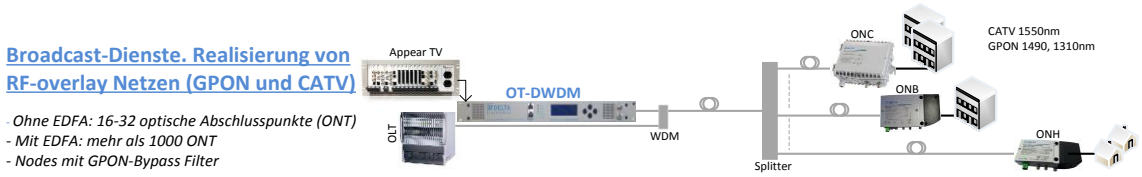
Optical external modulated transmitter (OT-DWDM-1155)

The optical network needs to be flexible and future-proof which is enabled by DCT DELTA. The new generation of optical transmitters offers more possibilities to extend consisting networks as well as to plan new networks modernly. Due to modern DWDM-technology the transmitters are adjusted optimally to future demands.

Application field

RF-Overlay (CATV-transmission) in FTTx networks and xPON-applications

A typical application for the optical transmitter is the transmission of CATV signals over one fiber next to FTTx or xPON services. With the DELTA Electronics optical amplifier (EDFA) the optical CATV-signal can be fed into several FTTx or xPON-networks at the same time. Lengths of fiberglass of up to 100 km are feasible due to external modulation technique and variable SBS-suppression.

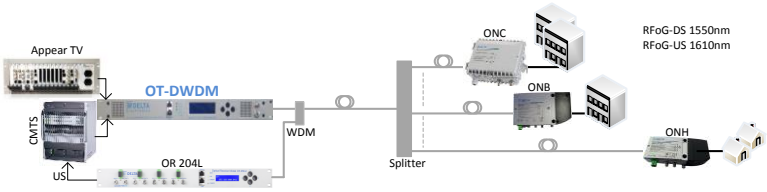


Implementation of RFoG-networks (Internet and CATV) with a transmitter:

In RFoG-networks the downstream-signals are relayed at a wavelength of 1550nm. Within a temperature range of 0-50 °C the wavelength of the transmitter remains exactly at the adjusted wavelength according to ITU-TG 692 Standard (see annex A). With an optical amplifier (EDFA) by DELTA Electronics a high number of users can be obtained, which is mostly only restricted by the capacity of the upstream in a one-fiber-system. In a two-fiber-system any desired number of users can be reached within a radius of 50 km.

Broadcast-Dienste. Realisierung von RFoG-Netzen (Internet und CATV) mit einem Transmitter:

- *Ohne EDFA: 16 optische Abschlusspunkte (ONT)*
- *Mit EDFA: mehr als 1000 ONT*
- *Upstream je 32 Nodes zu einem US-Rx (OBI free)*

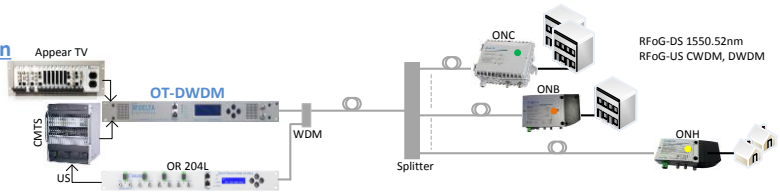


Modern CWDM-RFoG/ DWDM-RFoG networks:

Modern RFoG-networks, based on DOCSIS 3.0 and DOCSIS 3.1, use CWDM for a faultless transmission (OBI-safe RFoG) or DWDM-wavelengths for the transmission of upstream-signals. This requires that the downstream-wavelength of the optical transmitter has to be compatible with the CWDM or DWDM technique to prevent the appearance of interferences between US and DS. The new optical transmitter of DCT DELTA with the shiftable wavelength according to ITU-TG 692 Standard allows a faultless use of RFoG technique.

Narrowcast-Dienste. Realisierung von CWDM-RFoG-Netzen (Internet und CATV) mit einem Transmitter:

- *Ohne EDFA: 16 optische Abschlusspunkte (ONT)*
- *Mit EDFA: mehr als 1000 ONT*
- *Upstream je 32 Nodes zu einem US-Rx (OBI free)*

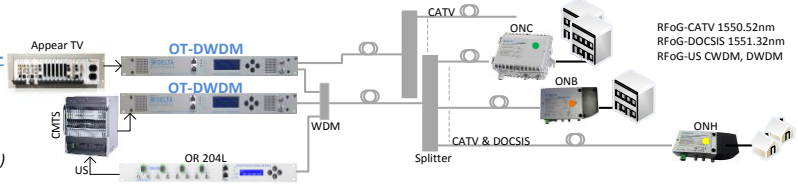


Transfer DOCSIS-services and CATV separately in one RFoG-network:

In some network architectures a partition of DOCSIS- and CATV-services is useful for various reasons, such as customer authorization or optimization of splitting ratio. The new generation of optical transmitters enables the realization of such networks with the help of a tuning range of the whole ITU-TG 692 section.

