# HK NATER TECH LIMITED
# 香港纳拓科技有限公司

无线路由器/无线 AP/无线网桥/无线 CPE/对讲机/无线通信模块 方案商

## AR9331模块承认书

客户名称

**Customer:**_____

样品名称

**Description: AR9331 Module VER：1.2**

客户料号

**Customer P/N:**_____

日 期

**Date:**_____

| 客户栏 Customer | | |
|---|---|---|
| 核准Approve | 审核Auditing | 承认Admit |
| | | |

| 供应商栏 Provider | | |
|---|---|---|
| 核准Approve | 审核Auditing | 承认Admit |
| | | |

客户名称:
公司地址:
电 话:
传 真:
联 系 人:

供方名称：香港纳拓科技有限公司
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尊敬的客户：请收到我公司样品承认书三日内传首页，谢谢!

## General Description

The module of AR9331 is a complete, small form factor 802.11 b/g/n Wi-Fi Solution optimized for low power, low-cost, and highly integrated AP and consumer electronic devices, the module integrates all Wi-Fi functionality in a package friendly to low-cost PCB design, requiring only a few external 3.3V power supply and connection to antenna.

The module based on the single chip AR9331 which integrates an 802.11n 1x1 MAC/BB/radio with internal PA and LNA. It supports 802.11n operations up to 72 Mbps for 20 MHz and 150 Mbps for 40 MHz channel respectively, and IEEE 802.11b/g data rates.

The module support AP mode and client mode at the same time and include mass service application software to reduce the research and design work of customer.

## Features

- MIPS 24K processor operating at up to 400 Mhz.
- DD2 memory up to 512 Mb.
- SPI NOR Flash memory up to 64Mb.
- 4LAN ports and 1 WAN port
- High-speed UART for console support
- I2S audio interface
- USB 2.0 host/device mode support
- GPIO/LED support
- SPI support.

# Radio Receiver Characteristics for 2.4 GHz Operation

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| $F_{rx}$ | Receiver input frequency range | 5 MHz center frequency | 2.412 | — | 2.472 | GHz |
| NF | Receive chain noise figure (max gain) | | | | — | |
| | | LNA1 (Tx/Rx shared) | — | 5.0 | — | |
| $S_{rf}$ | Sensitivity[1] | | | | | |
| | CCK, 1 Mbps | See Note[2] | -80 | -93 | — | dBm |
| | CCK 11 Mbps | | -76 | -87 | — | |
| | OFDM, 6 Mbps | | -82 | -88 | — | |
| | OFDM, 54 Mbps | | -65 | -74 | — | |
| | HT20, MCS0, 1 stream, 1 Tx, 1 Rx | See Note[2] | -82 | -88 | — | dBm |
| | HT20, MCS7, 1 stream, 1 Tx, 1 Rx | | -64 | -71 | — | |
| | HT40, MCS0, 1 stream 1 Tx, 1 Rx | See Note[2] | -79 | -85 | — | dBm |
| | HT40, MCS7, 1 stream 1 Tx, 1 Rx | | -61 | -69 | — | |
| IP1dB | Input 1 dB compression (min. gain) | — | — | -4 | — | dBm |
| IIP3 | Input third intercept point (min. gain) | — | — | 5.5 | — | dBm |
| $Z_{RFin\_input}$ | Recommended LNA differential drive impedance | LNA2 | — | 27-j5 | — | Ω |
| $ER_{phase}$ | I, Q phase error | — | — | 0.15 | — | ° |
| $ER_{amp}$ | I, Q amplitude error | — | — | 1.0 | — | dB |
| $R_{adj}$ | Adjacent channel rejection | | | | | |
| | OFDM, 6 Mbps | 10 to 20 MHz[3] | 16 | 34 | — | dB |
| | OFDM, 54 Mbps | | -1 | 19 | — | |
| | HT20, MCS0 | | 16 | 34 | — | dB |
| | HT20, MCS7 | | -2 | 18 | — | |
| $TR_{powup}$ | Time for power up (from synthesizer) | — | — | 1.5 | — | µs |

