Product Summary

UBX-R5

Multi-band LTE-M / NB-IoT chipset

IoT security redefined in a 5G-ready LTE-M and NB-IoT chipset
• First Common Criteria EAL5+ High certified cellular IoT Secure Element provides best-in-class hardware-based security
• 5G-ready, software-configurable cellular modem to last an IoT lifetime
• Service-on-chip architecture captures signal deep inside hardware for improved positioning and energy efficiency
• Easy integration with u-blox GNSS products and operation of LTE-based positioning
• Powerful edge computing platform provides a hosted application environment

Product description
The UBX-R5 is a 5G-ready, multi-band LTE-M / NB-IoT chipset that provides industry-leading hardware-based security to a wide range of low-power wide-area (LPWA) IoT devices. It includes the first Common Criteria (CC) EAL5+ High certified IoT Secure Element with a hardware Root of Trust, enabling the strongest protection against attacks on mission-critical IoT assets or devices that transmit sensitive information.

Due to the high degree of software configurability within the third generation in-house VSP-based modem processor, the UBX-R5 chipset is 5G-ready and offers platform stability and longevity to customer devices.

UBX-R5 is based on a service-on-chip architecture, which offers low-level insights and data points from deep within the hardware, such as event-based energy consumption monitoring and smart antenna tuning, among others.

The chip can be easily combined with any u-blox GNSS product.

The UBX-R5 chipset includes integrated RF, baseband, power management and RAM and supports several power-saving functionalities, such as PSM and eDRX. Further, it supports enhanced LTE coverage via CE Mode A and B for LTE-M, and ECL1 and ECL2 for NB-IoT, achieving deeper penetration inside buildings and underground.

UBX-R5

Grade
Automotive
Professional
Standard

Regions
Multi-region

Access Technology
LTE bands
Data rate
M1/NB2

Interfaces
UART
USB
DDC (I2C)
SDIO (host) 4-bit
ADC
PWM
I²S
GPIO

Features
EAL5+ High secure element
Hardware Root of Trust
Application CPU
Coverage Enhancement Mode A and B
PSM and eDRX
Dynamic antenna tuning

* = All bands within the 450 MHz to 2.48 GHz range
NB2 = Cat NB2 (125 kbit/s DL, 140 kbit/s UL)
M1 = LTE Cat M1 (375 kbit/s DL, 1200 kbit/s UL)

8.5 × 9.0 × 1.0 mm
### Features

| LTE standards | 3GPP Release 13 LTE Cat M1 and NB1  
|               | 3GPP Release 14 LTE Cat M1: Coverage  
|               | Enhancement Mode B, Uplink TBS of 2984b  
|               | 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 kbit/s DL, 1200 kbit/s UL  
|               | Cat NB2 Half-duplex, 125 kbit/s DL, 140 kbit/s UL  
| LTE channels  | 375 kbps UL/DL HD-FDD  
|               | PDSCH modes (TM) 1, 2  
|               | MPDCCH  
|               | SMS over SGS  
|               | RAN overload control for MTC – extended access barring R11  
|               | Coverage extension A, B  
|               | i-DRX, C-DRX, PSM  
| Security      | Root of Trust - Embedded Secure Element EAL5+ High  
| GNSS          | External  
| Bands         | Software selectable HD-FDD band configurations enables single hardware SKU supporting all 3GPP bands from 450 MHz to 2.46 GHz, depending on external components  
| Application CPU | Industrial grade  
| Interfaces    | UART  
|               | USB  
|               | SPI  
|               | DDC (I2C)  
|               | SDIO (host) 4-bit  
|               | ADC  
|               | PWM  
| GPIO          | Up to 15 GPIOs, configurable  
| SIM           | ISO 7816-3  
| GNSS          | 1 Time sync  

### Package

- **FCBGA package**: 8.5 x 9.0 x 1.0 mm  
- **395 pins**  
- **Pitch**: 0.4 mm  

### Environmental data, quality & reliability

- **Operating temperature**: –40 °C to +85 °C (AEC-Q100 certified)  
- **Storage temperature**: TBD  
- **RoHS compliant (lead-free) and green (no halogens)**  
- **Manufactured in ISO/TS 16949 certified production sites**

### Certifications and approvals

- **Module dependent**

### Electrical data

- **Power supply**: Range 3.3 V to 4.4 V  
- **Power consumption**: TBD

### Product variants

- **UBX-R5**: u-blox LTE-M and NB-IoT chipset for multi-regional use

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