



**ICS Smart Indoor Repeater
for
WCDMA Mobile**

User Manual

V1.0

CenRF Communications Limited

Contents

Introduction	2
1 Installation.....	3
1.1 The Setting of application.....	3
1.2 Schematic Diagram of Installation	4
1.3 Description on the Indicated Info of the Overall Unit's LCD	6
2 Device Debugging	8
2.1 Preparation.....	8
2.2 Device Debugging	8
3 Specifications	11
4 Precautions.....	12

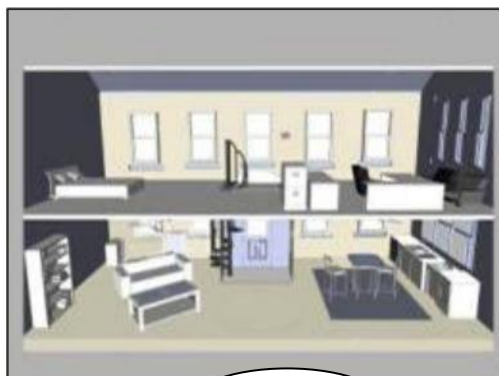
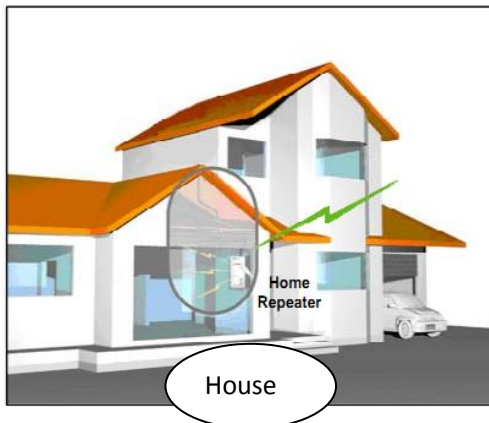
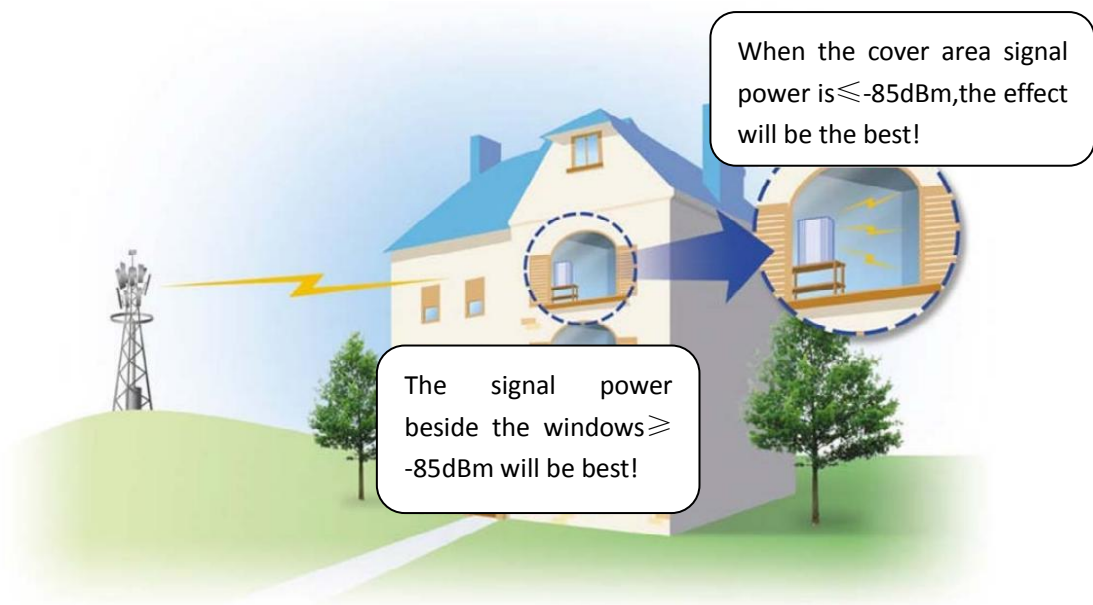
Following instruct application and configuration of Smart Indoor Repeater.

