QUALCOMM®

AR6004

Dual-band 2-stream 11n
for Mobile

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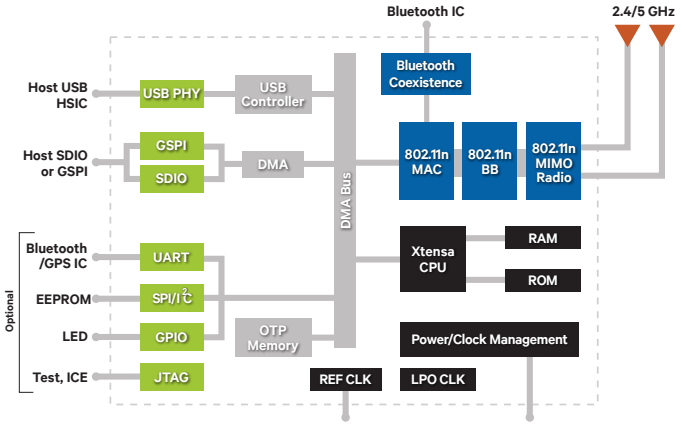
Dual-band 2-stream 11n for Mobile

Most power-efficient 802.11a/b/g/n WLAN implementation for high speed media applications.

Solution Highlights

- Dual-band, 2-stream 802.11n provides highest throughput and superior RF performance for mobile devices
- Advanced 802.11n features
  - HT20 (2.4/5 GHz) and HT40 (5 GHz only)
  - Full/Half guard interval
  - Frame aggregation
  - Space time block coding (STBC)
  - Low density parity check (LDPC)
  - Maximum Ratio Combining (MRC)
  - Transmit Beamforming (TxBF)
  - Spatial Multiplexing: Maximum Likelihood (ML)
- Optimized for maximum throughput and low power consumption
- Highest level of on-chip integration using CMOS technology
  - Radio/MAC/Baseband
  - Patented Qualcomm Efficient Power Amplifier (EPA™) for high transmitter output power
  - Power management unit
  - LNA
- Superior coexistence with Bluetooth co-located devices
  - Support for 2-, 3-, and 4-wire handshaking protocols
  - Enhanced PTA schemes and algorithms for optimal throughput at range
  - Qualcomm proprietary Bluetooth coexistence
- Supports popular interfaces used in low power embedded designs
  - USB High-Speed Interconnect (HSIC), SDIO 2.0, GSPI

AR6004 Architecture



Qualcomm Mobile Platform Solutions

The combination of Qualcomm 802.11n wireless solutions for mobile WLAN, Bluetooth® and Location, with our dominant position in the home, office and Metro Wi-Fi networking markets enables a worldwide wireless ecosystem based on the company's technologies. Qualcomm Qualcomm-engineered 11n technologies provide the most reliable wireless performance and connectivity anywhere you go. Our mobile platform solutions give customers the unsurpassed ability to:

- Build the most power-efficient devices
- Design for the smallest form factor applications
- Achieve the most cost-effective designs
- Deliver Qualcomm-class performance in a wide array of mobile devices, all featuring a high level of design and integration ease

Product Overview

The AR6004 is our fourth-generation Wi-Fi chip optimized for the throughput, size, and energy efficiency requirements of mobile and portable CE devices. In addition to its tiny footprint and energy-saving qualities, the AR6004 is the world's first dual-band, 2-stream 802.11n solution, which enables unprecedented wireless performance in smartphones, tablets, mobile gaming and portable CE devices.

Throughput and Range

The AR6004 brings the full throughput and range benefits of 11n to mobile devices – achieving throughput up to 90 Mbps in the 2.4 GHz band (in 20 MHz mode), and up to 170 Mbps in the 5 GHz band (in 40 MHz mode). It also enhances rate-over-range by leveraging Qualcomm's Signal Sustain Technology™ (SST), a set of optional 11n features that include STBC, LDPC, TxBF, MRC and Maximum Likelihood (ML). Such throughput and coverage improvements enable mobile devices to support flawless media streaming, content sharing and fast synch and-go. This provides consumers with the same wireless experience at home, at work and on-the-go.

The AR6004 offers ultra-low current consumption to significantly extend the battery life of mobile devices. It employs the company's on-chip Efficient Power Amplifier™ (EPA) to reduce the power typically consumed by internal PAs, while delivering the output power of an external PA. This results in the industry's lowest average receive current consumption (at 11n rates).

Qualcomm has taken integration to a new level with the AR6004 to enable true 11n performance in a wider variety of mobile handhelds and portable CE products. The AR6004 eliminates many external components compared to competitive mobile WLAN solutions, including a linearized, high-efficiency power amplifier and LNAs. This high level of integration results in the industry's most compact 2-stream 11n solution, measuring a miniscule 6 mm x 6 mm.

AR6004

Dual-band 2-stream 11n for Mobile

Longest range, high RBOM integration design flexibility and lowest cost

6 mm x 6 mm

AR6004 Radio

- 2.4 GHz and 2.4/5 GHz
- Integrated CMOS Efficient Power Amplifier (EPA™), LNA
- Adaptive radio biasing for low-power or high-performance modes
- Industry-leading receive sensitivity
- No external EEPROM required for RF calibration

AR6004 MAC/Baseband/Processor

- IEEE 802.11a/b/g/n
- Integrated RISC processor
- Support for industry standard QoS schemes (802.11e, WMM, WMM-PS)
- Hardware accelerated security, including WAPI (China)

AR6004 Specifications

On-chip functionality	Single-chip MAC/BB/RF/PA/LNA
Frequency Band	2.4 GHz, 5 GHz
Network Standard	802.11a, 802.11b, 802.11g, 802.11n (2-stream)
Modulation Modes	CCK and OFDM with BPSK, QPSK, 16 QAM, 64 QAM
Hardware Encryption	WEP, WPA/WPA2 (AES and TKIP), WAPI
Quality of Service (QoS)	WMM, WMM-PS, 802.11e
Communications Interface	USB HSIC, SDIO 2.0 and GSPI HCI UART over SDIO for BT/GPS
Peripheral Interface	UART, SPI, I2C, SDIO, GPIO
Supported Data Rates	
IEEE 802.11a	6 – 54 Mbps
IEEE 802.11b	1 – 11 Mbps
IEEE 802.11g	6 – 54 Mbps
IEEE 802.11n (2.4 GHz)	7.2 – 144 Mbps
IEEE 802.11n (5 GHz)	13.5 – 300 Mbps
Physical Specifications	6 mm x 6 mm BGA with 0.4 mm pitch CSP
Related ICs	AR6004G – 802.11b/g/n in BGA or CSP AR6004X – 802.11a/b/g/n in BGA or CSP
Bluetooth Coexistence	Supports 2-, 3-, and 4-wire handshaking protocols Bluetooth™ 3.0 + HS ready Qualcomm proprietary Bluetooth coexistence

Qualcomm Atheros is a wholly owned subsidiary of Qualcomm Technologies, Inc. and a leading provider of wireless and wired technologies for the mobile, networking, computing and consumer electronics markets. We're focused on inventing technologies that connect and empower people in ways that are elegant and accessible to all.

Our broad connectivity portfolio allows us to offer our global customer base high-performance, end-to-end solutions, featuring Wi-Fi®, GPS, Bluetooth®, FM, Ethernet, HomePlug™ Powerline and PON technologies. By leveraging substantial expertise in RF, signal processing, software and networking we can deliver highly-integrated, low-power, system-level solutions that enable developers to create high-performance, differentiated products.

For more information, please visit us online @ qca.qualcomm.com

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