

Report No.: SEWM2304000133RG08

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# **TEST REPORT**

**Application No.:** SEWM2304000133RG

Applicant: Quectel Wireless Solutions Co., Ltd.

Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin **Address of Applicant:** 

Road, Minhang District, Shanghai 200233, China

Manufacturer: Quectel Wireless Solutions Co., Ltd.

Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Address of Manufacturer:

Road, Minhang District, Shanghai 200233, China

**EUT Description:** LTE-A Module Model No.: EM061K-GL Trade Mark: QUECTEL

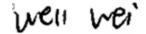
FCC ID: XMR2023EM061KGL2 Standards: 47 CFR Part 2.1091

FCC KDB 447498 D01 v06

**Date of Receipt:** 2023/04/25 Date of Issue: 2023/07/06

**Test Result:** PASS\*

Authorized Signature:



Well Wei Wireless Laboratory Manager



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



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### 1 Version

Revision Record							
Version	Remark						
01		2023/07/06		Original			

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



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#### Remark:

This test report (Report No.: SEWM2304000133RG08 issue on 2023/07/06) is based on the original test report (Report No.: SEWM2304000133RG02 issue on 2023/06/21).

Review this report and original report, this report just changing ID.

Therefore in this report all items do not need to recalculated and all test data in this report are based on the previous report with report number SEWM2304000133RG02 issue on 2023/06/21.



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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 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			

### 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:	LTE-A Module								
Model No.:	EM061K-GL								
Trade Mark:	QUECTEL								
Hardware Version:	R1.0	R1.0							
Software Version:	EM061KGLAAR01	A02M2G							
Antenna Type:		egrated							
	WCDMA Band II:	0.25dBi	WCDMA Band IV:	1.47dBi					
	WCDMA Band V:	2.68dBi							
	LTE Band 2:	0.25dBi	LTE Band 4:	1.47dBi					
	LTE Band 5:	2.68dBi	LTE Band 7:	0.55dBi					
	LTE Band 12:	-0.2dBi	LTE Band 13:	1.54dBi					
	LTE Band 14:	2.42dBi	LTE Band 17:	-0.2dBi					
Antenna Gain:	LTE Band 25:	0.25dBi	LTE Band 26:	2.87dBi					
	LTE Band 30:	-5.7dBi	LTE Band 38:	-0.18dBi					
	LTE Band 41:	0.78dBi	LTE Band 66:	1.47dBi					
	LTE Band 71:	1.22dBi							
	Note:								
	The antenna gain are derived from the gain information report provided by the manufacturer.								

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/cm2)	Averaging time (minutes)	
	(A) Limits for Occup	ational/Controlled Expo	sures		
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	1	1	f/300	6	
1500-100,000	1	1	5	6	
(	B) Limits for General P	opulation/Uncontrolled I	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	/	1	f/1500	30	
1500-100,000	1	1	1.0	30	

F=frequency in MHz

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

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

Pd id 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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<sup>\*=</sup>Plane-wave equivalent power density



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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 Average Output Power (dBm)	EIRP(ERP) (dBm)	EIRP(ERP) Limit (dBm)	Power Density at R = 20 cm (mW/cm2)	Limit (mW/cm2)	Gain according to EIRP(ERP) (dBi)	Gain according to Pd (dBi)	Max Gain Allowed (dBi)	conclusion
WCDMA Band II	1852.4	0.25	25.00	25.25	33.00	0.0666	1.0000	8.00	12.01	8.00	Pass
WCDMA Band VI	1712.4	1.47	25.00	26.47	30.00	0.0883	1.0000	5.00	12.01	5.00	Pass
WCDMA Band V	828.4	2.68	25.00	25.53	38.50	0.1166	0.5523	15.65	9.43	9.43	Pass
LTE Band 2	1850.7	0.25	24.50	24.75	33.00	0.0594	1.0000	8.50	12.51	8.50	Pass
LTE Band 4	1710.7	1.47	24.50	25.97	30.00	0.0787	1.0000	5.50	12.51	5.50	Pass
LTE Band 5	824.7	2.68	24.50	25.03	38.45	0.1039	0.5498	16.10	9.91	9.91	Pass
LTE Band 7	2502.5	0.55	24.00	24.55	33.00	0.0567	1.0000	9.00	13.01	9.00	Pass
LTE Band 12	699.7	-0.20	24.50	22.15	34.77	0.0535	0.4665	12.42	9.20	9.20	Pass
LTE Band 13	779.5	1.54	24.50	23.89	34.77	0.0799	0.5197	12.42	9.66	9.66	Pass
LTE Band 14	790.5	2.42	24.50	24.77	34.77	0.0979	0.5270	12.42	9.73	9.73	Pass
LTE Band 17	706.5	-0.20	24.50	22.15	34.77	0.0535	0.4710	12.42	9.24	9.24	Pass
LTE Band 25	1850.7	0.25	24.50	24.75	33.00	0.0594	1.0000	8.50	12.51	8.50	Pass
LTE Band 26 (814-824)	814.7	2.87	24.50	25.22	NA	0.1086	0.5431	NA	9.86	9.86	Pass
LTE Band 26 (824-849)	824.7	2.87	24.50	25.22	38.45	0.1086	0.5498	16.10	9.91	9.91	Pass
LTE Band 30	2307.5	-5.70	23.00	17.30	23.98	0.0107	1.0000	0.98	14.01	0.98	Pass
LTE Band 38	2572.5	-0.18	24.00	23.82	33.00	0.0479	1.0000	9.00	13.01	9.00	Pass
LTE Band 41	2498.5	0.78	24.00	24.78	33.00	0.0598	1.0000	9.00	13.01	9.00	Pass
LTE Band 66	1710.7	1.47	24.50	25.97	30.00	0.0787	1.0000	5.50	12.51	5.50	Pass
LTE Band 71	665.5	1.22	24.50	23.57	34.77	0.0743	0.4437	12.42	8.98	8.98	Pass
Bluetooth	2402.0	5.00	23.00	28.00		0.1255	1.0000				
WLAN2.4GHz	2412.0	5.00	23.00	28.00		0.1255	1.0000				
WLAN5GHz	5180.0	5.00	23.00	28.00		0.1255	1.0000				

#### Note:

- 1. This MPE analysis is applicable to any collocated transmitters with transmit power for WLAN is less than or equal to 28dBm and for Bluetooth is less than or equal to 28dBm.
- 2. A maximum antenna gain of 5dBi for WLAN/BT has been assumed for all collocated antennas.



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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

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

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

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

No.	Mode	Power Density (mW/cm²)	MPE Limit (mW/cm <sup>2</sup> )	Result Ratio	Total Ratio	Limit	Result
	WCDMA Band V	0.1166	0.5523	0.2111			Pass
	Bluetooth	0.1255	1.0000	0.1255	0.5876 1.0000	1.0000	
'	WiFi 2.4G	0.1255	1.0000	0.1255	0.5676	1.0000	
	WiFi 5G	0.1255	1.0000	0.1255			

Note: Considering the WWAN module collocation with the WLAN and Bluetooth transmitter of the EIRP performance listed in the table above, the aggregated (power density /limit) is smaller than 1, and MPE of 3 collocated transmitters is compliant.

---End of Report---



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