

u-blox cellular product overview



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

Cellular modules for all kinds of applications

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



ALEX SiP

LTE-M
SiP modules

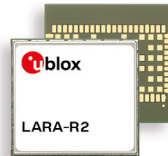
14.0 x 14.0 x 1.5 mm



SARA series

2G, 3G, LTE-M, NB-IoT
LGA modules

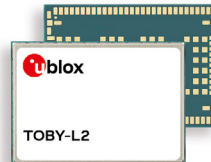
16.0 x 26.0 x 2.2-3.0 mm



LARA series

LTE Cat 1
LGA modules

24.0 x 26.0 x 2.6/2.7 mm



TOBY series

LTE Cat 1 and Cat 4
LGA modules

24.8 x 35.6 x 2.6 mm



MPCI series

LTE Cat 4
Mini PCIe modules

30.0 x 51.0 x 3.7 mm

Key features and benefits



Market-specific differentiators

- Unique features for automotive, industrial, and consumer markets



Technology designed for IoT

- Built to last an IoT lifetime: Long-term availability of integrated chipset platforms
- Secure by design: Industry-leading, foundational hardware and software security with proven and lightweight key management system
- Unique IoT-focused services: uFOTA, CellLocate[®], CellTime[™], and other 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	NB-IoT	LTE-M	LTE Cat 1	LTE Cat 4
Data rate	kb/s	Mb/s	kb/s	kb/s	10 Mb/s	150 Mb/s
Low latency	•	•		1	•	•
Indoor / underground penetration			•	2		
Low power			•	•		
Voice	•	•		3	4	•
2G/3G fallback				4	4	•
Secure cloud			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



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

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: Modules based on u-blox cellular chipsets include u-blox M8 GNSS reception, delivering high performance satellite positioning alongside cellular data connectivity.

Chipset integration

Modules based on our 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 R5 core
- Unique and IoT-focused services: via access to low-level chip data

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 up to +105 °C)
Product qualification	JESD47 (ICs) Subset of ISO 16750 (modules)	AEC-Q100 (ICs) ISO 16750 (modules)	AEC-Q100 (ICs) Extended ISO 16750 (modules)
Process levels for design, manufacturing, and testing	<ul style="list-style-type: none"> • 100% outgoing test • Product traceability • PCN process • Failure analysis 	Standard grade, plus: <ul style="list-style-type: none"> • 100% automatic X-ray and optical inspection of modules 	Professional grade, plus: <ul style="list-style-type: none"> • PPAP, long product life cycles, ISO/TS 16949 manufacturing, automotive test flow, automotive PCN process, component traceability, 8D failure reporting, 0-ppm program



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.

Modules	EMEA					North America					South America					APAC				
	G	U	N	R	L	G	U	N	R	L	G	U	N	R	L	G	U	N	R	L
ALEX-R510M8S				•					•					•					•	
SARA-R500S			•	•				•	•				•	•				•	•	
SARA-R510S			•	•				•	•				•	•				•	•	
SARA-R510M8S			•	•				•	•				•	•				•	•	
SARA-R540S			•	•				•	•				•	•				•	•	
SARA-R422	•		•	•		•		•	•		•		•	•		Δ		•	•	
SARA-R422S	•		•	•		•		•	•		•		•	•		Δ		•	•	
SARA-R422M8S	•		•	•		•		•	•		•		•	•		Δ		•	•	
SARA-R410M-63B																				J
SARA-R410M-73B																				K
SARA-R410M-83B																		A	A	
SARA-R410M-52B									•					•					•	•
SARA-R410M-02B			•	•				•	•				•	•					•	•
SARA-R412M	•		•	•		•		•	•		•		•	•		Δ			•	•
SARA-N310			•										•						•	
SARA-G450	•					•					•					Δ				
SARA-U201	•	•				•	•				•	•				Δ	◆			
LISA-U200	•	•				•	•				•	•				Δ	◆			
LISA-U201	•	•				•	•				•	•				Δ	•			
LARA-R202							•		•											
LARA-R203									•											
LARA-R204									•											
LARA-R211	•			•																
LARA-R281		•		•																
LARA-R220																				J
LARA-R280																	•		•	
TOBY-R200-02B						•	•		•		•	•		•						
TOBY-R200-82B	•	•		•		•	•		•		•	•		•		Δ	•		•	
TOBY-R202							•		•			•		•						
TOBY/MPCI-L200						•	•		•		•	•		•						
TOBY/MPCI-L201							•		•			•		•						
TOBY/MPCI-L210	•	•			•											Δ	◆			◆
TOBY/MPCI-L220																	J			J
TOBY/MPCI-L280											•	•		•		Δ	•		•	

