



Public Safety band Radio Module 2

PSM2 Product Manual 4.9GHz Public Safety band Access Radio Module

FCC ID RAR20008001

Document Date: April 2007
Document Number: PM-B2CG085AA
Document Version Number: 1
Document Status: Release

© Copyright 2007 by BelAir Networks.
All rights reserved..

Contents

About this Document.....	3
Introduction.....	3
Picture of the B2CG085AA 4.9 GHz Public Safety band Radio.....	4
General Conditions of Use	5
Overview of B2CG085AA module installation into BelAir Networks products ..	6
B2CG085AA module installation into BA100T product	7
BA100T Unit FCC Labeling.....	9
Antenna Usage and Module Transmit Power.....	10
Regulatory Statements	12
Appendix A –Approved antenna Specifications for the PSM2 module installed in a BA100T unit:	14

About this Document

This document is a product manual for the B2CG085AA 4.9 GHz Public Safety band Access Radio Module 2, FCC ID RAR 20008001. The manual outlines the radio modules limitations on use in BelAir Networks products marketed or offered for sale. An overview of BelAir Networks products is included with information on the module installation in these products. Specifications on approved antennas to be used with the module are provided. This manual provides an outline on the module installation, limitations of use, location of FCC label information, regulatory statements and RF exposure minimum safety requirements.

Introduction

The B2CG085AA (hereafter referred to as “the module”) is a 4.9 GHz Public Safety band Access Radio Module compatible with the IEEE 802.11 standard for WIFI operation. The module contains a complete 802.11 radio.

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 will operate under FCC part 90.

Picture of the B2CG085AA 4.9 GHz Public Safety band Radio

Module is shown below for reference.

Top and bottom views;



General Conditions of Use

This manual is intended to supplement training provided by BelAir Networks or authorized parties. The module B2CG085AA 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 B2CG085AA 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.

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 following all manufacturing and service procedures for that product. Refer to the following sections outlining specific installation in BelAir Networks products.

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.

Country of Use

B2CG085AA is certified for use as an Intentional Radiator in the United States as device: FCC ID: RAR20008001. 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. Before attempting to install and operate this module in any other country, contact BelAir Networks for approval.

Overview of B2CG085AA module installation into BelAir Networks products

List of Approved Final Products

The B2CG085AA module is only approved for use in the following BelAir Networks products:

- BelAir100T. See BelAir documentation for complete manufacturing instructions.

Operation of the module within the products expressly listed above is required to ensure compliance to all FCC 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.

The radio module is part of a multi radio system in which the B2CG085AA is used for Public Safety applications. The concept is as shown in figure 1.

The module can be installed stand alone or with up to two more BelAir Networks radio modules in the same unit.

A typical block diagram of a two radio configuration using one module (B2CG085AA), Access Radio incorporated into a BelAir Networks product is shown in figure 2. BelAir Networks products incorporate other functional blocks as shown, such as Line and Power interface, battery back up and power conditioning as well as a Backhaul Radio.

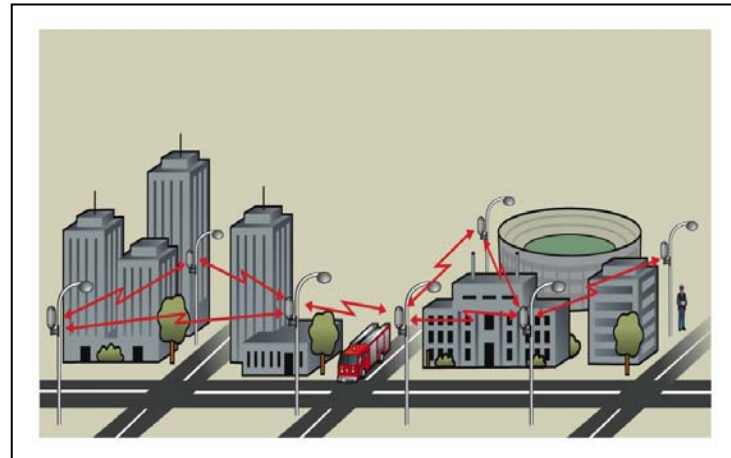


Fig. 1
Public Safety services using the B2CG085AA (RAR20008001) radio module in BelAir Networks products.

