ACE Antenna

USHR-1900
Bi-Directional Amplifier (BDA)

Installation and Operations Manual

10/2002

ACE ANTENNA

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1. General Information

1.1 Introduction

This manual provides information pertaining to the installation and operation of ACE Antenna's USHR-1900 "Ultra Slim Home" BDAs. This unit is for CDMA, GSM, and TDMA modulations in the PCS frequencies as shown in Table 1-1.

<**Table 1-1:** USHR-1900 BDA >

Model Number	Down Link* Frequencies	Up Link** Frequencies	Modulation
USHR-1900	1930 ~ 1990MHz	1850 ~ 1910 MHz	CDMA,GSM,TDMA

*: Down Link (= Forward Path) is from base station to mobile
**: Up Link (= Reverse Path) is from mobile to base station

Professional Installation Only

To ensure compliance with FCC rules and regulations, USHR-1900 must be installed by trained technicians. The unit may not function properly if not installed correctly.

1.2 Specifications

<**Table 1-2:** USHR-1900 Specifications>

PARAMETER		SPECIFICATION
Frequency	Down Link	1930 ~ 1990 MHz
	Up Link	1850 ~ 1910 MHz
Output Power		+ 7 dBm (5 mW)
Input Power		- 43 dBm max
Linear Gain		50 dB
Gain Flatness		7 dB max
1 dB Compression		+ 14 dBm
3rd Order Intercept		+ 24 dBm
Reverse Shutdown		+10 dBm (±1dB)
Noise Figure		8 dB max
Propagation Delay		1 μs max
VSWR		2 :1 max
Impedance		50 Ω
Status LED		POWER: GREEN FAIL: RED
Power Consumption		5.2 V / 500 mA
Input Voltage		AC/DC Adaptor, DC 5.2 V / 1A, 5.2 W
RF Connectors		Type SMA Female
Temperature	Operating	-20 °C to 50 °C
	Storage	-30 °C to 60 °C
Dimensions (W x H x D , inch)		3.10” x 3.80” x 1.54”
Weight (Pound)		1.1 lb

1.3 Description

This product is designed for offices, hotel rooms, small parking lots, garages or small buildings, helping to improve PCS communications signal and coverage by extending the coverage of a base station.

Outdoor antenna receives from a PCS base station, then USHR1900 BDA amplifies the signal. After amplification, the signal is passed through to the indoor antennas. Conversely, signals from handsets are amplified and retransmitted to the base station.

2. Installation

2.1 Introduction

This section provides information for the installation and setup of the USHR-1900 BDA. The information consists of procedures for unpacking, inspection and preparation for the installation, as well as the actual installation and the setup.

2.2 Unpacking and Inspection

Examine the shipping carton for damage before unpacking the unit. If the shipping carton is damaged, try to have the carrier's agent present when the equipment is unpacked. If visual inspection reveals physical damage(s) to the equipment, you should send it back for replacement.

Verify that the equipment is complete, as listed under packing slip. Contact ACE Antenna with any missing component.

2.3 Preparation for Use

2.3.1 Power Requirements

The power supply of the USHR-1900 accepts 5.2 VDC. Power consumption of the USHR-1900 is approximately 2.6 Watts.

Use Only with the Supplied AC/DC Adaptor

The USHR-1900 requires the correct power supply to operate properly. If abnormal power is detected, the "Power Supply" LED on the front face of the unit will turn red and the unit will stop functioning until it is reset and connected to the correct power supply. Increasing the supply voltage beyond what it specified will not increase the gain of the unit, but may cause severe damages.

