

# Fantom

2G-3G-4G 5-Band Wireless  
Adjustable Cellular Booster Kit



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CA-VAT User Guide

# INTRODUCTION

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Thank you for your purchase of the Fantom. The Fantom 5-Band adjustable cellular signal booster removes the frustration over dropped calls, limited range and slow data rates by amplifying incoming and outgoing cellular signals in large watercraft. The Fantom enhances 2G, 3G and 4G data reception data for all major US. Carriers.

This guide contains all the information you'll need to get your Fantom booster system up and running. If you need any assistance while installing this product please contact tech support at 1-888-365-6283 or email us at: support@surecall.com.

**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 this device on their network. If you are unsure, contact your provider.**

## How it works

The Fantom is a high-quality bidirectional signal booster that enhances signals to areas that are prone to weak cellular coverage.

Fantom works with two or more antennas:

- up to four inside antennas that communicate with your cellphone.
- an outside antenna that communicates with cellular towers.

Signals sent from a cellular tower are received by the outside antenna, amplified by the booster and then broadcast to your phone via the inside antenna. When your phone transmits, the signal is sent to the inside antenna, amplified and then sent to the cell tower via the outside antenna.

The signal booster requires a minimum cellular signal of low -100 dBm to high -90 dBm. Signal readings usually appear as a negative number. The stronger the signal, the closer it gets to zero. Signals stronger than -50dB may cause the booster to temporarily shut down.

To measure your existing cellular signal on an Apple iPhone, dial \*3001#12345# and press Call. In the top-left corner, your dB number appears instead of bars.

For Android devices, you can download several apps to measure exact signal strength. In your phone's App Store, search for "check signal strength" to find a cell signal measurement app.

## Package Contents:

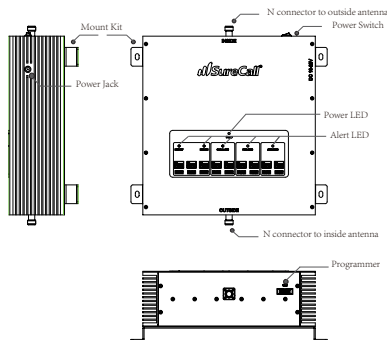
Unpack all package contents, compare them against the package contents list, and check for damage. For missing or damaged items, contact your retailer. Keep the carton and packing material to store the product or if you need to return it.



Package Contents
50 dB adjustable marine booster
20-ft CM240-M marine cable
40-ft CM240-M marine cable
Galaxy 5239 omni marine antenna
248W-M inside panel antenna
110W-M 10-ft inside patch antenna
12V 18-ft DC power supply

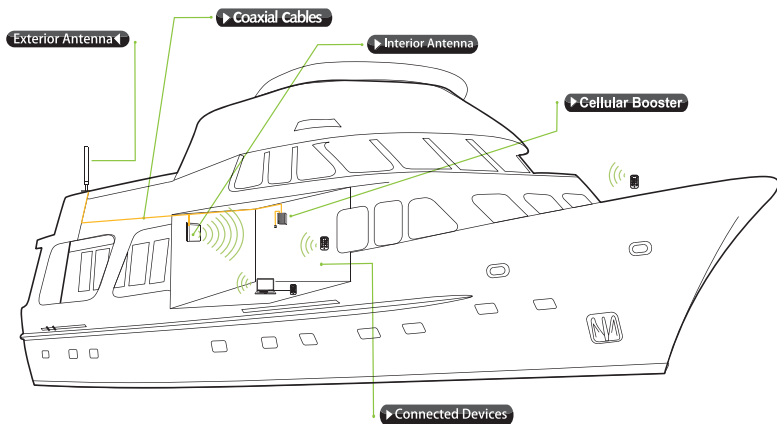
Screws not supplied\* Please purchase separately.

The following image shows the key hardware components on the cellular booster. Refer to this image as you install your Fantom components.



# INSTALLATION

## Quick Install Guide



## Installation

The Fantom booster kit is specially designed for marine applications. It can also be used for other applications with the right antennas, cables and mounting hardware.

