

UHF Fiber Optic Repeater



Tone Spread
Solutions for Wireless Signal

400-470 MHz

Model No:TS7C00A (Master Unit)

400-470 MHz

UHF Fiber Optic Repeater is an active distributed antenna system designed to extend wireless communication coverage. It is primarily used to resolve **UHF (Ultra High Frequency, typically between 380-512 MHz) signal blind spots or weak reception issues** in large buildings, underground tunnels, mining areas, or regions far from the Base Transceiver Station (BTS). By utilizing fiber optic cables for long-distance, low-loss signal transmission, it is particularly suitable for public safety systems (such as TETRA, P25), enterprise private networks (DMR/PMR), and two-way radio signal extensions.



System Components & Working Principle

A UHF fiber optic repeater system typically adopts a two-layer architecture, consisting of the following two core units:

Master Unit / Donor Unit (MU):

- Installed near the Base Transceiver Station (BTS) or at a location capable of receiving a strong wireless signal.
- Captures the RF (Radio Frequency) signal from the base station via a direct coupler or a donor antenna.
- Converts the internal RF signal into an **optical signal** and transmits it over long distances through a single-mode fiber optic network.

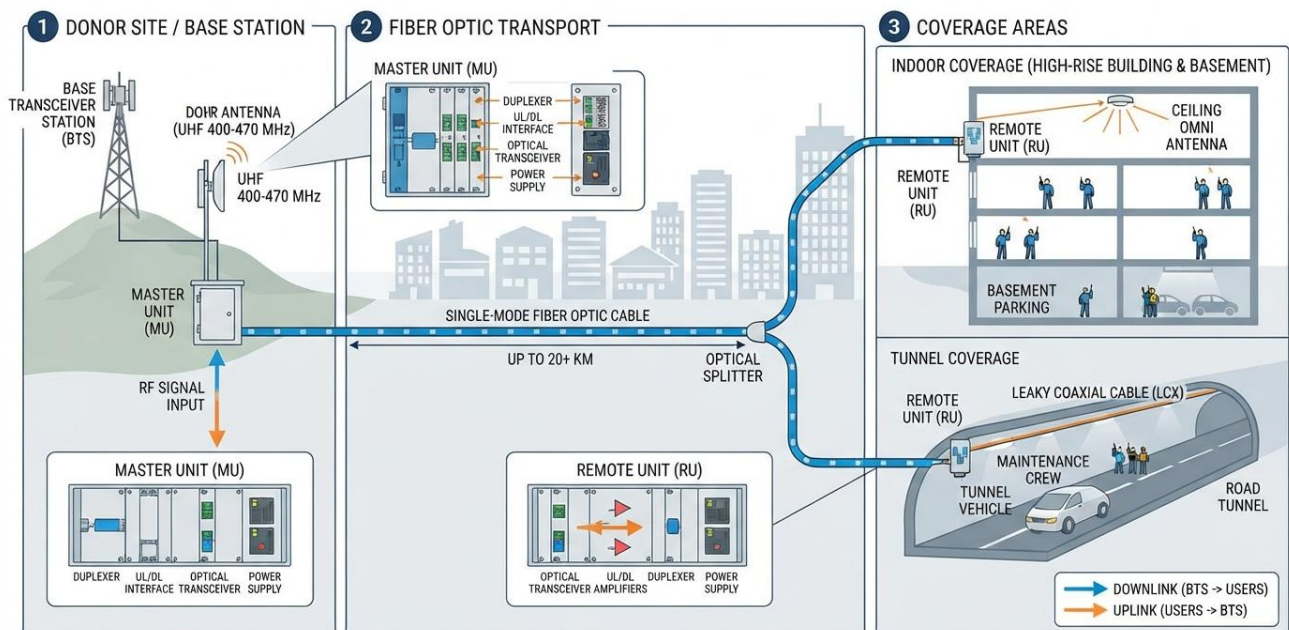
Remote Unit / Coverage Unit (RU):

- Deployed in the target blind zones requiring signal coverage (e.g., inside tunnels, basements).
- Receives the optical signal from the fiber optic cable and **converts it back into an RF signal**.
- Amplifies the signal using an internal power amplifier and broadcasts it through indoor/outdoor coverage antennas to terminal devices (such as walkie-talkies or radios).
- Conversely, the uplink signal from terminal devices travels back along the reverse path to the base station.

Key features

- **Long-Distance, Low-Loss Transmission:** Unlike traditional coaxial cables which suffer from severe signal attenuation, fiber optic transmission can span from **1 to 20 kilometers** (and can be extended up to **50 km in some systems**) with virtually zero transmission loss.
- **One-to-Many Architecture (Star Topology):** A single Master Unit can typically connect to **1 to 4 (or even more) Remote Units** simultaneously, allowing efficient signal distribution across multiple distinct blind zones or building floors.
- **Wavelength Division Multiplexing (WDM):** Many modern systems feature built-in WDM modules, allowing uplink and downlink signals to transmit simultaneously at different wavelengths over a **single strand of fiber**, which significantly reduces cabling costs.
- **Compatibility with Multiple Technologies:** Supports both analog and digital communication standards, including TETRA, DMR, P25, and MPT1327.
- **Remote Monitoring and Management:** Provides a network management interface (such as RJ-45 or USB), allowing maintenance personnel to remotely adjust internal gain, monitor power supplies, check battery backups, and track equipment temperature or alarms.

