



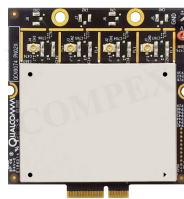
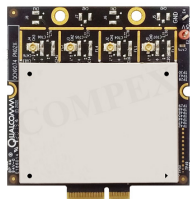
Wireless Module

Catalogue



Revision: 40121

802.11ax (WiFi 6)



HARDWARE SPECIFICATIONS

| TYPE OF CARD | 4x4 MU-MIMO 802.11ax | 4x4 MU-MIMO 802.11ax | 4x4 MU-MIMO 802.11ax |
|------------------------------|--|--|--|
| MU-MIMO | 4x4 | 4x4 | 4x4 |
| MODEL | PNO2.7 | PNO2.1 | PNO1.1 |
| CHIPSET | QCN9024/9074 | QCN9024/9074 | QCN9024/9074 |
| STANDARD | 802.11a/n/ac/ax | 802.11a/n/ac/ax | 802.11b/g/n/ax |
| THEORETICAL RATE | 4804Mbps | 4804Mbps | 1376.4Mbps |
| FORM FACTOR | Key E | Key E | Key E |
| SPECTRUM | 5.925-7.125GHz | 5.150-5.950GHz | 2.412-2.472GHz |
| REFERENCE DESIGN | PNO2.7 | PNO2.1 | PNO1.1 |
| HOST INTERFACE | M.2 E Key | M.2 E Key | M.2 E Key |
| OPERATING VOLTAGE | 5V | 5V | 5V |
| POWER (PER CHAIN) | 20dBm @ 6GHz | 24dBm @ 5GHz | 24dBm @ 2.4GHz |
| POWER CONSUMPTION | 16W | 16W | 15W |
| CHANNEL SUPPORT | Supports 20/40/80/160MHz at 6GHz | Supports 20/40/80/160MHz at 5GHz | Supports 20/40MHz at 2.4GHz |
| ANTENNA CONNECTOR | 4x U.FL Connectors | 4x U.FL Connectors | 4x U.FL Connectors |
| MODULATION TECHNIQUES | OFDMA: BPSK, QPSK, DBPSK, DQPSK, 16-QAM, 64-QAM, 256-QAM, 1024-QAM, 4096-QAM | OFDMA: BPSK, QPSK, DBPSK, DQPSK, 16-QAM, 64-QAM, 256-QAM, 1024-QAM, 4096-QAM | OFDMA: BPSK, QPSK, DBPSK, DQPSK, 16-QAM, 64-QAM, 256-QAM, 1024-QAM, 4096-QAM |
| OPERATING ENVIRONMENT | -20°C to 70°C | -20°C to 70°C | -20°C to 70°C |
| CERTIFICATION | REACH & RoHS Compliance | REACH & RoHS Compliance | REACH & RoHS Compliance |
| DIMENSIONS (W x H x D) in mm | 57 x 60 x 6.3 | 57 x 60 x 6.3 | 57 x 60 x 6.3 |

WLAN + BLE (WiFi 6)



HARDWARE SPECIFICATIONS

| | |
|------------------------------|--|
| TYPE OF CARD | 2x2 MU-MIMO 802.11ax |
| MU-MIMO | 2x2 |
| MODEL | WLT639 |
| CHIPSET | QCA6391 |
| STANDARD | 802.11a/b/g/n/ac/ax |
| THEORETICAL RATE | 573.6Mbps @ 2.4GHz, 1201Mbps @ 5GHz |
| FORM FACTOR | Key E |
| SPECTRUM | 2.412-2.483GHz, 5.150-5.850GHz |
| REFERENCE DESIGN | HST04 |
| HOST INTERFACE | M.2 E Key |
| OPERATING VOLTAGE | 3.3V |
| POWER (PER CHAIN) | 16dBm @ 2.4GHz, 15dBm @ 5GHz |
| POWER CONSUMPTION | TX: 798.12mA; RX: 196.8mA |
| CHANNEL SUPPORT | Supports 20/40MHz at 2.4GHz, Supports 20/40/80 at 5GHz |
| ANTENNA CONNECTOR | 2x MHF4 Connectors |
| MODULATION TECHNIQUES | OFDMA (DPSK, QPSK, 16-QAM, 64-QAM, 256-QAM, 1024-QAM) |
| OPERATING ENVIRONMENT | TBD |
| CERTIFICATION | REACH & RoHS Compliance |
| DIMENSIONS (W x H x D) in mm | 22 x 30 x 2.8 |

