



STARSOLUTIONS™

All-IP CDMA2000® Network
iCell®

Compact Macro EV-DO BTS Installation and Initial Configuration Guide

Part Number D02149 A0



All-IP CDMA2000® Network

iCell®

Compact Macro EV-DO BTS Installation and Initial Configuration Guide

Part Number D02149 A0



STARSOLUTIONS™

Copyright © 2008, Global Star Solutions ULC. All rights reserved. No part of this documentation may be reproduced in any form or by any means or used to make any derivative work (such as translation, transformation, or adaptation) without prior written permission from Global Star Solutions ULC.

Global Star Solutions ULC reserves the right to revise this documentation and to make changes in content from time to time without obligation on the part of Global Star Solutions ULC to provide notification of such revision or change.

Global Star Solutions ULC provides this documentation without warranty of any kind, either implied or expressed, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. Star Solutions may make improvements or changes in the product(s) and/or the program(s) described in this documentation at any time.

UNITED STATES GOVERNMENT LEGENDS:

If you are a United States government agency, then this documentation and the software described herein are provided to you subject to the following:

United States Government Legend: All technical data and computer software is commercial in nature and developed solely at private expense. Software is delivered as Commercial Computer Software as defined in DFARS 252.227-7014 (June 1995) or as a commercial item as defined in FAR 2.101(a) and as such is provided with only such rights as are provided in Star Solutions's standard commercial license for the Software. Technical data is provided with limited rights only as provided in DFAR 252.227-7015 (Nov. 1995) or FAR 52.227-14 (June 1987), whichever is applicable. You agree not to remove or deface any portion of any legend provided on any licensed program or documentation contained in, or delivered to you in conjunction with, this User Guide.

Star Solutions, the Star Solutions logo, iCell, Softexchange, Sonata, Sonata Access Tandem, Sonata HLR, Sonata IP, Sonata MSC, Sonata WLL, and Telos are registered trademarks or trademarks of Global Star Solutions ULC and its subsidiaries.

CDMA2000® is a registered trademark of the Telecommunications Industry Association (TIA-USA).

Intel and Pentium are registered trademarks of the Intel Corporation or its subsidiaries in the United States and other countries. Microsoft, Windows, Windows NT, and NetMeeting are registered trademarks of Microsoft Corporation. Sun, Java, and Solaris are trademarks or registered trademarks of Sun Microsystems, Inc. Oracle is a registered trademark of Oracle Corporation. HP, HP-UX, and HP Openview are trademarks or registered trademarks of the Hewlett-Packard Company. UTStarcom, the UTStarcom logo, MovingMedia, mSwitch, and Total Control are registered trademarks or trademarks of UTStarcom, Inc. and its subsidiaries.

Other brand and product names may be registered trademarks or trademarks of their respective holders.

CONTENTS

ABOUT THIS GUIDE

All-IP CDMA2000® Network Architecture	11
Product Overview	12
IP Radio Access Network Elements	13
Base Station Subsystem	13
RNC	13
Compact Macro BTS	13
Compact Macro BTS Hardware Specifications	14
GPS	14
Direct GPS and Daisy Chain of One PPS source	15
Conventions	17
Notices	17
Figures and Screen Captures	17
Text	17
Related Documentation	18
Technical Support	18
Obtaining Technical Assistance	18
Service Centers Operational Hours	19
Warranty Support	19
Contacting Technical Documentation	19

PART I PRE-INSTALLATION

1 PREREQUISITES

About This Chapter	23
Site Requirements	23
Equipment Supplied by Network Operator	23
Installer Requirements	24
Skills and Knowledge	24
Supporting Documentation	24
Required Hand Tools	24
Testing Requirements	24
Test Client Hardware	24
Laptop	24
Mobile Phone	25
Cables	25
Network Planning Requirements	25
IP Address Assignment	25
Test Client	26
Access Network IP Addressing	26

Core Network IP Addressing	26
Hostname Assignment	27
Password and Username Assignment	27

PART II INSTALLATION

2 INSTALLING THE COMPACT MACRO BTS

About This Chapter	31
Unpacking the Shipment	31
Verifying Compact Macro BTS Airflow and Ventilation	32
Installing the Compact Macro BTS	33
Maximum Permissible Exposure Requirements	33
Mounting the Compact Macro BTS	33
Connecting the Compact Macro BTS Front Panel Interface	35
Connecting the Compact Macro BTS Rear Panel Interface	35
Connecting the GPS.	36
GPS Connection Guidelines	36
GPS Receiver Protection	37
Connecting a GPS Cable to the Compact Macro BTS	37
1PPS Connections	37
Connecting the Main and Diversity Antennas.	38
Before Connecting RF Cables	38
Connecting the RF Cables.	38
Connecting AC Power to the Compact Macro BTS	38
Safety Advisory	38
AC Power Connection	39
Adding Sectors.	39
Maintaining the Compact Macro BTS	39
Front Panel LED Status Light.	39
Reset Button	40
Replacing the Fan Module	40

PART III INITIAL CONFIGURATION

3 CONFIGURING THE COMPACT MACRO BTS

About This Chapter	45
Initial Setup	45
Configuring a Test Client	46
Connecting the Test Client to the Ethernet Switch.	47
Performing a Ping Test	47
Configuring the IP Switch	47
Configuring the LENOVO Switch	47
Updating the RNC Software and Configuration	48
Modifying the RNC and BTS Configuration Files.	49
Modifying the RNC Configuration	50

Modifying the BTS Configuration File 50
Configuring the BTS BAP IP..... 51
Configuring the BTS(s)..... 51
Configuring the Serial Connection to the BTS..... 51

PART IV APPENDICES

A REGULATORY NOTICES

U.S. Regulatory Statement 57
Canadian Regulatory Statement 57
RF Exposure MPE Exhibit 57

B ACRONYMS AND ABBREVIATIONS

LIST OF TABLES

Table 1	Hardware Specifications	14
Table 2	Network Interfaces	14
Table 3	Notice Icon Descriptions	17
Table 4	Text Convention Descriptions	17
Table 5	Cables and Antennas Supplied by the Network Operator	23
Table 6	Required Tools for Installation	24
Table 7	Test Client Requirements	24
Table 8	Required Cables	25
Table 9	Required IP Addressing for Test Client	26
Table 10	Required IP Addressing for Ethernet Switch	26
Table 11	Required IP Addressing for RNC	26
Table 12	Required IP Addressing for BTS	26
Table 13	Required IP Addressing for Core Network	26
Table 14	Login Configuration for Site (telnet)	27
Table 15	Compact Macro BTS Front Panel Interface Connections	35
Table 16	Example of BTS Wiring	36
Table 17	Front Panel LED Status Light	40
Table 18	Factory Default IP Configuration Plan	45
Table 19	Serial Baud Rates	47
Table 20	bsc.cfg Configuration	50
Table 21	bts.cfg Configuration	51
Table 22	List of Acronyms	59

LIST OF FIGURES

Figure 1	All-IP CDMA2000® EV-DO Network Architecture	12
Figure 2	External Front View of the Compact Macro BTS	15
Figure 3	External Rear View of the Compact Macro BTS	15
Figure 4	External Side View of the Compact Macro BTS	16
Figure 5	Top View of Compact Macro BTS Airflow	32
Figure 6	Rear View of Installing the Compact Macro BTS	34
Figure 7	Compact Macro BTS Front Panel	35
Figure 8	Compact Macro BTS Rear Panel	36
Figure 9	Fan Module: Captive Panel Fastener Location	40
Figure 10	Connection Diagram	46
Figure 11	Example of The Change Command	53

ABOUT THIS GUIDE

This chapter contains an overview of this guide and an overview of the iCell® Compact Macro Base Transceiver Station (Compact Macro BTS). This chapter also lists guide conventions and related documentation, and describes how to contact customer service and technical documentation.

This guide is intended for those who must initially configure the Compact Macro BTS.

This chapter includes:

- [All-IP CDMA2000® Network Architecture](#)
- [Product Overview](#)
- [Conventions](#)
- [Related Documentation](#)
- [Technical Support](#)
- [Warranty Support](#)
- [Contacting Technical Documentation](#)



Release notes are issued with some products. If the information in the release notes differs from the information in this guide, follow the instructions in the release notes.

All-IP CDMA2000® Network Architecture

The Compact Macro BTS is part of the Global Star Solutions ULC (Star Solutions) All-IP CDMA2000® Network for CDMA2000® Radio Access Networks.

The All-IP CDMA2000® Network is an end-to-end, all-Internet-Protocol (IP)-based, wireless communication solution. The All-IP CDMA2000® Network provides the mobility and media-control traditionally associated with a circuit-switched Mobile Switching Center (MSC), but in a packet-based environment.

The All-IP CDMA2000® Network is second-generation (2G) and third-generation (3G) capable, supporting CDMAOne and CDMA2000® 1x and Evolution Data Optimized (EV-DO) networks. By deploying the All-IP CDMA2000® Network in 2G and 3G environments, network operators gain the efficiency inherent in packet-based networks, while building a network core capable of supporting 3G standards.

