PREFACE

Thank you for choosing our products, we will try our best to service you.

This is a high-power wireless broadband MMDS transmission equipment, the machine's gain is medium, with a high efficiency nucleus module and a low heat. It's your best choice with its excellent performance.

In order to gain its best performance, plesae read introduction carefully before you install and operate the equipment, and keep it for future reference.

Please open package and check accessories carefully in the following list.

	Power line	1
	User manual	1

SAFETY TIPS

	Before you use the equipment, plesae read this user manual carefully to operate properly.
	Please install the equipment according to the installation introduction.
	Non-professionals do not operate the equipment without permission.
	Please make full ligHPning measures to avoid damage to equipment.
	Please note ventilation and avoid vigorous shaking when place the equipment.
	When the machine is moved to another place where there is a large difference in temperature, please open it at interval 30 minutes.
	Do not disassemble or change the internal wiring of the equipment
	When open the machine, with caution to prevent electric shock .
	This equipment is high-power RF devices, please note that the relevant security

PRODUCT INTRODUCTION

This equipment is an indoor MMDS broadband transmitter. The system appearance looks as below

Figure 1 Indoor Transmitter Appearance

Transmitting Module Diagram

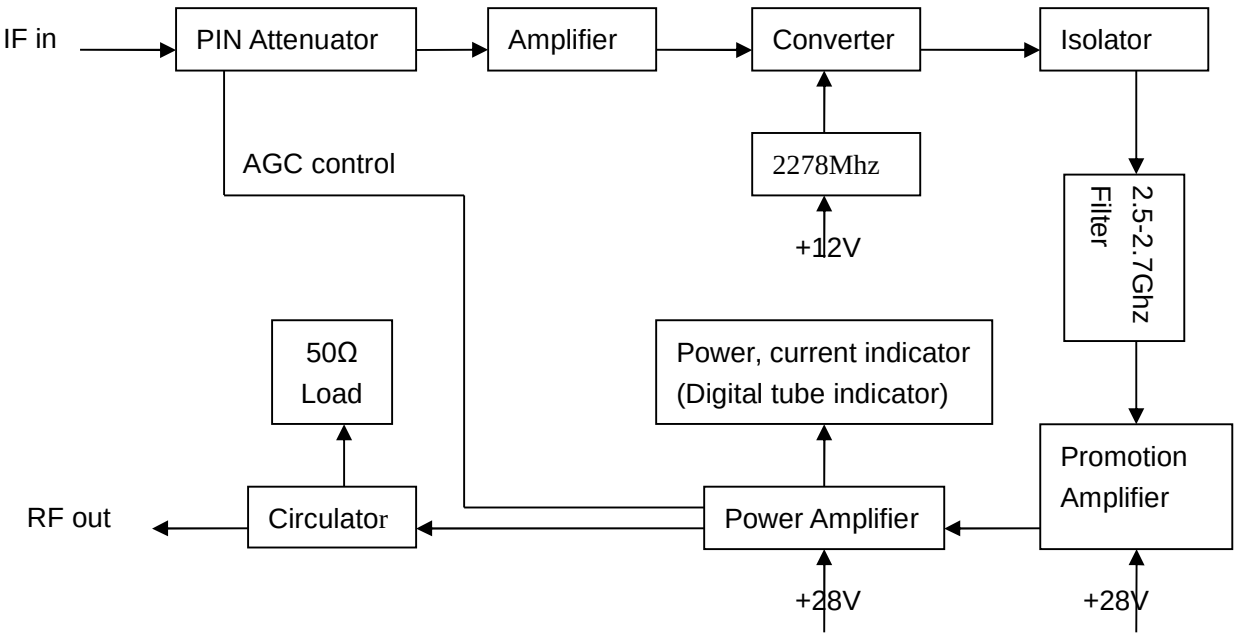


Figure2 Transmitter Block Diagram

1. Filter module: Filtering out the IF signal, local oscillator signal and sideband signal, Sending 2.5 ~ 2.7GHz signal to power amplifier

2. AGC amplifier module: the module is composed of IF amplifier, AGC attenuation control.

3. Promotion Amplifier Module: The module is composed of 5 level amplifying tube, which only amplify 2.5 ~ 2.7GHz signal, The module has function of power detection and current detection.

4. Final-Step Amplifier Module: Adopt balanced amplification to improve reliability. Each individual power supply with a temperature protection. The module has function of power detection and current detection, and output return loss detection. The supply voltage is +28 V.

