

# LTE-M / NB-IoT modules



	LTE-M / NB-IoT – global and regional coverage								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)
<b>Grade</b>												
Automotive	•	•	•	•	•	•	•	•	•	•	•	•
Professional												
Standard												
<b>Physical</b>												
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		
<b>Access technology</b>												
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		NB2
GSM/GPRS bands						Q		Q		Q		Q
<b>Positioning</b>												
Integrated u-blox GNSS receiver			■	■				■				
External GNSS control via modem	•	•							•			
<b>Compatible u-blox services</b>												
MQTT Anywhere™, MQTT Flex™	MQTT Anywhere only	•	•	•				•	•	•	•	•
AssistNow™ and CellLocate®	•	•	•	•				•	•	•	•	•
CloudLocate™			•	•				•				
<b>Interfaces</b>												
UART	2		2		2		2		2		3	
USB (for diagnostics)	1		1		1		1		1		1	
I2C	1		1		1		1		1		1	
USIM			1		1		1		1		1	
GPIO	6		6		6		6		6		8	
ADC	1		1		1		1		1		2	
<b>Features</b>												
eSIM	•											
Open CPU (uCPU)			•		•		•					
CellTime™	•		•		•		•					
Secure boot and updates	•		•		•		•		•		•	
Jamming detection	•		•		•		•		•		•	
Last gasp	•		•		•		•		•		•	
LwM2M	•		•		•		•		•		•	
FW update via serial interface	•		•		•		•		•		•	
FOTA	•		•		•		•		•		•	
eDRX	•		•		•		•		•		•	
PSM	•		•		•		•		•		•	
Ultra-low / deep sleep mode	•		•		•		•		•		•	
Dual stack IPv4/IPv6	•		•		•		•		•		•	
MQTT, MQTT-SN	•		•		•		•		•		•	
TCP/UDP stack	•		•		•		•		•		•	
HTTPS, FTPS	•		•		•		•		•		•	
TLS, DTLS	•		•		•		•		•		•	
CoAP	•		•		•		•		•		•	
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

■ = and dedicated GNSS antenna interface

# LTE-M / NB-IoT / SAT IoT modules



	LTE-M / NB-IoT / SAT IoT			LTE-M / NB-IoT			
	SARA-S528NM10	SARA-S520BM10	LEXI-R520	SARA-R520	SARA-R520M10	SARA-R510AWS AWS IoT ExpressLink	SARA-R540S
<b>Grade</b>							
Automotive							
Professional	•	•	•	•	•	•	•
Standard							
<b>Physical</b>							
Image							
Size [mm]	16.0 x 26.0 x 2.2		16 x 16 x 2	16.0 x 26.0 x 2.2			
Package and pins	96-pin LGA		133-pin LGA	96-pin LGA			
Regions	Global	Global	Global	Global	Global	Global	Global
<b>Access technology</b>							
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	M1/NB2	M1/NB2		M1	M1/NB2
Satellite protocol / bands	IoT-NTN GEO 23, 255, 256	IDP / L-band					
410 MHz spectrum power class							23 dBm
450 MHz spectrum power class							26 dBm
<b>Positioning</b>							
Integrated u-blox GNSS receiver	■	■			■		
External GNSS control via modem			•	•			•
SpotNow			■	■			
<b>Compatible u-blox services</b>							
MQTT Anywhere™, MQTT Flex™	•	•	•	•	•		•
AssistNow™ and CellLocate®	•	•	•	•	•	•	•
CloudLocate™		•			•		
<b>Interfaces</b>							
UART	2	2	2	2	2	1	2
USB (for diagnostics)	1	1	1	1	1	1	1
I2C	1	1	1	1	1		1
USIM	1	1	1	1	1	1	1
GPIO	6	6	6	6	6	2	6
ADC			1	1	1		
<b>Features</b>							
Smart Connection Manager			•	•	•		
Open CPU (uCPU)			•	•	•		
CellTime™	•	•	•	•	•		•
Secure boot and updates	•	•	•	•	•	•	•
Jamming detection	•	•	•	•	•		•
Last gasp	•	•	•	•	•		•
LwM2M	•	•	•	•	•		•
FW update via serial interface	•	•	•	•	•	•	•
FOTA	•	•	•	•	•	•	•
eDRX	•	•	•	•	•	•	•
PSM	•	•	•	•	•	•	•
Ultra-low / deep sleep mode			•	•	•	•	•
Dual stack IPv4/IPv6	•	•	•	•	•	•	•
MQTT, MQTT-SN	•	•	•	•	•	MQTT only	•
TCP/UDP stack	•	•	•	•	•		•
HTTPS, FTPS	•	•	•	•	•		•
TLS, DTLS	•	•	•	•	•		•
CoAP	•	•	•	•	•		•
Antenna dynamic tuning			•	•	•		•

M1 = LTE Cat M1, Rel 13 (300 kb/s DL, 375 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 ■ = and dedicated GNSS antenna interface  
 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 Cat 1bis modules



