Product Change Note

Topic **SARA-R410M-02B Product Change**
UBX-19024506

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1 Affected Products

Product Name	Order Code	Type No (Old)	Type No (New)	Remarks
SARA-R410M	SARA-R410M-02B	SARA-R410M-02B-00	SARA-R410M-02B-01	

2 Type of Change

☐ Hardware modification
☒ Firmware update
☒ Documentation update
☒ Other, Certification update

3 Description of Change

A new firmware release will be applied to the affected product in production according to the schedule below.

The version of firmware can be identified according to the type number as follows:

Old type number	Current firmware version	New type number	New firmware version
SARA-R410M-02B-00	L0.0.00.00.05.06 App version 02.01	SARA-R410M-02B-01	L0.0.00.00.05.08 App version 02.04

The modem and application version can be polled from the module by sending ATI and ATI9 commands. See u-blox AT commands manual [1] for details.

For full details of changes contained in this new version, see Annex A.

4 Schedule

Estimated First Shipment Date	**07 June 2019**

5 Customer Impact and Recommended Action

- The previous version may still be ordered by customers during the transition period to the new version. The transition period ends three months after the schedule date listed above. After the transition period, only the new SARA-R410M-02B-01 version may be ordered.
- The latest firmware version is required for new devices entering certification labs.
- It is recommended to use the Initial Production modules for certification activities.

- It is possible to upgrade SARA-R410M-02B units to the new firmware version, with the notable exception that LTE Cat M1 band 25 is newly available only via the new version SARA-R410M-02B-01.
- Backward compatibility between new type number and its predecessor is ensured.
- It is recommended to configure the module to the applicable MNO profile, RAT, and LTE bands intended for the application device and within regulatory compliance. The module is not intended be used in the factory default setting (+UMNOPROF=0: SW Default).

6 Reference Documents

[1] SARA-R4 series AT Commands Manual, u-blox Document UBX-17003787
[2] SARA-R4 series Data Sheet, u-blox Document UBX-16024152
[3] SARA-R4 series System Integration Manual, u-blox Document UBX-16029218
[4] SARA-R410M-02B PCN, u-blox Document UBX-18070443

Annex A

A Description of Changes

A.1 Hardware

No changes.

A.2 Firmware

Changes included in this released as compared to current firmware version L0.0.00.00.05.06 app version A02.01:

- Changes to set MNO Profile functionality (+UMNOPROF):
  - The factory-programmed setting (+UMNOPROF=0: SW default) enables LTE Cat M1 and LTE Cat NB1 with bands 2, 3, 4, 5, 8, 12, 13, 18, 19, and 20 and band 25 as M1-only
  - The following LTE Cat M1 and LTE Cat NB1 bands are available as roaming bands through band selection (+UBANDMASK): bands 1, 26, 28
  - The RAT selection (+URAT) is enabled/disabled within a profile as specified by the Mobile Network Operators
  - The band selection (+UBANDMASK) is enabled/disabled within a profile as specified the Mobile Network Operators
  - Vodafone (Europe) profile is added
  - Deutsche Telekom (Europe) profile is added
  - “Standard Europe” profile is added as a generic profile for the region
  - Sprint (USA) profile is added

- Updates to MNO profile version:

MNO	Version	System Selection	LTE Bands	PSM	eDRX	URAT	UBANDMASK
AT&T	v 7.1	M1 only	2, 4, 5, 12	yes	no	no	no
China Telecom	v 7.0	M1->NB1	3, 5, 8	no	no	yes	yes
Deutsche Telekom	v 7.0	M1->NB1	3, 8, 20	yes	yes	yes	yes
Sprint	v 7.0	M1 only	2, 4, 12, 25	no	no	yes	yes
Standard Europe	v 7.0	M1->NB1	3, 8, 20	yes	yes	yes	yes
Telstra	v 7.0	M1 only	3, 5, 8, 28	no	no	no	no
T-Mobile USA	v 7.0	NB1 only	2, 4, 5,12	no	no	yes	yes
TELUS	v 7.0	M1 only	2, 4, 5, 12	yes	no	no	no
Verizon	v 7.0	M1 only	13	no	no	no	no
Vodafone	v 7.0	NB1->M1	3, 8, 20	yes	no	yes	yes
SW default	N/A	M1->NB1	2, 3, 4, 5, 8, 12, 13, 18, 19, 20, and 25 as M1-only	no	no	no	no

