

**B2CH052AA**

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# **B2CH052AA Product Manual**

## **ERMI 4.9-5.9 GHz WLAN Radio Module**

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## About this Document

This document is a product manual for the B2CH052AA 5 GHz WLAN Radio Module, including its limitations on use in any product marketed or offered for sale. It is intended as a supplement to training and documentation by BelAir Networks Inc. or its authorized agents.

## Introduction

The B2CH052AA (hereafter referred to as “the module”) is a 4.9 – 5.9 GHz radio module compatible with the IEEE 802.11 standard for Wireless LAN operation. It is designed to be interoperable with WLAN products which are based on Direct Sequence Spread Spectrum (DSSS) radio technology.

The module contains a complete 802.11a radio and Medium Access Control (MAC) protocol engine which allows implementation of an 802.11a module.

The module is not intended for stand-alone operation. It will only be marketed as a complete product, in conjunction with a package, DC power supply and antenna (hereafter referred to as “the product” or the “final product”).

The module can be used in both the licensed 4.9 GHz public safety band and the 5 GHz unlicensed bands.

Since the module has a BelAir networks proprietary digital interface, it cannot be directly connected to any standard telecommunications or computer devices. It can only be used with final products designed and authorized specifically for that purpose.

## Conditions of Use

### General Conditions of Use

This manual is intended to supplement training provided by BelAir Networks or authorized parties. The module B2CH052AA is only intended for use in BelAir Networks products and is not for sale to the general public as a stand-alone module.

Please read this entire document, including the Regulatory Statements section before attempting to install or operate the module.

**Warning:** Any use of B2CH052AA in any manner which is not expressly specified within this manual or specifically approved by BelAir Networks or its authorized agents will void the user's right to operate this module, and is expressly forbidden by BelAir Networks. This includes any modification of the module, installation of the module in a configuration or used with an antenna which is not expressly listed in this document or approved by BelAir Networks.

### List of Approved Final Products

The B2CH052AA module is only approved for use in the following BelAir Networks products:

- BelAir200. See BelAir200 documentation for complete manufacturing instructions.
- BelAir100. See BelAir100 documentation for complete manufacturing instructions.
- BelAir50c. See BelAir50c documentation for complete manufacturing instructions.

Operation of the module within the products expressly listed above is required to ensure compliance to all FCC and Industry Canada regulations. Any modification of the module, or its use in any configuration not expressly listed above may void the user's right to operate this module.

### Country of Use

B2CH052AA is certified with limited modular approval for use as an Intentional Radiator in the United States as device: FCC ID: RAR20021001 and in Canada as

IC: 4674A-20021001. Please read all regulatory statements at the end of this document before any attempt to install or operate this module.

The module is only certified for operation in the United States and Canada. Before attempting to install and operate this module in any other country, contact BelAir Networks for approval.

## **Module Labeling**

One or more labels are applied to the module during manufacture, including a label which identifies the FCC and Industry Canada identification numbers. Do not attempt to remove any labels from the module.

## Module Installation and Service

### Installation into a Product

The module shall only be installed by a technician trained by BelAir Networks or its authorized agents. It should only be installed into an approved product (see above) following all manufacturing and service procedures for that product. The module should only be installed into a final product in a manufacturing or service depot site.

**Caution:** B2CH052AA is an electro-static discharge (ESD) sensitive device. All appropriate ESD measures must be taken when handling the module. Failure to employ appropriate ESD protection may damage the module.

### Module Service

The module is not intended as a field-serviceable unit. It contains no field-replaceable or field-serviceable parts, or any external adjustable mechanisms. The module should only be serviced in a manufacturing or service depot site approved by BelAir Networks or its authorized agents.

## Final Product Requirements

The requirements below apply to any final product in which the B2CH052AA module is installed.

### Antenna Usage and Module Transmit Power

B2CH052AA module shall only be used at the following output power levels in conjunction with the following antenna types as outlined in the tables that follow:

#### 4.9 GHz – Part 90

For operation in the 4.94 – 4.99 GHz band, the B2CH052AA may be set to operate on 5, 10, or 20 MHz channel bandwidths.

