Installation Manual
Celluteq Dual Band Cellular Enhancement System
CE0501K-A

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Product Description

The Celluteq CE0501K-A is a system for enhancing cellular reception in an indoor environment using wireless connections. The active component in the system is the Celluteq CE0501A, which is a bi-directional dual-band amplifier designed to deliver 60dB of Gain in both the Cellular and PCS bands. It is not designed to amplify signals in the iDEN band (Nextel).

When installed properly, this system can improve the quality of your voice communications and increase the speed of your data connections over virtually any cellular network. Its wireless interface makes it simple to use, and provides these performance advantages without a loss of user mobility.

To simplify installation, the amplifier is equipped with a self oscillation detection circuit which provides an audible alarm if the antennas are incorrectly positioned with respect to each other.

Package Contents – CE0501K-A

Qty	Description	Part #
1	Dual Band Bi-Directional Amplifier	CE0501A
1	Outside Omni-directional 17in Broadband Antenna w/ 6dBi gain	CE0601
	Outside Mounting Hardware	
1	Inside Omni-directional 9.5in Broadband Antenna w/ 6’3” cable (SMA connector)	CE0602
1	Outside Coaxial Cable (Type N to mini-UHF), 49ft (15m)	CE0701
1	110 VAC to 5 VDC Power Supply w/ 70” cord	PW117RA0503B01

Safety Instructions

1 The Outside Antenna must be located a minimum of 2 ft from people during operation and away from any power lines.

2 For Outside Antenna installations for Home or Office, it is ***highly recommended*** that lightning protection be provided, especially in areas where lightning storms are prevalent.

3 The RF output power of the Inside Antenna has less strength than that of a regular cell phone. Therefore, distance from the inside antenna during operation is NOT a safety issue. It can however, be a performance issue; operating a cell phone within a few inches of the inside antenna may cause some distortion, but will not harm the equipment.

4 With the exception of a mounting pole for the outside antenna, avoid any metal within 2 ft of either antenna.

5 Do NOT apply DC power to the amplifier until both antennas are connected to it through their cables.

FCC Regulations

FCC ID: VOR-CE0501K-A IC: 7371A-CE0501K-A

The term “IC” before the radio certification number signifies that Industry Canada technical specifications have been met.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment to isolated power with a ground cable connected directly to the battery, DC source, or house ground (or an outlet on a circuit different from that to which the interfered receiver is connected).
- Reposition the coaxial cables.
- Consult the dealer or an experienced radio/TV technician for help.

Per section 15.21 of the FCC Part 15 Regulations, the user is cautioned that any changes/ modifications not approved by the responsible party (the manufacturer, Celluteq Electronics) could void the user's authority to operate this equipment.

Installation Preparation

Before starting the installation:

- Inspect all components for shipping damage.
- Read all installation instructions applicable to your type of installation.
- DO NOT apply power to the amplifier until both antennas have been connected to it.
- DO NOT connect anything to the power amp other than the components provided.
- Plan your installation completely before starting.