All-IP CDMA2000® Network benefits include:

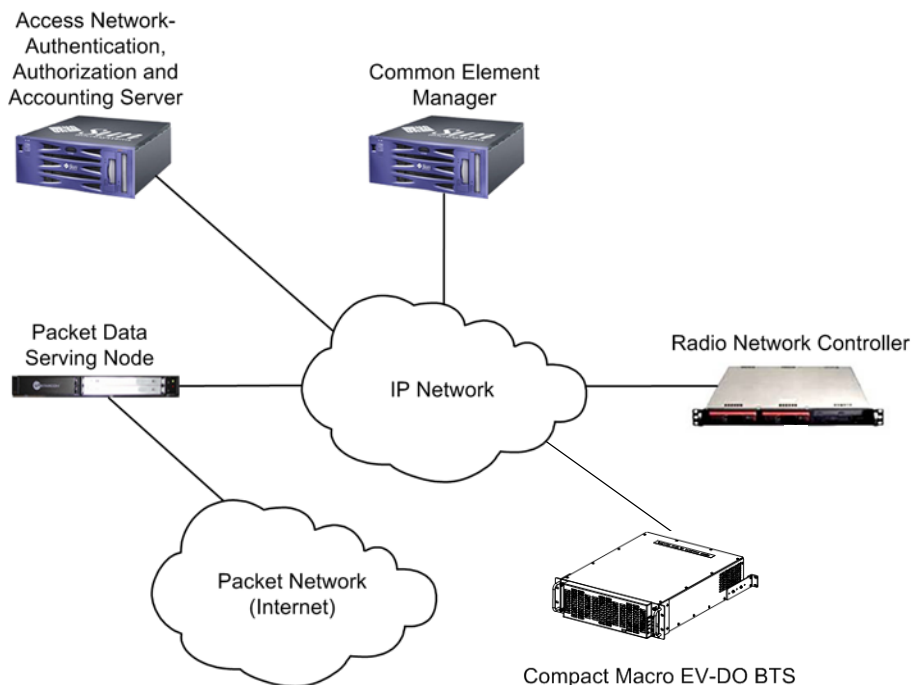
- A network core that supports both voice and data traffic, eliminating the need to operate separate Time Division Multiplexing (TDM) and packet backbones.
- Distributed switching for efficient call-routing from endpoint to endpoint.
- Centralized control of distributed switching for cost-effective scalability, security, and ease of operation.
- Voice carried in native air-interface format across the packet core for maximum bandwidth efficiency, with Pulse Code Modulation (PCM) vocoding done by the Media Gateways at the network edge for Public Switched Telephone Network (PSTN) connectivity.
- Supports ANSI IS-41 requirements
- 3G architecture for CDMA2000® 1x
- 3G architecture for EV-DO.

The All-IP CDMA2000® Network enables the evolution to an all-IP network while delivering a reduced cost of construction and ownership compared to traditional TDM networks.

Product Overview

[Figure 1](#) shows a high-level architecture example for the All-IP CDMA2000® Network, including the Radio Network Controller (RNC) and Compact Macro BTS Network Elements.

Figure 1 All-IP CDMA2000® EV-DO Network Architecture



IP Radio Access Network Elements The IP Radio Access Network Elements include:

- Authentication, Authorization And Accounting Server
- Common Element Manager
- Packet Data Serving Node
- Packet Network (Internet)
- IP Network
- RNC
- Compact Macro BTS.

Base Station Subsystem An RNC and the associated BTS(s) are known collectively as a Base Station Subsystem (BSS).

RNC

The RNC manages call control and interconnections to the other network elements.

The RNC application is supported by an operating system that also provides platform services. While the RNC has several physical platforms, each physical platform runs the same RNC application and platform services.

The Compact Macro BTS communicates with the RNC over an Ethernet IP connection. RNC servers are co-located, or centralized at any convenient location.

This guide does not describe all RNC configurations, which vary based on network and operator requirements.

Compact Macro BTS

The Compact Macro BTS provides IP-based coverage for CDMA2000® 3G wireless networks. This BTS interfaces by IP to the standard iCell soft RNC. The All-IP CDMA2000® Network distributed architecture, eliminates the need to carry traffic to a central RNC, reducing operational complexity. The Compact Macro BTS shares the same internal hardware as the standard iCell Macro system. The only difference is that all the components for one sector are housed in a single casing allowing for a very compact installation. The Compact Macro BTS is ideal for portable systems, disaster recovery systems and for rural areas where traffic is not anticipated to grow beyond one carrier and three sectors (1F/3S).

The main unit also supports the addition of two more sector units. Each sector unit comes in a 2U-high, 19 in., rack-mounted chassis. This modular, flexible design enables wireless operators to start small with a single sector and allows additional sectors to be added in the future to triple capacity.

Compact Macro BTS Hardware Specifications

[Table 1](#) lists the Compact Macro BTS hardware specifications.



Caution:

Although the power class of this equipment is generalized as 20 watts, the actual RF output power may exceed this level and in some instances be as high as 25 watts or greater. References in this guide to power output levels of 20 watts are typical; this statement applies in all references to this typical level.

Table 1 Hardware Specifications

RF Output Power	20 watts at antenna port
Rx Sensitivity	-128 dBm
Input voltage	110-240 VAC
Power consumption	450 watts for 1F/3S with sRNC
Dimensions	3U rack spaces (approximately 5.25 in. (13.33 cm) high, 19 in. (48.26 cm) wide, and 24 in. (60.96 cm) deep)
Weight	25kg
Operating temperature	0° to +40 °C
Storage temperature	-40 to +60 °C
Humidity	5-95% non-condensing
Antenna Connectors	Two 7-16 DIN Female (for diversity receive)
Transportation Shock and Vibration	Meets Telcordia Specification GR-63-CORE
Environmentally Induced Vibration	Meets Telcordia Specification GR-487-CORE
altitude Max	10000 ft.



Table 2 Network Interfaces

Ethernet (10/100BASE-T)
SNMP v2c



The information contained herein is for informational purposes only. Technical claims listed depend on a series of technical assumptions. Your experience with these products may differ if you operate the products in an environment, which is different from the technical assumptions. Star Solutions reserves the right to modify these specifications without prior notice. Star Solutions makes no warranties, express or implied, on the information contained in this document.

GPS

The following GPS-produced signals are used for each BTS when Soft or Hard Handoffs are required:

- Time of Day (ToD) message
- Synchronized 1 Pulse Per Second (1PPS)

Direct GPS and Daisy Chain of One PPS source

For in-building installations, the GPS receiver is connected to one BTS (the first BTS) in each cluster, directly through the 1PPS IN SMA connector and the RS232 ToD port. The 1PPS signal can be extended by coaxial cable to other nearby BTS units using the 1PPS OUT port of the first BTS going to the 1PPS IN port of the next BTS.

[Figure 2](#), [Figure 3](#), and [Figure 4](#) show external views of the Compact Macro BTS.

Figure 2 External Front View of the Compact Macro BTS

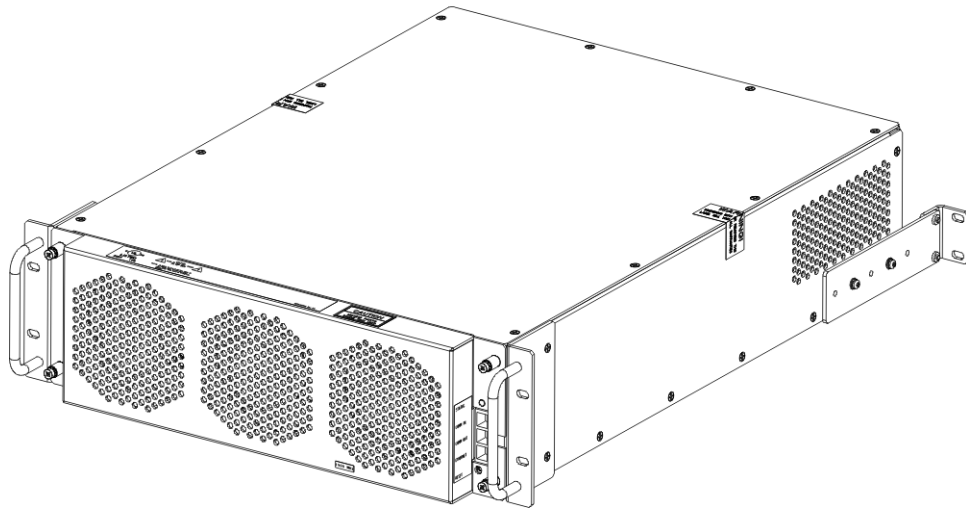


Figure 3 External Rear View of the Compact Macro BTS

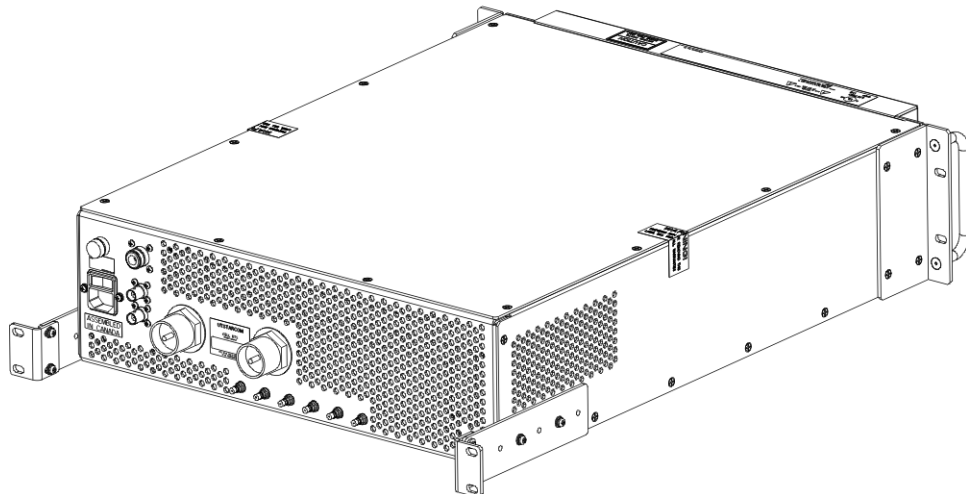
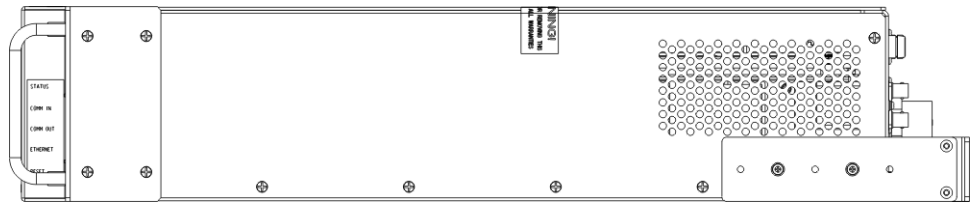


Figure 4 External Side View of the Compact Macro BTS







See [Figure 7](#) on [page 35](#) and [Figure 8](#) on [page 36](#) for identification of the Compact Macro BTS input and output connections.

