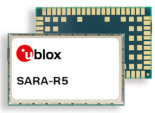
u-blox cellular product overview

Powerful, easy-to-integrate, comprehensive cellular modules and chips

Cellular modules for all kinds of applications

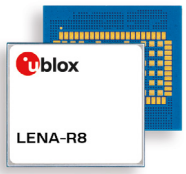
u-blox cellular and satellite modules optimize performance and cost, while supporting seamless technology transitions.

LEXI series
LTE Cat 1bis, LTE-M, NB-IoT, and 2G
LGA modules
16.0 x 16.0 x 2.0 mm



SARA series
LTE-M, NB-IoT, SAT, and 2G
LGA modules
16.0 x 26.0 x 2.2-3.0 mm

LARA series
LTE Cat 1 and Cat 4
LGA modules
24.0 x 26.0 x 2.6 mm



LENA series
LTE Cat 1bis
LGA modules
27 x 30 x 2.6 mm

Key features and benefits

Market-specific differentiators

- Unique features for automotive, industrial, and consumer markets
- Introduction of satellite communication (SAT) on latest products

Technology designed for IoT

- Built to last an IoT lifetime: Long-term availability of integrated chipset platforms
- Industry-leading security by design: secure boot, secure update, and secure production
- Compatible with u-blox communication and location services

Reduced system complexity

- Pin/pad compatible through nested design
- Seamless operation with u-blox GNSS and Wi-Fi / Bluetooth modules, along with flexibility to choose the best-suited module for specific applications
- Extensive set of features accessible via AT commands to simplify development
- Common AT commands simplify developing applications for multiple products

Ecosystem enablement

- Broad portfolio of technologies provide great flexibility and top performance
- Comprehensive set of worldwide cellular certifications that increase scalability and reduce cost for IoT solutions

Technology selection

IoT and automotive applications are very diverse. Different cellular technologies provide capabilities for a large variety of use cases. The comprehensive portfolio of u-blox cellular modules provides the right option for your product development.

	2G	3G	SAT	NB-IoT	LTE-M	LTE Cat 1	LTE Cat 1bis	LTE Cat 4
Data rate	kb/s	Mb/s	b/s	kb/s	kb/s	10 Mb/s	10 Mb/s	150 Mb/s
Low latency	•	•			1	•	•	•
Indoor / underground				•	2			
Low power				•	•		•	
Voice	•	•			3	•		3
2G/3G fallback					4	4	4	4

1 = Low latency if the device is not operating in PSM and eDRX
2 = Partly fulfilled: MCL GPRS -144 dB, LTE-M -155 dB, NB-IoT -164 dB
3 = Supported in a subsequent firmware version
4 = Variant dependent

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Why choose a u-blox cellular module?

As the world is becoming increasingly connected, cellular modules are critical components in the development of IoT devices and automotive communication hubs. They collect data from sensors, transmit it between connected objects and, in some cases, store data locally on devices deployed in the field. Choosing the right supplier to ensure a properly functioning, secure and sustainable module for your IoT or automotive application is an important business decision.

Financial stability and IPR protection

- Publicly traded on the Swiss stock exchange, providing transparency and guaranteeing quality and security
- Full intellectual property indemnity based on FRAND for standard essential patents at the module level

First class technical support

- Highly responsive and competent support teams with strong technical know-how
- Global technical support network with local support through all stages of development
- Extensive technical documentation
- Evaluation kits and application boards for design testing with minimal resources

High quality and reliability

- Lowest ppm level during customer production and in the field
- Very short delivery time due to multiple well-stocked locations
- Stringent product change notification process with advanced notification
- In-house reliability and test equipment
- Zero defect strategy, e.g. testing of functions within tolerance, X-ray inspection

Secure by design

- Secure boot, secure update, and secure production
- Latest (D)TLS stack
- Lower power consumption due to reduced data overhead in (D)TLS communications

GNSS integration

u-blox's unrivalled core competencies in cellular and positioning technologies bring strong synergies, as both are often required together in today's sophisticated applications.