☞ It is strongly recommended to configure the module to the applicable MNO profile, RAT, and LTE bands intended for the application device and within regulatory compliance. The module is not intended be used in the factory-programmed setting.

- Advanced the chipset supplier release version
- LTE Cat NB1 Non-IP Data Delivery
- Secure MQTT
- UART hardware flow control also referred to as RTS/CTS flow control (&K)
- UART data rate configuration (+IPR)
- DTE-DCE local flow control (+IFC)
- Multiplexing Mode (+CMUX)
- Low Power Mode / Active Idle Mode (+UPSV)
- Last gasp Configuration (+ULGASP)
- Resolve name / IP number through DNS (+UDNSRN)
- Internal temperature monitor (+UTEMP)
- Set greeting text (+CSGT)
- Configuration of uFOTA registration, timer connections to uFOTA server (+UFOTACONF)
- RING line configuration (+URINGCFG)
- Device service domain configuration as PS, CS, or Combined Attach (+USVCDOMAIN)
- Signaling connections status (+CSCON)
- PSM indication (+UPSMR)
- Fixes included in this release as described in Section A.5

A.3 Certification

The following certifications are achieved for the new type number:

Certification (country)	Status
FCC (US)	Complete (LTE Cat M1, NB1 bands 2, 4, 5, 12, 13, and M1 band 25)
ISED (Canada)	Complete (LTE Cat M1, NB1 bands 2, 4, 5, 12, 13)
GITEKI (Japan)	Complete (LTE Cat M1, NB1 bands 1, 8, 18, 19, 26)
NCC (Taiwan)	Complete (LTE Cat M1, NB1 bands 3, 8, 28)
RCM (Australia)	Complete (LTE Cat M1, NB1 bands 3, 5, 8, 28)
RED (Europe)	Complete (LTE Cat M1, NB1 bands 3, 8, 20)
PTCRB	Complete (LTE Cat M1, NB1 bands 2, 3, 4, 5, 8, 12, 13, 20, 28)
AT&T	Complete (LTE Cat M1 bands 2, 4, 5, 12)
Sprint	Complete (LTE Cat M1 band 25)
Telstra*	Complete (LTE Cat M1 bands 3, 5, 8, 28)
Verizon	Complete (LTE M1 bands 4, 13)

- FCC grant already achieved as LTE Cat M1, NB1 bands 2, 4, 5, 12, 13 is newly updated to include also LTE Cat M1 band 25.
- GITEKI, NCC, RCM, RED grants already achieved for SARA-R410M-02B-00 remain valid also for new product type number SARA-R410M-02B-01.
- Documentation updates will be required with PTCRB, AT&T, Verizon and Telstra to reflect the new type number/firmware version.
- Sprint certification is newly achieved.
- For customer products using SARA-R410M-02B-00 and already certified by AT&T, Verizon and Telstra customers should contact the operator for verification that no regression is required.
- *Telstra grant for the new firmware version is expected by 14 June 2019 and does not gate the PCN.
- For customer products using TELUS and USCC, the customer should contact the operator for verification that no regression is required.

A.4 Certification compliance

The SARA-R410M-02B module includes the ability to configure the device in the following ways:

- Mobile Network Operator Profile (+UMNOPROF AT command)
- Radio Access Technology (+URAT AT command)
- LTE band selection (+UBANDMASK AT command)

As these configuration decisions are made, u-blox reminds customers that the end device regulatory compliance shall be verified with an accredited laboratory. If the end device enables bands that are not within the country specific module approved configuration, then the customer will incur additional measurements that were not covered by the module certification.

