Customer signal booster

user manual

Content

WHAT IS INCLUDED

1. Booster F15G-CPAL-AB-C
2. Outdoor Yagi 9dbi Antenna & 50’5D Coaxial Cable
3. Indoor Panel 10dbi Antenna& 50’5D Coaxial Cable
4. AC/DC Power Adapter

1 HOW IT WORKS

The cellular booster provides reliable two-way cellular coverage by improving signal strength in homes, buildings, offices, and other areas where cellular reception is weak or unreliable.

The system amplifies the signal from the nearest cellular tower and retransmits at a higher power level within a local area.

This manual provides simple installation instructions that will have your cellular booster kit running in record time.

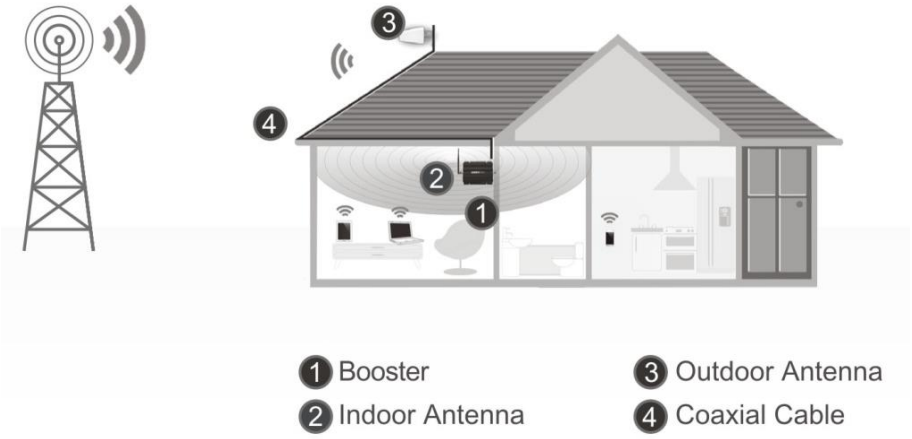
2 TOOL REQUIRED

Phillips Screwdriver

Drill

Cellular Phone (to check signal strength)

3 HOW TO INSTALL YOUR NEW CELLULAR BOOSTER



3.1 Overview

This guide will help you properly install your cellular booster kit. It is important to read through all of the installation steps before installing your equipment. Thoroughly read through the instructions, visualize where all the equipment will need to be installed and do a soft installation before mounting any equipment.

1

- **BOOSTER – select location**
- Install the booster in an area that is protected from the weather, properly ventilated and is away from excessive heat and moisture.

2

- **DONOR ANTENNA (OUTDOOR)- select location**
- Mount the signal (outdoor) antenna in an elevated outdoor location so that it points towards the cellular tower and away from where the inside antenna will be located.

3

- **OUTDOOR COAXIAL CABLE - select location**
- The outdoor coaxial cable is used to connect the donor (outdoor) antenna to the booster.

4

- **INDOOR COAXIAL CABLE- (if used)**
- The indoor coaxial cable is used to connect the server (indoor) antenna to the booster.

5

- **SERVER ANTENNA (indoor)**
- The ideal location for the distribution antenna will be the area of your property where you need to improve the signal most.
- NOTE:The signal strength will be strongest closest to the antenna.

