

## Optirep™ System 400 MHz



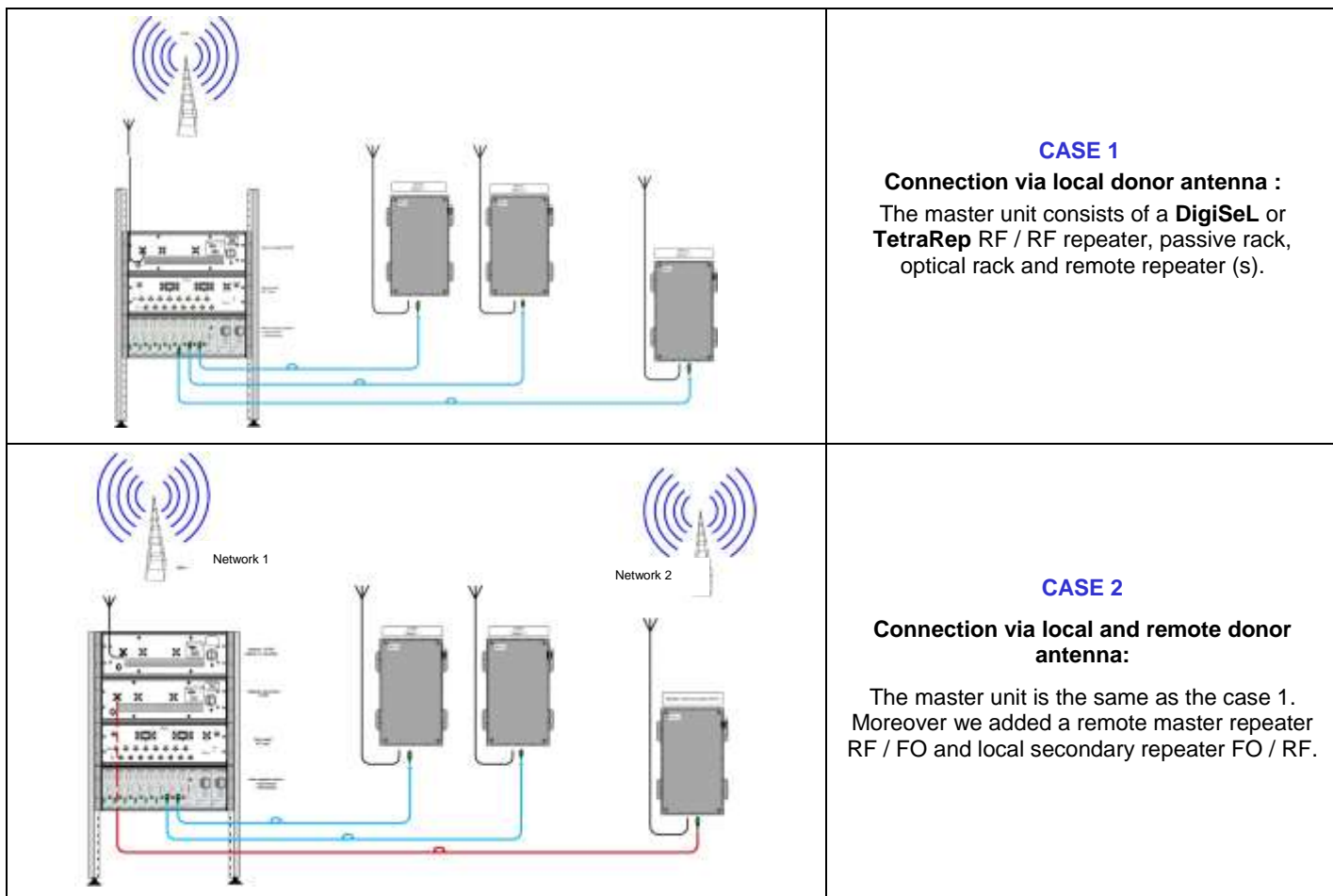
### ❖ General description :

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

The repeater can be monitored remotely using 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:



## Optical Master (Network head)

The optical master can consist of several racks depending on the signal source.

**Local RF reception :** A **DigiSel** or **Tetrarep** rack will be used to complement the passive rack and optical rack.

**Remote RF reception :** The optical master will be identical to that used in the context of a local RF reception to which will be added a secondary repeater.

