GLOSSARY

RSSI – Received signal strength indicator (RSSI) is a measure of the power present in a received radio signal.

dBm – A unit of measure of the absolute radio power level in decibel scale vs 1mW of power. It means 1 mW is 0 dBm, 10 mW is 3 dBm, 100 mW is 6 dBm, etc.

DCDC converter – An electronic circuit that provides an output regulated voltage that is different (higher/lower) than its input voltage. In a radio chip and battery-operated system, its purpose is to convert the battery voltage to a lower regulated level (also called a "buck converter").

RF balun – This RF circuit filters RF signals (ensuring compliance with local radio regulations such as ETSI, FCC, and ARIB) and performs 50-Ohm adaptation with an antenna connector to ensure optimal RF transmission and reception performance.

PLL – Phase Lock Loop is a circuit that generates the required phase or frequency in a radio system. This is basis of the analog part of a radio transceiver to perform radio modulation & demodulation.

HS XTAL – High-speed crystal oscillator required to provide the reference frequency to the PLL in order to generate the correct RF frequency.

RO – A ring oscillator is an internal circuit (low-cost vs external 32 kHz crystal oscillator) that is required for low-power management of transceivers. Internal transceiver timers run based on the RO frequency.

PCB antenna – PCB antenna is designed on a printed circuit board using copper lines. Its advantage in terms of cost is that its one-quarter wavelength ensures good RF performance.

50-Ohm adaptation – In RF applications, all measurements are based on 50-Ohm connectors to ensure a reference setup for radio & power consumption measurements. Moreover, it eases radio designs with antennas which are close to 50 Ohm impedance.

Extended data packet length – Optional BLE 4.2 feature used to increase data transfer rates (up to 700 kbps).

Secure connection – Optional state-of-the-art BLE feature to improve connection security.

FOTA – Firmware (application & stack) Over-The-Air upgrade. The procedure allows to push new firmware on a device deployed in the field.

BLE Profile – A basic collection of attributes (services and characteristics) exposed by a device in order to share user data over a BLE link.

GATT – Generic Attribute Profile software layer (part of the BLE stack) that defines how attributes are organized and how the application can access them.

Advertising – Bluetooth devices send advertising packets (PDUs) to broadcast data, and to allow other devices (scanners) to find and connect to them. The advertising data consists of up to 31 bytes of user configurable data.

Scan resp – An additional 31 bytes can be sent as a scan response to a scan request (scan request sent from client device such as smartphone).

Beacon – A beacon device uses advertising mode to share data with users. The payload can be specified such as iBeacon (Apple) and Eddystone (Google) or can be configured by application.

For more information, visit us on www.st.com/ble
Operating in the unlicensed 2.4 GHz frequency band, what makes Bluetooth Low Energy (BLE) so special is that it exploits the efficiency of the Industry, Science and Technology (ISM) band for short-range communications. One of the major considerations when designing a BLE solution is whether to use a Bluetooth Module or a discrete Bluetooth design. Bluetooth requires regional (FCC, CE, IC, etc.) and Bluetooth SIG certifications. Using a pre-certified Module eliminates a costly certification process and is usually faster to market thanks to data packet length extension (i.e., a non-disruptive way to increase the payload of a BLE packet). The BLE stack integrated over our latest BlueNRG SoC offers state-of-the-art communication, security and privacy mechanisms. Going further in this direction, the BlueNRG-LP and BlueNRG-2N offers secure bootloader feature, which always checks the stack before starting to allow only signed firmware images to run. The BlueNRG-LP adds other layers in security, like SKID interface disabling and flash read/write protection.

APPLICATION TOPOLOGIES: SOFTWARE ENABLERS

BlueNRG Software Development Kits offer flexibility to host different software enablers in order to address various application needs. BlueNRG-2N BLE 5.0 SoC 160 KB

BLE 5.0 SoC 256 KB

BlueNRG-2

BlueNRG-1

Discrete

BlueNRG-MQA

BlueNRG-MQP

BlueNRG-MOL

BlueNRG-2N BLE 5.0 Network processor

APPLICATION FEATURES

On top of basic beacon or point-to-point connections, BLE technology brings flexibility to enable multiple connection scenarios (i.e., a small hub connected to several sensors). ST solution enables maintaining multiple connections at the same time, impacting available RAM resources. While BlueNRG2 and BlueNRG-LP support up to 8 connections, the BlueNRG-LP provides for each connection an efficient power handling and fast switching.

To ensure secure product maintenance and update, the Firmware Over-The-Air procedure in more and more deployed, making it easy to update memory and take back the product. Thanks to our BLE stack of BlueNRG-LP, external data storage are supported for faster data transfer rates (thanks to data packet length extension) BlueNRG-2 allows an efficient OTA deployment. Moreover, thanks to 300kbps features, the BlueNRG-LP allows the OTA deployment in 5 seconds.

With the number of connected devices increasing daily, ensuring the security of one’s device is a very important concern. The Bluetooth Low Energy stack integrated over our latest BlueNRG SoC offers state-of-the-art communication, security, and privacy mechanisms. Going further in this direction, the BlueNRG-LP and BlueNRG-2N offers secure bootloader feature, which always checks the stack before starting to allow only signed firmware images to run. The BlueNRG-LP adds other layers in security, like SKID interface disabling and flash read/write protection.

ST’s BlueNRG portfolio offers various low-cost BLE solutions from the basic network processor to single-core Wireless SoC CPU processing.

In data pump mode, our BlueNRG SoC lets developers easily add BLE functions to an existing product via a basic UART-to-BLE integration (external 32 kHz or internal RO), bringing an overall hardware flexibility and scalability during product design.

There are different considerations when deciding whether to use a network processor or an application processor as a host for STM32 BlueNRG SoC.

APPLICATION INTEGRATION: CHIPSET SCALABILITY AND MODULE OFFER

APPLICATION TOPOLOGIES: SOFTWARE ENABLERS

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BlueNRG-2 BLE 5.0 SoC 256 KB

BlueNRG-LP BLE 5.2 Soc 256 KB

BlueNRG-MQA

BlueNRG-MQP

BlueNRG-MOL

BlueNRG-2N BLE 5.0 Network processor

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