Conventions

This guide may contain notices, figures, screen captures, and certain text conventions.

Notices [Table 3](#) lists notice icons used in this guide.

Table 3 Notice Icon Descriptions

Icon	Notice Type	Description
	Information Note	Information that contains important features or instructions but is not hazard-related.
	Caution or Warning	<p>Cautions are preceded with the word Caution. This type of caution indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also alert against unsafe practices and potential program, data, system, or device damage.</p> <p>Warnings are preceded with the word Warning. This type of warning indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.</p>
	Caution or Warning due to potential electrical hazard	<p>Cautions due to potential electrical hazards are preceded with the word Caution. This type of caution indicates a potential electrical hazard. This hazard, if not avoided, may result in minor or moderate injury. It may also alert against unsafe practices and potential program, data, system, or device damage.</p> <p>Warnings due to potential electrical hazards are preceded with the word Warning. This type of warning indicates a potential electrical hazard. This hazard, if not avoided, could result in death or serious injury.</p>
	ESD	Information that indicates proper grounding precautions are required before handling a product.

Figures and Screen Captures This guide provides figures and screen captures as examples. These examples contain sample data. This data may vary from the actual data on an installed system.

Text [Table 4](#) lists text conventions in this guide.

Table 4 Text Convention Descriptions

Convention	Description
Text represented as a screen display	This typeface represents text that appears on a terminal screen, for example <code>login:.</code>
Text represented as user entry .	This typeface represents commands entered by the user, for example, <code>cd \$HOME</code> .
Text represented as menus, sub-menus, buttons, tabs, directories, and field names	This typeface represents all menus, sub-menus, buttons, tabs, directories, and field names within procedures, for example: On the File menu, click New .
Text represented by <code><variable></code>	This typeface represents a required variable, for example: <code><filename></code>

Related Documentation

The Compact Macro BTS is part of the All-IP CDMA2000® Network product line for CDMA2000®. The Compact Macro BTS documentation is part of the documentation for the All-IP CDMA2000® Network product line.

The following documents contain information on how to install, operate, and maintain the Compact Macro BTS.

- *iCell All IP RAN CDMA EV-DO Release Notes*
- *iCell Compact Macro EV-DO BTS Installation and Initial Configuration Guide*
- *iCell All IP Radio Access Network Operation and Maintenance Guide*
- *iCell Base Station Subsystem Parameter Reference*.

Technical Support

The Star Solutions Product Support Team delivers the support services required for business and professional needs. Our product experts deliver Tier 1, 2 and 3 technical support directly to new and contract-entitled customers including the following services:

- Basic Support Package: Non-emergency technical support
- Premium Support Package: 24 hours a day, 7 days a week, 365 days a year, emergency technical support.

The *Star Solutions Service Guide* outlines the specific details for obtaining technical support. The guide is available from a sales account manager. Refer to the service guide for services and options specific to individual support plans, including guidelines for problem severity and the technical resolution escalation process.

Obtaining Technical Assistance

Star Solutions maintains a global presence through its Technical Response and Service Centers. These centers are available for technical telephone support to entitled customers during normal business hours.

Before contacting technical support, have this information available:

- Product information
 - Software and hardware revisions
 - Serial numbers
- Problem description
 - Symptoms
 - Known causes
- Trouble locating and clearing attempts.

For information about customer service, including support, training, code releases and updates, contracts, and documentation, contact us at:

<http://www.starsolutions.com/support>

Service Centers Operational Hours

- North America/CALA Region:
 - 09:00–18:00 Pacific Time (UTC-8:00)

- EMEA/Asia Pacific Region:
 - 09:30–18:30 Indian Standard Time (UTC+5:30)

Warranty Support

Star Solutions provides its customers warranty support per the terms of the Star Solutions Warranty Statement for their equipment. Customers who require warranty support should contact the Star Solutions Customer Service Center as specified in the customer service guide or at:

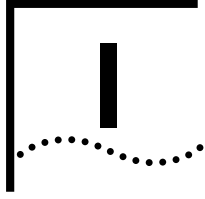
<http://www.starsolutions.com/support>

Contacting Technical Documentation

To provide comments on this documentation, send an e-mail to:

dl-techcom@starsolutions.com

Please include the name and part number of the guide being referenced. If applicable, provide the chapter and page number.



PRE-INSTALLATION

[Chapter 1 Prerequisites](#)

1

PREREQUISITES

About This Chapter

This chapter describes installation prerequisites that must be in place before installation begins.

This chapter includes:

- [Site Requirements](#)
- [Installer Requirements](#)
- [Testing Requirements](#)
- [Network Planning Requirements](#)

Site Requirements

The network operator is responsible for supplying supporting components, cabling, and the necessary operating environment for the Compact Macro BTS.

Equipment Supplied by Network Operator



The compact Macro BTS requires a minimum 3U, 19-inch (48.26 cm) wide equipment rack.



The network operator is responsible for site grounding and lightning protection. Verify all grounding, power connections, and lightning protection meet or exceed local standards.

[Table 5](#) lists cables and antennas supplied by the network operator to support the installation and operation of the Compact Macro BTS.

Table 5 Cables and Antennas Supplied by the Network Operator

Cable	Description
Cellular Sector Antenna	Main and Diversity sector antenna (20 Watt output)
Power Cable	Refer to Installation section for details (Installing the Compact Macro BTS)
Ethernet Cable	CAT-5 Ethernet cable with 2 RJ-45 connector ends.
RF Cables	Corrugated cables with N-type (male) connectors to connect sectors expansion BTS and external GPS antennas (if required).
Antenna Cable	Corrugated RF cable with DIN 7/16 plug (male) connector. (50 ohm impedance, 3GHz minimum interface frequency and rated for minimum 50 Watt at 2GHz)
Grounding Cable	#2 AWG wire

Installer Requirements

This section includes:

- [Skills and Knowledge](#)
- [Supporting Documentation](#)
- [Required Hand Tools](#)

Skills and Knowledge The installer of a Compact Macro BTS must have general telecommunications and electrical circuit knowledge.

Supporting Documentation This document provides all the necessary information to install, configure, integrate, and test a Compact Macro BTS. No other documents are required.

The Network Planning document (engineering specifications for the site and network) is required for any configuration of CDMA2000[®] parameters after installation and initial configuration. The Network Planning document also provides the necessary inputs to [Network Planning Requirements](#).

The documents in the iCell[®] documentation set are listed in [Related Documentation](#) on [page 18](#).

Required Hand Tools The tools required for the installation of the Compact Macro BTS are listed in [Table 6](#).

Table 6 Required Tools for Installation

Tool
Standard Tool Kit
1 in.-lbs. SMA Torque Wrench

Testing Requirements

This section includes:

- [Test Client Hardware](#)
- [Cables](#)

Test Client Hardware This section includes:

- [Laptop](#)

Laptop

A laptop PC, known as the test client, is required for the installation, configuration, verification, and network integration of the Compact Macro BTS.

[Table 7](#) lists the recommended requirements for the test client.

Table 7 Test Client Requirements

Component	Minimum	Recommended
Processor	1.0 GHz	1.3 GHz

Table 7 Test Client Requirements (continued)

Component	Minimum	Recommended
Operating System	Microsoft® Windows® XP Professional Edition	Microsoft® Windows® XP Professional Edition
Memory	256 MB	512 MB
Hard Drive	10 GB	10 GB
CD ROM Drive	24X	48X
Serial Port	Standard	Standard
USB Port	Optional	Optional
Ethernet Port and Card	10/100	10/100

Mobile Phone A mobile phone is required for making test calls.



Verify that a suitable data cable is available for the mobile used in making loopback test calls.

Cables Several cables are required throughout the configuration and verification process. [Table 8](#) lists the cables required for the Compact Macro BTS installation, configuration, and verification process.

Table 8 Required Cables

Cable	Description
Ethernet Cable	CAT-5 straight Ethernet cable with 2 RJ-45 connector ends. (Approximately 3M in length.)
Ethernet Cable	CAT-5 crossover Ethernet cable with 2 RJ-45 connector ends. (Approximately 3M in length.)
Serial Cable	Standard serial cable with 1 male DB-9 connector end and 1 female DB-9 connector end. (Approximately 3M in length.)
Data Cable	Data cable with one standard USB connector end and data connector end to mobile phone.

Network Planning Requirements

This section includes:

- [IP Address Assignment](#)
- [Hostname Assignment](#)
- [Password and Username Assignment](#)

IP Address Assignment This section includes:

- [Test Client](#)
- [Access Network IP Addressing](#)
- [Core Network IP Addressing](#)

Test Client

The test client is used to connect to the Network Elements, and must be on the same subnet. The required IP addressing information for the test client is listed in [Table 9](#).

Table 9 Required IP Addressing for Test Client

Test Client
IP address 1
Subnet mask 1
Default gateway 1
IP address 2
Subnet mask 2
Default gateway 2

Access Network IP Addressing

[Table 10](#), [Table 11](#), and [Table 12](#) list the IP addressing information required for the Access Network.

