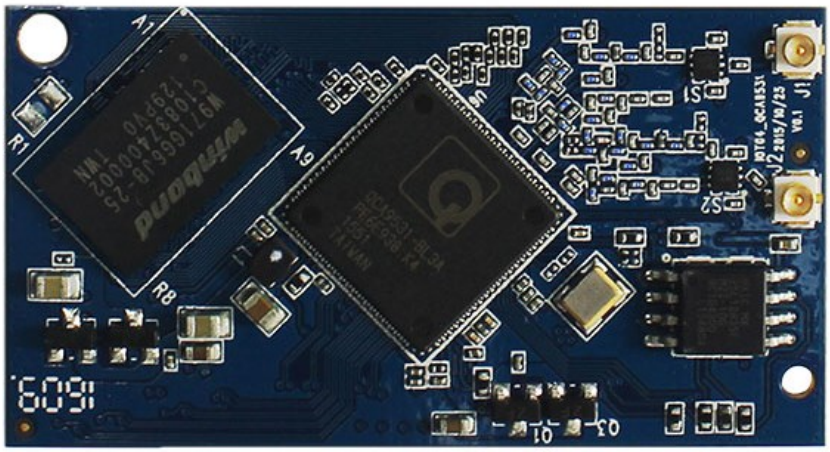
COMIOT-04

Product Specification



IEEE 802.11b/g/n wireless module

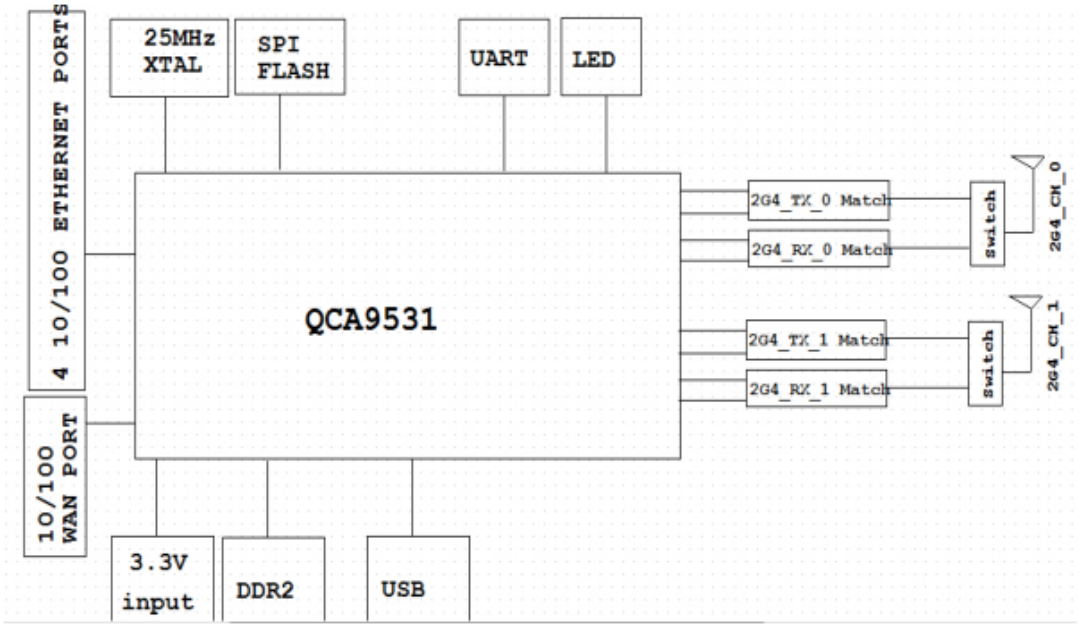
Release	Date	Modification	Approved
Version 1.0	2015-12-20	Initial release	
Version 1.1	2016-12-03	Update	

CONTENTS

1.Introduction

The ComIOT 04 module is a complete, small form factor WLAN module by a robust 802.11n wireless solution. It is optimized for low power, low cost, and highly integrated AP and consumer electronics solutions. This module has all Wi-Fi functionality in a single module and is friendly to low cost PCB design which requiring only 3.3V power supply and antenna connection to work. The ComIOT 04 is based on Qualcomm Atheros QCA9531 which is a highly integrated system-on-chip with 2.4GHz, IEEE 802.11n MIMO 2x2 and with internal PA and LNA. It supports IEEE 802.11b/g/n protocol and data rate can be up to 144Mbps in 802.11n 20MHz channel width and 300Mbps in 802.11n 40MHz channel width.

