

# Quectel RM520N-GL

IoT/eMBB-Optimized

5G Sub-6 GHz M.2 Module



# RM520N-GL-AA

## Release Notes

### 5G Module Series

Rev. RM520N-GL-AA\_Firmware\_Release\_Notes\_V0108\_01.205.01.205

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## 1. Release Content

This document provides the Release Notes for RM520N-GL-AA. The current release includes the following firmware package.

| Package  | Firmware Version    | Configuration Version |
|----------|---------------------|-----------------------|
| Firmware | RM520NGLAAR01A08M4G | 01.205.01.205         |

## 2. Matters Needing Attention

| SN  | Item  |
|-----|---|
| [1] | The firmware version earlier than R01A05 needs to be upgraded to the R01A05 or later version through USB Firehose, and cannot be upgraded to A05 through FOTA; R01A05 and later versions can be directly upgraded through FOTA.   |
| [2] | The new firmware version cannot be downgraded to versions released before RM520NGLAAR01A07M4G_01.200.01.200, otherwise the module will not be able to work normally.  |
| [3] | To extend the service life of flash, it is recommended that the total number of operations related to powering on/off the module, CFUN switching, SIM card hot swapping, dual-SIM switching, or repeated execution of NVM commands should not exceed 30 times per day.  |
| [4] | It is not recommended to directly modify the pre-set APN profiles. Please create an APN profile after the existed CID number. Suppose you modify the APN profile of IMS, SOS, etc. with added specific attributes, these attributes are hidden after modification, causing the profile to still be unavailable. |
| [5] | During the FOTA upgrade process, it is necessary to ensure the stable power supply of the module. If the power is disconnected during the upgrade, there is a small probability that the flash will be damaged.   |
| [6] | M.2 module is encapsulated without SPI, and SLIC cannot be mounted on the module.   |
| [7] | The firmware version whose description is “only for sample” is only used for debugging, and is prohibited from mass production, certification or any other purposes.  |

### 3. Release History

#### 3.1. Firmware Release History

| Firmware Version    | Configuration Version | Description     |
|---------------------|-----------------------|-----------------|
| RM520NGLAAR01A08M4G | 01.205.01.205         | Mass production |
| RM520NGLAAR01A08M4G | 01.204.01.204         | Mass production |
| RM520NGLAAR01A08M4G | 01.203.01.203         | Mass production |
| RM520NGLAAR01A08M4G | 01.202.01.202         | Mass production |
| RM520NGLAAR01A08M4G | 01.201.01.201         | Mass production |
| RM520NGLAAR01A08M4G | 01.200.01.200         | Mass production |
| RM520NGLAAR01A07M4G | 01.203.01.203         | Mass production |
| RM520NGLAAR01A07M4G | 01.202.01.202         | Mass production |
| RM520NGLAAR01A07M4G | 01.201.01.201         | Mass production |
| RM520NGLAAR01A07M4G | 01.200.01.200         | Mass production |
| RM520NGLAAR01A06M4G | 01.001.01.001         | Mass production |
| RM520NGLAAR01A05M4G | 01.001.01.001         | Only for sample |
| RM520NGLAAR01A04M4G | 01.001.01.001         | Only for sample |
| RM520NGLAAR01A03M4G | 01.001.01.001         | Only for sample |

#### 3.2. New Features

| RM520NGLAAR01A08M4G_01.205.01.205 |  |
|-----------------------------------|--|
| Item                              | Brief Description  |
| GNSS                              | <p>Added the following AT commands:</p> <ul style="list-style-type: none"> <li>● <b>AT+QGPSCFG="1pps_mode"</b> to turn on/off GPS 1PPS signal.</li> <li>● <b>AT+QGPSCFG="1pps_offset"</b> to specify the GPS receiver chain fixed bias to</li> </ul> |

be added to the timed output signal.

**NETWORK** Enabled DSS feature under FirstNet network.

**GENERAL** Added MCC and MNC configuration 46020–46029 for CMCC, and updated the date of MBN to 202408281.

**GENERAL** Merged XQCN, added SAR configuration feature and removed the restriction that SAR configurations were associated with DPR hardware pins.