### Step 1. Connect the Galaxy 5239 Outside Omni Antenna

The 5239 is a, full-band antenna, ideal for marine use.

#### Option 1 (Recommended)

1. Choose a mounting location that is as high as possible, free from obstructions and as far as possible from other antennas and sources of RF signal.
2. Before mounting base, drill a hole in the middle of the mounting location wide enough in diameter to allow the 40-ft CM240-M cable with FME connector to go through.
3. Hand-tighten the antenna base to the ferrule.
4. Feed cable, N connector end first, through bottom of base and through hollow ferrule.
5. Hand-tighten N connector to outside antenna and antenna to ferrule.
6. Feed cable, FME end first through the drilled hole.
7. Mount base (screws not provided) and hand tighten ferrule to mount base.

## Installation Steps

The Fantom booster kit is specially designed for installation on watercraft. Can be used in other applications with appropriate mounting hardware.

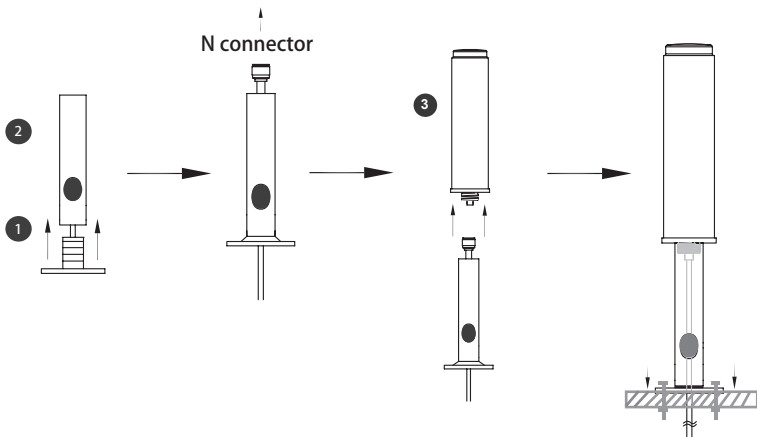
### Step 1. Connect the Galaxy 5239 Outside Antenna

The Galaxy 5239 is a full-band antenna, built specifically for marine use, it is weather resistant.

## Galaxy 5239 - Installation Instruction

### OPTION 1 ( Recommended )

1. Choose a mounting location that is as high as feasible, as free as possible from obstructions, and as far as possible from other antennas and strong sources of RF signal.
2. Before mounting base, drill a hole in the middle of the mounting location wide enough in diameter to allow CM240-M cable with FME connector to go through.
3. Hand tighten the antenna base to the ferrule.
4. Feed cable, N connector end first, through bottom of base and through hollow ferrule.
5. Hand tighten N connector to outside antenna and antenna to ferrule.
6. Feed cable, FME end first through the drilled hole.
7. Mount base (screws not provided) and hand tighten ferrule to mount base.



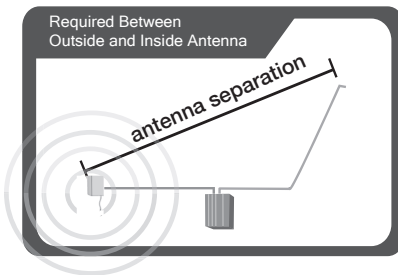
## Step 2. Using the CM240-M

Use the CM240-M cable FME connector to connect the outside antenna to the boost connector marked OUTSIDE (see page 3).

Make sure to not coil additional coax cable that might be left over from installation. Hand tighten the connection.

**Before installing Indoor Antenna check the table below for optimum coverage.**

Adjust dB Gain according to table below if you cannot achieve maximum separation.



- 50dB 8-10 ft. separation
- 47dB 5-7 ft. separation
- 44dB 3-4 ft. separation
- 40dB 1-2 ft. separation

Note: As you can see from the table above, acquiring the recommended inside and outside antenna separation optimizes coverage significantly. Panel antenna can be vertically installed 6 ft. under outside antenna with the booster at full dB gain. Inside panel antenna should face away from outside antenna. If panel antenna faces outside antenna, the booster will oscillate and go into Auto Shutdown.