The ComIOT 04 supports AP mode and Client mode working at the same time. It can support mass service application software to reduce development works. The general hardware architecture of the module is shown below block diagram:



Module Block Diagram

1.1 Specification reference

This specification is based on additional references listed below.

- IEEE Std. 802.11b
- IEEE Std. 802.11g
- IEEE Std. 802.11n

1.2 System Functions

Table1: General Specification as below:

Main Chipset	QCA9531
Operating Frequency	2.40~2.4835GHz
WiFi Standard	802.11b/g/n (2X2)
Modulation	11b: DBPSK, DQPSK and CCK and DSSS 11g: BPSK, QPSK, 16QAM, 64QAM and OFDM 11n: MCS0~15 OFDM
Data rates	11b:1, 2, 5.5 and 11Mbps 11g:6, 9, 12, 18, 24, 36, 48 and 54 Mbps 11n: MCS0~5, up to 300Mbps
Form factor	60pin CONN, 1.27mm pitch,
Interface	Ethernet, UART, USB
PCB Stack	4-layers design
PCB Dimension	Typical, 48.4mm(W) x 26mm(L) x 1.0mm(H)
Antenna	U.FL connector for external antenna
Operation Temperature	-10°C to +70°C
Storage Temperature	-40°C to +150°C
Operation Voltage	3.3V +/-10%
GPIO Voltage	2.5 V +/-10%