Introduction

These Application Instructions have provided a description, installation guide and recommendations on the hardware of facilities in miniature ICS repeater system as well as their software opening and debugging, including system overview, safety precautions on the installation work, the requirements on installation site and installation preparations. You are kindly requested to read these Application Instructions before installing and setting up the miniature ICS device and then follow the steps and procedures described hereunder.

1 Installation

1.1 The Setting of application



1.2 Schematic Diagram of Installation

1.2.1 The Profile of Smart Indoor Repeater Module:



1.2.2 The setting of application for reference is shown below (with WCDMA2100MHz application as an example)



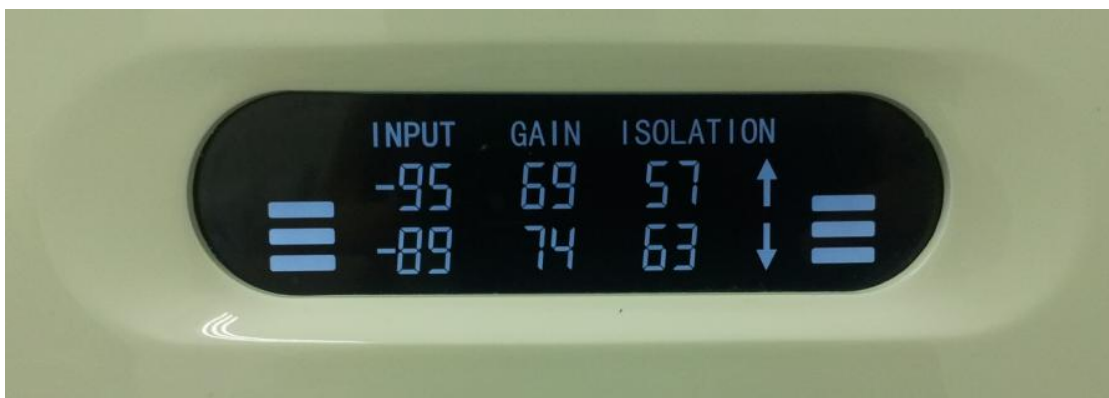


Descriptions on the Setting:

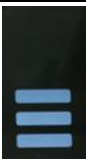
- a. The ICS micropower unit is placed indoors, facing any zone to be covered; receiving and transmitting antenna inside.
- b. the uplink isolation between the receiving and transmitting antenna is 42dB and the downlink isolation is 58dB, so the module's gain can be generally set to be approx. 68dB.




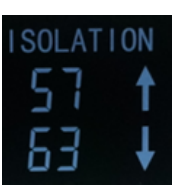
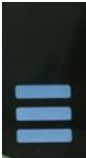
1.3 Description on the Indicated Info of the Overall Unit's LCD

1.3.1 The Whole Profile of the LCD



1.3.2 Description on Each Indication on the LCD

LCD Indication	Description	Remarks
	<p>The Progress Bar in the left has 6 bars in total:</p> <ol style="list-style-type: none"> 1. Once the module is powered on, the Progress Bar will roll circularly, indicating that the module is starting; 2. Once the module is normally started, the Progress Bar will show the downlink received signal level strength; 3. In case of failure in startup, all 6 progress bars would be lit, flashing for alarm. 	<p>The indication range of downlink signal strength:</p> <p>0: no signal input or no signal detected;</p> <p>1 bar: -110~-101dBm ;</p> <p>2 bars: -100~-91dBm;</p> <p>3 bars: -90~-81dBm;</p> <p>4 bars: -80~-66dBm;</p> <p>5 bars: -65~-51dBm m;</p> <p>6 bars: ≥-50dBm;</p>

