Solution for Indoor TETRA coverage

TETRA/TETRAPOL Repeater RF/OF High Power

Application

- TETRA / TETRAPOL coverage enhancement
- Safety networks
- Railway, road and waterway tunnels

Key Features

- Up to 16 optical outputs
- Remote booster 37 dBm
- Off-air or TBS reception
- WDM available
- IP Monitoring by GPRS, GSM-R, TETRA modem
- Network Management System (optional)

Benefits

- Flexibility : single or multi-optical fibers
- Centralized monitoring

Contact us

- **protel@protel.it**
- **www.protel.it**

To ensure TETRA coverage everywhere

The “TETRA / TETRAPOL Repeater RF-OF” ensures continuity of service for TETRA or TETRAPOL radio mobile network in the infrastructures inadequately covered or not, such as tunnels, shopping malls, large office buildings.

The signal reception can be achieved through off-air antenna or by direct connection to a TBS via coaxial cable.

The RF-optical converter allows up to 16 repeaters RF 5W that will power the antennas or radiating cables scattered throughout the infrastructure to cover.

The optical link between the master and the remote repeaters may use one fiber per remote or one single fiber for all remote repeaters with the WDM option.

Several systems can be installed from the same master repeater to cover long distance tunnels.

All peripheral devices are driven through the optical fiber by the master repeater where the WEB / SNMP server is located. The remote control is available through the embedded GPRS modems. Different such systems can be connected to the optional NMS to build a central point of monitoring.

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Quality Model FP1004D / ed 27 / 07 / 2011

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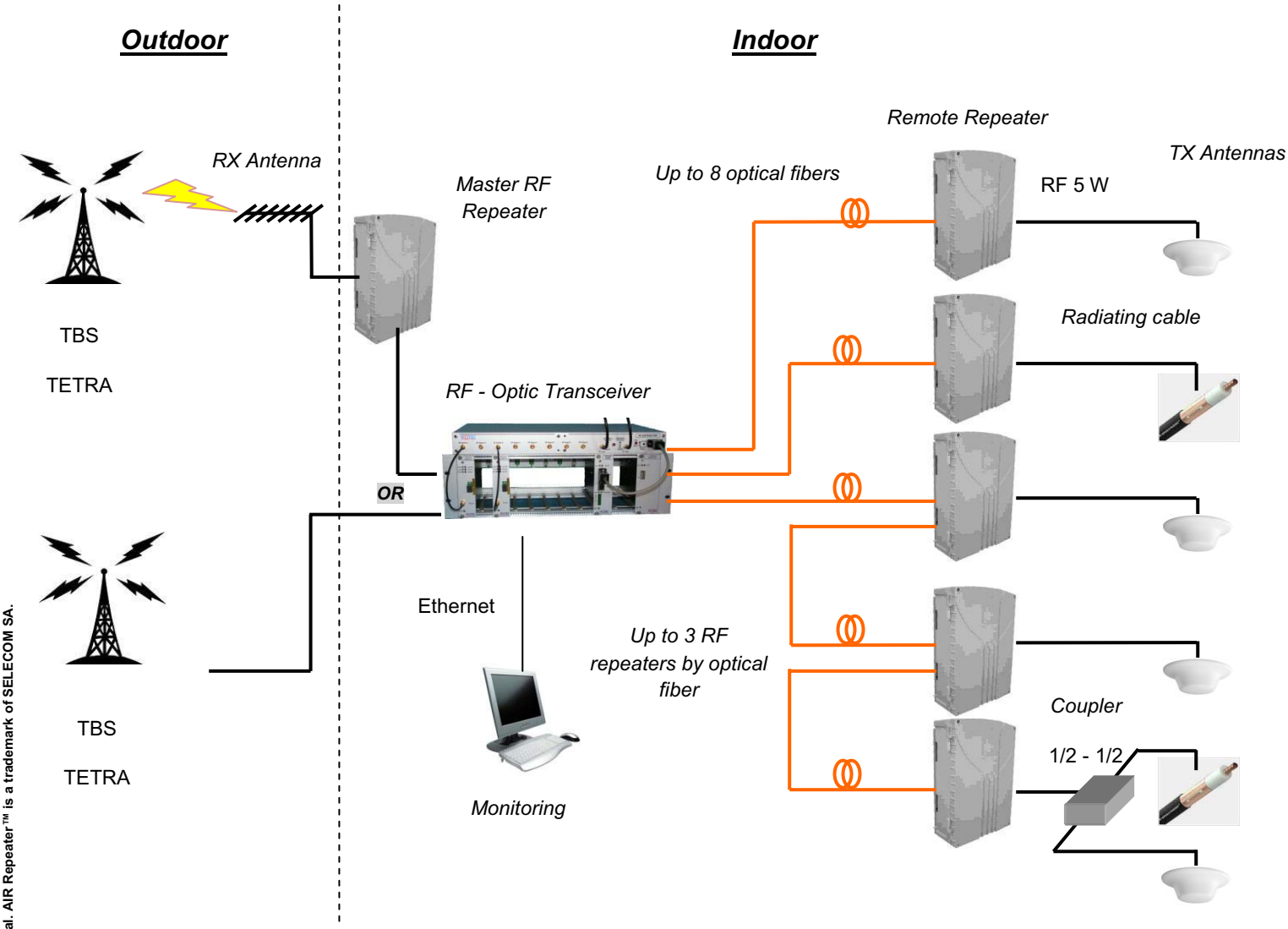
Operation of TETRA / TETRAPOL Repeater RF-OF



