

Dual Band Professional Cell Phone Signal Booster

INSTALLATION AND OPERATION MANUAL

Model: QUADB-PRO-1

Quadra  **BOOST™**

-----IMPORTANT-----
Read instructions completely before installation!

1. Package Contents (See Figure 1)

QTY	Model #	Description
1	C60A	60dB bi-directional Amplifier
1	CDBIP	Dual Band Indoor Panel Antenna 8/12 dBi gain 850 / 1900 MHz
1	CHBAP	High Band (1900 MHz) outdoor 12 dBi panel antenna
1	CLBAP	Low Band (850 MHz) outdoor 8.3 dBi panel antenna
2	PIX7301	Pole mount hardware kit
1	C5PS	5 VDC wall mount power supply
1	CODA1	Omni-direction Dual band 5 dBi indoor / outdoor antenna
1	ARM-1	Adjustable AZ/EL indoor panel antenna mounting arm
1	136738	Hi Band / Low Band Antenna diplexer
2	COAX Seal	Connector weather-proofing
1	FAM3-6-10	3 , 6, 10 dB inline attenuator kit
1	CPS-1	Wide band two-way signal splitter
1	PIX7301S	Indoor omni helix antenna mounting kit

2. Important Safety Information

The QuadraBoost system complies with all FCC, IC and UL rules, regulations and codes. Follow all guidelines in the installation and instruction manual and read completely before beginning the installation procedure. Do not deviate from or disregard any of the safety instructions included in the manual or with the equipment. Do not use the system for an unintended application.

WARNINGS !

- **Do not apply power to the amplifier unless all the antennas are connected. Operating the amplifier without the antennas connected could damage it and void your warranty.**
- **Don't substitute a different AC power adapter for the one that was shipped with the QuadraBoost. It is designed to operate only with the supplied adapter. Using a different one could damage the amplifier and void the warranty.**
- **As with any outdoor antenna caution should be taken when installing it so that it does not come into contact with electrical power lines during installation or in the event of a failure of the structure holding it. Follow the enclosed standard electrical codes relative to lightning protection**
- **Use only low-loss quad shielded RG-6 cable. Do not use inline adapters or splices to extend cable runs. All runs should be made with as single continuous cable between the antennas and the amplifier. Insure that all RG-6 cables are not kinked, damaged or shorted in any way before applying power. Such defective cabling can cause damage to the amplifier.**

a. LIMITATION ON LIABILITY

In no event shall Pixel Technologies, Inc. be liable for any direct, indirect, special, punitive, incidental, exemplary or consequential damages, or any damages whatsoever, even if Pixel Technologies has been previously advised of the possibility of such damages, whether in an action under contract, negligence, or any other theory, arising out of or in connection with the use, inability to use, or performance of the information, services, products, and materials available from this manual. These limitations shall apply notwithstanding any failure of essential purpose of any limited remedy. Because some jurisdictions do not allow limitations on how long an implied warranty lasts, or the exclusion or limitation of liability for consequential or incidental damages, the above limitations may not apply to you.

Figure 1. Included Items QUADB-PRO-1



High Band 1900 MHz outdoor
12 dBi panel antenna (CHBAP)



Low Band 850 MHz outdoor
8.3 dBi panel antenna (CLBAP)



Model C60A Amplifier
60 dB Bidirectional amplifier



Dual band Indoor
Panel Antenna 8/12
dBi Gain (CDBIP)



High /Low Band
Antenna Diplexer
(136738)



Two-way wide band
signal splitter (CPS-1)



Omni Directional
Indoor /Outdoor
antenna (CODA1)



Antenna Mounting
Screw Kit (CPS4KIT)



Model CPS-5 5 VDC
Power Adapter



Antenna Pole Mount
Hardware (PIX 7301)



Coax Seal connector
weather proofing
(2 packets)



3,6,10 dB inline
attenuator kit

b. FCC REGULATIONS

FCC ID: V23TWDBMPSB-01

This equipment complies with FCC radiation exposure limits set forth for uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator& your body. **Warning: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.**

5. Pre-Installation Guidelines

INSTALLATION TOOLS

The following tools are required for installation:

- Standard wrench and Philips head screwdriver
- Standard drill (optional)
- Mobile phones operating in both the 850 MHz CEL band and 1900 MHz PCS bands (any USA or Canadian mobile phone except Nextel). Alternatively a signal meter such as the Model YX699 can be used in place of the phones
- Wire ties

4. Description of the QuadraBoost System

The QuadraBoost Dual Band Wireless Amplifier/Repeater system provides cellular signal coverage to areas that have low signal strength to adequately operate a mobile phone. In these poor coverage areas it becomes difficult to place or receive calls and usually results in a dropped call. The QuadraBoost dual band amplifier/repeater system provides increased reception indoors by filtering, re-directing and amplifying the available signal. This translates into fewer dropped calls, clear connections and stronger signals. The QudraBoost dual band system operates with all carriers in the USA and Canada except Nextel and iDen

Wireless radio signals to and from a phone can be blocked or reduced by terrain , shrubbery and buildings and despite the best efforts of the cell phone carriers to add more cell site towers, there are just some places where reception is very poor. To improve this situation QuadraBoost uses an outdoor antenna that is much larger and has much more gain than the small antenna inside the phone and has much more signal reception and transmit capability. Hence it is capable of receiving signals that are too weak for reliable reception on a phone. The outdoor antenna is wired to an indoor amplifier that boosts the incoming signal to a much higher level and is retransmitted inside the house or office by another similar antenna. When you talk into a phone the transmitted signal is received by the indoor antenna, amplified to a much higher level and then transmitted to the local cell phone tower by the outdoor antenna.

The QuadraBoost PRO system contains a dual- band high-gain helix omni-directional indoor antenna an amplifier/repeater unit and two high gain outdoor panel antennas that can be independently pointed (one for each band since the cell site towers for each band may be located in different directions). The kit also includes a high gain dual band indoor panel that can be used in place of or in concert with the omni- directional helix to cover more area and to reach certain dead spots that need more signal. The outdoor panel antennas can be mounted to any pole up to 2 inches in diameter. The outdoor antennas should be installed outside of the building in a location with the strongest cellular signal as indicated by the bars on a phone. The inside omni antenna must be mounted in a central location in the building that is 60 feet or greater from the outside antenna. For best results and to avoid feedback the outdoor panels should be aligned for peak signal reception from their respective towers and should be pointed facing away from the area illuminated by the indoor antenna. The inside and outside antenna also must be separated by an exterior wall or roof.

5. Typical In-Building Coverage

The QuadraBoost system is designed to provide optimal coverage for areas up to 20,000 square feet using the indoor panel antenna and 12,000 square feet using the omni helix antenna. Interior coverage varies based upon the building construction and materials. Typically the QuadraBoost system will penetrate 1-2 interior walls and 1 floor above and below the indoor antenna. Results may vary depending on the construction material of the building. This kit includes two indoor antennas that can be installed in two separate zones as shown in Figure 3 or in a single zone configuration as shown in Figure 2.

