

OFC

The future of optical networking
and communications

The Virtual Conference
and Exhibition



Technical Conference: 06 – 11 June 2021

Exhibition: 07 – 11 June 2021

Pacific Daylight Time (UTC-07:00)



Optical Multi-Vendor Interoperable Specifications in ITU-T SG15/Q6

Dr.-Ing. Fabio Pittalà (Huawei Technologies Co., Ltd.) – on behalf of ITU-T SG15/Q6

OFC

The Virtual Conference and Exhibition



Current ITU-T SG15/Q6 Work Programme:

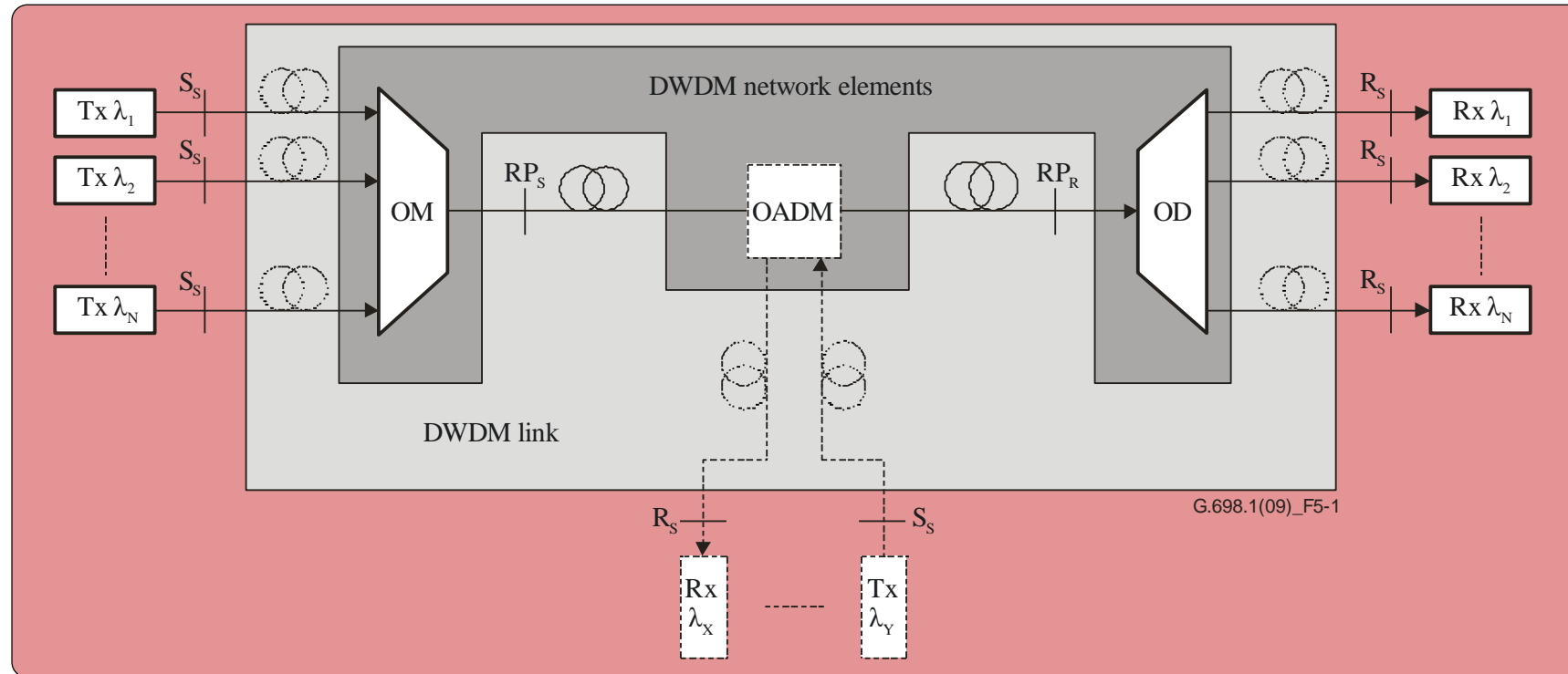
Work item	Subject / Title	Version	Timing	Liaison relationship
<u>G.698.1</u> addition of 25G	Multichannel DWDM applications with single-channel optical interfaces	Rev.	2022	-
<u>G.698.2</u> addition of 25G	Amplified multichannel DWDM applications with single channel optical interfaces	Rev.	2022	-
<u>G.698.2</u> addition of 200G and 400G	Amplified multichannel DWDM applications with single channel optical interfaces	Rev.	2022	IEEE 802.3, OIF
<u>G.698.4</u> addition of 25G	Multichannel bi-directional DWDM applications with port agnostic single-channel optical interfaces	Rev.	2022	-
<u>G.owdm</u>	Multichannel bi-directional WDM applications with single-channel optical interfaces in the O-band	New	-	-
<u>L.400</u>	Optical fibre splices	Rev.	2021	IEC SC86A, IEC SC 86B, CENELEC TC86BXA, CENELEC TC86A