Ordering Code	Designation
603 089	Master Repeater
605 564	RF-OF Transceiver – Main Rack (for 8 optical outputs)
602 563	RF-OF Transceiver – Transceiver RF-OF
602 393	RF-OF Transceiver – Monitoring Module
602 394	Remote Repeater OF-RF 5W – 1st stage
602 395	Remote Repeater OF-RF 5W – 2nd stage
602 396	Remote Repeater OF-RF 5W – 3rd stage

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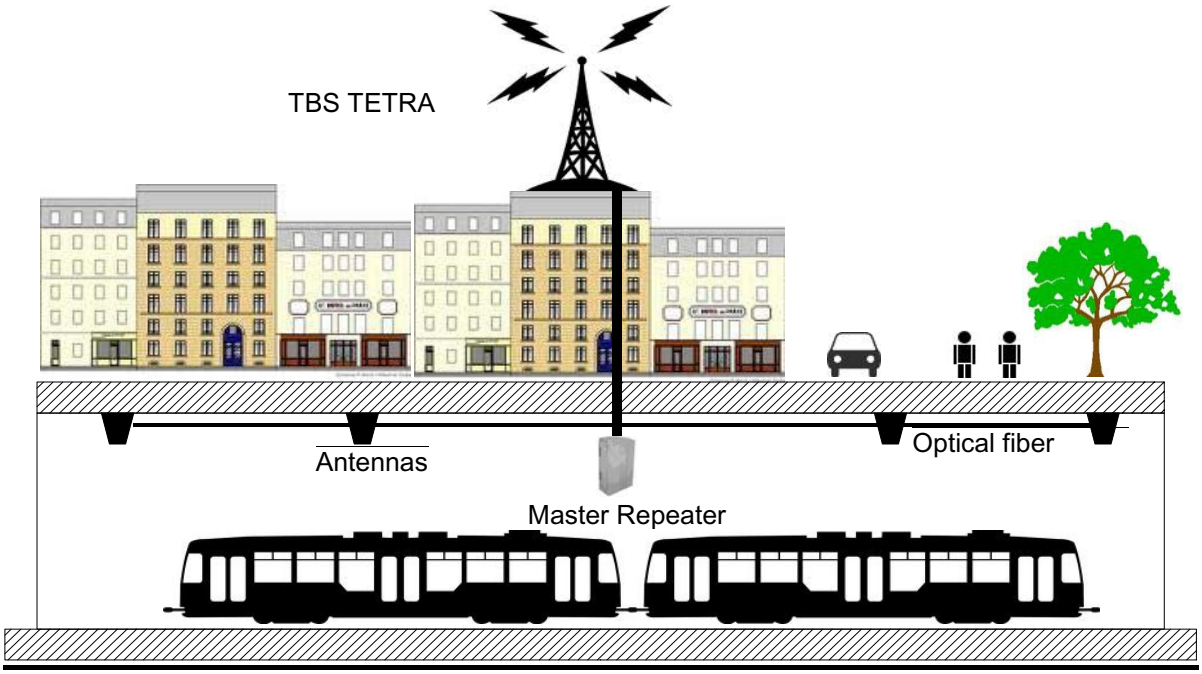
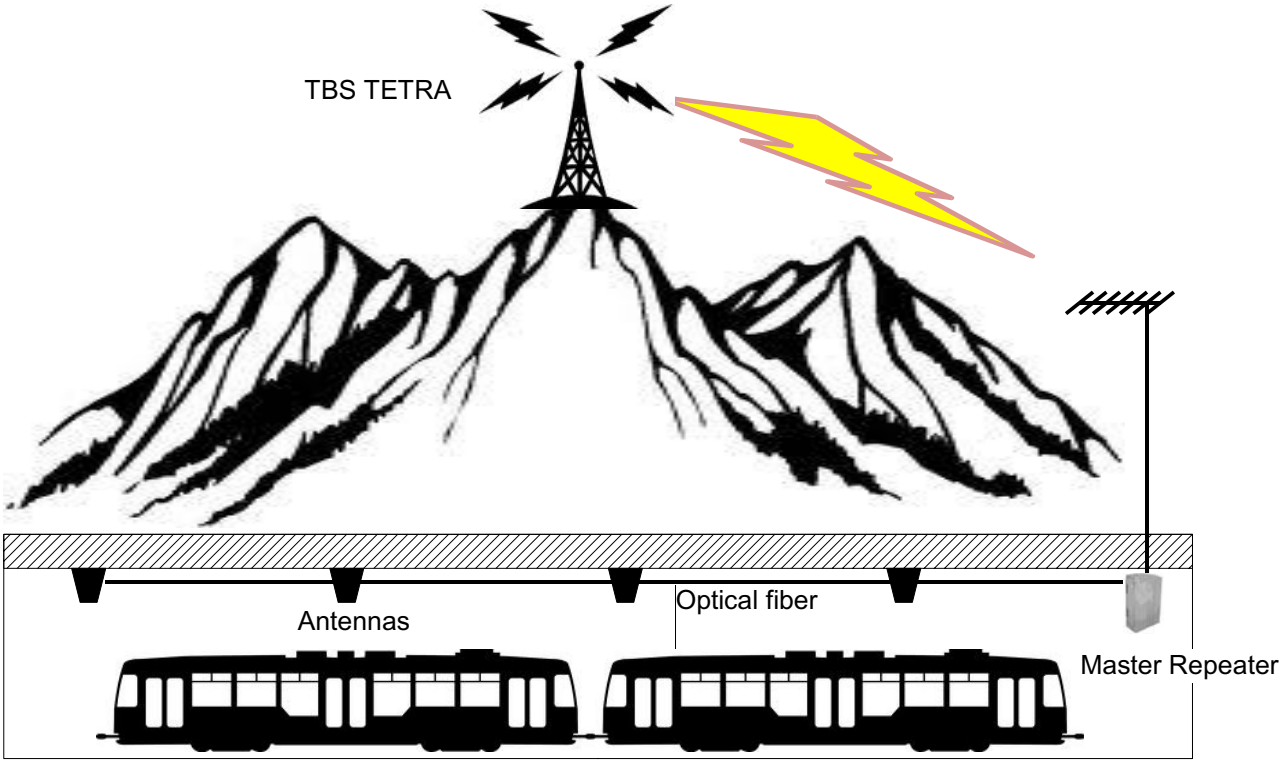
Example coverage of a subway tunnel



Example coverage of a rail tunnel



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Master Repeater Features		*Up - Link (RX)*	*Down - Link (TX)*
Frequency range (to specify when ordering)		380 - 385 MHz 385 - 390 MHz 410 - 415 MHz 415 - 420 MHz 450 - 455 MHz 455 - 460 MHz	390 - 395 MHz 395 - 400 MHz 420 - 425 MHz 425 - 430 MHz 460 - 465 MHz 465 - 470 MHz
Bandwidth (to specify when ordering)		From 1 to 5 MHz (Adjusted SAW filter)	
Gain		Adjustable from 50 dB to 80 dB	
Dynamic gain range		30 dB (step 1 dB)	
Nominal output power	1 carrier 2 carriers 4 carriers 8 carriers	+ 17 dBm + 14 dBm + 11 dBm + 8 dBm	+ 10 dBm + 7 dBm + 4 dBm + 1 dBm
Noise factor		≤ 6 dB	
Power supply voltage		Integrated 230 VAC power supply	
Power consumption		72 W	
Dimensions		224 × 429 × 582 mm	
Weight		28 kg	
Connectors		N female	
Rating class		IP65	
Temperature range		- 25°C / + 55°C	
Cooling system		Natural convection cooling with heat sink	
Remote supply of boosters		12V / 4A	
Monitoring		Dry Loop / WEB, SNMP / Green & red LED	

