

PRODUCT	BT(v4.2) & WLAN(802.11a/b/ g/n/ac) 2.4G SISO/5G MIMO	SPECIFICATION MODEL NAME : 6세대 BT/wifi Combo Module		
			MODEL CODE	A000020012A

6th Bt/Wifi Module User Manual



ADDRESS RM#2401, A-dong, D-Polis, 606, Seobusaet-gil, Geumcheon-gu, Seoul, 08504 Korea

TEL 070-7790-8869

FAX 02-2642-0012

CONFIDENTIAL



PRODUCT	BT(v4.2) & WLAN(802.11a/b/ g/n/ac) 2.4G SISO/5G MIMO	SPECIFICATION MODEL NAME : 6세대 BT/wifi Combo Module		
			MODEL CODE	A000020012A

Product Specification

1. Application

This specification is applied to MarkoneTechnology Bluetooth (v4.2)and 2.4GHz SISO/5GHz MIMO WLAN(802.11a/b/g/n/ac) Module A000020012A which includes BCM88359/CYW88359

2. Quality

Quality should meet each condition which mentioned on this specification. However, the items which are not mentioned on this specification follow the inspection agreements and standards which are agreed with both companies.

3. Appearance and Characteristics

1) Appearance

Appearance should not be contaminated by harmful materials and should not have cracks etc. Mechanical dimensions should meet the contents of clause 8.

2) Characteristics

Electrical characteristics should meet the contents of clause 10.

4. Application of Bluetooth v4.2 and 2.4GHz/5GHz WLAN(IEEE 802.11.a/b/g/n/ac)

1) Automotive

5. Maximum Rating

NO	ITEM	Rating	UNIT
1	Operating Temperature Range	-40 ~ +85	°C
2	Storage Temperature Range	-40 ~ +105	°C
3	VBAT Voltage Range	-0.5 ~ 6.0	V
4	VIO Voltage Range	-0.5 ~ 3.9	V
5	VBAT Max. Current	700(@3.3V)	mA

◆ Module assures operating normally at -40 ~ +85°C.

CONFIDENTIAL

PRODUCT	BT(v4.2) & WLAN(802.11a/b/ g/n/ac) 2.4G SISO/5G MIMO	SPECIFICATION MODEL NAME : 6세대 BT/wifi Combo Module		
			MODEL CODE	A000020012A

Product Specification

8. General Features

8.1 BT(v4.2) + 2.4GHz/5GHz WLAN(IEEE 802.11a/b/g/n/ac) 2.4G SISO/5G MIMO

1) Features

- Operation Voltage is 3.3V
- WiFi Single-stream up to 866 Mbps data rate
- Automotive Module
 - : All components are AEC-Q 100/200 qualified
- Support 2 Antenna port
 - : ANT0 : Bluetooth/5G WLAN, ANT1 : 2.4G/5G WLAN
- Integrated WLAN PA, RF Switch and LNA
- RoHS Compliant
- Size : 35.3 x 35.3 x 7.8 mm³
- Support bandwidth : HT20 / HT40 / VHT80
- HOST Interface : PCIE/SDIO(WLAN), UART(BT), PCM(I2S)
- Package type : Connector type(B to B)

CONFIDENTIAL

PRODUCT	BT(v4.2) & WLAN(802.11a/b/ g/n/ac) 2.4G SISO/5G MIMO	SPECIFICATION MODEL NAME : 6세대 BT/wifi Combo Module		
			MODEL CODE	A000020012A

Product Specification

8. General Features

8.2 Bluetooth(BT v4.2+EDR compliant)

1) Bluetooth Key Features

- Supports key features of upcoming Bluetooth standards
- Fully supports Bluetooth Core Specification version 4.2 + (Enhanced Data Rate) EDR features:
 - Adaptive Frequency Hopping (AFH)
 - Quality of Service (QoS)
 - Extended Synchronous Connections (eSCO) – Voice Connections
 - Fast Connect (interlaced page and inquiry scans)
 - Secure simple Pairing (SSP)
 - Sniff Sub rating (SSR)
 - Encryption Pause Resume (EPR)
 - Extended Inquiry Response (EIR)
 - Link Supervision Timeout (LST)
- UART baud rates up to 4 Mbps
- Supports all Bluetooth 4.2 packet types
- Supports maximum Bluetooth data rates over HCI UART
- Multipoint operation with up to seven active slaves
 - Maximum of seven simultaneous active ACL links
 - Maximum of three simultaneous active SCO and eSCO connections with scatternet support
- Narrowband and wideband packet loss concealment
- Scatternet operation with up to four active piconets with background scan and support for scatter mode
- High-speed HCI UART transport support
- Channel quality driven data rate and packet type selection
- Standard Bluetooth test modes
- Extended radio and production test mode features
- Full support for power savings modes
 - Bluetooth clock request
 - Bluetooth standard sniff
 - Deep-sleep modes and software regulator shutdown