2.3.2 Operating Environment

The USHR-1900 is intended for indoor use only. Do not install it where it might be exposed to the outside elements as this could result in destruction of the unit and other hazards.
For normal operations, the environmental conditions should be as follow:

Temperature range: –20 °C to 50 °C, Maximum Humidity: 95 %

2.4 Before Installation

You will need to determine the following before beginning the USHR-1900 installation:

a. Base station location
b. Location where the outdoor antenna is to be installed
c. Location where the indoor antenna is to be installed
d. Location where the USHR-1900 is to be installed
e. Length and type of coaxial cable needed to connect from the outdoor antenna to the BDA unit
f. Length and type of coaxial cable needed to connect from the BDA unit to the indoor antenna

2.5 Antenna Installation

2.5.1 Outdoor Antenna

Select a site for your outdoor antenna, making sure you have enough signal strength at that location. Using coax cable, connect the antenna to the BDA. If you are using a directional antenna such as a Yagi type, the antenna should be installed so that it is in line of sight of the base station. Then, align the directional antenna toward that direction, and secure the antenna using provided mounting hardware.

Use of a lightning arrester is highly recommended. By installing a lightning arrester between the outside antenna and the BDA, you can protect the BDA unit from electrical surge from lightning.

2.5.2 Indoor Antenna

Install the indoor antenna at a convenient location. It should be free of metallic obstruction in order to have an effective coverage. Depending on the circumstance of the installation, either one or a combination of following antennas can be used: Ceiling mount patch antenna, Wall mount patch antenna, Corner reflector

2.6 BDA Installation

USHR-1900 is an indoor BDA. Accordingly, the environment of the intended installation site needs to be considered. The BDA must be shielded from moisture, such as rain, and excessive temperatures. The operating temperatures should be between -20 °C and 50 °C.

2.6.1 Turn-On Procedure

Verify all RF connectors are tightened and cables and antennas are secured. Connect AC/DC Adaptor on the BDA's DC IN connector. The Power indicator LED should be green. Make sure that no other LED is illuminated. If any other LED is lit, consult the trouble shooting page of this manual, or "2.6.2 Antenna Isolation and Alignment" section.

2.6.2 Antenna Isolation and Alignment

USHR-1900 is equipped with an over drive protection circuit. If the output power level of reverse path(=Up Link) exceeds prescribed limit, then reverse path is disconnected and the FAIL LED (RED) is on. BDA automatically checks output power level every 1 minute of a 5 minute cycle when reverse path has over power . If reverse path still exceeds level then shut down mode continues for another 10 minutes. After 10 minutes, reverse path is switched on again and it checks output power level again. (Repeats the process)

A. Antenna Alignment

If you are triggering the overdrive alarms at any point, try to increase the isolation between the antennas by relocating them. The indoor antenna should be placed physically as far away from the outdoor antenna as practical. If the geometry of the intended coverage area allows it, you should also try the indoor antenna in such way that interference between the antennas is at the minimum. If you are using directional antennas, try to find a location for the indoor antenna where it can cover the needed area and oriented back to back with respect to the outdoor antenna.

2.7 Connectors

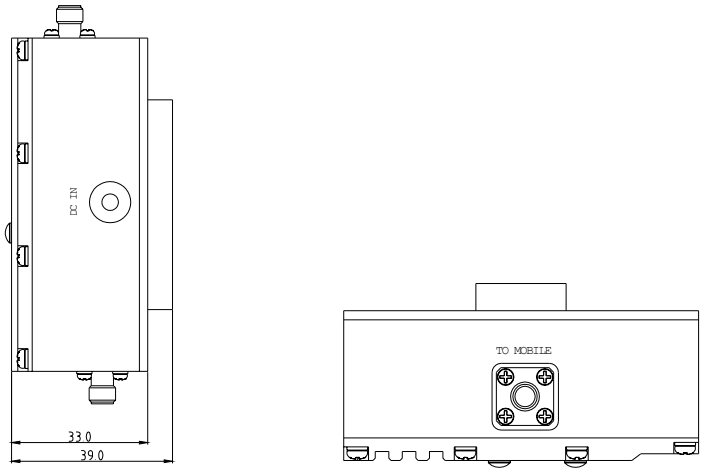
Figure 2-7 shows the connectors and Table 2-7 provides a description of each connector on the USHR-1900 unit

