

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

Date: 2021-12-30

Our aim is to provide customers with timely and comprehensive service. For any assistance, please contact our company headquarters:

Quectel Wireless Solutions Co., Ltd.

Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai 200233, China

Tel: +86 21 5108 6236

Email: info@quectel.com

Or our local office. For more information, please visit:

<http://www.quectel.com/support/sales.htm>.

For technical support, or to report documentation errors, please visit:

<http://www.quectel.com/support/technical.htm>

Or email to support@quectel.com.

Disclaimer

While Quectel has made efforts to assure the accuracy of this document, unless otherwise provided by valid agreement, Quectel assumes no liability resulting from any inaccuracies or omissions in this document, or from use of the information obtained herein. Quectel reserves the right to make changes to any contents described herein and reserves the right to revise this document and to make changes from time to time in content hereof with no obligation to notify any person of revisions or changes. Before using any updated software, please read this statement carefully. By accessing or using the said software you irrevocably and unconditionally accept and confirm that you agree to be bound by this statement. In the event you disagree with any provision hereof and would not like to be bound by this statement you shall cease use of the said software immediately.

Duty of Confidentiality

The Receiving Party shall keep confidential all documentation and information provided by Quectel, except when the specific permission has been granted by Quectel. The Receiving Party shall not access or use Quectel's documentation and information for any purpose except as expressly provided herein. Furthermore, the Receiving Party shall not disclose any of the Quectel's documentation and information to any third party without the prior written consent by Quectel. For any noncompliance to the above requirements, unauthorized use, or other illegal or malicious use of the documentation and information, Quectel will reserve the right to take legal action.

Copyright

The information contained here is proprietary technical information of Quectel Wireless Solutions Co., Ltd. Transmitting, reproducing, disseminating and editing this document as well as using the content without permission are forbidden. Offenders will be held liable for payment of damages. All rights are reserved in the event of a patent grant or registration of a utility model or design.

Copyright © Quectel Wireless Solutions Co., Ltd. 2021. All rights reserved.

Contents

Contents	2
1. Release Content	3
2. Matters Needing Attention	3
3. Release History	4
3.1. Firmware Release History	4
3.2. New Features	4
3.3. Improved Features	7
3.4. Known Issues	12
4. Functions List.....	13

Quectel
Confidential

1. Release Content

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

Package	Version
Firmware	RM502QAEAR11A04M4G_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
RM502QAEAAR11A04M4G_01.003.01.003	Mass production
RM502QAEAAR11A04M4G_01.002.01.002	Mass production
RM502QAEAAR11A02M4G_01.003.01.003	Mass production
RM502QAEAAR11A02M4G_01.002.01.002	Only for sample
RM502QAEAAR11A02M4G_01.001.01.001	Only for sample
RM502QAEAAR11A01M4G_01.001.01.001	Internal use only

3.2. New Features

RM502QAEAAR11A04M4G_01.003.01.003	
Item	Brief Description
DFOTA	Added the function of reporting DFOTA upgrade progress on the Debug port.
Thermal Mitigation	Added AT+QTHERMAL 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 AT+QSVN to obtain IMEISV.
RM502QAEAAR11A04M4G_01.002.01.002	
Item	Brief Description
NETWORK	Added AT+QNWCFG="nr5g_meas_info" to display 5G neighboring cell information.
NETWORK	Added AT+QNWCFG="nr5g_pref_freq_list" to configure the preference frequency list of NR5G.