<b>Racks</b> 3U x19" :	<b>Rack 1</b> Local donor antenna reception	RF/RF Master repeater Type DigiSeL or TetraRep
	<b>Rack 2 (OPTION)</b> Local and remote donor antenna reception	FO/RF secondary
	<b>Rack 3</b>	Passive rack
	<b>Rack 4</b>	Up to 8 RF / FO transceivers per optical rack (Possibility to triple the optical rack)
1 monitoring module		
Up to 2 230 VAC or 48 VDC redundant power supplies (option)		
<b>Supply</b>	<b>Voltage</b>	230 VAC or 48 VDC
	<b>Redondancy</b>	One or two redundant power supplies Plug & Play
<b>Cooling system</b>		Forced cooling
❖ <b>Monitoring (option)</b>		
<b>Protocols</b>		HTTP, SNMPv2
<b>Remote monitoring</b>		Modem 2G/3G/4G
❖ <b>OMU 1+ 1 redundancy (option)</b>		Automatic switchover in the event of failure of the fiber transmission system



## RF/RF master repeater

In the case of reception via a local antenna, an **RF / RF repeater** must be installed in order to amplify the signal before being injected into the passive rack.



INTERFACE RF		UL = +17 dBm	UL = +24 dBm	UL = +37 dBm		
Frequency range	Up - Link (RX)		Down - Link (TX)			
	380 - 385 MHz		390 - 395 MHz			
	385 - 390 MHz		395 - 400 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			
Bandwidth		From 1 to 5 MHz SAW filter adjusted Programmable digital filter option				
Gain		50dB to 80dB (Step 0.5dB)	55dB to 85dB (Step 0.5dB)	60dB to 90dB (Step 0.5dB)		
Nominal output power	1 Channel	+ 17 dBm	+ 24 dBm	+ 37 dBm		
	2 Channels	+ 14 dBm	+ 21 dBm	+ 34 dBm		
	4 Channels	+ 11 dBm	+ 18 dBm	+ 31 dBm		
	8 Channels	+ 8 dBm	+ 15 dBm	+ 28 dBm		
	16 Channels	+ 5 dBm	+ 12 dBm	+ 25 dBm		
	32 Channels	+ 2 dBm	+ 9 dBm	+ 22 dBm		
Noise factor		≤ 4 dB @ Gain max				
Ripple in the bandwidth		≤ ± 2 dB		≤ ± 1 dB		
Uplink & Downlink rejection		> 90dB		> 110dB		
Isolation UL/DL		> 40 dBm		> 80 dBm		
IP3		> 40 dBm	> 51 dBm	> 69 dBm		
Delay group		< 4 μs				
RF Connector		N female 50Ω				
Supply voltage		230 VAC or 48 Vcc or 24 Vcc integrated				
Power consumption		DL	17dBm	24dBm	37dBm	
		UL	17dBm	72 W	85 W	120 W
		24dBm	85 W	100 W	135 W	
		37dBm	120 W	135 W	150 W	
Protection		IP65				
Cooling		Internal fans				
WEB, SNMP monitoring (Option)		Dry loops Operating leds				

**AVAILABLE IN BOX VERSION ON REQUEST**

## RF/FO remote secondary master repeater

The remote secondary master repeater provides a radio link between a BTS and the master rack. The use of a repeater of this type requires, in addition, the installation of a secondary master repeater FO / RF.



Box illustration +37 dBm

RF INTERFACE		UL = +17 dBm	UL = +24 dBm	UL = +37 dBm
Frequency range	Up - Link (RX)		Down - Link (TX)	
	380 - 385 MHz		390 - 395 MHz	
	385 - 390 MHz		395 - 400 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	
Bandwidth		From 1 to 5 MHz SAW filter adjusted Programmable digital filter option		
Gain		50dB to 80dB (Step 0.5dB)	55dB to 85dB (Step 0.5dB)	60dB to 90dB (Step 0.5dB)
Nominal output power	1 Channel	+ 17 dBm	+ 24 dBm	+ 37 dBm
	2 Channels	+ 14 dBm	+ 21 dBm	+ 34 dBm
	4 Channels	+ 11 dBm	+ 18 dBm	+ 31 dBm
	8 Channels	+ 8 dBm	+ 15 dBm	+ 28 dBm
Wavelength		Downlink : 1310 nm Uplink : 1550 nm		
Noise factor		≤ 4 dB @ Gain max		
Ripple in the bandwidth		≤ ± 2 dB		≤ ± 1 dB
Rejection Downlink / uplink		> 90dB		> 110dB
Isolation UL/DL		> 40 dBm		> 80 dBm
Delay group		< 4 μs		
RF connector		N female 50Ω		
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)		
Laser type		DFB		
Optical noise level		-137 dBm/Hz		

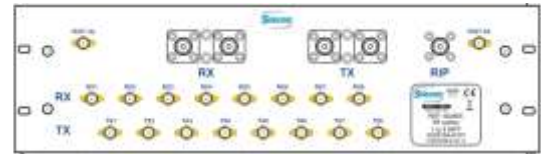
## FO/RF secondary local master repeater

FO / RF **secondary master repeater** is suitable for interfacing between the passive rack and the OMU.

