

SPECIFICATIONS

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

MODEL NAME : WC1NP8

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REG. DATE : 2017.11.01

SPECIFICATION

REV.NO : 2.0

REV. DATE : 2017.11.16

MODEL NAME : **TWCM-E001D (LGIT)**
WC1NP8

PAGE : 1 / 22

Index

No	Description	Page
1	Features	2
2	Ordering Information	2
3	Label Marking	2
4	Block Diagram	3
5	Absolute Maximum Ratings	3
6	Operating Conditions	4
7	Standard Test Conditions	4
8	Electrical Specifications for Wi-Fi	5
9	Electrical Specifications for Bluetooth	11
10	Environment Tests	14
11	Pin Description	15
12	Test Method	16
13	Mechanical Characteristics	17
14	Outline Drawing	18
15	Insulation Parts List	19
16	Packing Information	20
17	LG CI Specification	22
18	Change History of Revision	25

REG. DATE : 2017.11.01

SPECIFICATION

REV.NO : 2.0

REV. DATE : 2017.11.16

**MODEL NAME : TWCM-E001D (LGIT)
WC1NP8**

PAGE : 2 / 22

1. Features

WC1NP8 is the small size and low power module for IEEE 802.11ac wireless LAN & BT4.2 + HS. TWCM-E001D is based on QCA9379-7 solution.

* Caution: This model don't support AC Mode

- IEEE 802.11 a/b/g/n/ac Dual Band WLAN infrastructure
- Bluetooth 4.2+ HS , BLE
- Size : 68.0mm x 38.0 x 6.8 mm
- Two stream spatial multiplexing up to 300Mbps(802.11n)/ 867Mbps(802.11ac)
- WLAN Metal Press antenna(Ready), BT Printed antenna on
- Use on-chip OTP (One-Time Programmable)
- Host Interface :
 - WLAN : USB2.0
 - BT : USB1.1
- Security : WAPI, WEP, WPA, WPA2, WMM, AES, WEP, TKIP, CKP
- Application: DTV, DVR, HD DVD Player, Blue-ray Disk Player, STB

2. Ordering Information

Model	Description
TWCM-E001D WC1NP8	802.11 a/b/g/n/ac + BT combo Module, Dual Band 2T2R MIMO

3. Label marking



① Customer P/N

④ Product Lot No. : 1710A210101

② MAC Address BAR Code

-17 : Year - 21 : Date

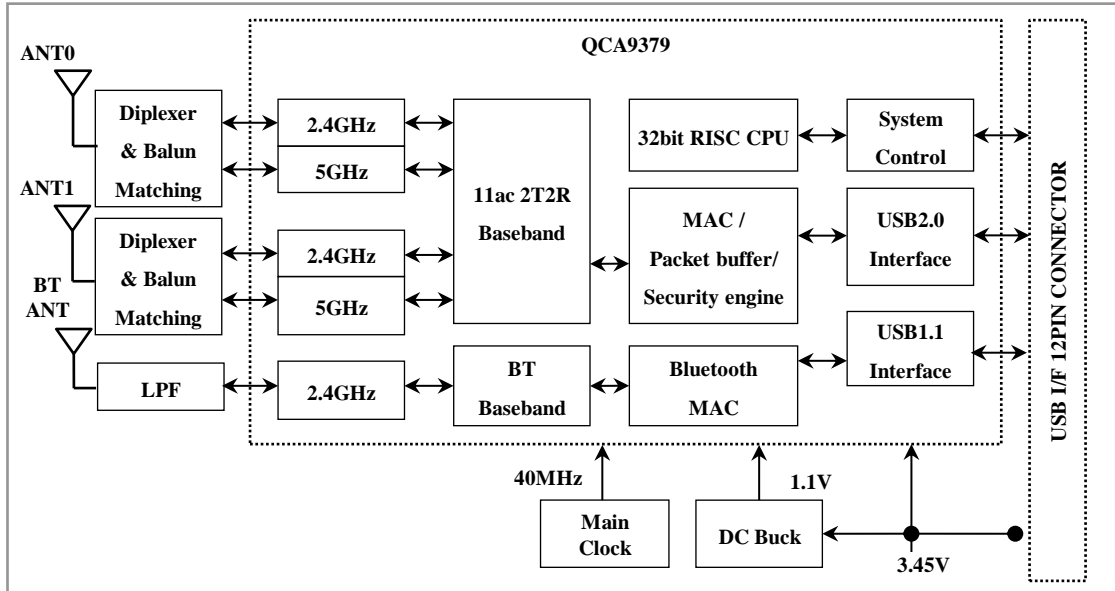
③ Model No

- 10: Month - 01 : Manufactured Process

- A : Revision No - 01 : Change History of Revision

⑤ MAC Address No.

4. Block Diagram



5. 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.

