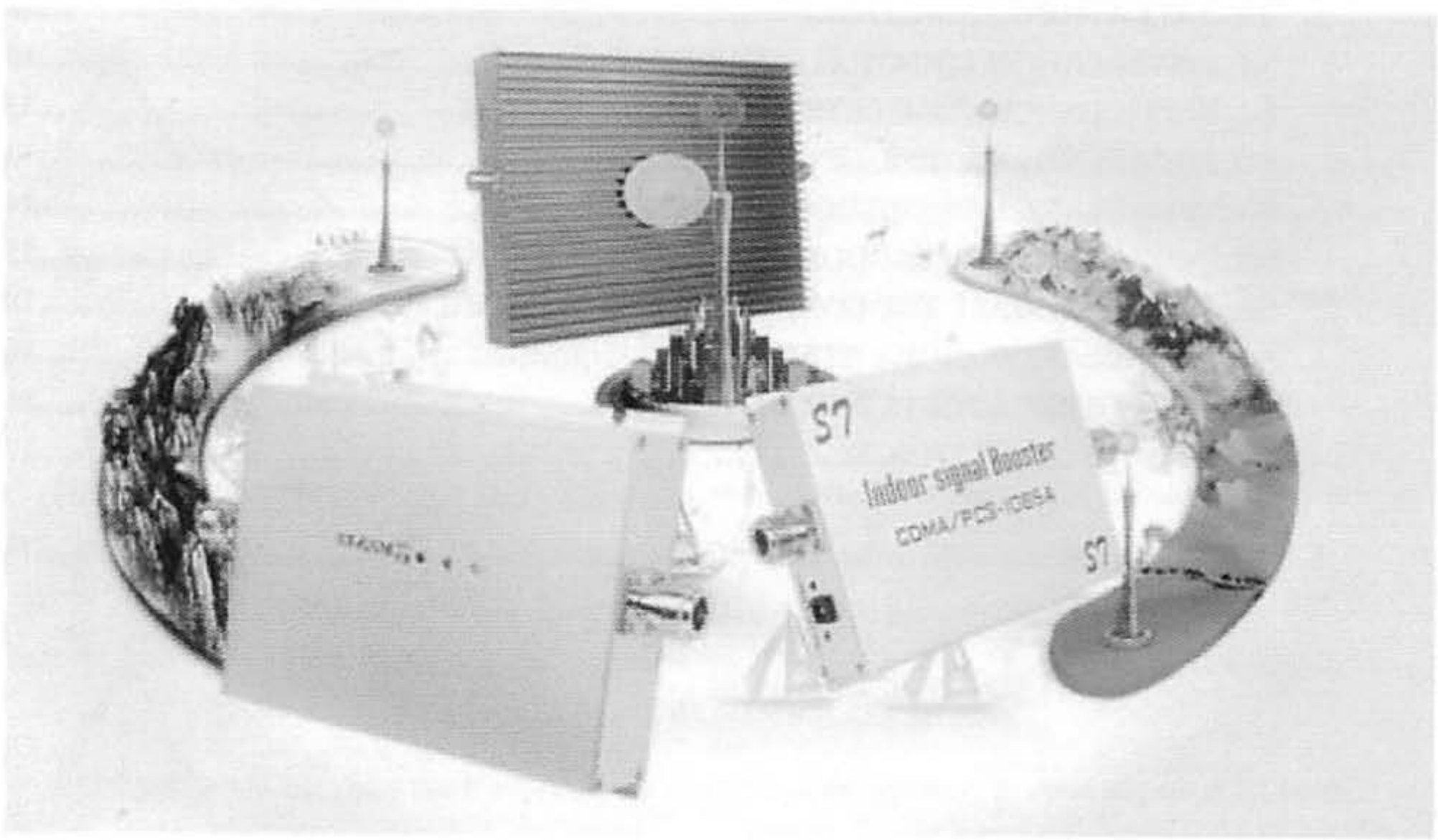
Mobile signal booster

User's Manual

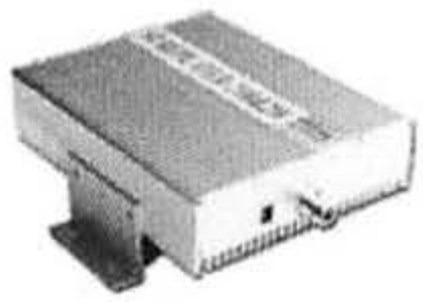


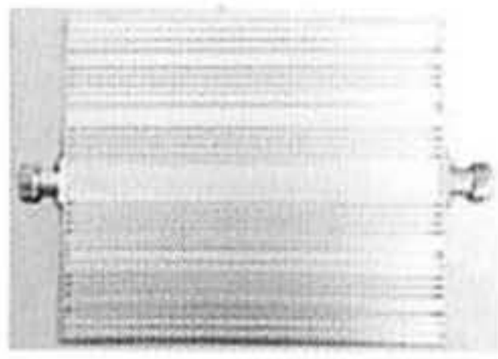
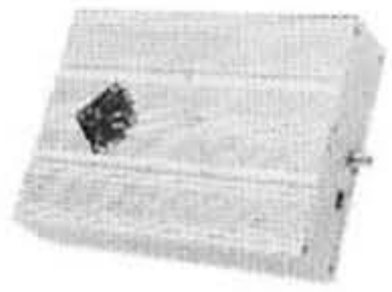
High quality products

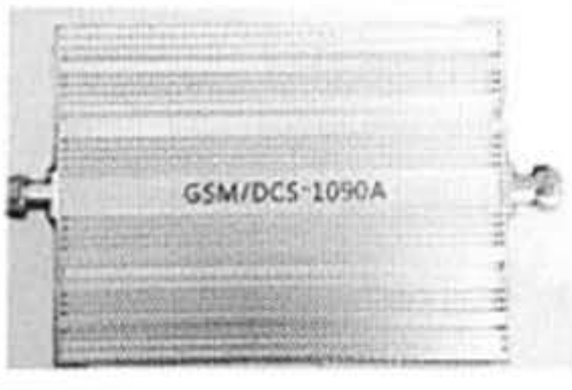
Satisfying service

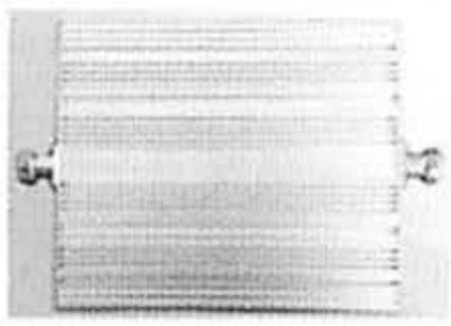
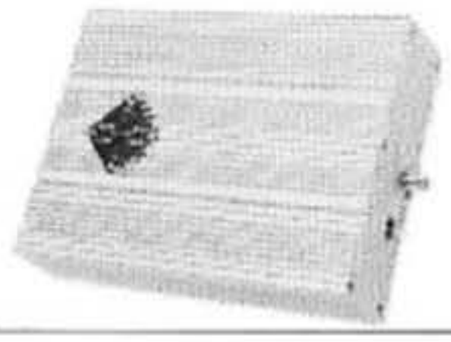
Continuous Innovation

