User Guide

RTL8188CTV

802.11 b/g/n WLAN 1T1R Card

Revision: 1.0

File name	Date
RT8188CTV_v010c	26-Apr-2012

Federal Communication Commission Interference Statement

This device 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.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Radiation Exposure Statement:
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

This device is intended only for OEM integrators under the following conditions:

The antenna must be installed such that 20 cm is maintained between the antenna and users, and The transmitter module may not be co-located with any other transmitter or antenna.

As long as 2 conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed

IMPORTANT NOTE: In the event that these conditions can not be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID can not be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

End Product Labeling

This transmitter module is authorized only for use in device where the antenna may be installed such that 20 cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following: “Contains FCC ID: RK9-RTL8188CTV”. The grantee's FCC ID can be used only when all FCC compliance requirements are met.

Manual Information To the End User

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user’s manual of the end product which integrates this module.

The end user manual shall include all required regulatory information/warning as show in this manual.

Canada-Industry Canada (IC)

This device complies with RSS-210 of the Industry Canada 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.

Ce dispositif est conforme à la norme CNR-210 d'Industrie Canada applicable aux appareils radio exempts de licence. Son fonctionnement est sujet aux deux conditions suivantes: (1) le dispositif ne doit pas produire de brouillage préjudiciable, et (2) ce dispositif doit accepter tout brouillage reçu, y compris un brouillage susceptible de provoquer un fonctionnement indésirable.

Radiation Exposure Statement:
This equipment complies with IC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

Déclaration d'exposition aux radiations:
Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20 cm de distance entre la source de rayonnement et votre corps.

This device is intended only for OEM integrators under the following conditions: (For module device use)
1) The antenna must be installed such that 20 cm is maintained between the antenna and users, and
2) The transmitter module may not be co-located with any other transmitter or antenna.

As long as 2 conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

Cet appareil est conçu uniquement pour les intégrateurs OEM dans les conditions suivantes: (Pour utilisation de dispositif module)
1) L'antenne doit être installée de telle sorte qu'une distance de 20 cm est respectée entre l'antenne et les utilisateurs, et
2) Le module émetteur peut ne pas être coïmplanté avec un autre émetteur ou antenne.

Tant que les 2 conditions ci-dessus sont remplies, des essais supplémentaires sur l'émetteur ne seront pas nécessaires. Toutefois, l'intégrateur OEM est toujours responsable des essais sur son produit final pour toutes exigences de conformité supplémentaires requis pour ce module installé.

IMPORTANT NOTE:
In the event that these conditions can not be met (for example certain laptop configurations or co-location with another transmitter), then the Canada authorization is no longer considered valid and the IC ID can not be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate Canada authorization.

NOTE IMPORTANTE:
Dans le cas où ces conditions ne peuvent être satisfaites (par exemple pour certaines configurations d'ordinateur portable ou de certaines co-localisation avec un autre émetteur), l'autorisation du Canada n'est plus considéré comme valide et l'ID IC ne peut pas être utilisé sur le produit final. Dans ces circonstances, l'intégrateur OEM sera chargé de réévaluer le produit final (y compris l'émetteur) et l'obtention d'une autorisation distincte au Canada.

End Product Labeling
This transmitter module is authorized only for use in device where the antenna may be installed such that 20 cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following: “Contains IC: 4729A-RTL8188CTV”.

Plaque signalétique du produit final
Ce module émetteur est autorisé uniquement pour une utilisation dans un dispositif où l'antenne peut être installée de telle sorte qu'une distance de 20cm peut être maintenue entre l'antenne et les utilisateurs. Le produit final doit être étiqueté dans un endroit visible avec l'inscription suivante: "Contient des IC: 4729A-RTL8188CTV".

Manual Information To the End User
The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user’s manual of the end product which integrates this module.
The end user manual shall include all required regulatory information/warning as show in this manual.

