

LTE-M / NB-IoT modules



LTE-M / NB-IoT modules with global coverage								
	SARA-R500S-01B	SARA-R510S-01B	SARA-R510M8S-01B	SARA-R510AWS AWS IoT ExpressLink	SARA-R540S	SARA-R422	SARA-R422S	SARA-R422M10S
Grade								
Automotive								
Professional	•	•	•	•	•	•	•	•
Standard								
Physical								
Image								
Size [mm]	16.0 x 26.0 x 2.2				16.0 x 26.0 x 2.5			
Package and pins	96-pin LGA				96-pin LGA			
Regions	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				*	1, 2, 3, 4, 5, 8, 12, 13, 18, 19, 20, 25, 26, 28, 66, 85		
GSM/GPRS bands						Q	Q	Q
Main technology, data rate	M1/NB2		M1	M1/NB2	M1/NB2			
450 MHz spectrum power class					26 dBm			
410 MHz spectrum power class					23 dBm			
Positioning								
Integrated u-blox GNSS receiver			•					•
Dedicated GNSS antenna interface			•					•
External GNSS control via modem	•	•			•		•	
Compatible with u-blox services								
MQTT Anywhere, MQTT Flex	•	•	•		•		•	•
AssistNow™ and CellLocate®	•	•	•	□	•		•	•
CloudLocate			•					•
Interfaces								
UART	2	2	2	1	2	2	2	2
USB (for diagnostics)	1	1	1	1	1	1	1	1
I2C	1	1	1		1	1	1	1
USIM	1	1	1	1	1	1	1	1
GPIO	6	6	6	2	6	6	6	6
ADC	1	1	1					
Features								
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
 Q = quad-band

□ = CellLocate available in future firmware

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LTE-M / NB-IoT modules



	LTE-M / NB-IoT regional modules					LTE Cat NB2
	SARA-R500E	SARA-R500S-61B	SARA-R510S-61B	SARA-R510MS-61B	SARA-R510MS-71B	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 2.4	
Package and pins	96-pin LGA	96-pin LGA			96-pin LGA	
Regions	North America	Japan	Japan	Japan	Korea	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, 71, 85			3, 5, 8, 20, 28, +	
Main technology, data rate	M1	M1/NB2			NB2	
Positioning						
Integrated u-blox GNSS receiver				•	•	
Dedicated GNSS antenna interface				•	•	
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	3
USB (for diagnostics)	1	1	1	1	1	
I2C	1	1	1	1	1	1
USIM	1	1	1	1	1	1
GPIO	6	6	6	6	6	8
ADC	1	1	1	1	1	2
Features						
eSIM	•					
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

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



	LTE Cat 4		LTE Cat 1 / Cat 1bis				GSM				
	LARA-L6004	LARA-L6004D*	LARA-R6001	LARA-R6001D*	LARA-R6401	LARA-R6401D*	LARA-R6801	LARA-R6801D*	LENA-R8001	LENA-R8001M10	SARA-G450
Grade											
Automotive											
Professional	•	•	•	•	•	•	•	•	•	•	•
Standard											
Physical											
Image											
Size [mm]	24.0 x 26.0 x 2.6		24.0 x 26.0 x 2.6				27.0 x 30.0 x 2.7		16.0 x 26.0 x 2.4		
Package and pins	100-pin LGA		100-pin LGA				100-pin LGA		96-pin LGA		
Regions	Global		Global	North America	EMEA, APAC, Japan, LATAM		Global	Global	Global		
Access technology											
LTE FDD bands	1,2,3,4,5,7,8, 12,13,18, 19,20,26,28		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, 20, 28, 66			
LTE TDD bands	38, 39, 40, 41		38, 39, 40, 41					38, 40, 41			
UMTS/HSPA [MHz]	850, 900, 1900, 2100		850, 900, 1900, 2100			850, 900, 1900, 2100					
GSM/GPRS bands	Q		Q			Q		Q		Q	
Main technology, data rate	Cat 4		Cat 1	Cat 1	Cat 1	Cat 1	Cat 1bis		GPRS		
Positioning											
External GNSS control via modem	•	•	•	•	•	•	•	•	•	•	•
Integrated u-blox GNSS receiver										•	
Dedicated GNSS antenna interface										•	
Compatible with u-blox Services											
MQTT Anywhere, MQTT Flex			•	•	•	•	•	•	•	•	•
AssistNow™ and CellLocate®	•	•	•	•	•	•	•	•	•	•	•
Interfaces											
UART	2	2	2	2	2	2	3	3	3	3	3
USB	1	1	1	1	1	1	1	1	1	1	1
I2C	1	1	1	1	1	1	1	1	1	1	1
I2S	1	1	1	1	1	1	1	1	1	1	1
GPIO	9	9	9	9	9	9	5	5	5	5	4
Analog audio											1
Features											
Secure boot, updates	•	•	•	•	•	•	•	•	•	•	•
Jamming detection	•	•	•	•	•	•	•	•	•	•	•
Last gasp	•	•	•	•	•	•	•	•	•	•	•
Antenna and SIM detection	•	•	•	•	•	•	•	•	•	•	•
LwM2M	•	•	•	•	•	•	•	•	•	•	•
FW update via serial (FOAT)	•	•	•	•	•	•	•	•	•	•	•
FOTA/uFOTA	•	•	•	•	•	•	•	•	•	•	•
eDRX	•	•	•	•	•	•	•	•	•	•	•
Power saving mode	□	□	□	□	□	□	•	•	•	•	•
Dual stack IPv4/IPv6	•	•	•	•	•	•	•	•	•	•	•
Embedded MQTT / MQTT-SN	•	•	•	•	•	•	•	•	•	•	•
Embedded TCP/UDP stack	•	•	•	•	•	•	•	•	•	•	•
Embedded HTTPS, FTPS	•	•	•	•	•	•	•	•	•	•	•
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
 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	N	R	L	G	U	N	R	L	G	U	N	R	L	G	U	N	R	L
SARA-R500S-01B			•	•				•	•				•	•				•	•	
SARA-R500S-61B																		J	J	
SARA-R510S-01B			•	•				•	•				•	•				•	•	
SARA-R510S-61B																		J	J	
SARA-R510M8S-01B			•	•				•	•				•	•				•	•	
SARA-R510M8S-61B																		J	J	
SARA-R510M8S-71B																		K	K	
SARA-R540S			•	•				•	•				•	•				•	•	
SARA-R510AWS				•					•					•					•	
SARA-R500E									•											
SARA-R422	•		•	•		•		•	•		•		•	•		Δ		•	•	
SARA-R422S	•		•	•		•		•	•		•		•	•		Δ		•	•	
SARA-R422M10S	•		•	•		•		•	•		•		•	•		Δ		•	•	
SARA-N310			•										•					•		
LARA-L6004	•	•			•	•	•			•	•	•			•	•	•			•
LARA-L6004D	•	•			•	•	•			•	•	•			•	•	•			•
LARA-R6001	•	•	•			•	•	•			•	•	•			Δ	•		•	
LARA-R6001D	•	•	•			•	•	•			•	•	•			Δ	•		•	
LARA-R6401								•					•							
LARA-R6401D								•					•							
LARA-R6801	•	•	•								•	•	•			Δ	•		•	
LARA-R6801D	•	•	•								•	•	•			Δ	•		•	
LENA-R8001	•		•			•		○			•		•			Δ			•	
LENA-R8001M10	•		•			•		○			•		•			Δ			•	
SARA-G450	•										•					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
- = LTE Cat 1bis with supported roaming but not certified by MNOs
- 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

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