



***USER MANUAL***  
***BDA-700UC-26-52-AA-MBX-VZW***  
***LTE 700 MHZ***  
***OVER-THE-AIR REPEATER***



**REVISIONS**

Rev	Description of Change	Revision date	Revised by

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## **YEAR LIMITED HARDWARE AND SOFTWARE WARRANTY**

Cellvine Ltd. warrants all repeater Products against electrical malfunction for a period of One (1) year from shipment of the product to the purchaser. If Cellvine receives notice of defects during the warranty period, Cellvine will either replace or repair the products.

## **WARRANTY EXCLUSIONS AND LIMITATIONS**

The warranty shall not apply to defects resulting from improper operation, inadequate maintenance, or unauthorized use or modification by the customer of the repeater products or software. The warranty service and service beyond the warranty period described herein are the customer's sole remedies.

## **OBTAINING SERVICE DURING AND BEYOND WARRANTY PERIOD**

To obtain warranty service, the customer shall return the repeater product to Cellvine Ltd with date and proof of purchase and an explanation of the problem. The customer shall pay for shipping charges and Cellvine shall pay for return shipping. For service beyond the warranty period, contact Cellvine for details of available service.

## **GETTING HELP**

The repeaters have undergone extensive testing prior to shipment. All of the functions have been thoroughly tested. However, if there are problems that you discover, please call us. We are here to help.

## **ABOUT THIS MANUAL**

This user manual is intended for experienced installation technicians and engineers. It contains the following:

- A general description of the BDA-700UC-26-52-AA-MBX-VZW repeater system and system components
- Installation overview
- Repeater system operation

## Contacting Cellvine

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# Abbreviations

The terms, acronyms and abbreviations used in this manual are detailed in the following list:

<b>Abréviation</b>	<b>Description</b>
AGC	Automatic Gain Control
BDA	Bi Directional amplifier
BL	Bluetooth
Div	Diversity
DU	Donor Antenna Unit
LED	Light Emitting Diode
LNA	Low Noise Amplifier
NMS	Network Management System
PA	Power Amplifier
PSU	Power Supply Unit
REP	Repeater
RF	Radio Frequency
RSSI	Received Signal Strength Indication
RU	Remote Unit
RX	Receiver
SC	Service Channel
TX	Transceiver unit

# General Safety Warning

Always observe standard safety precautions during installation, operation and maintenance of this product. Only qualified and authorized personnel should carry out adjustment, maintenance or repairs to the components of this system.



## **DANGER: ELECTRICAL SHOCK**

The power supply unit contains dangerous voltage that can cause electric shock. Disconnect the mains prior to any work in the Repeater. Any local regulations are to be followed when servicing Repeaters.

This equipment is usually installed indoors. Wet conditions increase the potential for receiving an electric shock when installing or using electrically powered equipment. To prevent electrical shock when installing or modifying the system power wiring, disconnect the wiring at the power source before working with insulated wires or terminals.

Repeaters supplied from the mains must be connected to grounded outlets and in conformity with any local regulations.



## **CAUTION: HIGH GROUND**

When working on a Repeater on high ground, e.g. on a mast or pole, be careful not to drop parts or the entire Repeater. Falling parts can cause serious personal injury.



## **CAUTION: COAX CABLE BENDING**

Allow sufficient coax cable length to permit routing of patch cords or pigtailed without severe bends.



## **CAUTION: RADIATION**

Any Repeater, including this Repeater, will generate radio signals and thereby give rise to electromagnetic fields that may be hazardous to the health of any person who is extensively exposed to the signals at the immediate proximity of the Repeater and the Repeater antennas.



## CAUTION: STATIC ELECTRICITY

Static electricity means no risk of personal injury but it can severely damage essential parts of the Repeater, if not handled carefully.

Parts on the printed circuit board as well as other parts in the Repeater are sensitive to electrostatic discharge.

Never touch the printed circuit board or uninsulated conductor surfaces unless absolutely necessary.

If you must handle the printed circuit board or uninsulated conductor surfaces, use ESD protective equipment, or first touch the Repeater chassis with your hand and then do not move your feet on the floor.

Never let your clothes touch printed circuit boards or uninsulated conductor surfaces.


Always, store printed circuit boards in ESD-safe bags.



## FCC STATEMENT

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 expense. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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 **RF exposure warning!** In order to comply with FCC RF exposure regulations, you must ensure that the donor antenna is installed at a minimum distance of 0.2 m (7.8 inches) from persons who may be present in the area.

---

# 1. Introduction

## 1.1. GENERAL DESCRIPTION

The goal of the Repeater system is to improve coverage for Verizon Wireless LTE (747– 757 MHz, 777– 787 MHz) in medium size indoor areas



**Figure 1-1: BDA-700UC-26-52-AA-MBX-VZW Repeater**

The system implements BDA technology to enhance coverage in urban areas. Repeaters are used to fill out uncovered areas in cellular mobile systems, such as base station fringe areas, road tunnels, business and industrial buildings, etc. A Repeater receives signals from a base station, amplifies the signals and retransmits them to service area. It also receives, amplifies and retransmits signals in the opposite direction. Both directions are served simultaneously.

In order to receive and transmit signals in both directions, the Repeater is connected to a donor antenna directed towards the base station and to a service antenna directed towards the area to be covered.

Control of the Repeaters is performed using a desktop or laptop computer equipped with standard browser (no special software) which can communicate with the Repeaters, either locally or remotely via modem (optional).

## 2. System components

### 2.1. BDA-700UC-26-52-AA-MBX-VZW REPEATER KIT

- Power Supply
- Ethernet CAT 5 cable for Operation and Maintenance of the unit using a PC .
- Repeater unit
- Wall mounting
- Power supply optional installation kit
- Cross Band Coupler for LTE & Cell / PCS (optional as external or internal)
- This manual

### 2.2. REPEATER UNIT

Cellvine's indoor BDA-700UC-26-52-AA-MBX-VZW Repeater has been designed to enhance and extend cellular coverage into small and medium-size buildings, restaurants, underground areas, office buildings and other similar indoor environments. It provides the following functionalities:

- High linearity and low noise amplifiers
- Telco grade reliability
- High gain + 90dB
- Advanced AGC
- Oscillation detection and protection
- Output power +26 dBm Downlink, +18dBm Uplink
- Full local and remote control and diagnostics
- Available communication through Ethernet protocol
- Optional cellular modem for remote monitoring and control
- integrated or external Cross Band Coupler for LTE & CELL/ PCS band's

## 2.3. REPEATER UNIT RF SPECIFICATIONS

Parameters		Specifications
700 MHz	DL	747 – 757 MHz (10 MHz LTE)
	UL	777 – 787 MHz (10 MHz LTE)
Composite output power		DL
		UL
		26 dBm
		18dBm
Pass band Ripple		± 2 dB
Max gain DL,UL		90 dB
UL Noise Figure		<5dB (at Max gain)
Filtering		Meets or exceeds FCC
Out of band Spurious		Meets or exceeds FCC
Out of Band Gain		Meets or exceeds FCC
EVM		DL-8-12.5% ,UL-12.5-17.5% According to VZW 3G&4G Requirements-Rev 2.0 Nov 5/09
AGC Range		30 dB
Manual Gain control		30 dB in 1 dB steps via software
VSWR		<1.5:1
Delay		<5 usec
Max Safe Input Power		-20 dBm
Operating Temp		-5C to +50C
Storage Temp		-30C to +80C
Sealing		Indoor enclosure IP-50
Dimension		16 X 10.5 X 5 inches
Weight		<20 Lbs

Parameters	Specifications
Power	10 VDC, < 60 W by included 115VAC power supply.
RF Connectors	2x Type N Female
Modem Connector	1x Type N Female
M&C connector	1x RJ-45