Manuel d'information à l'utilisateur final
L'intégrateur OEM doit être conscient de ne pas fournir des informations à l'utilisateur final quant à la façon d'installer ou de supprimer ce module RF dans le manuel de l'utilisateur du produit final qui intègre ce module.
Le manuel de l'utilisateur final doit inclure toutes les informations réglementaires requises et avertissements comme indiqué dans ce manuel.

根據低功率電波輻射性電機管理辦法:
第十二條　經型式認證合格之低功率射頻電機，非經許可、公司、商號或使用者均不得擅自變更頻率，加大功率或變更原設計之特性及功能。
第十四條　低功率射頻電機之使用不得影響飛航安全及干擾合法通信:經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。
前項合法通信，指依電信規定作業之無線電信。低功率射頻電機須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。

CONTENTS

Revision History

Rev.	Change Note	Date
1.0	- First release	26-Apr-2012

Declaration

1. INTRODUCTION

1.1 Scope

The **RTL8188CTV Series** is the WLAN 802.11n 1T1R module that offers various flexible model type for main device design selection like it co-layout with USB connector and Flex Flat Connector for USB host interface communication with main board, the default RF antenna is PCB antenna but reserve IPEX connector pin to satisfy your Wi-Fi TX/RX performance design consideration with Wi-Fi RF signal, the default input voltage is 3.3V but allow 5V customization on other model type of RTL8188USB module series . it is a suitable solution for IPC, Media Player, Set-Top-Box, IP-CAM, Tablet with this WLAN 11n USB module for wireless connectivity .

1.2 Features

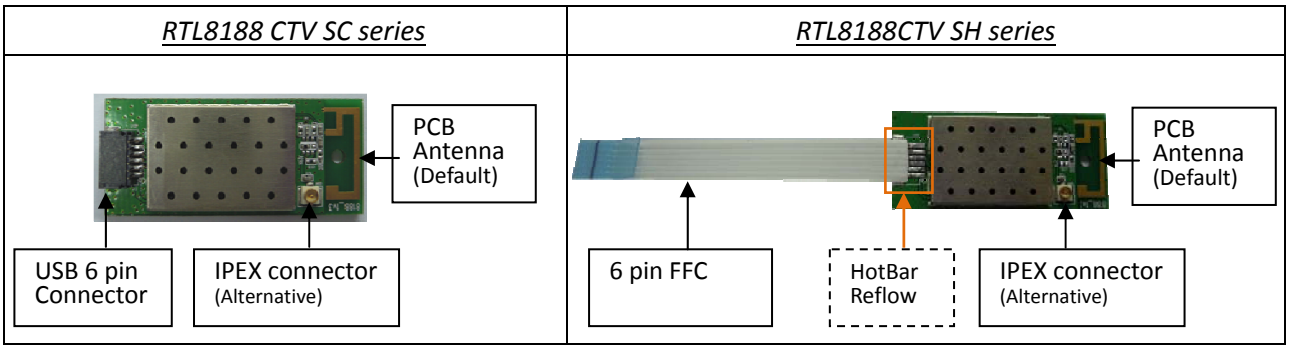
General

- Form factor: Mini-Size.
- Bus Interface: USB interface.
- Connector Type: USB 6 pin (Default) or Flex Flat Cable (FFC) , Optional.
- PCB Dimension: 38mm x 17 mm x 1mm
- RF Antenna: PCB Antenna (default) , IPEX (optional) for Wi-Fi data transmission.
- Input Voltage: +3.3V (5V is optional) .
- RoHS Compliant.

