

# USER MANUAL

**PRODUCT NAME : WLAN Module**

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**MODEL NAME : LCW-007**

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H/W version : v1.0

S/W version : v1.0

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## 1. Features

LCW-007 is the module for IEEE 802.11b/g/n wireless LAN + MCU.

LCW-007 is based on Realtek RTL8711AM solution.

- IEEE 802.11 b/g/n HT40 single band WLAN Infrastructure
- Size : 20mm x 48mm x 11.4 mm
- Auto-calibration(RF, Crystal)
- Data rates up to 72.2Mbps PHY rate
- UART interface
- Integrated IPv4/IPv6 TCP/IP stack
- Integrated Network services such as HTTP, DNS, FTP
- Security : WFA, WPA, WPA2, WEP, WAPI, TKIP
- Application : Home Appliance

### 3. Absolute Maximum Ratings

Parameter	Min	Max	Unit
Storage Temperature	-40	+100	°C
Storage Humidity (@ 40°C)	-	90	%

**Caution** : The specifications above the Table define levels at which permanent damage to the device can occur. Function operation is not guaranteed under these conditions. Operating at absolute maximum conditions for extend periods can adversely affect the long-term reliability of the device.

- Other conditions
  - 1) Do not use or store modules in the corrosive atmosphere, especially where chloride gas, sulfide gas, acid, alkali, salt or the like are contained.  
Also, avoid exposure to moisture.
  - 2) Store the modules where the temperature and relative humidity do not exceed 5 to 40°C and 20 to 60%.
  - 3) Assemble the modules within 6 months.  
Check the soldering ability in case of 6 months over.

### 4. Operating Test Conditions

Parameter	Min	Typ	Max	Unit
Operating Temperature	0	-	+85	°C
Operating Humidity (40°C)	-	-	85	%
Supply Voltage	4.5	5.0	5.5	Vdc
	10.8	12	13.2	

- 1) Test condition: AP connection Ping test mode(not continuous Tx and T-Put mode)
- 2) Surface Tem.: RTL8711AM(113°C), Crystal(90°C)

## 5. Electrical Characteristics

### 5-1. RF Characteristics for IEEE802.11b (11Mbps mode unless otherwise specified)

Items	Contents			
Specification	IEEE802.11b			
Mode	DSSS/CCK			
Channel frequency	2400 ~ 2483 MHz			
Data rate	1,2,5.5,11Mbps			
TX Characteristics	Min.	Typ.	Max.	Unit
Power Level	15	17	19	dBm
Spectrum Mask				
1 <sup>st</sup> side lobes ( to fc $\pm$ 11MHz)	-	-43	-30	dBr
2 <sup>nd</sup> side lobes ( to fc $\pm$ 22MHz)	-	-58	-50	dBr
Modulation Accuracy (EVM)	-	30	35	%
Power On/Off ramp	-	0.5	2.0	Usec
Freq. Tolerance	-25	-	25	ppm
Chip Clock Freq. Tolerance	-25	-	25	ppm
RX Characteristics	Min.	Typ.	Max.	Unit
Minimum Input Level Sens. (FER $\leq$ 8%)		-88	-76	dBm
Maximum Input Level (FER $\leq$ 8%)	-10	-	-	dBm

\* Normal Condition : 25°C, VDD=5V.

\* RF characteristics is board limit. It can differ according to standards

**5-2. RF Characteristics for IEEE802.11g (54Mbps mode unless otherwise specified)**

Items	Contents			
Specification	IEEE802.11g			
Mode	OFDM			
Channel frequency	2400 ~ 2483 MHz			
Data rate	6,9,12,18,24,36,48,54Mbps			
TX Characteristics	Min.	Typ.	Max.	Unit
Power Level	13	15	17	dBm
Spectrum Mask				
at $f_c \pm 11\text{MHz}$	-	-32	-20	dBr
at $f_c \pm 20\text{MHz}$	-	-43	-28	dBr
at $f_c \geq \pm 30\text{MHz}$	-	-48	-40	dBr
Constellation Error (EVM)	-	-32	-25	dB
Freq. Tolerance	-20	-	20	ppm
Chip Clock Freq. Tolerance	-20	-	20	ppm
RX Characteristics	Min.	Typ.	Max.	Unit
Minimum Input Level Sens. (PER $\leq 10\%$ )	-	-73	-65	dBm
Maximum Input Level (PER $\leq 10\%$ )	-20	-	-	dBm

\* Normal Condition : 25°C, VDD=5V.

