

Theory of Operation/Technical Description – FCC ID: WAP2001 & IC:7922A-2001

RF circuit function:

The RF part has a PLL that generates 2.4 GHz carrier from the 24 MHz ECO. The 24 MHz crystal is external to the IC and the rest of the oscillator including the load capacitors is inside the PProC-BLE IC itself. The binary signal stream is modulated into Gaussian Frequency Shifted Keying with a modulation index of 0.5 and a BT constant of 0.5. This modulated signal is up converted to the carrier. The internal power amplifiers can be digitally controlled to control the output power from +3 dBm to -18 dBm.

On the receive side, an automatic gain control (AGC) loop amplifies the incoming signal to a level suitable for down conversion and demodulation. The amplified signal is then down converted and demodulated to binary streams.

RF signal flow:

The radio has a common input and output pin. The transmit and receiver subsystem are internally switched based on the operation mode. The output of the radio goes through a two matching networks to the antenna. The first matching network consisting of L1 and C15 transforms the radio's impedance to 50 ohms. The second matching network consisting of L2 and C11 transforms the antenna's impedance to 50 ohm.

Description of Antenna system (Baluns, Multiplexers)

The radio has a common input and output pin. The output of the radio goes through a two matching networks to the chip antenna. The details are explained in the RF signal flow section.

Show compliance with 15.203 antenna requirements:

The module uses a chip antenna from Johanson Technologies. The part number is 2450AT18B100. This is a chip antenna of non-standard dimensions which is permanently soldered to the module. Further there is no provision for a standard antenna jack. So the antenna is not user replaceable and meets the requirements of 15.203 of FCC.

Description of all modulation schemes used in the product:

Modulation used in the radio is Gaussian Frequency Shift Keying. The following are the details

1. Modulation type: GFSK
2. Data Rate: 1 Mbps
3. BT constant: 0.5
4. Modulation index: 0.5