WLAN Features

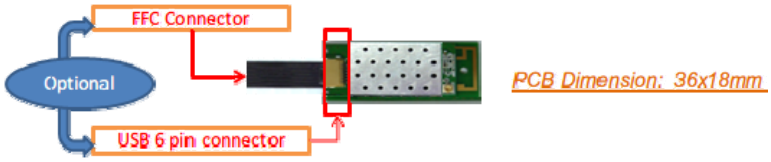
- Complete 802.11n 1T1R (1x1) solution for 2.4GHz band
- Backward compatible with 802.11b/g devices while operating at 802.11n data rates.
- 150Mbps PHY rate.
- 20MHz/40MHz bandwidth.
- WEP 64/128, WPA, WPA2, TKIP, AES.
- QoS-WMM, WMM-PS.
- WPS PBC, PIN (Software).
- Supports 16 BSSIDs.

1.3 Module Appearance (Main Model Type)



1.4 Model Definition

RTL8188USB series basically distinguish various model types that according to Main Chip, OS, USB Connector type, RF Antenna, and input voltage, the model naming rule shown below:



Model Type define :

● RTL8188CTV-SH(C)3(5)(X)

IC: **RTL8188CTV** Supported OS: Linux / Android	H: FFC C: USB	Input Voltage 3: 3.3V 5: 5V	IPEX connector

- *Main Chip: RTL8188CTV Default Basic Model Type: RTL8188CTV-SC3*

Model Type	OS	Connector	Antenna	Input Voltage
RTL8188CTV-SH5	Linux / Android Only	FFC(6 pin)	PCB x1	5V
RTL8188CTV-SH3				3.3V
RTL8188CTV-SC5		USB 6 pin connector		5V
RTL8188CTV-SC3				3.3V
RTL8188CTV-SH5X		FFC(6 pin)	IPEX x 1	5V
RTL8188CTV-SH3X				3.3V
RTL8188CTV-SC5X		USB 6 pin connector		5V
RTL8188CTV-SC3X				3.3V

2. HARDWARE SPECIFICATION

2.1.1 General Specification

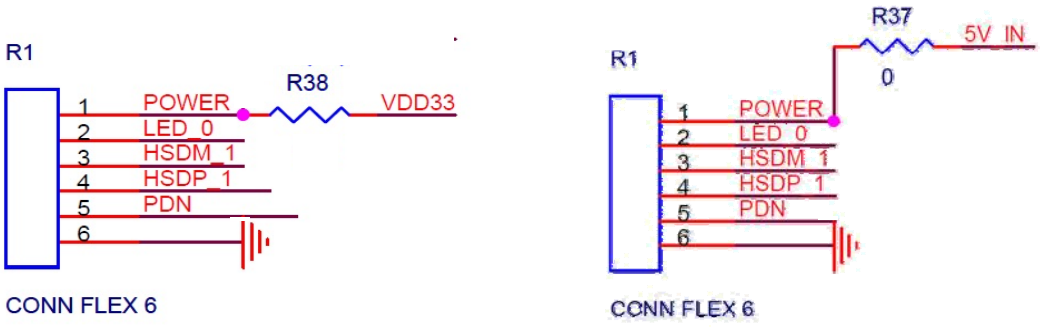
Specification	IEEE 802.11 b/g/n Wireless Local Area Networks
Security	WEP 64/128, WPA, WPA2, TKIP, AES.
PHY Rate	Max.150Mbps PHY Rate for both transmit and receiving
RF Frequency Range	2.412G~2.484GHz
Operating Voltage	+3.3V (Default) 5V (Selectable)
Interface	USB
Connector Type	USB Connector or Flex Flat Cable (Selectable)
WLAN RF	PCB antenna (Default) IPEX Connector (Optional)

2.1.2 Environmental

Operating	Operating temperature: 0 to 85 degree C Relative Humidity : 5-90% (non-condensing)
Storage	Temperature: -20 to 85 degree C Relative Humidity : 5-95% (non-condensing)

2.1.3 PIN Define & Input Voltage

INPUT VOLTAGE:



3.3V 5V

Notice: *Please decide which Input voltage of default 3.3V or 5V you will implement to your main board and refer to model definition to choose the suitable model type you want on Chapter 1.4*

PIN DEFINE:

Model	**RTL8188 USB module series**
PIN#	**Definition**
1	3.3V IN (Default) / 5V IN (Optional)
2	LED
3	High Speed USB D- signal
4	High Speed USB D+ signal
5	Radio On/Off Hi=On ; Low=Off
6	GND

2.1.4 Power Consumption

Mode (2.4GHz frequency band)	Power consumption (mA) / 3.3V				
Activity ➔	Uplink	Downlink	Radio off	Idle	Disable
11b mode	163/192mA	121/133mA	1.39mA	97.8mA	1.39mA
11g mode	154/195mA	121/125mA	1.39mA	97.8mA	1.39mA
11n mode(HT20)	160/206mA	117/123mA	1.39mA	98.5mA	1.39mA
11n mode(HT40)	183/215mA	123/128mA	1.39mA	101.18mA	1.39mA

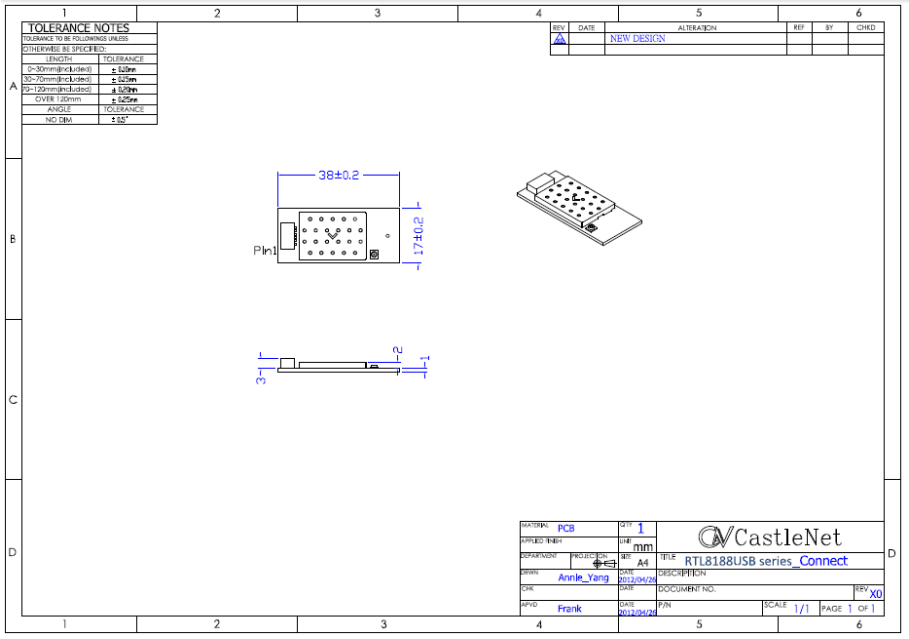
2.2 MECHANICAL SPECIFICATION

2.2.1 Board Dimension

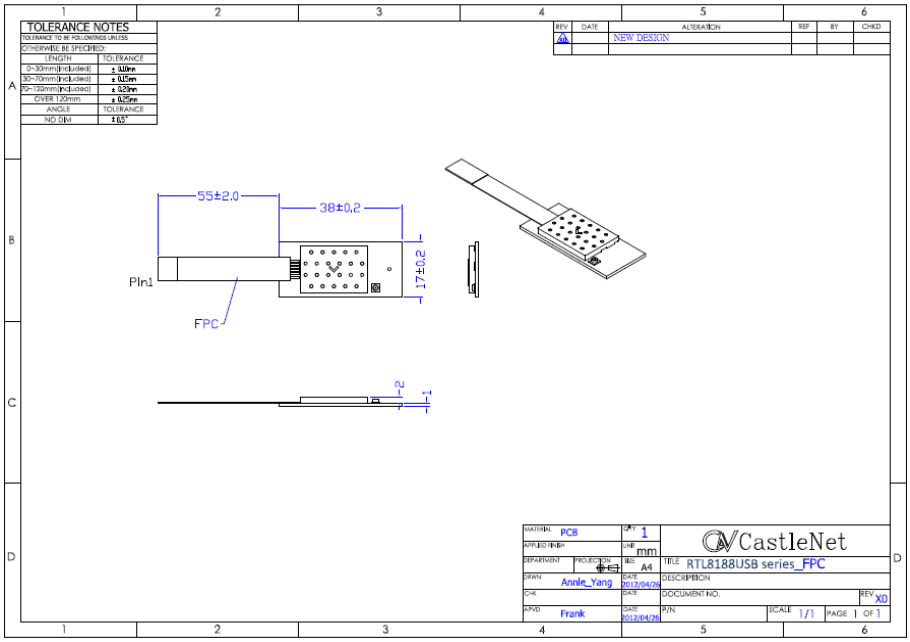
Form factor	Custom made mini-size	
PCB Dimension	38 mm*17 mm (+/- 0.20mm)	
PCB thickness	1.0mm (+/-0.10mm)	
SMD	Single side	
