Manuals+ — User Manuals Simplified.

LG Electronics LCWB-002 WiFi/BLE + MCU Module User Manual

Contents

LG Electronics LCWB-002 WiFi/BLE + MCU Module

Features

LCWB-002 is the module for IEEE 802.11b/g/n wireless LAN + BLE4.2 + MCU. LCWB-002 is based on Realtek RTL8720CM solution.

- IEEE 802.11 b/g/n HT20 single band WLAN infra-structure
- Bluetooth Low Energy 4.2 (BLE4.2)
- Size : 20 mm x 45 mm x 7.9 mm
- Auto-calibration (RF, Crystal)
- Data rates up to 72.2Mbps PHY rate
- SPI 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

Block Diagram
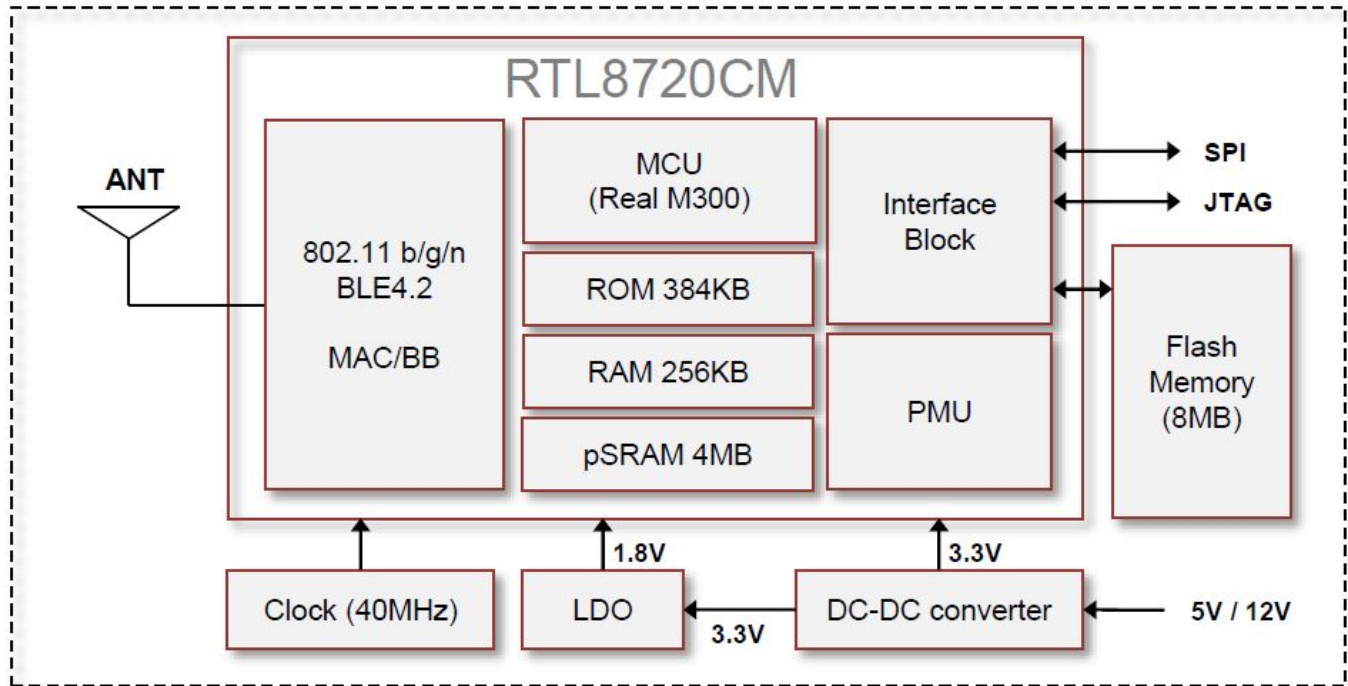
Absolute Maximum Ratings

Parameter	Min	Max	Unit
Storage Temperature	-40	+100	℃
Storage Humidity (@ 40℃)	-	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℃ and 20 to 60%
3. Assemble the modules within 6 months Check the soldering ability in case of 6 months over

