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LG Electronics LCWB-008 WiFi BLE Combo Module

General Description

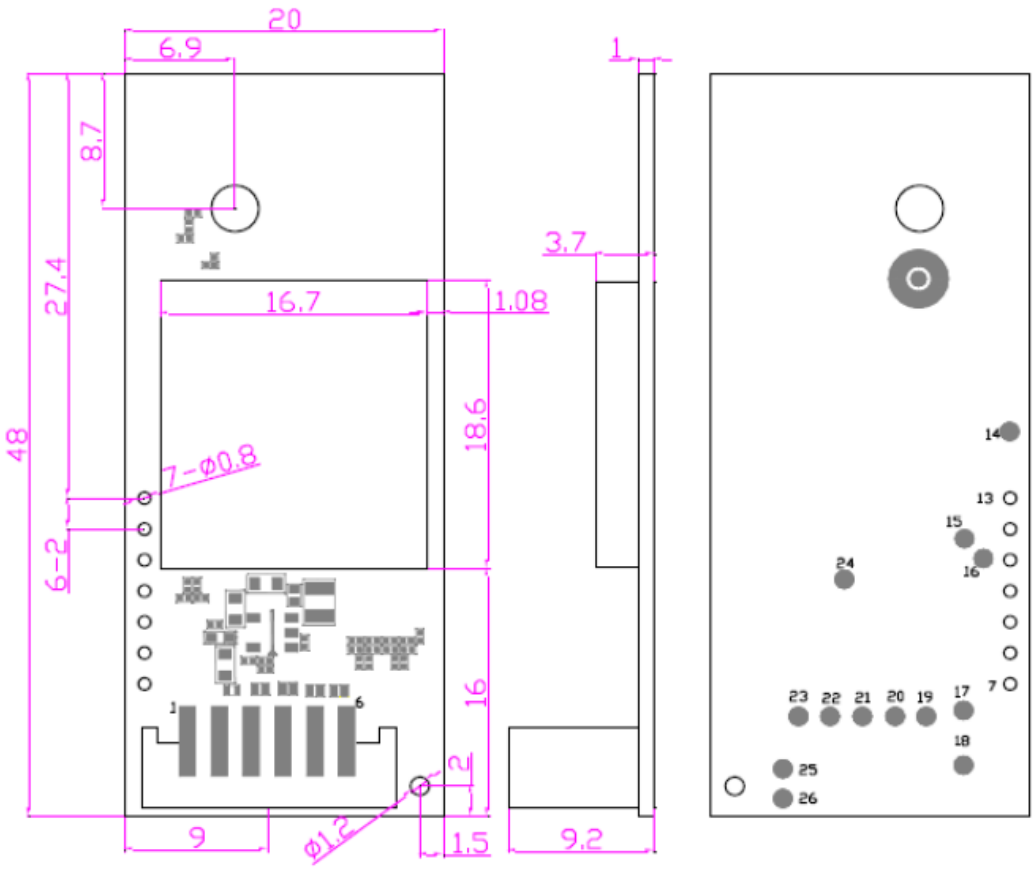
This document is to specify the product specification of LCWB-008, for 1T1R 802.11b/g/n and Bluetooth Low Energy (LE) 5.2 combo module. This Module is based on Beken BK7234 low-power chipset that complied with IEEE 802.11b, IEEE 802.11g, IEEE 802.11n standard for 2.4~2.5GHz. It can be used to provide up to 11Mbps for IEEE 802.11b, 54Mbps for IEEE 802.11g, 72.2Mbps for IEEE 802.11n to connect your wireless LAN. The Bluetooth part supports latest 5.2 operation.

