



**WCDMA 2100 MHz**

**Single Band Selective Repeater**

**W20S-WCDMA User Manual**



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Notes: Thank you for purchasing our product.  
Please read carefully the manual before installation

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# Chapter 1 - Safety Warning

■ Users must follow the below principles:



1. Repeater should follow system requirement of communication equipment, assure good groundings and lightning protection.



2. The power supply voltage of repeater should meet the standards of security requirement; any repeater-operator can operate only after cutting power in advance. Only the professional can operate electrified.



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



4. Do not open the repeater, touch the module of repeater, even not to open the cover of module to touch the electronic component, the components will be damaged due to electrostatic



5. Please keep away from heating-equipment, because the repeater will dissipate heat when working. And do not cover repeater with anything that influences heat-dissipation.

## Chapter 2 - Summary

In mobile communication, it is inevitable that macro-cell coverage cannot cover weak or dead zones; to use repeater is a good choice in these areas. These band selective repeaters mainly applied in covering small blind and weak zones.

Nowadays, wireless repeater are widely used in solving weak signal, blind signal's coverage questions, such as mountain settlements, scenic, shopping malls, hotels, airport, pier, bus station, stadium, entertainment hall, railway, tunnels, high-way, islands and so on. At the same time, the repeaters are still working flexibility in traffic diversion and BTS networking adjust and any other issues.



(Figure 2.1 Wireless repeater application diagram)

Our repeaters are suitable to solve poor signal and blind area coverage problems of medium-small areas, such as meeting room, office, bedroom, apartment, hotel, basement, mini parking lot and so on, could also be customized according to different frequency and different requirements. Because of its smart design, good band rejection, with display function for easier project setting, could set and debug fast, it is quite popular for customers. This use manual suits for the following modules: W20S-WCDMA.

## Chapter 3 - standard and specification

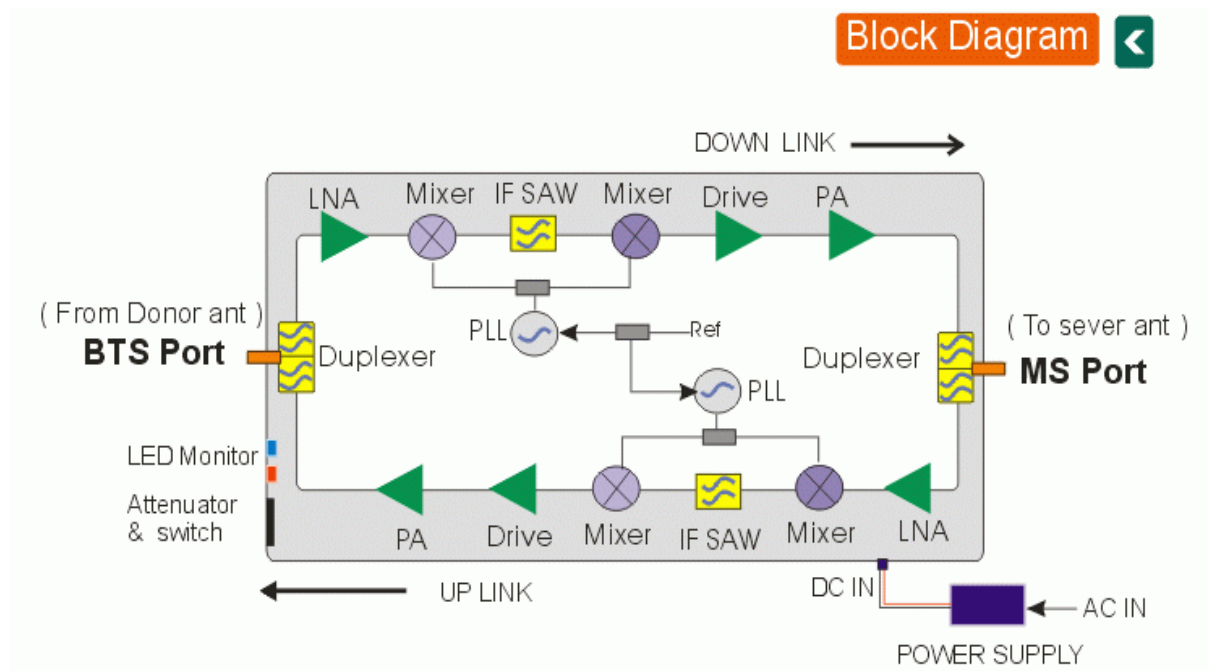
### 3.1 Product description

Repeater is essentially a same frequency,transparent and amplify equipment. Inside the single system repeater there are two independent amplify link road---Up Link and Down Link. DL get the RF signal by donor antenna from the BTS,amplify the signal and then transmit to the area to be covered through the coverage antenna. At the same time,the UL access to the RF signal from the mobile station by coverage antenna,amplify the signal and then transmit back to the BTS by donor antenna. WCDMA band selective repeater connect WCDMA single system,combine the donor antennas and coverage antennas of these systems. band repeater access the band selective ability of the signal and then selectively amplify all users' require signal frequency.

