



Australian Government

UEEEEC0068 Troubleshoot communication systems

Release: 1

UEEEEC0068 Troubleshoot communication systems

Modification History

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

Application

This unit involves the skills and knowledge required to troubleshoot communications systems.

It includes fault finding and repairing communications systems. It also includes working safely, interpreting circuit diagrams, applying logical fault-finding procedures, conducting repairs, safety and functional testing, and completing the necessary service documentation.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

Pre-requisite Unit

UEECD0043 Solve problems in direct current circuits

UEEEEC0074 Troubleshoot resonance circuits in an electronic apparatus

UEEEEC0063 Solve fundamental electronic communications system problems

Competency Field

Electronics and Communications

Unit Sector

Electrotechnology

Elements and Performance Criteria

ELEMENTS

Elements describe the essential outcomes.

1 Prepare to find and repair communications system faults

PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

1.1 Work health and safety (WHS)/occupational health and safety (OHS) requirements and workplace procedures for a given work area are identified obtained

- 1.2 WHS/OHS risk control measures and workplace procedures are followed in preparation for work
 - 1.3 Nature of the communications system fault is obtained from relevant documentation or from work supervisor to determine the scope of work to be undertaken
 - 1.4 Advice is sought from work supervisor to ensure the work is coordinated effectively with relevant person/s
 - 1.5 Sources of materials required for work are established in accordance with workplace procedures
 - 1.6 Tools, equipment and testing devices needed to carry out the work are obtained in accordance with workplace procedures and checked for correct operation and safety
- 2 **Find communications system faults**
 - 2.1 WHS/OHS risk control measures and workplace procedures for carrying out communications systems work are followed
 - 2.2 Need to test and measure live work is determined in accordance with WHS/OHS requirements and conducted within workplace safety procedures
 - 2.3 Communications system apparatus is checked and isolated in accordance with WHS/OHS requirements and workplace procedures
 - 2.4 Communications system fault finding is approached methodically using measured and calculated values of apparatus parameters
 - 2.5 Apparatus components are dismantled, as required, and parts stored to protect against loss or damage
 - 2.6 Faulty components are rechecked and their fault status confirmed
 - 2.7 Unplanned situations are responded to in accordance with workplace procedures in a manner that minimises risk to personnel and equipment
 - 2.8 Fault-finding activities are carried out efficiently without waste of materials or damage to apparatus, the surrounding environment or services using sustainable energy practices

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| 3 Repair communications system fault | 3.1 WHS/OHS risk control measures and workplace procedures for carrying out work are followed |
| | 3.2 Apparatus is checked and isolated in accordance with WHS/OHS requirements and workplace procedures |
| | 3.3 Materials required for the repair work are sourced and obtained in accordance with workplace procedures |
| | 3.4 Repairs are affected efficiently without damage to other components apparatus or circuits |
| | 3.5 Effectiveness of the repair is inspected and tested in accordance with workplace procedures |
| | 3.6 Apparatus is reassembled, inspected, finally tested and prepared for return to customer |
| 4 Complete and report repair activities | 4.1 WHS/OHS work completion risk control measures and workplace procedures are followed |
| | 4.2 Work area is cleaned and made safe in accordance with workplace procedures |
| | 4.3 Written justification is documented for repairs to communications system apparatus |

Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Non-essential conditions may be found in the UEE Electrotechnology Training Package Companion Volume Implementation Guide.

Unit Mapping Information

This unit replaces and is equivalent to UEENEEH172A Troubleshoot communication systems.

Links

Companion Volume implementation guides are found in VETNet - -

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

Assessment Requirements for UEEEC0068 Troubleshoot communication systems

Modification History

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Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least two separate occasions and include:

- analysing and interpreting measurement results
- applying fundamental knowledge in finding faults efficiently
- applying relevant work health and safety (WHS)/occupational health and safety (WHS/OHS) requirements, workplace procedures and practices, including using risk control measures
- applying sustainable energy principles and practices
- checking tools and test equipment for correct operation and safety
- consulting with relevant stakeholders regarding the nature of the problem and impacts of work to diagnose and repair
- dealing with unplanned situations in accordance with workplace procedures in a manner that minimises risk to personnel and equipment
- demonstrating signal testing and signal analysis
- demonstrating the making of relevant adjustments
- dismantling and reassembling equipment as required
- finding and repairing faults in communications system
- identifying faulty components and replacing components without damage
- making relevant measurements and calculations
- providing written justification for the repairs
- selecting and using relevant radio frequency (RF) test equipment
- selecting appropriate components and/or materials for the repairs
- using methodical fault-finding techniques.

Knowledge Evidence

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

- measurement techniques to verify system performance and signal quality of analogue and digital signals, including parameters such as bit error rate and inter-symbol interference.
- methods to reduce effects of spurious emissions, harmonics, over-modulation and

- intermodulation distortion (IMD) on the radio frequency (RF) spectrum
- modulation and demodulation techniques, including complex modulation schemes, e.g. multiple-input/multiple-output (MiMo) and spread-spectrum
- RF and intermediate frequency (IF) amplifier principles
- RF filtering principles, including quality (Q), bandwidth and typical filter types
- RF safety precautions
- RF signal generation and conversion principles
- receiver operating principles and characteristics, including practical troubleshooting and test techniques
- regulatory and technical requirements for efficient RF spectrum access
- relevant industry standards, codes of practice and regulations
- relevant job safety assessments or risk mitigation processes
- relevant manufacturer specifications
- relevant WHS/OHS legislated requirements
- relevant workplace documentation
- relevant workplace policies and procedures
- transmitter operating principles and characteristics, including practical troubleshooting and test techniques.

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 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 suitable simulations
- relevant and appropriate materials, tools, equipment and personal protective equipment (PPE) currently used in industry
- resources that reflect current industry practices in relation to finding and repairing faults in communication 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>