Max. height of components (from PCB)	Top side	3.0mm (USB connector model type) 2.0mm (FFC with shielding case)
	Bottom side	0mm

2.2.2 Mechanical Drawing (unit: mm)

RTL8188CTV-SC Series

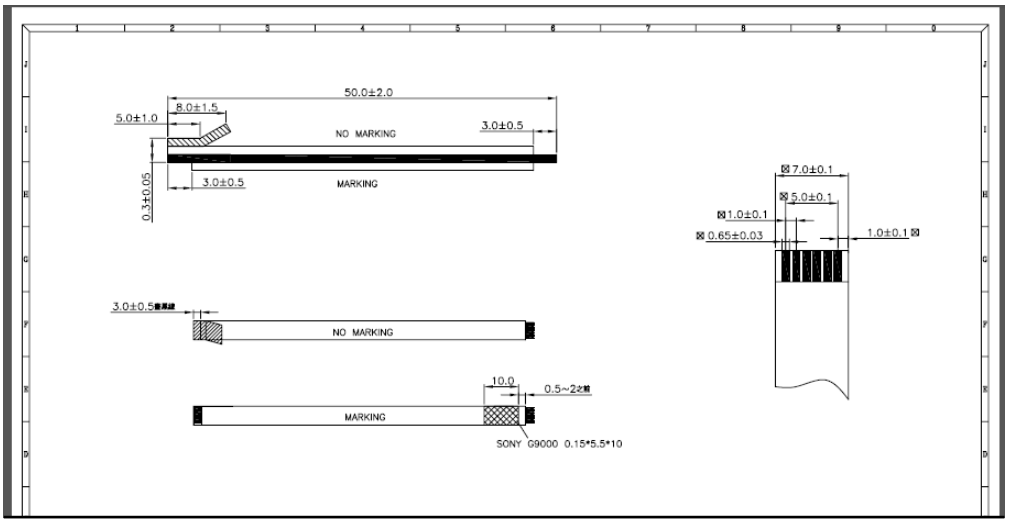


RTL8188CTV-SH Series



2.2.3 FFC specification (unit: mm)

RTL8188CTV-SH Series



2.3 SOFTWARE SPECIFICATION

2.3.1 Operating system & Supported CPU Plaform

Operating System	● Windows XP ● Windows 7	● Linux (kernel 2.6.18 ~ 2.6.38) ● Android 1.6 ~ 2.3.x
RTL8188CTV-SC/SH Series	N/A	Yes

Supported CPU Platform:

- PC-Based X86 system
- ARM (Embedded System with ARM processor : TBD/TBC is needed)
- MIPS (Exclude Embedded System)

3. PACKING & ACCESSORIES

Contents	Unit	Remarks
RTL8188USB series	*1	Follow customer Labeling spec.
Cable	*0	No cable is necessary.
Carton	TBD	Per customer requirement