TD_LTE Micro Repeater Datasheet

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Maipu values and appreciates comments you may have concerning our products or this document. Please address comments to:

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Overview

To meet the customer demands of the carrier, fulfill the service promise of "Call anytime and anywhere", and improve the brand competition, the carrier should set up the base stations anytime and anywhere. But the mobile communication adopts the wireless media to transmit information. The electromagnetic waves are lost greatly after passing various complicated environment during the transmission, and as a result, the signal is weak, even no signal in many small areas. TD-LTE micro repeater is one valid scheme of filling the blind zone of the indoor mobile communication coverage.

TD-LTE micro repeater is one device of magnifying the mobile communication signal bi-directionally, mainly used to strengthen the indoor signals, magnify the uplink and downlink link signals bi-directionally, cover the blind area of the mobile communication efficiently, and expand the coverage, so as to improve the mobile communication service quality.

TD-LTE micro repeater has the features of simple structure, low cost, small volume, light weight, convenient to install, flexible network design, simple networking mode, high system reliability, and convenient system capacity expansion. It can be widely used to the small areas hard to cover.

TD-LTE micro repeater is applicable to the conference room, small supermarket, small shopping centers, offices, small public areas, residential homes, basements, high-rise elevators, enclosed entertainment, villa, underground parking, villages, and other areas.

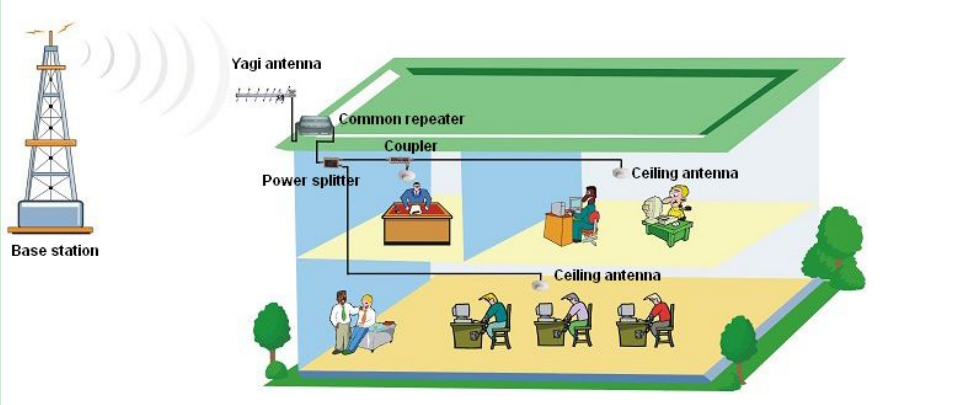
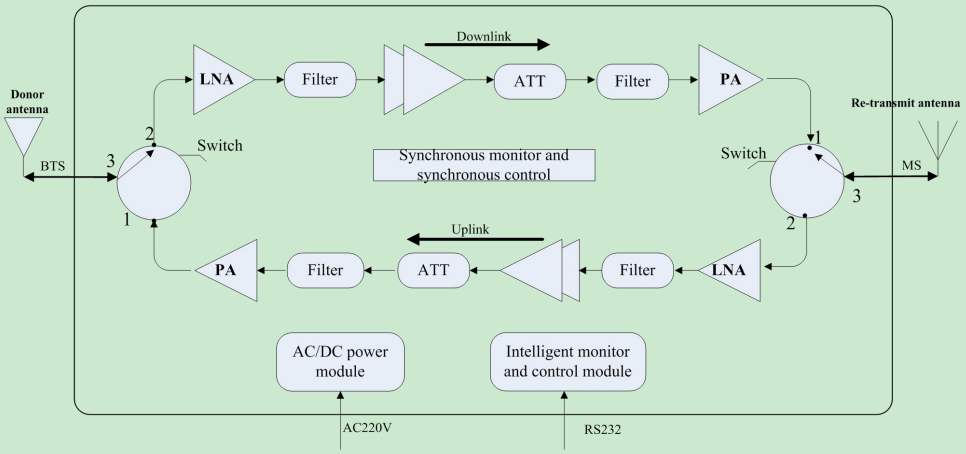


