

# User Manual

**PRODUCT NAME : 802.11a/b/g/n/ac + Bluetooth Combo DBDC Module**

**MODEL NAME : LGSBWAC97 (ETWCFMBC03)**

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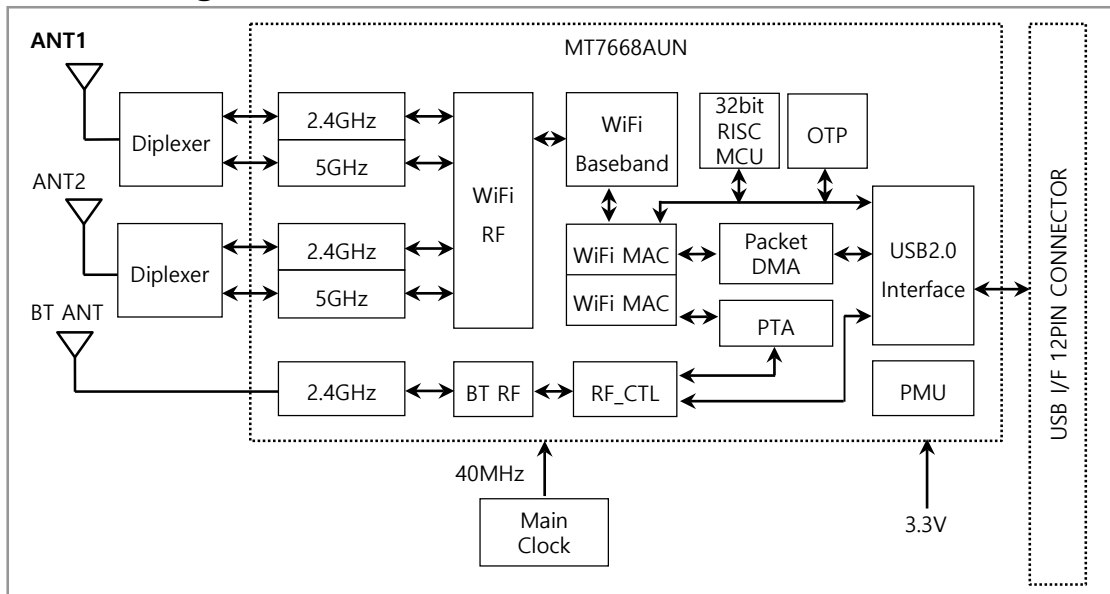
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## 1. Features

ETWCFMBC03 is the small size and low power module for IEEE 802.11ac wireless LAN & BT5.0 + HS. ETWCFMBC03 is based on Mediatek MT7668AUN solution.

- IEEE 802.11 a/b/g/n/ac Dual Band Dual Concurrent (DBDC)
- Bluetooth 5.0 + HS , BLE
- Size : 48.0 x 30.0 x 7.7mm
- Two stream spatial multiplexing up to 300Mbps(802.11n) / 867Mbps(802.11ac)
- Use on-chip OTP (One-Time Programmable)
- Host Interface : USB2.0 (WLAN & BT)
  - This model is using the common USB2.0 to control WLAN and BT
- Security : WAPI, WEP, WPA, WPA2, WMM, AES, TKIP, CKP
- Application: DTV, DVR, HD DVD Player, Blue-ray Disk Player, STB

## 2. Block Diagram



## 3. Absolute Maximum Ratings

**Caution** : The specifications in Table 1 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.

| Parameter               | Min | Max | Unit |
|-------------------------|-----|-----|------|
| Storage Temperature     | -20 | +80 | °C   |
| Storage Humidity (40°C) | -   | 90  | %    |

< Table 1 >

. 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.

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## 4. Operating Conditions

| Parameter               | Min   | Typ | Max | Unit |
|-------------------------|-------|-----|-----|------|
| Ambient Temperature     | 0     |     | 60  | °C   |
| Ambient Humidity (40°C) |       |     | 85  | %    |
| Supply Voltage          | 3.135 | 3.3 | 3.6 | Vdc  |

## 5. Standard Test Conditions

The Test for electrical specification shall be performed under the following condition  
Otherwise this following conditions, not guaranteed this performance.