## 2.4. REPEATER BLOCK DIAGRAM

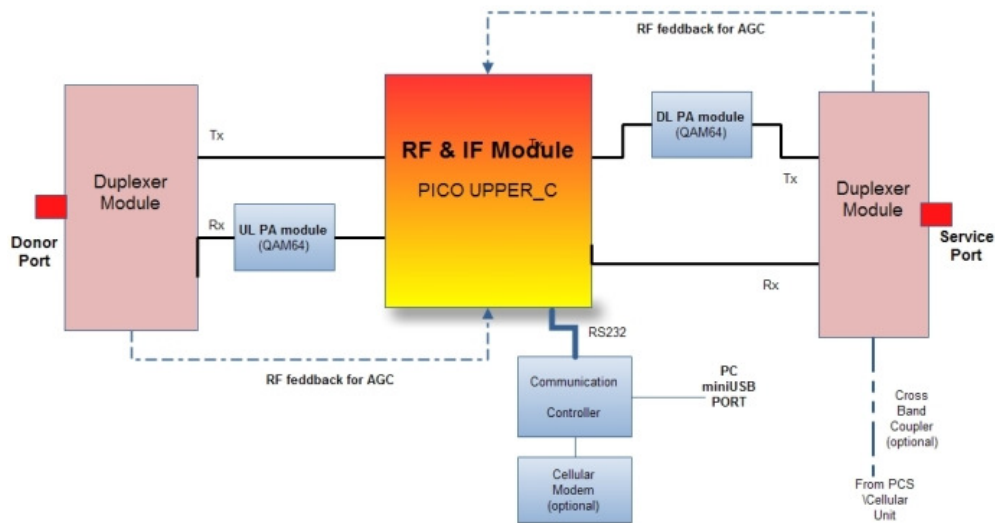
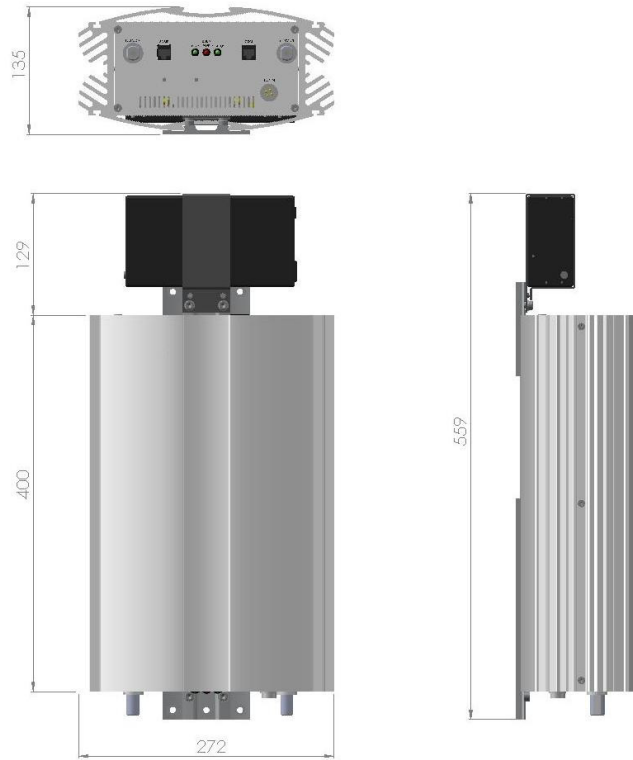


Figure 2-1: System Block Diagram

## 2.5. DIMENSIONS AND WEIGHT

The dimension of the Repeater, including the mounting bracket, is shown in Figure2-2.



**Figure 2-2: Repeater dimensions**

Approximate Repeater weight: 12 Kg (26 lbs)



## 2.6. REPEATER UNIT INTERFACES

The Repeaters interfaces are located at the bottom, top and the side of the Repeater.

Name	Type	Function
SERVICE	N-Type female connector	Connect to Service antenna
DONOR	N-Type female connector	Connect to Donor antenna
Cell & PCS band Input	N-Type female connector	Connect to cell & PCS band repeater
POWER	PLT DC connector	Connect to Power supply
COM	RJ 45	Ethernet connection to PC
SNMP	RJ 45	<b>N/A</b> -Ethernet connection to LAN

**Table 1 : Repeater Interfaces**

## 3. Installation

This section provides information for the installation and setup of the Cellvine Repeaters.

The information consists of procedures for unpacking, inspection and preparation for the installation, as well as the actual installation and the setup. It is important that the Repeater will be installed correctly at its working location. It is recommended that installation be done by a certified radio technician.

The Repeater installation consists of five basic steps:

- (1) Unpacking and inspection
- (2) Antenna installation
- (3) Repeater installation
- (4) Cable installation
- (5) Repeater parameters Set-Up and tuning with Control application.

### 3.1. UNPACKING AND INSPECTION

Examine the shipping package for damage before unpacking the unit. If the shipping package 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 includes all components, as listed under packing slip. Contact Cellvine Ltd. if you find missing components.

## 3.2. OPERATING ENVIRONMENT

Cellvine's indoor Repeaters are intended for installation indoors only.

Do not install them where they might be exposed to direct sunlight and rain\snow conditions as this could be harmful to the unit. For normal operation, the environmental conditions should be as follows:

Ambient temperature range:  $-10\text{ }^{\circ}\text{C}$  to  $+50\text{ }^{\circ}\text{C}$ , Maximum Humidity: 90 %.

## 3.3. PRE-INSTALLATION INSPECTION

Before beginning the Repeater installation determine the following:

- Base station location and receiving power ( Tx power in dBm )
- Location where the DONOR/ Service antenna is to be installed
- Location where the Repeater is to be installed
- Length of coaxial cable needed to connect from the Donor antenna to the Repeater unit
- Length of coaxial cable needed to connect from the Repeater unit to the indoor antenna/s.
- Isolation estimation between the donor and the coverage antenna/s.

## 3.4. ANTENNAS INSTALLATION

### 3.4.1. COVERAGE (SERVICE) ANTENNAS

Coverage (service) antennas are facing to the service area. The mostly used Antennas for indoor applications are Omni or panel antennas. When multiple indoor areas need coverage, more than one antenna can be used. The indoor antennas are usually placed near the ceiling with decorative covers, antenna location decisions take into account isolation issues and overcoming interfering signals. For outdoor coverage, panel antennas are commonly used, location of the antenna is defined by coverage and isolation matter.

### **3.4.2. DONOR ANTENNA**

DONOR antenna is installed outside, facing to the donor BTS. The donor cell site should be chosen by considering capacity, range and signal level in the outdoor antenna location. The location should be chosen so that the donor cell site will be received at a higher level than all other adjacent cell sites. If possible this antenna should be faced directly to the nearest cellular site with a line of sight view. This antenna should also be properly grounded with an appropriate grounding strap and lightning protection if needed. Install the antenna according to antenna manufacturer instructions.

## 3.5. REPEATER UNIT MECHANICAL INSTALLATION

### 3.5.1. REPEATER INSTALLATION

- Use the hardware bracket supplied to mount the Repeater to a solid location as show in Figures 3-1to 3-8.
- Install the Lower (Long) bracket on the wall in vertical position using three fixing screws ÷ M6 (or 1/4 ") socket pan screw, M6 plain washer, M6 spring washer.(Figure 3-1,3-2)
- \* Please note: Hardware not supplied



Figure 3-1

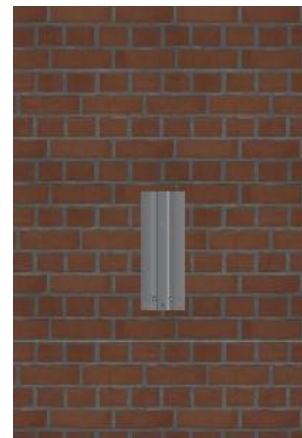


Figure 3-2

- Slide the repeater on the lower bracket from top (Figure 3-3, 3-4).



Figure 3-3

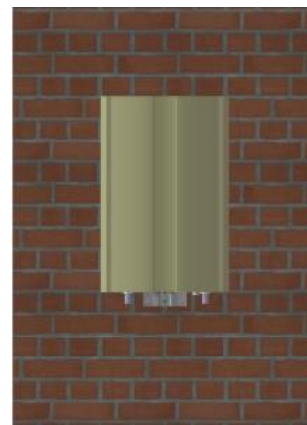


Figure 3-4

- Slide the Upper bracket (Short) and mark the drilling points for the upper bracket (use the black marker on the bracket Figure 3-5,3-6,3-7)



Figure 3-5



Figure 3-6



Figure 3-7

- Take out the Upper bracket and the repeater and drill the needed holes.
- Re slide the repeater and the upper bracket (till the black marker), Connect the two upper screws and fasten the bracket to the wall (Figure 3-7,3-8).

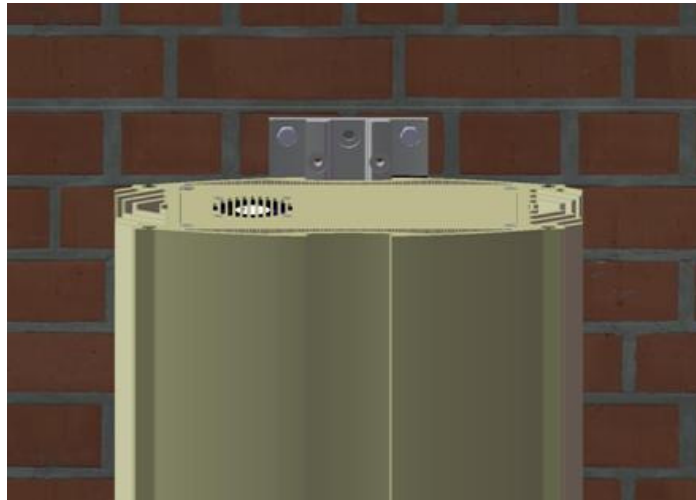


Figure 3-8

- Make sure that the antenna cable connectors and the Repeater connectors are clean and dry.
- Connect the Donor antenna cable to the "DONOR" RF connector.
- The connection should be snug and tight.
- Connect the "service" (coverage) antenna cable to the service RF connector. The connection should be snug and tight.
- Ensure that the antenna cables have not been crimped, kinked, or otherwise damaged in the process.