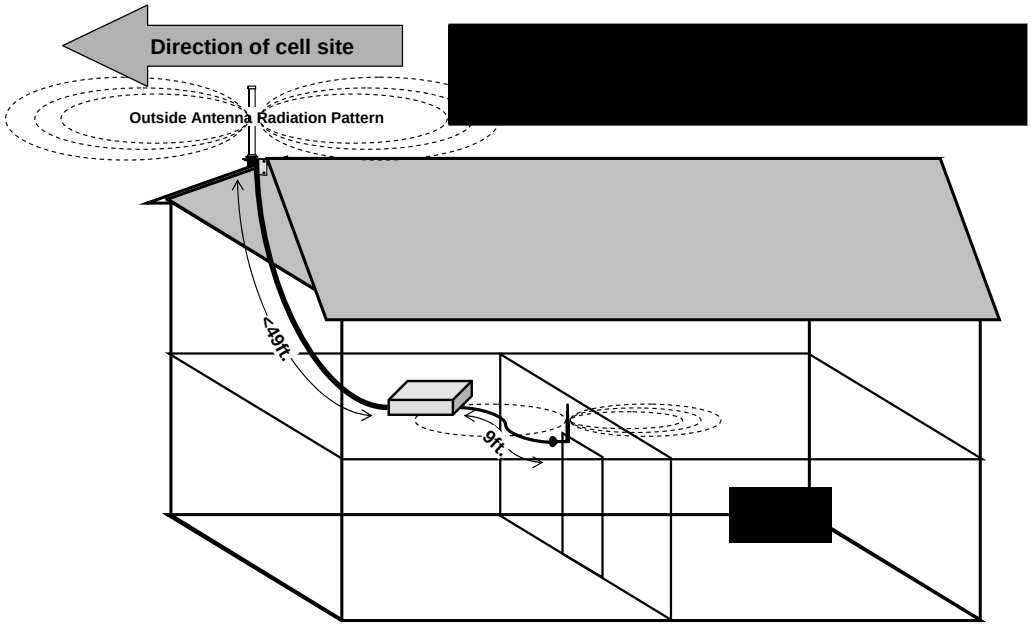
- Take care not to damage the cables with kinks, twists or abrupt bends.

Installation Procedures – Home/Small Office

In order to obtain the maximum benefit from this cellular enhancement system, the most important aspect of the installation is the proper placement of the two antennas. The optimum location for the Outside Antenna, in most cases, would be on the outside of the building, as high up as feasible, with a direct line of sight to the nearest cellular tower. In a multi-story building, it is possible to mount the Outside Antenna inside the top floor or attic if there is sufficient signal strength in that location, and if there will be enough separation between the Inside and the Outside antennas.

The Inside Antenna should be located inside the building at a location central to the area to be covered, at a different height than and as far as necessary from the Outside Antenna, to where the system does not self oscillate. This system includes a 6'3" cable from the amplifier to the inside antenna and a 49' cable from the amplifier to the outside antenna. Should additional cable length be desired, extensions to the outside cable may be purchased. Contact Celluteq support line.

For best results, it is recommended that the system components be laid out, assembled and tested at their proposed locations before being permanently attached.



Tools Required

Wrench, $1^{3}/_{16}$"
Screw Driver, Philips Head
Drill (if necessary for mounting)

Determining Location – Outside Antenna (Simple)

Try this procedure first. In most cases, it is possible to determine an appropriate location for the Outside Antenna, simply by using the signal strength indicator on your cell phone. Moving around the outside (or inside) of your building while observing the signal strength (number of bars) on your cell phone may result in a sufficiently clear determination of where to position the outside antenna. It is recommended that the location show at least two bars and preferably three bars of signal strength.

Determining Location – Outside Antenna (Complete)

In some cases, the location of the Outside Antenna may be critical to the optimum operation of this enhancement system. Best reception is achieved by locating the antenna on the side of the building closest to the nearest cell tower, at the highest point of the structure, with the fewest obstacles (buildings, hills, trees, etc.) between the antenna and the cell tower.

Finding the Nearest Cell Site

The following is a procedure for locating the nearest cell sites to a particular location using the public information contained on the FCC website in combination with the Google Earth program (available for free on the web) to create a visual overview of your location.

The FCC website has two methods for finding tower locations: by City and State, or by Coordinates (Latitude and Longitude). Searching by City and State looks only within a city's borders, and will yield acceptable results if your location is somewhere in the middle of your city or town. If the closest tower may be in an adjoining town or city, it is best to use the search by coordinates method.

Determining the coordinates of your location

The first step is to determine the coordinates of your location. This can be done with a GPS Receiver or on line using Google Earth. To download the free version of Google Earth software, either go to the Google site and double-click on the Google Earth icon (the blue and white globe to the right of the search field), or go directly to

http://earth.google.com/.

Follow the instructions for downloading the appropriate version. When the download is complete, launch the Google Earth program.

