QCA9994 Dual-Band 4x4 with 4 SS MIMO 802.11 b/g/n/ac WLAN SoC

Device Specification

1 Introduction

1.1 General description

The QCA9994 with Qualcomm® VIVE^{TM} 802.11ac technology is a highly integrated wireless local area network (WLAN) system-on-chip (SoC) for 2.4 802.11n WLAN applications. The QCA9994 is a synthesizer WLAN radio. It includes a
CPU and memory for WLAN media access layer (MAC) and physical layer (PHY) management and provides host offload of other high-level networking tasks. It enables high-performance 4x4 MIMO with 4 spatial streams for wireless applications demanding the highest robust link quality and maximum throughput and range, plus 4 spatial stream MU-MIMO. The QCA9994 integrates a multi-protocol MAC, PHY, analog-to-digital/digital-to-analog converters (ADC/DAC), 4x4 MIMO radio transceivers, and PCIE interface in an all-CMOS device for low power consumption and small form-factor applications.

The QCA9994 implements half-duplex OFDM, CCK, and DSSS PHY. In 2 GHz mode it supports up to 346.7 Mbps for 20 MHz and 800 Mbps for 40 MHz channel operations, and IEEE 802.11b/g/n data rates. , Maximal Likelihood (ML) decoding, Low-Density Parity Check (LDPC), Maximal Ratio Combining (MRC), Space Time Block Code (STBC), and On-Chip OneTime Programmable (OTP) memory to eliminate the need for an external flash and to further reduce the external component count and BOM cost. The QCA9994 supports 802.11 wireless MAC protocol, 802.11i security, Wi-Fi offload, error recovery, and 802.11e quality of service (QoS).

The QCA9994 supports up to four simultaneous spatial streams integrating four Tx and four Rx chains for high throughput and extended coverage. Tx chains combine PHY in-phase (I) and quadrature (Q) signals, convert them to the desired frequency, and drive the RF signal through external power amplifiers (PAs). Rx chains receive from antennas through external LNAs. The frequency synthesizer supports 1-MHz steps to match frequencies defined by IEEE 802.11b/g/n specifications. The QCA9994 supports frame data transfer to and from the host using a PCIE interface that supports interrupt generation and reporting and status reporting. Other external interfaces include EEPROM and GPIOs.

1.2 Features

General

- 4x4 SU-/MU-MIMO technology improves effective throughput and range over existing 802.11ac/b/g/n
  products
- Support for up to four spatial streams
- Support for 48-MHz crystal
- 156-pin, 12 mm x 12 mm DRQFN package
- Package footprint compatible with QCA9980/QCA9990

WLAN

- Supports 20/40 MHz at 2.4 GHz
- Supports up to 64 QAM
- Data rates of up to 346.7 Mbps for 20 MHz channels and 800 Mbps for 40 MHz channels in 2 GHz mode using short GI
- TCP and UDP checksum offload
- Dynamic bandwidth switching
- Maximal likelihood (ML) decoding
- Supports spatial multiplexing, cyclic-delay diversity (CDD), low-density parity check (LDPC), maximal ratio combining (MRC), Space Time Block Code (STBC)
- AMSDU and AMPDU frame aggregation
- 802.11e-compatible bursting
- Digital predistortion
- Support for locationing (RSSI and RTT-based, 802.11REVmc compliant)

Supported Standards

- 802.11ac/b/g/n
- Support for IEEE 802.11d, e, h, i, j, k, r, u, v time stamp, w, and z standards

CPU/Memory

- Integrated CPU for Wi-Fi offload with memory
- On-chip OTP memory

Safety Notices

1. Read, follow, and keep these instructions.
2. Heed all warnings.
3. Only use attachments/accessories specified by the manufacturer.

⚠ WARNING: Do not use this product in location that can be submerged by water.

⚠ WARNING: Avoid using this product during an electrical storm. There may be a remote risk of electric shock from lightning.

Electrical Safety Information

1. Compliance is required with respect to voltage, frequency, and current requirements indicated on the manufacturer's label. Connection to a different power source than those specified may result in improper operation, damage to the equipment or pose a fire hazard if the limitations are not followed.
2. There are no operator serviceable parts inside this equipment. Service should be provided only by a qualified service technician.
3. This equipment is provided with a detachable power cord which has an integral safety ground wire intended for connection to a grounded safety outlet.
   a. Do not substitute the power cord with one that is not the provided approved type. Never use an adapter plug to connect to a 2-wire outlet as this will defeat the continuity of the grounding wire.
   b. The equipment requires the use of the ground wire as a part of the safety certification, modification or misuse can provide a shock hazard that can result in serious injury or death.
   c. Contact a qualified electrician or the manufacturer if there are questions about the installation prior to connecting the equipment.
   d. Protective earthing is provided by Listed AC adapter. Building installation shall provide appropriate short-circuit backup protection.
   e. Protective bonding must be installed in accordance with local national wiring rules and regulations.

Limited Warranty

UBIQUITI NETWORKS, Inc ("UBIQUITI NETWORKS") warrants that the product(s) furnished hereunder (the "Product(s)") shall be free from defects in material and workmanship for a period of one (1) year from the date of shipment by UBIQUITI NETWORKS under normal use and operation. UBIQUITI NETWORKS' sole and exclusive obligation and liability under the foregoing warranty shall be for UBIQUITI NETWORKS, at its discretion, to repair or replace any Product that fails to conform to the above warranty during the above warranty period. The expense of removal and reinstallation of any Product is not included in this warranty. The warranty period of any repaired or replaced Product shall not extend beyond its original term.

Warranty Conditions

The above warranty does not apply if the Product:

(I) has been modified and/or altered, or an addition made thereto, except by Ubiquiti Networks, or Ubiquiti Networks' authorized representatives, or as approved by Ubiquiti Networks in writing;

(II) has been painted, rebranded or physically modified in any way;

(III) has been damaged due to errors or defects in cabling;

(IV) has been subjected to misuse, abuse, negligence, abnormal physical, electromagnetic or electrical stress, including lightning strikes, or accident;

(V) has been damaged or impaired as a result of using third party firmware;

(VI) has no original Ubiquiti MAC label, or is missing any other original Ubiquiti label(s); or

(VII) has not been received by Ubiquiti within 30 days of issuance of the RMA.

In addition, the above warranty shall apply only if: the product has been properly installed and used at all times in accordance, and in all material respects, with the applicable Product documentation; all Ethernet cabling runs use CAT5 (or above), and for outdoor installations, shielded Ethernet cabling is used, and for indoor installations, indoor cabling requirements are followed.

Returns

No Products will be accepted for replacement or repair without obtaining a Return Materials Authorization (RMA) number from UBIQUITI NETWORKS during the warranty period, and the Products being received at UBIQUITI NETWORKS' facility freight prepaid in accordance with the RMA process of UBIQUITI NETWORKS. Products returned without an RMA number will not be processed and will be returned freight collect or subject to disposal. Information on the RMA process and obtaining an RMA number can be found at: **www.ubnt.com/support/warranty**.

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