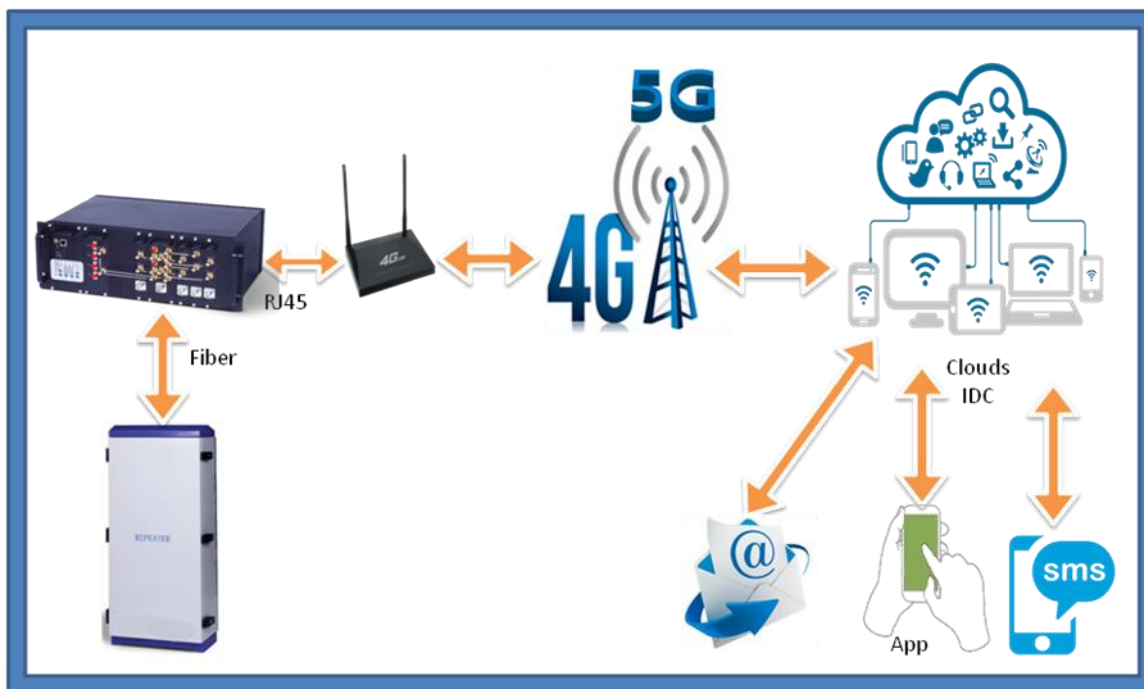
UHF FIBER OPTIC REPEATER SYSTEM APPLICATION TOPOLOGY



Specifications

Items		Specifications
		MU
System		TETRA/DMR/P25/iDEN
Frequency Range (Customized)	Uplink/Rx	400~470MHz(At least 5MHz Guard Bandwidth Between Uplink and Downlink)
	Downlink/Tx	400~470MHz(At least 5MHz Guard Bandwidth Between Uplink and Downlink)
Bandwidth		5MHz(Customized)
Maximum Input Power (Non-Destructive)		5 dBm
Transmission Distance		≤ 10km
Maximum UL RF Output Power		-10±2dBm
Gain of MU		0±3dB
Manual Adjustable Attenuation		0~10dB
VSWR		≤ 1.5
Noise Figure		≤6dB
Spurious Emission		9kHz~1GHz: ≤ -36dBm
		1GHz~12.75GHz: ≤ -30dBm
System Delay		≤ 5μSec
I/O Impedance		50Ω
Connector	RF Connector	1xN-Female(Duplex Port)
	Optic Connector	1xFC/APC
Fiber Optical Type		Single Mode
Optical Output Power		0±3dBm@1550nm
Optical Receiver Sensitivity		≥-12dBm
Temperature Range		Operation: -10°C ~ + 45°C
Relative Humidity Range		≤ 85%
Power Supply		AC110~220V±10%,50/60Hz
Power Consumption		≤ 20W
Application		Indoor(IP30)
Dimensions		485x350x90mm(19 “2U Chassis)
Weight		≤ 6kg
Mounting		Rack Mounting
Local Control		Via USB Interface or Wi-Fi Hotspot
NMS Mode		Cloud NMS via RJ45 Port
Special Requirements		Dry Contact Output Alarm: 1 Relay output for a Collective Alerts(Real-time Alarm for Power Supply, Output Power, Optical Fail) from the BDA

Network Management System (NMS)



Applications

- **Public Safety & Emergency Communications:** Extends two-way radio signals for fire departments and police forces in subways, underground passages, and high-rise building basements during rescue operations.
- **Underground & Enclosed Spaces:** Subway/metro tunnels, high-speed railway tunnels, highway tunnels, mines, and underground parking lots.
- **Large Industrial Facilities:** Offshore oil platforms, refineries, mega steel plants, and other industrial sites with heavy steel structures that cause severe signal shielding.