### 5-1. Ambient condition

|             |          |
|-------------|----------|
| Temperature | 25 ± 5°C |
| Humidity    | 65 ± 5%  |

### 5-2. Power supply voltages

|             |                |
|-------------|----------------|
| Input power | Supply Voltage |
| VDD_3.3V    | 3.135 ~ 3.6V   |

### 5-3. Current consumption

| Current Consumption       | Min. | Typ. | Max. | Unit |
|---------------------------|------|------|------|------|
| TX Mode ( 11ac/80MHz)     |      |      | 1200 | mA   |
| Idle and Associated state |      |      | 300  |      |
| Radio disabled state      |      |      | 70   |      |

Note 1 : This figure is the RMS(root mean square) Value.

### 5-4. ESD Information

| Human Body Model (HBM) | Min. | Max. | Unit |
|------------------------|------|------|------|
| Contact                |      | ±4   | kV   |
| Air                    |      | ±15  |      |

Note 1. IEC 61000-4-2 (150pF, 330R)

Note 2. Test condition : After 8-pin USB Cable connect to module, progress ESD test.

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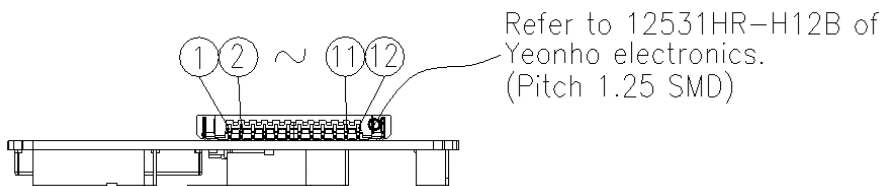
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## 7. Pin Description

| Pin No. | Pin Name | I/O | Pin Description   |
|---------|----------|-----|---|
| 1       | VCC      | I   | VDD 3.3V  |
| 2       | D-       | I/O | USB Communication signal (USB_DN)                       |
| 3       | D+       | I/O | USB Communication signal (USB_DP)                       |
| 4       | GND      | -   | GND   |
| 5       | WOWL     | O   | Wake On WLAN  |
| 6       | VCC      | I   | VDD 3.3V  |
| 7       | NC       | -   | No connection   |
| 8       | GND      | -   | GND   |
| 9       | RESET    | I   | RESET   |
| 10      | WOBLE    | O   | Host wake up.<br>(Signal from Wi-Fi module to the host) |
| 11      | GND      | -   | GND   |
| 12      | VCC      | -   | VDD 3.3V  |



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## 7. Mechanical Characteristics

### 1) Outline view

| Item       | Test Conditions                                |
|------------|--|
| Assembly   | No defects of wiring, soldering and assembling |
| Appearance | No dirt, rust, corrosion or foreign material   |

### 2) Appearance structure

| Item      | Test Conditions     |
|-----------|---------------------|
| Dimension | As assembly drawing |
| Mounting  | As assembly drawing |
| Weight    | 6g                  |

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### 8. Outline Drawing

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All parts which supply to LG Innotek must not contain prohibited substances including RoHS Hazardous substances and for more details refer to LG Innotek's "Manual for management of hazardous substances in Product"

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| DIMENSIONAL TOLERANCE      |      | C<br>H<br>A<br>N<br>G<br>E<br>S | REV. NO. | DATE (YY MM DD) | SIGNATURE | CHANGE CONTENTS |
|----------------------------|------|---------------------------------|----------|-----------------|-----------|-----------------|
| ~ up to 6                  | ±0.3 |                                 |          |                 |           |                 |
| over 6 up to 30            | ±0.5 |                                 |          |                 |           |                 |
| over 30 up to 120          | ±0.5 |                                 |          |                 |           |                 |
| UNLESS OTHERWISE SPECIFIED |      |                                 |          |                 |           |                 |

RELEASING THIS DRAWING WITHOUT PERMISSION OF LG Innotek SHOULD BE ACCUSED ACCORDING TO THE LAWS AND COMPANY RULES

Refer to 12531HR-H12B of Yeonho electronics. (Pitch 1.25 SMD)

