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SERIES G: TRANSMISSION SYSTEMS AND MEDIA,
DIGITAL SYSTEMS AND NETWORKS

Transmission media and optical systems characteristics –
Characteristics of optical systems

Multichannel seeded DWDM applications with single-channel optical interfaces

Recommendation ITU-T G.698.3



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Recommendation ITU-T G.698.3

Multichannel seeded DWDM applications with single-channel optical interfaces

Summary

Recommendation ITU-T G.698.3 provides optical parameter values for physical layer interfaces of seeded dense wavelength division multiplexing (DWDM) systems primarily intended for metro applications. Applications are defined using optical interface parameters and values for single-channel and multichannel interfaces of seeded DWDM multichannel optical systems in point-to-point applications. This Recommendation uses a system architecture comprising a head-end, connecting to the tail-end equipment (TEE) through a black link. The head-end houses a set of transmitters and receivers and an optical multiplexer and demultiplexer (OD/OM) in addition to a seed signal source. A single bidirectional fibre is used to connect the head-end to the passive OD/OM. Connection between OD/OM and remote TEE is also bidirectional. At the tail-end, all transmitters use a seed signal to lock to the desired transmission wavelength. The initial version of this Recommendation includes seeded DWDM application at 1.25 Gbit/s with 100-GHz channel frequency spacing.

History

Edition	Recommendation	Approval	Study Group
1.0	ITU-T G.698.3	2012-02-13	15

FOREWORD

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The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

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As of the date of approval of this Recommendation, ITU had received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementers are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database at <http://www.itu.int/ITU-T/ipr/>.

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Recommendation ITU-T G.698.3

Multichannel seeded DWDM applications with single-channel optical interfaces

1 Scope

The purpose of this Recommendation is to provide optical interface specifications towards the realization of transversely compatible seeded dense wavelength division multiplexing (DWDM) systems primarily intended for metro applications.

This Recommendation defines and provides values for optical interface parameters of point-to-point seeded DWDM applications (with maximum transmission distance of about 40 km) on single-mode optical fibres through the use of the "black link" approach.

Applications containing amplifiers within the black link are outside the scope of this Recommendation.

This Recommendation describes seeded DWDM systems that include the following features:

- Channel frequency spacing: 100 GHz;
- Bit rate of signal channel: up to 1.25 Gbit/s.

Specifications are organized according to application codes.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

- | | |
|-----------------|---|
| [ITU-T G.652] | Recommendation ITU-T G.652 (2005), <i>Characteristics of a single-mode optical fibre and cable</i> . |
| [ITU-T G.664] | Recommendation ITU-T G.664 (2006), <i>Optical safety procedures and requirements for optical transport systems</i> . |
| [ITU-T G.671] | Recommendation ITU-T G.671 (2009), <i>Transmission characteristics of optical components and subsystems</i> . |
| [ITU-T G.691] | Recommendation ITU-T G.691 (2006), <i>Optical interfaces for single-channel STM-64 and other SDH systems with optical amplifiers</i> . |
| [ITU-T G.694.1] | Recommendation ITU-T G.694.1 (2002), <i>Spectral grids for WDM applications: DWDM frequency grid</i> . |
| [ITU-T G.698.1] | Recommendation ITU-T G.698.1 (2009), <i>Multichannel DWDM applications with single-channel optical interfaces</i> . |
| [ITU-T G.709] | Recommendation ITU-T G.709/Y.1331 (2009), <i>Interfaces for the Optical Transport Network (OTN)</i> . |
| [ITU-T G.957] | Recommendation ITU-T G.957 (2006), <i>Optical interfaces for equipments and systems relating to the synchronous digital hierarchy</i> . |
| [ITU-T G.959.1] | Recommendation ITU-T G.959.1 (2009), <i>Optical transport network physical layer interfaces</i> . |

- [IEC 60825-1] IEC 60825-1 (2007), *Safety of laser products – Part 1: Equipment classification and requirements*.
- [IEC 60825-2] IEC 60825-2 (2010), *Safety of laser products – Part 2: Safety of optical fibre communication systems (OFCS)*.

3 Terms and definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

3.1.1 Terms defined in [ITU-T G.671]:

- channel insertion loss
- channel spacing
- dense wavelength division multiplexing (DWDM)
- differential group delay
- reflectance
- ripple

3.1.2 Term defined in [ITU-T G.694.1]:

- frequency grid

3.1.3 Term defined in [ITU-T G.709]:

- completely standardized OTUk (OTUk)

3.1.4 Terms defined in [ITU-T G.957]:

- joint engineering
- receiver sensitivity
- transverse compatibility

3.1.5 Terms defined in [ITU-T G.959.1]:

- optical tributary signal
- optical tributary signal class NRZ 1.25G

3.2 Terms defined in this Recommendation

This Recommendation does not define any terms.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

BER	Bit Error Ratio
BLS	Broadband Light Source
DOP	Degree of Polarization
DWDM	Dense Wavelength Division Multiplexing
MPI-R _M	Multichannel reference point at the head-end aggregate input
MPI-S _M	Multichannel reference point at the head-end aggregate output
MWS	Multi-Wavelength Source