Type your location address into the field marked "Fly to" in the "Search" section (top left), and double-click the "Begin Search" icon (magnifying glass). Street names can be added to the display by checking the box labeled "roads" in the "Layers" section (bottom left). Zoom in and out using the scrolling wheel on your mouse, or the plus minus icons on the right-top of the display. Change the location of the display by grabbing on any point in the display (click and hold the left mouse button) and moving the mouse. When you have found your location it can be marked by clicking on the yellow Push-pin icon at the top of the screen. Label and move as needed the push-pin that appears on the screen, and then click the OK button of the pop up. Place the cursor on your location, and note the coordinates at the bottom of the screen in the format xx°xx'xx.x"N xxx°xx'xx.x"W.

Finding Antenna Locations near you

Access the FCC Website at http://wireless.fcc.gov/. On page 1, find "Antenna Structure Registration" (3rd major heading on the right of the page) and click on "Registration Search" (5th subheading). On page 2 under the "Search by Tower Location" section enter the coordinates of your location in the "Coordinate Search" and start with a nominal Radius of 10km. You are looking for between 5 and 10 sites whose status is "Constructed", **NOT** "Granted", "Terminated", "Canceled", or "Dismantled". If necessary, click on "Refine Search" at the top of the page of results, and adjust the radius until the results list contains an appropriate number of Constructed sites. Note the coordinates of each of these sites. (The format of the output of the FCC site will be xx-xx-xx.xN xxx-xx-xx.xW and will have to be reformatted for input into Google Earth.)

Displaying the Cell Sites

On Google Earth, enter the coordinates (format: xx xx'xx.x"N xx xx'xx.x"W) of each site into the field marked "Fly to" in the "Search" section, and double-click the "Begin Search" icon. A marker will appear for each location as it is entered. Once all sites have been entered, check the box for each of the sites in the list and Zoom out and adjust the view until the display shows your location and each of the sites. From this display, it should be easy to figure out the closest sites.

Ensuring a Clear Line of Site

Be sure that the "Terrain" box is checked in the Layers section to give the details of hills, mountains and valleys. If you are in or near a metropolitan area, also see that the "3D Buildings" box is checked as well. To ensure that your location has a clear line of sight to a particular cell site, you can adjust your direction orientation using the scroll wheel while holding down the Ctrl-key and you can move your point of view from vertical to horizontal using the scroll wheel while holding down the Shift-key. Using these two

controls plus the Zoom (scroll wheel), you should be able to display a horizontal view from either your location to the tower site or from the tower site to your location. Note the direction from your location to the clearest, nearest site.

Checking in the Real World

Go to the side of the building that faces in the direction noted. Determine visually a location on that side of the structure where the line of sight in the direction noted is as free as possible of obstructions (other buildings, trees, etc.). Using your cell phone, ensure that adequate signal strength is being received at the proposed location (using number of bars as a measurement, or using the field test mode on your phone (if so equipped).

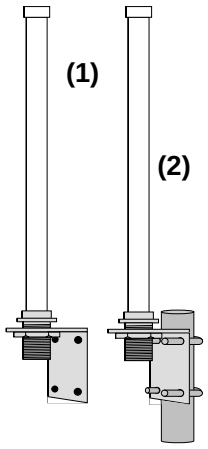
Mounting Instructions – Outside

Mount the antenna oriented in the vertical direction.

Hardware is provided for mounting the outside antenna either to a vertical surface or to a pole with a maximum diameter of 1¼ inches.

Drawing (1) to the right illustrates the antenna with mounting hardware configured for a surface mount (using #12 screws provided).

Drawing (2) shows a pole mounting using the supplied "U" brackets and #10 hardware (washers, lock washers and nuts).

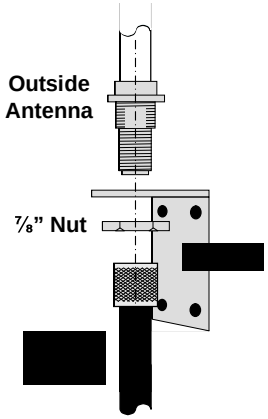


Connecting the Antenna

Once the bracket is attached to a surface or to a pole, orient and insert the antenna through the keyed hole in the bracket.

