HiBOOST

We Improve Your Mobile Signals

User's Manual

(F27/F23/F20-5S)

MADE IN HUAPTEC

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How it works

F27/F23/F20-5S are designed to help mobile users amplify weak signals of 2G, 3G and 4G. They are bi-directional amplifiers.

The donor antenna receives the signals from the cell tower, amplifies it, and transmits to the signal booster. Then the indoor antenna will receive the signal and retransmit it to your mobile device.

The signals produced by your phone are also amplified by the indoor antenna via the booster and donor antenna.

Package contents

No.	Name	Description	Quantity
1	Hiboost Industrial Booster		1
2	Adapter	12V/7A	1
3	Plastic Expansion bolt	Φ8	5
4	Tapping Screw	M6*50	4
5	User Manual		1

F27/F23/F20-5S booster Power supply12V/7A

*Outdoor and indoor antennas and cables are required for installation (purchased separately).

RF cables Wide Band Yagi antenna Indoor panel antenna

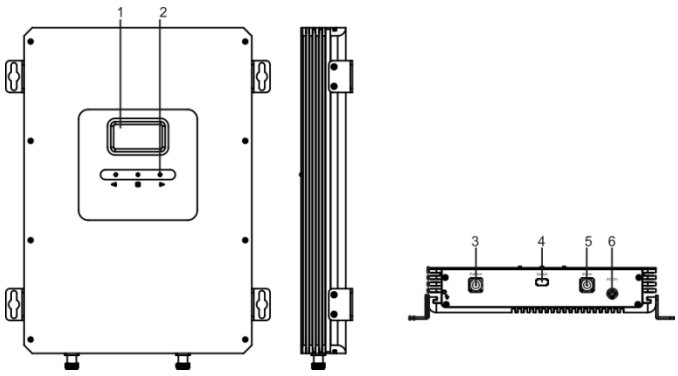
Omini ceiling antenna Outdoor ceiling mount dome antenna Whip

Features

- Embedded CPU, self-adaptive intelligent system to make booster system very easy to install and better performance is guaranteed under complex and constantly changing RF environment.
- ISO: Intelligent isolation processing to avoid self-oscillation, quite wide adjusting range to stabilize the signal strength/quality for clearer voice/ higher data speed and avoid interference to mobile network
- ALC: Intelligent ALC, quite wide adjusting range to improve the signal quality for clearer voice and higher data speed
- LCD Display: to display ISO status, ALC status, actual gain and downlink output power that make booster installation and troubleshooting much easier
- MGC: control button to adjust the gain for both uplink and downlink independently, 31dB range
- Excellent RF performance, larger coverage area, clearer voice and higher speed data services.
- Elegant design, small size, very low power consumption to save cost during operation and low heat dissipation.

Booster's port description

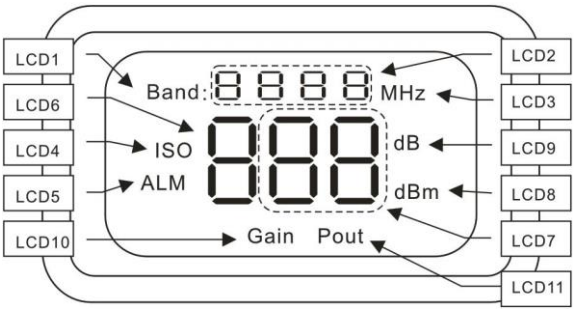
The following image shows the key components of the booster. There are 3 parts: First part is LCD indicator, which will show the booster status. Second part is control button. Third part is connectors to the outdoor antenna and indoor antenna. The following tables and graphs show the details.



1. LCD 2. Control Button 3. Outdoor antenna port

4. Debug Port 5. Indoor antenna port 6. Power connector

LCD Introduce



LCD1/LCD2/LCD3: Display area of working frequency.
After power on the repeater, LCD1 and LCD3 will light all the time, LCD2 will display the working frequency in turn, the following is the display content corresponding to frequency.