Figure1 TD-LTE micro repeater work diagram

Product Principle and Features

Work Principle of TD-LTE Micro Repeater

The base station signals received by the donor antenna are transmitted to the TD-LTE micro repeater via the cables for low-noise amplification and linear amplification. Meanwhile, the micro repeater detects and analyzes the envelops of the base station signals, so as to get the TD-LTE frame synchronization signal, locate the uplink and downlink time switching point correctly, and control the downlink and uplink link time-shared work. When the downlink link works, the TD-LTE micro repeater amplifies the received base station signals and transmits to the covered area via the coverage antenna and let the mobile phone user receive; when the uplink link works, the signals transmitted by the mobile phone enter the micro repeater via the coverage antenna for low-noise amplification and linear amplification, and then are transmitted to the base station via the donor antenna.



TD-LTE Micro Repeater Features

The output powers of TD-LTE micro repeater series products include 0.02W, 0.05W, and 0.1W, meeting different environment requirements. The main features include:

1. Synchronization

The micro repeater adopts the envelop detection synchronization mode. Through special related analysis processing, it has the features of high synchronization sensitivity and wide synchronization scope. Meanwhile, it has the functions of setting the synchronization threshold and keeping synchronous, convenient for being applied to different environments.

2. Timeslot power control

The micro repeater has the digital ASLC and analog ALC functions. With the combine control of the digital ASLC and analog ALC, the output total power level and timeslot power level can be adjusted continuously and make the amplitude stable automatically. Meanwhile, it has the timeslot attenuation function, ensuring the high reliability and high stability of the system.

3. Anti-interference capability

The micro repeater uses the private filter and has the strong anti-outband signal interference capability; after being processed by the self-adaption, the synchronization circuit can suppress the interference of the inband signals for the synchronization effectively and has the strong interference capability for the inband signals; the synchronization circuit has the maintaining capability and can suppress the strong moment interference signals from outside effectively.

4. Uplink auto disconnection function

The micro repeater automatically detects the users in the covered area. If finding that no user is using in the covered area, disconnect the uplink amplifying channel automatically, ensuring no interference for the network. When finding user call in the network, open the uplink amplifying channel automatically, ensuring that the user can use well.

5. Uplink and downlink auto gain balancing function

After the micro repeater is installed and powered on, the system automatically detects the input power and controls the output power. After calculating the downlink gain of the system, adjust the uplink again of the

system automatically. Keep the amplifying balance of the system, realizing the uplink and downlink auto linkage debugging. The gain of the auto control system is smaller than the path attenuation of the signal, ensuring that the product has no interference noise for the network and one base station can carry multiple products.

6. Self-excitation detection eliminating function

After the micro repeater is installed, detect the isolation of the antenna automatically. If the antenna isolation does not meet the installation requirement of the system, the device has the indicator to provide indication and controls the device to reduce the gain automatically until the device does not amplification self-excitation. Through changing the antenna isolation, the system automatically opens the attenuation gain and recovers the best work status, so as to protect the device security and prevent the network from being interfered.

7. Monitor function

The micro repeater has the perfect monitoring function. It can expand the remote centralized network management and provide the power, output signal and alarm indication; It can use the serial port RS232 to maintain the device locally and also can adopt the GSM network to realize the remote centralized network management monitoring via the remote module, which is convenient for the engineering application and later operation and maintenance management.