Secure the antenna to the bracket using the ⅞ inch Nut. Tighten using a wrench.

Attach the outside cable to the Type-N female connector at the end of the antenna. Finger tighten only.



Determining Location – Inside Antenna

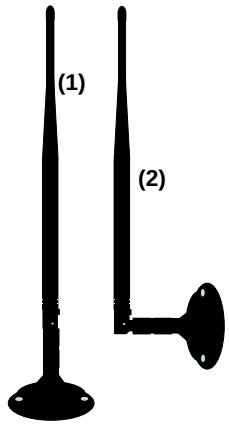
If possible, the Inside Antenna should be placed in the center of the areas in which you wish to use your cell phone or laptop, with as few walls or obstructions between the antenna and your primary use area. It should NOT be located within 2ft of any metal objects or surfaces. To minimize interference, the inside antenna should be mounted at a different height from the outside antenna.

Mounting Instructions – Inside

Assemble the Inside Antenna by carefully screwing the antenna to the base. The inside antenna may be mounted to any flat horizontal or vertical surface using 2 ea #6 screws (not provided) appropriate for the surface material (wood, wallboard, masonry).

When mounting to a horizontal surface, point the antenna element up as indicated in the drawing (1) to the right.

When mounting to a vertical surface, pivot the antenna so that the antenna element is pointing up as shown in the drawing (2) to the right.



Determining Location –Amplifier

Four considerations should determine the location of the amplifier: (1) within 70in of 110VAC power outlet (or use an extension cord), (2) within 9ft 10in of the inside antenna, (3) within 49ft of the outside antenna, and (4) in a location with adequate ventilation. The location should also be away from direct sunlight, excessive heat and moisture. The amplifier can be placed on any horizontal surface or attached using 4ea #6 (or smaller) screws (not provided) to any flat surface in any orientation.

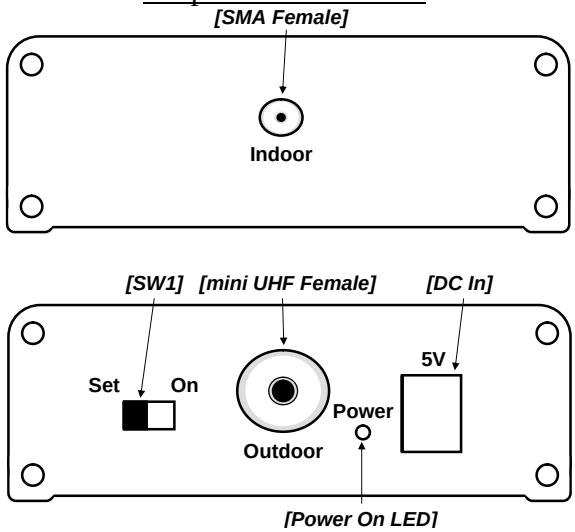
The amplifier produces some heat during normal operation but, given adequate ventilation, it should not be more than about 20 degrees Fahrenheit above the ambient temperature. Therefore, placing the amplifier in an attic would be acceptable provided it is not placed under insulation.

Turn-On Procedure

[redacted]

1. Temporarily mount the Outside Antenna in its pre-determined location.
2. Connect the cable (Type N connector) to the Outside Antenna. Finger tighten.
3. Run the cable to the pre-determined location for the amplifier.

Amplifier Side Panels



4. Connect the cable to the amplifier at the port marked “Outdoor”. Finger tighten.
5. Connect the Inside Antenna cable to the amplifier at the port marked “Indoor”. Finger tighten.
6. Position the Inside Antenna at its pre-determined location.
7. Place the Switch (SW1) on the amplifier into the “Set” position.
8. Plug the DC Power Supply into the amplifier (DC In) and then into the wall socket.
9. If the amplifier emits an audible alarm, reposition either or both of the antennas until the alarm is silent.
10. Place the Switch (SW1) on the amplifier into the “On” position.
11. Make a test call to verify system operation.
12. Place the Switch (SW1) on the amplifier back into the “Set” position.
13. Permanently affix the Outside Antenna, Inside Antenna and Amplifier in their locations.