External GNSS: Provides utmost flexibility to choose GNSS features, accuracy, and sensitivity. GNSS-related commands are tunneled, allowing the host processor to fully control both subsystems through single serial interface and user-friendly AT commands.

Integrated GNSS: Cellular modules with integrated u-blox positioning chipsets include u-blox M8 or M10 GNSS reception, delivering high performance satellite positioning alongside cellular data connectivity.

Chipset integration

Modules based on our UBX-R52 chipsets are not dependent on third parties and are focused on IoT-specific feature development. This translates into long-term availability, roadmap stability, and technical support down to the silicon level.

- Designed to last an IoT lifetime: Long-term availability of the platform
- Excellent customer support: down to a chip level, thanks to the u-blox R52 core
- Unique and IoT-focused services: via access to low-level chip data

Satellite communication

In the IoT ecosystem, satellite connectivity serves as a complementary solution to cellular connectivity, particularly in harsh scenarios like remote rural areas, mountains, or in the middle of the ocean where cellular connectivity may be limited or absent. The SARA-S520 is a multi-mode cellular and satellite IoT module series providing connectivity through cellular networks and geostationary (GEO) and low Earth orbit (LEO) satellites.

u-blox cellular product overview

Form factors, technologies, and regions

For each module variant, the main and fallback technologies are shown in the regions where they are to be used.

	EMEA						North America						South America						APAC					
Modules	**G**	**U**	**S**	**N**	**R**	**L**	**G**	**U**	**S**	**N**	**R**	**L**	**G**	**U**	**S**	**N**	**R**	**L**	**G**	**U**	**S**	**N**	**R**	**L**
LEXI-R520				●	●					●	●					●	●					●	●	
SARA-R520				●	●					●	●					●	●					●	●	
SARA-R520M10				●	●					●	●					●	●					●	●	
SARA-S520BM10			●	●	●				●	●	●				●	●	●				●	●	●	
SARA-R510AWS					●						●						●						●	
SARA-R540S				●	●					●	●					●	●					●	●	
SARA-R500E											●													
SARA-R510S-61B																						**J**	**J**	
SARA-R510M8S-61B																						**J**	**J**	
SARA-R510M8S-71B																						**K**	**K**	
SARA-R422	•			●	●		◦			●	●		•			●	●		Δ			●	●	
SARA-R422S	•			●	●		◦			●	●		•			●	●		Δ			●	●	
SARA-R422M10S	•			●	●		◦			●	●		•			●	●		Δ			●	●	
LEXI-R422	•			●	●		◦			◦	◦		•			●	●		Δ			●	●	
SARA-N310				●												●						●		
LEXI-R10401D											●						●							
LEXI-R10801D					●												**B**						●	
LENA-R8001	•				●		◦				o		•				●		Δ				●	
LENA-R8001M10	•				●		◦				o		•				●		Δ				●	
LARA-R6001(D)	•	•			●		◦	•			●		•	•			●		Δ	•			●	
LARA-R6401(D)											●													
LARA-R6801(D)	•	•			●								•	•			●		Δ	•			●	
LARA-L6004	•	•				●	◦	•				●	•	•				●	•	•				●
LARA-L6004D	•	•				●	◦	•				●	•	•				●	•	•				●
LARA-L6804D	•	•				●							•	•				●	•	•				●

Legend:

G = GSM/GPRS

U = UMTS/HSPA

S = Satellite communication

N = NB-IoT

R = LTE-M, LTE Cat 1

L = LTE Cat 4

● = Main technology

◦ = Main technology, but not currently certified

• = Fallback technology

◦ = 2G soon to shut down

o = LTE Cat1bis with supported roaming but not certified by MNOs

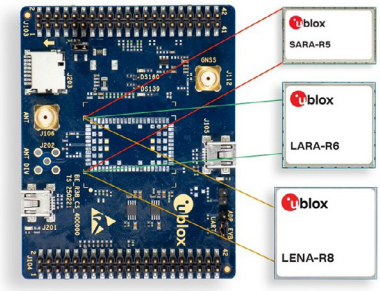
Δ = GSM/GPRS in APAC, but not supported in Japan or Korea