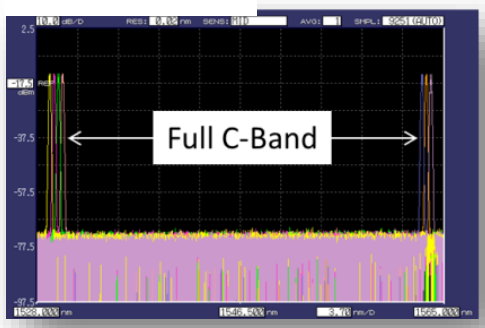
Narrowcast-Dienste. CWDM-RFoG-Netzen & CATV

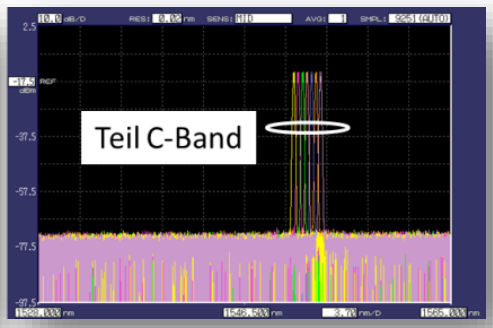
- *Ohne EDFA: 16 optische Abschlusspunkte (ONT)*
- *Mit EDFA: mehr als 1000 ONT*
- *Upstream je 32 Nodes zu einem US-Rx (OBI free)*



Full C-Band or Partial C-Band:

Relating to the number of possible wavelengths the new generation of optical transmitters offers two alternatives: Full C-Band- and partial C-Band-

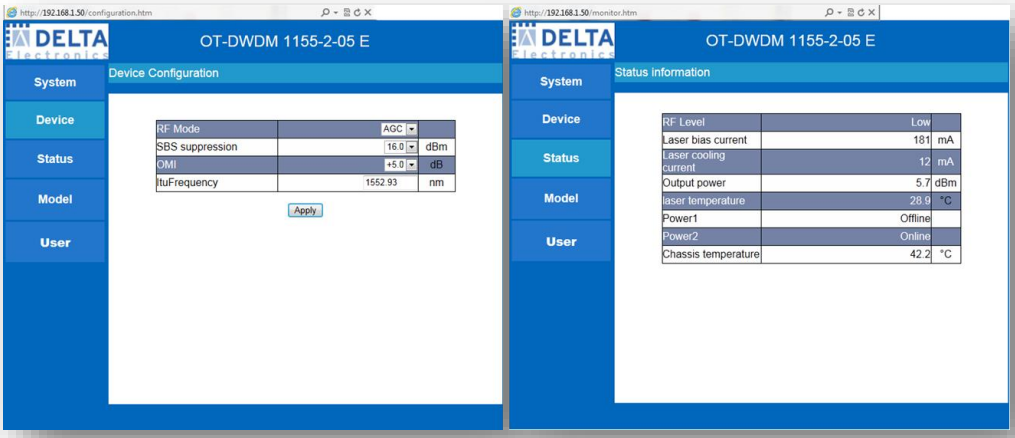




transmitter.

The Full C-Band-transmitter enables all possible wavelengths from 1528.77nm to 1560.61nm in an interval of 50 GHz according to ITU-TG 692 Standard (see annex A). The partial C-Band-transmitter enables a shift of the wavelength from 1550.92nm to 1554.13nm in an interval of 50 GHz according to ITU-TG 696 Standard (see annex A).

The requested wavelength can be adjusted directly at the transmitter or be inserted remotely over the web-surface of the transmitter. Next to the wavelength other important parameters are adjustable and can be monitored.