Timing: Best current estimate of expected year of Consent of a work item

IM/DD Multi-Vendor Interoperable Interfaces

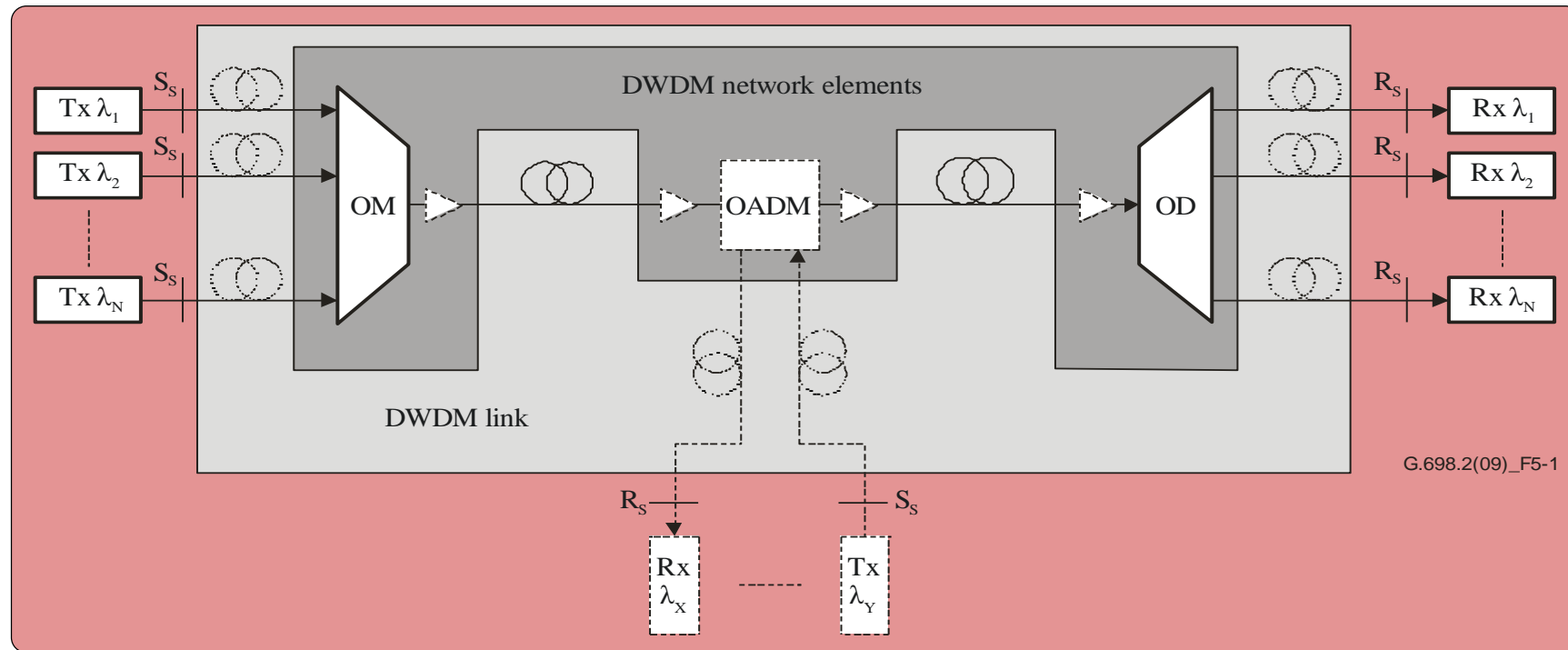
G.698.1: Multichannel DWDM applications with single-channel optical interfaces

Unamplified DWDM systems primarily intended for metro applications



Specification feature	In-force Recommendation	Under development
Bit rate of signal channel	up to 10 Gbit/s	NRZ 25 Gbit/s
Channel frequency spacing	50 GHz and 100 GHz	50 GHz and 100 GHz
Transmission distance	30 km – 80 km	up to 10 km

