

Technical Description:

The Equipment Under Test (EUT) is a Streaming Media Box, equipped with HDMI, USB, LAN, SD Interface, audio and video output. The EUT contains a 2.4GHz WiFi module (RL-UM02L) operates in the frequency range from 2412MHz to 2462MHz at 802.11b,g,n(HT20) (11 channels with 5MHz spacing), while 2422MHz to 2452MHz at 802.11n(HT40) (7 channels with 5MHz spacing). The EUT is powered by an external AC/DC adaptor with 5VDC output. The adaptor accepts 100 – 120VAC only.

1. WiFi RF module (RL-UM02L)

RL-UM02L is a WLAN USB module which fully supports the features and functional compliance of IEEE 802.11b/g/n(HT20)/n(HT40) standards. This module operates in 2.4GHz frequency bands. RL-UM02L consists of:

- 1) U1 (RTL8188CUS) is a single-chip IEEE802.11b/g/n 1T1R WLAN controller with PCI (USB) interface.
- 2) XTAL1 is 40MHz crystal oscillator providing clock for U1.

2. Main Processor Portion

- 1) U12 (RK2908) is main processor.
- 2) Y2 is 24MHz crystal oscillator for U12.
- 3) Y3 is 27MHz crystal oscillator for U12.
- 4) U10 (VC8563) is real-time-clock. Y1 (32.768kHz) is crystal for U10.

3. Memory Portion

- 1) U15, U16, U17, U18 (H5TQ2G83EFR) are 1Gbit DDR3 memories.
- 2) U19 (TC58TEG5DCJTA00) is 4GB flash memory.

4. Video Portion

- 1) U26 (ANX7150) is HDMI Transceiver.
- 2) U32 (RK1000-S) is Analog AV Processor.

5. Network Portion

- 1) U23 (DM9161CEP) is 10/100 Mbps Fast Ethernet Physical Layer Single Chip Transceiver.

Channel Occupation of RL-UM02L WiFi Module in 802.11b/g/n standard

Channel (b/g/n20)	Frequency (MHz)
1	2412
2	2417
3	2422
4	2427
5	2432
6	2437
7	2442
8	2447
9	2452
10	2457
11	2462

n20 = 802.11n HT20 (20MHz Bandwidth)

Channel (n40)	Frequency (MHz)
1	N/A
2	N/A
3	2422
4	2427
5	2432
6	2437
7	2442
8	2447
9	2452
10	N/A
11	N/A

n40 = 802.11n HT40 (40MHz Bandwidth)

The WiFi modules was tested in according with the following power output and in actual application the below limit shall not be exceeded.

Operating Mode	Nominal Radiated Field Strength	Production Tolerance
802.11b	100.8dB μ V/m at 3m	\pm 3dB
802.11g	98.6dB μ V/m at 3m	\pm 3dB
802.11n (HT20)	95.2dB μ V/m at 3m	\pm 3dB
802.11n (HT40)	93.6dB μ V/m at 3m	\pm 3dB

An internal, integral antenna has been used.
Antenna Gain: 0dBi

RL-UM02L

Product Specifications

WLAN 11n USB module (1T1R)

Version: 1.1

Overview

UM02L is a WLAN 11n USB module, which fully supports the features and

Functional compliance of IEEE 802.11n,e and i standards. It supports up to

150Mbps high-speed wireless network connections.

It is designed to provide excellent performance with low power Consumption and enhance the advantages of robust system and cost-effective.

It is targeted at competitive superior performance, better power Management applications.

Features

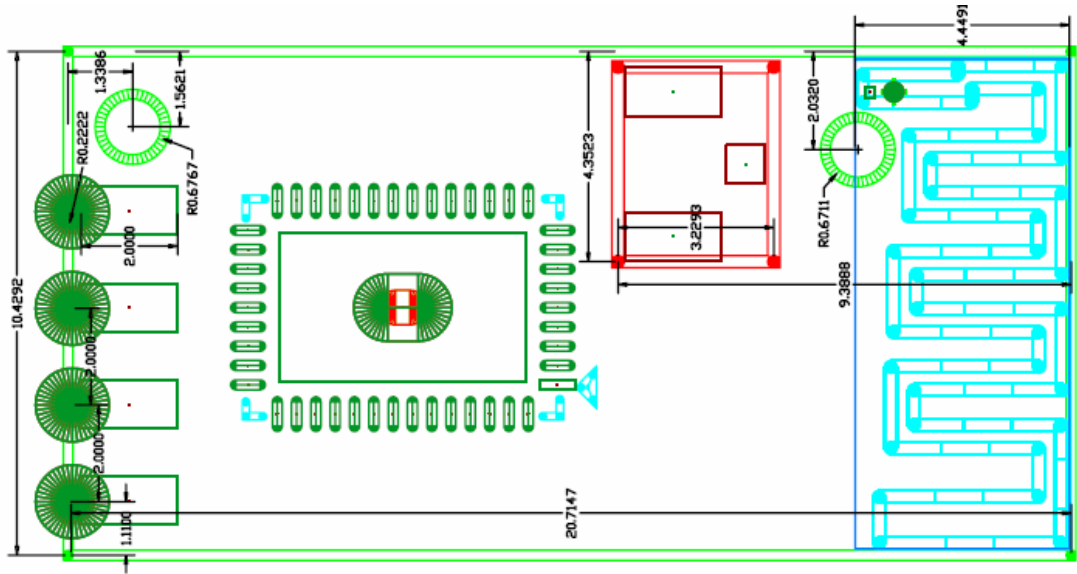
- * Operates in 2.4 GHz frequency bands
- * 1x1 MIMO technology improves effective throughput and range existing 802.11 b/g products
- * Data rates: up to 150Mbps
- * 802.11e-compatible bursting and I standards
- * BPSK, QPSK, 16 QAM, 64 QAM modulation schemes
- * WEP, TKIP, and AES, WPA, WPA2 hardware encryption schemes