WLAN + BLE (WiFi 5)



HARDWARE SPECIFICATIONS

| TYPE OF CARD | System-on-chip (SoC) 1x1 WLAN and Bluetooth | M.2 2230 2x2 MU-MIMO 802.11ac |
|------------------------------|---|---|
| MIMO | 1x1 | 2x2 |
| MODEL | WSD377 | WLT674 |
| CHIPSET | QCA9377-3 | QCA6174A-5 |
| STANDARD | 802.11a/b/g/n/ac | 802.11a/b/g/n/ac |
| THEORETICAL RATE | 433Mbps | 867Mbps |
| FORM FACTOR | Single-die | M.2 2230, Key A+E |
| SPECTRUM | 2.412-2.472GHz, 5.180-5.825GHz | 2.412-2.472GHz, 5.150-5.850GHz |
| REFERENCE DESIGN | WB396 | NFA364 |
| HOST INTERFACE | SDIO | M.2 E KEY |
| OPERATING VOLTAGE | 3.3V DC | 3.3V DC |
| POWER (PER CHAIN) | 16dBm @ 2.4GHz, 11dBm @ 5GHz | 18dBm @ 2.4GHz, 10.5dBm @ 5GHz |
| POWER CONSUMPTION | 3.83W (Max) | TX: 610mA, RX: 280mA |
| CHANNEL SUPPORT | 20/40MHz @ 2.4GHz, 20/40/80MHz @ 5GHz | 20/40MHz @ 2.4GHz, 20/40/80MHz @ 5GHz |
| ANTENNA CONNECTOR | SDIO | 2x U.FL connectors |
| MODULATION TECHNIQUES | OFDM: BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM | OFDM: BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM |
| OPERATING ENVIRONMENT | -20°C to 70°C | -20°C to 70°C |
| CERTIFICATION | CE RED, REACH & RoHS Compliance | CE, FCC, IC, REACH & RoHS Compliance |
| DIMENSIONS (W x H x D) in mm | 12 x 12 x 2.5 | 22 x 30 x 3 |

802.11ac Wave 2 (WiFi 5)



