Qualcomm's QCA6391 2.4GHz + 5GHz DBS Dual Band Dual Concurrent 802.11ax with Bluetooth Milan
Designed for WLAN/BT and Low-Energy Communications

Model: WLT639

KEY FEATURES

- Supports 2x2 multiple input, multiple output (MIMO) with two spatial streams.
- Supports IEEE 802.11a/b/g/n/ac/ax WLAN standards.
- Enables seamless integration of WLAN/ Bluetooth and low energy technology.
- Provides a highly integrated System-on-Chip (SoC) for 802.11ax WiFi, Bluetooth (BT) Milan.
- Supports Bluetooth 5.1 + ANT+ IC and Bluetooth Milan ready and backward compatibility with BT 1.2 and BT 2.X + enhanced data rate.
- Supports BT-WLAN coexistence and 5G/ ISM coexistence

Specifications

Chipset	Qualcomm Atheros QCA6391 'Hastings' Series
WLAN Host Interface	PCIe Gen 2
Bluetooth Host Interface	HCI UART Interface
Host Interface	M.2 2230, Key E
Operating Voltage	3.3V DC power supply and I/O supply of 1.8V or 3.3V
WLAN Frequency Range	2.412GHz to 2.483GHz, 5.150GHz to 5.850GHz, *Subject to local regulations
Standards for WLAN	IEEE 802.11ax/ac/a/b/g/n (2T2R)
Standards for Bluetooth	Bluetooth 5.1
Channel Spectrum Widths for WLAN	Supports 20/40MHz at 2.4GHz Supports 20/40/80MHz at 5GHz
Data Rates for WLAN	802.11b: 11Mbps 802.11a/g: 54Mbps 802.11n: MCS 0 to MCS 7 802.11ac: MCS 0 to MCS 9 802.11ax: MCS 0 to MCS 11

Configurations are subject to change without notifications.

Specifications

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Max Data Rates for WLAN	573.6Mbps on 2.4GHz 802.11ax networks 1201Mbps on 5GHz 802.11ax networks
Data Rates for Bluetooth	2Mbps
Antenna	2x MHF4 Connectors Support WiFi/ Bluetooth coexistence
Modulation Techniques	802.11b: DSSS (DBPSK, DQPSK, CCK) 802.11a/g: OFDM (BPSK, QPSK, 16-QAM, 64-QAM) 802.11n: OFDM (BPSK, QPSK, 16-QAM, 64-QAM) 802.11ac: OFDM (BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM) 802.11ax: OFDMA (DPSK, QPSK, 16-QAM, 64-QAM, 256-QAM, 1024-QAM)
Certification	REACH & RoHS Compliance
Power Consumption	TX: 798.12 mA RX: 196.8 mA
Driver Support	Linux, Windows 7/8.1/10
Security	64/128-bits WEP, WPA, WPA2, 802.1X
Environmental Temperature	Operating: TBD, Storage: -40°C to 85°C
Environmental Humidity, non-condensing	Operating: 5% to 95%, Storage: 5% to 90%
Dimensions (W × H × D)	22mm × 30mm × 2.8mm

*Configurations are subject to change without notifications.

