



Australian Government

Department of Education, Employment and Workplace Relations

ICTTEN4086A Undertake routine maintenance of the telecommunications network

Release: 1

ICTTEN4086A Undertake routine maintenance of the telecommunications network

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes, skills and knowledge required to undertake routine maintenance of the telecommunications network. This planned maintenance ensures that network equipment is regularly serviced and is operating correctly, so that minor faults and potential problems are corrected before they develop into major defects and disruption to the network. Licensing, legislative, regulatory and certification requirements apply to working at heights, confined spaces, crane operation, rigging, driving and other operations involved in this unit. Users should confirm requirements with the relevant federal, state or territory authority.
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Application of the Unit

Application of the unit	Field officers or technicians from carriers, contractors and other service providers apply the skills and knowledge in this unit. This unit involves routine maintenance of network plant and equipment in various telecommunications switching and transmission environments, including wide area networks (WAN), virtual private networks (VPN) and Core networks, using wireless, optical, broadband and Next Generation Networking (NGN) technologies.
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Licensing/Regulatory Information

Refer to Unit Descriptor

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.
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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	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.
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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Plan routine maintenance	1.1. Obtain relevant legislation, codes, regulations and standards for the given work 1.2. Determine the network elements requiring maintenance and the maintenance details from the manufacturer's equipment manual 1.3. Notify the network operations centre (NOC) of the proposed maintenance schedule and maintenance details to minimise disruption to the network 1.4. Assess the potential impact of the proposed maintenance on customers and network and plan for possible outage or deferral of maintenance 1.5. Obtain necessary tools, test equipment and resources to undertake the maintenance 1.6. Produce a schedule of the planned routine maintenance 1.7. Negotiate schedules and access with the customer where equipment to be maintained is located on customer premises 1.8. Ascertain and record network stability to determine network performance
2. Undertake planned maintenance	2.1. Conduct routine maintenance tasks following occupational health and safety (OHS) and environmental requirements and record results 2.2. Escalate unresolved faults according to established enterprise procedure 2.3. Test the network equipment for required performance following routine maintenance 2.4. Check operation of associated network equipment to ensure that the maintenance did not generate other faults or alarms
3. Report on routine maintenance and document results	3.1. Notify all relevant parties of the results of the routine maintenance 3.2. Update routine maintenance logs and record other additional work for inclusion in the next cycle of maintenance 3.3. Complete administrative tasks and recommend any changes as required by the enterprise quality assurance system 3.4. Notify NOC of job completion and obtain sign off

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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

Required skills

- analytical skills to evaluate impact of maintenance on customers and network
- communication skills to provide advice and guidance to others and to liaise with other technical staff on operational matters
- initiative and enterprise skills to identify improvements to routine maintenance
- literacy skills to read and interpret technical data and technical and non-technical information from a range of sources
- PC skills to upgrade installed software
- planning and organisational skills to plan for outage
- technical skills to use hand and power tools to assemble and disassemble equipment

Required knowledge

- alarms
- computer knowledge
- network management systems
- overview knowledge of telecommunications networks and equipment
- telecommunications test equipment and test setups
- telecommunications wiring practices
- use of scheduler

Evidence Guide

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	Evidence of the ability to: - plan a detailed routine maintenance schedule - conduct and record routine maintenance activities procedures and techniques - test network equipment complying with site risk control, OHS, environmental, quality and communication requirements.
Context of and specific resources for assessment	Assessment must ensure: - sites on which routine maintenance may be conducted - use of maintenance tools and test instruments currently used in industry - relevant regulatory and equipment documentation that impacts on maintenance activities.
Method of assessment	A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit: - direct observation of the candidate carrying out routine maintenance activities - review of maintenance reports completed by the candidate for different sites and equipment - oral or written questioning to assess knowledge of maintenance procedures.
Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplaces and job role is recommended, for example: ICTTEN4081A Locate, diagnose and rectify faults. Aboriginal people and other people from a non-English speaking background may have second language issues. Access must be provided to appropriate learning and assessment support when required.

EVIDENCE GUIDE

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.

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.

Where applicable, physical resources should include equipment modified for people with special needs.