### 3.2 Product Feature

- Human Machine Interaction, the display shows very clearly of all display devices and the button function are more intuitively and faster,
- Could support WCDMA mobile communication network,
- Low power consumption, low interference,
- ALC could limit the output power to ensure stable coverage,
- Manual gain attenuation, with 1dB steep to attenuate the gain among 1-30dB range,
- Two working mode, normal mode and smart mode. Under the smart mode, the Isolation could automatic detection, auto adjust the isolation, AGC auto control, install with one button which is much more easier for project setting, could install and debug quickly,
- Apply for medium and small areas coverage, such as VIP room, meeting room, office, bedroom, apartment, hotel, parking lot and so on.

### 3.3 System Schematic



(Figure 3.1 the Schematic of the repeater)

### 3.4 Electric Specifications

Frequency Range	1959.9 ~ 1979.7 MHz	2149.9 ~ 2169.7 MHz
Bandwith	19.8 MHz	19.8 MHz
Output Power	12±2 dBm	20±2 dBm
Gain	70±2 dB	70±2 dB
Ripple	≤2 dB/3.84MHz	≤2 dB/3.84MHz
VSWR	≤2	≤2
Max. Input Power Without Damage	0 dBm	0 dBm
Intermodulation Products	≤-30 dBm	≤-30 dBm
Spurious Emission	9KHz~1GHz	≤-36 dBm
	1GHz~12.75GHz	≤-30 dBm
Out of Band Gain	2.7≤f<3.5MHz	≤ 60 dB
	3.5≤f<7.5MHz	≤ 45 dB
	7.5≤f<12.5MHz	≤ 45 dB
	12.5 MHz≤f	≤ 35 dB
ATT step of 1 dB	1~10 dB	Δ   ≤1 dB
	10~20 dB	Δ   ≤1 dB

	20~30 dB	$ \Delta  \leq 1.5$ dB	$ \Delta  \leq 1.5$ dB
ALC Active 25dB		$ \Delta  \leq 2$ dB	$ \Delta  \leq 2$ dB
Noise Figure@ max. gain		$\leq 6$ dB	$\leq 6$ dB
Time Delay		$\leq 5$ $\mu$ s	$\leq 5$ $\mu$ s
ATT 31dB in step of 1dB	1 ~ 10 dB	$ \Delta  \leq 1$ dB	$ \Delta  \leq 1$ dB
	10 ~ 20 dB	$ \Delta  \leq 1.5$ dB	$ \Delta  \leq 1.5$ dB
	20 ~ 31 dB	$ \Delta  \leq 2$ dB	$ \Delta  \leq 2$ dB
Power LED Indication	Power ON	Green	
	Power OFF	No Light	
AGC Alarm	Not Active	—	Green
	Active 5~25 dB	—	Orange
	Active $\geq 30$ dB	—	Red
Smart LED Indication	smart mode	Green	
	Normal mode	No Light	
ISO LED Indication	Normal	—	Green
	Lower 60~75 dB	—	Orange
	Lower $\leq 55$ dB	—	Red
Power Supply		DC: 12V	
Power Consumption		< 25 W	

