

Manual For WCK730B

Operation Description for WCK730B

1. Introduction

This module is a Wi-Fi/Bluetooth Combo module compliant with IEEE802.11a/b/g/n/ac MAC/baseband/radio and Bluetooth 4.1+HS optimized for low-power application.

The core chipset is from Broadcom, part number BCM43569.

2. Operational Description [WiFi - 2.4GHz]

(1) Description for 2.4GHz

2) Description for 802.11n

	Description		
Frequency	• 2412~2462		
DFS attestations	• Client without radar detection capability		
Frequency tolerance	• 802.11 b / g / n : ± 20 ppm		
IEEE802.11 mode	• b/g/n		
Data rate	• up to 300Mbps defined by the IEEE 802.11 b/g/n		
Channel bandwidth	• 20MHz, 40MHz		
Scan behavior	Frequency (MHz)	Active Scanning	Passive Scanning
	2412-2462	☒ Yes, ☐ No	☐ Yes, ☒ No
DFS channel	• Not support		
Ad-hoc/WiFi direct	• Support		
Wifi display	• Support		
Type of MIMO	• 2x2 MIMO • 802.11b/g : uncorrelated signal(1*T _x), • 802.11n(MCS0~MCS7) : correlated signals • (2*T _x CDD or 2*T _x STBC) • 802.11n (MCS8~MCS15) : uncorrelated signals(2*T _x SDM)		
Data Modulation	• DSSS : CCK, BPSK, QPSK for 802.11b • OFDM : BPSK, QPSK, 16QAM, 64QAM for 802.11g/n		

(2) Power Table for 2.4GHz

- The power output is made under conducted conditions

Parameter	Conditions	Min	Nom	Max	Unit
802.11b	All rates	-	-	12.33	dBm
802.11g	All rates	-	-	12.57	dBm
802.11n	2.4GHz, HT20, MCS0 ~ 7	-	-	12.57	dBm
	2.4GHz, HT20, MCS8 ~ 15	-	-	12.57	dBm
	2.4GHz, HT40, MCS0 ~ 7	-	-	10.68	dBm
	2.4GHz, HT40, MCS8 ~ 15	-	-	10.50	dBm

3. Operational Description [WiFi - 5GHz]

(1) Description for 5GHz

	Description		
Frequency	• 5150-5850		
DFS attestations	• Client without radar detection capability		
Frequency tolerance	• 802.11 a/n/ac : $\pm 18\text{ppm}$		
IEEE802.11 mode	• a /n/ac		
Data rate	• up to 867Mbps defined by the IEEE 802.11 a/n/ac		
Channel bandwidth	• 20MHz , 40MHz , 80MHz		
DFS channel	• Use DFS range, No ability of radar detection		
Scan behavior	Frequency (MHz)	Active Scanning	Passive Scanning
	5180-5240	☒ Yes, ☐ No	☐ Yes, ☒ No
	5260-5320	☐ Yes, ☒ No	☒ Yes, ☐ No
	5500-5700	☐ Yes, ☒ No	☒ Yes, ☐ No
	5745-5825	☒ Yes, ☐ No	☐ Yes, ☒ No
Ad-hoc/WiFi direct	• Support (not support in DFS bands)		
Wifi display	• Support		
Type of MIMO	• 2x2 MIMO • 802.11a : uncorrelated signal(1*T_x), • 802.11n(MCS0~MCS7) : correlated signals (2*T_x CDD or 2*T_x STBC), • 802.11n(MCS8~MCS15) : uncorrelated signals(2*T_x SDM), • 802.11ac (MCS0~MCS9 NSS1) : correlated signals (2*T_x CDD or 2*T_x STBC), • 802.11ac (MCS0~MCS9 NSS2) : uncorrelated signals (2*T_x SDM)		
Data Modulation	• OFDM : BPSK, QPSK, 16QAM, 64QAM, 256QAM • for 802.11a/n/ac		

(2) Power Table for 5GHz

- The power output is made under conducted conditions

Parameter	Conditions	Min	Nom	Max	Unit
UN II -1 (5150~5250MHz)	802.11a	-	-	15.18	dBm
	802.11n, HT20, MCS0 ~ 7	-	-	15.03	dBm
	802.11n, HT20, MCS8 ~ 15	-	-	14.86	dBm
	802.11n, HT40, MCS0 ~ 7	-	-	15.49	dBm
	802.11n, HT40, MCS8 ~ 15	-	-	15.07	dBm
	802.11ac, VHT20, MCS0 ~ 9 NSS1	-	-	15.16	dBm
	802.11ac, VHT20, MCS0 ~ 9 NSS2	-	-	15.08	dBm
	802.11ac, VHT40, MCS0 ~ 9 NSS1	-	-	15.54	dBm
	802.11ac, VHT40, MCS0 ~ 9 NSS2	-	-	15.39	dBm
	802.11ac, VHT80, MCS0 ~ 9 NSS1	-	-	13.84	dBm
	802.11ac, VHT80, MCS0 ~ 9 NSS2	-	-	13.63	dBm