# Transmitter Characteristics for 2.4 GHz Operation

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| $F_{tx}$ | Transmit output frequency range | 5 MHz center frequency | 2.412 | — | 2.472 | GHz |
| $P_{out}$ | Mask Compliant CCK output power | See Note[1] | — | 19.5 | — | dBm |
| | Mask Compliant OFDM output power | | | | | |
| | 802.11g BPSK 6 Mbps | See Note[2] | — | 20 | — | dBm |
| | HT20, MCS0 | | — | 19 | — | |
| | HT40, MCS0 | | — | 16 | — | |
| | EVM Compliant OFDM output power | | | | | |
| | 802.11g 64 QAM 54 Mbps | See Note[1] | — | 19 | — | |
| | HT20, MCS7 | | — | 17 | — | dBm |
| | HT40, MCS7 | | — | 16 | — | |
| $SP_{gain}$ | PA gain step | See Note[2] | — | 0.5 | — | dB |
| $A_{pl}$ | Accuracy of power leveling loop | See Notes[3][4] | — | ±0.5 | — | dB |
| $Z_{RFout\_load}$ | Recommend differential PA load impedance | See Note[5] | — | 12+j13 | — | Ω |
| OP1dB | Output P1dB (max. gain) | 2.442 GHz | — | 21 | — | dBm |
| OIP3 | Output third order intercept point (max. gain) | 2.442 GHz | — | 31 | — | dBm |
| SS | Sideband suppression | — | — | -37 | — | dBc |
| RS | Synthesizer reference spur | — | — | -62 | — | dBc |
| $TT_{powup}$ | Time for power up (from synthesizer on) | — | — | 1.5 | — | µs |

## Pin Description

| Pin No. | Name | Description |
|---|---|---|
| 1 | GND | GROUND |
| 2 | ANTENNA | Customer can select connection point, top or side |
| 3 | GND | GROUND |
| 4 | SPI_MOSI | SPI serial interface |
| 5 | SPI_CLK | SPI serial interface |
| 6 | SPI_MISO | SPI serial interface |
| 7 | RESET_CONFIG | resets the firmware to its default configuration when pushed |
| 8 | LED6 | WLAN LED |
| 9 | LED5 | LAN_PORT3_LED |
| 10 | LED4 | LAN_PORT2_LED |
| 11 | LED3 | LAN_PORT1_LED |
| 12 | GPIO_22 | KEY_INPUT |
| 13 | GPIO_23 | KEY_INPUT |
| 14 | LED2 | LAN_PORT0_LED |
| 15 | LED0 | Wireless LED |
| 16 | UART_RX (SPI_CS1) | Serial data in |
| 17 | UART_TX (SPI_CS2) | Serial data out |
| 18 | GND | GROUND |
| 19 | GND | GROUND |
| 20 | WAN_PORT_RX+ | Ethernet port |
| 21 | WAN_PORT_RX- | Ethernet port |
| 22 | WAN_PORT_TX+ | Ethernet port |
| 23 | WAN_PORT_TX- | Ethernet port |
| 24 | LAN_PORT3_TX+ | Ethernet port |
| 25 | LAN_PORT3_TX- | Ethernet port |
| 26 | LAN_PORT3_RX+ | Ethernet port |
| 27 | LAN_PORT3_RX- | Ethernet port |
| 28 | LAN_PORT2_RX+ | Ethernet port |
| 29 | LAN_PORT2_RX- | Ethernet port |
| 30 | LAN_PORT2_TX+ | Ethernet port |
| 31 | LAN_PORT2_TX- | Ethernet port |
| 32 | LAN_PORT1_TX+ | Ethernet port |
| 33 | LAN_PORT1_TX- | Ethernet port |
| 34 | LAN_PORT1_RX+ | Ethernet port |
| 35 | LAN_PORT1_RX- | Ethernet port |
| 36 | GND | GROUND |
| 37 | VDD_3.3V | 3.3V input 1000mA |
| 38 | VDD_3.3V | 3.3V input 1000mA |

| | | |
|---|---|---|
| 39 | VDD_2.0V OUTPUT | Power supply output for peripheral network transformer |
| 40 | GND | GROUND |
| 41 | LAN_PORT0_RX+ | Ethernet port |
| 42 | LAN_PORT0_RX- | Ethernet port |
| 43 | LAN_PORT0_TX+ | Ethernet port |
| 44 | LAN_PORT0_TX- | Ethernet port |
| 45 | USB - | USB signal, carries USB data to and from the USB 2.0 PHY |
| 46 | USB + | USB signal, carries USB data to and from the USB 2.0 PHY |
| 47 | LED8 | JUMP START LED |
| 48 | JUMPSTART UART_RTS) | KEY_INPUT |

## Dimensions and Footprint - Top View