Table 10 Required IP Addressing for Ethernet Switch

Ethernet Switch
Switch IP Address
Subnet Mask
Default Gateway

Table 11 Required IP Addressing for RNC

RNC
RNC IP Address

Table 12 Required IP Addressing for BTS

BTS
BTS1 IP Address
BTS2 IP Address
BTS3 IP Address
BTS4 IP Address

Core Network IP Addressing

[Table 13](#) lists the IP addressing information required for Core Network integration (PDSN/HA).

Table 13 Required IP Addressing for Core Network

Core Network
MSC IP Address
PDSN IP Address

Hostname Assignment This section includes:

- [Password and Username Assignment](#)

Password and Username Assignment The Compact Macro BTS components have default username and passwords configured. The BSS components can be assigned new site-specific usernames and passwords during installation and configuration, or new usernames and passwords can be configured later by the operator.



Contact Star Solutions support engineering for default password information.

[Table 14](#) lists the BSS components that require a username and password to connect. Have the site-specific usernames and passwords ready before installation begins so that login information can be changed to site-specific values.

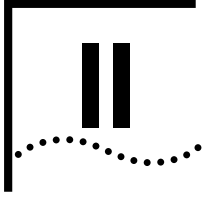


Changing usernames and passwords is not mandatory, but site-specific values will be required if usernames and passwords are changed.

The username and password for the Core Network Elements (MSC, PDSN) are not set here, but they must be available to enable connection during test calls.

Table 14 Login Configuration for Site (telnet)

BSS Component	Default Username	Default Password	Site Username	Site Password
Ethernet Switch		Contact Star Solutions support engineering for password information.	<site-specific>	<site-specific>
RNC	utdora	Contact Star Solutions support engineering for password information.	<site-specific>	<site-specific>
BTS	utdora	Contact Star Solutions support engineering for password information.	<site-specific>	<site-specific>
MSC	msc	Contact Star Solutions support engineering for password information.	<site-specific>	<site-specific>
PDSN		Contact Star Solutions support engineering for password information.	<site-specific>	<site-specific>



INSTALLATION

[Chapter 2 Installing the Compact Macro BTS](#)

2

INSTALLING THE COMPACT MACRO BTS

About This Chapter

This chapter describes how to install the Compact Macro BTS.

The Compact Macro BTS is designed to be installed in a standard, 7 ft. (213.36 cm) tall, 19 in. (48.26 cm) wide, equipment rack. To prevent damage, refer to the instructions packaged with the desired rack.

This chapter includes:

- [Unpacking the Shipment](#)
- [Verifying Compact Macro BTS Airflow and Ventilation](#)
- [Installing the Compact Macro BTS](#)
- [Connecting the Compact Macro BTS Front Panel Interface](#)
- [Connecting the Compact Macro BTS Rear Panel Interface](#)
- [Adding Sectors](#)
- [Maintaining the Compact Macro BTS](#)

Unpacking the Shipment

Inspect the packing container immediately on arrival at the installation site to verify that no damage has occurred during shipment.



Warning:

The Compact Macro BTS may exceed local weight-handling guidelines for a single person. Before installing the Compact Macro BTS, verify sufficient personnel are available to assist in the unloading, handling, and installation process.



Warning:

Do not open casing. No user serviceable parts are inside. Refer servicing to qualified service personnel.

If any damage is observed, notify the shipper immediately to begin the insurance claim process. Do not open or unpack the container until an insurance adjuster has inspected the containers for exterior damage.

If the container appears to be in satisfactory condition, open it and carefully unpack the equipment. Verify the contents and quantities against the packing list. Notify Star Solutions immediately if any discrepancies are discovered, to verify whether the complete shipment has been received.



Do not discard the shipping carton. The shipping carton should be used if units are returned for repair and replacement.

Verifying Compact Macro BTS Airflow and Ventilation Maintaining sufficient airflow through the Compact Macro BTS is required for proper system operation and to protect system components from overheating.



Warning:

Do not block air vents, intake and exhaust. Rear of unit must be 6 in. (152mm) away from walls to provide sufficient airflow.



Warning:

Surrounding equipment exhaust must not feed into the Compact Macro BTS air intake panels.

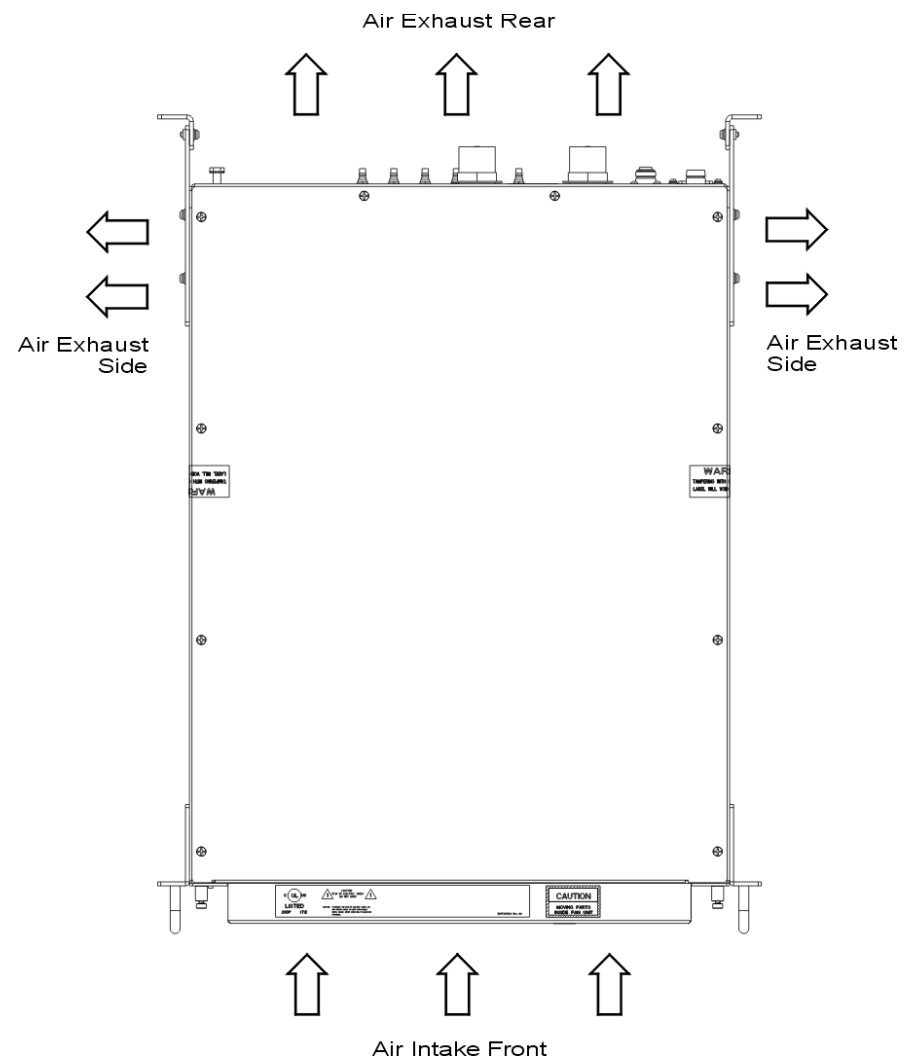


Caution:

Failure to ensure proper ventilation and airflow through the Compact Macro BTS can result in degraded system performance or damage to the components.

[Figure 5](#) displays the airflow direction through the Compact Macro BTS.

Figure 5 Top View of Compact Macro BTS Airflow



Installing the Compact Macro BTS

This section describes how to install the Compact Macro BTS in a 19 in. equipment rack.



Warning:

Use the rack breakers to stop power to the rack before removing or installing the Compact Macro BTS.



Warning:

Verify the unit is properly grounded, using the provided ground stud on the rear panel (see [Figure 8](#)). Failure to install proper grounding may cause personal injury and/or damage to equipment.



See [Table 1](#) on [page 14](#) for hardware specifications.

Maximum Permissible Exposure Requirements

To comply with the Maximum Permissible Exposure (MPE) requirements, the maximum power density resulting from the composite Effective Isotropic Radiated Power (EIRP) from the antenna connected to this equipment must be such that exposure is limited to a maximum of 1 mW/cm².

This value can be achieved by multiple combinations of RF output, antenna gain, and distance from the antenna when energized.

The MPE is expressed as follows:

$$\text{Power Density } P_d \text{ (mW/cm}^2\text{)} = \text{EIRP}/4 d^2$$

Where d = distance from the antenna.

