Fiber Optic Repeater

RPT864 (GSM 900MHz) / **RPT884** (GSM 1800MHz) / **RPT894** (GSM 1900MHz)
RPT914 (CDMA 450MHz) / **RPT934** (CDMA 800MHz) / **RPT994** (CDMA 1900MHz)

The Fiber Optic Repeater (FOR) is designed to solve problems of weak mobile signal in such place: far away from the BTS (Base Transceiver Station) and has fiber optic cable network underground.

The whole FOR system consists of two parts: **Donor Unit** and **Remote Unit**. They transparently convey and amplify the wireless signal between the BTS (Base Transceiver Station) and mobiles via fiber optic cables.

The **Donor unit** captures the BTS signal via a direct coupler closed to the BTS (or via open air RF transmission through the Donor Antenna), then converts it into optic signal and transmits the amplified signal to the **Remote Unit** via fiber optic cables. The **Remote Unit** will reconvert the optic signal into RF signal and provide the signal to the areas where network coverage is inadequate. And the mobile signal is also amplified and retransmitted to the BTS via the opposite direction.

As per the method of receiving BTS signal by the Donor Unit, two types of FOR are available:

- **Cable-Access FOR**: to receive BTS signal via a direct coupler closed to the BTS (recommended);
- **Wireless-Access FOR**: to receive BTS signal via a Donor Antenna (applicable when no fiber optic cable connecting to the BTS); can be sorted into 2 sub-categories: *Band-Selective* and *Channel-Selective*.

Cable-Access Fiber Optic Repeater

Wireless-Access Fiber Optic Repeater

FEATURES

- Aluminum-alloy casing has high resistance to dust, water and corroding;
- Omni-directional coverage antenna can be adopted to expand more coverage;
- Adopting WDM (Wavelength Division Multiplexing) module to realize long-distance transmission;
- Stable and improved signal transmission quality;
- One Donor Unit can support up to 8 Remote Units to maximize utilization of fiber optic cable;
- RS-232 ports provide links to a notebook for local supervision and to the built-in wireless modem to communicate with the NMS (Network Management System) that can remotely supervise repeater's working status and download operational parameters to the repeater.

APPLICATIONS

To expand signal coverage or fill signal blind area where signal is weak or unavailable.

- Outdoor: Airports, tourism regions, golf courses, tunnels, factories, mining districts, villages, highways…
- Indoor: Hotels, exhibition centers, basements, shopping malls, offices, parking lots, …

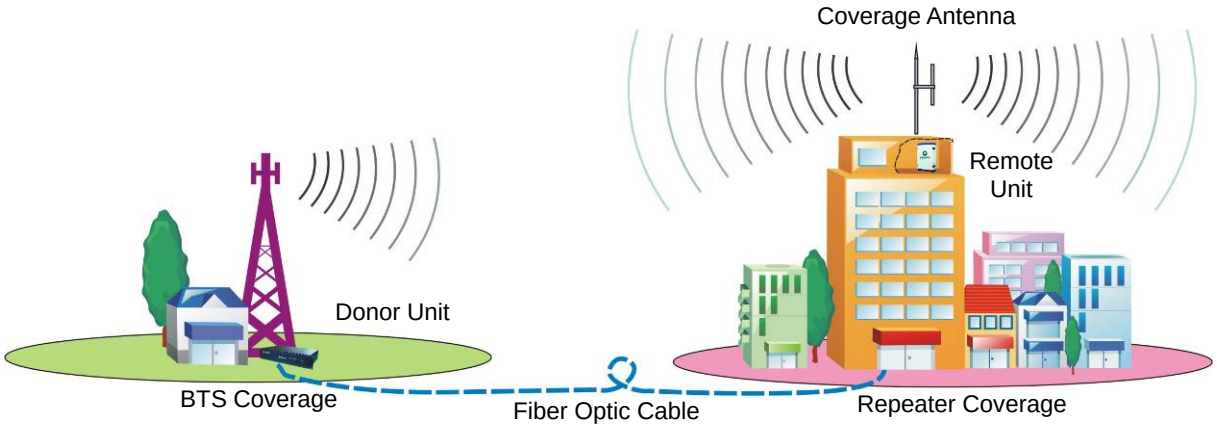
The FOR is mainly applicable to such case:

- Underground fiber optic cable network already exists beneath the area to be covered;
- There is huge obstructive terrain between the BTS and the area to be covered;
- The distance between the BTS and the area to be covered is 20 km around.