NETWORK	Added AT+QNWCFG="used_algo" to obtain the current encryption algorithm and integrity algorithm.
NETWORK	Added AT+QNWCFG="nr5g_earfcn_lock" to lock NR5G EARFCN.
NETWORK	Added AT+QNWCFG="data_roaming" to control data roaming.
NETWORK	Added AT+QNWCFG="encryp_alg_support" and AT+QNWCFG="integ_alg_support" to obtain supported encryption algorithms and integrity algorithms respectively.
NETWORK	Set the default value of <mode_pref> in AT+QNWPREFCFG="mode_pref" to AUTO to support LTE and 5G NR.
NETWORK	Added AT+QNWCFG="dis_rplmn" and AT+QNWCFG="dis_rplmnact" to control RPLMN and RPLMNACT respectively.
NETWORK	Added AT+QNWCFG="LTE_AMBR" and AT+QNWCFG="NR5G_AMBR" 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 AT+QNWCFG="wcdma_cqi" to get the CQI value.
GENERAL	Added AT+QCFG="ResetFactory" 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 AT+QCFG="clat" 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 AT+QESMINFO and AT+QEMMINFO to query ESM and EMM error codes.
GENERAL	Disabled 256QAM and deleted some CAs for BELL MBN.
GENERAL	Added AT+QNWCFG="dis_4MIMO_enable" 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 AT+QNWCFG="LTE_AMBR" 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
NETWORK	Enabled DSS by default.
RmNet	Added AT+QNETDEVSTATUS to query RmNet device status.
Thermal Mitigation	Supported configuring MDM thermal mitigation strategy through AT+QCFG="thermal5g/mdm" .
GENERAL	Added RF band bandwidth.
GENERAL	Added AT+QNWCFG="up/down" and AT+QGDNRCNT to query rate statistics and data flow statistics.
GENERAL	Modified the default value of IMS_enable of KDDI MBN to 1.
GENERAL	Deleted the subcommands of AT+QCFG="usbspeed" and AT+QCFG="netmaskset" displayed by AT+QCFG=? .
GENERAL	Added AT+QMAP="mac_bind" to obtain IPv4 and MAC addresses.
GENERAL	Added AT+QSCAN to scan the base station information without a SIM card.
SIMCARD	Added AT+QSIMCFG="disable_physim" to disable SIM card feature.
RM502QAEAAR11A02M4G_01.002.01.002	
Item	Brief Description
NETWORK	Added 513/624 channel and B3C_n78.
NETWORK	Added AT+QNWCFG="dss_enable" to control the DSS function.
NETWORK	Added AT+QNWCFG="lte_cell_id" and AT+QNWCFG="nr5g_cell_id" to obtain ECI/NCI related parameters.
USB	Added AT+QCFG="usbspeed" to switch between USB 2.0 and USB 3.0 interface protocols.
Thermal Mitigation	Set the Level 2 temperature threshold of thermal mitigation mechanism to 105 °C.
5G	Added AT+QNWCFG="nr5g_cdrx" to control 5G_CDRX.
GENERAL	Added AT+QETH="eth_at" to support SMD switching between Modem port and Ethernet port.
RM502QAEAAR11A02M4G_01.001.01.001	
Item	Brief Description
GENERAL	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 AT+QSINR and AT+QSRQ to query the received signal value.
GENERAL	Added AT+QMAP="lan" to configure QCMAP LAN IP.
NETWORK	Added AT+QNWPREFCFG="nr5g_disable_mode" to disable NR5G configuration.
GENERAL	Configured the module to data only. Added Telus_DataOnly MBN version 20200911.

3.3. Improved Features

RM502QAEAR11A04M4G_01.003.01.003	
Item	Brief Description
NETWORK	Updated the PLMN list of the TS 25 operator.
NETWORK	Optimized AT+QSRP 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 AT+QGDNRCNT in some cases.
GNSS	Solved the problem of no NMEA sentence output when AT+QGPS=2 was entered in the situation that the return value <plane> of AT+QGPSCFG="plane" was 0.
SIMCARD	Solved the problem that AT+CGLA could not return long data.
RM502QAEAR11A04M4G_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 AT+QSPN .
NETWORK	Optimized the WCDMA band format of <band> in AT+QNWINFO 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 AT+QNWINFO was inconsistent with the actual information.
NETWORK	Solved the problem that <MCC> and <MNC> of the LTE cells returned by AT+QSCAN under SA had no value.
NETWORK	Extended AT+QSCAN to support querying LTE cell bandwidth information and 5G cell SSB SCS information.