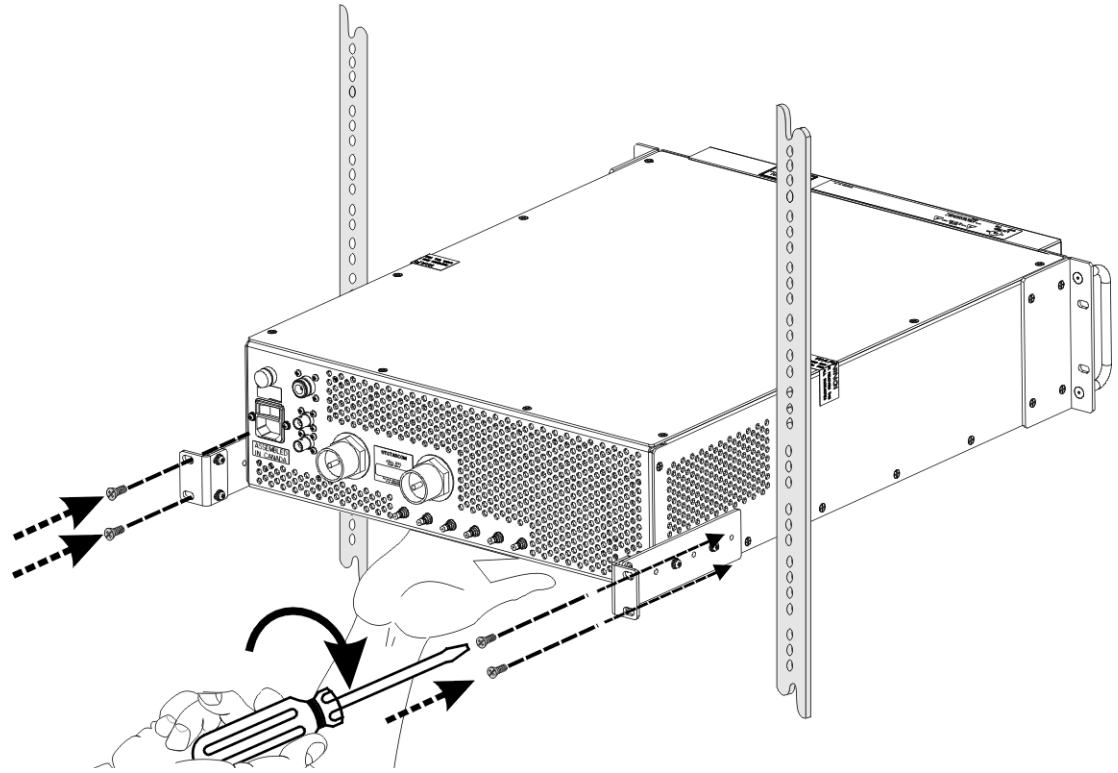
As an example, with the transmitter running at 20 W output into an antenna with a gain of 10 dBi, the minimum safe distance from the antenna to insure that exposure remains below 1 mW/cm² would be 126 cm.

When installing, the above relationship should be used to insure the combination of power, antenna gain, and distance are such that the maximum permissible power density of 1 mW/cm² is not exceeded. Different combinations of output power and antenna gain will result in different minimum safe distances.

Mounting the Compact Macro BTS

The Compact Macro BTS is mounted at the rear of the rack, as shown in [Figure 6](#) and requires 3U rack spaces—approximately 5.25 in. (13.33 cm) high, 19 in. (48.26 cm) wide, and 24 in. (60.96 cm) deep.

Figure 6 Rear View of Installing the Compact Macro BTS



Installation requires access to the rear of the equipment rack.

To install the Compact Macro BTS in a 19 in. rack (See [Figure 6](#)):

- 1 Verify that power to the 19 in. rack is stopped.
- 2 Verify that the rack in which the BTS is installed is earth-grounded.
- 3 Verify that the mounting ears have been secured to the BTS.
- 4 While supporting the underside of the BTS with one hand, slide the BTS into the rear of the rack until the front of the BTS is flush with the front of the rack.
- 5 Use two pairs of fasteners (screws) to secure the BTS mounting ears to the rear vertical rails of the rack.
 - a Insert the two bottom fasteners (screws).
 - b Insert the two top fasteners (screws).



Caution:

Wait until all initial installation and connection procedures in this chapter are complete before restoring power to the rack.

Connecting the Compact Macro BTS Front Panel Interface

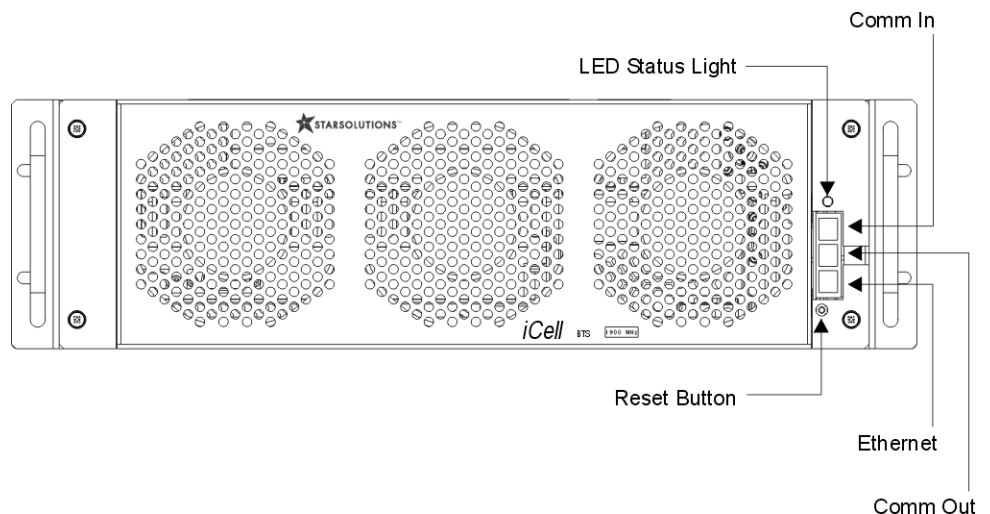
[Table 15](#) describes the Compact Macro BTS front panel interface connections. See [Table 8](#) on [page 25](#) for cable specifications.

Table 15 Compact Macro BTS Front Panel Interface Connections

Connection	Description
ETHERNET	Provides Ethernet IP connection to an RNC.
COMM IN	Used in conjunction with a PC to configure the IP address of the unit.
COMM OUT	Attached to additional sectors and should remain disconnected.

[Figure 7](#) shows the front panel interface connections for the Compact Macro BTS.

Figure 7 Compact Macro BTS Front Panel



To connect the Compact Macro BTS front panel:

- 1 Using a CAT-5 straight Ethernet cable with RJ-45 connectors, connect the Ethernet port on the BTS front panel (see [Figure 7](#)) to a free port on the Ethernet switch.
- 2 Using a standard serial cable with one male DB-9 connector end and one female DB-9 connector end, connect the COMM IN port to the serial port of the test client (See [Test Client Hardware](#) on [page 24](#)).

Connecting the Compact Macro BTS Rear Panel Interface

This section includes:

- [Connecting the GPS](#)
- [Connecting the Main and Diversity Antennas](#)
- [Connecting AC Power to the Compact Macro BTS](#)

[Figure 8](#) shows the Compact Macro BTS rear panel wiring connectors, while [Table 16](#) provides an example of the wiring parameters.

Figure 8 Compact Macro BTS Rear Panel

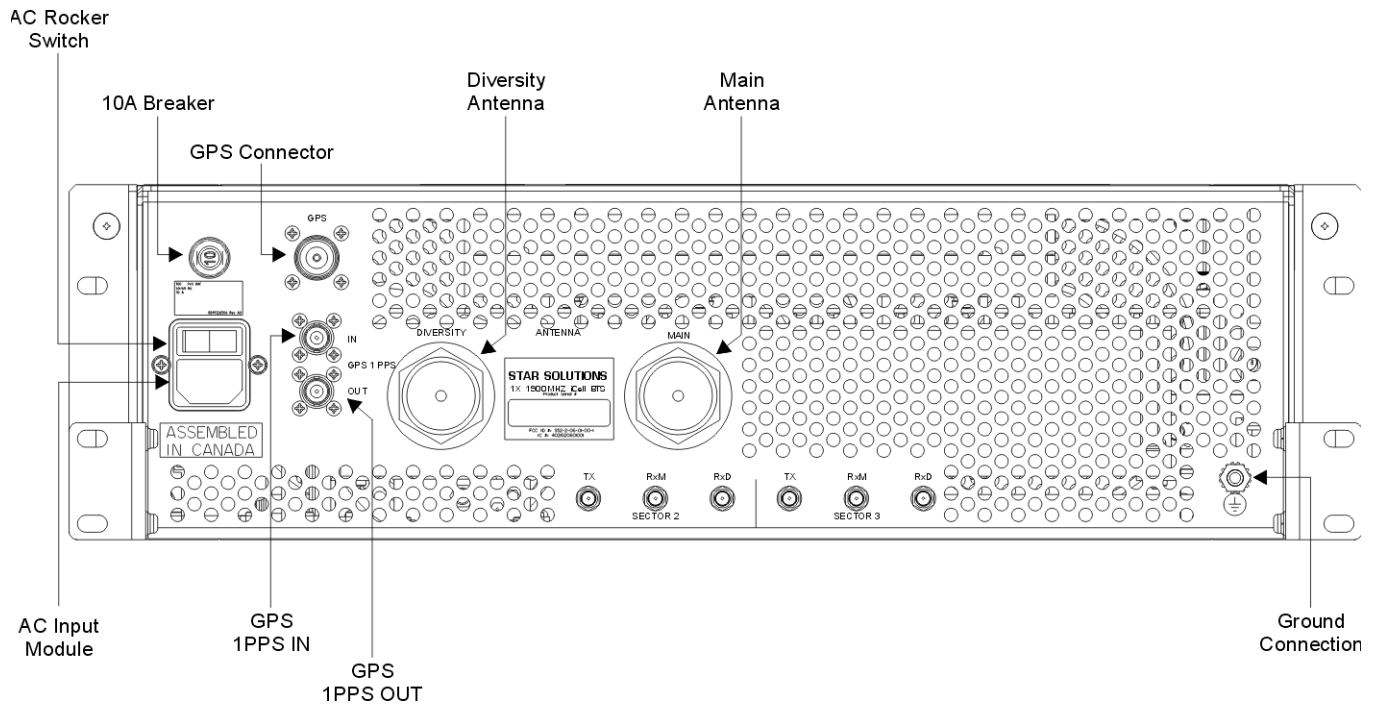


Table 16 Example of BTS Wiring

Name	Type
Primary Ethernet	RJ45S
Antenna Connectors	7-16 DIN Female
1 PPS IN	SMA
1 PPS OUT	SMA
Power Supply Switching	AC Power

Connecting the GPS The Compact Macro BTS requires a GPS antenna, and the GPS satellite system to maintain precise timing.

GPS Connection Guidelines

A BTS requires accurate timing information for both ToD and message synchronization.

The GPS is a constellation of 24 active, and three backup, Earth-orbiting satellites. A GPS receiver must locate four or more of these satellites, determine the distance to each, and use this information to deduce its own location. This operation is based on trilateration.

