

# AR6004

2-stream 11n for Mobile



## AR6004 Solution Highlights

- Most power-efficient 802.11a/b/g/n WLAN implementation for high-speed media applications
- 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 Atheros 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
  - Atheros proprietary Bluetooth coexistence
- Supports popular interfaces used in low power embedded designs
  - USB High-Speed Interconnect (HSIC)
  - SDIO 2.0
  - GSPI

## Atheros ROCm® Platform

Radio-On-Chip for Mobile (ROCm) Products



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

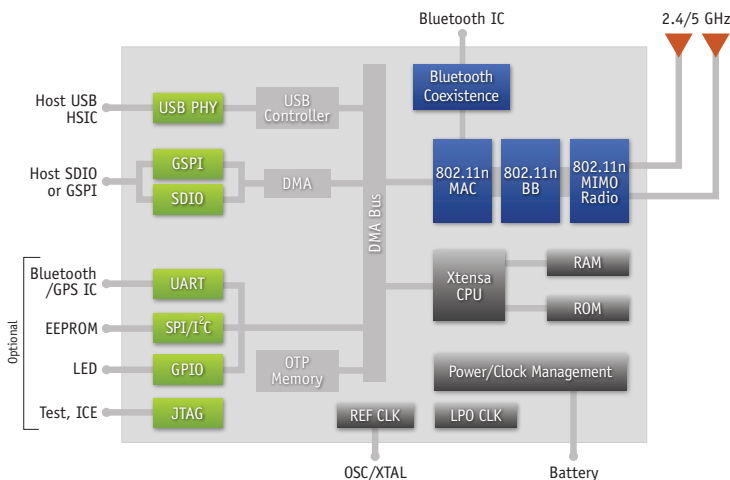
- Build the most power-efficient devices
- Design for the smallest form factor applications
- Achieve the most cost-effective designs
- Deliver Atheros-class performance in a wide array of mobile devices, all featuring a high level of design and integration ease.

## AR6004 Technology Overview

The AR6004 is Atheros' 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.

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 Atheros' 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.

## AR6004 System Architecture



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).

Atheros 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

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)

Atheros Communications is a leading developer of semiconductor system solutions for wireless and other network communications products. Atheros combines its wireless and networking systems expertise with high-performance radio frequency (RF), mixed signal and digital semiconductor design skills to provide highly integrated chipsets that are manufactured on low-cost, standard complementary metal-oxide semiconductor (CMOS) processes. Atheros technology is used by a broad base of leading customers, including networking equipment, computing and consumer device manufacturers.

## 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, I <sup>2</sup> C, 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 Atheros proprietary Bluetooth coexistence

For more information on the AR6004 or other solutions from Atheros contact your local representative:

Atheros Communications, Inc.  
t +1 408.773.5200  
f +1 408.773.9940

Atheros Hong Kong Limited  
t +852 8206.1131  
f +852 8206.1301

Atheros Communications KK-Japan  
t +81 3.5501.4100  
f +81 3.5501.4129

Atheros (Shanghai) Co., Ltd.  
t +86 21.5108.3626  
f +86 21.5027.0100

Atheros Communications Intl, LLC-Taiwan  
t +886 2.8751.6385  
f +886 2.8751.6397

Atheros Korea  
t +82 31.786.0428