



Certified Installer Program





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SureCall Product Advantages

Many companies promote their product advantages using words like “quality” or “cost-effective,” but it’s rare to find both in the same sentence. Fortunately, SureCall can truthfully make that rare claim combining both high quality and cost-effective value into their full line of products. SureCall passes these advantages on to consumers and end users for mobile, home, in-building, M2M (machine-to-machine) and direct connect applications for cellular signal boosters.

There are distinct reasons which make SureCall cellular signal boosters and accessories (including antennas, cables and connectors) better than any other in the wideband booster market.

The outer casing: All SureCall cellular signal boosters are built with aluminum alloy shells surrounding their inner workings. While they may look nice, beware of cellular boosters in plastic cases. Metal is much better at dissipating heat which is an important part of cellular booster functionality. Obviously, metal is more durable than plastic, so SureCall booster metal casings provide a dual advantage to plastic cased competitive models.

Inside the booster: SureCall cellular signal boosters are built using compartmentalized design. Our Enterprise boosters have a linear design which allows them to handle multitudes of simultaneous users. We design our boosters using these proven methods to provide users with the best cellular reception and most power with the least amount of oscillation.

Boosters that do not use these design elements may provide the same decibels, or dBs, which is the easiest way to gauge a booster’s power. Lesser quality boosters built without these elements, however, may work great boosting one cellular call, but they quickly lose power when two or more simultaneous calls are being made or received.

The other advantage of compartmentalized and linear designed boosters is that they minimize oscillation, or noise, to the cellular towers. Boosters built without these design safeguards are less effective and have a greater tendency to reduce reception clarity and carry that noise to the cellular towers, which the carriers do not like.

Adjustable Gain: One of the main advantages that SureCall can safely claim is first-to-market innovation. SureCall was the first company to manufacture cellular signal boosters with adjustable dB gain. Because cellular or wireless technology is not as stable as cable technology, there are a variety of factors that can affect cellular and data reception success. Providing boosters with adjustable dB gain through the use of dials or dip switches is another way SureCall ensures its products and their users will receive the best, most enhanced cellular reception on the market.

LTE/4G: The foreseeable future of mobile technology is the ability to upload and download data with your 4G cell phone/smart phone. SureCall was the first booster company to develop 4G specific boosters for Verizon LTE, AT&T LTE, T-Mobile AWS and Sprint WiMax. SureCall was also the first to develop a self-contained 5-band booster, the Force-5, with dual-band frequencies for 2G through 3G and LTE and AWS for Verizon, AT&T and T-Mobile 4G. At one-fifth the cost and a fraction of the size of the next closest competitive model, it puts a cost-effective, all-in-one solution in the hands of medium-sized businesses, as well as the largest buildings and corporate campuses.

With the Fusion5s, SureCall has developed a five-band booster that even small businesses and larger homes can afford to enhance voice and data cellular service and takes cost-effective cellular amplification to the next level.



Overview

-The purpose of this handbook is to educate and provide training on how to properly choose and install a booster solution in order to achieve maximum performance.

-The handbook will cover how to properly perform a site survey, how to determine the correct solution for an installation, how to properly install a solution to achieve maximum performance, and how to troubleshoot an installation.

-In order to receive certification, there will be a test given at the end of the presentation. You must pass with an 80% or higher to be considered a SureCall "Certified Installer".

-Once certified, you will receive a certificate from SureCall, a certified installer badge that you can include on your website and/or marketing materials, and future referrals for customers in your area.

Site Survey

-It is recommended that a site survey be completed in advance of selling a booster solution. This will insure that the correct product is offered as well as a proper installation is done.

-The objective of the site survey is to pinpoint the best placement for the external (donor) antenna, identify what type of external and internal antenna is needed, and to determine the correct booster for the location. If you are considering using SureCall's Design Assistance Service, the Commercial Installation Questionnaire (CIQ) must be completed and floorplans submitted before work can begin on an in-building design.

Site Survey-Home/SOHO (<10,000 square feet)

-It is recommended that the user complete a CIQ even if they are not using the Design Assistance Service. SureCall can provide you with this document. This will insure that the needed location information is provided.

-For a small home or office solution, the customer can be instructed on how to perform their own site survey. The customer can use their own cell phone to test the signal strength. Keep in mind that cellphones only read signal for the user's specific carrier.