General Specification

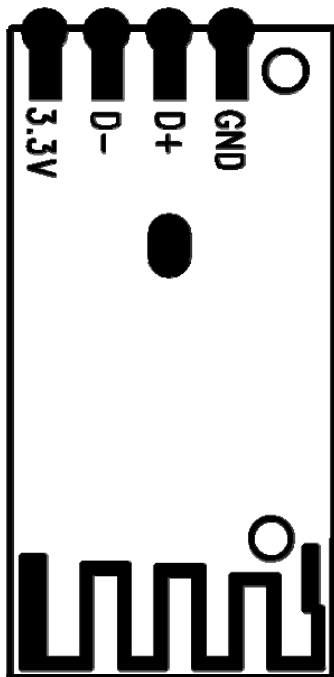
Model	RL-UM02L
Product Name	WLAN 11n USB module
Standard	802.11b/g/n, 802.3, 802.3u
Data Transfer Rate	1,2,5.5,6,11,12,18,22,24,30,36,48,54,60,90,120 and maximum of 150Mbps
Modulation Method	BPSK/ QPSK/ 16-QAM/ 64-QAM
Frequency Band	2.4GHz ISM Band
Spread Spectrum	IEEE 802.11b: DSSS (Direct Sequence Spread Spectrum) IEEE 802.11g/n:OFDM (Orthogonal Frequency Division Multiplexing)
RF Output Power	< 13dBm@11n,< 19dBm@11b,< 14dBm@11g
Operation Mode	Ad hoc, Infrastructure
Receiver Sensitivity	11Mbps -86dBm@8%,54Mbps -73dBm@10%,130Mbps -66dBm@10%
Operation Range	Up to 180 meters in open space
LED	
OS Support	Windows XP /Vista /Mac /Linux
Security	WEP, TKIP, AES, WPA, WPA2
Interface	USB 2.0
Power Consumption	DC3.3V Maximum power dissipation in 150MA
Operating Temperature	0 - 50° C ambient temperature
Storage Temperature	-10 ~ 70°C ambient temperature
Humidity	5 to 90 % maximum (non-condensing)
Dimension	21 x 11. x 3.6mm (LxWxH)



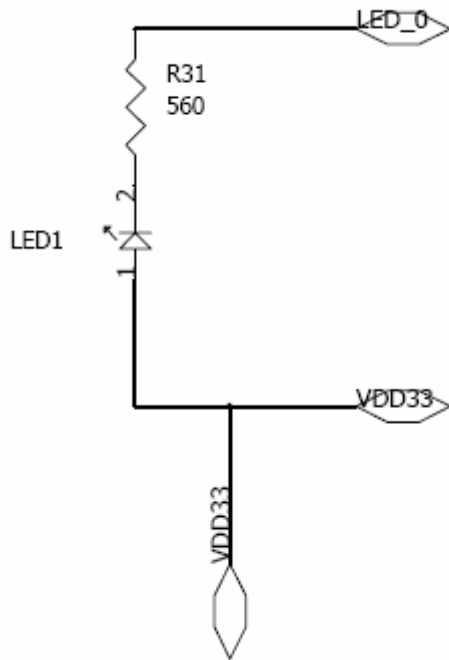
Dimensions:



PIN Definition

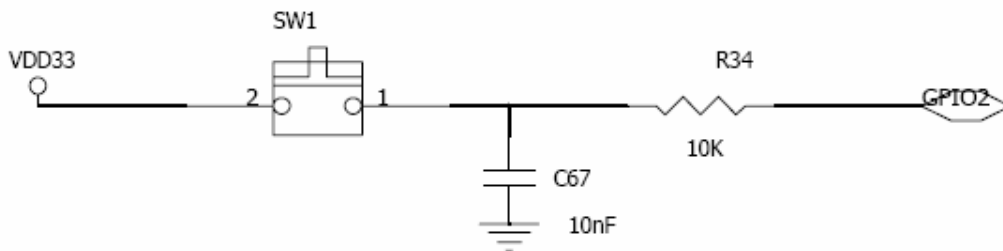


**The external circuit for WiFi activity
LED display**



The external circuit for SW switch input

WPS CONFIGURE



External antenna reference design