HARDWARE SPECIFICATIONS

| TYPE OF CARD | Standard size 4x4 MU-MIMO 802.11ac Wave 2 | Standard size 4x4 MU-MIMO 802.11ac Wave 2 | Standard size 4x4 MU-MIMO 802.11ac Wave 2 | Standard size 4x4 MU-MIMO 802.11ac Wave 2 | Wide Size 4x4 MU-MIMO 802.11ac Wave 2 |
|------------------------------|--|--|---|---|---|
| MIMO | 4x4 | 4x4 | 4x4 | 4x4 | 4x4 |
| MODEL | WLEI216VX-1 | WLEI216VX | WLEI216V5-20 | WLEI216V5-20-1 | WLEI216V5-23 |
| CHIPSET | QCA9994 | QCA9984 | QCA9984 | QCA9994 | QCA9984 |
| STANDARD | 802.11a/b/g/n/ac | 802.11a/b/g/n/ac | 802.11a/n/ac | 802.11a/n/ac | 802.11a/n/ac |
| THEORETICAL RATE | 800Mbps @ 2.4GHz 1733Mbps @ 5GHz | 800Mbps @ 2.4GHz 1733Mbps @ 5GHz | 1733Mbps | 1733Mbps | 1733Mbps |
| FORM FACTOR | Standard size | Standard size | Standard size | Standard size | Wide size |
| SPECTRUM | 2.412-2.472GHz, 5.180-5.825GHz | 2.412-2.472GHz, 5.180-5.825GHz | 5.180-5.825GHz | 5.180-5.825GHz | 5.180-5.825GHz |
| REFERENCE DESIGN | CAS03 | CAS03 | CUS239 | CUS239 | CUS239 |
| HOST INTERFACE | MiniPCIe | MiniPCIe | MiniPCIe | MiniPCIe | MiniPCIe |
| OPERATING VOLTAGE | 3.3V DC | 3.3V DC | 3.3V DC | 3.3V DC | 5V DC |
| POWER (PER CHAIN) | 20dBm @ 2.4GHz 19dBm @ 5GHz | 20dBm @ 2.4GHz 19dBm @ 5GHz | 20dBm @ 5GHz | 20dBm @ 5GHz | 23dBm @ 5GHz |
| POWER CONSUMPTION | 9W (Max) | 9W (Max) | 8.5W (Max) | 8.5W (Max) | 13W (Max) |
| CHANNEL SUPPORT | 20/40/80/80+80MHz | 20/40/80/80+80MHz | 20/40/80/80+80MHz | 20/40/80/80+80MHz | 20/40/80/80+80MHz |
| ANTENNA CONNECTOR | 4x U.FL | 4x U.FL | 4x U.FL | 4x U.FL | 4x U.FL |
| MODULATION TECHNIQUES | CCK, OFDM: BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM | CCK, OFDM: BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM | OFDM: BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM | OFDM: BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM | OFDM: BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM |
| OPERATING ENVIRONMENT | -40°C to 85°C | -20°C to 70°C | -20°C to 70°C | -40°C to 85°C | -20°C to 70°C |
| CERTIFICATION | REACH & RoHS Compliance | REACH & RoHS Compliance | FCC, CE, REACH & RoHS Compliance | FCC, CE, REACH & RoHS Compliance | REACH & RoHS Compliance |
| DIMENSIONS (W x H x D) in mm | 29.9 x 50.8 x 12.9 | 29.9 x 50.8 x 12.9 | 29.9 x 50.8 x 12.9 | 29.9 x 50.8 x 12.9 | 73.7 x 51.0 x 5.5 |

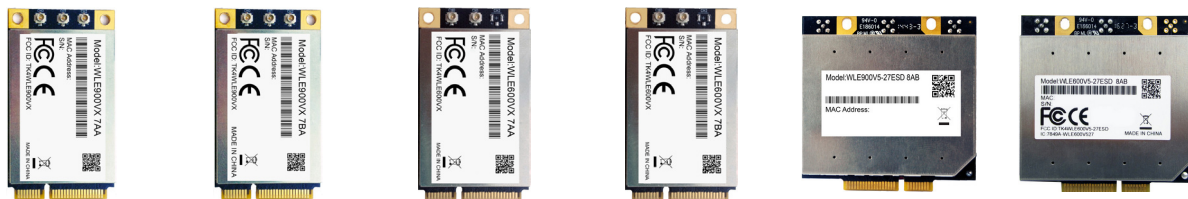
802.11ac Wave 2 (WiFi 5)