UN II -2A (5250~5350MHz)	802.11a	-	-	15.51	dBm
	802.11n, HT20, MCS0 ~ 7	-	-	15.07	dBm
	802.11n, HT20, MCS8 ~ 15	-	-	14.86	dBm
	802.11n, HT40, MCS0 ~ 7	-	-	15.38	dBm
	802.11n, HT40, MCS8 ~ 15	-	-	15.09	dBm
	802.11ac, VHT20, MCS0 ~ 9 NSS1	-	-	15.18	dBm
	802.11ac, VHT20, MCS0 ~ 9 NSS2	-	-	15.05	dBm
	802.11ac, VHT40, MCS0 ~ 9 NSS1	-	-	15.55	dBm
	802.11ac, VHT40, MCS0 ~ 9 NSS2	-	-	15.39	dBm
	802.11ac, VHT80, MCS0 ~ 9 NSS1	-	-	14.03	dBm
	802.11ac, VHT80, MCS0 ~ 9 NSS2	-	-	13.82	dBm
UN II -2C (5470~5725MHz)	802.11a	-	-	14.93	dBm
	802.11n, HT20, MCS0 ~ 7	-	-	15.08	dBm
	802.11n, HT20, MCS8 ~ 15	-	-	14.82	dBm
	802.11n, HT40, MCS0 ~ 7	-	-	15.45	dBm
	802.11n, HT40, MCS8 ~ 15	-	-	15.02	dBm
	802.11ac, VHT20, MCS0 ~ 9 NSS1	-	-	15.03	dBm
	802.11ac, VHT20, MCS0 ~ 9 NSS2	-	-	14.98	dBm
	802.11ac, VHT40, MCS0 ~ 9 NSS1	-	-	15.02	dBm
	802.11ac, VHT40, MCS0 ~ 9 NSS2	-	-	14.83	dBm
	802.11ac, VHT80, MCS0 ~ 9 NSS1	-	-	10.91	dBm
	802.11ac, VHT80, MCS0 ~ 9 NSS2	-	-	13.91	dBm
UN II -3 (5725~5850MHz)	802.11a	-	-	5.79	dBm
	802.11n, HT20, MCS0 ~ 7	-	-	2.85	dBm
	802.11n, HT20, MCS8 ~ 15	-	-	2.73	dBm
	802.11n, HT40, MCS0 ~ 7	-	-	5.85	dBm
	802.11n, HT40, MCS8 ~ 15	-	-	5.41	dBm
	802.11ac, VHT20, MCS0 ~ 9 NSS1	-	-	5.67	dBm
	802.11ac, VHT20, MCS0 ~ 9 NSS2	-	-	5.58	dBm
	802.11ac, VHT40, MCS0 ~ 9 NSS1	-	-	5.87	dBm
	802.11ac, VHT40, MCS0 ~ 9 NSS2	-	-	5.78	dBm
	802.11ac, VHT80, MCS0 ~ 9 NSS1	-	-	5.30	dBm
	802.11ac, VHT80, MCS0 ~ 9 NSS2	-	-	5.09	dBm

4. Operational Description [Bluetooth]

(1) Description for Bluetooth

	Description
Frequency	• 2402-2480
Power Class	• Class 1 or 2
Bluetooth Standard	• Bluetooth 4.1 + EDR
Data rate	• up to 3Mbps defined by the Enhanced Data Rate
Data Modulation	• FHSS : GFSK, OQPSK, 8DPSK, π /4DPSK for Bluetooth

(2) Power Table for Bluetooth

Parameter	Conditions	Min	Nom	Max	Unit
BDR	TRM/CA/01/C 1DH5	5	11	14	dBm
EDR	TRM/CA/10/C 2DH5	3	7	11	dBm