Technical Indexes

Main Technical Indexes of TD-LTE Micro Repeater

Project		Index Requirement	
		Uplink	Downlink
Frequency range (MHz) (only support one band)		D band: 2575-2635MHz E frequency: 2320-2370MHz F band: 1880-1900MHz	D band: 2575-2635MHz E frequency: 2320-2370MHz F band: 1880-1900MHz
Gain (dB)		70dB (±3)	70dB (±3)
Inband flatness (dB)		≦4dB	≦4dB
Max. power (dBm)		13/17/20dBm (±2)	13/17/20dBm (±2)
Gain adjusting range and step length		15dB, step length1dB	15dB, step length1dB
Gain adjusting error		≤±1.5dB，	≤±1.5dB，
Synchronization range		————	-85dBm— -25dBm
Noise factor (dB)		≤6	≤6
Error vector magnitude (EVM)		≤6%	≤6%
Peak code domain error (PCDE)		<-33dB	<-33dB
ALC		Input change≧10dB, output change <2dB	
standing wave ratio		≤2	
Delay (us)		≤5	
Stray radiation	9kHz — 1GHz	-36dBm/1kHz	
	1GHz— 12.75GHz (outband)	- 30dBm/1MHz	
Intermodulation product	9kHz—1GHz	-36dBm/3KHz	
	1GH— 12.75GHz (outband)	-30dBm/3KHz	
Timeslot adjusting		Manual setting/network management configuration; by default, it is 1:3 (uplink: downlink) By default, the special sub frame configuration is 10:2:2	
Max. non-destructive input level (dBm)		-20dBm	
Function setting			
Downlink synchronization enabling/disabling threshold	Enabling threshold	Default: -86dBm	
	Disabling threshold	Default: -89dBm	
Uplink enabling	Range: -	Default: -82dBm	

threshold	90dBm ─ -60dBm	

Monitor Parameters of TD-LTE Micro Repeater

TD-LTE micro repeater has the local monitoring and remote monitoring functions. The local monitoring: RS-232; the remote monitoring: wireless GSM MODEM.

The main monitoring data is as follows:

No.	Name	Demand	No.	Name	Demand
Network management parameters					
1	Device information	√	6	Report communication mode	√
2	Station No.	√	7	Query/setting number1-5	√
3	Device No.	√	8	Device monitoring parameter list	√
4	Short message center service No.	√	9	Remote data communication module	√
5	Report number	√	10		√
Sampling parameters					
1	Downlink output power level	√	6	Conventional timeslot 0, 2-6 downlink input power level	√
2	Downlink input power level	√	7	Conventional timeslot 1-6 uplink output power level	√
3	Uplink output power level	√	8	Conventional timeslot 0, 2-6 downlink output power level	√
4	Uplink theoretical gain	√	9	Downlink input pilot power level	√
	Downlink actual gain	√			
5	Source information	√	10	Downlink output pilot power level	√
Setting parameters					
1	Uplink attenuation value	√	5	Alarm enabling	√
2	Downlink attenuation value	√	6	RF signal switch	
3	Downlink output over-power threshold	√	7	TD-LTE frame second timeslot switching point	√
4	Downlink output less-power threshold	√	8		√
Alarm parameters					
1	Self-excitation alarm	√	5	Inspection report	√

No.	Name	Demand	No.	Name	Demand
2	Troubleshooting report	√	6	Downlink output over-power alarm	√
3	Opening report	√	7	Downlink output less-power alarm	√
4	Configuration change	√	8	TD-LTE LFA	√