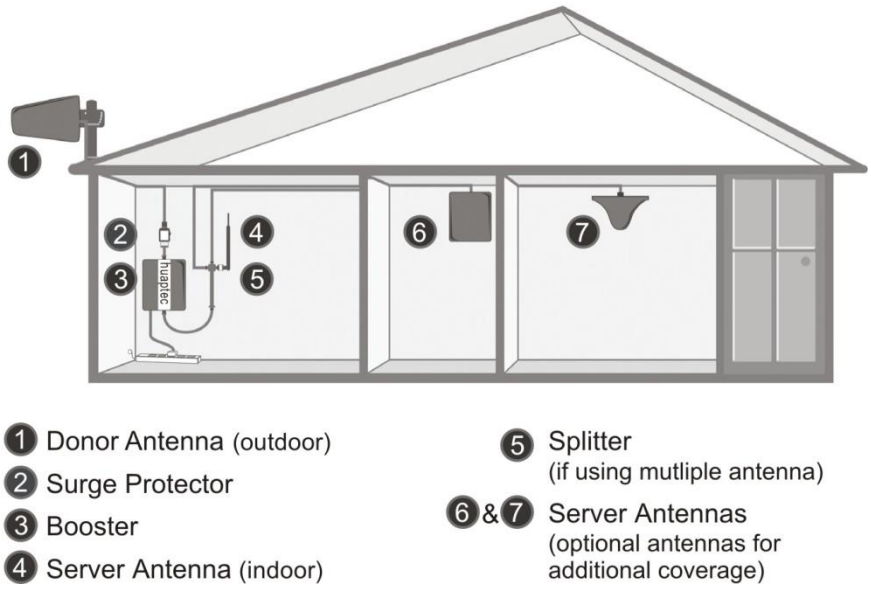
- **IMPORTANT**: The signal antenna (outdoor)should always be separated from the distribution antenna (indoor)by at least 20 vertical feet including the separation of a thick barrier such as a roof or a wall. Depending on the strength of your outdoor signal, the weaker the signal the less separation distance is required.

7

- **LIGHTNING SURGE PROTECTOR- (SOLD SEPARATELY)**
- The lightning surge protector connects in between the signal antenna and the booster.
- IMPORTANT: Lightning surge protector must be grounded.

8

- COMMISSIONING THE SYSTEM



1 Donor Antenna (outdoor)
2 Surge Protector
3 Booster
4 Server Antenna (indoor)
5 Splitter (if using mutliple antenna)
6 & 7 Server Antennas (optional antennas for additional coverage)

3.2 Plan the layout of your system

Before you get started you will need to plan the layout of your system. This involves checking signal strength for signals coming from the cellular tower, as well as antenna, booster and cable placement.

3.3 Check for Signal Strength

Select a location on the roof of the building to install the signal antenna, by monitoring your cellular phone's signal strength (signal bars) to find the strongest signal from your carrier's cellular tower.

Mark that area as the installation location for the Donor (outdoor)

IMPORTANT: Confirm that you have at least 20 feet of vertical distance between the marked antenna location and the location where you will place the Server (indoor) antenna. To prevent the system from oscillation (feedback) you want to ensure that there is enough separation between the distribution

and signal antenna or that they are shielded from each other to ensure the distribution antenna does not send a signal back into the signal antenna. If you cannot achieve these separations, either choose an alternate location for the donor (outdoor) antenna or determine if there are natural barriers in the building construction itself that will attenuate signals between the two antennas so that oscillation can be prevented.

3.4 Run coaxial cable

Loosely run the coaxial cable from your outdoor antenna to your booster. (After you have tested the system you can permanently secure the coaxial cable).

As you route and pull cabling, follow these general guidelines:

- Bend cables and route them smoothly, and protect the outer skin against any damage.
- Keep horizontal cables straight and fasten them with a tie every three to five feet.
- Bind and fasten vertical cables every six to eight feet.
- Waterproof all outdoor connections with silicone caulking
- Be careful when plugging the connector in so as not to damage the center pins on the connectors.

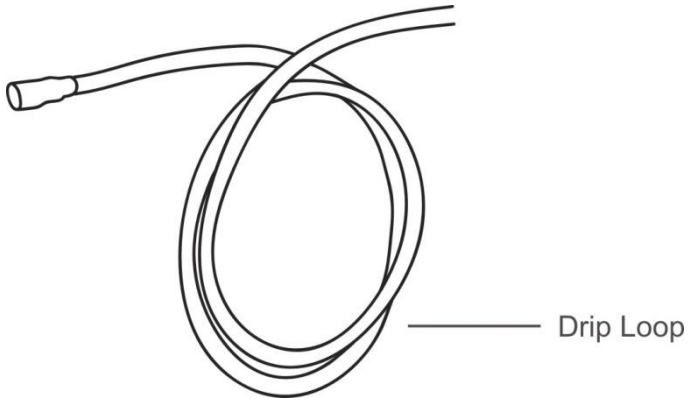
3.5 Install the Donor (Outdoor) antenna

Connect the supplied coaxial cable to the antenna. We recommend applying

silicone caulking to fully waterproof the connection.

