

WiFi 6 (802.11ax) 2x2 MU-MIMO OFDMA 2.4/5GHz Dual Band Selectable Wireless Module

Model: WLE3002HX



KEY FEATURES

- Qualcomm QCN6024/9024 'Pine' series for Commercial grade
- Qualcomm QCN9074 'Pine' series for Industrial grade
- 2.4GHz, 2x2 MU-MIMO OFDMA Technology, up to 573Mbps physical data rate
- 5GHz, 2x2 MU-MIMO OFDMA Technology, up to 2402Mbps physical data rate
- Dual band selectable 2.4/5GHz 2x2 WiFi 6 (802.11ax)
- Supports Dynamic Frequency Selection (DFS)
- Heat sink allows free air operation
- Supports IEEE 802.11d, e, h, i, j, k, r, u, v time stamp, w standard
- Designed for High Bandwidth Enterprise Wireless Access Points
- MiniPCIe interface with PCIe 3.0

Specifications

Chipset	Qualcomm QCN6024/9024 'Pine' series for Commercial grade Qualcomm QCN9074 'Pine' series for Industrial grade
System Memory	2Mbit serial I ² C bus EEPROM
Reference Design	PN03.1
Host Interface	MiniPCIe interface with PCIe 3.0
Operating Voltage	3.3V
Power Consumption	6.6W (max)
Wireless	2.4GHz 802.11b/g/n/ax, max 20dBm per chain 5GHz 802.11a/n/ac/ax, max 20dBm per chain 2x U.FL Connectors
Frequency Range	2.4GHz: 2.412~2.472GHz 5GHz (QCN6024/9024): 5.150~5.850GHz 5GHz (QCN9074): 4.920~5.850GHz
Modulation Techniques	OFDMA: BPSK, QPSK, DBPSK, DQPSK, 16-QAM, 64-QAM, 256-QAM, 1024-QAM
Channel Spectrum Widths for WLAN	Supports 20/40MHz at 2.4GHz Supports 20/40/80/160MHz at 5GHz
Operating Systems	Linux
Certification	FCC, CE Certified, REACH & RoHS Compliance
Environmental Temperature	Operating (Commercial Grade): -20°C to 70°C, Storage: -40°C to 90°C Operating (Industrial Grade): -40°C to 85°C, Storage: -40°C to 90°C
Environmental Humidity, Non-Condensing	Operating: 5% to 95%, Storage: Max. 90%
Dimensions (W x H x D) in mm	50.8 X 30 X 9.9 mm

*Configurations are subject to change without notifications.

**Can be requested from respective sales executive.

RF Performance Table at 2.4GHz

	Data Rate	TX Power (per chain)	TX Power (2 chains)	Tolerance
2.4GHz 802.11b	1Mbps	20dBm	23dBm	±2dB
	2Mbps	20dBm	23dBm	±2dB
	5.5Mbps	20dBm	23dBm	±2dB
	11Mbps	20dBm	23dBm	±2dB
2.4GHz 802.11g	6Mbps	20dBm	23dBm	±2dB
	9Mbps	20dBm	23dBm	±2dB
	12Mbps	20dBm	23dBm	±2dB
	18Mbps	20dBm	23dBm	±2dB
	24Mbps	19dBm	22dBm	±2dB
	36Mbps	19dBm	22dBm	±2dB
	48Mbps	18dBm	21dBm	±2dB
	54Mbps	18dBm	21dBm	±2dB
2.4GHz 802.11n HT20	MCS 0	20dBm	23dBm	±2dB
	MCS 1	20dBm	23dBm	±2dB
	MCS 2	20dBm	23dBm	±2dB
	MCS 3	19dBm	22dBm	±2dB
	MCS 4	19dBm	22dBm	±2dB
	MCS 5	18dBm	21dBm	±2dB
	MCS 6	17dBm	20dBm	±2dB
	MCS 7	16dBm	19dBm	±2dB
2.4GHz 802.11n HT40	MCS 0	20dBm	23dBm	±2dB
	MCS 1	20dBm	23dBm	±2dB
	MCS 2	20dBm	23dBm	±2dB
	MCS 3	19dBm	22dBm	±2dB
	MCS 4	19dBm	22dBm	±2dB
	MCS 5	18dBm	21dBm	±2dB
	MCS 6	17dBm	20dBm	±2dB
	MCS 7	16dBm	19dBm	±2dB
2.4GHz 802.11ax HE20	MCS 0	20dBm	23dBm	±2dB
	MCS 1	20dBm	23dBm	±2dB
	MCS 2	20dBm	23dBm	±2dB
	MCS 3	19dBm	22dBm	±2dB
	MCS 4	19dBm	22dBm	±2dB
	MCS 5	18dBm	21dBm	±2dB
	MCS 6	17dBm	20dBm	±2dB
	MCS 7	16dBm	19dBm	±2dB
	MCS 8	15dBm	18dBm	±2dB
	MCS 9	14dBm	17dBm	±2dB
	MCS 10	13dBm	16dBm	±2dB
	MCS 11	13dBm	16dBm	±2dB

