MARKONE A000010007A BT/Wi-Fi Combo Module Gen6 User Manual

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Product Specification

PRODUCT	BT(v4.2) & WLAN(802.11a/b/ g/n/ac) 2.4G SISO/5G MIMO
SPECIFICATION MODEL NAME :	6+ BT/wifi Combo Module
MODEL CODE	A000010007A

Application

This specification is applied to MarkoneTechnology Bluetooth (v4.2)and 2.4GHz SISO/5GHz MIMO WLAN(802.11a/b/g/n/ac) Module A000010007A which includes BCM88359/CYW88359

Quality

Quality must meet each condition mentioned in this specification.

Appearance and Characteristics

1. **Appearance**
   The appearance should not be contaminated with harmful substances, and there should be no cracks, etc.
   Mechanical dimensions must meet the provisions of paragraph 7.
2. **Characteristics**
   Electrical characteristics should meet the contents of clause 9

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

Automotive

Maximum Rating

NO	ITEM	Rating	UNIT
1	Operating Temperature Range	-40 ~ +85	℃
2	Storage Temperature Range	-40 ~ +105	℃
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
6	VIO Max. Current	50(@1.8V)	mA

General Features

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

Features

- Operation Voltage is 3.3V/1.8V Dual Power Rail
- 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)

Bluetooth(BT v4.2+EDR compliant)

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

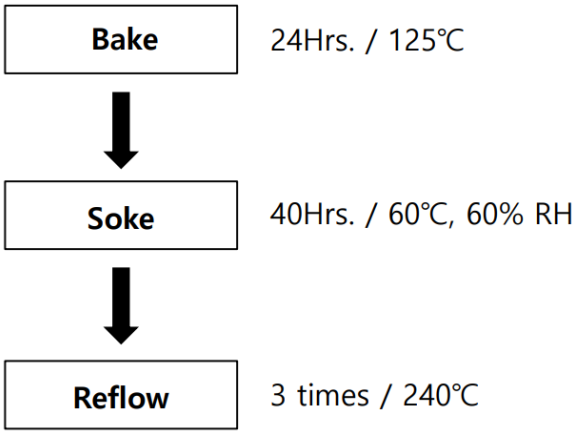
WLAN

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
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

JEDEC MSL JEDEC MSL (Moisture Sensitivity Level) Test

- MSL 3 Level (Floor Life Time : 168Hrs. / Condition : ≤30℃, 60% RH)
- Standard : IPC / JEDEC J-STD-020C



Electrical Specification

Operating Conditions

Recommended operation conditions

Parameters	Min	Max	Unit
Operating Temperature Range	-40	+85	℃
Supply Voltage : VBATT (3.3V)	3.0[1)]	3.6	V
Supply Voltage : VIO (1.8V)	1.62	1.98	V

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

ESD Precautions
A1000010007A is classified as a JESD22-A114(HBM) class 1C(1kV) product. Apply ESD static handling precautions during manufacturing

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	

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

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

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

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.

MARKONE TECHNOLOGY

Documents / Resources

	MARKONE A000010007A BT/Wi-Fi Combo Module Gen6 [pdf] User Manual A000010007A, 2AVZC-A000010007A, 2AVZCA000010007A, A000010007A BT Wi-Fi Combo Module Gen6, BT Wi-Fi Combo Module Gen6, Wi-Fi Combo Module Gen6