Attach the cable in such a way that a drip loop is formed.

Once mounted, connect one end of the coaxial cable to the donor (outdoor) antenna and the other end to the cellular booster where it is marked “outdoor”



3.6 Install the Server (Indoor) antenna

Connect one end of the coaxial cable to the antenna and the other end to the cellular booster where it is marked “indoor”.

Select the installation location of your supplied server (outdoor) antenna based on the following:

Omni Ceiling directional antenna

Place in the center of the area where the signal needs to be amplified.

Panel directional antenna

Place in the outer perimeter of the area the signal needs to be amplified.

Whip Omni directional antenna

Mount directly to the connector marked “indoor” on the cellular booster.

3.7 Install your cellular booster

Install the cellular booster in a location that is properly ventilated and not exposed to excessive heat, moisture and/or direct sunlight. The optimal area would be on a wall located near a power outlet.

It should be mounted in an easily accessible area so it's easy to perform general maintenance with the coaxial cable connections, dip switch settings and power adaptor.

Make sure all cables and antennas are securely connected before commissioning the system.

3.8 Power up your cellular booster

Once all the Following precautions have been taken, power on the cellular booster.

1. Verify that you have left at least 20 feet of vertical separation space between the indoor and outdoor antennas.
2. Never point the front of the yagi donor (outdoor) antenna towards the inside of the server (outdoor)antenna.
3. Verify that the supplied coaxial cables from both the donor (outdoor) antenna and the server (outdoor)antenna are properly connected to the cellular booster before powering it up.
4. Carefully plug in the supplied power adaptor into the back of the cellular booster where it is marked 'power' and connect the other end to a power outlet.

The LED indicator marked power should light up green.

3.9 Check the Cellular Booster Status

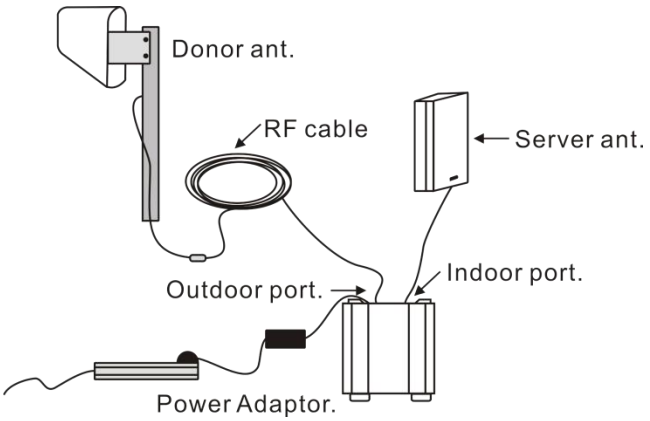
Your cellular booster comes equipped with electronic sensors designed to identify cellular signal overload or oscillation which can hinder signal boosting performance. Your cellular booster is specially designed to automatically decrease gain to compensate for these circumstances. The device also has a feature to automatically shut down in case of excessive oscillation. Improper equipment installation and unusable signal quality can cause oscillation, this is why it is important to fully understand the LED alarm lights on your booster, as they will help you identify and solve any potential issues.

The color of the LED indicates the status of the booster system.

4 UNDERSTAND THE PORTS, MGC DIP SWITCH, LED STATUS

4.1 Repeater ports

1) Outdoor port: connected with the donor antenna by cable.
2) Indoor port: connected with server antenna directly or by cable.
3) DC IN: connected with power supply.



4.2 LED status

1. Status and definition of POWER indicators:

Status	Definition
Green	Normal
Off	DC power problem

2. Status and Definition of ALARM indicators; Alarm LED only works for downlink signals

Status	ALARM
Green	It is working in linearity
	Attention: Input signals may be not enough
Flashing Green	It is working in linearity.
	Attention: Please adjust MGC to increase the attenuation value, till you find the “edge point” (I.E. the Alarm LED shall stay at green color, with intention of turning flashing green), and let the repeater work at this point.
Flashing Red	Repeater shut off
	There are overloading or self-oscillation, strong input signals, measures shall be taken

5 UNDERSTAND THE ANTENNA

5.1 Donor (Outdoor) antenna

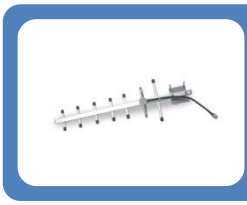
The Yagi Lpda Antenna

The yagi is a very precise directional antenna with a powerful reach. This antenna should be installed in an elevated position and must be pointed towards your carrier's cellular tower.