REG. DATE : 2017.11.01

SPECIFICATION

REV.NO : 2.0

REV. DATE : 2017.11.16

 MODEL NAME : **TWCM-E001D (LGIT)**
WC1NP8

PAGE : 4 / 22

6. Operating Conditions

Parameter	Min	Typ	Max	Unit
Ambient Temperature	0	-	60	℃
Ambient Humidity (40℃)	-	-	85	%
Supply Voltage	3.35	3.45	3.6	Vdc

7. Standard Test Conditions

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

7-1. Ambient condition

Temperature	25 ± 5℃
Humidity	65 ± 5%

7-2. Power supply voltages

Input power	Supply Voltage
VDD_3.3V	3.35 ~ 3.6V

7-3. Current consumption (2X2 Continuous Power)

Current Consumption	Min.	Typ.	Max.	Unit
TX Mode (CCK 1M @ 17dBm)	-	1A		mA

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

7-4. ESD Information

Human Body Model (HBM)	Min.	Max.	Unit
Contact	-	±2	kV
Air	-	±10	

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

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

REG. DATE : 2017.11.01

SPECIFICATION

REV.NO : 2.0

REV. DATE : 2017.11.16

**MODEL NAME : TWCM-E001D (LGIT)
WC1NP8**

PAGE : 5 / 22

8. Electrical Specifications for Wi-Fi (Radiation Test)

8-1. RF Characteristics for IEEE802.11b (11Mbps mode unless otherwise specified)

Items	Contents			
Specification	IEEE802.11b			
Mode	DSSS/CCK			
Channel frequency	2400 ~ 2483.5 MHz			
Data rate	1, 2, 5.5, 11Mbps			
TX Characteristics	Min.	Typ.	Max.	Unit
Power Level ²⁾	14	17	20	dBm
Spectrum Mask				
1 st side lobes (to fc ±11MHz)	-	-43	-30	dBr
2 nd side lobes (to fc ±22MHz)	-	-58	-50	dBr
Modulation Accuracy (EVM)	-	30	35	%
Power On/Off ramp	-	0.5	2.1	Usec
Freq. Tolerance	-20	-	20	ppm
Chip Clock Freq. Tolerance	-20	-	20	ppm
RX Characteristics	Min.	Typ.	Max.	Unit
Minimum Input Level Sens. (FER ≤ 8%)		-88	-82	dBm
Maximum Input Level (FER ≤ 8%)	-10	-	-	dBm

* Normal Condition : 25°C, VDD=3.3V.

Note 1. This varies by regulatory domain.

Refer to the product documentation for specific details for each regulatory domain.

Note 2. The maximum power setting will vary by channel and according to individual country regulations.

Refer to the product documentation for specific details.

REG. DATE : 2017.11.01

SPECIFICATION

REV.NO : 2.0

REV. DATE : 2017.11.16

 MODEL NAME : **TWCM-E001D (LGIT)**
WC1NP8

PAGE : 6 / 22

8-2. RF Characteristics for IEEE802.11g (54Mbps mode unless otherwise specified)

Items	Contents			
Specification	IEEE802.11g			
Mode	OFDM			
Channel frequency	2400 ~ 2472 MHz			
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 $f_c \pm 11\text{MHz}$	-	-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%)	-	-74	-67	dBm
Maximum Input Level (PER \leq 10%)	-20	-	-	dBm

* Normal Condition : 25°C, VDD=3.3V.

Note 1. This varies by regulatory domain.

Refer to the product documentation for specific details for each regulatory domain.

Note 2. The maximum power setting will vary by channel and according to individual country regulations.

Refer to the product documentation for specific details.

REG. DATE : 2017.11.01

SPECIFICATION

REV.NO : 2.0

REV. DATE : 2017.11.16

**MODEL NAME : TWCM-E001D (LGIT)
WC1NP8**

PAGE : 7 / 22

8-3. RF Characteristics for IEEE802.11a (54Mbps mode unless otherwise specified)

Items	Contents			
Specification	IEEE802.11a			
Mode	OFDM			
Channel frequency	5150~5850 MHz			
Data rate	6, 9, 12, 18, 24, 36, 48, 54Mbps			
TX Characteristics	Min.	Typ.	Max.	Unit
Power Level ²⁾	10	13	16	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 ≤ 10%)	-	-73	-67	dBm
Maximum Input Level (PER ≤ 10%)	-30	-	-	dBm

* Normal Condition : 25°C, VDD=3.3V.

Note 1. This varies by regulatory domain.

Refer to the product documentation for specific details for each regulatory domain.

Note 2. The maximum power setting will vary by channel and according to individual country regulations.

Refer to the product documentation for specific details.

REG. DATE : 2017.11.01

SPECIFICATION

REV.NO : 2.0

REV. DATE : 2017.11.16

**MODEL NAME : TWCM-E001D (LGIT)
WC1NP8**

PAGE : 8 / 22

8-4. RF Characteristics for IEEE802.11gn (MCS7 mode unless otherwise specified)

Items	Contents			
Specification	IEEE802.11n – 2.4GHz			
Mode	OFDM			
Channel frequency	2400 ~ 2483.5 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	15	18	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%)	-	-73	-66	dBm
Maximum Input Level (PER ≤ 10%)	-20	-	-	dBm

* Normal Condition : 25°C, VDD=3.3V.

Note 1. This varies by regulatory domain.

Refer to the product documentation for specific details for each regulatory domain.

Note 2. The maximum power setting will vary by channel and according to individual country regulations.

Refer to the product documentation for specific details.