### 3.5.2. POWER SUPPLY INSTALLATION

#### Bracket Mounting

- Take out the 2 Allen screws mount the power supply on the bracket
- re insert the screw and the spring lock washers, fasten the screws to the bracket (see figure 3-9)

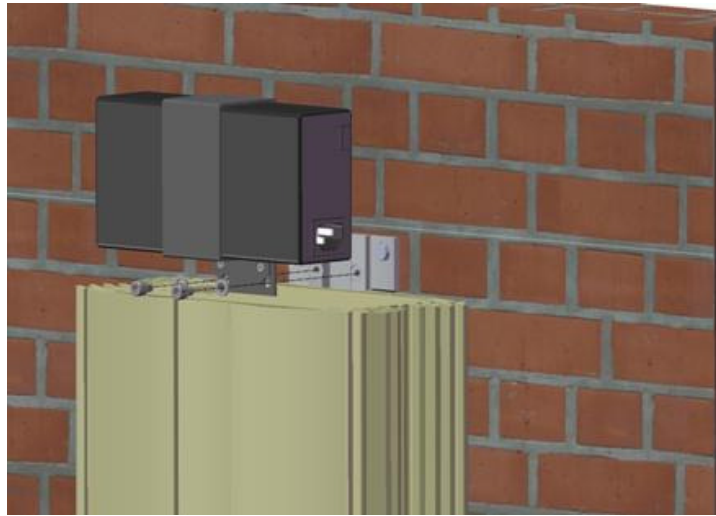


Figure 3-9

- Connect the DC cable to the repeater
- Connect the AC cable to the Power supply and than to the AC outlet.

### Wall Mounting

Take the power supply kit (Power supply + attached bracket) place it on the wall and mark the holes for drilling.

Drill the 2 holes and than fasten the kit to the wall with 2 screws.

(Figure 3-10).



Figure 3-10



- Connect the DC cable to the repeater
- Connect the AC cable to the Power supply and than to the AC outlet.



**NOTE:** Always connect RF connectors to Repeater before applying electric power!

### 3.6. REPEATER CABLE CONNECTION

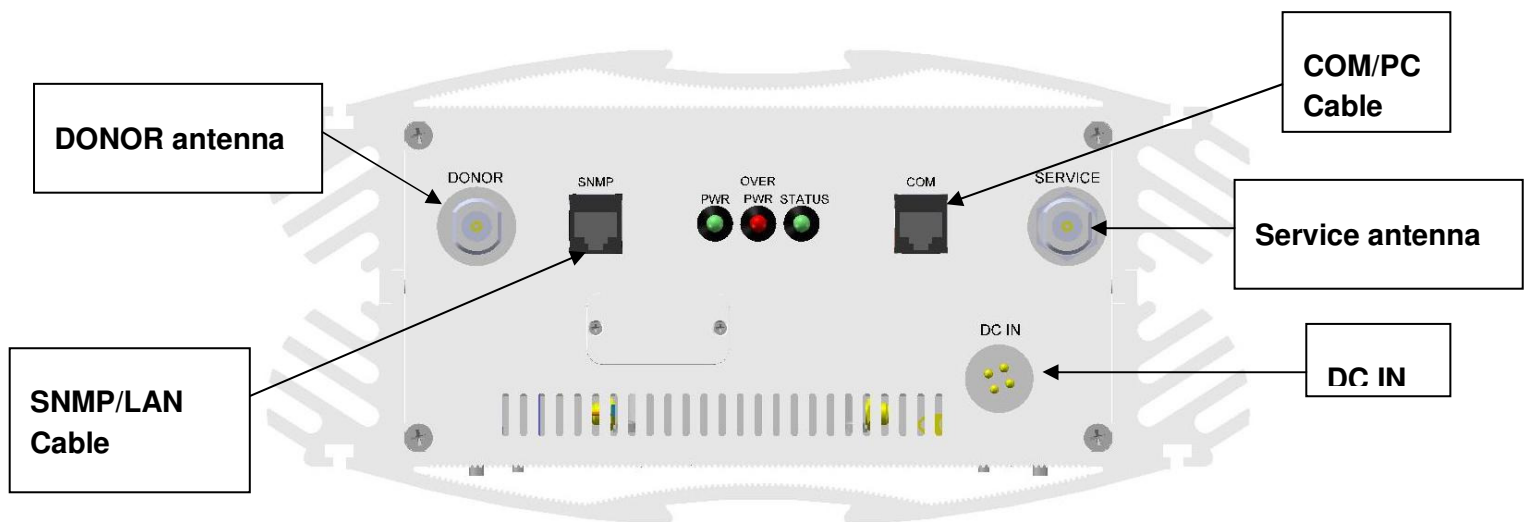


Figure 3-1: Cable Connections

### 3.7. SYSTEM INDICATIONS

There are three indication LED's on the front panel:

Power, Over Power, Status.

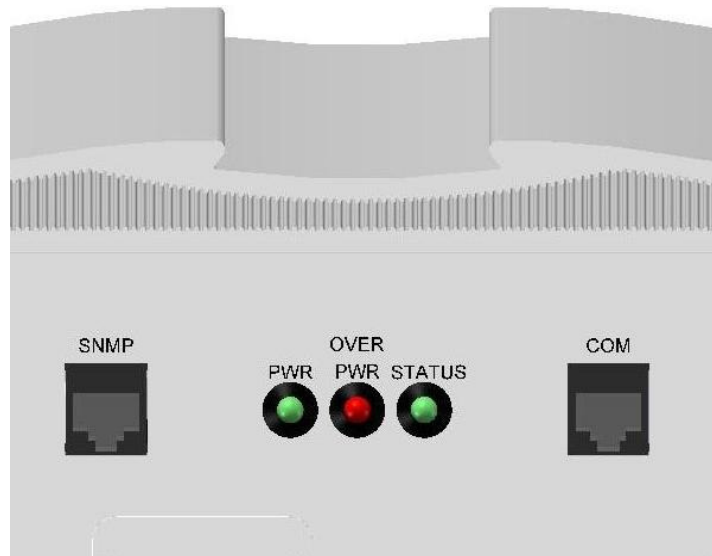


Figure 3-2: Repeater Indications LED's

- PWR: On when the repeater is ON,
- OVER PWR:
  - Off** in normal operation,
  - On** when signal is high (28dBm) and Gain is at minimum value.
  - Blinking** when signal is high (above 28dBm) and the system is shut down for a period of approximately 1 minute.
- STATUS:
  - On** in normal operation and good DL power
  - Blinking** when DL power is low

### **3.8. TUNING DONOR ANTENNA**

Locate a potential site for installing the Donor Antenna with an accessible and comfortable working space. If possible locate a place with a line of sight to the Donor BTS.

Deploy a coax cable between the Donor antenna and the Repeater location and connect to the DONOR connector.

In order to achieve the best signal reception quality at the donor antenna, rotate the antenna gently sideways and measure signal strength by an approved test set.

### **3.9. ANTENNA ISOLATION**

To assure proper Repeater operation, the isolation between the indoor (Service) and Donor antennas should be higher than the Repeater's maximal gain (15dB difference is recommended). This parameter can be measured by injecting a pilot signal at the indoor antenna's (DAS) connector and measuring the received signal at the DONOR antenna connector. The isolation measured should be at least 15dB higher than the MAX GAIN of the repeater. It is recommended to perform the test using a sweep signal generator to cover the whole band. It is also recommended, to perform the test in the opposite direction. (Injecting to the donor antenna and measuring at the Service antenna's connector).

## 4. Repeater Monitoring and Control

This type of repeater can be accessed in two ways for Monitoring and Control:

- Via Ethernet cable in local, web connection or by
- Internet connection via cellular modem



**NOTE:** The remote access method is an optional feature to the standard model

### 4.1. PREPARING THE REPEATER FOR LOCAL CONNECTION

#### 4.1.1. SOFTWARE APPLICATION

The provided software allows you to access, modify and configure the repeater parameters, receive alarms, and control the repeater locally.

The software provides various status indications and readouts.

The configurable parameters include Gain settings, power settings, alarm settings and more.

