



**Australian Government**

# **UEENEEF11A Test, report and rectify faults in data and voice installations**

**Release: 2**

# **UEENEEF111A Test, report and rectify faults in data and voice installations**

## **Modification History**

Not applicable.

## **Unit Descriptor**

**Unit Descriptor**                      **1) Scope:**

### **1.1) Descriptor**

This unit covers testing for certification finding and repairing faults in telecommunication installations and local area networks. The unit encompasses working safely, reading cabling diagrams, performance testing, applying logical fault finding procedures, testing functionality of the network, conducting repairs and completing the necessary documentation.

## **Application of the Unit**

**Application of the Unit**            **2)**

This unit is intended for competency development in entry-level employment based programs incorporated in approved contracts of training

## **Licensing/Regulatory Information**

**License to practice**                      **3)**

The skills and knowledge described in this unit require a registration to practise in the workplace subject to requirements set out ACMA 'Open' Cabling Provider Rule. Practice in workplace and during training is also subject to regulations directly related to occupational health and safety and where applicable contracts of training such as apprenticeships.

**License to practice****3)**

Note:

1. Compliance with permits may be required in various jurisdictions and typically relates to the operation of plant, machinery and equipment such as elevating work platforms, powder operated fixing tools, power operated tools, vehicles, road signage and traffic control and lifting equipment. Permits may also be required for some work environments such as confined spaces, working aloft, near live electrical communications equipment and site rehabilitation.

2. Compliance may be required in various jurisdictions relating to currency in First Aid, confined space, lifting and risk safety measures.

**Pre-Requisites****Prerequisite Unit(s)****4)****Competencies****4.1)**

Granting competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

UEENEEE1 01A Apply Occupational Health and Safety regulations, codes and practices in the workplace

UEENEEE1 02A Fabricate, assemble and dismantle utilities industry components

UEENEEE1 04A Solve problems in d.c. circuits

UEENEEE1 05A Fix and secure electrotechnology equipment

UEENEEE1 07A Use drawings, diagrams, schedules, standards, codes and specifications

UEENEEF10 2A Install and maintain cabling for multiple access to telecommunication services

UEENEEF10 Install and modify performance data

<b>Prerequisite Unit(s)</b>	<b>4)</b>
	4A communication copper cabling
	UEENEEF10 Install and modify performance data
	5A communication optical fibre cabling

**Literacy and numeracy skills 4.2)**

Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 'Literacy and Numeracy'

Reading	3	Writing	3	Numeracy	3
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## Employability Skills Information

**Employability Skills 5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

## Elements and Performance Criteria Pre-Content

<b>6)</b> Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.
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## Elements and Performance Criteria

<b>ELEMENT</b>	<b>PERFORMANCE CRITERIA</b>
1 Prepare to test, report and rectify faults.	1.1 OHS procedures for a given work area are identified, obtained and understood.
	1.2 Health and safety risks are identified, and established risk control measures and procedures in preparation for the work are followed.
	1.3 Safety hazards that have not previously been identified are noted, and established risk control measures are implemented.
	1.4 Testing is prepared in consultation with others affected by the work and sequenced appropriately.
	1.5 The nature and location of the work is determined from documentation or in discussion with appropriate person(s) to establish the scope of work to be undertaken.
	1.6 Advice is sought from appropriate persons to ensure the work is coordinated effectively with others.
	1.7 Material needed for the testing, reporting and rectifying work is obtained in accordance with established procedures and checked against job requirements.
	1.8 Tools, equipment and testing devices needed to for the work are obtained in accordance with established procedures and checked for correct operation and safety.
	1.9 Preparatory work is checked to ensure no damage has occurred and that it complies with requirements.
2 Test and rectify faults	2.1 OHS risk control measures and procedures for carrying out the work are followed.
	2.2 Tests are carried out in strict accordance with OHS established safety procedures.
	2.3 Tests are prepared and conducted in accordance with test equipment operating instructions and

<b>ELEMENT</b>	<b>PERFORMANCE CRITERIA</b>
	requirements.
	2.4 Cable performance tests are conducted accurately and results documented in accordance with established procedures.
	2.5 Causes of defects or faults indicated by test results are identified and rectified in accordance with established procedures.
	2.6 Established methods for dealing with unexpected situations are discussed with appropriate person(s) and documented.
	2.7 Unexpected situations are dealt with safely and with the approval of an authorised person.
	2.8 Ongoing checks of the quality of installed equipment are undertaken in accordance with established procedures.
	2.9 Testing and rectifying faults is carried out efficiently without waste of materials or damage to equipment, circuits, the surrounding environment or services and using sustainable energy principles.
3 Document and verify installation performance.	3.1 OHS work completion risk control measures and procedures are followed.
	3.2 Work site is cleaned and made safe in accordance with established procedures.
	3.3 Service reports are completed, when necessary in accordance with established procedures.
	3.4 Documentation certifying system performance is issued to an appropriate person(s).