14. Route the outside cable, inside cable and power cord, ensuring that alarm does not sound (the outside cable should be attached to the building using appropriate fasteners). Be sure to keep the cables free of kinks, twists and abrupt bends, to avoid damaging the inside insulator and degrading the performance of the system.
15. Place the Switch (SW1) on the amplifier into the "On" position.

There is no On-Off switch on the Celluteq amplifier; it is meant for continuous operation. Should you find it necessary to power down the unit, simply unplug the power supply at either the wall outlet or the amplifier. In its idle state, the power amp consumes about 3W of power, so with a nationwide average residential electric rate of about 9¢, the cost to operate the system idle for a month averages less than 20cents. (Even in Hawaii, the state with the highest residential electric rate, the cost of leaving the unit plugged in when not operating is only about 42 cents per month.)

Product Specifications – CE0501A Power Amp

Electrical Characteristics:

Parameter	**Units**	**Condition**	**Cellular Band**	**PCS Band**
Frequency	MHz	Uplink	824 to 849	1850 to 1910
		Downlink	869 to 894	1930 to 1990
Max Output Power	W		2	2
Impedance	Ω	Input	50	50
		Output	50	50
Max Gain	dB		60	60
Noise Figure	dB		4	4.5
Modulations Types		CDMA, GSM, TDMA		

Physical Characteristics:

Parameter	**Units**	**Condition**	**Typical Value**
Power Consumption	W	operating	5 max
		idling	3
Dimensions	in		4.7 x 3.3 x 1.2
	mm		120 x 85 x 30
Weight	oz		9.9
	g		280
Connectors		Outside antenna	mini-UHF Female
		Inside antenna	SMA Female
Operating Temperature	ºF		–30 º to +140º

Warranty Information

30-day Money-Back Guarantee

Your satisfaction with this Celluteq product is protected by our 30-day money-back guarantee. If for any reason the performance of any product is not acceptable, simply return the product directly to the reseller with a dated proof of purchase.

1-year Warranty

Celluteq Amplifiers are warranted for up to one (1) year from defects in materials and workmanship. Warranty claims can be initiated by returning the product directly to the reseller with proof of date of purchase.

Alternatively, the amplifier may be returned at the customer's expense, directly to the manufacturer with a dated proof of purchase and a Returned Material Authorization (RMA) number supplied by Celluteq. We shall have the option of either repairing or replacing the product and will pay for its delivery back to the original customer. RMA numbers may be obtained by contacting Celluteq Technical Support by by e-mail to customer.service@celluteq.com

Warranty may be voided by:

- Removing the cover from the amplifier
- Connecting unauthorized equipment to the amplifier (cables, antennas, power supplies)
- Mishandling, misuse, neglect or abuse to the point of damaging the amplifier either physically or electronically (as determined by the manufacturer)
- Damage due to natural causes (such as lightning, flooding, earthquake, tornado, etc.)

Limited Liability

Celluteq (the company) shall in no event be liable for any direct, indirect, punitive, incidental, consequential, special or exemplary damages, or any damages whatsoever, even if the company has been advised previously of the possibility of such damages, whether in negligence, an action under contract, or any other theory which arises in connection with or out of the use, inability to use, or performance of the products, materials, information, and services presented in this manual. The company shall also limit the remedy for any valid in-warranty failures to repair or replacement of the equipment or to refund of the purchase price at the company's discretion.

Contact Information

Celluteq Support Line:

Address Customer Service, Celluteq Electronics
32108 Alvarado Blvd. Suite 353, Union City, CA94560
e-mail customer.service@celluteq.com