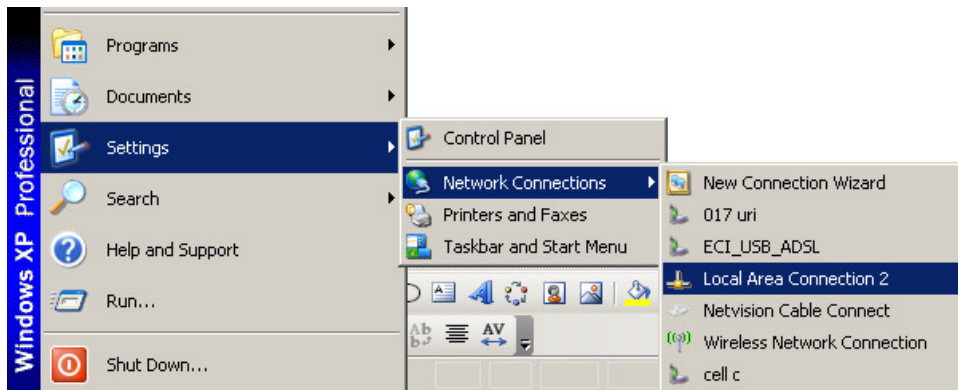
#### 4.1.2. SYSTEM REQUIREMENTS

Windows 2000\XP operating system\Vista\Windows 7

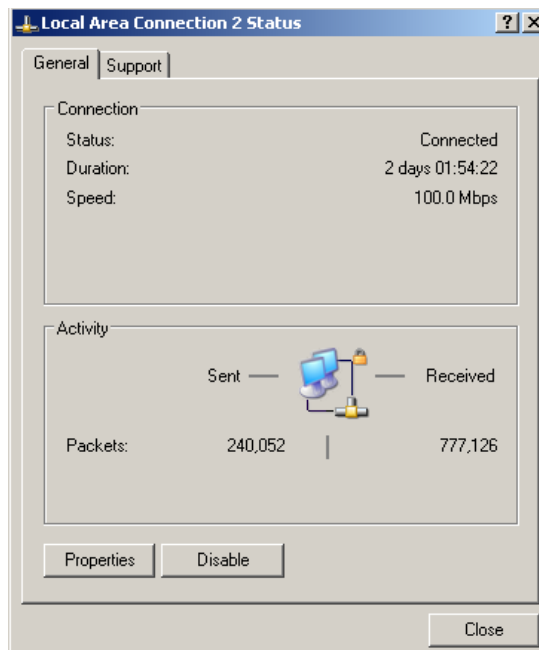
## 4.2. DEFINE PC/LAPTOP INTERNET SETTINGS

In order to connect to the repeater software via the web browser, the browser should be configured as follows:

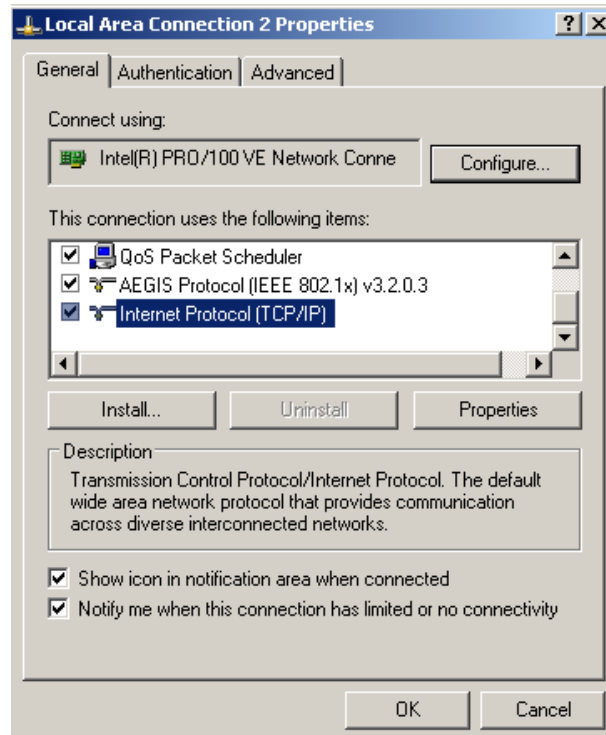
1. Go to Start→Settings→Network Connections→Local Area Connection.



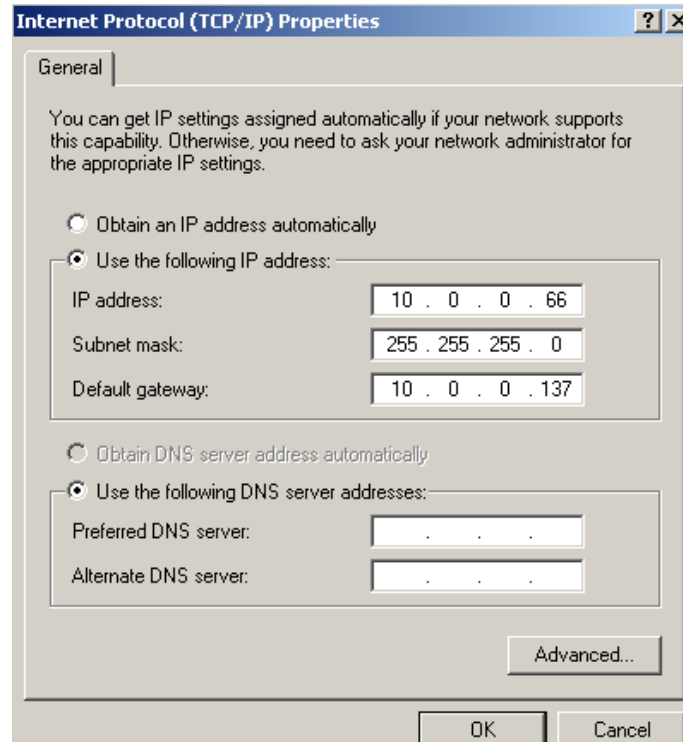
2. Click on *Properties*.



3. Select "Internet Protocol (TCP/IP)", and click on *Properties*.

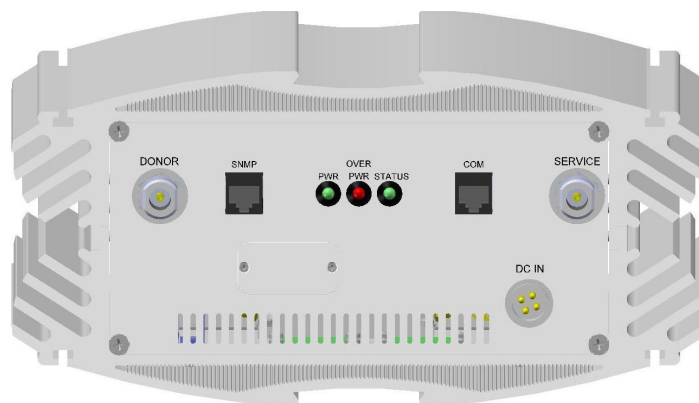


4. Define TCP/IP properties as indicated below, and then click *OK*.



## 5. Software operation

1. Connect the supplied crossed Ethernet cable to the "COM" RJ45 jack on the repeater panel and the PC/LAPTOP.
2. Turn the repeater ON. Make sure the RF input and output are connected to the antenna or to the 50 Ohm termination.
3. Wait two minutes after power ON. Open the web browser and enter the following IP address: **10.0.0.71**



**NOTE:** It is recommended that before connecting to the repeater, delete all history and temporary files from the Internet Browser.

Once the user is recognized by the repeater, the repeater data will be loaded.

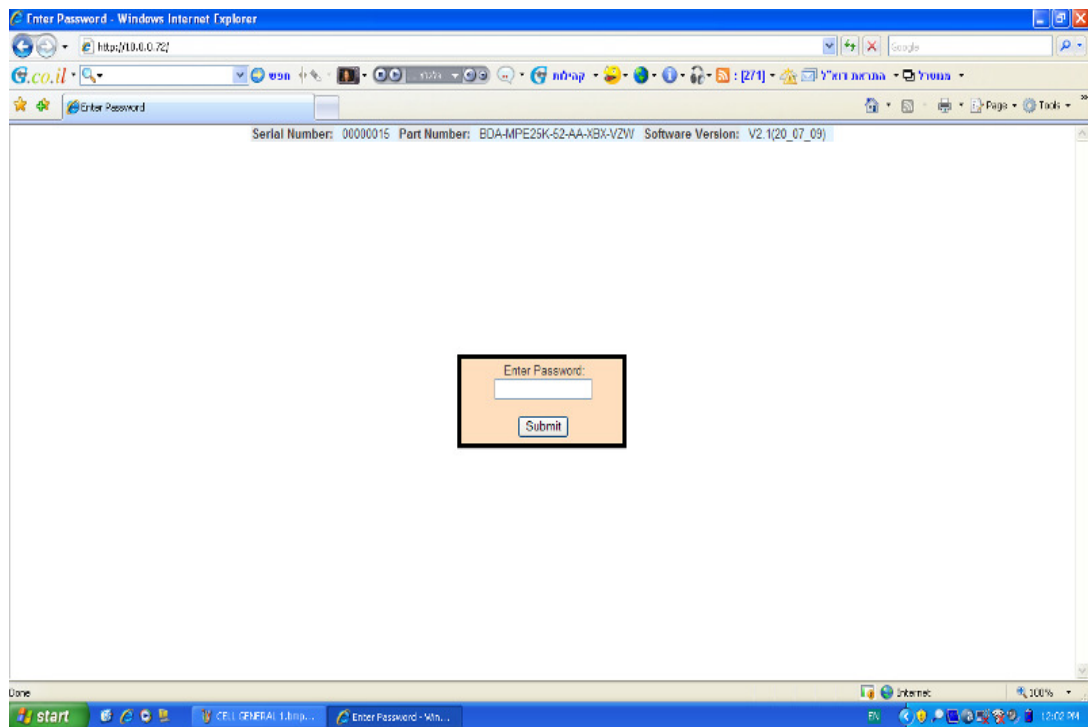
There are three setup screens:

4. Software entrance Password and Unit details
5. Technician Setup
6. Alarm Settings

## 5.1. SOFTWARE PASSWORD AND UNIT DETAILS SCREEN

Once opening the browser and typing 10.0.0.71, the password screen will load up.

