TPE-N150USB Specification

802.11n b/g wifi USB adapter (1T1R), UB93/AR9271

Overview:

TPE-N150USB is an 802.11n b/g wifi one-stream USB adapter designed specifically to provide enhanced WiFi performance and value for GNU/Linux, from set-top boxes, gaming consoles, printers, IP cameras, and variety of other products that host processors not originally intended to support WiFi functions. TPE-N150USB's AR9271 single-chip features a new architecture that integrates both a CPU and memory to run more of the WiFi function on-chip. The integrated CPU offloads the wireless processing overhead from the host appliance and enables consumer electronic devices to support WiFi functions seamlessly without change of original host processors.

Key Features:

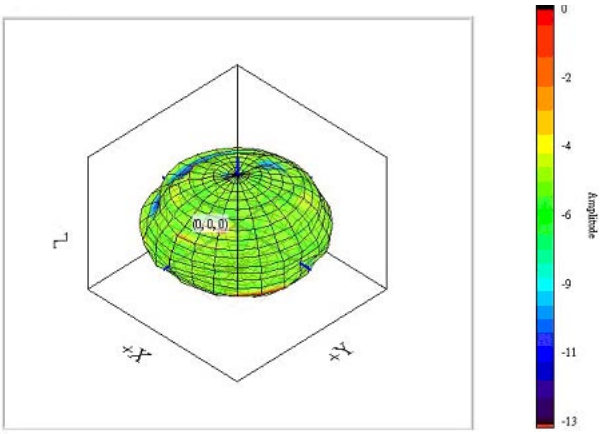
» Integrated CPU and memory to run more of WiFi function on-chip to offload wireless processing overhead from the host appliance.

CPU Utilization Comparison Between Atheros AR9271 and Competitor

DUT & Driver	Downlink		Uplink	
	Utilization	Throughput	Utilization	Throughput
AR9271 (v7.7.0.77)	36%	105.21Mbps	30%	105.95Mbps
Competitor (v1.4.7.0)	52%	83.24Mbps	30%	97.41Mbp

» Innovative embedded antenna design with perfect 3D radiation pattern enhances at least 15% better Tx power and Rx sensitivity performance than competitors.

3D Radiation Pattern at 2.4GHz



» 30(L) x 17(W) x 8.5(H) mm small dimension with standard USB connector is ideal for new ergonomic home gateways, set-top boxes, gaming consoles, printers, IP cameras, and variety of other WiFi products that host processors not originally intended to support WiFi functions..

» Windows XP/Vista/7, and Linux drivers enable manufacturers to quickly and easily bring new bandwidth intensive applications to market with trouble-free WiFi integration.

» Supported by ath9k providing Linux kernel AP/Station/IBSS/Monitor-mode drivers for industrial, academic, or personal projects at highest flexibility and lowest cost.

» 802.11n compliance effectively interoperates with other chipsets.

» Enables bandwidth of up to 150Mbps link rate, three times the throughput of 802.11g.