PRODUCT PARAMETERS

Characteristics:

The main feature of this device is that detect the state of indoor transmitter, such as working voltage, transmitting power, working temperature and so on through the LCD and touch screen at the front panel.

Comprehensive self-diagnostic, protection function, the user can monitor the working status timely.

Ultra-low local oscillator phase noise, ensure high-quality digital signals transmission.

Compatible with different digital modulation modes

Ultra-linear power amplifier design, low non-linear distortion, transmission power upgraded, ensuring high-quality signals for remote users.

Modular design for easy maintenance and replacement.

T y p e	**HP600FS-200W(indoor type)**
Analog Indicator	
1dB compressed point power	200W
Output frequency range	2500～2700 MHz
Power output stability（ALC）	＜±0.5dB
Local oscillator frequency	2278MHz
Input frequency range	222～422MHz
Maximum Gain	65dB
In-band distortion and harmonic wave parasitic	＜-60dBc
Out of band distortion parasitic	＜-60dBc
Group delay	＜±10ns
Frame feature（within200 MHz bandwidth）	±1.0dB
Noise coefficient	＜10dB
Input level (ALC)	80～100dBuv
Input return loss	15dB
Output return loss	18dB
Digital Indicators	
Digital average power	50W(QPSK); 30W(DVB-T)
Output spectrum ratio (QAM/DVB-T 时)	＜-40dBc
Frequency response (Within 8 MHz bandwidth)	＜±0.2dB
Input signal modulation mode	QPSK,64/256 QAM,COFDM,AM,FM,DVB-T,DMB-T/H
Vector Error Rate(EVM)	＜2%
Specification	
Power consumption at 25℃	28V/12A,
Working temperature	-20°～ +50℃ （outdoor）
Input connector	50Ω/N-female
Output connector	50Ω/N-female
Humidity	100%
Cooling	Fan convection cooling
Working voltage	220VAC±10%/50Hz
Installation	Refer to “installation instruction”
Dimension	550×485×178mm

OPERATION MANUAL

Preparations before start of

Appropriate Input Level

Adjust the input signal level to 70-95dBμV for input level. If input level is too great will cause the saturation of inverter and result in nonlinear distortion, and damage the power amplifier.

Conncet the output load

Don’t open the device when the output port open, RF output port can connect 50Ω load impendance or 50Ω antenna feeding system.

Connect input signal

Connect the input cable, make sure the output impedance is a 50Ω 300W load or 50Ω antenna feeding system.

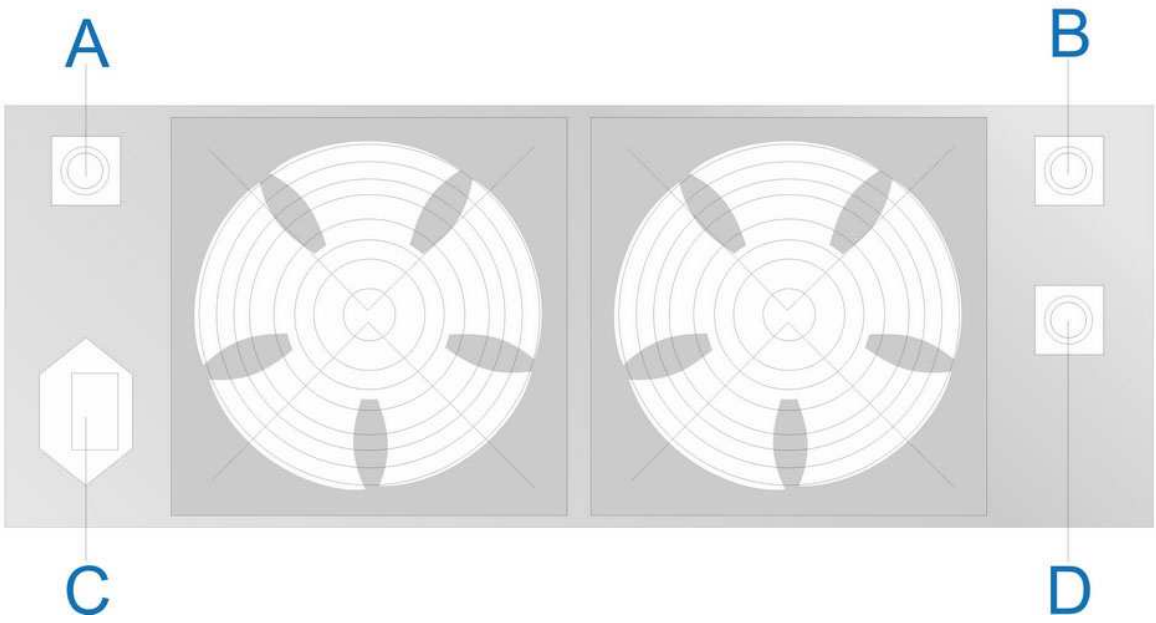


Figure 3 Transmitter Back Interface Port

A: Signal input interface

B: Signal output interface (connect antenna)