## Step 3. Connect the Interior Antenna

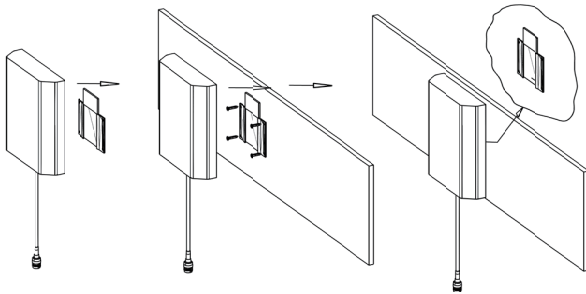
### Option 1: Standard Wireless Usage (Recommended)

The supplied 248W-M full-band antenna is a compact directional antenna designed to cover 2G, 3G, 4G and WLAN systems for Cellular, PCS, AWS and LTE frequencies. It's a high-gain indoor antenna suited for places where the signal needs to be broadcast over a wide area. This interior antenna transmits and receives signals to cell phones.

1. Choose location for mounting antenna on vertical surface. Ideal height from the cabin floor (should be approximate height of cell phone users).

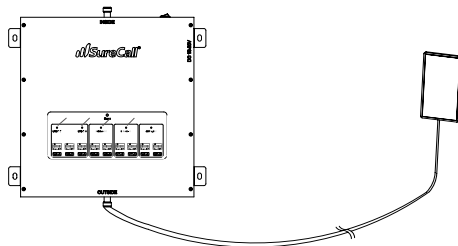
2. Using supplied plate, mark position of desired placement with a pencil or marker.
3. Screw (not supplied) mounting plate into place with the slide panel protruding towards you. Provided plastic anchors are only to be used for sheetrock installation.
4. Slide antenna securely onto mounting plate.
5. Use the additional 20-ft CM240-M cable to connect the antenna to the booster connector labeled (INSIDE).

Note: Be sure to provide enough separation from outside antenna (see table on page 6. Panel antenna should not face the outside antenna.



### Option 2 : Low Profile Usage

1. The supplied 248W-M patch antenna is intended for indoor use only. Do not mount on a surface within 4" of metal.
2. Screw the patch antenna cable to the booster connector labeled (INSIDE).



Note: Laboratory tests show that patch antennas can work from as close as 2 feet from outside antennas if the patch antenna is facing away from the outside antenna. If the booster shows oscillation (red light blinking), turn it down in 3 dB increments on the dial of oscillating band until the light stops blinking.

## Step 4. Install the Signal Booster

1. Select a location close to a working AC outlet. Do not expose the signal booster to excessive heat, direct sunlight, moisture, and airtight enclosures.
2. If you'd like to mount the booster to a wall, mark location of screw tabs on the wall in the desired location
3. Use supplied screws or appropriate screws for surface of mounting location and drill through screw tab holes on booster.
4. Ensure that the outside antenna cable is connected to the signal booster connector marked OUTSIDE. Hand-tighten the connection.
5. Ensure that the inside antenna cable is connected to the signal booster connector marked INSIDE. Hand-tighten the connection.
6. Connect the AC power cord to the signal booster.
7. Connect the plug on the other end of the 110V AC power outlet.
8. Turn the booster's power switch on.
  - The signal booster turns on automatically
  - The Power LED lights up green to show that the signal booster is ready to use.
  - The Alert LEDs flash red and yellow intermittently on each band, indicating that the band is activated.

Note: If the Power LED does not turn ON or the Alert LEDs continue to flash, see Troubleshooting on page 12-13. This booster is rated for 19V AV input voltage. DO NOT use the booster with a higher voltage power supply. This can damage the booster and/or cause personal injury and void your warranty.

Note: While the watercraft is in port, the alert light may light up red. This means that the signal coming into the booster is too strong and it may cause the booster to shut down. As you move out to sea this will no longer be a problem.

