

BLUENRG-LPS WIRELESS PROCESSOR



Streamlined ultra-low-power Bluetooth® LE 5.3 system-on-chip



BlueNRG-LPS SoC enables Bluetooth® real-time positioning with centimeter-level accuracy

Its flexible program/data memories, streamlined peripherals set and the support of two-layer PCB make the [BlueNRG-LPS](#) SoC the optimal solution for lightweight, cost-effective and ultra-low-power applications.

Compliant with Bluetooth SIG core specification version 5.3, the BlueNRG-LPS enables a wide variety of applications requiring indoor navigation, asset tracking, as well as real-time location finding for tools, assets, and goods.

KEY FEATURES & BENEFITS

- **Bluetooth 5.3 supported features:**
 - Direction Finding (AoA and AoD)
 - 2Mbps data rate
 - Long-range mode (Coded PHY)
 - Advertising extension
 - LE power control and path loss monitoring
- **Integrated balun and minimized BOM for cost optimization**
- **RF performance:**
 - Rx sensitivity: -97dBm at 1Mbps, -104dBm at 125kbps
 - 4.3mA peak current in Tx (at 0dBm, 3.3V)
 - 3.4mA peak current in Rx (at sensitivity level, 3.3V)
 - Programmable output power up to 8dBm

- **SoC architecture**
 - Embedded 32-bit Arm Cortex-M0+ up to 64MHz
 - Memories: 192 Kbytes of Flash, 24 Kbytes of RAM
 - Embedded BlueCore accelerator for Bluetooth time-critical operations
- **1.7 to 3.6 V operating supply voltage**
- **-40 to 105° C temperature range**

KEY APPLICATIONS

- Asset tracking, ID location, and real-time locating systems
- Home automation
- Healthcare, consumer medical
- Wireless sensor and IoT networking
- Metering

Bluetooth LE 5.3 SoC

The BlueNRG-LPS is an ultra-low-power programmable Bluetooth® Low Energy Wireless SoC, embedding ST's latest state-of-the-art 2.4 GHz RF technology, optimized for unparalleled battery lifetime.

The BlueNRG-LPS embeds an Arm® Cortex®-M0+ microcontroller that can operate up to 64 MHz with 192 Kbytes of Flash and 24 Kbytes of RAM and also the BlueNRG core co-processor (DMA based) for time-critical BLE operations.

In addition to Direction Finding (AoA/AoD), the BlueNRG-LPS supports high-speed (2 Mbps) on-air throughput, Long-range mode (Coded PHY), Advertising extensions, and GATT caching as well as the LE Power Control & Path Loss feature.

The BlueNRG-LPS supports simultaneous multi-role connections and is suitable for 2.4 GHz proprietary wireless communications to address ultra-low latency applications. In addition, the BlueNRG-LPS provides enhanced security support by dedicated hardware functions.

Streamlined peripheral set

With a memory footprint and peripheral set streamlined for lightweight applications together with the single-core architecture, the BlueNRG-LPS ensures a shorter design cycle for a reduced development time and cost.

The BlueNRG-LPS embeds a 12-bit ADC, a low-power RTC and three general-purpose 16-bit timers. Moreover, it features standard and advanced communication interfaces: 1x SPI/I2S, 1x LPUART, 1x USART supporting ISO 7816 (smartcard mode), IrDA and Modbus mode, 1x I2C supporting SMBus/PMBus.

Location System

The BlueNRG-LPS supports the standard Bluetooth Direction Finding feature with both Angle of Arrival (AoA) and Angle of Departure (AoD) methods for powerful, low-cost, real-time locating systems.

The BlueNRG-LPS is capable to transmit the special direction finding tone as well as to capture the signal via a suitable antenna array and to feed IQ samples to an external host, thus

computing 3D locations of tracked devices.

These features make the BlueNRG-LPS convenient to use in simple and cost-effective tracking tags and in more complex locator gateways and anchor point designs.

Packages

The BlueNRG-LPS is available in QFN32 (5 x 5 mm, 20 I/Os) and WLCSP36 (2.65 x 2.59 mm, 20 I/Os) coming later this year.

Software development kits and developer resources to reduce design time and cost

Evaluation Kit	STVAL-IDB012V1	Evaluation platform based on the BlueNRG-LPS system-on-chip
	STSW-QUUPPA-ETAG	ST Quuppa tag emulation
SDK	STSW-BNRGLP-DK	BlueNRG-LP, BlueNRG-LPS Software Development Kit package
PC GUI and Tools	STSW-BNRGFLASHER	The RF-Flasher utility
	STSW-BNRGUI	BLUENRG family GUI
	STSW-WISE-STUDIO	WiSE-Studio free IDE for Windows, Linux, MAC OS
Documentation	DS13819	BlueNRG-LPS data-sheet
	RM0491	The BlueNRG-LPS ARM Cortex M0+ based Reference Manual
	UM2058	The BlueNRG GUI SW software package
	UM2726	The BlueNRG-LP, BlueNRG-LPS 2.4 GHz radio proprietary driver
	AN5466	BlueNRG-LP, BlueNRG-LPS power-save modes
	AN5503	Bringing up the BlueNRG-LP, BlueNRG-LPS devices
	AN5574	Driving an external RF front-end with the BlueNRG-LP, BlueNRG-LPS
	AN5463	The BlueNRG-LP, BlueNRG-LPS OTA (over-the-air) firmware upgrade
	AN5471	The BlueNRG-LP, BlueNRG-LPS UART bootloader protocol

