



LTE-M / NB-IoT / SAT IoT modules with global coverage						
	LEXI-R520	SARA-R520	SARA-R520M10	SARA-S520BM10	SARA-R510AWS AWS IoT ExpressLink	SARA-R540S
Grade						
Automotive	•	•	•	•	•	•
Professional						
Standard						
Physical						
Image						
Size [mm]	16 x 16 x 2	16.0 x 26.0 x 2.2				
Package and pins	133-pin LGA	96-pin LGA				
Regions	Global	Global	Global	Global	Global	Global
Access technology						
LTE-M / NB-IoT bands	1, 2, 3, 4, 5, 8, 12, 13, 18, 19, 20, 25, 26, 28, 66, 71, 85					*
Main technology, data rate	M1/NB2	M1/NB2		M1/NB2	M1	M1/NB2
Satellite protocol / band				IDP / L-band		
410 MHz spectrum power class						23 dBm
450 MHz spectrum power class						26 dBm
Positioning						
Integrated u-blox GNSS receiver			■	■		
External GNSS control via modem	•	•				•
SpotNow	■	■				
Compatible with u-blox services						
MQTT Anywhere™, MQTT Flex™	•	•	•	•		•
AssistNow™ and CellLocate®	•	•	•	•	□	•
CloudLocate™			•	•		
Interfaces						
UART	2	2	2	2	1	2
USB (for diagnostics)	1	1	1	1	1	1
I2C	1	1	1	1		1
USIM	1	1	1	1	1	1
GPIO	6	6	6	6	2	6
ADC	1	1	1			
Features						
Smart Connection Manager	•	•	•			
Open CPU (uCPU)	•	•	•	•		
CellTime™	•	•	•	•		•
Secure boot, updates, production	•	•	•	•	•	•
Jamming detection	•	•	•	•		•
Last gasp	•	•	•	•		•
Antenna detection	•	•	•	•		•
LwM2M	•	•	•	•		•
FW update via serial (FOAT)	•	•	•	•		•
FOTA/uFOTA™	•	•	•	•	•	•
eDRX and power saving mode	•	•	•	•	•	•
Ultra-low / deep sleep mode	•	•	•	•	•	•
Dual stack IPv4/IPv6	•	•	•	•	•	•
Embedded MQTT / MQTT-SN	•	•	•	•	MQTT only	•
Embedded TCP/UDP stack	•	•	•	•		•
Embedded HTTPS, FTPS	•	•	•	•		•
Embedded TLS / DTLS	•	•	•	•		•
Embedded CoAP/DTLS	•	•	•	•		•
Antenna dynamic tuning	•	•	•			•

M1 = LTE Cat M1, Rel 13 (300 kb/s DL, 375 kb/s UL)
 LTE Cat M1, Rel 14 (300 kb/s DL, 1200 kb/s UL)
 NB2 = Cat NB2 (125 kb/s DL, 140 kb/s UL)

* = LTE bands 1, 2, 3, 4, 5, 8, 12, 13, 18, 19, 20, 25, 26, 28, 31, 66, 71, 72, 73, 85, 87, 88

□ = CellLocate available in future firmware
 ■ = and dedicated GNSS antenna interface