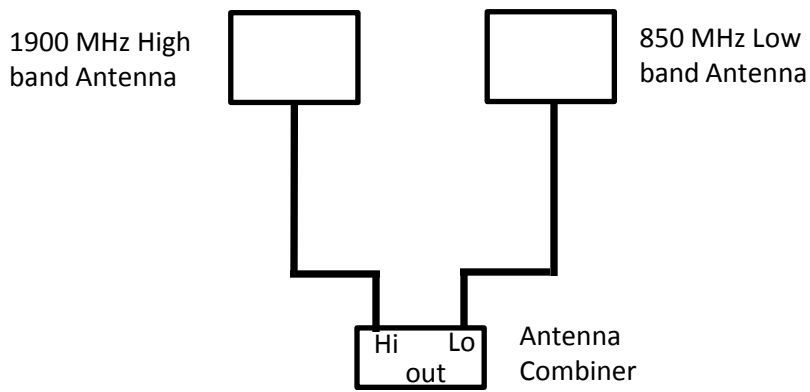
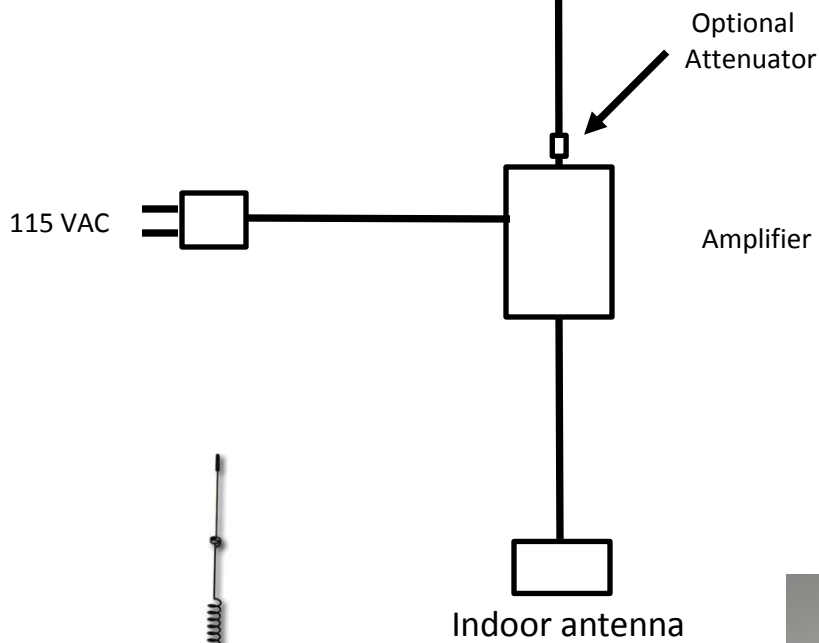


Figure2 . Single Zone Setup with either High gain indoor Directional Panel or Omni Directional Helix Antenna



Indoor Panel or
Omni Directional
Helix Antenna



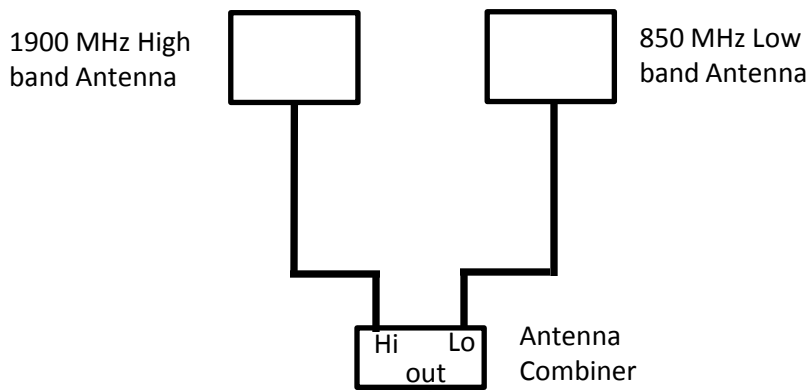
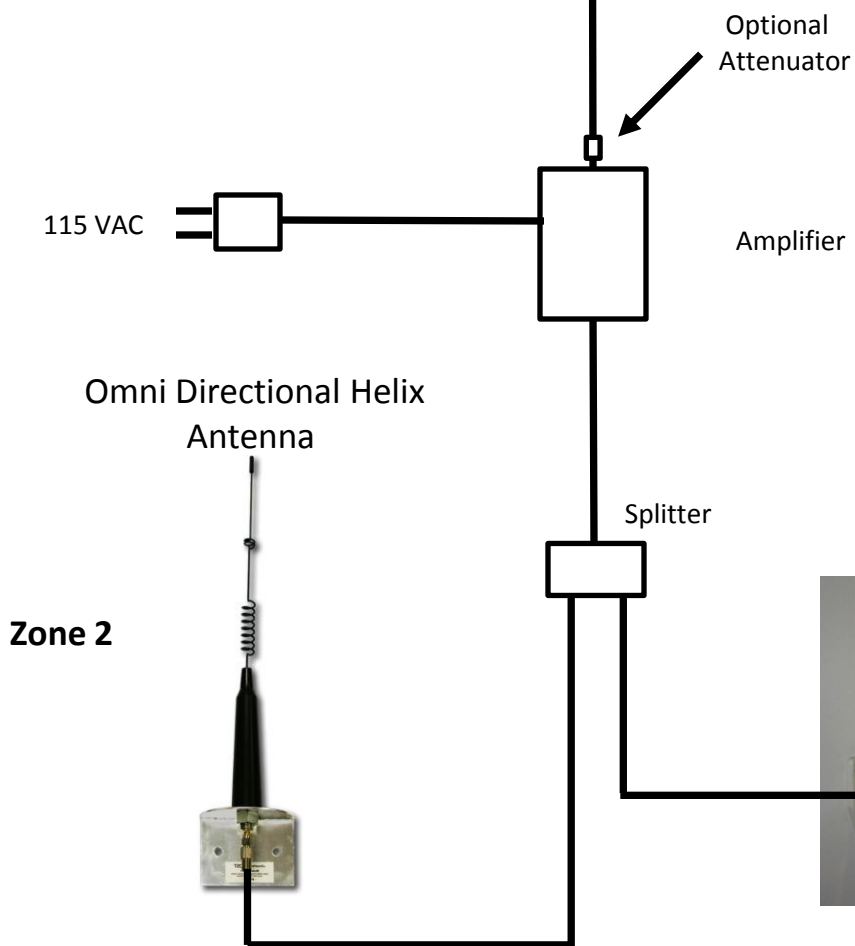


Figure 3. Two Zone Setup with High Gain Directional Panel or Omni Directional Helix Antenna



6. Pre-installation Considerations

Critical to getting good results with this product is placement of the antennas. Everyone's home or office and signal reception environment is different, so some experimentation may be required to achieve optimum results.