CONFIDENTIAL

PRODUCT	BT(v4.2) & WLAN(802.11a/b/ g/n/ac) 2.4G SISO/5G MIMO	SPECIFICATION MODEL NAME : 6세대 BT/wifi Combo Module		
			MODEL CODE	A000020012A

Product Specification

8. General Features

8.3 WLAN

1) WLAN RF band & modulation Features

- Dual-band 2.4GHz and 5GHz 802.11 a/b/g/n/ac(802.11ac compliant)
- Up to 866Mbps data rate
- Supports 20, 40 and 80MHz channels with optional SGI(256 QAM modulation)
- Tx and Rx low-density parity check(LDPC)
- Supports IEEE 802.11ac/n beamforming
- Supports PCIe v3.0-compliant interface running at GEN1 speeds
- Supports two antennas with Bluetooth/5G WLAN and 2.4G/5G WLAN antenna
- Supports standard SDIO V3.0 (up to SDR104 mode at 208MHz, 4-bit and 1-bit)
- Backward compatibility with SDIO v2.0 host interface
- WPA and WPA2(Personal) support for powerful encryption and authentication
- AES and TKIP in hardware for faster data encryption and IEEE 802.11i compatibility
- Reference WLAN subsystem provides Wi-Fi protected Setup(WPS)

2) WLAN MAC features

- Enhanced MAC for supporting IEEE 802.11ac features
- Transmission and reception of aggregated MPDUs(A-MPDU) for high throughput(HT)
- Support for power management schemes, including WMM power-save multi-poll(PSMP) and multiphase PSMP operation
- Support for immediate ACK and block-ACK policies
- Inter-frame space timing support, including RIFS
- Back-off counters in hardware for supporting multiple priorities as specified in the WMM specification
- Timing synchronization function(TSF), network allocation vector(NAV) maintenance, and target beacon transmission time(TBTT) generation in hardware
- Hardware offload for AES-CCMP, legacy WPA TKIP, legacy WEP ciphers, WAPI, and support for key management
- Programmable independent basic service set(IBSS) or infrastructure basic service set functionality

CONFIDENTIAL

PRODUCT	BT(v4.2) & WLAN(802.11a/b/ g/n/ac) 2.4G SISO/5G MIMO	SPECIFICATION MODEL NAME : 6세대 BT/wifi Combo Module		
			MODEL CODE	A000020012A

Product Specification

8. General Features

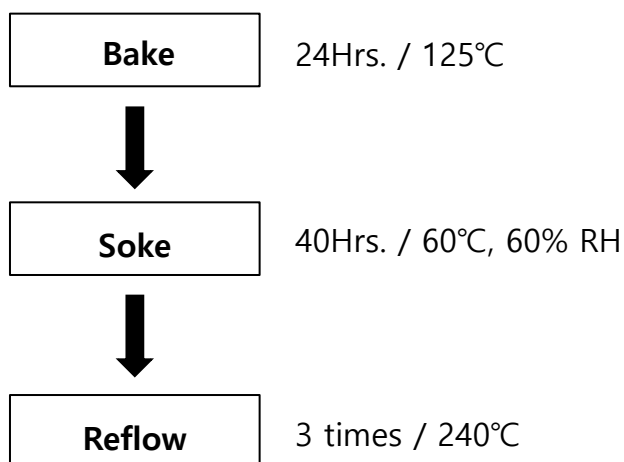
8.3 WLAN

3) WLAN PHY features

- Programmable data rates from MCS0-9 in 20MHz, 40MHz, and 80MHz channels, as specified in IEEE 802.11ac
- Improved performance with channel smoothing and spur canceller support
- Supports Optional short GI and Green field modes in Tx and Rx
- Tx and Rx LDPC for improved range and power efficiency
- Beam forming support
- Supports IEEE 802.11h/k for worldwide operation
- Advanced algorithms for low power, enhanced sensitivity, range, and reliability
- IEEE 802.11a, 11b, 11g, 11n, 11ac single stream PHY standards
- Designed to meet FCC and other worldwide regulatory requirements

