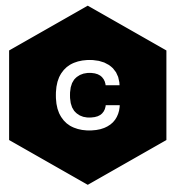


# SARA-R4 series



## Size-optimized LTE-M / NB-IoT and EGPRS modules

### Ultra-compact LTE Cat M1 / NB1 and EGPRS modules with multi-regional coverage

- Configurable with a single hardware version
- Flexible mode selection as LTE Cat M1 / LTE Cat NB1 / EGPRS – only/preferred
- Deliver critical firmware updates via uFOTA with LWM2M
- Low power consumption and longer battery life
- Extended range in buildings, basements, and with NB1, underground
- Easy migration between u-blox 2G, 3G and 4G modules



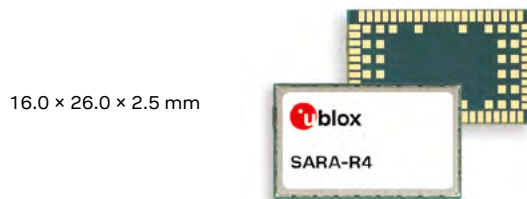
Standard



Professional



Automotive



### Product description

At 16 x 26 mm, the SARA-R4 series modules are among the world's smallest LTE-M / NB-IoT and EGPRS multi-mode modules offered in a single hardware design. They have software-based LTE band configuration, and come in an LGA package for easy manufacturing.

The SARA-R410M and SARA-R412M variants simplify diverse deployments worldwide and provide enormous operational efficiencies. Software-based configurability of operator profiles and LTE bands enables a wide range of multi-regional coverage. The flexibility extends further through system selection as LTE-M, NB-IoT, EGPRS single or preferred modes. Customers can future-proof their solutions by means of OTA firmware updates, thanks to the uFOTA client/server solution, which utilizes LWM2M, a light and compact protocol ideal for IoT applications. The modules offer low power consumption by utilizing PSM and eDRX, which extend battery life to up to 10 years. Coverage enhancement reaches deeper into buildings and basements (and underground with NB1) with up to 15 dB improved MCL compared to GSM or LTE Cat 1.

With many interface options and an integrated IP stack, the SARA-R4 modules are targeted to a wide range of data-centric IoT applications, such as smart metering, smart lighting, telematics, asset tracking, remote monitoring, alarm panels, and connected health. The SARA-R4 modules target long life, low-maintenance, cost-sensitive, lower power consumption, extended battery life applications.

The SARA form factor follows the u-blox nested design principle and is compatible with other u-blox product families, which facilitates easy migration from 2G, 3G and 4G. This also maximizes the investments of customers, simplifies logistics, and enables very short time-to-market.

The temperature range of -40 to +85 °C guarantees operation in harsh environments. The module is manufactured in ISO/TS 16949 certified sites with the highest production standards, quality and reliability. Each module is fully tested and inspected during production.

	SARA-R410M-52B	SARA-R410M-02B	SARA-R412M-02B
<b>Grade</b>			
Automotive			
Professional	•	•	•
Standard			
<b>Regions</b>			
	North America	Multi-region	Multi-region
<b>Access Technology</b>			
GSM/GPRS bands			Q
LTE bands	2, 4, 5, 12, 13	*	*
Data rate	M1	M1/NB	M1/NB
<b>Positioning</b>			
GNSS via modem	•	•	•
AssistNow Software	•	•	•
CellLocate®		□	□
<b>Interfaces</b>			
UART	1	1	1
USB	1	1	1
DDC (I <sup>2</sup> C)	1	1	1
SPI	□	□	□
SDIO (Master)	□	□	□
GPIO	6	6	6
<b>Audio</b>			
Digital audio		□	
<b>Features</b>			
Last gasp	•	•	•
Antenna detection	•	•	•
Embedded TCP/UDP stack	•	•	•
Embedded HTTPS, FTPS, TLS	•	•	•
Power Save Mode Rel.12	•	•	•
eDRX	•	•	•
Deep sleep mode	•	•	•
FW update via serial	•	•	•
uFOTA	•	•	•
Dual stack IPv4/IPv6	•	•	•
MQTT	•	•	•
LWM2M Device Management	•	•	•