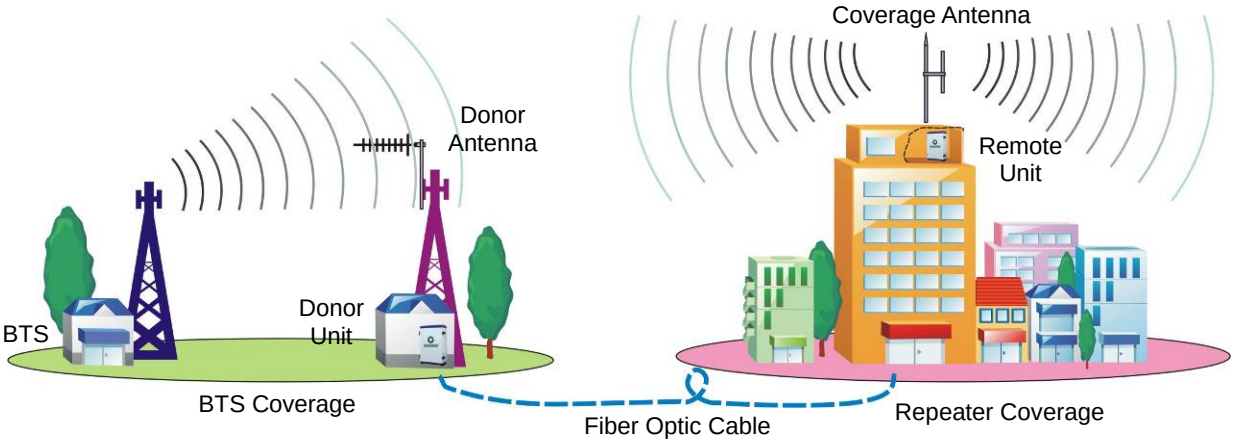
In comparison with RFR (RF repeater) and FSR (frequency shift repeater), the FOR has the following benefits and disadvantages:

Pro	Con
• No more self-oscillation and easy to choose installation location; • For Cable-Access type, pure BTS signal picked up by the Donor Unit will greatly reduce the signal noise; • The Remote Unit can be installed out of the BTS coverage; • A full 360-degree coverage can be realized; • No need to occupy frequency resource as the link frequency.	• The total cost of equipment is higher; • A fiber optical connection between the Donor Unit and Remote Unit is required.

APPLICATION DIAGRAM



Application Diagram of Cable-Access FOR



Application Diagram of Wireless-Access FOR

TECHNICAL SPECIFICATIONS

- Specifications of GSM Fiber Optic Repeater (900MHz, 1800MHz, 1900MHz)

