

Qualcomm

Qualcomm® QCA402x

Wi-Fi SoC Solutions for IoT

**Multi-mode intelligent connectivity solution integrating dual-band Wi-Fi, Bluetooth® 5 and 802.15.4 technology.**

QCA4020/4 Wi-Fi SoCs are low power host-less Internet of Things (IoT) platforms offering multiple radios, standards, protocols and connectivity framework support on a single-chip solution.

The QCA4020 tri-mode System-on-Chip (SoC) integrates Bluetooth 5, dual-band Wi-Fi and 802.15.4-based technologies, including ZigBee and Thread, and the QCA4024 dual-mode SoC integrates Bluetooth 5 and 802.15.4.

Both QCA4020 and QCA4024 deliver advanced features from the Qualcomm® Network IoT Connectivity Platform, including virtually seamless coexistence across technologies with pre-integrated support for HomeKit and the Open Connectivity Foundation (OCF) specifications, as well as support for AWS IoT software development kit (SDK) and for Microsoft Azure IoT Devices SDK to connect with Azure IoT Hub.

The QCA4020/4 SoCs supports a connectivity solution with advanced smart coexistence, integrating numerous wireless communication technologies into a single SoC, an approach that addresses fragmentation in many technology areas. QCA4020/4 supports hardware-based security features in a low power, cost-optimized single-chip solution offering flexible product development options for OEMs.

## Solution Highlights

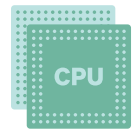
### Tri-mode intelligent connectivity with advanced smart coexistence

QCA4020 supports integrated Bluetooth 5 and Qualcomm® Mesh connectivity; low power Wi-Fi 802.11n in 2.4GHz/5GHz bands and 802.15.4 which supports ZigBee3.0 and Thread via OpenThread.



### Multi-core processing for optimized performance

Dedicated Arm Cortex-M4F CPU for customer applications and low power Arm Cortex-M0 CPU for BLE/802.15.4 protocol and Xtensa-based Wi-Fi CPU (QCA4020 only) to offload Wi-Fi stack.



### Advanced hardware-based security features

QCA4020/4 includes hardware-based security features and functions integrated in a single IC, and provides OEMs with the option of replacing external security chips for potential cost savings.



### Pre-integrated support for cloud services and multiple protocols

The Qualcomm Network IoT Connectivity Platform provides a full network stack with pre-integrated software for HomeKit and OCF specifications as well as support for AWS IoT SDK and for Microsoft Azure IoT Device SDK to connect devices with the Azure IoT Hub.





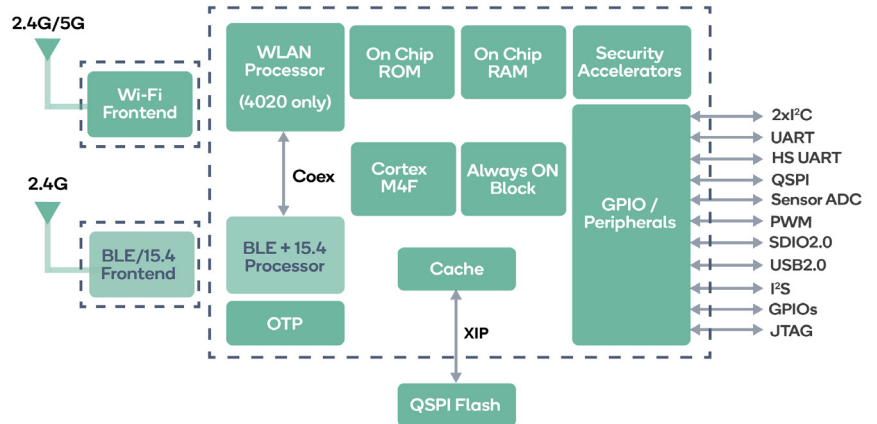
## QCA4020/4 Target Applications

- Internet of Things (IoT)
- Home Automation
- Smart Home
- IoT Hub
- Smart Cities
- Home Entertainment

## Features

- QCA4020 tri-mode SoC integrates Bluetooth 5, dual-band Wi-Fi, and 802.15.4 technologies
- QCA4024 dual-mode SoC integrates Bluetooth 5 and 802.15.4
- Isolated low power processors for connectivity
  - 15.4 SW MAC, 15.4 and BLE drivers, coex management
  - Wi-Fi operations (QCA4020 only)
- Advanced hardware-based security featuring secure boot, trusted execution environment, encrypted storage, key provisioning and wireless protocol security
- Comprehensive set of peripherals and interfaces: SPI, UART, PWM, I<sup>2</sup>S, I<sup>2</sup>C, SDIO, ADC and GPIOs
- Integrated sensor hub for post-processing designed to enable low power sensor use cases
- Small package size allows for optimized form factors

## QCA4020/4 Block Diagram



## QCA4020/4 Specifications

<b>Package Type</b>	11.2 x 11.2mm, 0.65mm pitch, 217-ball BGA (QCA4020) 8 x 8mm, 0.40mm pitch, 68-pin QFN (QCA4024)
<b>Application CPU</b>	Arm Cortex-M4F @ up to 128MHz 32KB- L1 cache controller, XIP from external S-flash Internal Memory: 300+KB RAM reserved for applications
<b>Connectivity/System CPU</b>	Dedicated processor for Bluetooth LE LC and 15.4 MAC Dedicated processor for 802.11 a/b/g/n Isolated Memory: RAM, ROM
<b>Low Power Bluetooth &amp; 15.4</b> (Separate radios)	Bluetooth v5.0, PA =+4dBm/+10dBm (for Long Range) 802.15.4: 2006 compliant, 15.4e, 2.4GHz DSSS +4dBm/+21dBm (for Long Range)
<b>Wi-Fi</b> (QCA4020 only)	Dual Band, 1x1, HT20, MCS0-7, 2.4/5GHz, PA=+18dBm
<b>Sensor Hub</b>	Low power HW+App CPU, Interface: I <sup>2</sup> C, SPI, ADC
<b>Display</b>	Segmented or character display with SPI or I <sup>2</sup> C interfaces
<b>Interfaces</b>	I <sup>2</sup> C, UART, SPI/Q-SPI, ADC (8ch, 12-bit 1Msps) PWM, SDIO2.0, USB2.0 HS, I <sup>2</sup> S, GPIOs
<b>Security</b>	Secure boot, Secure Storage, HW Crypto Engine HW ECC, 16-bit true random number generator Trusted Execution Environment
<b>Direct Battery Connection</b>	1.8V-3.6V

## Ordering Information

Product	Part Number
QCA4020 SOC	QCA-4020-0-217MSP
QCA4024 SOC	QCA-4024-0-6BCMQFN

## Related Products

Development kits, reference design platforms and production module information available at [developer.qualcomm.com](http://developer.qualcomm.com)

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