REG. DATE : 2017.11.01

SPECIFICATION

REV.NO : 2.0

REV. DATE : 2017.11.16

**MODEL NAME : TWCM-E001D (LGIT)
WC1NP8**

PAGE : 9 / 22

8-5. RF Characteristics for IEEE802.11an (MCS7 mode unless otherwise specified)

Items	Contents			
Specification	IEEE802.11n – 5GHz			
Mode	OFDM			
Channel frequency	5150~5850 MHz			
Data rate	6.5, 13, 19.5, 26, 39, 52, 58.5, 65Mbps			
TX Characteristics	Min.	Typ.	Max.	Unit
Power Level (HT20/HT40:MCS7)	10	13	16	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%)	-	-70	-64	dBm
Minimum Input Level Sens. (HT40, PER ≤ 10%)	-	-67	-62	dBm
Maximum Input Level (PER ≤ 10%)	-30	-	-	dBm

* Normal Condition : 25°C, VDD=3.3V.

Note 1. This varies by regulatory domain.

Refer to the product documentation for specific details for each regulatory domain.

Note 2. The maximum power setting will vary by channel and according to individual country regulations.

Refer to the product documentation for specific details.

REG. DATE : 2017.11.01

SPECIFICATION

REV.NO : 2.0

REV. DATE : 2017.11.16

MODEL NAME : **TWCM-E001D (LGIT)**
WC1NP8

PAGE : 10 / 22

8-4. RF Characteristics for IEEE802.11ac (MCS8/9 mode unless otherwise specified)

Items	Contents
<p>Don' t support This Model</p>	

Note 1: This varies by regulatory domain
Refer to the product documentation for specific details for each regulatory domain

Note 2: The maximum power setting will vary by channel and according to individual country regulations.
Refer to the product documentation for specific details.

REG. DATE : 2017.11.01

SPECIFICATION

REV.NO : 2.0

REV. DATE : 2017.11.16

**MODEL NAME : TWCM-E001D (LGIT)
WC1NP8**

PAGE : 11 / 22

9. Electrical Specifications for Bluetooth (Conducted Test)

9-1. Transmitter Performance

Parameter (Condition)	Min.	Typ.	Max.	Unit
Transmit Power (P_{GPSK})	6	11	15	dBm
Power Density	-	-	20	dBm
Frequency Range	2400	-	2483.5	MHz
20dB Bandwidth	-	-	1000	kHz
In-band Spurious Emissions				
$\pm 500\text{kHz}$	-	-	-20	dBc
$ M-N = 2\text{MHz}$	-	-	-20	dBm
$ M-N \geq 3\text{MHz}$	-	-	-40	dBm
Modulation Characteristics, frequency Deviation				
$\Delta F_{1\text{avg}}$ (00001111 sequence in payload)	140	155	175	kHz
$\Delta F_{2\text{max}}$ (10101010 sequence in payload)	115	-	-	kHz
$\Delta F_{1\text{avg}} / \Delta F_{2\text{max}}$	80	90	-	%
Initial Carrier Frequency Tolerance	-75	-	75	kHz
Carrier Frequency Drift				
DH1 Packet	-25	-	25	kHz
DH3 Packet	-25	-	25	kHz
DH5 Packet	-40	-	40	kHz
Drift rate	-20	-	20	kHz / μs

* Normal Condition : 25°C, VDD=3.5V.

* Supported bluetooth tx power class 1.

REG. DATE : 2017.11.01

SPECIFICATION

REV.NO : 2.0

REV. DATE : 2017.11.16

 MODEL NAME : **TWCM-E001D (LGIT)**
WC1NP8

PAGE : 12 / 22

9-2. Transmitter Performance

Parameter (Condition)	Min.	Typ.	Max.	Unit	
EDR Relative Transmit Power	-4	-	1	dB	
EDR Carrier Frequency Stability					
ω_i (2-DH5 and 3-DH5)	-75	-	75	kHz	
ω_0 (2-DH5 and 3-DH5)	-10	-	10	kHz	
$\omega_i + \omega_0$ (2-DH5 and 3-DH5)	-75	-	75	kHz	
EDR Modulation Accuracy					
RMS DEVM	2-DH5	-	6	20	%
	3-DH5	-	6	13	%
99% DEVM DEVM < 0.30, $\pi/4$ -DQPSK DEVM < 0.20, 8DPSK symbols	2-DH5	99	-	-	%
	3-DH5	99	-	-	%
Peak DEVM	2-DH5	-	13	35	%
	3-DH5	-	13	25	%
EDR Differential Phase Encoding (packet with 0 error > 99%)	99	-	-	%	
EDR In-band Spurious Emissions					
$ M-N = 1\text{MHz}$	-	-	Ptx_ref-26	dBm	
$ M-N = 2\text{MHz}$	-	-	-20	dBm	
$ M-N = 3\text{MHz}$	-	-	-40	dBm	
Enhanced Power Control	-	-	4	dBm	

9-3. BLE RF Performance

Parameter (Condition)	Min.	Typ.	Max.	Unit
Tx Power	0	4	8	dBm
Rx sensitivity (GFSK, BER, 1 Mbps)	-	-90	-80	dBm
Mod Char : delta F1 average	225	255	275	kHz
Mod Char : delta F2 max	99.9	-	-	%
Mod Char : ratio	80	95	-	%

