

Single-Band RF Repeater

RPT863 (GSM 900MHz) / RPT883 (GSM 1800MHz) / RPT893 (GSM 1900MHz)
 RPT913 (CDMA 450MHz) / RPT933 (CDMA 800MHz) / RPT993 (CDMA 1900MHz)
 RPT653 (WCDMA)

The Single-Band RF Repeater (RFR) is the kind of repeater used most frequently. It has a simple structure to transparently convey and amplify the wireless signal (at the same frequency) between the BTS (Base Transceiver Station) and mobiles in single wireless network.

The Single-Band RFR is working as a relay between the BTS and mobiles. It picks up the signal from the BTS via the Donor Antenna, linearly amplifies the signal and then retransmits it via the Coverage Antenna (or the Indoor Signal Distribution System) to the weak/blind coverage area. And the mobile signal is also amplified and retransmitted to the BTS via the opposite direction.

As per operator's requirement for working frequency, two types of Single-Band RFR are available:

- **Band-Selective Single-Band RF Repeater:** to amplify all signals in the whole band (bandwidth is customized);
- **Channel-Selective Single-Band RF Repeater:** to amplify only the signals transmitted in the customized 1 (2 or 4) channel.

FEATURES

- Aluminum-alloy casing has high resistance to dust, water and corroding;
- AGC (automatic gain control) function to prevent self-oscillation;
- Highly selective channel selector can process 2 channels simultaneously;
- No interference to BTS by adopting linear amplifier with high gain and low noise;
- Adopting filter with highly selectivity and low insertion loss eliminates interference between uplink and downlink;
- 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 RFR is mainly applicable to such case:



Outdoor Single-Band RF Repeater



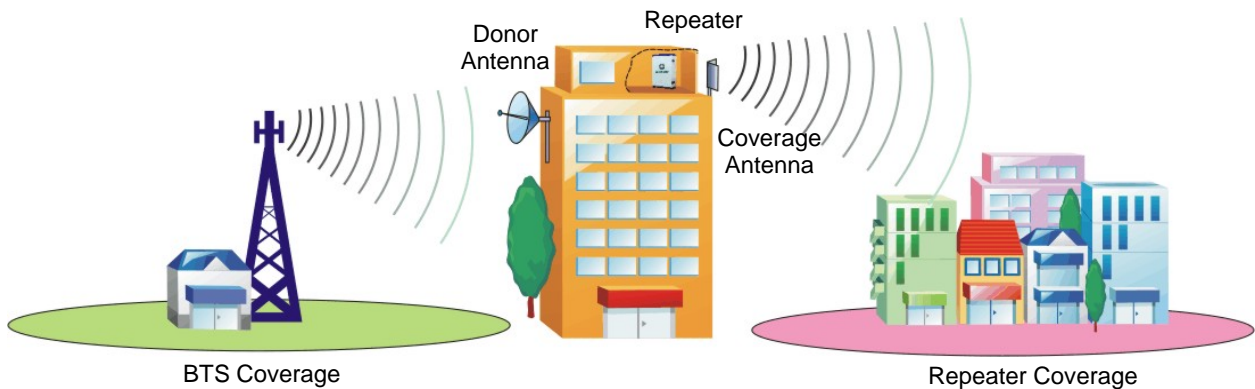
Indoor Single-Band RF Repeater

- The repeater can find an installation place which can receive pure BTS signal at strong enough level and can meet the requirement of isolation to avoid self-oscillation;
- And the distance between the BTS and the area to be covered is 2km around.

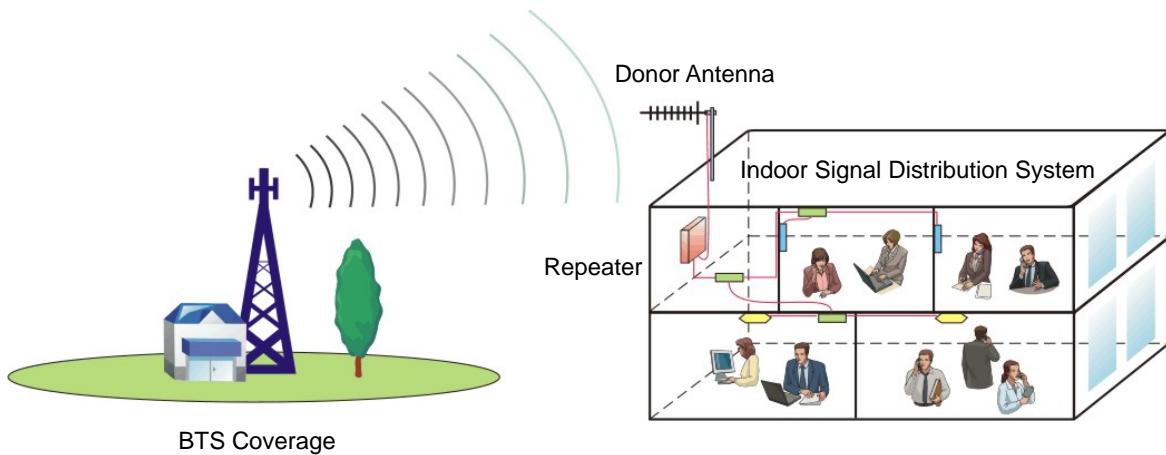
In comparison with FSR (frequency shift repeater) and FOR (fiber optic repeater), the RFR has the following benefits and disadvantages:

Pro	Con
<ul style="list-style-type: none"> • Easy to build the installation site; • Lower cost of equipment and site-building. 	<ul style="list-style-type: none"> • Inappropriate installation may cause self-oscillation; • The Coverage Antenna shall face against the Donor Antenna, which limits the coverage angle; • High signal noise may be introduced since the Donor Antenna picks up signal from the air; • The repeater shall be installed within the coverage of BTS.