- If using an Apple iPhone, dial *3001#12345#* and press "Call". In the top-left corner, a number appears instead of bars.
- For Android devices, there are several apps available to measure exact signal strength. In the phone's App Store, search for "Check Real Signal Strength" to find a cell signal measurement app.

-Instruct the user to make a sketch of the location where the booster will be used.

-Once the customer has enabled their phone to identify signal strength, the customer can then walk around the exterior of the building, logging the signal strength, or dB (decibels) at various points on their sketch.

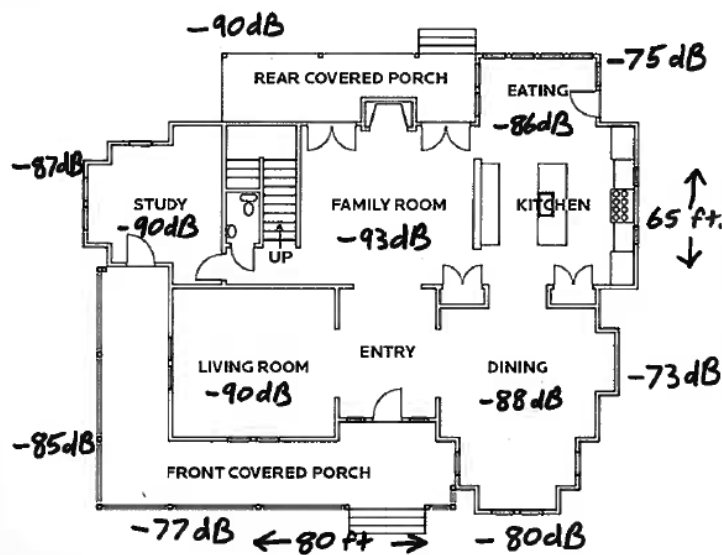
-The lower the number, the stronger the signal (-65dB is better than -85dB). Some cell signal is required in order to enhance cellular signal coverage. The weakest cell signal for the booster to work is -100dB to high -90dB.

-The location where the outside signal strength is the best is the ideal spot to mount the donor antenna.

-Using their cell phone and sketch of the location, have the customer walk around the interior of the building and log the signal strength for the locations where amplification is needed.

-The customer can now provide you with enough information to determine a solution.

-Example of user prepared site survey:



Site Survey-Large Building (>10,000 square feet)

-For a large home or building solution over 10,000 square feet, it is recommended that a site survey is done by the certified installer.

-A Signal Meter should be used to read the existing signal strength both inside and outside of the building, including the roof. There are potential issues that may need to be considered depending on the roof environment, including cable access points and roof material.

-It is best to acquire a blueprint or floor plan of the building in order to log the signal measurements as well as have a clear illustration of the building along with dimensions. If this is not available, a detailed drawing is advised.

-Once on site, walk around the exterior of the building, logging the signal strength, or dB (decibels), reported by the Signal Meter. It is also good practice to take along a CIQ as either reference material or a worksheet.

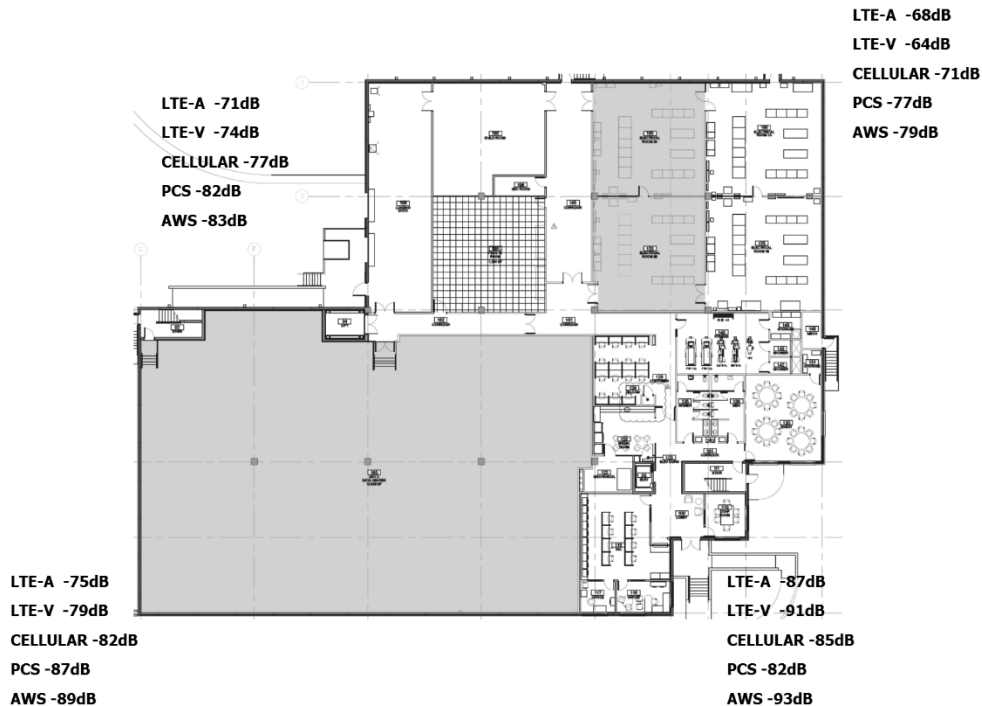
-The closer the number is to 0dB, the stronger the signal. Some cell signal is required in order to enhance cellular signal coverage. The weakest cell signal for the booster to work is -100dB to high -90dB.