RM520NGLAAR01A08M4G\_01.204.01.204

| Item | Brief Description |
|------|-------------------|
|------|-------------------|

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| / | / |
|---|---|

RM520NGLAAR01A08M4G\_01.203.01.203

| Item | Brief Description |
|------|-------------------|
|------|-------------------|

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|---|---|
| / | / |
|---|---|

RM520NGLAAR01A08M4G\_01.202.01.202

| Item | Brief Description |
|------|-------------------|
|------|-------------------|

|   |   |
|---|---|
| / | / |
|---|---|

RM520NGLAAR01A08M4G\_01.201.01.201

| Item | Brief Description |
|------|-------------------|
|------|-------------------|

**GENERAL** Added **AT+QRSSI** to obtain the RSSI of the current service network of the module.

RM520NGLAAR01A08M4G\_01.200.01.200

| Item | Brief Description |
|------|-------------------|
|------|-------------------|

|   |   |
|---|---|
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|---|---|

RM520NGLAAR01A07M4G\_01.203.01.203

| Item | Brief Description |
|------|-------------------|
|------|-------------------|

|   |   |
|---|---|
| / | / |
|---|---|

RM520NGLAAR01A07M4G\_01.202.01.202

| Item | Brief Description |
|------|-------------------|
|------|-------------------|

Added the following AT commands:

**GENERAL**

- **AT+QNWCFG="nr5g\_mimo\_info"** to control whether to list 5G DL and UL MIMO information.

RM520NGLAAR01A07M4G\_01.201.01.201

| Item    | Brief Description   |
|---------|---|
| GENERAL | <p>Added the following AT commands:</p> <ul style="list-style-type: none"> <li>● <b>AT+QNWCFG="ledmode"</b> to set the blinking mode of the network light.</li> <li>● <b>AT+QWDSCFG="operator_reserved_pco"</b> to configure PCO.</li> <li>● <b>AT+QNWCFG="nitz_ons"</b> to query PLMN long name and short name from NITZ.</li> <li>● <b>AT+QAUARDY</b> to query the status of the Audio service on AP side.</li> </ul> |

RM520NGLAAR01A07M4G\_01.200.01.200

| Item    | Brief Description   |
|---------|---|
| NETWORK | Relevant technical controls have been carried out to restrict normal network registration in regions such as RUS and IRN, thus ensuring that the module can be used only for civilian applications. |
| GENERAL | The new firmware version cannot be downgraded to previous versions, otherwise the module will not be able to work normally.   |
| GENERAL | Supported the feature of routing behind mobile station.   |
| GENERAL | Added <b>AT+QXQCN</b> to configure and query RF parameters of the module and import QXCN file.  |

RM520NGLAAR01A06M4G\_01.001.01.001

| Item    | Brief Description  |
|---------|--|
| GENERAL | Supported AQR113C.   |
| GENERAL | Supported URC reporting of PIN-related information (modification, activation, and verification of PIN).  |
| GENERAL | <p>Added the following AT commands:</p> <ul style="list-style-type: none"> <li>● <b>AT+QUPTIME</b> to get the system power-up time.</li> <li>● <b>AT+QFOTAPID</b> to configure the Profile ID used in FOTA upgrade.</li> <li>● <b>AT+QSIMCFG="dual_slot_status"</b> to query related information of the SIM cards when dual SIM cards were both inserted.</li> <li>● <b>AT+QSIMCFG="sim_recovery"</b> to support SIM card recovery and automatic detection.</li> <li>● <b>AT+QNWCFG="nr5g_pathloss"</b> to query NR5G pathloss information.</li> <li>● <b>AT+QPCIE="pcie_gen"</b> to query PCIe GEN in PCIe RC mode.</li> <li>● <b>AT+QNWCFG="cops_auto_mode"</b> to configure whether the mode preference is controlled by <b>AT+COPS</b>.</li> <li>● <b>AT+QNWCFG="nr5g_ulbw"</b> to query NR5G uplink bandwidth.</li> <li>● <b>AT+QNWCFG="lte_ulMCS"</b> to query LTE uplink MCS and modulation type.</li> <li>● <b>AT+QTHERMAL="lte_ul_throttle"</b> to control the uplink rate of Level 1 in LTE PA mechanism.</li> <li>● <b>AT+QTHERMAL="nr_ul_throttle"</b> to configure the uplink rate of Level 1 in</li> </ul> |

NR5G PA mechanism.

