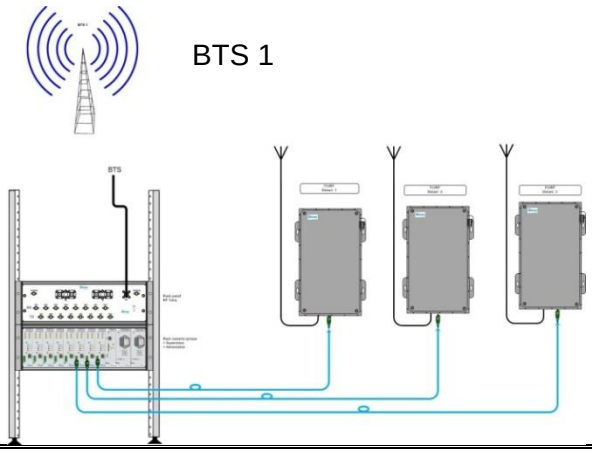
OPTIREP_SYSTEM
400 MHz
TETRA_TETRAPOL_P25_DMR

Key features

The **OPTIREP™_400 MHz** system is a flexible device that ensures service continuity **Tetra _Tetrapol_P25_DMR** in places or insufficiently covered infrastructure.

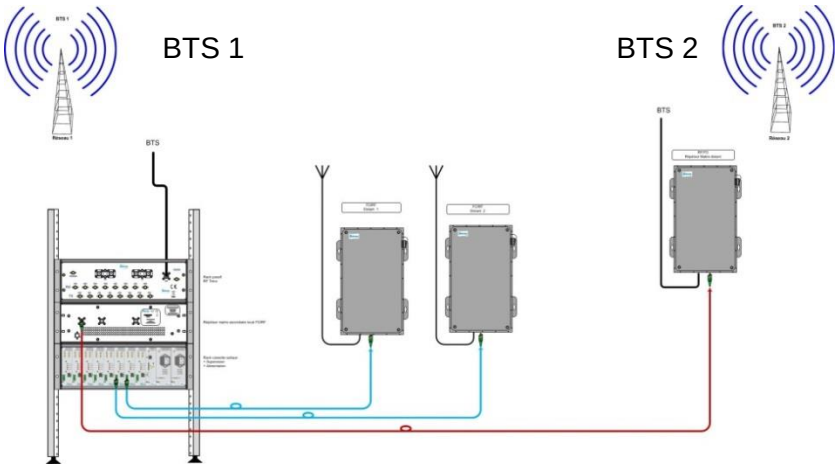
The repeater can be monitored remotely thanks to its web server / Integrated SNMP.
The flexibility of the **OPTIREP™ 400 MHz** system allows several combinations according to the specificities of every site.
The signal emitted may come from different sources and therefore present different scenarios:



CASE 1

Direct connection to the local BTS

The master unit consists of a passive rack, optical rack and remote repeater (s).



CASE 2

Direct connection to the local BTS and remote BTS:

The master unit is the same as the more over we addect case 1 a remote RF / FO secondary repeater and a local secondary FO / RF repeater.

Specifications

✓ **OPTICAL MASTER UNIT (Network head)**

The optical master can consist of several racks depending on the signal source.
Local BTS reception: Use of a passive rack and an optical rack
Local and remote BTS reception : The optical master will be identical to that used in a local BTS reception, to which will be added a secondary master repeater

Technical characteristics

Rack 3Ux19''	***Rack 1***	Passif rack
	Rack 2	Up to 8 RF / FO transceivers per optical rack (Possibility to triple the optical rack)
		A monitoring module
		Up to 2 230 VAC or 48 VDC redundant power supplies (option)
	Rack 3	FO / RF Secondary Master Repeater
Supply	***Voltage***	230 VAC or 48 VDC
	Redundancy	One or two redundant power supplies Plug & Play
Cooling system		Forced cooling
Monitoring protocols *(option)*		HTTP, SNMPv2
Remote monitoring		Modem 2G/3G/4G
OMU 1+1redundancy *(option)*		Automatic switching in the event of failure of the fiber transmission system

Rack 3

Rack 1

Rack 2

✓ RF/FO REMOTE SECONDARY MASTER REPEATER

The remote secondary master repeater provides a radio link between a remote BTS n ° 2 and the optical master rack. The use of a repeater of this type is necessary in addition, the installation of a local secondary FO / RF repeater.

