

# Quectel RM502Q-AE

IoT/eMBB-Optimized  
5G Sub-6 GHz M.2 Module



# RM502Q-AE-AA

## Release Notes

### 5G Module Series

Rev. RM502Q-AE-AA\_Firmware\_Release\_Notes\_V1104\_01.003.01.003

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## 1. Release Content

This document provides the Release Notes for RM502Q-AE-AA. The current release includes the firmware package.

Package	Version
Firmware	RM502QAEAAR11A04M4G_01.003.01.003

## 2. Matters Needing Attention

SN	Item
[1]	SA MBIM dialing is supported in Windows 10 1903 and above versions.
[2]	5G CA and VoNR are not supported.

### 3. Release History

#### 3.1. Firmware Release History

Firmware Release	Description
RM502QAEALAR11A04M4G_01.003.01.003	Mass production
RM502QAEALAR11A04M4G_01.002.01.002	Mass production
RM502QAEALAR11A02M4G_01.003.01.003	Mass production
RM502QAEALAR11A02M4G_01.002.01.002	Only for sample
RM502QAEALAR11A02M4G_01.001.01.001	Only for sample
RM502QAEALAR11A01M4G_01.001.01.001	Internal use only

#### 3.2. New Features

RM502QAEALAR11A04M4G_01.003.01.003	
Item	Brief Description
DFOTA	Added the function of reporting DFOTA upgrade progress on the Debug port.
Thermal Mitigation	Added <b>AT+QTHermal</b> to increase the URC reporting function of the thermal mitigation levels.
GENERAL	Added two MBNs of Telus-Do_Consumer and Telus-Do_Jasper.
GENERAL	Disabled the GEA1 algorithm by default.
GENERAL	Added <b>AT+QSVN</b> to obtain IMEISV.

  

RM502QAEALAR11A04M4G_01.002.01.002	
Item	Brief Description
NETWORK	Added <b>AT+QNWCFG="nr5g_meas_info"</b> to display 5G neighboring cell information.
NETWORK	Added <b>AT+QNWCFG="nr5g_pref_freq_list"</b> to configure the preference frequency list of NR5G.

NETWORK	Added <b>AT+QNWCFG="used_algo"</b> to obtain the current encryption algorithm and integrity algorithm.
NETWORK	Added <b>AT+QNWCFG="nr5g_earfcn_lock"</b> to lock NR5G EARFCN.
NETWORK	Added <b>AT+QNWCFG="data_roaming"</b> to control data roaming.
NETWORK	Added <b>AT+QNWCFG="encryp_alg_support"</b> and <b>AT+QNWCFG="integ_alg_support"</b> to obtain supported encryption algorithms and integrity algorithms respectively.
NETWORK	Set the default value of <mode_pref> in <b>AT+QNWPREFCFG="mode_pref"</b> to AUTO to support LTE and 5G NR.
NETWORK	Added <b>AT+QNWCFG="dis_rplmn"</b> and <b>AT+QNWCFG="dis_rplmnact"</b> to control RPLMN and RPLMNACT respectively.
NETWORK	Added <b>AT+QNWCFG="LTE_AMBR"</b> and <b>AT+QNWCFG="NR5G_AMBR"</b> to obtain the AMBR information of all activated APNs under LTE and 5G NR.
SMS	Supported automatic deletion of read messages when the message space was full.
ESIM	Added eSIM LPA feature.
5G	Enabled all 5G bands.
GENERAL	Added <b>AT+QNWCFG="wcdma_cqi"</b> to get the CQI value.
GENERAL	Added <b>AT+QCFG="ResetFactory"</b> to restore factory settings.
GENERAL	Added n28 to NSA and SA of China Mobile.
GENERAL	Supported Secure Boot feature and disabled it by default.
GENERAL	Added <b>AT+QCFG="clat"</b> to control clat_enabled.
GENERAL	Enabled UL LTE 256QAM in ENDC for Commercial-SKT MBN.
GENERAL	Enabled TCP Keepalive.
GENERAL	Disabled SA and NSA n77 of AT&T.
GENERAL	Added <b>AT+QESMINFO</b> and <b>AT+QEMMINFO</b> to query ESM and EMM error codes.
GENERAL	Disabled 256QAM and deleted some CAs for BELL MBN.
GENERAL	Added <b>AT+QNWCFG="dis_4MIMO_enable"</b> to control 4*MIMO under LTE bands.
GENERAL	Turned off pwm1 by default when the module was powered on.
GENERAL	Disable IMS roaming on CDMAless-Verizon.
GENERAL	Added <b>AT+QNWCFG="LTE_AMBR"</b> to obtain the AMBR information of all activated APNs under LTE.