REG. DATE : 2017.11.01

SPECIFICATION

REV.NO : 2.0

REV. DATE : 2017.11.16

**MODEL NAME : TWCM-E001D (LGIT)
WC1NP8**

PAGE : 13 / 22

9-4. Receiver Performance

Parameter (Condition)	Min.	Typ.	Max.	Unit
Rx sensitivity				
GPSK, 0.1% BER, 1Mbps	-	-85	-70	dBm
$\pi/4$ -DQPSK, 0.01% BER, 2Mbps	-	-80	-70	dBm
8-DPSK, 0.01% BER, 3Mbps	-	-80	-70	dBm
C/I performance				
C/I co-channel (GFSK, 0.1%BER)	-	-	11	dB
C/I 1MHz (GFSK, 0.1%BER)	-	-	0	dB
C/I 2MHz (GFSK, 0.1%BER)	-	-	-30	dB
C/I ≥ 3 MHz (GFSK, 0.1%BER)	-	-	-40	dB
C/I image (GFSK, 0.1%BER)	-	-	-9	dB
C/I image \pm 1MHz (GFSK, 0.1%BER)	-	-	-20	dB
C/I co-channel ($\pi/4$ -DQPSK, 0.1%BER)	-	-	13	dB
C/I 1MHz ($\pi/4$ -DQPSK, 0.1%BER)	-	-	0	dB
C/I 2MHz ($\pi/4$ -DQPSK, 0.1%BER)	-	-	-30	dB
C/I ≥ 3 MHz ($\pi/4$ -DQPSK, 0.1%BER)	-	-	-40	dB
C/I image ($\pi/4$ -DQPSK, 0.1%BER)	-	-	-7	dB
C/I image \pm 1MHz ($\pi/4$ -DQPSK, 0.1%BER)	-	-	-20	dB
C/I co-channel (8-DPSK, 0.1%BER)	-	-	21	dB
C/I 1MHz (8-DPSK, 0.1%BER)	-	-	5	dB
C/I 2MHz (8-DPSK, 0.1%BER)	-	-	-25	dB
C/I ≥ 3 MHz (8-DPSK, 0.1%BER)	-	-	-33	dB
C/I image (8-DPSK, 0.1%BER)	-	-	0	dB
C/I image \pm 1MHz (8-DPSK, 0.1%BER)	-	-	-13	dB
Intermodulation(BER \leq 0.1%) Input = -64dBm, n=5	-39	-	-	dBm
Out-of-band blocking (CW, BER\leq0.1%)				
30MHz ~ 2000MHz	-10	-	-	dBm
2000MHz ~ 2399MHz	-27	-	-	dBm
2498MHz ~ 3000MHz	-27	-	-	dBm
3000MHz ~ 12.75GHz	-10	-	-	dBm
Maximum input (GFSK, 0.1% BER)	-20	-	-	dBm

 * Normal Condition : 25 $^{\circ}$ C, VDD=3.3V.

REG. DATE : 2017.11.01

SPECIFICATION

REV.NO : 2.0

REV. DATE : 2017.11.16

 MODEL NAME : **TWCM-E001D (LGIT)**
WC1NP8

PAGE : 14 / 22

10. Environment Tests

Item	Test Conditions	Specifications
Heat Load Test	Initial values are measured at standard test condition. Leave samples in $60\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$ for 96 ± 5 hours, and in standard test condition for 30 minutes, then take measurements within 1 hour. - Supply voltage : standard $\pm 5\%$	•TX Power : $\pm 4\text{dB Max}$ • Min Input Level : $\pm 4\text{dB Max}$
Humidity Load Test	Initial values are measured at standard test condition. Leave samples in $40\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$, 90 ~ 95% RH for 96 ± 5 hours, and in standard test condition for 30 minutes, then take measurements within 1 hour. - Supply voltage : standard + 5%	
Heat Test	Initial values are measured at standard test condition. Leave samples in $70\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ for 96 ± 5 hours, and in standard ambient for 1 hour with standard power Supply then take measurements within 1 hour.	
Cold Test	Initial values are measured at standard test condition. Leave samples in $-20\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ for 96 ± 5 hours, and in standard ambient for 1 hour with standard power Supply then take measurements within 1 hour.	
Temperature Shock	Take measurements in standard test condition. Temp. : $-40\text{ }^{\circ}\text{C} \sim +85\text{ }^{\circ}\text{C}$ Duration : 30 min Ramp-up & Ramp-down for 5 min Cycle : 200cycle.	
Vibration Test	Initial value measure at standard test condition. Sweep rate : 1 single sweep/ minute Amplitude : 1.5 mm Frequency : 10-55Hz Duration : 1 Hours per direction (X,Y,Z)	

