

# Calliope LTE Platform



## Chipset Solution for Category 1 LTE Devices for the Internet of Things

The Calliope LTE Platform is a member of Sequans' StreamliteLTE™ family of LTE chipset products for the Internet of Things. Calliope is designed specifically for wearables and other Category 1 M2M and IoT devices. Calliope comprises baseband and RF chips, an integrated IoT applications processor running Sequans' carrier-proven LTE protocol stack, an IMS client, and a comprehensive software package for over-the-air device management and packet routing. It includes Sequans' powerful interference rejection technology, Sequans AIR™.

### Highlights

- Throughput: up to Category 1 – 10 Mbps DL/ 5 Mbps UL
- Ultra low power consumption
- 3GPP Release 10; software-upgradable to Release 11
- FDD and TDD, up to 20 MHz LTE channels
- Embedded application CPU
- Wafer-level packaging
- Supports VoLTE and location based services
- Host environments: Android, Android Wear, Linux, Windows, Real Time OS
- Versatile interfaces to host system: UART, USB, HSIC,
- Includes Sequans AIR™ interference cancellation technology

### StreamLITE<sup>LTE</sup>

StreamliteLTE is Sequans' product line for devices for the Internet of Things. StreamliteLTE solutions provide an ideal balance of IoT features and low cost, enabling affordable, mass-market M2M and IoT devices.

### Calliope LTE platform

Calliope is extremely cost and power-efficient either as a standalone single-mode 4G LTE solution or as a basis for LTE modules. Calliope has been highly optimized for low cost LTE device design, enabling category 1 LTE modules to replace 3G modules. Calliope provides all necessary IoT features along with extremely low power consumption at a low cost for an industry-leading price/performance capability.

### Applications

Calliope is ideal for adding Cat 1 LTE connectivity to M2M and IoT modules and is also suitable for wearables and M2M devices for metering, home automation, and automotive applications.

## Key Benefits of Calliope LTE Platform

### Ultra small footprint

Calliope's LTE baseband processor (SQN3223), RF transceiver (SQN3241) and power management components are extremely compact due to wafer-level packaging, resulting in the smallest footprint in the StreamliteLTE family.

### Optimized for low cost

Calliope leverages a decade of Sequans' 4G chip design optimization experience and delivers up to category 1 peak throughput (10 Mbps downlink). Its high-level integration and highly-efficient architecture results in a very cost-effective chipset solution for price-sensitive M2M and IoT applications.

### Built for the lowest power consumption

Leveraging the power consumption achievements of Sequans' earlier generation 4G platforms, Calliope's ultra low power consumption—in both idle and active modes—is best in class.

### Comprehensive software suite

Calliope's software suite is based on more than a decade of proven field experience. It is running in major 4G deployments around the world and is one of the most mature solutions in the global 4G ecosystem. It includes the entire LTE Release 10 software stack along with all drivers and host applications required for a complete 4G system. It includes a turnkey package for all major operating systems (including Android, Android Wear, Linux, Windows and Real Time OS) and contains Sequans' standards-compliant OMA-DM, IMS clients and support AT commands for M2M applications. A field diagnostic tool and an RF calibration software tool are delivered for faster time-to-market.

### Supports numerous interfaces

Calliope supports a wide variety of interfaces, including USB 2.0 host and device with integrated transceiver, HSIC, USIM, UART and I2S/PCM-TDM (audio).

### Sequans AIR - Active Interference Rejection

Sequans AIR is Sequans' innovative and powerful interference mitigation algorithm implemented on all its LTE platforms. Sequans AIR has been fully tested and proven at both the system and link levels. It has been shown to significantly improve user experience, especially at the cell edge, and increase network capacity up to 2X when all user terminals are equipped with Sequans AIR (see Sequans' white paper: Mitigating Interference in LTE Networks with Sequans AIR).

