



Smart NB-IoT Sensor Platform

Highly Integrated CEVA® Dragonfly NB2 Based SoC Solution

The eSi-NB-IOT-Sensor is a customisable SoC platform delivering a fully integrated NarrowBand-Internet of Things solution that is compliant with the 3GPP Release 14/15 Cat NB2 standard. The modem is based on the market leading CEVA Dragonfly NB2 solution with integrated GNSS capability.

Specialized interfaces are available supporting a wide range of environmental, industrial and medical sensors.

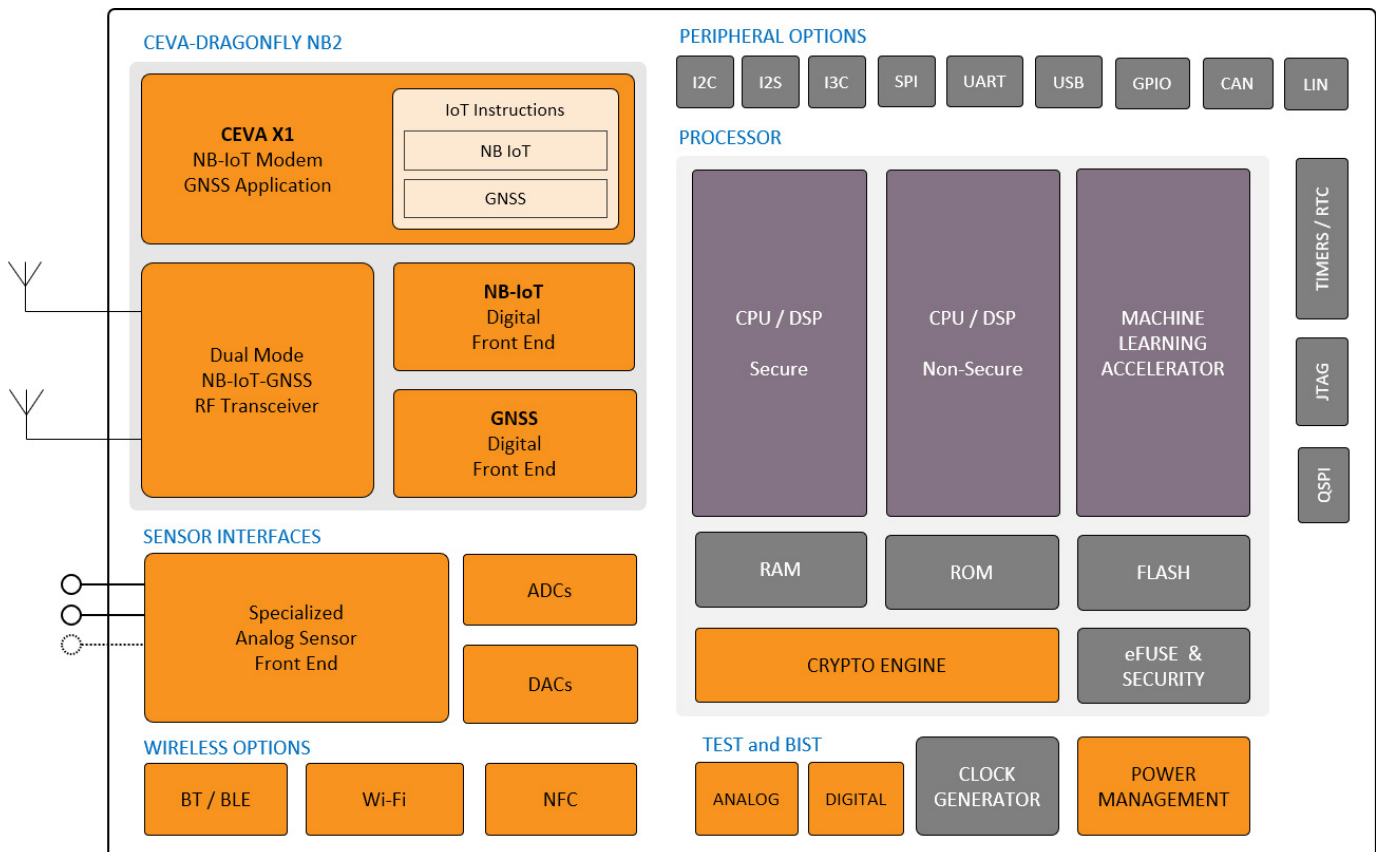
Raw data from the sensors can be processed by the CPU or DSP core/s, or in conjunction with the optional Machine Learning (ML) accelerator. Such edge processing lowers the communication overhead and reduces the power consumption of the modem and radio. A very low power standby mode enables applications where measurement updates can be in the order of hours or days.