RF Performance Table at 2.4GHz

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

	Data Rate	RX Specifications Sensitivity	Tolerance
2.4GHz 802.11b	1 Mbps	TBD	±2dB
	2 Mbps	TBD	±2dB
	5.5 Mbps	TBD	±2dB
	11 Mbps	TBD	±2dB
2.4GHz 802.11g	6 Mbps	TBD	±2dB
	9 Mbps	TBD	±2dB
	12 Mbps	TBD	±2dB
	18 Mbps	TBD	±2dB
	24 Mbps	TBD	±2dB
	36 Mbps	TBD	±2dB
	48 Mbps	TBD	±2dB
	54 Mbps	TBD	±2dB
2.4GHz 802.11n HT20	MCS 0	TBD	±2dB
	MCS 1	TBD	±2dB
	MCS 2	TBD	±2dB
	MCS 3	TBD	±2dB
	MCS 4	TBD	±2dB
	MCS 5	TBD	±2dB
	MCS 6	TBD	±2dB
	MCS 7	TBD	±2dB
2.4GHz 802.11n HT40	MCS 0	TBD	±2dB
	MCS 1	TBD	±2dB
	MCS 2	TBD	±2dB
	MCS 3	TBD	±2dB
	MCS 4	TBD	±2dB
	MCS 5	TBD	±2dB
	MCS 6	TBD	±2dB
	MCS 7	TBD	±2dB
2.4GHz 802.11ax HE20	MCS 0	TBD	±2dB
	MCS 1	TBD	±2dB
	MCS 2	TBD	±2dB
	MCS 3	TBD	±2dB
	MCS 4	TBD	±2dB
	MCS 5	TBD	±2dB
	MCS 6	TBD	±2dB
	MCS 7	TBD	±2dB
	MCS 8	TBD	±2dB
	MCS 9	TBD	±2dB
	MCS 10	TBD	±2dB
	MCS 11	TBD	±2dB

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RF Performance Table at 2.4GHz

Data Rate		TX Power (per chain)	TX Power (2 chains)	Tolerance
2.4GHz 802.11ax HE40	MCS 0	15dBm	18dBm	±2dB
	MCS 1	15dBm	18dBm	±2dB
	MCS 2	15dBm	18dBm	±2dB
	MCS 3	15dBm	18dBm	±2dB
	MCS 4	14dBm	17dBm	±2dB
	MCS 5	14dBm	17dBm	±2dB
	MCS 6	14dBm	17dBm	±2dB
	MCS 7	14dBm	17dBm	±2dB
	MCS 8	13dBm	16dBm	±2dB
	MCS 9	13dBm	16dBm	±2dB
	MCS 10	12dBm	15dBm	±2dB
	MCS 11	12dBm	15dBm	±2dB

Data Rate		RX Specifications Sensitivity	Tolerance
2.4GHz 802.11ax HE40	MCS 0	TBD	±2dB
	MCS 1	TBD	±2dB
	MCS 2	TBD	±2dB
	MCS 3	TBD	±2dB
	MCS 4	TBD	±2dB
	MCS 5	TBD	±2dB
	MCS 6	TBD	±2dB
	MCS 7	TBD	±2dB
	MCS 8	TBD	±2dB
	MCS 9	TBD	±2dB
	MCS 10	TBD	±2dB
	MCS 11	TBD	±2dB

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RF Performance Table at 5GHz

