CyberTAN Technology, Inc.

Model Name	WD111
Description	802.11n Hosted IoE Module with NXP MCU
Version	Release 0.3
Date	February 05, 2016
Author	Cindy Fan

WD111
User Manual

Revision History

Date	Release	Author	Description
2015-04-08	0.1	Cindy Fan	First preliminary release.
2015-06-29	0.2	Cindy Fan	Add FCC Statement.
2016-02-05	0.,3	Cindy Fan	Delete Block diagram.

Related Documents

Date	Author	Description
		Qualcomm Atheros QCA4002 datasheet
	IEEE.org	IEEE 802.11b/g/n specifications

2016-02-05

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1. Introduction

WD111 is a hosted IoE Smart Network module that enables wireless internet connectivity for any device wishing to be monitored or managed remotely.   The WD111 is architected for ultra-low power consumption, with near-zero power consumption in power down modes with fast wakeup.

This module comes with a single band 1-stream 11n radio Qualcomm QCA4002 and a NXP LPC54 processor in ARM Cortex-M4 operating at frequencies up to 100MHz.   This module has an extra 2MByte flash memory, in addition to the flash memory internal to the MPU.

2. Features

- 2.412-2.484 GHz for worldwide market.
- IEEE 802.11n, single stream 1x1.
- Green TX power saving mode, Low power listen mode.
- Small size suitable for low volume system integration.
- Single Rx front end for multiple application.
- Full security support: WPS, WPA, WPA2, WAPI, WEP, TKIP.
- On-chip memory
- Serial interfaces: 4x USART, 2x SPI, 3x I2C
- ROM API support
- 4power-saving modes and wake-up from power saving modes

3. Specification

Model Number	WD111
Product Type	802.11n hosted IoE module
Memory Sizes	Flash: 2MB External to MCU, 512KB internal to MCU 96KB SRAM internal to MCU.
Host Interface(s)	4xUSART, 2xSPI, 3xI^{2}C
Embedded MAC Address	Yes
WiFi Chip(s)	Qualcomm Atheros QCA4002
MCU	NXP LPC54
Package	40-pin QFN
Wireless Standard(s)	IEEE 802.11b/g/n
Spreading	IEEE 802.11b DSSS and 802.11g/n OFDM
Operating Frequency	2412~2484MHz ISM band
Antenna	One PIFA antenna and one on-board printed antenna.
Number of Channels	11 (US), 13 (EU), 14 (Japan)
Data Rates	802.11n: up to 135Mbps 802.11g: 54Mbps with fallback to 48, 36, 24, 18, 12, 9 and 6Mbps 802.11b: 11Mbps with fallback to 5.5, 1 and 1Mbps
Modulation Schemes	802.11g/n: 64QAM (up to 135Mbps), 16QAM (39/36/26/24Mbps), QPSK (19.5/18/13/12Mbps), BPSK (9/6.5/6Mbps) 802.11b: CCK (11/5.5Mbps), DQPSK (2Mbps), DBPSK (1Mbps)
Tx Power (typical)	Printed Ant. 22.76 dBm for 802.11b, 22.46 dBm for 802.11g, 22.89 dBm for 802.11n MCS0 (HT20), 17.76 dBm for 802.11n MCS0 (HT40). PIFA Ant.: 22.76 dBm for 802.11b, 22.46 dBm for 802.11g, 22.89 dBm for 802.11n MCS0 (HT20), 17.36 dBm 802.11n MCS0 (HT40).
Rx Sensitivity (typical)	-90dBm for 1Mbps @ 8% PER -82dBm for 11Mbps @ 8% PER -72dBm for 54Mbps @ 10% PER -67dBm for HT40, MCS7 @ 10% PER
Media Access Protocol	CSMA/CA with ACK
Supply Power	3.14V to 3.46V

Model Number	WD111

Power Requirements (typical)	Tx mode :
	   11Mbps: 240mA
	   54Mbps: 210mA
	   135Mbps: 220mA
	Rx mode :
	   11Mbps: 62mA
	   54Mbps: 62mA
	   135Mbps: 62mA