	Data Rate	RX Specifications Sensitivity	Tolerance
2.4GHz 802.11b	1Mbps	-100	±2dB
	2Mbps	-99	±2dB
	5.5Mbps	-96	±2dB
	11Mbps	-94	±2dB
2.4GHz 802.11g	6Mbps	-97	±2dB
	9Mbps	-95	±2dB
	12Mbps	-92	±2dB
	18Mbps	-90	±2dB
	24Mbps	-88	±2dB
	36Mbps	-85	±2dB
	48Mbps	-83	±2dB
	54Mbps	-82	±2dB
2.4GHz 802.11n HT20	MCS 0	-96	±2dB
	MCS 1	-94	±2dB
	MCS 2	-92	±2dB
	MCS 3	-90	±2dB
	MCS 4	-87	±2dB
	MCS 5	-84	±2dB
	MCS 6	-81	±2dB
	MCS 7	-80	±2dB
2.4GHz 802.11n HT40	MCS 0	-93	±2dB
	MCS 1	-92	±2dB
	MCS 2	-90	±2dB
	MCS 3	-87	±2dB
	MCS 4	-85	±2dB
	MCS 5	-82	±2dB
	MCS 6	-80	±2dB
	MCS 7	-77	±2dB
2.4GHz 802.11ax HE20	MCS 0	-96	±2dB
	MCS 1	-94	±2dB
	MCS 2	-92	±2dB
	MCS 3	-89	±2dB
	MCS 4	-86	±2dB
	MCS 5	-83	±2dB
	MCS 6	-81	±2dB
	MCS 7	-79	±2dB
	MCS 8	-75	±2dB
	MCS 9	-73	±2dB
	MCS 10	-69	±2dB
	MCS 11	-66	±2dB

RF Performance Table at 2.4GHz

	Data Rate	TX Power (per chain)	TX Power (2 chains)	Tolerance
2.4GHz 802.11ax HE40	MCS 0	20dBm	23dBm	±2dB
	MCS 1	20dBm	23dBm	±2dB
	MCS 2	20dBm	23dBm	±2dB
	MCS 3	19dBm	22dBm	±2dB
	MCS 4	19dBm	22dBm	±2dB
	MCS 5	18dBm	21dBm	±2dB
	MCS 6	17dBm	20dBm	±2dB
	MCS 7	16dBm	19dBm	±2dB
	MCS 8	15dBm	18dBm	±2dB
	MCS 9	14dBm	17dBm	±2dB
	MCS 10	13dBm	16dBm	±2dB
	MCS 11	13dBm	16dBm	±2dB

	Data Rate	RX Specifications Sensitivity	Tolerance
2.4GHz 802.11ax HE40	MCS 0	-94	±2dB
	MCS 1	-92	±2dB
	MCS 2	-89	±2dB
	MCS 3	-87	±2dB
	MCS 4	-84	±2dB
	MCS 5	-81	±2dB
	MCS 6	-79	±2dB
	MCS 7	-76	±2dB
	MCS 8	-73	±2dB
	MCS 9	-70	±2dB
	MCS 10	-67	±2dB
	MCS 11	-64	±2dB