Similar to the way a public address system can "squeal" or feedback when a microphone is too close to the speakers, this booster can also feedback on itself if the antennas are too close together. When this happens signals from the outdoor antennas are received by the indoor antenna, are amplified and retransmitted in an infinite loop. The QuadraBoost amplifier has a special circuit in it that detects this feedback and shuts down the transmission until the antennas are moved farther apart. The antennas should be separated by an outside wall or roof and a distance of at least 60 feet to ensure that there is no feedback. When feedback is happening, the Alarm LED on the amplifier is illuminated **RED** and an audible beep is heard every few seconds (for up to 3 minutes). When the system is operating normally the Alarm LED on the side of the amplifier turns green and the beeping stops. During installation if the amplifier is "Alarming", disconnect power, move the antennas farther apart to achieve more "isolation" and then reconnect power.

Another factor that affects "isolation" is how much signal loss the outside wall or roof causes. Some walls have less loss than others. For example if there are a number of large windows or doors in the wall between the outdoor and inside antennas the loss and isolation will be low and more distance will be required between the antennas to prevent feedback. In the event that the required isolation cannot be achieved, as a last resort (and only after the antenna separation has been adjusted to maximize the separation) the included inline attenuators can be installed on the outdoor antenna port to lower the gain of the system (see Figure 17). However these attenuators should be used sparingly and only the minimum amount of attenuation should be installed to stop the feedback. Three separate values are included (3, 6 and 10 dB). They can be cascaded in series for up to 19 dB of attenuation. Some experimentation may be required to find the minimum value that stops the feedback.

Figures 4, 5, 6, 7 and 8 show typical installations. The indoor omni-helix antenna can be hidden behind any non metallic object such as drape, mounted in closet, mounted in wooden cabinet, mounted on wall behind a wooden bookcase, hidden in a non-metallic vase or camouflaged with fake plastic plants (see Figure 11). It can also be painted any color with standard latex paint to blend in with its environment. The indoor panel antenna can be mounted as shown in Figure 12 with the supplied wall bracket that allows for adjustments in azimuth and elevation to optimize pointing. It can also be mounted flush to a wall as shown in Figure 13. Figure 14 shows the supplied adapter bracket that can be used to ceiling mount the panel. Figures 15 and 16 show the antenna patterns for the panels. The 3 dB beam width varies from ± 20 degrees to ± 40 degrees, so accurate pointing is required to achieve optimum results.

You should try to get the indoor antennas as high in the air as possible for maximum coverage and also keep them at least 12 inches away from close-by metal objects such as metal window frames, aluminum siding, HVAC ducts, vents and metallic pipes. Figures 9 and 10 show a typical mounting of the outdoor antennas to a pole. Follow the instructions on the included packets of Coax Seal to provide additional water proofing for the outdoor connectors. **Be sure to connect the High band 1900 MHz antenna to the input of the diplexer marked "High In" and the output of the 850 MHz antenna to the input marked "Low In". If these are reversed the system will not operate properly. Likewise make sure the output of the diplexer is connected to the port on the amplifier marked "Outdoor Antenna" and the indoor antenna is connected to the amplifier port marked "Inside Antenna".**

Because of the narrow beam width of the outdoor antennas, they need to be accurately pointed for maximum signal.. As the high band and low band signals may be coming from different towers, each antenna needs to be independently aligned. To adjust the antennas a signal meter such as the Model YX699 is the best method. Alternatively two phones, one operating in the high band and one operating in the low band can be used to measure signal strength near the indoor antenna. For best results the phones should be operating in their field test modes. This web site provides details on how to program various phones to operate in this mode:

<http://www.wpsantennas.com/pdf/testmode/FieldTestModes.pdf>

Figure 4. Typical Installation with outdoor antenna mounted to a rain gutter or vent pipe

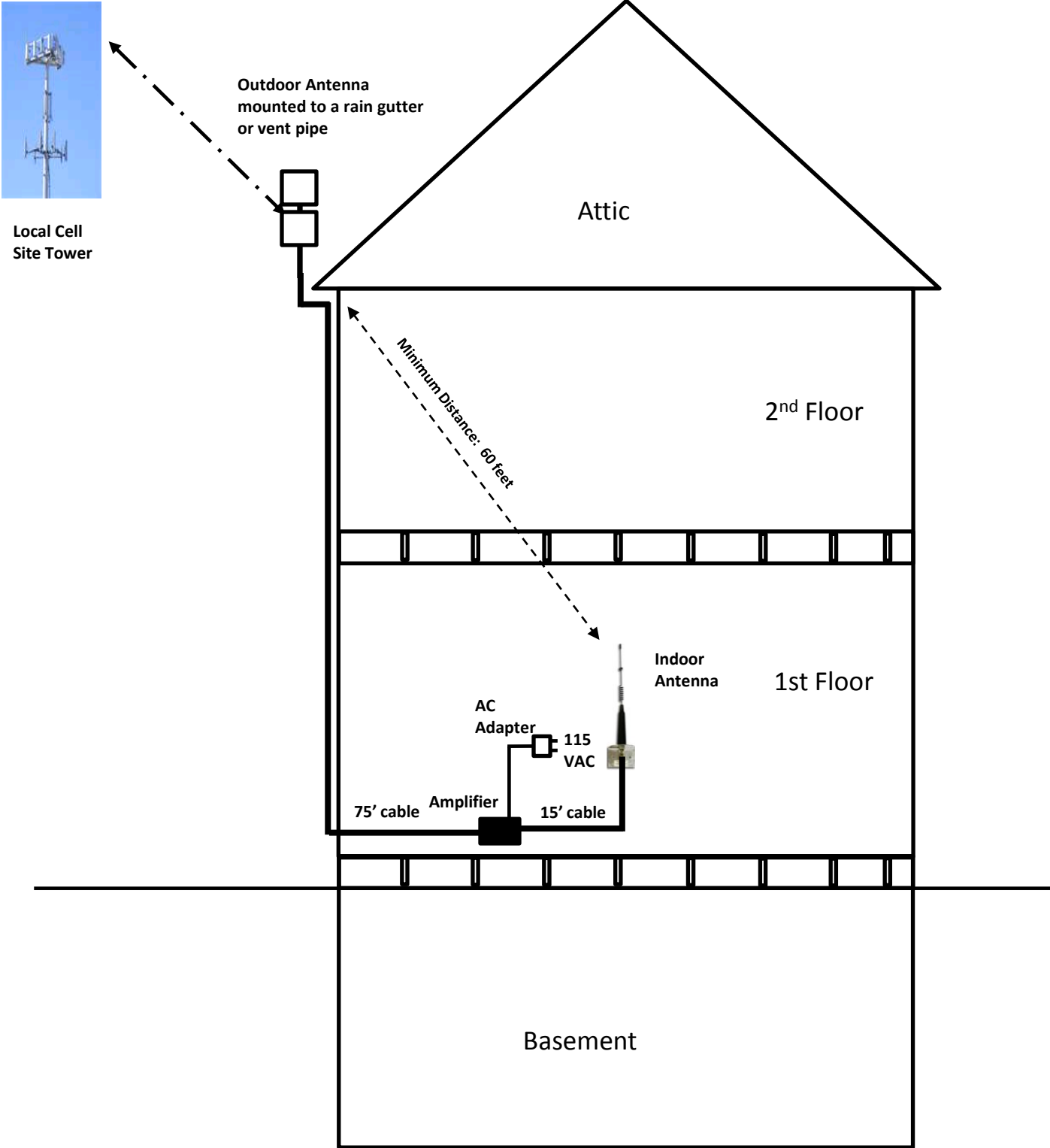


Figure 5. Typical Installation with outdoor antenna mounted to a fence post or wall