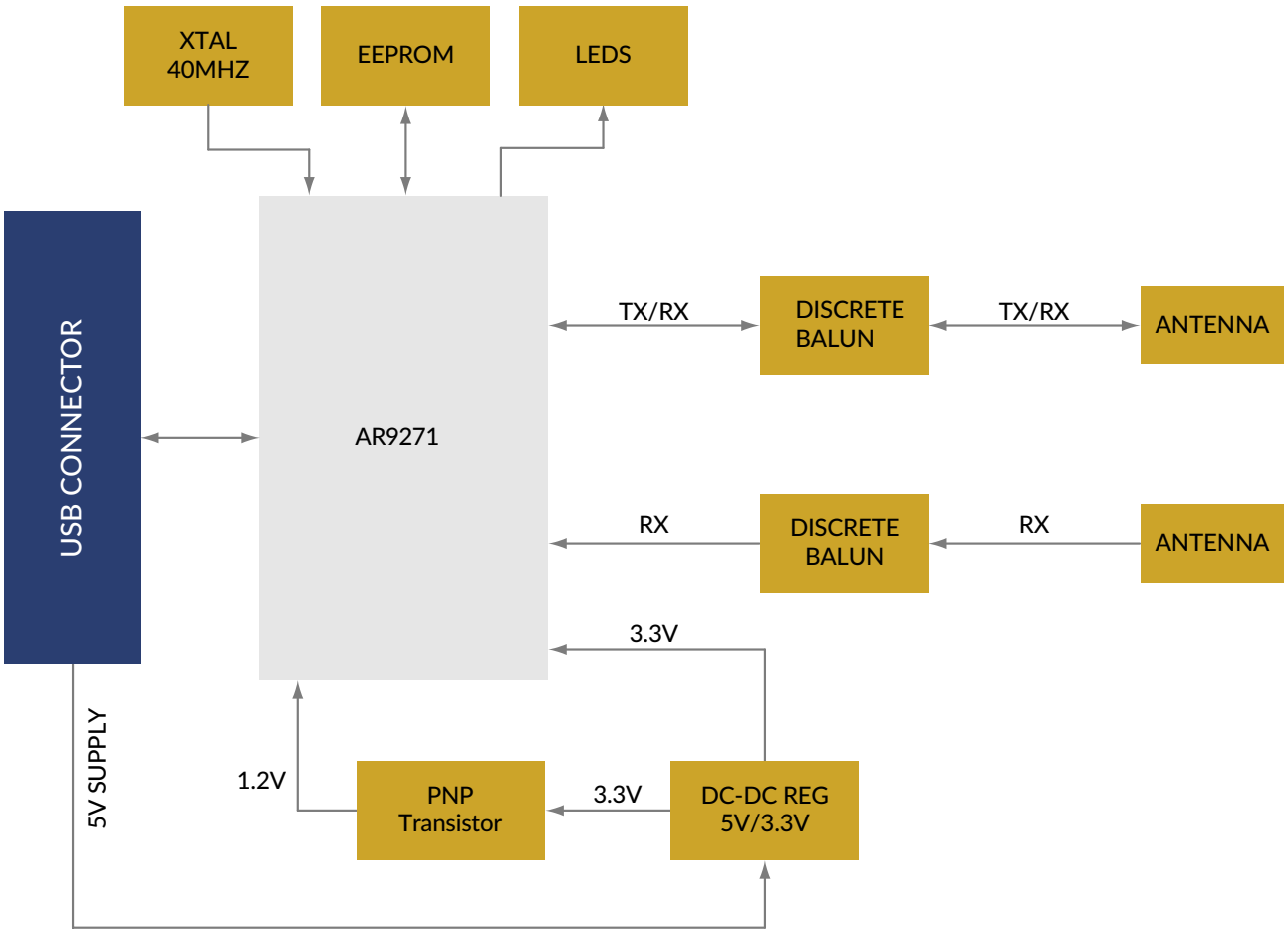
» Supports IEEE 802.11b/802.11g backward compatibility allowing inter-operability among multiple wifi networks.

» Embedded antennas support one-stream 802.11n with Rx diversity.

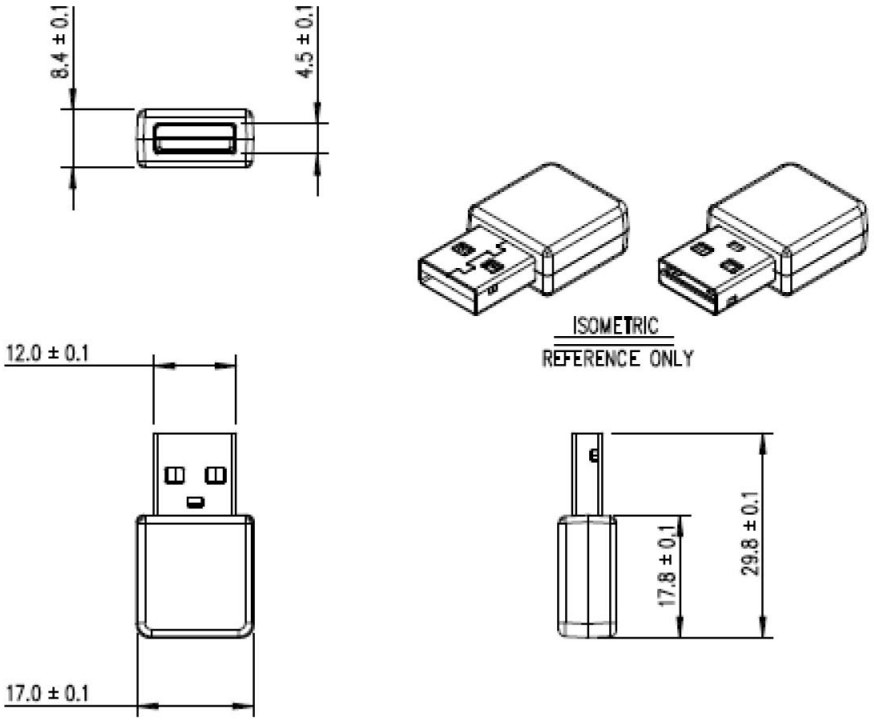
» The only one-stream 802.11n solution with two embedded antennas supports WiFi diversity to better throughput over range.

» RoHS compliance meets environment-friendly requirement.

Hardware Block Diagram:



Mechanical Outline:



Specifications:

Main Chipset	Atheros® AR9271
Embedded CPU	120MHz with off-load capability
Standard Conformance	802.11b, 802.11g, and 802.11n
Frequency Range	» USA: 2.400 – 2.483GHz » Europe: 2.400 – 2.483GHz » Japan: 2.400 – 2.497GHz » China: 2.400 – 2.483GHz
Interface	Universal Serial Bus (USB) revision 2.0
Operation Voltage	5.0V ± 5%
Modulation Technique	» DSSS with CCK, DQPSK, DBPSK » OFDM with BPSK, QPSK, 16QAM, 64QAM
Channel Spacing	20MHz

Data Rate

- 802.11b: 1, 2, 5.5 and 11Mbps
- 802.11g: 6, 9, 12, 18, 24, 36, 48, 54Mbps
- 802.11n:
  - 20MHz channel: 1Nss: 65Mbps @ 800GI, 72.2Mbps @ 400GI (Max.)
  - 40MHz channel: 1Nss: 135Mbps @ 800GI, 150Mbps @ 400GI (Max.)

