



Australian Government

ICTTEN316 Conduct basic tests and analyses of telecommunications copper cabling

Release: 1

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Modification History

Release	Comments
Release 1	This version released with ICT Information and Communications Technology Training Package Version 5.0.

Application

This unit describes the skills and knowledge required to test and analyse telecommunications copper cabling using a variety of telecommunications industry test equipment.

This unit applies to technicians who conduct basic tests and telecommunications copper cabling analysis.

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

Unit Sector

Telecommunications – Telecommunications Network Engineering

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. Determine cable type/s and applications in use in telecommunications system	1.1 Identify and document applications in use in telecommunications system according to relevant standards 1.2 Identify cables in use within a telecommunications system according to relevant standards 1.3 Assess balanced/unbalanced nature of type of cable system in use
2. Determine testing parameters and calibrate devices	2.1 Select most appropriate testing device and methodology for cable type 2.2 Outline testing parameters to be used for task 2.3 Locate and isolate alternative energy supply sources

ELEMENT	PERFORMANCE CRITERIA
	2.4 Determine components to be tested 2.5 Resolve implications of system interruptions and methods for live testing with minimum system disruption 2.6 Calibrate test devices according to manufacturer and enterprise requirements
3. Conduct copper cable test/s and record results	3.1 Connect test devices to cable system 3.2 Perform and record test results 3.3 Save and retrieve test results as required 3.4 Review adverse findings and escalate according to enterprise policy and procedures
4. Report test results	4.1 Analyse and record critical test data 4.2 Develop recommendations based on test data analysis 4.3 Write up report of test results 4.4 Submit report to customer and obtain sign-off

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance, but not explicit in the performance criteria.

Skill	Description
Learning	Identifies, plans and implements strategies using knowledge attained
Reading	- Analyses and consolidates information and data from sources, against defined criteria and requirements, and checks for accuracy and completeness - Recognises and interprets textual information to determine specific information about security incidents
Writing	Develops material for a specific audience, using clear and detailed language in order to convey explicit information
Oral Communication	- Articulates information clearly, using specific and relevant language suitable to audience to convey recommendations and provide verbal reports - Uses listening and questioning techniques to confirm understanding of WHS and operational testing
Numeracy	Extracts and evaluates the mathematical information embedded in a range of technical specifications and manuals

Skill	Description
Navigate the world of work	• Accepts responsibility and ownership for the task and makes decisions on completion parameters and the need for coordination with others • Takes personal responsibility for following explicit and implicit policies, procedures and legislative requirements
Interact with others	• Selects form, channel and mode of communication for a specific purpose relevant to own role • Ensures stakeholders are aware of WHS identified risks for task
Get the work done	• Plans strategic priorities and outcomes within a flexible, efficient and effective context, in a diverse environment exposed to competing demands • Gathers and analyses data, and seeks feedback, to improve plans and processes • Makes decisions in a complex and diverse environment, using input from a range of sources • Explores and incubates new ideas through unconstrained analysis and critical thinking, to develop and improve enterprise controls

Unit Mapping Information

No equivalent unit. New unit.

Links

Companion Volume Implementation Guides are available from VETNet -

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

Assessment Requirements for ICTTEN316 Conduct basic tests and analyses of telecommunications copper cabling

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Performance Evidence

The candidate must demonstrate the ability to perform the tasks outlined in the elements, performance criteria, and foundation skills, and to:

- select, set-up and operate test instruments for three different cable types from the following list:
 - structured cabling verification/qualification tester
 - wire mapper
 - oscillator and probe
 - spectrum analyser
 - DVB-T/S2 analyser
 - multimeter – analog and digital
 - time-domain reflectometer (TDR)
 - asymmetric digital subscriber line (ADSL)/very-high-bit-rate digital subscriber line (VDSL) test instruments
- select appropriate instrument test cables and adaptors to suit test equipment for three different cable types and:
 - determine safety of cables to be tested (i.e. live or inactive)
 - identify calibration status of selected devices
 - confirm test results are within acceptable operational parameters.

Note: Evidence must be provided at least once when a specific volume or frequency is not stated.

Knowledge Evidence

The candidate must demonstrate the knowledge required to perform the tasks outlined in the elements, performance criteria, and foundation skills, which includes knowledge about:

- relevant legislation, regulations, codes, standards, rules, guidance notes and other formal agreements that impact on work, in particular:

- AS/CA S008:2010 Requirements for customer cabling products
- AS/CA S009:2013 Installation requirements for customer cabling (Wiring Rules)
- AS/NZS 1367:2016 Coaxial cable and optical fibre systems for the RF distribution of digital television, radio and in-house analog television signals in single and multiple dwelling installations
- AS/NZS 3000:2018 Electrical installations known as the Australian/New Zealand Wiring Rules
- AS/NZS 3080:2013 Information technology - Generic cabling for customer premises (ISO/IEC 11801:2011, MOD)
- AS/NZS 3084:2017 Telecommunications installations – Telecommunications pathways and spaces for commercial buildings
- National Construction Code
- work health and safety (WHS) regulations pertaining to electrical and electromagnetic telecommunications systems including energy supply sources
- different copper cable types utilised to match transmitted and received signals
- testing concepts and parameters used by test instruments including:
 - impedance, resistance, mismatches, crosstalk, reflections, ACR, spectrum, bandwidth, modulation depth, intermodulation, signal delay, group delay, normalisation, linearity, TDR, clock, jitter, latency, ping, signal to noise ratio (SNR), simplified Fourier analysis concepts, eye patterns, PAM4 or SDI, QAM patterns/constellations, MER, BER, FEC, signal losses, noise, interference, data rates, traffic, upload/download testing, signal levels, dBs, dBm, dBμ, dBr, dBμV
- testing acronyms including expansion and meaning
- common tests utilised with each copper cable telecommunication system
- telecommunications systems utilised in the telecommunications industry including:
 - telephone/voice over internet protocol (VoIP) systems
 - mobile phones, security systems
 - closed-circuit television (CCTV) systems
 - fire protection systems
 - structured cabling systems
 - local area network (LAN) equipment, telemetry
 - equipment control and monitoring systems
 - automation control systems
 - entertainment and control systems
 - radio communications
 - wi-fi
 - radio links
 - satellite and digital television reception
 - private automatic branch exchange (PABX)
- technical standards as applicable to copper cable systems
- test devices as applicable to copper cables in each transmission medium
- purpose and use of test results

- solid core cable versus stranded core.
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Assessment Conditions

Skills must be assessed in a workplace or simulated environment where conditions are typical of those in a telecommunications work environment or workplace.

Access is required to:

- safety procedures signage and personal protective equipment (PPE) for testing cable
- cabling products and cable used in telecommunications systems
- operating conditions that may be present within local industry and regional contexts
- test equipment to test cable and identify test results, including:
 - wire mapper
 - oscillator and probe
 - spectrum analyser (available in DVB analyser)
 - DVB-T/S2 analyser
 - multimeter
 - TDR (available in SC certifiers)
 - ADSL/VDSL test instruments
- typical cable types including:
 - Cat 6 UTP cable
 - Cat 6/7 STP cable
 - RG6 coaxial cable (quad shielded)
 - RG11 coaxial cable (quad shielded)
 - copper conductor ribbon cable
 - solid core cable
 - stranded core cable
- appropriate connectors for testing cables
- appropriate adaptors and test leads for test instruments and cables to be tested
- backup energy sources, including power supplies and uninterrupted power supply/source (UPS) equipment.

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

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