The GPS receiver and satellite both need clocks that are synchronized to the nanosecond. Every satellite contains an atomic clock and the GPS receiver itself uses an ordinary quartz clock, which it constantly resets.

The receiver looks at incoming signals from four or more satellites and gauges its own inaccuracy—there is only one value for the "current time" that the receiver

can use. The correct time value will cause all of the signals that the receiver is receiving to align at a single point in space. That time value is the time value held by the atomic clocks in all of the satellites. So the receiver sets its clock to that time value, and it then has the same time value that all the atomic clocks in all of the satellites have.

GPS Receiver Protection

The Compact Macro BTS provides +5 VDC voltage at the GPS antenna input connector to power the external antenna. Verify the voltage is sufficient for normal antenna operation and the power consumption of the antenna does not exceed 275mW.

Connecting a GPS Cable to the Compact Macro BTS

A GPS antenna connection point is provided on the rear panel of the Compact Macro BTS (see [Figure 8](#) on [page 36](#)).

The Compact Macro BTS connector supports either N type or TMA type connections via the supplied N-TMA adapter.

**Caution:**

Verify appropriate lightning protection is provided for the GPS antenna and cables.

**Caution:**

A GPS antenna is an active antenna. Avoid a short-circuit termination of the GPS antenna input on the Compact Macro BTS case. If different voltage is fed to the external GPS antenna, use the DC block module with an external lightning-protector to avoid back-current leakage into the GPS antenna input.



The network operator is responsible for supplying the GPS antenna and cables.

To connect the external GPS antenna cable:

- 1 Verify that external AC power to the Compact Macro BTS is stopped.

**Caution:**

Do not over-tighten connector.

- 2 Connect the GPS antenna cable to the GPS connector on the rear panel of the Compact Macro BTS (see [Figure 8](#) on [page 36](#)).

1PPS Connections

The 1PPS connectors are type-BNC. Terminations are supplied with the unit and should remain installed unless a second Compact Macro BTS is installed (second FA).

- If a second compact macro BTS is installed, the unit connected to the GPS antenna should supply 1PPS to the second unit (1PPS out to 1PPS in).

- If, for redundancy in the above situation, a second GPS antenna is used, two cables can be connected between the boxes (1PPS out to 1PPS in x 2).



The network operator is responsible for supplying these cables. The Compact Macro BTS GPS port is a female N-Type connector and female TNC-Type.

Connecting the Main and Diversity Antennas Main and diversity antenna connection points are provided on the rear panel of the Compact Macro BTS (see [Figure 8](#) on [page 36](#)).

Before Connecting RF Cables



Warning:

All RF connectors that are not connected should be terminated. The shielding of all coaxial connections must be grounded.



Caution:

To avoid possible damage to RF connectors, do not exceed 4 in-lbs of torque.

Connecting the RF Cables

To connect the main and diversity antenna cables:

- 1 Verify that external AC power to the Compact Macro BTS is stopped.
- 2 Verify the antenna cables are labeled near the Compact Macro BTS terminating end.



Label the cables if they are not already labeled.

- 3 Thread the 7-16 DIN-type connector-end of the MAIN cable onto the 7-16 DIN connector-end on the antenna connection plate.
- 4 Thread the 7-16 DIN-type connector-end of the DIVERSITY cable onto the 7-16 DIN connector-end on the antenna connection plate.

Connecting AC Power to the Compact Macro BTS

The Compact Macro BTS requires sufficient AC power to meet operating requirements (for example, the power consumption for 1F/3S with sRNC is approximately 400 watts).

Safety Advisory



Warning:

Power connections to the Compact Macro BTS must comply with local safety codes.



Warning:

Power connections must be performed by qualified personnel only.



Caution:

Before beginning, verify that the external AC power to the rack is disconnected.

AC Power Connection

To connect AC power to the Compact Macro BTS:

- 1 Verify that the external AC power to the 19 in. rack is disconnected.
- 2 Verify that the rocker switch on AC input module is in the **OFF** (0) position (see [Figure 8](#)).
- 3 Connect the AC power cord from the AC input module on the rear panel of the Compact Macro BTS to the 19 in. rack power source.



Caution:

Verify that all installation and connection procedures have been completed and meet or exceed local standards before powering up the Compact Macro BTS.



Caution:

Verify an antenna is connected before applying power.

- 4 Restore power to the 19 in. rack.
- 5 Power up the Compact Macro BTS by pressing the rocker switch on AC input module to the **ON** (1) position.

The Compact Macro BTS is ready for initial configuration.

Adding Sectors

The main unit supports the addition of two more sector units. Each sector unit comes in a 2U high, 19 in. wide, rack-mounted chassis.

The sector 2 and sector 3 connectors are type QMA. These are supplied with terminations which must remain attached unless additional sector units are being used.



If additional sector boxes are being installed, refer to the wiring instructions supplied with the sector expansion boxes for installation procedures.

Maintaining the Compact Macro BTS

There are no user serviceable parts inside the Compact Macro BTS casing. The BTS does provide external features for monitoring and restarting the unit, if required.

This section includes:

- [Front Panel LED Status Light](#)
- [Reset Button](#)
- [Replacing the Fan Module](#)

Front Panel LED Status Light

A status light on the front panel of the Compact Macro BTS (see [Figure 7](#)) indicates overall operational status.

[Table 17](#) describes the status information provided by the front panel LED status light.

Table 17 Front Panel LED Status Light

Status	Solid (Timing OK)	Blinking (Timing Not OK)	BTS Operational?
Normal	Green	Blinking Green	Yes
Degrade (Minor Alarms)	Orange	Blinking Green	Yes
System Disabled (Major Alarm)	Red	Blinking Red	No
ACMJ in Boot	Flashing Blue and Red	Flashing Blue and Red	BTS is booting up
User Disabled	Blue	Blinking Blue	No
No Power	Off	Off	No

Reset Button

A reset button is located on the front panel of the Compact Macro BTS (see [Figure 7](#)). Press the reset button to reset the unit.



Caution:

Use the reset button only when all other reconfiguration options have failed. Pushing the reset button takes the unit out of service ungracefully for several minutes.

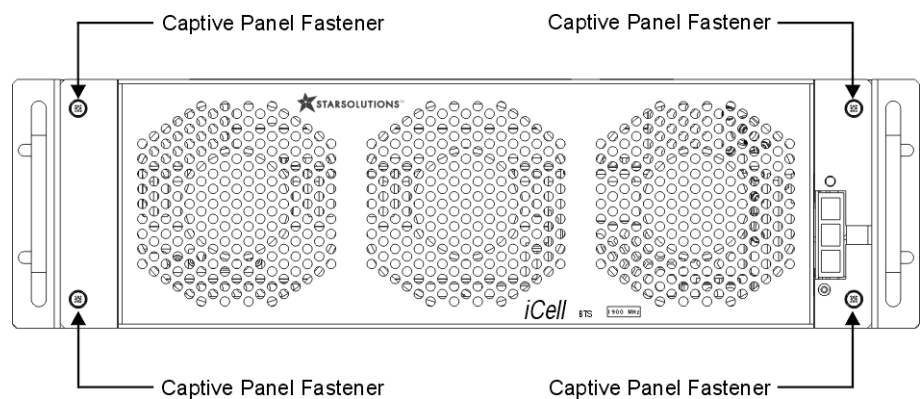
Replacing the Fan Module



Caution:

The AC input power to the Compact Macro BTS chassis must be disconnected, by removing the power cable from the rear of the chassis, before removing or replacing the fan module.

Figure 9 Fan Module: Captive Panel Fastener Location



To remove the fan module:

- 1 Switch off the power switch located on the backplane.

- 2 Unplug the AC power cable located on the backplane.
- 3 Using a No. 2 Phillips screwdriver, unfasten the four captive panel-fasteners located on the front fan panel.
- 4 Unplug the fan connectors (follow the wires from the fans to the connectors).

To install the fan module:

- 1 Plug the fan connectors into the connector located under the PA.
- 2 Using a No. 2 Phillips screwdriver, fasten the four captive panel-fasteners located on the front fan panel.
- 3 Plug the AC power cable into the backplane.
- 4 Switch on the power switch located on the backplane.



INITIAL CONFIGURATION

[Chapter 3 Configuring the Compact Macro BTS](#)

3

CONFIGURING THE COMPACT MACRO BTS

About This Chapter

This chapter includes:

- [Initial Setup](#)
- [Configuring the BTS BAP IP](#)
- [Configuring the BTS\(s\)](#)

Initial Setup

This section includes:

- [Configuring a Test Client](#)
- [Connecting the Test Client to the Ethernet Switch](#)
- [Performing a Ping Test](#)
- [Configuring the IP Switch](#)
- [Updating the RNC Software and Configuration](#)
- [Modifying the RNC and BTS Configuration Files](#)

When the Compact Macro BTS ships, its component network elements are pre-configured with non-routable IP addresses. This section describes how to change to addresses that are routable on your network.

