

SolidRF E2 Cell Phone Signal Booster Manual

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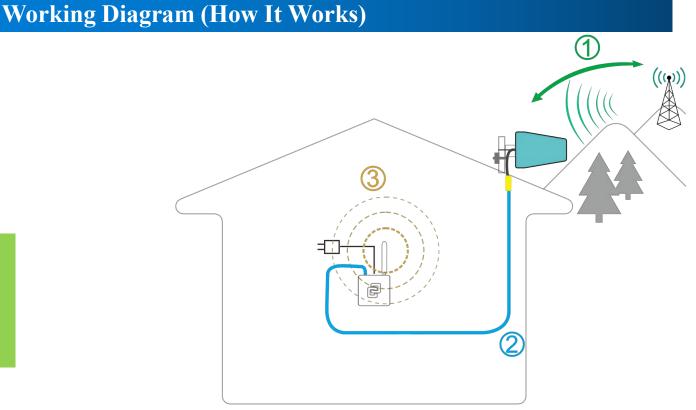
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- 1. The outdoor antenna catches the signal from the tower.
- 2. Sends outside signal to the booster through a coax cable.
- 3. The booster amplifies the signal then rebroadcasts the signal indoors to all mobile devices within range.
- 4. The system also works in reverse; amplifying outgoing signal back to the tower.

A The coverage area and the **strength** of the boosted signal are directly related to two key factors:

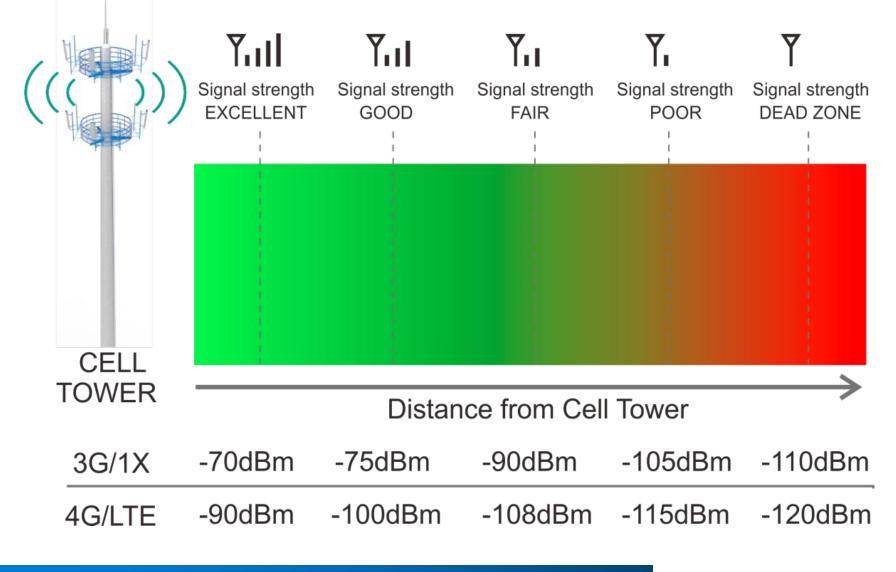
- 1. Signal strength received by the outdoor unit. So, setting up the outside unit where the signal is the strongest will provide the best results.
- 2. Distance of **separation** between the outdoor unit and the indoor unit.

Package Contents

The kit includes the following items:

- 1. Outdoor Antenna (with mounting kits);
- 2. Booster(with indoor antenna);
- 3. Power supply;
- 4. 60 ft of RG6 cable, for connecting the outdoor unit and indoor unit;





Coverage area ability

Note: FCC regulations limit the amplification of all cell phone boosters in order to prevent damage to the telecommunications infrastructure. Therefore, the maximum coverage area of a booster depends on the original power level of the signal captured by the outdoor unit.

Notice: Not recommended when outdoor signal strength is less than -110dbm(3G/1x) or -120dBm(4G/LTE). The resulting coverage area of the boosted signal will be prohibitively small.

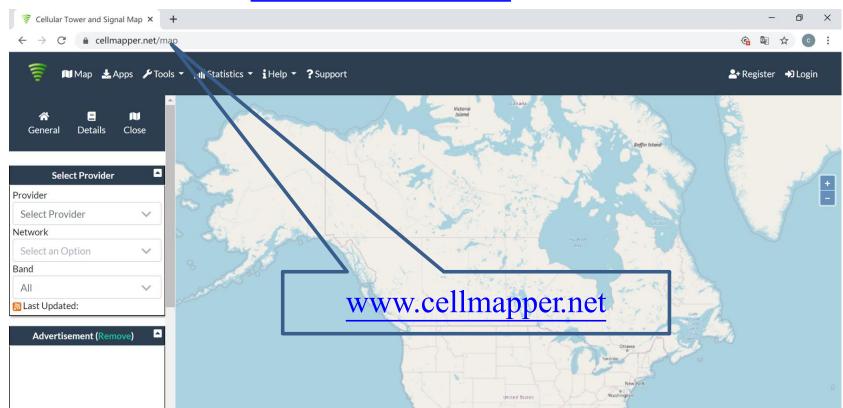
Power level at the outdoor antenna location	Coverage Area (sq. ft.)
Strong (5 bars on the cellphone)	2,000
Medium (3~4 bars on the cellphone)	1,000
Weak (1~2 bars on the cellphone)	300

Find your cell tower nearby!

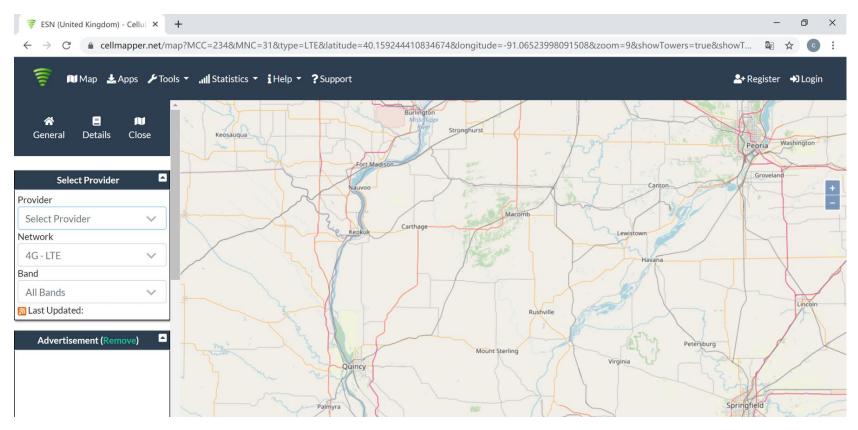
There are a variety of resources available online, here is a third party website recommended. Use it to locate your nearest cell tower: www.cellmapper.net

Note: This is very important step. If we use the wrong direction, we won't have good result.