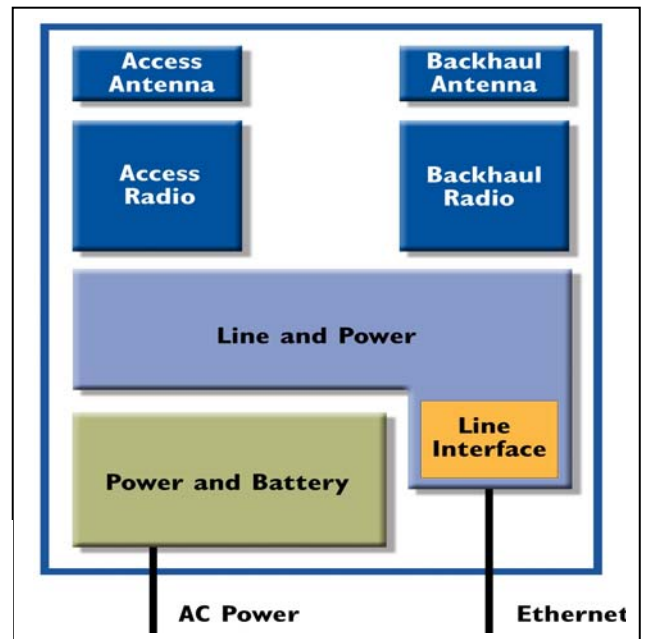


Fig. 2
Block diagram of a two radio configuration with the Public safety module (B2CG085AA) incorporated into a BelAir Networks product is shown.

Fig.2

B2CG085AA module installation into BA100T product

The module can be installed into the BelAir Networks BA100T product. The BA100T product is capable of incorporating up to three radio modules, options include one B2CG085AA (FCC ID :RAR20008001) module with one B2CH043AA-C (FCC ID :RAR20000003) 2.4 GHz ISM band Access module as well one RAR20001003 Backhaul Radio module.

A BA100T with associated antennas is shown in figure 3. Figure 4 outlines typical outdoor mounting of a BA100T on hydro and light poles.



Fig 3.
Typical BA100T with
B2CG085AA module
and antennas

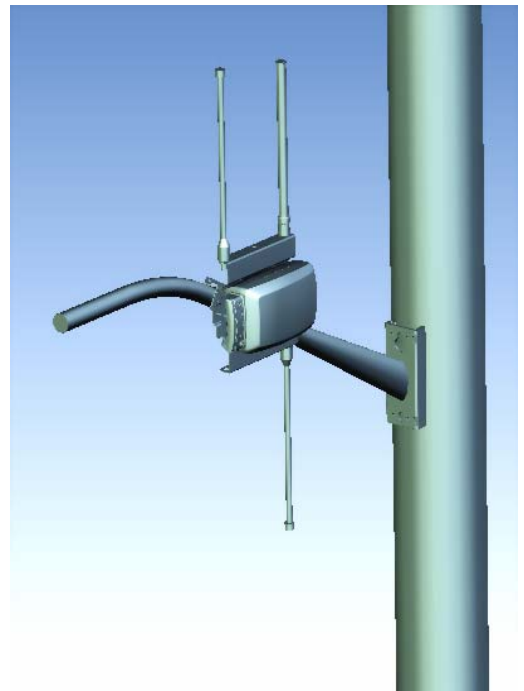


Fig 4.
Typical BA100T with B2CG085AA module
and antennas pole mounting arrangements

Module installation in a BA100T clam shell

The assembly is made up of two bolted clamshells. The modules are installed in the bottom clamshell. Figure 5 & 6 outline how boards are installed. Refer to document RAR20008001_Label Information_v1.pdf for FCC label location details for the module.

One B2CH043AA-C (FCC ID : RAR20000003) module and B2CH033AA module (RAR20001003)