The certification of the application device that integrates a SARA-R4 module and the compliance of the application device with all the applicable certification schemes, directives and standards are the sole responsibility of the application device manufacturer.

A.5 Fixes included in this release

- [u-blox id 3870] Corrections to default TLS cipher suite list
- [u-blox id 3863] Optimize LWM2M CoAP timer values for RAT
- [u-blox id 3812] LWM2M client allow PSM after client shuts down
- [u-blox id 3797] Improvements to TIS performance
- [u-blox id 3572] Improvements to TIS performance
- [u-blox id 3771] TLS data transmission reports +USOWR:0,0 and upon retry server receives double additional data
- [u-blox id 3564] COPS=2 then COPS=0 will ignore RAT acquisition order
- [u-blox id 3651] Ciphers and file size failures : Post to AWS ELB SSL
- [u-blox id 3544] Duplicate UUSORD URC seen when data is sent to modem while a USOWR is in progress
- [u-blox id 3534] MQTT does not work upon deregister and re-register, only from power on
- [u-blox id 3460] SSL data transmission issue using USOWR
- [u-blox id 3324] Network indication of roaming data transmission output not correct
- [u-blox id 3322] No response from TCP echo server in direct link mode
- [u-blox id 3321] Change the default cipher suites for Mocana secure stack
- [u-blox id 3285] UHTTP times out when response doesn't have content-length field
- [u-blox id 3264] After setting the keep alive enabled, +USOGO still shows "Disable"
- [u-blox id 3247] LWM2MCFG returning error despite waiting more than 45sec
- [u-blox id 3020] URAT=? returns '7-9' but '9' is not applicable
- [u-blox id 2957] IPv4v6 - Introduce a module default MTU setting
- [u-blox id 2850] After inputting AT+USOST, no response
- [u-blox id 2940] MQTT restore to Factory Default does not reset local port
- [u-blox id 2939] MQTT Read in Terse mode does not terminate in S3 and S4 characters
- [u-blox id 2908] Sending UDP message with long delay in Direct Link mode
- [u-blox id 2846] Error when trying to send SMS with all the characters in IRA
- [u-blox id 2842] AT Interface affects GNSS Client
- [u-blox id 2841] Buffer dropped when receiving a 5 MB file using USODL and MUX
- [u-blox id 2840] URDFILE partially retrieves file if RTS is toggled on UART
- [u-blox id 2839] File retrieval fails to complete when using UFTPC=6 (Direct Link), and UART running MUX at 9600 baud rate
- [u-blox id 2830] Module reset after a lengthy period of sending NMEA data over MUX
- [u-blox id 2829] GPS device stops sending NMEA data when URDFILE operation is in progress at 9600 baud rate
- [u-blox id 2820] +UFTPC commands unsuccessful randomly when SSL enabled
- [u-blox id 2816] Enable FTP Direct Link, socket Direct Link flow control by watermark event
- [u-blox id 2807] +UTEST=2 lower range does not reach -90dBm floor
- [u-blox id 2803] Ring Indication does not trigger for inbound UDP, but triggers for outbound
- [u-blox id 2775] Connecting a secure socket with non-secure server results in an OK instead of ERROR
- [u-blox id 2774] SSL issue with validating server certificate
- [u-blox id 2614] Cannot close secure TCP socket without connecting to socket
- [u-blox id 2595] Unexpected restart after +USOWR using SSL
- [u-blox id 2495] GNSS COLD start <Not receiving +UGUBX string> after sending UBX CFG-RST message
- [u-blox id 2449] The GNSS supply enable GPIO is set to ON after the module reboot