To enter the management and control software, type the user password and click on submit. The user password is: **vzw25kp1** (in small letters).



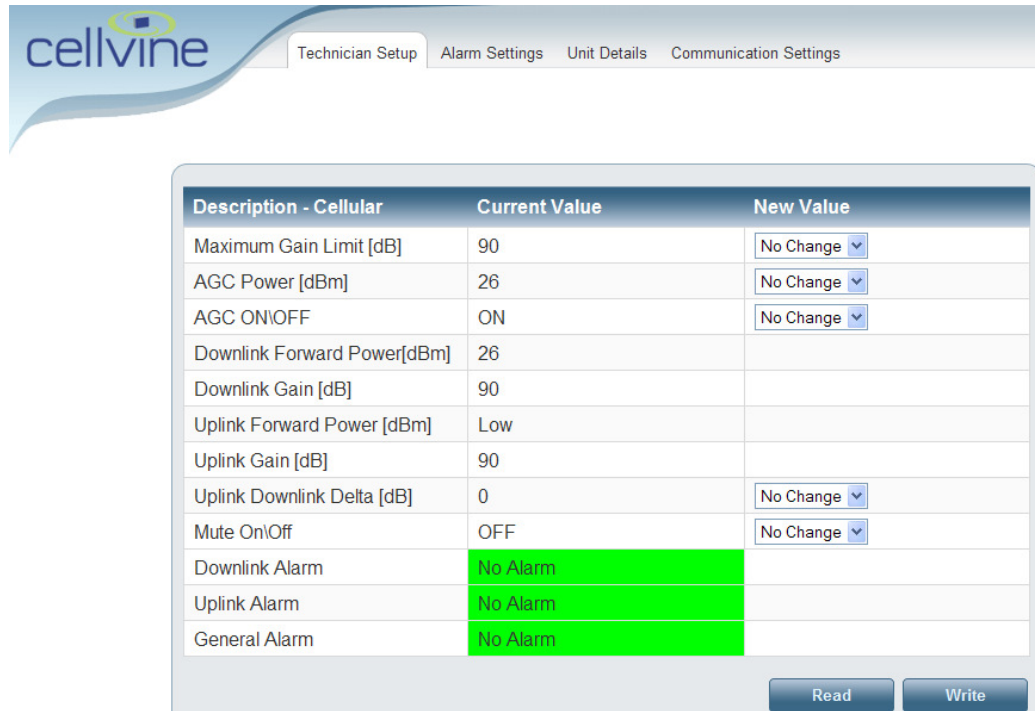
Also on the password screen are displayed the following details:

- Units Serial Number
- Part Number
- Software Version



## 5.2. TECHNICIAN SETUP SCREEN

The main screen of the repeater control application allows you to control and monitor all the repeaters main parameters



Description - Cellular	Current Value	New Value
Maximum Gain Limit [dB]	90	No Change ▾
AGC Power [dBm]	26	No Change ▾
AGC ON/OFF	ON	No Change ▾
Downlink Forward Power [dBm]	26	
Downlink Gain [dB]	90	
Uplink Forward Power [dBm]	Low	
Uplink Gain [dB]	90	
Uplink Downlink Delta [dB]	0	No Change ▾
Mute On/Off	OFF	No Change ▾
Downlink Alarm	No Alarm	
Uplink Alarm	No Alarm	
General Alarm	No Alarm	

- Use the drop down menus to change values.
- After modifying a value, click on the *Write* button to send the new value to the repeater. Only one value can be changed at a time.
- **Read button** – reads current values from the repeater and updates the screen.
- **Write button** – writes the modified value to the repeater and updates the screen.

After configuring/modifying values, click on the *Write* button to apply the new values.

To display the current repeater parameter values, click on the *Read* button. The parameters are continuously updating, but the new values are only displayed after you click the *Read* button

The following parameter values are configurable:

- Maximum Gain limit
- AGC power
- AGC ON/OFF
- Uplink Downlink Delta
- Mute On/Off



The screenshot shows the 'Technician Setup' page in the Cellvine interface. A table lists various cellular parameters with their current values and options to change them. Two red boxes highlight the parameters mentioned in the text above: Maximum Gain Limit, AGC Power, AGC ON/OFF, Uplink Downlink Delta, and Mute On/Off.

Description - Cellular	Current Value	New Value
Maximum Gain Limit [dB]	90	No Change ▾
AGC Power [dBm]	26	No Change ▾
AGC ON/OFF	ON	No Change ▾
Downlink Forward Power[dBm]	26	
Downlink Gain [dB]	90	
Uplink Forward Power [dBm]	Low	
Uplink Gain [dB]	90	
Uplink Downlink Delta [dB]	0	No Change ▾
Mute On/Off	OFF	No Change ▾
Downlink Alarm	No Alarm	
Uplink Alarm	No Alarm	
General Alarm	No Alarm	

Buttons: Read Write

### 5.2.1. MAXIMUM GAIN LIMIT

The Downlink Maximum Gain can only be set in **AGC-ON** mode.

You can determine the maximum gain level for the repeater in automatic gain control; usually the default parameter is the maximum repeater gain.

With this repeater model you can set the gain value between **60-90 dB**

Description - Cellular	Current Value	New Value
Maximum Gain Limit [dB]	90	No Change
AGC Power [dBm]	26	61
AGC ON/OFF	ON	62
Downlink Forward Power[dBm]	26	63
Downlink Gain [dB]	90	64
Uplink Forward Power [dBm]	Low	65
Uplink Gain [dB]	90	66
Uplink Downlink Delta [dB]	0	67
Mute On/Off	OFF	68
Downlink Alarm	No Alarm	69
Uplink Alarm	No Alarm	70
General Alarm	No Alarm	71
		72
		73
		74
		75
		76
		77
		78
		79
		80
		81
		82
		83
		84
		85
		86
		87
		88
		89
		90

The Downlink AGC Power can only be set in **AGC-ON** mode.

The AGC level is the parameter of the downlink forward-power level, which the automatic gain control will try to achieve by changing the repeater gain. This level is usually set to the maximal linear power of the repeater. You can determine the level in dBm of the AGC automatic mechanism.

If, for example, 26 dBm is set, the repeater will increase or decrease gain in order to permanently achieve an output power of 26 dBm.

In AGC ON mode, the change in the downlink gain and the uplink gain is simultaneous, and at the same step level unless the "*Uplink Downlink Delta*" parameter is different from "0".

Description - Cellular	Current Value	New Value
Maximum Gain Limit [dB]	90	No Change ▾
AGC Power [dBm]	26	No Change ▾
AGC ON/OFF	ON	No Change
Downlink Forward Power[dBm]	26	16
Downlink Gain [dB]	90	17
Uplink Forward Power [dBm]	Low	18
Uplink Gain [dB]	90	19
Uplink Downlink Delta [dB]	0	20
Mute On/Off	OFF	21
Downlink Alarm	No Alarm	22
Uplink Alarm	No Alarm	23
General Alarm	No Alarm	24
		25
		26
		No Change ▾

### 5.2.3. AGC ON/OFF

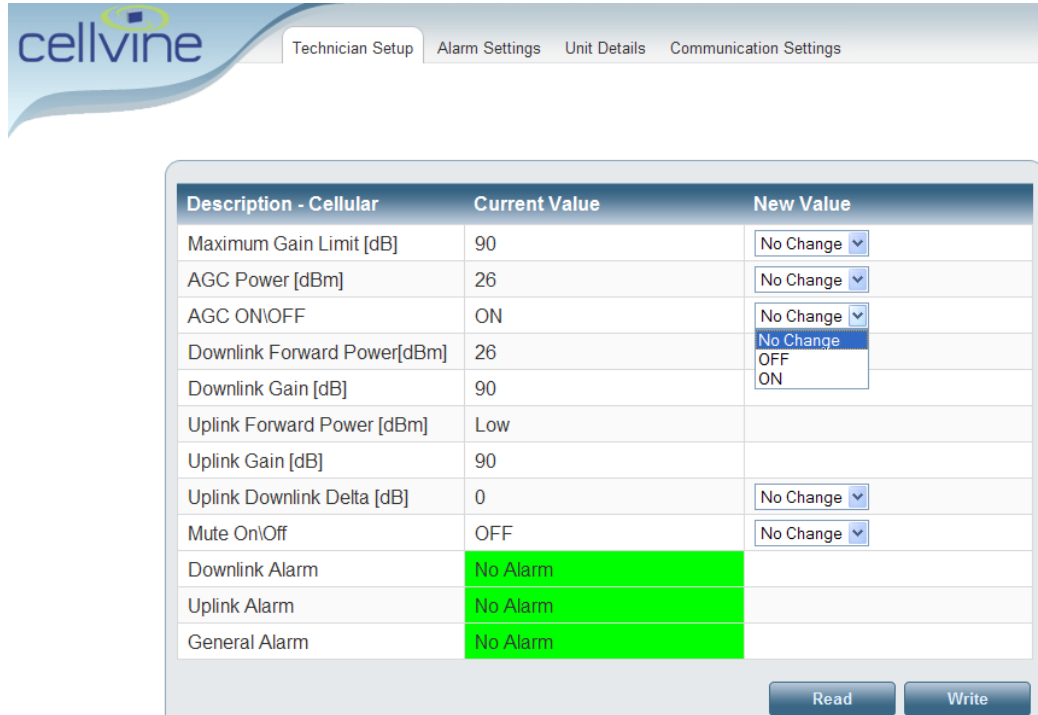
You can set the ON/OFF option of the AGC mechanism from the application window.

