

Report No.: SEWM2306000206RG01

Rev.: 01

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TEST REPORT

Application No.: SEWM2306000206RG
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 200233, China
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 200233, China
EUT Description: Smart Module
Model No.: SG368Z-WF
Trade Mark: Quectel
FCC ID: XMR2023SG368ZWF
Standards: 47 CFR Part 2.1091
FCC KDB 447498 D01 v06
Date of Receipt: 2023/06/20
Date of Issue: 2023/07/07

Test Result:**PASS***

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

Authorized Signature:

Well Wei

Well Wei
Wireless Laboratory Manager

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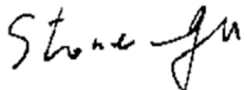
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1 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2023/07/07		Original

Prepared By	
	(Nick Hu) / Test Engineer
Checked By	
	(Stone Gu) / Reviewer



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2 General Information

2.1 Client Information

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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 200233, China

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:	Smart Module
Model No.:	SG368Z-WF
Trade Mark:	Quectel
Hardware Version:	R1.0
Software Version:	SG368ZWFNAR60A04
Antenna Type:	<input checked="" type="checkbox"/> External, <input type="checkbox"/> Integrated
Antenna Gain:	BT/BLE: -0.5dBi (Ant0)
	2.4GWIFI: -0.5dBi (Ant0)
	5150MHz to 5250MHz: 2dBi (Ant0);
	5250MHz to 5350MHz: 2dBi (Ant0);
	5470MHz to 5725MHz: 3.2dBi (Ant0);
	5725MHz to 5850MHz: 3.3dBi (Ant0);
	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: $P_d = (P_{out} * G) / (4 * \pi * R^2)$

Where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

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

P_d 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.



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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.

Operating Band	Frequency (MHz)	Antenna Gain (dBi)	Max Conducted Power (dBm)	EIRP(ERP) (dBm)	EIRP(ERP) Limit (dBm)	Power Density at R = 20 cm (mW/cm ²)	Limit (mW/cm ²)	Gain according to EIRP(ERP) (dBi)	Gain according to Pd (dBi)	Max Gain Allowed (dBi)	conclusion
BT	2402.0	-0.50	9.00	8.50	30.00	0.0014	1.0000	NA	NA	NA	Pass
2.4GWIFI	2412.0	-0.50	20.00	19.50	30.00	0.0177	1.0000	NA	NA	NA	Pass
5GWIFI	5180.0	3.30	18.50	21.80	30.00	0.0301	1.0000	NA	NA	NA	Pass



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3.1.4 Exposure calculations for multiple sources

When a number of sources at different frequencies, and/or broadband sources, contribute to the total exposure, it becomes necessary to weigh each contribution relative to the MPE in accordance with the provisions of Table(A) and Table(B). To comply with the MPE, the fraction of the MPE in terms of E2, H2 (or power density) incurred within each frequency interval should be determined and the sum of all such fractions should not exceed unity.

In order 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	2.4GHz WiFi + Bluetooth
2	5GHz WiFi + Bluetooth

No.	Mode	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)	Result Ratio	Total Ratio	Limit	Result
1	Bluetooth	0.0014	1.0000	0.0014	0.0191	1.0000	Pass
	2.4GHz WiFi	0.0177	1.0000	0.0177			
2	Bluetooth	0.0014	1.0000	0.0014	0.0315	1.0000	Pass
	5GHz WiFi	0.0301	1.0000	0.0301			

---End of Report---



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