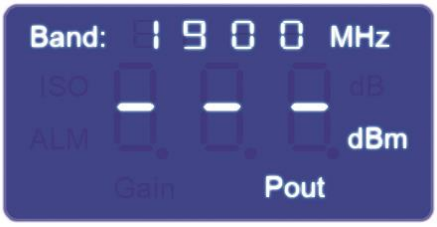
Frequency	Content of LCD2 display
LTE(A+B)	700
LTE(C)	700
CDMA800&GSM850	850 (or 800)
PCS1900	1900
AWS2100	2100 (or 1700)

LCD4: "ISO" Isolation alarm indication.
When the repeater doesn't have enough isolation between the outdoor and indoor antennas, the "ISO" is flashing. Vice Versa, the "ISO" is off.

LCD5: "ALC" Over power alarm indication.
When the repeater's input power is too strong, leading to the output power severe over rated, the "ALC" is flashing. Vice Versa, the "ALC" is off.

LCD6: Uplink, Downlink or "-" indication.
Uplink display "u", downlink display "d", minus display "-".
LCD7: Gain or Power indication.

The displayed value represents the real-time gain and power.

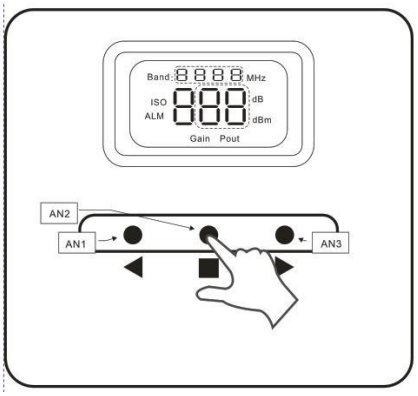


When the repeater's output power is lower than -10dBm, the LCD6 and LCD7 will display "---".

When the repeater is in the stat of LCD screen "Off", if the repeater breaks down, the LCD screen will be flashing.

When the repeater is in the state of LCD screen "ON", if the repeater breaks down, under the current band, the LCD6 and LCD7 will display "OFF".

Control Button operation



There are 4 operation modes: long press "AN2", short press "AN2", short press "AN1" and short press "An3".When the LCD is in the rotation display mode:

- Short press "AN2" will stop the rotation display mode, the LCD will stay on the display of frequency, gain or power.
- Short press"AN2"again, the LCD display will start up the rotation display mode.
- Long press "AN2", the LCD display will start up the setting mode.
- Short press"AN1"and "AN3", the LCD display will start up the page turning query mode.

When the LCD is in page turning query mode:

- Short press "AN2", the LCD will start up the rotation display mode..
- Long press "AN2", the LCD display will start up the setting mode.
- Short press"AN1"and "AN3", the LCD display will switch the frequency, gain or power manually.

Manual gain control (MGC)

The boosters have quite intelligent software system, so MGC attenuation is not needed. Unless you feel uncomfortable about ISO or ALC flashing, or in some extreme cases you might need to attenuate them for special purpose.

When the LCD is in the circulation display or page turning query mode, long press "AN2" into the setting mode.

Short press "AN2" to choose operation objects: frequency, uplink/downlink or gain .

- When choose the frequency, short press

"AN1", the frequency switches to lower frequency, short press"AN3",the frequency switches to higher frequency.

• When choose the uplink/downlink , short press "AN1"or "AN3", switch to uplink or downlink.

• When choose the gain, short press "AN1" once, the gain is reduced 1dB, short press"AN3"once, the gain is added 1dB.

Note:

In case you need to adjust gain, please ensure uplink gain to be equal with or to be 5dB less than downlink gain, uplink gain shouldn't be more than downlink gain in order to avoid interference with mobile network.

Install Hiboost Booster system

Before you install

• Make sure you have sufficient cable length between proposed outdoor/indoor antennas and the booster in case you don't purchase standard kits

• Make sure the position where you install the booster is near to one existing electrical outlet, well ventilated, away from excessive heat, moisture, and direct sunlight.