C: 220V AC power supply socket and fuse.

D: signal output detection port. (Relative -50dB signal output port attenuation)

Observe working status

Making preparations for observing the MMDS transmitter working status when open the power.

Display Front Panel

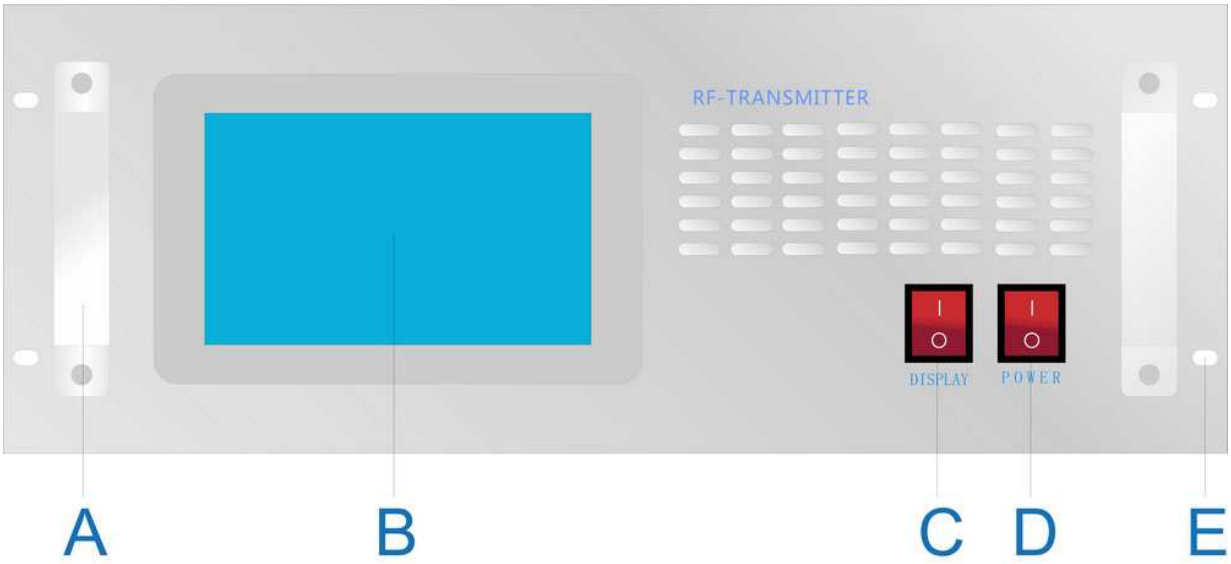


Figure4 Transmitter Front Panel Display

A: Handle(×2);

B: 7inch TFT LCD and touch screen. (short as “touch screen” in the following manual.)

C: Touch Screen switch; **[notes: please turn off this switch when don’t need monitor the transmitter status]**

D: Power supply switch;

E: Fixed hole(×4).

Touch Screen User Instruction:

1. First Boot:

When the user open the machine first time, the system will display the transmitter information (including products label, equipment type, working frequency, center frequency and digital power watt and so on). Click on the “OK” button to confirm.

After confirmation, it enter the language configuration, click on the “CHINESE” or “ENGLISH” button to select the corresponding system language. After configuration, user can enter the standby main screen to view the transmitter’s working status.

[Notes] *only in the first boot need above configuration, if user want to change the system language, please choose "System SET" to click on the "SWITCH" under the menu of the management mode.*

2. Standby Mode

Besides the first boot, the system will enter this mode automatically after the reboot, displaying a standby screen.

At standby mode, it displays following four parameters: "Final Power/P2", "Final Current/ID2", "Return Loss/RL", "working temperature/TEMP".

Touch HAND SHAPE ZONE, enter the management mode.