APPLICATION DIAGRAM



Application Diagram of Outdoor Single-Band RF Repeater



Application Diagram of Indoor Single-Band RF Repeater

TECHNICAL SPECIFICATIONS

- Specifications of GSM Single-Band RF Repeater (900MHz, 1800MHz, 1900MHz)

Items		Band-Selective RF Repeater	Channel-Selective RF Repeater
Working Frequency (customizable)	Uplink	890-915MHz / 1710-1785MHz / 1895-1910MHz	
	Downlink	935-960MHz / 1805-1880MHz / 1975-1990MHz	
Working Bandwidth		2-25 MHz (customizable)	200 kHz / Channel
Output Power (customizable)		27-43 dBm (0.5-20 W)	
Gain		≥ 85dB	
Gain Adjustment Range		1-31dB @ step of 1dB	
Voltage Standing Wave Ratio (VSWR)		< 1.5	
Noise Figure		≤ 5dB	
In-Band Ripple		≤ 3dB p-p	
Max. Input Level		≥ -10dBm	
Spurious Emission	Within working band	≤ -15dBm/30kHz	
	Out of working band (Δf > 2.5MHz)	9kHz-1GHz: ≤ -36dBm/30kHz	
		1GHz-12.75GHz: ≤ -30dBm/30kHz	
In-Band Intermodulation Attenuation		≤ -40dBc/30kHz (measured under rated output power)	
System Delay		≤ 1.5μSec	≤ 5.0μSec
I/O Impedance		50Ω	
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 / AC 220V±15%, 50Hz / AC 110V±15%, 50Hz	
Backup Power Supply (optional)		4 hours	
Casing Level		Output power @27-30dBm: IP31 Output power @33-43dBm: IP65	
Dimensions		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		Output power @27-30dBm: 8kg Output power @33-37dBm: 27kg Output power @37-43dBm: 35kg	
Remote Monitoring/Control via NMS		Supported	
AGC (Automatic Gain Control) / ALC (Automatic Level Control)		Supported	

- Specifications of CDMA Single-Band RF Repeater (450MHz, 800MHz, 1900MHz)

Items	Band-Selective RF Repeater	Channel-Selective RF Repeater
Working Frequency (customizable)	Uplink	450-457.5 MHz / 824-849MHz / 1880-1890MHz
	Downlink	460-467.5 MHz / 869-894MHz / 1960-1970MHz
Output Power (customizable)	27-43 dBm (0.5-20 W)	
Gain	≥ 85dB	
Gain Adjustment Range	1-31dB @ step of 1dB	
Frequency Error	≤ 0.05ppm	
Voltage Standing Wave Ratio (VSWR)	≤ 1.3	
Noise Figure	≤ 5dB	
In-Band Ripple	≤ 3dB p-p	
Max. Input Level	≥ -10dBm	
Spurious Emission	≤ -36dBm	
In-Band Intermodulation Attenuation	≤ -15dBm/30kHz	
System Delay	≤ 1.5μSec	≤ 5.0μSec
I/O Impedance	50Ω	
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 / AC 220V±15%, 50Hz / AC 110V±15%, 50Hz	
Backup Power Supply (optional)	4 hours	
Casing Level	Output power @27-30dBm: IP31	
	Output power @33-43dBm: IP65	
Dimensions	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	Output power @27-30dBm: 8kg	
	Output power @33-37dBm: 27kg	
	Output power @37-43dBm: 35kg	
Remote Monitoring/Control via NMS	Supported	
AGC (Automatic Gain Control) / ALC (Automatic Level Control)	Supported	

- Specifications of WCDMA Single-Band RF Repeater (2100MHz)

Items	Downlink	Uplink
Working Frequency (customizable)	2110-2170MHz	1920-1980MHz
Carrier Wave Mode	Channel Selective / Band Selective	
Carrier Quantity	1-2 channels	
Max. Output Power (customizable)	27/30/33/37/40 dBm (+0dB/-2dB)	27/30 dBm (+0dB/-2dB)
Frequency Error	≤ 0.01ppm	
Adjacent Channel Power Ratio (ACPR)	P ≥ 31 dBm	(Offset 5MHz) ≤ 49dBc, (Offset 10MHz) ≤ 54dBc
	P < 31 dBm	(Offset 5MHz) ≤ 50dBc, (Offset 10MHz) ≤ 55dBc
Gain	85 ± 3dB	
Gain Adjustment Range	1-31dB @ step of 1dB	
Noise Figure	≤ 4dB	
In-Band Ripple	≤ 3dB p-p / 3.84MHz	
Spurious Emission and IMD3	Comply with 3GPP TS 25.106 V6.0.0	
System Delay	≤ 5.0μSec	
Voltage Standing Wave Ratio (VSWR)	≤ 1.4	
Error Vector Magnitude (EVM)	≤ 12.5%	
	2.7 ≤ f_offset < 3.5MHz	≤ 60dB
Out-of-Band	3.5 ≤ f_offset < 7.5MHz	≤ 45dB
Gain	7.5 ≤ f_offset < 12.5MHz	≤ 45dB
	12.5 ≤ f_offset	≤ 30dB
Peak Code Domain Error (PCDE)	≤ -35dB	
I/O Impedance	50Ω	
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 / AC 220V±15%, 50Hz / AC 110V±15%, 50Hz	
Backup Power Supply (optional)	4 hours	
Casing Level	Output power @27-30dBm: IP31 Output power @33-43dBm: IP65	
Dimensions	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	Output power @27-30dBm: 8kg Output power @33-37dBm: 27kg Output power @37-43dBm: 35kg	
Remote Monitoring/Control via NMS	Supported	
AGC (automatic gain control) / ALC (automatic level control)	Supported	

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