**GENERAL** Turn off n2, n25 and n66.

#### RM502QAEAAR11A02M4G\_01.003.01.003

Item	Brief Description
<b>NETWORK</b>	Enabled DSS by default.
<b>RmNet</b>	Added <b>AT+QNETDEVSTATUS</b> to query RmNet device status.
<b>Thermal Mitigation</b>	Supported configuring MDM thermal mitigation strategy through <b>AT+QCFG="thermal5g/mdm"</b> .
<b>GENERAL</b>	Added RF band bandwith.
<b>GENERAL</b>	Added <b>AT+QNWCFG="up/down"</b> and <b>AT+QGDNRCNT</b> to query rate statistics and data flow statistics.
<b>GENERAL</b>	Modified the default value of IMS_enable of KDDI MBN to 1.
<b>GENERAL</b>	Deleted the subcommands of <b>AT+QCFG="usbspeed"</b> and <b>AT+QCFG="netmaskset"</b> displayed by <b>AT+QCFG=?</b> .
<b>GENERAL</b>	Added <b>AT+QMAP="mac_bind"</b> to obtain IPv4 and MAC addresses.
<b>GENERAL</b>	Added <b>AT+QSCAN</b> to scan the base station information without a SIM card.
<b>SIMCARD</b>	Added <b>AT+QSIMCFG="disable_physim"</b> to disable SIM card feature.

#### RM502QAEAAR11A02M4G\_01.002.01.002

Item	Brief Description
<b>NETWORK</b>	Added 513/624 channel and B3C_n78.
<b>NETWORK</b>	Added <b>AT+QNWCFG="dss_enable"</b> to control the DSS function.
<b>NETWORK</b>	Added <b>AT+QNWCFG="lte_cell_id"</b> and <b>AT+QNWCFG="nr5g_cell_id"</b> to obtain ECI/NCI related parameters.
<b>USB</b>	Added <b>AT+QCFG="usbspeed"</b> to switch between USB 2.0 and USB 3.0 interface protocols.
<b>Thermal Mitigation</b>	Set the Level 2 temperature threshold of thermal mitigation mechanism to 105 °C.
<b>5G</b>	Added <b>AT+QNWCFG="nr5g_cdrx"</b> to control 5G_CDRX.
<b>GENERAL</b>	Added <b>AT+QETH="eth_at"</b> to support SMD switching between Modem port and Ethernet port.

#### RM502QAEAAR11A02M4G\_01.001.01.001

Item	Brief Description
<b>GENERAL</b>	Added the feature of flashing fool-proofing that the versions of a different module are not allowed to be upgraded in the module.

GENERAL	Added <b>AT+QSINR</b> and <b>AT+QSRQ</b> to query the received signal value.
GENERAL	Added <b>AT+QMAP="lan"</b> to configure QCMAP LAN IP.
NETWORK	Added <b>AT+QNWPREFCFG="nr5g_disable_mode"</b> to disable NR5G configuration.
GENERAL	Configured the module to data only. Added Telus_DataOnly MBN version 20200911.

### 3.3. Improved Features

#### RM502QAEAAAR11A04M4G\_01.003.01.003

Item	Brief Description
NETWORK	Updated the PLMN list of the TS 25 operator.
NETWORK	Optimized <b>AT+QSRP</b> by returning -32768 to indicate an invalid value.
GENERAL	Modified the APN of the first profile of Telstra MBN to Telstra.internet.
GENERAL	Solved the problem of incorrect results queried by <b>AT+QGDNRCNT</b> in some cases.
GNSS	Solved the problem of no NMEA sentence output when <b>AT+QGPS=2</b> was entered in the situation that the return value <b>&lt;plane&gt;</b> of <b>AT+QGPSCFG="plane"</b> was 0.
SIMCARD	Solved the problem that <b>AT+CGLA</b> could not return long data.

