# OPERATIONAL DESCRIPTION OF BM15_AN

The equipment under test (EUT) is a 2.4GHz Wireless MCU targeting *bluetooth* smart applications the module.

It uses Texas Instruments CC2640 of 2.4G baseband system of RF. The transmitter according to the bluetooth standards.

The CC2640 is a single integrated circuit, contains a 32-bit ARM Cortex™-M3 running at 48-MHz as the main processor and a rich peripheral feature set, including a unique ultra low-power Sensor Controller engine.

The *Bluetooth* Low Energy controller and the embedded into ROM and are partly running on a separate ARM Cortex-M0 processor. This configuration improves overall system performance and power consumption and frees up flash memory for the application.

The RF Core contains an ARM Cortex M0 that interfaces the analog RF and base-band circuitries, handles data to and from the system side, and assembles the information bits in a given packet structure.

The RF core offers a high level, command-based API to the main CPU.

The RF core is capable of autonomously handling the time-critical aspects of the radio protocols (Bluetooth Low Energy) thus offloading the main CPU and leaving more resources for the application of the user.

The RF core has a dedicated 4-kB SRAM block and runs initially from separate ROM memory.

The sensor interface contains circuitry that can be selectively enabled in the power-down mode. The peripherals in this domain may be controlled by the Sensor Controller Engine which is a proprietary power-optimized CPU. This CPU can read and monitor sensors or perform other tasks autonomously, thereby reducing power consumption and offloading the main CM3 CPU.

The sensor controller is set up using a PC-based configuration tool and typical use cases may be (but are not limited to):

- Analog sensors using integrated ADC
- Digital sensors using GPIO and bit-banged I2C and SPI
- Capacitive sensing
- Waveform generation
- Pulse counting
- Keyboard scan
- Quadrature decoder for polling rotation sensors
- Oscillator calibration

**The main features of 2.4G bluetooth module include:**

- 2.4-GHz RF Transceiver Compatible with Bluetooth 4.1 Low Energy and Proprietary
- Microcontroller Powerful ARM® Cortex® -M3
- Up to 48-MHz Clock Speed
- Up to 128KB of In-System Programmable Flash
- 8kB SRAM for Cache
- Up to 20KB of RAM, with Retention in All Power Modes except shutdown
- 2-pin cJTAG and JTAG Debugging
- Supports Over-the-Air Upgrade (OTA)

The system diagram is as below:

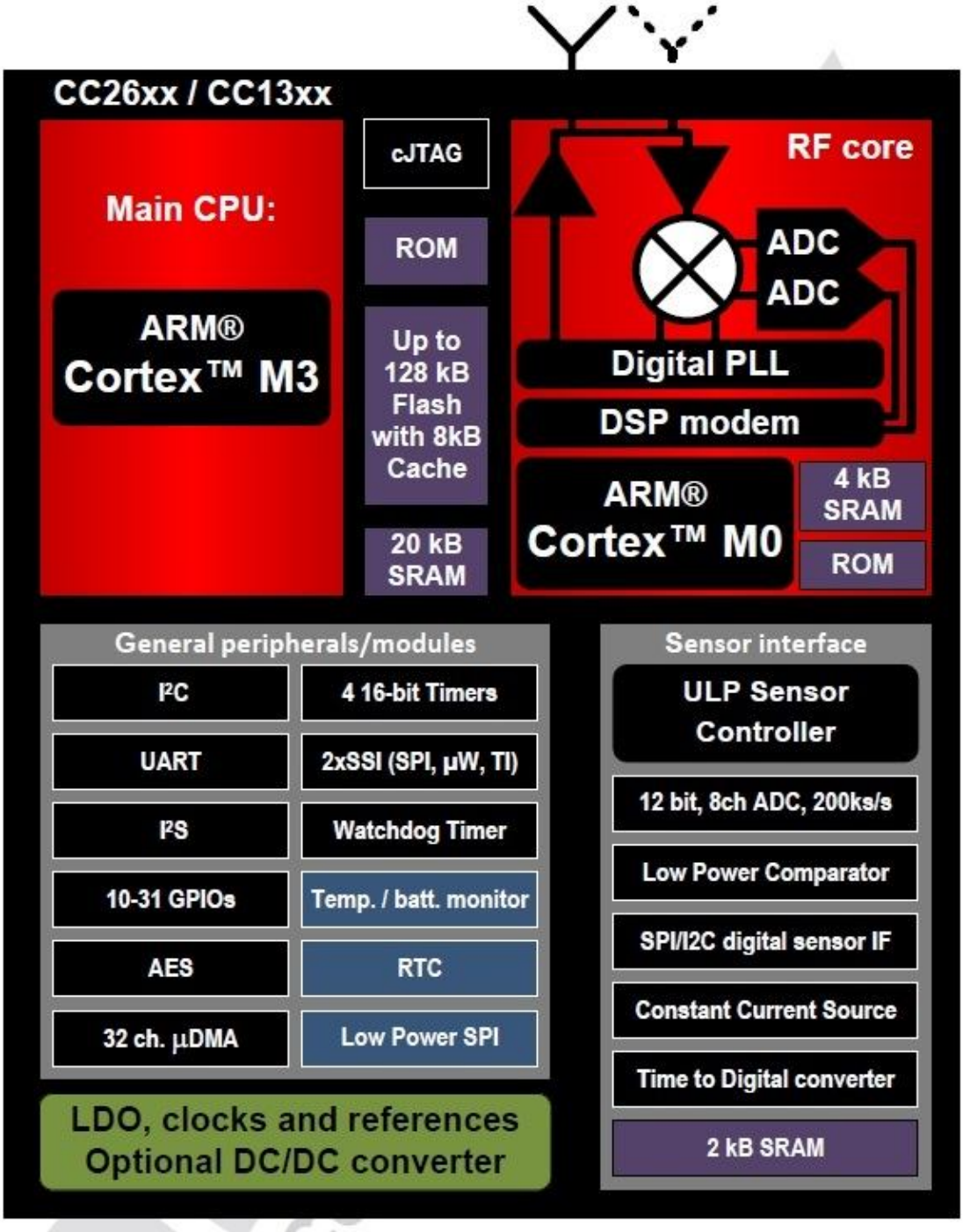


Figure 1 CC2640 system functional block diagram