REG. DATE : 2017.11.01

SPECIFICATION

REV.NO : 2.0

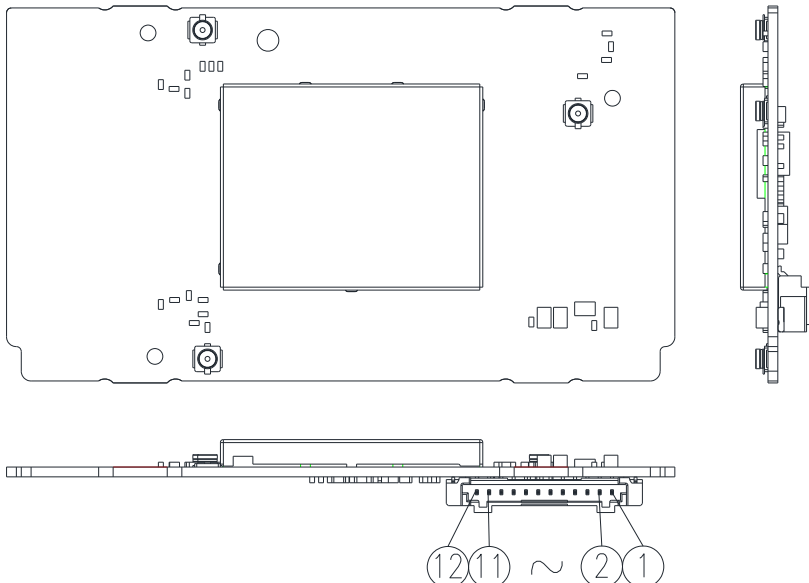
REV. DATE : 2017.11.16

 MODEL NAME : **TWCM-E001D (LGIT)**
WC1NP8

PAGE : 15 / 22

11. Pin Description

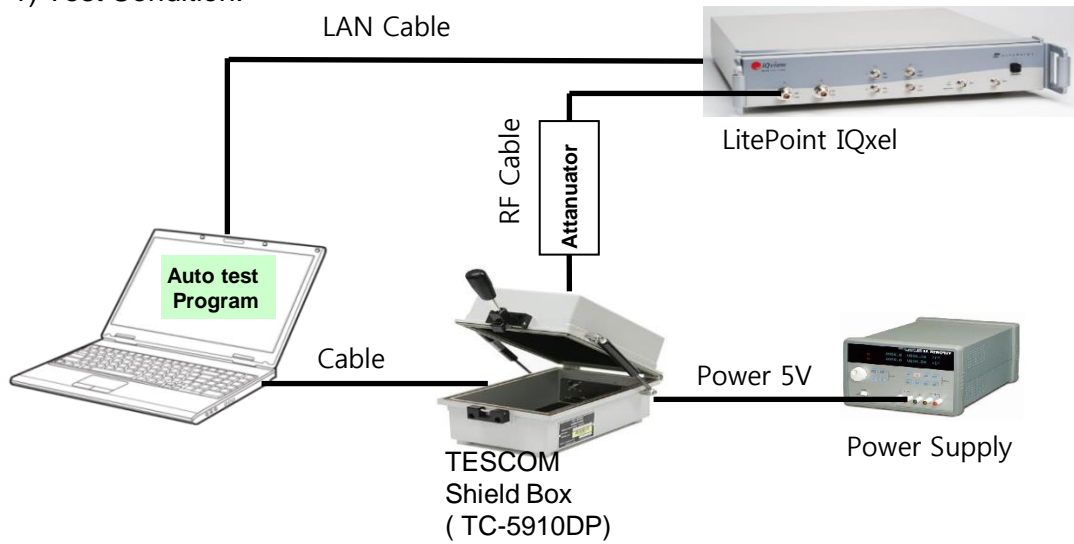
Pin No.	Pin Name	I/O	Pin Description
1	VCC	I	Power Supply 3.3V
2	USB_DN_WiFi	I/O	WiFi USB Communication signal USB D-
3	USB_DP_WiFi	I/O	WiFi USB Communication signal USB D+
4	GND	I	Ground
5	WOWL	I	Wake On WLAN
6	VCC	I	Power Supply 3.3V
7	WLAN_EN	I	WiFi_RESET
8	GND	I	Ground
9	USB_DN_BT	I/O	BT USB Communication signal USB D-
10	USB_DP_BT	I/O	BT USB Communication signal USB D+
11	GND	I	Ground
12	BT_EN	I	BT_RESET



12. Test method

This is a conducted test method of WiFi RF performance.

1) Test Condition.



2) Test Set-up List.

- Instrument : LitePoint IQxel
- Shield Box : Tescom TC-5910DP
- RF Cable : TESCOM 4011-0011
- Attenuator : Mini-Circuit 15542 10dB attenuator
- USB Cable, LAN Cable, Murata RF Cable : MXHT83QE3000 or MXHS83QE3000
- Power Supply

3) Test Flow

- Install the test set-up.
- Power OFF.
- Open the Shield box and install the DUT for test.
- Close the shield box.
- Power ON.
- Check the driver icon.
- Start testing.

#. Notes.

- Be careful that you can consider a RF cable LOSS.