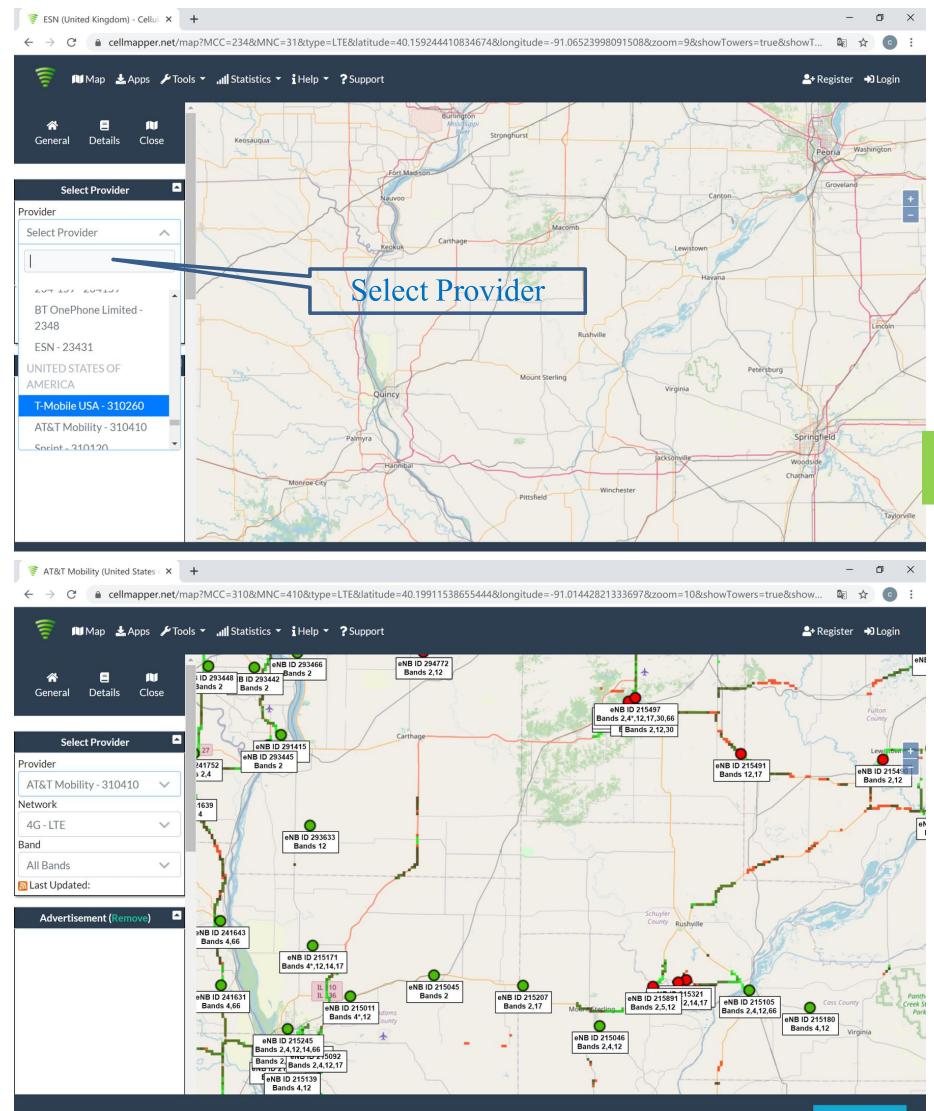
Step 1: Visit website <u>www.cellmapper.net</u>



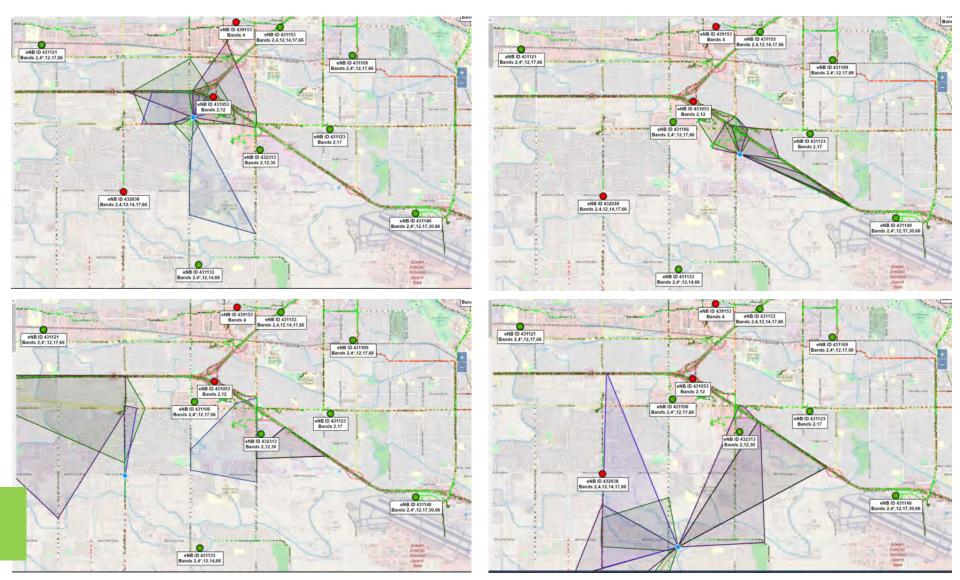
Step 2: Find your location on the map and zoom in on your area



Step 3: Select Provider. You will find the cell tower around your house.

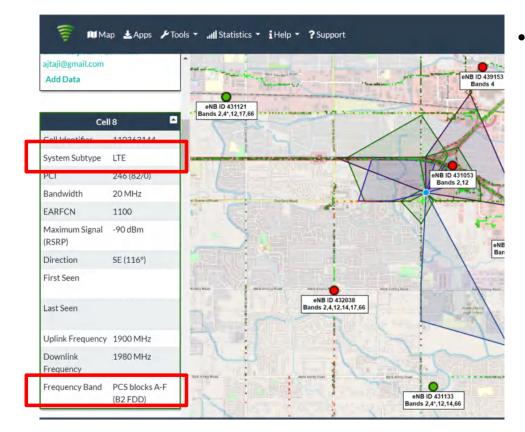


Step 4: Find your cell tower



Click the red or green dot on the map that represents the base station, and the detailed information of the base station will be displayed.

• The first important information, you can see from the above four pictures, the coverage area (shaded part) of each base station is different. You have to find a base station with signal coverage to your house, or the coverage direction is facing you, and the coverage area is closest to you.

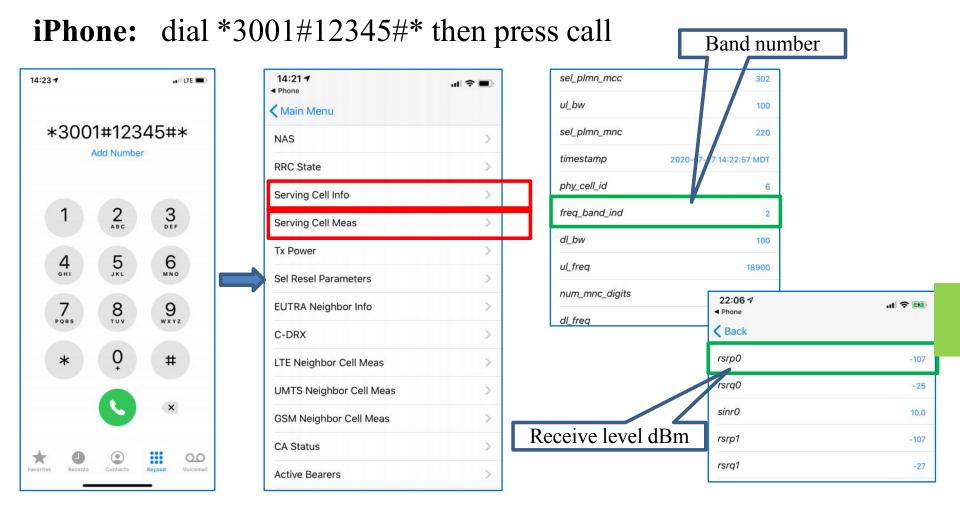


The second important information,
you can scroll the information
content on the left to find the
specific carrier information of this
base station, including the
communication standard and
frequency band. Please reference
the left picture, "LTE" and "B2
FDD"(Band 2, FDD).