-The location where the external signal strength is the best is the ideal spot to mount the donor antenna.

-Using the Signal Meter and floor plan of the location, walk around the interior of the building and log the signal strength in various critical signal areas, areas of high importance or "focus areas".

-Once this information is logged, a product recommendation can be made for a solution.

-Example of large building site survey:



Determining a Solution

-Once the site survey has been completed, a determination can be made as to what the right solution is.

-The basic components of a booster solutions are the booster, indoor and outside antennas, cables, and splitters.

-Using the completed site survey, determine what booster is best suited for the customer's needs. This may include a simple dual-band (2G/3G) or a more complete 5-band solution (2G/3G/4G). 2G and 3G are universal for all carriers. Today, virtually all voice calls are made on the 2G/3G platform. Data also travels on the 3G platform but not as quickly as 4G. Currently, 4G provides optimum data speeds only. If the customer only needs to increase phone call reliability, uses Wi-Fi for 4G data, or if 4G is not available in the area, a dual-band booster is the solution. If the customer also wants to increase 4G reliability as well, then a 5-band booster is the best solution.



Carrier Operating Frequencies (MHz):

2G,3G	CELL Uplink	824-849	AT&T 4G	LTE Uplink	698-716	Verizon 4G	LTE Uplink	776-787
	CELL Downlink	869-894		LTE Downlink	728-746		LTE Downlink	746-757
	PCS Uplink	1850-1910						
	PCS Downlink	1930-1990						
T-Mobile/ Canada 4G	AWS Uplink	1710-1755	Sprint 4G	WiMax	2496-2690			
	AWS Downlink	2110-2155						

Booster Coverage Area:

Consumer Grade Products					
2G/3G	Up to 6,000sqft	FlexPro	2G/3G/4G	1-2 Rooms	EZ 4G
	Up to 25,000sqft	DualForce		Up to 6,000sqft	Fusion5s
				Up to 25,000sqft	Force5

Industrial Grade Products (Requires Carrier Approval Before Activation)					
2G/3G	Up to 80,000sqft	Industrial DualForce	2G/3G/4G	Up to 80,000sqft	Industrial Force5

-Under the new FCC rules that went into effect May 1, 2014, there are two categories of cellular boosters; consumer labeled and industrial labeled. There are different requirements for using these boosters.

-Consumer Booster Requirements:

- **Carrier consent & registration**
 - The carriers have given a “blanket” commitment of consent to FCC approved consumer boosters if registered prior to operation
 - Therefore, **REGISTRATION = CONSENT**
 - **Booster OPERATION is not contingent on booster registration, but to be FCC compliant it must be registered online prior to activation**

- **Use products that meet the Network Protection Standards**
 - Power limit of 1 Watt EIRP
 - Triple Safeguard to tower: Automatic Gain Control (AGC), Oscillation Detection, and Auto Shutdown
- **Stealth Mode**
 - Uplink becomes inactive when not in use – saving energy and preventing excess noise
- **OOBE (Out-of-Band Emissions) Detection**
 - Decreases potential of interference into other bands, such as public safety frequencies
- **Shut down the booster if it causes tower interference until adjusted to prevent interference**

Placing the Antennas

-Identify a location where the booster can be mounted, keeping in mind that it requires AC power and occasional access for possible maintenance.