Range Statement**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.

Relevant legislation, codes, regulations and standards may include:

- appropriate licences:
 - cable
 - electrical
 - elevated work platform (EWP)
 - rigger
- AS/ACIF standards and codes
- Australian building codes and regulations
- Australian and New Zealand standards
- cabling security codes and regulations
- Environmental Protection Acts
- fire regulations
- noise abatement and heritage legislation
- OHS
- relevant international standards
- Trade Practices Act.

RANGE STATEMENT	
Network elements may include:	- cellular base station - gateway - optical add drop multiplexer - private automatic branch exchange (PABX) - router - synchronous digital hierarchy (SDH) multiplexer - server - switch.
Maintenance may include:	- corrective maintenance - remote maintenance - routine maintenance.
Network operations centre (NOC) may include:	- coordinating repairs or changes to the network - escalation - monitoring: - network alarms - optical fibre cuts - power failures - performing diagnostic tests - troubleshooting.
Maintenance schedule may be:	- details from service level agreement (SLA) - frequency: - monthly - quarterly - procedures - responsibilities and commitment - timings.
Potential impact may include:	- customer impact: - disruption of service to residential customers - intermittent performance - loss of service and revenue to an enterprise customer - network impact: - call drop out - congestion - excessive latency - limited coverage - poor grade of service (GoS)

RANGE STATEMENT	
	• poor signal quality • routing problems • transmission loss.

RANGE STATEMENT	
Outage may include:	• loss of service to customers due to a network fault or upgrade • planned in the case of network upgrades • unplanned in relation to faults.
Tools, test equipment and resources may include:	• resources: • elevated work platform hire • licensed cabler • licensed electrician • licensed rigger • optical fibre specialist • test equipment: • communication system analyser • lap top computer • microwave link analyser • multimeter • optical fibre power meter • optical time domain reflectometer (OTDR) • oscilloscope • RF microwave test set • RF power meter • RF sweep tester • spectrum analyser • SWR meter • transmission measuring set • tools: • anti-static wrist strap • PC board or subrack removal tool • pliers • power drill • screwdrivers • sockets • soldering iron • spanners.
Network stability may include:	• reliability of the network over time • reliability of the network under varying load conditions • reliability of the network under varying traffic conditions.

RANGE STATEMENT	
<i>OHS and environmental requirements</i> may relate to:	• decommissioning and isolating work ite and lines prior to commencement • safe working practices, such as the safe use and handling of: • asbestos • chemicals • materials • tools and equipment • work platforms • safety barriers • safety equipment • warning signs and tapes • environmental considerations • clean-up • noise and dust • stormwater protection • waste management.
<i>Results</i> may include:	• calibration date • lubrication date • meter readings • replacement of air filter date • visual inspection findings: • electrical cables • electrical connectors • failed indicator lights and alarms.
<i>Escalate</i> may include:	• requesting action from: • expert staff • network specialist • NOC • vendor.
<i>Enterprise procedure</i> may include:	• clearing faults • implementing maintenance • installation • reporting.
<i>Test</i> may include:	• bandwidth • bit error ratio (BER) • blocking • call rate

RANGE STATEMENT	
	• congestion • distortion • drop out rate • equipment self diagnostics • functionality • interference • latency • packet loss rate • ping • protocol analysis • quality of service (QoS) • recovery rate • redundancy • return loss • signal level • switching tests • testing functionality of: • individual equipment • system • uploads and downloads rate.
Relevant parties may include:	• customer • design engineer • NOC • project manager • supervisor.
Administrative tasks may include:	• checking and amending labelling of equipment • completing test sheets according to specification • completion and submission of job orders • following quality control procedures • handing over installation briefs and equipment manuals to operational staff • recording test results • updating databases • updating design specifications and returning them to design area.
Quality assurance system may include:	• analysing logs • correction of legacy problems • documenting logs • ongoing improvements

RANGE STATEMENT

	• reporting on installation • reporting on maintenance activities.
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Unit Sector(s)

Unit sector	Telecommunications
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Co-requisite units

Co-requisite units		

Competency field

Competency field	Telecommunications networks engineering
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