Operating Test Conditions

Parameter	Min	Typ	Max	Unit
Operating Temperature	0	-	+85	℃
Operating Humidity (40℃)	-	-	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)

Electrical Characteristics

RF Characteristics for IEEE802.11b (11Mbps mode unless otherwise specified)

Items	Contents			
Specification	IEEE802.11b			
Mode	DSSS / CCK			
Channel frequency	2400 ~ 2483MHz			
Data rate	1, 2, 5.5, 11Mbps			
TX Characteristics	**Min.**	**Typ.**	**Max.**	**Unit**
Power Level	14	17	20	dBm
Spectrum Mask				
1st side lobes (to fc ±11MHz)	-	-	-30	dBr
2nd side lobes (to fc ±22MHz)	-	-	-50	dBr
Modulation Accuracy (EVM)	-	-	35	%
Power On/Off ramp	-	-	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 ≤ 8%)	-	-	-76	dBm
Maximum Input Level (FER ≤ 8%)	-10	-	-	dBm

- Normal Condition : 25℃, VDD=5V.
- RF characteristics is board limit. It can differ according to standards

RF Characteristics for IEEE802.11g (54Mbps mode unless otherwise specified)

Items	Contents			
Specification	IEEE802.11g			
Mode	OFDM			
Channel frequency	2400 ~ 2483MHz			
Data rate	6, 9, 12, 18, 24, 36, 48, 54Mbps			
TX Characteristics	**Min.**	**Typ.**	**Max.**	**Unit**
Power Level	12	15	18	dBm
Spectrum Mask				
at fc ±11MHz	-	-	-20	dBr
at fc ±20MHz	-	-	-28	dBr
at fc ≥ ± 30MHz	-	-	-40	dBr
Constellation Error (EVM)	-	-	-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 ≤ 10%)	-	-	-65	dBm
Maximum Input Level (PER ≤ 10%)	-20	-	-	dBm

RF Characteristics for IEEE802.11gn (MCS7 mode unless otherwise specified)

Items	Contents			
Specification	IEEE802.11n – 2.4GHz			
Mode	OFDM			
Channel frequency	2400 ~ 2483MHz			
Data rate	6.5, 13, 19.5, 26, 39, 52, 58.5, 65Mbps			
TX Characteristics	Min.	Typ.	Max.	Unit
Power Level (HT20 : MCS7)	11	14	17	dBm
Spectrum Mask (HT20)				
at fc ±11MHz	-	-	-20	dBr
at fc ±20MHz	-	-	-28	dBr
at fc ±30MHz	-	-	-40	dBr
Constellation Error (EVM)	-	-	-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%)	-	-	-64	dBm
Maximum Input Level (PER ≤ 10%)	-20	-	-	dBm

- Normal Condition : 25℃, VDD=5V.
- RF characteristics is board limit. It can differ according to standards

RF Characteristics for BLE

TX characteristics	Min.	Typ.	Max.	Unit
Power level	1.5	4.5	7.5	dBm
Adjacent channel transmit power				
@ F = F0 ± 1MHz	-	-	0	dBr
@ F = F0 ± 2MHz	-	-	-30	dBr
@ F = F0 ± 3MHz	-	-	-40	dBr
@ F > F0 ±3MHz	-	-	-40	dBr
Modulation characteristics – Frequency derivation				
$\Delta F1_{AVG}$	140	-	175	KHz
$\Delta F2_{MAX}$	115	-	-	KHz
$\Delta F2_{MAX} / \Delta F1_{AVG}$	80	-	-	%
RX characteristics	**Min.**	**Typ.**	**Max.**	**Unit**
Min. input level (BER ≤ 0.1%)	-	-	-84	dBm
Max. input level (BER ≤ 0.1%)	-20	-	-	dBm