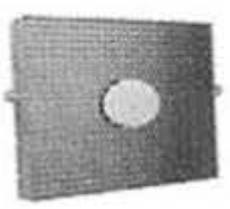
Fast delivery

Model	Picture	Frequency	Output	Gain
WCDMA 3G 2100MHz Booster				
ST-3GA		**2100MHz** **UL**:1920-1980MHz **DL**:2110-2170MHz	UL:14±1dBm	UL:65±3dB
			DL:17±1dBm	DL:68±3dB
ST-3G			UL:20±1dBm	UL:70±3dB
			DL:24±1dBm	DL:75±3dB
ST-3G&2W			UL:30±1dBm	UL:70±3dB
			DL:33±1dBm	DL:75±3dB

Model	Picture	Frequency	Output	Gain
Dual-band 850MHz&1900MHz Booster				
ST-1085A		**850MHz** **UL**:824-849MHz **DL**:869-894MHz **1900MHz** **UL**:1850-1910MHz **DL**:1930-1990MHz	UL:15±1dBm	UL:62±3dB
			DL:17±1dBm	DL:65±3dB
ST-1085B			UL:20±1dBm	UL:70±3dB
			DL:24±1dBm	DL:75±3dB
ST-1085AI			UL:14±1dBm	UL:65±3dB
			DL:17±1dBm	DL:68±3dB

Model	Picture	Frequency	Output	Gain
Dual-band 900MHz&1800MHz Booster				
ST-1090A		**900MHz** **UL**:880-915MHz **DL**:925-960MHz **1800MHz** **UL**:1710-1785MHz **DL**:1805-1800MHz	UL:15±1dBm	UL:62±3dB
			DL:17±1dBm	DL:65±3dB
ST-1090B			UL:20±1dBm	UL:70±3dB
			DL:24±1dBm	DL:75±3dB
ST-1090AI			UL:14±1dBm	UL:65±3dB
			DL:17±1dBm	DL:68±3dB

Model	Picture	Frequency	Output	Gain
Dual-band 900MHz&3G Booster				
ST-92A		**900MHz** **UL**:880-915MHz **DL**:925-960MHz **2100MHz** **UL**:1920-1980MHz **DL**:2110-2170MHz	UL:15±1dBm	UL:62±3dB
			DL:17±1dBm	DL:65±3dB
ST-92B			UL:20±1dBm	UL:70±3dB
			DL:24±1dBm	DL:75±3dB
ST-92AI			UL:14±1dBm	UL:65±3dB
			DL:17±1dBm	DL:68±3dB

Model	Picture	Frequency	Output	Gain
Tri-band 900MHz&1800MHz&3G Booster				
ST-9182A		**900MHz** **UL**:880-915MHz **DL**:925-960MHz	UL:10±1dBm	UL:60±3dB
			DL:14±1dBm	DL:65±3dB
ST-9182B		**1800MHz** **UL**:1710-1785MHz **DL**:1805-1800MHz	UL:14±1dBm	UL:65±3dB
			DL:17±1dBm	DL:68±3dB
ST-9182C		**2100MHz** **UL**:1920-1980MHz **DL**:2110-2170MHz	UL: 20±1dBm	UL:68±3dB
			DL: 23±1dBm	DL:72±3dB

4.2. Mechanical specification

Ripple in Band	≦8dB
Return loss	≦-8 dB
Auto Level Control	≥15dB auto shut off after 15dB (Optional)
MGC	≥31db/1dB step
Noise Figure	≦6dB
VSWR	≦2.0
Time Delay	≦0.5 μs
Power Supply	110~240V，50Hz/ 60Hz
Power Consumption	12.5W
Impedance	50 Ω
Cooling	Heat sink Convection cooling
Installation Type	Wall Installation
Environment Conditions	IP40
Humidity	< 90%
Operating Temperature	-10℃ ~ 55℃

5. INSTALLATION

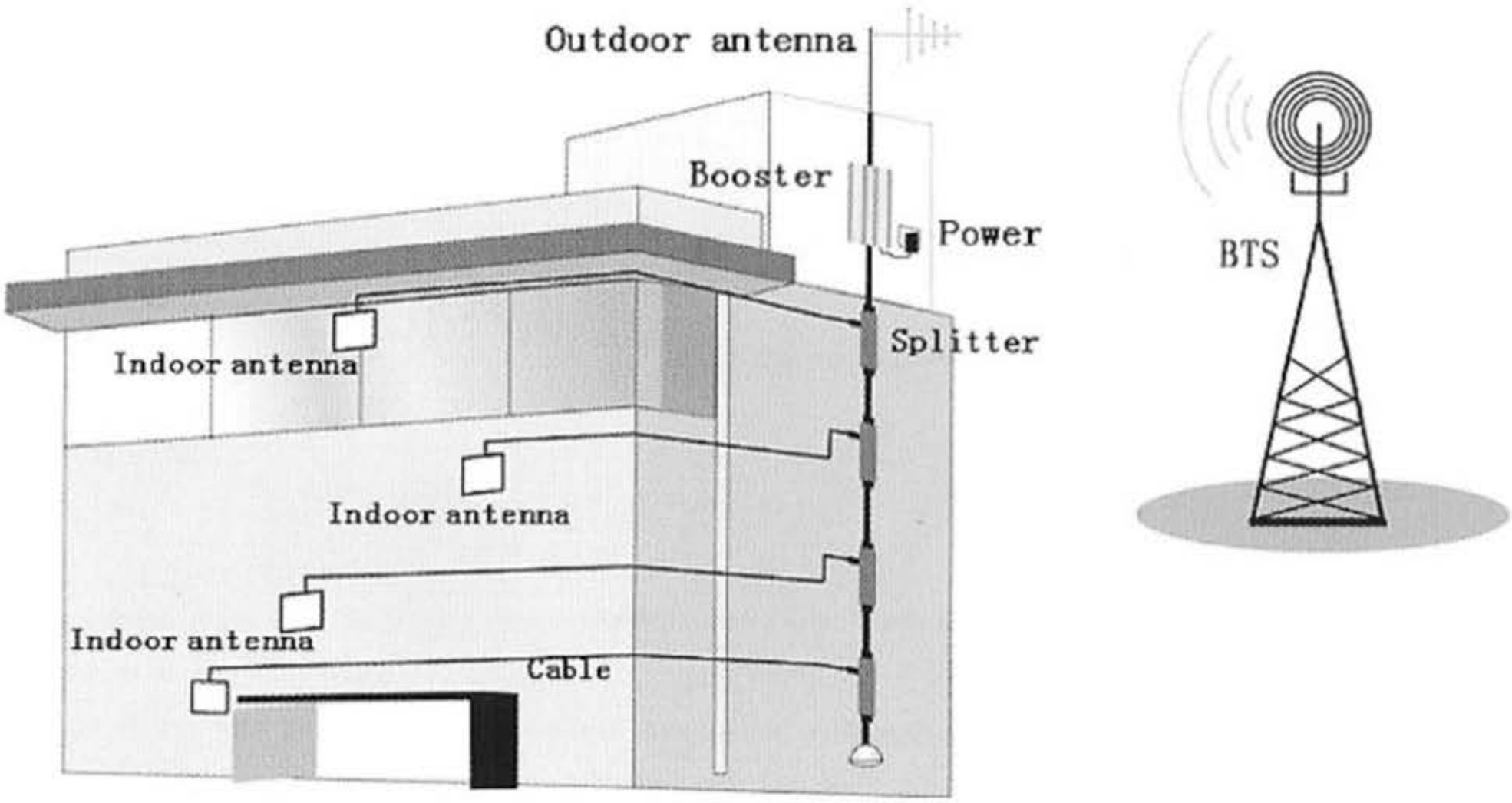
5.1. Installation Location Requirement

1) It is appreciated that the booster is installed in a cool, dry and ventilated room without erosive gas and smoke and without leakage on its proof.
2) Or a cool and ventilated wall of which sun-proof and waterproof is expected.
3) Besides above, common wall, tower or high pole is ok too.
4) Installation height should be easy for RF cable wiring, heat dissipation, security and maintenance.
5) Have a set of independent and stable power supply.
6) Have lightning conductor in the building, tower or high pole with enough strength or stability.

