



**Australian Government**

# **Assessment Requirements for UEEEC0023**

## **Diagnose and rectify faults in digital transmission circuits and systems**

**Release: 1**

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## **Modification History**

Release 1. This is the first release of this unit of competency in the UEE Electrotechnology Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- applying logical diagnostic methods
- using fault scenarios to test the source of circuit faults
- identifying the cause faults using logical diagnostic methods
- rectifying faults effectively
- verifying that the apparatus operates correctly
- documenting fault rectification
- dealing with unplanned events
- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements, workplace procedures and practices, including using risk control measures
- applying sustainable energy principles and practices.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- digital television transmission faults, advanced digital television principles, digital television transmission towers and equipment, applying safe working practices and relevant standards, codes and regulations, including:
  - audio component encompassing:
    - audio encoding
    - audio masking
    - audio sub-band encoding
  - Dolby AC-3
  - MPEG-2 system layer encompassing:
    - PES packet construction
    - time stamps

- programme clock reference (PCR)
- transport packet header
- programme specific information (PSI)
- channel encoding:
  - forward error correction (FEC)
  - bit error rate (BER)
  - puncturing
- interleaving
- modulation:
  - phase shift keying (PSK)
  - quadrature amplitude modulation (QAM)
  - orthogonal frequency division multiplexing (OFDM)
  - coded orthogonal frequency division multiplexing (COFDM)
- hierarchical modulation:
  - terrestrial channel encoder
  - satellite channel encoder
  - carrier to noise ratio (C/N)
- single frequency networks:
  - guard interval
  - mega-frames
- the requirements of digital television terrestrial broadcast (DTTB) program input and monitoring equipment encompassing:
  - basic system arrangement: a central router connected to a number of control rooms
  - terminologies: vertical, multi-level; tie-line routing and cross point
  - typical signal types processed by a router
  - the purpose of redundant central processing units (CPUs) and power supply units
  - common control protocols used in routers
  - typical analogue audio and video output voltage levels present at the router
  - typical specifications for digital data signals present at the router
  - function of various test equipment used in DTTB measurements
- the operating characteristics of a DTTB transmitter encompassing:
  - typical DTTB digital transmission system
  - safety precautions required when working with high power radio frequency (RF) transmitters
  - operating characteristics of a typical MPEG encoder
  - operation of a COFDM modulator
  - arrangement of sub-system components in a DTTB transmitter
  - purpose of an up converter in a DTTB transmitter
  - typical characteristics of a DTTB power amplifier
  - advantages and disadvantages of air and liquid cooling systems used in transmitters

- typical DTTB transmitter measurements techniques
- the performance requirements of the DTTB combiner and antenna systems encompassing:
  - minimum channel separation required between digital and analogue television channels
  - typical specifications of an antenna combiner system
  - the need for combiner systems in DTTB systems
  - typical system faults in combiners and antenna system
- the requirements of remote monitoring and measurement equipment encompassing:
  - purpose of control panel indicators and controls
  - process by which the system manages a critical failure: power supplies and CPUs
  - different system alarm signals
  - periodic equipment self-tests and diagnostic routines on DTTB systems
  - DTTB systems fault diagnostic and rectification techniques
  - function of the basic components of a DTTB system
  - typical units of a DTTB telemetry system
- relevant job safety assessments or risk mitigation processes
- relevant manufacturer specifications
- relevant WHS/OHS legislated requirements
- relevant workplace documentation
- relevant workplace policies and procedures.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment

Assessment must occur in suitable workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in suitable simulated workplace operational situations that replicate workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- a range of relevant exercises, case studies and/or simulations
- relevant and appropriate materials, tools, facilities, equipment and personal protective equipment (PPE) currently used in industry
- resources that reflect current industry practices in relation to diagnosing and rectifying faults in digital transmission systems
- applicable documentation, including workplace procedures, equipment specifications, regulations, codes of practice and operation manuals.

## Links

Companion Volume implementation guides are found in VETNet - -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b8a8f136-5421-4ce1-92e0-2b50341431b6>