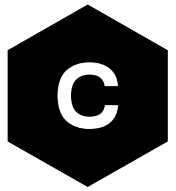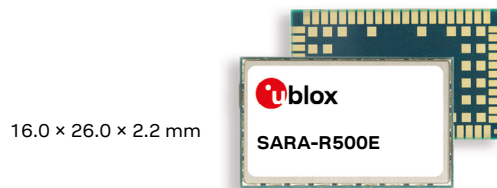# Product summary

SARA-R500E

LTE-M module with embedded SIM and bundled connectivity

Designed with the u-blox UBX-R5 chipset to last an IoT lifetime

- Embedded SIM (eSIM) with various connectivity plans
- No need for external SIM, SIM holder, or related components
- Enhanced robustness and reliability
- Cost-effective, power efficient, reduced total solution footprint

C

Standard

Professional

Automotive

16.0 × 26.0 × 2.2 mm

Product description

The SARA-R500E module is based on u-blox's UBX-R5 cellular chipset, and is the first module with an onboard embedded SIM (eSIM) and bundled LTE-M connectivity.

The eSIM contains all the attributes and features needed to connect the module to the cellular network. Like a standard SIM card, which it replaces, the eSIM inside the SARA-R500E allows the module to connect to the LTE-M network, and is specifically intended for the North American market. The SIM profile and settings are preconfigured, requiring no customer intervention, thus providing a real out-of-the-box connectivity experience.

SARA-R500E supports a comprehensive set of 3GPP Rel. 14 features that are relevant for IoT applications, like improvements to power consumption, coverage, data rate, mobility, and positioning.

The module is designed for customer applications with strong robustness, security, and compactness requirements. The eSIM cannot be stolen or removed, thus meeting the requirements of sealed devices.

The eSIM saves costs and board space, since the SIM card holder and related circuitry are not required. It also eliminates the need to separately source a SIM card and a connectivity plan, as both are offered by u-blox with the SARA-R500E; customers only need to activate it by using the u-blox Thingstream Platform and then choose their preferred data plan.

The SARA-R500E gives the option to subscribe for a general purpose connectivity plan or the u-blox MQTT Anywhere communication service.

	SARA-R500E
Grade	
Automotive	
Professional	•
Standard	
Regions	
	North America
Access technology	
LTE bands	1, 2, 3, 4, 5, 8, 12, 13, 18, 19, 20, 25, 26, 28, 66, 71, 85
Data rate	M1
LTE Power class	23 dBm
Positioning	
External GNSS control	•
Compatible u-blox Services	
MQTT Anywhere™	•
AssistNow™	•
CellLocate®	•
Interfaces	
UART	2
USB (for diagnostics)	1
DDC (I2C)	1
GPIO	6
Features	
eSIM	•
Secure boot, updates, and production	•
MQTT, MQTT-SN	•
Antenna dynamic tuning	•
HTTP, FTP	•
TCP/UDP	•
TLS/DTLS	•
FW update via serial (FOAT)	•
uFOTA™	•
CoAP and LwM2M	•
Last gasp	•
Jamming detection	•
Antenna and SIM detection	•
CellTime™	•

M1 = LTE Cat M1 (375 kb/s DL, 1200 kb/s UL)

□ = Available in future FW version

SARA-R500E

Features

LTE	**3GPP Release 13 LTE Cat M1**
	3GPP Release 14 LTE Cat M1: Coverage enhancement mode B, Uplink TBS of 2984b, CIoT optimizations, and Release Assistance Indication (RAI)
	Cat M1 Half-duplex, 375 kb/s DL, 1200 kb/s UL
SMS	MT/MO PDU / text mode
	SMS over SG/NAS

Compatible u-blox services

Communication	MQTT Anywhere
Location	AssistNow
	CellLocate

Software features

Protocols	Dual stack IPv4 and IPv6
	PPP over IPv4 and IPv6
	Embedded TCP/IP, UDP/IP, FTP, HTTP, DNS
	Embedded MQTT and MQTT-SN
	Embedded CoAP and LwM2M
	Embedded TLS/DTLS
	SIM provisioning (BIP)
Positioning	Direct access to u-blox GNSS via module
Functionalities	Antenna dynamic tuning
	CellTime for robust and accurate timing reference
	Last gasp
	Jamming detection
	Antenna and SIM detection
Firmware upgrade	Via UART
	uFOTA client/server solution
	(firmware upgrade over the air)

Package

96 pin LGA: 16.0 x 26.0 x 2.2 mm, < 3 g

Environmental data, quality & reliability

Operating temperature	–40 °C to +85 °C
RoHS compliant (lead-free)	
Qualification according to AEC-Q104	
Manufactured in ISO/TS 16949 certified production sites	

Certifications and approvals

SARA-R500E	FCC, ISED, PTCRB, AT&T, RED
SARA-R500E	AWS IoT Core qualified
	Microsoft Azure certified

Electrical data

Power supply	3.8 V nominal, range 3.0 V to 4.5 V
PSM current consumption	62 µA
eDRX current consumption	180 µA
LTE Cat M1 Connected mode current consumption	195 mA (at 23 dBm)

Interfaces

Serial	8-wire UART, configurable as 2x 4-wire UART with ring indication
	DDC (I2C)
	USB for diagnostics
GPIO	Up to 6 GPIOs, configurable

Support products

EVK-R500E	Evaluation kit for SARA-R500E

Product variants

SARA-R500E	LTE-M module with embedded SIM and connectivity for North America

Further information

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

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

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