#### 5.2.3.1. DOWNLINK GAIN

The Downlink Gain can only be set in AGC-OFF mode. You can set the required gain fixed level in the downlink path.

### 5.2.3.2. UPLINK GAIN

The Uplink Gain can only be set in AGC-OFF mode. You can set the required gain fixed level in the uplink path.



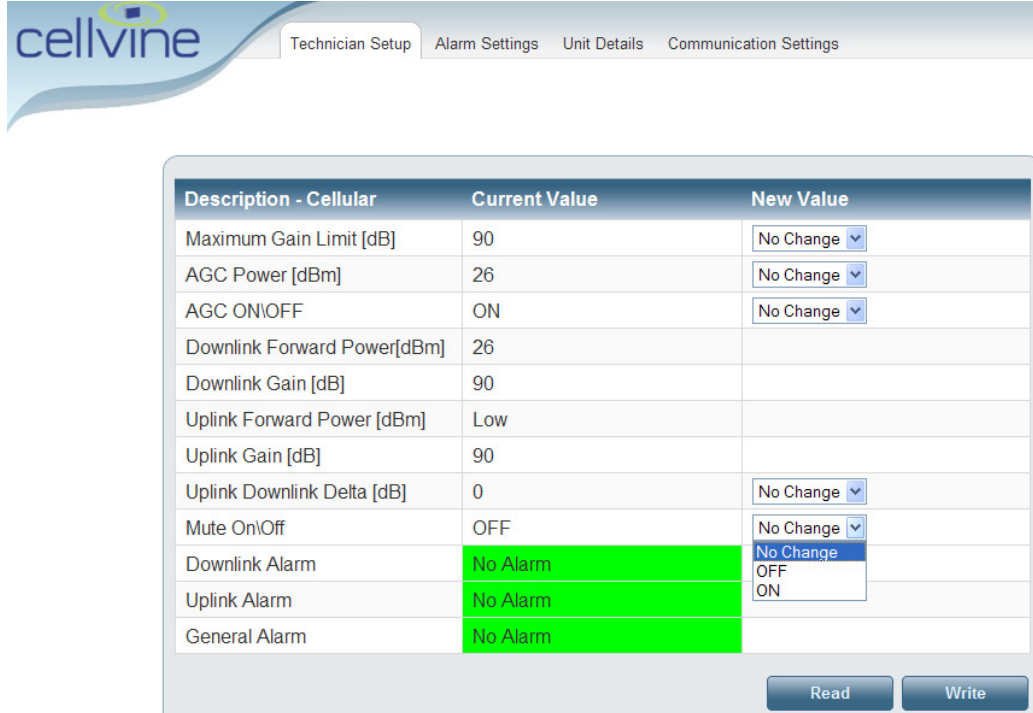
The screenshot shows the 'Technician Setup' page with a navigation menu including 'Alarm Settings', 'Unit Details', and 'Communication Settings'. The main content is a table for 'Description - Cellular' settings. The 'Current Value' column shows the current configuration, and the 'New Value' column shows a dropdown menu for each setting. The 'Uplink Gain [dB]' setting is currently set to 90. Below the table are 'Read' and 'Write' buttons.

Description - Cellular	Current Value	New Value
Maximum Gain Limit [dB]	90	No Change
AGC Power [dBm]	26	No Change
AGC ON/OFF	ON	No Change
Downlink Forward Power [dBm]	26	No Change
Downlink Gain [dB]	90	OFF
Uplink Forward Power [dBm]	Low	ON
Uplink Gain [dB]	90	
Uplink Downlink Delta [dB]	0	No Change
Mute On/Off	OFF	No Change
Downlink Alarm	No Alarm	
Uplink Alarm	No Alarm	
General Alarm	No Alarm	

Read Write

## MUTE ON/OFF

If Mute ON is selected for the power amplifier, no RF signal will be transmitted from the repeater output in the selected band.



Description - Cellular	Current Value	New Value
Maximum Gain Limit [dB]	90	No Change ▾
AGC Power [dBm]	26	No Change ▾
AGC ON/OFF	ON	No Change ▾
Downlink Forward Power[dBm]	26	
Downlink Gain [dB]	90	
Uplink Forward Power [dBm]	Low	
Uplink Gain [dB]	90	
Uplink Downlink Delta [dB]	0	No Change ▾
Mute On/Off	OFF	No Change ▾
Downlink Alarm	No Alarm	No Change OFF ON
Uplink Alarm	No Alarm	
General Alarm	No Alarm	

#### 5.2.4. UPLINK DOWNLINK DELTA

The *Uplink Downlink Delta* can only be set in AGC-ON mode.

This parameter is used to determine the spacing in dB between uplink and downlink gain, when operating in AGC ON mode with automatic gain control is activated

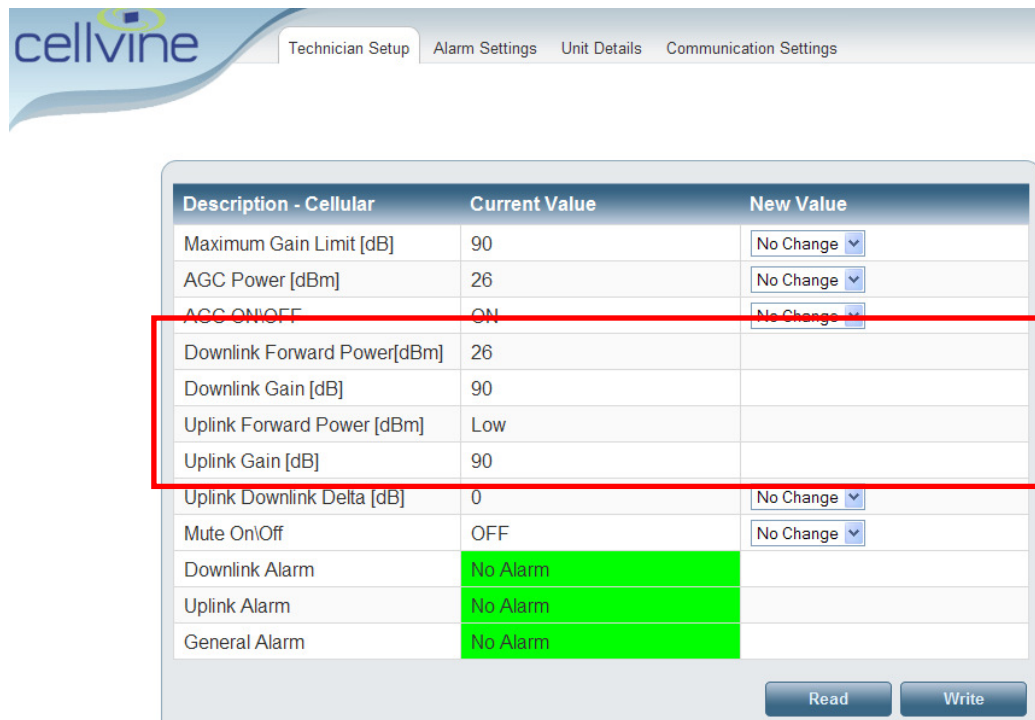
Description - Cellular	Current Value	New Value
Maximum Gain Limit [dB]	90	No Change ▾
AGC Power [dBm]	26	No Change ▾
AGC ON/OFF	ON	No Change ▾
Downlink Forward Power[dBm]	26	
Downlink Gain [dB]	90	
Uplink Forward Power [dBm]	Low	
Uplink Gain [dB]	90	
Uplink Downlink Delta [dB]	0	No Change ▾
Mute On/Off	OFF	No Change ▾
Downlink Alarm	No Alarm	-6
Uplink Alarm	No Alarm	-5
General Alarm	No Alarm	-4
		-3
		-2
		-1
		0
		1
		2
		3
		4
		5
		6

Write

### 5.3. PARAMETER VALUE READOUTS

The parameter current values indicate the current repeater status.

