

OPTICAL REPEATER - MULTIPLE INPUTS SINGLE OUTPUT

O-MISO

O-MISO 4-61-1, 8-61-1, 16-61-1 and 32-61-1 is a DOCSIS 3.1 ready active optical repeater for signal splitting and signal processing for FTTx-Networks.



O-MISO x - 61 - 1 - x

Split factor	US-wavelength	Number of Fibres	Monitoring
4; 8; 16 or 32	61: 1610 nm	1: one fibre for DS and US	-: FOISTRA-F prepared F: FOISTRA F integrated

Type	Item No.	Description
O-MISO 4-61-1	57002984	Optical Upstream Repeater 4 x Inputs, 1 x Output
O-MISO 8-61-1	57002926	Optical Upstream Repeater 8 x Inputs, 1x Output
O-MISO 16-61-1	57002816	Optical Upstream Repeater 16 x Inputs, 1x Output
O-MISO 32-61-1	57002927	Optical Upstream Repeater 32 x Inputs, 1x Output
O-MISO 32-61-1 F	57002944	Optical Upstream Repeater 32 x Inputs, 1x Output, including FOISTRA-F module
OA XFP 13 / 17 dBm	57002813 /	optional
Optical MEMS-Switch	57003035	optional

	Unit	min.	typ.	max.	Remarks
Operating Voltage	V AC	185	230	265	Switched mode PSU
Mains Power	W				
4-61-1			4.0	4.5	
8-61-1			4.5	5.0	
16-61-1			5.8	6.3	
32-61-1			8.0	8.5	
Length of Power Cable	m	1.3	1.5		
Mains Plug			EURO		
Protection Class			II		
Operating Voltage, internal	V DC		9		19" case (1RU)
Indication Power ON			LED green		
Operating Temperature	°C	-20		+55	
IP Class			IP 20		
Dimensions W x H x D	mm		430 x 260 x 45		
Weight	kg		2.5		
Fiber Connector			SC/APC		
RF Connectors			F-female		
Conformity			CE		

OPTICAL REPEATER - MULTIPLE INPUTS SINGLE OUTPUT

TECHNICAL DATA - DOWNSTREAM

Downstream:

- Transparent for 1550 nm DS signals
- Prepared for XFP EDFA-module 17 dBm optical output power
- Redundant fiber concept possible with optical MEMS-switch
- Separate xPON output / xPON with RF overlay application

Downstream transparent	Unit	min.	typ.	max.	Remarks
Optical Wavelength	nm	1540	1550	1560	
Integrated WDM filter 1550 nm /CWDM			Yes		others on request
Attenuation					
4-61-1			7.5	8.0	
8-61-1	dB		10.5	11.0	
16-61-1			13.5	14.0	
32-61-1			16.5	17.0	
Optical Input Power	dBm			22	
Optical Input Return Loss DS	dB	45			
with FOSTRA-F	Optical Receiver Diode Type		PIN		
	Decoupling Attenuation		0.3	0.5	
with EDFA	Optical Input Power Range	dBm	0	+3	+6
	Optical Output Power (total)	dBm		17.0	Laser Class 1M
	Mains Power	W		2.5	3.0
with optical MEMS-Switch	Optical wavelength	nm	1240		1640
	Insertion Loss	dB		0.4	0.9
	Switching Time	ms		2	10

OPTICAL REPEATER - MULTIPLE INPUTS SINGLE OUTPUT

TECHNICAL DATA - UPSTREAM

Upstream:

- Totally avoiding of optical interferences (OBI)
- All DOCSIS US channels on one optical CWDM wavelength
- Pluggable optical US module
- Transparent for all the adjustments set by the optical node
- High input performance from -3 to +3 dBm
- OMI-Adjustment over FOSTRA-F possible
- Testpoint to measure the total electrical US signal before converting to an optical signal
- Ultra Low noise DFB-laser with isolator