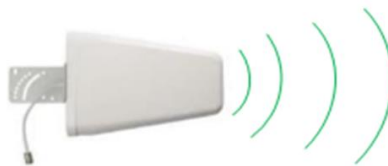
-If the outside signal strength is average, -65dB (or better) to -80db, an Omni antenna can be used. An Omni is also ideal if amplification is needed for multiple carriers and the signal strength is average for all.

-If the outside signal strength is weak (-95dB to high -80dB), a Yagi directional antenna or high gain Omni antenna is recommended. This antenna increases the dB signal coming into the booster. If using a Yagi antenna, the antenna must be pointed towards the carrier’s tower to optimize performance. Tower locations can be found on the internet. Recommended: www.cellreception.com/towers, www.opensignal.com

• **Omni Antenna**



• **Yagi Antenna**



-The indoor antenna can be mounted in a central location, or where the dB number is the weakest. Attention must be given to the antenna separation. The separation distance refers to the distance between the external antenna and closest internal antenna in a straight line. Separation is not related to the cable length. Refer to below chart.

ANTENNA SEPERATION IS ONE OF THE MOST IMPORTANT ASPECTS OF A PROPER INSTALLATION

- 72dB Consumer Booster: 50ft of Linear Separation
- 80dB Industrial Booster: 125ft of Linear Separation

****Recommended separation between donor and closest broadcast antenna can increase or decrease depending on a strong or weak outside signal****

-If the recommended separation cannot be achieved: the booster can be attenuated, or tuned down. However, this can decrease the coverage area. A panel (directional) indoor antenna can be used instead, pointing the signal away from the donor antenna. You can also shield the outside antenna to limit the strength of the signal interfering with the internal antenna(s).

-For most home/SOHO installations, 1 or 2 indoor antennas are sufficient.

-For large building installations, the number of internal antennas will vary based on total coverage area.

-Internal antenna separation is also important. If using multiple internal antennas, it is important to provide enough separation so that the signal from one antenna does not reach another physical antenna. The signals can cross, but the signal should not reach another physical antenna. If this happens, you would still see a strong signal with a Signal Meter or cell phone, but call quality would be poor.

-In most installs, a dome antenna is used. This antenna mounts to the ceiling. This antenna may also be placed above the ceiling tile if preferred. Each dome antenna radiates a circular coverage radius of 30 to 40 feet with a consumer system or 50 to 60 feet with an industrial system. This will vary based on the signal strength as well as the materials used to construct the walls of the building.



-In some installs, a panel (directional) antenna is used. This antenna mounts to the wall. Panels are used when the required antenna separation cannot be achieved or for a more aesthetically pleasing design, if a ceiling mount is not possible, or if you are trying to cover a hallway or other similar type of area. Each panel antenna omits a horizontal coverage area of approximately 50 feet wide at 100 feet from the antenna.



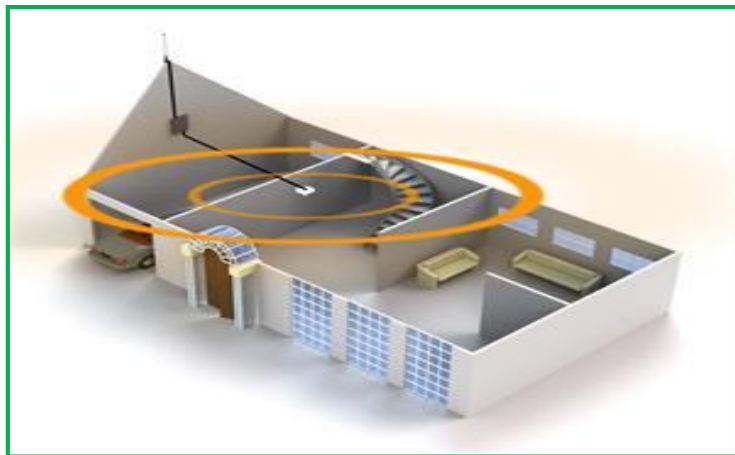
-Once the above steps have been completed, a recommendation of what antennas, booster, and cables lengths are needed to provide a booster solution can be made.

