Product Summary
SARA-R4/N4 series

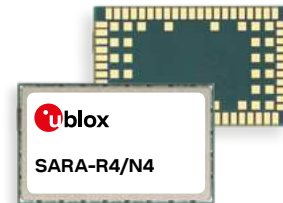## Size-optimized LTE Cat M1 / NB1 and EGPRS modules

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Standard

Professional

Automotive

Ultra-compact LTE Cat M1 / NB1 and EGPRS modules with global coverage

- Global configurability 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

u-blox
SARA-R4/N4

16.0 × 26.0 × 2.5 mm

Product description

At 16 x 26 mm, the SARA-R4 series modules are among the world's smallest LTE Cat M1 / NB1 and EGPRS multi-mode modules offered in a single hardware design. They have software-based global band configuration, and come in an LGA package for easy manufacturing.

The R410M and R412M single hardware versions simplify diverse deployments worldwide and provide enormous operational efficiencies. Software-based configurability in all deployed bands enables essentially world-wide coverage. The flexibility extends further through system selection as LTE Cat M1, LTE Cat NB1, 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 with Cat M1 compared to GSM or 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.

Product selector

Model	Region	Bands				Positioning			Interfaces						Audio	Features								Grade		
		3GPP Release Baseline	3GPP category	FDD bands	GPRS/EGPRS quad band	GNSS via modem	AssistNow software	CellLocate®	UART	USB 2.0	DDC	SPI	SDIO (Master/Slave)	GPIO	Digital audio	Power Save Mode	eDRX	Antenna Supervisor	Embedded HTTPS, FTPS, TLS	Embedded TCP/UDP stack	Embedded HTTP, FTP	Dual stack IPv4 / IPv6	FW update over the air (FOTA)	Standard	Professional	Automotive
SARA-N410-02B	USA	13	NB1	2, 4, 5, 12		●	●	□	1	1	●	□	□	6	□	●	●	●	●	●	●	●	●		●	
SARA-R404M-00B	USA	13	M1	13		□	□	□	1	1	□	□	□	6	□	●	□	●	□	●	●	●	●		●	
SARA-R410M-01B	North America	13	M1	2, 4, 5, 12		□	□	□	1	1	□	□	□	6	□	●	●	●	●	●	●	●	●		●	
SARA-R410M-02B	Global	13	M1, NB1	★		●	●	●	1	1	●	□	□	6	□	●	●	●	●	●	●	●	●		●	
SARA-R412M-02B	Global	13	M1, NB1	★	●	●	●	●	1	1	●	□	□	6	□	●	●	●	●	●	●	●	●		●	

★ = Bands 1, 2, 3, 4, 5, 8, 12, 13, 17, 18, 19, 20, 25, 26, 28 (and band 39 in M1-only)   □ = Available in future FW version

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Objective Specification

SARA-R4 series

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Features

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

Software features

Protocols	Dual stack IPv4 and IPv6
	Embedded TCP/IP, UDP/IP, FTP, HTTP
	Embedded MQTT, CoAP [1]
	Embedded HTTPS, FTPS, TLS
Device Management	OMA LWM2M
Security	Jamming detection [1]
GNSS Interfaces	Direct access to u-blox GNSS via module
	AssistNow software for fastest GPS Time-To-First-Fix
	CellLocate® & Hybrid Positioning [1]
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 Mode:	8 mA
LTE Connected Mode	Min power	100 mA
	0 dBm	105 mA
	12 dBm	125 mA
	18 dBm	150 mA
	Max power	190 mA

Interfaces

Serial	1 UART
	1 USB 2.0 (high-speed, 480 Mbit/s)
	1 SDIO (Master) [1]
	1 DDC (I²C)
	1 SPI [1]
GPIO	Up to 6 GPIOs, configurable
(U)SIM	Supports 1.8 V and 3.0 V, SIM toolkit

1 = Available in future FW version

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-N410-02B [2]	FCC, ISED, PTCRB, T-Mobile
SARA-R404M-00B	FCC, ISED, Verizon
SARA-R410M-01B	FCC, ISED, IFETEL, PTCRB, AT&T
SARA-R410M-02B [2]	FCC, ISED, IFETEL, GCF, CCC, NCC, PTCRB, RCM, SRRC, AT&T, Telstra, T-Mobile, Verizon
SARA-R412M-02B [2]	FCC, ISED, RED, PTCRB, AT&T

2 = All are planned certifications

Support products

EVK-N410-02B	Evaluation kit for SARA-N410-02B
EVK-R404M-00B	Evaluation kit for SARA-R404M-00B
EVK-R410M-01B	Evaluation kit for SARA-R410M-01B
EVK-R410M-02B	Evaluation kit for SARA-R410M-02B
EVK-R412M-02B	Evaluation kit for SARA-R412M-02B

Product variants

SARA-N410-02B	LTE module for USA (T-Mobile USA); Cat NB1 bands: 2, 4, 5, 12
SARA-R404M-00B	LTE-only module for USA (Verizon); Cat M1; Band 13
SARA-R410M-01B	LTE module for North America (AT&T); Cat M1; Bands 2, 4, 5, 12
SARA-R410M-02B	LTE module for global use; Cat M1, Cat NB1 deployed bands: 1, 2, 3, 4, 5, 8, 12, 13, 17, 18, 19, 20, 25, 26, 28, and band 39 in M1-only
SARA-R412M-02B	LTE, 2G module for global use; Cat M1, Cat NB1 deployed bands: 1, 2, 3, 4, 5, 8, 12, 13, 17, 18, 19, 20, 25, 26, 28, and band 39 in M1-only EGPRS quad-band, 850/900/1800/1900 MHz

Further information

For contact information, see www.u-blox.com / contact-us.

For more product details and ordering information, see the product data sheet.