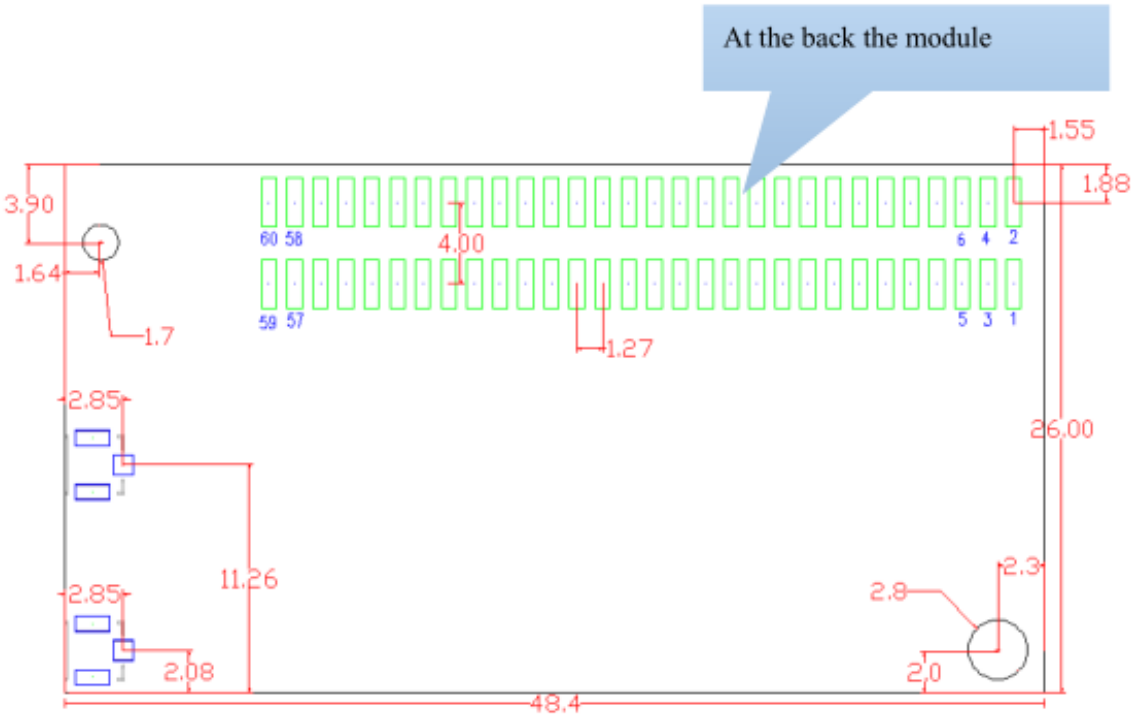
2. Mechanical Specification

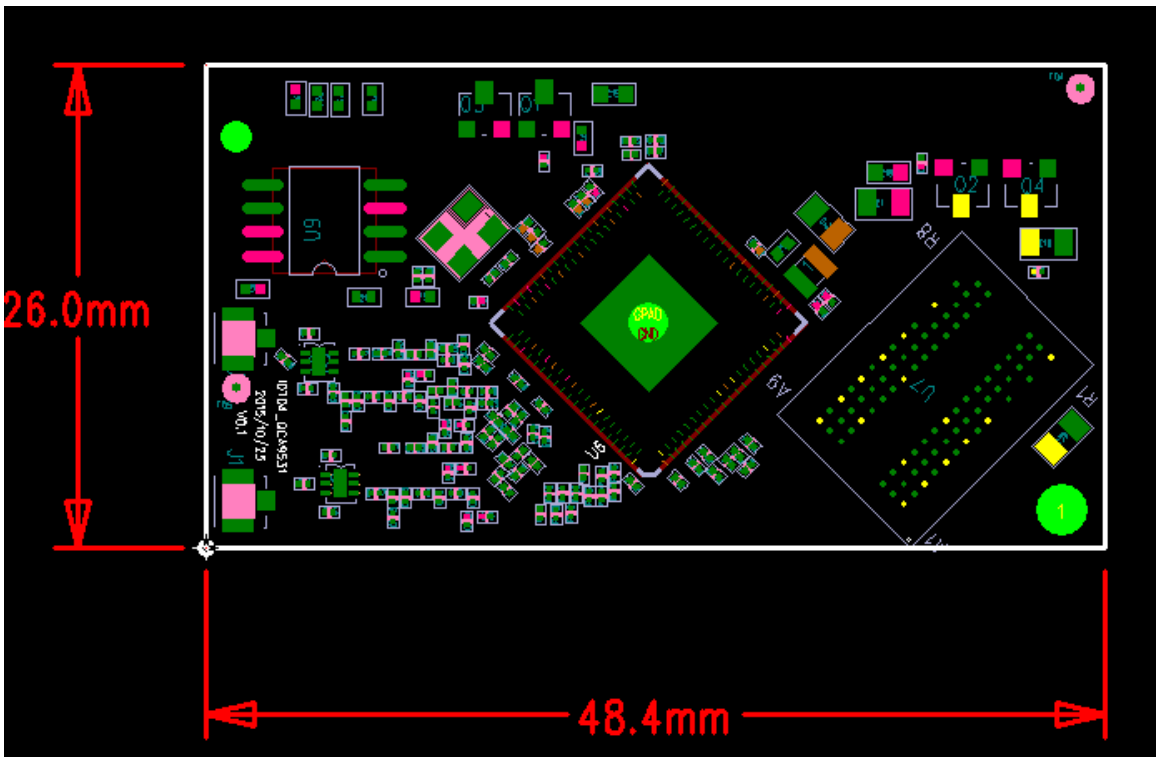
2.1 Mechanical Outline Drawing

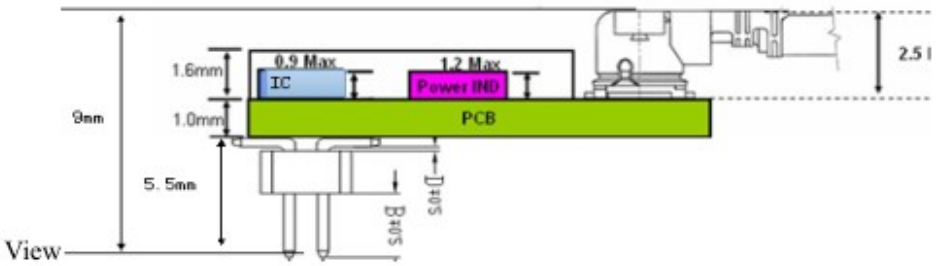
Typical PCBA Dimension (W x L): 48.4mm x 26mm, routing tolerance: +/-0.25mm.