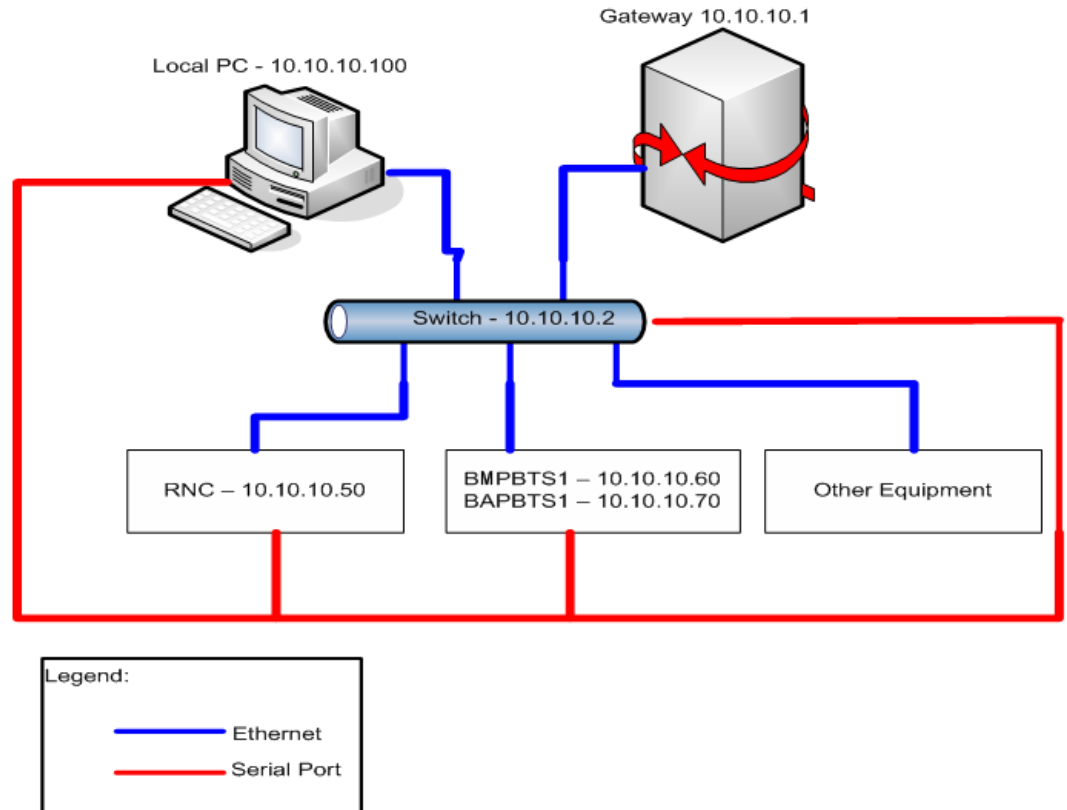
[Table 18](#) lists the factory default IP configuration plan.

Table 18 Factory Default IP Configuration Plan

Device	IP Address	Name
Gateway	10.10.10.1	DGW
Ethernet Switch	10.10.10.2	ES
RNC1	10.10.10.50	RNC1
RNC2	10.10.10.51	RNC2
RNCn (n must be less than 10)	10.10.10.(50 + n -1)	RNCn
BMP BTS1	10.10.10.60	BMPBTS1
BMP BTS2	10.10.10.61	BMPBTS2
BMP BTSn (n must be less than 10)	10.10.10.(60 + n -1)	BMPBTSn
BAP BTS1	10.10.10.70	BAPBTS1
BAP BTS2	10.10.10.71	BAPBTS2
BAP BTSn (n must be less than 10)	10.10.10.(70 + n -1)	BAPBTSn

[Figure 10](#) shows the BSS connections.

Figure 10 Connection Diagram



Configuring a Test Client Configure a test client with two IP addresses (see [Test Client Hardware](#) on [page 24](#)). Configure one IP address on the shipping (10.10.10.xx) network and the other on your local network.

To configure a test client:

- 1 In Windows, click the **Start** button.
- 2 Right-click **My Network Places**, then click **Properties**.
- 3 Right-click **Local Area Connection**, then click **Properties**.
- 4 In the **General** tab, double-click **Internet Protocol (TCP/IP)**.
- 5 In the **General** tab, click **Use the following TCP/IP address**.
 - a Enter an IP address that is valid on your network.
 - b Enter the subnet mask for your network.
 - c Enter the default gateway address for your subnet.
- 6 Click **Advanced**.
 - a In **IP addresses**, click **Add**.
 - b For **IP address**, enter **10.10.10.100**.

- c For **Subnet mask**, enter **255.255.255.0**.
- d Click **Add**.
- e In **Default gateways**, click **Add**
- f For **Gateway address**, enter **10.10.10.1**.
- g Click **Add**.
- h Click **OK**, then **OK**, then **OK**.

[Table 19](#) lists the serial baud rates.

Table 19 Serial Baud Rates

Device	BPS	Bits/Character	Parity Bit	Stop Bits
RNC	38400	8	None	1
Ethernet Switch	Lenovo: 38400 Cisco: 9600	8	None	1
BTS1	115200	8	None	1

Connecting the Test Client to the Ethernet Switch Connect an Ethernet cable from a port on the test client to an empty port on the Ethernet switch.

Performing a Ping Test Ping each of the network elements on the shipping network.

To perform the ping test:

- 1 From the test client, click **Start | Run**.
- 2 Enter **cmd**. Ping the Ethernet switch by entering:
ping 10.10.10.2
- 3 Ping the RNC by entering:
ping 10.10.10.50
- 4 Ping BTS1 by entering:
ping 10.10.10.60
- 5 Ping BTS1 by entering:
ping 10.10.10.70

Configuring the IP Switch When the BTS ships, its component network elements are pre-configured with non-routable IP addresses. This section describes how to change the addresses to the 10.10.10.xx network.

Configuring the LENOVO Switch

To configure the Lenovo Ethernet switch serial connection:

- 1 Connect an Ethernet port on the switch to the Ethernet port on the test client.
- 2 Connect the serial port on the switch to the serial port on the test client.

- 3 Open up a terminal software program (for example, HyperTerminal).
- 4 Press **enter** and wait for the Switch> prompt
- 5 Enter the following commands as each prompt is displayed:

```
Switch> en
password: *****
```



Contact Star Solutions support engineering for password information.

```
Switch# password
Switch# *****
Switch# *****
Switch# ip address <ip address> <net mask>
Switch# ip gateway <gateway address>
Switch# save
Switch# show switch
Ip Address : 10.10.10.2
Subnet Mask : 255.255.255.0
Default Gateway : 10.10.10.1
MAC Address : 00:09:ca:14:94:10
Spanning Tree : Disable
IGMP Snooping : Disable
Switch# exit
Switch> <Ctrl-a, then z, then x>
root@acmServer:/home/acmuser#
```

- 6 Repeat steps 1 through 6 for the next unit.

Updating the RNC Software and Configuration This section lists the procedures required to update the RNC software and the RNC configuration.



The following procedure assumes that the RNC image is in the temporary directory that was created in the previous procedure.

To update the RNC software and the RNC configuration:

- 1 Verify **bootstrapd service** is stopped. If **bootstrapd service** is still running, stop it by entering: `/etc/rc.d/init.d/bootstrapd stop`
- 2 Install and upgrade the latest bootstrapd rpm (x.y.z is the version, latest is 0.9.3 as of May 2007) by entering:

```
cd /tmp
rpm -e bootstrapd-x.y.z-1.x86_64
```


(Removes the old one if it exists)

```
rpm -ivh bootstrapd-x.y.z-1.x86_64.rpm
```

- 3 Zero out old software and configuration partitions by entering:

```
dd if=/dev/zero of=/dev/sda2
```

```
dd if=/dev/zero of=/dev/sda3
```

```
dd if=/dev/zero of=/dev/sda5
```

```
dd if=/dev/zero of=/dev/sda6
```

```
dd if=/dev/zero of=/dev/sda7
```

```
dd if=/dev/zero of=/dev/sda8
```

```
dd if=/dev/zero of=/dev/sda9
```



Do not perform the command for /dev/sda4, or the OS will have to be reinstalled.

- 4 Copy the RNC software image “bsc.img” into the primary and secondary software banks by entering:

```
cd /tmp
```

```
dd if=bsc.img of=/dev/sda2
```

```
dd if=bsc.img of=/dev/sda3
```

- 5 First modify and make sure the RNC configuration file “bsc.cfg” is updated with the correct information and the IP addresses for all related system components. Then update the RNC configuration by copying the “bsc.cfg” configuration file to the software configuration banks by entering:

```
cat bsc.cfg > /dev/sda6
```

```
cat bsc.cfg > /dev/sda7
```

```
cat bsc.cfg > /dev/sda8
```

```
cat bsc.cfg > /dev/sda9
```

- 6 Update the global configuration file to the global configuration bank by entering:

```
cat bsc-gc.txt > /dev/sda5
```

- 7 If the new RNC software image “bsc.img” requires upgrading to software bank 2 and 3 above without changing the configuration file, it is not necessary to update the configuration software banks 5 to 9.

- 8 Reboot the system by entering:

```
reboot
```

Modifying the RNC and BTS Configuration Files

Before the RNC and the BTS software configuration banks are updated with the configuration files (bsc.cfg and bts.cfg), these files need to be modified with the following fields updated to match the system being setup. These configuration files currently contain factory default information such as IP address and gateway information. They must be updated, before the data can be written to the RNC and the BTS systems software configuration banks 6 to 9.

Modifying the RNC Configuration

- 1 Use any Unix-compatible editing tool to edit the RNC configuration file (bts.cfg).



Editing the config file with MS-DOS editors, such as MS Notepad can change the file to MS-DOS format and corrupt the boot process. The configuration file must be in UNIX format.



Make sure to update all the IP address information for the system. Incorrect IP system address information will cause remote connection failure.

- 2 Refer to [Table 20](#) for the correct values for the bsc.cfg file. Change values, as required, using the values specified in the “Set To” column of [Table 21](#).