REG. DATE : 2017.11.01

SPECIFICATION

REV.NO : 2.0

REV. DATE : 2017.11.16

MODEL NAME : **TWCM-E001D (LGIT)**
WC1NP8

PAGE : 17 / 22

13. 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	8 g

REG. DATE : 2017.11.01

SPECIFICATION

REV.NO : 2.0

REV. DATE : 2017.11.16

MODEL NAME : **TWCM-E001D (LGIT)**
WC1NP8

PAGE : 18 / 22

14. Outline Drawing

LG Innotek Confidential		2	3	4	
DIMENSIONAL TOLERANCE ~ up to 6 ±0.3 over 6 up to 30 ±0.5 over 30 up to 120 ±0.5 UNLESS OTHERWISE SPECIFIED	C H A N G E S	REV. NO.	DATE (YY MM DD)	SIGNATURE	CHANGE CONTENTS
				A	
				B	
				C	
RELEASING THIS DRAWING WITHOUT PERMISSION OF LG Innotek SHOULD BE ACCUSED ACCORDING TO THE LAWS AND COMPANY RULES					
PCB : FR-4 Shield can : Nickel Silver or S-Tin plate steel sheet Refer to 12507WR-H12G of Yenho electronics. (Pitch 1.25 SMD)					
Notes 1. Tolerances are ±0.3, Radii are 0.5, unless otherwise specified. 2. Lot No. shall be conformed to LGIT standard specification. 3. As long as the outer appearance doesn't affect the performance of the product, it can be changed without prior notice. 4. PCB Warpages are max. 0.6mm. 5. Caution for handling. 1) Don't touch the circuit components. 2) Don't drop the wifi module 50cm high. (Allowed 1 time for 50cm high Max) 3) Don't twist the wifi module. 6. Reliability for PCB bending. 1) Requirement : No apparent damage 2) Test method : Solder the sample PCB, band down to 2mm 3) Fig					
RELATED P/N		SCALE	UNIT	DESIGN	TITLE
	THIRD ANGLE PROJECT	1:1	mm	'17. 09 13 <i>Jangeun Yang</i>	Outline Drawing
				CHECKED	PART NO
				'17. 09 13 <i>Hojin Roh</i>	
				APPROVED	MODEL
				'17. 09 13 <i>Yeongtaek Kang</i>	TWCM-E001D
				DWG NO	
LGIT_STD A4_VER	2	3	LG Innotek Co., Ltd.		

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REG. DATE : 2017.11.01

SPECIFICATION

REV.NO : 2.0

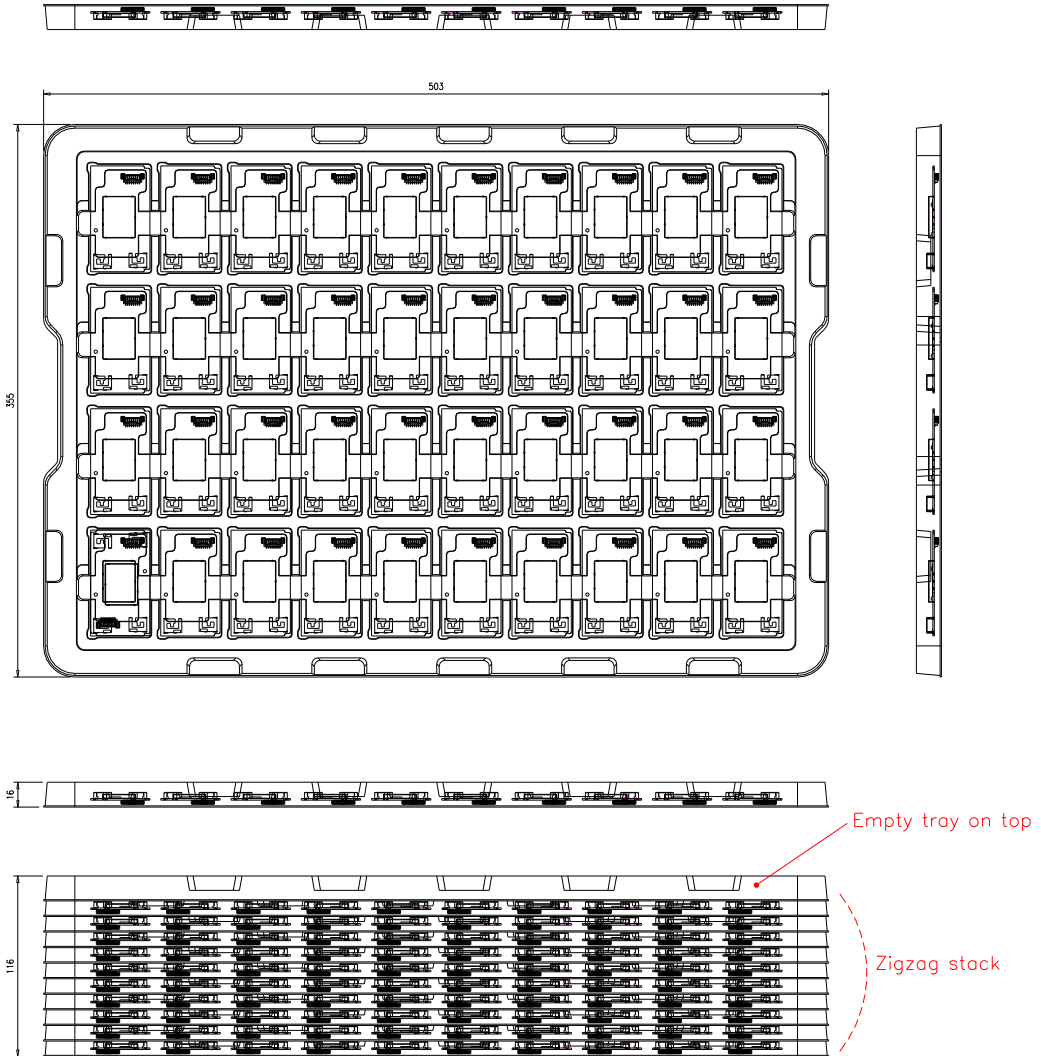
REV. DATE : 2017.11.16

MODEL NAME : **TWCM-E001D (LGIT)
WC1NP8**

PAGE : 19 / 22

15. Packing Information

PACKING SPECIFICATION



PART NO.		NAME		MATERIAL			SPEC.		FINISH		A4 SIZE
							UNIT mm	SCALE N/A	5PKQ00618A		
							DSGD.	DRAW.	TITLE Packing Tray		
									DOCUMENT NO.		1/2
ZONE	SYMB	DATE OR NO.	APPD.	CHKD.	DSGD.						