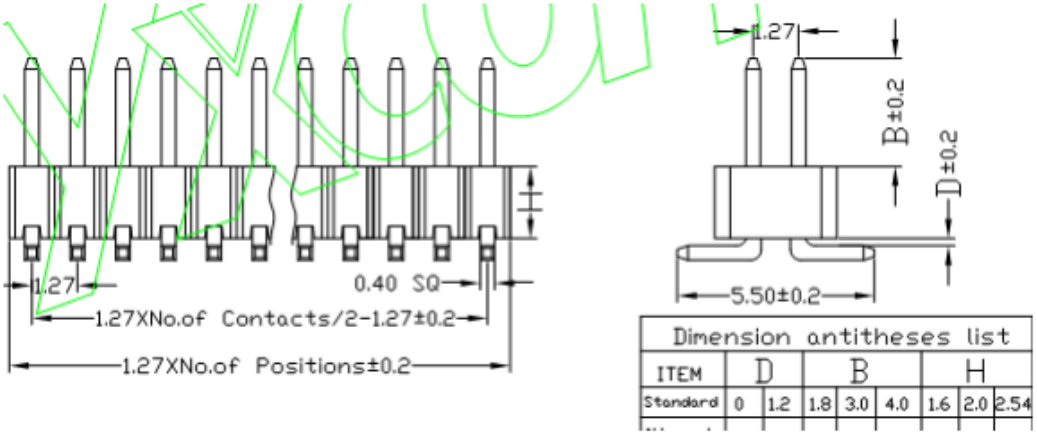
TOP view

Unit: mm









Dimension antitheses list

ITEM	D		B			H		
Standard	0	1.2	1.8	3.0	4.0	1.6	2.0	2.54

2.2 CONNECTOR Pin definition

60Pin, 1.27mm pitch

Pin #	Name	Description
1	GND	GROUND
2	GND	GROUND
3	LED_LINK_4(GPIO_11)	LAN_PORT3_LED
4	LAN_PORT2_RX+	Ethernet port
5	LED_LINK_3 (GPIO_14)	LAN_PORT2_LED
6	LAN_PORT2_RX-	Ethernet port
7	LED_LINK_2 (GPIO_15)	LAN_PORT1_LED
8	LAN_PORT2_TX+	Ethernet port
9	GND	GROUND
10	LAN_PORT2_TX-	Ethernet port
11	LAN_PORT3_TX+	Ethernet port
12	GND	GROUND
13	LAN_PORT3_TX-	Ethernet port
14	LAN_PORT1_TX+	Ethernet port
15	LAN_PORT3_RX+	Ethernet port
16	LAN_PORT1_TX-	Ethernet port
17	LAN_PORT3_RX-	Ethernet port
18	LAN_PORT1_RX+	Ethernet port
19	VDD_3.3V	3.3V input 1000mA, recommended voltage 3.3V
20	LAN_PORT1_RX-	Ethernet port
21	VDD_3.3V	3.3V input 1000mA, recommended voltage 3.3V
22	GND	GROUND
23	GPIO_0	GPIO
24	WAN_PORT_RX+	Ethernet port
25	GPIO_1	GPIO
26	WAN_PORT_RX-	Ethernet port
27	GPIO_2	GPIO
28	WAN_PORT_TX+	Ethernet port
29	NC	NC
30	WAN_PORT_TX-	Ethernet port
31	NC	NC