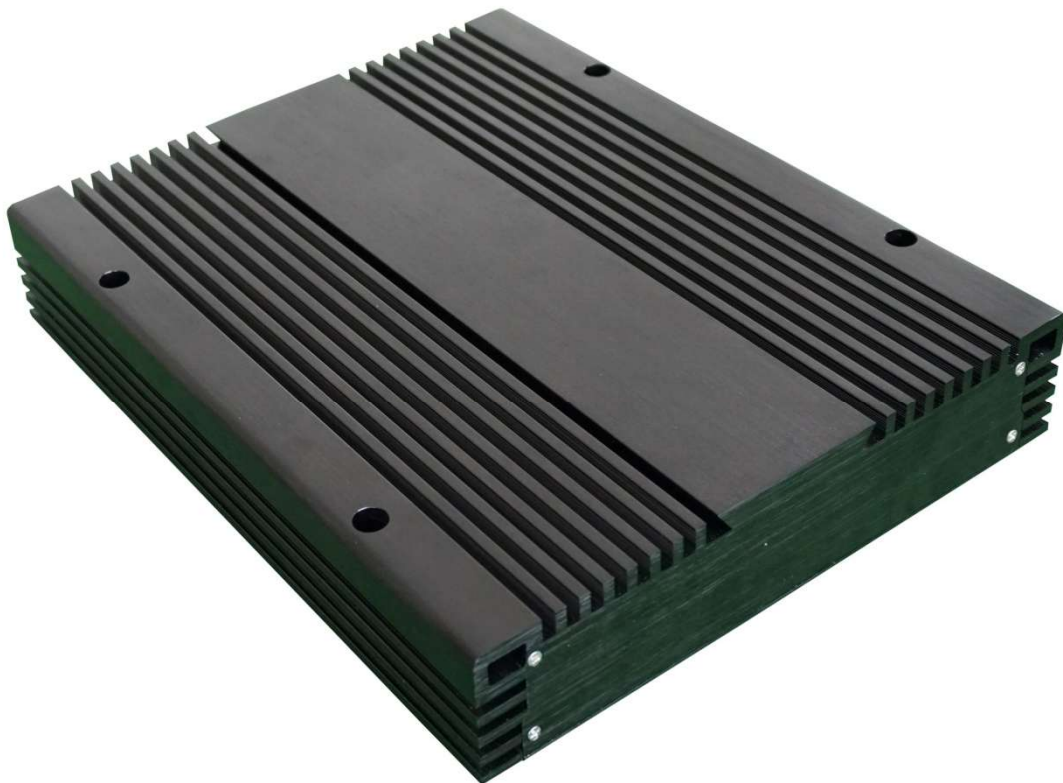
### 3.5 Machine Specifications

RF Connector	N-Female
Environment Conditions	IP40
Humidity	< 90%

### 3.6 Appearance and Constructure

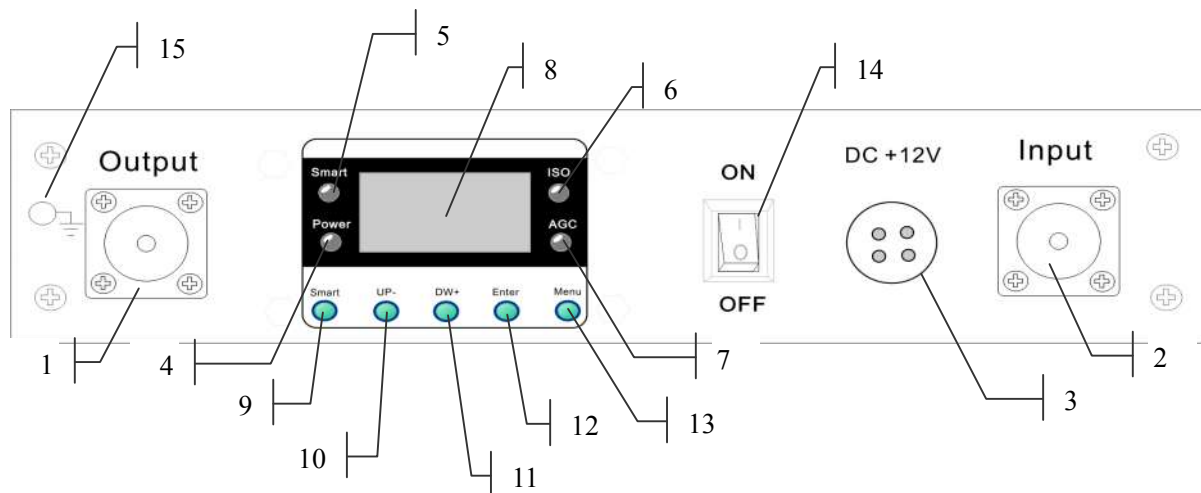


( Figure 3.2-1 Product appearance – Front Side)



(Figure 3.2-2 Product appearance – Back Side)





(Figure 3.5 panel connectors)

■ **Annotation:**

- 1 - Donor antenna connector (N-female)
- 2 - Service antenna connector (N-female)
- 3 - 12V DC power connector
- 4 - Power supply light
- 5 - Smart light
- 6 - ISO light
- 7 - AGC warning light
- 8 - LCD Display
- 9 - Smart mode start on button
- 10 - Up choice, reduce button
- 11 - Down choice, add button
- 12 - Confirm button
- 13 - Menu button
- 14 - Power switch
- 15 - Ground screw

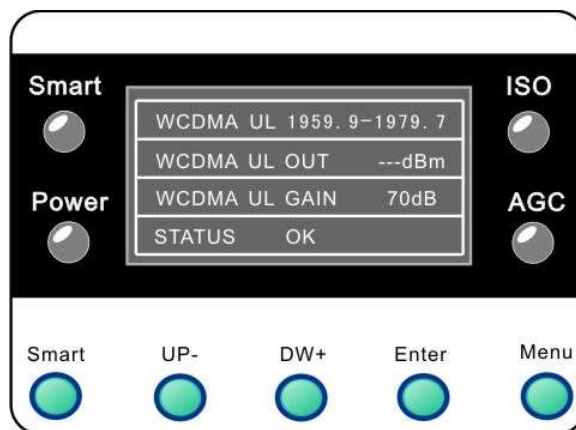
# Chapter 4 - Function Operation

## 4.1 Function of all buttons

- Smart button: Start on the smart mode
- UP- button: From down to up to choose buttons, set the timing reduce value
- DW+ button: From up to down to choose buttons, set the timing adding value
- Enter button: Confirm selective button, ensure to enter into the next options, confirm the setting value and go back to the upper interface,
- Menu button: Go back to the menu interface at any arbitrarily interfaces

## 4.2 Working mode

The default is normal mode, press the “Smart” button, enter into the smart mode, its light is on (as picture 4.2), and press the “Smart” button to drop out the Smart mode, go back to the manual mode, and the Smart mode light is off.



