2.4GHz/5GHz WiFi + Bluetooth Combination Module

Designed for WLAN/BT and Low-Energy Communications

Model: WSD377

KEY FEATURES

- Qualcomm Atheros QCA9377
- Single-die wireless local area network (WLAN) and Bluetooth (BT) combination solution
- Supports 1x1 IEEE 802.11b/g/n at 2.4GHz
- Supports 1x1 IEEE 802.11a/n/ac at 5GHz
- Provides a highly integrated WLAN system-on-chip (SoC) for 5 GHz 802.11ac, or 2.4 GHz/5 GHz 802.11n WLAN applications
- Supports Bluetooth 4.2 + HS single mode with backward compatibility for BT 1.x, BT 2.x, BT4.2 + Enhanced Data Rate
- Supports 20/40MHz at 2.4GHz and supports 20/40/80MHz at 5GHz
- Supports multiuser MIMO
- Supports BT-WLAN coexistence and ISM-LTE coexistence
- Supports IEEE 802.11d, e, h, i, k, r, v, and w
- Supports Client Dynamic Frequency Selection (DFS)

Specifications

Chipset	QCA9377
Device Variant	QCA9377-3
System Memory	OTP
WLAN Host Interface	Low-power SDIO 3.0
Bluetooth Host Interface	UART/PCM
Operating Voltage	3.3V DC power supply and I/O supply of 1.8V or 3.3V
WLAN Frequency Range	2.412GHz to 2.462GHz 5.180GHz to 5.825GHz
Bluetooth Frequency Range	2.402GHz to 2.480GHz
Power Consumption	3.83W (Max)
Modulation Techniques	CCK, OFDM: BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM
Temperature Range	Operating: -20°C to 70°C Storage: -40°C to 90°C
Humidity	Operating: 5% to 95% (non-condensing) Storage: Max. 90% (non-condensing)
Dimensions (W x H x D) in mm	12 x 12 x 2.5

RF Performance Table for 2.4GHz

	Data Rate	TX Power	Tolerance
2.4GHz 802.11b	1Mbps	16dBm	±2dB
	11Mbps	16dBm	±2dB
2.4GHz 802.11g	6Mbps	15dBm	±2dB
	54Mbps	13dBm	±2dB
2.4GHz 802.11n 20MHz	MCS 0	14dBm	±2dB
	MCS 7	13dBm	±2dB
	MCS 8	13dBm	±2dB
2.4GHz 802.11n 40MHz	MCS 0	14dBm	±2dB
	MCS 9	13dBm	±2dB

	Data Rate	RX Specifications Sensitivity	Tolerance
2.4GHz 802.11b	1Mbps	-97dBm	±2dB
	11Mbps	-90dBm	±2dB
2.4GHz 802.11g	6Mbps	-92dBm	±2dB
	54Mbps	-76dBm	±2dB
2.4GHz 802.11n 20MHz	MCS 0	-92dBm	±2dB
	MCS 7	-75dBm	±2dB
	MCS 8	-71dBm	±2dB
2.4GHz 802.11n 40MHz	MCS 0	-89dBm	±2dB
	MCS 9	-67dBm	±2dB

RF Performance Table for 5GHz

	Data Rate	TX Power	Tolerance
5GHz 802.11a	6Mbps	11dBm	±2dB
	54Mbps	10dBm	±2dB
5GHz 802.11n/ac 20MHz	MCS 0	11dBm	±2dB
	MCS 7	7dBm	±2dB
5GHz 802.11n/ac 40MHz	MCS 0	10dBm	±2dB
	MCS 7	6dBm	±2dB
	MCS 8	6dBm	±2dB
5GHz 802.11n/ac 80MHz	MCS 0	9dBm	±2dB
	MCS 9	6dBm	±2dB

	Data Rate	RX Specifications Sensitivity	Tolerance
5GHz 802.11a	6Mbps	-92dBm	±2dB
	54Mbps	-75dBm	±2dB
5GHz 802.11n/ac 20MHz	MCS 0	-92dBm	±2dB
	MCS 7	-74dBm	±2dB
5GHz 802.11n/ac 40MHz	MCS 0	-89dBm	±2dB
	MCS 7	-72dBm	±2dB
	MCS 8	-70dBm	±2dB
5GHz 802.11n/ac 80MHz	MCS 0	-86dBm	±2dB
	MCS 9	-62dBm	±2dB