	<p>The uplink and downlink indications: The UP Arrow represents uplink and the data on the same row is uplink-related data; The DOWN Arrow represents downlink and the data on the same row is downlink-related data;</p>	
	<p>The input power value: The data on the previous row represents the electric level of input power in uplink channel; The data on the next row represents the electric level of input power in downlink channel.</p>	
	<p>The gain value: The data on the previous row represents the set gain of uplink channel; The data on the next row represents the set gain of downlink channel.</p>	
	<p>Isolation: The data on the previous row represents the environmental isolation of uplink channel; The data on the next row represents the environmental isolation of downlink channel.</p>	
	<p>The Progress Bar in the right has 6 bars in total:</p> <ol style="list-style-type: none"> 1. For the GSM system, upon startup of module, in the process of frequency search, the Progress Bar will roll circularly. 2. For the GSM system, if the frequency search failed, flashing for alarm would occur. 3. During the normal operation, the number of bars indicates the condition of current working environment. 	<p>The condition of current working environment:</p> <p>1 bar: 19~25 dB; 2 bars: 16~20dB; 3 bars: 11~15dB; 4 bars: 6~10dB; 5 bars: 0~5dB 6 bars: < 0dB</p>

2 Device Debugging

2.1 Preparation

Detail of Preparation	Description
Data cable	USB data cable
Computer	Computer
Configuration interface of overall unit	ICS debugging software (PICO_ICS_TOOL_EN.exe)

2.2 Device Debugging

Connect the module to the power adapter, approx. 20 seconds later start up the module, then connect USB data cable to the USB port of the computer and the overall unit and open the ICS debugging interface.

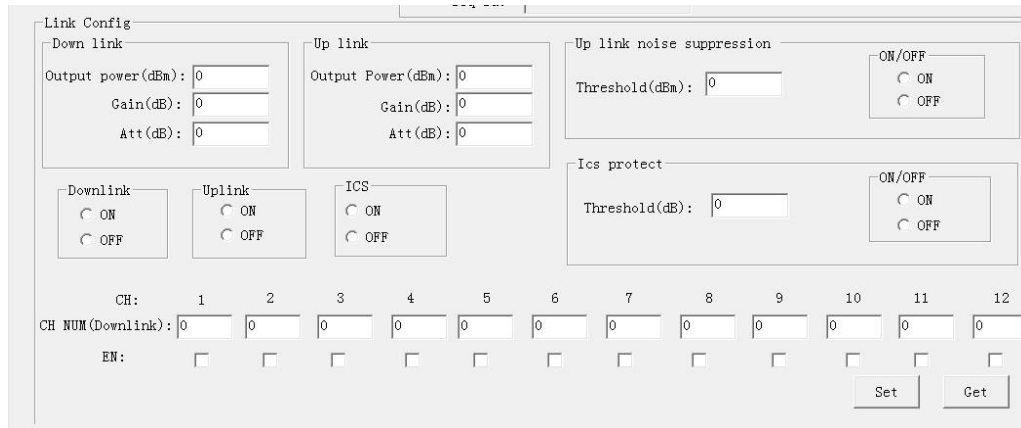
Open the ICS debugging software (PICO_ICS_TOOL_EN.exe) interface. In case of connection failure due to incorrect setting of serial ports, the software would pop up a dialog box indicating connection failure. Then select the current computer's serial port in the options of serial port configuration. You may view the computer port in the operating sequence (computer — attribute — hardware — device manager — port). The serial port's baud rate is 460800 and serial port's configuration is shown in Figure 2.2.1. once selected properly, you may view the monitoring interface and in case of connection failure, the basic data of monitoring interface would be read out. Only after the serial port was properly configured could sequent operation proceed.



Figure 2.2.1

The settings of module's monitoring interface for reference are detailed as follows:

The following screenshot is data reading in the setting of application for reference. Please refer to the instruction concerning the use of this interface behind each screen shot in the configuration.



