

2.1 Description of Circuit Function

2.1.1 General Description

Bluetooth operates in the unlicensed ISM band at 2.4 GHz. A frequency hop transceiver is applied to combat interference and fading. A shaped, binary FM modulation is applied to minimize transceiver complexity. The symbol rate is 1 Ms/s. A slotted channel is applied with a nominal slot length of 625 μ s. For full duplex transmission, a Time-Division Duplex (TDD) scheme is used. On the channel, information is exchanged through packets. Each packet is transmitted on a different hop frequency. A packet nominally covers a single slot, but can be extended to cover up to five slots. The Bluetooth protocol uses a combination of circuit and packet switching. Slots can be reserved for synchronous packets. Bluetooth can support an asynchronous data channel, up to three simultaneous synchronous voice channels, or a channel which simultaneously supports asynchronous data and synchronous voice. Each voice channel supports a 64 kb/s synchronous (voice) channel in each direction. The asynchronous channel can support maximal 723.2 kb/s asymmetric (and still up to 57.6 kb/s in the return direction), or 433.9 kb/s symmetric. The Bluetooth system consists of a radio unit, a link control unit, and a support unit for link management and host terminal interface functions.

2.1.2 Specific Information about the RF module

The implemented hardware is a true single chip radio and baseband IC for Bluetooth, 2.4GHz radios, implemented in CMOS technology. Together with an external Flash ROM containing the Bluetooth software stack, it provides a fully compliant Bluetooth system for data and voice communications. A low receiver IF is utilised to allow on-chip channel filtering. A novel synthesiser technique removes the requirement for external varactor diodes and resonator capacitors. The use of digital techniques allows a higher performance to be achieved in the demodulator and modulator as well as providing improved immunity to interference and easier Interoperability with other Bluetooth systems. The on-chip 16 bit microcontroller is powerful enough to support full rate Bluetooth data communications (723.2/57.6Kbps). The device works from a regulated supply in the range 2.7V to 3.6V.