Data Rate	TX Power (per chain)	TX Power (2 chains)	Tolerance	Data Rate	RX Specifications Sensitivity	Tolerance
5GHz 802.11a	6Mbps 15dBm	18dBm	±2dB	5GHz 802.11a	6Mbps TBD	±2dB
	9Mbps 15dBm	18dBm	±2dB		9Mbps TBD	±2dB
	12Mbps 15dBm	18dBm	±2dB		12Mbps TBD	±2dB
	18Mbps 15dBm	18dBm	±2dB		18Mbps TBD	±2dB
	24Mbps 14dBm	17dBm	±2dB		24Mbps TBD	±2dB
	36Mbps 14dBm	17dBm	±2dB		36Mbps TBD	±2dB
	48Mbps 14dBm	17dBm	±2dB		48Mbps TBD	±2dB
	54Mbps 14dBm	17dBm	±2dB		54Mbps TBD	±2dB
5GHz 802.11n/ac VHT20	MCS 0 15dBm	18dBm	±2dB	5GHz 802.11n/ac VHT20	MCS 0 TBD	±2dB
	MCS 1 15dBm	18dBm	±2dB		MCS 1 TBD	±2dB
	MCS 2 15dBm	18dBm	±2dB		MCS 2 TBD	±2dB
	MCS 3 15dBm	18dBm	±2dB		MCS 3 TBD	±2dB
	MCS 4 14dBm	17dBm	±2dB		MCS 4 TBD	±2dB
	MCS 5 14dBm	17dBm	±2dB		MCS 5 TBD	±2dB
	MCS 6 14dBm	17dBm	±2dB		MCS 6 TBD	±2dB
	MCS 7 14dBm	17dBm	±2dB		MCS 7 TBD	±2dB
	MCS 8 13dBm	16dBm	±2dB		MCS 8 TBD	±2dB
5GHz 802.11n/ac VHT40	MCS 0 15dBm	18dBm	±2dB	5GHz 802.11n/ac VHT40	MCS 0 TBD	±2dB
	MCS 1 15dBm	18dBm	±2dB		MCS 1 TBD	±2dB
	MCS 2 15dBm	18dBm	±2dB		MCS 2 TBD	±2dB
	MCS 3 15dBm	18dBm	±2dB		MCS 3 TBD	±2dB
	MCS 4 14dBm	17dBm	±2dB		MCS 4 TBD	±2dB
	MCS 5 14dBm	17dBm	±2dB		MCS 5 TBD	±2dB
	MCS 6 14dBm	17dBm	±2dB		MCS 6 TBD	±2dB
	MCS 7 14dBm	17dBm	±2dB		MCS 7 TBD	±2dB
	MCS 8 13dBm	16dBm	±2dB		MCS 8 TBD	±2dB
	MCS 9 13dBm	16dBm	±2dB		MCS 9 TBD	±2dB
5GHz 802.11ac HT80	MCS 0 15dBm	18dBm	±2dB	5GHz 802.11ac HT80	MCS 0 TBD	±2dB
	MCS 1 15dBm	18dBm	±2dB		MCS 1 TBD	±2dB
	MCS 2 15dBm	18dBm	±2dB		MCS 2 TBD	±2dB
	MCS 3 15dBm	18dBm	±2dB		MCS 3 TBD	±2dB
	MCS 4 14dBm	17dBm	±2dB		MCS 4 TBD	±2dB
	MCS 5 14dBm	17dBm	±2dB		MCS 5 TBD	±2dB
	MCS 6 14dBm	17dBm	±2dB		MCS 6 TBD	±2dB
	MCS 7 14dBm	17dBm	±2dB		MCS 7 TBD	±2dB
	MCS 8 13dBm	16dBm	±2dB		MCS 8 TBD	±2dB
	MCS 9 13dBm	16dBm	±2dB		MCS 9 TBD	±2dB

RF Performance Table at 5GHz

Data Rate		TX Power (per chain)	TX Power (2 chains)	Tolerance
5GHz 802.11ax HE20	MCS 0	15dBm	18dBm	±2dB
	MCS 1	15dBm	18dBm	±2dB
	MCS 2	15dBm	18dBm	±2dB
	MCS 3	15dBm	18dBm	±2dB
	MCS 4	14dBm	17dBm	±2dB
	MCS 5	14dBm	17dBm	±2dB
	MCS 6	14dBm	17dBm	±2dB
	MCS 7	14dBm	17dBm	±2dB
	MCS 8	13dBm	16dBm	±2dB
	MCS 9	13dBm	16dBm	±2dB
	MCS 10	12dBm	15dBm	±2dB
	MCS 11	12dBm	15dBm	±2dB
5GHz 802.11ax HE40	MCS 0	15dBm	18dBm	±2dB
	MCS 1	15dBm	18dBm	±2dB
	MCS 2	15dBm	18dBm	±2dB
	MCS 3	15dBm	18dBm	±2dB
	MCS 4	14dBm	17dBm	±2dB
	MCS 5	14dBm	17dBm	±2dB
	MCS 6	14dBm	17dBm	±2dB
	MCS 7	14dBm	17dBm	±2dB
	MCS 8	13dBm	16dBm	±2dB
	MCS 9	13dBm	16dBm	±2dB
	MCS 10	12dBm	15dBm	±2dB
	MCS 11	12dBm	15dBm	±2dB
5GHz 802.11ax HE80	MCS 0	15dBm	18dBm	±2dB
	MCS 1	15dBm	18dBm	±2dB
	MCS 2	15dBm	18dBm	±2dB
	MCS 3	15dBm	18dBm	±2dB
	MCS 4	14dBm	17dBm	±2dB
	MCS 5	14dBm	17dBm	±2dB
	MCS 6	14dBm	17dBm	±2dB
	MCS 7	14dBm	17dBm	±2dB
	MCS 8	13dBm	16dBm	±2dB
	MCS 9	13dBm	16dBm	±2dB
	MCS 10	12dBm	15dBm	±2dB
	MCS 11	12dBm	15dBm	±2dB

