

**Product Specification**  
**RTL8188EUS**  
**WLAN 11b/g/n WIFI Module(1T1R)**

**Version A1.0**

**History**

Document Release	Date	Modification	Initials	Approved
Version A1.0	2012/07/11	First version	Eddy	

# Overview

RLT8188EUS 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.

# Product block diagram

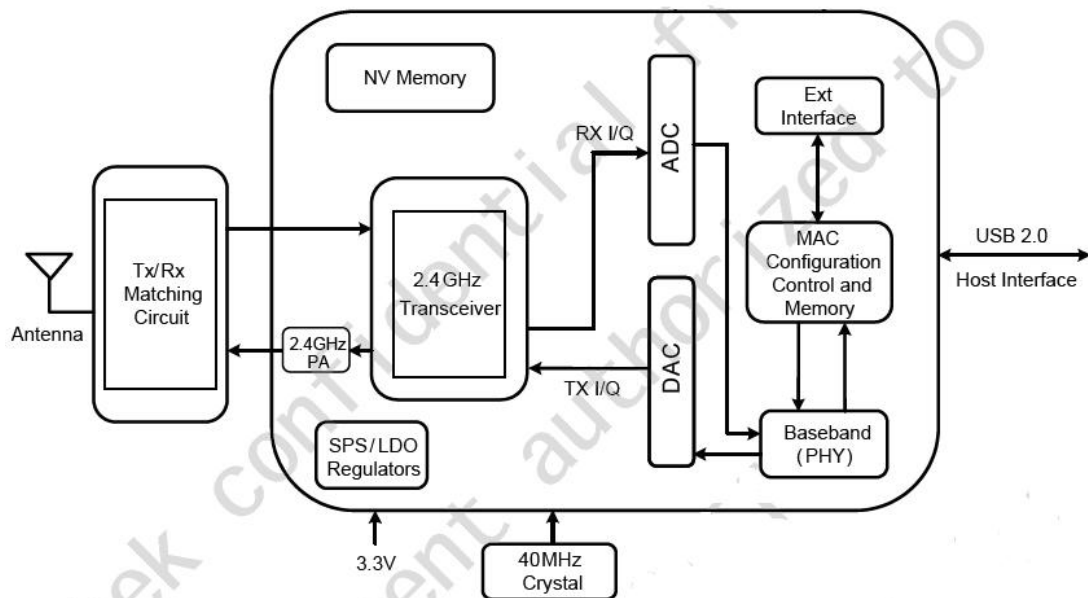


Figure 1. Single-Band 11n (1x1) Solution (11n 1x1 MAC/BB/RF+PA)

## Features

Operates in 2.4 GHz frequency bands

1x1 MIMO technology improves effective throughput and range over

existing 802.11 b/g products

Data rates: up to 150Mbps

802.11e-compatible bursting and I standards

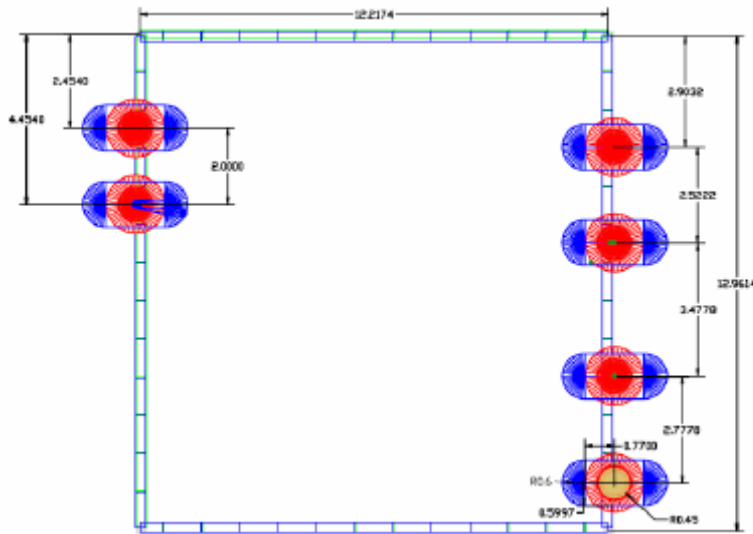
BPSK, QPSK, 16 QAM, 64 QAM modulation schemes

WEP, TKIP, and AES, WPA, WPA2 hardware encryption schemes

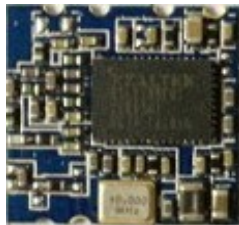
## General Specification

Model Name	RTL8188EUS
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	< 14dBm@11n,< 18dBm@11b,< 15dBm@11g
Operation Mode	Ad hoc, Infrastructure
Receiver Sensitivity	11Mbps -83dBm@8%,54Mbps -73dBm@10%,130Mbps -64dBm@10%
Operation Range	Up to 180 meters in open space
LED	Power
OS Support	Windows XP /Vista /Mac /Linux/Win7
Security	WEP, TKIP, AES, WPA, WPA2
Interface	USB 2.0
Power Consumption	DC 3.3V module - Transmit: max. 120 mA; Receive: max 70 mA
Operating Temperature	0 - 50° C ambient temperature
Storage Temperature	-40 - 70°C ambient temperature
Humidity	5 to 90 % maximum (non-condensing)
Dimension	12.95 x 12.17 x 1.6mm (LxWxH)

## PCB Dimensions (Units: mm)



## Pin Definition



3.3V	Supply volt3.3V
D-	High-Speed USB D- Signal
D+	High-Speed USB D+ Signal
GND	Ground
RFGND	GND
ANT	Antenna output