Features

- Compatible with IEEE 802.11b standard to provide wireless 11Mbps data rate
- Compatible with IEEE 802.11g standard to provide wireless 54Mbps data rate
- Compatible with IEEE 802.11n standard to provide wireless 72.2Mbps data rate
- Support 20MHz bandwidth in 2.4GHz band
- Supports downlink Multi-User Multiple-Input Multiple-Output (DL MU-MIMO)
- Supports Orthogonal Frequency Division Multiple Access (OFDMA)
- Supports Target Wake Time (TWT)
- TX and RX Low-Density Parity Check (LDPC) support for extended range
- WPA/WPA2/WPA3-Personal support for enhanced security
- Operating modes: STA and Soft AP

- Concurrent Soft AP + STA
- Bluetooth 5.2 Low Energy (LE)
- HSF compliant
- Security S/W: Beken

Mechanical Dimension



Pin Description

Pin No	Pin name	Remark
1	VDD	5V or 3.3V Power Supply
2	RX0	UART0 RX
3	IO4	GPIO4_OUT
4	IO3	GPIO3_OUT
5	TX0	UART0_TX

6	GND	Ground

Recommended Operating Conditions

Parameter	Min	Max	Unit
Power Supply Voltage : VDD	+2.0	+5.5	V
Storage Temperature	-55	+150	℃
operating temperature	-20	+85	℃

Mechanical Characteristics

Feature	Detailed Description
Length	• 48mm
Width	• 20mm
PCB Height	• 1.0 mm
Module Height	• 3.7mm

RF Characteristics

IEEE 802.11b Section

	Feature	Detailed Description
9.1.1	Standard	IEEE 802.11b

9.1.2	Radio and Modulation Schemes	DQPSK , DBPSK and CCK with DSSS
9.1.3	Operating Frequency	2412 2462MHz ISM band
9.1.4	Channel Numbers	13 channels for Worldwide 11 channels for FCC NCC
9.1.5	Data Rate	at most 11Mbps
9.1.6	Media Access Protocol	CSMA/CA with ACK
9.1.7	Transmitter Output Power at Antenna Connector	Typical RF Output Power at each RF chain, at room Temp 25℃ 17±1.5 dBm at 11Mbps
9.1.8	Receiver Sensitivity at Antenna Connector	Typical Sensitivity at each RF chain.@Frame (1000-byte PDUs) Error Rate<8% at room Temp 25℃-83 dBm for 11 Mbps

IEEE 802.11g Section

	Feature	Detailed Description
9.2.1	Standard	IEEE 802.11g
9.2.2	Radio and Modulation Type	QPSK , BPSK , 16QAM ,64QAM with OFDM
9.2.3	Operating Frequency	2412 2462MHz ISM band

9.2.4	Channel Numbers	13 channels for Worldwide 11 channels for FCC NCC
9.2.5	Data Rate	at most 54Mbps
9.2.6	Media Access Protocol	CSMA/CA with ACK
9.2.7	Transmitter Output Power at Antenna Connector	Typical RF Output Power at each RF chain, at room Temp 25℃ 15±1.5 dBm at Maximum data rate
9.2.8	Receiver Sensitivity at Antenna Connector	Typical Sensitivity at each RF chain.@Frame(1000-byte PDUs) Error Rate<10% at room Temp 25℃-71 dBm at Maximum data rate

IEEE 802.11n Section

	Feature	Detailed Description
9.3.1	Standard	IEEE 802.11n
9.3.2	Radio and Modulation Type	BPSK , QPSK , 16QAM ,64QAM with OFDM
9.3.3	Operating Frequency	2412 2462MHz ISM band
9.3.4	Channel Numbers	13 channels for Worldwide 11 channels for FCC NCC
9.3.5	Data Rate	at most MCS7
9.3.6	Media Access Protocol	CSMA/CA with ACK

9.3.7	Transmitter Output Power at Antenna Connector	Typical RF Output Power at each RF chain, at room Temp 25℃ 14±1.5 dBm at Maximum data rate
9.3.8	Receiver Sensitivity at Antenna Connector	Typical Sensitivity at each RF chain. @Frame (1000-byte PDUs) Error Rate=10% and at room Temp 25℃-68dBm at Maximum data rate

Bluetooth Section

	Feature	Detailed Description		
9.4.1	Bluetooth standard	Bluetooth V5.2		
9.4.2	Modulation	GFSK		
9.4.3	Operating Frequency	2402MHz-2480MHz		
9.4.4	Channel Numbers	40 channels for BLE		
		Min dBm	Typical dBm	Max dBm
9.4.5	BLE Output Power	2.5	4.5	6.5
9.4.6	Sensitivity @PER=30.8% FOR BLE		-90	

FCC Statement

FCC Part 15.19 Statements:

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 15.105 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.

FCC 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.