### Passive rack module

The **passive rack** allows to inject the RF signals through 8 optical slots in the downlink direction (BS to MS) and to recover the RF signals coming from 1 to 8 optical slots in the uplink direction (MS to BS).

Depending on the site and the requirements, several versions can be proposed.

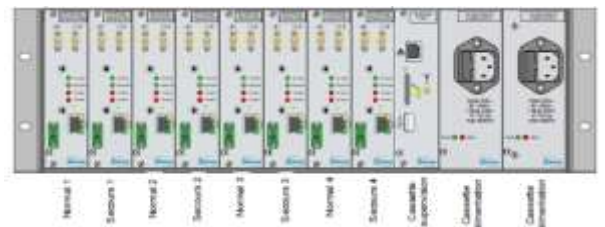


RF INTERFACE		
Frequency range		Broadband
Number input/output RF	Or BTS access	1 BTS access (multiplexed RX/TX)
	RF_RF I/O	1 output RX/1 output TX
	Output	8 outputs RX/8 outputs TX
	Measurement test point (optional)	1 access test RX/1 access test TX
	RIP access	1 Access (multiplexed RX/TX)
Mechanical characteristics		
Dimensions (L x H x D)		483 (19") x 133 (3U) x 500 mm
RF Connectors	Inputs	N female
	Outputs	QMA female => Quick tool-less connector
	Access test (optional)	SMA female

### Optical rack

The **optical rack master** is equipped with 8 optical cassettes, a supervision 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.

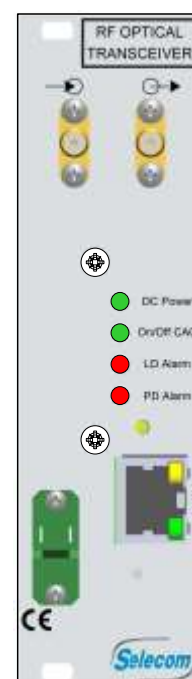


Mechanical characteristics	
Dimensions	Rack 19" prof.290mm
Weight	3.500 kg

## RF/FO Transceiver

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

<b>RF Characteristics</b>		
<b>Frequency range</b>	300 – 2500 MHz	
<b>RF input power</b>	-10 dBm	
<b>RF output power</b>	< -15 dBm	
<b>VSWR</b>	1.3 : 1	
<b>RF connector</b>	QMA female => <i>Quick tool-less connector</i>	
<b>Optical interface</b>		
<b>Wavelength</b>	<b>1 repeater per fiber (Star)</b>	Downlink : 1310 nm Uplink : 1550 nm
	<b>Several repeaters per fiber (daisy-chain)</b>	Uplink: 1310 nm Downlink : 1510, 1530, 1550, 1570 nm
<b>Optical output power</b>	4 dBm ± 2 dB	
<b>IP3 output</b>	≥ +30 dBm	
<b>Optical connector</b>	SCAPC	
<b>Optical fiber</b>	SMF (G652D et G657A2)	
<b>Number of optical outputs</b>	1 per transceiver (DL + UL on the same optical fiber)	
<b>Electrical and Mechanical characteristics</b>		
<b>Dimensions (L x H x D)</b>	35 mm × 133 (3U) x 100 mm	
<b>Weight</b>	0,486 kg	
<b>Energy consumption (For each transceiver module)</b>	6 W	
<b>Maintenance</b>	Plug & Play	
<b>Monitoring</b>	Centralized to the Monitoring Module via a serial bus link	

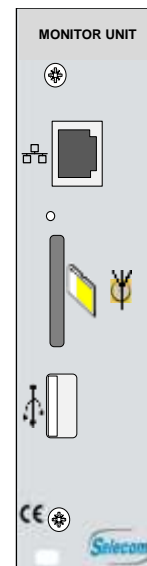




## Monitoring module

The **Monitoring module** allows the remote access with media using IP (satellite modem ....). All "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.

