



Australian Government

ICTBWN3205B Use optical and radio frequency measuring instruments

Release 1

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Modification History

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

Unit Descriptor

This unit describes the performance outcomes, skills and knowledge required to set up and use hand-held optical and radio frequency (RF) communications instruments in order to perform installations, upgrades and fault-finding on optical and RF equipment.

The complexity of the measurements performed is suitable for entry-level practitioners.

Application of the Unit

Installation contractors, technical staff and field officers from telecommunications carriers, other private and public organisations and regulatory authorities apply the skills and knowledge in this unit. They combine technical skills with organisational and administrative skills.

Field officers may be responsible for small projects such as forming routine field measurements on optical fibres in broadband optical networks, RF cables and equipment in broadband cable networks and satellite and terrestrial television systems.

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
<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

1. Prepare to use measuring instruments	<p>1.1 Obtain approval for site access with customer or site owner prior to site entry</p> <p>1.2 Identify the purpose of the test and the <i>type of measurement</i> required</p> <p>1.3 Select the appropriate <i>tools</i> and <i>instruments</i> according to the required measurement</p> <p>1.4 Check tools and instruments and calibrate to ensure accuracy</p> <p>1.5 Obtain resources required</p> <p>1.6 Devise and implement risk control measures in consultation with appropriate personnel and document safety hazards</p>
2. Conduct measurements	<p>2.1 Follow site-specific safety requirements and enterprise occupational health and safety (OHS) processes and procedures</p> <p>2.2 Set up test equipment according to manufacturer's instructions and safe industry practice</p> <p>2.3 Perform measurement using knowledge of appropriate testing techniques to assess the overall system performance</p> <p>2.4 Record and interpret test results and compare with standard test specifications</p> <p>2.5 Clean work area and make safe according to established procedures</p>
3. Document measurement results	<p>3.1 Document test results and make recommendations to achieve optimum performance</p> <p>3.2 Notify customer of work completion</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
 - relate to work associates, supervisors, team members and clients
- literacy skills to interpret technical documentation such as manufacturer's instructions
- numeracy skills to take and analyse measurements
- planning and organisational skills to organise and maintain equipment
- safety awareness skills to:
 - apply precautions and required action to minimise, control or eliminate hazards that may exist during work activities
 - select and use required personal protective equipment conforming to industry and OHS standards
 - work systematically with required attention to detail without injury to self or others, or damage to goods or equipment
- task management skills to work systematically with required attention to detail and adherence to all safety requirements
- technical skills to:
 - clean an optical connector to an acceptable industry standard
 - inspect an optical connector for contamination and determine if cleaning is necessary
 - operate a digital signal level meter (SLM) to measure RF signals on a broadband network or on a satellite or terrestrial television installation
 - operate a passive optical network (PON) power meter to measure PON signals of various wavelengths on fibre to the home (FTTH) and fibre to the premises (FTTP) network
 - operate optical loss test set (OLTS) to measure loss of a fibre.
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Required knowledge

- consequences of mating contaminated optical connectors
- decibels, dBm and dBmV
- optical and RF connector types
- RF awareness and RF safety
- RF spectrum and optical spectrum limits and allocations
- safe handling procedures with optical fibres.

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.

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"> • check and calibrate tools and instruments • perform optical measurements using hand-held instrument • perform RF measurements using hand-held instrument • comply with all related OHS requirements and work practices.
Context of and specific resources for assessment	<p>Assessment must ensure:</p> <ul style="list-style-type: none"> • sites on which optical and RF measurements installations can be conducted • tools and equipment, currently used in industry, required for measurements.
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 performing an optical measurement using a hand-held instrument • direct observation of the candidate performing an RF measurement using a hand-held instrument • review of an oral and written report with completed documentation.
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"> • ICTBWN3100B Work safely with live fibre to test and commission a fibre to the x installation • ICTBWN3082B Perform tests on optical communication system and components • ICTRFN3055A Install a radio communications antenna and feedline

	<ul style="list-style-type: none">• ICTRFN3175A Operate and maintain radio communications technical instruments and field equipment. <p>Aboriginal people and other people from a non-English 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.

<p><i>Type of measurement</i> may include:</p>	<ul style="list-style-type: none"> • optical measurement: <ul style="list-style-type: none"> • detecting the presence of an active optical network terminal (ONT) • determining absolute optical power (in dBm) • determining insertion loss (in dB) • determining relative optical power level (in dB) • RF measurement: <ul style="list-style-type: none"> • determining absolute RF power (in dBm) • determining relative RF power level (in dB) • determining relative RF voltage (in dBmV).
<p><i>Tools</i> may include:</p>	<ul style="list-style-type: none"> • alcohol swabs • dry type cleaning cassette for optical connectors • electrical attenuators with suitable connectors • lint free dry wipes • metallic test leads and RF cables • microscope for examining optical connector face • optical connector adaptors: <ul style="list-style-type: none"> • FC to LC • FC to SC • FC to ST • SC to ST • optical launch cable • optical reference cable • optical termination • resistive termination • RF connector adaptors: <ul style="list-style-type: none"> • BNC to F type • N type to BNC • N type to SMA • test leads.
<p><i>Instruments</i> may include:</p>	<ul style="list-style-type: none"> • hand-held optical power meter • hand-held optical source • OFI-FTTx active ONT detector

	<ul style="list-style-type: none">• OLTS• PON meter• signal level meter (SLM).
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Unit Sector(s)

Telecommunications - Broadband and wireless networks