

Report No.: SEWM2304000133RG08

Rev.: 01

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# TEST REPORT

**Application No.:** SEWM2304000133RG  
**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:** 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

|                     |              |
|---------------------|--------------|
| <b>Test Result:</b> | <b>PASS*</b> |
|---------------------|--------------|

\* 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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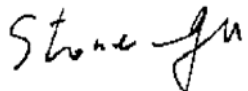
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## 1 Version

| Revision Record |         |            |          |          |
|-----------------|---------|------------|----------|----------|
| Version         | Chapter | Date       | Modifier | Remark   |
| 01              |         | 2023/07/06 |          | Original |

|             |  |                                                                                                                |
|-------------|--|----------------------------------------------------------------------------------------------------------------|
| Prepared By |  | <br>(Nick Hu) / Test Engineer |
| Checked By  |  | <br>(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 be 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                                                                              |                        |
| Software Version:                                                                                                                                                            | EM061KGLAAR01A02M2G                                                               |                        |
| Antenna Type:                                                                                                                                                                | <input checked="" type="checkbox"/> External, <input type="checkbox"/> Integrated |                        |
| Antenna Gain:                                                                                                                                                                | 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   |
|                                                                                                                                                                              | 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:<br>The antenna gain are derived from the gain information report provided by the manufacturer.                                                                         |                                                                                   |                        |
| Remark:<br>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<br>(MHz)                                       | Electric field strength<br>(V/m) | Magnetic field strength<br>(A/m) | Power density<br>(mW/cm <sup>2</sup> ) | Averaging time<br>(minutes) |
|----------------------------------------------------------------|----------------------------------|----------------------------------|----------------------------------------|-----------------------------|
| <b>(A) Limits for Occupational/Controlled Exposures</b>        |                                  |                                  |                                        |                             |
| 0.3-3.0                                                        | 614                              | 1.63                             | *(100)                                 | 6                           |
| 3.0-30                                                         | 1842/f                           | 4.89/f                           | *(900/f <sup>2</sup> )                 | 6                           |
| 30-300                                                         | 61.4                             | 0.163                            | 1.0                                    | 6                           |
| 300-1500                                                       | /                                | /                                | f/300                                  | 6                           |
| 1500-100,000                                                   | /                                | /                                | 5                                      | 6                           |
| <b>(B) Limits for General Population/Uncontrolled Exposure</b> |                                  |                                  |                                        |                             |
| 0.3-1.34                                                       | 614                              | 1.63                             | *(100)                                 | 30                          |
| 1.34-30                                                        | 824/f                            | 2.19/f                           | *(180/f <sup>2</sup> )                 | 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/cm<sup>2</sup>

$P_{out}$  = 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

$P_d$  is the limit of MPE, 1 mW/cm<sup>2</sup>. 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 Average Output Power (dBm) | EIRP(ERP) (dBm) | EIRP(ERP) Limit (dBm) | Power Density at R = 20 cm (mW/cm <sup>2</sup> ) | Limit (mW/cm <sup>2</sup> ) | 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

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

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/cm <sup>2</sup> ) | MPE Limit (mW/cm <sup>2</sup> ) | Result Ratio | Total Ratio | Limit  | Result |
|-----|--------------|-------------------------------------|---------------------------------|--------------|-------------|--------|--------|
| 1   | WCDMA Band V | 0.1166                              | 0.5523                          | 0.2111       | 0.5876      | 1.0000 | Pass   |
|     | Bluetooth    | 0.1255                              | 1.0000                          | 0.1255       |             |        |        |
|     | WiFi 2.4G    | 0.1255                              | 1.0000                          | 0.1255       |             |        |        |
|     | 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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