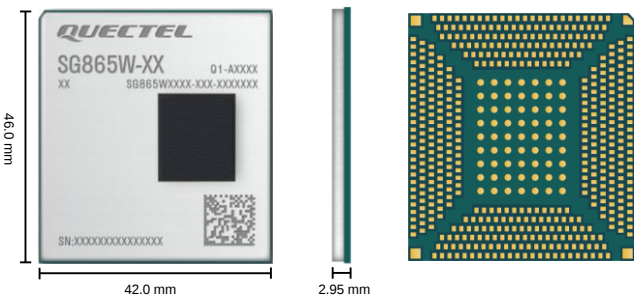


# Quectel SG865W Series

## Smart Module



SG865W series is Quectel’s new generation of flagship smart module. It is based on Qualcomm’s flagship IoT chipset QCS8250, which has a built-in octa-core high-performance Kryo™ 585 CPU, Adreno™ 650 GPU, Adreno 995 DPU, Adreno 665 VPU, Hexagon™ DSP, and Spectra™ 480 ISP. The SG865W-WF module supports Wi-Fi 6, Bluetooth 5.1 and 2 × 2 Wi-Fi MIMO technology. With powerful performance and rich multimedia functions, SG865W series module is ideal for both industrial and consumer applications requiring high computing power and multimedia functions.

A rich set of interfaces (such as LCM, Camera, Touch Panel, I2S, PCIe, UART, USB, I2C, SPI, etc.) extends the applicability of the SG865W series module to a wide range of M2M applications, including video conference systems, live streaming devices, gaming, edge computing, robots, AR/VR, intelligent retail and smart safety.



### Key Features

- ✓ Kryo™ 585 CPU
- ✓ Adreno™ 650 GPU
- ✓ Hexagon™ DSP + 4 × Hexagon Vector eXtensions (HVX)
- ✓ Spectra™ 480 ISP
- ✓ Adreno 665 VPU
- ✓ Adreno 995 DPU
- ✓ Neural processing unit (NPU230)
- ✓ Security processing unit (SPU240)
- ✓ IEEE 802.11ax, 2 × 2 Wi-Fi MIMO
- ✓ Bluetooth 5.1
- ✓ Video encoder: 4K @ 120 fps; 8K @ 30 fps
- ✓ Video decoder: 4K @ 240 fps; 8K @ 60 fps
- ✓ Computing power of up to 15 TOPS



Qualcomm  
Kryo™ 585  
CPU (Octa-core)



Qualcomm  
Adreno™ 650  
GPU



Android 10/ Android  
13\*/ Ubuntu 18.04



PCIe Interface



IEEE 802.11  
a/ b/ g/ n/ ac/ ax



Bluetooth 5.1  
(BR/ EDR + BLE)



