



Australian Government

UEEEEC0061 Set up and adjust commercial radio frequency (RF) transmission and reception systems

Release: 1

UEEEEC0061 Set up and adjust commercial radio frequency (RF) transmission and reception 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 set up and adjust commercial radio frequency (RF) transmission and reception systems for optimum performance. It includes preparing for, setting up and adjusting commercial RF transmission and reception systems, signal testing and analysis, and completing reports on set-up and adjustment activities.

Permits may be required for some work environments, such as confined spaces, working aloft, near live electrical apparatus and site rehabilitation.

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

Pre-requisite Unit

UEECD0007 Apply work health and safety regulations, codes and practices in the workplace

UEEEEC0063 Solve fundamental electronic communications system problems

UEEEEC0074 Troubleshoot resonance circuits in an electronic apparatus

AND

UEECD0043 Solve problems in direct current circuits

OR

UEECD0044 Solve problems in multiple path circuits

UEECD0046 Solve problems in single path circuits

Competency Field

Electronics and Communications

Unit Sector

Electrotechnology

Elements and Performance Criteria

ELEMENTS

PERFORMANCE CRITERIA

Elements describe the essential outcomes.

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

1 Prepare to set up and adjust commercial RF transmission and reception systems

- 1.1** Work health and safety (WHS)/occupational health and safety (OHS) requirements and workplace procedures for relevant work area are identified, obtained and applied
- 1.2** Risk control measures are applied in accordance with workplace procedures prior to commencing work
- 1.3** Risks/hazards are identified, assessed and reported to relevant person/s, and control measures implemented
- 1.4** Relevant person/s is consulted to ensure the work is coordinated effectively with others
- 1.5** Measurement parameters are identified by reviewing transmission/reception requirements and manufacturer instructions
- 1.6** Tools, equipment and testing devices required for work are obtained in accordance with workplace procedures and checked for correct operation and safety
- 1.7** Preparatory work is checked to ensure no damage has occurred in accordance with workplace procedures and relevant industry standards
- 1.8** Need to test and measure live work is determined in accordance with WHS/OHS requirements and workplace procedures
- 1.9** Circuits are checked and isolated, as required, in accordance with WHS/OHS requirements and workplace procedures

2 Set up and adjust commercial RF transmission and reception systems

- 2.1** Workplace risk control measures and procedures are applied
- 2.2** Testing/measuring devices are connected and set up in accordance with requirements for relevant control system

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| | <p>2.3 Measuring instruments are set up and adjusted in accordance with transmission/reception requirements and manufacturer instructions</p> <p>2.4 Measurement results are analysed to determine the type and nature of adjustments required in accordance with relevant industry standards and job specifications</p> <p>2.5 Adjustments are made to provide optimum transmission/reception performance in accordance with relevant industry standards</p> <p>2.6 Decisions for dealing with unexpected situations are made from discussions with relevant person/s in accordance with relevant industry standards and job specifications</p> <p>2.7 Methods for dealing with unexpected situations are selected on the basis of safety, specified outcomes and workplace procedures</p> <p>2.8 Setting-up is conducted efficiently without waste of materials, damage to apparatus, the surrounding environment or services applying sustainable energy principles</p> |
| <p>3 Complete and report set-up and adjustment activities</p> | <p>3.1 WHS/OHS risk control work completion measures and workplace procedures are followed</p> <p>3.2 Worksite is cleaned and made safe in accordance with workplace procedures</p> <p>3.3 Adjustment settings are recorded and relevant person/s notified in accordance with workplace procedures</p> |

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.

Setting-up and adjusting commercial radio frequency (RF) transmission and reception systems must include at least the following

- two different types of commercial radio RF transmission and reception systems

Unit Mapping Information

This unit replaces and is equivalent to UEENEEH127A Set up and adjust commercial radio frequency (RF) transmission and reception 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 UEEEC0061 Set up and adjust commercial radio frequency (RF) transmission and reception 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, performance criteria and range of conditions on at least two separate occasions and include:

- applying relevant risk identification, assessment, reporting and control requirements
- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements, including the use of risk control measures
- applying sustainable energy principles and practices
- coordinating work with relevant person/s
- dealing effectively with unplanned events
- demonstrating signal testing and signal analysis
- demonstrating the making of relevant adjustments
- determining live testing/measurement requirements
- identifying and accessing materials, tools, apparatus and testing devices
- identifying measurement parameters
- isolating circuits/machines/systems
- recording adjustment settings in accordance with workplace procedures
- selecting and terminating correct connectors to coaxial cable
- selecting and using appropriate test equipment to make measurements
- setting up and adjusting in accordance with transmission/reception requirements and manufacturer instructions
- using measurement results to inform system adjustments.

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:

- advanced electronic radio frequency (RF) testing and measuring devices and techniques
- antenna fundamentals, including selection and location of receiving and transmitting antennas, and test techniques

- antenna system measurements, including standing wave ratio (SWR), return loss and reflection coefficient
- antenna types, features and characteristics, including reciprocity, impedance matching, polarisation, gain, directivity and bandwidth
- calculation of path loss and received power
- electronic communications fundamentals
- fundamentals of cavity filters, ferrite isolators and their application to multiple-transmitter or multiple-receiver systems
- fundamentals of half-wave dipole and quarter-wave ground plane antennas
- impedance calculations, including the use of Smith charts
- impedance matching techniques, including the use of resonant lines, including $\frac{1}{4}$ wave stubs
- notion of decibel ratio (dB), including relative measurements (dBr), dB referenced to power (dBm) and voltage (dBuV) measurements
- radio wave propagation characteristics and modes of propagation in free space, including multiple-path effects
- relevant industry standards, codes and regulations
- relevant manufacturer specifications
- relevant safe work method statements (SWMS)/job safety assessments or risk mitigation processes
- relevant WHS/OHS legislated requirements
- relevant workplace documentation
- relevant workplace policies and procedures
- RF connector fundamentals and common types
- RF measurement techniques, including time and frequency domain measurements
- transmission line fundamentals, including characteristic impedance (Z_0) line velocity, impedance matching, loss characteristics, line and waveguide types and line test/measurement 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 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, equipment and personal protective equipment (PPE)

currently used in industry

- resources that reflect current industry practices in relation to commissioning commercial RF transmission and reception 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>