Channel Bandwidth	Channels	Maximum Transmit Power
5 MHz	4945 - 4985, 5 MHz steps	22 dBm
10 MHz	4945 - 4985, 5 MHz steps	22 dBm
20 MHz	4950 - 4980, 5 MHz steps	21 dBm



<p><b>4.9 GHz Omni Antennas:</b></p> <p>MTI MT-462008-N-A; 10dBi (direct connect omni antenna) (450mm tall);                  MTI MT-462008-N; 10dBi (cable connected omni antenna) (450mm tall);                  MTI MT-462007-N-A; 7dBi (direct connect omni antenna) (330mm tall);                  MTI MT-462007-N; 7dBi (cable connected omni) (330mm tall);                  MTI MT-462002/N; 9 dBi (cable connected Omni) (450mm tall)                  MAXRAD MFB49009; 9 dBi (cable connected Omni antenna) (512mm tall)                  MAXRAD BMEFC49005; 5.5 dBi Elevated Feed antenna                  MAXRAD MH05158010NM; 10 dBi Omni Antenna                  Mobile Mark ECOM6-4900; 6 dBi Magnetic Mount Antenna                  Mobile Mark ECOM6-4900; 9 dBi Magnetic Mount Antenna                  Mobile Mark ECOM6-4900-TEF; 6 dBi Elevated feed Magnetic Mount Antenna                  Mobile Mark ECOT6-4900PT; 6 dBi Mount Antenna                  Mobile Mark ECOT6-4900PT; 9 dBi Mount Antenna                  Mobile Mark RM3-4900; 3 dBi Omni Antenna                  Mobile Mark DM2-4900; 3 dBi Omni Antenna                  Mobile Mark SCR14-4900; 14 dBi Corner Reflector Antenna                  Laird Phantom Antenna; 3 dBi Omni Antenna.</p>
<p><b>High Gain Directional Antennas:</b></p> <p>MTI MT-465005/N; 21 dBi high gain directional (1 foot panel)                  MTI MT-466004/N; 25 dBi high gain directional (1.5 foot panel)</p>
<p><b>Sector Antennas:</b></p> <p>MTI MT-464002/NV; 16 dBi 60 degree sector (V)                  MTI MT-464003/NV; 15.5 dBi 90 degree sector (V)                  MTI MT-444003/NV; 15 dBi 120 degree sector (V)                  Mobile Mark PN16-4900-120; 16 dBi 120 degree sector                  Mobile Mark PN17-4900-90; 17 dBi 90 degree sector                  Mobile Mark PN22-4900-30; 22 dBi 30 degree sector</p>

## 5.8 GHz – Part I5

For operation in the 5.725 – 5.850 GHz band, the B2CH052AA may be set to operate on 5, 10, 20, or 40 MHz channel bandwidths.

**Maximum Conducted Transmit Output Power**

Gain (dBi)	5 MHz		10 MHz		20 MHz		40 MHz	
	Chan 146 - 169		Chan 147 - 168		Chan 148 - 167		Chan 150 - 165	
	P2M (dBm)	P2P (dBm)	P2M (dBm)	P2P (dBm)	P2M (dBm)	P2P (dBm)	P2M (dBm)	P2P (dBm)
10	22.8	22.8	22.9	22.9	22.5	22.5	21.1	21.1
15	21	22.8	21	22.9	21	22.5	21	21.1
19	17	22.8	17	22.9	17	22.5	17	21.1
22	13	22.8	13	22.9	13	22.5	13	21.1
23	13	22.8	13	22.9	13	22.5	13	21.1

**Certified Antennas**

Manufacturer	Part #	Gain (dBi)	Type
MAXRAD	MHO5158010NM	10	Omni
MTI	MT-462008	10	Omni
MAXRAD	MMO58010NF	10	Omni
BelAir	BX2A00002	15	Directional
MAXRAD	WISP4959018MBV	15	90 deg Sector
MTI	MT-485001	19	Directional
MTI	MT-485028/N	22	Directional
Huber&Suhner	SPA5600_9_23_0_V	23	Directional

In order to comply with the FCC and Industry Canada rules in the USA and Canada, respectively, it is required to respect the maximum transmit power limits as follows for each of the antenna types as indicated in the Table: Maximum Conducted Output Power.

\* P2P indicates that the rated transmit power is only permissible for use in point-to-point links. For point-to-multipoint or multipoint-to-multipoint links the power must be reduced as shown.

**Warning:** Use of this module in conjunction with any antenna not expressly listed above will void authority to install or operate this equipment.

**Warning:** Setting of module transmit power above the limits specified in the above table for a particular combination of antenna type, frequency of operation, and type of usage, will exceed FCC or Industry Canada limits and void authority to install or operate this equipment.