\* RF characteristics is board limit. It can differ according to standards

### 5-3. RF Characteristics for IEEE802.11n (MCS7 mode unless otherwise specified)

Items	Contents			
Specification	IEEE802.11n – 2.4GHz			
Mode	OFDM			
Channel frequency	2400 ~ 2483 MHz			
Data rate	6.5,13,19.5,26,39,52,58.5,65Mbps			
TX Characteristics	Min.	Typ.	Max.	Unit
Power Level (HT20 : MCS7)	12	14	16	dBm
Power Level (HT40 : MCS7)	11	13	15	dBm
Spectrum Mask (HT20)				
at $f_c \pm 11\text{MHz}$	-	-32	-20	dBr
at $f_c \pm 20\text{MHz}$	-	-35	-28	dBr
at $f_c \pm 30\text{MHz}$	-	-45	-40	dBr
Constellation Error (EVM)	-	-32	-28	dB
Freq. Tolerance	-20	-	20	ppm
Chip Clock Freq. Tolerance	-20	-	20	ppm
RX Characteristics	Min.	Typ.	Max.	Unit
Minimum Input Level Sens. (HT20,PER ≤ 10%)	-	-68	-64	dBm
Minimum Input Level Sens. (HT40,PER ≤ 10%)	-	-66	-61	dBm
Maximum Input Level (PER ≤ 10%)	-20	-	-	dBm

\* Normal Condition : 25°C, VDD=5V.

\* RF characteristics is board limit. It can differ according to standards

## FCC Warning Statement

### FCC Part 15.19

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.

### FCC Part 15.21

Any changes or modifications (including the antennas) to this device that are not expressly approved by the manufacturer may void the user's authority to operate the equipment.

This equipment complies with FCC Radiation exposure limits set forth for an uncontrolled environment. This device and its antenna must not be co-located or operating in conjunction with any other antenna or transmitter.

This equipment should be installed and operated with a minimum distance of 20cm between the radiator and your body.

Please notice that if the FCC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: "Contains FCC ID : BEJ-LCW007" any similar wording that expresses the same meaning may be used.

### Manual Information to the End User

The module is limited to OEM installation ONLY.

The OEM integrator is responsible for ensuring that the end-user has no manual instruction to remove or install module.

The module is limited to installation in mobile application;

A separate approval is required for all other operating configurations, including portable configurations with respect to Part 2.1093 and difference antenna configurations.

There is requirement that the grantee provide guidance to the host manufacturer for compliance with Part 15B requirements.

## IC Warning Statement

This device complies with Industry Canada licence-exempt RSS standard(s).

Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) L'appareil ne doit pas produire de brouillage, et (2) L'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

IC RF Radiation Exposure Statement : This equipment complies with IC RF Radiation exposure limits set forth for an uncontrolled environment. This device and its antenna must not be co-located or operating in conjunction with any other antenna or transmitter.

RF du IC d'exposition aux radiations: Cet équipement est conforme à l'exposition de la IC rayonnements RF limites établies pour un environnement non contrôlé.

L'antenne pour ce transmetteur ne doit pas être même endroit avec d'autres émetteur sauf conformément à la IC procédures de produits Multi-émetteur.

Please notice that if the IC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: "Contains IC : 2703N-LCW007" any similar wording that expresses the same meaning may be used.

L'étiquette d'homologation d'un module d'Innovation, Sciences et Développement économique Canada devra être posée sur le produit hôte à un endroit bien en vue, en tout temps. En l'absence d'étiquette, le produit hôte doit porter une étiquette sur laquelle figure le numéro d'homologation du module d'Innovation, Sciences et Développement économique Canada, précédé du mot « contient », ou d'une formulation similaire allant dans le même sens et qui va comme suit :

Contient IC : 2703N-LCW007 est le numéro d'homologation du module

### 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 shown in this manual.