



**Australian Government**

**Department of Education, Employment and Workplace Relations**

# **ICTRFN4159A Test and repair cellular network equipment**

**Release: 1**

## ICTRFN4159A Test and repair cellular network equipment

### Modification History

Not Applicable

### Unit Descriptor

<b>Unit descriptor</b>	<p>This unit describes the performance outcomes, skills and knowledge required to test cell performance and perform diagnostic tests and repairs on sub-elements and subsystems within cellular networks.</p> <p>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.</p>
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### Application of the Unit

<b>Application of the unit</b>	<p>Field officers and technicians who perform diagnostic and repair tasks on cellular network equipment apply the skills and knowledge of this unit.</p> <p>They may be responsible under supervision for small projects or parts of larger projects and for the coordination of projects in sites remote from the organisational headquarters.</p>
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### Licensing/Regulatory Information

Refer to Unit Descriptor

## Pre-Requisites

<b>Prerequisite units</b>		

## Employability Skills Information

<b>Employability skills</b>	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. Prepare to test cellular network equipment	1.1. Produce an alarm list from <b>cellular network</b> subsystem which shows faults or <b>disturbances</b> 1.2. <b>Reset sub-element</b> according to manufacturer's specifications 1.3. Clear or block alarms and <b>adjust alarm thresholds</b> according to manufacturer's specifications
2. Test cellular network sub-element equipment	2.1. Test parameters influencing <b>cell performance</b> and record performance for a range of field settings 2.2. Test, record and report <b>sub-element</b> performance according to manufacturer's specifications 2.3. Run diagnostic test on sub-element 2.4. <b>Swap</b> the working or executing sub-element with the spare or idle unit to allow software upgrades 2.5. Swap the working or executing sub-element with the spare or idle sub-element to allow replacement of hardware
3. Rectify faults in cellular network equipment subsystems	3.1. Locate <b>faulty sub-element</b> within <b>subsystem</b> and identify fault 3.2. Identify faulty parts or equipment and <b>replace or repair</b> according to service agreement 3.3. Record fault details and rectification summary 3.4. Hand over and sign off with customer

## Required Skills and Knowledge

### 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 requirements
- literacy skills to read, interpret and prepare technical documentation
- numeracy skills to read and interpret measurements and report to supervisors
- planning and organisational skills to plan the test in coordination with supervisors
- safety awareness skills to:
  - apply precautions and required action to minimise, control or eliminate hazards

**REQUIRED SKILLS AND KNOWLEDGE**

- that may exist during work activities
- work systematically with required attention to detail without injury to self or others, or damage to goods or equipment
- technical skills to:
  - install network equipment
  - perform fault clearance
  - select and use appropriate test equipment and practices to suit different network applications
  - recognising and interpreting alarms

**Required knowledge**

- anti static protection
- cellular antenna installation
- electrical concepts and measurements
- electromagnetic radiation (EMR) and mitigation
- network components and their basic functions
- occupational health and safety (OHS) relevant to work activity
- overview knowledge of:
  - 1st, 2nd and 3rd generations of cellular networks
  - features and operating requirements of test equipment
- procedures for repairs and swap activities
- test operation of cellular network equipment
- testing network components
- voltage levels and polarity

## 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:

- measure cell performance
- measure output power received at around a cell
- produce an alarm list and use this to locate faults
- run diagnostic tests on sub-elements and subsystems
- locate and repair faulty sub-elements and subsystems.

#### Context of and specific resources for assessment

Assessment must ensure:

- site for mobile phone network tests and measurements
- performance testing software
- relevant legislation and documentation to test and repair network equipment.

#### 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 performing measurements and repairing faults
- review of fault details, rectification summary and recommendations prepared by the candidate
- oral or written questioning to assess required knowledge.

#### Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example:

- ICTTEN3056A Install telecommunications network equipment
- ICTTEN3089A Repair and replace telecommunications network hardware.

Aboriginal people and other people from a non-English speaking background may have second language issues.

**EVIDENCE GUIDE**

	<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****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.

<b><i>Cellular network</i></b> may include:	<ul style="list-style-type: none"> <li>• GSM (2G)</li> <li>• 2.5G GPRS</li> <li>• 2.75G EGPRS</li> <li>• 3G and associated 3GPRS</li> <li>• 4G.</li> </ul>
<b><i>Disturbances</i></b> may relate to:	<ul style="list-style-type: none"> <li>• common channel signalling unit</li> <li>• link performance or sub-elements: <ul style="list-style-type: none"> <li>• charging unit (CHU)</li> <li>• statistical unit (STU).</li> </ul> </li> </ul>
<b><i>Reset sub-element</i></b> may include:	<ul style="list-style-type: none"> <li>• hardware</li> </ul>

<b>RANGE STATEMENT</b>	
	<ul style="list-style-type: none"> <li>• software.</li> </ul>
<i>Adjust alarm thresholds</i> may relate to:	<ul style="list-style-type: none"> <li>• increasing or decreasing thresholds for: <ul style="list-style-type: none"> <li>• links between carriers</li> <li>• links between elements</li> <li>• subsystem units.</li> </ul> </li> </ul>
<i>Cell performance</i> may include:	<ul style="list-style-type: none"> <li>• bit error rate (BER) of air interface</li> <li>• handover</li> <li>• hysteresis parameter</li> <li>• power measurements from neighbour cells</li> <li>• power measurements within a cell.</li> </ul>
<i>Sub-element</i> may refer to:	<ul style="list-style-type: none"> <li>• CHU</li> <li>• common channel signalling control unit (CCSCU)</li> <li>• group switch unit (GSU)</li> <li>• home location register unit (VLRU)</li> <li>• STU</li> <li>• visitor location unit (VLRU).</li> </ul>
<i>Swap</i> may refer to:	<ul style="list-style-type: none"> <li>• units in: <ul style="list-style-type: none"> <li>• faulty out of use mode</li> <li>• spare or idle mode</li> <li>• testing mode</li> <li>• working or executing mode.</li> </ul> </li> </ul>
<i>Faulty sub-element</i> may refer to:	<ul style="list-style-type: none"> <li>• hardware</li> <li>• software.</li> </ul>
<i>Subsystem</i> may include:	<ul style="list-style-type: none"> <li>• authentication centre (AUC)</li> <li>• base station controller (BSC)</li> <li>• base transceiver station (BTS)</li> <li>• equipment Identity Register (EIR)</li> <li>• gateway GPRS Support Node (GGSN)</li> <li>• home Location Register (HLR)</li> <li>• media gateway (MGW)</li> <li>• mobile Switching Centre (MSC)</li> <li>• Node-B</li> <li>• Radio Network Controller (RNC)</li> <li>• Serving GPRS Support Node (SGSN)</li> <li>• Transcoder Rate Adapter Unit (TRAU)</li> <li>• visitor location register (VLR).</li> </ul>
<i>Replace or repair</i> may refer to:	<ul style="list-style-type: none"> <li>• cold swap procedure</li> <li>• hot swap procedure.</li> </ul>



**Unit Sector(s)**

<b>Unit sector</b>	Telecommunications
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**Co-requisite units**

<b>Co-requisite units</b>		

**Competency field**

<b>Competency field</b>	Radio frequency networks
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