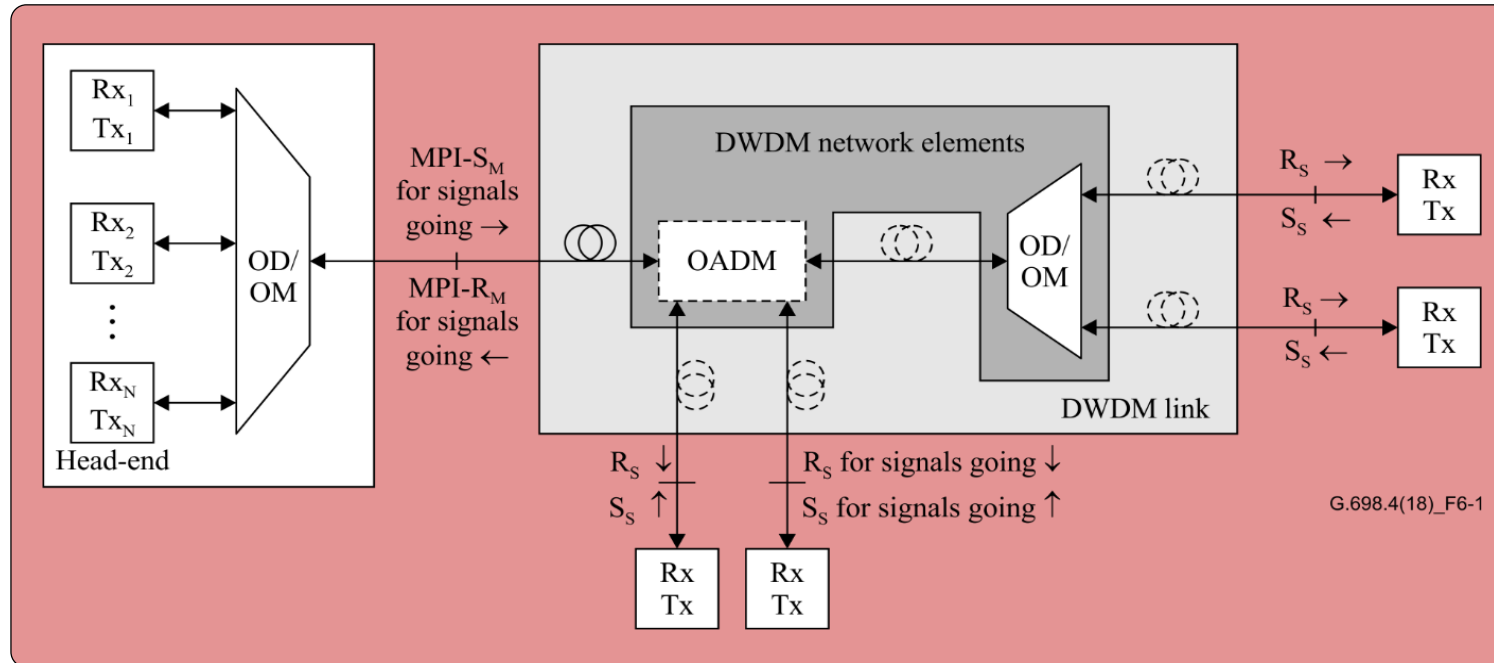
Amplified DWDM systems primarily intended for metro applications



Specification feature	In-force Recommendation	Under development
Bit rate of signal channel	up to 10 Gbit/s	NRZ 25 Gbit/s
Channel frequency spacing	50 GHz and 100 GHz	50 GHz and 100 GHz
Transmission distance	200 – 450 km distances, for 3 – 4 OADMs, not precluding 6 – 7	20 km ?

G.698.4: Multichannel bi-directional DWDM applications with port agnostic single-channel optical interfaces