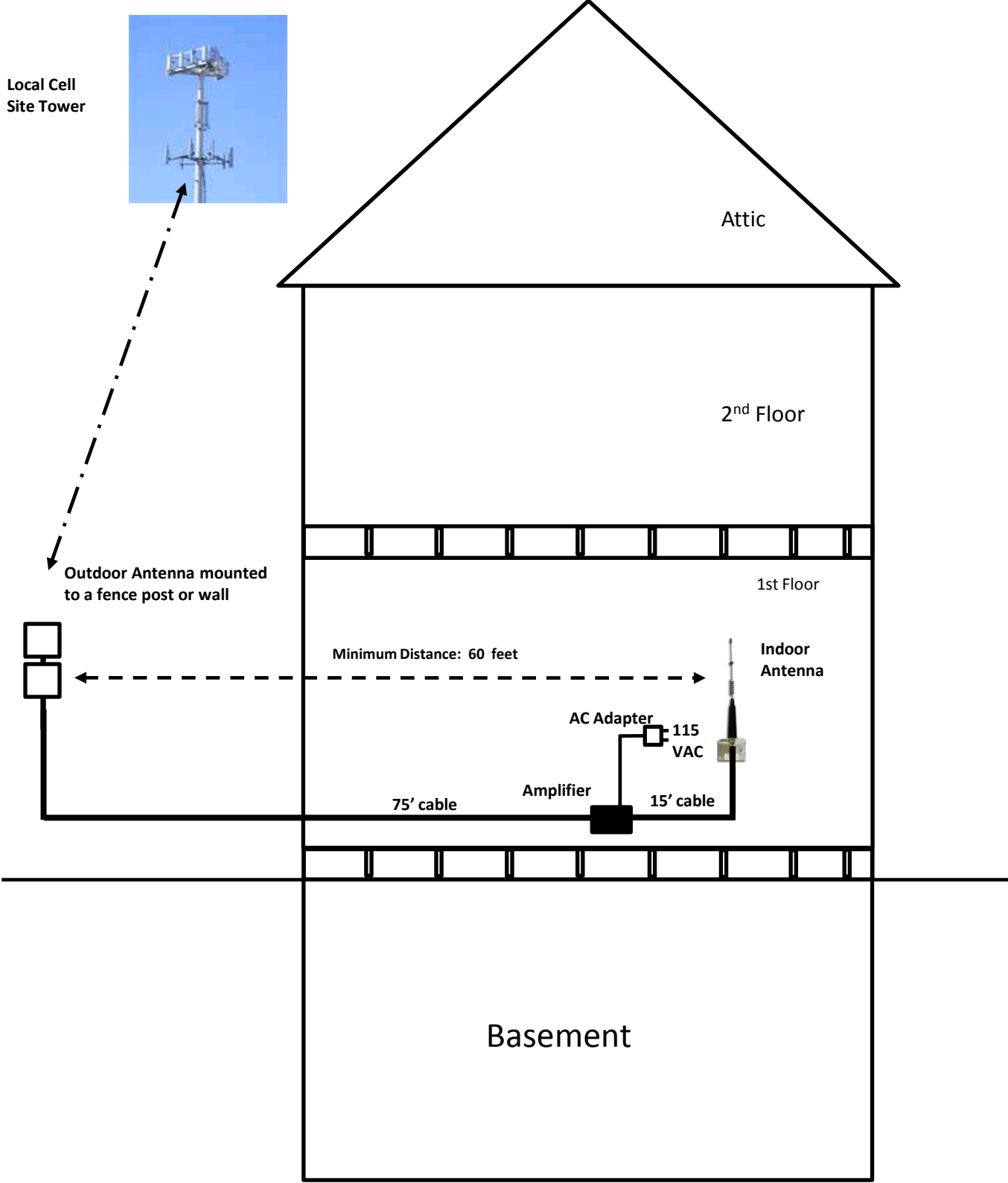
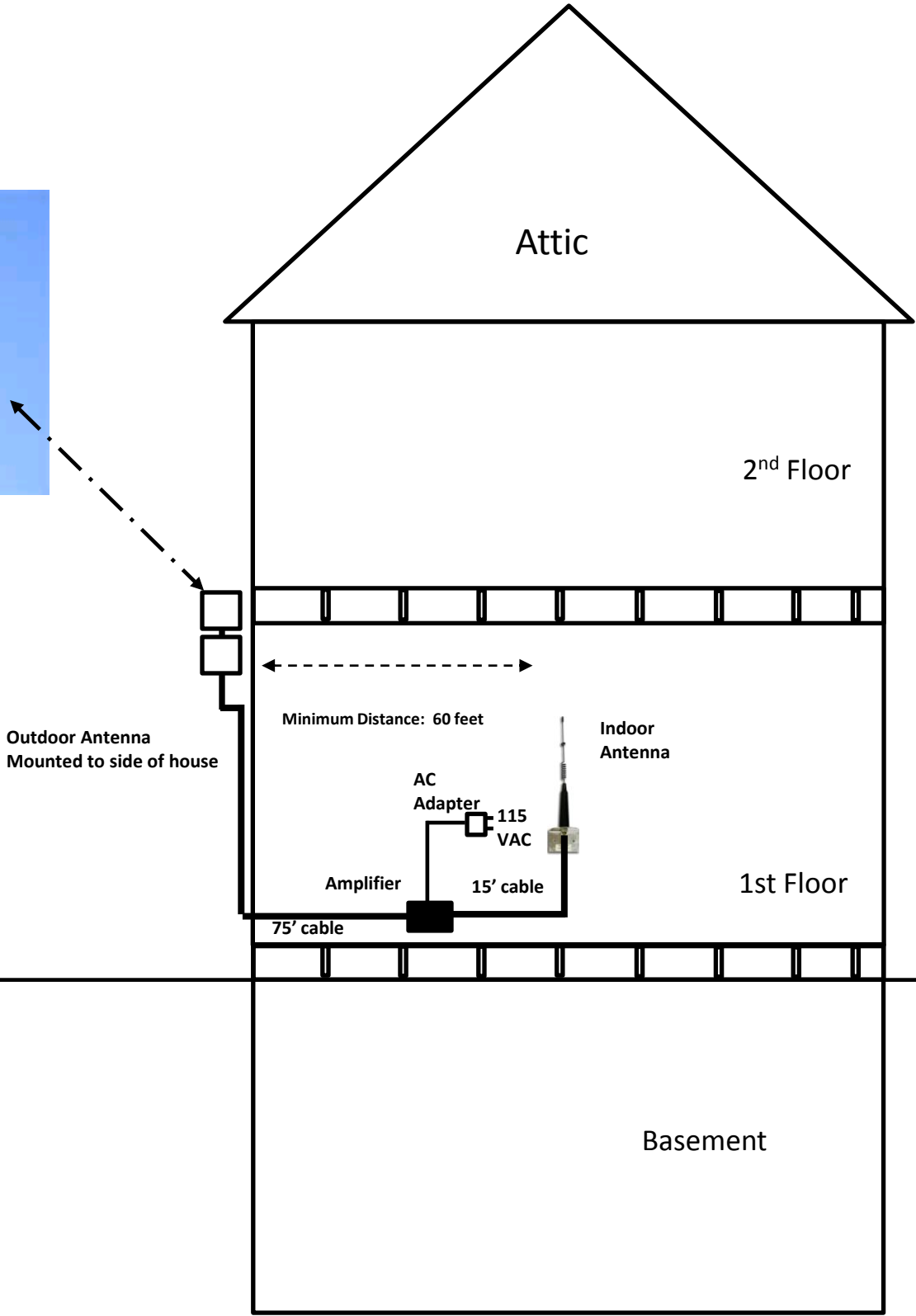