#### RM502QAEAAAR11A04M4G\_01.002.01.002

Item	Brief Description
SMS	Solved the problem that there was no SMS push to receive messages after the SMS space was full.
NETWORK	Solved the problem of incorrect service provider name returned by <b>AT+QSPN</b> .
NETWORK	Optimized the WCDMA band format of <b>&lt;band&gt;</b> in <b>AT+QNWINFO</b> to keep it consistent with the actual band name.
NETWORK	Solved the problem that the frequency band information of "TDD NR5G" and "FDD NR5G" returned by <b>AT+QNWINFO</b> was inconsistent with the actual information.
NETWORK	Solved the problem that <b>&lt;MCC&gt;</b> and <b>&lt;MNC&gt;</b> of the LTE cells returned by <b>AT+QSCAN</b> under SA had no value.
NETWORK	Extended <b>AT+QSCAN</b> to support querying LTE cell bandwidth information and 5G cell SSB SCS information.

NETWORK	Extended <b>AT+QSCAN</b> to obtain or calculate the frequency of the carrier center.
NETWORK	Fixed the problem that the value of <ri> in <b>AT+QNWCFG="nr5g_csi"</b> was incorrect.
NETWORK	Solved the problem that the returned value of <b>AT+QENG="neighbourcell"</b> was incorrect.
NETWORK	Solved the problem that the return value of <b>AT+QENG="neighbourcell"</b> was incorrect under LTE.
NETWORK	Solved the problem of insufficient display bit width of the NR 5G cell ID queried by <b>AT+QENG="servingcell"</b> .
NETWORK	Solved the problem that the return value queried through <b>AT+QNWCFG="dis_4MIMO_enable"</b> was incorrect.
NETWORK	Modified the default value of <b>AT+QNWCFG="dis_4MIMO_enable"</b> to 1, and solved the problem that the configuration might not take effect.
NETWORK	Solved the problem of incorrect TX power returned by <b>AT+QNWCFG="nr5g_tx_pwr"</b> .
NETWORK	Modified <b>AT+QCAINFO</b> by replacing the value of <SINR> with <RSSNR>.
NETWORK	Solved the problem that the 5G network did not change but the URC was reported abnormally after the module deregistered and then re-registered the network.
NETWORK	Solved the problem of URC <b>+CREG</b> and <b>+CEREG</b> report error if you queried network status when the module was in weak or no signal strength.
NETWORK	Optimized <b>AT+QNWCFG="LTE_tx_pwr"</b> to support querying PUCCH, PRACH, SRS and PUSCH TX power.
RF RX FTM	Optimized <b>AT+QRFTESTNR5G="RX"</b> to support testing other level signals other than -50 dBm.
GENERAL	Solved the problem of incorrect return value of <b>AT+QCAINFO</b> .
GENERAL	Solved the problem of incorrect terminal capability when using third-party LPA.
GENERAL	Solved the problem that the module could not respond correctly to C-APDU requests.
GENERAL	Optimized <b>AT+QGDNRCNT</b> so that it could query the last recorded traffic data even when the data call was disconnected.
GENERAL	Solved the problem of URC reporting abnormally when the cell signal did not change.
GENERAL	Solved the problem of A/ would be executed once more.
GENERAL	Solved the format problem of the return values of <b>AT+QIMSCFG="user_agent"</b> without double quotes.
GENERAL	Solve the problem that Windows OS could not display the 5G icon after the module successfully registered the 5G NSA under Verizon.
GENERAL	Updated the version number of CDMAless_Verizon MBN to 202107291.