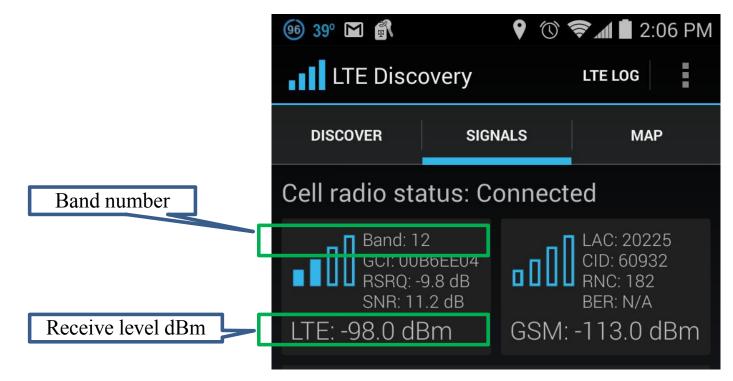
Find The dBm Reading and Band Number On Your Phone

Having an accurate measurement of signal strength in decibels (dBm) is crucial when installing your system. Decibels accurately measure the signal strength you are receiving.

Note: Turn off your cell phone's WiFi to ensure you are checking the cellular connection. The dBm reading will be refreshed every 30-60 seconds. Want faster results? Once you have a reading, turn on airplane mode. Wait 15 seconds. Turn off airplane mode. The signal strength reading is refreshed.



Android: download third part APP-LTE Discovery



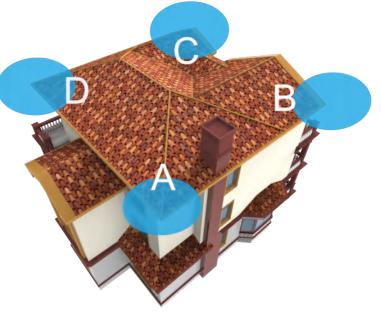
We **STRONGLY** recommend doing a test installation before finalizing the installation. Doing a test installation of your cell phone booster ensures that you will get the optimal performance from your system.

Step1: Select the Location for the Outside Unit

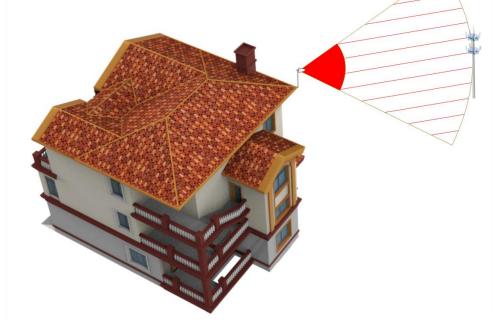
Note: This is the most critical step and will determine the overall performance of the booster system.

- 1. Generally, the strongest signal will be located on the side of your home facing the nearest cell tower. Keep in mind, the signal strength at ground level may be different from the signal strength at or above the roofline due to obstructions (trees, other buildings, etc.) that block the incoming signal. In most situations, the strongest signal is found about 25 feet above the ground on the side of your home facing the nearest cell tower.
- 2. The most ideal installation position is the corner of the building, choose the one facing your cell tower.

Four corner of the building are the most ideal position



Choose the one facing your cell tower



Step 2: Temporarily Mount the Outside Antenna

In addition to the four corners of the building, the chimney and the pole above the roof can also be selected. As long as the installation distance between indoor and outdoor antennas is maintained enough, satisfactory results can also be achieved.

Use one of the three options to mount the outside antenna on your roof on the side of the house with the strongest signal.

The height of the outside antenna should never exceed the highest point of your house.

This is a precaution against damage and safety concerns caused by lightning strikes to the outside unit.

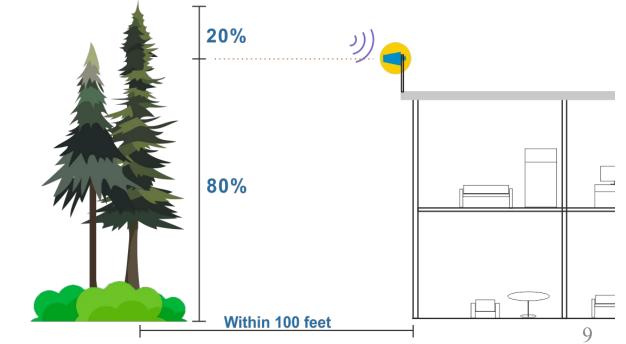
🙆 Outdoor antenna must be installed over the roof line.

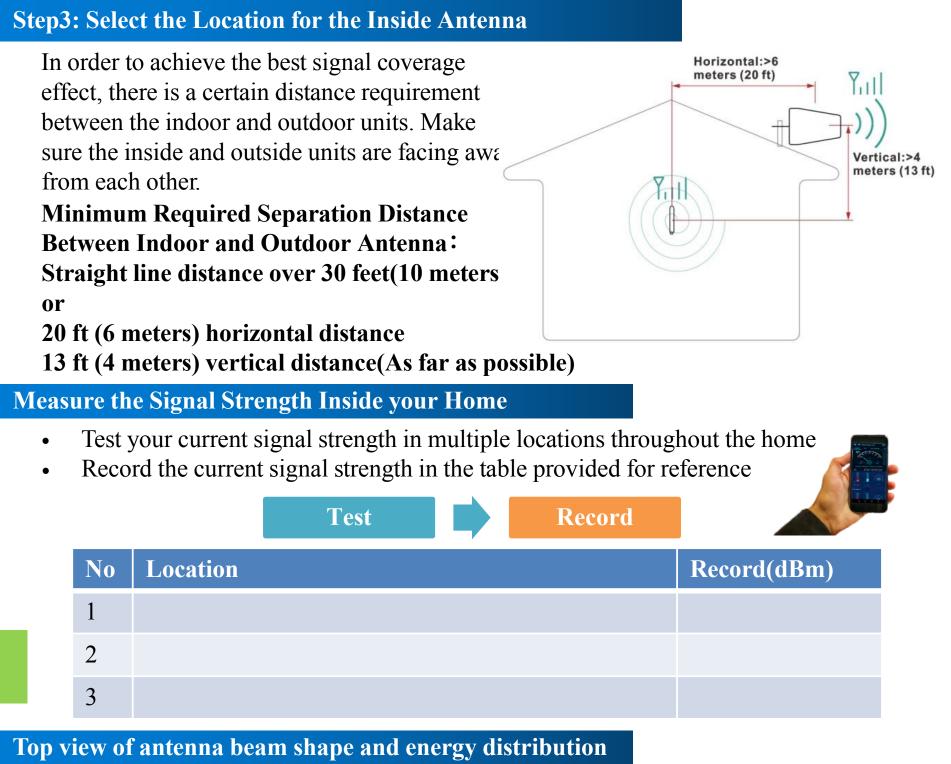


Caution

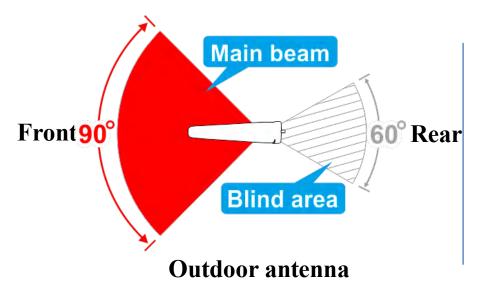
Trees will greatly attenuate wireless signals. If there are tall trees within 100 feet of the house. At the same time you can't find a stable signal above 3 bars, the outdoor antenna needs to be erected 60%(at least) to 80%(best) of the tree height. Never exceed the trees!

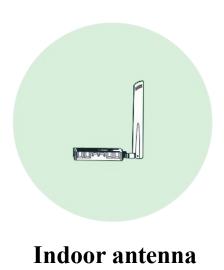
But according to FCC regulations, outdoor antenna height cannot exceed 30 feet. At the same time, if the antenna exceeds the roof, please pay attention to lightning protection measures.