B = Brazil only

J = Japan only

K = Korea only

For a detailed view of our cellular product offering, see our overview: **www.u-blox.com/cellular-modules**



Nested design

Thanks to u-blox nested design, alternate modules (except LEXI form factor) can be mounted on the same PCB space as assembly options. This allows a single PCB design to be retrofitted with GSM, HSPA, NB-IoT, or LTE u-blox technologies, thus enabling a straightforward migration between cellular technologies and module generations. This in turn protects the customer's development investment.

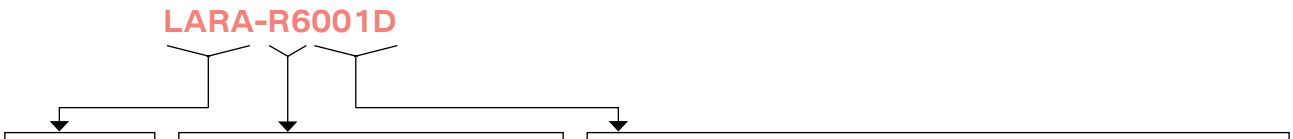
u-blox cellular product overview

Product grades

	Standard grade	Professional grade	Automotive grade
Environmental conditions	Consumer environment	Industrial environment	Automotive environment
Temperature	-20 °C to +65 °C	-40 °C to +85 °C	-40 °C to +85 °C or extended (up to +105 °C on some products)
Product qualification	JESD47 (ICs) Subset of AEC-Q104 non-biased (modules)	AEC-Q100 (ICs) u-blox policy / sub-set of AEC-Q104 (modules)	AEC-Q100 (ICs) AEC-Q104 (modules)
Process levels for design, manufacturing, and testing	• 100% outgoing test • Product traceability • PCN process • Failure analysis	Standard grade, plus: • 100% automatic X-ray and optical inspection of modules	Professional grade, plus: • PPAP, automotive test flow, ISO/TS 16949 manufacturing, component traceability, 8D failure reporting, automotive PCN process, long product life cycles, 0-ppm program

u-blox cellular product naming

u-blox cellular modules are available in different form factors and variants to provide flexibility for scaling different cellular technologies to various application and geographical requirements, such as band support, cost, performance, and level of component integration.



Form factor
SARA
LARA
LENA
LEXI

Main technology/generation	
G4	GSM/GPRS
N3	NB-IoT
R4, R5	LTE-M / NB-IoT
R6, R8	LTE Cat 1(bis) multi-mode
R10	LTE Cat 1bis single-mode
L6	LTE Cat 4
S5	LTE-M / NB-IoT / Satellite

Variant		
VV	All variants have two digits, **VV**, to indicate HW variants with differing band configurations or backup technologies.	
(DDDD)	The optional **D**s (1-4 characters) are used to distinguish:	
	1 or M	LTE Cat 1/Cat 1bis or LTE-M
	B	ORBCOMM connectivity
	M8, M10	Integrated GNSS technology platform
	D	Data-only

u-blox values and promise

Competent technical support worldwide
- Over 20 years of R&D in GNSS technology
- Lifetime support and maximum competence

Quick time to market
- Short and reliable delivery times
- Module form factor consistency

High quality
- Global leader in positioning and wireless communication
- In-house chip technology

Broad spectrum of solutions
- Strong synergies between technologies: Wi-Fi, Bluetooth, cellular, positioning
- Hardware, software, services, and solutions

Security
- Secure by design: secure boot, secure updates, and secure production

Further information

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

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