Upstream active combiner		Unit	min.	typ.	max.	Remarks
Input	Optical Receiver Diode Type			PIN		
	Optical Input Wavelength	nm	1240		1620	without 1540 - 1560
	Optical Input Power	dBm	-3		+3	adjustable
	Optical Input Return Loss US	dB	45			
Output	Optical Transmitter Diode Type			DFB		Laser Class 1
	Optical Output Wavelength	nm	1605	1610	1615	18 CWDM - λ avail.
	Optical Output Power	dBm		+3		+6 dBm on request
Transmission Characteristic	Laser turn-on time	nsec		CW		continuous mode
	Frequency range	MHz	12	-	204	for DOCSIS 3.1
	Flatness	dB		± 0.5	± 0.75	
	Level Drift between Inputs	dB		± 0.75	± 1.0	
	Testpoint for OMI control	dB μ V	75		82	75dB μ V \pm 6% OMI 82dB μ V \pm 15% OMI
	Optical input dynamic range, adjustable with 10 dB Step-Att. (2dB Step)	dB	0		10	-2 dBm -> 0 dB 0 dBm -> 4 dB +3 dBm -> 10 dB
	CINR measurement *) @114 MHz 24 Ch.; QAM 64; 5.56 Msym/s	dB	40.0	>42.0		at: MER EUT > 45.0 dB BER EUT < 1E-9

FOSTRA-F switching options	Unit	Function	
		with FOSTRA-F	without FOSTRA-F
OMI Adjustment	dB μ V	-3 ... +3	OFF

OPTICAL REPEATER - MULTIPLE INPUTS SINGLE OUTPUT CINR MEASUREMENT O-MISO

Measurement equipment and settings:

- || 24 Channels
- || 64 QAM modulated with 5.56 Msymb/s
- || Measure channel @ 114 MHz

DIN EN 60728-3-1 (VDE 0855-3-1):2013-02
EN 60728-3-1:2012

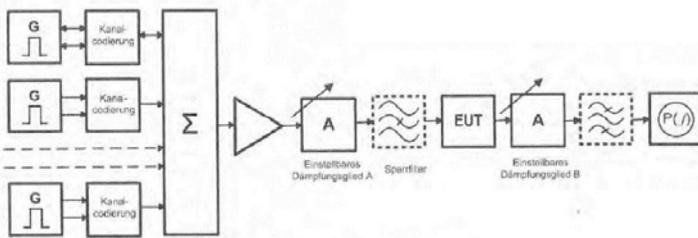
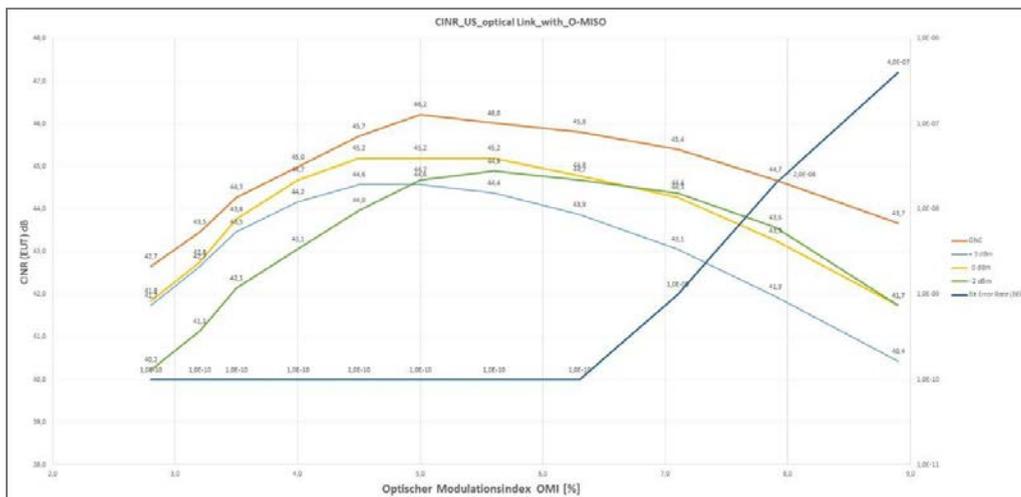
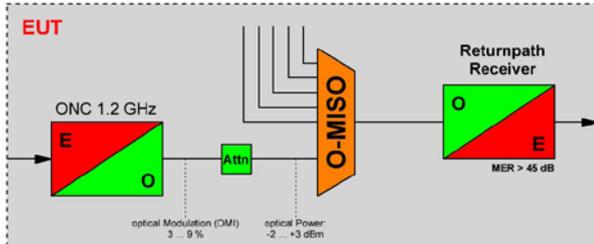


Bild 2 – CINR-Messaufbau

Equipment under test (EUT):



INVERTED NODE - OBI-FREE

The Inverted Node acts as interface between the coaxial and the optical network.

