HARRIS®
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Product Manual
14221-6200-6000
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Harris® LTE

PBM-100 Band 14 PCI Express Mini Module

PBM-102 Band 14/12 PCI Express Mini Module

MANUAL REVISION HISTORY

REV	DATE	REASON FOR CHANGE
-	Nov/11	Initial release.
A	Dec/11	Minor corrections.
B	Jan/12	Modified sections 2.2.2 and 2.2.3.
C	Jan/12	Modified Section 3.3.
D	May/14	Modified Section 2.2

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Repairs to this equipment should be made only by an authorized service technician or facility designated by the supplier. Any repairs, alterations or substitutions of recommended parts made by the user to this equipment not approved by the manufacturer could void the user's authority to operate the equipment in addition to the manufacturer's warranty.

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1 INTRODUCTION

1.1 DESCRIPTION

The PCI Express Mini (PEM) module functions as LTE User Equipment (UE) capable of interoperating with the Harris LTE network and is deployed by integrating into the current generation of laptop computers and mobile data terminals. The PEM is capable of dual-band operation supporting UMTS bands 14 and 12, and conforms to the PCI Express Mini specification as a Type F1 Full-Mini (50.9 × 30.0 × 5.0 mm³), as shown below, for integration into devices as a USB modem. The PEM card is a modular transmitter and is not shipped with antennas.

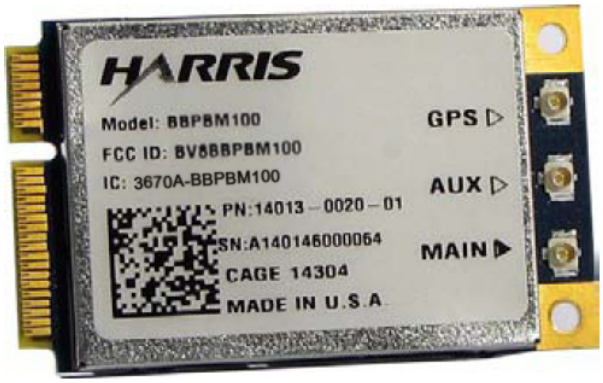

Figure 1-1: PCI Express Mini (PEM) Module

The module is supplied under two part product codes:

- The PBM-100 is a single LTE band device operating in 3GPP band 14 in the spectrum dedicated to public safety.
- The PBM-102 is a dual LTE band device which has the capability of operation in 3GPP band 14 and band 12.

1.2 SCOPE

This document outlines the use and installation guidelines for the PEM module into host devices.

2 REGULATORY AND SAFETY INFORMATION

2.1 REGULATORY APPROVALS

2.1.1 Transmitter

The transmitting devices listed below have been tested and meet the following regulatory requirements:

MODEL	DESCRIPTION	BW (MHz)	FCC ID (PART 90)	INDUSTRY CANADA (RSS-119)
PBM-100	700 MHz LTE B14 PEM Module	5 or 10	BV8BBPBM100	3670A-BBPBM100
PBM-102	700 MHz LTE B14/12 PEM Module	5 or 10		

2.1.2 Receiver

The receiver associated with this transmitting device has been tested and declared to meet the regulatory requirements.

2.1.3 FCC Compliance

This device complies with Part 15 of the FCC Rules. Operation is subject to the condition that this device does not cause harmful interference.

The user should take caution that changes or modifications not expressly approved by Harris could void the user's authority to operate this equipment. All required software and operating conditions must not be violated by the installer/user and is an express condition of use for this equipment.

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.
- Consult an experienced radio/TV technician for help.

2.1.4 Industry Canada

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

The installer of this radio equipment must ensure that the antenna is located or pointed such that it does not emit RF field in excess of Health Canada limits for the general population; consult Safety Code 6, obtainable from Heath Canada's website www.hc-sc.gc.ca/rpb.

2.1.5 Labeling

The FCC labeling of the PEM module is shown below. When integrating the module into a host, the label must be visible through a window, visible through an access panel that is easily removed, or a second label must be placed on the outside of the host device that contains the following text: Contains FCC ID: BV8BBPBM100. Labelling for Canada must include the following text: Contains IC: 3670A-BBPBM100.

Figure 2-1: FCC Labeling

2.2 RF ENERGY EXPOSURE INFORMATION

2.2.1 Maximum Permissible Exposure Limits

Mobile devices are defined by the FCC as transmitters with a separation distance of at least 20 centimeters between radiating structures and the body of the user. At least 20 centimeters of separation between the antenna and the user's body must be maintained at all times.

The FCC defines portable devices as transmitters whose radiating structures are designed to be used within 20 centimeters of the body of the user. These portable devices are to be evaluated with respect to limits for specific absorption rate (SAR) and require separate approval.

The Maximum Permissible Exposure (MPE) is based on a mobile device installation and is specified in FCC rules 47 CFR 2.1091 Radio frequency radiation exposure evaluation: mobile devices. Since this device operates at frequencies below 1.5 GHz, the effective radiated power (ERP) is limited to 1.5 watts.