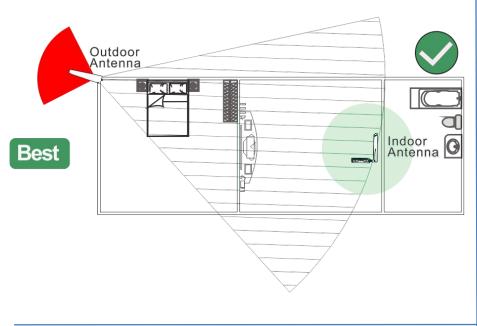
- For the outdoor antenna:
 - 1. The front radiation main beam angle is about 90 degrees;
 - 2. There is a very less energy radiation area behind the antenna, which we call it "blind area". The angle of the blind area is about 60 degrees;
 - For the indoor antenna: The radiation beam is omnidirectional, the energy is evenly distributed in the direction of 360 degrees.



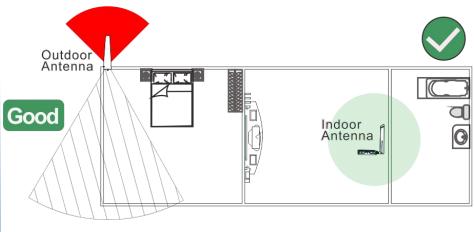


Antenna mutual position(top view)

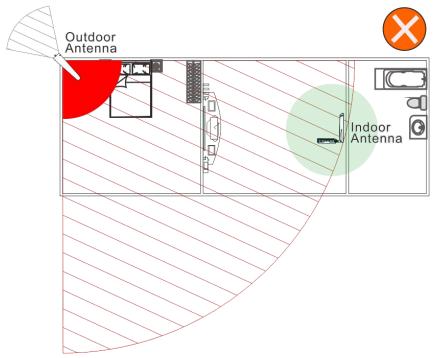
Ensure the distance, keep indoor antenna in the blind area(the best solution).



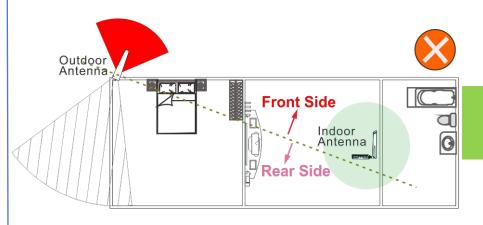
Ensure the distance, indoor antenna outside of blind area but it's at rear side of the outdoor antenna(good solution).



Do not face the outdoor antenna to the indoor antenna.



Do not set the indoor antenna at the front side of the outdoor antenna.

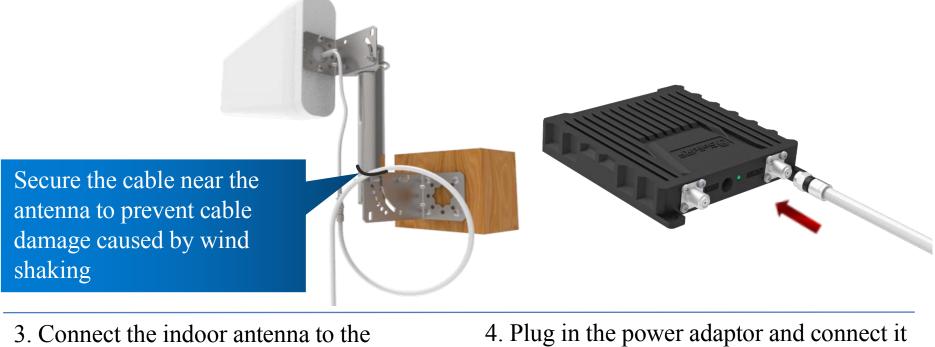


The indoor antenna is an omnidirectional antenna. Choosing a location in the middle of your home will help maximize coverage.

Step4: Connect the System

1. Connect the outside antenna to the 60 feet RG6 cable, Secure the cable near the antenna.

2. Connect the cable to "OUTSIDE" port on the booste.



"INSIDE" port on the booster.

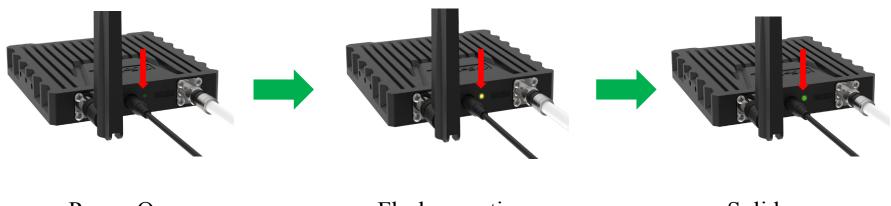


4. Plug in the power adaptor and connect it to the nearest power outlet.



Correct Panel Lights - Self-test

The indicator light indicates the status of the booster. Every time the booster is turned on, the indicator will turn orange for about 1 second and then go green. This means that the booster has passed the self-test and is in good condition. If you can see any flash or solid orange, that means the separation is not enough or the outdoor antenna is facing the indoor antenna. Please go to "**Trouble Shooting**" on page 17 for detail information.



Flash once time

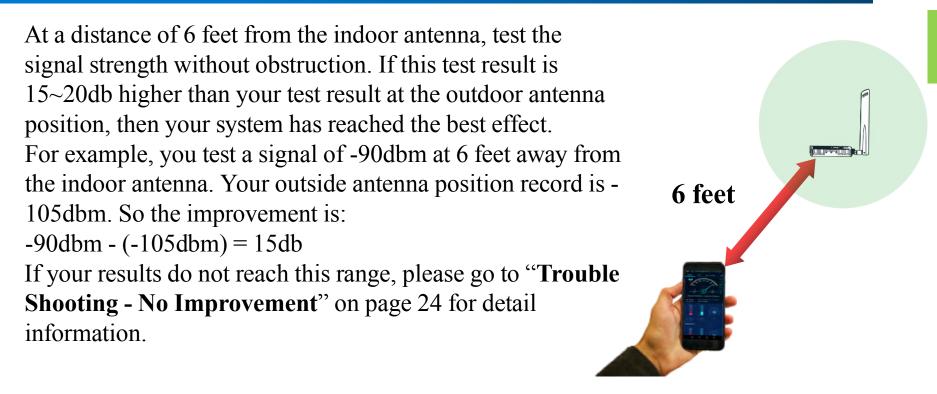
Step5: Evaluate the Effects

- Now that the booster is up-and-running, re-test the signal strength inside your home at the same locations from Step 1. If the number is higher (dBm reading is closer to zero) than the original reading, your booster is working.
- If your signal is not stronger, check the LED lights on the booster and refer to the "**Trouble Shooting**" on page 17 for detail information.



Note: Decibel Gain and Power Amplification may vary depending on the specifics of your situation. Different building materials and other obstructions in your home will result in different outcomes.

How to visually confirm that your installation is effective and correct?



Note1: In daily life, the signal dbm readings of our mobile phones range from -70dbm to -120dbm. Because it is a negative number, the smaller the number, the greater the signal strength.

Note2: In the case of no problems with the installation, the strength of the indoor signal depends entirely on the strength of the outdoor signal.

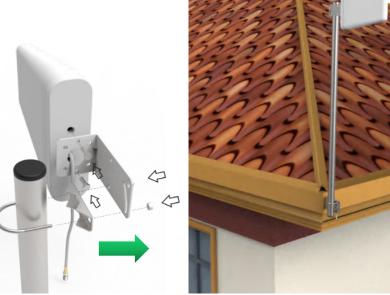
Step6: Finalizing Outdoor Antenna Installation

Once you have tested the performance of the signal booster and made all necessary adjustments, it's time to finalize the installation.