REG. DATE : 2017.11.01

SPECIFICATION

REV.NO : 2.0

REV. DATE : 2017.11.16

MODEL NAME : **TWCM-E001D (LGIT) WC1NP8**

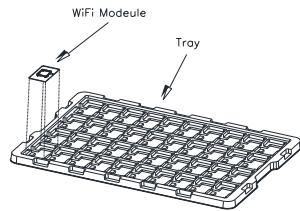
PAGE : 20 / 22

LG Innotek Confidential

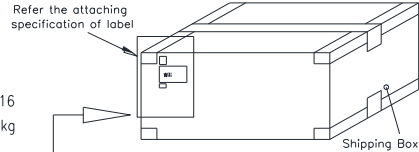
DIMENSIONAL TOLERANCE	~ up to 6	±0.3	C H A N G E S	REV NO.	DATE (YY MM DD)	SIGNATURE	CHANGE CONTENTS
	over 6 up to 30	±0.5					
	over 30 up to 120	±0.5					
	UNLESS OTHERWISE SPECIFIED						

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"

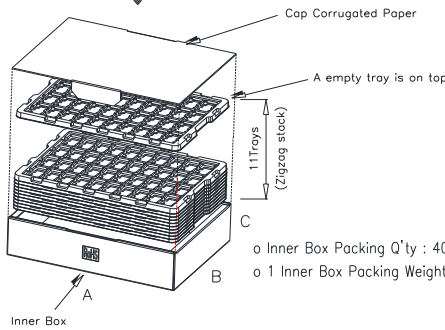
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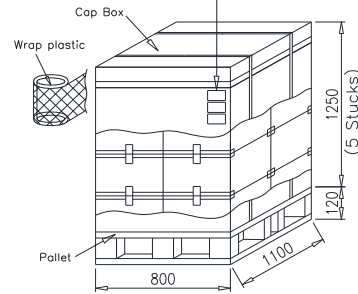
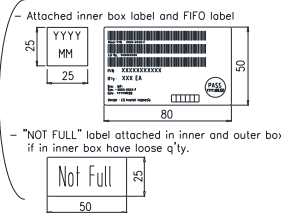
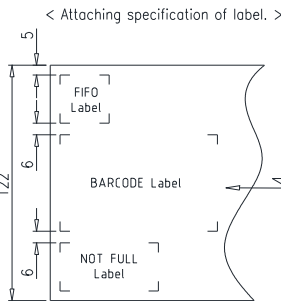
- o 1 Tray Packing Q'ty : 40EA
- o Size : W X D X H : 503 * 355 * 16
- o 1 Tray Packing Weight : 0.6±0.1kg (1 Module Weight : 9.7±1g)



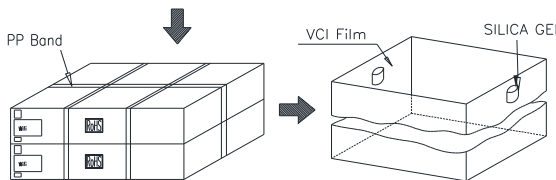
- o Carton Box Packing Q'ty : 800EA
- o Size : W X D X H : 514 * 394 * 248
- o 1 Carton Box Packing Weight : 14.0±0.8kg



- o Inner Box Packing Q'ty : 400EA
- o 1 Inner Box Packing Weight : 6.6±0.5kg



- (CARTON BOX : 20EA)
- o Box Material : Corrugated Paper
- o Total Packing Q'TY : 16,000EA
- o Total Packing Weight : 295±10kg



RELATED P/N		SCALE	UNIT	DESIGN	17 10. 31 Wira	TITLE	EXP. Packing Specification
				CHECKED	17 10. 31 J. E. Yang	PART NO	_____
				APPROVED	17 10. 31 Y. T. Kang	MODEL	TWCM-E001D
				DWG NO	NTH40147 (1/1)		

