

# QHS600 Reference Design

## World's First 802.11a/n 4x4 MIMO 5GHz Single Chip

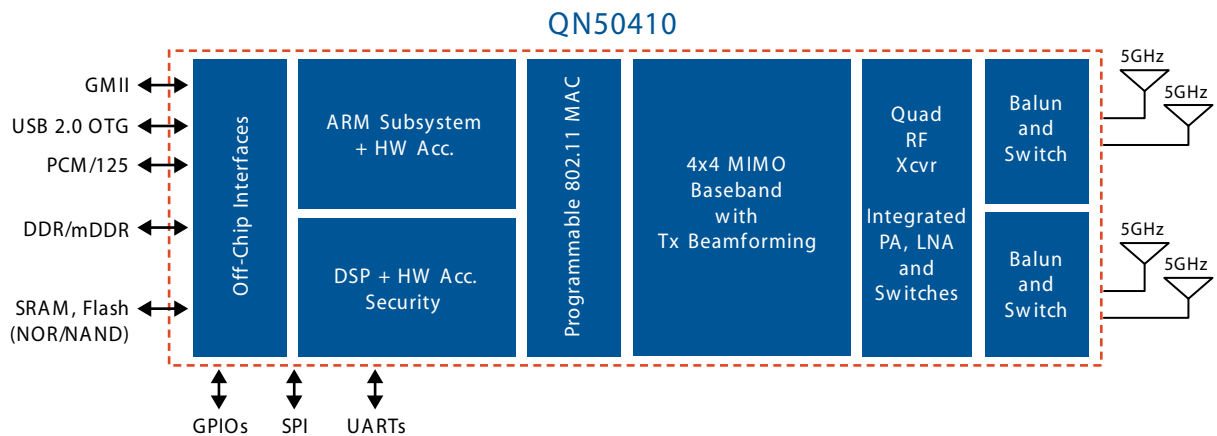
Up to 600 Mbps Link Speed and 400 Mbps Data Throughput

### QHS600 Overview

The QHS600 is an 802.11a/n 4x4 MIMO chip that is integrated into wireless home and enterprise networking equipment, as well as consumer electronics devices, for an unprecedented level of reliability and performance of up to 600 Mbps. It is the world's most fully integrated solution to combine integrated mesh networking, transmit (Tx) beamforming, and a 4x4 radio transceiver/antenna to deliver guaranteed high-speed bandwidth for total coverage of any size home or office, anywhere.

The QHS600 chipset includes four RF transceivers and associated power amplifiers (PAs), low noise amplifiers (LNAs) and Tx/Rx switches, which eliminate the need for external front end modules and enables game-changing size, power and performance. The advanced silicon also features an advanced MIMO baseband and media access controller (MAC), and provides tremendous processing capability using dual ARM CPUs and DSPs along with application specific hardware acceleration.

### QHS600 4x4 MIMO 802.11a/n Block Diagram



### Features

- Advanced MIMO techniques including Tx beamforming, STBC and channel state aware link management using real time spectrum analysis for sustained link robustness.
- 4x4 MIMO operation.
- Integrated ARM-based network processor with hardware assist to manage multiple simultaneous 802.11a/n connections and to optimize throughput using channel state aware routing and fast relay.
- Integrated DSP engine for VoIP processing and higher layer security acceleration.
- Four 5GHz 802.11n RF transceivers with integrated high-efficiency PAs, LNAs and switches.
- On-chip diplexer, baluns and switches to reduce system size and BOM.
- Advanced vector mesh networking.

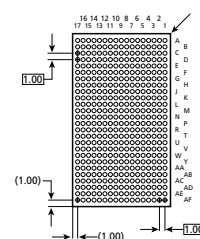
### Applications

Vector Mesh Router, Access Point/Router, Wireless Gateways and Multimedia Gateways.

### Benefits

- Configurable 4x4 MIMO 802.11a/n solution using 4x4 5GHz RF subsystems with integrated baseband and MAC.
- Integrated ARM CPUs and associated hardware assist, including higher layer security functions such as IPSec and VPN.
- Onboard 4-channel VoIP termination using SIP v2.
- Lowest BOM for AP/router and vector mesh router.
- Mesh networking with 4x4 and Tx beamforming ensures guaranteed high-speed wireless bandwidth.

### Package Information



## QHS600 Specifications

### Wireless Interfaces

4x4 MIMO using 5GHz RF subsystems with integrated Wi-Fi 802.11a/n baseband and MAC and support for up to two spatial streams (MCS15) 4x4 antenna combination.