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of safe working practices and testing, reporting and rectifying faults in voice and data installations.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

#### **KS01-EF111A**

#### **Data and voice cabling testing devices and techniques**

Evidence shall show an understanding of data and voice cabling testing devices and techniques, applying safe working practices and relevant Standards, Codes and Regulations to an extent indicated by the following aspects:

T1. Networking fundamentals

- Analogue and digital signals encompassing:
  - How information is carried
  - Signal distortion

Examples include attenuation, reflection, noise, dispersion, jitter, latency and collisions

- Types of networks, network components and hardware
- Local Area Network (LAN) architectures
- Networking protocols and the OSI model
- Network signal propagation
- Transmission Control Protocol / Internet Protocol (TCP/IP)
- Basics of Encoding Networking Signals
- Internet services

T2. Basic electrical testing and measuring devices and techniques encompassing:

- Types and applications of testing/measuring devices including voltage testers, multimeters, clamp meters, continuity testers and insulation resistance testers.
- Features of testing/measuring devices including safety, user calibration and parameter and range settings.
- Connection of test/measuring devices into a circuit
  - safety procedures
  - circuit arrangement of test/measuring devices
- Taking readings
- Storage, maintenance and care of test/measuring devices.
- Australian Standard quality assurance requirements for test equipment calibration certification.

T3. Performance parameters associated with copper cables, coaxial cables and

## REQUIRED SKILLS AND KNOWLEDGE

optical cables encompassing:

- Open circuit, short circuit and pair continuity
- Split pair and crossed pair
- Attenuation
- Return loss
- Insulation Resistance (leakage)
- Near end cross talk (NEXT)
- Attenuation to cross talk ratio (ACR)
- Loop resistance
- Noise (Impulse noise and average noise)
- Characteristic impedance

Note: Structured cabling including, twisted pair cabling, shielded twisted pair (STP), unshielded twisted pair (UTP) and higher performance cabling.

T4. Test results for compliance with required regulation, standards, and or codes for structured copper cables, coaxial; and optical fibre cables encompassing:

- Tests required to evaluate a given performance parameter
- Test equipment and leads needed to evaluate a given performance parameter.
- Operation of test equipment for correct evaluation of specific cable performance parameters and to obtain accurate and reliable results.
- Transmission performance requirements.

T5. Testing and validation of a customer premises cabling installation encompassing:

- Requirements of current Standard of site certification for high performance copper cables, coaxial cable and optical fibre cables
- Reporting requirements for the completion of work related to conformity of a cabling installation.
- Documentation required in certifying a cabling installation conforms to relevant standards and specifications.

T1. Optical Time Domain Reflectometer (OTDR) operating principles, applications and calibration procedures encompassing:

T2. Typical causes of non compliant test results.

T3. Recording, reporting and maintaining test results encompassing:

- Purpose and extent of maintaining work activities records in an enterprise
- Types of records for maintaining work activities in an enterprise
- Methods for recording and maintaining work records
- Work records required by regulation requirements



## Evidence Guide

### EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit and must be read in conjunction with the performance criteria and the range statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of the unit and performed in accordance with the Assessment Guidelines of this Training Package.

#### Overview of Assessment 9.1)

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the industry-preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal everyday work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

**Critical aspects of evidence required to demonstrate competency in this unit 9.2)**

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines – UEE11'. Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices, including the use of risk control measures as specified in the performance criteria and range statement
  - Apply sustainable energy principles and practices as specified in the performance criteria and range statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
  - Demonstrate an appropriate level of skills enabling employment
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, policies and workplace procedures
- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Test, report and rectify faults in voice and data installations as described in 8) and including:

- A Reading and interpreting drawings and schedules of the installation
- B Preparing and conducting appropriate test accurately
- C Interpreting test results correctly

- D Identifying defects/faults from test results
- E Rectifying faults effectively
- F Completing the required documentation accurately.
- G Dealing with unplanned events by drawing on essential knowledge and skills to provide appropriate solutions incorporated in a holistic assessment with the above listed items

**Context of and specific resources for assessment** 9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

These should be used in the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to testing, reporting and rectifying faults in voice and data installations

**Method of assessment** 9.4)

This unit shall be assessed by methods given in Volume 1, Part 3 'Assessment Guidelines'.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this competency standard unit applies. This requires assessment in a structured environment which is primarily intended for learning/assessment and

incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

**Concurrent  
assessment and  
relationship with  
other units** 9.5)

For optimisation of training and assessment effort, competency development in this unit may be arranged concurrently with unit:

UEENEEF10 Install and modify performance data  
4A communication copper cabling

UEENEEF10 Install and modify optical fibre performance data  
5A communication cabling

UEENEEF10 Install and connect voice and data communications  
9A equipment

## Range Statement

### RANGE STATEMENT

**10)** This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

This unit shall be demonstrated in relation to testing, reporting and rectifying faults in voice and data installations comprising two different items of customer premises equipment and a local area network.

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

## Unit Sector(s)

Not applicable.

## Competency Field

Competency Field 11)

Data and Voice Communications