



# Product Documentation

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Product Documented:	StemDotz	Document Rev:	B
Documented Attribute:	Operational Description	Page 1 of 1	

## 1.0 Purpose

This document records the operational description of the radio for the STEMdotz product.

## 2.0 Operational Description

The STEMdotz utilizes the STMicroelectronics BlueNRG-2 system on chip (SoC) microcontroller with integrated Bluetooth Low Energy (BLE) radio.

The BlueNRG-2 integrates an RF transceiver compliant to the Bluetooth specification and to the standard national regulations in the unlicensed 2.4 GHz ISM band.

The RF transceiver requires very few external discrete components. It provides a configurable 96 dB link budgets with excellent link reliability, keeping the maximum peak current below 15 mA.

In transmit mode, the power amplifier drives the signal generated by the frequency synthesizer out to the antenna terminal through a very simple external network. The power delivered as well as the harmonic content depends on the external impedance seen by the power amplifier, this is run through the balun which imparts a 1.33 – 1.85 dB loss on the output power.

The BlueNRG-2 radio is set to transmit at power setting 4, which translates to a 0dBm transmission level. The antenna chip (TDK ANT016008LCS2442MA1) is designed for a 1.6dB gain via the on board antenna network resulting in transmission power of -2 dBm  $\pm 0.8$  dBm due to the balun and other part tolerances and variability in the transmitter power.

All data transmission is communicated at 1Mbps data rate, in the 2.4GHz ISM band via frequency hopping and coordination between the BlueNRG-2 and a host device is coordinated in compliance with the Bluetooth Low Energy(BLE) 5.0 standard by the software of the SoC.

Revision History			
Revision	Date	Description	Author
A	04/14/2023	Initial Release	Robert Fogg
B	04/24/2023	Added descriptions of power settings and details for power loss in transmitter	Robert Fogg