**Standards:** 802.11n, 802.11a, 802.11i (WEP, WPA/WPA2, RADIUS), 802.11d, 802.11e (WMM, WMM-PS), 802.11j, 802.11h, 802.11k, 802.11s (Draft).

**Operating Frequencies:** 2.4-2.5GHz, 4.9-5.85GHz.

**Aggregate Data Rate:** 600Mbps Dual 40MHz.

### Data Rates per Spatial Stream:

40MHz: 300, 270, 243, 216, 162, 108, 81, 54, 27.

20MHz: 144, 130, 117, 104, 78, 52, 39, 26, 13.

Legacy: 1, 2, 5.5, 11; 6, 9, 12, 18, 24, 36, 48, 54.

### Power Output (at PA Output):

18 dBm.

### Communications Interfaces

GMII (WAN, and LAN Switch) for GigE Ethernet USB 2.0 OTG with integrated USB PHY. PCM to external Audio DAC/ADCs.

**Memory Interfaces:** DDR, Flash and Serial EEPROM.

**Peripheral Interfaces:** GPIO, UARTS, SPI.

### Software Support

**Quantenna OS:** Quantenna OS running on the integrated network processor enables equipment vendors to develop and port their own features and enhancements for value-add and additional BOM cost reduction.

**Software Package:** Complete software package for standard Access Point/Router and Vector Mesh Router in Linux with standard APIs to allow for easy porting. Support for reference VoIP stack.

**Certifications:** Worldwide Regulatory, Wi-Fi 802.11a/b/g/n (WPA, WPA2 Personal/Enterprise, WMM, WMM-PS), WHQL, CCX.

**Reference Design:** Complete vector mesh router reference design including PCB layout and external BOM.

### Input Supply Requirements

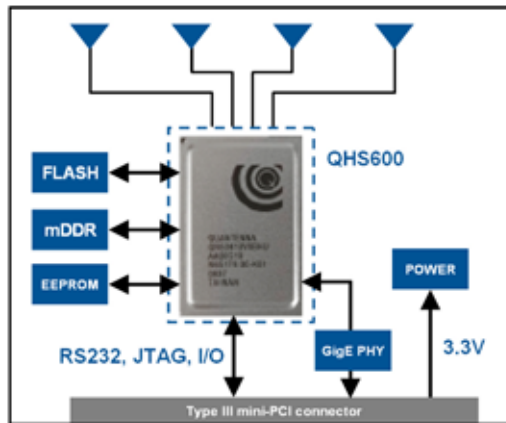
1.2v, 2.5v and 3.3v.

### Physical Specifications

QM50410

17mm x 27mm (459mm<sup>2</sup>)

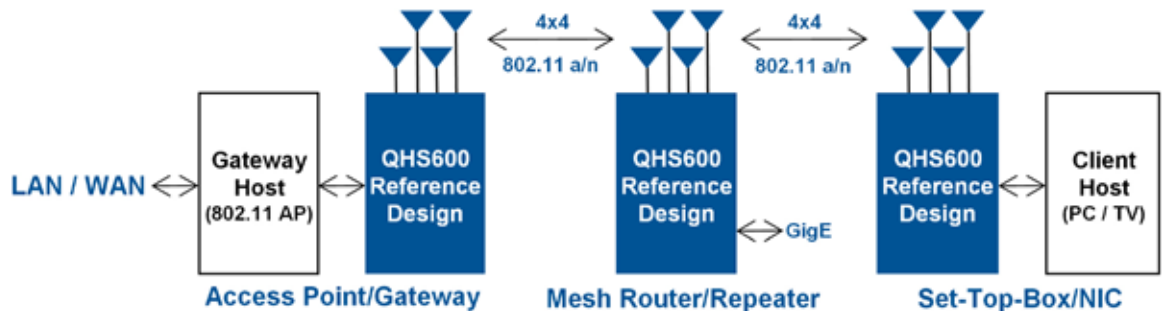
## QHS600 4x4 MIMO 802.11a/n Reference Design



### Features

- QHS600 802.11a/n 4x4 chip
- Compact PCB form factor
- 32 Mbyte mobile DDR SDRAM
- 16 Mbyte NOR Flash
- Gigabit Ethernet PHY
- Type IIIA mini-PCI connector
  - Mini-PCI LAN bus (Ethernet)
  - RS232
  - JTAG
  - LEDs
  - 3.3VDC
- On board switching regulators
- On board clock circuitry

## QHS600 4x4 MIMO 802.11a/n Applications



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