NOTE:This antenna is not meant to capture signal from multiple carriers.

The Panel Antenna

The panel is a directional antenna with a 120 degree reach and is designed to capture the signal from multiple carrier towers. This antenna should be installed in an elevated position and must be pointed towards your carrier's cellular towers.



Yagi Antenna

The yagi is a very precise directional antenna with a powerful reach. This antenna should be installed in an elevated position and must be pointed towards your carrier's cellular tower.

NOTE: This antenna can only support single band signal booster.

5.2 Server (Indoor) antenna

The Whip Antenna

The whip antenna is an omni-directional antenna with a 360 degree reach. It is designed to distribute the signal from the center of the affected area. Typically it is connected directly to the booster.

The Omni Antenna

The omni antenna is an omni-directional antenna with a 360 degree reach. It is designed to distribute the signal from the center of the affected area. Typically it is installed in a false or dropped ceiling.

The Panel Antenna

The panel is a directional antenna with a 120 degree reach and is designed to distribute the signal from a perimeter wall or ceiling.

5.3 Authorized Kitting Options

Outdoor Default Antenna & Cable Kit Options

1. Kit 9-5050
   Outdoor Yagi 9dbi Antenna & 50’ 5D Coaxial Cable

Indoor Default Antenna & Cable Kit Options

1. Kit 102-5050-50

2 Panel 10dbi Antenna &50' 5D N male & a 50 Ohm 2-Way Splitter

Outdoor Antenna & Cable Kit Options

2. Kit 11-100400
   Yagi 11dbi Antennac& 100' 400 Coaxial Cable
3. Kit 11-7550
   Yagi 11dbi Antenna & 75' 5D Coaxial Cable
4. Kit 11-100500
   Yagi 11dbi Antenna & 100' 5D Coaxial Cable
5. Kit 10-3050
   Panel 10dbi Antenna & 30' 5D Coaxial Cable
6. Kit 10-50400
   Panel 10dbi Antenna & 50' 400 Coaxial Cable
7. Kit 10-5050
   Panel 10dbi Antenna & 50' 5D Coaxial Cable
8. Kit 10-75400
   Panel 10dbi Antenna & 75' 400 Coaxial Cable
9. Kit 10-100400
   Panel 10dbi Antenna & 100' 400 Coaxial Cable
10. Kit 10-7550
    Panel 10dbi Antenna & 75' 5D Coaxial Cable
11. Kit 10-10050
    Panel 10dbi Antenna & 100' 5D Coaxial Cable
12. Kit 9-50400
    Yagi 9dbi Antenna & 50' 400 Coaxial Cable
13. Kit 9-75400
    Yagi 9dbi Antenna & 75' 400 Coaxial Cable
14. Kit 9-100400
    Yagi 9dbi Antenna & 100' 400 Coaxial Cable
15. Kit 9-7550
    Yagi 9dbi Antenna & 75' 5D Coaxial Cable
16. Kit 9-10050
    Yagi 9dbi Antenna & 100' 5D Coaxial Cable
17. Kit 5-30400
    Omni 5dbi Antenna & 30' 400 Coaxial Cable

18. Kit 5-3050
    Omni 5dbi Antenna & 30' 5D Coaxial Cable
19. Kit 5-50400
    Omni 5dbi Antenna & 50' 400 Coaxial Cable
20. Kit 5-5050
    Omni 5dbi Antenna & 50' 5D Coaxial Cable
21. Kit 5-75400
    Omni 5dbi Antenna & 75' 400 Coaxial Cable
22. Kit 5-10400
    Omni 5dbi Antenna & 100' 400 Coaxial Cable
23. Kit 5-7550
    Omni 5dbi Antenna & 75' 5D Coaxial Cable
24. Kit 5-10050
    Omni 5dbi Antenna & 100' 5D Coaxial Cable

