



Australian Government

Department of Education, Employment and Workplace Relations

ICTRFN4177A Install radio communications base station equipment

Release: 1

ICTRFN4177A Install radio communications base station equipment

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes, skill and knowledge required to install a radio communications base station in the VHF, UHF or microwave bands. 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.
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Application of the Unit

Application of the unit	Field officers from private or public organisations apply the skills and knowledge in this unit. They combine technical radio communications skills with organisational and administrative skills to install radio communications base station equipment in a range of commercial and community contexts. Base station installation generally includes data and voice equipment and wiring, transmitter, receiver, feedline and multicoupling equipment
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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. Prepare to install radio communications base station equipment	1.1. Assess available installation options against customer requirements and relevant legislation, codes, regulations and standards 1.2. Arrange access to the site according to required procedure 1.3. Confirm equipment locations 1.4. Confirm base station equipment listings and manufacturer's and enterprise documents against the installation brief 1.5. Review installation briefs in consultation with the designers or manufacturers 1.6. Adjust tools and equipment to manufacturer's specification
2. Install equipment and terminate voice and data cables, power cables and radio frequency (RF) cables	2.1. Observe <i>anti-static precautions when handling circuit cards</i> and conduct all work in a manner which is safe to self, fellow workers and the public at large 2.2. Install racks, frames, and shelves as required for data and voice frequency (VF) interface equipment, transmitter and receiver 2.3. Position equipment and install according to manufacturer's specifications and design detail 2.4. Label equipment, distribution frames and blocks according to enterprise policy 2.5. Strip cables and terminate conductors according to manufacturer's specifications 2.6. Clean optical fibre connectors using <i>appropriate cleaning techniques</i> 2.7. Connect network termination unit (NTU) cables to data and VF interface unit via distribution frame 2.8. Connect data and VF cables to radio equipment 2.9. Connect digital and analog <i>alarm</i> inputs and outputs to supervisory, control and data acquisition (SCADA) controller 2.10. Connect power cables to rectifier, battery rack, circuit breakers, and equipment according to manufacturer's and enterprise documents 2.11. Use computer or handheld device to program internal software in the data and VF interface equipment, and transmitter and receiver

ELEMENT	PERFORMANCE CRITERIA
	2.12. Interconnect multicoupling equipment to antenna feedline and transmitter and receiver units. 2.13. Mount lightning protection equipment and earth wire according to specification
3. Connect receiver and transmitter multicoupling equipment to antenna feedline	3.1. Perform distance to fault measurement on antenna feedline 3.2. Perform return loss measurement of overall antenna system at transmitter and receiver connector points 3.3. Record test results
4. Finalise installation and complete preliminary tests and administrative tasks	4.1. Complete preliminary tests to verify transmitter and receiver operation prior to commissioning 4.2. Complete installation report, test results and administrative tasks and forward to the appropriate person according to enterprise policy 4.3. Dispose of packaging according to accepted environmental conditions 4.4. Notify appropriate person that base station is ready for commissioning and integration

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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

Required skills

- communication skills to question, listen and respond to subject matter experts on technical and operational matters related to performance of telecommunications networks and fault-finding
- literacy skills to interpret technical documentation and incorporate technical language into written tasks and basic reports
- numeracy skills to:
 - interpret technical data for specifications of telecommunications networks
 - use mathematical formulas to solve problems in AC circuits
- planning and organisational skills to plan, prioritise and monitor own work and coordinate the work of others
- problem solving skills to:
 - apply AC fault-finding techniques to different situations
 - apply network fault-finding techniques to fault find telecommunications

REQUIRED SKILLS AND KNOWLEDGE

network

- research skills to interrogate databases and other sources to investigate performance and systematic and logical fault-finding techniques of telecommunication networks
- 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 occupational health and safety (OHS) standards
 - work systematically with required attention to detail without injury to self or others, or damage to goods or equipment
- technical skills to:
 - fibre optic connector cleaning techniques
 - load software from computer to various devices
 - select and use appropriate test equipment to undertake performance and fault-finding techniques in telecommunications networks including:
 - distance to fault measurement
 - return loss measurement
- terminate data and voice cable and RF cable

Required knowledge

- detailed knowledge of:
 - anti-static precautions
 - RF radiation hazard awareness
 - network termination unit
 - radio transmitter system
 - radio receiver system
 - multicoupler
 - SCADA system inputs and outputs
- operation and purpose of testing equipment and meaning of test results and network element and system specifications
- overview of telecommunications networks
- performance testing and fault finding techniques of telecommunications networks

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 following is essential: • install radio communications base station equipment • perform distance to fault measurement on feedline • perform return loss measurement on feedline • document and complete installation report.
Context of and specific resources for assessment	Assessment must ensure: • sites on which base station installation can be conducted • tools and equipment required for installation • technical specifications, organisational documentation and requirements for installation and testing.
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: • review of an oral and written report with completed documentation • direct observation of the candidate installing and connecting base station equipment • oral or written questioning to assess knowledge of radio communications base station installation procedures.
Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example: • ICTRFN4095A Conduct radio frequency measurements. Aboriginal people and other people from a non-English speaking background may have second language issues. Access must be provided to appropriate learning and

EVIDENCE GUIDE

	assessment support when required. 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.
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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.

Relevant legislation, codes, regulations and standards may include:

- Australian Communications Industry Forum (ACIF) standards and codes
- AS Communications Cabling Manual (CCM) Volume 1
- AS/NZS 3000:2007
- AS/NZS 3080:2003
- AS/NZS 3084:2003
- AS/NZS 3085.1:2004
- AS/NZS IEC 61935.1:2006
- AS/NZS IEC 61935.2:2006
- AS/NZS ISO/IEC 14763.3:2007
- AS/NZS ISO/IEC 15018:2005

RANGE STATEMENT	
	• AS/NZS ISO/IEC 24702:2007 • Australian building codes and regulations • cabling security codes and regulations • fire regulations • industry drafting codes of practice • mining legislation • noise abatement and heritage legislation • OHS • technical standards AS/ACIF S008:2006 and AS/ACIF S009:2006.
Base station may include:	• analog modulation • digital modulation • repeater • terrestrial trunked radio (TETRA).
Anti-static precautions may include:	• avoiding contact with static materials, such as plastics • circuit cards transported in anti-static bags or cartons • electrically conducting floor mats • use of conducting wrist strap earthed via high resistance path.
Appropriate cleaning techniques may include:	• alcohol swabs • dry type cleaning cassette for optical connectors • lint free dry wipes • microscope for examining optical connector face.
Alarm may include:	• forward power • over temperature • over voltage • PLL unlock • rack door • radio hut door • reverse power • time out.
Multicoupling equipment may include:	• cavity filter • ferrite isolator • hybrid multicoupler • receiver multicoupler • receiver preselect amplifier

RANGE STATEMENT	
	transmitter multicoupler.
<i>Appropriate person</i> may include:	- consultant - customer - project engineer - supervisor - team leader.

Unit Sector(s)

Unit sector	Telecommunications
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Co-requisite units

Co-requisite units		

Competency field

Competency field	Radio frequency networks
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