

PRO SERIES

INSTALLATION GUIDE



PRO 70 PLUS™ LX

In-Building
SmarTech III®
Cellular Signal Boosters

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Appearance of device and accessories may vary.

Note: This manual contains important safety and operating information. Please read and follow the instructions in this manual. Failure to do so could result in damage to your Signal Booster.

How a Cellular Booster Improves Indoor Signals

Wilson cellular signal booster systems work as follows: an outdoor antenna placed on a building where some cell signal is present, (ideally on a roof or pole), receives and sends that weak signal via coax cable (like used in satellite TV installs) to a signal booster located indoors. That weak signal is amplified by the booster and delivered via coax cable to an inside antenna(s) which rebroadcasts the amplified signal within one or several areas where improved signal is required. Signals from indoor cell device(s) are likewise picked up by the inside antenna(s), amplified by the signal booster and transmitted back to the cell tower via the outside antenna. The improved signals result in reliable cellular connections for indoor users.

About Gain and Improved Signal Area

The less signal strength at the outside antenna's location and/or the greater the coverage need, the more gain will be required. Conversely, the more signal present outside, the greater the inside coverage area will be. Proper aiming of the outside antenna towards the source of the cell signal is also important. The gains of the outside and inside antenna, though reduced by losses from coax cable lengths, also affect area of improved coverage. Placement of the inside antenna is also a factor as they have directional characteristics. Inside wall materials will also affect indoor coverage area.

Another important factor affecting coverage area is inadequate isolation between outside and inside antenna(s). Wilson boosters are designed to reduce their internal gain in order to prevent any feedback "oscillations" which if unchecked, could affect nearby cell site operation. The LCD status display on the booster is used to determine if a booster is operating at optimal gain for each cellular band. Optimal gain can be achieved by increasing antenna separation, i.e. isolation, until the max gain is indicated. If attainable separation is limited by a building's layout, gain will suffer. A nearby cell site, even if not providing service to a user, can also cause the booster's automatic network protection circuitry to reduce gain or even turn off one or more of the booster's bands so as to prevent signal overload to the nearby site. The display on the booster can also be used to determine if this condition is taking place. Refer to pages 9-11 for explanation of the booster status display.

Inside this Package *Note: Kits may contain different accessories*

To purchase Expansion Kits call Wilson Electronics Sales Department at: **888-503-5329**



Signal
Booster



Wide Band Directional
Antenna 75' Wilson 400
(314411-2375)



Wide Band Panel Antenna
60' Wilson 400
(204453-2360)



2' Wilson 400
(952302)



AC/DC
Power Supply
12V/3A (859900)



Lightning Surge
Protector
(859902)

For additional antenna options see pages 14 & 15.