Table 20 bsc.cfg Configuration

Row	Column	Name	Type	Value	Set To:
		UTDORA-BSC-MIB::btsCount	Integer	1	Total no.of BTSs
		UTDORA-BSC-MIB::bscPrimaryLansIp	Integer	10.10.10.50	BSC address
		UTDORA-BSC-MIB::bscIp	Integer	10.10.10.50	BSC address
		UTDORA-BSC-HRPD-MIB::uatiColorCode	Integer	42	
		UTDORA-BSC-HRPD-MIB::uatiSubnetMask	Integer	104	
		UTDORA-BSC-HRPD-MIB::uatiSubnet	String	0x00000000000000000000000000001000000	



The above three fields must match the BTS configuration

0	Normal	UTDORA-A11-MIB::pdsnSharedSecret	String	0x00000000	“delimited value, ex: “telostech”
		UTDORA-A11-MIB::pdsnCount	Integer	1	No. of PDSNs
0	Start	UTDORA-A12-MIB::aaaSharedSecret	String	0x00000000	“delimited value, ex: “telostech”

Modifying the BTS Configuration File

Use any Unix-compatible editing tool to edit the BTS configuration file (bts.cfg).



Editing the config file with MS-DOS editors, such as MS Notepad can change the file to MS-DOS format and corrupt the boot process. The configuration file must be in UNIX format.

The boot process will stop at :

Initialize RFM module: ...Ok

Initialize TIME module: ...Ok

Components initialized.

Refer to [Table 21](#) on [page 51](#) for the correct values for the bts.cfg file. Change values, as required, using the values specified in the “Set To” column of [Table 21](#).

Table 21 bts.cfg Configuration

Row	Column	Name	Type	Value	Set To
0	End	UTDORA-BTS-MIB::sectorAdministrativeState	Integer	0	1
0	Start	UTDORA-BTS-MIB::bscAbisRowStatus	Integer	3	1
0	Normal	UTDORA-BTS-MIB::bscAbisIp	Integer	10.10.10.50	IP of the BSC
0	End	UTDORA-BTS-MIB::bscAbisAdministrativeState	Integer	0	1
0	Start	UTDORA-BTS-CSM6800-MIB::sectorValid	Integer	3	1
0	End	UTDORA-BTS-HRPD-MIB::sectorValid	Integer	3	1
		UTDORA-BTS-HRPD-MIB::uatiColorCode	Integer	42	
		UTDORA-BTS-HRPD-MIB::uatiSubnet	String	0x00000000000000000000000000001000000	
		UTDORA-BTS-HRPD-MIB::subnetMask	Integer	104	



The above three fields must match the RNC configuration.

Configuring the BTS BAP IP



To configure the BTS Application Processor (BAP) IP for the BTS, please contact Star Solutions support engineering.

Configuring the BTS(s)

First, set up the serial connection to the BTS. Then configure the IP settings using the BTS command prompt and the http interface. Repeat for each additional BTS in the rack.

Configuring the Serial Connection to the BTS

- 1 Connect the serial cable to the BTS Modem Processor (BMP) serial port on the BTS.
- 2 Enter: **ctr1-x**
- 3 When **Press any key...** displays, click any key to interrupt the process.
- 4 Enter **c** to change the information.



See [Figure 11](#), on [page 53](#), before proceeding with [step 5](#).

- 5 Change the following values:

boot device	: mottsec
processor number	: 0
host name	: boothost
file name	: vxworksT22ppc8560_IDORA_BMP.st
inet on ethernet (e)	: 10.10.10.60:ffffe00
inet on backplane (b)	:

```
host inet (h)                : 10.10.10.70
gateway inet (g)             : 10.10.10.1
user (u)                     : target
ftp password (pw) (blank = use rsh) : target
flags (f)                    : 0x0
target name (tn)             : bts1
startup script (s)           : bmpptest.txt
other (o)                    :
```



The flash must be updated by entering w, before proceeding to enter @.

6 Verify the following conditions exist:

- Starting RF sector 1 ... OK.
- Starting RF sector 2 ... OK.
- Starting RF sector 3 ... OK.

7 Note the MAC Address for future use.

8 Verify that the unit resets.

Figure 11 Example of The Change Command

BootLine from /fd0/BOOTCFG.TXT:

```
<mottsec(0,0)boothost:vxworksT22ppc8560_IDORA_BM
```

```
P.st e=172.25.136.168:fffffe00 h=172.25.136.169 g=172.25.136.1  
u=target pw=targe
```

```
t tn=bmp s=bmptest.txt>
```

Press any key to stop auto-boot...

a7

[VxWorks Boot]: c

'.' = clear field; '-' = go to previous field; ^D = quit

```
boot device          : mottsec0 <Enter>  
processor number     : 0 <Enter>  
host name           : boothost <Enter>  
file name           : vxworksT22ppc8560_IDORA_BMP.st <Enter>  
inet on ethernet (e) : 172.25.136.168:fffffe00 <Enter>  
inet on backplane (b): <Enter>  
host inet (h)       : 172.25.136.169 <Enter>  
gateway inet (g)    : 172.25.136.1 <Enter>  
user (u)            : target <Enter>  
ftp password (pw) (blank = use rsh): target <Enter>  
flags (f)           : 0x0 <Enter>  
target name (tn)    : bmp <Enter>  
startup script (s)  : bmptest.txt <Enter>  
other (o)           : <Enter>
```

[VxWorks Boot]:w <Enter>

[VxWorks Boot]:@ <Enter>

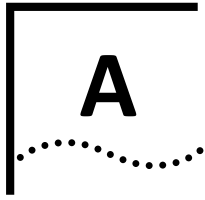
->



APPENDICES

[Appendix A Regulatory Notices](#)

[Appendix B Acronyms and Abbreviations](#)



REGULATORY NOTICES

U.S. Regulatory Statement

This device complies with Part 15 of the FCC Rules. Operation of this device 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.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Canadian Regulatory Statement

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

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



Caution:

Unauthorized modifications or changes not expressly approved by Global Star Solutions ULC could void compliance with regulatory rules, and thereby your authority to use this equipment.

RF Exposure MPE Exhibit

This device operates at frequencies in the 1900 MHz region. Maximum permissible exposure in this region is specified under per FCC Part 1, Section 1.1310, Table 1, as 1 mW/cm².

FCC Part 1, Section 1.1307 states that Part 24E (Broadband PCS) devices are excluded from routine environmental evaluation when operating at power levels beneath a maximum EIRP of 3280 W.

EIRP (Effective Isotropic Radiated Power) is the amount of power that a theoretical isotropic antenna (that evenly distributes power in all directions) would emit to produce the peak power density observed in the direction of maximum antenna gain.

EIRP can take into account the losses in transmission line and connectors and includes the gain of the antenna.

$$EIRP = P_t - L_c + G_a$$

Where $EIRP$ and P_t (power of transmitter) are in dBm, cable losses (L_c) is in dB, and antenna gain (G_a) is expressed in dBi, relative to a (theoretical) isotropic reference antenna.

No antenna is supplied with this unit. Therefore, based on measured RF output power of 26.18 watts at 1947.5 MHz and assumption of cable loss is zero, the maximum antenna gain that will allow the EIRP to remain under the environmental evaluation exclusion limit of 3280 watts is 20.97 dB.

MPE is determined by the following relationship:

$$\text{Power Density } P_d \text{ (mW/cm}^2\text{)} = EIRP/4 d^2$$

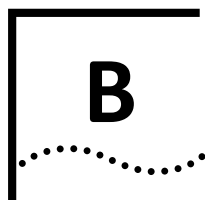
Where d = distance.

$$3280 \text{ watts} = 3.28 \times 10^6 \text{ mW}$$

Therefore:

$$\begin{aligned} d &= (EIRP/4 P_d)^{1/2} \\ &= (3.28 \times 10^6 \text{ mW} / 4 \cdot 1 \text{ mW/cm}^2)^{1/2} \\ &= 510.89 = 511 \text{ cm} \end{aligned}$$

The minimum safe distance from a radiating structure exhibiting a maximum gain of 20.97 dB connected to the Compact Macro BTS, when installed and transmitting at full output power, is 511 cm.



ACRONYMS AND ABBREVIATIONS

This appendix defines acronyms and abbreviations that may be used in this guide.

Table 22 List of Acronyms

Acronym	Definition
1PPS	1 Pulse Per Second
AC	Alternating Current
ANSI	American National Standards Institute
AWG	American Wire Gauge
BAP	BTS Application Processor
BMP	BTS Modem Processor
BSS	Base Station Subsystem
BTS	Base Transceiver Station
CAT-5	Category 5 Cable
CDMA	Code Division Multiple Access
DB-9	Standard serial cable connector
DC	Direct Current
DIN	Deutsches Institut für Normung
EIRP	Effective Isotropic Radiated Power
ESD	Electrostatic Discharge
EV-DO	Evolution-Data Optimized
FA	Frequency Allocation
FCC	Federal Communications Commission
GHz	Gigahertz
GND	Ground
GPS	Global Positioning System
HA	Home Agent
HLR	Home Location Register
IGMP	Internet Group Management Protocol
IP	Internet Protocol
LAN	Local Area Network
MAC	Media Access Control
MIB	Management Information Base
MSC	Mobile Switching Center
PC	Personal Computer
PCM	Pulse Code Modulation
PDSN	Packet Data Serving Node

Table 22 List of Acronyms (continued)

Acronym	Definition
PSTN	Public Switched Telephone Network
RF	Radio Frequency
RJ-45	Registered Jack - 45
RNC	Radio Network Controller
RS232	Recommended Standard 232
QMA	Quick disconnect version of the SMA connector
SMA	SubMiniature version A [connector]
SSH	Secure Shell
TCP	Transmission Control Protocol
TDM	Time Division Multiplexed
ToD	Time of Day
USB	Universal Serial Bus
VAC	Volts, Alternating Current
VDC	Volts, Direct Current

Copyright © 2008 Global Star Solutions ULC

Part Number D02149 A0



STARSOLUTIONS™
ENABLING NETWORKS TO REACH NEW MARKETS

Global Star Solutions ULC

120-4600 Jacombs Road

Richmond, British Columbia V6V 3B1 Canada

www.starsolutions.com