Screenshot of Downlink and Uplink Setting

Description of Basic Setting Parameters:

CH NUM: See the Specifications for the maximum number of channels supported by the overall unit based on the practical environmental setting; Up and down the line frequency point linkage (just Settings horizontal frequency point, ascending will automatically associated the corresponding frequency point)

Gain: According to external isolation degree automatic Settings, the biggest gain 75 db

Output power: Module of the total output power, the default Settings for downlink 13 DBM, every 15 DBM, each channel power divide (total power divide to open each channel)

Attenuation: To set the overall unit's gain attenuation

EN: Open and close the channel based on the number of channels used; Electromagnetic linkage (will open channel after the uplink channel corresponding also open)

Description of Work Control Parameters:

Downlink: ON means that it is under normal operating condition;

OFF means that downlink is closed and there is no output signal from the module;

Uplink: ON means that it is under normal operating condition;

OFF means that downlink is closed and there is no output signal from the module;

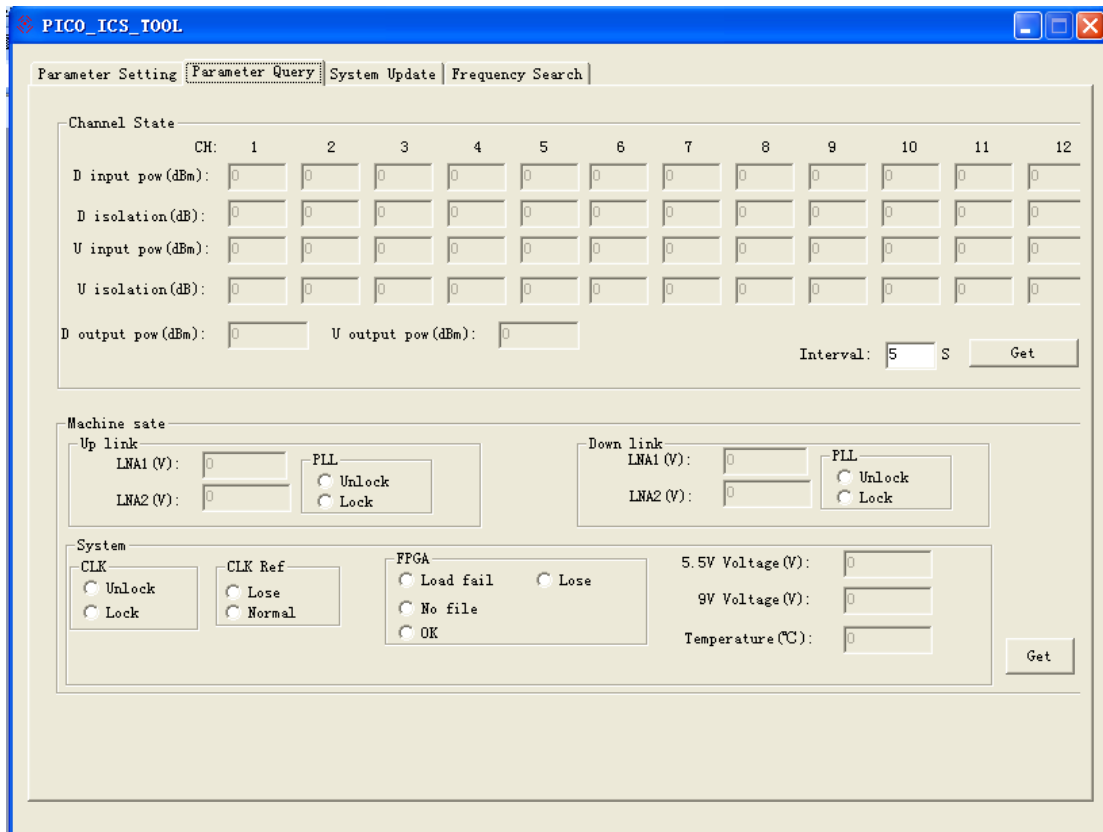
ICS: ON means that the feedback inhibition function is enabled (the uplink and downlink of this switch must be under the same condition, i.e. switch on or off simultaneously);

OFF means that the feedback inhibition function is disabled;

Up link Noise Suppression: Select Not Working;

ICS protect: Select Working.

