Australian Government

Department of Education, Employment and Workplace Relations

ICTDRE3165A Install a complex digital reception system

Release: 1

ICTDRE3165A Install a complex digital reception system

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes, skills and knowledge required to design, install, test and commission a complex digital reception system. Depending on the particular installation, organisational requirements, and state or territory legislation, specific licences may be required in areas such as: • working at heights • confined spaces • working on construction worksites. Some cabling and installation work may fall within the definition of construction work. If so, people entering the construction site are required to complete the general induction training program specified by the National Code of Practice for Induction Training for Construction Work (Australian Safety Compensation Council, May 2007). Achievement of the unit CPCCOHS1001A Work safely in the construction industry from the CPC08 Construction and Plumbing Services Integrated Framework Training Package fulfils this requirement. Users should confirm requirements with the relevant federal, state or territory authority.

Application of the Unit

Application of the unit	Technicians working on large scale, complex radio frequency (RF) and digital distribution systems, such as master antenna television (MATV), and satellite master antenna television (SMATV) in commercial or multi-dwelling unit (MDU) environment apply the skills and knowledge in this unit.

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

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.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Plan the installation of a complex digital reception system	1.1. Notify ***customer*** to arrange access to site and identify ***customer equipment*** 1.2. Select type of ***complex digital systems*** and consequent constraints on installation according to client specifications 1.3. Complete a job safety analysis (JSA) identifying occupational health and safety (OHS) issues 1.4. Prepare for installation according to ***relevant legislation***, ***codes***, ***regulations and standards*** 1.5. Verify ***design requirements*** are suitable for site application and required system performance
2. Assemble complex digital reception system	2.1. Select and obtain materials, ***tools and equipment*** for installation 2.2. Select suitable ***headend*** location and cable access 2.3. Build headend according to design requirements and manufacturer's specifications 2.4. Configure headend and distribution devices to operate according to design and manufacturer's specifications 2.5. Run ***cables*** along identified runs 2.6. Terminate cables according to both design and manufacturer's specifications
3. Test and commission system	3.1. Conduct ***performance test*** operation of headend and distribution ***devices*** 3.2. Activate system and conduct signal measurement using test equipment 3.3. Record and analyse initial test results for quality of service according to design specifications 3.4. Rectify identified faults and adjust system to optimal operation 3.5. Conduct final signal measurement using test equipment to ***optimise performance*** 3.6. Update design plans to 'as built' status
4. Complete administrative tasks	4.1. Record final commissioning test results and settings in line with client requirements 4.2. Complete appropriate records and test results, and store according to policy 4.3. Completion of all financial and other documentation 4.4. ***Handover to customer*** 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

- communication skills to:
  - negotiate with site owner and organisations or individuals who may be affected by an outage
  - provide advice and guidance to others or to seek assistance
- literacy skills to interpret technical documentation, specifications and service orders
- numeracy skills to:
  - set up
  - check that equipment is calibrated
  - take RF measurements
  - interpret results
  - evaluate different types of technical data
- planning and organisational skills to organise and prepare installation resources
- problem solving skills to respond to typical antenna installation challenges
- task management skills to:
  - work systematically with required attention to detail
  - adhere to all safety requirements
- technical skills to:
  - use hand and power tools
  - operate a range of specialised radio communications equipment
  - perform diagnostic procedures.

Required knowledge

- detailed knowledge of procedures and equipment required for measurement of:
  - forward and reflected RF power
  - feedline insertion loss
  - distance to fault
  - modulation error rate (MER) and bit error rate (BER) for the purpose of signal integrity
- features of instruments, test equipment and performance requirements
- performance of adjustments (tuning, balancing and replacing components)
- legislation, codes of practice and other formal agreements that directly impact on

REQUIRED SKILLS AND KNOWLEDGE
operation and testing of radio communications antennas and equipment • MATV and SMATV • overview knowledge of RF spectrum • RF awareness, electromagnetic radiation (EMR) standards and specific OHS requirements that impact on the use and testing of radio communications instruments and equipment • typical issues and challenges that occur in telecommunications antenna installations

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, assemble and install a complex digital reception system • conduct functionality tests and interpret results • perform handover to customer • apply related OHS requirements and work practices.
Context of, and specific resources for assessment	Assessment must ensure: • site for complex digital reception system installation • range of complex digital reception systems currently used in industry • range of test equipment required for digital reception system installation and testing.
Methods 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 installing a complex digital reception system • direct observation of the candidate conducting signal measurement and adjusting for optimal performance • oral or written questioning of the candidate to assess knowledge of complex digital reception systems • oral or written questioning of the candidate to assess knowledge of test methods and performance requirements.
Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example: • ICTDRE4166A Integrate customer digital reception equipment. Aboriginal people and other people from a non-English speaking background may have second language issues.

EVIDENCE GUIDE	
	Access must be provided to appropriate learning and 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.

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.	
Customer may include:	• consultant • individual client • project manager • site manager • site supervisor.
Customer equipment may include:	• digital free to air (FTA) • hard disk recorder • high definition (HD) TV • home automation • MATV

RANGE STATEMENT	
	• media centre • SMATV • video player • video and audio distribution systems.
Complex digital systems may include:	• MATV • SMATV.
Relevant legislation, ***codes***, ***regulations and standards*** may include:	• Australian Communications Industry Forum (ACIF) standards and codes • Australian Communications and Media Authoruty (ACMA) technical standards • ARPANSA EMR standard • Australian building codes and regulations • Australian standards • enterprise standards • environmental protection • equipment standards, intrinsically safe lightning protection, site engineering standard • fire regulations • heritage legislation • international standards • local government • OHS • Radcoms Act • Telecoms Act.

Design requirements may include:	• equipment performance
	• symbols:
	  • audiovisual (AV) system features
	  • common electrical circuit features.

Tools and equipment may include:	• hand and power tools
	• test equipment:
	  • antenna analyser
	  • directional RF power meter
	  • multimeter
	  • return loss measuring equipment
	  • RF termination
	  • spectrum analyser.

Headend may include:	• RF • optical.

RANGE STATEMENT	
Cables may include:	• flexible coaxial • interconnected cable harness • optical • rigid or semi-rigid coaxial line.

Performance test may include:	• antenna sweep:
	  • antenna analyser
	  • return loss bridge and RF sweep generator
	  • scalar network analyser
	  • vector network analyser
	• distance to fault
	• insertion loss
	• reflected power:
	  • antenna analyser
	  • directional power meter at a single frequency only
	  • return loss bridge and RF sweep generator
	  • scalar network analyser
	  • vector network analyser
	• return loss.

Devices may include:	• active:
	  • amplifiers
	  • modulators
	• passive:
	  • couplers
	  • multi-switches
	  • splitters
	  • taps.

Optimise performance may relate to:	• antenna orientation • aspect ratio • contrast • picture quality • signal amplification adjustment.
Handover to customer may include:	• functionality demonstration • provision of appropriate literature • training customers on equipment use.

Unit Sector(s)

Unit sector	Telecommunications

Co-requisite units

Co-requisite units		

Competency field

Competency field	Digital reception technology