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Engineering Project Design

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Main content:

1、 Overview of mobile communication and indoor distribution

2、 The importance of indoor distribution

3、 Introduction to project process and scheme design process

4、 Collaboration with various departments

5、 Recent case analysis, combined with the company's products Introduction and Selection

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1、Overview of Mobile Communication and Indoor Distribution

Mobile communication refers to the exchange of information between two or at least one party in a mobile state to achieve communication. It includes communication between mobile objects and fixed points, between mobile objects, and between mobile users and fixed users. We refer to the wireless communication equipment installed on mobile objects as mobile stations, and the wireless communication equipment installed at fixed points as base stations. The technology and equipment for implementing mobile communication are collectively referred to as mobile communication systems.

The main coverage methods of mobile communication are:

1. Base station coverage
2. Indoor distribution

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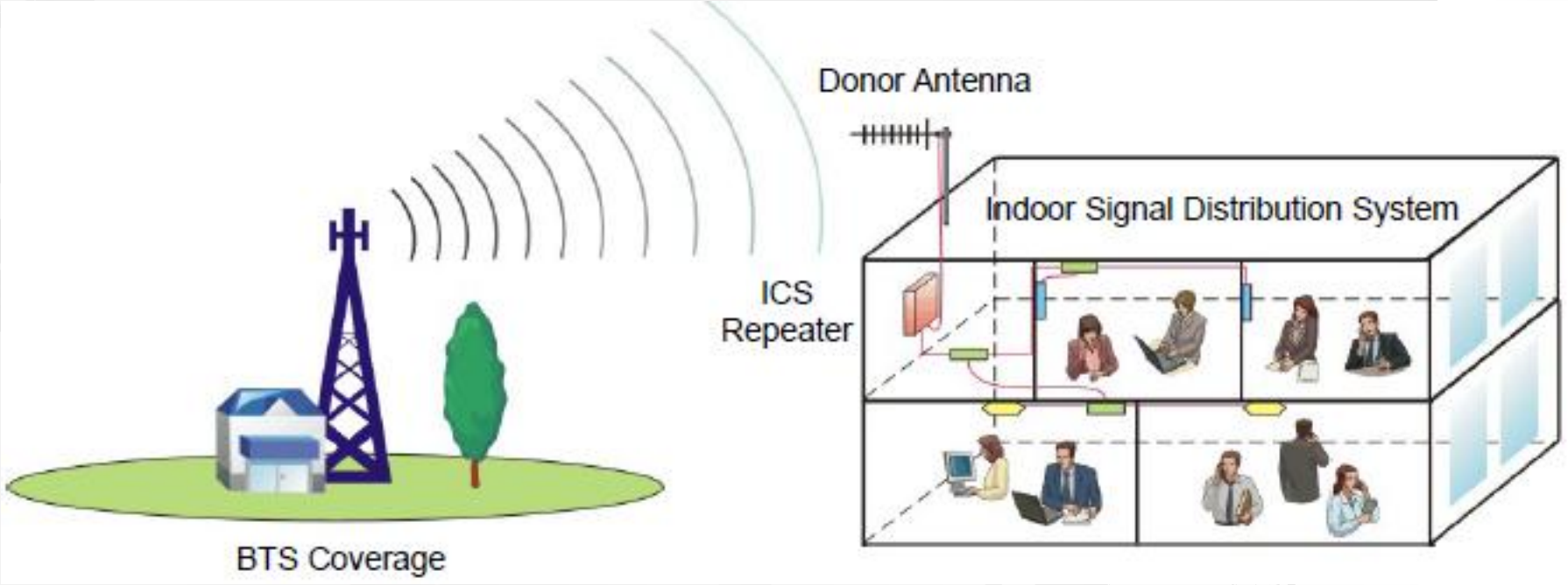
Base station coverage

(Most outdoor areas)