## DIP Switches and Lights

The Phantom booster has the following indicators and controls:

- PCS Uplink Warning light DIP switches. These DIP switches control the PCS communications with the cellular tower.
- PCS Downlink Warning light DIP switches. These DIP switches control the PCS amplification within the building.
- Power Light: This light should be illuminated or blinking green at all times while the booster's power is on.
- Cellular Uplink Warning light DIP switches. These DIP switches control the cellular communications with the cellular tower.
- Cellular Downlink Warning light DIP switches. These DIP switches control the cellular amplification within the building.

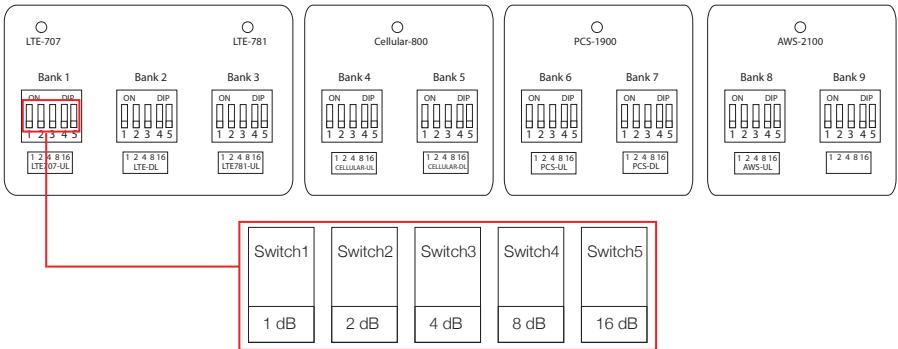


## Step 5. Configure Gain Settings

Facing the front of your booster, find 9 banks of Dual In-line Package (DIP) switches. These switches allow manual dB gain attenuation for uplink and downlink channels.

- Bank 1 controls AT&T communications with the cellular tower.
- Bank 2 controls Verizon and AT&T amplification in the building.
- Bank 3 controls Verizon communications with the cellular tower.
- Bank 4 controls Cellular communications with the cellular tower.
- Bank 5 controls Cellular amplification in the building.
- Bank 6 controls PCS amplification with the cellular tower.
- Bank 7 controls PCS amplification in the building.
- Bank 8 controls T-Mobile communications with the cellular tower.
- Bank 9 controls T-Mobile amplification in the building.

The DIP switches in each bank correspond to the following dB gain values:



For maximum gain on all channels, your booster ships with all DIP switches turned OFF. This setting should always be your starting point when installing or reinstalling the booster. To change it, move the DIP switches to the ON or OFF position.

- Moving a switch down (away from the LEDs) turns OFF the switch and increases booster gain for the selected channel.
- Moving a switch up (toward the LEDs) turns ON the switch and decreases booster gain for the selected channel.

Switch settings are cumulative. This means the total amount of attenuation for a channel equals the combined dB of all DIP switches in the same bank being set to ON.

**WARNING:** Do not adjust the uplink and downlink dB attenuation more than 20 dB. This could cause the booster to shut down.

To Achieve...	Set the DIP Switchs in the Same Bank as Follows...				
	SW1 (1 dB)	SW2 (2 dB)	SW3 (4 dB)	SW4 (8 dB)	SW5 (16 dB)
0 DB	OFF	OFF	OFF	OFF	OFF
1 DB	ON	OFF	OFF	OFF	OFF
3 DB	ON	ON	OFF	OFF	OFF
7 DB	ON	ON	ON	OFF	OFF
15 DB	ON	ON	ON	ON	OFF
21 DB	ON	OFF	ON	OFF	ON
31 DB	ON	ON	ON	ON	ON

**Note:** As you see from the table above, attaining the recommended indoor and outdoor antenna separation optimizes coverage significantly. Any reduced antenna separation decreases the booster's cellular signal capabilities.

## LEDs

A Light-Emitting Diode (LED) appears above each DIP switch bank on the top panel of the signal booster.