3. Management Mode

From the standby mode to management mode, It needs input administrator password, the original password is "100000". It can be changed under the menu of "system setting".

Notes: Be sure remember the password, otherwise will not able to enter the management mode.

At the home of the management mode, all the transmitter parameters display on the left side, the control panel on the rigHP side. Bottom is the prompt box, displaying whether the transmitter working, with or without warning.

The Control panel including following six buttons: "Power ADJ", "Alarm Check", "Alarm SET", "System SET", "Device INFO", "EXIT".

(1): Power ADJ

At this functional interface, click button "UP or DOWN" to adjust the transmitter's power watt.

Click "MAX" can output the transmitter's maximum power watt.

Click "MIN" CAN output the transmitter's minimum power watt.

After adjust the corresponding output power and parameter, please click "SAVE" button to save the current status, otherwise it will restore the original working status after exit or shutdown.

Click "BACK" button to exit the home of management mode.

(2) Alarm Check

When the transmitter monitoring the corresponding parameter exceeds the preset warning value, it will automatically turn off the promotional power amplifier and final power amplifier, so that doesn't work to protect the power amplifier module. When there is a alarm, the system will pop out a prompt box to display the warming, in order to troubleshoot and solve the transmitter's abnormal.

After solving the corresponding fault, please click on the button to clear the alarm and open the transmitter.

[Notes]: *After solving corresponding alarm, user must press this button to clear alarm, otherwise the transmitter will not open automatically even if after troubleshooting.*

(3) Alarm SET

Set the following five main alarm values of transmitter, including: "Over Voltage", "Over Current", "Over RL", "Over Power", "Over TEMP".

Click on the corresponding parameter warning value of "INPUT" button, after the input box effecting, input the number "0-9" and backspace "←" on the keyboard, then input the settings, click "OK" to complete the setting.

Click "Default" button, all the parameters will be set as the preset value.

Click "BACK" button to exit the home of management mode.

[Notes]: *The Over Voltage can be set to 35, the Over Current can be set to 21, the Over LR can be set to -6, the Over Power can be set to 120, the Over TEMP can be set to 80. When all the setting value exceeds the maximum value, the system will pop out a "setting error".*

(4) System SET

Under the menu of System SET, it can set administrator password and system time.

Click on the corresponding "INPUT" button, after the input box effecting, input the number from "0-9" and the backspace"←" on the input panel, then input the setting value, click "OK" to complete the setting.

Click "SWITCH" button on the menu of language setting, to change the system language.

Click "BACK" button to exit the home of management mode.

(5) Device INFO

It can check the transmitter's detailed information.

Click "BACK" button to exit the home of management mode.

(6) EXIT

Exit the management mode, enter the standby screen.

Appendix: transmitter working parameter

1. Working voltage/VPS(Voltage Power Supply): display the supply voltage of final power amplifier, 28.00V is regular.

2. LOCK Voltage: display the supply voltage of other functional modules, 4.5V is regular.

3. Input level/PIN (Input Voltage Level): input signal level.

4. Automatic Gain Control (AGC): When AGC ligHP have voltage indication, that's mean the input level is big enough to control the gain and the level.

5. Driver PA Current (ID1): Shows the working current of promotion amplifier, 1.5-3.8A is regular.

6. Driver PA Output Power (P1): Shows the output power of the promotion amplifier.

7. Final PA Current (ID2): Shows the working current of final amplifier, 3.0-18.5A is regular. Working current will be changed according to the power changes, the static current is 3-6A when there is no signals.