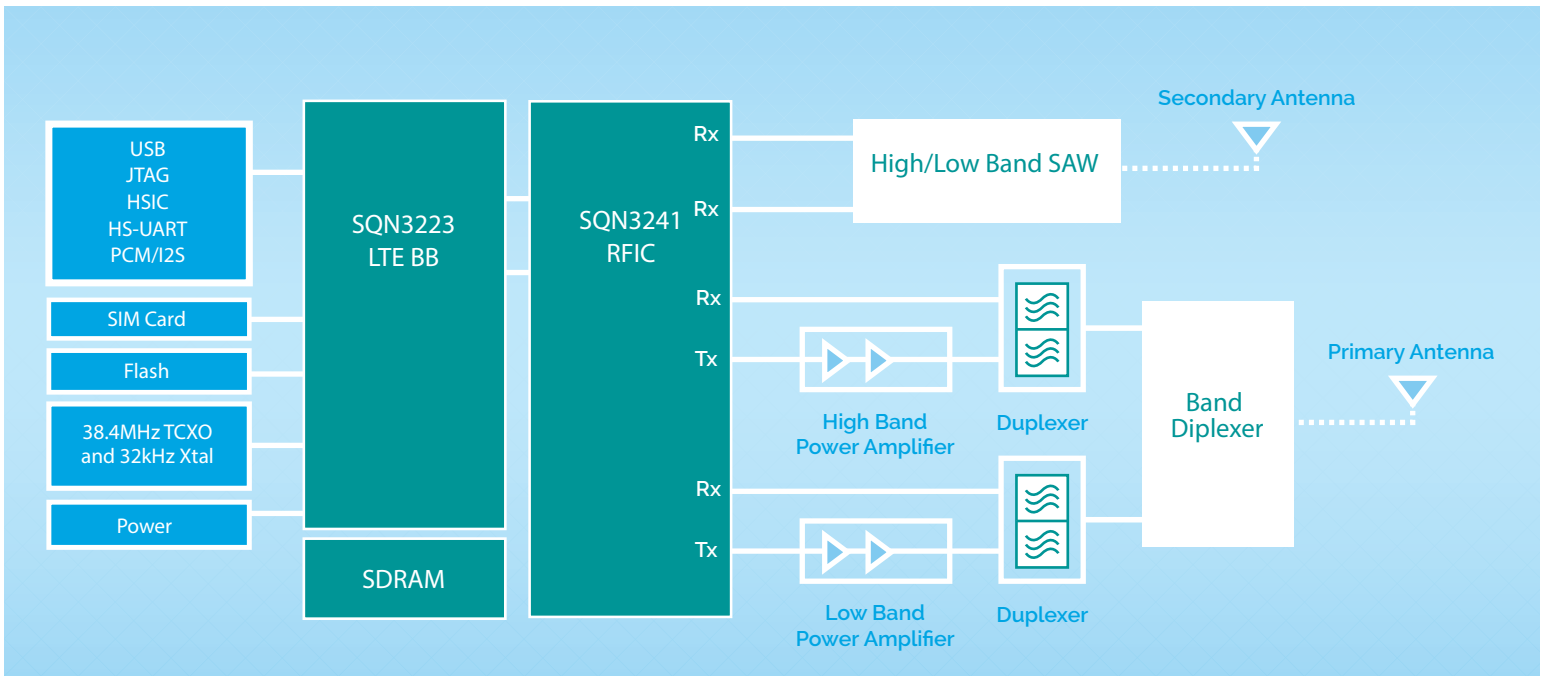
### Full-featured PHY and MAC layer

Calliope's SQN3223 baseband features an extremely efficient LTE PHY and MAC implementation that is strategically partitioned between hardware and software to minimize cost and reduce power consumption. It has been cost optimized for category 1 throughput.

### VoLTE support

Calliope embeds DSP capability to run the VoLTE media engine in an extremely power efficient manner.

## Calliope LTE Platform block diagram



## Product characteristics

### Baseband Features SQN3223

#### Throughput

- Up to category 1 (10Mbps downlink, 5Mbps uplink)

#### LTE PHY

- 3GPP Release 10; software-upgradable to Release 11
- 40 nm low power CMOS
- FDD and TD-LTE
- From 1.4 to 20 MHz bandwidth
- Cat 1 throughput
- All transmission modes (up to TM9, beamforming)
- All DL/UL and special sub-frames configurations
- Tx diversity
- HARQ Chase combining and incremental redundancy
- Fast scanning

#### LTE MAC

- Standard 3GPP security, integrity, ciphering algorithms
- Intra/inter-frequency handover
- Discontinuous reception (cDRX – short and long cycles)

- Semi-persistent scheduling
- Advanced QoS features
- Voice support: VoLTE
- IPv4/v6
- SMS MO and MT
- RoHC

#### Interfaces

- USB 2.0/OTG host/device with integrated transceiver and HSIC
- High-speed UART
- USIM
- PCM-TDM and I2S (audio)

#### RF Transceiver Features SQN3241

- FDD and TD-LTE operation
- Optimized for dual band design
- Support for 1 Tx, 2 Rx
- 699 MHz to 960 MHz, 1.71 GHz to 2.2 GHz and 2.3 to 2.7 GHz
- Low power CMOS

streamLITE<sup>LTE</sup>