B2CG085AA (FCC ID :RAR20008001) module

Bottom clamshell

Digital board

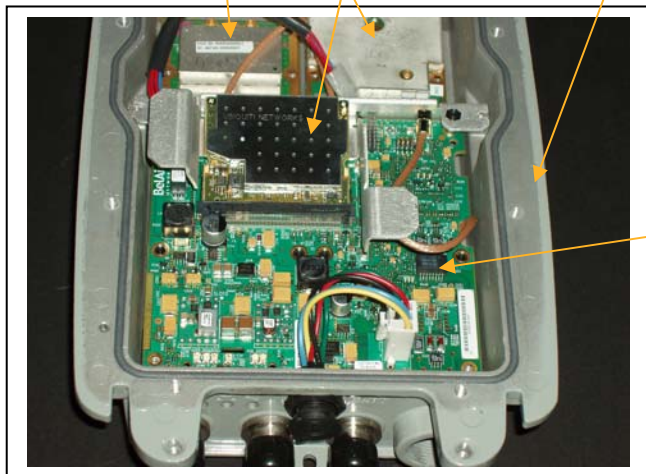


Fig. 5
BA100T B2CG085AA (FCC ID :RAR20008001) board installation into bottom clamshell

Fig. 6 BA100T, picture of B2CG085AA (FCC ID :RAR20008001) module installed into bottom clamshell

BA100T Unit FCC Labeling

One or more labels are applied to the product during manufacture, including a label which identifies the FCC identification numbers. Refer to figures 7 and 8 for label location on BA100T product. Do not attempt to remove any labels from the module.

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: RAR20008001

BA100T location of unit FCC labels;



Fig. 7



Fig. 8

Location of FCC labels for BA100T located on top and bottom clamshells. The labels outline the modules contained in the unit.

Antenna Usage and Module Transmit Power

B2CG085AA module shall only be used in conjunction with the following antenna types:

4.9 GHz Omni Antennas:

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

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

High Gain Directional Antennas:

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)

Sector Antennas:

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)

In order to comply with the FCC rules in the USA, the module is limited to the maximum transmit power limits as follows for each of the antenna types.

For all antennae as outlined above, the maximum average transmit power is 23.8 dBm.

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

Installation

Products which contain B2CG085AA shall only be installed by professional installers trained by BelAir Networks or its authorized agents. 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 during normal operation to the antenna by the general population should be limited to distances as outlined in the Table 2 in the section on RF Exposure Statement.

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

Regulatory Statements

The following regulatory notes apply to the product which contains module B2CG085AA (FCC ID: RAR20008001).

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 90 of the FCC Rules. This equipment has been tested and found to comply with the limits for a Class B digital device.

RF Exposure Statement

This Wireless radio device has been evaluated under FCC Bulletin OET 65C and found to be compliant to the requirements set forth in CFR 47 Section 1.1310 limits 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 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, this equipment should be installed and operated at a minimum distance as per the Table 2 between the

radiator and a human body. Refer to Appendix A for typical information on approved antennas for the B2CG085AA (RAR20008001) module.

Table 2 outlines the worst case scenarios for the combinations of the subject Radio modules and approved antennas.

With respect to the RAR20001003, BRM 3 module, please refer to the specific module installation guide (Module B2CC033AA, manual :RAR20001003_Manual.pdf) for allowed transmit power, antennas and maximum EIRP, as per the subject Grant. For the BRM3, Case III in Table 2 applies to antennas of 15 dBi or less. Similarly, refer to the installation manual for the RAR20000003 ARM3 module (PM-B2CC043AA-C_Manual_IIa.pdf) for allowed antennas and transmit power as per the subject Grant.

For all scenarios, the RF exposure table below (Table 2) should be used for units incorporating RAR20008001 PSM2 module.

Table 2

RF Exposure	Radios Combinations & antennas dBi	FCCID Radio Modules	Minimum Safety Distance	
			cm	inches
BelAir 100T Radio	Case I: ARM3 + PSM2 & 16 dBi antenna or less	1 X RAR20000003 + 1 X RAR20008001	35	13.8
	Case II: ARM3 + PSM2 & 25 dBi antenna (Includes 21 dBi)	1 X RAR20000003 + 1 X RAR20008001	85	33.5
	Case III :ARM3 + PSM2 & 25 dBi + BRM3 & 15dBi	1 X RAR20000003 + 1 X RAR20008001 + 1 X RAR20001003	85	33.5
	Case IV :ARM3 + PSM2 & 25 dBi + BRM3 & 23dBi	1 X RAR20000003 + 1 X RAR20008001 + 1 X RAR20001003	95	37.4
	Case V :PSM2 & 25 dBi + 2 X BRM3 & 23dBi	1 X RAR20008001 + 2 X RAR20001003	100	39.4

Appendix A –Approved antenna Specifications for the PSM2 module installed in a BA100T unit:

General specifications and photos for each antenna type from the list of approved antennas

MTI: Omni antenna

SPECIFICATION

OMNIDIRECTIONAL ANTENNA

MTI PART NUMBER	MT – 462007/N
REGULATORY COMPLIANCE	RoHS , CE 0682
1. ELECTRICAL	
FREQUENCY RANGE	4.9 – 5.875 GHz
PEAK GAIN	7 dBi ± 1 dB
VSWR	2.0 :1 (max)
AZIMUTH BEAMWIDTH	360°
AZIMUTH RIPPLE	± 1.5 dB (max)
POLARIZATION	Linear Vertical
E - PLANE BEAMWIDTH	15° (typ)
E - PLANE SIDELOBES	-10 dB (max)
INPUT IMPEDANCE	50 (ohms)
POWER	6 W (max)
LIGHTNING PROTECTION	DC Grounded



Specifications and Photo of Omni antenna type MT-46200/N

MAXRAD Omni antenna

Specification for antenna MAXRAD MFB49009:



Electrical Specifications						
Model #	Frequency Range	Gain	Bandwidth @ 1.5:1 VSWR	Vertical Beamwidth @ 1/2 Power	VSWR	Maximum Power
MFB49009	4.9-5.0 GHz	9 dBi	100 MHz	8°	< 1.5:1	25 Watts

Specifications and Photo MAXRAD omni

MTI Directional Antennas:

MT-466004/N

4.9-5.1 GHz 25Bi Subscriber Antenna



Specifications

MTI PART NUMBER	MT – 466004/N
ELECTRICAL	
FREQUENCY RANGE	4.9-5.1 GHz
GAIN	25 dBi
VSWR	1.5 : 1 (typ) 1.7 : 1 (max)
3 dB BEAMWIDTH	6° (typ)
POLARIZATION	Linear (Vertical or Horizontal)
SIDELOBES LEVEL	ETSI EN 302 085 V1.1.2, TS1-TS5
CROSS POLARIZATION	ETSI EN 302 085 V1.1.2, TS1-TS5 -20dB (max)
F/B RATIO	ETSI EN 302 085 V1.1.2, TS1-TS5 -30dB (max)
INPUT IMPEDANCE	50 (ohm)
INPUT POWER	6W (max)
LIGHTNING PROTECTION	DC Grounded

MTI Sector Antenna

A typical antenna is **MTI MT-444003**

MT-444003/NV

4.9-5.35 GHz 15dBi Base Station Antenna



Specifications

MTI PART NUMBER	MT – 444003/NV
ELECTRICAL	
FREQUENCY RANGE	4.9-5.35GHz
GAIN	15 dBi
VSWR	1.7 : 1 (max)
12 dBi AZIMUTH BEAMWIDTH	120° (typ)
POLARIZATION	Linear Vertical
ELEVATION BEAMWIDTH	6° (typ)
SIDELOBES LEVEL	4.9-5.1GHz ETSI EN 302-085 V1.1.2 CS3 5.15-5.35GHz -10dB (max)
CROSS POLARIZATION	4.9-5.1GHz ETSI EN 302-085 V1.1.2 CS3 5.15-5.35GHz -10dB (max)
F/B RATIO	ETSI EN 302-085 V1.1.2 CS3
INPUT IMPEDANCE	50 (ohm)
INPUT POWER	6W (max)
LIGHTNING PROTECTION	DC Grounded

Mobile Mark magnetic Mounted Omni Antennas

Magnetic Mount Models

<u>Frequency</u>	<u>Gain</u>	<u>Height</u>	<u>Model</u>
4.8 - 5.0 GHz	6 dBI	10.0 in/26 cm	ECOM6-4900
4.8 - 5.0 GHz	9 dBI	14.0 in/36 cm	ECOM9-4900
4.8 - 5.0 GHz	6 dBi	14.5 in/37 cm	ECOM6-4900TEF
4.8 - 5.0 GHz	6 dBI	11.5 in/29 cm	ECOT6-4900PT
4.8 - 5.0 GHz	9 dBI	15.0 in/38 cm	ECOT9-4900PT



**BelAir Networks
Inc.**
603 March Road
Kanata, Ontario
Canada
K2K 2M5

613-254-7070

Sales
sales@belairnetworks.com

Support
support@belairnetworks.com

General Information
Info@belairnetworks.com