5.2. Installation complete kit items

◆Signal booster
◆Outdoor antenna
◆Indoor antenna
◆Cable
◆Splitter (When there are more than 2 indoor antennas)
◆Connector（N connector, F connector, N to F connector, SMA connector etc）

Installation sketch



5.3. Installation Steps

Step 1: Install the outdoor antenna in a suitable place

Step 2: Connect the outdoor antenna to the booster "outdoor" side by cable and connector

Step 3: Connect the indoor antenna to the booster "indoor" side by cable and connector

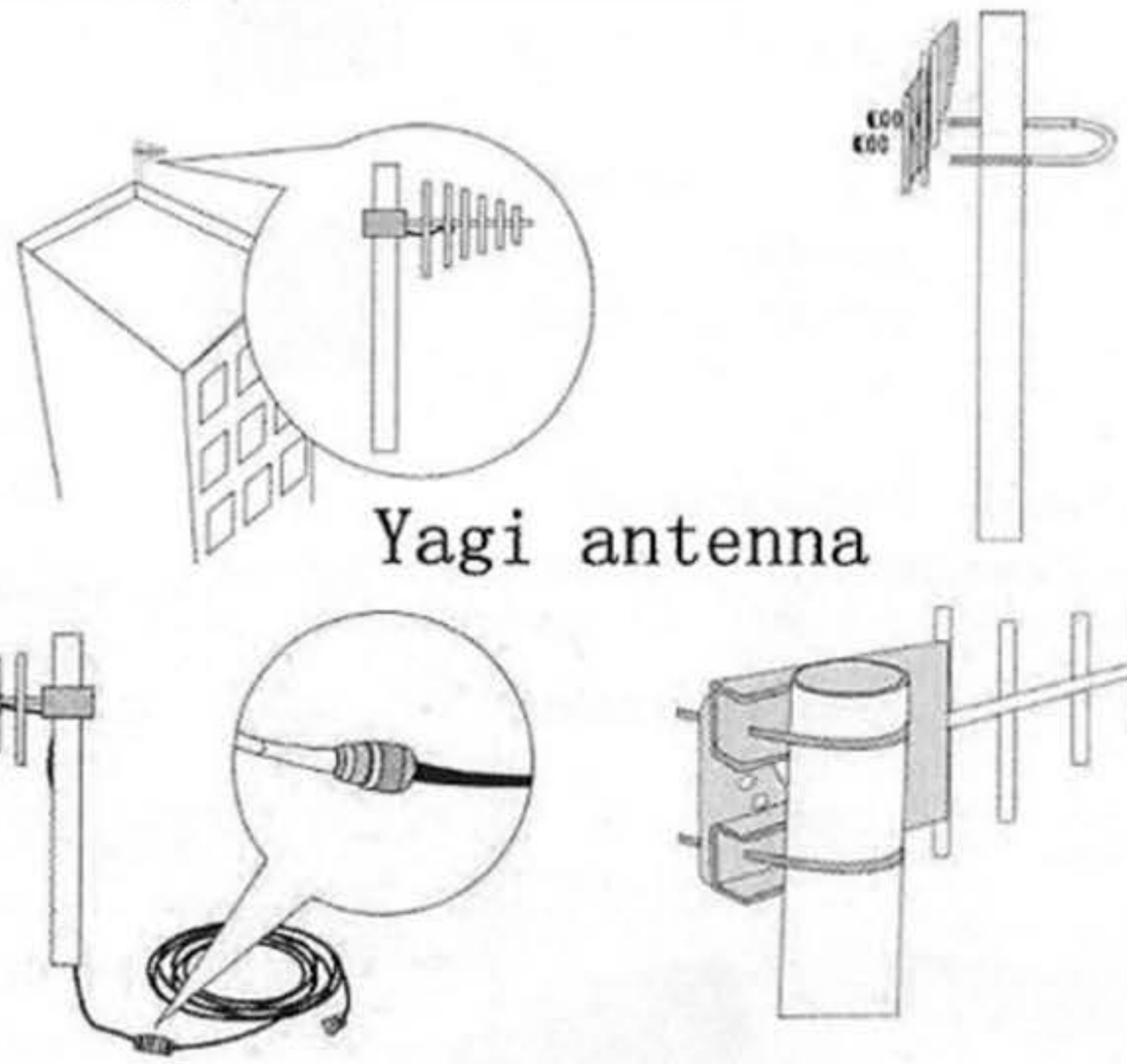
Step 4: Connect to the power

5.4 Installation of outdoor antenna

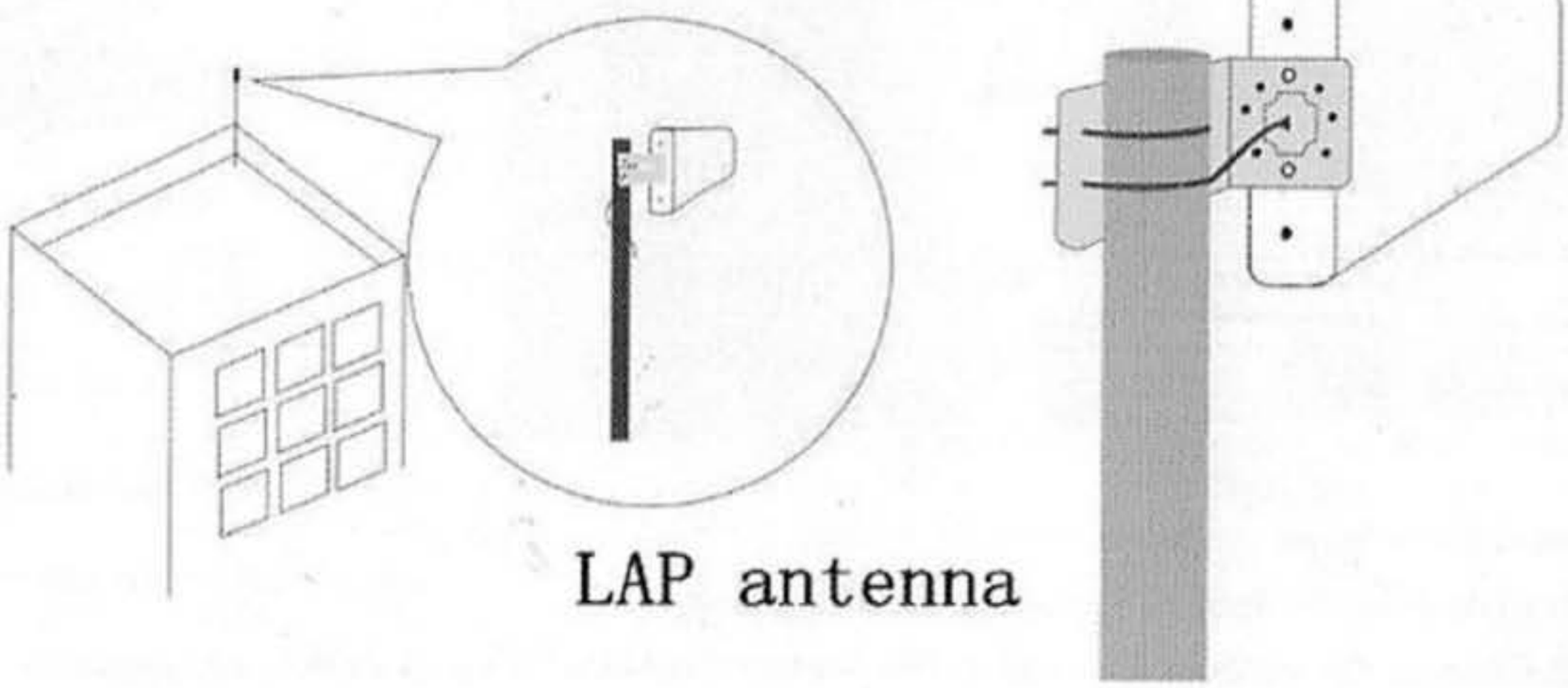
The signal strength from the outdoor antenna directly affects the efficiency of the indoor coverage, so it is very important to choose the outdoor antenna location to get the best signals.