VPU Multimedia  
Processing Engine

# Quectel SG865W Series

| Smart Module                | SG865W-WF                                                                                                                                                                                                        | SG865W-AP                                                                                                                                                                                                        |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Region/Operator             | Global                                                                                                                                                                                                           | Global                                                                                                                                                                                                           |
| OS                          | Android 10/ Andriod 13*/ Ubuntu 18.04                                                                                                                                                                            | Android 10/ Andriod 13*/ Ubuntu 18.04                                                                                                                                                                            |
| Memory                      | 64 GB UFS + 8 GB LPDDR5 (Default)<br>256 GB UFS + 12 GB LPDDR5 (Optional)                                                                                                                                        | 64 GB UFS + 8 GB LPDDR5 (Default)<br>256 GB UFS + 12 GB LPDDR5 (Optional)                                                                                                                                        |
| Dimensions (mm)             | 46.0 × 42.0 × 2.95                                                                                                                                                                                               | 46.0 × 42.0 × 2.95                                                                                                                                                                                               |
| Package                     | LGA                                                                                                                                                                                                              | LGA                                                                                                                                                                                                              |
| Weight (g)                  | Approx. 14 g                                                                                                                                                                                                     | Approx. 14 g                                                                                                                                                                                                     |
| Temperature Range           |                                                                                                                                                                                                                  |                                                                                                                                                                                                                  |
| Operating Temperature       | -35 °C to 75 °C                                                                                                                                                                                                  | -35 °C to 75 °C                                                                                                                                                                                                  |
| Frequency Bands             |                                                                                                                                                                                                                  |                                                                                                                                                                                                                  |
| WLAN                        | 2.4 & 5 GHz, Wi-Fi 6, 802.11a/ b/ g/ n/ ac/ ax, 2 × 2 Wi-Fi MIMO                                                                                                                                                 | -                                                                                                                                                                                                                |
| Bluetooth                   | Bluetooth 5.1 (BR/ EDR + BLE)                                                                                                                                                                                    | -                                                                                                                                                                                                                |
| Certifications              |                                                                                                                                                                                                                  |                                                                                                                                                                                                                  |
| Carrier                     | -                                                                                                                                                                                                                | -                                                                                                                                                                                                                |
| Regulatory                  | CE/ FCC/ IC/ KC                                                                                                                                                                                                  | -                                                                                                                                                                                                                |
| Others                      | RoHS                                                                                                                                                                                                             | -                                                                                                                                                                                                                |
| General Features            |                                                                                                                                                                                                                  |                                                                                                                                                                                                                  |
| Supply Voltage Range        | 3.55–4.4 V, typ. 3.8 V                                                                                                                                                                                           | 3.55–4.4 V, typ. 3.8 V                                                                                                                                                                                           |
| Power Consumption (Typical) | 200 µA @ power off; 7 mA @ sleep mode                                                                                                                                                                            | 200 µA @ power off; 7 mA @ sleep mode                                                                                                                                                                            |
| Interfaces                  |                                                                                                                                                                                                                  |                                                                                                                                                                                                                  |
| Display                     | 2 × 4-lane MIPI DSI<br>5040 × 2160 @ 60 fps (8 lanes)<br>(2560 × 1600 @ 60 fps) × 2 (4 lanes + 4 lanes)<br>4K @ 60 fps Miracast<br>DisplayPort v1.4 over Type-C                                                  | 2 × 4-lane MIPI DSI<br>5040 × 2160 @ 60 fps (8 lanes)<br>(2560 × 1600 @ 60 fps) × 2 (4 lanes + 4 lanes)<br>4K @ 60 fps Miracast<br>DisplayPort v1.4 over Type-C                                                  |
| Camera                      | 6 × 4-lane MIPI CSI<br>2 × Full ISP + 2 × Lite ISP<br>2 × Front-end input: 25 MP (4:3 aspect ratio) or 18 MP (16:9 aspect ratio)<br>2 × Front-end input: Mono/YUV interface<br>Max. 64 MP @ 30 fps ZSL @ 2 × ISP | 6 × 4-lane MIPI CSI<br>2 × Full ISP + 2 × Lite ISP<br>2 × Front-end input: 25 MP (4:3 aspect ratio) or 18 MP (16:9 aspect ratio)<br>2 × Front-end input: Mono/YUV interface<br>Max. 64 MP @ 30 fps ZSL @ 2 × ISP |
| Audio                       | SWR, Digital Microphone, MI2S interfaces                                                                                                                                                                         | SWR, Digital Microphone, MI2S interfaces                                                                                                                                                                         |
| Video                       | Encoder: 4K @ 120 fps; 8K @ 30 fps<br>Decoder: 4K @ 240 fps; 8K @ 60 fps<br>H.264 High Profile, H.265 Main 10 Profile,VP8, HDR 10-bit video playback (HLG, HDR10), HDR 10-bit capture (HLG)                      | Encoder: 4K @ 120 fps; 8K @ 30 fps<br>Decoder: 4K @ 240 fps; 8K @ 60 fps<br>H.264 High Profile, H.265 Main 10 Profile,VP8, HDR 10-bit video playback (HLG, HDR10), HDR 10-bit capture (HLG)                      |
| USB                         | × 2, both are USB 3.1/2.0 compliant<br>• USB0 supports USB OTG and DisplayPort v1.4<br>• USB1 only supports USB host mode                                                                                        | × 2, both are USB 3.1/2.0 compliant<br>• USB0 supports USB OTG and DisplayPort v1.4<br>• USB1 only supports USB host mode                                                                                        |
| PCIe                        | × 2<br>• PCIe1: 2-lane, Gen 3<br>• PCIe2: 2-lane, Gen 3                                                                                                                                                          | × 2<br>• PCIe1: 2-lane, Gen 3<br>• PCIe2: 2-lane, Gen 3                                                                                                                                                          |
| UART                        | × 4                                                                                                                                                                                                              | × 4                                                                                                                                                                                                              |
| Vibrator Drive              | × 1, for ERM/LRA vibrator                                                                                                                                                                                        | × 1, for ERM/LRA vibrator                                                                                                                                                                                        |
| SD Card                     | × 1, SD 3.0                                                                                                                                                                                                      | × 1, SD 3.0                                                                                                                                                                                                      |
| I2C                         | × 9                                                                                                                                                                                                              | × 9                                                                                                                                                                                                              |
| I2S                         | × 3                                                                                                                                                                                                              | × 3                                                                                                                                                                                                              |
| Flashlight                  | 3 high-current flash LED drivers, which support both flash and torch modes<br>• Up to 1.5 A in total for FLASH_LED1/FLASH_LED2 in flash mode<br>• Up to 0.75 A for FLASH_LED3 in flash mode                      | 3 high-current flash LED drivers, which support both flash and torch modes<br>• Up to 1.5 A in total for FLASH_LED1/FLASH_LED2 in flash mode<br>• Up to 0.75 A for FLASH_LED3 in flash mode                      |
| ADC                         | × 4, general-purpose ADC interfaces                                                                                                                                                                              | × 4, general-purpose ADC interfaces                                                                                                                                                                              |
| SPI                         | × 5, only supports master mode                                                                                                                                                                                   | × 5, only supports master mode                                                                                                                                                                                   |
| Charging Management         | Supports battery voltage detection, fuel gauge, battery temperature detection                                                                                                                                    | Supports battery voltage detection, fuel gauge, battery temperature detection                                                                                                                                    |
| Real Time Clock             | Supported                                                                                                                                                                                                        | Supported                                                                                                                                                                                                        |
| PWRKEY                      | Internally pulled up                                                                                                                                                                                             | Internally pulled up                                                                                                                                                                                             |
| GPIO                        | × 16                                                                                                                                                                                                             | × 16                                                                                                                                                                                                             |
| Antenna                     | × 2, Wi-Fi/Bluetooth and Wi-Fi MIMO antenna interfaces                                                                                                                                                           | -                                                                                                                                                                                                                |

Note:  
1. \*: Under development/ planning/ in progress.  
2. - : Not supported.