- **Downlink Forward Power [dBm]**- Real time indication of the current forward (output) power of the repeater in each band, and the currently downlink gain.
- **Downlink Gain [dB]**- The current downlink Gain of the repeater, and changes in Gain according to the AGC level
- **Uplink Forward Power [dBm]** - Real time indication of the current reverse power of the BTS from the repeater in each band, and the currently downlink gain.
- **Uplink Gain [dB]** - The current Uplink Gain of the repeater, and changes in Gain according to the AGC level



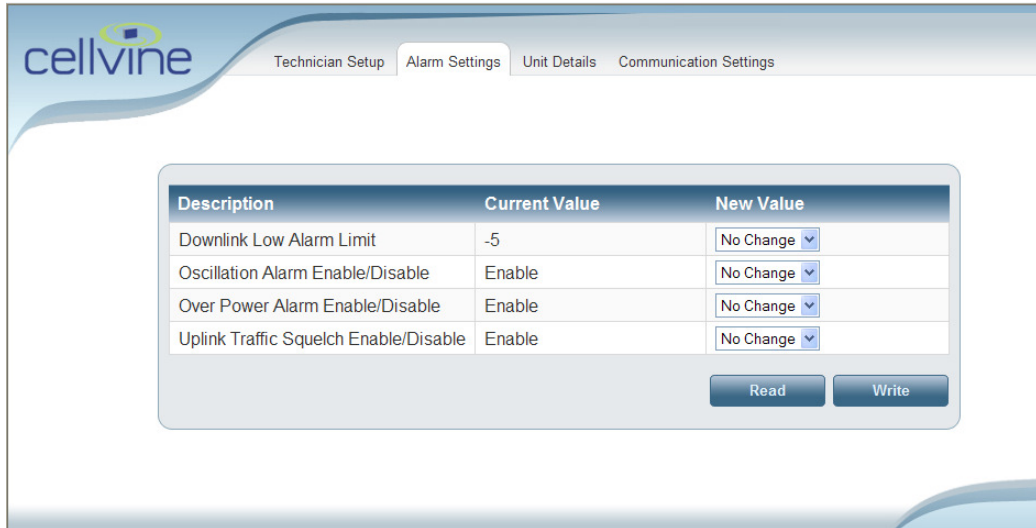
The screenshot shows the 'Technician Setup' page in the Cellvine interface. The 'Alarm Settings' tab is selected. A table displays various parameters with their current values and options to change them. A red box highlights the 'Downlink Forward Power [dBm]', 'Downlink Gain [dB]', 'Uplink Forward Power [dBm]', and 'Uplink Gain [dB]' rows. The 'Downlink Alarm', 'Uplink Alarm', and 'General Alarm' rows are highlighted in green.

Description - Cellular	Current Value	New Value
Maximum Gain Limit [dB]	90	No Change ▾
AGC Power [dBm]	26	No Change ▾
AGC ON/OFF	ON	No Change ▾
Downlink Forward Power [dBm]	26	
Downlink Gain [dB]	90	
Uplink Forward Power [dBm]	Low	
Uplink Gain [dB]	90	
Uplink Downlink Delta [dB]	0	No Change ▾
Mute On/Off	OFF	No Change ▾
Downlink Alarm	No Alarm	
Uplink Alarm	No Alarm	
General Alarm	No Alarm	



## 5.4. ALARM SETTING SCREEN

This screen allows you to set the application to display specific alarm types in the application software window, and send alarm notifications (if a modem is installed in the repeater) to the network operations center (NOC).



Description	Current Value	New Value
Downlink Low Alarm Limit	-5	No Change
Oscillation Alarm Enable/Disable	Enable	No Change
Over Power Alarm Enable/Disable	Enable	No Change
Uplink Traffic Squelch Enable/Disable	Enable	No Change

Read Write

### 5.4.1. DOWNLINK LOW LIMIT TRESHOLD

The output power level which the Downlink Low Alarm will be triggered from can be set at this window. For example: if we set the AGC Power to 26 dBm and we want to be alert with a "Downlink Low" alarm from output power of 21 dBm and below, we need to set the limit threshold level parameter to -5 dB.

An optional Enable / Disable to this feature is also available at this screen

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## 6. System Alarms

Cellvine BDA-700UC-26-52-AA-MBX-VZW repeater is equipped with several alarm and smart protection mechanisms, which provide alerts and protect the repeater and the cellular network. This section describes the default alarms and protection mechanisms.

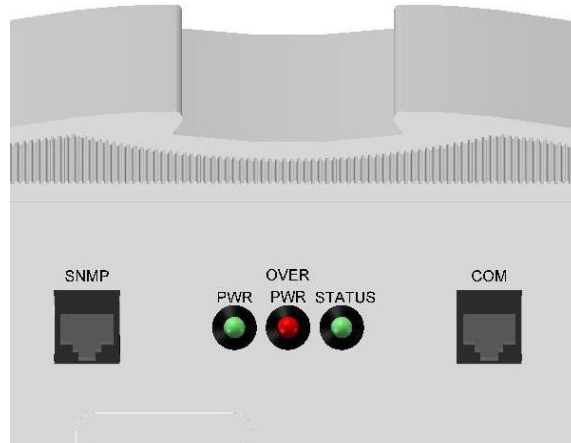
The alarms are indicated in three ways:

1. LED indication on the front panel of the repeater.
2. On the graphical utility interface screen, in the Alarms description column of the Technician Setup screen.
3. Alarming capabilities to the Network Operations Center (NOC) via Kentrox (formerly Applied Innovation) system for repeater alarm monitoring.

## 6.1. LED INDICATION PANEL

There are three indication LED's on the front panel:

Power, Over Power, Status.

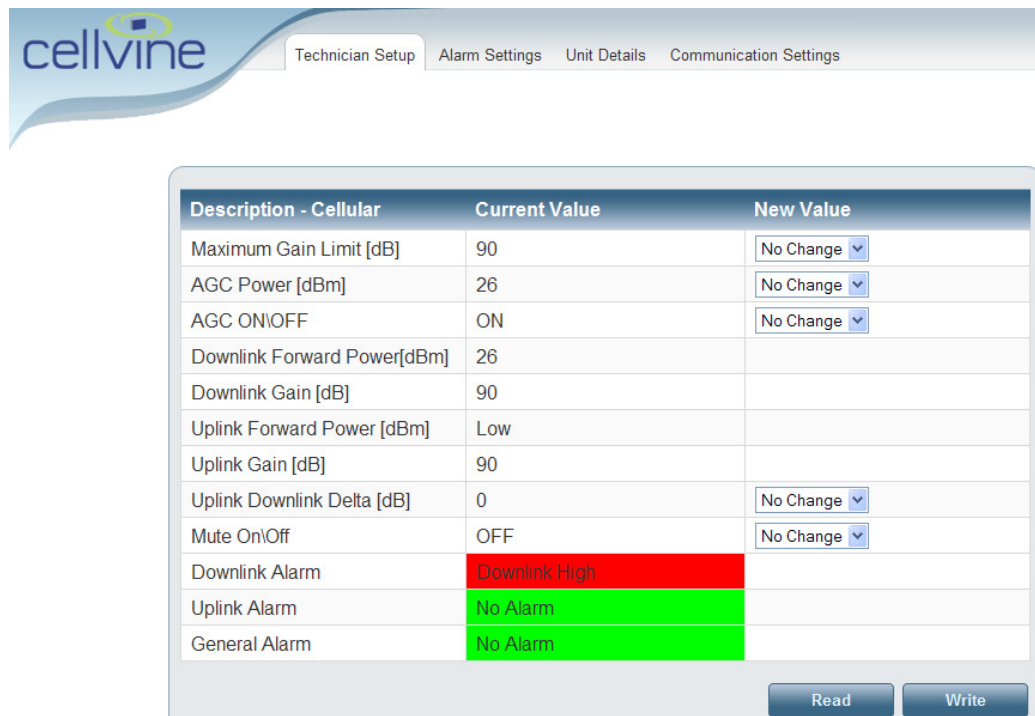


<b>LED INDICATION</b>			
<b>"STATUS" LED</b>	<b>"OVP" LED</b>	<b>Spec</b>	<b>Description</b>
ON	OFF	DL FWD PWR $\geq$ AGC Level - DL Low Alarm limit Threshold	DL FWD PWR is at AGC Level
Blink	OFF	DL FWD PWR < AGC Level - DL Low Alarm Threshold	Low DL FWD PWR
OFF	Blink	DL FWD PWR > 2dBm after AGC at maximum attenuation (30 dB)	DL P.A is at Shutdown
OFF	ON	Downlink DCA( attenuator) >15dB	DL High PWR
According to DL status	ON	Uplink ( attenuator) >15dB	UL High PWR

## 6.2. DOWNLINK HIGH

The alarm indicating high downlink power is triggered when a high signal is detected at the downlink input of the repeater. Automatic gain attenuation will reduce the downlink gain up to 30 dB.

A high downlink red "OVER PWR" LED lights up on the alarms panel of the repeater, and "Downlink High" alarm notification appears on the software application window.