<**Table 2-7:** UHSR-1900 Connectors>

Label	Description
DC IN	Connect AC/DC Adaptor for supplying DC power to the unit
TO BASE	SMA-type female connector transmits base station RF, receives mobile RF, and connects to the outdoor antenna

TO MOBILE	SMA-type female connector transmits mobile RF, receives base station RF, and connects to the indoor antenna

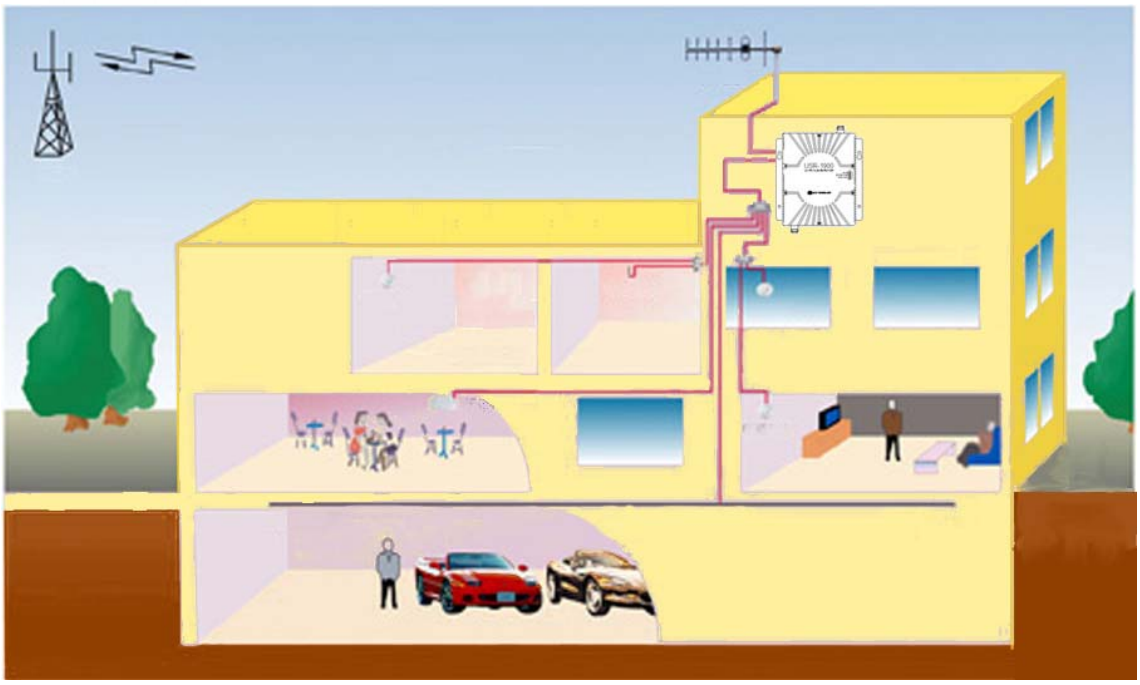
<**Figure 2-7:** USHR-1900 Connectors>



2.8 Installation Example

USHR-1900 can be installed with multiple indoor antennas as shown in Figure 2-8. In this example, a 6-way power splitter was used to split the signal to and from the indoor antennas.

<**Figure 2-8:** USHR-1900 Installation Example>



3. Operation

3.1 Introduction

This section provides information for operating the USHR-1900 BDA.

3.2 Operating Instruction

3.2.1 Power-up

Connect the BDA to AC/DC Adaptor. If no FAIL condition is present, only the "POWER" LED will remain lit. The BDA is then operating properly.

3.2.2 Fail Status

3.2.2.1 Overdrive Fail

There is one overdrive fail on the unit, for the up link. Over driving occurs when the RF output power of the BDA exceeds a prescribed limit. This means that the input RF power level is too high, or the BDA is oscillating. The condition may be transient, caused by a passing emergency vehicle emitting a strong signal for example, or permanent, due to a nearby base station. It may also indicate low isolation between the antennas, which causes the unit to oscillate (please refer to the section 2.6.2 of this manual for antenna alignment and isolation.)