Install Overview

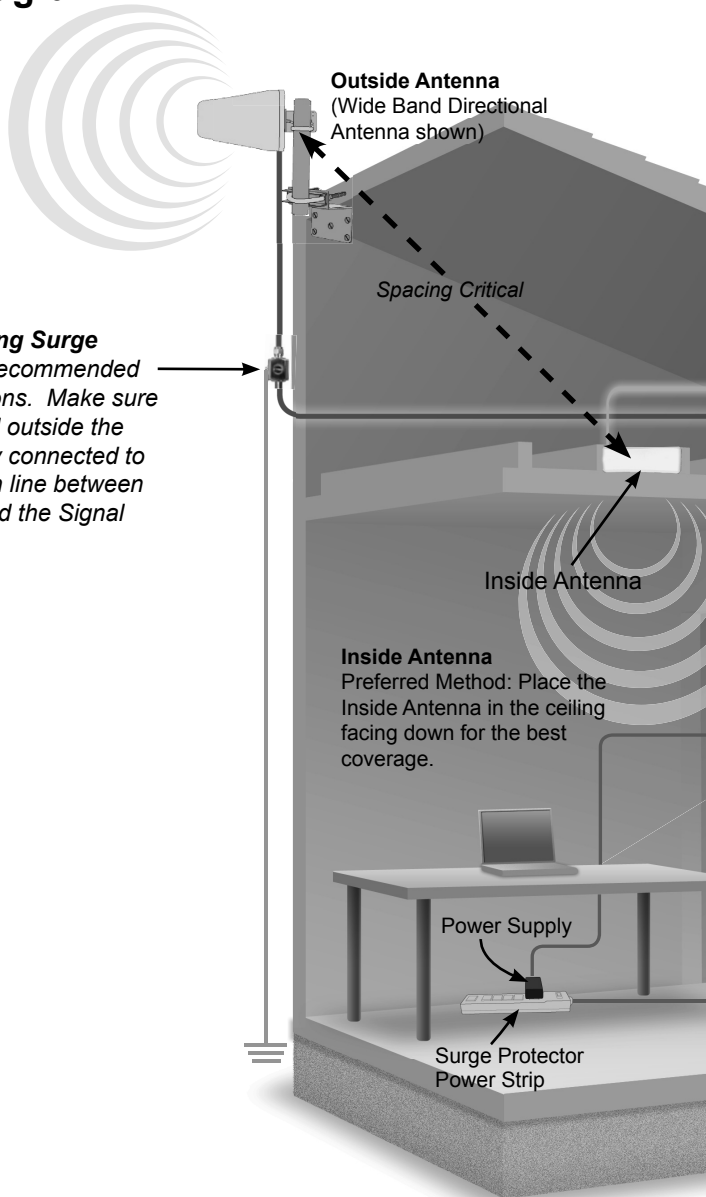
Refer to Installation Diagram on page 3 & 4. Contact Wilson Electronics Technical Support Team with any questions at 866-839-9361.

1. Select a location on the roof or outside of the building to install the outside antenna. Refer to pages 3 & 5.
2. Select a location to install the Signal Booster that is away from excessive heat, direct sunlight or moisture, and has adequate ventilation. Airtight enclosures are not recommended. Booster should be as close to the outside antenna as possible in order to minimize losses from cable length to outside antenna.
3. Connect the cable from the outside antenna to the signal booster's "outside antenna" connector. Refer to page 6 for more information on running cable. Lightning Surge Protection is recommended for all in-building installations. Refer to pages 3 & 6.
4. Select a location for the inside antenna. Try to choose a position in the center of the area needing improved signal. Keep in mind that proper inside antenna to outside antenna isolation is necessary for the system to function properly. This may require as much as **50 to 75 feet of horizontal separation** from the outside antenna. Vertical separation also helps increase isolation. Alternate means of isolation are possible. If physical separation is not possible, please contact Wilson Electronics Tech Support at 866-839-9361 for suggestions on alternate methods to achieve isolation.
5. Connect the cable from the inside antenna to the signal booster's "inside antenna" connector. Refer to page 6 for more information on running cable. Keep cable runs as short as possible to reduce signal loss in the system.
6. Before powering up the signal booster, verify that both the outside antenna and the inside antenna are connected correctly, and check that all connections are tight. **Note: Be careful when plugging the connectors in so as not to bend the center pins on the connectors.**
7. Power on the signal booster by plugging in the included power supply. If the lights are not green, please refer to pages 9-11.

Contact Wilson Electronics Customer Support Team with any questions at
866-294-1660 or email: tech@wilsonelectronics.com

Installation Diagram

Note: A Wilson **Lightning Surge Protector (859992)** is recommended for all building installations. Make sure the protector is installed outside the building at point of entry connected to a suitable ground and in line between the Outside Antenna and the Signal Booster.