LED	Designation	Description
1	LTE 707 Uplink	OFF = normal operation. ON = LTE AT&T uplink warning. Power off booster immediately.
2	LTE 781 Uplink	OFF = normal operation. ON = LTE Verizon uplink warning. Power off booster immediately.
3	Cellular 800 Uplink	OFF = normal operation. ON = Cellular uplink warning. Power off booster immediately.
4	PCS 1900 Uplink	OFF = normal operation. ON = PCS downlink warning. Power off booster immediately.

LED	Designation	Description
5	AWS 2100 Uplink	OFF = normal operation. ON = AWS uplink warning. Power off booster immediately.
6	Power	Green ON or blink = booster receiving power. OFF = booster not receiving power Red ON = oscillation has occurred for longer than 15 minutes and the booster is shutting down

### Automatic Shutdown

SureCall boosters that have automatic shutdown work in the following way:

1. The cellular side (LEDs 4 and 5) is usually the first side to experience oscillation. When oscillation is detected in the uplink and/or downlink, the appropriate red Warning LEDs flash and Power (LED 3) turns red.
2. If oscillation occurs on the PCS side, LEDs 1 and/or 2 blink as appropriate and Power (LED 3) turns red due to cellular oscillation.
3. If the problem is not resolved, the affected side shuts down after 30 seconds. In general, the cellular side oscillates more easily than the PCS side.
4. The booster wakes up and Power (LED 3) turns green. If oscillation resumes, the LEDs flash as described previously. These 30-second cycles continue for 15 minutes or until the problem is resolved.
5. If the problem is not resolved within 15 minutes, the booster shuts down automatically (all LEDs OFF except Power, which is red) and must be reset by unplugging the booster from the power supply and plugging it back in.
6. To resolve oscillation, increase antenna separation and/or the attenuation.

### If you Want to Improve Coverage

- Find a location that receives a stronger signal and relocate the outside antenna to that location.
- Increase the distance between the outside and inside antennas.

Be sure your signal booster's dB gain is turned up to maximum gain on each dial (see page 9).

Problem	Resolution
Signal booster has no power	Verify that the booster switch is turned on. Connect the power supply to an alternate power source. Be sure the AC outlet is working and is not controlled by a wall switch that can cut power to the outlet. If the green <b>POWER LED</b> on the signal booster is OFF, return the power supply to SureCall. Contact tech support at 1-888- 365-6283 or <a href="mailto:support@surecall.com">support@surecall.com</a> , or go to <a href="http://www.surecall.com">www.surecall.com</a> and log on to online support to receive a Return Merchandise Authorization (RMA).
After installing your signal booster system, you have no signal or reception.	Check the strength of the outside signal as close as you can to the outside antenna. (see instructions on page 7) Double-check all signal booster and antenna cable connections. Be sure your signal booster's dB gain is turned up to full power on each dial. (see page 14)
Yellow Flashing LED	Automatic Gain Control (AGC) is adjusting, part of normal operation.
Red Flashing LED	Signal coming into booster from cellular tower is too strong causing the booster to automatically shut down. There are two possible solutions: 1. Add an inline attenuator to the cable coming into the booster 2. Relocate the outdoor antenna to a location where the signal is weaker.
Your signal booster restarted and shut down for 15 minutes, and is now shut down permanently.	Each SureCall signal booster is equipped with Auto Shutdown to prevent cell tower interference. The outside antenna may be close to a cell tower. Move the outside antenna to a location that provides sufficient distance from the cell tower to prevent the signal booster from automatically enabling Auto Shutdown. Once away from the original location, perform the procedure under step 3 on page 10
Solid Red LED	Band is off
The Power LED does not turn ON	Be sure the AC outlet is working and is not controlled by a wall switch that can cut power to the outlet.

<b>Problem</b>	<b>Resolution</b>
Solid Yellow LED	Indicates an inactive band. Light is off while band is active.
Yellow/Red Flashing LED	Oscillation is detected. First try increasing the separation between the indoor and outdoor antennas. If this doesn't eliminate oscillation, lower the dB gain in 5dB increments.
Your signal booster has no power.	Verify that the switch on the power supply is turned on and red LED is ON. Connect the power supply to an alternate power source. Be sure the power source is not controlled by a switch that can remove power from the outlet. Check the green POWER LED on the signal booster. If it is OFF, return the power supply to SureCall. Contact tech support at <a href="tel:1-888-365-6283">1-888-365-6283</a> or <a href="mailto:support@surecall.com">support@surecall.com</a> , or go to <a href="http://www.surecall.com">www.surecall.com</a> and log on to online support to receive an RMA.