Bidirectional DWDM systems, primarily intended for metro applications

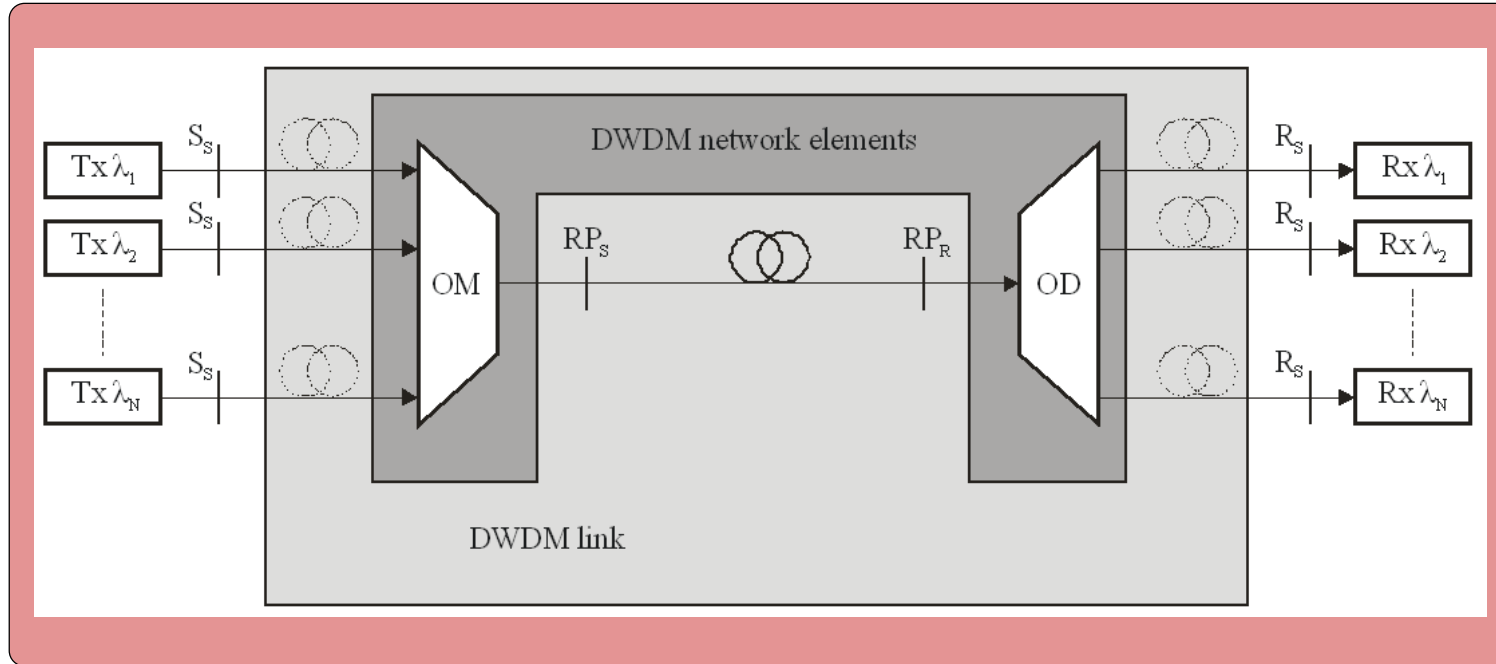


The tail-end equipment (TEE) transmitters have the capability to adapt their DWDM channel frequency to the optical demultiplexer/optical multiplexer (OD/OM) or OADM port they are connected to using feedback from the head-end equipment (HEE) via the head-to-tail message channel (HTMC).

Specification feature	In-force Recommendation	Under development
Bit rate of signal channel	up to 10 Gbit/s	NRZ 25 Gbit/s
Channel frequency spacing	50 GHz and 100 GHz	50 GHz and 100 GHz
Transmission distance	Up to 20 km	up to 10 km
Capacity	up to 40 bidirectional channels	up to 20 bidirectional channels

G.owdm: Multichannel bi-directional WDM applications with single-channel optical interfaces in the O-band

WDM systems primarily intended for 5G front haul application










Physical point-to-point WDM applications in the O-band on single-mode optical fibres through the use of the "black link" approach

Specification feature	Under development
Bit rate of signal channel	25 Gbit/s
Wavelength range of operation	O-band (1260 – 1380 nm)
Transmission distance	at least 10 km
Capacity	up to 12 uni-directional or 6 bi-directional