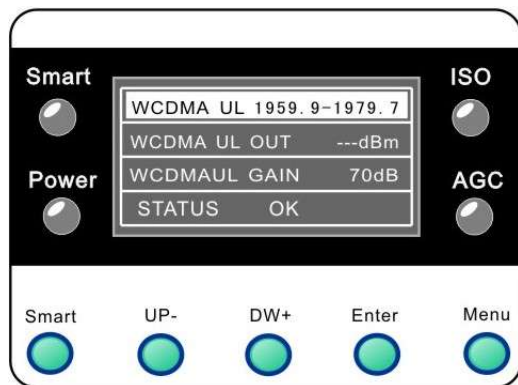
(Figure 4.2)

- Normal mode: Under this mode, according to the BTS signal, the AGC will auto control just to in case the repeater will not disturb the BTS, and you could according to the signal strengthen of the BTS, manual attenuate the UL and DL gain. You could set 30dB attenuation.
- Smart mode: Start the smart mode, the equipment could detect the

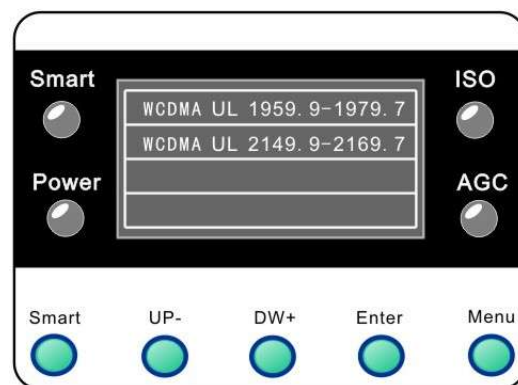
antenna Isolation automatically, and according to the real situation to eliminate automatically. Then according to the signal strengthen, the AGC will start on the auto control to ensure the signal amplify the largest capacity and make sure produce the lowest noise pollution to the BTS, reduce the interference from the repeater to the BTS.

### 4.3 Inquiry the Frequency

Press the “DW+” button, selective the frequency (as Figure 4.2-1), press the “Enter” button to enter into the frequency range to check the interface (as 4.2-2). Press the “Enter” button again and then return to the upper interface.



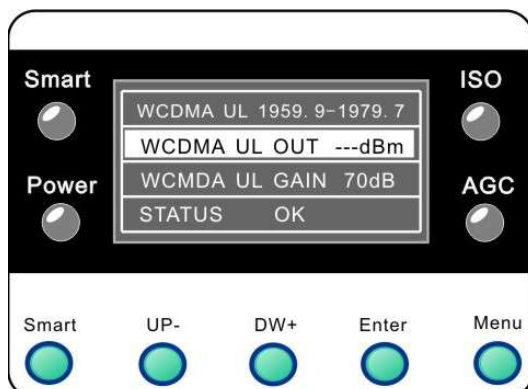
(Figure 4.3-1)



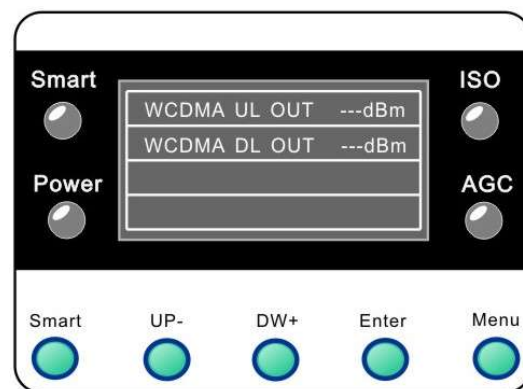
(Figure 4.3-2)

### 4.4 Inquiry Output power

Double press “DW+” button and select the output power (Figure 4.4-1), press the “Enter” button and get into the output power to see the interface (4.4-2), and then press the Enter button to return to the upper interface.



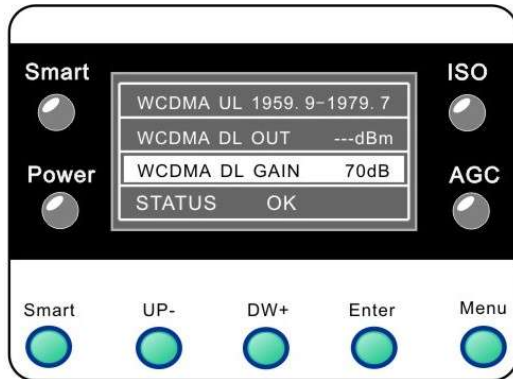
(Figure 4.4-1)



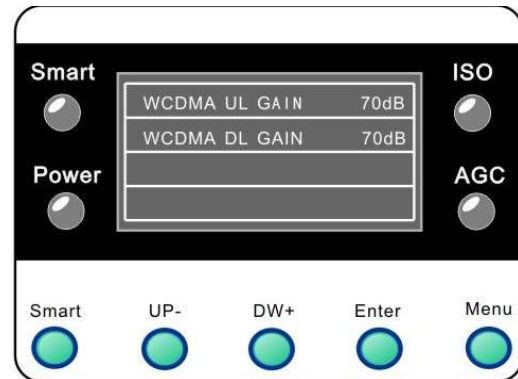
(Figure 4.4-2)

## 4.5 Inquiry Gain

Press the “DW+” button to select “Gain” (as 4.5-1), press “Enter” button and get into the Gain interface (4.5-2). Press the “Enter” button again and get back to the upper interface.