- Select the top of building, the window or the balcony to install the outdoor antenna where there is with sound signal.
- Testing the signal strength received from outdoor antenna by mobile phone from different direction, and it shall display full bar signals where the outdoor antenna installed.
- Fix the outdoor antenna after selecting the best position, and adjust slightly its height or angles in order to get the best signals.
- The phone calls or data transmission shall be smooth and stable by 3 times testing where the outdoor antenna installed.

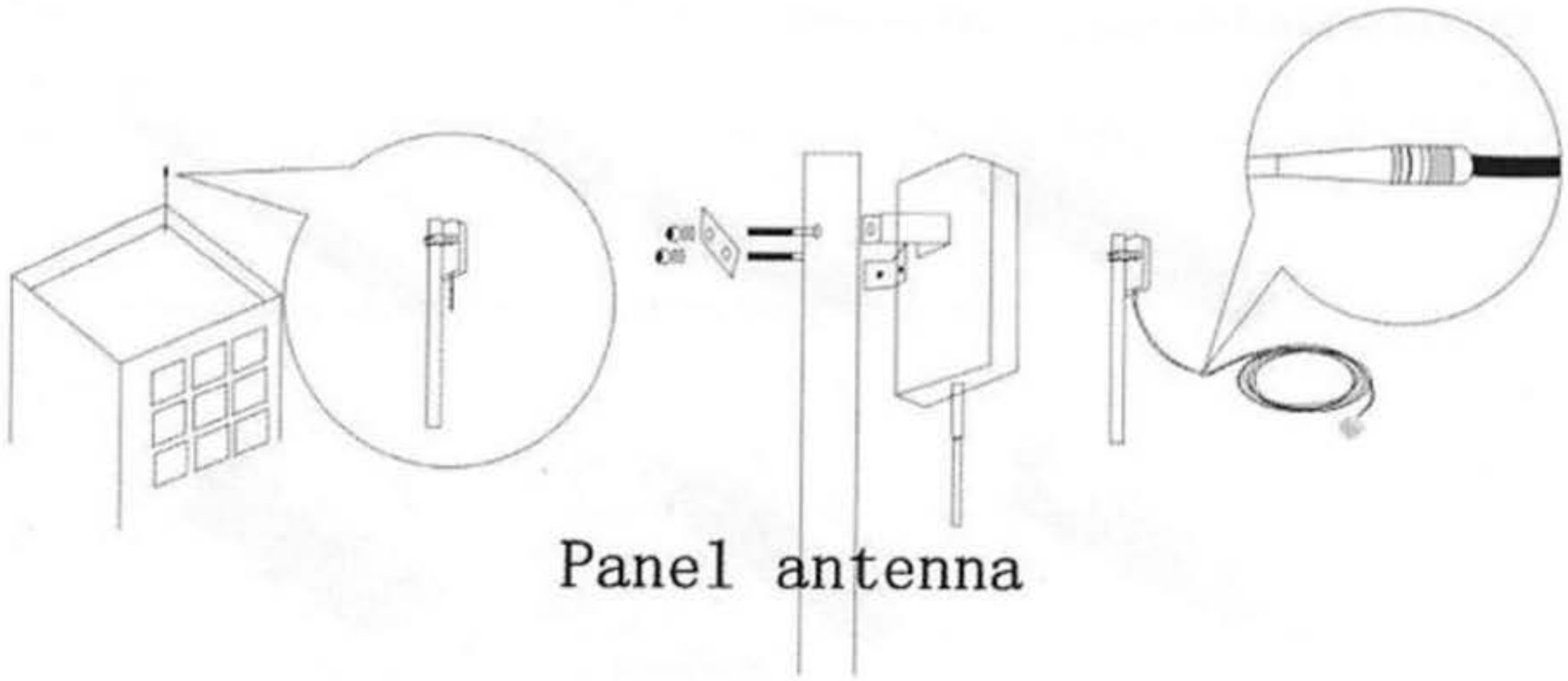
Installation of Yagi antenna as outdoor antenna



Installation of LAP antenna as outdoor antenna



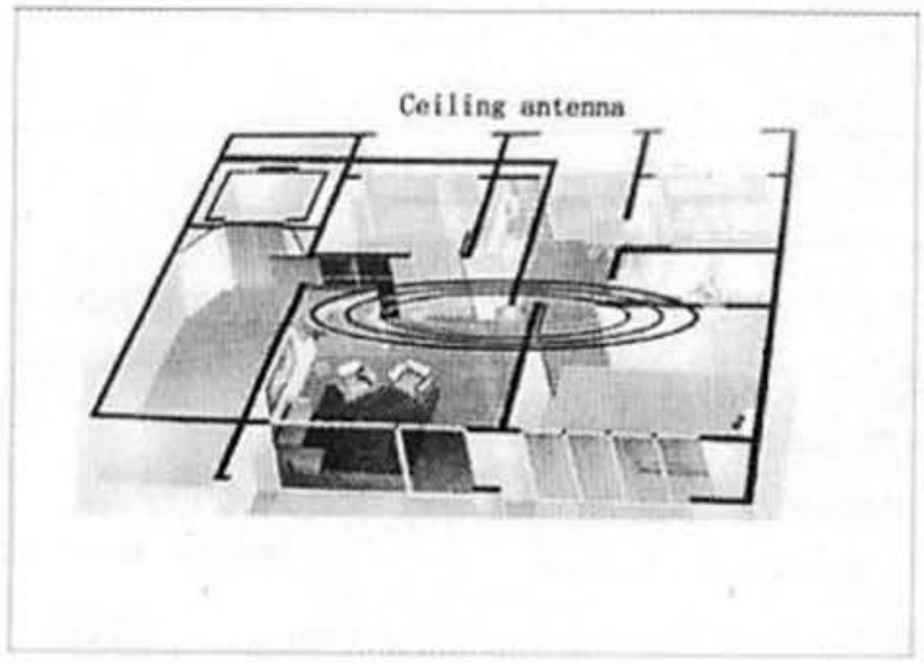
Installation of Panel antenna as outdoor antenna