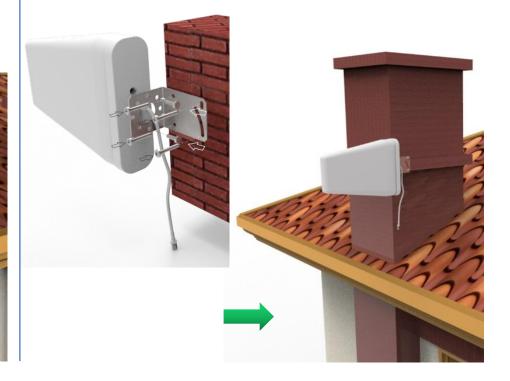
Outdoor Antenna Installation

Make sure that the outside unit is mounted at least 3 feet away from any windows.

Option A : Outside Roof Pole Mount (Best Choice) Use an existing pole to mount the outdoor unit in the optimal signal location. Use the picture for reference.



Option B : Mounting on the side of the chimney(Second Choice).

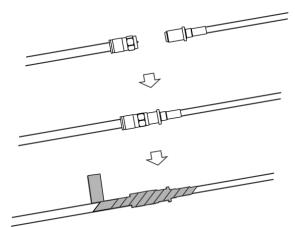


Seal and Fix the Connector

In particular, cables for outdoor antenna locations must be fixed. Otherwise, the internal wires of the cable will be pulled off after the wind has been shaken for a long time. The amplifier will not receive the signal and the system will fail completely.

As shown in the figure, it is best to have the cable around a single turn shape and then fix it.



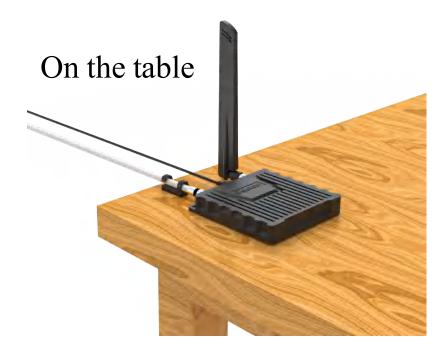


Long-term rain or moisture erosion can damage the electrical characteristics of outdoor antenna connectors. Make sure connectors are well screwed in and seal the connectors with glued tape. Secure the cable to prevent cable damage caused by

wind shaking

Step7: Finalizing Indoor Installation

- 1. Choose right position for the indoor antenna
- 1 feet away from any other metallic objects
- 3 feet away from any windows



- 2. Mount the booster
- Choose a ventilated and dry place
- Keep away from heat
- Don't cover booster



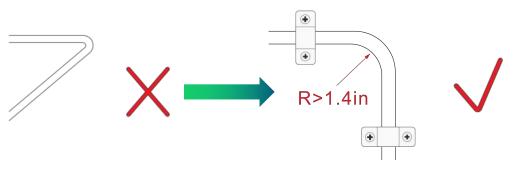
On the wall

A Booster will about 30 degrees Fahrenheit higher than the ambient temperature, which is a normal phenomenon.

Step8: Finalizing and Securing Cable Route

- Find the best route for the cable. Follow the lines of your home to hide the cable in eaves or between the soffit and the exterior wall.
- If needed, cable clips can be purchased at most hardware stores.
- Whether the cable is properly secured is very important for the entire system. In most cases, the customer found that the booster did not work after working for a period of time because the cable was not installed securely.
- Carefully arrange the cable along the outside of the building and ensure that there are no folds or kinks. Fix the cable at each corner.





Caution



TA

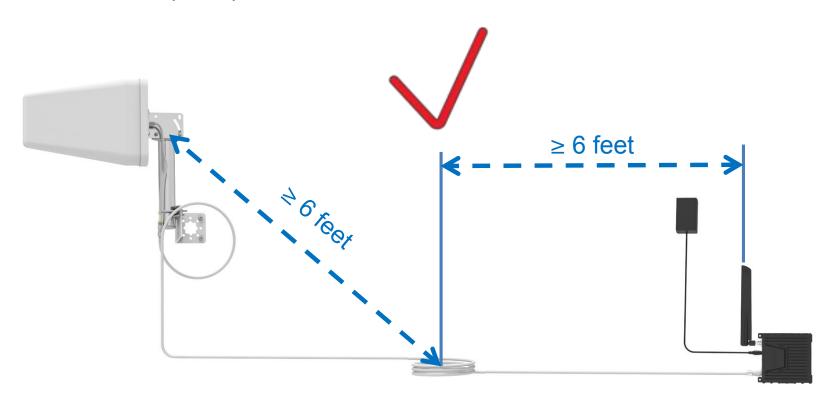
Secure the cable near the antenna to prevent cable damage caused by wind shaking

Properly Handle Excess Cables

If the coiled cable is too close to the antenna or booster, the system will be unstable. Make sure these coiled cables are more than 6 feet(2 meters) from the antenna or booster

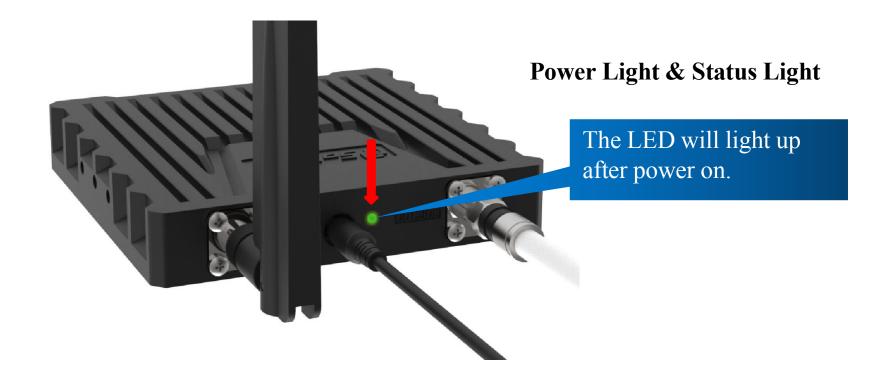


Make sure these excess coiled cables are more than 6 feet(2 meters) from the antenna or booster can make your system work more stable.



DC Power Indicator Correct functioning:

• Status Light should be solid green after powered on.



Trouble Shooting: No Power Light On



DC Power Indicator Off

- Please check your outlet, make sure it is normal;
- Contact us through email or phone call for replacement;

Trouble Shooting: Panel Lights Flash or Solid Orange

The panel indicator is flashing or solid on:

 Booster has CPU inside, it will do the "Oscillation" test every time after power on. When it detect the Oscillation is happening, it will lower the gain of the relative band 1dB. And then test again, see if the oscillation is cancelled. If not it will lowered the gain 1dB again. This cycle will continue.



- 2. If the gain of the band is lowered by CPU between 1~15dB, and the oscillate stopped. The indicator will flash 1~15 times for 2 cycles.
- 3. If the gain of the band is lowered by CPU between 16~25dB, and the oscillate stopped. The indicator will flash all the time.
- 4. If the CPU can not eliminate the oscillation after reducing the gain by 25dB, it will shut down the corresponding band to stop the oscillation. The status light will solid orange.

Meaning of indicator light

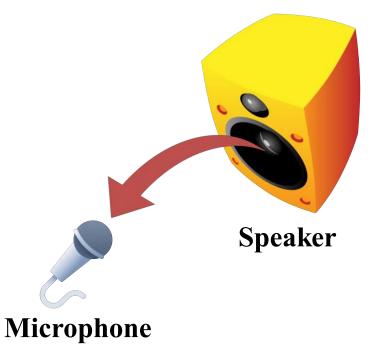
Indicator Status	Gain lowered	What to do?
Flash 1 to 15 times(2 cycle)	1~15 dB	If your coverage is good and reception is good, you can ignore the flash.
Flash all the time	15~25 dB	Check and install the whole system again.
Solid orange	shut down	Check and install the whole system again.