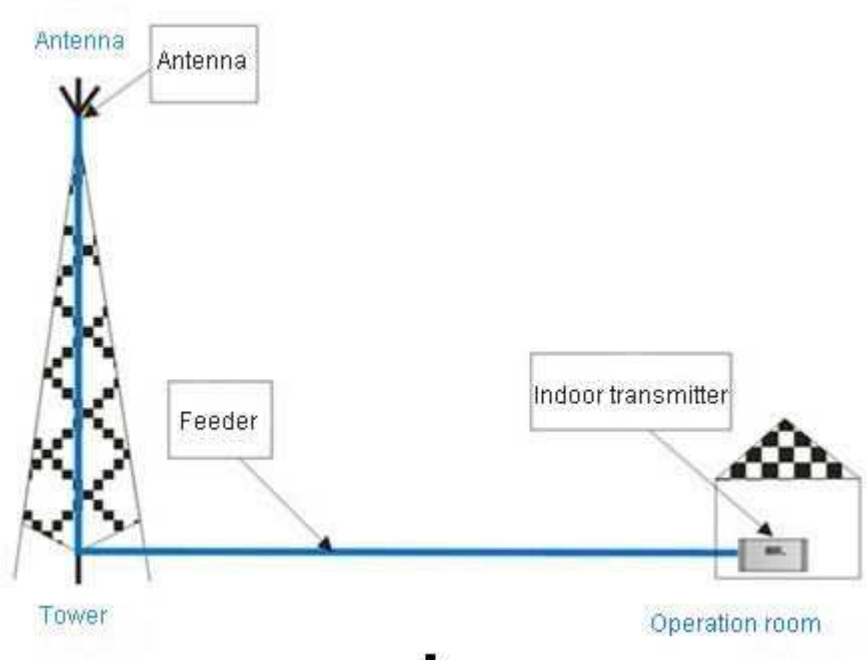
8. Final PA Output Power (P2): Shows the output power of the final amplifier, that is also the output power of the device.

9. Output Return Loss (RL): Shows the return Loss of the output port.

10. Operating Temperature (TEMP): Shows the final amplifier's working temperature.

INSTALLATION DESCRIPTION

System Installation Diagram



WARNING: For transmitting system's usage and maintenance, the indoor transmitter should be used under -5℃~45℃, and it should be used under good ventilation and rain-proof environment. Keep voltage steady during using. The whole system should be ligHPing protection, especially on the mountain areas.

Installation Site Selection

There is no huge barrier from the selected site to coverage areas.

Provide tall tower for installing omni-directional antenna.

Antenna Selection

Choose suitable antenna according to coverage requires, the antenna gain is generally 8-14dBi, 3m should be kept from transmitting antenna to metal. When different antennas are installed on one tower, the antenna should be kept 3-4m in vertical space to reduce the mutual influence.

Power Supply

Relay station with electricity supply, the solar power is selected for no electricity supply areas.

LigHPning Protection

The main reason for relay station damage is the induction ligHPning of electricity supply. The relay station internal power supply is equipped with anti-surge device, whose grounding terminal connect with the chassis directly. There is external grounding terminal on the chassis. When installing, the grounding terminal and the feeder should be in good connection with grounding cable. When field installing, the resistance of grounding cable should be within 10 ohms.

Relay Station Installation

Recheck the parts that have been installed.

Recheck the nut fixed tigHPly.

Recheck the joints fixed tigHPly, whether there is short circuit or open circuit.

System Installation

The transmitting antenna connects with the RF output interface.

The receiving antenna or coaxial cable connects with RF output interface.

The 220V power line is inserted into relay station power socket.

Chassis' grounding terminal access to grounding line, and the grounding resistance is required to be <15Ω.

Key Points for Relay Station LigHPing Protection

The relay station installed on the tower can directly access the tower grounding line.

The relay station installed on the hills, the grounding line can be made around the relay station. Firstly, dig trench with 80~100cm deep, put the galvanized angle iron into ground, and weld the flat iron with angle iron tigHPly by welding machine, coating anticorrosive paint on the welding place, and then cover them with soil. Weld a flat iron on the Repeater Platform on the both left and rigHP side.

The feeder is 2 meters away from chassis with a grounding-chip.

The ligHPning is higher than the antenna, the antenna placed within 45° of ligHPning protection zone.

Installation Methods

1. In order to prevent the display confusion, the data exchange should not be too fast, so that press SWITCH key within 1s.

2. The modulation signal from the input port of indoor transmitter, the modulation signal amplitude is between 80~90BuV. For multiple modulation signals, modulate each modulation signals to the same by spectrum analyzer after synthesizing, the high-end reaches to 0.5~1.0dB.

Notices

1. The back panel of Chassis with output power adjustment potentiometer used to control the output level, clockwise increases. Factory tune is 50W, the adjustment potentiometer works only when the AGC works (AGC with voltage indication). The factory tune is the best state, it do not need adjust.

2. The preamplifier in the Chassis has automatic AGC/manual MGC switch, normally it is placed on the AGC. When it turns in MGC, it means that the system add a Variable Attenuator. When MGC potentiometer put the clockwise the maximum, the attenuation is minimum. Trimming potentiometer counterclockwise will increase the attenuator, the maximal attenuation is 25dB. The MGC is used when the system is instable and easy to occur self-excitation, it should be placed AGC position after commissioning.