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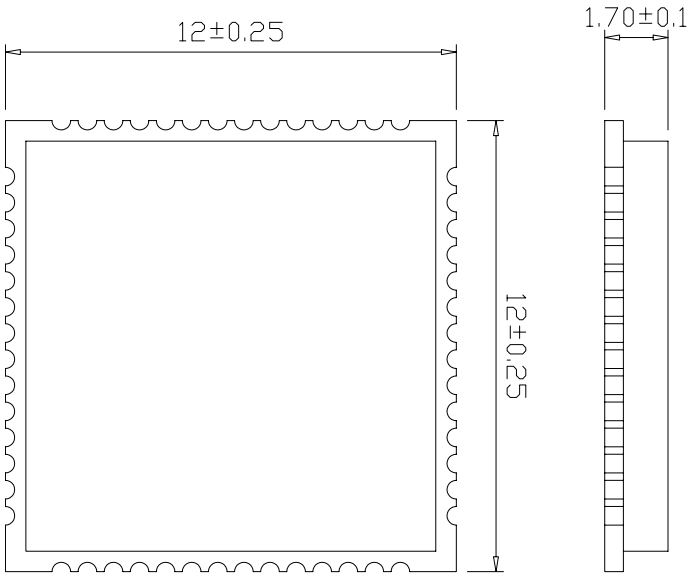
Dimensional Drawing

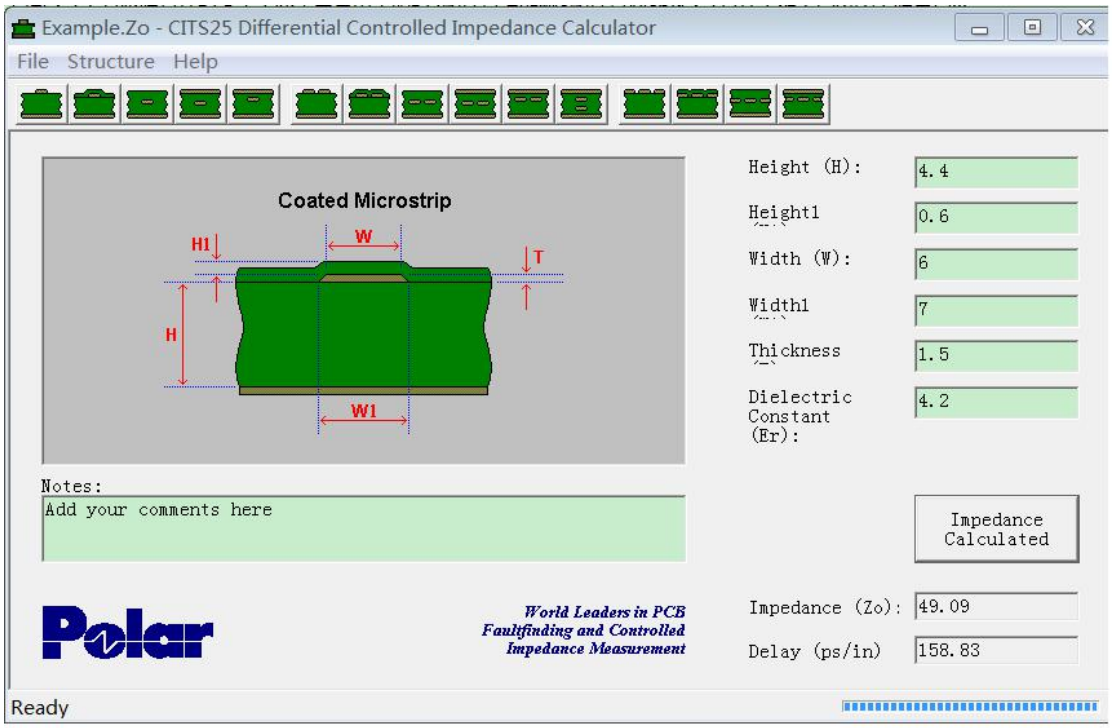


All dimensions are in mm.

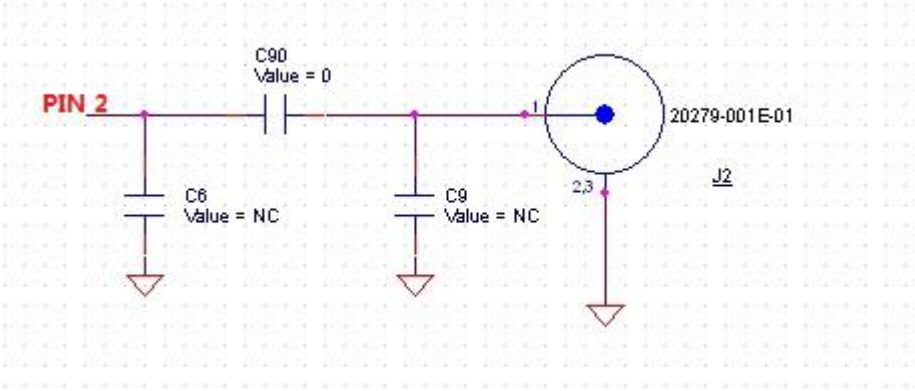
Ordering Configuration

Item Code	Model	Description
WSD377 7A0000-R1.02	WSD377	802.11a/b/g/n/ac 1x1 WiFi+BT, SDIO+UART