Technical characteristics

	Up - Link (RX)	Down - Link (TX)
Frequency range	380 - 385 MHz 410 - 415 MHz 415 - 420 MHz 450 - 455 MHz 455 - 460 MHz	390 - 395 MHz 420 - 425 MHz 425 - 430 MHz 460 - 465 MHz 465 - 470 MHz
Bandwidth	From 1 to 5 MHz SAW filter adjusted Programmable digital filter option	
RF connector	N female 50Ω	
Wavelength	Downlink: 1310 nm Uplink : 1550 nm	
Optical output power	4 dBm ± 2 dB	
Optical connector *(in the box)*	SCAPC	
Optical fiber	SMF (G652D and G657A2)	
Optical input / output number	1 per repeater (DL + UL on the same fiber) If multiple repeaters per fiber, external optical coupler is available as an option	
Laser type	DFB	
Optical noise level	-137 dBm/Hz	

✓ SECONDARY LOCAL REPEATER FO/RF

The **local secondary FO / RF** repeater is adapted to make the connection between the passive rack with the BTS 2.

Caractéristiques techniques		
RF INTERFACE	**DL = +36 dBm**	
Frequency range	Up - Link (RX	Down - Link (TX)
	380 - 385 MHz	390 - 395 MHz
	410 - 415 MHz	420 - 425 MHz
	415 - 420 MHz	425 - 430 MHz
	450 - 455 MHz	460 - 465 MHz
	455 - 460 MHz	465 - 470 MHz
Gain	60dB to 90dB (Step 0.5dB)	
Dl composite output power	+ 36 dBm	
Noise factor	≤ 4 dB @ Gain max	
Ripple in the bandwith	≤ ± 1 dB	
Downlink / uplink rejection	> 110dB	
UL/DL isolation	> 80 dBm	
IP3	> 69 dBm	
Group delay	< 1 µs	
RF Connector	N female 50Ω	
Wavelenght	Downlink: 1310 nm Uplink: 1550 nm	
Optical output power	4 dBm ± 2 dB	
Optical connector *(In the box)*	SCAPC	
Optical fiber	SMF (G652D and G657A2)	
Number of optical input / output	1 per repeater (DL + UL on the same fiber) If multiple repeaters per fiber, an external optical coupler is available as an option	
Laser type	DFB	
Optical noise level	-137 dBm/Hz	

✓ PASSIVE RACK MODULE (Rack 1)

The **passive rack** allows to inject the RF signals through 8 optical slots in the downlink direction (BS to MS) and to catch the RF signals coming from 1 to 8 optical slot in the uplink direction (MS to BS).
According to the site and the requirements, several versions can be proposed.

Technical and mechanical characteristics		
Frequency range		Broadband The optional RIP incorporates a diplexer that attaches the various TETRA / TETRAPOL bands
Number Input/Output RF	***BTS access Or RF_RF I/O***	1 BTS access (multiplexed RX/TX) 1 input RX/1 output TX
	Output	8 outputs RX/8 outputs TX
	Measurement test point (optional)	1 access test RX1 access test TX
	RIP access	1 Access (multiplexed RX/TX)
Dimensions (L x H x D)		483 (19") × 133 (3U) x 500 mm
RF Connectors	***Inputs***	N female
	Outputs	QMA female => Quick tool-less connector
	Access test (optional)	SMA female

✓ OPTICAL RACK (Rack 2)

The **optical rack master** is equipped with 8 optical slots, a monitoring module, and two power supplies in parallel each able to power the complete rack.
A backplane bus distributes the power supplies and the RS485 links (global system control) to each cassette.

Mechanical characteristics	
Dimensions	Rack 19" prof.290mm
Dimensions (L x H x D)	483 (19") × 133 (3U) x 500 mm

✓ RF/FO TRANSCEIVER (Rack 3)

The **RF / FO transceiver** is an optical transmitter that converts RF input signals into optical signals and transmits them via FO to remote FO / RF repeaters.