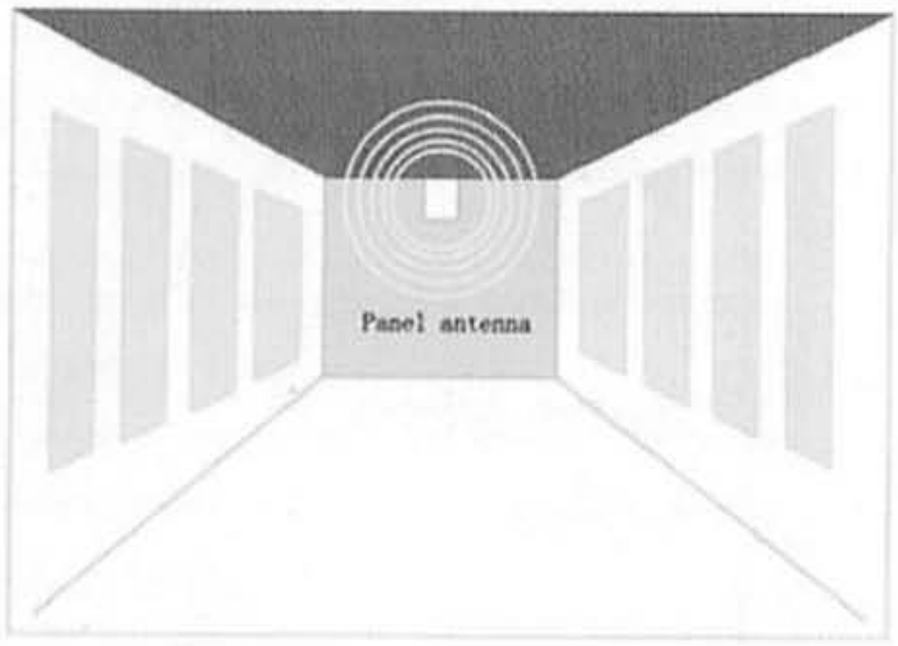


5.5 Installation of indoor antenna

Omni antenna (Indoor ceiling antenna or whip antenna), suitable for installing in the center and radiate all directions.

Directional antenna (Panel antenna) suitable for the coverage shape is long and narrow, like corridors, tunnels or elevators, etc. (The directional antenna is good for isolation from outdoor antenna)





Note: Attention on the install of outdoor antenna and indoor antenna

Booster is a two-way signal amplifier, so proper isolation between outdoor antenna and indoor antenna is necessary in order to avoid self-oscillation. About the definition for self-oscillation, take MIC and Loudspeaker for example, if it is too close for each other, it could make big noise. And the minimum distance between outdoor antenna and indoor antenna shall be 5 meters. Again if the two antennas install in the same level, then the direction of outdoor antenna and indoor antennas shall be opposite (in this case, the directional antenna will be a good choice). If the isolation can't be achieved by the limited distance, the roof of the building or any other barriers can be put between two antennas to increase isolation.

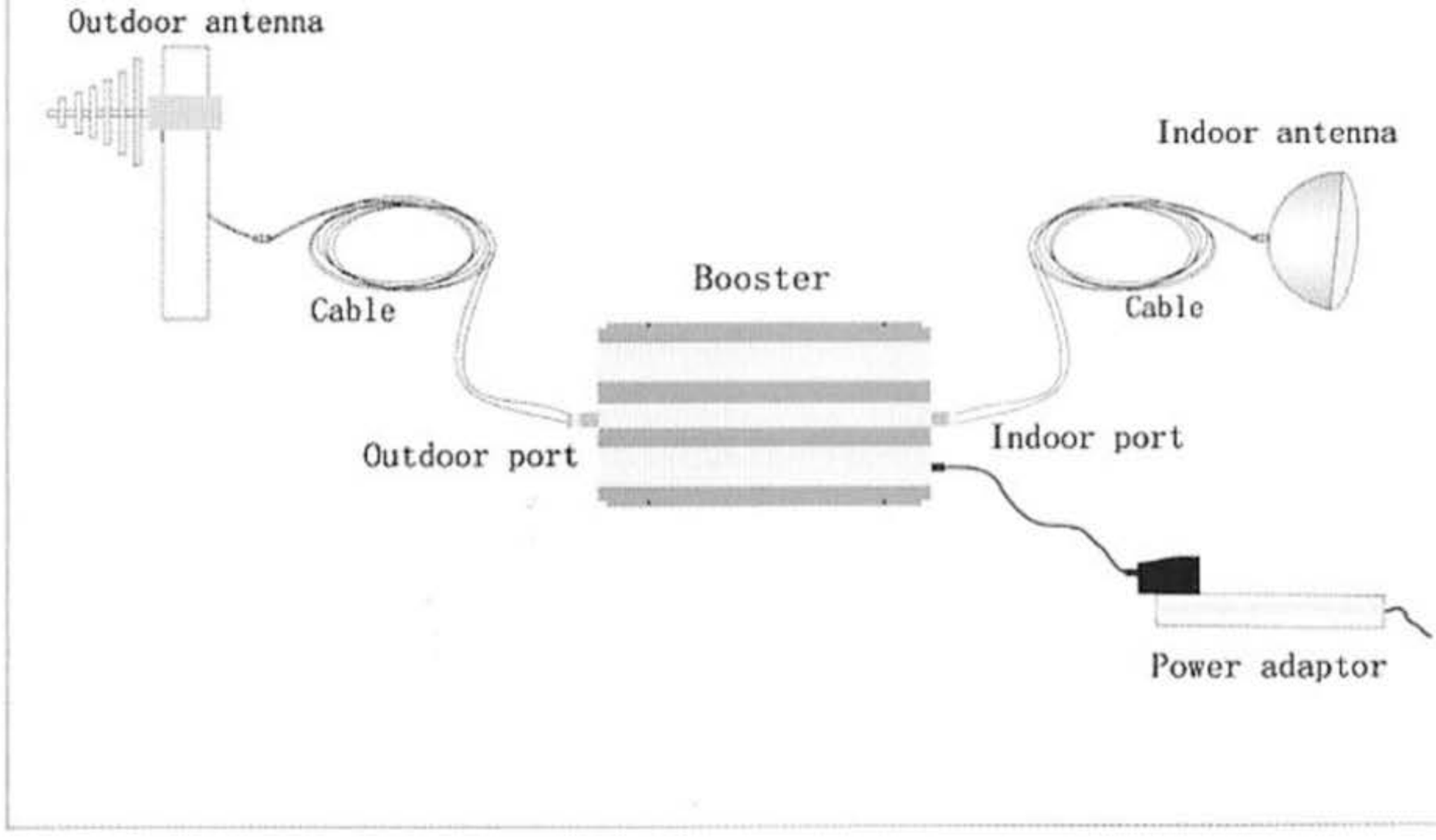
5.6. How to install the connectors to the cable?

5.7. Installation of booster

The booster can only be installed indoor, and can not turn on the power of booster until all accessories is settled correctly!

5.7.1 Booster's ports description

1) Outdoor port: Connect with the outdoor antenna by cable and connector
2) Indoor port: Connect with the indoor antenna directly or by cable and connector
3) Power: connect with power supply



5.7.2 Booster settings

Please check very carefully all connections are correct and firm before running operation test and then carry out following tests

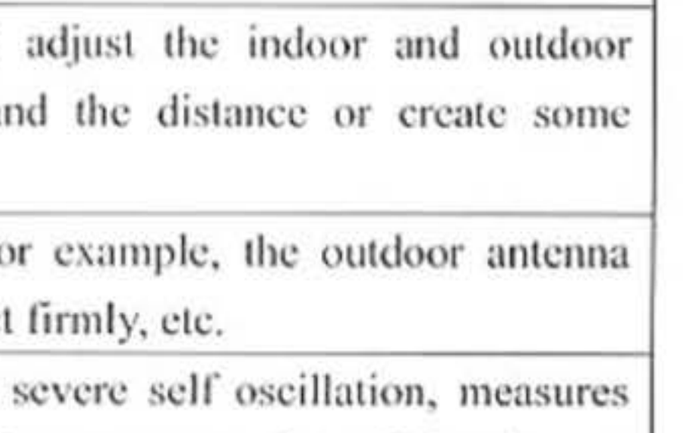
Switch on the power, after power is on, check the LED as blow.

