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User Manual

Product Name: Wireless N dual-band Moudle

Model: WL0241

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Chapter 1 Revision

1.1 Version History

Version	Amendments	Revision Date	Revised
V1.0	Final Document	2012-08-15	Longshuzhen

Chapter 2 Introduction

2.1 Introduction

WL0241 is designed to provide a high-speed and unrivaled wireless performance for your computer. With a faster wireless connection, you can get a better Internet experience, such as downloading, gaming, video streaming and so on.

WL0241 is a 2T*2R dual band WLAN USB module, which complies with the most advanced IEEE 802.11n standard and can deliver up to 300Mbps data rate. With its high wireless performance, you can build your own WLAN network easily. Since it supports 5G band with less condition interference, it will allow users to get a better Internet experience, such as downloading, gaming and video streaming and so on. The MIMO technology not only makes the signals more stable, but also expands the transmission coverage. Therefore, it's the perfect solution for small offices and home needs.

2.2 Product Features

- Complies with IEEE 802.11n and IEEE 802.11a/g/b standards for 2.4GHz and 5GHz Wireless LAN.
- High-speed up to 300Mbps data rate.
- Supports 4PINs header, easy to assemble for embedded using.
- Works with all existing network infrastructures.
- Capable of up to 128-bit WEP encryption.
- MIMO technology makes the signals more stable and expands the wireless coverage.
- Supports 5.8G band, less condition interference, more stable and better performance.
- Supports Windows XP 32/64, Vista 32/64, Win7 32/64, Linux, Mac OS.
- Easy to install and configure.

2.3 Applications

- ◆ Home networking for device
- ◆ Wireless multimedia

Chapter 3 Hardware

3.1 General Overview

- ◆ 4*onboard pin connector and 802.11n chipset-on-board design

3.2 Hardware Architecture

- ◆ RT5572 single chip

3.3 PCB Dimensions:

- ◆ PCB Dimension: 59.5mm x 22.6mm x 1.0mm (L x W x H)
- ◆ PCB with USB interface: 73mm x 23mm x 1.0mm (L x W x H)

3.4 Host Interface

- ◆ 4 onboard pin connector

Chapter 4 Software

4.1 Operating System Supported

- ◆ Windows 2000, XP, Vista, Win 7
- ◆ Linux
- ◆ Mac

4.2 Wireless Mode Supported

- ◆ Infrastructure/Ad-hoc mode

4.3 Security

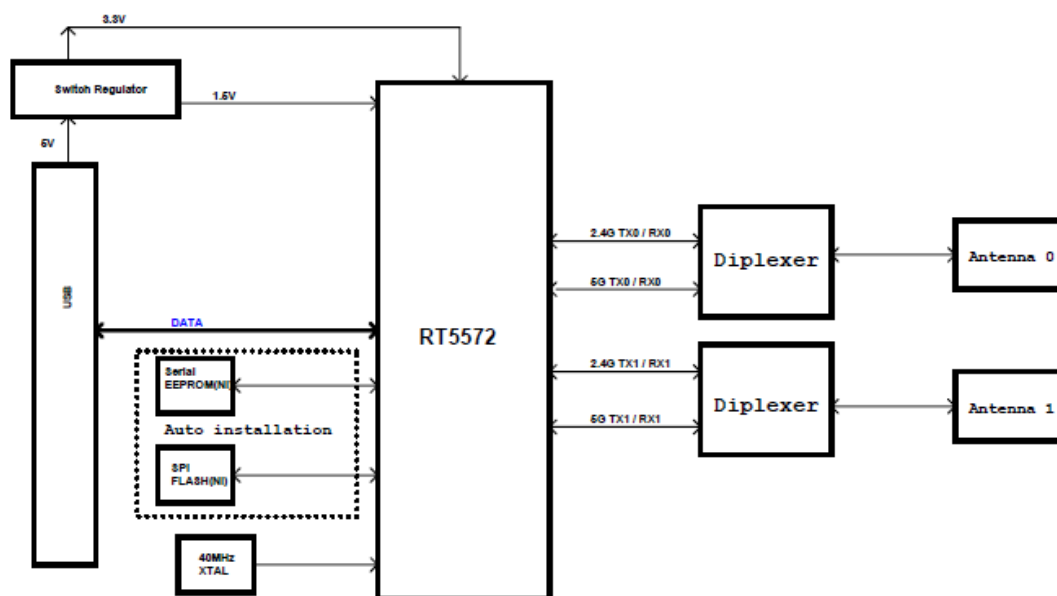
- ◆ Supports AP (Infrastructure) mode
- ◆ Static WEP supports both 64 and 128 bit keys.
- ◆ WPA (TKIP) with PSK
- ◆ Supports Ad-hoc mode
- ◆ None (plaintext)