(3) Simultaneous transmission

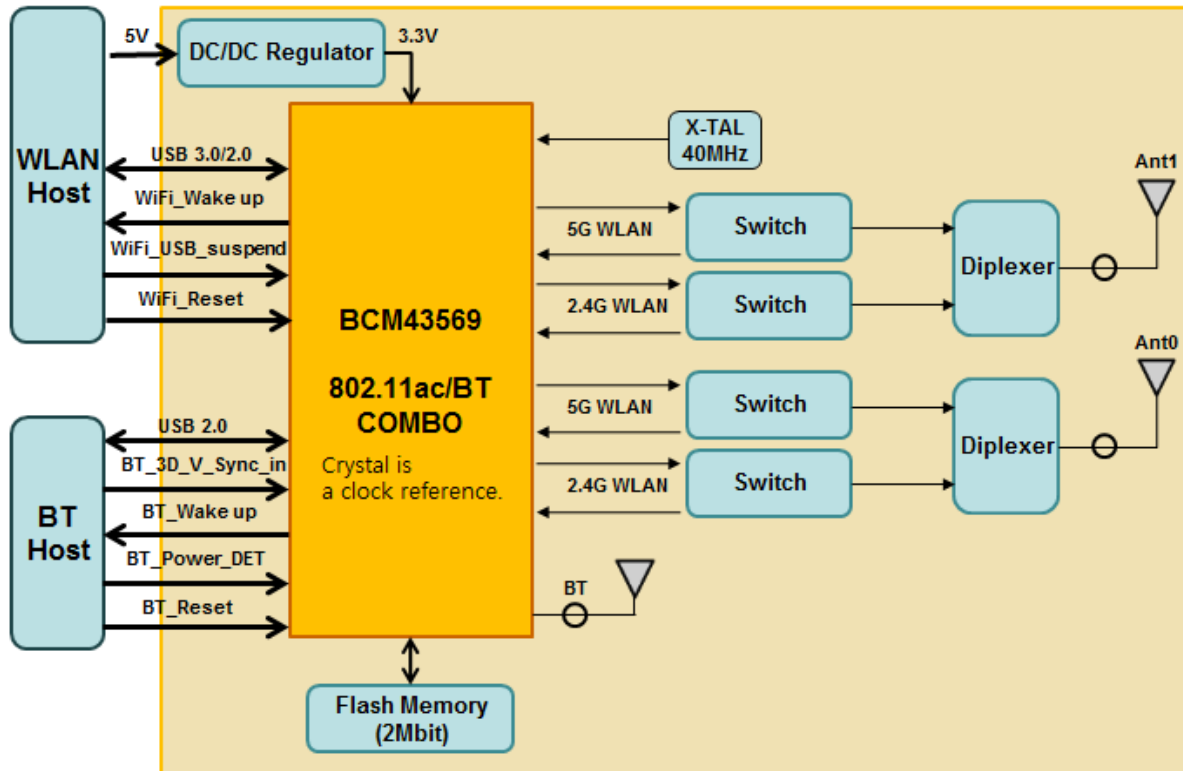
	BT	BT LE	2.4GHz Wi-Fi	5GHz Wi-Fi
BT		O	O	O
BT LE	O		O	O
2.4GHz Wi-Fi	O	O		N/A
5GHz Wi-Fi	O	O	N/A	

5. Hardware Architecture

1) Main Chipset Information

Item	Vendor	Part Number
MAC/BBP/Radio Transceiver/PA	Broadcom	BCM43569PKFFBG

2) Block Diagram



3) Hardware and Software version

Hardware	Software	
0.9	WiFi	106
	BT	61

4) Description for Hardware

(1) General Description

This is the 802.11a/b/g/n/ac + Bluetooth 4.1 Combo module that acts as a communication controller for users of a wireless device to connect to SMART TV.

(2) Features summary

- IEEE 802.11ac compliant
- Dual band 2.4GHz / 5GHz
- Two-stream spatial multiplexing up to 867Mbps
- Supports MCS0-15 modulation and coding rates
- Supports 20MHz, 40MHz and 80MHz channels with optional SGI(256QAM modulation)
- On chip power amplifiers and low noise amplifier for both band.

- Complies with Bluetooth Core Specification Version 4.1 +HS
- Adaptive frequency hopping(AFH) for reducing radio frequency interference

[External Switch]

- RTC6603 for 2.4GHz (Richwave)

The RTC6603 is a switch (SPDT) designed for 0.1 ~3.0GHz frequency range, compatible with 802.11b/g/n wireless LAN system. The device is manufactured based on advanced CMOS SOI(silicon-on-insulator) technology. The RTC6603 features low insertion loss, high isolation and positive voltage operation with low power consumption.

- RTC6608O for 5GHz (Richwave)

The RTC6608O is a switch (SPDT) designed for 0.1~6GHz frequency range, compatible with 802.11a/b/g/n wireless LAN system. The device is manufactured based on GaAs PHET technology. The RTC6608O exhibits low insertion loss, high isolation and low DC power consumption characteristics over broadband range.

[DC/DC Regulator]

- AX3811A (axelite)

The AX3811A develops high efficiency synchronous step down DC-DC converter capable of delivering 2A load current. AX3811A adopts the instant PWM architecture to achieve fast transient responses for high step down applications and high efficiency at light loads. It operates at pseudo-constant frequency of 500KHz under heavy load conditions.

[X-tal]

- 40MHz (Hosonic)

For IF and RF frequency, a crystal(40MHz) is a clock reference.



Approval Statement

CE Statement

Hereby, we declare that this device is in compliance with the essential requirements and other relevant provisions of directive 1999/5/EC.

