# G.698.5 Multichannel DWDM applications with single-channel optical interfaces in the O-band

- Recommendation ITU-T G.698.5 (ex G.owdm) provides optical parameter values for physical layer interfaces of dense wavelength division multiplexing (DWDM) systems primarily intended for mobile fronthaul and metro applications in the O-band, optimized for 10-km and 20-km transmission distances.
- Applications are defined using optical interface parameters and values for single-channel interfaces of multichannel wavelength division multiplexing (WDM) optical systems in point-to-point applications.

- The Recommendation uses a system architecture comprising a head-end equipment (HEE) connecting to the tail-end equipment (TEE) through a black link. For mobile fronthaul applications, the HEE is in a central office while the TEE is in a remote antenna site. A single bidirectional transmission fibre is used in the black link to connect the HEE to the TEE.
- The current version of the Recommendation includes bidirectional single-fibre WDM applications at 25 Gbit/s per channel with a nominal optical channel frequency spacing of 800 GHz.
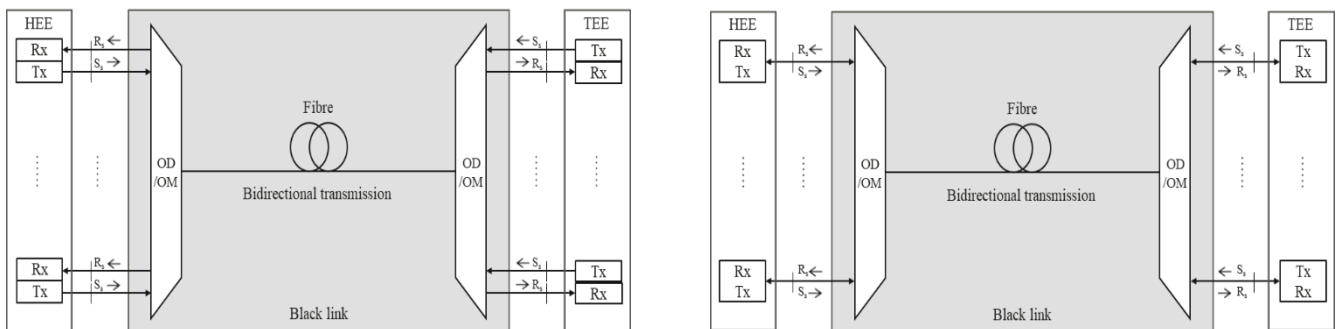
Reference configurations for bidirectional transmission applications with two fibres (left) and one fibre (right) connecting to each transceiver

Bidirectional channel	From HEE to TEE			From TEE to HEE		
	Channel index	Central frequency (THz)	Central wavelength (nm)	Channel index	Central frequency (THz)	Central wavelength (nm)
1	f_2	235.4	1273.54	f_1	236.2	1269.23
2	f_4	233.8	1282.26	f_3	234.6	1277.89
3	f_6	232.2	1291.10	f_5	233.0	1286.66
4	f_7	231.4	1295.56	f_8	230.6	1300.05
5	f_{10}	229.0	1309.14	f_9	229.8	1304.58
6	f_{12}	227.4	1318.35	f_{11}	228.2	1313.73

Nominal bidirectional optical channel frequencies and their pairing for L12-8-10B-9-D1 and L12-8-20B-9-D1 applications codes

Reference points

The reference points in the reference configurations are defined as follows:

– S_S is a single-channel reference point at the black link tributary input;

– R_S is a single-channel reference point at the black link tributary output.

At the S_S interface, a single channel signal enters the black link from an optical transmitter.

At the R_S interface, a single channel signal exits the black link towards an optical receiver.

Key features

The Recommendation describes bidirectional WDM systems that include the following features:
- operating wavelength band: the O-band
- nominal optical channel frequency spacing: 800 GHz
- nominal bit rate of signal channel: 25 Gbit/s

- nominal transmission distances: 10 km and 20 km
- maximum capacity: 12 wavelength channels at 25 Gbit/s per channel

Application codes

The application code notation is constructed as

Lc-s-dD-y-tz,

where L is the indicator of WDM applications defined in the Recommendation, c is the number of channels, s is a number giving the channel spacing in 100 GHz, d is a number indicating the span distance in km, D is the indicator of unidirectional (U) or bidirectional (B) transmission; y indicates the highest class of optical tributary signal supported; t indicates the configuration supported by the application code with D indicating that the black link does not contain any optical amplifiers, and z indicates the fibre type, whose value in the current version of this Recommendation is 1, indicating ITU-T G.652 fibre.

For more information, please visit the ITU-T Study Group 15 website at: www.itu.int/go/tsg15