Power Saving Modes	Sleep Deep-sleep Power-down Deep Power-down
Dimensions	16mm x 31mm (typical)
Regulatory Conformance	FCC Part 15b, Part 15c
RoHS Compliance	Yes
Operating Temperatures	-40 ~ 85°C

Software Functions	ROM API Support:
	   Boot loader with boot options from flash or external source via USART
	   Flash In. Application Programming (IAP) and In-System Programming (ISP).
	   USART drivers
	   I2C drivers
	   Power control

2016-02-05

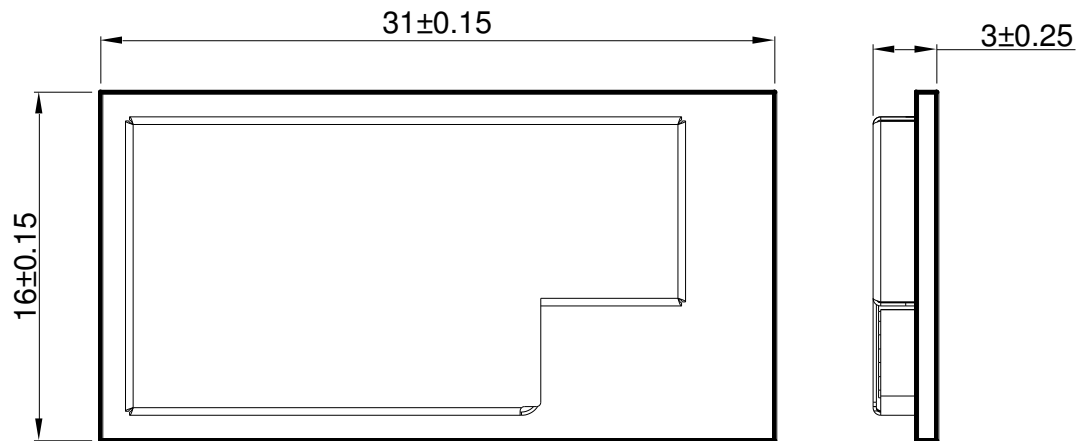## 4. Mechanical Characteristics

4.1 Module Dimensions

Figure 1: PCB Outline Top View (Unit: mm)

Note:
W:16 ±0.15mm ; L:31±0.15mm ; H:3±0.25mm

5. Warranty

One year limited warranty.

FCC Statement:

Federal Communication Commission Interference 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 generates, 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 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.

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.

For product available in the USA/Canada market, only channel 1~11 can be operated. Selection of other channels is not possible.

This device and its antenna(s) must not be co-located with any other transmitters except in accordance with FCC multi-transmitter product procedures.

Refering to the multi-transmitter policy, multiple-transmitter(s) and module(s) can be operated simultaneously without C2P.

IMPORTANT NOTE:

This module is intended for OEM integrator. The OEM integrator is responsible for the compliance to all the rules that apply to the product into which this certified RF module is integrated.

Additional testing and certification may be necessary when multiple modules are used.

20cm minimum distance has to be able to be maintained between the antenna and the users for the host this module is integrated into. Under such configuration, the FCC radiation exposure limits set forth for an population/uncontrolled environment can be satisfied.

Any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment.

USERS MANUAL OF THE END PRODUCT:

In the users manual of the end product, the end user has to be informed to keep at least 20cm separation with the antenna while this end product is installed and operated. The end user has to be informed that the FCC radio-frequency exposure guidelines for an uncontrolled environment can be satisfied. The end user has to also be informed that any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment. If the size of the end product is smaller than 8x10cm, then additional FCC part 15.19 statement is required to be available in the users manual: This device complies with Part 15 of 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.

LABEL OF THE END PRODUCT:

The final end product must be labeled in a visible area with the following " Contains TX FCC ID: N89-WD111 ". If the size of the end product is larger than 8x10cm, then the following FCC part 15.19 statement has to also be available on the label: This device complies with Part 15 of 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.