RF Performance Table at 5GHz

	Data Rate	TX Power (per chain)	TX Power (2 chains)	Tolerance
5GHz 802.11a	6Mbps	20dBm	23dBm	±2dB
	9Mbps	20dBm	23dBm	±2dB
	12Mbps	20dBm	23dBm	±2dB
	18Mbps	20dBm	23dBm	±2dB
	24Mbps	19dBm	22dBm	±2dB
	36Mbps	19dBm	22dBm	±2dB
	48Mbps	18dBm	21dBm	±2dB
	54Mbps	18dBm	21dBm	±2dB
5GHz 802.11n/ac VHT20	MCS 0	20dBm	23dBm	±2dB
	MCS 1	20dBm	23dBm	±2dB
	MCS 2	20dBm	23dBm	±2dB
	MCS 3	19dBm	22dBm	±2dB
	MCS 4	19dBm	22dBm	±2dB
	MCS 5	18dBm	21dBm	±2dB
	MCS 6	17dBm	20dBm	±2dB
	MCS 7	16dBm	19dBm	±2dB
	MCS 8	15dBm	18dBm	±2dB
5GHz 802.11n/ac VHT40	MCS 0	20dBm	23dBm	±2dB
	MCS 1	20dBm	23dBm	±2dB
	MCS 2	20dBm	23dBm	±2dB
	MCS 3	19dBm	22dBm	±2dB
	MCS 4	19dBm	22dBm	±2dB
	MCS 5	18dBm	21dBm	±2dB
	MCS 6	17dBm	20dBm	±2dB
	MCS 7	16dBm	19dBm	±2dB
	MCS 8	15dBm	18dBm	±2dB
	MCS 9	14dBm	17dBm	±2dB
5GHz 802.11ac VHT80	MCS 0	20dBm	23dBm	±2dB
	MCS 1	20dBm	23dBm	±2dB
	MCS 2	20dBm	23dBm	±2dB
	MCS 3	19dBm	22dBm	±2dB
	MCS 4	19dBm	22dBm	±2dB
	MCS 5	18dBm	21dBm	±2dB
	MCS 6	17dBm	20dBm	±2dB
	MCS 7	16dBm	19dBm	±2dB
	MCS 8	15dBm	18dBm	±2dB
	MCS 9	14dBm	17dBm	±2dB

	Data Rate	RX Specifications Sensitivity	Tolerance
5GHz 802.11a	6Mbps	-94	±2dB
	9Mbps	-93	±2dB
	12Mbps	-91	±2dB
	18Mbps	-89	±2dB
	24Mbps	-87	±2dB
	36Mbps	-85	±2dB
	48Mbps	-82	±2dB
	54Mbps	-79	±2dB
5GHz 802.11n/ac VHT20	MCS 0	-94	±2dB
	MCS 1	-93	±2dB
	MCS 2	-91	±2dB
	MCS 3	-88	±2dB
	MCS 4	-86	±2dB
	MCS 5	-83	±2dB
	MCS 6	-81	±2dB
	MCS 7	-79	±2dB
	MCS 8	-76	±2dB
5GHz 802.11n/ac VHT40	MCS 0	-92	±2dB
	MCS 1	-90	±2dB
	MCS 2	-88	±2dB
	MCS 3	-85	±2dB
	MCS 4	-83	±2dB
	MCS 5	-81	±2dB
	MCS 6	-79	±2dB
	MCS 7	-77	±2dB
	MCS 8	-74	±2dB
	MCS 9	-71	±2dB
5GHz 802.11ac VHT80	MCS 0	-90	±2dB
	MCS 1	-88	±2dB
	MCS 2	-85	±2dB
	MCS 3	-82	±2dB
	MCS 4	-80	±2dB
	MCS 5	-77	±2dB
	MCS 6	-75	±2dB
	MCS 7	-72	±2dB
	MCS 8	-69	±2dB
	MCS 9	-67	±2dB