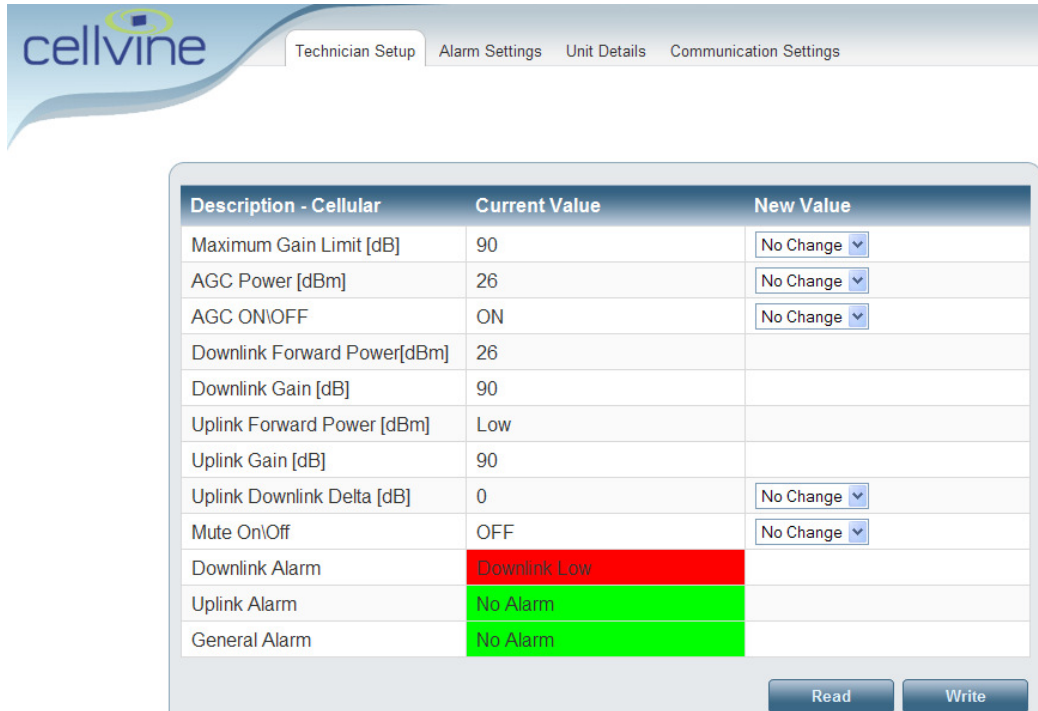
Description - Cellular	Current Value	New Value
Maximum Gain Limit [dB]	90	No Change ▼
AGC Power [dBm]	26	No Change ▼
AGC ON/OFF	ON	No Change ▼
Downlink Forward Power[dBm]	26	
Downlink Gain [dB]	90	
Uplink Forward Power [dBm]	Low	
Uplink Gain [dB]	90	
Uplink Downlink Delta [dB]	0	No Change ▼
Mute On/Off	OFF	No Change ▼
Downlink Alarm	Downlink High	
Uplink Alarm	No Alarm	
General Alarm	No Alarm	

## 6.3. DOWNLINK LOW

The Downlink Low alarm indicates that the incoming signal on the downlink path (from the BTS) is low, and the repeater is not providing its full power capacity. The alarm is triggered when the value of the downlink forward power is at least 3 dBm lower than the AGC power parameter. The Alarm will set on when the value of the Downlink Forward power parameter will be different from the "Downlink Low Limit Threshold" at the Alarm Setting screen.

For example, if the downlink AGC power is set to 26 dBm and the "Downlink Forward Power" parameter current value, is less than 21 dBm, a Downlink Low alarm is triggered.

A "STATUS" green LED up Blink on the front panel of the repeater, and a "Downlink Low" alarm notification appears on the software application window.



Description - Cellular	Current Value	New Value
Maximum Gain Limit [dB]	90	No Change ▾
AGC Power [dBm]	26	No Change ▾
AGC ON/OFF	ON	No Change ▾
Downlink Forward Power[dBm]	26	
Downlink Gain [dB]	90	
Uplink Forward Power [dBm]	Low	
Uplink Gain [dB]	90	
Uplink Downlink Delta [dB]	0	No Change ▾
Mute On/Off	OFF	No Change ▾
Downlink Alarm	Downlink Low	
Uplink Alarm	No Alarm	
General Alarm	No Alarm	

Read Write

## 6.4. UPLINK HIGH

The Uplink High alarm is triggered when a high signal is detected at the uplink input of the repeater. Automatic gain attenuation will reduce the uplink gain up to 30 dB.

An Uplink High red "OVP" LED lights up on the alarms panel of the repeater, and a Uplink High alarm notification appears on the software application window.



Description - Cellular	Current Value	New Value
Maximum Gain Limit [dB]	90	No Change ▾
AGC Power [dBm]	26	No Change ▾
AGC ON/OFF	ON	No Change ▾
Downlink Forward Power[dBm]	26	
Downlink Gain [dB]	90	
Uplink Forward Power [dBm]	Low	
Uplink Gain [dB]	90	
Uplink Downlink Delta [dB]	0	No Change ▾
Mute On/Off	OFF	No Change ▾
Downlink Alarm	Uplink High	
Uplink Alarm	No Alarm	
General Alarm	No Alarm	

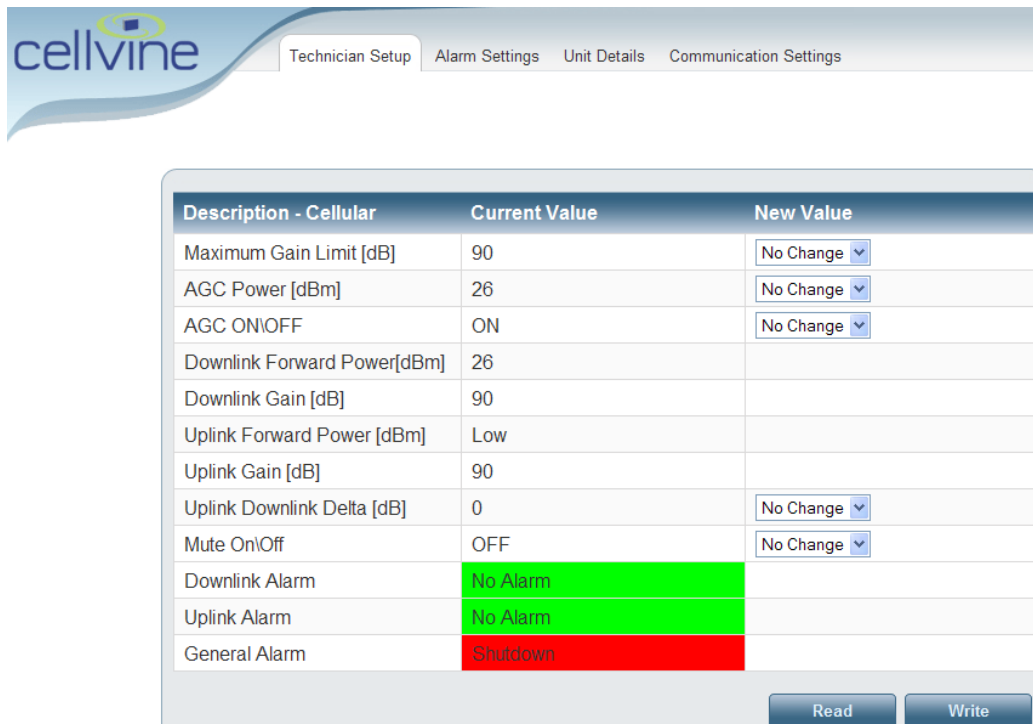
## 6.5. POWER AMPLIFIER SHUTDOWN PROTECTIONS

Shutting down the PA in AGC ON mode occurs, when the repeater automatic gain control reduces the repeater gain by 30 dB (maximum reduction), but the incoming signal is still very high and the output power is above the AGC forward parameter (an indication of increasing signal). If the condition described above lasts for more than 10 seconds, the repeater controller will shut down the power amplifier.

The duration of the 10 shutdown cycle is set by default for 30 seconds, after which the PA is restarted.

The repeater will not make more than ten attempts to restart in a time span of 100 minutes .If the RF condition triggers an eleven shutdown in that time span, then the unit will permanently shutdown

When shutdown protection is activated, the shutdown red "OVP" LED on the front panel is blinking, and a shutdown alarm notification appears on the software application window.



Description - Cellular	Current Value	New Value
Maximum Gain Limit [dB]	90	No Change ▾
AGC Power [dBm]	26	No Change ▾
AGC ON/OFF	ON	No Change ▾
Downlink Forward Power[dBm]	26	
Downlink Gain [dB]	90	
Uplink Forward Power [dBm]	Low	
Uplink Gain [dB]	90	
Uplink Downlink Delta [dB]	0	No Change ▾
Mute On/Off	OFF	No Change ▾
Downlink Alarm	No Alarm	
Uplink Alarm	No Alarm	
General Alarm	Shutdown	

## 7. TROUBLESHOOTING

### 7.1. CONNECTION FAILURE

Trying to locally connect to the repeater via the internet browser fail

#### Possible reason:

1. Address typed is not correct.
2. TCP/IP definitions are not correct.
3. Communication port on the repeater is not ready yet.
4. The Ethernet cable is not the original (Crossed).

#### Solution:

Check cable and reconnect it, verify configuration according to chapter 4 & 5, clean all temporary internet files and history on your internet browser, wait two min for repeater software load up and try to connect.

### 7.2. GUI PARAMETERS NOT UPDATE CORRECTLY

Parameters coming from the repeater not updated as they should.

#### Possible reason:

1. Internet browser cache is full

#### Solution:

Delete temporary internet files and history on your internet browser