Indoor distribution coverage

(Office buildings, hotels,

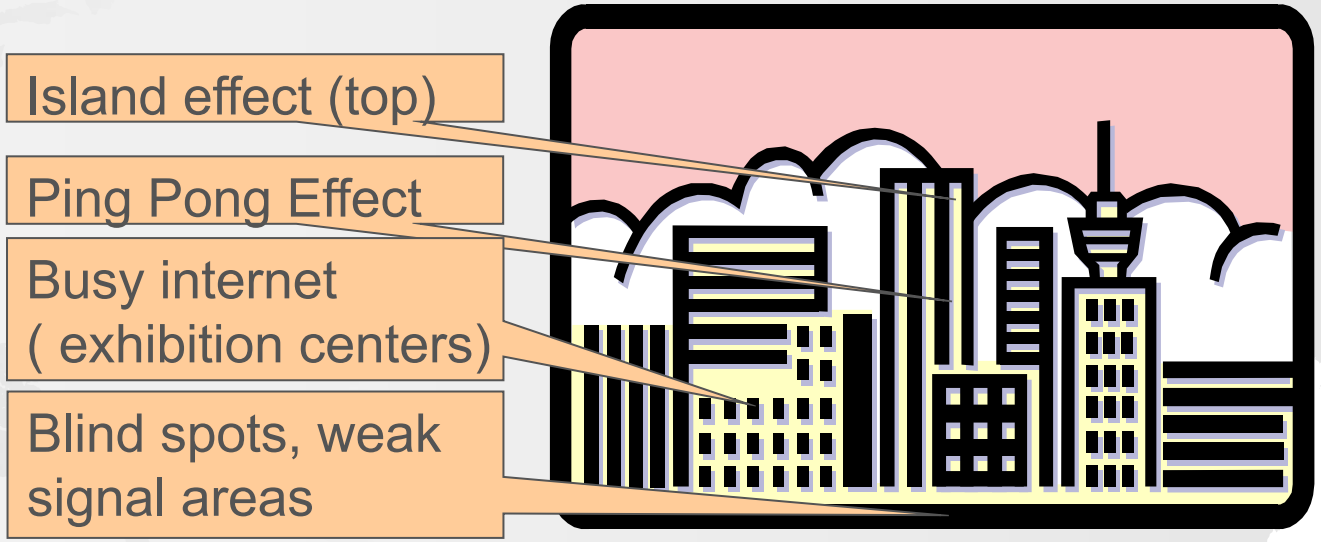
transportation hubs, etc.)



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2、The Importance of Indoor Distribution

Due to the influence of building shielding, partition walls, floors, and signal multipath fading, the following problems can occur:



High rise buildings (over 20 floors)

"Island effect" - severe interference from same frequency and leading frequency.

"Ping Pong Effect" - ideal signal strength, but frequent switching.

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The role of indoor distribution

1. Overcoming building shielding
2. Fill blind spots or weak signal areas inside buildings
3. Solving the problem of uneven distribution of signal field strength in large buildings
4. Addressing the issues of island and ping-pong effects in high-rise buildings
5. Absorb phone traffic and increase operator's revenue from phone bills