1) LED indicates

LED	Status	Definition
Power	**Red**	Normal
	Off	DC power problem
DL(Downlink)	**White**	No signal received
		Solution: Adjust the outdoor installation to get sound signal(see page 14)
	Green	Signal received ok but not perfect
		Solution: Adjust the outdoor installation to get sound signal(see page 14)
	Red	Full signal received
UP(Uplink))	**Flicker**	When there is a call, it is normal
	Green	Always green means self-excited
		Solution: Turn off the booster, adjust the indoor and outdoor antenna again, and try to expand the distance or create some barriers between them.
ALA(Only for smart booster)	**Red**	The installation is not correct. For example, the outdoor antenna been stolen, the cable is not connect firmly, etc.
		There are strong input signals or severe self oscillation, measures must be taken(please note that our boosters auto shut off function, so the red color status can only maintain 5 seconds).
	Off	Booster breaks down, or severe self-oscillation leads to auto mute. Please re-plug in and check if alarm LED turns Red.

Note: Single band system booster only has one set LED of DL, UL and ALA, while dual band system have two sets LEDS of DL, UL and ALA, and three system boosters have three sets of LEDS. Each system has own relevant LED and please refer to the correct LED for system performance evaluation.

2) Manual Gain Control (MGC)



Code switch→Attenuation:

DL: 1→1dB 2→2dB 3→4dB 4→8dB 5→16dB

UL: 6→1dB 7→2dB 8→4dB 9→8dB 10→16dB

Switches1-5 represents Downlink and 6-10 represent Uplink.

When it is necessary to adjust the gain by the switch, firstly please adjust Downlink gain according to input signals, secondly please adjust Uplink gain according to Downlink gain. For Example you want to make the 3G Gain down 1dB, so you make the switches "1" and "6"is OK.

The switches have default "OFF" status; please push relevant switches to "ON" position if certain attenuation value needs to be achieved.

The Downlink attenuation setting

ATT	1	2	3	4	5	ATT	1	2	3	4	5	ATT	1	2	3	4	5
0dB	OFF	OFF	OFF	OFF	OFF	11dB	ON	ON	OFF	ON	OFF	22dB	OFF	ON	ON	OFF	ON
1dB	ON	OFF	OFF	OFF	OFF	12dB	OFF	OFF	ON	ON	OFF	23dB	ON	ON	ON	OFF	ON
2dB	OFF	ON	OFF	OFF	OFF	13dB	ON	OFF	ON	ON	OFF	24dB	OFF	OFF	OFF	ON	ON
3dB	ON	ON	OFF	OFF	OFF	14dB	OFF	ON	ON	ON	OFF	25dB	ON	OFF	OFF	ON	ON
4dB	OFF	OFF	ON	OFF	OFF	15dB	ON	ON	ON	ON	OFF	26dB	OFF	ON	OFF	ON	ON
5dB	ON	OFF	ON	OFF	OFF	16dB	OFF	OFF	OFF	OFF	ON	27dB	ON	ON	OFF	ON	ON
6dB	OFF	ON	ON	OFF	OFF	17dB	ON	OFF	OFF	OFF	ON	28dB	OFF	OFF	ON	ON	ON
7dB	ON	ON	ON	OFF	OFF	18dB	OFF	ON	OFF	OFF	ON	29dB	ON	OFF	ON	ON	ON
8dB	OFF	OFF	OFF	ON	OFF	19dB	ON	ON	OFF	OFF	ON	30dB	OFF	ON	ON	ON	ON
9dB	ON	OFF	OFF	ON	OFF	20dB	OFF	OFF	ON	OFF	ON	31dB	ON	ON	ON	ON	ON
10dB	OFF	ON	OFF	ON	OFF	21dB	ON	OFF	ON	OFF	ON						

The Uplink attenuation setting

ATT	6	7	8	9	10	ATT	6	7	8	9	10	ATT	6	7	8	9	10
0dB	OFF	OFF	OFF	OFF	OFF	11dB	ON	ON	OFF	ON	OFF	22dB	OFF	ON	ON	OFF	ON
1dB	ON	OFF	OFF	OFF	OFF	12dB	OFF	OFF	ON	ON	OFF	23dB	ON	ON	ON	OFF	ON
2dB	OFF	ON	OFF	OFF	OFF	13dB	ON	OFF	ON	ON	OFF	24dB	OFF	OFF	OFF	ON	ON
3dB	ON	ON	OFF	OFF	OFF	14dB	OFF	ON	ON	ON	OFF	25dB	ON	OFF	OFF	ON	ON
4dB	OFF	OFF	ON	OFF	OFF	15dB	ON	ON	ON	ON	OFF	26dB	OFF	ON	OFF	ON	ON
5dB	ON	OFF	ON	OFF	OFF	16dB	OFF	OFF	OFF	OFF	ON	27dB	ON	ON	OFF	ON	ON
6dB	OFF	ON	ON	OFF	OFF	17dB	ON	OFF	OFF	OFF	ON	28dB	OFF	OFF	ON	ON	ON
7dB	ON	ON	ON	OFF	OFF	18dB	OFF	ON	OFF	OFF	ON	29dB	ON	OFF	ON	ON	ON
8dB	OFF	OFF	OFF	ON	OFF	19dB	ON	ON	OFF	OFF	ON	30dB	OFF	ON	ON	ON	ON
9dB	ON	OFF	OFF	ON	OFF	20dB	OFF	OFF	ON	OFF	ON	31dB	ON	ON	ON	ON	ON
10dB	OFF	ON	OFF	ON	OFF	21dB	ON	OFF	ON	OFF	ON						

6 FAQ

1) After installing the booster, but no effect

Solution:

- Check whether you got the booster with correct frequency. For example, the GSM900MHz frequency can not works for the DCS1800MHz.
- Check the signal outside received is enough, the total input power level shall be around -50dBm, lowest shall be more than -80dBm. And check the LED of DL whether it is RED.
- Check all the installation is correct, and all the accessories are well connected, check the LED of ALA is RED.

2) After installation, there is full bars signal, but can not make or received a call.

- The Downlink is very well, but the Uplink is can not send the signal back to BTS. Need to check the cables and connectors are well connected indoor.

3) After installation, there is full bars signal, but will turn 0 bar when make a call.

- There is a self-oscillation. The isolation between the outdoor antenna and indoor antenna is not good enough, try to adjust the antennas' directions or enlarge the distance between them.

4) After installation, the signal is very sound, but there is noise when make calls.

- The indoor antenna and the mobile are too close, and cause interference, try to keep the mobile a little far away from indoor antenna.

5) What is AGC function? And what is the advantage?

AGC means Auto Gain Control; it means the booster can control the gain by itself according to the surroundings.

- When there is a sudden strong signal input, the booster can adjust the gain accordingly to protect the booster module together BTS station, make the strong signal will not affect the BTS after adjustment.
- When the signal outside is too weak, the booster can adjust the gain to full stage to boost the signal received at most for end use.
- The AGC repeater is with LED on it, it can directly show the running state of the booster.

6) What is MGC function? And what is the advantage?

- MGC function means Manual Gain Control
- when your outdoor signal too stronger, so the repeater can not work well and have noise, so you can adjust the Gain by yourself ;

7) What is AI function? And what is the advantage?