\* = Bands may include:  
1, 2, 3, 4, 5, 8, 12, 13, 18, 19, 20,  
25, 26, 28

□ = Available in future FW version  
NB = Cat NB1 (27.2 kb/s DL, 62.5 kb/s UL)  
M1 = LTE Cat M1 (300 kb/s DL, 375 kb/s UL)

# SARA-R4 series



## Features

LTE	3GPP Release 13 LTE Cat M1 3GPP Release 13 LTE Cat NB1 Coverage Enhancement Mode A Rel 12 LTE Power Save Mode, PSM Rel 13 e-DRX Cat M1 Half-duplex (300 kbit/s DL, 375 kbit/s UL) Cat NB1 Half-duplex (27.2 kbit/s DL, 62.5 kbit/s UL) Cat NB1 Non-IP Data Delivery
GSM	EGPRS Power Class E2
SMS	MT/MO PDU / Text mode SMS over SG/NAS
Voice <sup>1</sup>	VoLTE (Cat M1 only) Codec: AMR-WB

## Software features

Protocols	Dual stack IPv4 and IPv6 Embedded TCP/IP, UDP/IP, FTP, HTTP Embedded MQTTs Embedded HTTPS, FTPS, TLS
Device Management	OMA LWM2M LWM2M with Dynamically Loaded Objects <sup>1</sup>
GNSS Interfaces	Direct access to u-blox GNSS via module AssistNow software for fastest GPS Time-To-First-Fix CellLocate® & Hybrid Positioning <sup>1</sup>
Firmware upgrade	Via USB uFOTA client/server solution (Firmware upgrade Over the Air)

## Electrical data

Power supply	3.8 V nominal, range 3.2 V to 4.2 V (SARA-R412M has range 3.2 V to 4.5 V)
Power consumption	Power Save Mode: 8 µA Active Idle Mode: 2 mA
LTE Cat NB1 Connected Mode power consumption	Min power 60 mA 0 dBm 65 mA 12 dBm 80 mA 18 dBm 100 mA Max power 140 mA
LTE Cat M1 Connected Mode power consumption	Min power 100 mA 0 dBm 105 mA 12 dBm 125 mA 18 dBm 150 mA Max power 190 mA
2G Connected Mode power consumption	Max power 200 mA

## Interfaces

Serial	1 UART 1 USB 2.0 (high-speed, 480 Mbit/s) 1 SDIO (Master) <sup>1</sup> 1 DDC (I <sup>2</sup> C) 1 SPI <sup>1</sup>
GPIO	Up to 6 GPIOs, configurable
(U)SIM	Supports 1.8 V and 3.0 V, SIM toolkit

<sup>1</sup> = Available in future FW version

## Further information

For contact information, see [www.u-blox.com/contact-us](http://www.u-blox.com/contact-us).

For more product details and ordering information, see the [product data sheet](#).

## Package

96 pin LGA: 16.0 x 26.0 x 2.5 mm, < 3 g

## Environmental data, quality & reliability

Operating temperature -40 °C to +85 °C

RoHS compliant (lead-free)

Qualification according to ISO 16750

Manufactured in ISO/TS 16949 certified production sites

## Certifications and approvals

SARA-R410M-52B FCC, ISED, PTCRB, AT&T, GCF, Verizon

SARA-R410M-02B FCC, ISED, NCC, RCM, RED, PTCRB, AT&T, Sprint, Telstra, Telus, Verizon, USCC, GITEKI

SARA-R412M-02B FCC, ISED, RED, PTCRB, AT&T, T-Mobile USA

## Support products

EVK-R410M-02B Evaluation kit for SARA-R410M-02B

EVK-R412M-02B Evaluation kit for SARA-R412M-02B

## Product variants

SARA-R410M-52B LTE module for North America;  
Cat M1 bands: 2, 4, 5, 12, 13

SARA-R410M-02B LTE module for multi-regional use;  
Cat M1/NB1 bands:  
1\*, 2, 3, 4, 5, 8, 12, 13, 18, 19, 20, 25, 26\*, 28

SARA-R412M-02B LTE, 2G module for multi-regional use;  
Cat M1/NB1 bands:  
2, 3, 4, 5, 8, 12, 13, 20, 26\*, 28\*  
EGPRS quad-band, 850/900/1800/1900 MHz

\* = Roaming bands

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