Install tools and accessories:

No.	Name	Specification	Quantity	Remark
1	Plastic expansion bolt	Φ8	5	Standard accessories
2	Tapping screw	M6*50	4	Standard accessories
3	Hanging folder		1	Standard accessories
4	Reciprocating drill		1	Engineering-owned
5	Shot bit	Ø8	1	Engineering-owned

Installation overview

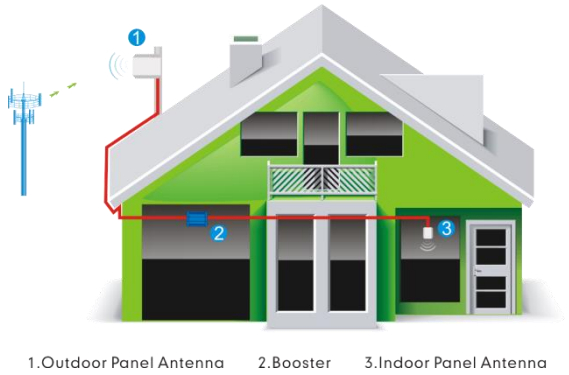
The booster has LCD display and intelligent self-adaptive system, LCD displays real time working state, and intelligent self-adaptive system can automatically calculate and adjust the booster to obtain its best performance, so it is very easy to install for end-user.

General installation steps:

Step1. Install your outdoor antenna on the roof where there is the strongest signal.

Step2. Install the indoor antenna where you want to improve the signal.

Step3. Mount your signal booster, connect the cables to the signal booster from the outdoor antenna and indoor antenna at the designated ports, and connect the booster to the AC supply (make sure all the cables are connected).



1. Outdoor Antenna 2. Booster 3. Indoor Antenna

1. Install Outdoor Antenna

1.1 How to find the position with the strongest receiving signal

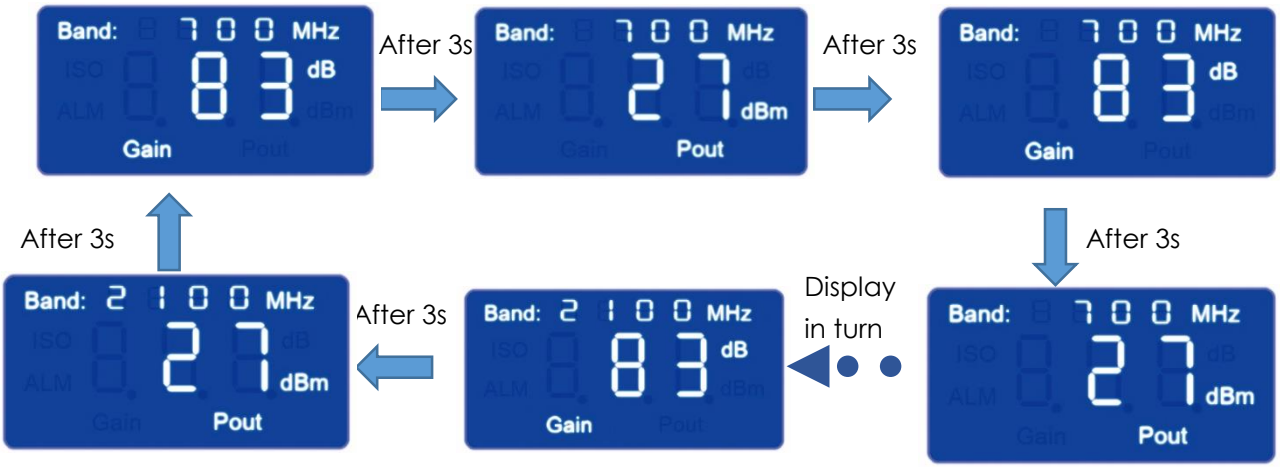
The booster's main function is to improve weak RF signal of an area. The receiving signal strength from the outdoor antenna directly affects the efficiency of indoor coverage.