- [u-blox id 2439] SFS certificate retrieval failing during GetSize function
- [u-blox id 2401] DUT does a soft RESET when executing URDFILE
- [u-blox id 2391] Sending data to the AT interface causes reading (SCL activity) on the I2C interface
- [u-blox id 2356] Not getting valid CME Error <GNSS Rx ON without mode>
- [u-blox id 2350] Safeguarding TLS/SSL private keys
- [u-blox id 2337] AT interface lockup with AT+USOCO command
- [u-blox id 2330] AT command IPR is not permanently storing several baud rates for UART
- [u-blox id 2327] +CEDRXRDP does not answer as expected
- [u-blox id 2306] Module returns +UUSOCL URC response twice
- [u-blox id 2922] Polling for GNSS messages locks up the module after a while
- [u-blox id 2265] In order to enable the +USIMSTAT URCs for states 9-13, the value in the set command shall be "4" and not "2"
- [u-blox id 2264] The +CIEV: 12,0 URC is not issued unless the +CIND read command is issued. (+CIEV: 12,1 is displayed only after having issued the AT+UGPIOC=42,7 command)
- [u-blox id 2253] May takes another SSL USOWR to free up the previous one that gets stuck intermittently
- [u-blox id 2240] USOCTL <param_id> 2, 3 implementation for SSL
- [u-blox id 2235] Module lock up after +USOWR=0,1 and SSL
- [u-blox id 2233] Enable CEREG = 4
- [u-blox id 2251] The AT interface locks up when the TCP TX buffer overfills
- [u-blox id 2222] After one partial read from a SSL socket, subsequent partial reads return no data. The user can partially read by splitting into two portions.
- [u-blox id 2220] At times when using +USOWR in binary mode a race condition seen when writing to socket and receiving inbound data
- [u-blox id 2219] When a socket is created the module sometimes does not provide a socket ID. After the AT+USOCL=X,1 command is issued, wait 1 s before sending next socket command
- [u-blox id 2217] UART shall use a baud rate from its profile in NV after a power reset
- [u-blox id 2212] The +USOST AT command sometimes gives the following incorrect response: +USOCR: 0, OK. Under low signal conditions, the sending of UDP packet can be in pending state. If socket receives a packet while sending is in progress, the socket state machine may get out of sync
- [u-blox id 2200] The TCP/IP error result code 172 (ENSROF) is provided even if it should be 65 (EEOF - socket closure)
- [u-blox id 2196] FTP/HTTP socket interface need to handle no signal conditions
- [u-blox id 2179] A wrong HTTP URC is issued even in case of a successful HTTP request
- [u-blox id 2178] Zero length UDP packet withholds data
- [u-blox id 2177] Socket issue after all socket IDs are used
- [u-blox id 2173] The result of a HTTP GET command is not correct
- [u-blox id 2164] +ULSTFILE=0, If invalid filename found, error message is given, and list of valid files already read is output
- [u-blox id 2147] The +UCPSMS AT command does not report the parameter assigned by network
- [u-blox id 2123] The +UFTPC test command does not return support for FTP direct link.
- [u-blox id 2120] USOCTL throws CME ERROR when queried for read total number of bytes sent
- [u-blox id 2114] At first power up, the +UMNOPROF test command returns blank profiles

- [u-blox id 2112] Socket not closing and free port number with USOCL non-blocking
- [u-blox id 2110] In TCP/UDP hex mode, it is not possible to read more than the correct number of bytes (NB IoT)
- [u-blox id 2105] It is not possible to try to create write and read data from multiple sockets (NB IoT)
- [u-blox id 2104] Crash observed while importing large certificate using File system import
- [u-blox id 2100] The +UTEST=2 lower range does not reach -90 dBm floor.
- [u-blox id 2099] It is not possible to send data using the enhanced TCP Direct Link during a 2nd iteration
- [u-blox id 2092] Cancelling a file transfer by means of the +UDWNFILE AT command after 50% results in unresponsive MUX ports
- [u-blox id 2064] An incorrect state is shown when the +USIMSTAT mode is set as "0"
- [u-blox id 2031] Importing CA certificate using AT+USECMNG throws "USECMNG no memory available" ERROR
- [u-blox id 1992] The +CUSATW AT command is not able to change profile
- [u-blox id 1983] The module is unresponsive / lockup when performing +USOWR after a network connection loss
- [u-blox id 1976] The URC appears frequently after the +CEDRXS URC is enabled
- [u-blox id 1888] The following non-common special characters are not allowed in a MO SMS: ~ ` ^ { } [ ] \
- [u-blox id 1825] Append needs to be implemented in FTP core.
- [u-blox id 1510] AT+UGGSA only reports the last GSA NMEA string when multiple GNSS are active
- [u-blox id -1509] AT+UGGSV shows truncated NMEA strings when more than 16 satellites are in view