Data Rate		RX Specifications Sensitivity	Tolerance
5GHz 802.11ax HE20	MCS 0	TBD	±2dB
	MCS 1	TBD	±2dB
	MCS 2	TBD	±2dB
	MCS 3	TBD	±2dB
	MCS 4	TBD	±2dB
	MCS 5	TBD	±2dB
	MCS 6	TBD	±2dB
	MCS 7	TBD	±2dB
	MCS 8	TBD	±2dB
	MCS 9	TBD	±2dB
	MCS 10	TBD	±2dB
	MCS 11	TBD	±2dB
5GHz 802.11ax HE40	MCS 0	TBD	±2dB
	MCS 1	TBD	±2dB
	MCS 2	TBD	±2dB
	MCS 3	TBD	±2dB
	MCS 4	TBD	±2dB
	MCS 5	TBD	±2dB
	MCS 6	TBD	±2dB
	MCS 7	TBD	±2dB
	MCS 8	TBD	±2dB
	MCS 9	TBD	±2dB
	MCS 10	TBD	±2dB
	MCS 11	TBD	±2dB
5GHz 802.11ax HE80	MCS 0	TBD	±2dB
	MCS 1	TBD	±2dB
	MCS 2	TBD	±2dB
	MCS 3	TBD	±2dB
	MCS 4	TBD	±2dB
	MCS 5	TBD	±2dB
	MCS 6	TBD	±2dB
	MCS 7	TBD	±2dB
	MCS 8	TBD	±2dB
	MCS 9	TBD	±2dB
	MCS 10	TBD	±2dB
	MCS 11	TBD	±2dB

Mechanical Dimensions

22.0±0.1

0.8±0.1

1.3±0.1

2.0±0.2

30.0±0.1
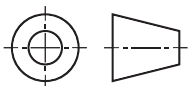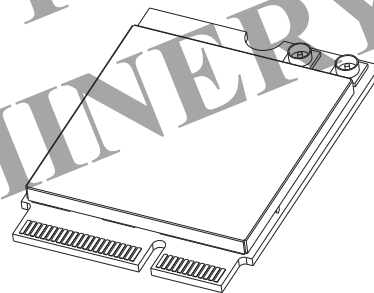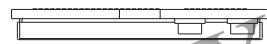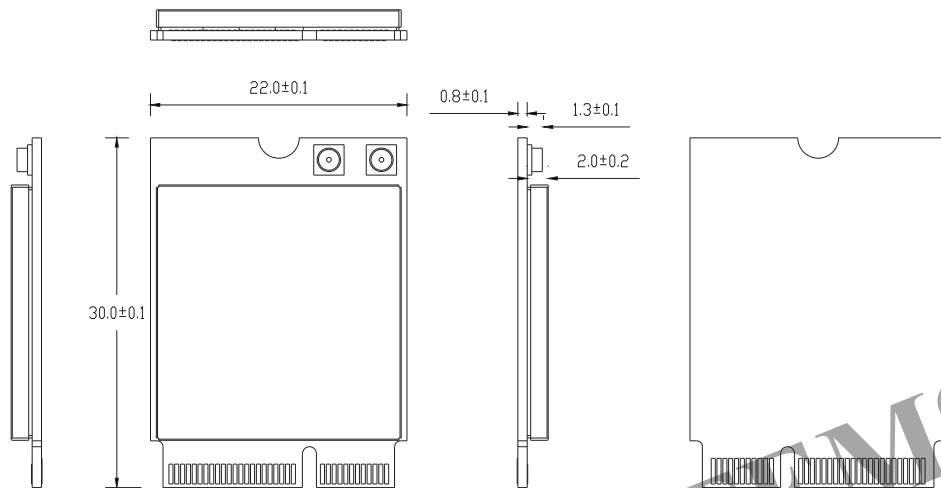
All dimensions are in mm.

