



Australian Government

Department of Education, Employment and Workplace Relations

CUFBRT402A Maintain broadcast equipment and facilities

Revision Number: 1

CUFBRT402A Maintain broadcast equipment and facilities

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit describes the skills and knowledge required to diagnose faults in and repair radio or television broadcasting facilities and equipment. No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.
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Application of the Unit

Application of the unit	<p>Broadcast technicians or technologists apply the skills and knowledge described in this unit. Although they work under the direction of a senior technologist or broadcast engineer, they are expected to work with minimum supervision and may, on occasions, be responsible for supervising others.</p> <p>This unit covers the maintenance of equipment in both television and radio studios. The scope of work varies from working with a single piece of equipment to maintenance of a whole studio or facility, including outside broadcast vehicles.</p> <p>Skills associated with the installation of equipment and facilities are covered in:</p> <ul style="list-style-type: none"> • CUFBRT401A Install or upgrade broadcasting equipment and facilities. <p>Note: To meet the requirements of this unit, candidates need to demonstrate competency in the maintenance of facilities and equipment for either television or radio. The Required Skills and Knowledge section should be tailored accordingly.</p>
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Licensing/Regulatory Information

Not applicable.

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
Locate and repair faults.	<ol style="list-style-type: none"> 1. Use <i>diagnostic techniques</i> and <i>reference material</i> to isolate faults to specific equipment or parts of equipment 2. Use appropriate <i>test equipment</i> to carry out diagnostic activities methodically, safely and in a manner suitable for system and problem type, obtaining specialist advice where required 3. Consult with <i>relevant personnel</i> to determine the <i>impact</i> of repairs or <i>maintenance</i> on broadcast operations 4. Document maintenance requirements in accordance with enterprise procedures, including reference to the impact of maintenance on broadcast operations 5. Provide temporary service, if necessary, ensuring it meets the standards of existing equipment 6. Carry out <i>equipment</i> repairs within scope of own job role or organise repair of faulty equipment in accordance with enterprise procedures and <i>regulatory and industry standards</i> 7. <i>Test</i> performance of system/equipment for satisfactory operation on completion of repairs
Undertake routine maintenance	<ol style="list-style-type: none"> 8. Implement manufacturer upgrades, as required, and align systems to manufacturer standards and broadcast specifications 9. Carry out routine alignment on broadcast systems, including scheduled replacement of mechanical parts 10. Advise relevant personnel if maintenance activities cannot be completed or faults outside the planned maintenance schedule have been found 11. Ensure that interconnection between equipment is compatible and logical 12. Implement established preventative maintenance routines and carry out repairs and alterations as required 13. Check, update and maintain system logbooks and fault reports 14. Monitor system/equipment faults for trends in device/component failures 15. Consult with relevant personnel to ensure satisfaction with the outcome of completed maintenance and <i>maintenance procedures</i> 16. Complete work in a safe manner, remove waste and debris from the worksite, and remove obsolete equipment according to enterprise guidelines and

ELEMENT	PERFORMANCE CRITERIA
	regulatory and industry standards
Provide general technical support	17. Assist relevant personnel with facility-related queries 18. Communicate with clients about facilities and equipment without over-use of jargon and technical language 19. Devise alternate configurations to meet the needs of relevant personnel as required

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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

Required skills

- communication, teamwork and literacy skills sufficient to:
 - interpret information from system drawings, equipment specifications and technical handbooks
 - liaise effectively with customers/clients on the job, including ability to communicate technical terminology
 - complete workplace documentation
 - work and communicate effectively as a team member, including seeking advice and assistance with non-routine equipment malfunction
- planning and problem solving skills sufficient to:
 - diagnose electronic faults in specified equipment and broadcast system
 - plan maintenance activities to cause minimum disruption to normal work flows
 - identify the benefits, weaknesses and implications of different solutions to maintenance issues
 - plan for contingencies in the context of organising maintenance activities
 - propose maintenance solutions that are practicable and meet technical requirements
- technical skills sufficient to:
 - use hand and power tools and test equipment in a safe manner to undertake maintenance of broadcasting equipment and facilities
 - solder components
 - carry out measurements and adjustments, such as amplitude and frequency response, distortion, noise performance, phase, timing, bit error rate (BER), data network performance and mechanical performance
- self-management skills sufficient to:
 - prioritise work tasks
 - meet deadlines
 - seek expert assistance as required
- numeracy skills sufficient to interpret and record test measurement data

Required knowledge

- features of test measurement equipment, including:
 - waveform monitor
 - peak program meter (PPM)
 - reference signals, e.g. video or audio line-up signals
 - performance limitations of signal paths, e.g. cliff effect