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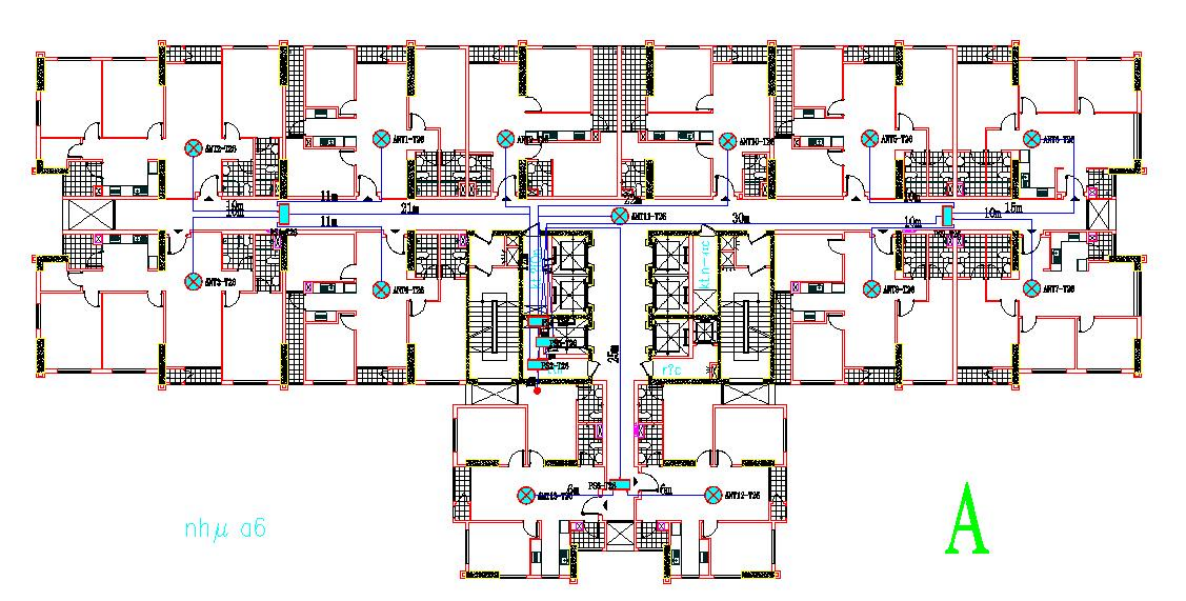
3、Collaboration with Various Departments

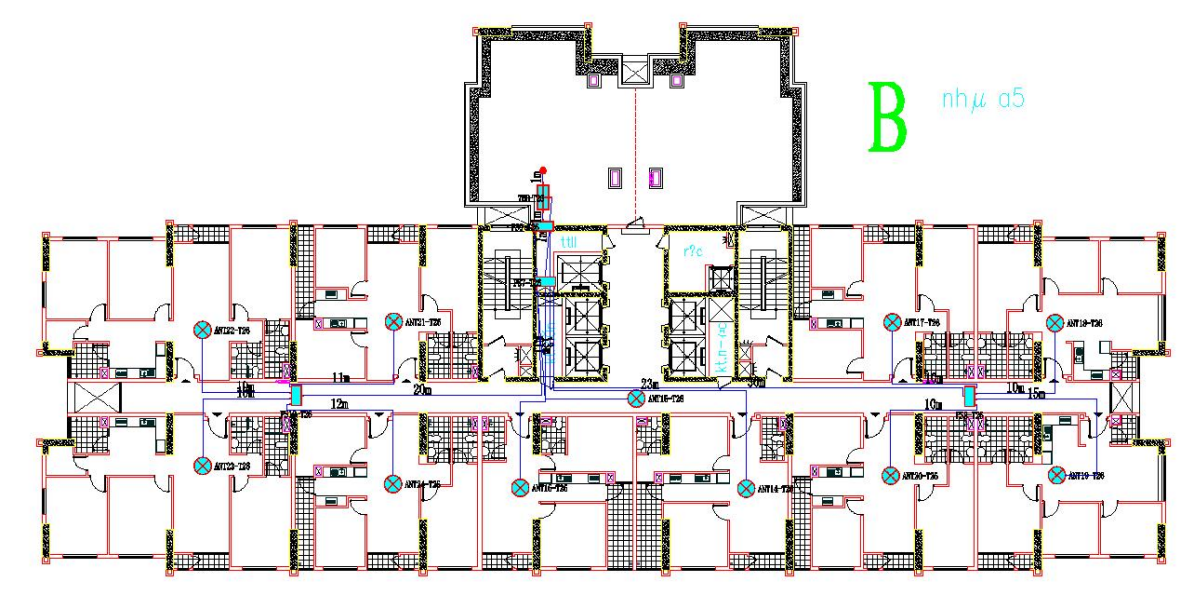
1. Collaborate with technical departments and business departments to complete:
A. Communicate with clients in the early stage to collect the necessary information and specific requirements of the clients. After completing the plan, follow up with the order, regularly monitor project progress, and modify the plan according to customer feedback.
B. Design product manuals and regularly conduct overseas promotion and product promotion on the website.
2. Collaborate with the supply chain to complete:
A. Complete the plan design as soon as possible, provide the quantity and indicators of materials required for the client's project, and determine the delivery time based on the actual situation (production cycle, testing time, logistics time, etc.).
B. Find suitable suppliers based on material specifications and cost-effectiveness.
C. Product quality control, design various test reports and user manuals.
3. Collaborate with the after-sales service department to complete:
When a product malfunctions, promptly contact the customer for inquiries, determine the cause of the malfunction through remote or on-site troubleshooting, provide solutions, and solve the problem in a timely manner to improve customer satisfaction.