Pin Description

Pin No.	Pin Name
1	VDD
2	MODE
3	SPI_SCL
4	SPI_CSN
5	SPI_MISO
6	SPI_MOSI
7	STATUS
8	GND

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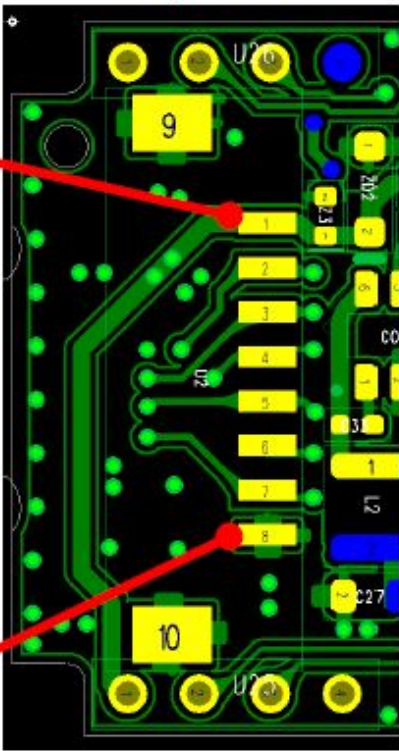
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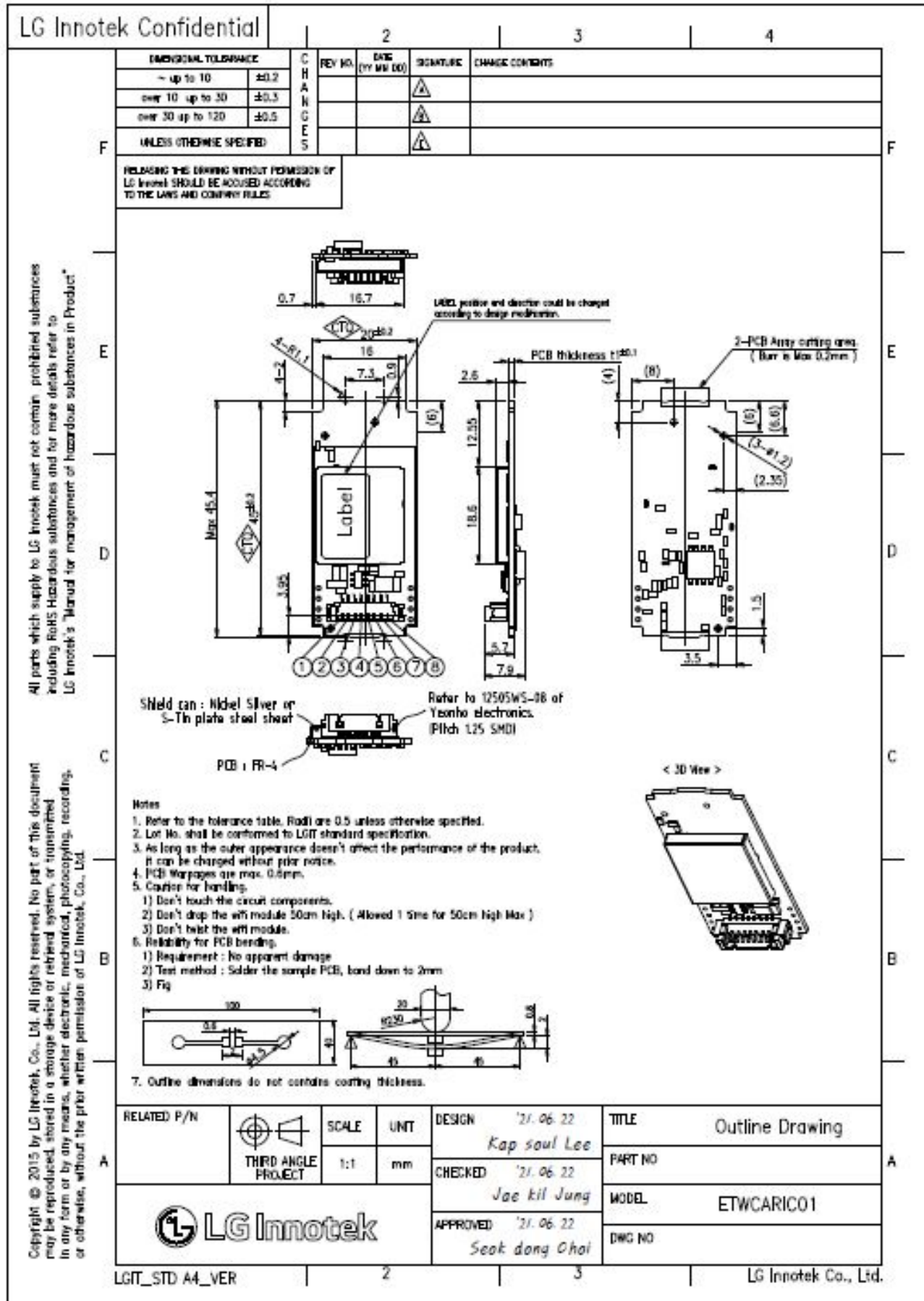# Outline Drawing