Indoor Antenna & Cable Kit Options

2. Kit 52-5050-50
    2 Whip 5dbi Antenna &50' 5D Coaxial Cable & a 50 Ohm 2-Way Splitter
3. Kit 103-7550-50
    3 Panel 10dbi Antenna & 75' 5D Coaxial Cable & a 50Ohm 3-Way Splitter
4. kit 104-7550-50
    4 Panel 10dbi Antenna & 75' 5D Coaxial Cable & three 50 Ohm 2-Way Splitter
5. Kit 3-5050
    Omni 3dBi Antenna & 50' 5D Coaxial Cable
6. Kit 3-7550
    Omni 3dBi Antenna & 75' 5D Coaxial Cable
7. Kit 3-10050
    Omni 3dBi Antenna & 100' 5D Coaxial Cable
8. Kit 3-50400
    Omni 3dBi Antenna & 50' 400 Coaxial Cable
9. Kit 3-75400
    Omni 3dBi Antenna & 75' 400 Coaxial Cable
10. Kit 3-100400
    Omni 3dBi Antenna & 100' 400 Coaxial Cable
11. Kit 32-50400-50
    2 Omni 3dBi Antenna & 50' 400 Coaxial Cable & a 50 Ohm 2-Way Splitter
12. Kit 33-50400-50
    3 Omni 3dBi Antenna & 50' 400 Coaxial Cable & a 50 Ohm 3-Way Splitter
13. Kit 34-50400-50
    4 Omni 3dBi Antenna &50' 400 Coaxial Cable & three 50 Ohm 2-Way Splitter

6 TROUBLESHOOTING

The LED alarm lights represent the status of the booster on each frequency. When the lights are green the device is operating normally meaning that it is not experiencing any oscillation (feedback) and it is boosting the signal at maximum power. When the LED lights begin to change status from green to flashing green to flashing red, it means that particular frequency is experiencing some oscillation (feedback).

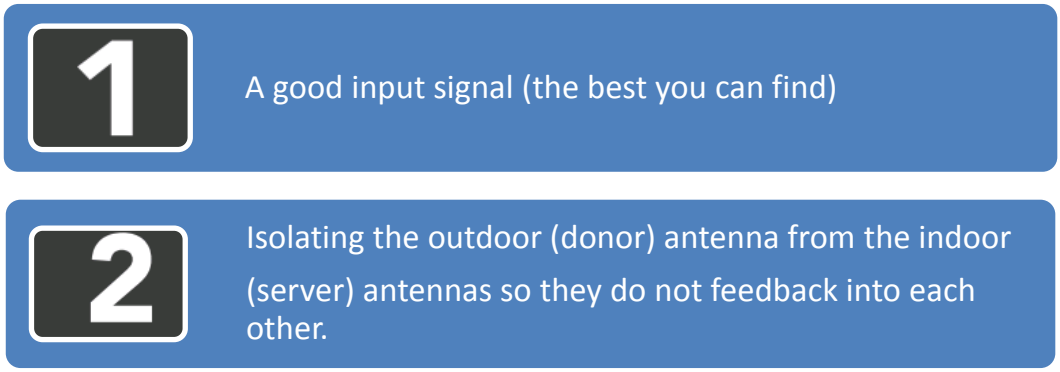
If the oscillation is excessive the booster will shut down for that particular frequency. The booster will still work for the other frequency on a multi-band booster.

Oscillation is caused when the indoor (distribution) antenna sends a signal back into the outdoor (signal) antenna. Similar to a PA system, when the microphone gets too close to the speaker it causes feedback. This will occur if your antennas are too close together, or the indoor antenna is pointed at the outdoor antenna. Make sure you have adequate separation and some type of shielding between the antennas

(Usually your roof or a cement wall is good enough).

IMPORTANT NOTES

The 2 most important things to look for when setting up your system is:



By capturing the best input signal you will be able to enjoy the maximum coverage and best quality signal inside where your Indoor antennas are located. The better the input signal, the better the output signal. In order to find the best input signal, you want to place your outdoor antenna as high as possible with the least amount of obstruction between the antenna and the cellular base tower. A clear line of site is ideal.