AI means Artificial Intelligence

- The booster is with CPU inside, it can control the gain more intelligence according to surroundings than AGC function.
- The booster with AI is energy-effective. When there is no call, the booster will change to a "Stand-By" state, thus can save a lot power.
- The boosters with AI function have ALA LED on it, and it can easily help to find out the problem when setting and running.

8) Will the repeater increase the RF radiation?

- No, it will decrease instead.
- When the signal is bad, the BTS will "Order" the mobile phone to increase its output power in order to ensure find connection, there will be stronger mobile output power level when the mobile signal bar is less. And stronger mobile output power level means stronger radiation.

..... END.....

This User's manual describes the booster feature, the installation, maintenance of the mobile phone signal booster of single-band, dual-band, and triple-band signal systems.

Please do read user manual carefully before installing and maintaining the repeaters.

The information in this manual is subject to change without prior notice.

Opinions are welcomed about the manual improvement.

1. SECURITY GUIDE

· Boosters should follow system requirement of communication equipment, the booster should be installed at a place waterproof with good lightning protection and well-ventilated.

· The power supply voltage of repeater should meet the standards of security requirement. Any operation shall be carried out only after cutting off power in advance. Only the professional is authorized for the operation.

· Do not dismantle the machine, maintain or displace accessories by yourself, because in this way, the equipment may be damaged and you may even get an electric shock.

· Do not open the booster, touch the module of repeater, or open the cover of module to touch the electronic component. The components will be damaged due to electrostatic.

· Please keep away from heating-equipment, because the repeater will dissipate heat during working. And do not cover the booster with anything that will influence the heat-dissipation.

2. GENERAL INTRODUCTION OF BOOSTER

2.1. What is the booster?

Cell phone signal booster (also named repeater, amplifier) is a product designed to solve the mobile phone blind signal. As the mobile phone signal is transmitted by electromagnetic waves to establish a communications link, however there are a lot barriers make it is unavailable to get sound signal. When people enter some tall buildings, some places basement malls, restaurants and parking lot, some places of entertainment such as karaoke sauna and massage, some public place such as subway, tunnel and etc. where cell phone signals can not reach, now the cell phone signal booster can solve these problems! The entire range of mobile phone signals can be well used; we all will get great convenience and benefit from sound signal.

Our boosters are the perfect solutions for a wireless improvement in the mobile reception!

2.2. Why need a signal booster?

Will your customers stay comfortable when there is no smooth communication in your shops, restaurants, hotels or clubs?

Will that be frustrating if your clients could not call you through due to weak signals in offices?

Will your life be influenced if your mobile is always "out-of-service" at home when your friends call you?

It is really a miserable experience without a sound signal today!

Purchase a suitable set of booster from us and install it, and immediately you would be able to enjoy the full bar and high quality signals!

2.3. Places where can use the signal booster

1) Blind or weak signal areas are formed if the buildings are too far away from the Base Transceiver Station (BTS), or the buildings themselves shield or absorb signals.
2) The are too many complicated signals in the higher part of the buildings, therefore ping-pong switching effect has been formed and the signals fluctuate a log, there are annoying noises during phone calls and call drops accordingly.
3) Elevators and basements are well-know for blind areas.
4) Downtown areas of the cities, which congested with many high-rise buildings, are usually the weak or blind areas.
5) The remote villages, mountains, hills, valleys, etc. Are mostly populated areas with quite few mobile users, the main target is to send coverage to these areas, and it will not be worthy installing a BTS, therefore a booster is quite a good choice.

2.4. How to choose a suitable booster?

1) What frequency does your operator (s) support? – (One or multiple)

2) How is the signal outside?

3) How large an area do you need a quality signal in your building? (It is greatly related to the accessories allocation)

3. SYSTEM CHARACTERISTICS

3.1. Features

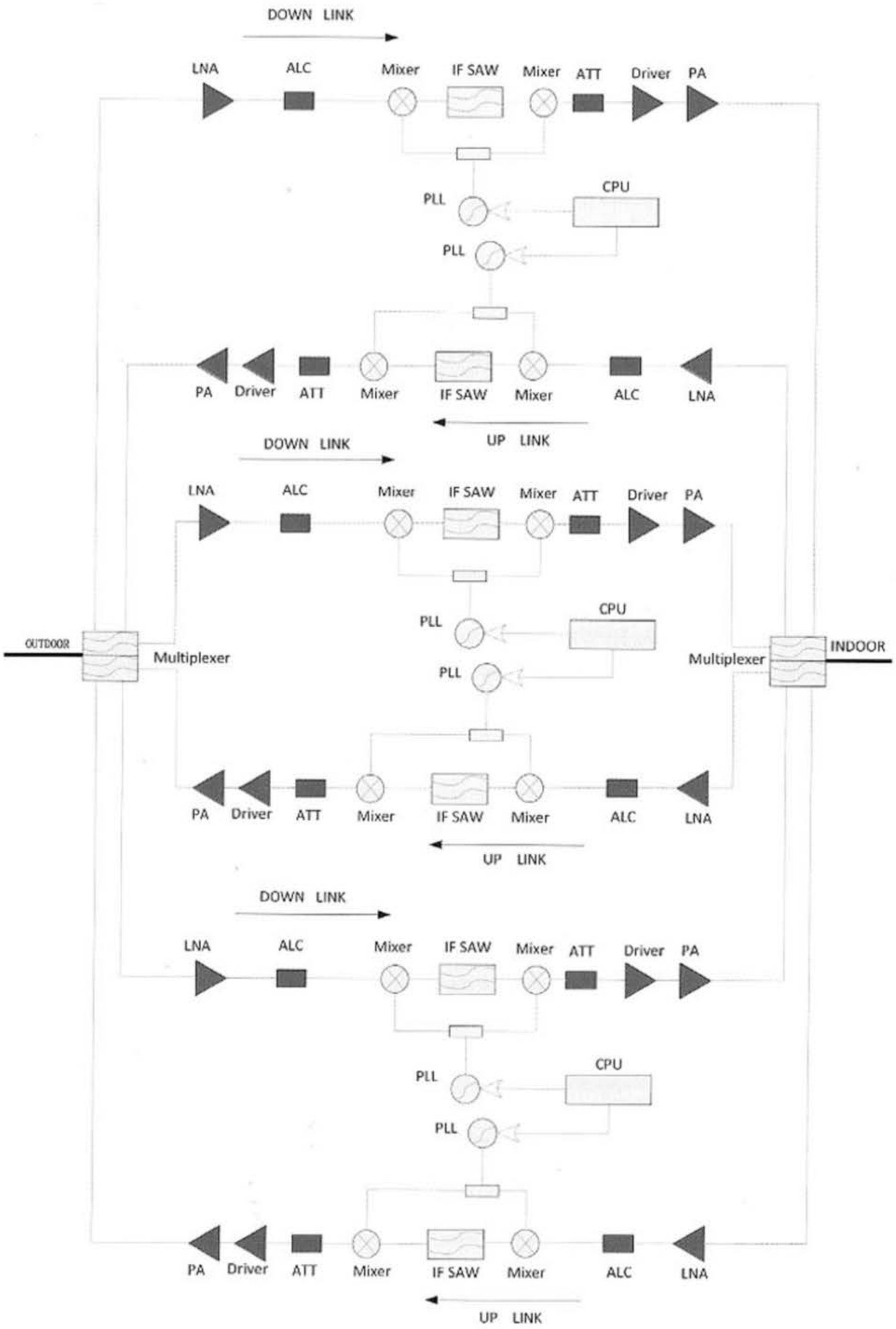
- Elegant appearance, mini size, light weight
- Easy installation.
- No interference to the base station, no harm to people health.
- CE & RoHS proved.
- Low consumption.
- ALC technology.
- Stable performance.
- Environment Friendly, Energy-Efficient.
- Comply to the ETS300 694-4 standard
- Comply to the GB6993-86 standard
- Wide band repeater to support signals of all operators.
- High-integration (One board to contain low-noise amplifier, frequency selection module, power amplifier module, both uplink and downlink one for all).
- Manual gain control, Automatic gain control, Artificial Intelligence function can protect the repeater together the BTS perfectly.
- Auto shut off function as final step to avoid severe interference with mobile net network and energy saving.

