Australian Government

UEENEEH182A Develop engineering solutions to RF amplifiers problems

Release: 2

INDUSTRY SKILLS COUNCILS
Creating Australia's Future

UEENEEH182A Develop engineering solutions to RF amplifiers problems

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit covers developing engineering solutions to resolve problems with RF amplifiers. It encompasses working safely, applying extensive knowledge of RF amplifier circuits and device operation and their application, gathering and analysing data, applying problem solving techniques, developing and documenting solutions and alternatives.

Note.

Typical RF amplifiers electronic problems are those encountered in meeting performance requirements and compliance standards, revising an RF amplifier electronic operating parameters and dealing with RF amplifiers electronic malfunctions.

Application of the Unit

Application of the Unit **2)**

This unit is intended to apply to any recognised development program that leads to the acquisition of a formal award at AQF level 5 or higher.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit require a

License to practice **3)**

license to practice in the workplace for work involving direct access to plant and equipment connected to installation wiring at voltage above 50 V a.c. or 120 V d.c. However other conditions may apply in some jurisdictions subject to regulations related to electrical work. Practice in the 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.

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, lifting equipment and the like. Permits may also be required for some work environments such as confined spaces, working aloft, near live electrical apparatus 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.

UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace

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 5 Writing 5 Numeracy 5

Employability Skills Information

Employability Skills **5)**

This unit contains Employability Skills

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

6) 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.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to develop engineering solution for RF amplifiers electronic problems	1.1 OHS processes and procedures for a given work area are obtained and understood.
	1.2 Established OHS risk control measures and procedures are followed in preparation for the work.
	1.3 The extent of the RF amplifiers problem is determined from performance specifications and situation reports and in consultations with

ELEMENT	PERFORMANCE CRITERIA	
		relevant persons.
	1.4	Activities are planned to meet scheduled timelines in consultation with others involved in the work.
	1.5	Effective strategies are formed to ensure solution development and implementation is carried out efficiently.
2 Develop engineering solution for RF amplifiers electronic problems	2.1	OHS risk control measures and procedures for carrying out the work are followed.
	2.2	Knowledge of RF amplifiers circuit, device operation, characteristics and applications are applied to developing solutions to RF amplifiers problems.
	2.3	Parameters, specifications and performance requirements in relation to each RF amplifiers problem are obtained in accordance with established procedures.
	2.4	Approaches to resolving RF amplifiers problems are analysed to provide most effective solutions.
	2.5	Unplanned events are dealt with safely and effectively consistent with regulatory requirements and enterprise policy.
	2.6	Quality of work is monitored against personal performance agreement and/or established organizational or professional standards
3 Test, document and implement engineering solution for RF amplifiers electronic problems	3.1	Solutions to RF amplifiers problems are tested to determine their effectiveness and modified where necessary.
	3.2	Adopted solutions are documented including instruction for their implementation that incorporates risk control measure to be followed.
	3.3	Appropriately competent and qualified person(s) required to implement solutions to RF amplifiers

ELEMENT	PERFORMANCE CRITERIA	
		problems are coordinated in accordance with regulatory requirements and enterprise policy. (See Note)
	3.4	Justification for solutions used to solve RF amplifiers problems is documented for inclusion in work/project development records in accordance with professional standards.

Note:

A license to practice in the workplace is required for work involving direct access to plant and equipment connected to installation wiring at voltages above 50 V a.c. or 120 V d.c.

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 developing solutions to RF amplifiers problems.

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

KS01-EH182A RF amplifiers problems

T1. RF amplifiers

- Selection of RF components
- Frequency response of amplifiers
- Gain levelling techniques
- Tuned amplifiers
- Techniques for impedance matching capacitive and transformer coupling
- Double-tuned circuits
- Tapped C and L circuits for Z-matching (Examples are use of S parameters and Smith charts.)
- Small signal RF amplifiers and
- RF Power amplifiers class A,B,C,D - low power (1W) / high power (kWs) - typical circuits
- Power combiners
- Strip line circuit techniques

T2. Transmission lines and antennas

- Reflectometry minimum and maximum voltage and current values on a transmission line carrying an RF signal
- Transmission line loss measured in decibels
- EH field directions in relation to antenna elements

T3. OH&S

- Standards, Codes and Regulations of ACMA regulation for power, frequency and antenna gain and Occupational Health &Safety.

Evidence Guide

EVIDENCE GUIDE

9) The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

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 must 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 accord 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 influence decisions about how/how much 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, polices and workplace procedures
- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Develop solutions to RF amplifiers problems as described in 8) and including:

  a. Understanding the extent of the RF-amplifiers electronic problem.

  b. Forming effective strategies for solution development and implementation.

  c. Obtaining RF-amplifiers electronic parameters, specifications and performance requirements appropriate to each problem.

d. Testing and solutions to RF-amplifiers electronic problems.
e. Documenting instruction for implementation of solutions that incorporate risk control measure to be followed.
f. Documenting justification of solutions implemented in accordance with professional standards.
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.

Note:

Successful completion of relevant vendor training may be used to contribute to evidence on which competency is deemed. In these cases the alignment of outcomes of vendor training with performance criteria and critical aspects of evidence shall be clearly identified.

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 part of 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 developing solutions to RF amplifiers problems.

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 unit applies. This requires that the specified essential knowledge and associated skills are assessed 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)

There are no concurrent assessment recommendations for this unit.

The critical aspects of occupational health and safety covered in unit UEENEEE101A and other discipline specific occupational health and safety units shall be incorporated in relation to this unit.

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 using a representative range of RF amplifier problems in developing engineering solutions for at least four RF amplifiers' electronic problems.

Note.

Typical RF amplifiers electronic problems are those encountered in meeting performance requirements and compliance standards, revising RF amplifiers electronic operating parameters and dealing with RF amplifiers electronic malfunctions.

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)**

Electronics