32	LAN_PORT0_RX+	Ethernet port
33	NC	NC
34	LAN_PORT0_RX-	Ethernet port
35	USB +	USB signal,
36	LAN_PORT0_TX+	Ethernet port
37	USB -	USB signal
38	LAN_PORT0_TX-	Ethernet port
39	SYSTEM_LED(GPIO_13)	SYSTEM LED
40	GND	GROUND
41	VDD_2.5V OUTPUT	IO voltage output
42	VDD_2.0V OUTPUT	Power supply output for peripheral network transformer
43	RESET	External power on reset, it has an internal 10K pull up resistance, the external pull low effective.
44	VDD_2.0V OUTPUT	Power supply output for peripheral network transformer
45	JUMPSTART (GPIO_17)	KEY_INPUT to start WPS function, it has an internal 10K pull up resistance, the external pull low effective.
46	GND	GROUND
47	GND	GROUND
48	SPI_MISO	SPI serial interface
49	VDD_3.3V	3.3V input 1000mA, recommended voltage 3.3V
50	SPI_CLK	SPI serial interface
51	VDD_3.3V	3.3V input 1000mA, recommended voltage 3.3V
52	SPI_MOSI	SPI serial interface
53	WAN_LED (GPIO_4)	WLAN LED
54	LED_LINK_1 (GPIO_16)	LAN_PORT0_LED
55	NC	NC
56	WLAN_LED (GPIO_12)	Wireless LED
57	UART_RX	Serial data in
58	UART_TX	Serial data out
59	GND	GROUND
60	GND	GROUND

3. Electrical Specification

3.1 802.11b Mode

Items	Contents			
Specification	IEEE802.11b			
Mode	DSSS / CCK			
Channel	CH1 to CH13			
Data rate	1, 2, 5.5, 11Mbps			
TX Characteristics	**Min.**	**Typ.**	**Max.**	**Unit**
2. Power Levels(Calibrated)				
1) 16dBm Target	16	18	20	dBm
3. Spectrum Mask @ target power				
1) fc +/-11MHz to +/-22MHz	-	-	-30	dBr
2) fc > +/-22MHz	-	-	-50	dBr
4. Frequency Error	-25	0	+25	ppm
RX Characteristics	**Min.**	**Typ.**	**Max.**	**Unit**
5 Minimum Input Level Sensitivity				
1) 1Mbps (FER≦8%)	-	-	-83	dBm
2) 2Mbps (FER≦8%)	-	-	-80	dBm
3) 5.5Mbps (FER≦8%)	-	-	-79	dBm
4) 11Mbps (FER≦8%)	-	-88	-76	dBm
6 Maximum Input Level (FER≦8%)	-20	-10	-	dBm

3.2 802.11g Mode

Items	Contents			
Specification	IEEE802.11g			
Mode	OFDM			
Channel	CH1 to CH13			
Data rate	6, 9, 12, 18, 24, 36, 48, 54Mbps			
TX Characteristics	**Min.**	**Typ.**	**Max.**	**Unit**
2. Power Levels				
1) 16dBm Target @6Mbps	16	18	20	dBm
2) 14dBm Target @54Mbps	13	15	17	dBm
3. Spectrum Mask @ target power				
1) at fc +/- 11MHz	-	-	-20	dBr
2) at fc +/- 20MHz	-	-	-28	dBr
3) at fc > +/-30MHz	-	-	-40	dBr
4 Constellation Error(EVM)@ target power				
1) 6Mbps	-	-	-5	dB
2) 9Mbps	-	-	-8	dB
3) 12Mbps	-	-	-10	dB
4) 18Mbps	-	-	-13	dB
5) 24Mbps	-	-	-16	dB
6) 36Mbps	-	-	-19	dB
7) 48Mbps	-	-	-22	dB
8) 54Mbps	-	-31	-25	dB
5 Frequency Error	-25	0	+25	ppm
RX Characteristics	**Min.**	**Typ.**	**Max.**	**Unit**
6 Minimum Input Level Sensitivity				
1) 6Mbps (PER ≦ 10%)	-	-	-85	dBm
2) 9Mbps (PER ≦ 10%)	-	-	-84	dBm
3) 12Mbps (PER ≦ 10%)	-	-	-82	dBm
4) 18Mbps (PER ≦ 10%)	-	-	-80	dBm
5) 24Mbps (PER ≦ 10%)	-	-	-77	dBm
6) 36Mbps (PER ≦ 10%)	-	-	-73	dBm
7) 48Mbps (PER ≦ 10%)	-	-	-69	dBm
8) 54Mbps (PER≦ 10%)	-	-72	-68	dBm
7 Maximum Input Level (PER ≦ 10%)	-20	-10	-	dBm