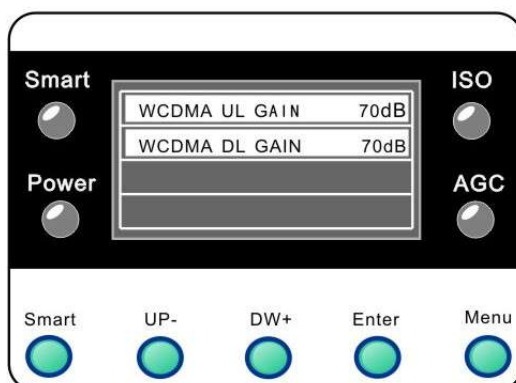
(Figure 4.5-1)



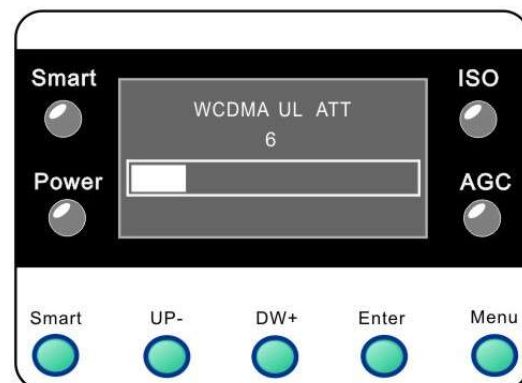
(Figure 4.5-2)

## 4.6 Set ATT

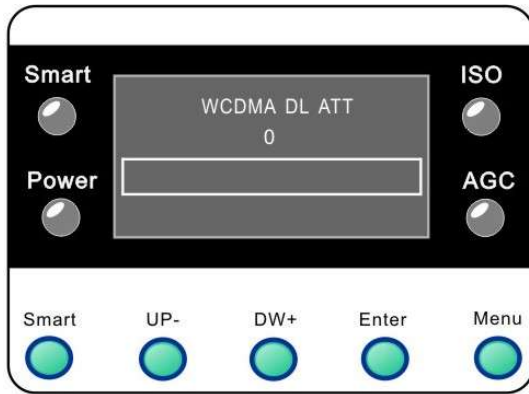
Under the normal mode, as 4.5 steps to get into the Gain interface, press “DW+” button to set the ATT operation items (as 4.6-1), press “Enter” button to get into the ATT setting interface (as 4.6-2), adjust values through the “UP-“ and “DW+” ( as 4.6-3), and press the “Enter” button to ensure the values and return to the upper interface(as 4.6-4).



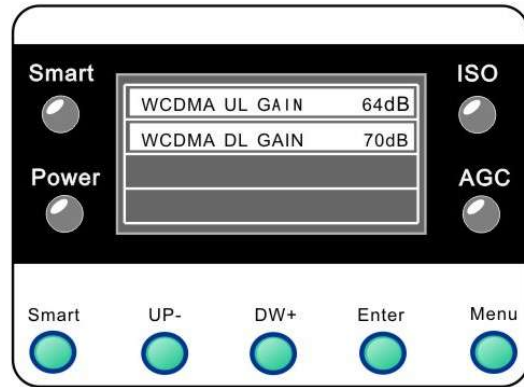
(Figure 4.6-1)



(Figure 4.6-2)



(Figure 4.6-3)

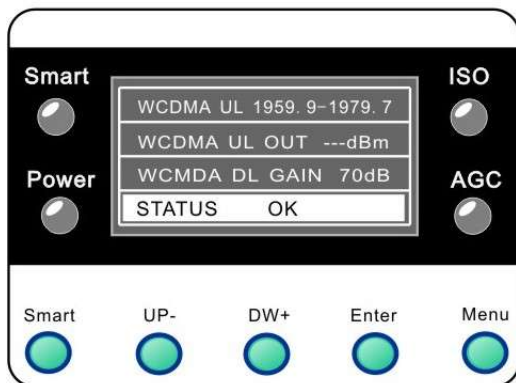


(Figure 4.6-4)

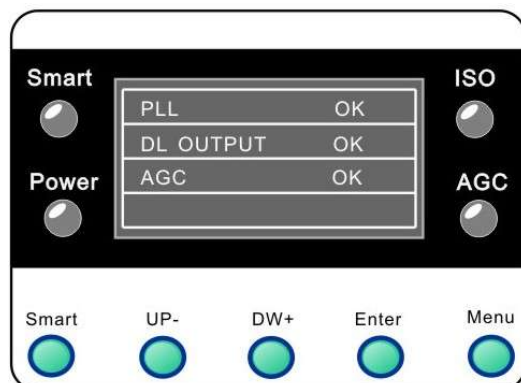
## 4.7 Query working status

### 4.7.1 Enter the query interface

Press “DW+” button selected this one (Figure 4.7.1-1), press “Enter” button to enter the status viewing interface (Figure 4.7.1-2). Press “Menu” button again to return to the up level interface.