LTE-M / NB-IoT modules



	LTE-M / NB-IoT global and regional modules								LTE Cat NB2			
	SARA-R500E	SARA-R510S-61B		SARA-R510MS-61B		SARA-R510MS-71B		SARA-R422	SARA-R422S	SARA-R422M10S	LEXI-R422	SARA-N310 (ATEX module)
Grade												
Automotive	•	•	•	•	•	•	•	•	•	•	•	•
Professional												
Standard												
Physical												
Image												
Size [mm]	16.0 x 26.0 x 2.2		16.0 x 26.0 x 2.2		16.0 x 26.0 x 2.5		16 x 16 x 2		16.0 x 26.0 x 2.4			
Package and pins	96-pin LGA		96-pin LGA		96-pin LGA		133-pin LGA		96-pin LGA			
Regions	North America	Japan	Japan	Korea	Global		Global		Global			
Access technology												
LTE-M / NB-IoT bands	1, 2, 3, 4, 5, 8, 12, 13, 18, 19, 20, 25, 26, 28, 66, 71, 85				1, 2, 3, 4, 5, 8, 12, 13, 18, 19, 20, 25, 26, 28, 66, 85				3, 5, 8, 20, 28, +			
Main technology, data rate	M1	M1/NB2		M1/NB2		M1/NB2	M1/NB2	M1/NB2	M1/NB2	NB2		
GSM/GPRS bands					Q	Q	Q	Q	Q			
Positioning												
Integrated u-blox GNSS receiver			■	■				■				
External GNSS control via modem	•	•							•			
Compatible with u-blox services												
MQTT Anywhere™, MQTT Flex™	MQTT Anywhere only	•	•	•		•	•	•	•	•	•	•
AssistNow™ and CellLocate®	•	•	•	•		•	•	•	•	•	•	•
CloudLocate™			•	•				•				
Interfaces												
UART	2	2	2	2	2	2	2	2	2	2	2	3
USB (for diagnostics)	1	1	1	1	1	1	1	1	1	1	1	
I2C	1	1	1	1	1	1	1	1	1	1	1	1
USIM		1	1	1	1	1	1	1	1	1	1	1
GPIO	6	6	6	6	6	6	6	6	6	6	6	8
ADC	1	1	1	1								2
Features												
eSIM	•											
Open CPU (uCPU)		•	•	•								
CellTime™	•	•	•	•								
Secure boot, updates, production	•	•	•	•	•	•	•	•	•	•	•	•
Jamming detection	•	•	•	•	•	•	•	•	•	•	•	•
Last gasp	•	•	•	•	•	•	•	•	•	•	•	•
Antenna detection	•	•	•	•	•	•	•	•	•	•	•	•
LwM2M	•	•	•	•	•	•	•	•	•	•	•	•
FW update via serial (FOAT)	•	•	•	•	•	•	•	•	•	•	•	•
FOTA/uFOTA™	•	•	•	•	•	•	•	•	•	•	•	•
eDRX and power saving mode	•	•	•	•	•	•	•	•	•	•	•	•
Ultra-low / deep sleep mode	•	•	•	•	•	•	•	•	•	•	•	•
Dual stack IPv4/IPv6	•	•	•	•	•	•	•	•	•	•	•	•
Embedded MQTT / MQTT-SN	•	•	•	•	•	•	•	•	•	•	•	•
Embedded TCP/UDP stack	•	•	•	•	•	•	•	•	•	•	•	•
Embedded HTTPS, FTPS	•	•	•	•	•	•	•	•	•	•	•	•
Embedded TLS / DTLS	•	•	•	•	•	•	•	•	•	•	•	•
Embedded CoAP/DTLS	•	•	•	•	•	•	•	•	•	•	•	•
Antenna dynamic tuning	•	•	•	•	•	•	•	•	•	•	•	•

M1 = LTE Cat M1, Rel 13 (300 kb/s DL, 375 kb/s UL)
 LTE Cat M1, Rel 14 (300 kb/s DL, 1200 kb/s UL)
 NB2 = Cat NB2 (125 kb/s DL, 140 kb/s UL)

+ = LTE bands 1, 2, 4, 12, 13, 18, 19, 26, 66, 71, 85 available in future firmware
 Q = quad-band