Outside Antenna
(Wide Band Directional Antenna shown)

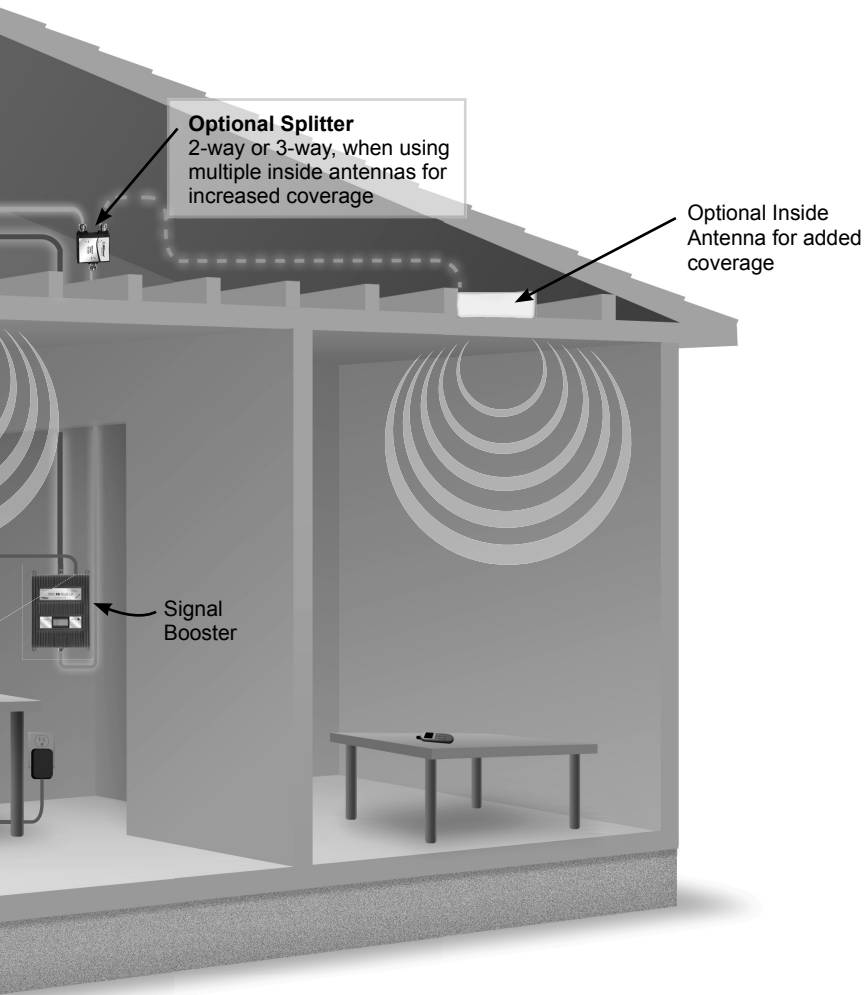
Spacing Critical

Inside Antenna

Inside Antenna
Preferred Method: Place the Inside Antenna in the ceiling facing down for the best coverage.

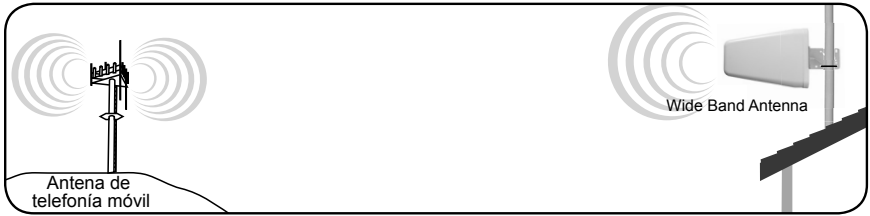
Power Supply

Surge Protector Power Strip



Contact Wilson Electronics Customer Support Team with any questions at 866-294-1660 or email: tech@wilsonelectronics.com

Selecting a Location for the Outside Antenna



The outside antenna must be mounted at a location outside of the home or building, where the strongest cell signal is present. This can be accomplished by using the Wilson Signal Meter. Alternatively, a cell phone in test mode can be used for finding the area around the building with the strongest signal.

Mount the outside antenna as high as possible facing towards the suspected location of the cell tower and pointing away from the expected location of the inside antenna(s).

Outside Antenna Installation

The antenna should be mounted as shown in Figure 1. The mounting bracket, included with antenna, is adjustable and will accommodate pipe diameters from 1.25 inches to 2 inches (pipe sold separately #901117). Mount the antenna so that there is at least 3 feet of clearance in all directions around it. Make sure the antenna is not pointing across your own roof or at the inside antenna as this will cause the cell site protection circuitry to shut down the signal booster.

