

## Theory of Operation

The Module is a radio module that implements an 802.11 b/g/n WLAN (Wireless Local Area Network) transceiver and a Bluetooth (BT) transceiver. A Texas Instruments WL1273L SOIC (System on Integrated Circuit) has two independent transceivers, one for the WLAN functions and one for BT functions. The two radio sections are supported by a FEM (Front End Module), which implements the Power Amplifier Section (PA) and switch duplexing functions. All of the radio functions use an on-module 26 MHz Temperature Compensated Crystal Oscillator (TCXO) as the station frequency reference. Both radios are supported by an on-chip ARM cortex processor. An external 32 kHz clock signal is applied externally for low-power operation of the on-board communications ARM processor.

The data source/sink and command interface for the WLAN transceiver is an SDIO (Secure Digital Input-Output) interface. The data source/sink and command interface for the BT transceiver is through a 4-wire UART Host Control Interface (HCI).

The WL1273L supports 2.4 GHz WLAN, 5.8 GHz WLAN, and 2.4 GHz BT. The FEM module has a port for each 2.4 GHz WLAN and BT, and 5.8 GHz WLAN. The antenna port is duplexed between the 2.4 GHz and 5.8 GHz paths to the FEM. Each antenna path includes a bandpass filter between the FEM and the diplexer.

The WLAN transceiver section is based on a direct-conversion vector (I-Q) transmitter and receiver architecture. The local oscillator is generated at four times the carrier frequency, phase-locked, and divided by four for the quadrature LO injections for the 2.4 GHz band and divided by 2 for the 5.8 GHz band. The transmitter signal is routed to the FEM, amplified by the PA section, fed out either the 2.4 GHz or 5.8 GHz port and fed to the antenna terminal. The WLAN receive section is fully realized in the SOIC and the FEM only provides a passive transmission path through the FEM.

The BT transmitter is based on a direct PLL modulation for the FSK-based modulations and uses Polar modulation techniques for the higher EDR rates which employ differential phase-shift keying modulation. The BT receiver uses a near-zero IF architecture. Both the transmit and receive local oscillators are generated at two-times the carrier frequency and divided by two. The BT transmit and receive uses the 2.4 GHz port on the FEM, and goes through the 2.4 GHz bandpass filter and diplexer to the module antenna port. The 26 MHz station reference is used for the BT functions as well.

The radio transceivers and station reference (26 MHz TCXO) power supplies are provided by on-module voltage regulators.

The FM transmitter and Receive functions are not currently supported, and the module is not certified for their application.