Technical Description

This 2.4GHz 40 channel cordless phone operates in the 2400-2483.5MHz Industrial, Scientific and Medical (ISM) band. It consists of the Hummingbird baseband device U204 RF109 transceiver, U202 RF110 power amplifier and U108(B/S) / U305(H/S) C7505-12P baseband controller.

Baseband controller

The U108(B/S) / U305(H/S) baseband controller consists of 1) an ASIC, into which are integrated a baseband modem, audio modem, and a controller, and 2) a linear auido codec.

It requires a 9.6 MHz crystal oscillator to generator the system reference clock.

The baseband modem provides all modulation, encoding, spreading, scrambling, TDD control, AGC, AFC, decoding, and timing required for a diSSTance cordless telephone system. (Conexant's diSSTance™ (digital Spread Spectrum) technology.)

The audio modem consists of an ITU G.726-compliant 40 kbps or 32kbps ADPCM engine that interfaces to the audio codec. Built-in DTMF and ring tone with audio path control complete the interface for audio support functions.

The controller, and embedded MC19 (65C02) micro-controller core, performs all control and monitoring functions required for a digital spread spectrum (DSS) telephone. Interfaces are provided for all peripheral functions needed for a complete DSS telephone, such as keypad, LED, LCD and EEPROM. System performance enhanced by control functions for a secure serial link between handset and base station.

The audio codec is ITU G.714-compliant. It converts analog signals from the PSTN and microphone to and from digital voice samples for the audio modem. It has buit-in electret microphone interfaces and independent audio channels for line and speaker interfaces.

The baseband controller set requires an external CID detector/ demodulator (the Mitel MT8843) to support CID Type I and Type II. The MT8843 (U106) is a low power CMOS integrated circuit intend for receiving physical layer signals transmited according to Bellcore GR-30-CORE & SR-TSV-002476 specifications.

Transmit path

The baseband digital data input is shaped by external filter. The shaping of the baseband data determines the spectral shape of the transmitted RF signal.

The base and handset station power amplifier (PA) operates from a 3 VDC supply.

The U202 RF110 power amplifier (PA) inputs and outputs are differential RF signal.

It has impedance matching networks between the PA output and the U201(B/S) / U303(H/S) RX/TX switch.

This model is designed to provide automatically selectable High, Medium, and Low output power modes. Depending on the distance between base and handset, the system automatically sets the desired power mode. The nominal step size from High to Medium power mode is 10 dB, and from Medium to Low power mode the nominal step size is 14.5 dB.

Receive Path

The signal is received at the antenna and passes through the U201(B/S) / U303(H/S) T/R switch and an FL1 RF bandpass filter. The FL1 RF bandpass filter is used to minimize the overloading of the front-end of the radio. The FL1 RF bandpass filter has 3 dB passband range from 2404.8MHz to 2475 MHz.
The output of the bandpass filter is ac-couple to the Low Noise Amplifier (LNA) of the U204 RF109.The U204 RF109 downcoverts the RF signal into In-phase (I) and Quadrature (Q) baseband signals. The differential I and Q baseband signals are dc-coupled to the U108(B/S) / U305(H/S) baseband controller.

U201 Transmit Received (T/R) switch

The transmit and receive functions of the switch are enabled by the TXEN and RXEN control signals from the U108(B/S) / U305(H/S) baseband controller IC.

LO Generation.

The LO signal is generated by a programmable PLL frequency synthesizer in the U204 RF109 and an external 2.4 GHz VCO (U205).
The U204 RF109 synthesizer requires differential input signals, from the external VCO, to generate the LO frequency. A BALUN transformer L208(B/S) / L206(H/S) is used to generate differential signals from the single-ended U205 VCO output.