Figure 6. Typical Installation with outdoor antenna mounted to side of house



Local Cell Site Tower



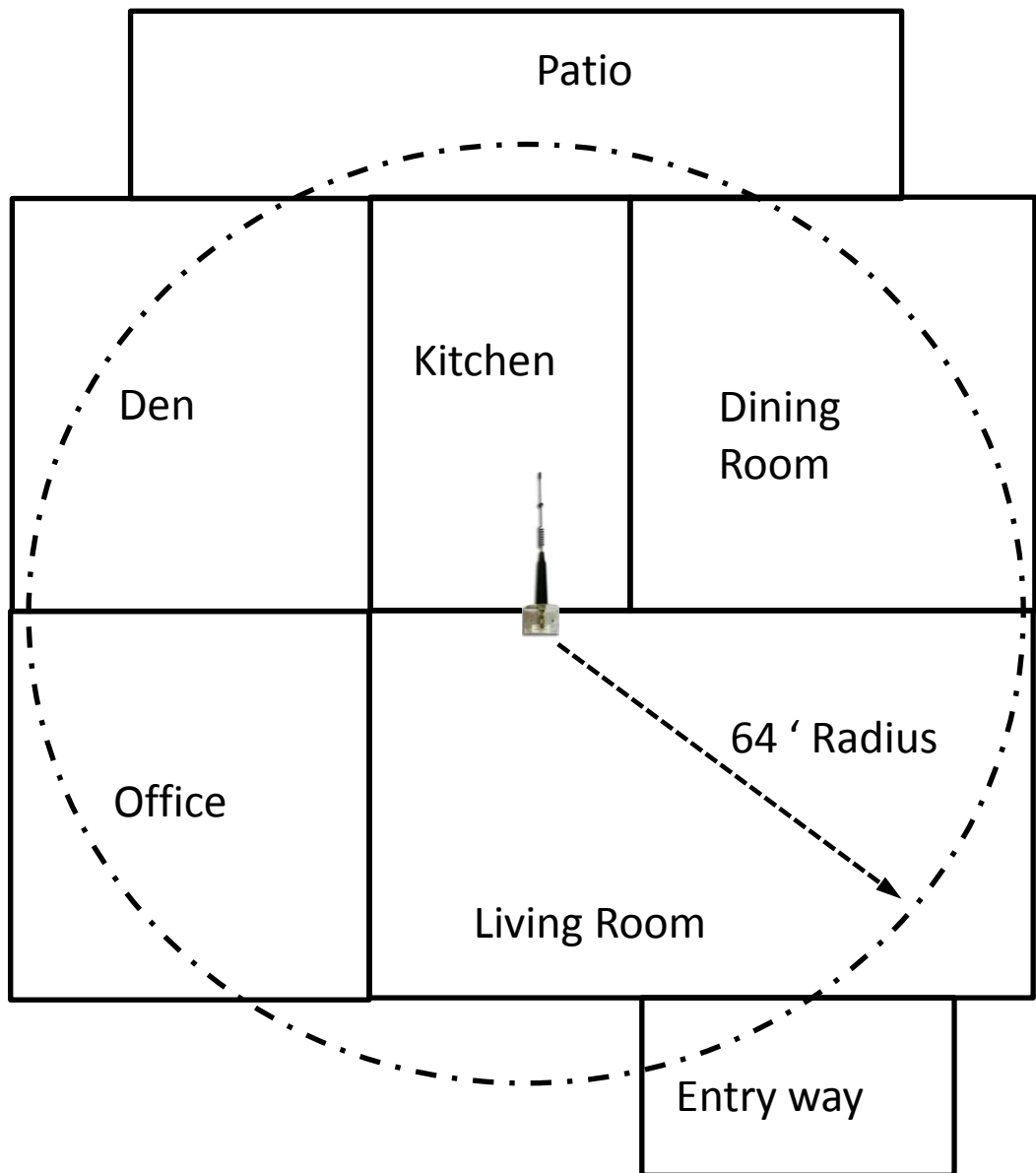


Figure 7. Typical Coverage Footprint with Omni Directional Helix Antenna

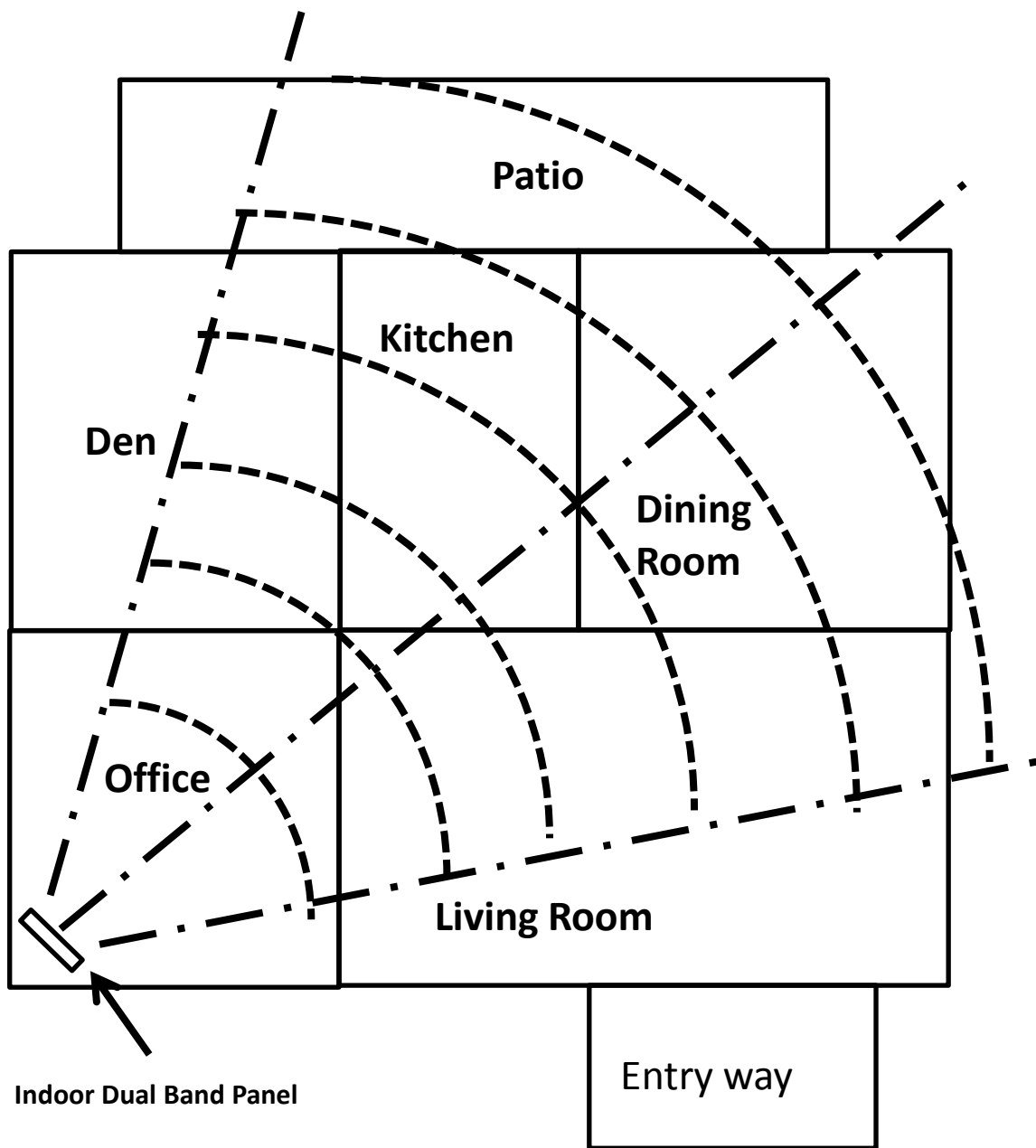


Figure 8. Typical Coverage Footprint With Panel Antenna

Figure 9. Outdoor Panel Antennas

850 MHz Panel Antenna



1900 MHz Panel Antenna





Antenna
Combiner

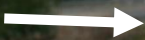


Figure 10. Outdoor Panel Antennas Connected to Diplexer



Figure 11. Antenna camouflaged inside or on a non- metallic vase which can be placed on a shelf or cabinet as high up as possible to get good coverage

