Product summary

SARA-R540S module

LTE-M / NB-IoT module for 400 MHz spectrum

Standard

Professional

Automotive

Designed to last an IoT lifetime: 5G-ready with the u-blox UBX-R5 chipset

- Support of 410 MHz and 450 MHz LTE bands
- Cost-effective, power efficient, end-to-end IoT communication with MQTT Anywhere and MQTT Flex
- Support of Power Class 2 (26 dBm) over the 400 MHz spectrum
- Optimized ultra-low power consumption
- Critical firmware updates delivered and services enabled via uFOTA

16.0 × 26.0 × 2.2 mm

Product description

The SARA-R540S LTE-M / NB-IoT module is specifically designed for LTE networks deployed over the 400 MHz spectrum (bands 31, 72, 73, 87, 88). Smart metering, smart grid, smart city, and public safety are typical applications that may also require indoor coverage in locations that are otherwise difficult to reach via cellular connectivity. To meet the needs of these applications, SARA-R540S combines the support of the Power Class 3 over the standard LTE bands in the 410 MHz spectrum with the enhanced 26 dBm maximum output power (Power Class 2) in the 450 MHz spectrum.

SARA-R540S has been optimized for extremely low power consumption, using less than 1 µA of current in PSM mode, making it ideal for battery-powered applications. Customers can future-proof their solutions by means of OTA firmware updates, thanks to the uFOTA client/server solution, which utilizes LwM2M, a light and compact protocol ideal for IoT applications.

SARA-R540S is based on u-blox's UBX-R5 cellular chipset. By bringing all technology building blocks in house and having full hardware and software ownership, u-blox can guarantee long-term device availability and provide lifetime support of the entire platform, down to the chipset level.

Like other modules in the SARA-R5 family, SARA-R540S delivers state-of-the-art security thanks to its secure boot, secure updates, and secure production implementations. With u-blox's communication services – MQTT Anywhere or MQTT Flex – data overhead, time spent on-the-air, and energy consumption can be reduced, thus enabling users to extend device life cycles, lower costs, and improve ROI.

	SARA-R540S
Grade	
Automotive	
Professional	•
Standard	
Regions	
	Global
Access technology	
LTE bands	1, 2, 3, 4, 5, 8, 12, 13, 18, 19, 20, 25, 26, 28, 31, 66, 71, 72, 73, 85, 87, 88
Data rate	M1/NB2
450 MHz spectrum power class	26 dBm
410 MHz spectrum power class	23 dBm
Standard LTE spectrum power class	23 dBm
Positioning	
External GNSS control	•
Compatible with u-blox Services	
MQTT Anywhere, MQTT Flex	•
AssistNow™	•
CellLocate®	•
Interfaces	
UART	2
USB (for diagnostics)	1
DDC (I2C)	1
USIM	1
GPIO	6
Features	
Secure boot, updates, production	•
MQTT, MQTT-SN	•
Antenna dynamic tuning	•
CellTime	•
Ultra low PSM	•
TCP/UDP	•
HTTP, FTP	•
TLS/DTLS	•
FW update via serial (FOAT)	•
uFOTA	•
CoAP and LwM2M	•
Last gasp	•
Jamming detection	•
Antenna and SIM detection	•

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

SARA-R540S module

Features

LTE	**3GPP Release 13 LTE Cat M1 and NB1** **3GPP Release 14 LTE Cat M1**: Coverage enhancement mode B, Uplink TBS of 2984b, CIoT optimizations, and Release Assistance Indication (RAI) **3GPP Release 14 LTE Cat NB2**: Higher data rate (TBS of 2536b), mobility enhancement (RRC connection re-establishment), E-Cell ID, lower power class PC6 (14 dBm), two HARQ processes, release assistant, random access on non-anchor carrier Cat M1 Half-duplex, 375 kb/s DL, 1200 kb/s UL Cat NB2 Half-duplex, 125 kb/s DL, 140 kb/s UL
SMS	MT/MO PDU / text mode SMS over SG/NAS

Compatible u-blox services

Communication	MQTT Anywhere MQTT Flex
Location	AssistNow CellLocate
Security	Secure boot, updates, and production

Software features

Protocols	Dual stack IPv4 and IPv6 PPP over IPv4 and IPv6 Embedded TCP/IP, UDP/IP, FTP, HTTP, DNS Embedded secure MQTT and MQTT-SN Embedded CoAP and LwM2M Embedded TLS/DTLS SIM provisioning (BIP)
Device management	LwM2M with dynamically loaded objects
Positioning	Direct access to u-blox GNSS via module
Functionalities	Antenna dynamic tuning CellTime for robust and accurate timing reference Last gasp Jamming detection Antenna and SIM detection
Firmware upgrade	Via UART uFOTA client/server solution (firmware upgrade over the air)

Package

96 pin LGA: 16.0 x 26.0 x 2.2 mm, < 3 g

Environmental data, quality & reliability

Operating temperature	TBD
RoHS compliant (lead-free)	
Qualification according to ISO 16750	
Manufactured in ISO/TS 16949 certified production sites	

Certifications and approvals

SARA-R540S module	RED, GFC [1]

1 = Planned certifications

Electrical data

Power supply	3.8 V nominal
PSM current consumption	0.5 µA
eDRX current consumption	130 µA
LTE Cat M1 Connected mode current consumption	TBD (at 26 dBm)

Interfaces

Serial	8-wire UART, configurable as 2x 4-wire UART with ring indication DDC (I2C) USB for diagnostics
GPIO	Up to 6 GPIOs, configurable
(U)SIM	Supports 1.8 V and 3.0 V

Support products

EVK-R540S	Evaluation kit for SARA-R540S

Product variants

SARA-R540S	LTE-M and NB-IoT module for global use with 400 MHz spectrum support

Further information

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

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