## Product Installation

Products which contain B2CH052AA-A shall only be installed by professional installers trained by BelAir Networks or its authorized agents. This product is to be installed on fixed permanent structures. In addition to normal installation procedures and good installation practice, professional installers are responsible to ensure that:

1. Only an approved antenna (see above) is connected to the module, and,
2. The antenna is mounted in such a manner and in such a location that access to the antenna by the general population is minimized. Access to the antenna by the general population should be limited to more than the minimum safety distance. These distances are outlined according to product type and whether high gain antennas are used:

Minimum Safety Distances										
Product	Standard Antennas (up to 19 dBi)					High Gain Antennas (up to 30 dBi)				
RF boards: All valid combinations	ERM1	ERM2	ARM3C	PSM1 PSM2	WRM1 WRM2	ERM1	ERM2	ARM3C	PSM1 PSM2	WRM1 WRM2
BelAir100, BelAir100C, BelAir100T, BelAir100S, BelAir100M, BelAir100D	up to 19 dBi	up to 19 dBi	Any	10 dBi	15 dBi	up to 23 dBi	up to 30 dBi	Any	25 dBi	25 dBi
Distance	<b>43 cm (16.5 in)</b>					<b>150 cm (59.1 in)</b>				
BelAir200, BelAir200D	up to 19 dBi	up to 19 dBi	Any	10 dBi	15 dBi	up to 23 dBi	up to 30 dBi	Any	25 dBi	25 dBi
Distance	<b>65 cm (25.6 in)</b>					<b>156 cm (61.4 in)</b>				
RAR20000003 (ARM3); RAR20004001 (PSM1); RAR20008001 (PSM2); RAR20021001 (ERM1); RAR20031001 (ERM2); RAR20006001 (WRM1); RAR20007001 (WRM2)										

Adherence to these rules by the professional installer is mandatory. See full installation procedures for the particular product for details.

## Product Labeling

The following permanent label, or one containing equivalent information, must be affixed in a conspicuous location on the exterior of every product containing this module:

FCC ID: RAR20021001 IC: 4674A-20021001
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## Regulatory Statements

The following regulatory notes apply to the product which contains module B2CH052AA. The following sections or equivalent information shall appear in the user-manual of the final product.

### Regulatory Information and Disclaimers

Installation and use of this device must be in strict accordance with the instructions included in the user documentation provided with the product. Any changes or modifications to this product not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

The manufacturer is not responsible for any interference to radio or television equipment caused by unauthorized modification of this device, or attachment of any antennas or equipment other than those specified by the manufacturer. The manufacturer or its authorized resellers or distributors will assume no liability for any damage or violation of government regulations arising from failing to comply with these guidelines.

### Manufacturer's FCC Conformity 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.

### FCC Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 and Part 90 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.

## **Manufacturer's Industry Canada Conformity Statement**

This device has been designed to operate with an antenna having a maximum gain of 23 dBi. Antenna having a higher gain is strictly prohibited per regulations of Industry Canada. The required antenna impedance is 50 ohms.

This device has been designed to ensure that radio frequency emissions are maintained within the band of operation under all normal operating conditions listed in this manual.

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.

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (EIRP) is not more than that required for successful communication.

This Class B Digital apparatus meets all the requirements of the Canadian Interference-Causing Equipment Regulations.

## RF Exposure Statement

This Wireless LAN radio device has been evaluated under FCC Bulletin OET 65C and found to be compliant to the requirements set forth in CFR 47 Sections 2.1091, 2.1093, and 15.247 (b) (4) addressing RF exposure from radio frequency devices.

This Wireless LAN radio device has been evaluated under FCC Bulletin OET 65C and found to be compliant to the requirements set forth in CFR 47 90.1335 and Sections 2.1091, 2.1093, addressing RF exposure from radio frequency devices.

This device complies with FCC RF radiation exposure limits for an uncontrolled environment. The radiated output power of this Wireless LAN device is below the FCC radio frequency exposure limits. However, this device should still be installed and used in such a manner that the potential for human contact during normal operation is minimized. In order to comply with RF exposure limits established in the ANSI C95.1 standard, this equipment should be installed and operated at a minimum distance between the radiator and a human body. This minimum distance is:

Minimum Safety Distances										
Product	Standard Antennas (up to 19 dBi)					High Gain Antennas (up to 30 dBi)				
RF boards: All valid combinations	ERM1	ERM2	ARM3C	PSM1 PSM2	WRM1 WRM2	ERM1	ERM2	ARM3C	PSM1 PSM2	WRM1 WRM2
BelAir100, BelAir100C, BelAir100T, BelAir100S, BelAir100M, BelAir100D	up to 19 dBi	up to 19 dBi	Any	10 dBi	15 dBi	up to 23 dBi	up to 30 dBi	Any	25 dBi	25 dBi
Distance	<b>43 cm (16.5 in)</b>					<b>150 cm (59.1 in)</b>				
BelAir200, BelAir200D	up to 19 dBi	up to 19 dBi	Any	10 dBi	15 dBi	up to 23 dBi	up to 30 dBi	Any	25 dBi	25 dBi
Distance	<b>65 cm (25.6 in)</b>					<b>156 cm (61.4 in)</b>				
RAR20000003 (ARM3); RAR20004001 (PSM1); RAR20008001 (PSM2); RAR20021001 (ERM1); RAR20031001 (ERM2); RAR20006001 (WRM1); RAR20007001 (WRM2)										

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