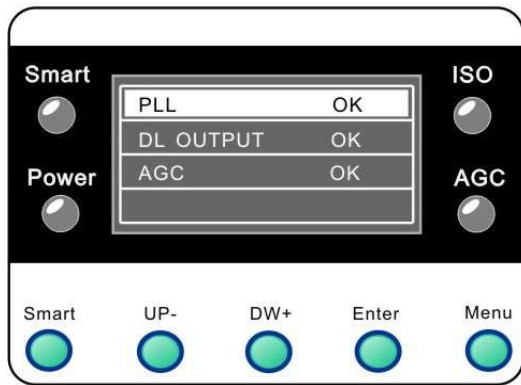
(Figure 4.7.1-1)



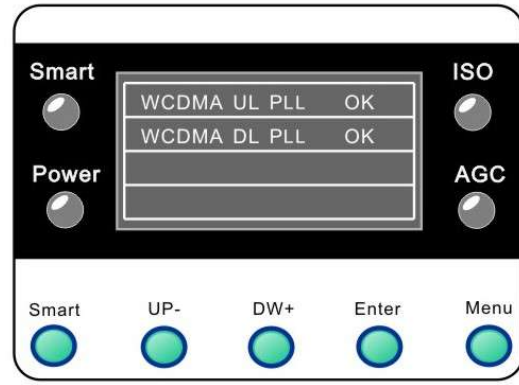
(Figure 4.7.1-2)

### 4.7.2 Check the state of phase-lock loop

Steps such as 4.7.1, enter the status viewing interface, press “DW +” button to select this one phase-locked loop (Figure 4.7.2-1), press “Enter” button to enter the phase-locked state interface (Figure 4.7.2-2), and then press “Enter” button to return to up level interface.



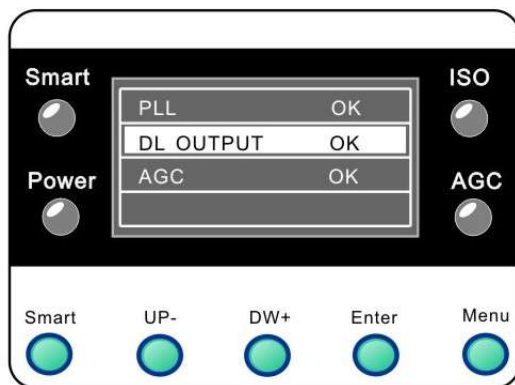
(Figure 4.7.2-1)



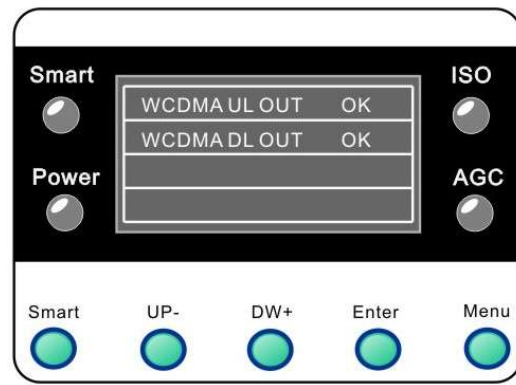
(Figure 4.7.2-2)

### 4.7.3 View Downlink output power status

Steps such as 4.7.1, enter the state viewing interface, press “DW+” button to select downlink power (Figure 4.7.3-1). Press “Enter” button to enter downlink power interface (Figure 4.7.3-2), then press “Enter” button to return to up level interface.



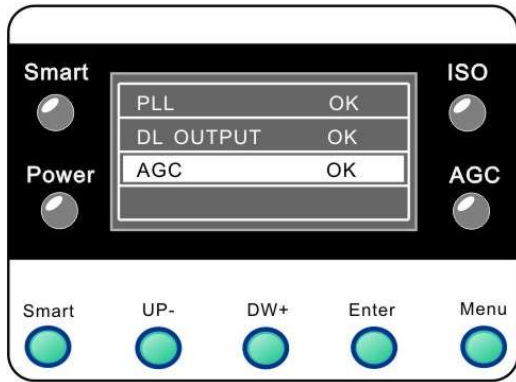
(Figure 4.7.3-1)



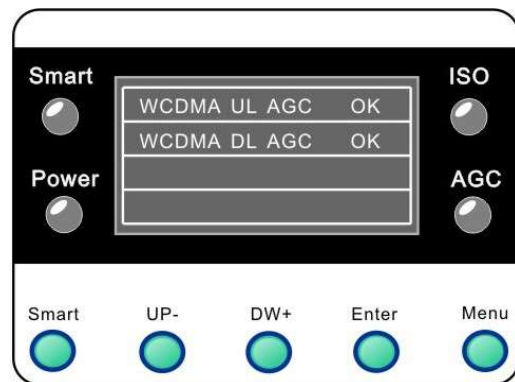
(Figure 4.7.3-2)

### 4.7.4 Check AGC status

Steps such as 4.7.1, enter the state viewing interface, press “DW+” button to select AGC this one (Figure 4.7.4-1), press “Enter” button to enter the AGC interface (Figure 4.7.4-2), then press “Enter” button to return the up level interface.