<Regulatory notice to host manufacturer according to KDB 996369 D03 OEM Manual v01 >

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 below this instruction manual.

Limited module procedures (N/A) Single Module

Trace antenna designs (N/A)

If trace antenna designs are applicable, full-detail design specifications are required per D02 Module Q&A Question 11.

For a modular transmitter with trace antenna designs, see the guidance in Question 11 of KDB Publication 996369 D02 FAQ –Modules for Micro-Strip Antennas and traces. The integration information shall include for the TCB review the integration instructions for the following aspects: layout of trace design, parts list (BOM), antenna, connectors, and isolation requirements.

- Information that includes permitted variances (e.g., trace boundary limits, thickness, length, width, shape(s), dielectric constant, and impedance as applicable for each type of antenna);
- Each design shall be considered a different type (e.g., antenna length in multiple(s) of frequency, the wavelength, and antenna shape (traces in phase) can affect antenna gain and must be considered);
- The parameters shall be provided in a manner permitting host manufacturers to design the printed circuit (PC) board layout;
- Appropriate parts by manufacturer and specifications;
- Test procedures for design verification; and
- Production test procedures for ensuring compliance.

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 40mm 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.

- portable 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.
- This module is exclusively for LG Electronics' finished products.
- If the host device equipped with this module does not meet the 40mm separation distance requirement, additional certification will be conducted.

* Host device examples: washing machines, air conditioners, refrigerators, ovens, vacuum cleaners, etc.

Antennas

This module is certified with the following integrated antenna.

- Ant. Type: PCB Pattern Antenna (Max. Antenna gain: 1.67 dBi)
  Any new antenna type, higher gain than listed antennas should be met the requirements of FCC rule 15.203 and 2.1043 as permissive change procedure

Label and compliance information

End Product Labeling (FCC)

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-LCWB008**

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 grantee should include a statement that the modular transmitter is only FCC authorized for the specific rule parts (i.e., FCC transmitter rules) listed on the grant, and that the host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. If the grantee markets their product as being Part 15 Subpart B compliant (when it also contains unintentional-radiator digital circuity), then the grantee shall provide a notice stating that the final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.

Note EMI Considerations

Note that a host manufacture is recommended to use D04 Module Integration Guide recommending as “best practice” RF design engineering testing and evaluation in case non-linear interactions generate additional non-compliant limits due to module placement to host components or properties For standalone mode, reference the guidance in D04 Module Integration Guide and for simultaneous mode; see D02 Module Q&A Question 12, which permits the host manufacturer to confirm compliance.

How to make changes

Since only Grantees are permitted to make permissive changes, when the module will be used differently than granted, please contact the module manufacture on below contact information.

- Contact information: younguk.nam@lge.com /
- Tel: 82-31-8066-5539

Responsible Party Information

- Model name : LCWB-008
- Responsible Party U.S. Contact Information : LG ELECTRONICS CANADA INC.
- (Name) David Kim
- (Phone number) 201-470-2696
- (Address) 111 Sylvan Avenue, North Building, Englewood Cliffs,New Jersey 07632, United States

ISED Statemen

Licensed-exempt Statement

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

RF Exposure Statement

The antenna(s) must be installed such that a minimum separation distance of at least 40mm is maintained between the radiator (antenna) and all persons at all times.

End Product Labeling

The module is labeled with its own IC Certification Number. If the IC Certification Number are 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-LCWB008

Frequently Asked Questions

- **Q: What are the supported operating modes of the LCWB-008 module?**
  A: The module supports STA (Station) and Soft AP (Access Point) operating modes.
- **Q: What is the Bluetooth version supported by the LCWB-008 module?**
  A: The module supports Bluetooth version 5.2 Low Energy (LE).
- **Q: What are the recommended storage temperature conditions for the LCWB-008 module?**
  A: The recommended storage temperature range is -55°C to +150°C.

Documents / Resources

	LG Electronics LCWB-008 WiFi BLE Combo Module [pdf] User Manual LCWB-008, LCWB-008 WiFi BLE Combo Module, LCWB-008, WiFi BLE Combo Module, Combo Module, Module

References

- User Manual

LG Electronics

Combo Module, LCWB-008, LCWB-008 WiFi BLE Combo Module, LG Electronics, Module, WiFi BLE Combo Module

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