The overdrive fail on the USHR-1900 BDA is design to detect whether the over driving is transient or permanent. If the output power level of reverse path(=Up Link) exceeds prescribed limit, then reverse path is disconnected and the FAIL LED

(RED) is on. BDA automatically checks output power level every 1 minute of a 5 minute cycle when reverse path has over power . If reverse path still exceeds level then shut down mode continues for another 10 minutes. After 10 minutes, reverse path is switched on again and it checks output power level again. (Repeats the process)

4. Trouble Shooting

If the BDA does not operate properly after installation, first make sure that the installation procedures as described in section 2 of this manual were followed correctly. Inspect each connection, both RF and AC, and connectors for a secure fit, checking to see if all the connections are made to the proper ports of the unit and the antennas.

If the malfunction is due to an alarm condition, refer to the appropriate part of the section 3.2 of this manual. Corrective actions may be taken for the overdrive alarms.

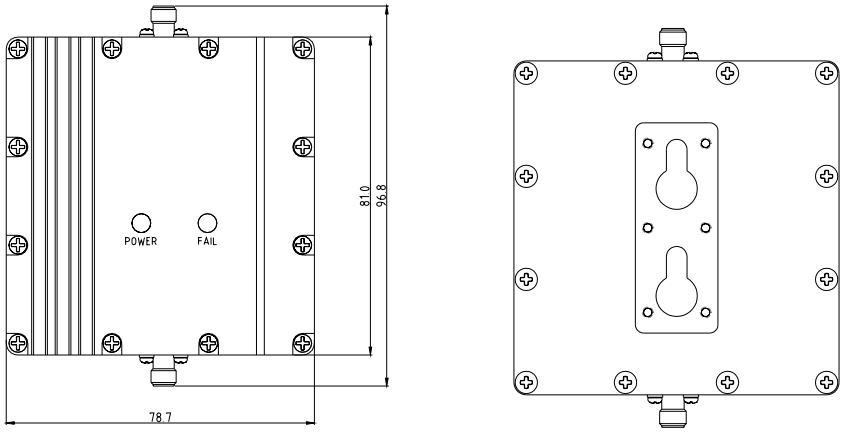
CAUTION!

There are no user serviceable parts in the USHR-1900. DO NOT OPEN the unit. There is a danger of an electric shock. Opening the covers of the unit will void all warranties.

5. Drawings

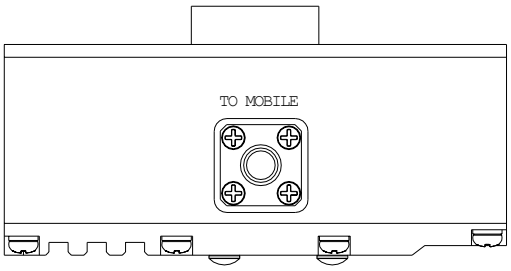
5.1 Front and Back views

<**Figure 5-1:** USHR-1900 Front and Back views>

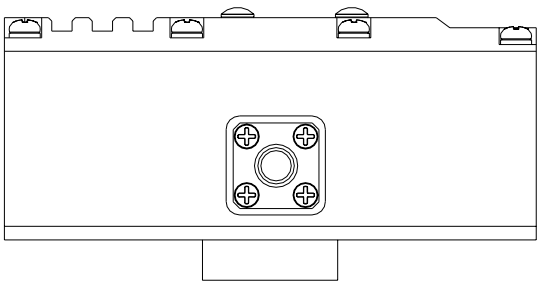


5.2 Top and Bottom views

<**Figure 5-2:** USHR-1900 Top and Bottom views>



TOP



BOTTOM

5.3 Side views

<**Figure 5-3:** USHR-1900 Side views>