□ = available in future firmware
 ■ = and dedicated GNSS antenna interface

UBX-13004714 - R40 - Feb, 2024



LTE Cat 1, LTE Cat 1bis, LTE Cat 4, and 2G modules



	LTE Cat 1 / Cat 1bis						LTE Cat 4							
	LEXI-R10401D	LEXI-R10801D	LENA-R8001	LENA-R8001M10	LARA-R6001	LARA-R6001D*	LARA-R6401	LARA-R6401D*	LARA-R6801	LARA-R6801D*	LARA-L6004	LARA-L6004D*	LARA-L6804D*	
Grade														
Automotive														
Professional	•	•					•	•	•		•		•	
Standard			•	•										
Physical														
Image														
Size [mm]	16.0 x 16.0 x 2.0		27.0 x 30.0 x 2.7		24.0 x 26.0 x 2.6			24.0 x 26.0 x 2.6						
Package and pins	133-pin LGA		100-pin LGA		100-pin LGA			100-pin LGA						
Regions	Americas	EMEA, APAC	Global	Global	Global	North America	EMEA, APAC, Japan, LATAM	Global	Multi-region					
Access technology														
LTE FDD bands	2,4,5,12,13,14,20,28	1,3,5,7,8,20,28	1,2,3,4,5,7,8,12,20,28,66		1,2,3,4,5,7,8,12,13,18,19,20,26,28		2,4,5,12,13,14,66,71	1,2,3,4,5,7,8,18,19,20,26,28		1,2,3,4,5,7,8,12,13,18,19,20,26,28		1,2,3,4,5,7,8,18,19,20,26,28		
LTE TDD bands			38,40,41		38,39,40,41			850,900,1900,2100		850,900,1900,2100		850,900,1900,2100		
UMTS/HSPA [MHz]														
GSM/GPRS bands			Q		Q		Q		Q		Q		Q	
Main technology, data rate	Cat 1bis		Cat 1bis		Cat 1		Cat 1		Cat 1		Cat 4		Cat 4	
Positioning														
External GNSS control via modem			•	•	•	•	•	•	•	•	•	•	•	
Integrated u-blox GNSS receiver				■										
Compatible with u-blox Services														
MQTT Anywhere™, MQTT Flex™			•	•	•	•	•	•	•	•	•	•	•	
AssistNow™			•	•	•	•	•	•	•	•	•	•	•	
CellLocate®	•	•	•	•	•	•	•	•	•	•	•	•	•	
Interfaces														
UART	2	2	3	3	2	2	2	2	2	2	2	2	2	
USB	1	1	1	1	1	1	1	1	1	1	1	1	1	
I2C	1	1	1	1	1	1	1	1	1	1	1	1	1	
I2S					1	1	1	1	1	1	1	1	1	
GPIO	10	10	5	5	9	9	9	9	9	9	9	9	9	
Features														
Secure boot, updates, production	•	•			•	•	•	•	•	•	•	•	•	
Jamming detection			•	•	•	•	•	•	•	•	•	•	•	
Last gasp					•	•	•	•	•	•	•	•	•	
Wi-Fi scan	•	•												
Antenna and SIM detection	•	•			•	•	•	•	•	•	•	•	•	
Antenna dynamic tuning	•	•	•	•	•	•	•	•	•	•	•	•	•	
LwM2M					•	•	•	•	•	•	•	•	•	
FW update via serial (FOAT)	•	•	•	•	•	•	•	•	•	•	•	•	•	
FOTA or uFOTA™	•	•	•	•	•	•	•	•	•	•	•	•	•	
eDRX	•	•												
Power saving mode	•	•												
Dual stack IPv4/IPv6	•	•												
Embedded MQTT / MQTT-SN	MQTT only		•	•	•	•	•	•	•	•	•	•	•	
Embedded TCP/UDP stack	•	•	•	•	•	•	•	•	•	•	•	•	•	
Embedded HTTPS, FTPS	HTTPS only		•	•	•	•	•	•	•	•	•	•	•	
Embedded TLS / DTLS	•	•	•	•	•	•	•	•	•	•	•	•	•	
Rx Diversity					•	•	•	•	•	•	•	•	•	
VoLTE/CSFB			□	□	•	•	•	•	•	•	•	•	•	

Cat 4 = LTE Cat 4 (150 Mb/s download, 50 Mb/s upload)
 Cat 1 / Cat 1bis = LTE Cat 1 (10 Mb/s DL, 5 Mb/s UL)
 GPRS = 85.6 kb/s (class 12)

* = Data-only module variant
 □ = available in future firmware version
 ■ = and dedicated GNSS antenna interface

Q = quad-band



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	S	N	R	L	G	U	S	N	R	L	G	U	S	N	R	L	G	U	S	N	R
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	•	•				•					•	•				•	•	•					•

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

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
- (grey) = Main technology, but not currently certified
- (light grey) = Fallback technology
- (small) = 2G soon to shut down
- o = LTE Cat 1bis 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