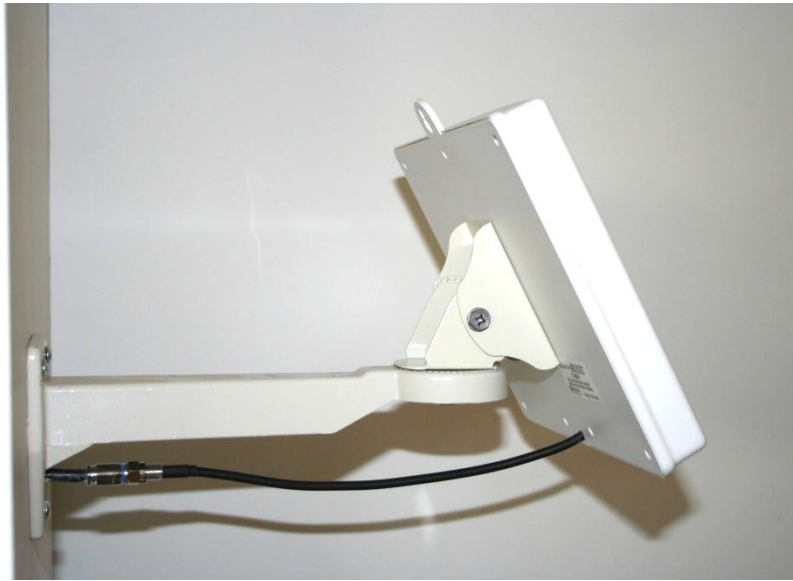


Figure 12. Indoor Dual Band Panel Antenna mounted on AZ/ EL wall mount bracket

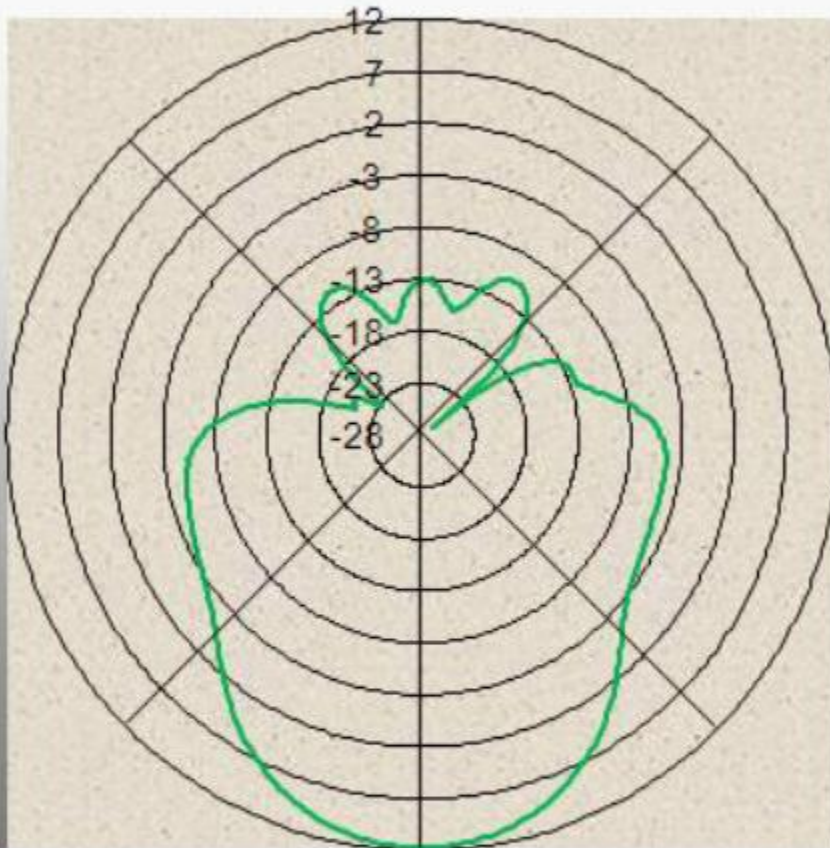


Figure 13. Indoor Dual Band Panel Antenna mounted flush to wall



Figure 14. Indoor panel antenna with ceiling mount bracket

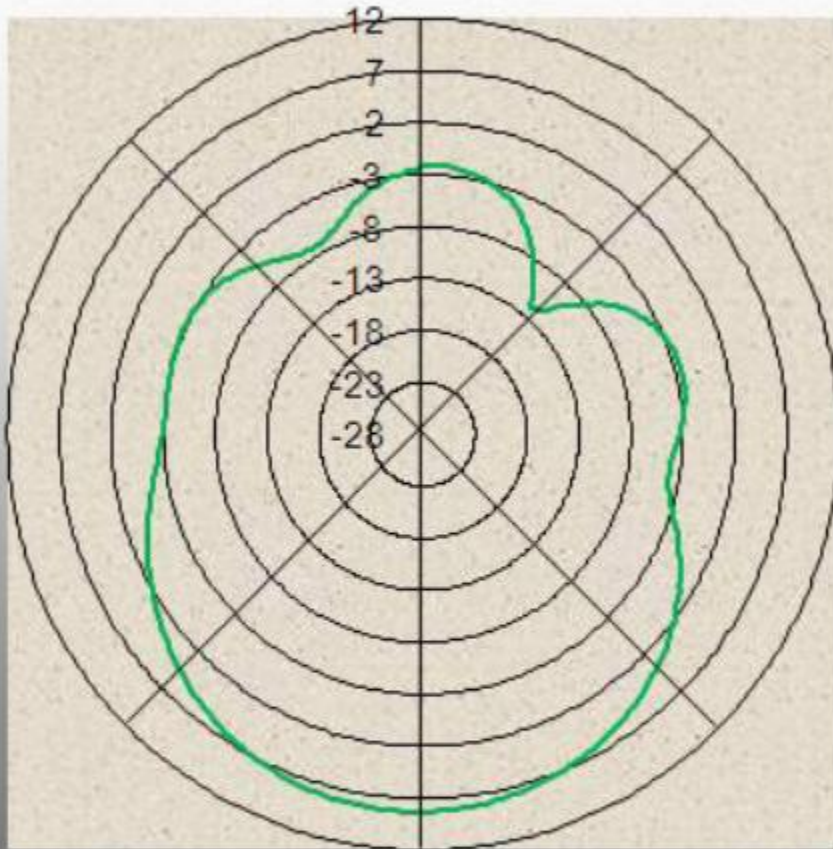
Figure 15. Antenna Radiation Pattern
1900 MHz



Peak Gain: 12 dBi

3 dB beam width = +/- 22 deg

**Figure 16. Antenna Radiation Pattern
850 MHz**



Peak Gain = 8.3 dBi
3 dB beam width = +/- 40 deg

7. Establish a site installation plan based upon the desired central coverage area:

- The inside and outside antennas must have a separation distance of 60 feet or greater. **It is very important that the outside antenna be separated from the inside antenna by at least one exterior wall. This avoids feedback/oscillation problems.**
- Identify the outside antenna location. If the outdoor coverage area is very poor, the outside antenna should be placed on the side of the building where the signal is the strongest. If the signal is equally strong outdoors, the outside antenna should be placed in a secure, unobstructed area.
- Based upon the desired indoor coverage area, choose a central location as close as practical to the location where the phone is used the most, and position the indoor antenna as high as possible for better coverage.
- For maximum coverage, the location of the indoor antenna should have a direct line-of-site to as much of the coverage area as possible.

d. ELECTRICAL POWER

The QuadraBoost system includes an AC adapter 120 VAC to 5 VDC power supply that plugs into a standard 120 VAC receptacle (Model CPS-5, a 120 VAC to 5 VDC power supply.)

d. AMPLIFIER / REPEATER ALARM STATUS LED (on the side of the Amplifier)

Alarm LED GREEN– shows normal status and is operating normally.

Alarm LED RED– possible feedback oscillation. Unit is not working properly. Please re-arrange antennas or move them further apart.

Beeping intervals of 3 seconds (up to 3 minutes) – possible feedback oscillation. Please re-arrange antennas or move them further apart. Use the supplied inline attenuators as a last resort to stop the beeping

d. IN-BUILDING COVERAGE PROBLEMS

If the QuadraBoost system is working properly and the coverage area appears to be smaller than anticipated, one or more of the following may limit the signal strength to the area.

- **Physical obstructions attenuate the indoor signal** – the path of the indoor signal is weakened by objects. Large metal objects block or reflect the signal. Inspect the coverage area, rearrange any metal objects in the path of the cell signal and/or relocate the indoor antenna. You should also position the indoor antenna as high as possible.
- **Distance between inside and outside antenna** –Verify that inside and outside antennas are located at least 60' apart and separated by an exterior wall.
- **Cabling** – examine coaxial cable run and verify that the cable is not kinked or damaged. Re-locate cable to avoid kinks or coils. Check all connectors and verify they are snug. Do not over tighten connectors with a wrench. All connectors should be finger tight.