There are two methods to find strongest receiving signal. One is to use booster's LCD display to find the strongest, the other is to use mobile phone to test signal bars, we highly recommend you to use the booster LCD display if you purchase our LCD boosters.

- The booster has LCD signal display, which is very convenient to find strongest signal. Connect the outdoor antenna to the booster's outdoor port by using the original coaxial cable that is to be used between outdoor antenna and the booster, power on the booster, adjust outdoor antenna's direction near the window or on the top of the building(The outdoor antenna should point to the tower for better signal strength or quality), the booster LCD can display the

booster output power;

The booster's LCD display shows the gain and the output power one by one every 3 seconds, and circulate all the time, the output power can be checked when a "dBm" value and "Pout" display on LCD with its relevant system. Please check below:



You can long press the control button"AN2" for 3s, so that the LCD will enter to the page turning query mode ,then click "AN1" or "AN3" make the LCD stay in the output power interface.

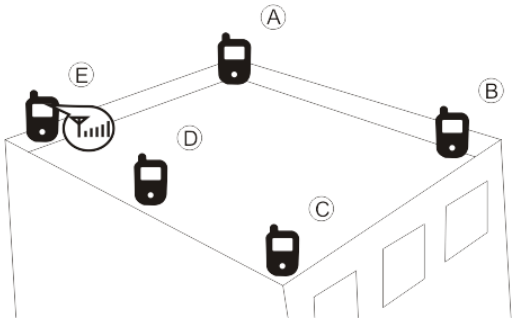
The outdoor antenna receives the strongest signal when the booster's output power reaches its full output power, please install the outdoor antenna in this position.

Remark: when ALC shows up and is flashing, it means the receiving power is stronger than suitable, it is recommended to adjust outdoor antenna to get a full output power and to ensure ALC is not flashing. Or in case you don't want to do anything, just please leave as it is since the booster will adjust itself. But when ALC

flashes, and the observed gain is more than 30dB less than rated gain value, please do adjust outdoor antenna to decrease the receiving power.

- In case you purchase a booster without display, please use telephone to test signal near the window or on the top of the building. Normally the roof of the building is a good choice. As shown from the above graph, you need test the signal from A to E, and select a place with best signal strength for installation.

It is recommended to use app over smart phone that can display signal level, since it is more accurate than checking the signal bars. The outdoor antenna should point to the tower for better signal strength or quality.



More Tips: Please try to pick up signal from cell towers that are not busy, which can be judged by people density served by the towers. For example, please try to avoid a cell tower near a super market where there are many people. This will help on successful phone call connections or higher speed data services

1.2 Install Outdoor Antenna

In most cases, the panel antenna is the best choice. You can also choose wide band YAGI antenna as an option.

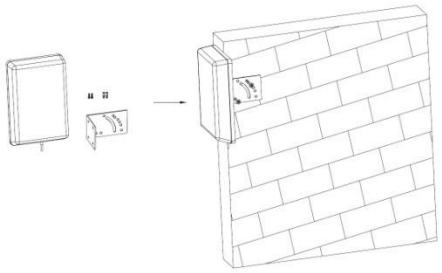
There are 2 types of installation: wall mount or pole mount.

Install outdoor panel antenna onto the wall for your reference:

Step1: Unscrew antenna from L-mounting bracket on antenna base with wrench.

Step2: Mount vertical plate of the L-bracket on the wall with supplied screws.

Step3: Screw antenna back onto horizontal plate.



Notes:

• Wrap waterproof tape around the connectors between outdoor antenna and feeder line to avoid water or other kinds of damage.