Downstream:

- Conversion of the electrical DOCSIS 3.1 downstream signal into an optical signal
- DOCSIS 3.1 compatible with operating bandwidth up to 1218 MHz
- Externally modulated XFP-module is used for the conversion of an electrical into an optical signal
- Pluggable RF diplexer 85 / 105 / 258 MHz
- Transmission of up to 79 analogue plus 75 QAM channels
- Power consumption of the Tx-XFP module < 3.5W
- Compliant with SCTE 195 2013
- Prepared for XFP EDFA-module 13/17 dBm optical output power
- Integrated passive splitter in DS, various splitting ratios: 1-4/ -8/ -16/ -32



Upstream:

- Up to 32 optical inputs
- Totally avoiding of optical interferences (OBI)
- Transparent for all the adjustments set by the optical node
- High input performance from -2 to +3 dBm
- Testpoint to measure the total electrical US signal
- Adjustable RF output level

Monitoring:

- By DOCSIS modem or Local Ethernet interface

ELECTRICAL AND GENERAL DATA

	Unit	min.	typ.	max.	Remarks
Operating Voltage	V AC	185	230	265	Switched mode PSU
Mains Power	W		16	16.5	
Length of Power Cable	m	1.3	1.5		
Mains Plug			Euro		
Protection Class			II		
Operating Voltage, internal	V DC		9		
Indication Power ON			LED green		
Operating Temperature	°C	-20		+55	
IP Class			IP 20		
Dimensions W x H x D	mm		430 x 260 x 45		19" case (1RU)
Weight	kg		0.8		
Fiber Connector			SC/APC		
RF Connectors			F-female		
Conformity			CE		

INVERTED NODE

TECHNICAL DATA - DOWNSTREAM AND UPSTREAM

Downstream		Unit	Value	Remarks
RF Features	RF Bandwidth	MHz	50 ... 1218	
	RF Input Level	dBμV	70 ... 80	
	RF Flatness	dB	+/- 1.5	
	Cable simulator	dB	0 ... 16	
	Return Loss	dB	>18	
	CSO/CTB	dB	>60	
	Link Noise Figure	dB	<20	
	RF Input Connection		standard F-connector, 75 Ω	
RF Test Point		available for each Tx-Module		
Optical Features	Optical Wavelength	nm	1550 or DWDM	
	Type of modulation		external	
	Optical Output Power, Tx only	dBm	4 or 7	4 dBm integrated
	Attenuation DS passive splitter			
	1-4	dB max.	7.2	
	1-8	dB max.	10.5	
With EDFA	1-16	dB max.	13.8	
	1-32	dB max.	17.2	
	Optical Input Power Range	dBm	+7 ... 0	
	Optical Output Power	dB	13.0 / 17.0	
Mains Power	W	2.5		

Upstream	Unit	min.	typ.	max.	Remarks
Optical Input Wavelength	nm	1240		1620	without 1540 - 1560
Optical Input Power	dBm	-3		+2	others on request
Optical Input Return Loss US	dB	45			
Optical Receiver Diode Type			PIN		
Frequency range	MHz	12	-	204	depends on plugged diplexer
Flatness	dB			±0.5	
Testpoint	dB		-20		TP for calibration
CINR measurement @35 MHz 16 x Tx: 8 Ch.; QAM 64; 5.56 Msym/s	dB	38.1	>40.0		at: MER EUT > 45.0 dB BER EUT < 1E-9
Opt. input receiver -8 ... -22 dBm					
RF output level	dBμV	70		85	adjustable; 0.5 steps