REG. DATE : 2017.11.01

SPECIFICATION

REV.NO : 2.0

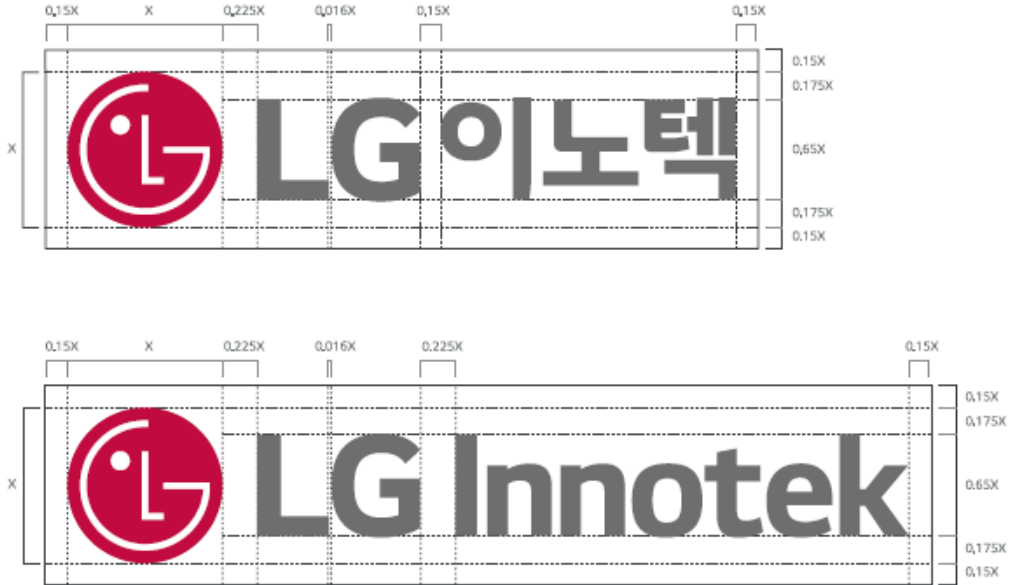
REV. DATE : 2017.11.16

MODEL NAME : **TWCM-E001D (LGIT)**
WC1NP8

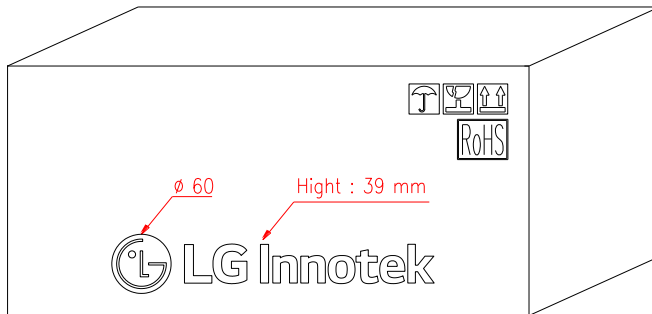
PAGE : 21 / 22

16. LG CI Specification.

■ **LG CI regulation**

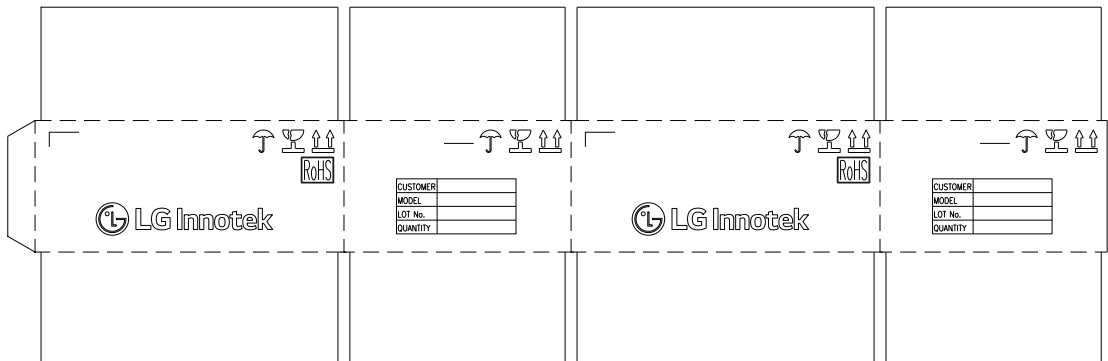


■ **LG CI print in Carton box**



Logo Ratio – 1 : 0.65
Logo Type Color -- Black

■ **Planar figure of Carton box**



REG. DATE : 2017.11.01

S P E C I F I C A T I O N

REV.NO : 2.0

REV. DATE : 2017.11.16

MODEL NAME : **TWCM-E001D (LGIT)**
WC1NP8

PAGE : 21 / 22

■ FCC and ISED Statements**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 not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

FCC Part 15.105

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.

OEM Responsibilities to comply with FCC and Industry Canada Regulations

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.

As long as the two condition above is met, further transmitter testing 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 (for example, digital device emissions, PC peripheral requirements, etc.).

End Product Labeling

The module is labeled with its own FCC ID and IC Certification Number. If the FCC ID and ISED 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: BEJ-WC1NP8

“Contains ISED ID: 2703H- WC1NP8”

REG. DATE : 2017.11.01

SPECIFICATION

REV.NO : 2.0

REV. DATE : 2017.11.16

MODEL NAME : **TWCM-E001D (LGIT)**
WC1NP8

PAGE : 21 / 22

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 C NR 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 BT111 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 : BEJ-WC1NP8

« Contient module émetteur ISED ID : 2703H-- WC1NP8”

REG. DATE : 2017.11.01

S P E C I F I C A T I O N

REV.NO : 2.0

REV. DATE : 2017.11.16

MODEL NAME : **TWCM-E001D (LGIT)**
WC1NP8

PAGE : 21 / 22

■ CE Statements

Hereby, LG Electronics Inc. declares that the radio equipment type RF Module is in compliance with Directive 2014/53/EU. The full text of the EU declaration of conformity is available at the following internet address:

<http://www.lg.com/global/support/cedoc/cedoc#>

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. This device must not be collocated or operating in conjunction with any other antenna or transmitter.

The host manufacturer integrating this module should be assessed total compliance with all essential requirements regarding this radio module.

The host manufacturer has the responsibility that the host device should be compliance with all essential requirement of RED.

Contact Address

LG Electronics European Shared Service Center B.V. Krijgsman 1, 1186 DM
Amstelveen, The Netherlands



REG. DATE : 2017.11.01

SPECIFICATION

REV.NO : 2.0

REV. DATE : 2017.11.16

MODEL NAME : **TWCM-E001D (LGIT)
WC1NP8**

PAGE : 22 / 22

Change History of Revision

Revision	Date	Contents of Revision Change	Remark
1.0	'17.11.01	First release	H.J.Roh
2.0	'17.11.16	Remove 802.11AC specification(Customer request)	H.J.Roh