<b>Product Name</b>	<b>Fantom</b>
Uplink Frequency Range (MHz):	698-716 / 776 – 787 / 824-849 1850-1910 / 1710-1755
Downlink Frequency Range (MHz):	728-746 / 746 – 757 / 869-894 1930-1990 / 2110-2155
Input Impedance:	50 Ω
Maximum Gain:	50dB
Noise Figure:	8 dB
VSWR:	≤2.0
Supported Standards:	CDMA, WCDMA, GSM, EDGE, HSPA+, EVDO, LTE and all cellular standards
AC Input:	Input AC110V, 60 Hz; Output DC 19 V
Maximum Output Power:	1 Watt EIRP
Cable:	CM240-M marine cable
RF Connectors:	N Female (both ends )
Power Consumption:	<50W
Operation Temperature:	-4°F to +158°F
Dimensions:	11.3" x 10.9" x 2.5"
Weight:	16.5 lbs
FCC (USA):	RSNFORCE-550

## Marine Kitting

Component	Product Number/ Description	Gain/Loss				
		LTE-A	LTE-V	800 MHz	1900 MHz	1700 MHz/2100 MHz
Outdoor Antenna*	SC-288W or 5239	3dBi	3dBi	3dBi	4dBi	4dBi/4dBi
Outdoor Cable	SC-240-40FN 40 Feet	3.52dB	3.52dB	3.98dB	6.52dB	6.12dB/6.92dB
Indoor Antenna	SC-248W-M	7dBi	7dBi	7dBi	10dBi	10dBi/10dBi
Inside Cable	SC-240-20FN 20 Feet	2.06dB	2.06dB	2.06dB	3.56dB	3.36dBi/3.76dB

\*All equivalent antennas and cables are suitable for use with the Fantom booster.

Warning: Unauthorized antennas, cables, and/or coupling devices are prohibited by current FCC regulations. Please contact FCC for details.

### Three-Year Product Warranty

SureCall warrants its products for three years from the date of purchase against defects in workmanship and/or materials. Specifications are subject to change. The three-year warranty only applies to products meeting the latest FCC Certification Guidelines stated on 2/20/2013 and going into effect April 30, 2014. A two-year warranty applies to any products manufactured before May 1, 2014.

Products returned by customers must be in their original, un-modified condition, shipped in the original or protective packaging with proof-of-purchase documentation enclosed, and a Return Merchandise Authorization (RMA) number printed clearly on the outside of the shipping container.

Buyers may obtain an RMA number for warranty returns by calling the SureCall Return Department toll-free at 1-888-365-6283. Any returns received by SureCall without an RMA number clearly printed on the outside of the shipping container will be returned to sender. In order to receive full credit for signal boosters, all accessories originally included in the signal booster box must be returned with the signal booster. (The Buyer does not need to include accessories sold in addition to the signal booster, such as antennas or cables.)

This warranty does not apply to any product determined by SureCall to have been subjected to misuse, abuse, neglect, or mishandling that alters or damages the product's physical or electronic properties.

SureCall warrants to the Buyer that each of its products, when shipped, will be free from defects in material and workmanship, and will perform in full accordance with applicable specifications. The limit of liability under this warranty is, at SureCall's option, to repair or replace any product or part thereof which was purchased up to **THREE YEARS after May 1, 2014 or TWO YEARS for products purchased before May 1, 2014**, as determined by examination by SureCall, prove defective in material and/or workmanship. Warranty returns must first be authorized in writing by SureCall. Disassembly of any SureCall product by anyone other than an authorized representative of SureCall voids this warranty in its entirety. SureCall reserves the right to make changes in any of its products without incurring any obligation to make the same changes on previously delivered products.