3.3 802.11n HT20 Mode

Items	Contents			
Specification	IEEE802.11n HT20 @ 2.4GHz			
Mode	OFDM			
Channel	CH1 to CH13			
Data rate (MCS index)	MCS0~15			
TX Characteristics	**Min.**	**Typ.**	**Max.**	**Unit**
2. Power Levels				
1) 17dBm Target@MCS0	15	17	19	dBm
2) 13dBm Target@MCS7	12	14	16	dBm
3. Spectrum Mask @target power				
1) at fc +/- 11MHz	-	-	-20	dBr
2) at fc +/- 20MHz	-	-	-28	dBr
3) at fc > +/-30MHz	-	-	-45	dBr
4. Constellation Error(EVM)@ target power				
1) MCS0	-	-	-5	dB
2) MCS1	-	-	-10	dB
3) MCS2	-	-	-13	dB
4) MCS3	-	-	-16	dB
5) MCS4	-	-	-19	dB
6) MCS5	-	-	-22	dB
7) MCS6	-	-	-25	dB
8) MCS7	-	-31	-28	dB
5. Frequency Error	-25	0	+25	ppm
RX Characteristics	**Min.**	**Typ.**	**Max.**	**Unit**
6. Minimum Input Level Sensitivity				
1) MCS0 (PER ≦ 10%)	-	-	-85	dBm
2) MCS1 (PER ≦ 10%)	-	-	-82	dBm
3) MCS2 (PER ≦ 10%)	-	-	-80	dBm
4) MCS3 (PER ≦ 10%)	-	-	-77	dBm
5) MCS4 (PER ≦ 10%)	-	-	-73	dBm
6) MCS5 (PER ≦ 10%)	-	-	-69	dBm
7) MCS6 (PER ≦ 10%)	-	-	-68	dBm
8) MCS7 (PER ≦ 10%)	-	-69	-67	dBm
7. Maximum Input Level (PER ≦ 10%)	-20	-10	-	dBm

3.4 802.11n HT40 Mode

Items	Contents			
Specification	IEEE802.11n HT40 @ 2.4GHz			
Mode	OFDM			
Channel	CH3 to CH11			
Data rate (MCS index)	MCS0~15			
TX Characteristics	**Min.**	**Typ.**	**Max.**	**Unit**
2. Power Levels (Calibrated)				
1) 16dBm Target @MCS0	14	16	18	dBm
2) 13dBm Target@MCS7	11	13	15	dBm
3. Spectrum Mask @14dBm				
1) at fc +/- 22MHz	-	-	-20	dBr
2) at fc +/- 40MHz	-	-	-28	dBr
3) at fc > +/-60MHz	-	-	-45	dBr
4. Constellation Error(EVM)@target power				
1) MCS0	-	-	-5	dB
2) MCS1	-	-	-10	dB
3) MCS2	-	-	-13	dB
4) MCS3	-	-	-16	dB
5) MCS4	-	-	-19	dB
6) MCS5	-	-	-22	dB
7) MCS6	-	-	-25	dB
8) MCS7	-	-30	-28	dB
5. Frequency Error	-25	0	+25	ppm
RX Characteristics	**Min.**	**Typ.**	**Max.**	**Unit**
6. Minimum Input Level Sensitivity				
1) MCS0 (PER ≦ 10%)	-	-	-82	dBm
2) MCS1 (PER ≦ 10%)	-	-	-79	dBm
3) MCS2 (PER ≦ 10%)	-	-	-77	dBm
4) MCS3 (PER ≦ 10%)	-	-	-74	dBm
5) MCS4 (PER ≦ 10%)	-	-	-70	dBm
6) MCS5 (PER ≦ 10%)	-	-	-66	dBm
7) MCS6 (PER ≦ 10%)	-	-	-65	dBm
8) MCS7 (PER ≦ 10%)	-	-66	-62	dBm
7. Maximum Input Level (PER ≦ 10%)	-20	-10	-	dBm