2.2.2 MPE Calculation for Mobile Device Installation

Given the limit for Effective Radiated Power (ERP), we can calculate the maximum antenna gain allowed for use in a mobile installation:

$$ERP = G_T P_T$$

$$1.5\ W = G_T(0.316\ W)$$

And converting to gain in dBi:

$$G_T = 6.76\ dBi$$

Where*:*

G_T is the Maximum Antenna Gain

P_T is the Maximum Transmitted Power = 316 mW

2.2.3 Maximum Allowed Antenna Gain

Table 2-1 summarizes the maximum gain allowed for use in mobile installations at each band of operation. When designing the antenna system for the PEM, the gain of the host antenna must not exceed these values.

Table 2-1: MPE Limits

UMTS Operating Band	Transmitter Frequency	Maximum ERP	Maximum Antenna Gain
12	700.5 MHz	1.5 W	6.76 dBi
14	790.5 MHz	1.5 W	6.76 dBi

3 INSTALLATION GUIDELINES

3.1 INTRODUCTION

Always read and follow all installation instructions. Follow ESD precautions and prepare an ESD safe workspace for installation. Turn the power to the host off and ground yourself to dissipate static charge.

Mount only in sockets and locations intended for Type F1 Full-Mini cards and consult Harris on thermal management recommendations for the PEM mounted within the host.

All instructions relating to the integration of the module described on the FCC Grant notes must be followed.

3.2 MOBILE HOST

The PEM can be installed in host devices as a standalone transmitter where the distance between the antenna and the body of the user is greater than 20 centimeters and the antenna gain is less than the value shown in section 2.2.3. Labeling requirements are given in section 2.1.5.

3.3 PORTABLE HOST

In host devices where the distance between the antenna and the body of the user is equal to or less than 20 centimeters, the device must be evaluated using specific FCC and Industry Canada test procedures for SAR and requires separate approval. Users are required to consult with Harris for all portable installations.

3.4 COLLOCATED TRANSMITTERS

This module can be incorporated in mobile host devices containing other transmitters if:

- The separation among all simultaneous transmitting antennas is ≥ 20 cm.

  OR

- Antennas comply with MPE limits as specified in the application filing and simultaneously transmitting antennas must be ≥ 5 cm from each other.

As with any mobile installation, all antennas must be at least 20 cm from users and nearby persons.

All collocated transmitter installations must be evaluated by Harris.

4 SPECIFICATIONS

4.1 GENERAL SPECIFICATIONS

Model Number:

PBM-100/PBM-102

Physical Characteristics:

Electrical Power:	3.3 Vdc
Power Consumption:	3.5 Watts maximum
Size (H x W x D):	50.9 × 30.0 × 4.2 mm (2.0 x 1.18 x .17 in)
Weight:	13 g (.46 oz)

Environmental Specifications:

Operating Temperature:	-30°C to +60°C (-22°F to +140°F)
Storage Temperature:	-40°C to +85°C (-40°F to +185°F)
Altitude:	15,000 ft. (operational)

System Interfaces:

Host	PCI Express Mini (USB)
LTE	U.FL-R connector

4.2 TRANSMITTER SPECIFICATIONS

Frequency:	788 – 798 MHz, 698 – 716 MHz
Channel Bandwidth:	5 or 10 MHz
RF Power Output:	+23 dBm maximum
Output Power Control:	50 dB
FCC ID:	BV8BBPBM100
Industry Canada:	3670A-BBPBM100

4.3 RECEIVER SPECIFICATIONS

Frequency	758 – 768 MHz, 728 – 746 MHz
Channel Bandwidth:	5 or 10 MHz
Sensitivity (5MHz QPSK)	-97 dBm
Max RX Input Power:	-25 dBm
Max RX Input Power (no damage):	0 dBm

5 CUSTOMER SERVICE

5.1 CUSTOMER CARE

If any part of the system equipment is damaged on arrival, contact the shipper to conduct an inspection and prepare a damage report. Save the shipping container and all packing materials until the inspection and the damage report are completed. In addition, contact the Customer Care center to make arrangements for replacement equipment. Do not return any part of the shipment until you receive detailed instructions from a Harris representative.

Contact the Customer Care center at http://www.pspc.harris.com/CustomerService or:

North America:

Phone Number: 1-800-368-3277

Fax Number: 1-321-409-4393

E-mail: PSPC_CustomerFocus@harris.com

International:

Phone Number: 1-434-455-6403

Fax Number: 1-321-409-4394

E-mail: PSPC_InternationalCustomerFocus@harris.com

5.2 TECHNICAL ASSISTANCE

The Technical Assistance Center's (TAC) resources are available to help with overall system operation, maintenance, upgrades and product support. TAC is the point of contact when answers are needed to technical questions.

Product specialists, with detailed knowledge of product operation, maintenance and repair provide technical support via a toll-free (in North America) telephone number. Support is also available through mail, fax and e-mail.

For more information about technical assistance services, contact your sales representative, or call the Technical Assistance Center at:

North America: 1-800-528-7711

International: 1-434-385-2400

Fax: 1-434-455-6712

E-mail: PSPC_tac@harris.com

NOTES

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