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RF-OF Transceiver	
❖ **RF Interface**	
Frequency range	380 – 470 MHz
RF Input power	0 dBm
Gain	0 dB ± 0,5 dB
VSWR	1.3 : 1
RF connector	SMA female
❖ **Optical Interface**	
Wavelength	1310 – 1550 ± 20 nm or CWDM
Optical output power	4 dBm ± 2 dB
Compression point	> 15 dBm
Optical connector	SC / APC
Fiber Optic	SMF (G652 and G655)
Number of optical outputs	Up to 8 optical outputs
❖ **Mechanical and electrical**	
Dimensions	19" × 4U × 200 mm
Power supply	230 VAC or 48 VDC
Power consumption (for each optical module)	12 W
Temperature range	0°C / +50°C
Cooling System	Natural convection cooling
Monitoring	WEB, SNMP (Optional)

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Remote Repeater OF-RF 5W			
❖ **RF Interface**		*Up - Link (RX)*	*Down - Link (TX)*
Frequency range (to specify when ordering)		380 - 385 MHz 385 - 390 MHz 410 - 415 MHz 415 - 420 MHz 450 - 455 MHz 455 - 460 MHz	390 - 395 MHz 395 - 400 MHz 420 - 425 MHz 425 - 430 MHz 460 - 465 MHz 465 - 470 MHz
Bandwidth (to specify when ordering)		From 1 to 5 MHz	
Gain		Adjustable from 30 dB to 50 dB	
Nominal output power	1 carrier 2 carriers 4 carriers 8 carriers		+ 37 dBm + 34 dBm + 31 dBm + 28 dBm
Noise factor		≤ 6 dB	
Ripple in bandwidth		< 2dB	
Amplification class		AB	
Downlink / uplink rejection		> 80dB	
IP3 for 16 carriers		> 68 dBm	
IP3 for 17 carriers		68 dBm	
Intermodulation		< -36 dBm	
Group delay		< 1 µs	
RF Connector		N femelle 50Ω / N female 50Ω	

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Remote Repeater OF-RF 5W		
❖ **Optical Interface**		
Wavelength	1310 – 1550 ± 20 nm or CWDM	
Optical output power	4 ± 2 dBm	
Optical connector	SC / APC	
Optical Fiber	SMF (G652 and G655)	
Number of optical inputs / outputs	1 input + 1 output	
❖ **Mechanical and electrical**	**Indoor rack version**	**Outdoor case version**
Impact protection class		IK9
Cooling system	Fan cooling	Natural convection cooling with heat sink
Dimensions	19" × 3U × 600 mm	224" × 429 × 577 mm
Rating class	IP20	IP65
Weight	20 kg	28 kg
Temperature range	- 25°C / + 55°C	
Power supply voltage	Integrated 85-265 VAC power supply	
Power consumption	85 VA	
Monitoring	Centralized to the RF-optical transceiver with an information signal through the optical fiber	

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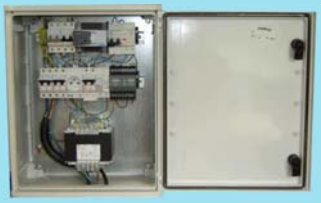
Options	
Cabin protection	✓ Protection against Sunlight and Rain ✓ Compatible with all SELECOM Repeaters ✓ Easy installation ✓ Support for laptop or measuring device
Electrical Case 	✓ Outdoor case ✓ Cost effective solution ✓ Isolation Transformer ✓ GFCI ✓ Re-starter ✓ Service Outlet ✓ CE compliant ✓ Custom design on request
GPRS Modem	✓ For the remote control via GPRS network
NMS (Network Management System)	✓ NMS software manages a complete network of different ✓ Screens with complete status and reports ✓ Location on a map of each equipment ✓ SMS, EMAIL alerts ✓ Equipments control in case of needing
Couplers	✓ Balanced couplers (1 to 2, 1 to 3, 1 to 4) ✓ Unbalanced couplers (1/3-2/3; 1/5-4/5; 1/10-9/10) ✓ For all types of antenna combinations
Antennas	✓ Donor antenna ✓ Wall mounted antennas indoor ✓ Ceil mounted antennas indoor
Feeders	✓ Coaxial feeders ✓ Radiating cables

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