RF Performance Table at 5GHz

	Data Rate	TX Power (per chain)	TX Power (2 chains)	Tolerance
5GHz 802.11ax HE20	MCS 0	20dBm	23dBm	±2dB
	MCS 1	20dBm	23dBm	±2dB
	MCS 2	20dBm	23dBm	±2dB
	MCS 3	19dBm	22dBm	±2dB
	MCS 4	19dBm	22dBm	±2dB
	MCS 5	18dBm	21dBm	±2dB
	MCS 6	17dBm	20dBm	±2dB
	MCS 7	16dBm	19dBm	±2dB
	MCS 8	15dBm	18dBm	±2dB
	MCS 9	14dBm	17dBm	±2dB
	MCS 10	13dBm	16dBm	±2dB
	MCS 11	13dBm	16dBm	±2dB
5GHz 802.11ax HE40	MCS 0	20dBm	23dBm	±2dB
	MCS 1	20dBm	23dBm	±2dB
	MCS 2	20dBm	23dBm	±2dB
	MCS 3	19dBm	22dBm	±2dB
	MCS 4	19dBm	22dBm	±2dB
	MCS 5	18dBm	21dBm	±2dB
	MCS 6	17dBm	20dBm	±2dB
	MCS 7	16dBm	19dBm	±2dB
	MCS 8	15dBm	18dBm	±2dB
	MCS 9	14dBm	17dBm	±2dB
	MCS 10	13dBm	16dBm	±2dB
	MCS 11	13dBm	16dBm	±2dB
5GHz 802.11ax HE80	MCS 0	20dBm	23dBm	±2dB
	MCS 1	20dBm	23dBm	±2dB
	MCS 2	20dBm	23dBm	±2dB
	MCS 3	19dBm	22dBm	±2dB
	MCS 4	19dBm	22dBm	±2dB
	MCS 5	18dBm	21dBm	±2dB
	MCS 6	17dBm	20dBm	±2dB
	MCS 7	16dBm	19dBm	±2dB
	MCS 8	15dBm	18dBm	±2dB
	MCS 9	14dBm	17dBm	±2dB
	MCS 10	13dBm	16dBm	±2dB
	MCS 11	13dBm	16dBm	±2dB

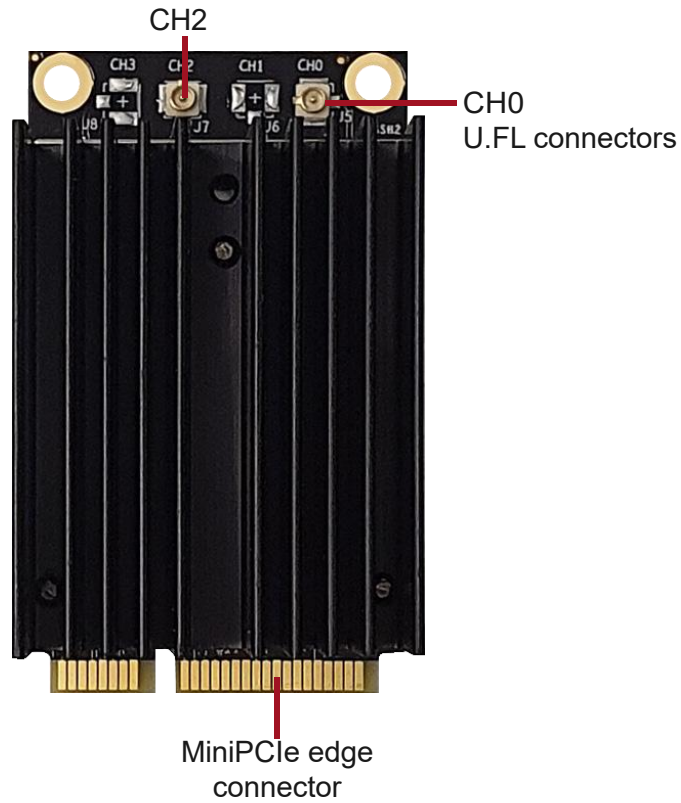
	Data Rate	RX Specifications Sensitivity	Tolerance
5GHz 802.11ax HE20	MCS 0	-94	±2dB
	MCS 1	-92	±2dB
	MCS 2	-89	±2dB
	MCS 3	-87	±2dB
	MCS 4	-85	±2dB
	MCS 5	-82	±2dB
	MCS 6	-79	±2dB
	MCS 7	-77	±2dB
	MCS 8	-74	±2dB
	MCS 9	-72	±2dB
	MCS 10	-70	±2dB
	MCS 11	-67	±2dB
5GHz 802.11ax HE40	MCS 0	-92	±2dB
	MCS 1	-90	±2dB
	MCS 2	-88	±2dB
	MCS 3	-86	±2dB
	MCS 4	-83	±2dB
	MCS 5	-81	±2dB
	MCS 6	-79	±2dB
	MCS 7	-76	±2dB
	MCS 8	-74	±2dB
	MCS 9	-71	±2dB
	MCS 10	-68	±2dB
	MCS 11	-65	±2dB
5GHz 802.11ax HE80	MCS 0	-88	±2dB
	MCS 1	-86	±2dB
	MCS 2	-84	±2dB
	MCS 3	-82	±2dB
	MCS 4	-79	±2dB
	MCS 5	-77	±2dB
	MCS 6	-74	±2dB
	MCS 7	-72	±2dB
	MCS 8	-69	±2dB
	MCS 9	-67	±2dB
	MCS 10	-64	±2dB
	MCS 11	-61	±2dB