HARDWARE SPECIFICATIONS

| TYPE OF CARD | Standard size 4x4 MU-MIMO 802.11n | Standard size 4x4 MU-MIMO 802.11ac Wave 2 | Standard size 2x2 MU-MIMO 802.11ac Wave 2 | Standard size 2x2 MU-MIMO 802.11ac Wave 2 |
|------------------------------|--|---|---|---|
| MIMO | 4x4 | 4x4 | 2x2 | 2x2 |
| MODEL | WLEI216V2-20 | WLEI216V2-20-1 | WLE650V5-25A | WLE650V5-18A |
| CHIPSET | QCA9984 | QCA9994 | QCA9888 | QCA9888 |
| STANDARD | 802.11b/g/n/ac | 802.11b/g/n/ac | 802.11a/n/ac | 802.11a/n/ac |
| THEORETICAL RATE | 800Mbps | 800Mbps | 867Mbps | 867Mbps |
| FORM FACTOR | Standard size | Standard size | Standard size | Standard size |
| SPECTRUM | 2.412-2.472GHz | 2.412-2.472GHz | 5.180-5.825GHz | 5.180-5.825GHz |
| REFERENCE DESIGN | CUS260 | CUS260 | BSR02 | BSR02 |
| HOST INTERFACE | MiniPCIe | MiniPCIe | MiniPCIe | MiniPCIe |
| OPERATING VOLTAGE | 3.3V DC | 3.3V DC | 3.3V and 5V DC | 3.3V DC |
| POWER (PER CHAIN) | 20dBm @ 2.4GHz | 20dBm @ 2.4GHz | 25dBm @ 5GHz | 18dBm @ 5GHz |
| POWER CONSUMPTION | 6.68W (Max) | 6.68W (Max) | 9.49W (Max) | 5.6W (Max) |
| CHANNEL SUPPORT | 20/40MHz | 20/40MHz | 20/40/80/80+80MHz | 20/40/80/80+80MHz |
| ANTENNA CONNECTOR | 4x U.FL | 4x U.FL | 2x MMCX | 2x U.FL |
| MODULATION TECHNIQUES | CCIK, OFDM: BPSK, QPSK, 16-QAM, 64-QAM | CCIK, OFDM: BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM | OFDM: BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM | BPSK, QPSK, DBPSK, DQPSK, 16-QAM, 64-QAM, 256-QAM |
| OPERATING ENVIRONMENT | -20°C to 70°C | -40°C to 85°C | -20°C to 70°C | -20°C to 70°C |
| CERTIFICATION | FCC, CE, REACH & RoHS Compliance | FCC, CE, REACH & RoHS Compliance | REACH & RoHS Compliance | REACH & RoHS Compliance |
| DIMENSIONS (W x H x D) in mm | 29.9 x 50.8 x 12.9 | 29.9 x 50.8 x 12.9 | 29.9 x 50.8 x 12.2 | 29.9 x 50.8 x 10.4 |

802.11ac Wave 1 (WiFi 5)