Legend:

G = GSM/GPRS

U = UMTS/HSPA

N = NB-IoT

R = LTE-M, LTE Cat 1

L = LTE Cat 4

• = Main technology

• = Fallback technology

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

◆ = Special firmware version for Japan and Korea is available for some variants; refer to product documentation

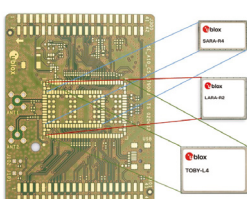
J = Japan only

K = Korea only

A = Australia primarily

For a detailed view of our product offering, see our guided product selector:

www.u-blox.com/guided-product-selector



Nested design

Thanks to u-blox nested design, alternate modules 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.



Secure by design



Robust

- Commercially hardened Root of Trust is foundation of advanced security functionality in Secure Cloud modules
- Lightweight, scalable and proven key management system, ideal for high volume LPWA deployments
- Latest (D)TLS stack and cipher suites with hardware-based crypto acceleration



Efficient

- Reduced data overhead in (D)TLS communications, resulting in lower power consumption
- Support of IoT Security-as-a-Service with additional Design Security, End-to-end Security, and Access Control features

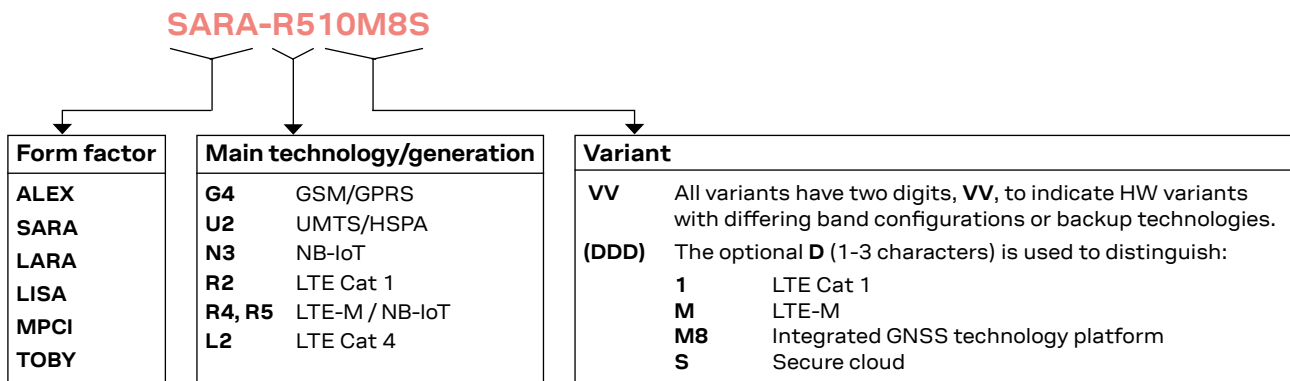


Time-to-market

- Deploy more rapidly by minimizing integration efforts and removing the need for an external crypto chip, while reducing device size and saving component costs
- Eliminate the need to develop your own certificate delivery solution with out-of-the-box Zero Touch Provisioning to the most widely used IoT cloud platforms and your servers

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 bands support, cost, performance and level of component integration.



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, V2X, cellular, positioning
- Hardware, software, services, and solutions



Security

- Advanced spoofing and jamming detection
- End-to-end trust of domain

Further information

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

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

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