MANUAL (Model : WIDT2OR)

1. Introduction

WIDT20R is a USB embedded module compliant with IEEE802.11n standard. The core chipset is from Ralink, part number is RT5572.

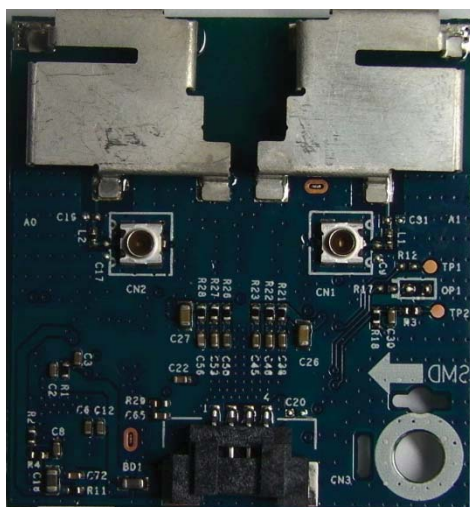## 2. Hardware Architecture:

2.1 Main Chipset Information

Item	Vender	Part number
MAC/BBP/Radio Transceiver/PA	Ralink	RT5572

3. Antennas Information

Two SMD antennas supporting both TX & RX.

4. Operational Description

WIDT20R is the 802.11a/b/g/n RF Module, that acts as a communication hub for users of a wireless device to connect to a wired LAN.

MIMO type

Product type: WLAN (11b mode: 1TX, 1RX, 11g mode: 1TX, 1RX, n mode: 2TX, 2RX)

Time base of the transmission frequency

For IF and RF frequency, Crystal is a clock reference.

Synthesizer

Synthesizer inside Transceiver. Internal voltage controlled oscillator (VCO) provides the desired LO signal base on the phase-locked loop (PLL) with a relatively wide tuning range for this application.

Transmission

Base-band Processing (BBP) IC has DSSS (BPSK/QPSK/CCK) and OFDM (BPSK/QPSK/16QAM/64QAM) modulation function, it provides transmission data rate are 1, 2, 5.5, 11 Mbps on DSSS and 6, 12, 18, 24, 36, 48, 54 Mbps on OFDM. Digital data signal will be converted to analog (TX IQ) signals through DAC in BBP IC, TX IQ pass through to low pass filter. TX I/Q signal use direct conversion (zero-IF) architecture converter to generate carrier frequency signal. Transceiver IC and internal PA magnify output power.

Receiver

Reverse direction isolation of LNA inside Transceiver IC suppresses unwanted radiation. Then RF signal will be directly down to IF signal (RX IQ) and high frequency spurious emissions are suppressed by LPF. At last RX IQ signal will be demodulated digital data.

Base band Processing

1. Channel selection is controlled by BBP IC to support data modulation:
   - DSSS (BPSK/QPSK/CCK)
   - OFDM (BPSK/QPSK/16QAM/64QAM)

Power Control Level

It uses closed-loop power control function to limit RF output power level.

Transmit/Receive Switch

EUT has Transmit/Receive Switch and Antenna switch. End user can't select any power setting.

Channel Selection Restriction

For product available in the USA/Canada/Taiwan market, only channel 1~11 can be operated. Selection of other channels is not possible. But product also could be available in the Europe/Japan market, channel 1~13 can be operated under the manufacturer change the different driver.

Data Rate Control

The operation date rate is changing during data transfer base on the optimization of driver.

Discontinue Transmitting with absence of Data or operational failure states

"The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission

of control or signaling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization a description of how this requirement is met." Data transmission is always initiated by software, which is then passed down through the MAC, through the digital and analog baseband, and finally to the RF chip.

Several special packets (ACKs, CTS, PSPoll, etc...) are initiated by the MAC. These are the only ways the digital baseband portion will turn on the RF transmitter, which it then turns off at the end of the packet. Therefore, the transmitter will be on only while one of the aforementioned packets is being transmitted.

Product Details

> Modulation see the below table for draft n
> Data Modulation OFDM (BPSK / QPSK / 16QAM / 64QAM)
> Frequency : 2.4GHz and 5GHz
> Data Rate (Mbps) see the below table for Draft n
> Channel Number 4 for 20MHz bandwidth ; 2 for 40MHz bandwidth
> Channel Band Width (99%) MCS8 (20MHz): 18.08 MHz ; MCS8 (40MHz): 36.48 MHz

Modulation modes

Draft n spec

| MCS Index | Nss | Modulation | R | NBPSC | NCBPS | | NDBPS | | Datarate(Mbps) | | | |
| | | | | | | | | | 800nsGI | | 400nsGI | |
					20MHz	40MHz	20MHz	40MHz	20MHz	40MHz	20MHz	40MHz
0	1	BPSK	1/2	1	52	108	26	54	6.5	13.5	7.200	15
1	1	QPSK	1/2	2	104	216	52	108	13.0	27.0	14.400	30
2	1	QPSK	3/4	2	104	216	78	162	19.5	40.5	21.700	45
3	1	16-QAM	1/2	4	208	432	104	216	26.0	54.0	28.900	60
4	1	16-QAM	3/4	4	208	432	156	324	39.0	81.0	43.300	90
5	1	64-QAM	2/3	6	312	648	208	432	52.0	108.0	57.800	120
6	1	64-QAM	3/4	6	312	648	234	486	58.5	121.5	65.000	135
7	1	64-QAM	5/6	6	312	648	260	540	65.0	135.0	72.200	150
8	2	BPSK	1/2	1	104	216	52	108	13.0	27.0	14.444	30
9	2	QPSK	1/2	2	208	432	104	216	26.0	54.0	28.889	60
10	2	QPSK	3/4	2	208	432	156	324	39.0	81.0	43.333	90
11	2	16-QAM	1/2	4	416	864	208	432	52.0	108.0	57.778	120
12	2	16-QAM	3/4	4	416	864	312	648	78.0	162.0	86.667	180
13	2	64-QAM	2/3	6	624	1296	416	864	104.0	216.0	115.556	240
14	2	64-QAM	3/4	6	624	1296	468	972	117.0	243.0	130.000	270
15	2	64-QAM	5/6	6	624	1296	520	1080	130.0	270.0	144.444	300