



Australian Government

ICTOPN608 Analyse optical transmission systems

Release: 1

ICTOPN608 Analyse optical transmission systems

Modification History

Release	Comments
Release 1	This version first released with ICT Information and Communications Technology Training Package Version 7.0.

Application

This unit describes the skills and knowledge required to verify the characteristics of Next Generation Networks (NGN) to ensure they will support the new modulation requirements of the equipment.

It applies to individuals who are experienced technicians from networking carriers, service providers, or other private and public organisations, who have experience in the optical transmission area.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

Unit Sector

Telecommunications – Optical Networks

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
1. Prepare to conduct characterisation tests on optical networks	1.1 Obtain and review required legislation, codes, company work practices, regulations and standards, work health and safety (WHS) and environmental requirements, personal protective equipment, and hazard identification tools for scoped work 1.2 Construct test procedures according to organisational guidelines and requirements 1.3 Obtain specifications for characterisation tests on optical networks from relevant personnel
2. Conduct link characterisation tests and analyse optical	2.1 Perform optical tests to characterise existing fibre link 2.2 Analyse results of optical tests, and determine extent and nature of future upgrades

networks	
3. Document analysis of optical networks with recommendations	3.1 Produce final drawings and plans of proposed upgrade requirements for optical transmission and submit to project manager according to enterprise policy 3.2 Prepare a report on the networks measured performance and recommendations of future upgrades

Foundation Skills

This section describes language, literacy, numeracy and employment skills incorporated in the performance criteria that are required for competent performance.

SKILL	DESCRIPTION
Numeracy	Uses mathematical equations to evaluate all required technical data
Oral communication	- Uses listening and questioning skills to confirm technical and operational requirements - Participates in verbal exchanges of ideas and solutions and uses required, detailed and clear language to address team members, supervisors and customers
Reading	Interprets textual information from required sources to identify and plan for all job requirements and adhere to procedures and standards
Writing	Prepares standard documentation using clear and technically specific language, numerical data, drawings and plans
Planning and organising	- Develops plans to manage relatively complex, non-routine tasks with an awareness of how they may contribute to longer term operational and strategic goals - Takes personal responsibility for adherence to legal and regulatory responsibilities required to own work, with specific reference to workplace safety - Understands main tasks, responsibilities and boundaries of own work
Problem solving	- Recognises and addresses complex problems involving multiple variables - Makes a range of critical and non-critical decisions in relatively complex situations, taking a range of constraints into account
Technology	Identifies systems, devices and applications with potential to meet current and/or future needs

Unit Mapping Information

Supersedes and is equivalent to ICTOPN604 Analyse optical transmission systems.

Links

Companion Volume Implementation Guide is found on VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=a53af4e4-b400-484e-b778-71c9e9d6aff2>

Assessment Requirements for ICTOPN608 Analyse optical transmission systems

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Performance Evidence

The candidate must demonstrate the ability to complete the tasks outlined in the elements, performance criteria and foundation skills of this unit, including evidence of the ability to:

- analyse at least two types of optical transmission systems.

In the course of the above, the candidate must:

- conduct optical transmission measurements
- analyse complex optical measurement results
- liaise with the customer as required
- report on measured network performance and recommendations for future upgrades.

Knowledge Evidence

The candidate must be able to demonstrate knowledge to complete the tasks outlined in the elements, performance criteria and foundation skills of this unit, including knowledge of:

- principles and techniques for documenting measured performance
- conduct characterisation tests on optical networks
- attenuation characteristics of optical fibres
- the chromatic dispersion (CD) test
- principles of operation of dense wavelength division multiplexing (DWDM)
- dispersion and outline dispersion characteristics of various fibres and devices used for compensation
- precautions required to minimise electrostatic discharge
- features and operating requirements of the following test equipment:
 - a hand-held optical power meter
 - an optical spectrum analyser
 - a transmission test set
- functions of an optical add-drop multiplexer (OADM) and reconfigurable optical add-drop multiplexer (ROADM)

- functions and features of gain equalisation techniques
- insertion loss test requirements and procedures
- International Telecommunications Union (ITU) wavelength grid for DWDM
- measurement of dispersion theory
- methods to reduce dispersion
- optical amplifier operation methods
- optical fibre connector types and characteristics
- optical fibre types and characteristics
- the optical return loss (ORL) test procedures
- the optical signal-to-noise ratio (OSNR) test procedures
- the optical time domain reflectometer (OTDR) test procedures
- path protection and protection switching requirements
- performance qualification of 40 Gbit/s and 100 Gbit/s transceivers
- the polarisation mode dispersion (PMD) test procedures
- protocols used on optical DWDM systems
- reflectance in fibre optic systems
- ring topologies and linear network topologies
- required report formats to make recommendations
- work health and safety (WHS) requirements and environmental constraints that impact safe inspection of optical connectors and safe measurement of optical power from laser transmission systems
- required legislation, codes, company work practices, regulations and standards and environmental requirements for scoped work.

Assessment Conditions

Skills in this unit must be demonstrated in a workplace or simulated environment where the conditions are typical of those in a working environment in this industry.

This includes access to:

- test equipment used in industry
- test equipment and manufacturer technical documentation.

Assessors of this unit must satisfy the requirements for assessors in required vocational education and training legislation, frameworks and/or standards.

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