Notes

- Tolerances are ±0.3, Radii are 0.5, unless otherwise specified.
- Lot No. shall be conformed to LGIT standard specification.
- As long as the outer appearance doesn't affect the performance of the product, it can be changed without prior notice.
- '[x.xx]': these dimensions inside of the square are cutting area.
- Label information is based on specification

|             |                     |       |      |          |           |         |                 |
|-------------|---------------------|-------|------|----------|-----------|---------|-----------------|
| RELATED P/N |                     | SCALE | UNIT | DESIGN   | '22.06.10 | TITLE   | Outline Drawing |
|             | THIRD ANGLE PROJECT | 1:1   | mm   |          |           | PART NO |                 |
|             |                     |       |      | CHECKED  | '22.06.10 | MODEL   | ETWCFMBC03      |
|             |                     |       |      | APPROVED | '22.06.10 | DWG NO  |                 |

**3D View**

LGIT\_STD A4\_VER

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## 9. Tune-up Power

| Mode | Frequency | Channel No. | SISO Max. Power (dBm) |    |        |        | MIMO Max. Power (dBm) |    |        |        |
|------|-----------|-------------|-----------------------|----|--------|--------|-----------------------|----|--------|--------|
|      |           |             | b                     | g  | n(20M) | n(40M) | b                     | g  | n(20M) | n(40M) |
| WLAN | 2.4 GHz   | Ch. 1 ~ 11  | 15                    | 17 | 16     | Ch.3~8 | 18                    | 20 | 19     | Ch.3~8 |
|      |           |             |                       |    |        | 15     |                       |    |        | 18     |
|      |           |             | Ch.9                  | 13 | -      | -      |                       |    |        |        |
|      |           | Ch. 12      | 14                    | 13 | 14     | -      | 17                    | 16 | 17     | -      |
|      |           | Ch. 13      | 13                    | 7  | 4      | -      | 16                    | 10 | 7      | -      |

Tolerance : Max. Power  $\pm 3$  dB

| Mode | Frequency         | SISO Max. Power (dBm) |        |                    |         |                    |                    | MIMO Max. Power (dBm) |        |                    |         |                    |                    |
|------|-------------------|-----------------------|--------|--------------------|---------|--------------------|--------------------|-----------------------|--------|--------------------|---------|--------------------|--------------------|
|      |                   | a                     | n(20M) | n(40M)             | ac(20M) | ac(40M)            | ac(80M)            | a                     | n(20M) | n(40M)             | ac(20M) | ac(40M)            | ac(80M)            |
| WLAN | 5 180 ~ 5 250 MHz | 14                    | 14     | 14                 | 14      | 14                 | 9                  | 17                    | 17     | 17                 | 17      | 17                 | 12                 |
|      | 5 250 ~ 5 350 MHz | 14                    | 14     | 15<br>(Ch.62//12)  | 14      | 14<br>(Ch.62//11)  | 9                  | 17                    | 17     | 18<br>(Ch.62//15)  | 17      | 17<br>(Ch.62//14)  | 12                 |
|      | 5 470 ~ 5 725 MHz | 15                    | 15     | 15<br>(Ch.102//12) | 15      | 14<br>(Ch.102//11) | 10<br>(Ch.138//16) | 18                    | 18     | 18<br>(Ch.102//15) | 18      | 17<br>(Ch.102//14) | 13<br>(Ch.138//19) |
|      | 5 725 ~ 5 850 MHz | 16                    | 16     | 17                 | 16      | 17                 | 17                 | 19                    | 19     | 20                 | 19      | 20                 | 20                 |

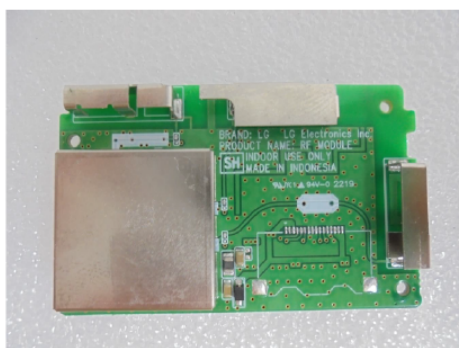
Tolerance : Max. Power  $\pm 3$  dB

| Mode  | Frequency         | Max. Power (dBm) |
|-------|-------------------|------------------|
| BT    | 2 402 ~ 2 480 MHz | 8                |
| BT LE | 2 402 ~ 2 480 MHz | 8                |