	LTE Cat 1bis						
	SARA-R10001D	SARA-R10001M10D	LEXI-R10001D	LEXI-R10401D	LEXI-R10801D	LENA-R8001	LENA-R8001M10
<b>Grade</b>							
Automotive							
Professional	•	•	•	•	•		
Standard						•	•
<b>Physical</b>							
Image							
Size [mm]	16 x 26 x 2.2		16 x 16 x 2.0			27 x 30 x 2.7	
Package and pins	96-pin LGA		133-pin LGA			100-pin LGA	
Regions	Global	Global	Global	Americas	EMEA, APAC	Global	Global
<b>Access technology</b>							
LTE FDD bands	1, 2, 3, 4, 5, 7, 8, 12, 13, 20, 28, 66		1, 2, 3, 4, 5, 7, 8, 12, 13, 20, 28, 66		2, 4, 5, 12, 13, 14, 66, 71	1, 3, 5, 7, 8, 20, 28	
LTE TDD bands	34, 38, 39, 40, 41		34, 38, 39, 40, 41			38, 40, 41	
GSM/GPRS bands	Q						
Main technology, data rate	Cat 1bis		Cat 1bis	Cat 1bis	Cat 1bis	Cat 1bis	
<b>Positioning</b>							
External GNSS control via modem							
Integrated u-blox GNSS receiver	•					•	
Dedicated GNSS antenna interface	•					•	
<b>Compatible u-blox Services</b>							
MQTT Anywhere™, MQTT Flex™						•	
AssistNow™	•					•	
CellLocate®	•	•	•	•	•	•	•
<b>Interfaces</b>							
UART	2	2	2	2	2	3	3
USB	1	1	1	1	1	1	1
I2C			1	1	1	1	1
GPIO	6	6	10	10	10	5	5
<b>Features</b>							
eSIM	o	o	o				
Secure boot and updates	•	•	•	•	•	•	•
Jamming detection						•	•
SNTP	•	•	•	•	•		
Wi-Fi scan	•	•	•	•	•		
Backup/restore	•	•	•	•	•		
FW update via serial interface						•	•
FOTA	•	•	•	•	•	•	•
eDRX	•	•	•	•	•	•	•
PSM	•	•	•	•	•	•	•
Deep sleep mode	•	•	•	•	•		
Dual stack IPv4/IPv6	•	•	•	•	•		
MQTT, MQTT-SN	MQTT only		MQTT only			•	•
TCP/UDP stack	•	•	•	•	•	•	•
HTTPS, FTPS	HTTPS only		HTTPS only			•	•
TLS, DTLS	•	•	•	•	•	•	•
VoLTE, CSFB						•	•
Antenna dynamic tuning	•	•	•	•	•	•	•

Cat 1bis = LTE Cat 1 (10 Mb/s DL, 5 Mb/s UL)  
Q = quad-band

\* = Data-only variant      o = Optional

UBX-13004714 - R42 - Sep, 2024

# LTE Cat 1 and LTE Cat 4 modules



	LTE Cat 1			LTE Cat 4	
	LARA-R6001 LARA-R6001D*	LARA-R6401 LARA-R6401D*	LARA-R6801 LARA-R6801D*	LARA-L6004 LARA-L6004D*	LARA-L6804D*
<b>Grade</b>					
Automotive					
Professional	•	•	•	•	•
Standard					
<b>Physical</b>					
Image					
Size [mm]	24 x 26 x 2.6			24 x 26 x 2.6	
Package and pins	100-pin LGA			100-pin LGA	
Regions	Global	North America	EMEA, APAC, Japan, LATAM	Global	Multi-region
<b>Access technology</b>					
LTE FDD bands	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, 39, 40, 41			38, 39, 40, 41	
UMTS/HSPA [MHz]	850, 900, 1900, 2100			850, 900, 1900, 2100	
GSM/GPRS bands	Q		Q	Q	Q
Main technology, data rate	Cat 1	Cat 1	Cat 1	Cat 4	Cat 4
<b>Positioning</b>					
External GNSS control via modem	•	•	•	•	•
Integrated u-blox GNSS receiver					
<b>Compatible u-blox Services</b>					
MQTT Anywhere™, MQTT Flex™	•	•	•		
AssistNow™	•	•	•	•	•
CellLocate®	•	•	•	•	•
<b>Interfaces</b>					
UART	2	2	2	2	2
USB	1	1	1	1	1
I2C	1	1	1	1	1
I2S	1	1	1	1	
GPIO	9	9	9	9	9
<b>Features</b>					
Secure boot and updates	•	•	•	•	•
Jamming detection	•	•	•	•	•
Last gasp	•	•	•	•	•
LwM2M	•	•	•	•	•
FW update via serial interface	•	•	•	•	•
FOTA	•	•	•	•	•
eDRX	•	•	•	•	•
PSM	•	•	•	•	•
Rx Diversity	•	•	•	•	•
Dual stack IPv4/IPv6	•	•	•	•	•
MQTT, MQTT-SN	•	•	•		
TCP/UDP stack	•	•	•	•	•
HTTPS, FTPS	•	•	•	•	•
TLS, DTLS	•	•	•	•	•
VoLTE, CSFB (not for data-only variants)	•	VoLTE only	•	•	•
Antenna dynamic tuning	•	•	•	•	•

Cat 4 = LTE Cat 4 (150 Mb/s download, 50 Mb/s upload)  
Cat 1 = LTE Cat 1 (10 Mb/s DL, 5 Mb/s UL)

Q = quad-band

\* = Data-only variant