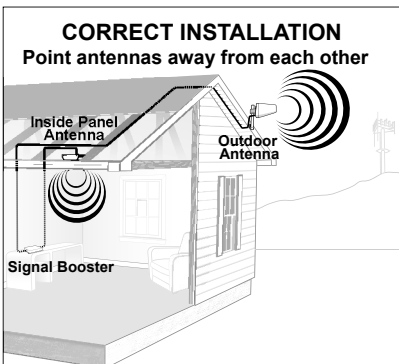


Figure 1

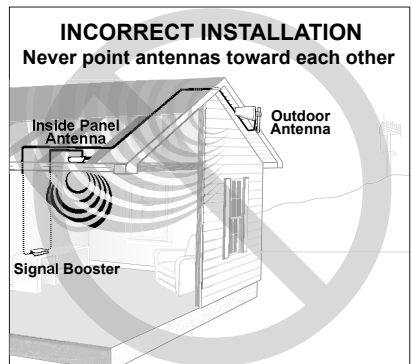
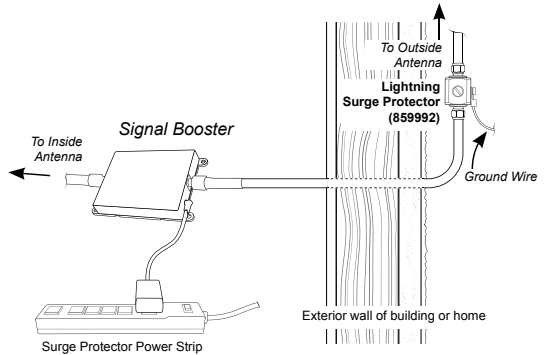


Figure 2

Installing Lightning Protection

⚠ Warning: Lightning protection is recommended for all installations (#859992-50 Ohm, shown below). Take extreme care to ensure that neither you nor the antenna comes near any electric power lines.

Install the Lightning Surge Protector (LSP) outside, in line with the coax cable from the outside antenna, near where the coax cable from the outside antenna will enter the building. Connect the Outside antenna cable to one of the connectors of the surge protector. Connect the other connector on the LSP to the cable entering the building. Ensure the LSP is properly grounded as close to the LSP as possible (ground wire not included).



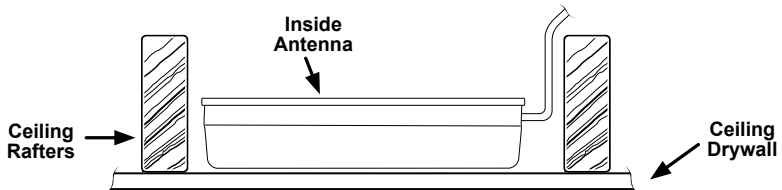
Running Outside Antenna Cable

If you are mounting the outside antenna to the outside wall of your home or building, the simplest way is to run the cable on the outside of the wall and attach it to the exterior of your home or office. Then drill a hole through the wall where you want the cable to appear on the inside of the building. Before drilling, make sure that there are no electrical outlets, sewer or water pipes, or electrical wiring in the wall that you are about to drill through as this could potentially harm you or damage the building. **Note:** Existing TV cables already being used for another purpose can not be shared with the cell booster installation.

After drilling the required hole, run the cable through and seal it with cable bushings or a silicone-type sealant to enclose the hole that you have created. In some instances, it may be possible to run the cable up into the fascia of the attic overhang. In this circumstance, the cable will be accessible in the attic for further routing.

Installing the Inside Panel Antenna(s)

Select a location for the inside antenna, preferably in the center of where the signal needs to be amplified. A minimum separation distance of 20 vertical feet and or 50 horizontal feet between the inside and outside antenna(s) may be necessary in order to achieve full booster gain and therefore maximum indoor coverage. If the amplifier can not be set to maximum gain as explained on page 10, you may need as much as 75 feet of horizontal separation, or mechanical isolation, between inside and outside antennas. Refer to installation diagram on pages 3 & 4.