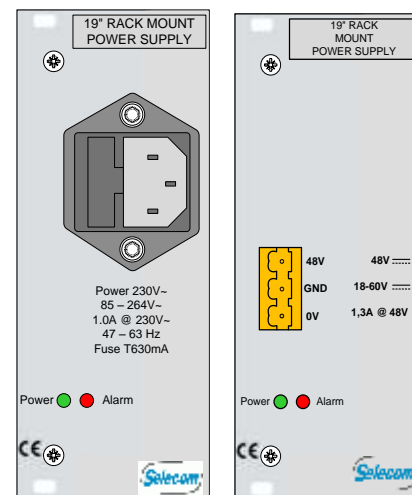
<b>Module characteristics</b>	
<b>Protocols</b>	HTTP, SNMPv2
<b>Remote control</b>	Modem GPRS (GSM) SIM card M2M required
<b>Connectors</b>	RJ45 Slot for SIM card M2M RJ45
<b>Maximum number of optical channels</b>	Can monitor up to 16 pairs of remote receiver / repeater via serial bus
Mechanical and Electrical characteristics	
<b>Dimensions (L x H x D)</b>	35 mm x 133 mm (3U) x 160 mm
<b>Weight</b>	0.524 kg
<b>Power consumption</b>	5 W
<b>Maintenance</b>	Plug & Play



## Energy management module

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

<b>Module characteristics</b>	
<b>Dimensions (L x H x D)</b>	35 mm x 133 mm (3U) x 160 mm
<b>Weight</b>	0.720 kg
<b>Supply</b>	230 VAC or 48 VDC
<b>Maintenance</b>	Plug & Play



Option 230 Vac

Option 48 Vdc

## Optical remote repeaters

Optical remote repeaters distribute the signal to the coverage antennas.

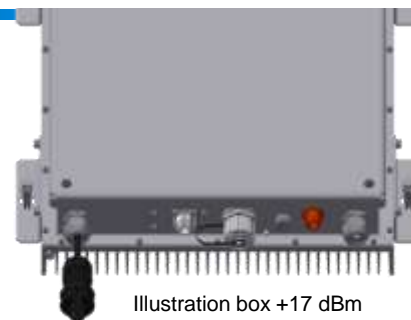


Illustration box +17 dBm

RF INTERFACE		DL = +17 dBm	DL = +24 dBm	DL = +37 dBm
Frequency range	Up - Link (RX)		Down - Link (TX)	
	380 - 385 MHz		390 - 395 MHz	
	385 - 390 MHz		395 - 400 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		50 dB to 80 dB (Step 0.5dB)	55 dB to 85 dB (Step 0.5dB)	60 dB to 90 dB (Step 0.5dB)
Composite output power		+ 17 dBm	+ 24 dBm	+ 37 dBm
Noise factor		≤ 4 dB @ Gain max		
Ripple in the blanket		≤ ± 2 dB		≤ ± 1 dB
Downlink / uplink rejection		> 90dB		> 110dB
Isolation UL/DL		> 40 dBm		> 80 dBm
IP 3		> 40 dBm	> 51 dBm	> 69 dBm
Group delay		< 1 μs		
RF connector		N femelle 50Ω		
Wavelength	1 repeater per fiber	Standard Downlink : 1310 nm Uplink : 1550 nm		
	Several repeaters per fiber	Rang 1	Downlink : 1310 nm Uplink : 1550 nm	
		Rang 2	Downlink : 1310 nm Uplink : 1510 nm	
		Rang 3	Downlink : 1310 nm Uplink : 1530 nm	
		Rang 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 several repeaters per fiber, An external optical coupler is available as an option		
Laser type		DFB		
Optical noise level		-137 dBm/Hz		



## Generals characteristics

Built in an IP65-compliant cabinet, remote repeaters can be wall mounted indoor or outdoor and in the most challenging environments.

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



Rack version 3 U +17/+24 dBm

<b>Supply voltage</b>		230 Vac or 48 Vdc or 24 Vdc integrated		
<b>Consumption power</b>		<b>+17dBm</b>	<b>+24dBm</b>	<b>+37dBm</b>
		60 W	70 W	100 W
<b>Dimensions (H x P x I)</b>	<b>Box version</b>	550 mm x 140 mm x 350 mm		
	<b>Rack version +17&amp;+24 dBm</b>	3U x 452 mm x19"		
	<b>Rack version +37 dBm</b>	5U x 452 mm x19"/6U x 452 mm x19" (UL/DL)		
<b>Connectors</b>		N_Female		
<b>RAL</b>		9002		
<b>Protection</b>	<b>Box version</b>	IP65		
	<b>Rack version</b>			
<b>Temperature range</b>	<b>Box version</b>	- 25°C / + 50°C		
	<b>Rack version</b>	0°C / + 45°C		
<b>Cooling system</b>	<b>Box version</b>	Natural convection		
	<b>Rack version</b>	Internal fans		
<b>Monitoring</b>		LAN RJ45 2G/3G/4G Modem Protocol IP, http Web, SNMP Dry loops LED <b>Green</b> and <b>Red</b>		