- **AT+QTHERMAL="lte\_mtpl\_backoff"** to control the reduced power value of Level 2 in LTE PA mechanism.
- **AT+QTHERMAL="nr\_mtpl\_backoff"** to control the reduced power value of the level 2 in NR5G PA mechanism.
- **AT+QCALLCFG="ussd\_format"** to configure the report format of +CUSD to be hexadecimal or ASCII.
- **AT+QSIMCFG="slot\_features"** to support whether to skip the detection of service130 and service133.

**RM520NGLAAR01A05M4G\_01.001.01.001**

| Item | Brief Description |
|------|-------------------|
|------|-------------------|

**GENERAL** Configured the project as data-only.

**GENERAL** Configured Commercial-TMO MBN as data-only.

**RM520NGLAAR01A04M4G\_01.001.01.001**

| Item | Brief Description |
|------|-------------------|
|------|-------------------|

**Thermal Mitigation** Added **AT+QTHERMAL** to expand related configurations of thermal management.

**GENERAL** Added **AT+QDPRSAR** to set a DPR scheme.

**RM520NGLAAR01A03M4G\_01.001.01.001**

| Item | Brief Description |
|------|-------------------|
|------|-------------------|

/ /



### 3.3. Improved Features

| RM520NGLAAR01A08M4G_01.205.01.205 |  |
|-----------------------------------|--|
| Item                              | Brief Description  |
| NETWORK                           | Solved the problem that the operator name could not be obtained after the execution of <b>AT+COPS?</b> .   |
| NETWORK                           | Solved the problem that there was a probability that no result was returned when searching for a single frequency band by <b>AT+QSCAN</b> .  |
| (U)SIM                            | Solved the problem that SIM-related QMI response timed out.  |
| (U)SIM                            | Solved the problem that <b>+CME ERROR: 13</b> was returned after the execution of <b>AT+COPS</b> when SIM refresh occurred.  |
| GENERAL                           | Solved the problem that an empty profile was incorrectly created when executing <b>AT+QPACT</b> with an overlong <b>&lt;APN_name&gt;</b> value.  |
| GENERAL                           | Updated the PLMN list of the TS 25 operator.   |
| RM520NGLAAR01A08M4G_01.204.01.204 |  |
| Item                              | Brief Description  |
| NETWORK                           | Solved the problem that the module did not report URC <b>+C5GREG: 1</b> after a China Telecom SIM card was inserted and the network mode was switched from LTE to AUTO.  |
| NETWORK                           | Solved the problem that the latest AMBR configuration could not be obtained via <b>AT+QNWCFG="nr5g_ambr"</b> under NR5G network when the PDU_SESSION_MODIFICATION_COMMAND message issued by the network contained an AMBR message. |
| NETWORK                           | Solved the problem that <b>+CEREG</b> URC was reported repeatedly when the LTE network was switched to NR5G network.   |
| NETWORK                           | Solved the problem that the value of <b>&lt;AcT&gt;</b> queried by <b>AT+COPS?</b> was still 13 after the module switched from NSA network to LTE network.   |
| NETWORK                           | Solved the problem of being unable to attach T-Mobile network with static APN.   |
| (U)SIM                            | Solved the problem of 5G network registration failure caused by the failure to obtain the SUCI of the SIM card.  |
| RM520NGLAAR01A08M4G_01.203.01.203 |  |
| Item                              | Brief Description  |
| NETWORK                           | Solved the problem that the NR5G cell information queried with <b>AT+QSCAN=3,3</b> was not complete.   |
| GENERAL                           | Solved the low-probability problem of QLINK exception.   |