Some installations requiring signal improvement in far areas of larger homes or structures may require multiple inside antennas and splitter(s). For example if signal is improved in most areas of a structure, but yet there is weak signal in another area, the signal from the booster can be split to two or more separate indoor antennas by using a splitter (sold separately). Refer to the configuration on pages 3 & 4.



Additional Inside Panel Antenna
(sold separately)

Multiple mounting options available

For additional antenna options see pages 14 & 15

Splitter Options:



Installing the Signal Booster

Select a location for the signal booster which is away from excessive heat, direct sunlight, moisture and is not subject to high temperatures. Do not place the signal booster in an air-tight enclosure. Recommended installation locations for in-building signal boosters are in a closet or on a shelf where power is available. Attic installations may expose the booster to high heat.

Note: Do not install in areas subject to temperatures in excess of 150 °F.

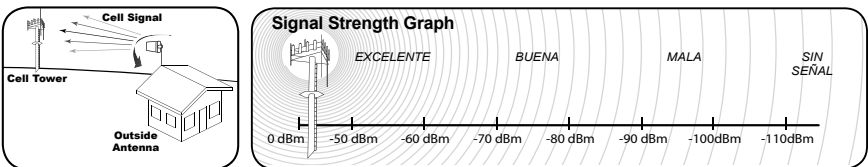
Note: Maintain at least 6 inches of clearance from surrounding objects. Be careful when plugging the connector in so as not to damage the center pins on the connectors.

Run the outside antenna cable to the signal booster and attach it to the connector labeled “Outside Antenna” on the signal booster. Run the inside antenna cable to the signal booster and attach it to the connector labeled “Inside Antenna” on the signal booster.

Note: It is very important to power your signal booster using a surge protected AC power strip with at least a **1000 Joule rating**. Failure to do this will void your warranty in the event of a power surge or lightning strike

Finding the Strongest Signal

When installing your signal booster’s outside antenna, aiming it towards the best signal source from your carrier is important. The best way of getting the strongest signal is to use the Wilson Signal Meter and accessory Directional Antenna (see outside antenna kit options on page 14), an alternate way is to have one person on the roof to rotate the outside antenna, which is connected to the signal booster. Turn the outside antenna about 45 degrees at a time, while the second person, inside the building, is watching the signal strength on a signal meter (preferred) or a phone in test mode. This allows you to read the signal strength from the cell tower. The phone should be in the test mode so the actual signal strength can be read, as bars are not the most accurate. Always make sure the person inside the building gives the signal strength time to register on the phone (at least 30 seconds for phone to update the signal reading).



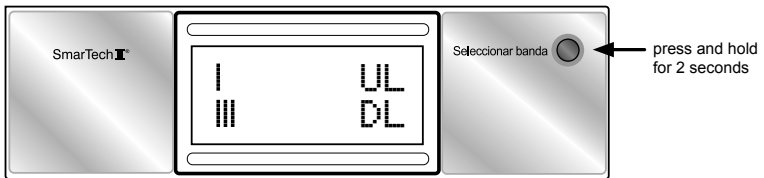
Signal readings usually appear as a negative number (for example, -86). The closer the number to zero, the stronger the signal (see Signal Strength Graph above).

Post Install Setup

The Pro Series booster is designed with advanced internal programming which allows it to automatically adjust itself for a variety of conditions and still boost weak signals. After completing the amplifier installation, the LCD display and push button on the lower panel of the Pro Series booster is used to verify the final gain that the booster adjusted itself to produce after antennas have been placed. The display can also be used (if necessary) to re-adjust antennas so the booster can produce maximum gain and therefore, coverage. The LCD screen will show status for each band and inform the installer if any bands may have had their gain reduced by the booster's internal programming. In addition, an indicator light on the booster's upper panel will help diagnose the overall status of the booster by glowing in different colors. This will be covered in the following page.