As a condition to the warranties provided for herein, the Buyer will prepay the shipping charges for all products returned to SureCall for repair, and SureCall will pay the return shipping with the exception of products returned from outside the United States, in which case the Buyer will pay the shipping charges.

The Buyer will pay the cost of inspecting and testing any goods returned under the warranty or otherwise, which are found to meet the applicable specifications or which are not defective or not covered by this warranty.

Products sold by SureCall shall not be considered defective or non-conforming to the Buyer's order if they satisfactorily fulfill the performance requirements that were published in the product specification literature, or in accordance with samples provided by SureCall. This warranty shall not apply to any products or parts thereof which have been subject to accident, negligence, alteration, abuse, or misuse. SureCall makes no warranty whatsoever in respect to accessories or parts not supplied by it.

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## Limitations of Warranty, Damages and Liability:

EXCEPT AS EXPRESSLY SET FORTH HEREIN, THERE ARE NO WARRANTIES, CONDITIONS, GUARANTEES, OR REPRESENTATIONS AS TO MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR OTHER WARRANTIES, CONDITIONS, GUARANTEES, OR REPRESENTATIONS, WHETHER EXPRESSED OR IMPLIED, IN LAW OR IN FACT, ORAL OR IN WRITING.

SURECALL AGGREGATE LIABILITY IN DAMAGES OR OTHERWISE SHALL NOT EXCEED THE PAYMENT, IF ANY, RECEIVED BY CELLPHONE-MATE, INC. FOR THE UNIT OF PRODUCT OR SERVICE FURNISHED OR TO BE FURNISHED, AS THE CASE MAY BE, WHICH IS THE SUBJECT OF CLAIM OR DISPUTE. IN NO EVENT SHALL SURECALL BE LIABLE FOR INCIDENTAL, CONSEQUENTIAL, OR SPECIAL DAMAGES, HOWSOEVER CAUSED.

All matters regarding this warranty shall be interpreted in accordance with the laws of the State of California, and any controversy that cannot be settled directly shall be settled by arbitration in California in accordance with the rules then prevailing of the American Arbitration Association, and judgment upon the award rendered may be entered in any court having jurisdiction thereof. If one or more provisions provided herein are held to be invalid or unenforceable under applicable law, then such provision shall be ineffective and excluded to the extent of such invalidity or unenforceability without affecting in any way the remaining provisions hereof.

**WARNING: E911 location information may not be provided or may be inaccurate for calls served BY USING THIS DEVICE.**

48346 Milmont Drive  
Fremont, California 94538  
USA  
888.365.6283  
Fax: 510.996.7250  
[www.surecall.com](http://www.surecall.com)

SureCall has made a good faith effort to ensure the accuracy of the information in this document and disclaims the implied warranties of merchantability and fitness for a particular purpose and makes no express warranties, except as may be stated in its written agreement with and for its customers. SureCall shall not be held liable to anyone for any indirect, special or consequential damages due to omissions or errors. The information and specifications in this document are subject to change without notice. © 2014. All Rights Reserved. All trademarks and registered trademarks are the property of their respective owners.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

## Safety Information

The Federal Communications Commission (FCC) has tested this product and found it to comply with their RF Exposure Requirements, pursuant to FCC Part 22 and 24.

To comply with the FCC RF exposure requirement, keep the human user's body at least 8" (20cm) from the indoor antenna of the booster. Don't expose this product to extreme low or high temperature (-4°F or -20°C and 150°F or 70°C).

There are no consumer serviceable or modifiable parts inside this booster product. Alteration or abuse of the booster other components will void this product's warranty, and could be dangerous to the user.

**FCC 27.50(d)(4) Statement:** Fixed, mobile and portable (hand-held) stations operating in the 1720-1755 MHz band are limited 1 Watt EIRP. Fixed stations operating in this band are limited to a maximum antenna height of 10 meters above ground. Mobile and portable stations operating in this band must employ a means for limiting power to the minimum necessary for successful communications.

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.

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 any person. You **MUST** cease operating this device immediately if requested by the FCC or a licensed wireless service provider.

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