TD-LTE Micro Repeater Figure and Device Interface

TD-LTE Micro Repeater Figure

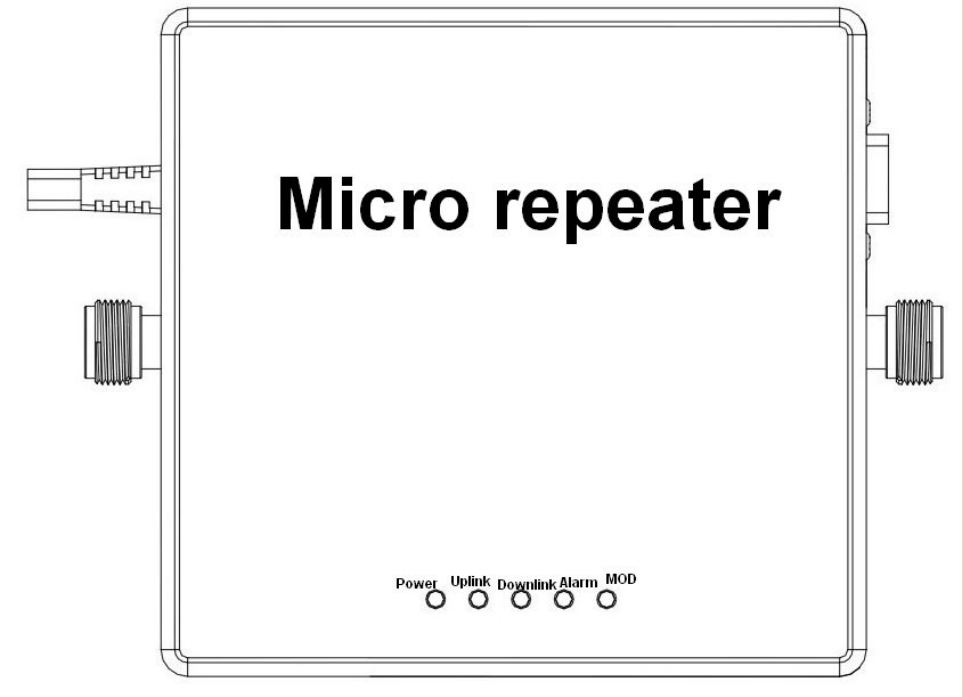


Figure 2 Micro Repeater Figure

External Interface Definition of TD-LTE Micro Repeater

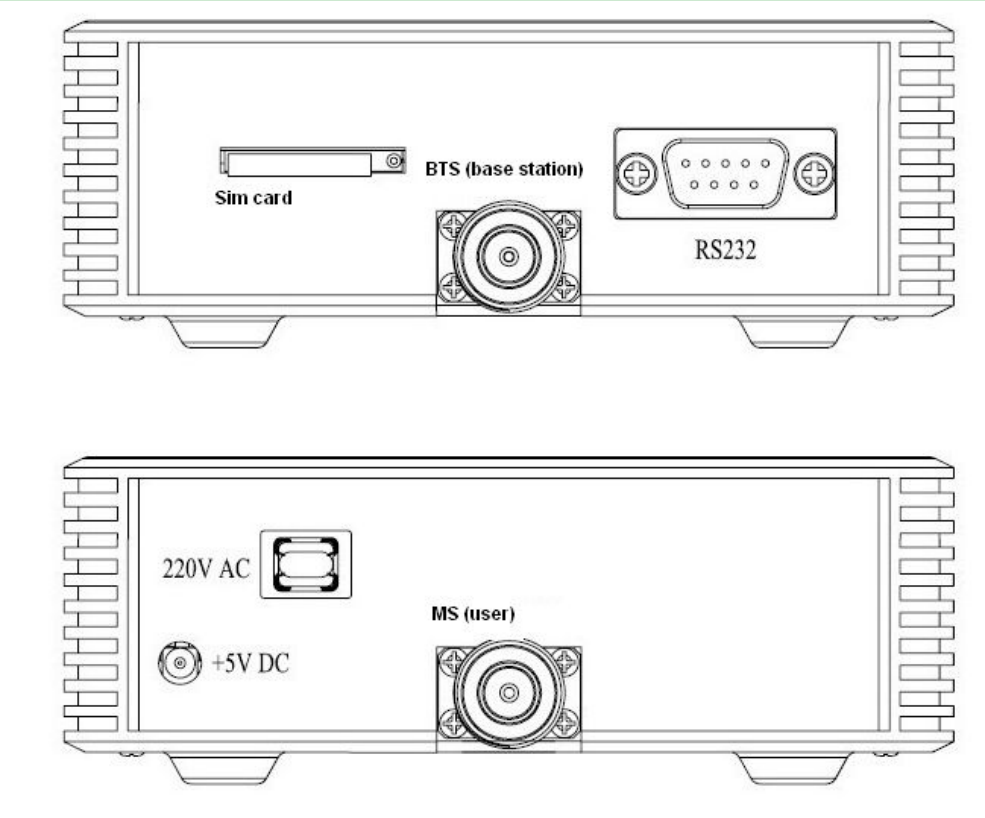


Figure 3 External interface

External interface definition:

1: RS232——Monitor interface DB9 (female)
2: BTS/MS——RF interface N-F
3: SIM card slot——Inserted with China Mobile GSM card
4: +5V DC—— Power socket (with the adapter)
5: 220V AC——power cable (directly connected with AC220V power)

Note: If the device has the accessory adapter, the micro repeater adopts the adapter to provide power; if the device is directly connected with the power cable, the micro repeater adopts the AC 220V to provide power.

RS232 Monitoring Interface Definition

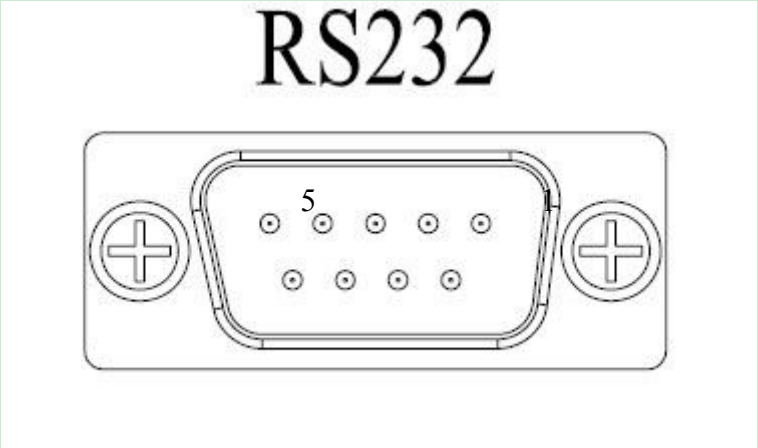
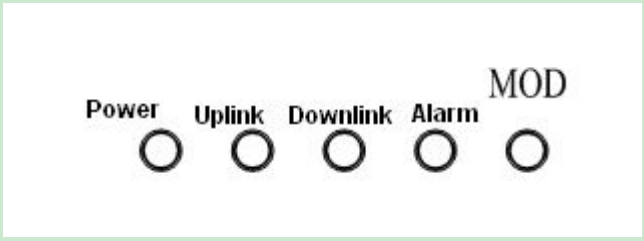


Figure 4 RS232 interface diagram

RS232 pin definition:

Pin No.	Pin definition	Remarks
1, 4, 6, 7, 8, 9	NC	
2	TX	
3	RX	
5	GND	

Indicator LED Definition



Work Indicator	Status	Description
Power (green)	On	The power is normal
	Off	The power is faulty
Uplink (green)	On	The uplink switch is enabled
	Off	The uplink switch is disabled
Downlink (green)	On	Synchronized, working normally; input field strength is larger than -60dBm.
	Flash fast	Synchronized; the input field strength is -80dBm – -60dBm

	Flash slowly	Synchronized; the input field strength is smaller than -80dBm
	Off	No signal input, un-synchronized
Alarm (red)	On	Isolation is not enough/ Self-excitation detection indication
	Flash	The input power is too large, adjust the antenna angle
	Off	No fault
MOD (green)	Flash	Refer to the note
	Off	MODEM is not enabled

Note: MOD indicator——When MODEM is not installed with the SIM card, the flashing frequency of the indicator is 1s/times after being powered on and MODEM is normal; when MODEM is installed with the SIM card, the flashing frequency of the indicator is 2s/times after being powered on and MODEM works normally.

Device Installation Description

TD-LTE micro repeater is small, light, and convenient to install. It can lay plat on the installation place, and also can be mounted on the wall via the installation hole on the device backplane. The dimension of the installation frame is as shown in Figure 5. Ensure that the installation frame and wall have the enough strength during the installation.