Installation

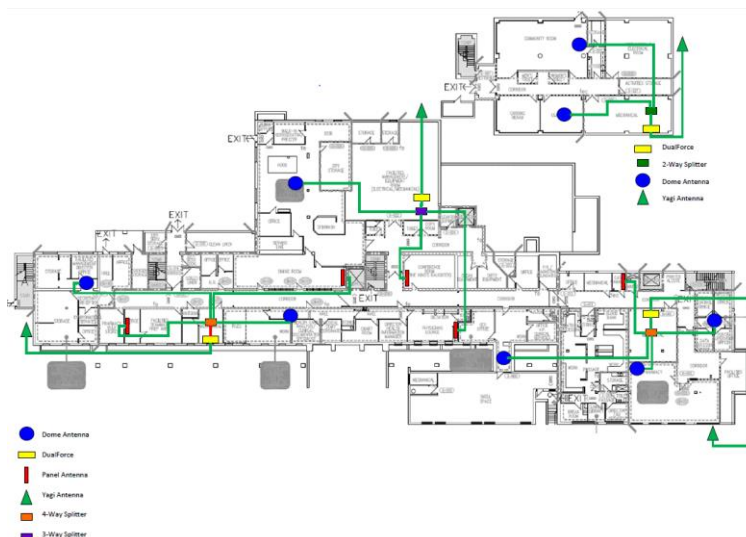
We are operating on the premise that the installer has knowledge and experience with cable pulling and general installation technique. Therefore the concentration is on the detailed technique of installing a booster solution.

-Once a solution is decided on and the Bill of Materials is determined, the installation can begin.

-Example of home with antenna separation:



Example of large building design and layout:



-As a reminder, proper antenna separation is critical.



-Once the system is laid-out and connected, apply power to the booster. The power light will turn on. The alert LED lights will flash for up to 15 seconds on each band to show the band is active.

-If the booster and antennas are installed properly based on the separation requirements, no adjustments should need to be made. Ideally there would be no reason to attenuate the booster from its max gain

-If the alert lights are flashing red, the booster is at its shut-down threshold. This is caused by the signal coming into the booster being too strong. Attenuate down in 1 decibel increments until the red light turns off. Once off, turn down 2 or 3 additional dB to prevent shut-down if the signal strength spikes unexpectedly as seen at night or under different weather conditions, as an example. If more than 2 bands are flashing red, consider using an inline attenuator on the OUTSIDE port to weaken the incoming signal on all supported bands.

-If the Alert lights are yellow, the booster has gone into sleep mode because it has not detected any uplink for a period of time. This is a normal booster feature and function. Once uplink is detected, the booster will reactivate.

-If no Alert lights turn on, the booster is safely operating at the maximum decibels.

-If the lights are flashing yellow, the automatic gain control (AGC) is activated. It's safe to operate the booster with the AGC functioning. However, the AGC may cause the system to not perform as well because it's automatically turning the system down, therefore weakening it. If possible, try to achieve more antenna separation or lessen the signal coming into the system in order to prevent the AGC from affecting the system performance. This mode also adjusts the booster as radio frequencies fluctuate. It helps the booster maintain its configured gain level.

Installation Tips

- After installing system, to test if the uplink is strong enough, make a call from a cell phone to a desk phone in the building. If the call is completed and is clear, the uplink is strong enough. If the call will not go through or if the quality is poor, adjust the uplink and test again until a clear phone call can be made.

-Balance out the installation. Make every attempt to equal out the cable lengths to the antennas instead of having some of the domes on short cables and then some on really long runs.

-Long cable runs will cause dB loss. The higher the MHz, the more loss. For example, the 700 MHz band will lose roughly 3dB per 100 feet, the 2100 MHz band will lose roughly 7dB per 100 feet with 400 cable. Smaller cable (RG6) will have more loss. Larger cable (LMR 400) will have less loss. For long cable runs (100ft+), 400 or 600 Low Loss Coax Cable is best.

-The dB loss for a splitter is 3dB. If you have open ports on a splitter, terminate them. This prevents leakage.

- With the newly introduced AGC (Automatic Gain Control) present in all of our FCC certified consumer boosters, outside signal can now be considered "too good". Our boosters work best with an outside signal of between -90dB and -65dB, but if the signal is better than -65dB, you can use one or more RF Attenuators to reduce the amount of decibels entering the booster and prevent a possible AGC overload. We have started carrying attenuators and offer them in three strengths: 5dB, 10dB and 20dB. You are able to group these attenuators together to attenuate as many decibels as you would like.

