R(m)	Threshold ERP(W)
1.34~30MHz	13.56	3.5229	3.6000	243.167
300~1500MHz	433	0.1103	0.6000	1.995
1500~100000MHz	2462	0.0194	0.2000	0.768
1500~100000MHz	5825	0.0082	0.2000	0.768

2.1.3 SAR-based Exemption

SAR-based thresholds are derived based on frequency, power, and separation distance of the RF source. The formula defines the thresholds in general for either available maximum time-averaged power or maximum time-averaged ERP, whichever is greater.

If the ERP of a device is not easily determined, such as for a portable device with a small form factor, the applicant may use the available maximum time-averaged power exclusively if the device antenna or radiating structure does not exceed an electrical length of $\lambda/4$.

As for devices with antennas of length greater than $\lambda/4$ where the gain is not well defined, but always less than that of a half-wave dipole (length $\lambda/2$), the available maximum time-averaged power generated by the device may be used in place of the maximum time-averaged ERP, where that value is not known.

The separation distance is the smallest distance from any part of the antenna or radiating structure for all persons, during operation at the applicable ERP. In the case of mobile or portable devices, the separation distance is from the outer housing of the device where it is closest to the antenna.

The SAR-based exemption formula of §1.1307(b)(3)(i)(B), repeated here as Formula (B.2), applies for single fixed, mobile, and portable RF sources with available maximum time-averaged power or effective radiated power (ERP), whichever is greater, of less than or equal to the threshold P_{th} (mW).

This method shall only be used at separation distances from **0.5cm to 40cm** and at frequencies from 0.3 GHz to 6 GHz (inclusive). P_{th} is given by Formula (B.2).

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}} (d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases} \quad (\text{B.2})$$

where

$$x = -\log_{10} \left(\frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right)$$

and f is in GHz, d is the separation distance (cm), and $ERP_{20 \text{ cm}}$ is per Formula (B.1).

Limit calculation				
Frequency range(GHz)	Frequency(GHz)	X	d(cm)	Pth (mW)
0.3~1.5	0.45	1.011	1	44.373
1.5~6	2.462	1.903	20	3060.000

2.2 RF Exposure Test Exemptions for Simultaneous Transmission

The available maximum time-averaged power of each source is no more than 1 mW and there is a separation distance of two centimeters between any portion of a radiating structure operating and the nearest portion of any other radiating structure in the same device, except if the sum of multiple sources is less than 1 mW during the time-averaging period, in which case they may be treated as a single source (separation is not required). This exemption may not be used in conjunction with other exemption criteria other than those is paragraph (b)(3)(i)(A) of this section. Medical implant devices may only use this exemption and that in paragraph (b)(3)(i)(A).

Either SAR-based or MPE-based exemption may be considered for test exemption for fixed, mobile, or portable device exposure conditions; therefore, the contributions from each exemption in conjunction with the measured SAR (Evaluated $_k$ term) shall be used to determine exemption for simultaneous transmission. In the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation.

$$\sum_{i=1}^a \frac{P_i}{P_{th,i}} + \sum_{j=1}^b \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^c \frac{Evaluated_k}{Exposure Limit_k} \leq 1$$

Where:

a = number of fixed, mobile, or portable RF sources claiming exemption using paragraph (b)(3)(i)(B) of this section for P_{th} , including existing exempt transmitters and those being added.

b = number of fixed, mobile, or portable RF sources claiming exemption using paragraph (b)(3)(i)(C) of this section for Threshold ERP, including existing exempt transmitters and those being added.

c = number of existing fixed, mobile, or portable RF sources with known evaluation for the specified minimum distance including existing evaluated transmitters.

P_i = the available maximum time-averaged power or the ERP, whichever is greater, for fixed, mobile, or portable RF source *i* at a distance between 0.5 cm and 40 cm (inclusive).

P_{th,i} = the exemption threshold power (P_{th}) according to paragraph (b)(3)(i)(B) of this section for fixed, mobile, or portable RF source *i*.

ERP_j = the ERP of fixed, mobile, or portable RF source *j*.

ERP_{th,j} = exemption threshold ERP for fixed, mobile, or portable RF source *j*, at a distance of at least $\lambda / 2 \pi$ according to the applicable formula of paragraph (b)(3)(i)(C) of this section.

Evaluated_k = the maximum reported SAR or MPE of fixed, mobile, or portable RF source *k* either in the device or at the transmitter site from an existing evaluation at the location of exposure.

Exposure Limit_k = either the general population/uncontrolled maximum permissible exposure (MPE) or specific absorption rate (SAR) limit for each fixed, mobile, or portable RF source *k*, as applicable from § 1.1310 of this chapter.

3 Measurement and Calculation

3.1 Maximum transmit power

The Power Data is based on the RF Test Report SUCR251000103402, SUCR251000103403, SUCR251000103404, SUCR251000103405, SUCR251000103406

3.2 RF Exposure Calculation

For single RF source :

	Evaluation method	Separation distance between the antenna to person (R)
☐	Blanket 1 mW Blanket Exemption	Regardless of separation distance
☐	MPE-based Exemption(ERP)	$R \geq (\lambda/2\pi)$
☒	SAR-based Exemption(P_{th})	$0.5\text{cm} < R < 40\text{cm}$

Band	Frequency	Max power (dBm)	Ant Gain (dBi)	EIRP (dBm)	Max EIRP (mW)	Limit (mW)	Distance R (cm)	Result	Ratio
Bluetooth	2402.0	10	4.2	14.2	26.30	3060	20	Pass	0.01
Wifi 2.4GHz	2412.0	20.5	4.2	24.7	295.12	3060	20	Pass	0.10
Wifi 5GHz	5180.0	19.5	3.4	22.9	194.98	3060	20	Pass	0.06
Wifi 6GHz	5955.0	20	5.3	25.3	338.84	3060	20	Pass	0.11

For multiple RF sources:

The BT & WLAN can transmit simultaneously but the maximum rate of MPE is $0.01+0.10+0.06+0.11=0.28 \leq 1$. So the MPE of collocated transmitter is compliant.

---End of Report---