



Australian Government

ICTBWN301 Perform tests on optical communication system and components

Release: 1

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Modification History

Release	Comments
Release 1	This version first released with ICT Information and Communications Technology Training Package Version 2.0.

Application

This unit describes the skills and knowledge required to test optical communication systems and components in the field using portable test instruments

It applies to individuals who are installation contractors, technical staff and field officers from telecommunications service providers or other private and public organisations or regulatory authorities. They combine technical skills with organisational and administrative skills when working on broadband passive optical networks (PON), fibre to the x (FTTx) networks, hybrid fibre coaxial (HFC) networks and dense wavelength division multiplexing (DWDM) systems during installation, maintenance, commissioning and troubleshooting phases.

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

Unit Sector

Telecommunications – broadband and wireless networks

Elements and Performance Criteria

Elements	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 use optical measuring instruments	1.1 Obtain relevant legislation, codes, regulations and standards and prepare for given work 1.2 Notify client for site access, security arrangements and location details of optical system and test purpose 1.3 Identify site hazards and notify appropriate personnel to make site safe

	1.4 Devise and implement risk control and safety measures when using high power laser test instruments and optical time-domain reflectometer (OTDR) associated with launch fibres, patch cords or enclosure adaptors 1.5 Prepare testing plan indicating type of measurement at nominated wavelength, based on equipment specifications and in consultation with client 1.6 Select appropriate tools and test instruments according to required measurement and enterprise practice
2. Conduct optical measurements	2.1 Set up test instrument according to manufacturer's instructions, and according to work health and safety (WHS) and environmental requirements 2.2 Perform measurement using knowledge of appropriate testing techniques in safe manner to assess performance of optical system or component 2.3 Record test results and compare with standard test specifications from manufacturer and enterprise guidelines 2.4 Evaluate test results and report on functionality of optical component or equipment and performance of optical system
3. Document measurement results	3.1 Document test results for future reference and make recommendations on optimising component and system performance 3.2 Clean work site and make safe according to enterprise requirements and to client satisfaction 3.3 Notify appropriate personnel of job completion for sign off and present test documentation

Foundation Skills

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

Skill	Performance Criteria	Description
Reading	1.1, 1.6, 2.1, 2.3, 3.2	Interprets information from relevant sources to plan and identify all job requirements
Writing	1.2-1.5, 2.3, 2.4, 3.1, 3.3	Accurately completes relevant reports and documentation using clear and technically specific language

Oral Communication	1.2-1.5, 2.4, 3.3	• Uses listening and questioning skills to confirm understanding of requirements, and participates in a verbal exchange of ideas and solutions • Uses appropriate, detailed and clear language to address key personnel and clients
Numeracy	1.5, 1.6, 2.2-2.4	• Performs mathematical calculations to check, interpret and confirm results of system tests
Navigate the world of work	1.3, 1.4, 1.6, 2.1, 2.3, 3.2	• Complies with explicit policies and procedures, and explores and implements where identified the implicit expectations of policies and procedures • Understands roles and responsibilities for task and makes basic decisions on work completion parameters
Interact with others	1.2, 1.4, 1.5, 2.4, 3.3	• Uses a limited range of accepted practices for communicating in a work environment • Recognises common cultural and other differences of people in the work context and makes adjustments in addressing the differences
Get the work done	1.1, 1.3, 1.4, 1.6, 2.1, 2.2, 3.1, 3.2	• Takes responsibility for planning, sequencing and prioritising tasks and own workload for efficiency and effective outcomes • Makes low-impact decisions within familiar situations, based on a range of predefined or routine solutions and evaluates the effectiveness of the outcome

Range of Conditions

This field allows for different work environments and conditions that may affect performance. 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) should be included.

Instruments/devices to be used must include:	• laser light source including visual laser light source • laser power meter • passive optical network (PON) meter • optical time domain reflectometer (OTDR)
Optical measurements to be taken and recorded must include:	• optical power levels • insertion loss of a passive device • end-to-end fibre loss (bi-directional) • splice loss • distance to fault, event, end of fibre using an (OTDR)

Unit Mapping Information

Code and title current version	Code and title previous version	Comments	Equivalence status
ICTBWN301 Perform tests on optical communication system and components	ICTBWN3082B Perform tests on optical communication system and components	Updated to meet Standards for Training Packages	Equivalent unit

Links

Assessment Requirements for ICTBWN301 Perform tests on optical communication system and components

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Performance Evidence

Evidence of the ability to:

- carry out work according to job specifications and work health and safety (WHS) regulations
- determine and plan optical tests and measurements
- use optical measuring instruments and devices
- perform and record optical measurements
- assess and make recommendations from the test results
- document and present test outcomes.

Note: If a specific volume or frequency is not stated, then evidence must be provided at least once.

Knowledge Evidence

To complete the unit requirements safely and effectively, the individual must:

- explain the consequences of mating contaminated optical connectors
- summarise downstream and upstream signals
- discuss dense wavelength division multiplexing (DWDM) metro and long haul system architecture
- outline hybrid fibre coaxial (HFC) architecture (optical section)
- explain logarithmic power levels (decibels and dBm)
- discuss optical connector types
- summarise optical fibre and laser safety, practices, handling and application
- identify optical spectrum limits, wavelengths used in various applications and International Telecommunications Union (ITU) grid
- explain the role of optical transmitters and receivers
- explain passive optical network (PON) architecture

- discuss transmission system line rates:
 - optical ethernet
 - synchronous digital hierarchy (SDH)
- summarise wavelength division multiplexing (WDM), coarse wavelength division multiplexing (CWDM) and DWDM principles, and optical multiplexers.

Assessment Conditions

Gather evidence to demonstrate consistent performance in conditions that are safe and replicate the workplace. Noise levels, production flow, interruptions and time variances must be typical of those experienced in the telecommunications – broadband and wireless networks field of work and include access to:

- a site where installation of supporting infrastructure may be conducted
- plant, tools and equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities.

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

Links

Companion Volume implementation guides are found in VETNet -

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