Items		Donor Unit	Remote Unit
Working Frequency (customizable)	Uplink	890~915MHz / 1710~1785MHz / 1895~1910MHz	
	Downlink	935~960MHz / 1805~1880MHz / 1975~1990MHz	
Transmission Distance		≤ 20km	
Max. Input Level		+10dBm	--
Output Power (customizable)		0 dBm	27~43 dBm (0.5~20 W)
Gain		≥ 65dB	
Gain Adjustment Range		1~31dB @ step of 1dB	
Voltage Standing Wave Ratio (VSWR)		< 1.5	
Noise Figure		< 5dB (only for uplink)	
In-Band Ripple		≤ 3dB p-p	
Spurious Emission		≤ -36dBm	
In-Band Intermodulation Attenuation		≤ -40dBc/30kHz	
System Delay		≤ 5.0μSec	
I/O Impedance		50Ω	
Fiber Optic Light Source		Laser unit (wavelength: 1310nm / 1550nm)	
Optical Output Power		≥0dBm (1310nm) / ≥3dBm (1550nm)	
Optical Receiver Sensitivity		≤ -25dBm	
RF Connector		N-Type (Female)	
Temperature Range		Operation: -25°C ~ +55°C / Storage: -30°C ~ +60°C	
Relative Humidity Range		≤ 95% (non condensing)	
Power Supply (customizable)		DC +24V / DC -48V / AC 220V±15%, 50Hz / AC 110V±15%, 50Hz	
Backup Power Supply (optional)		4 hours	
Casing Level		Cable-Access: -- Wireless-Access: IP65	Output power @27~30dBm: IP31 Output power @33~43dBm: IP65
Dimensions		Cable-Access: 418mm X 90mm X 290mm Wireless-Access: 630mm X 400mm X 230mm	Output power @27~30dBm: 385mm X 300mm X 130mm Output power @33~37dBm: 570mm X 325mm X 215mm Output power @37~43dBm: 630mm X 400mm X 230mm
Weight		Cable-Access: 6kg Wireless-Access: 35kg	Output power @27~30dBm: 8kg Output power @33~37dBm: 27kg Output power @37~43dBm: 35kg
Remote Monitoring/Control via NMS		Supported	
ALC (Automatic Level Control)		Supported	

- Specifications of CDMA Fiber Optic Repeater (450MHz, 800MHz, 1900MHz)

Items		Donor Unit	Remote Unit
Working Frequency (customizable)	Uplink	450~457.5 MHz / 824~849MHz / 1880~1890MHz	
	Downlink	460~467.5 MHz / 869~894MHz / 1960~1970MHz	
Transmission Distance		≤ 20km	
Max. Input Level		+10dBm	--
Output Power (customizable)		0 dBm	27~43 dBm (0.5~20 W)
Gain		≥ 65dB	
Gain Adjustment Range		1~31dB @ step of 1dB	
Voltage Standing Wave Ratio (VSWR)		< 1.5	
Noise Figure		< 5dB (only for uplink)	
In-Band Ripple		≤ 3dB p-p	
Spurious Emission		≤ -36dBm	
In-Band Intermodulation Attenuation		≤ -15dBm/30kHz	
System Delay		≤ 5.0μSec	
I/O Impedance		50Ω	
Fiber Optic Light Source		Laser unit (wavelength: 1310nm / 1550nm)	
Optical Output Power		≥0dBm (1310nm) / ≥3dBm (1550nm)	
Optical Receiver Sensitivity		≤ -25dBm	
RF Connector		N-Type (Female)	
Temperature Range		Operation: -25°C ~ +55°C / Storage: -30°C ~ +60°C	
Relative Humidity Range		≤ 95% (non condensing)	
Power Supply (customizable)		DC +24V / DC -48V / AC 220V±15%, 50Hz / AC 110V±15%, 50Hz	
Backup Power Supply (optional)		4 hours	
Casing Level		Cable-Access: -- Wireless-Access: IP65	Output power @27~30dBm: IP31 Output power @33~43dBm: IP65
Dimensions		Cable-Access: 418mm X 90mm X 290mm Wireless-Access: 630mm X 400mm X 230mm	Output power @27~30dBm: 385mm X 300mm X 130mm Output power @33~37dBm: 570mm X 325mm X 215mm Output power @37~43dBm: 630mm X 400mm X 230mm
Weight		Cable-Access: 6kg Wireless-Access: 35kg	Output power @27~30dBm: 8kg Output power @33~37dBm: 27kg Output power @37~43dBm: 35kg
Remote Monitoring/Control via NMS		Supported	
ALC (Automatic Level Control)		Supported	

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