The SoC offers a high level of integration with minimum external components and a small footprint, and can be qualified to meet customer specified functional safety and environmental requirements.



Typical Application Areas

- Remote diagnostics
- Remote environmental sensing
- Smart metering
- Remote monitoring and control
- Asset tracking



NB-IoT Connectivity

- Software modem using CEVA-X1 processor with dedicated eNB-IoT and GNSS instructions
- Modem software compliant with 3GPP Release 14, upgradeable to Release 15
- Integrated multi-mode half-duplex RF transceiver using a single antenna, no SAW filter, no duplexer and a single crystal
- Transfer rates: 142kbps (DL) and 126kbps (UL)
- USIM and eSIM interfaces

Embedded Processor Sub-System

- One or more CPU and/or DSP cores in addition to the CEVA-X1 NB-IoT processor:
 - ARM M0+, M23, M4 or M33, M35P
 - CEVA-BX1 DSP
- Optional machine learning accelerator (ML) such as Arm Ethos-U35/U55 or CEVA NeuPro-S™
- Peripheral option including I2C, I2S, I3C, SPI, UART, GPIOs, USB2.0 HS/LS, CAN/CAN-FD and LIN
- RTC requiring an additional 32KHz crystal, systems timers, watchdog and multi-channel PWM

Memory Sub-System

- Minimum of 1MByte of embedded Flash
- Flash expandable via stacked die QSPI
- Configurable amount of SRAM banks with selectable power modes for each memory

Power Management and Clocking

- Internal PMU. Supply voltage from 1.0V to 3.6V
- Multiple power states. Standby current of <1uA
- Minimal external components
- Operates from a single low-cost crystal

Connectivity

- A range of secondary wireless connectivity options can be integrated into the SoC:
 - CEVA RivieraWaves Bluetooth IP up to Bluetooth 5.2 with options for both low energy (BLE) and dual mode (BTDM)
 - CEVA RivieraWaves low power WiFi
 - NFC interface for connecting to smart phones and asset tags readers

Sensors Interfaces

- Multi-channel ADC for monitoring supply voltage, die temperature and auxiliary channels
- Custom sensor interfaces (optional): e.g. precision voltage and transimpedance front-ends and specialist measurements interfaces for ECG, heart rate, respiration rate, temperature and electro-chemical-based sensors

Security and Cryptography

- eFuse for key storage, security options and product traceability
- Cryptographic accelerators:
 - AES-256, SHA-512 and ECC-384
- True-random number generator (NIST 800-22)
- JTAG debug port disabled via eFuse
- Optional integration of advanced security features including Arm TrustZone® CryptoCell and CryptoIsland, Rambus DPA resistance accelerators, PUF, integrated Root of Trust or Secure Element (SE)

Software Support

Extensive software ecosystem:

- Licensable software from CEVA
 - NB-IoT Firmware and Protocol Stack
 - Layer 1 PHY + L1 C
 - UDP Stack and platform drivers
- Range of OSs including FreeRTOS, Mbed OS and ThreadX
- 3rd party GNSS Software receiver

Packaging Options

- Low-pin count QFN or B/LGA
- Bare die for flip-chip bumping directly on PCB

IP Partners