## RM520NGLAAR01A08M4G\_01.202.01.202

| Item    | Brief Description  |
|---------|--|
| NETWORK | Optimized the logic of <b>AT+QENDC</b> so that <b>AT+QENDC</b> can also be executed when a data only SIM card is inserted.   |
| NETWORK | Solved the problem that the invalid <b>&lt;TAC&gt;</b> did not appear as "-" after the execution of <b>AT+QENG</b> .   |
| NETWORK | Solved the problem that the operator name could not be returned after the execution of <b>AT+COPS?</b> when a SIM card of China Broadcast Network Co., Ltd was inserted. |
| NETWORK | Integrated the patch to fix the problem of network disconnection in the case of unstable 5G network.   |
| GENERAL | Fixed the CVE-2023-33042/33043/33044 security vulnerabilities.   |

## RM520NGLAAR01A08M4G\_01.201.01.201

| Item      | Brief Description  |
|-----------|--|
| DATA CALL | Solved the problem that RTL8367 did not support fixed rates of 100 Mbps or 10 Mbps.  |
| DATA CALL | Solved the problem of <b>AT+QPING</b> exception.   |
| GNSS      | Solved the problem that SBAS satellite information was not displayed in GPGSV sentence after SBAS was enabled.   |
| NETWORK   | Solved the problem that there was a probability that the band information obtained by <b>AT+QENG="servingcell"</b> in the limited-service status was abnormal. |
| NETWORK   | Solved the problem that the module might be unable to work properly due to the execution of <b>AT+QENG="neighbourcell"</b> .                                   |
| NETWORK   | Solved the problem that an incorrect PLMN was returned in some cases after the execution of <b>AT+QSCAN</b> .  |
| NETWORK   | Solved the problem that the SINR value returned by <b>AT+QENG</b> was incorrect.   |
| NETWORK   | Solved the problem that <b>AT+QSRQ</b> was unavailable under NSA network.  |
| NETWORK   | Solved the problem that an error was reported when the length of parameter <b>&lt;APN&gt;</b> in <b>AT+QICSGP</b> was 63 bytes.                                |
| SAR       | Optimized <b>AT+QSAR</b> to solve the problem that the switching of index under WCDMA network could not take effect immediately.                               |

## RM520NGLAAR01A08M4G\_01.200.01.200

| Item    | Brief Description  |
|---------|--|
| GENERAL | Updated the Verizon ENDC whitelist as required by Verizon. |

## RM520NGLAAR01A07M4G\_01.203.01.203

| Item | Brief Description |
|------|-------------------|
|------|-------------------|

|         |  |
|---------|--|
| GENERAL | Fixed DFIT#1 issue to make module acquire 3LTE+1NR when working under Samsung n77 Infra for Verizon MBN.               |
| GENERAL | Fixed Motive issue on TC2.08 for Verizon MBN.  |
| GENERAL | Hard code 5G Stand Alone was disabled in SW and not allowed to use AT command to enable or disable SA for Verizon MBN. |
| GENERAL | Disabled 2CC on N77 for non-contiguous carriers for Verizon MBN.   |

#### RM520NGLAAR01A07M4G\_01.202.01.202

| Item      | Brief Description  |
|-----------|--|
| NETWORK   | Extended <b>AT+QNWCFG="ssb_beam_id"</b> to add <b>&lt;RSRQ&gt;</b> and <b>&lt;PCID&gt;</b> in the return value of the command and to query all SSB beam information that have been measured currently. |
| NETWORK   | Modified the value of <b>&lt;SRS_tx_pwr&gt;</b> in the return result of <b>AT+QNWCFG="lte_tx_pwr"</b> .  |
| RF TX FTM | Extended <b>AT+QTXFTMEX</b> to add <b>&lt;nr_srs&gt;</b> parameter.  |
| RmNet     | Solved the probabilistic problem that RmNet data call failed in some special cases.  |
| GENERAL   | Solved the problem that the module probabilistically did not forward IPV6 NS packets to LAN device in bridge mode.   |

#### RM520NGLAAR01A07M4G\_01.201.01.201

| Item      | Brief Description  |
|-----------|--|
| DFOTA     | Added judgment to limit FOTA URL length to 512 bytes.  |
| MBIM      | Solved the problem of incorrect signal grids of Windows OS.  |
| RF TX FTM | Solved the problem of error reported when n41 was tested with <b>AT+QTXFTMSRS</b> .  |
| GENERAL   | Optimized cw2017 driver to solve the problem that the module might not be available in some scenarios.   |
| GENERAL   | Solved the problem that URC could only be sent through the USB AT port, USB modem port and UART1 because the URC reporting ports were limited.   |
| GENERAL   | <p>Solved the following problems related to <b>AT+CLCC</b>:</p> <ul style="list-style-type: none"> <li>An error was reported when <b>AT+CLCC</b> was executed during EPSFB process.</li> <li>The voice call status queried through <b>AT+CLCC</b> was abnormal after the data call ended.</li> </ul> |