RF Performance Table at 5GHz

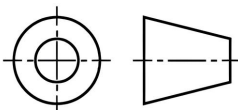
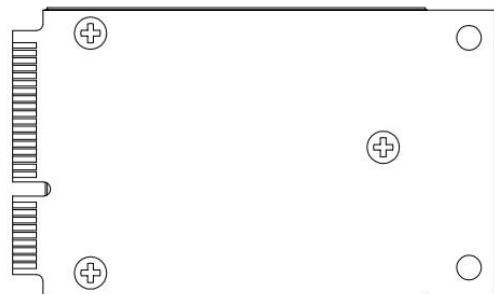
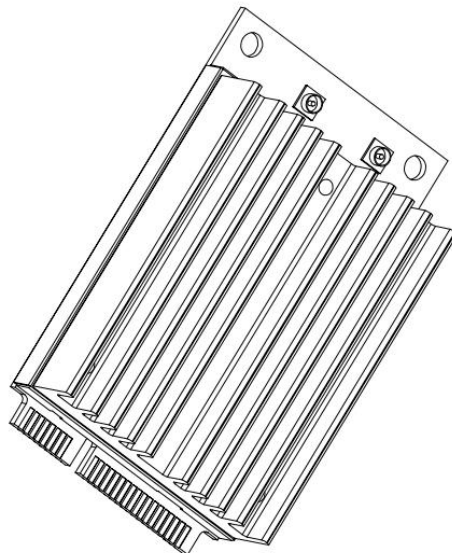
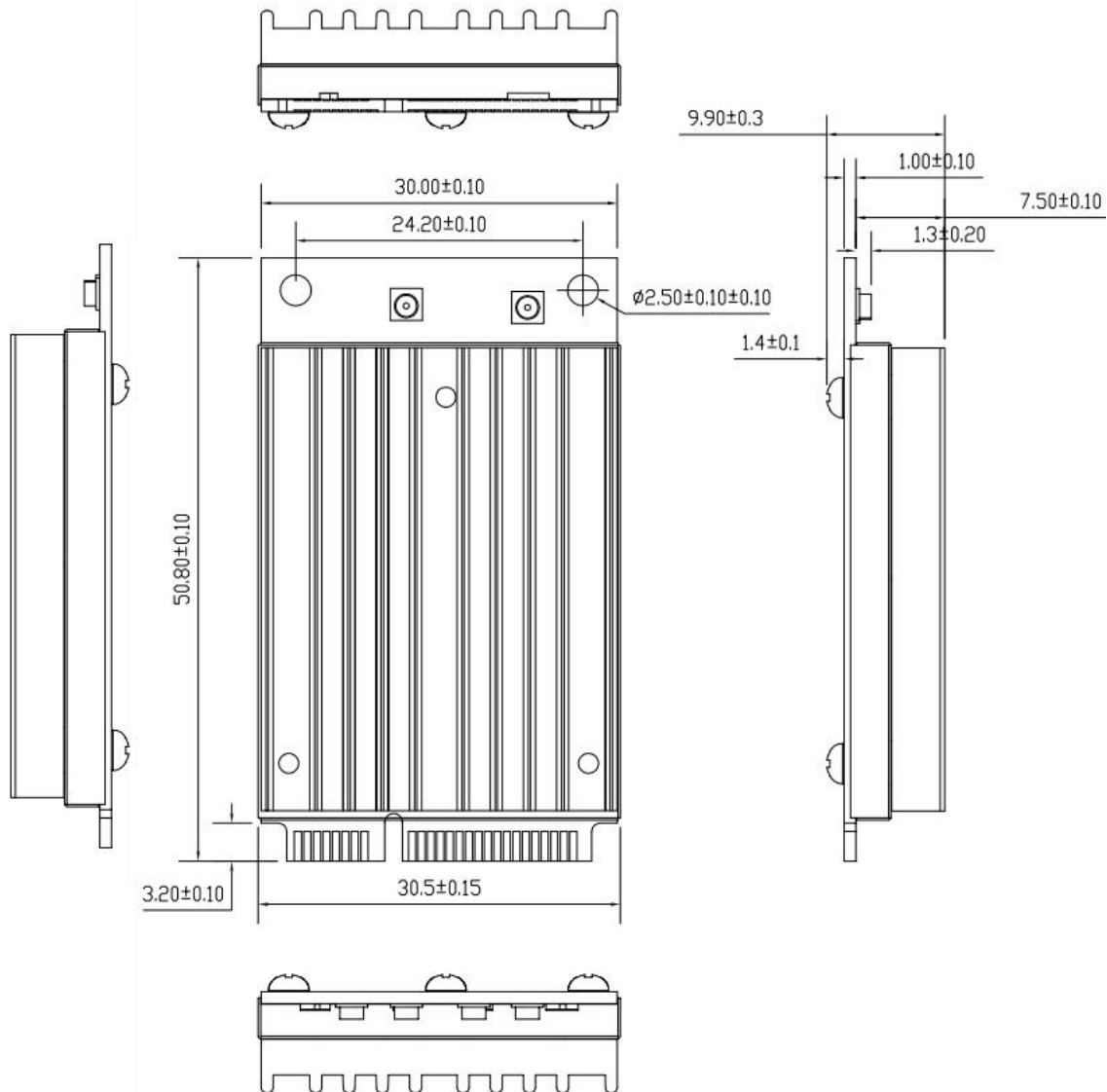
	Data Rate	TX Power (per chain)	TX Power (2 chains)	Tolerance
5GHz 802.11ax HE160	MCS 0	20dBm	23dBm	±2dB
	MCS 1	20dBm	23dBm	±2dB
	MCS 2	20dBm	23dBm	±2dB
	MCS 3	19dBm	22dBm	±2dB
	MCS 4	19dBm	22dBm	±2dB
	MCS 5	18dBm	21dBm	±2dB
	MCS 6	17dBm	20dBm	±2dB
	MCS 7	16dBm	19dBm	±2dB
	MCS 8	15dBm	18dBm	±2dB
	MCS 9	14dBm	17dBm	±2dB
	MCS 10	13dBm	16dBm	±2dB
	MCS 11	13dBm	16dBm	±2dB