Operating Channels

- USA/Canada: 11 (1-11)
- Major Europe Countries: 13 (1-13)
- France: 4 (10-13)
- Japan: 14 for 802.11b (1-13 or 14th), 13 for 802.11g (1-13)
- China: 13 (1-13)

Power Consumption

- For throughput Tx mode: 300mA
- For throughput Rx mode: 280mA
- For 6M continuous Tx mode: 310mA
- For HT40 MCS0 continuous Tx mode: 310mA
- For HT20 MCS0 continuous Tx mode: 300mA
- For HT40 MCS7 continuous Tx mode: 300mA
- For HT20 MCS7 continuous Tx mode: 300mA

Transmit Power Settings

- target power tolerance ± 2dBm
- 802.11b:
  - +18dBm
- 802.11g:
  - +17dBm @ 6, 9, 12,18,24,36,48Mbps
  - +15dBm @ 54Mbps
- 802.11n HT20:
  - +16dBm @ MCS 0/8
  - +16dBm @ MCS 1/9
  - +16dBm @ MCS 2/10
  - +16dBm @ MCS 3/11
  - +16dBm @ MCS 4/12
  - +16dBm @ MCS 5/13
  - +14dBm @ MCS 6/14
  - +11dBm @ MCS 7/15
- 802.11n HT40:
  - +16dBm @ MCS 0/8
  - +16dBm @ MCS 1/9
  - +16dBm @ MCS 2/10
  - +16dBm @ MCS 3/11
  - +16dBm @ MCS 4/12
  - +16dBm @ MCS 5/13
  - +14dBm @ MCS 6/14
  - +11dBm @ MCS 7/15

Receiver Sensitivity

» 802.11b:

Data Rate	IEEE Spec(1 Rx dBm)	Typical
1M	-82	-92
5.5M	-80	-89
11M	-76	-87

» 802.11g:

Data Rate	IEEE Spec(1 Rx dBm)	Typical
6M	-82	-92
9M	-81	-92
12M	-79	-91
18M	-77	-90
24M	-74	-86
36M	-70	-83
48M	-66	-78
54M	-65	-76

» 802.11b/g/n, H20:

Data Rate	IEEE Spec(1 Rx dBm)	Typical
MCS0	-82	-92
MCS1	-79	-91
MCS2	-77	-90
MCS3	-74	-85
MCS4	-70	-82
MCS5	-66	-79
MCS6	-65	-75
MCS7	-64	-73

» 802.11b/g/n, H40:

Data Rate	IEEE Spec(1 Rx dBm)	Typical
MCS0	-79	-88
MCS1	-76	-87
MCS2	-74	-86
MCS3	-71	-82
MCS4	-67	-78
MCS5	-63	-75
MCS6	-62	-72
MCS7	-61	-70

Operation Distance

» 802.11b:

Outdoor	Indoor
» 150m @ 11Mbps	» 30m @ 11Mbps
» 300m @ 1Mbps	» 100m @ 1Mbps

» 802.11g:

Outdoor	Indoor
» 50m @ 54Mbps	» 30m @ 54Mbps
» 300m @ 6Mbps	» 100m @ 6Mbps

» 802.11n:

Outdoor	Indoor
» 30m @ 150Mbps	» 20m @ 150Mbps
» 30m @ 65Mbps	» 20m @ 65Mbps
» 250m @ 6.5Mbps	» 100m @ 6.5Mbps

MAC Protocol

CSMA/CA with ACK architecture 32-bit MAC

Operation System Supported

» Windows XP/Vista/7 and Linux.

Dimension

30(L)x 17(W) x 8.5(H) mm

Security

» 64/128/152-bit WEP encryption
» 802.1x authentication
» AES-CCM & TKIP encryption
» WPA & WPA2

Operation Temperature Range

0˚C ~ +40˚C

Storage Temperature Range	-10˚C ~ +70˚C
Operating Humidity	15% ~ 95%, non-condensing
Storage Humidity	max. 95%, non-condensing
Environment-Friendly Compliance	RoHS

Ordering Information:

TPE-N150USB	802.11n b/g wifi USB adapter (1T1R), UB93/AR9271

Wireless radio modules are ESD sensitive, especially the components such as RF switch and the power amplifier. To avoid damage by electrostatic discharge, the following installation procedure is recommended:

» Touch your hands and the bag or tray containing the radio module to a ground point on the host board (for example one of the mounting holes).

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