



Australian Government

ICTOPN4115B Install and test a dense wavelength division multiplexing system

Release 1

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Modification History

| Release | Comments |
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| Release 2 | This version first released with <i>ICT10 Integrated Telecommunications Training Package Version 3.0</i> . References to other units updated. Outcomes deemed equivalent. |
| Release 1 | This version first released with <i>ICT10 Integrated Telecommunications Training Package Version 1.0</i> . |

Unit Descriptor

This unit describes the performance outcomes, skills and knowledge required to install dense wavelength division multiplexing (DWDM) equipment in optical networks.

Application of the Unit

Telecommunications technical staff who install long haul or metropolitan area DWDM equipment apply the skills and knowledge in this unit. They install the DWDM unit and circuit cards and inspect, clean, and install optical fibres, connectors and associated equipment and prepare the system for subsequent testing and commissioning.

Licensing/Regulatory Information

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement but users should confirm requirements with the relevant federal, state or territory authority.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

| Element | Performance Criteria |
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| <i>Elements describe the essential outcomes of a unit of competency.</i> | <i>Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.</i> |

Elements and Performance Criteria

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| <p>1. Prepare to install DWDM units</p> | <p>1.1 Determine the number of racks and DWDM units at each <i>site</i> by referring to installation documents</p> <p>1.2 Determine the DWDM unit and equipment positions within the individual racks</p> <p>1.3 Assemble <i>equipment racks</i> according to safe industry practice and manufacturer's instructions</p> <p>1.4 Select <i>tools</i> and equipment</p> <p>1.5 Prepare <i>patch panels</i> with connectors according to installation plan</p> |
| <p>2. Install DWDM units and associated cabling</p> | <p>2.1 Install DWDM unit in the designated rack position in order to maintain the planned link budget margin</p> <p>2.2 Install patch panels and <i>ancillary equipment and connections</i> into equipment rack in preparation for commissioning procedures</p> <p>2.3 Insert circuit cards into specified slot locations in readiness for commissioning procedures, but do not seat cards into backplane nor lock into position at this stage</p> <p>2.4 Connect optical fibre cables between circuit cards, optical multiplexers, adjoining DWDM units and patch panels according to manufacturer's specifications</p> |
| <p>3. Test power connections and complete the installation report</p> | <p>3.1 Measure the main and redundant power supplies to verify the correct polarity of the ground and power connections</p> <p>3.2 Rectify any identified <i>power wiring fault</i> if applicable</p> <p>3.3 Confirm that cooling fans, panel lights, indicator lights and alarms behave according to the manufacturer's prescribed specifications when power is applied</p> <p>3.4 Complete the installation report and reinstate site</p> |

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

- communication skills to liaise with internal and external personnel on technical and operational matters
- literacy skills to interpret technical documentation
- technical skills to:
 - assemble and secure standard telecommunications equipment rack, associated ironwork and optical fibre support ducting
 - clean optical fibre connector
 - examine optical fibre connector for contamination and assess whether cleaning is required
 - prepare and connect power and ground wires
 - use a digital multimeter to measure DC and AC voltage and to check continuity.
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Required knowledge

- DWDM principles of operation
- electrostatic discharge
- optical fibre connector types and characteristics
- optical fibre types and characteristics
- specific OHS requirements that impact on the safe inspection of optical connectors and the safe measurement of optical power from laser transmission systems.

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

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| Overview of assessment | |
| Critical aspects for assessment and evidence required to demonstrate competency in this unit | <p>Evidence of the ability to:</p> <ul style="list-style-type: none"> • conduct installation of DWDM systems and associated cabling according to plans and specifications • test power and ground connections • complete installation reports. |
| Context of and specific resources for assessment | <p>Assessment must ensure:</p> <ul style="list-style-type: none"> • suitable site for DWDM equipment installation • access to tools and equipment required for installation • a range of optical fibres to suit the installation. |
| Method of assessment | <p>A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:</p> <ul style="list-style-type: none"> • direct observation of the candidate installing a DWDM unit from a DWDM system together with installation of optical fibre interconnecting cables • review of DWDM installation report prepared by the candidate • oral or written questioning of the candidate to assess knowledge of DWDM installation practices. |
| Guidance information for assessment | <p>Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example:</p> <ul style="list-style-type: none"> • ICTTEN3056A Install telecommunications network equipment • ICTBWN3088B Install optical fibre splitters in fibre distribution hubs. <p>Aboriginal people and other people from a non-English</p> |

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| | <p>speaking background may have second language issues.</p> <p>Access must be provided to appropriate learning and assessment support when required.</p> <p>Assessment processes and techniques must be culturally appropriate, and appropriate to the oral communication skill level, and language and literacy capacity of the candidate and the work being performed.</p> <p>In all cases where practical assessment is used it will be combined with targeted questioning to assess required knowledge. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency.</p> <p>Where applicable, physical resources should include equipment modified for people with special needs.</p> |
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Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

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| <i>Site</i> may include: | <ul style="list-style-type: none"> • optical add drop multiplexer (OADM) site • terminal site. |
| <i>Equipment racks</i> may include: | <ul style="list-style-type: none"> • 19 inch type • 23 inch type • 535 mm (ETSI rack) type. |
| <i>Tools</i> may include: | <ul style="list-style-type: none"> • hand tools: <ul style="list-style-type: none"> • crimping tool • screwdrivers • wire cutters • wire stripping tool • optical fibre connector cleaning cassette • microscope or video fibre connector inspection instrument. |
| <i>Patch panels</i> may include: | <ul style="list-style-type: none"> • rack mounted • wall mounted. |
| <i>Ancillary equipment and connections</i> may include: | <ul style="list-style-type: none"> • air filter • alarm connections • C/L band splitter tray • cooling fan assembly • coupler tray • craft terminal • data communications connections • equaliser tray • Ethernet hub • fibre management trays • optical attenuators • optical fibre patch cords • optical multiplexer • optical service channel tray • telemetry connections • variable optical attenuators. |
| <i>Power wiring</i> fault may include: | <ul style="list-style-type: none"> • battery and ground wires are reversed to the DWDM unit • battery wire is open or missing • return wire is open or missing. |

Unit Sector(s)

Telecommunications - Optical networks