	Data Rate	RX Specifications Sensitivity	Tolerance
5GHz 802.11ax HE160	MCS 0	-87	±2dB
	MCS 1	-84	±2dB
	MCS 2	-82	±2dB
	MCS 3	-80	±2dB
	MCS 4	-77	±2dB
	MCS 5	-75	±2dB
	MCS 6	-73	±2dB
	MCS 7	-70	±2dB
	MCS 8	-68	±2dB
	MCS 9	-67	±2dB
	MCS 10	-62	±2dB
	MCS 11	-59	±2dB

Component Map

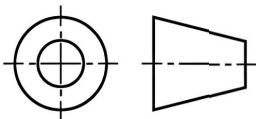
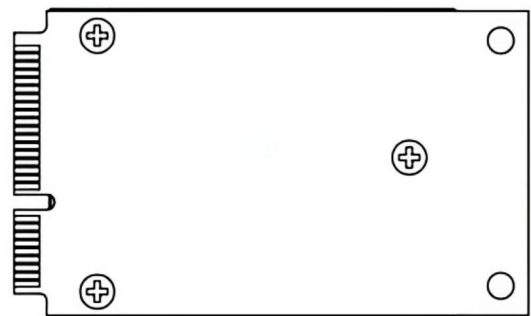
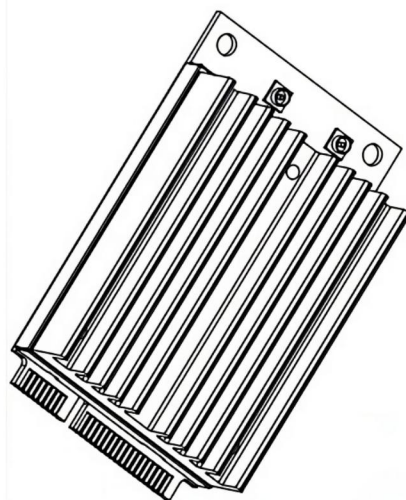
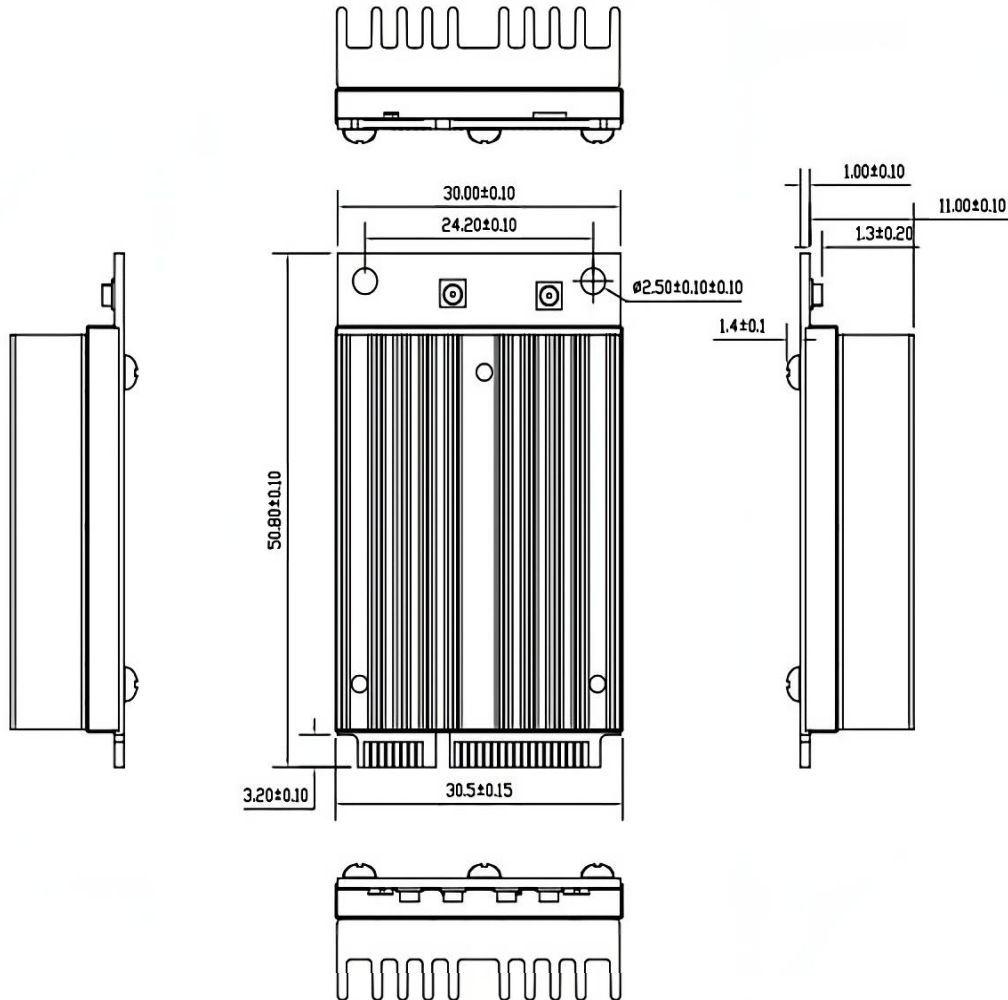


Mechanical Dimensions for Commercial Grade



All dimensions are in mm

Mechanical Dimensions for Industrial Grade



All dimensions are in mm

Ordering Configuration

Item Code	Model	Description
WLE3002HX 7A0624S	WLE3002HX	QCN6024 2x2 802.11a/b/g/n/ac/ax support 2.4/5GHz Dual Band Selectable MiniPCIe interface with PCIe 3.0 Module
WLE3002HX 7A0924S	WLE3002HX	QCN9024 2x2 802.11a/b/g/n/ac/ax support 2.4/5GHz Dual Band Selectable MiniPCIe interface with PCIe 3.0 Module
WLE3002HX 7B0974S-I	WLE3002HX-I	QCN9074 2x2 802.11a/b/g/n/ac/ax support 2.4/5GHz Dual Band Selectable MiniPCIe interface with PCIe 3.0 Module

Chipsets Comparisons

		QCN6024	QCN9024	QCN9074
Bands	4.9GHz	-	-	✓
	6GHz	-	✓	✓
	165MHz	-	-	✓
	4k QAM	-	✓	✓
	#clients	128	256	512
Advanced 11ax Features	#OFDMA users	8	16	37
	#MU-MIMO users	4	4	4
	UL/DL OFDMA	✓	✓	✓
	DL OFDMA w/ TxBF	-	✓	✓
	DL MU-MIMO	✓	✓	✓
	UL MU-MIMO (R2)	✓	✓	✓
	Spectrum Scan	-	✓	✓
	aDFS/aSA	aDFS	aDFS/aSA	aDFS/aSA
Management				
Others	RF Sensing	✓	✓	✓
	FIPS L2	-	-	✓