Coherent Multi-Vendor Interoperable Interfaces

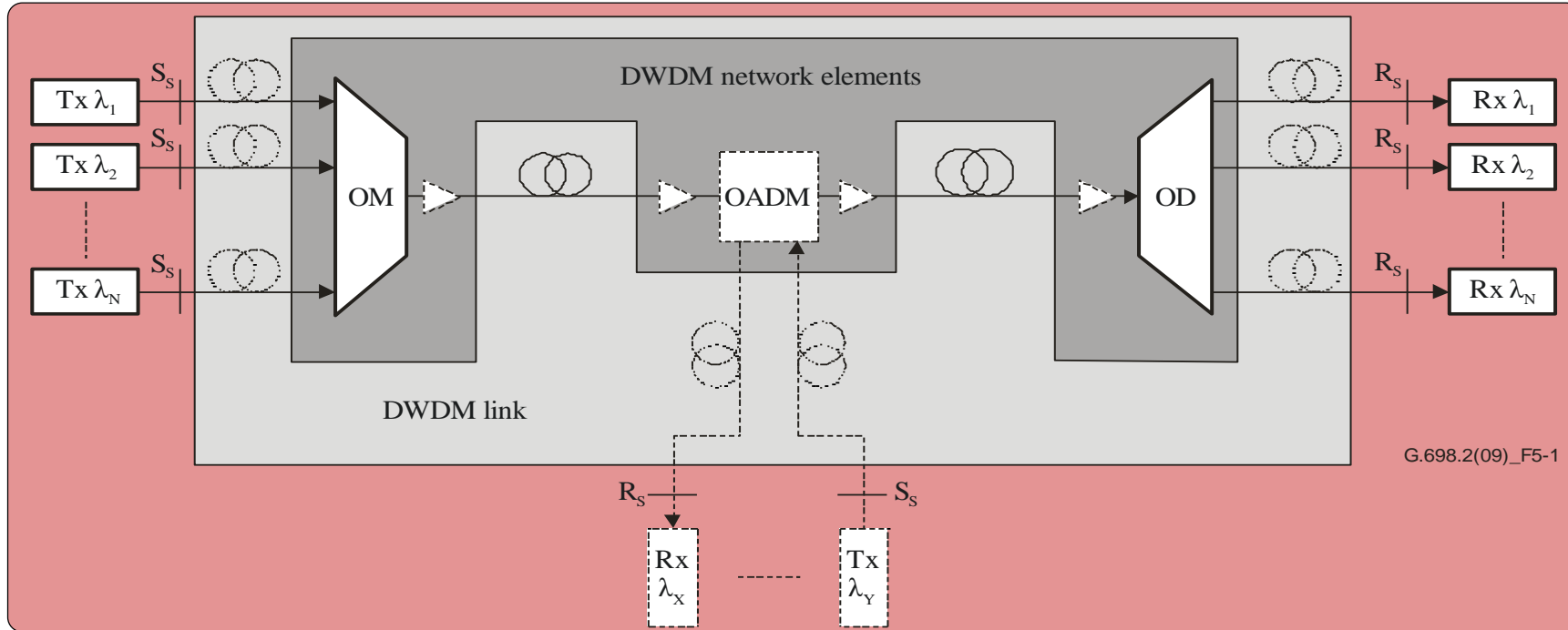
Standardization Activities on Coherent Optical Interfaces

	 Beyond 400G Study Group			
Data Center			 OIF 400ZR (IA), <u>800ZR/LR in progress</u>	
	 100GBASE-ZR		 <u>400G in progress</u>	
	 OpenZR+ <small>MULTI-SOURCE AGREEMENT</small> 100G, 200G, 300G & 400G			
Carrier	 100G, <u>200G, (300G) & 400G in progress</u>			
	 Open ROADM		100G, 200G, 300G & 400G	
Cable/MSO	CableLabs® 100G & 200G			
	100G	200G	400G	800G
				1.6T

So many groups.... what is so special about this work in ITU-T?

- **Specifications and optical parameter definitions** on basis of established **“black link” methodology**:
 - Flexibility for users, supporting a variety of applications without defining its details.
 - Removes complexity of engineering of non-linear performance of the black link (gain tilt OAs, Cross-Phase mixing, Four Wave Mixing, etc.) from the standard.
- **Coherent multi-vendor interoperability** by defining the **quality of an optical signal, with the data encoded in-phase and quadrature, using the ‘Error Vector Magnitude’**:
 - The metric defines the **quality of a transmitter**, a consideration **fundamental to multi-vendor interoperability**.
- **“black link” methodology is also adopted in IEEE 802.3 100GBASE-ZR in P802.3ct and 400GBASE-ZR in P802.3cw projects and OIF 400ZR project.**

Amplified DWDM systems primarily intended for metro applications



Specification feature	In-force Recommendation	Under development
Bit rate of signal channel	DP-QPSK 100 Gbit/s	DP-16QAM 200 Gbit/s, (200 Gbit/s), and 400 Gbit/s
Channel frequency spacing	50 GHz and 100 GHz	50 GHz, 75 GHz and 100 GHz
Link configuration	80 km distances, not precluding 120 km, without OADMs	
	200 – 450 km distances, for 3 – 4 OADMs, not precluding 6 – 7	

Thank you!