GENERAL	Solved the problem that <b>AT+QCFG="ims"</b> could not query the IMS registration status under SA network.
GENERAL	Solved the problem that the SIM card slot configuration did not take effect due to the change of the hash value.
GENERAL	Solved the problem that battery voltage read through <b>ADC_INPUT_VPH_PWR</b> was incorrect when the USB was inserted.
GENERAL	Solved the problem that <b>AT+QGDNRCNT</b> could not save the traffic statistics results to NVM.
GENERAL	Solved the problem that some ports could not report FOTA URC.
GENERAL	Extended <b>AT+QSCAN</b> to support querying cell ID and tracking area code.
GENERAL	Optimized <b>AT+QMBNCFG="Select"</b> so that it can query the currently selected MBN information.
GENERAL	Solved the problem of network access failure in some scenarios (such as roaming) after AT&T 3G sunset.
GENERAL	Solved the problem that the airplane mode could not be entered through the <b>W_disable</b> pin.
GENERAL	Solved the problem of <b>&lt;eps_mobile_identity&gt;</b> error in the return value of <b>AT+QIMSCFG="qirep"</b> .
GENERAL	Solved the probabilistic problem of return error through <b>AT+QSRQ</b> .
GENERAL	Modified default MTU of AT&T to 1430 and default MTU of FirstNet to 1342.
GENERAL	Solved the problem that the module could not power down normally after executing <b>AT+QPOWD=1</b> .
GENERAL	Optimized <b>+CREG/+CGREG/+CEREG/+C5GREG</b> URC report logic to ensure that there were empty lines between URCs.
GENERAL	Solved the problem that the Windows interface abnormally showed no signal after registering for 5G SA with NDIS dial-up under Win10.
GNSS	Upgraded NMEA sentences to comply with 0183 v4.11 protocol.
GNSS	Fixed the problem of incomplete GSV sentences obtained by <b>AT+QGPSGNMEA="GSV"</b> .
SIMCARD	Solved the problem that there was no URC <b>+CPIN: NOT INSERTED</b> report when the module was powered on without inserting the SIM card.
USB	Solved the problem that USB3.1 port could not be enumerated normally in some scenarios in Linux.
USB	Extended <b>AT+QCFG="usbspeed"</b> and added the switch between USB3.1 Gen1 and Gen2.

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Item	Brief Description
NETWORK	Solved the problem that the return value of <b>AT+QENG="neighbourcell"</b> was too long and the module could not work normally.

NETWORK	Solved the problem of incorrect PLMN information returned by <b>AT+QENG="servingcell"</b> when sharing base stations.
NETWORK	Solved the problem that when the module registered to SA, <b>&lt;cellID&gt;</b> returned by <b>AT+QENG="servingcell"</b> was incorrect.
NETWORK	Expanded <b>AT+QSRSP</b> to support returning the current network standard.
RF TX FTM	Updated the LTE/WCDMA Tx/Rx process to solve the problem that RX2 such as B42NB7/B3/B1 could not receive signals.
LowPower	Solved the problem that the configured <b>AT+QSCLK</b> did not take effect after module restarting.
LowPower	Solved the problem that it took too long for the module to go to sleep.
Thermal Mitigation	Optimized PA thermal mitigation strategy.
Thermal Mitigation	Solved the problem that the return value of <b>AT+QTEMP</b> was incorrect.
GENERAL	Solved the problem of incorrect upload and download rates queried by <b>AT+QNWCFG="up/down"</b> .
GENERAL	Optimized the format of <b>AT+QAUDCFG="slic_IndRep"</b> , <b>AT+QAUDCFG="uac_cfg"</b> and <b>AT+QAUDCFG="uac_switch"</b> .
GENERAL	Solved the problem that the configuration of <b>AT+QCFG="ims"</b> did not take effect after switching to another MBN when the module was shut down.

### RM502QAEAAR11A02M4G\_01.002.01.002

Item	Brief Description
GENERAL	Extended <b>AT+CPOL</b> to check whether the SIM card supported NR5G.
NETWORK	Solved the problem that the module could not work normally when executing <b>AT+QIMSACT=0</b> .
NETWORK	Solve the problem that the return value of <b>AT+CREG</b> after setting <b>AT+CGATT=0</b> was wrong after inserting the SIM card of China Mobile or China Telecom.
NETWORK	Maintained the default value of <b>&lt;SINR&gt;</b> of <b>AT+QENG="servingcell"</b> to -32768 when NSA network was in idle state.
NETWORK	Solved the problem that when <b>AT+QGPAPN=1</b> was executed under real network, the module would not work normally under certain environment.
LowPower	Solved the problem that there was no URC report when the module received SMS in sleep mode.
5G	Solved the problem that <b>AT+QNWLOCK="common/5g"</b> did not take effect after module restart.
GENERAL	Solved the problem of <b>AT+QNEG</b> displaying the wrong 5G band value in EN-DC mode.
GENERAL	Solved the problem that there was no URC <b>+QIND: SMS DONE</b> report at module restart.