Isolating the signal from the antennas is done by ensuring that the antennas are not pointing to each other and by having enough distance or barrier shielding in between them. The signals travel like rays of sunlight, a directional antenna will send the signal in the direction that it is pointing. An omni directional antenna will send the signal in every direction around it. So depending on your equipment it's important to be sure that your Indoor antenna is not sending the signal back into the outdoor antenna.

THINGS TO CHECK WHEN EXPERIENCING WEAK CELLULAR SIGNAL

1. Ensure the outdoor antenna is pointing in the correct direction and is capturing adequate signal for the booster.

2. Check all connections on the cable, antennas, and booster.
3. Check cable for bends and or cuts.
4. All LED lights on the booster should be green.
5. Outdoor antenna and the indoor antennas have adequate separation and are not causing feedback.

7 FREQUENTLY ASKED QUESTIONS

WHY ARE THE LED LIGHTS TURNING FLASHING GREEN, FLASHING RED OR SHUTTING OFF?

There are certain cases where your system could be experiencing oscillation. This can be attributed to either the quality of your input signal or having your outdoor antenna and indoor antenna too close together. Please review the following guidelines to help resolve this issue:

1. Adjust the direction of the outdoor antenna. If the system is receiving a very high input signal, you can point your outdoor antenna away from the cellular tower to reduce the strength of the input signal and therefore, reduce the oscillation. Alternatively if your system is receiving a very poor quality signal (weak and unusable signal), you can point your outdoor antenna more directly towards the cellular tower to increase the strength of the input signal. Sometimes this may require completely repositioning the antenna to a location where you can achieve a line of site to the tower.
2. Increase the separation between the outdoor antenna and the indoor antenna. This can be achieved by increasing the distance between the two

antennas or by placing barriers between them, such as moving the indoor antenna to an adjacent room where there would be an additional wall separating them from the outdoor antenna.

3. Manual Gain Control. Adjust the gain with the manual gain control function using the dip switches on the side of the booster.

8 FCC RF Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. End users must follow the specific operating instruction for satisfying RF exposure compliance. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

9 Warning

Warning: The Outdoor Antennas must be installed no higher than 10 meters above ground.

10 Specification

F15G-CPAL-AB-C

Electrical specification		**Uplink**	**Downlink**
Frequency Range	LTE (A+B)	704~716MHz	734~746MHz
	LTE C	776~787MHz	746~757MHz
	CDMA	824~849MHz	869~894MHz
	PCS	1850~1910MHz	1930~1990MHz
	AWS	1710~1755MHz	2110~2155MHz
Band width	LTE (A+B)	12MHz	
	LTE C	11MHz	
	CDMA	25MHz	
	PCS	60MHz	
	AWS	45MHz	
Max .Gain	LTE (A+B)	≤63dB	
	LTE C	≤64dB	
	CDMA	≤64dB	
	PCS	≤66dB	
	AWS	≤65dB	
Max .Output Power	LTE (A+B)	≤25dBm	≤10dBm
	LTE C	≤25dBm	≤10dBm
	CDMA	≤25dBm	≤10dBm
	PCS	≤23dBm	≤10dBm
	AWS	≤23dBm	≤10dBm
MGC (Step Attenuation)		31dB/1dBstep	
Automatic Level Control		≥ 15dB, auto shut off after 15dB	
Inter-modulation	9KHz~12.75GHz	≤-19dBm	≤-19dBm
Spurious Emission	9KHz~12.75GHz	≤-13dBm	≤-13dBm
LED Alarm		**Standard**	
Power LED		Power Indicator	
ALC LED		Flashing green @ ALC 1~15dB	
		Flashing red @ auto shut off after ALC 15dB	
Mechanical Specifications		**Standard**	
I /O Port		N-Female	
Impedance		50 ohm	
Operating Temperature		10ºC~+55ºC	
Environment Conditions		IP40	
Dimensions		218*165*50	
Weight		≤ 2.5Kg	
Power Supply		Input AC90~264V,output DC12V / 3A	