Chapter 5 Architecture

5.1 Product Appearance



5.2 System Interface



5.3 Pin Description

The below figure shows you detailed Pin description and size of WL0241 module.

Pin No	Pin Description
1	VCC
2	DM
3	DP
4	GND

Chapter 6 Specifications

◆ Frequency Bands:

Draft 802.11n Radio: 2.4 GHz

802.11g Radio: 2.4 GHz

802.11b Radio: 2.4 GHz

USA – FCC 2412~2462MHz (Ch1~Ch11)

Canada – IC 2412~2462MHz (Ch1~Ch11)

Europe – ETSI 2412~2472MHz (Ch1~Ch13)

Japan – STD-T66/STD-33 2412~2484MHz (Ch1~Ch14)

802.11a Radio: 5 GHz

5.150~5.250GHz

5.725~5.850GHz

◆ Operating Channels:

IEEE 802.11b/g/a/n compliant:

11 channels (US, Canada)

13 channels (ETSI)

14 channels (Japan)

◆ Transmit Power and Sensitivity:

TX Output Power:

2.4GHz

11b 17dBm $\pm$ 2dBm

11g 14dBm $\pm$ 2dBm

11n 20MHz 14dBm $\pm$ 2dBm

11n 40MHz 14dBm $\pm$ 2dBm

5GHz (5150~5250MHz)

11a 12 $\pm$ 2dBm

11n 20MHz 11 $\pm$ 2dBm

11n 40MHz 12 $\pm$ 2dBm

5GHz (5725~5850MHz)

11a 17 ± 2 dBm

11n 20MHz 14 ± 2 dBm

11n 40MHz 14 ± 2 dBm

Rx Sensitivity: (Typical)

