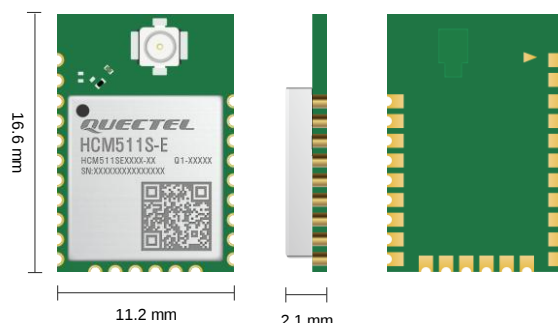


# Quectel HCM511S-E

## BLE 5.4 Module

## Compact LCC Package



HCM511S-E is a high-performance MCU Bluetooth module launched by Quectel. It boasts an ARM Cortex-M33 processor with a frequency of up to 76.8 MHz and supports BLE 5.4. The module features built-in 32 KB RAM and 352 KB/512 KB flash (optional), ensuring efficient performance.

HCM511S-E is in an LCC form factor with an ultra-compact size of 16.6 mm × 11.2 mm × 2.1 mm, which optimizes the size and cost for end-products. HCM511S-E provides two optional antenna (interface) designs: 1<sup>st</sup> generation RF coaxial connector and pin antenna interface, which are compatible with diverse designs.

HCM511S-E supports standard Bluetooth mesh network low-power nodes (optional), increasing network scalability and node counts with mesh topology, which is suitable for digital keys, asset tags and beacons, portable medical devices, low-power nodes for smart homes, battery-operated motion sensors, etc.



## Key Features

- ✓ BLE 5.4
- ✓ 32 KB RAM, 352 KB/512 KB flash (optional)
- ✓ Bluetooth mesh network low-power nodes (optional)
- ✓ 1 USART, 1 SWD, and 14 GPIOs by default, 18 GPIOs which can be multiplexed as various interfaces including EUART, I2C, ADC, and PDM in Open solution
- ✓ Operating temperature range: -40 °C to +85 °C
- ✓ Max. transmit power: 8 dBm
- ✓ 1<sup>st</sup> generation RF coaxial connector, pin antenna interface (optional)



BLE 5.4



LCC Form Factor



Compact Size



Multiple Interfaces



Operating Temperature Range: -40 °C to +85 °C

| BLE 5.4                     |                          | HCM511S-E                                                                                                               |                |
|-----------------------------|--------------------------|-------------------------------------------------------------------------------------------------------------------------|----------------|
| Bluetooth Protocol          |                          | BLE 5.4                                                                                                                 |                |
| Encryption Mode             |                          | AES128/256, SHA-1, SHA-2, ECC, ECDSA, ECDH, TRNG, secure boot                                                           |                |
| Operating Mode              |                          | BLE (Bluetooth Low Energy)                                                                                              |                |
| Bluetooth Antenna           |                          | 1 <sup>st</sup> generation RF coaxial connector/pin antenna interface (optional)                                        |                |
| Kernel                      |                          | ARM Cortex-M33 (up to 76.8 MHz)                                                                                         |                |
| RAM                         |                          | 32 KB                                                                                                                   |                |
| Flash                       |                          | 352 KB/512 KB (optional)                                                                                                |                |
| Dimensions                  |                          | 16.6 mm × 11.2 mm × 2.1 mm                                                                                              |                |
| Weight                      |                          | Approx. 0.62 g                                                                                                          |                |
| Temperature Range           |                          |                                                                                                                         |                |
| Operating Temperature Range |                          | -40 °C to +85 °C                                                                                                        |                |
| Storage Temperature Range   |                          | -45 °C to +95 °C                                                                                                        |                |
| Certifications              |                          |                                                                                                                         |                |
| Regulatory                  |                          | Europe: CE<br>America: FCC<br>Canada: IC<br>China: SRRC<br>Australia/New Zealand: RCM<br>Japan: TELEC<br>Brazil: Anatel |                |
| Others                      |                          | Bluetooth                                                                                                               |                |
| Interfaces                  |                          |                                                                                                                         |                |
| Interfaces <sup>①</sup>     |                          | USART, EUART, SWD, I2C, ADC, PDM, etc.                                                                                  |                |
| Electrical Features         |                          |                                                                                                                         |                |
| Power Supply Voltage        |                          | VBAT: 1.71–3.8 V, Typ. 3.3 V                                                                                            |                |
| RF Performance              |                          |                                                                                                                         |                |
|                             |                          | Receiver Sensitivity                                                                                                    | Transmit Power |
| BLE                         | 1 Mbps                   | -98 dBm ±2 dB                                                                                                           | ≤ 8 dBm        |
|                             | 2 Mbps                   | -95 dBm ±2 dB                                                                                                           | ≤ 8 dBm        |
|                             | BLE (S = 2) <sup>②</sup> | -102 dBm ±2 dB                                                                                                          | ≤ 8 dBm        |
|                             | BLE (S = 8) <sup>②</sup> | -106 dBm ±2 dB                                                                                                          | ≤ 8 dBm        |

| Ordering Code   | Flash  | Transmit Power | Operating Temperature Range | Antenna                                         | Development Board (Only for Debugging) |
|-----------------|--------|----------------|-----------------------------|-------------------------------------------------|----------------------------------------|
| HCM511SEAAMD-1X | 352 KB | ≤ 8 dBm        | -40 °C to +85 °C            | 1 <sup>st</sup> generation RF coaxial connector | HCM511SEATB-1X                         |
| HCM511SEABMD-1X | 512 KB | ≤ 8 dBm        | -40 °C to +85 °C            | 1 <sup>st</sup> generation RF coaxial connector | HCM511SEABTB-1X                        |
| HCM511SEABMD-0L | 512 KB | ≤ 8 dBm        | -40 °C to +85 °C            | Pin antenna interface                           | HCM511SEABTB-0L                        |

NOTE:

1. ①: See hardware design manual for details of the module interfaces.

2. ②: Only applicable to the module model with built-in 512 KB flash.