The Pro Plus booster has an integrated graphical meter to simplify the installation process. This is not to replace your signal meter - rather it complements the use. The bar graphs will assist in the aiming of your outside antenna - the biggest graph indicates that you are receiving the best overall signal.

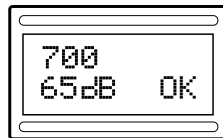
To access this feature for the currently displayed frequency band, press and hold the "Band Select" button for 2 seconds. This will change the display to the UL/DL bar graph (uplink/downlink). A quick press of the button will move to the next band (briefly showing the band, before returning back to the bar graph); while holding the button will return to the regular display.



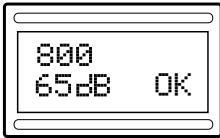
Understanding the LCD Screen

1. Four bands can be individually selected:

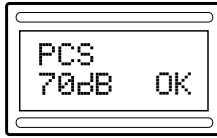
- Ⓐ The 700 MHz LTE Bands (B12/17 and B13)



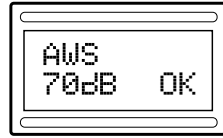
b The 800 MHz Band
– Cell Band



c The 1900 MHz
– PCS Band



d 1700/2100 MHz
– AWS Band



The single “BAND SELECT” button is used to scroll the display through the four cellular bands in order to verify that each band is functioning properly. An asterisk (located next to the band selected) will flash if one or more bands have been turned down/off by the boosters control circuitry due to strong nearby cell site signal overload (“OVL”) and/or oscillation detection (“OSC”) from antennas being too close. This is no cause for concern if the power light remains green and you are satisfied with your indoor coverage area.

Understanding the Upper Panel Indicator Light

As the LCD display is being toggled through the four cellular bands, the upper indicator light (power) will glow green, orange, or red on each selected band, depending on how the booster is functioning on each band as explained below.



Green indicates the unit is powered and working properly.

Red indicates the booster has shut down due to extreme oscillation (feedback).

Orange indicates the booster has shut down due to extreme signal overload. This is caused from being too close to a cell tower.

Fixing Red Light Issues

If the power light is red:

1. Make sure all connections are tight.
2. You need to increase the distance between the outside antenna and the inside antenna by moving them horizontally and/or vertically farther apart. After doing so, reset the booster by unplugging the power supply and then plugging it back in. If the light is green after separating the antennas, you have eliminated the problem.
3. If your coverage area is still too small after separating the antennas contact the Wilson Electronics Customer Support Team for assistance: 866-839-9361.

Fixing Orange Light Issues

If the power light is orange:

1. It will be necessary to turn the outside antenna away from the nearby cellular signal in small increments until the light turns green. If the Signal Booster will not respond, relocation of the outside antenna may be required.
2. If the light remains orange, contact the Wilson Electronics Customer Support Team for assistance at 866-839-9361.

About Wilson Electronics






Wilson Electronics has been a leader in the wireless communications industry for over 40 years. The company designs and manufactures Signal Boosters, antennas and related components that significantly improve cellular telephone signal reception and transmission in a wide variety of applications, mobile (marine, RV, vehicles) and in-building (home, office, machine to machine).

With extensive experience in antenna and Signal Booster research and design, the company's engineering team uses a state-of-the-art testing laboratory, including an anechoic chamber and network analyzers, to fine-tune antenna designs and performance. For its Signal Boosters, Wilson Electronics uses a double electrically shielded RF enclosure and cell tower simulators for compliance testing.

Wilson Electronics Signal Boosters feature patented SmarTech^{III}® that enables them to automatically adjust their power based on cell tower requirements. By detecting and preventing oscillation (feedback), signal overload and interference with other users, these SmarTech^{III}® Signal Boosters improve network cell phone areas without compromising carrier systems.

All products are engineered and assembled in the company's 100,000 square-foot headquarters in St. George, Utah. Wilson Electronics has product dealers in all 50 states as well as in countries around the world.