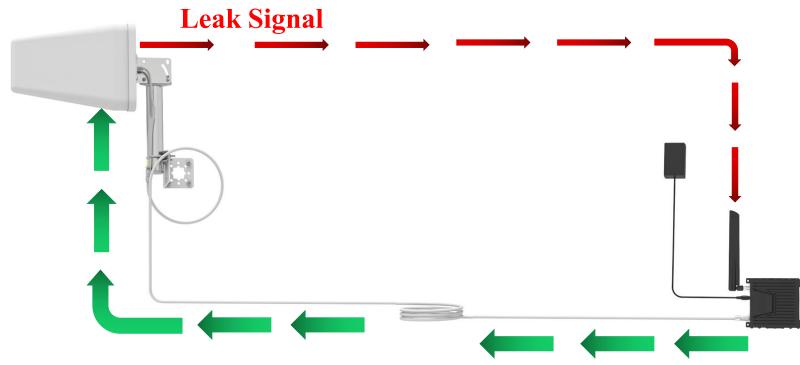
Every 3dB lower, the power level go down 50%. Every 6dB lower the power level go down 75%, the coverage radius go down 50%.

Basic Oscillation Knowledge

Have you ever had the experience of putting the microphone in front of the speaker and you'll hear a loud noise?

- 1. Microphone receive sound which from the speaker, and then send the sound to speaker;
- 2. Speaker boost the sound then broadcast the bigger sound to microphone again;
- 3. The sound gets louder and louder, and eventually it becomes noise.





How does oscillation happened:

Boosted Signal

- 1. Indoor antenna receive leak signal from the outdoor antenna;
- 2. Booster amplify the signal and then transmit it to the outdoor antenna;
- 3. Outdoor antenna broadcast the signal in the air, some of the signal back to indoor antenna become leak signal;
- 4. If the gain of the booster higher than the loss of the leak signal, the leak signal will become bigger and bigger, finally oscillation happened.

Trouble Shooting: How to confirm that oscillation has occurred

- 1. Status light flash or solid orange after power on;
- 2. Screw off the indoor antenna from the booster;
- 3. Restart the power supply;
- 4. The status light solid in green color.

Such a situation means your system has oscillation problem.

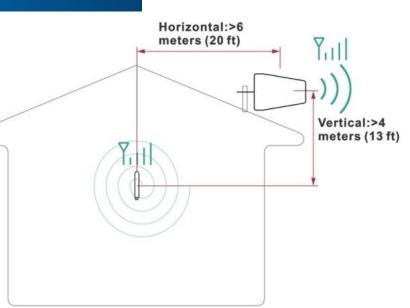
Trouble Shooting: How to solve the problem of oscillation

Step 1: Keep enough distance between indoor and outdoor antennas

Minimum Required Separation Distance Between Indoor and Outdoor Antenna: Straight line distance over 30 feet(10 meters) or

20 ft (6 meters) horizontal distance

13 ft (4 meters) vertical distance(As far as possible)



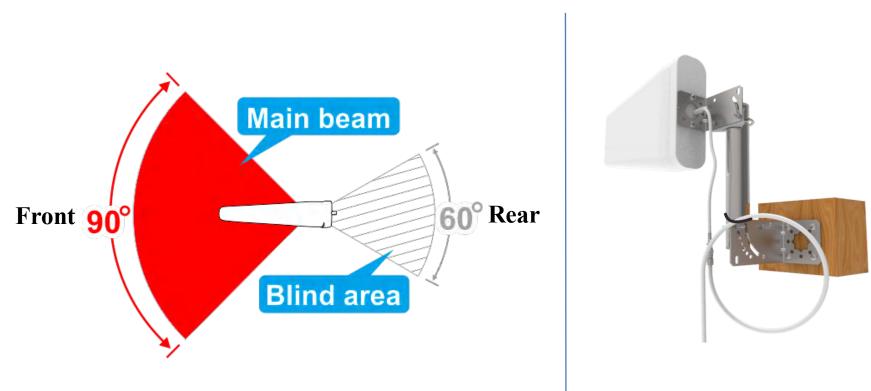
Step 2: Outdoor antenna must be installed over the roof line

The roof can block the signal coupling between the indoor and outdoor antennas, improve the stability of the system. Installing the outdoor antenna above the roof can form a large isolation area between the two antennas. Greatly reduce the signal leakage between the two antennas.



Step 3: Keep indoor antenna in the "blind area" of the outdoor antenna

- 1. The front radiation main beam angle is about 90 degrees;
- 2. There is a very less energy radiation area behind the antenna, which we call it "blind area". The angle of the blind area is about 60 degrees;

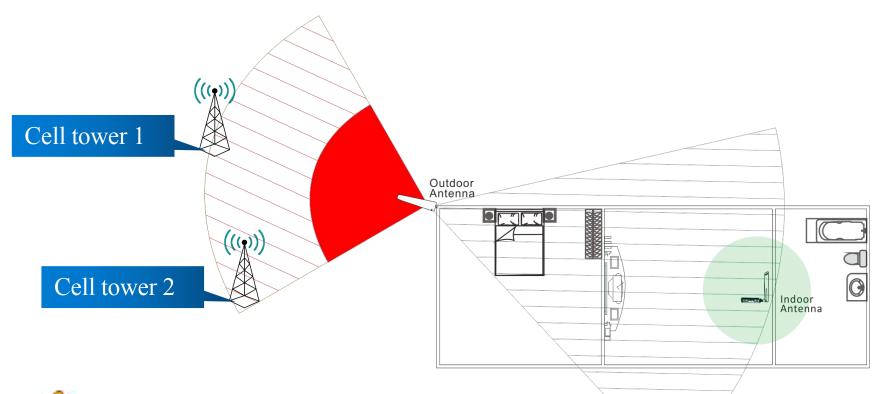


Top view(horizontal) of outdoor antenna

Outdoor antenna

If you have oscillating issue, at the same time, due to the structure or size of the house, your installation can not keep enough distance between indoor and outdoor antenna. Please setup your indoor antenna in the "blind area", that will increase the isolation greatly. Effectively solve the problem of oscillation.

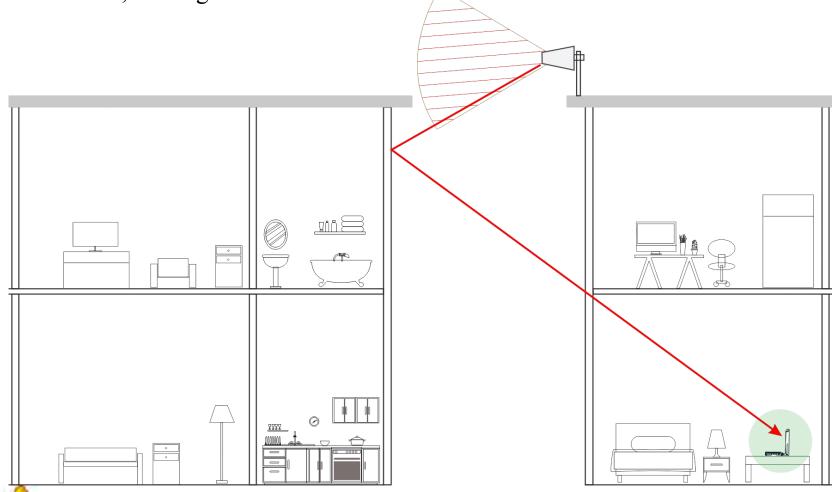
When you do this, your outdoor antenna may not right facing the cell tower. That is fine. Please understand that any direction in the main beam area will be the same reception. Remember, the antenna's forward horizontal main beam is about 90 degrees.



Cell tower No. 1 and No. 2 in the above picture, their signal received by outdoor antenna is the same.