A.6 Known Limitations

The following are known limitations:

- For PSM, the works-as-designed behavior is that there may be times when the Data or LTE timers may wake up the module before the expected PSM wakeup time.
- When the device is ready to go into PSM it does not gracefully shutdown TCP sockets, therefore the remote end is unaware of the client socket state. The remote server should implement a timeout or have keep alive probes enabled to check on the connection at regular intervals.
- The RxAGC value provided with the +UTEST: 2 information text response may have an approximate -3 dB inaccuracy.
- [u-blox id 3869] For MQTTS (secure) ciphering needs to be manually specified
- [u-blox id 3724] Incorrect response reading a stored SMS with all GSM 7 bit chars
- [u-blox id 3586] When eDRX is enabled, during PPP connection there is a long delay in obtaining IP address. Workaround is to disable eDRX with PPP.
- [u-blox id 3557] Connection to MQTT Microsoft Azure results in error code
- [u-blox id 3517] Higher current consumption observed after MQTT login. Suggest to keep login session short.
- [u-blox id 3466] Intermittently +UHTTP=0 can take up to ~120s to respond. Workaround by sending dummy byte to UART.
- [u-blox id 3168] When connecting to MQTT server, SSL negotiations can fail due to large TCP packets, which can be triggered by large certificate files

- [u-blox id 3142] Data being received via a UDP socket can be read in a maximum of 2 chunks by +USORF
- [u-blox id 3117] AT &K hardware flow control setting is not saved to Profile
- [u-blox id 3036] When coming subscribed MQTT messages pile up without being read, there are too many messages for the module to handle. When this pile of messages is read, not all the message characters are read out as some of the messages are "chopped off" from the output. Suggested workaround: Read messages as soon as they come in. Do not let too many messages go unread and pile up. Issue observed around 800 char and above.
- [u-blox id 2611] uTEST=2 RX and uTEST=3 not giving consistent readings unless Reset applied between test. Suggested workarounds:
  - Avoid using continuous mode for uTEST=3. Instead, use non-continuous mode.
  - After issuing uTEST=3 in continuous mode, then issue same uTEST=3 TX test but in non-continuous mode to clear a flag causing issue.
- [u-blox id 2573] Sometimes the modem reaches a state where MQTT publish and MQTT publish from file returns a success code, but the MQTT message URC is never seen from the same modem (which is also subscribed to the MQTT Topic of the message).
- [u-blox id 2494] Not getting <+UULOCIND> URC indication of +ULOC request complete while turning on GPS after requesting localization info
- [u-blox id 2324] A DUN call fails when a LWM2M data call is active. Workaround: retry the call.
- [u-blox id 2153] The FTP is not able to send data when the SSL is enabled (NB IoT)
- [u-blox id 2136] PKCS8 client key format is not supported for FTPS
- [u-blox id 2135] In TX test mode (AT+UTEST=3 command) the maximum output power is 17 dBm even when set to greater values.
- [u-blox id 2068] The +USORD and +USORF information text responses add extra characters. The host application should disregard any extraneous <S3> and <S4> bytes.
- [u-blox id 2052] The +USORD AT command fails to read pending bytes when the socket is in closed state. To avoid the AT command interface hanging, it is recommended to use async socket close, e.g. AT+USOCL=0,1 (the +UUSOCL URC response will take 120 s in this case but will not block the AT interface).