## DC Characteristics

Parameter	Minimum	Typical	Maximum	Units
3.3V supply voltage	3.1	3.3	3.5	V
3.3V Rating current	-	-	150	mA

Parameters	Sym	Conditions	Min	Typ	Max	Unit
3.3V Supply Voltage	Vc33		3.1	3.3	3.5	V
1.5V Supply Voltage	Vc15		1.4	1.5	1.6	V
<b>Receiving Tests the biggest receive</b>						
3.3V Current Consumption	Icc33rx	H40MCS7		65		MA
3.3V Current Consumption	Icc33rx	OFDM 54M		70		MA
<b>Transmission Biggest transmission test</b>						
3.3V Current Consumption	Icc33tx	H40 MCS7		80		MA
3.3V Current Consumption	Icc33tx	OFDM 54M		85		MA
<b>The depth waits for an opportunity</b>	Icc33tx/rx			2		MA
<b>Deep sleep</b>	Ic33tx/rx			2		MA

## TEST Characteristics

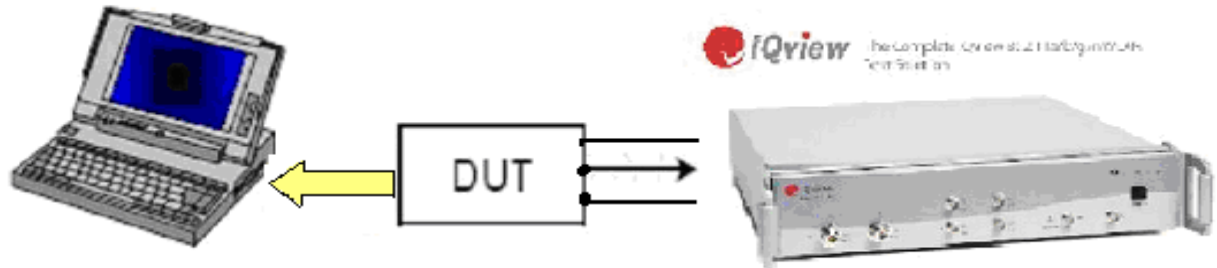
### 1. TX TEST

#### 1.1 Output Power

**Purpose:** Verify the transmitter output power of the Device Under Test (DUT) is below conformance limit.

**Pass Condition:** The IEEE 802.11 specification is 20 dBm / 100mW max.

**Test Environment:**



**Software:** DUT generates continuous frames to IQview with XXX and measure the output power.

**802.11b TX Test**

802.11b Data Rate: 11Mbps														
Channel	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Output Power	18.19	17.93	18.06	18.01	18.08	18.74	18.01	18.03	18.51	18.83	18.01	18.56	18.63	18.05
EVM (%)	-23.7	-23.8	-23.9	-24.3	-24.1	-24.5	-24.3	-24.1	-24.2	-24.3	-23.9	-23.9	-24.1	-24.2
Freq. Offset (KHz)	-4.27	-4.55	-4.10	-4.26	-4.96	-5.16	-5.63	-5.33	-5.46	-4.65	-4.66	-5.10	-4.53	-4.56

**Note:** Criterion: Power > 17dBm, EVM < 10%, Frequency Offset <  $\pm 25$ ppm, Mask < -30dBc,

**802.11g TX Test**

<b>802.11g Data Rate: 54Mbps</b>														
<b>Chann el</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>
Output Power	15.0 2	14.9 6	15.0 0	14.9 0	14.8 9	14.9 9	14.2 0	15.1 3	15.2 1	15.3 1	14.9 6	15.1 2	15.3 0	15.1 0
EVM (%)	-28. 6	-28. 9	-28. 6	-28. 7	-28. 9	-29. 3	-28. 5	-29. 0	-29. 3	-29. 2	-28. 9	-29. 4	-29. 3	-29. 1
Freq. Offset (KHz)	-5.0 2	-5.0 4	-5.2 0	-5.4 0	-5.0 1	-5.1 0	-4.9 6	-5.2 0	-5.0 7	-5.4 1	-5.2 1	-5.3 1	-5.6 2	-4.9 0

**Note:** Criterion: Power > 14dBm, EVM < -25, Frequency Offset < ±20ppm, Mask < -30dBc,

**802.11n(20) TX Test**

<b>802.11n Data Rate:MCS7 20M</b>														
<b>Chann el</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>
Output Power	14.3	14.4 0	14.3 4	14.2 1	14.1	14.2 1	14.3 6	14.5 1	14.5 2	14.3	14.2 8	14.4 3	14.5	14.4 3
EVM (dB)	-31. 2	-30. 1	-30. 9	-31. 0	-31. 5	-30. 3	-29. 8	-29. 6	-31. 0	-30. 5	-29. 8	-29. 1	-30. 4	-29. 6
Freq. Offset (KHz)	-4.9 0	-5.2 0	-4.8 0	-5.1 0	-4.9 0	-5.1 0	-5.3 0	-5.6 0	-6.3 0	-5.8 0	-4.8 0	-6.0 0	-6.4 0	-5.6 0

**Note:** Criterion: Power > 13dBm, EVM < -28, Frequency Offset < ±20ppm, Mask < -30dBc,

**802.11n(40M) TX Test**

<b>802.11N Data Rate: MCS7 40M</b>														
<b>Channel</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>
Output Power			14.7	14.67	14.79	14.01	14.60	14.50	14.90	14.90	14.2			
EVM			-30.4	-29.5	-29.3	-29.6	-30.1	-29.6	-29.5	-29.4	-29.2			