Step 4: Check whether there is a reflecting surface formed by a large object in front of the outdoor antenna

- 1. Please understand that the physical properties of radio wave transmission are a bit like that of light. Will form a reflection on the surface of the object. The reflection efficiency varies according to the material of the object. Metal objects reflect the most strongly.
- 2. In some cases, the signal from the outdoor antenna will be reflected to the indoor antenna, causing oscillation.



Solution The vertical direction front radiation main beam angle is about 60 degrees.

Real case 1: Oscillation caused by signal reflection

Basic information description

- 1. The outdoor antenna is right facing the cell tower;
- 2. There is a iron warehouse infront of the outdoor antenna, about 100 ft away from the outdoor antenna;
- 3. Distance between the indoor and outdoor antenna is good enough;
- 4. Indoor antenna is setup in the "blind area" of the outdoor antenna;

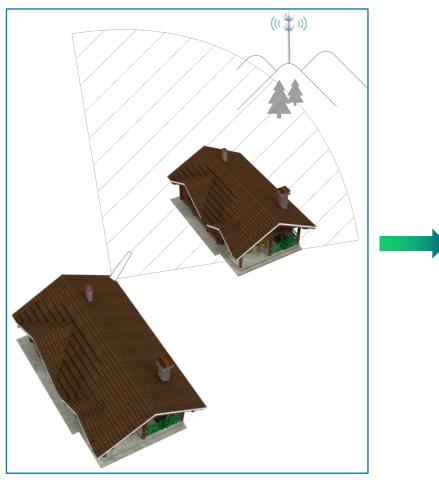


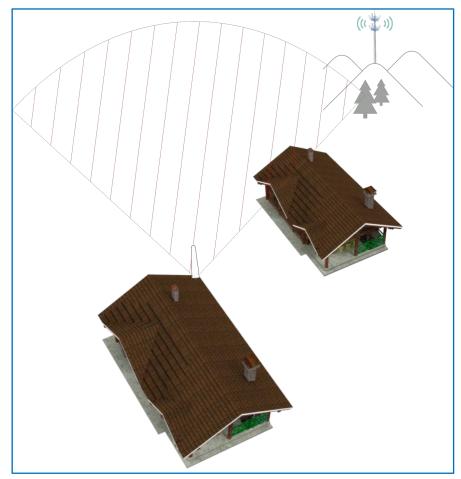
Case analysis:

The outer surface of the warehouse facing the outdoor antenna, become a big reflect surface. It reflect the signal from the outdoor antenna to the indoor antenna.

Solution:

Horizontal rotating outdoor antenna. Keep the cell tower at the edge of the main beam, same time move part of the warehouse out of the main beam. This reduces the energy of the reflected signal.

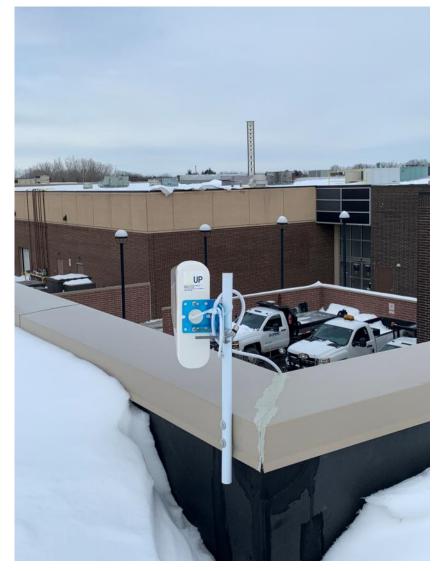




Real case 2: Oscillation caused by signal reflection

Basic information description

- 1. The outdoor antenna is right facing the cell tower;
- 2. There is a big building infront of the outdoor antenna, about 100 ft away from the outdoor antenna;
- 3. Distance between the indoor and outdoor antenna is good enough;

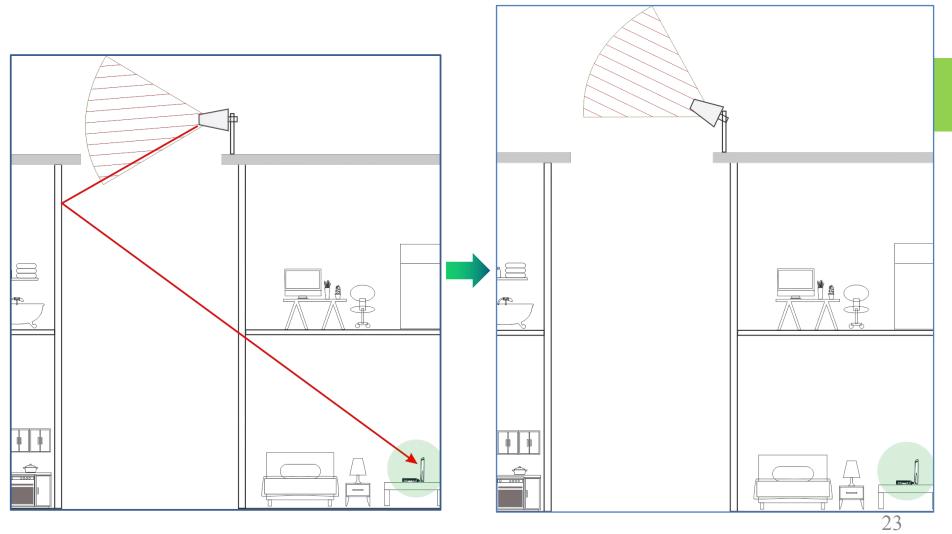


Case analysis:

The outer surface of the building facing the outdoor antenna, become a big reflect surface. It reflect the signal from the outdoor antenna to the indoor antenna.

Solution:

Vertical rotating outdoor antenna up 15 to 30 degree. Keep the cell tower at the bottom edge of the main beam, same time move part of the opposite building out of the main beam. This reduces the energy of the reflected signal.



Trouble Shooting: No Signal Improvement

Follow the test method on page 13, if your signal doesn't improve at all. Please follow the steps below to find out the reason.

Step 1. Check band number. Make sure your band number belongs to one of the following: band 12/5/2/25. If not this booster can't help you.

Step 2. Check incoming signal level at outdoor antenna position. Usage of a booster is not recommend when the outdoor signal is less than - 110dbm(3G) or -120dBm(4G).

Step 3. Observe the indicator light on the control panel, if there is flashing or constant light alarm, please go back to page 18, solve the problem of oscillation first.

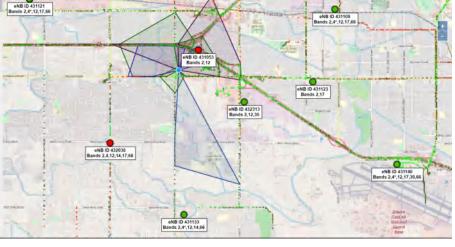
Trouble Shooting: The Signal Increase Was Not Obvious

Follow the test method on page 13, if your signal doesn't improve as much as 15 to 20 db. Please follow the steps below to make improvements.

Step 1. Find your cell tower direction. Check website <u>www.cellmapper.net</u>. Double check your outdoor antenna direction, see if it is facing the tower which coverage your house.

On the map, you can see three colors of dots representing the cell tower. Different colors represent different degrees of information accuracy.