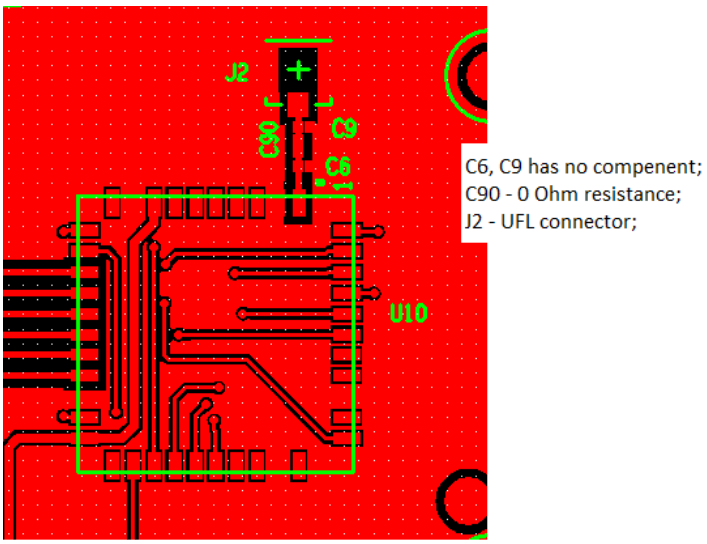
To facilitate the antenna tuning and certification test, a RF connector and an antenna matching circuit should be added. The following figure is the recommended circuit.RF trace should be 50Ω.



Antenna matching peripheral circuit schematic

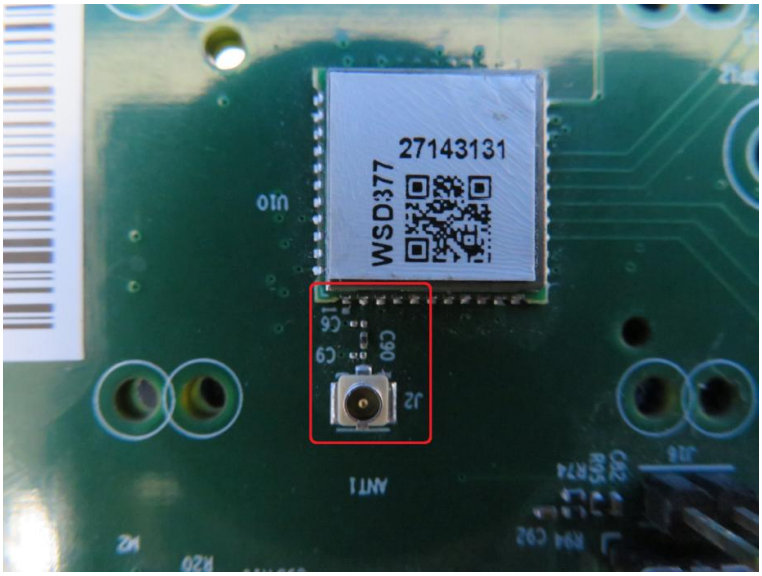


Antenna matching peripheral circuit PCB layout



The C90 are 0Ω resistors, and the C6, C9 are reserved for tuning and have no components. The RF test connector is used for the conducted RF performance test, and should be placed as close as to the module's MAIN_ANT pin. The traces impedance between WSD377 and antenna must be controlled in 50Ω.

EUT sample plot



Note: All platforms must follow this antenna matching when using this module. If not follow completely, the FCC authorization is no longer considered valid.

Compliance Information

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

FCC Statement:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generate, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Exposure to Radio Frequency Radiation. This equipment must be installed and operated in accordance with provided instructions and the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be collocated or operating in conjunction with any other antenna or transmitter.

End-users and installers must be provided with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance.

For end product label, the final end product must be labeled in a visible area with the following: “Contains Transmitter Module FCC ID: TK4WSD377 or Contains FCC ID: TK4WSD377”

Note:
(1) This device is approved for OEM installation with specified antennas as listed in this Manual. It is the responsibility of the Installer to comply with the separation distance for satisfying RF exposure compliance.
(2) This device only could work when being installed into “client devices” which could not transmit automatically.

Important Note: In the event that these conditions can not be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID can not be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

Antenna Type	Frequency Band (MHz)	TX Paths	Antenna Gain (dBi)
Dipole Antenna	2400 ~ 2483.5	1*1	5.0
	5150 ~ 5850	1*1	7.0

OEM installation must use the antenna that its antenna gain less than above table gain.