2. Install Indoor Antenna

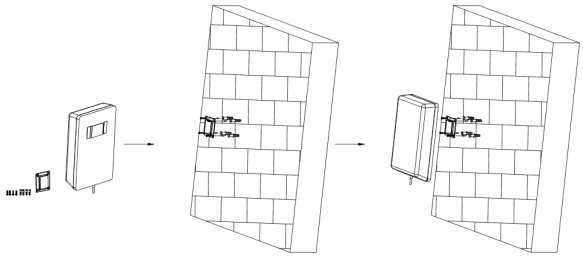
According to the requirement of practical application, please select Indoor panel antenna, or Omni-ceiling antenna as indoor antenna for coverage

Install indoor panel as reference.

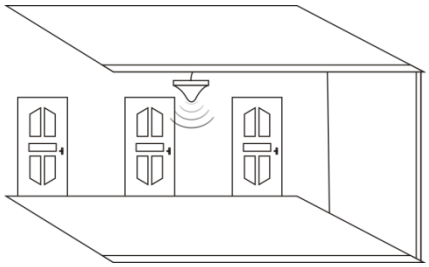
Step1: Select a place on a wall projecting the area where you want reception. Normally, to provide an overall coverage, you will need to choose a corner.

Step2: Mount the bracket on the wall after drilling the screw to the wall.

Step3: Put the panel antenna on the bracket.



When you choose Indoor ceiling omni antenna or whip antenna, the best place to install it is the center of your house as the graph shows.



3. Install the signal booster

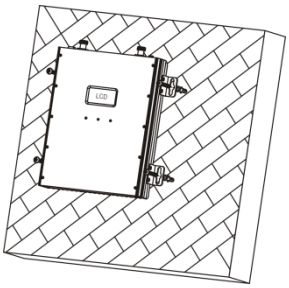
Step1: Select an indoor location near to a power outlet on a wall.

Step2: Mount the booster with the screws included as shown in the figure.

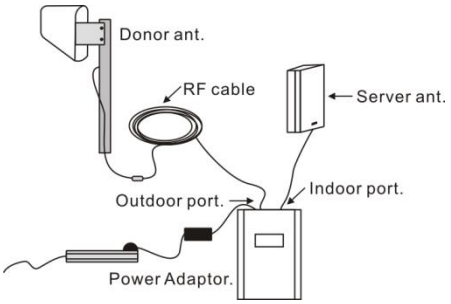
Step3: Connect the outdoor antenna cables to booster connector marked "outdoor". Tighten the connection with hand or wrench.

Step4: Connect the indoor antenna cables to booster connector marked "indoor". Tighten the connection with hand or wrench.

Step5: Connect the AC power cord to the signal booster, and then connect the plug to the electrical outlet to power on the booster



Booster installation



Connection from cable to booster

4. Booster Commissioning

Overview: The booster has quite intelligent startup system, booster commissioning is an automatic process to guarantee its optimal performance.

After finishing the booster system installation, please power on the booster, the booster starts its initialization to check it is receiving signal, the isolation status to ensure its best performance. This will take around 3~5 seconds.

After the booster start up, please check whether the coverage is good. If it is good, the booster system is completed.

You can check the output power displayed in LCD. It may vary at 1~3dB difference which is normal due to outdoor signal conditions. It would be perfect that the output power reaches its rated one for largest coverage; but you can always leave it even though it doesn't as long as the coverage is good enough for

you.

In case the coverage is not enough, please take below measures as per below conditions.

1. The rated output power is reached, but the coverage is not enough or the signal in specific areas has not been improved

- Check whether the indoor antenna is installed correctly or not, you may try to move the antenna location to improve coverage.
- Check if it is necessary to adjust the direction of the indoor antenna.
- Check whether it is necessary to add more indoor antennas since barriers block the signal penetration

2. The rated output power is not reached.

1) Please adjust the outdoor antenna to get a stronger receiving signal in order to get higher output power (not necessarily to reach rated value as long as the coverage is enough)

2) please observe the LCD display, if the reading gain is less than rated value and "ISO" is flashing, it means the gain is reduced by **ISO function** for not having enough isolation.