Red pointer: Low accuracy and unlocated **Yellow pointer:** unlocated **Green pointer:** located



Many of our customers can have signal reception outside of the house, but have experienced the following two situations:

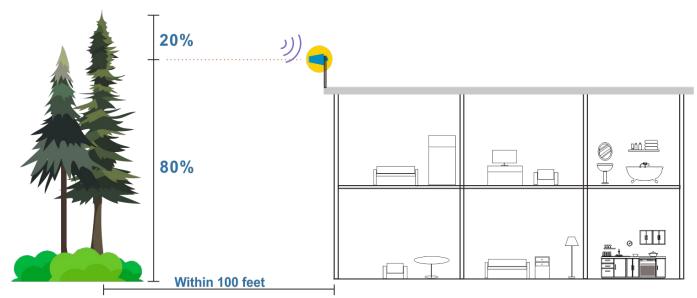
- 1. Only red dots can be found on the map around home. And through field observation, there are no cell towers in those places, or there have been.
- 2. There is no cell tower information on the map around the house.

Solution:

Walk around the house, make sure to walk close to the outside wall of the house. Find the best dbm reading position. That direction is the direction of your cell tower. Please understand that the main beam of the outdoor antenna is about 90 degree. As long as the cell tower is in this range, it can work normally. Best to choose the corner position of the building.

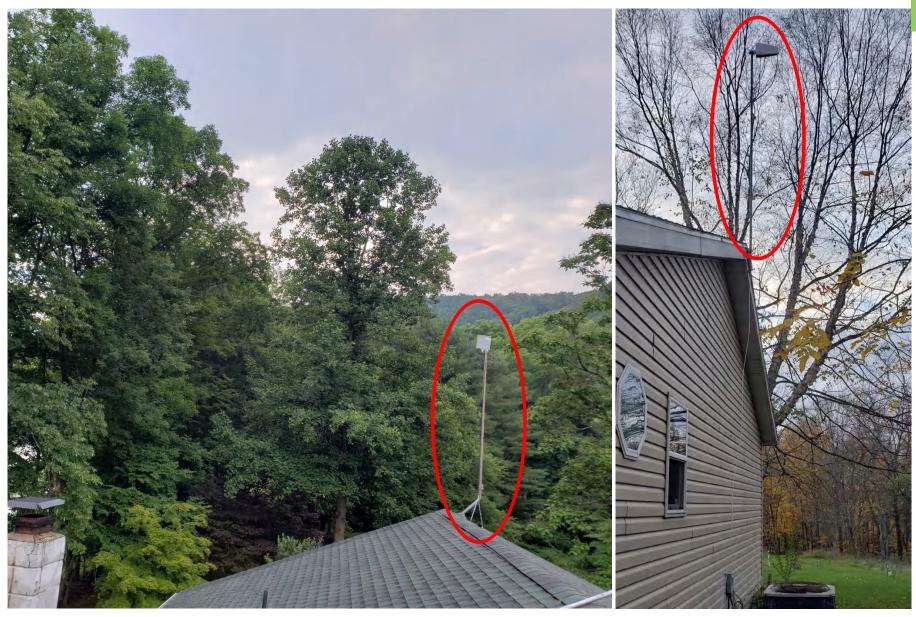
Trouble Shooting: The Signal Increase Was Not Obvious

Step 2. Improve the receiving conditions of outdoor antenna. Trees will greatly attenuate wireless signals. If there are tall trees around your house. At the same time you can't find a stable signal above 2 bars(-90dbm), the outdoor antenna needs to be erected 60%(at least) to 80%(best) of the tree height(Never exceed the trees!).



Solution:

Below two cases, customers all have signal improvement issue. After they raised the installation position of outdoor antenna again, the signal improvement was very obvious



Q1. Can I add more cables? How long can the longest increase be?

A: Please understand that more cables means more insertion loss, that will decrease the system gain, and will decrease the coverage area. So it will depend on how good your outdoor signal reception is. Please refer to the table below for consideration.

RG6

added length (ft)	30	60	120	180
Coverage radius reduction	40%	50%	75%	87.5%

RG11

added length (ft)	60	120	240	360
Coverage radius reduction	40%	50%	75%	87.5%

For example:

If you current coverage radius is 100 ft, and you add 120 ft RG6 cable to the system. Your finial coverage radius will be 100*(1-75%)=25 ft.

Q2. Do I need to install a lightning arrester?

A: Please understand that our outdoor antenna is internal DC short circuit. So the external antenna has certain lightning protection capability. However, if it is directly hit by lightning, it will still damage the equipment. So the best way is not to install the antenna in the highest position of the building to avoid lightning. If lightning strikes are frequent in your area, it is safer to install arresters before cables enter the room.

Q3. The temperature is very high when the booster works. Is that normal?

A: Yes, when the booster works, the temperature will be 25 °C to 30 °C higher than the ambient temperature. Operating temperature range is 5°Fto 140°F (-15°C~60 °C).

Q4. How many devices can this booster support?

A: Each band can support $5 \sim 10$ users same time.

Technical Specification

		GSM	DCS	WCDMA	
Frequency		(band 8)	(band 3)	(band1)	
(MHz)	Uplink	890-915	1710-1785	1920-1980	
	Downlink	935-960	1805-1880	2110-2170	
Gain	Uplink	62	62	62	
	Downlink	65	65	65	
Output power	20dBm(Uplink)/10±2dBm(Downlink)				
Noise figure	<5dB				
In-band Flatness	<9dB				
Weight	0.65Kg				
EIRP	1W				
Impedance	50 ohm				
Operating temperature	5°F to 140°F (-15°C~60 °C)				
Current	$\leq 1.5A(12V DC)$				
Dimension(mm/in)	158*125*25/6.2*4.87*0.98				

WARRANTY



The Booster is covered under a one-year product warranty for failures or defects that result from craftsmanship and/or materials. Dated proof of purchase should be retained for use in warranty cases. Contact the retailer/reseller directly with any warranty issues, or alternatively contact the manufacturer in cases where the reseller is no longer available to handle warranty claims. In cases where the reseller is unavailable, the product may be returned to the manufacturer at the consumer's expense, with a dated proof of purchase and a return authorization letter which can be attained by contacting Amazboost.

This warranty does not apply to any signal booster components determined by Amazboost to have been subjected to misuse, abuse, neglect, tampering, or mishandling that result in damages to the physical or electronic properties of the product. Refurbished products that have been recertified to conform to product specifications may be used for product replacements.

DISCLAIMER: The information provided by Amazboost is believed to be complete and accurate, to the best of our knowledge. However, no responsibility is assumed by Amazboost for any business or personal losses arising from the use of the information herein contained, or for any infringements of patents or other rights of third parties that may result from its use.

Safety Guidelines

To uphold network protection standards and ensure compliance, all active cellular devices must maintain a separation distance of at least six feet between the inside unit antenna and outside unit antenna and at least four feet of separation distance from the inside unit. Use only the power supply provided in this package. Use of a non-SolidRF product or accessory may result in damage to the equipment or components of the equipment. The inside unit is designed for use in an indoor, temperature-controlled environment (less than 100 degrees Fahrenheit). It is not intended for use in attics or similar locations where temperatures may be in excess of that range.

RF Safety Warning: Any antenna used with this device must be located at least 8 inches from all persons.

This is a CONSUMER device

BEFORE USE, you **MUST REGISTER THIS DEVICE** with your wireless provider and have your provider's consent. Most wireless providers consent to the use of signal boosters. Some providers may not consent to the use of this device on their network. If you are unsure, contact your provider.

In Canada, **BEFORE USE** you must meet all requirements set out in ISED CPC-2-1-05. You **MUST** operate this device with approved antennas and cables as specified by the manufacturer. Antennas **MUST** be installed at least 20 cm (8 inches) from (i.e., **MUST NOT** be installed within 20 cm of) any person.

You **MUST** cease operating this device immediately if requested by the FCC (or ISED in Canada) or licensed wireless service provider.

WARNING. E911 location information may not be provided or may be inaccurate for calls served by using this device.

This device complies with Part 15 of FCC rules. Operation is subject to two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. Changes or modifications not expressly approved by SolidRF could void the authority to operate this equipment.