8.4 JEDEC MSL (Moisture Sensitivity Level) Test

- MSL 3 Level (Floor Life Time : 168Hrs. / Condition : $\leq 30^{\circ}\text{C}$, 60% RH)
- Standard : IPC / JEDEC J-STD-020C



CONFIDENTIAL

PRODUCT	BT(v4.2) & WLAN(802.11a/b/ g/n/ac) 2.4G SISO/5G MIMO	SPECIFICATION MODEL NAME : 6세대 BT/wifi Combo Module		
			MODEL CODE	A000020012A

Product Specification

9. Electrical Specification

9.4 Operating Conditions

1) Recommended operation conditions

Parameters	Min	Max	Unit
Operating Temperature Range	-40	+85	°C
Supply Voltage : VBATT (3.3V)	3.0 ¹⁾	3.6	V

2) Current consumption

Parameters	Average	Unit
Stand-by (BT & WLAN)	10	mA
WLAN Continuous Rx	180	mA
WLAN Continuous Tx ²⁾	420	mA
Bluetooth Connection	20	mA

3) ESD Precautions

RBHP-B213B is classified as a JESD22-A114(HBM) class 1C(1kV) product. Apply ESD static handling precautions during manufacturing.

4) External 32.768KHz low-power oscillator(LPO)

External 32.768KHz precision oscillator is required.

Parameters	LPO clock	Unit
Nominal input frequency	32.768	KHz
Frequency accuracy	±200	ppm
Single input amplitude	200 ~ 3300	mV, p-p
Signal type	Square-wave or sine-wave	

1) The BCM88359/CYW88359 is functional across this range of voltages.

Optimal RF performance specified in the RBHP-B213B approval sheet, however, is guaranteed only for min. 3.2V including VBAT ripple

2) MIMO condition

CONFIDENTIAL

FCC Warning 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.

Any changes or modifications (including the antennas) to this device that are not expressly approved by the manufacturer may void the user's authority to operate the equipment.

FCC RF Radiation Exposure Statement

This equipment complies with FCC RF Radiation exposure limits set forth for an uncontrolled environment.

This device and its antenna must not be co-located or operating in conjunction with any other antenna or transmitter.

This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and your body.

ISED Warning 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:

(1) This device may not cause interference.

(2) This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique 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;

(2) L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

IC RF Radiation Exposure Statement

This equipment complies with IC RF Radiation exposure limits set forth for an uncontrolled environment.

This device and its antenna must not be co-located or operating in conjunction with any other antenna or transmitter.

This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and your body.

RF du IC d'exposition aux radiations

Cet équipement est conforme à l'exposition de la IC rayonnements RF limites établies pour un environnement non contrôlé.

L'antenne pour ce transmetteur ne doit pas être même endroit avec d'autres émetteur sauf conformément à la IC procédures de produits Multi-émetteur.

Cet équipement doit être installé et utilisé avec une distance minimale de 20 cm entre le radiateur et votre corps.

Please notice that if the FCC/IC identification 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. This exterior label can use wording such as the following:

"Contains FCC ID: 2AVZC-A000010007A"

"Contains IC: 26076-A000010007A"

any similar wording that expresses the same meaning may be used.

L'étiquette d'homologation d'un module d'Innovation, Sciences et Développement économique Canada devra être posée sur le produit hôte à un endroit bien en vue, en tout temps. En l'absence d'étiquette, le produit hôte doit porter une étiquette sur laquelle figure le numéro d'homologation du module d'Innovation, Sciences et Développement économique Canada, précédé du mot « contient », ou d'une formulation similaire allant dans le même sens et qui va comme suit :

"Contient IC : IC: 26076-A000010007A" est le numéro d'homologation du module

Manual Information to the End User

The module is limited to OEM installation ONLY.

The OEM integrator is responsible for ensuring that the end-user has no manual instruction to remove or install module.

The module is limited to installation in mobile application;

A separate approval is required for all other operating configurations, including portable configurations with respect to Part 2.1093 and difference antenna configurations.

There is requirement that the grantee provide guidance to the host manufacturer for compliance with Part 15B requirements.