3.2. Work principle

Our mobile signal booster is basically a bi-directional amplifier.

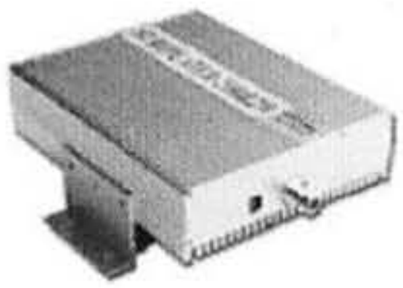
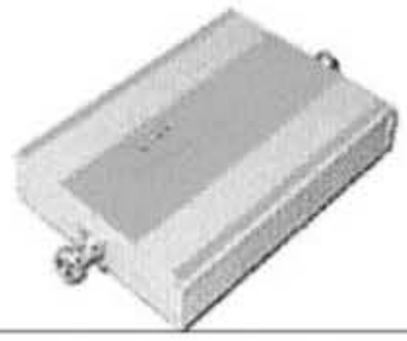
The Downlink signals are received by the repeater from the BTS by the outdoor antenna, filtered by its internal duplexers and FC unit, amplified by low noise amplifier(LNA) and downlink PA unit, then send via the indoor antenna to the area where need to improve mobile signals.

The Uplink signal of mobile devices from the coverage area is input via the indoor antenna, then filtered by duplexers and FC unit, boosted by the uplink low noise amplifier(LNA) and the unlink PA unit and finally sent via the outdoor antenna to the cell tower. (Picture followed)

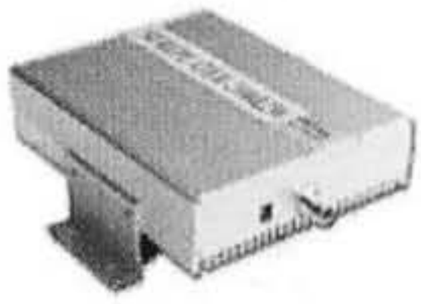
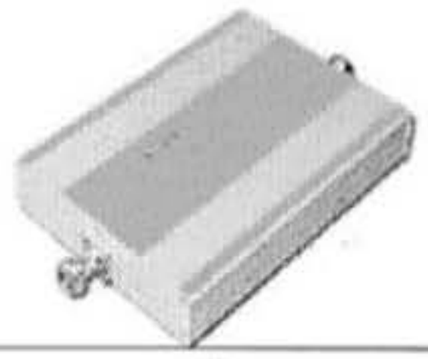

DOWN LINK
LNA
ALC
Mixer
IF SAW
Mixer
ATT
Driver
PA
PLL
CPU
PLL
PA
Driver
ATT
Mixer
IF SAW
Mixer
ALC
LNA
UP LINK
DOWN LINK
LNA
ALC
Mixer
IF SAW
Mixer
ATT
Driver
PA
OUTDOOR
Multiplexer
PLL
CPU
PLL
Multiplexer
INDOOR
PA
Driver
ATT
Mixer
IF SAW
Mixer
ALC
LNA
UP LINK
DOWN LINK
LNA
ALC
Mixer
IF SAW
Mixer
ATT
Driver
PA
PLL
CPU
PLL
PA
Driver
ATT
Mixer
IF SAW
Mixer
ALC
LNA
UP LINK

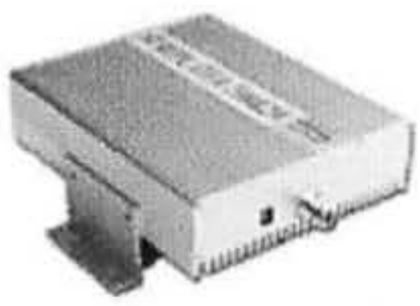
4. MAIN TECHNICAL SPECIFICATION

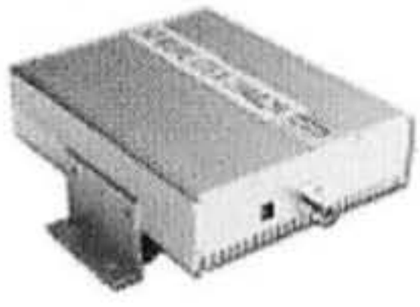
4.1. Electrical specification for all models

Model	Picture	Frequency	Output	Gain
850MHz Booster				
ST-850A		**UL**:824-849MHz **DL**:869-894MHz	UL:10±1dBm	UL:60±3dB
			DL:14±1dBm	DL:65±3dB
ST-850			UL:20±1dBm	UL:70±3dB
			DL:24±1dBm	DL:75±3dB
ST-850&2W			UL:30±1dBm	UL:70±3dB
			DL:33±1dBm	DL:75±3dB
ST-850AI			UL:14±1dBm	UL:65±3dB
			DL:17±1dBm	DL:68±3dB

Model	Picture	Frequency	Output	Gain
GSM900MHz Booster				
ST-900A		**UL**:880-915MHz **DL**:925-960MHz	UL:10±1dBm	UL:60±3dB
			DL:14±1dBm	DL:65±3dB
ST-900(SMA)			UL:14±1dBm	UL:58±3dB
			DL:17±1dBm	DL:63±3dB

ST-950		**UL**:880-915MHz **DL**:925-960MHz	UL:14±1dBm	UL:65±3dB
			DL:17±1dBm	DL:68±3dB
ST-960			UL: 17±1dBm	UL:68±3dB
			DL: 20±1dBm	DL:72±3dB
ST-970			UL: 20±1dBm	UL:70±3dB
			DL: 23±1dBm	DL:75±3dB
ST-980			UL: 23±1dBm	UL:73±3dB
			DL: 27±1dBm	DL:80±3dB
ST-980A			UL: 27±1dBm	UL:75±3dB
			DL: 30±1dBm	DL:83±3dB
ST-900&2W			UL: 30±1dBm	UL:70±3dB
			DL: 33±1dBm	DL:75±3dB
ST-900AI			UL: 14±1dBm	UL:65±3dB
			DL: 17±1dBm	DL:68±3dB

Model	Picture	Frequency	Output	Gain
DCS 1800MHz Booster				
ST-1800A		**UL**:1710-1785MHz **DL**:1805-1800MHz	UL:14±1dBm	UL:65±3dB
			DL:17±1dBm	DL:68±3dB
ST-1800			UL:20±1dBm	UL:70±3dB
			DL:24±1dBm	DL:75±3dB
ST-1800&2W			UL:30±1dBm	UL:70±3dB
			DL:33±1dBm	DL:75±3dB

Model	Picture	Frequency	Output	Gain
PCS 1900MHz Booster				
ST-1900A		**UL**:1850-1910MHz **DL**:1930-1990MHz	UL:10±1dBm	UL:60±3dB
			DL.:14±1dBm	DL:65±3dB
ST-1900			UL:20±1dBm	UL:70±3dB
			DL:24±1dBm	DL:75±3dB
ST-1900&2W			UL:30±1dBm	UL:70±3dB
			DL:33±1dBm	DL:75±3dB