Component Map

2x MHF4 antenna connectors
Both support 2.4GHz and 5GHz

Chain1
WLAN CH1 only

Chain0
WLAN CH0 and Bluetooth

M.2 edge connector

Key E
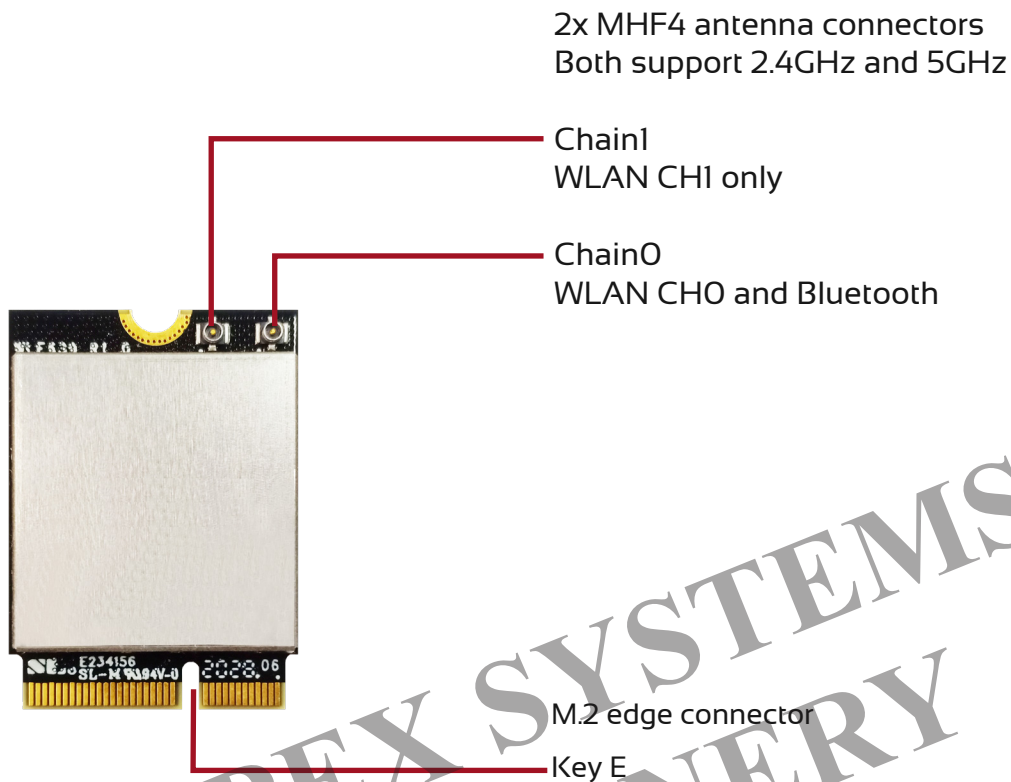
Ordering Configuration

Item Code	Model	Description
WLT639 6A0000 1.0-TE	WLT639	2x2 802.11a/b/g/n/ac/ax support dual band dual concurrent PCIe M.2 module

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