- **Outdoor Antenna Location-** The outdoor antenna may not be in the best location to receive the signal from the local tower. Usually the higher up you go with the antenna, the better the reception is and make sure there are no trees, large metal objects or buildings in the way. Try to establish an un-obscured direct line-of-site with the local tower.
- **Trouble shooting:** See section 11 of this manual

d. COAXIAL CABLE

- Cable length can affect the performance of the QuadraBoost system because all cables have signal loss characteristics that are a function of cable length. So the shorter the cables are between the antennas and amplifier, the more signal you will get. Use high quality low loss quad shield cable with good high frequency rated connectors. **Do not use inline adapters or splices to extend cable runs. All runs should be made with as single continuous cable between the antennas and the amplifier. Insure that all RG-6 cables are not kinked, damaged or shorted in any way before applying power. Such defective cabling can cause damage to the amplifier.**

8. Home/Office Installation

Review pre-installation considerations and determine the site installation plan.

Do not apply power to the amplifier until the antennas are connected. This could damage the amplifier and void the warranty

1. Install the outside antennas with the supplied hardware.
2. Mount the outside antennas in a vertical position clear of metal objects and obstructions.
3. Connect one end of the RG-6 cable to the outside antenna diplexer output. Secure cable to the side of the building with appropriate fasteners (not supplied).
4. Route the cable to the amplifier unit.
5. Attach the other end of the cable to the amplifier to the port labeled **Outside Antenna**.
6. Mount the indoor antenna and connect the inside antenna to the connector port labeled **Inside Antenna**.
7. Plug the power unit into the amplifier port labeled **DC5V** on the side of the amplifier unit. Plug the other end into a standard household 120 VAC electrical power receptacle.
8. The amplifier will beep momentarily and the Alarm light will turn from red to green if everything is operating normally. Test the repeater by making a cell call.
9. Align the outdoor and indoor antennas for maximum signal strength.

9. Specifications

Amplifier/Repeater Unit (Model C60A)

- Frequency:
Uplink: 824-849 MHz and 1850-1910 MHz
Downlink: 869-895 MHz and 1930-1990 MHz
- Modulations: CDMA/GSM850/GSM1900
- Dynamic Variable Gain: 60dB Max
- Impedance: 75 ohms (outside antenna connector), 75 ohms (inside antenna)
- Noise Figure: < 10dB
- Power Consumption: Standby 5 vdc/0.5A, Uplink 5 vdc /2.5A Max.
- FCC approved, FCC ID: V23TWDBMPSB-01
- Dimensions: 4.5" l x 4.0" w x 1" h (114mm x 102mm x 26mm)
- Weight: 10 oz
- RF Connections:
Outside Antenna Port: F-female connector
Inside Antenna Port: SMA Female
- DC Power: Coaxial ID = 2.5mm, OD = 5.5mm (center positive)
- Indicator: Green/RED LED status indicator and audio alert

Inside Helix Antenna (Model CODA1)