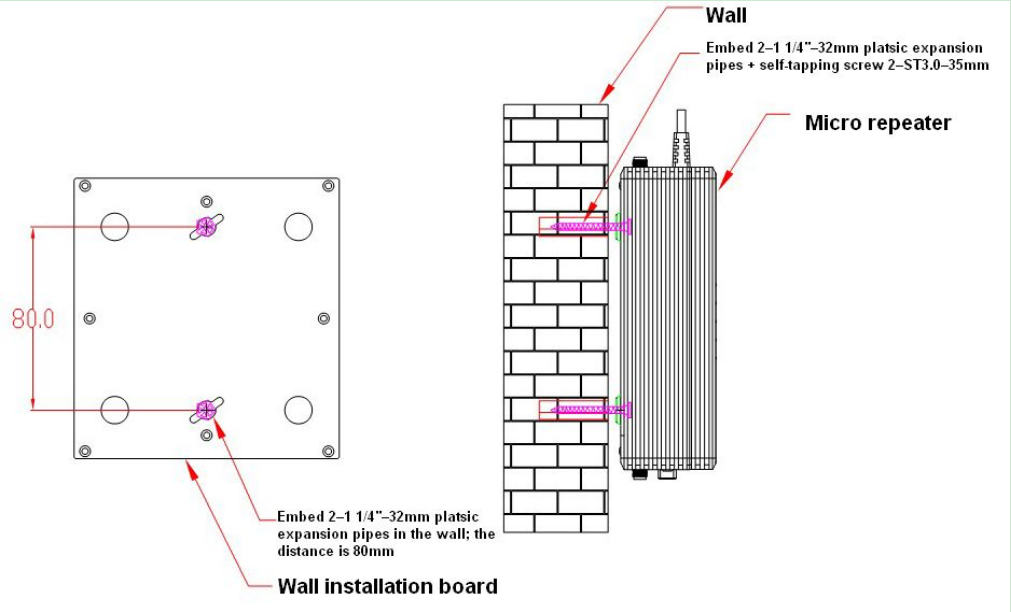


Figure 5 The diagram of mounting the micro repeater on the wall

Installation Program of TD-LTE Micro Repeater

1. Open the packing box of the device and check the wireless repeater device and the installation accessories;

2. Fix the expansion screw on the wall;

3. Fix the device host on the wall via the fastening bolts;

4. Connect the RF cables of the antenna port correctly;

5. Connect the BTS port of the device host with the donor antenna, the MS port with the re-transmit antenna; at last, connect the power plug with the 220V AC power socket.

Installation Elements of TD-LTE Micro Repeater

1. TD-LTE micro repeater is connected with the antenna port correctly;

2. The input power budget of the BTS port is smaller than the input power;

3. The installation location is close to the AC power interface and well grounded;

4. The isolation between the re-transmit antenna and donor antenna should be larger than the actual work gain of the repeater plus 10dB redundant storage;

5. The donor antenna should use the directional antenna; the point and pitch angle comform to the requirement of the design scheme.

Common Problems and Solutions

1. OMT Software cannot read the device parameters

(1) Confirm that the computer is installed with the serial port drive program; try to restart the computer and repeater;

(2) Confirm whether the device is powered on and the power works normally.

2. LED power indicator is not on

(1) Whether the power is connected correctly and the contact is well;

(2) Whether the power has the output voltage.

3. Downlink power has no output or the output power is too low

(1) Measure whether the power input to the BTS port reaches the budget requirement;

(2) Whether the synchronization enabling threshold is set too high;

(3) Check whether the cables of the re-transmit antenna and donor antenna are connected correctly;

(4) Check whether the device is attenuated too large and as a result, the power output is not normal;

(5) Check whether the isolation of the re-transmit antenna and the donor antenna meets the requirement.

4. Opening report failed or monitor center cannot query the connected device

(1) The SIM card is not installed well;

(2) Check whether the manufacturer code, station number, device number, query setting number, and report number are correct;

(3) The communication mode is set as short message;

(4) The short message gateway is blocked.