RF and méchanical characteristics		
Frequency range		300 – 2500 MHz
RF input power		-10 dBm
RF output power		< -15 dBm
VSWR		1.3 : 1
RF Connector		QMA female => *Quick tool-less connector*
Wavelenght	***1 repeater per fiber (Star)***	Downlink: 1310 nm Uplink: 1550 nm
	Several repeaters per fiber (daisy-chain)	Downlink: 1310 nm Uplink: 1510, 1530,1550, 1570 nm
Optical output power		4 dBo ± 2 dB
IP3 output		≥ +30 dBm
Optical connector		E2000_APC
Number optical output		1 per transceiver (DL + UL on the same optical fiber)
Dimensions (L x H x D)		35 mm × 133 (3U) x 100 mm
Weight		0,486 kg
Energy consumption (For each transceiver module)		6 W
Maintenance		Plug & Play
Monitoring		Centralized to the Monitoring Module via a serial bus link bus

✓ MONITORING MODULE

The **Monitoring module** allows the remote access with media using IP (satellite modem ....). All the "centralized" units (FO / RF repeater) are monitored (via optical fiber) by the master sub assembly in which the supervision module (WEB / SNMP server) is located.

RF and Mechanical characteristics	
Protocols	HTTP, SNMPv2
Remote control *(option)*	Modem 2G/3G/4G
Connectors	Modem GPRS (GSM) SIM card M2M required
Maximum number of optical channels	Can monitor up to 16 pairs of remote receiver / repeater via serial bus
Dimensions (L x H x D)	35 mm × 133 mm (3U) x 160 mm
Weight	0.524 kg
Consumption power	5 W
Maintenance	Plug & Play

✓ ENERGY MANAGEMENT MODULE

Integrated in the optical rack, the energy management module is available in 230Vac or 48VDC.

Mechanical and electrical characteristics	
Dimensions (L x H x D)	35 mm × 133 mm (3U) x 160 mm
Weight	0.720 kg
Supply	230 VACor 48 VDC
Maintenance	Plug & Play

✓ OPTICAL REMOTE REPEATER

Optical remote repeaters distribute the signal to the coverage antennas. Built in an IP65-compliant box, remote repeaters can be wall mounted indoor or outdoor and in the most challenging environments.

The rack version (3U or 5U) is exclusively for indoor installations so that it can be mechanically integrated into a 19 "rack.

Technical characteristics

RF INTERFACE			**DL = +36 dBm**
		Up - Link (RX	Down - Link (TX)
Frequency range		380 - 385 MHz 410 - 415 MHz 415 - 420 MHz 450 - 455 MHz 455 - 460 MHz	390 - 395 MHz 420 - 425 MHz 425 - 430 MHz 460 - 465 MHz 465 - 470 MHz
Gain			60dB à 90dB (Saut de 0.5dB)
DL composite output power			+ 36 dBm
Noise factor			≤ 4 dB @ Gain max
Ripple in the bandwidth			≤ ± 1 dB
Downlink / uplink rejection			> 110dB
UL/DL isolation			> 80 dBm
IP3			> 69 dBm
Group delay			< 1 µs
RF connector			N female 50Ω
Wavelenght	***1 repeater per fiber***	***Standard***	Downlink: 1310 nm Uplink: 1550 nm
		Rank 1	
	Several repeater per fiber	***Rank 2***	Downlink: 1310 nm Uplink: 1510 nm
		Rank 3	Downlink: 1310 nm Uplink: 1530 nm
		Rank 4	Downlink: 1310 nm Uplink: 1570 nm
Optical output power			4 dBm ± 2 dB
Optical connector (in the box)			SCAPC
Optical fiber			SMF (G652D and G657A2)
Number of optical input/output			1 per repeater (DL + UL on the same fiber) If multiple repeaters per fiber, an external optical coupler is available as an option
Laser type			DFB
Optical noise level			-137 dBm/Hz

Generals characteristics

		DL = +36 dBm
Supply voltage		230 Vac or 48 Vdc or 24 Vdc integrated
Consumption power		100 W
Dimensions (H x P x l)	***Box version***	550 mm x 140 mm x 350 mm
	Rack version	5U x 452 mm x19”/6U x 452 mm x19” (UL/DL)
Connectors		*N_female*
RAL		9002
Protection	***Box version***	IP65
	Rack version	IP20
Temperature range	***Box version***	- 25°C / + 50°C
	Version Rack	0°C / + 45°C
Cooling system	***Box version***	Natural convection
	Version Rack	Internal fan
Monitoring		LAN RJ45 2G/3G/4G Modem Protocol IP, http Web, SNMP Dry loops LED Green and Red

Box version

Rack version

More informations: www.see-critical.com

SEE CRITICAL COMMS | Version: V1911003EN | www.see-critical.com | Ref: 010014 | DAT_OPTI_BTS-400 MHz _GB
Writing: V.RAOUL| Design: L.CHARVIN | Verification: B.KELLER | Approval: O.DEBLOCK

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