Warnings and Recommendations

-  **WARNING:** Connecting the Signal Booster directly to the cell phone with use of an adapter will damage the cell phone.
-  **WARNING:** Use only the power supply provided in this package. Use of a non-Wilson Electronics product may damage your equipment.
-  **WARNING:** The Signal Booster unit is designed for use in an indoor, temperature-controlled environment (less than 150 degrees Fahrenheit). It is not intended for use in attics or similar locations subject to temperatures in excess of that range.
-  **WARNING:** Take care to ensure that neither you nor the pole comes near any power lines during installation.
-  **RF SAFETY WARNING:** Any antenna used with this device must be located at least 8 inches from all persons.

3-Year Warranty

Wilson Electronics Signal Boosters are warranted for three (3) years against defects in workmanship and/or materials. Warranty cases may be resolved by returning the product directly to the reseller with a dated proof of purchase.

Signal Boosters may also be returned directly to the manufacturer at the consumer's expense, with a dated proof of purchase and a Returned Material Authorization (RMA) number supplied by Wilson Electronics. Wilson Electronics shall, at its option, either repair or replace the product. Wilson Electronics will pay for delivery of the repaired or replaced product back to the original consumer if located within the continental U.S.

This warranty does not apply to any Signal Booster determined by Wilson Electronics to have been subjected to misuse, abuse, neglect, or mishandling that alters or damages physical or electronic properties.

Failure to use a surge protected AC Power Strip with at least a 1000 Joule rating will void your warranty.

RMA numbers may be obtained by contacting Customer Support at 866-294-1660.

Disclaimer : The information provided by Wilson Electronics is believed to be complete and accurate. However, no responsibility is assumed by Wilson Electronics for any business or personal losses arising from its use, or for any infringements of patents or other rights of third parties that may result from its use.

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U.S. Patent Nos. – 7,221,967; 7,729,669; 7,486,929; 7,409,186; 7,783,318; 8,583,034; 8,583,033; 8,874,030 B2;
8,874,029 B2; 8,755,399; 8,849,187 B2; 8,639,180

Signal Booster Specifications

		Pro 70 Plus LX™				
Product Number		460027G				
Model Number		273470				
Connectors		N-Female				
Antenna Impedance		50 Ohm				
Frequency		698-716 MHz, 729-746 MHz, 746-756 MHz, 777-787 MHz, 824-894 MHz, 1850-1990 MHz, 1710-1755/2110-2155 MHz				
Passband Gain (nominal)		700MHz Band12/17 72.6	700MHz Band13 70.3	800MHz 71.4	1700/2100MHz 76.6	1900MHz 73.5
20 dB Bandwidth (MHz)		700MHz Band12/17	700MHz Band13	800MHz	1700/2100MHz	1900MHz
	Typical	24.0	21.6	38.5	78.0	77.1
	Maximum	24.3	23.7	40.8	80.0	83.9
Power output for multiple received channels (Uplink) dBm						
	No. Tones	700MHz Band12/17	700MHz Band13	800MHz	1700MHz	1900MHz
	2	19.4	24.9	20.9	19.6	19.8
	3	15.9	21.4	17.4	16.1	16.3
	4	13.4	18.9	14.9	13.6	13.8
	5	11.4	16.9	12.9	11.6	11.8
	6	9.9	15.4	11.4	10.1	10.3
Power output for multiple received channels (Downlink) dBm						
	No. Tones	700MHz Band12/17	700MHz Band13	800MHz	2100MHz	1900MHz
	2	18.8	18.5	24.4	17.5	20.7
	3	15.3	15.0	20.9	14.0	17.2
	4	12.8	12.5	18.4	11.5	14.7
	5	10.8	10.5	16.4	9.5	12.7
	6	9.3	9.0	14.9	8.0	11.2
Noise Figure		5 dB nominal				
Power Requirements		12V/3A				

This Product Is Not Approved For Use In The U.S. Or Canada



3301 East Deseret Drive, St. George, UT
www.wilsonelectronics.com | tech@wilsonelectronics.com

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 For patents go to: weboost.com/us/patents