Special features at a glance:

- Adjustable DFB Laser, variable from 1528.77nm to 1560.61nm
- Supports Dense Wavelength Division Multiplexing (DWDM)
- Wavelength adjustable in an interval of 0.4nm
- High stability of the wavelengths
- Narrow spectrum of laser
- Adjustable SBS-suppression of 13 to 19 dB in 0.1 steps
- Adjustable optical modulation index (OMI)
- Automatic (AGC) or manual (MGC) control for laser management
- Outstanding CNR, CSO and CTB values
- Implemented micro processor, LCD and LED status display
- SNMP and web-based monitoring for all parameters
- OMI, SBS, wavelength AGC and MGC remotely adjustable
- Redundant power supply
- Test socket: RF Test -20dB

Technical specifications:

Data Sheet					
Performance			Index		
			Min	Typ	Max
Optical features	Output Wavelength (λ) Full C-Band Partial C-Band	nm	1528.77 1550.92		1560.61 1554.13
	Optical output power (at each output)	dBm	5		11
	Number of outputs			2	
	Channel spacing	nm		0.4	
	Duration of adjustment	ms		20	
	SBS-treshold value	dB	13		19
	Side mode suppression ratio (SMSR)	dB	45	50	
	Relative intensity noise (RIN)	dB			-160
	Optical return loss	dB		>45	
	Optical connector	SC/APC (more on demand)			
HF features	HF bandwidth	MHz	47 - 1000		
	Input level	dBµV	70 - 86		
	Frequenzy response	dB	±0.75		
	CNR	dB	52.5 PAL-D/60 Ch. 65 km fiber, 0 dBm receiver		
	CSO, CTB	dB	< 65		
	Input impedance	Ω	75		
General features	SNMP network management			RJ45, LAN WebGUI	
	Power supply	VDC	±36	±48	±72
	Power consumption	W			50
	Operating temperature	°C	-5	22	65
	Storage temperature	°C	-40		85
	Relative humidity	%	5	55	95
	Dimensions	mm		482 x 360 x 44	W x D x H

Ordering data:

	OT-DWDM-1155-02-05	OT-DWDM-1155-02-07	OT-DWDM-1155-02-09	OT-DWDM-FC-1155-02-05	OT-DWDM-FC-1155-02-07	OT-DWDM-FC-1155-02-09
Optical Output Power (dBm)	5	7	9	5	7	9
Number of outputs	2	2	2	2	2	2
Setting range (nm)	1550.92-1554.14	1550.92-1554.14	1550.92-1554.14	Full C-Band	Full C-band	Full C-band
Article number	57002131	57002132	57002428	57002429	57002430	57002431

Annex A: **Nominal central frequencies;** ITU-TG 692 Standard

Nominal central frequencies (THz) for spacings of 50 GHz	Nominal central wavelengths (nm)	Nominal central frequencies (THz) for spacings of 50 GHz	Nominal central wavelengths (nm)	Nominal central frequencies (THz) for spacings of 50 GHz	Nominal central wavelengths (nm)
196.10	1528.77	194.75	1539.37	193.40	1550.12
196.05	1529.16	194.70	1539.77	193.35	1550.52
196.00	1529.55	194.65	1540.16	193.30	1550.92
195.95	1529.94	194.60	1540.56	193.25	1551.32
195.90	1530.33	194.55	1540.95	193.20	1551.72
195.85	1530.72	194.50	1541.35	193.15	1552.12
195.80	1531.12	194.45	1541.75	193.10	1552.52
195.75	1531.51	194.40	1542.14	193.05	1552.93
195.70	1531.90	194.35	1542.54	193.00	1553.33
195.65	1532.29	194.30	1542.94	192.95	1553.73
195.60	1532.68	194.25	1543.33	192.90	1554.13
195.55	1533.07	194.20	1543.73	192.85	1554.54
195.50	1533.47	194.15	1544.13	192.80	1554.94
195.45	1533.86	194.10	1544.92	192.75	1555.34
195.40	1534.25	194.05	1544.53	192.70	1555.75
195.35	1534.64	194.00	1545.32	192.65	1556.15
195.30	1535.04	193.95	1545.72	192.60	1556.55
195.25	1535.43	193.90	1546.12	192.55	1556.96
195.20	1535.82	193.85	1546.52	192.50	1557.36
195.15	1536.22	193.80	1546.92	192.45	1557.77
195.10	1536.61	193.75	1547.32	192.40	1558.17
195.05	1537.00	193.70	1547.72	192.35	1558.58
195.00	1537.40	193.65	1548.11	192.30	1558.98
194.95	1537.79	193.60	1548.51	192.25	1559.39
194.90	1538.19	193.55	1548.91	192.20	1559.79
194.85	1538.58	193.50	1549.32	192.15	1560.20
194.80	1538.98	193.45	1549.72	192.10	1560.61