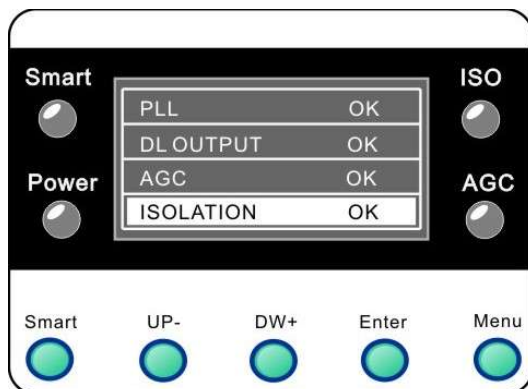
(Figure 4.7.4-1)



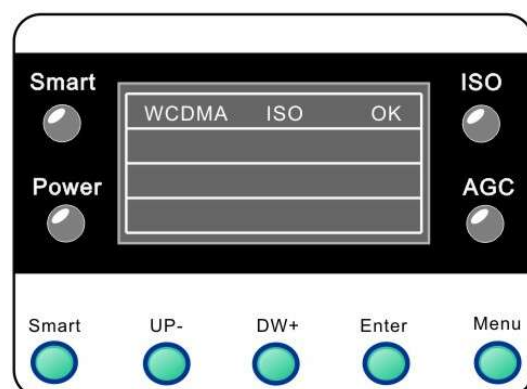
(Figure 4.7.4-2)

## 4.7.5 Check Isolation status

Steps such as 4.7.1, enter state viewing interface, press “DW+” button to select “ISOLATION” this one(Figure 4.7.5-1), press “Enter” button to enter ISOLATION interface (Figure 4.7.5-2), then press “Enter” button to return to the up level interface.



(Figure 4.7.5-1)



(Figure 4.7.5-2)

## 4.8 Indicator

- Power: Power indicator - when the equipment is powered on, green light is on; when it is powered off, green light is off.
- Smart: Intelligent mode indicator - intelligent mode debugging, green

light flashes; intelligent mode working, green light is on; existing intelligent mode, the light is off.

- ISO: Isolation indicator - Normal isolation, green light is on; Inadequate isolation, orange light is on; Isolation of alarm, red light is on; The isolation indicator only works in intelligent mode, and when exists intelligent mode, the lights are off.
- AGC: AGC indicator - When AGC is not turned on, green light is on; when AGC is turned on, orange light is on; when ACG alarms, red light is on.



# Chapter 5 - Installation

## 5.1 Installation Requirements

Before the installation and operation of the repeater, please read the first chapter of this manual "Safety Tips" carefully.

Before the equipment is powered on, be sure to check if the grounding line and power cord are connected properly.

### 5.1.1 Environment Requirement

- Installed in the environment that there's no corrosive gas and smoke or liquid leakage.
- Install on the wall that is waterproof and with lightning and sun protection and cool ventilation.
- Mounting height should be safe and be easy for cabling, heat dissipation and maintenance.
- There is stable and independent power supply.

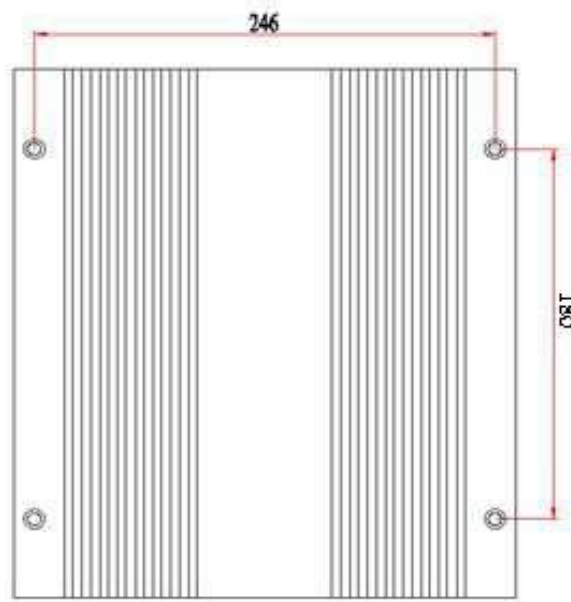
### 5.1.2 Installation tools

No	Items	Quantity	Remarks
1	Percussion drill	1	Drilling holes on wall, self-contained
2	Spanner	1	Reinforce the interface connection, self-contained
3	Expansion pipe, screw	4	Fasten the equipment, incidental
4	Test mobile	1	Test equipment installation effect , Self-contained
5	Multimeter	1	Test voltage and wiring condition , Self-contained
6	Screwdriver	1	Tighten the screws to fasten the equipment, Self-contained
7	Waterproof tape	some	To prevent the feeder interface into the water, Self-contained