HARDWARE SPECIFICATIONS

| TYPE OF CARD | Standard size 3x3 MIMO 802.11ac | Standard size Industrial Grade 3x3 MIMO 802.11ac | Standard size 2x2 MIMO 802.11ac | Standard size Industrial Grade 2x2 MIMO 802.11ac | Wide card High Power 2x2 MIMO 802.11ac | Wide card High Power 2x2 MIMO 802.11ac |
|------------------------------|--|--|---|--|--|--|
| MIMO | 3x3 | 3x3 | 2x2 | 2x2 | 3x3 | 2x2 |
| MODEL | WLE900VX | WLE900VX-I | WLE600VX | WLE600VX-I | WLE900V5-27ESD | WLE600V5-27ESD |
| CHIPSET | QCA9880 | QCA9890 | QCA9882 | QCA9892 | QCA9880 | QCA9882 |
| STANDARD | 802.11a/b/g/n/ac | 802.11a/b/g/n/ac | 802.11a/b/g/n/ac | 802.11a/b/g/n/ac | 802.11a/n/ac | 802.11a/n/ac |
| THEORETICAL RATE | 1300Mbps | 1300Mbps | 867Mbps | 867Mbps | 1300Mbps | 867Mbps |
| FORM FACTOR | Standard size | Standard size | Standard size | Standard size | Wide size | Wide size |
| SPECTRUM | 2.412-2.472GHz 5.180-5.825GHz | 2.412-2.472GHz 4.920-5.825GHz | 2.412-2.472GHz 5.180-5.825GHz | 2.412-2.472GHz 4.920-5.825GHz | 5.180-5.825GHz | 5.180-5.825GHz |
| REFERENCE DESIGN | XB140 | XB140 | XB140 | XB140 | CUS223 | CUS223 |
| HOST INTERFACE | MiniPCIe | MiniPCIe | MiniPCIe | MiniPCIe | MiniPCIe | MiniPCIe |
| OPERATING VOLTAGE | 3.3V DC | 3.3V DC | 3.3V DC | 3.3V DC | 3.3V and 5V DC | 3.3V and 5V DC |
| POWER (PER CHAIN) | 21dBm @ 2.4GHz 20dBm @ 5GHz | 21dBm @ 2.4GHz 20dBm @ 5GHz | 21dBm @ 2.4GHz 20dBm @ 5GHz | 21dBm @ 2.4GHz 20dBm @ 5GHz | 27dBm @ 5GHz | 27dBm @ 5GHz |
| POWER CONSUMPTION | 5W (Max) | 5W (Max) | 3.5W (Max) | 3.5W (Max) | 10W (Max) | 7.5W (Max) |
| CHANNEL SUPPORT | 20/40/80MHz | 20/40/80MHz | 20/40/80MHz | 20/40/80MHz | 20/40/80MHz | 20/40/80MHz |
| ANTENNA CONNECTOR | 3x U.FL | 3x U.FL | 2x U.FL | 2x U.FL | 3x MMCX | 2x MMCX |
| MODULATION TECHNIQUES | OFDM: BPSK, QPSK, DBPSK, DQPSK, CCK, 16-QAM, 64-QAM, 256-QAM | OFDM: BPSK, QPSK, DBPSK, DQPSK, CCK, 16-QAM, 64-QAM, 256-QAM | OFDM: BPSK, QPSK, DBPSK, DQPSK, 16-QAM, 64-QAM, 256-QAM | OFDM: BPSK, QPSK, DBPSK, DQPSK, CCK, 16-QAM, 64-QAM, 256-QAM | BPSK, QPSK, DBPSK, DQPSK, 16-QAM, 64-QAM, 256-QAM | BPSK, QPSK, DBPSK, DQPSK, 16-QAM, 64-QAM, 256-QAM |
| OPERATING ENVIRONMENT | -20°C to 70°C | -40°C to 70°C* | -20°C to 70°C | -40°C to 70°C* | -20°C to 70°C with normal heatsink, -40°C to 80°C with large heatsink | -20°C to 70°C with normal heatsink, -40°C to 85°C with large heatsink |
| CERTIFICATION | FCC, CE, REACH & RoHS | FCC, CE, REACH & RoHS Compliance | FCC, CE, REACH & RoHS Compliance | FCC, CE, REACH & RoHS Compliance | REACH & RoHS Compliance | FCC, CE, IC, REACH & RoHS Compliance |
| DIMENSIONS (W x H x D) in mm | 30 x 50.9 x 3.2 | 30 x 50.9 x 3.2 | 30 x 50.9 x 3.2 | 30 x 50.9 x 3.2 | 50 x 51 x 12.5 with normal heatsink, 95 x 51 x 13 with large heatsink | 50 x 51 x 12.5 with normal heatsink, 95 x 51 x 13 with large heatsink |

*The wireless module can operate up to 90°C. For long term reliability, it is recommended that a 20°C safety margin be maintained.

802.11n (WiFi 4)



HARDWARE SPECIFICATIONS

| | |
|------------------------------|---|
| TYPE OF CARD | Half size 2x2 MIMO 802.11n |
| MIMO | 2x2 |
| MODEL | WLE200N2 |
| CHIPSET | AR9287 |
| STANDARD | 802.11b/g/n |
| THEORETICAL RATE | 300Mbps |
| FORM FACTOR | Half size |
| SPECTRUM | 2.412-2.484GHz |
| REFERENCE DESIGN | HB97 |
| HOST INTERFACE | MiniPCIe |
| OPERATING VOLTAGE | 3.3V DC |
| POWER (PER CHAIN) | 16dBm @ 2.4GHz |
| POWER CONSUMPTION | 1.9W |
| CHANNEL SUPPORT | 20/40MHz |
| ANTENNA CONNECTOR | 2x U.FL |
| MODULATION TECHNIQUES | OFDM: BPSK, QPSK, 16-QAM, 64-QAM DSSS: DBPSK, DQPSK, CCK |
| OPERATING ENVIRONMENT | -20°C to 70°C |
| CERTIFICATION | IC, CE, FCC, REACH & RoHS Compliance |
| DIMENSIONS (W x H x D) in mm | 30 x 26.8 x 3.2 |