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4、Recent Case Analysis, Combined with the introduction of company products

Scenario 1 (Room Division) - Office Building in Vietnam: Building A has 35 floors and Building B has 29 floors, each with an independent base station. There are a total of 4 operators accessing LTE and WCDMA systems.

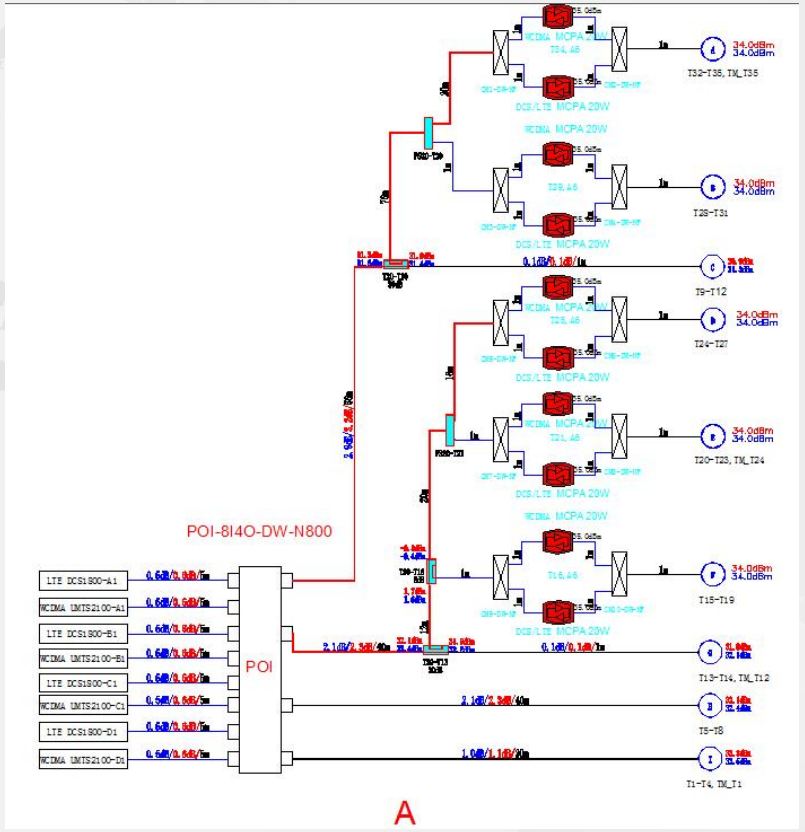




Plan View

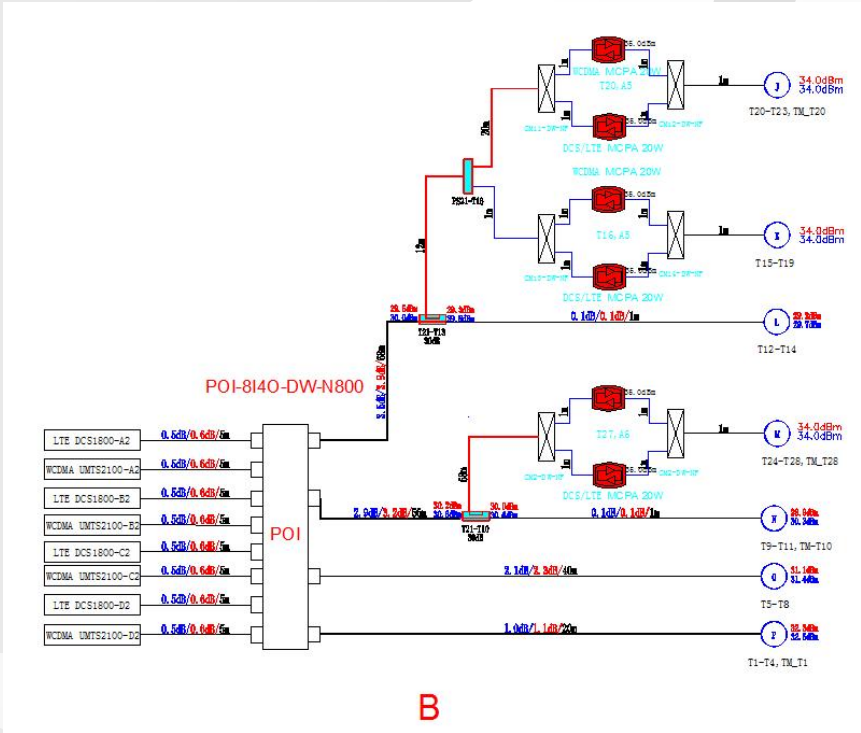
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Based on the on-site situation and considering the reliability of the system, we have chosen to use our company's 8-in 4-out POI, LTE, WCDMA dry amplifiers (which require that the equipment and base station should not be too far away), as well as some high-performance ceiling antennas, power dividers, couplers, combiners, etc.



A

System Block Diagram



B

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The following figure shows the Inline Booster (20W) and POI (8 in and 4 out) equipment selected by our company for this plan. Choose appropriate frequency bands and power levels for Inline Booster(2W, 5W, 10W, 20W) and POI (8I4O, 10I4O, 16I4O) based on different coverage scenarios, number of access operators, and frequency bands.



DCS&WCDMA MCPA Inline Booster



POI 8in 4out

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On-site Engineering Pictures

Inline Booster
(in weak current well)





Ceiling (in suspended ceiling)

Panel (in basement)





Ceiling (on the bridge)

Scene 2 (Outdoor) - Vietnam Industrial Park: located 2.2 kilometers northwest of the airport, covering an area of 1.6 square kilometers. Most areas are on two floors of factories and residential buildings. The total number of sites in the weak signal coverage area exceeds 1.6 square kilometer, and a total of 3 operators have access to LTE and WCDMA systems.



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According to the on-site conditions, choose to use our company's optical fiber repeater (the distance between the equipment and the base station is very far) and high-gain base station antenna.