FCC Statement

To satisfy FCC exterior labeling requirements, the following text must be placed on the exterior of the end product.

Contains Transmitter module FCC ID: A3LWCK730B

The final end product must be labeled in a visible area with the following " Contains TX FCC ID: **A3LWCK730B**"

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.

This device complies with Part 15 of the FCC's 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 undesirable operation.

FCC Radiation Exposure Statement;

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & body.

This module is intended for OEM integrator. The OEM integrator is still responsible for the FCC compliance

Requirement of the end product, which integrates this module.

20cm minimum distance has to be able to be maintained between the antenna and the users for the host

this module is integrated into. Under such configuration, the FCC radiation exposure limits set forth for an

population / uncontrolled environment can be satisfied.

Any change or modifications not expressly approved by the manufacturer could void the user's authority to

Operate this equipment.

In the users manual of the end of product, the end user has to be informed to keep at least 20cm separation

with the antenna while this end product is installed and operated.

The end user has to be informed that the FCC radio-frequency exposure guidelines for an uncontrolled environment can be satisfied. The end user has to also be informed that any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment. If the size

Of the end product is smaller than 8x10cm, then additional FCC part 15.19 statement is required to be available in the users manual; This device complies with Part 15 of FCC rules.

IC Information

This device complies with Industry Canada license-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.

Cet appareil est conforme avec Industrie Canada exempts de licence standard RSS (s). L'opération est soumise aux deux conditions suivantes:

- (1) cet appareil ne peut causer d'interférences, et*
- (2) cet appareil doit accepter toute interférence, y compris les interférences qui peuvent causer un mauvais fonctionnement de l'appareil.*

The end product must be labeled to display the Industry Canada certification number of the module.

Contains transmitter module IC: 649E-WCK730B

Le dispositif d'accueil doivent être étiquetés pour afficher le numéro de certification d'Industrie Canada du module.

Contient module émetteur IC : 649E-WCK730B

For product available in the USA/Canada market, only channel 1~11 can be operated and these channel

Assignments deal with only the 2.4GHz range

This device and its antenna(s) must not be co-located or operation in conjunction with

Any other antenna or transmitter.

This device is going to be operated in 5.15~5.25GHz frequency range, it is restricted in indoor environment only

IC Radiation Exposure Statement:

This equipment complies with IC RSS-102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

This module is intended for OEM integrator. The OEM integrator is still responsible for the IC compliance requirement of the end product, which integrates this module.

20cm minimum distance has to be able to be maintained between the antenna and the users for the host this module is integrated into. Under such configuration, the IC RSS- 102 radiation exposure limits set forth for an population/uncontrolled environment can be satisfied.

The final end product must be labeled in a visible area with the following " Contains TX IC : 649E-WCK730B"

User Information

This device complies with FCC & IC radiation exposure limits set forth for an uncontrolled environment. This device should be installed and must not be co-located or operating in conjunction with any other antenna or transmitter.

This device is intended only for OEM integrators under the following conditions:

- 1) The antenna must be installed such that 20cm is maintained between the antenna and users.
- 2) This module may not be co-located with any other transmitters or antennas.

As long as 2 conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements with this module installed. In the event that these conditions cannot be met, then the FCC & IC authorizations are no longer considered valid and the FCC ID cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product including this module and obtaining separate FCC & IC authorizations.

Cet appareil est conforme aux limites d'exposition rayonnement de la FCC et IC définies pour un environnement non contrôlé . Cet appareil doit être installé et ne doit pas être co- localisées ou opérant en conjonction avec une autre antenne ou émetteur .

Cet appareil est conçu uniquement pour les intégrateurs OEM dans les conditions suivantes :

- 1) L' antenne doit être installée de telle sorte que 20 cm est maintenue entre l'antenne et les utilisateurs .*
- 2) Ce module ne peut pas être co-localisé avec d'autres émetteurs ou des antennes .*

Tant que deux conditions ci-dessus sont remplies , nouvel essai de l'émetteur ne sera pas tenu . Cependant , l'intégrateur OEM est toujours responsable de tester leur produit final pour les exigences de conformité supplémentaires avec ce module installé . Dans le cas où ces conditions ne peuvent être remplies, les autorisations de la FCC et IC ne sont plus considérés comme valides et l'ID FCC ne peuvent pas être utilisés sur le produit final . Dans ces circonstances , l'intégrateur OEM sera chargé de réévaluer le produit final incluant ce module et l'obtention des autorisations de la FCC et IC distincts .

Any changed or modifications not expressly approved by the party responsible for compliance could void the



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user's authority to operate this equipment.

Toute changé ou modifications non expressément approuvés par la partie responsable de la conformité pourraient annuler l'utilisateur `autorité de faire fonctionner cet équipement.

It is noticed the device is stated to be not able to be operated at 5600-5650.
This module use for Samsung TV and AV products with indoor condition