<b>GNSS</b>	Solved the problem of returning historical residual information when executing <b>AT+QGPSGNMEA</b> for the first time.
<b>LowPower</b>	Solved the problem that when you executed <b>AT+CFUN=0/AT+CFUN=4</b> , the module entered slow clock but the current consumption value unexpectedly maintained at 28 mA.
<b>LowPower</b>	Solved the problem that when you executed <b>AT+CFUN=1</b> , the module could not enter slow clock in linux and the current consumption continues to be 2-300 mA.
<b>PCIE</b>	Solved the problem that after configuring to PCIe mode by executing <b>AT+QCFG="data_interface",1,0</b> , QMI and AT port did not respond after booting the module with IPQ4019.
<b>PCIE</b>	Solved the problem that the port could not be loaded after switching to IPQ4019 if you executed <b>AT+QCFG="data_interface",1,0</b> to configure PCIe and IPQ8074 could be loaded normally.

**RM502QAEAAAR11A02M4G\_01.001.01.001**

Item	Brief Description
<b>GENERAL</b>	Solved the problem that the module could not enter flight mode after pulling low W_disable pin.
<b>USB</b>	Solved the problem of product name display error at the first boot-up after the module downloaded the firmware version.

### 3.4. Known Issues

Item	Bug Description
PCIE	After executing <code>AT+QCFG="data_interface",1,0</code> , the USB AT port cannot work normally probabilistically after the module enables ADB.
GENERAL	When network URC automatic report is enabled, URC is reported when CSQ is not changed; and URC <code>+CREG</code> : and <code>+CGREG</code> : are not reported.
DFOTA	Firmware lower than the current version will reboot once more when performing DFOTA upgrade.

**NOTE**

Verification Environment is shown below. For more details, please contact Quectel technical support.

For Windows,

USB Driver: Quectel\_LTE&5G\_Windows\_USB\_Driver\_V2.2.4.zip

Qflash Tool: QFlash\_V5.20

QLog Tool: QWinLog\_V1.6.1.zip

For Linux,

QMI\_WWAN Driver: Quectel\_Linux&Android\_QMI\_WWAN\_Driver\_V1.2.0.12.zip

GobiNet Driver: Quectel\_Linux&Android\_GobiNet\_Driver\_V1.6.1.zip

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

QFirehose Tool: Quectel\_LTE&5G\_QFirehose\_Linux&Android\_V1.4.8.zip

Quectel-CM Tool: Quectel\_QConnectManager\_Linux\_V1.6.0.12.zip

QLog Tool: Quectel\_QLog\_Linux&Android\_V1.4.7.zip

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

Qualcomm IPQ Driver: spf11.1

## 4. Functions List

Category	Item	Supported Version(Since)	Note
Basic Function	SMS	RM502QAEAAR11A02M4G_01.001.01.001	/
	Network	RM502QAEAAR11A02M4G_01.001.01.001	/
Protocol Function	QMI	RM502QAEAAR11A02M4G_01.001.01.001	/
Interface Function	USB	RM502QAEAAR11A02M4G_01.001.01.001	/
	MBIM	RM502QAEAAR11A02M4G_01.001.01.001	/
	RmNet	RM502QAEAAR11A02M4G_01.001.01.001	/
	PCIE	RM502QAEAAR11A02M4G_01.001.01.001	/
Locate Function	AGPS	RM502QAEAAR11A02M4G_01.002.01.002	/
Upgrade Function	DFOTA	RM502QAEAAR11A02M4G_01.002.01.002	/
SIM Function	(U)SIM Detection	RM502QAEAAR11A02M4G_01.001.01.001	/
	ESIM	RM502QAEAAR11A04M4G_01.002.01.002	/
Special Function	RF RX FTM	RM502QAEAAR11A02M4G_01.003.01.003	/
	RF TX FTM	RM502QAEAAR11A02M4G_01.003.01.003	/
	LowPower	RM502QAEAAR11A02M4G_01.002.01.002	/
	Thermal Mitigation	RM502QAEAAR11A02M4G_01.002.01.002	/
5G Function	5G	RM502QAEAAR11A02M4G_01.001.01.001	/

## About Quectel

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