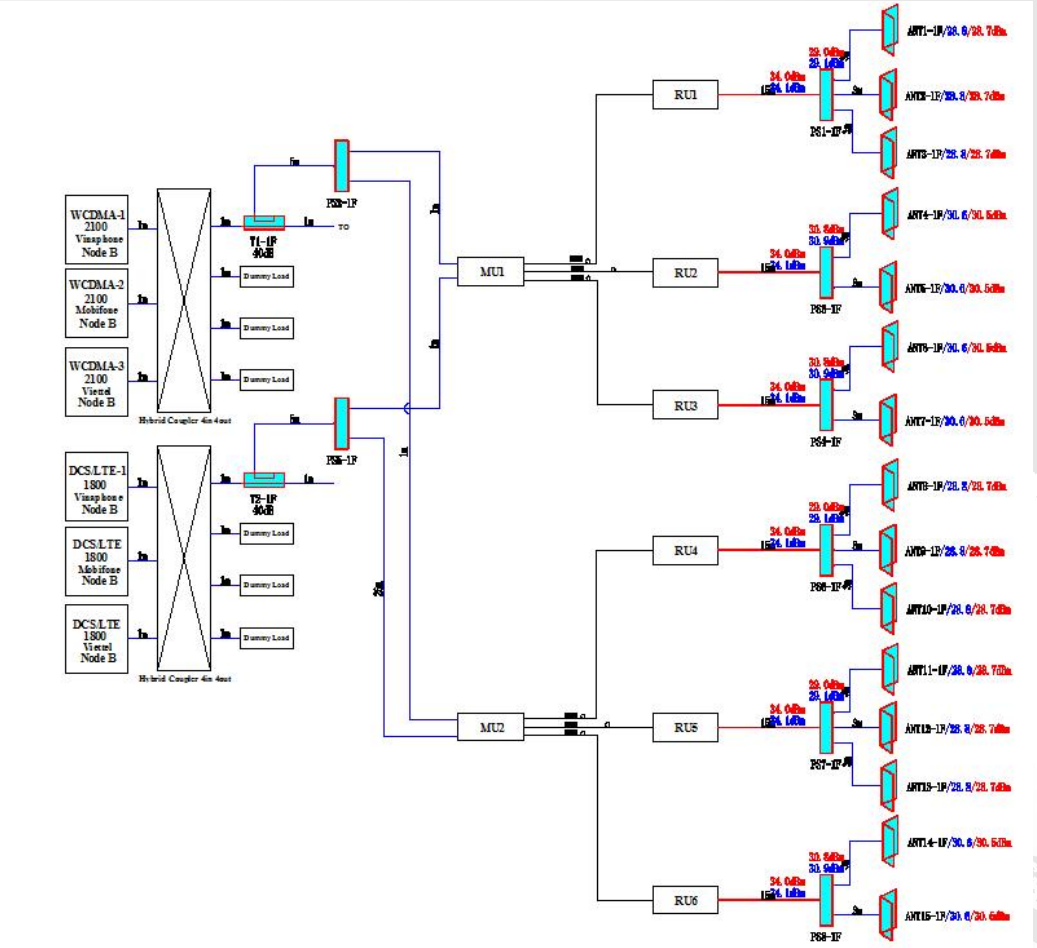


No.	Antenna number	Antenna height	Azimuth
1	3	12m	40°, 180°, 320°
2	2	20m	0°, 180°
3	2	12m	30°, 180°
4	3	12m	0°, 120°, 240°
5	3	12m	0°, 120°, 240°
6	2	12m	0°, 240°

Floor Plan

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Because access operators have fewer frequency bands, you can choose a more cost-effective combiner to replace POI. The near-end machine of the optical fiber repeater is installed in the base station, and the remote machine is installed in the equipment room of the coverage area, and is connected with an optical cable in the middle.



System Block Diagram

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The picture below is our company's optical fiber repeater product. One near-end machine can drag up to four remote machines. The advantage is: the remote machine can be placed anywhere the optical cable can be pulled, regardless of intermediate losses, and the price is cheap.



Optical Master Unit



Optical Remote Unit

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Outdoor Station Scene Pictures