REQUIRED SKILLS AND KNOWLEDGE

- variations of test methods, e.g. waveform display errors, meter errors
- effect of the measurement equipment itself on the measured system
- television standards, e.g. PAL, NTSC, SECAM, digital
- industry knowledge, including:
 - structure of the broadcasting industry
 - roles and responsibilities of personnel in the broadcasting industry
 - impact of technological changes on maintenance procedures
 - correct terminology, e.g. symbols, terminology and conventions used for electrical, mechanical and electronic drawings and specifications
 - regulatory and industry standards relevant to field of work (see range statement for examples)
 - product knowledge, e.g. manufacturer standards and specifications
 - sources of advice, information, and technical support
 - issues and challenges that arise in the context of maintaining broadcasting facilities and equipment
- features and operational standards for enterprise-specific equipment and facilities, e.g.:
 - microphones, e.g. types, polar response characteristics, electrical operation, phantom powering, applications in program making
 - amplifiers
 - loudspeakers, e.g. electronic operation, cabinet construction, crossovers, placement in studio environment
 - dynamic range, e.g. compression principles, expansion principles, multi-band compression, noise reduction
 - analogue audio recorders
 - digital recording and replay systems
 - digital compression, e.g. characteristics of different file formats
 - television cameras, e.g. light splitting, functions and operating principles of charge coupled devices (CCDs), signal processing, luminance and colour difference signals, PAL encoding, triax theory
 - digitising video signals
 - video compression, e.g. lossless and lossy, intra-frame and inter-frame, characteristics of file formats
- editing facilities and software applications
- OHS requirements as they relate to maintenance operations, e.g. protective clothing and personal safety systems; safe isolation of equipment, such as mechanical, electricity, gas, air or fluids; weight loading; and manual handling

Evidence Guide

EVIDENCE GUIDE	
<p>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.</p>	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	<p>Evidence of the following is essential:</p> <ul style="list-style-type: none"> • correct interpretation of manufacturer specifications to diagnose and repair faults in either radio or television broadcasting facilities and equipment • ability to work as a team member with minimum supervision • efficient repair and maintenance of either radio or television broadcasting equipment and facilities according to enterprise requirements • ability to complete scheduled work on time.
Context of and specific resources for assessment	<p>Assessment must ensure:</p> <ul style="list-style-type: none"> • access to a range of equipment used in either radio or television broadcasting facilities • access to regulatory and industry standards • access to appropriate learning and assessment support when required • use of culturally appropriate processes and techniques appropriate to the language and literacy capacity of learners and the work being performed.
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 questioning combined with review of portfolios of evidence and third-party workplace reports of on-the-job performance • observation of the candidate repairing or maintaining equipment • written or verbal questioning to test knowledge as listed in the required skills and knowledge section of this unit.
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"> • CUFBRT401A Install or upgrade broadcasting

EVIDENCE GUIDE

	equipment and facilities <ul style="list-style-type: none">• CUFBRT403A Ensure quality of broadcast output• ICTTC101C Locate and diagnose electronic faults.
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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.

<p><i>Diagnostic techniques</i> may include:</p>	<ul style="list-style-type: none"> • comparison of measured readings for equipment and system performance against manufacturer or site specifications • comparison of results against past performance in the same piece of equipment • comparison of results against similar pieces of equipment or systems • operational checks against normal operating specifications.
<p><i>Reference material</i> may include:</p>	<ul style="list-style-type: none"> • circuit schematics • design plan • drawings • equipment manuals • equipment warranties • fault reports • instruction sheets • logbooks • manufacturer support data • previous history of equipment • purchase orders • system interconnection information • system/equipment specifications and manuals.
<p><i>Test equipment</i> may include:</p>	<ul style="list-style-type: none"> • audio test set • automatic measuring equipment • computer • digital analysis equipment • multimeter • oscilloscope • RF measurement test set • test signal generator • video waveform monitor.
<p><i>Relevant personnel</i> may include:</p>	<ul style="list-style-type: none"> • architects • building personnel

RANGE STATEMENT	
	<ul style="list-style-type: none"> • client • designers • floor manager • head of department • operators of the equipment • other specialist personnel • other technical personnel • producer • production assistant • production designer • production manager • station manager • subcontracted personnel • supervisor • technical director.
Repairs or maintenance may <i>impact</i> :	<ul style="list-style-type: none"> • budgets • end users/audience • legal requirements • maintenance systems • operational procedures • personnel • physical • production schedules • quality of broadcast signal • technical systems • the environment • work.
<i>Maintenance</i> may involve:	<ul style="list-style-type: none"> • entire broadcast facility • multiple pieces of equipment • one piece of equipment • outside broadcast vehicle.
<i>Equipment</i> may include:	<ul style="list-style-type: none"> • analogue • broadcast-specific systems • communication or RF equipment, e.g. ISDN, RF links • computers • digital • display devices, e.g. monitors • line equipment, e.g. audio/video DAs • production video and audio equipment, e.g.

RANGE STATEMENT	
	<ul style="list-style-type: none"> • sound/vision mixer • record/replay machines, e.g. cameras, audio recorders.
<i>Regulatory and industry standards</i> may include:	<ul style="list-style-type: none"> • ACMA technical standards • Australian and international standards • Australian building codes and regulations • confined spaces regulations • environmental legislation • fire regulations • heritage legislation • industry codes of practice • noise abatement • OHS • trade practices legislation.
Performance <i>tests</i> may include:	<ul style="list-style-type: none"> • assessing error performance levels • checking alarms • checking compliance with equipment parameters, e.g.: <ul style="list-style-type: none"> • amplitude response • frequency response • distortion • noise performance • phase • timing • data network performance • bit error rate (BER) • mechanical performance • working temperature • checking that performance measurements: <ul style="list-style-type: none"> • accord with predetermined specifications • meet approved operating margins • testing of protection mechanisms.
<i>Maintenance procedures</i> may include:	<ul style="list-style-type: none"> • in situ performance, e.g.: <ul style="list-style-type: none"> • monitor alignment • hard disk defragmentation • replacement of parts • alignment or calibration and measurement • software upgrade • software reinstallation.

Unit Sector(s)

Unit sector	
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Competency field

Competency field	Media and entertainment production - broadcast technology
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Co-requisite units

Co-requisite units	