Outline Drawing — LG Innotek Confidential, Model ETWCARICO1

Regulatory Notice

Part 15.19 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.

Part 15.105 Statement (Class B)

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 or more 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.

Part 15.21 Statement

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. This device must not be co-located or operating in conjunction with any other antenna or transmitter.

Responsible Party Information (Supplier's Declaration of Conformity)

LG Electronics USA1000 Sylvan Avenue Englewood Cliffs New Jersey, United States, 07632

Regulatory notice to host manufacturer according to KDB 996369 D03 OEM Manual
List of applicable FCC rules
This module has been granted modular approval as below listed FCC rule parts. -FCC Rule parts 15C(15.247)
Summarize the specific operational use conditions
The OEM integrator should use equivalent antennas which is the same type and equal or less gain then an antenna listed in this instruction manual.
RF exposure considerations
The module has been certified for integration into products only by OEM integrators under the following condition:

- The antenna(s) must be installed such that a minimum separation distance of at least 20 cm is maintained between the radiator (antenna) and all persons at all times.
- The transmitter module must not be co-located or operating in conjunction with any other antenna or transmitter except in accordance with FCC multi-transmitter product procedures.
- Mobile use

As long as the three conditions above are met, further transmitter testing will not be required.OEM integrators should provide the minimum separation distance to end users in their end-product manuals.

Antennas list

This module is certified with the following integrated antenna.

- Type: Printed Antenna
- Max. peak Antenna gain: 1.58 dBi

Any new antenna type, higher gain than listed antenna should be met the requirements of FCC rule 15.203 and 2.1043 as permissive change procedure.

Label and compliance information

End Product Labeling

The module is labeled with its own FCC ID. If the FCC ID 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. In that case, the final end product must be labeled in a visible area with the following:

Contains FCC ID: BEJ-LCWB002

Information on test modes and additional testing requirements

OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, additional transmitter in the host, etc.).

Additional testing, Part 15 Subpart B disclaimer

The final host product also requires Part 15 subpart B compliance testing with the modular transmitter installed to be properly authorized for operation as a Part 15 digital device.

RF Exposure

The antenna (or antennas) must be installed so as to maintain at all times a distance minimum of at least 20 cm between the radiation source (antenna) and any individual. This device may not be installed or used in conjunction with any other antenna or transmitter.
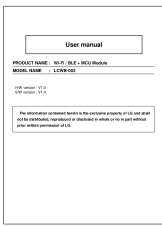
l'exposition aux RFL'antenne (ou les antennes) doit être installée de façon à maintenir à tout instant une distance minimum de au moins 20 cm entre la source de radiation (l'antenne) et toute personne physique.

End Product Labeling

The module is labeled with its own IC Certification Number. If the IC Certification 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. In that case, the final end product must be labeled in a visible area with the following:

Contains IC: 2703N-LCWB002

Documents / Resources

LG Electronics LCWB-002 WiFi/BLE + MCU Module [pdf] User Manual
LCWB002, BEJ-LCWB002, BEJLCWB002, WiFi BLE MCU Module, LCWB-002 WiFi BLE MCU Module

Manuals+,