#### RM520NGLAAR01A07M4G\_01.200.01.200

| Item    | Brief Description   |
|---------|---|
| GENERAL | Extended <b>AT+QSINR</b> to obtain the SINR value in NSA.   |
| GENERAL | Solved the problem that the RSRP and RSRQ values returned by <b>AT+QSCAN</b> in some cases were null. |

## RM520NGLAAR01A06M4G\_01.001.01.001

| Item    | Brief Description  |
|---------|--|
| NETWORK | Extended <b>AT+QNWCFG="ledmode"</b> to support turning off all lights.   |
| USB     | Optimized <b>AT+QCFG="usbcfg"</b> to support disabling or enabling QDL and QDSS.   |
| GENERAL | Solved the problem that the bandwidth value returned by <b>AT+QENG="servingcell"</b> did not match the actual value.                               |
| GENERAL | Optimized the MBN exception recovery mechanism.  |
| GENERAL | Optimized the verification mechanism of DFOTA and ABFOTA for the file name of upgrade firmware package.  |
| GENERAL | Optimized <b>AT+QCAINFO</b> to add restrictions and judgments on the network so that the parameters were returned after connecting to the network. |
| GENERAL | Extended <b>AT+QSCAN</b> to add <b>&lt;scan_LTE_band&gt;</b> and <b>&lt;scan_NR5G_band&gt;</b> .   |
| GENERAL | Solved the problem of not supporting the query of the uplink frequency of LTE under NSA with <b>AT+QNWCFG="freq_info"</b> .                        |
| GENERAL | Optimized <b>AT+QIMSCFG="service"</b> for parameter configuration to take effect immediately.  |
| GENERAL | Extended <b>AT+QENDC</b> to add parameter and to support URC reporting.  |
| GENERAL | Forbade to execute <b>AT+CFUN=0</b> or <b>AT+CFUN=1</b> when #W_DISABLE1 was in low level.   |
| GENERAL | Modified the URC default report port to All Port.  |

## RM520NGLAAR01A05M4G\_01.001.01.001

| Item    | Brief Description  |
|---------|--|
| NETWORK | Extended <b>AT+QNWCFG="rrc_state"</b> to support URC reporting.  |
| GENERAL | Solved the problem that the AT port could not work properly after configuring to report the URC through all ports. |
| GENERAL | Extended <b>AT+QGPAPN</b> to support querying IPv4 addresses.  |
| GENERAL | Extended <b>AT+QRSRP</b> to support querying NSA information.  |
| GENERAL | Modified <b>AT+QGPAPN</b> to adapt it to NSA.  |
| GENERAL | Optimized the reporting logic of URC +C5GREG.  |
| GENERAL | Solved the problem that only one APN could be queried through <b>AT+QGPAPN</b> after multiple data call under SA.  |

## RM520NGLAAR01A04M4G\_01.001.01.001

| Item | Brief Description |
|------|-------------------|
|------|-------------------|

| <b>NETWORK</b>                           | Extended <b>AT+QCAINFO</b> to support querying CA information under NSA and SA.                            |
|--|--|
| <b>NETWORK</b>                           | Solved the problem that after disabling NSA, you can still query the NSA information with <b>AT+QENG</b> . |
| <b>GENERAL</b>                           | Updated the command set and the response format of <b>AT+QMAP</b> .  |
| <b>RM520NGLAAR01A03M4G_01.001.01.001</b> |  |
| Item                                     | Brief Description  |
| /  | /  |

### 3.4. Known Issues

| Item | Bug Description |
|------|-----------------|
| /    | /               |

#### NOTE

Verification Environment is shown below. For more details, please contact Quectel Technical Support.