-84dBm @11 Mbps

-70dBm @54 Mbps

-61dBm @270Mbps

◆ **Modulation**

DBPSK @1Mbps

DQPSK@2Mbp

CCK@5.5/11Mbps

BPSK@6/9 Mbps

QPSK@12/18Mbps

16-QAM@24Mbps

64-QAM@48/54Mpb and above

◆ **Operating Temperature:** 0 ~ 40 °C ambient

◆ **Storage Temperature:** -10 ~ 70 °C ambient

◆ **Humidity:** 5 % ~ 90% and must be non-condensing

References

◆ IEEE 802.11b Standard Specification

◆ IEEE 802.11g Standard Specification

◆ IEEE 802.11a Standard Specification

◆ IEEE 802.11n draft Standard Specification

Chapter 7 Sample Test Report

7.1 RF Hardware Performance (2.4G)

Testing Item	Testing Sub-Item	Expectation result	Actual result	Test result
Antenna 1	Frequency error	$\pm 20\text{ppm}$	-1.044ppm	PASS
	power	11M $\geq 17\sim 19\text{dbm}$ 54M $\geq 14\sim 16\text{dbm}$ MCS7(HT20) $\geq 13\sim 15\text{dbm}$ MCS7(HT40) $\geq 13\sim 15\text{dbm}$	11M 18.159dbm 54M 14.359dbm MCS7(HT20) 13.366dbm MCS7(HT40) 13.236dbm	PASS
	EVM	11M $\leq -10\text{db}$ 54M $\leq -25\text{db}$ MCS7(HT20) $\leq -28\text{db}$ MCS7(HT40) $\leq -28\text{db}$	11M -24.100db 54M -34.531db MCS7(HT20) -32.126db MCS7(HT40) -33.952db	PASS
	MAX Sensitivity	1M $\leq -90\text{dbm}$ 6M $\leq -88\text{dbm}$ 11M $\leq -85\text{dbm}$ 54M $\leq -68\text{dbm}$ MCS7(HT20) $\leq -65\text{dbm}$ MCS7(HT40) $\leq -65\text{dbm}$	1M -95dbm 6M -91dbm 11M -87dbm 54M -74dbm MCS7(HT20) -74dbm MCS7(HT40) -70dbm	PASS
Antenna 2	Frequency error	$\pm 20\text{ppm}$	-1.037ppm	PASS
	power	11M $\geq 17\sim 19\text{dbm}$ 54M $\geq 14\sim 16\text{dbm}$ MCS7(HT20) $\geq 13\sim 15\text{dbm}$ MCS7(HT40) $\geq 13\sim 15\text{dbm}$	11M 18.596dbm 54M 14.222dbm MCS7(HT20) 13.288dbm MCS7(HT40) 13.169dbm	PASS
	EVM	11M $\leq -10\text{db}$ 54M $\leq -25\text{db}$ MCS7(HT20) $\leq -28\text{db}$ MCS7(HT40) $\leq -28\text{db}$	11M -24.730db 54M -34.607db MCS7(HT20) -33.787db MCS7(HT40) -34.189db	PASS
	MAX Sensitivity	1M $\leq -90\text{dbm}$ 6M $\leq -88\text{dbm}$ 11M $\leq -85\text{dbm}$ 54M $\leq -68\text{dbm}$ MCS7(HT20) $\leq -65\text{dbm}$ MCS7(HT40) $\leq -65\text{dbm}$	1M -95dbm 6M -91dbm 11M -89dbm 54M -75dbm MCS7(HT20) -74dbm MCS7(HT40) -70dbm	PASS

