# Intel® PRO/Wireless 5116 Broadband Interface

Innovation for WiMAX fixed wireless broadband platforms

The Intel® PRO/Wireless 5116 is a highly integrated, IEEE 802.16-2004 compliant system on chip (SoC) for both licensed and license-exempt radio frequencies. The unmatched level of integration streamlines the design process and delivers a solid foundation for the development of cost-effective customer premise equipment (CPE).
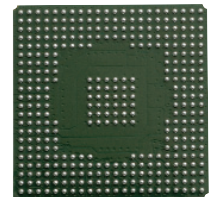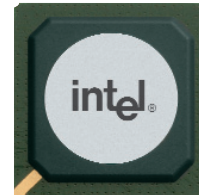
When combined with third-party RFICs and power amplifiers, manufacturers can create a broad range of outdoor and indoor self-installable WiMAX modems and residential gateways capable of delivering high-rate IP-based data, voice, and real-time video. To further reduce cost and speed hardware product development, Intel PRO/Wireless 5116 hardware implementations will be available through third-party ODMs.

The Intel PRO/Wireless 5116 is built around a high-performance OFDM modem. Channel bandwidths and data rates are programmable and support a wide range of applications and regulatory domains. The dual-core processor architecture provides manufacturers with functional flexibility and programmability for their MAC and software applications. Integration of a 10/100 MAC, inline security processing, and a TDM controller interface enables IP-based applications and legacy voice applications.

Included with the Intel PRO/Wireless 5116 is a software development kit (SDK) that provides developers with the necessary tools to harness the device's programmability. Modem and RF APIs, and reference drivers for radio, Ethernet, and TDM devices allow developers to abstract the complexity of the modem hardware and concentrate on their MAC and application development.

Figure 1: Intel® PRO/Wireless 5116 high-level block diagram
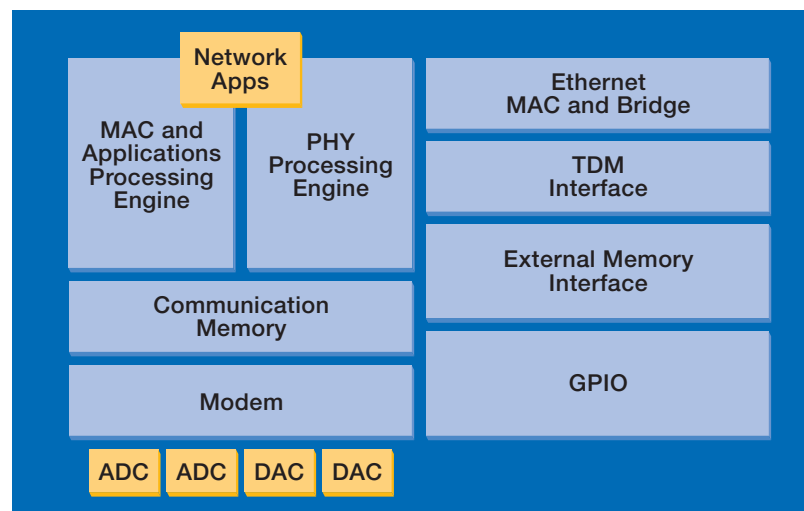
Key Feature Highlights

Modem

- Highly integrated SoC based on IEEE 802.16-2004 standard
- 256 OFDM PHY with support for channel bandwidths up to 10 MHz
- TDD and H/FDD duplexing modes
- Concatenated Reed-Solomon and Convolutional Encoding Forward Error Correction
- Adaptive modulation (BPSK, QPSK, QAM16, QAM64)
- Enhanced link budget support
  - Receive space time coding
  - Uplink sub-channelization
  - SNR, RSSI channel quality measurement
  - ARQ capable

Processing

- Dual-core ARM* 946E-S engines for PHY, MAC, and application protocol processing
- DSP engine with three parallel ALUs allow three simultaneous complex multiply operations per cycle for OFDM processing
- In-line security processing using advanced encryption techniques (3DES, AES, and RC4)

I/O and Interfaces

- Modular RF interface supporting I/F or baseband I/Q radios designed for WiMAX licensed and unlicensed spectrum
- Integrated pair of ADCs and DACs and a high performance PLL to drive converters
- Integrated 10/100 Ethernet MAC with MII interface to external PHY
- TDM interface for legacy analog voice applications or T1/E1 connection
- Additional I/O and system interfaces
  - Extended memory interfaces – SDRAM and flash
  - Test and debug interfaces
  - Programmable GPIOs

Packaging and Thermals

- 360-pin industrial-grade PBGA supporting temperatures ranging from –40˚ C to 85˚ C

Figure 2: Intel® PRO/Wireless 5116 CPE system diagram
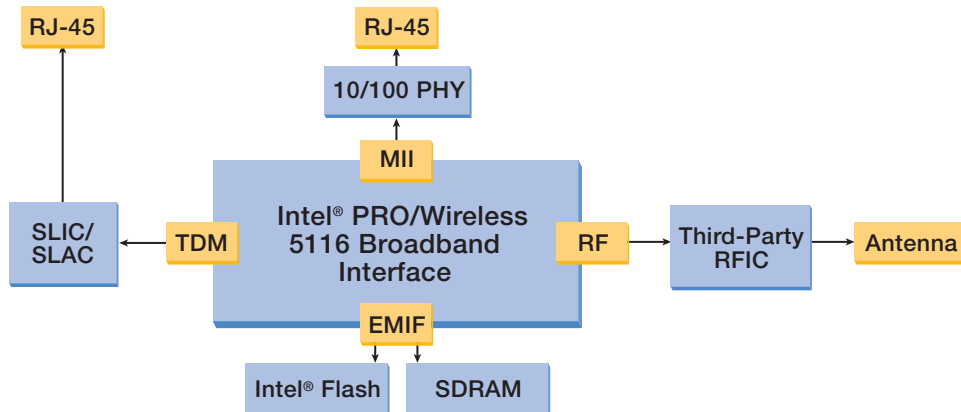
For more information, visit us on the web at
www.intel.com/netcomms/technologies/wimax