For Windows:

USB Driver: Quectel\_Windows\_USB\_Driver(Q)\_NDIS\_V2.4.8.zip

Qflash Tool: QFlash\_V6.8.zip

For Linux:

QMI\_WWAN Driver: Quectel\_Linux\_QMI\_WWAN\_Driver\_V1.2.1.zip

GobiNet Driver: Quectel\_Linux&Android\_GobiNet\_Driver\_V1.6.3.zip

PCIE Driver: Quectel\_Linux\_PCIE\_MHI\_Driver\_V1.3.1.zip

QFirehose Tool: Quectel\_LTE&5G\_QFirehose\_Linux&Android\_V1.4.10.zip

Quectel-CM Tool: Quectel\_QConnectManager\_Linux\_V1.6.1.zip

QLog Tool: Quectel\_QLog\_Linux&Android\_V1.5.14.zip

For IPQ:

Quectel PCIE Driver: Quectel\_Linux\_PCIE\_MHI\_Driver\_V1.3.1.zip

## 4. Functions List

| Category           | Item             | Supported Version (Since)             | Note |
|--------------------|------------------|---------------------------------------|------|
| Basic Function     | SMS              | RM520NGLAAR01A03M4G<br>_01.001.01.001 | /    |
|                    | Network          | RM520NGLAAR01A03M4G<br>_01.001.01.001 | /    |
| File Function      | UFS              | RM520NGLAAR01A03M4G<br>_01.001.01.001 | /    |
| Protocol Function  | QMI              | RM520NGLAAR01A03M4G<br>_01.001.01.001 | /    |
|                    | NITZ             | RM520NGLAAR01A03M4G<br>_01.001.01.001 | /    |
|                    | LwM2M            | RM520NGLAAR01A06M4G<br>_01.001.01.001 | /    |
| Interface Function | USB              | RM520NGLAAR01A03M4G<br>_01.001.01.001 | /    |
|                    | MBIM             | RM520NGLAAR01A03M4G<br>_01.001.01.001 | /    |
|                    | RmNet            | RM520NGLAAR01A03M4G<br>_01.001.01.001 | /    |
|                    | PCIE             | RM520NGLAAR01A03M4G<br>_01.001.01.001 | /    |
| Locate Function    | AGPS             | RM520NGLAAR01A03M4G<br>_01.001.01.001 | /    |
| Upgrade Function   | FOTA             | RM520NGLAAR01A05M4G<br>_01.001.01.001 | /    |
| SIM Function       | DSSS             | RM520NGLAAR01A03M4G<br>_01.001.01.001 | /    |
|                    | (U)SIM Detection | RM520NGLAAR01A03M4G<br>_01.001.01.001 | /    |
|                    | ESIM             | RM520NGLAAR01A06M4G<br>_01.001.01.001 | /    |
| Special Function   | Wi-Fi 6          | RM520NGLAAR01A04M4G<br>_01.001.01.001 | /    |
|                    | Low Power        | RM520NGLAAR01A04M4G<br>_01.001.01.001 | /    |
|                    | RF RX FTM        | RM520NGLAAR01A03M4G<br>_01.001.01.001 | /    |
|                    | RF TX FTM        | RM520NGLAAR01A03M4G                   | /    |

|                   |                    |                                       |   |
|-------------------|--------------------|---------------------------------------|---|
|                   |                    | _01.001.01.001                        |   |
|                   | SAR                | RM520NGLAAR01A04M4G<br>_01.001.01.001 | / |
|                   | Thermal Mitigation | RM520NGLAAR01A04M4G<br>_01.001.01.001 | / |
| Security Function | Secure boot        | RM520NGLAAR01A06M4G<br>_01.001.01.001 | / |
| 5G Function       | 5G                 | RM520NGLAAR01A03M4G<br>_01.001.01.001 | / |

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## About Quectel

Quectel's passion for a smarter world drives us to accelerate IoT innovation. As a highly customer-centric organization, we are a global IoT solution provider backed by outstanding support and services. Our growing global team of 5,900 professionals sets the pace for innovation in cellular, automotive, smart, GNSS, satellite, Wi-Fi and Bluetooth modules as well as antennas and services.

With regional offices and support across the globe, our international leadership is devoted to advancing IoT and building a smarter world.