Threshold(dB): Gain binding isolation degree value (suggest setting for 17)



Downlink and Uplink Data Reading

Description on Parameters Requiring Special Attention:

Input Power: The enabled channel’s input power value, used for indicating the power of signal received by the donor antenna;

Isolation: The isolation between the donor antenna and the retransmission antenna;

The Overall Unit’s Actual Output Power: The module’s actual output power in total.

Machine state: And do some monitoring parameters, the condition of LNA, the state of the PLL

System: Clock, the clock reference state, logic state of loading

3 Specifications

Parameter	Uplink	Downlink
Frequency Range	1920MHz-1980MHz	2110MHz-2170MHz
Bandwidth	15MHz (Continuous 3 carrier)	
Gain		75dB±3dB
Output Power	15dBm±3dB	15dBm±3dB
Gain Adjustment Range	30dB, Step 1dB	
Max. Damage Input Power	-10dBm	
Gain Adjustment Step Error	≤1dB (1-20dB); ≤1.5dB / (20-30dB)	
ALC	>20dB	
Ripple in Band	≤3dB p-p	
ACRR	≥20dB offset ±5MHz; ≥20dB offset ±10MHz	
Noise Figure	≤6dB	≤6dB
VSWR	≤2.0	
Frequency stability	0.01ppm	
Time Delay	≤10.5us	
EVM	≤ 12.5%@75dB	
Intermodulation	Comply with 3GPP TS 25. 106	
Automatic Gain Control	≥30dB	
PCDE	≤-35dB	
Out of band Rejection	≤ 60dB @ 2.7MHz≤f_offset <3.5MHz ≤ 45dB @ 3.5MHz≤f_offset <7.5MHz ≤ 45dB @ 7.5MHz≤f_offset <12.5MHz ≤ 35dB @ 12.5Mhz ≤f_offset	
Spurious emission	In band: 2.515MHz<f_offset<2.715MHz: ≤-22dBm/30kHz 2.715MHz<f_offset<3.515MHz: ≤-22dBm/30kHz 3.515MHz<f_offset<4.0MHz: ≤-34dBm/30kHz 4.0MHz<f_offset<8.0MHz: ≤-21dBm/1MHz 8.0MHz<f_offset<f_offsetmax: ≤-25dBm/1MHz Outoff Band: 9kHz~150kHz≤-36dBm/1kHz 150kHz~30MHz≤-36dBm/10kHz 30MHz~1GHz≤-36dBm/100kHz 1GHz~12.75GHz≤-30dBm/1MHz	
Local Control interface	USB	
Power Supply	AC220V	
Power Consumption	18W	
Working Temperature	-10°C to +40°C	
Dimension	270*210*65mm	
Weight	1.8KG	

4 Precautions

- 4.1.1 Assure the quality of signal at the location of donor antenna to the greatest extent;
- 4.1.2 Maintain the isolation between the donor antenna and the ICS overall unit;
- 4.1.3 Keep the ICS micropower unit and the antenna over 1m away from the range of human activity as possible practically;
- 4.1.4 Put the micropower unit and the antenna on a higher place as possible practically;
- 4.1.5 When setting the interface, the uplink gain is generally 5dB less than the downlink gain and the uplink output power is generally set to maximum.

-----End-----

CenRF Communications Limited

Address: Dongguan Building, Jiangnan Ave 4288, Binjiang District, Hangzhou City 310053, China.

Tel: +86-571-86631886

Fax: +86-571-89930536

Technical Support hotline: +8618058168088

Online support Skype ID: wofoch

Complaints E-mail: admin@cenrf.com

www.cenrf.com