Measures: One of below actions are recommended to eliminate ISO problems and increase the gain

- Adjust the antenna's directions or locations, or enlarge the distance between them.
- Enlarge the vertical or horizontal distance between donor antenna and server antenna.
- Use the barrier, such as walls, to increase the isolation.
- Change server antenna(server antenna can be changed to other antenna type which has better directional antenna pattern, also you can let server antenna and donor antenna point opposite direction).
- Reduce the booster's downlink gain by the control button. Keep the uplink attenuation value and downlink attenuation value same then restart the booster.

More about "ISO" indication

ISO status indicates if the booster has enough isolation between outdoor and indoor antennas in order to avoid loop back or so-called self-oscillation. This is an intelligent system that works automatically to ensure the booster has no interference to either call/data services, or mobile networks. "ISO" flashes in

LCD display when ISO function works; the flashing status shows ISO is working, and the self-oscillation has been eliminated.

LED	Status	Meaning	Solve methods
ISO status	Remain still	No loop back or no self-oscillation	NO action is needed
	Flashing but actual gain is not more than 30dB less than rated gain	Slight loop back or self-oscillation	NO action is needed
	Flashing but actual gain is more than 30dB less than rated gain	Deep loop back or self-oscillation	Working properly, but deep loop, below actions are recommended: ● Adjust the antennas' directions or locations to enlarge the distance. ● Add the vertical or horizontal distance between outdoor and indoor antennas. ● Use the barrier like walls to increase the isolation. ● Reduce the booster's gain by external attenuator or replace with lower gain antenna if the above methods don't work.

More about "AGC" indication: Flashing ALC indicates if the booster has a strong receiving power

LED	Status	Meaning	Solve methods
ALC status	Remain still	Output power is not weak or just suitable	Check coverage, leave it if it is good; take below actions to increase signal if coverage is not good. 1. Adjust the antenna direction or location to get stronger receiving signal 2. Replace current antenna with higher gain to get stronger receiving signal
	Flashing but actual gain is not more than 30dB less than rated gain	Full output power	Working properly
	Flashing but actual gain is more than 30dB less than rated gain	Too strong receiving signal	Working properly, but too strong signal, actions are recommended: 1. Adjust the antennas' directions or locations to lower down input power. 2. Reduce the booster's gain by external attenuator or replace with lower gain antenna if the above

			methods don't work.

Notes: The flashing ISO and ALC status are to show you that ISO and ALC functions are working to solve the self-oscillation or strong signal problems, so the problems have been solved already. In most cases, there is no need for you to do anything, except deep self-oscillation or too strong signals that we recommend your actions but not mandatory, since the booster still solves the problems. However it is already more proper for you to deal with it.

More about LCD indication:

<table>
<tr><th>LCD</th><th>Status</th><th>Meaning</th><th>Solve methods</th></tr>
<tr><td colspan="2">"---" status</td><td>Output power is lower than -10dBm</td><td>Check coverage, leave it if it is good; take below actions to increase signal if coverage is not good.
1. Adjust the antenna direction or location to get stronger receiving signal
2. Replace current antenna with higher gain to get stronger receiving signal</td></tr>
<tr><td>"OFF" status</td><td rowspan="2">Actual gain is more than 51dB less than rated gain</td><td rowspan="2">Severe loop back or self-oscillation or output power is severe over rated to lead that
the repeater breaks down.</td><td rowspan="2">Not working properly, actions must be taken and recommend the below actions:
1. Adjust the antennas' directions or locations to lower down input power or enlarge the distance.
2. Add the vertical or horizontal distance between outdoor and indoor antennas.
3. Use the barrier like walls to increase the isolation.
4. Reduce the booster's gain by external attenuator or replace with lower gain antenna if the above methods don't work.</td></tr>
<tr><td>Flashing LCD screen</td></tr>
</table>

Trouble Shooting

Problem	Resolution
The signal booster has no power.	Check that the AC outlet is working.
The booster's power is on but the phone is not connected into the network and still cannot communicate.	Try to fasten the connections between the different parts of the system. Change the direction of donor antenna or its installation position. Use barriers (like buildings) to block signals of other operators.
Good downlink signal with poor communication quality	Check whether there's interference. Consult the operator whether the signal source base station works well.
The power is on but it has a signal fluctuation or a flash signal.	Firstly check whether the "ISO" is Flashing. The Flashing shows the insufficient isolation. Secondly adjust the antennas' directions or locations or enlarge the distance between them. Thirdly reduce the booster's gain by MGC if the above methods don't work.