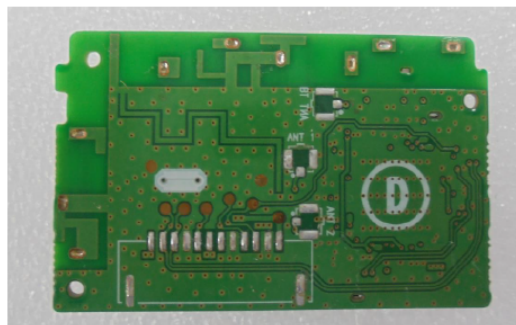
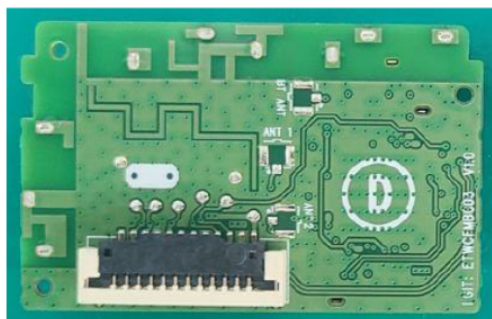
Tolerance : Max. Power  $\pm 2$  dB

LGSBWAC97 has two type connector. (Bottom Connector FFC Cable Type, Top Connector FFC Cable Type)

[Bottom Connector FFC Cable Type]



[Top Connector FFC Cable Type]



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**<Regulatory notice>****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.

**Responsible Party Information**

Supplier's Declaration of Conformity 47 CFR § 2.1077 Compliance Information

**Responsible Party –U.S. Contact Information** LG Electronics USA 1000 Sylvan Avenue Englewood Cliffs

New Jersey, United States, 07632 Telephone number or internet contact information

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**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 than an antenna listed in 2.7 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: Metal antenna (Internal Antenna)

-Max. peak Antenna gain

| Frequency Band                             | Dual Band Ant1 | Dual Band Ant 2 | BT Ant (2402-2480) |
|--|----------------|-----------------|--------------------|
| 2.4GHz (2412-2472)                         | -0.94 dBi      | -1.68 dBi       | 1.12dBi            |
| UNII-1 (5180-5240)                         | 1.5 dBi        | 1.5 dBi         |                    |
| UNII-2A (5260-5320)                        | 1.5 dBi        | 1.5 dBi         |                    |
| UNII-2C (5500-5720)<br>(without 5600-5650) | 1.48 dBi       | 1.46 dBi        |                    |
| UNII-3 (5745-5825)                         | 1.5 dBi        | 1.49 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.

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**Label and compliance information****End Product Labeling**

The module is labeled with its own FCC ID and IC Certification Number. If the FCC ID and 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 FCC ID: BEJLGSBWAC97”

“Contains IC: 2703H-LGSBWAC97”

**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.

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**2. ISED****RSS-GEN, Sec. 7.1.3—(licence-exempt radio apparatus)**

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.

**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 RF**

L'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.

Caution: Any changes or modifications to this device not explicitly approved by manufacturer could void your authority to operate this equipment. Attention:  
 Les changements ou modifications de cet appareil non expressément approuvé par le fabricant peuvent annuler votre droit à utiliser cet équipement.

**Étiquetage du produit final (IC)**

Le module LGSBWAC95 est étiqueté avec sa propre identification FCC et son propre numéro de certification IC. Si l'identification FCC et le numéro de certification IC ne sont pas visibles lorsque le module est installé à l'intérieur d'un autre dispositif, la partie externe du dispositif dans lequel le module est installé devra également présenter une étiquette faisant référence au module inclus. Dans ce cas, le produit final devra être étiqueté sur une zone visible avec les informations suivantes :

- « Contient module émetteur identification FCC ID: BEJLGSBWAC97
- « Contient module émetteur IC : 2703H-LGSBWAC97»

“The 5150-5250 MHz band is restricted to indoor use only.”