Simple outdoor base station



Landscape tower outdoor base station



base station antenna

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Beautify Antenna Pictures



Light Pole



Square Columns

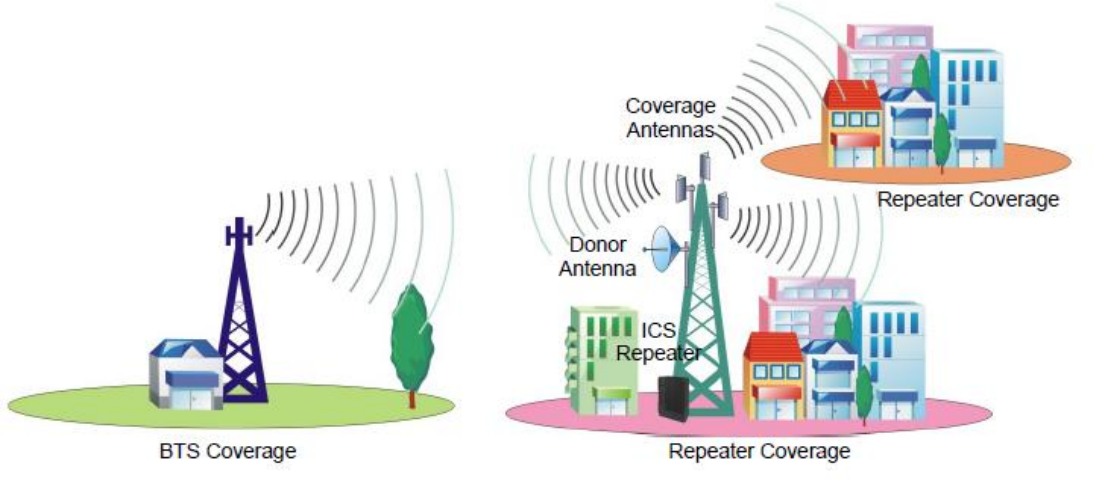


Air Conditioner

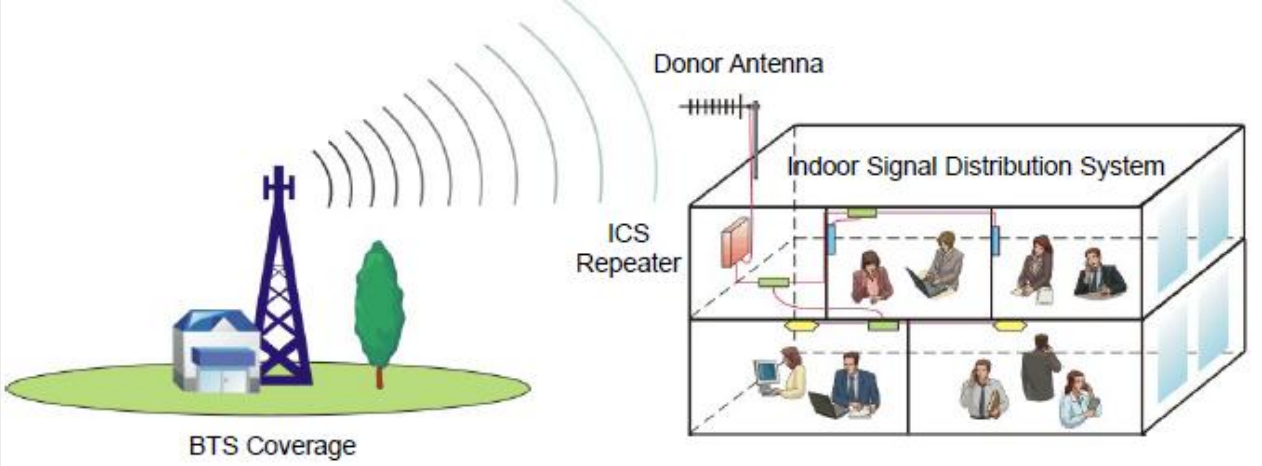


Exhaust Pipe

Scenario 3 - Pakistan project: 2W wireless repeaters with three frequency bands of 900/1800/2100, suitable for covering small-scale indoor or outdoor signals.



Cover Outdoor



Cover Indoor

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Advantages: Can cover many areas that fiber optic cables cannot reach. The USB interface on the CPU can be connected to a laptop, and various indicators such as the repeater power can be adjusted through the OMT software.

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Advantages of wireless repeaters: It can cover many areas that cannot be reached by optical cables. Monitoring: The USB interface on the CPU can be connected to a laptop, and various indicators such as the repeater power can be adjusted through the OMT software. The SIM card can also be used to poll and modify remotely through the OMC.

Device Info | Network Parameters | Alarm And Enabled | Set Parameters | Timely Samp

	Option	Label	Name	Parameter
1	☑	0101	Repeater ID	00000000
2	☑	0102	Device ID	00
3	☑	0111	Query/set telephone number 1	+8613000000
4	☑	0112	Query/set telephone number 2	+8613000001
5	☑	0113	Query/set telephone number 3	+8613000002
6	☑	0114	Query/set telephone number 4	+8613000000
7	☑	0115	Query/set telephone number 5	+8613000000
8	☑	0120	Report phonenumber	+8618651000
9	☐	0130	Monitoring center IP addre...	220.162.15.15
10	☐	0131	Monitoring center port number	9600
11	☐	0140	2G communication mode	SMS
12	☐	0150	Date,Time	2000/07/07,12:19:46