7.2 RF Hardware Performance (5G)

Testing Item	Testing Sub-Item	Expectation result	Actual result	Test result
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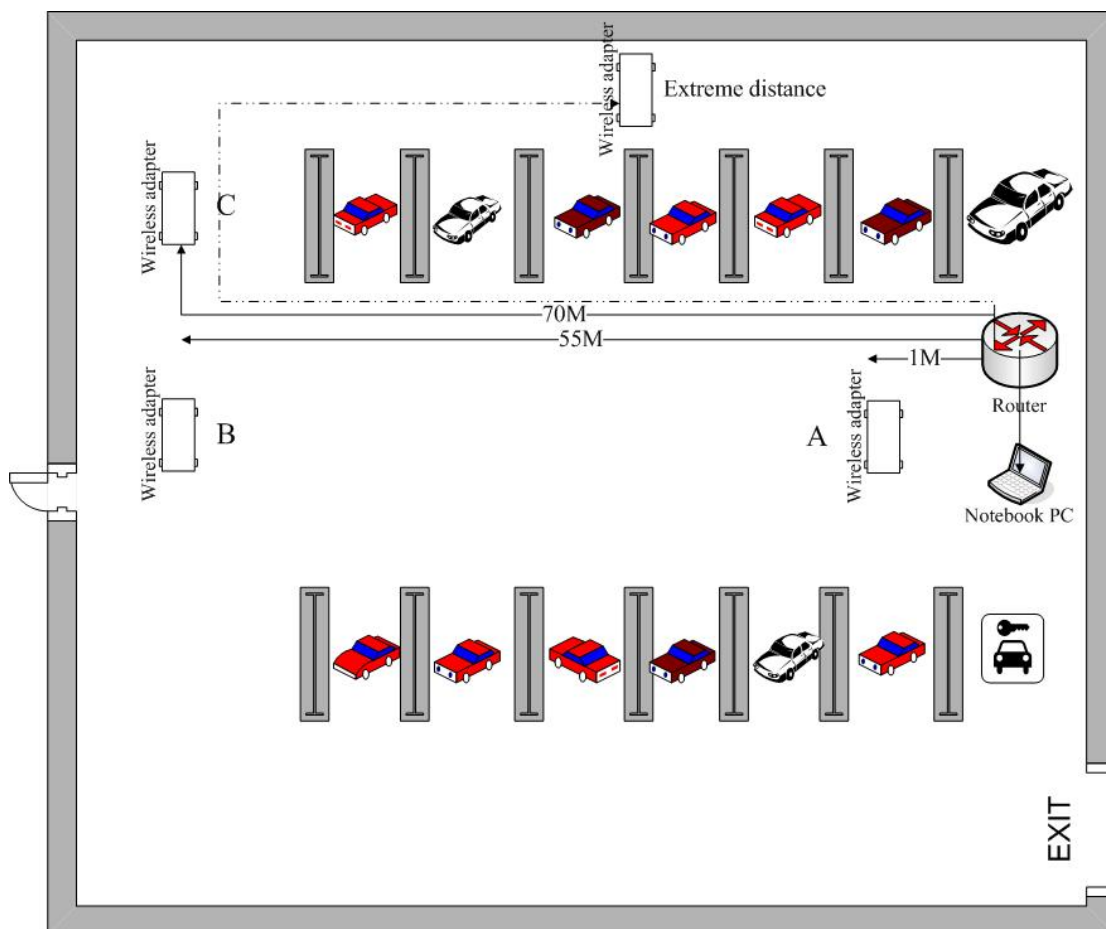
Antenna 1	Frequency error	$\pm 20\text{ppm}$	-1.057ppm	PASS
	power	54M $\geq 12\sim 16\text{dbm}$ MCS7(HT20) $\geq 11\sim 15\text{dbm}$ MCS7 (HT40) $\geq 11\sim 15\text{dbm}$.	54M 13.403dbm MCS7(HT20) 12.425dbm MCS7(HT40) 12.698dbm	PASS
	EVM	54M $\leq -25\text{db}$ MCS7(HT20) $\leq -28\text{db}$ MCS7(HT40) $\leq -28\text{db}$	54M -30.072db MCS7(HT20) -30.337db MCS7(HT40) -29.507db	PASS
	MAX Sensitivity	54M $\leq -68\text{dbm}$ MCS7(HT20) $\leq -65\text{dbm}$ MCS7(HT40) $\leq -65\text{dbm}$	54M -74dbm MCS7(HT20) -70dbm MCS7(HT40) -67dbm	PASS
Antenna 2	Frequency error	$\pm 20\text{ppm}$	-1.349ppm	PASS
	power	54M $\geq 12\sim 16\text{dbm}$ MCS7(HT20) $\geq 11\sim 15\text{dbm}$ MCS7(HT40) $\geq 11\sim 15\text{dbm}$	54M 13.389dbm MCS7(HT20) 12.271dbm MCS7(HT40) 12.582dbm	PASS
	EVM	54M $\leq -25\text{db}$ MCS7(HT20) $\leq -28\text{db}$ MCS7(HT40) $\leq -28\text{db}$	54M -30.256db MCS7(HT20) -28.809db MCS7(HT40) -30.697db	PASS
	MAX Sensitivity	54M $\leq -68\text{dbm}$ MCS7(HT20) $\leq -65\text{dbm}$ MCS7(HT40) $\leq -65\text{dbm}$	54M -73dbm MCS7(HT20) -72dbm MCS7(HT40) -68dbm	PASS

7.3 Wireless Distance Testing

(1) DUT Environment

DUT Environment	Router Description	Name: IP04175	PCB Version: V1.0
		Chip: RTL8186+8192DR	Power Supply: 9V, 0.8A
	Wireless Adapter Description	Name: WL0241.A(PCB Antenna)	Chip: RT5572

