# TEST REPORT

| | |
|---|---|
| **Application No.:** | SEWA2210000069RG |
| **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:** | 5G Module |
| **Model No.:** | AG568N-NA |
| **Trade Mark:** | Quectel |
| **FCC ID:** | XMR2022AG568NNA |
| **Standards:** | 47 CFR Part 2.1091<br>FCC KDB 447498 D01 v06 |
| **Date of Receipt:** | 2023/01/28 |
| **Date of Issue:** | 2023/03/29 |
| **Test Result:** | **PASS*** |

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

Authorized Signature:

Panta Sun

Panta Sun
Wireless Laboratory Manager



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.sgsgroup.com.cn
中国·苏州·中国（江苏）自由贸易试验区苏州片区苏州工业园区润胜路1号的6号厂房南部 邮编：215000 t (86-512) 62992980 sgs.china@sgs.com

# 1 Version

| Revision Record | | | | |
|---|---|---|---|---|
| **Version** | **Chapter** | **Date** | **Modifier** | **Remark** |
| 01 | | 2023/03/29 | | Original |

| | | |
|---|---|---|
| **Prepared By** | | Nick Hu<br>**(Nick Hu) / Test Engineer** |
| **Checked By** | | Well Wei<br>**(Well Wei) / Reviewer** |



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# Contents





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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

## 2.3 General Description of EUT

| | | | | |
|---|---|---|---|---|
| EUT Description: | 5G Module | | | |
| Model No.: | AG568N-NA | | | |
| Trade Mark: | Quectel | | | |
| Hardware Version: | R1.0 | | | |
| Software Version: | AG568NAAR06A05M8G_OCPU | | | |
| Antenna Type: | ☒ External, ☐ Integrated | | | |
| Antenna Gain: | LTE Band 2: | 0dBi (Ant0) | LTE Band 4: | 0.3dBi (Ant0) |
| | LTE Band 5: | -0.42dBi (Ant1) | LTE Band 12: | 0.97dBi (Ant1) |
| | LTE Band 66: | 0.39dBi (Ant0) | LTE CA_5B: | -0.42dBi (Ant1) |
| | LTE CA_66B: | 0.39dBi (Ant0) | LTE CA_66C: | 0.39dBi (Ant0) |
| | NR Band n2: | 0dBi (Ant0) | NR Band n5: | -0.42dBi (Ant1) |
| | NR Band n12: | 0.97dBi (Ant1) | NR Band n66: | 0.39dBi (Ant0) |
| | NR Band n77: | -3.65dBi (Ant1) | NR Band n78: | -3.65dBi (Ant1) |
| | ENDC:<br>DC_12A_n2A;DC_5A_n2A; DC_66A_n5A;DC_2A_n5A; DC_5A_n66A;<br>DC_12A_n66A ; DC_2A_n77A;DC_5A_n77A;DC_12A_n77A;DC_66A_n77A | | | |
| | 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. | | | | |

# 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 Occupational/Controlled Exposures** | | | | |
| 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 | / | / | 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/f2) | 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

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.

### 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LTE B2 | 1850.7 | 0.00 | 25.00 | 25.00 | 33.00 | 0.0629 | 1.0000 | 8.00 | 12.01 | 8.00 | Pass |
| LTE B4 | 1710.7 | 0.30 | 25.00 | 25.30 | 30.00 | 0.0674 | 1.0000 | 5.00 | 12.01 | 5.00 | Pass |
| LTE B5 LTE CA_5B | 824.7 | -0.42 | 25.00 | 22.43 | 38.45 | 0.0571 | 0.5498 | 15.60 | 9.41 | 9.41 | Pass |
| LTE B12 | 699.7 | 0.97 | 25.00 | 23.82 | 34.77 | 0.0787 | 0.4665 | 11.92 | 8.70 | 8.70 | Pass |
| LTE B66 /LTE CA_66B /LTE CA_66C | 1710.7 | 0.39 | 25.00 | 25.39 | 30.00 | 0.0688 | 1.0000 | 5.00 | 12.01 | 5.00 | Pass |
| NR Band n2 | 1852.5 | 0.00 | 25.00 | 25.00 | 33.00 | 0.0629 | 1.0000 | 8.00 | 12.01 | 8.00 | Pass |
| NR Band n5 | 826.5 | -0.42 | 25.00 | 22.43 | 38.45 | 0.0571 | 0.5510 | 15.60 | 9.42 | 9.42 | Pass |
| NR Band n12 | 701.5 | 0.97 | 25.00 | 23.82 | 34.77 | 0.0787 | 0.4677 | 11.92 | 8.71 | 8.71 | Pass |
| NR Band n66 | 1712.5 | 0.39 | 25.00 | 25.39 | 30.00 | 0.0688 | 1.0000 | 5.00 | 12.01 | 5.00 | Pass |
| NR Band n77 (3450-3550)(PC2) | 3455.01 | -3.65 | 27.00 | 23.35 | 30.00 | 0.0430 | 1.0000 | 3.00 | 10.01 | 3.00 | Pass |
| NR Band n77 (3700-3980)(PC2) | 3705.0 | -3.65 | 27.00 | 23.35 | 30.00 | 0.0430 | 1.0000 | 3.00 | 10.01 | 3.00 | Pass |
| NR Band n78 (3450-3550)(PC2) | 3455.01 | -3.65 | 27.00 | 23.35 | 30.00 | 0.0430 | 1.0000 | 3.00 | 10.01 | 3.00 | Pass |
| NR Band n78 (3700-3800)(PC2) | 3705.0 | -3.65 | 27.00 | 23.35 | 30.00 | 0.0430 | 1.0000 | 3.00 | 10.01 | 3.00 | Pass |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

Due to the EUT support NR ENDC:
Both LTE and NR/LTE band can transmit simultaneously, the formula of the calculated the MPE is:

$$\sum_{i=1}^{n} \frac{S_{E_i}(duty\,factor)}{MPE_{E_i}} < 1$$

NOTE The corresponding MEs must be expressed in terms of power density in the above summation
Therefore, the worst-case(DC_12A_n66A) situation is 0.169+0.069=0.238,which is less than “1”,
this confirmed that the device comply with MPE limit.

---End of Report---