Set monitoring number and SMS center number

Device Info | Network Parameters | Alarm And Enabled | Set Parameters | Tim

	Option	Label	Name	Parameter
1	☐	0402	Power amplifier switch 1	1
2	☐	0403	Power amplifier switch 2	1
3	☐	0442	Uplink attenuation(Channel 1)	25
4	☐	0443	Downlink attenuation(Chann..	25
5	☐	0444	Uplink attenuation(Channel 2	25
6	☐	0445	Downlink attenuation(Chann...	25
7	☐	0466	Downlink input under-power...	-10
8	☐	0467	Downlink input over-power ...	10
9	☐	0468	Downlink output under-powe...	30
10	☐	046C	Downlink input under-power...	-10
11	☐	046D	Downlink input over-power ...	10
12	☐	046E	Downlink output under-powe...	30

Set attenuation value and adjust output power

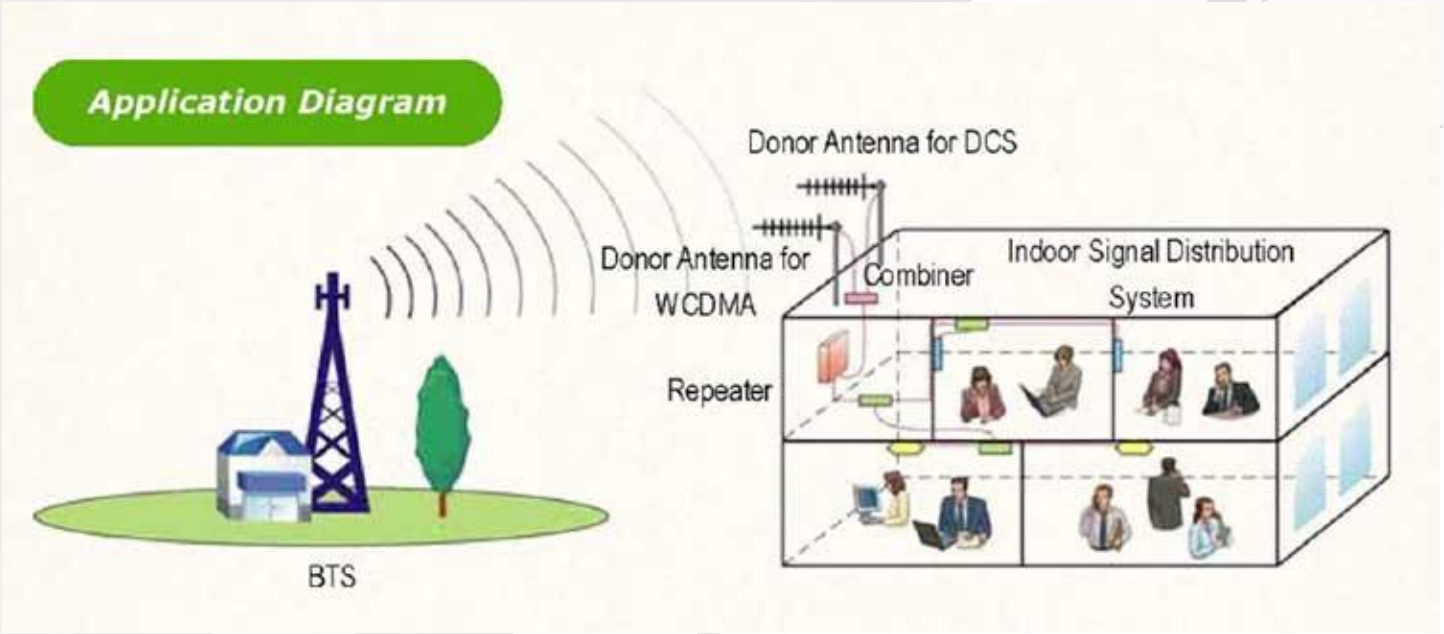
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PICO：It is an integrated small wireless repeater that can be placed in a window or other location where outdoor signals can be received (the outdoor signal strength must reach the take-off field strength). It can amplify outdoor signals and can generally cover 50-100 square meters. The product is beautiful , suitable for home use.





Wireless Pico Repeater

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Thank You !