## 5.2 Installation Steps

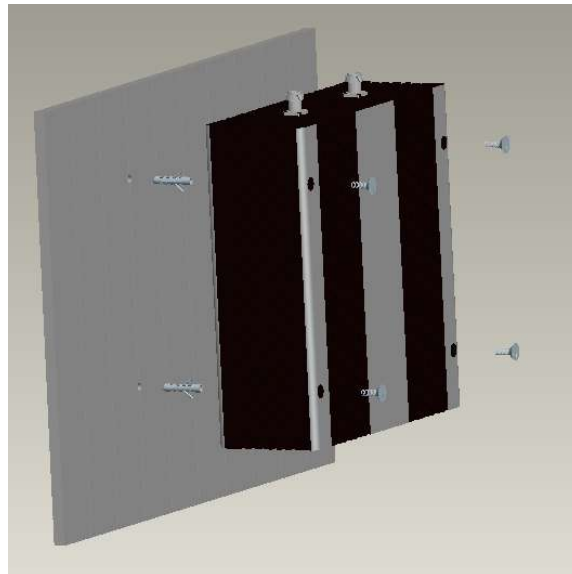
The repeater needs to be installed on a hard, firm and flat surface. Its installation steps are as follows

- According to the size and installation requirement of the repeater, select the appropriate place to install.
- According to the position of the shell holes, drill holes with the percussion drill, pore size  $\Phi 7$ , the hole location as below (Unit: mm):



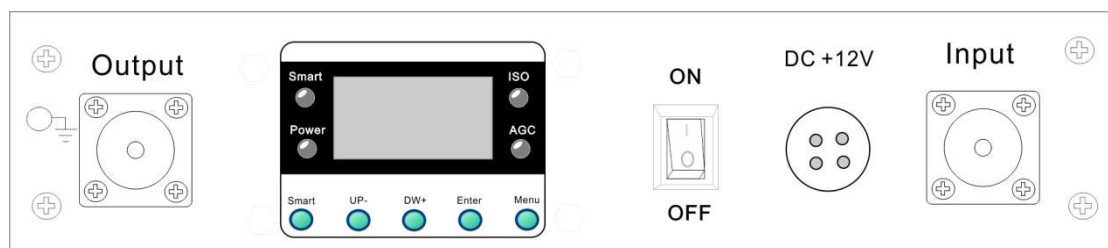
(Figure 5.2-1 Mounting hole dimensions)

- Put the  $\Phi 8$  expansion tube into the 4 holes.
- Shown as Figure 5.2-2, align the fixing holes of the repeater with the corresponding holes on wall, use the screwdriver screwing the four M6\*40 screws in expansion tube, to fasten the repeater.



(Figure 5.2-2 Repeater Installation Figure 5)

### 5.3 External Connection

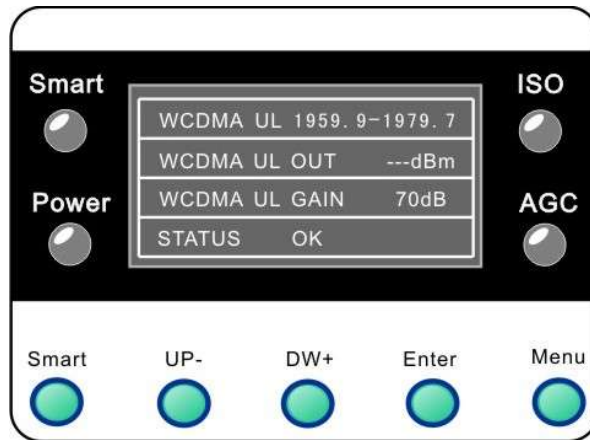


(Figure 5.3 Interface Panel Figure)

The interface panel of the repeater is shown as Figure 5.3. Before connecting with the feeder, please do not turn on the power. Antennas should be designed and installed by professionals. Please wrap waterproof tape at the interface to prevent water into the repeater during the feeder connection. The interface can be tightened using a wrench. Before the power supply is accessed, should use a multimeter to test the voltage, to make sure the voltage meets the standard. The external connection of the repeater is shown as follows.:

- Input: Connect the donor antenna feeder
- Output: Connect the service antenna feeder
- DC 12V: Connect the incidental power adapter. The rated input of the power adapter is AC power. AC power supply voltage range is 100~240V, and the frequency range is 50~60Hz.
- GND: Ground connection

## 5.4 Repeater Settings



(Figure 5.4 Repeater Display and Control Panel)

- After ensuring that the equipment is installed, that the power supply and GND meet the requirements, turn on the power. After 5 seconds, repeater initialization is complete and it enters the normal working state.
- Observation and adjustment indicator and display (adjustment method, refer to Chapter IV):
  - 1) Power indicator: Green
  - 2) AGC indicator: Green or orange.
  - 3) If the indicators appear abnormal display, and it can not be solved by normal adjustment method, please contact the supplier.
- Using the test mobile to verify the installation effect and the installation of the repeater is complete.

# Chapter 6 Maintenance

## 6.1 Operation and Maintenance

### ■ Power Supply

- Please make sure the voltage and frequency comply with the repeater requirement.

### ■ Component Replacement

- Please do not maintain or replace components by yourself, otherwise may get an electric shock. Only the authorized professional can maintain and replace the components.

### ■ Waterproof and Moist proof

- Please do not turn on or off the booster in moist environment when its door is opened.

## 6.2 Attention

### ■ Switch off is recommended during following situations:

- The power supply is not normal.
- Liquid flows into the equipment.
- Working conditions is not normal,(overheating, abnormal smelling, abnormal sundries).
- Performance decrease.
- Near to fire.