

# BlueNRG-1

## Ultra-low-power Bluetooth® Low Energy System-on-Chip



BlueNRG-1 is ST's first Bluetooth® Low Energy Application Processor optimized to satisfy high-volume opportunities in the fast-growing Internet Of Things market, combining superior energy efficiency and strong radio performance.

BlueNRG-1 is ideal for energy-constrained smart sensors and connected devices like wearables, retail beacons, keyless entry systems, smart remote controllers, asset trackers, industrial and medical monitors being a perfect enabler of the Internet Of Things applications.

### KEY FEATURES

- Extends battery life
- Robust and reliable RF connections
- A full-featured SDK, including:
  - Templates, examples and iOS/Android apps
  - High-level abstraction layer APIs (no BLE expertise required)
  - Real-time debug capabilities
  - IAR, Keil, and Atollic support

### KEY BENEFITS

- Ultra-low-power, sub- $\mu$ A power current consumption in Sleep mode
- Operating temperature range up to +105 °C
- Up to +8 dBm maximum output power
- Ultra-fast sleep-to-active and active-to-sleep switching
- On-chip PDM interface for digital MEMS microphone interfacing
- On-chip battery monitor and temperature sensor
- On-chip DC/DC step-down converter and linear regulator

- On-chip ADC analog front end with 10-bit resolution
- Up to 14/15 GPIOs (QFN/WLCSP)
- Single-core, ultra-low-power 32-bit ARM® Cortex®-M0 core architecture
- Optimized memory architecture: 160 Kbytes of Flash memory, 24 Kbytes of ultra-low-leakage RAM (with full data retention)
- Dual package offering: QFN32 (5 x 5 x 1 pitch 0.5 mm) and WLCSP34 (2.69 x 2.56 x 0.5 pitch 0.4 mm)

### KEY APPLICATIONS

- IoT
- Smart Home
- Beacons
- Remote Control
- Wearables
- Health Care
- Industrial

BlueNRG-1 shows an unmatched energy efficiency due to its ultra-low power consumption as well as its incredible state transition speed between low-power and active states, greatly extending battery life from month to years.

In addition, RF-output power is boosted to +8 dBm to ensure clear and reliable communication even in noisy environments.

## Bluetooth® low energy System-on-Chip



### AVAILABLE TOOLS AND TECHNICAL DOCUMENTATION

<b>Evaluation kit</b>	STEVAL-IDB007V1	BlueNRG-1 evaluation kit
<b>HW resources</b>	Schematic pack	Evaluation kit: schematics
	BOM	Evaluation kit: bill of material
	Gerber pack	Evaluation kit: board manufacturing specification
<b>SW resources</b>	GUI	Graphical user interface for driving by PC evaluation kit
	Navigator	PC application providing interface to demonstration and peripheral driver example
	Flasher	PC application allowing BlueNRG-1 programming
	OTA demo	Demonstration software for enabling the over the air firmware update
	Sensor demo	Demonstration software showing communication between BlueNRG-1 and smartphone
	Beacon demo	Demonstration software showing BlueNRG-1 beacon functionality
	HID peripheral demo	Demonstration software showing BlueNRG-1 HID (mouse and keyboard) functionality
	Remote Control	Demonstration software showing how BlueNRG-1 can control a remote device
	Chat demo	Demonstration software showing how to implement two way communication between two BlueNRG-1 device
	DTM	Software for enabling direct test mode
<b>Documentation</b>	AN4818	Bringing up the BlueNRG-1 device
	AN4819	PCB design guidelines for BlueNRG-1 device
	AN4820	BlueNRG-1 low power modes
	AN4869	BlueNRG-1 BLE over the air firmware upgrade
	AN4872	BlueNRG-1 UART bootloader protocol
	UM2071	BlueNRG-1 development kit user manual
	PM0257	BlueNRG-1 programming manual