- Radiation pattern: Omni-directional
- Gain: 5 dBi
- VSWR: < 1.5:1 @ 850 MHz; < 1.5:1 @ 1900 MHz
- Bandwidth VSWR: < 1.5:1 = 810-950 and 1800-1980 MHz
- Max input power: 5 watts
- Dimensions: 18" l x .75" OD (45.7 cm x .2 cm)
- RF connector: F female
- Wind rating: 150 mph
- Installation: supplied L-bracket and hardware wall or pole
- RF connector: F-Female

Outdoor Panel Antennas (Models CHBAP and CLBAP)

- Radiation pattern: See figures 15 and 16
- Gain: 8.3 dBi @ 850 MHz, 12 dBi @ 1900 MHz
- VSWR: < 1.5:1 @ 850 MHz; < 1.5:1 @ 1900 MHz
- Bandwidth VSWR: < 1.5:1 = 810-950 and 1800-1980 MHz
- Max input power: 5 watts
- Dimensions: 10" x 10 "
- RF connector: F female
- Wind rating: 100 mph
- Installation: supplied L-bracket and hardware wall or pole

Indoor Panel Antenna (Model CDBIP)

- Radiation pattern: See figures 15 and 16
- Gain: 8.3 dBi @ 850 MHz, 12 dBi @ 1900 MHz
- VSWR: < 1.5:1 @ 850 MHz; < 1.5:1 @ 1900 MHz
- Bandwidth VSWR: < 1.5:1 = 810-950 and 1800-1980 MHz
- Max input power: 5 watts
- Dimensions: 10" x 10 "
- RF connector: F female

Power Supply (Model CPS-5)

- Input: 120VAC 50/60 Hz
- Output: 5VDC 2.5A
- Mounting: Wall type
- Cord Length: 6 feet
- Output plug: 5.5 x 2.5 x 11mm

10. Technical Support

Before contacting technical support try the troubleshooting actions listed below. But if all fails locate the serial number on the bottom of the amplifier unit before calling. The serial number must be available to authorize technical support and/or establish a return authorization. **For installation technical support and system warranty issues contact Pixel Technologies Technical Support between the hours of 7:30 AM and 4:00 PM (Mountain Time Zone), at (303) 526-1965 or e-mail sales@pixelsatradio.com.**

11. Trouble Shooting

If the QuadraBoost system is not operating properly, before contacting technical support please try the following:

Symptom	Action
LED on Amplifier does not light	Check that AC power is on and that the power unit is plugged into the wall socket properly and it is not loose. Also verify that it is plugged fully into the amplifier power socket.
LED on Amplifier is RED	Disconnect power and move the antennas farther apart or to different location to achieve more isolation between the indoor and outdoor antennas. Reconnect power and confirm the LED turns GREEN after a few seconds
Amplifier is making a beeping sound	Disconnect power and move the antennas farther apart or to different location to achieve more isolation between the indoor and outdoor antennas. Reconnect power and confirm the LED turns GREEN after a few seconds
Boosted Signal is weak	First verify that the LED on the amplifier is GREEN indicating that the amplifier is working properly. Second , check that all of the cable connections to the antennas and amplifier are secure, finger tight and properly mated and that the Indoor antenna is connected to the port labeled "Inside Antenna" and the outdoor antennas are connected to the port labeled "outdoor antenna). Check to see if the cables are kinked or damaged in anyway. Third , verify that you can make a call from the outside antenna's location. Fourth , verify that when you are standing right next to the indoor antenna that the signal is boosted and that you are getting more "bars" than at the outside location. If you are getting a boosted signal, the QuadraBoost is working properly and you can try finding a better location for the outdoor antenna that receives more signal from the local cell site tower. If this still does not improve the performance, a higher gain outdoor or indoor antenna may improve the performance. Contact technical support for an antenna recommendation.

12. IMPORTANT SUPPLEMENTAL INSTRUCTIONS

In some homes or offices it may not be possible to achieve the required isolation between the indoor antenna and the outdoor antenna because the building construction may not provide sufficient attenuation between the two antennas to keep the booster from oscillating.

If you encounter this situation the first option is to reposition the antennas as far apart as possible until the oscillation is eliminated.

If this fails to cure the problem, as a last resort you can use one of the enclosed attenuators (see Figure 17) in-line with the outdoor antenna port to reduce the system gain and stop the oscillation. Included are three different types (3 dB, 6 dB and 10 dB). First try the 3dB unit and see if that works, if not use the 6 dB, if that fails to stop the oscillation try the 10 dB unit. The idea is to find the minimum amount of attenuation that cures the problem. Multiple attenuators can be used in series if more attenuation is required.

IMPORTANT !!!

If you accidentally apply power to the amplifier without the antennas connected, it is important to reset the amplifier after the antennas have been reconnected. You can do this by simply removing power for 5 seconds and plugging the power connector back in again.

If the cable lengths need to be extended, do not use couplers to splice additional cable onto existing cables. Replace the entire cable with a longer continuous length of high quality low-loss (quad shielded) RG-6 cable. Using a coupler will degrade performance and potentially could damage the amplifier.



Attach attenuator here to reduce system gain

1900 MHz High band Antenna

850 MHz Low band Antenna

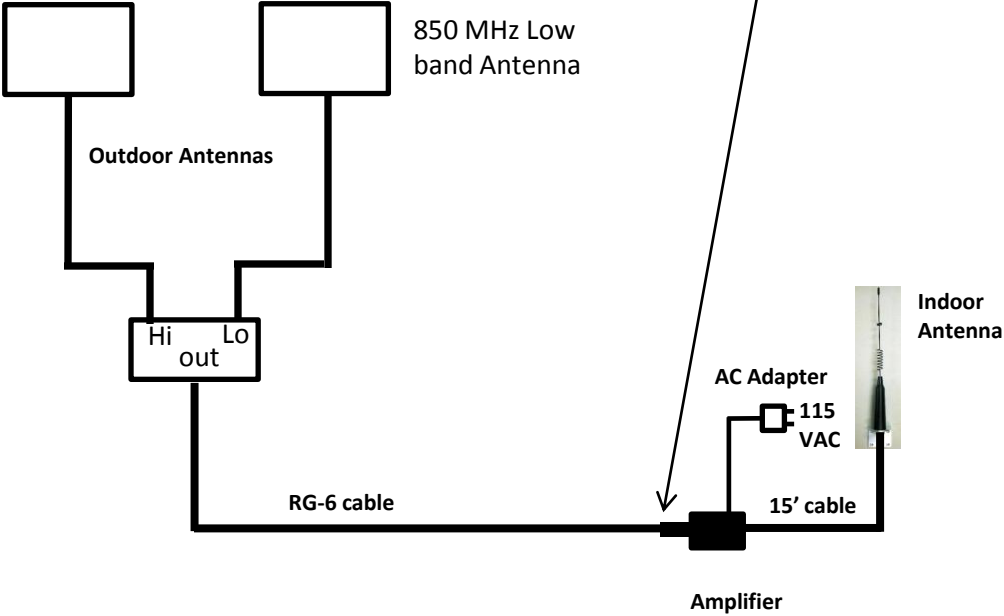


Figure 17. Use of Attenuator to Reduce System Gain