FCC RF Exposure Statement

WARNING.This is **NOT** a **CONSUMER** device.It is designed for installation by **FCC LICENSEES** and **QUALIFIED INSTALLERS**. You **MUST** have an **FCC LICENSE** or express consent of an FCC Licensee to operate this device.Unauthorized use may result in significant forfeiture panalties,including penalties in excess of $100,000 for each continuing violation.

Notice

The Manufacturer's rated output power of this equipment is for single carrier operation. For situations when multiple carrier signals are present, the rating would have to be reduced by 3.5dB, especially where the output signal is re-radiated and can cause interference to adjacent band users. This power reduction is to be by means of input power or gain reduction and not by an attenuator at the output of the device.

La puissance de sortie nominale indiquée par le fabricant pour cet appareil concerne son fonctionnement avec porteuse unique. Pour des appareils avec porteuses multiples, on doit réduire la valeur nominale de 3, 5 dB, surtout si le signal de sortie est retransmis et qu'il peut causer du brouillage aux utilisateurs de bandes adjacentes. Une telle réduction doit porter sur la puissance d'entrée ou sur le gain, et ne doit pas se faire au moyen d'un atténuateur raccordé à la sortie du dispositif.

Specifications

Uplink Frequency Range	698-716 / 776 – 787 / 824-849 / 1850-1915 / 1710-1780
Downlink Frequency Range	728-746 / 746 – 757 / 869-894 / 1930-1995 / 2110-2180
Supported Standards	CDMA, WCDMA, GSM, EDGE, HSPA+, EVDO, LTE and all cellular standards
F20-5S Max .Gain	70±3dB(UL)/75±3dB(DL)
F23-5S Max .Gain	75±3dB(UL)/80±3dB(DL)
F27-5S Max .Gain	83±3dB(UL)/83±3dB(DL)
F20-5S Nominal passband gain	60~73dB/65~73dB/62~73dB/60~73dB/62~73dB(UL) 65~78dB/65~78dB/65~78dB/59~78dB/67~78dB(DL)
F23-5S Nominal passband gain	65~78dB/70~78dB/67~78dB/65~78dB/67~78dB(UL) 70~83dB/70~83dB/72~83dB/64~83dB/72~83dB(DL)
F27-5S Nominal passband gain	70~83dB/75~83dB/72~83dB/70~83dB/72~83dB(UL) 70~83dB/70~83dB/72~83dB/64~83dB/72~83dB(DL)
F20-5S Max .Output Power	20dBm(UL)/20dBm(DL)
F23-5S Max .Output Power	20dBm(UL)/23dBm(DL)
F27-5S Max .Output Power	20dBm(UL)/27dBm(DL)
F20-5S Rated .Output Power	20dBm(UL)/20dBm(DL)
F23-5S Rated .Output Power	20dBm(UL)/23dBm(DL)
MGC (Step Attenuation)	31dB/1dB step
Automatic Gain Control	≥31dB
Inter-modulation	≤-19dBm
Spurious Emission	≤-13dBm
Indicator	LCD diaplay, frequency, gain, power, ALC, ISO, etc.
I/O Port	N-Female
Impedance	50 ohm
Environment Conditions	IP40
Dimensions	11*15.7*2.1inch /280*400*53mm
Weight	≤17.6Lbs. / 8Kg
Power Supply	Input AC100~240V,50/60Hz,Output DC12V /7A