NETWORK	Extended AT+QSCAN to obtain or calculate the frequency of the carrier center.
NETWORK	Fixed the problem that the value of <ri> in AT+QNWCFG="nr5g_csi" was incorrect.
NETWORK	Solved the problem that the returned value of AT+QENG="neighbourcell" was incorrect.
NETWORK	Solved the problem that the return value of AT+QENG="neighbourcell" was incorrect under LTE.
NETWORK	Solved the problem of insufficient display bit width of the NR 5G cell ID queried by AT+QENG="servingcell" .
NETWORK	Solved the problem that the return value queried through AT+QNWCFG="dis_4MIMO_enable" was incorrect.
NETWORK	Modified the default value of AT+QNWCFG="dis_4MIMO_enable" to 1, and solved the problem that the configuration might not take effect.
NETWORK	Solved the problem of incorrect TX power returned by AT+QNWCFG="nr5g_tx_pwr" .
NETWORK	Modified AT+QCAINFO 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 +CREG and +CEREG report error if you queried network status when the module was in weak or no signal strength.
NETWORK	Optimized AT+QNWCFG="LTE_tx_pwr" to support querying PUCCH, PRACH, SRS and PUSCH TX power.
RF RX FTM	Optimized AT+QRFTESTNR5G="RX" to support testing other level signals other than -50 dBm.
GENERAL	Solved the problem of incorrect return value of AT+QCAINFO .
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 AT+QGDNRCNT 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 AT+QIMSCFG="user_agent" 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 AT+QCFG="ims" 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 ADC_INPUT_VPH_PWR was incorrect when the USB was inserted.
GENERAL	Solved the problem that AT+QGDNRCNT could not save the traffic statistics results to NVM.
GENERAL	Solved the problem that some ports could not report FOTA URC.
GENERAL	Extended AT+QSCAN to support querying cell ID and tracking area code.
GENERAL	Optimized AT+QMBNCFG="Select" 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 W_disable pin.
GENERAL	Solved the problem of <eps_mobile_identity> error in the return value of AT+QIMSCFG="qirep" .
GENERAL	Solved the probabilistic problem of return error through AT+QSRQ .
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 AT+QPOWD=1 .
GENERAL	Optimized +CREG/+CGREG/+CEREG/+C5GREG 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 AT+QGPSGNMEA="GSV" .
SIMCARD	Solved the problem that there was no URC +CPIN: NOT INSERTED 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 AT+QCFG="usbsspeed" and added the switch between USB3.1 Gen1 and Gen2.

RM502QAEAR11A02M4G_01.003.01.003

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

NETWORK	Solved the problem of incorrect PLMN information returned by AT+QENG="servingcell" when sharing base stations.
NETWORK	Solved the problem that when the module registered to SA, <cellID> returned by AT+QENG="servingcell" was incorrect.
NETWORK	Expanded AT+QSRP 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 AT+QSCLK 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 AT+QTEMP was incorrect.
GENERAL	Solved the problem of incorrect upload and download rates queried by AT+QNWCFG="up/down" .
GENERAL	Optimized the format of AT+QAUDCFG="slic_IndRep" , AT+QAUDCFG="uac_cfg" and AT+QAUDCFG="uac_switch" .
GENERAL	Solved the problem that the configuration of AT+QCFG="ims" did not take effect after switching to another MBN when the module was shut down.

RM502QAEAAAR11A02M4G_01.002.01.002

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

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

RM502QAEAR11A02M4G_01.001.01.001

Item	Brief Description
GENERAL	Solved the problem that the module could not enter flight mode after pulling low W_disable pin.
USB	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 AT+QCFG="data_interface",1,0 , 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 +CREG: and +CGREG: 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

Quectel Wireless Solutions is the leading global supplier of cellular and GNSS modules, with a broad product portfolio covering the most recent wireless technologies of 5G, LTE/LTE-A, NB-IoT/LTE-M, UMTS/HSPA(+), GSM/GPRS and GNSS. As a professional IoT (Internet of Things) technology developer and cellular module supplier, Quectel is able to provide one-stop services for IoT cellular modules. Quectel products have been widely applied in IoT/M2M fields including smart payment, telematics and transport, smart energy, smart cities, security, wireless gateways, industry, healthcare, agriculture, and environment monitoring.