(2) Wireless Distance Testing Graph



(3) Distance Test Result (2.4G Wireless-Cable LAN)

Distance Point	Channel		DUT Throughput
Site A (1M)	Channel 1	Up	86.388Mbps
		Down	90.223Mbps
	Channel 6	Up	87.251Mbps
		Down	89.841Mbps
	Channel 11	Up	86.763Mbps
		Down	89.519Mbps
Site B (55M)	Channel 1	Up	81.085Mbps
		Down	85.818Mbps
	Channel 6	Up	82.153Mbps
		Down	88.801Mbps
	Channel 11	Up	81.719Mbps
		Down	83.248Mbps
Site C (70M)	Channel 1	Up	5.909Mbps
		Down	13.474Mbps
	Channel 6	Up	8.496Mbps
		Down	21.331Mbps

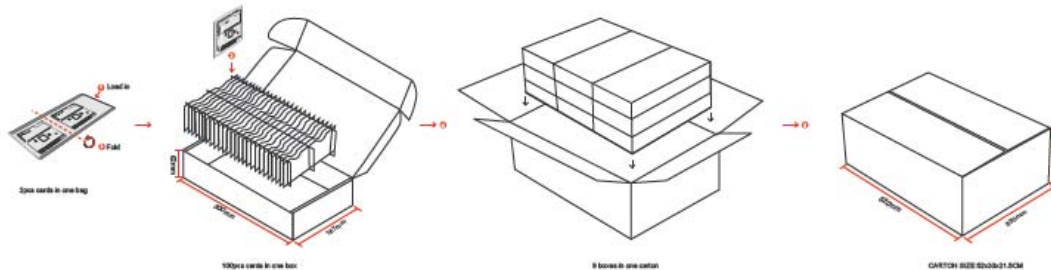
Site Extreme Distance	Channel 11	Up	16.550Mbps
		Down	19.035Mbps
	Channel 1	Up	1.387Mbps
		Down	9.770Mbps
	Channel 6	Up	3.356Mbps
		Down	8.860Mbps
	Channel 11	Up	2.552Mbps
		Down	11.504Mbps

(4) Distance Test Result (5G Wireless-Cable LAN)

Distance Point	Channel		DUT Throughput
Site A (1M)	Channel 36	Up	91.546Mbps
		Down	90.017Mbps
	Channel 149	Up	90.306Mbps
		Down	88.820Mbps
	Channel 161	Up	91.376Mbps
		Down	86.727Mbps
Site B (55M)	Channel 36	Up	74.434Mbps
		Down	51.655Mbps
	Channel 149	Up	73.020Mbps
		Down	46.186Mbps
	Channel 161	Up	73.998Mbps
		Down	51.898Mbps
Site C (70M)	Channel 36	Up	19.500Mbps
		Down	33.078Mbps
	Channel 149	Up	21.121Mbps
		Down	35.966Mbps
	Channel 161	Up	33.883Mbps
		Down	29.914Mbps
Site Extreme Distance	Channel 36	Up	1.878Mbps
		Down	11.675Mbps
	Channel 149	Up	2.970Mbps
		Down	8.751Mbps
	Channel 161	Up	2.899Mbps
		Down	10.122Mbps

Chapter 8 Packaging

8.1 Packaging TBD



FCC Caution:

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

FCC Radiation Exposure Statement

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This transmitter must be co-located or operating in conjunction with any other antenna or transmitter.

This equipment 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.

OEM Labeling Requirements

NOTICE: The OEM or final integrator must ensure that FCC labeling requirements are met. This includes an additional label on the outside of the final product housing with the following contents:

Company Name

MODEL:

Contains Model: WL0241, FCC ID: 2AAN4-WL0241

This device complies with Part 15 of the FCC Rules. Operation is subjected to the following two conditions: (1) This device may not cause harmful interferences, and (2) this device must accept any interference received, including interference that may cause undesired operation.