Australian Government

Department of Education, Employment and Workplace Relations

# MEA229D Test and troubleshoot aircraft radio frequency navigation and communications systems and components

**Release: 1**

# MEA229D Test and troubleshoot aircraft radio frequency navigation and communications systems and components

## Modification History

Knowledge statements expanded - equivalent to previous unit.

## Unit Descriptor

This unit of competency is part of the Avionic Certificate IV (Aircraft Maintenance Stream) training pathways. It covers the competencies required to test and troubleshoot radio frequency (RF) navigation and communication systems and components of fixed and rotary wing aircraft. The unit is used in workplaces that operate under the airworthiness regulatory systems of the ADF and CASA.
Where a CASA licensing outcome is sought this unit forms part of the CASA requirement for the granting of the B2 maintenance certification licence under CASR Part 66, in accordance with the licensing provisions in Section 3, Assessment Guidelines.

## Application of the Unit

This unit requires application of hand skills and the use of system/component knowledge and applicable maintenance publications and test equipment to test and troubleshoot communication and RF navigation systems and components.
Applications include fixed and rotary wing aircraft.

## Licensing/Regulatory Information

Refer to unit descriptor

## Pre-Requisites

MEA226D Inspect aircraft electronic systems and components

## Employability Skills Information

This unit contains employability skills.

# Elements and Performance Criteria Pre-Content

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| Elements describe the essential outcomes of a unit of competency. | Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide. |

# Elements and Performance Criteria

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| 1 | Prepare for troubleshooting | 1.1 | Relevant maintenance documentation and modification statu defect reports where relevant, are used to identify an unservi |
| 2 | Test/adjust RF navigation and communications systems | 2.1 | Aircraft and system are prepared in accordance with applicab manual for the application of power/system operation |
| | | 2.2 | ***RF navigation or communication system*** is functionally test with maintenance manual, for evidence of serviceability or n |
| | | 2.3 | System calibration or adjustments are performed in accordan maintenance manual, as appropriate |
| 3 | Troubleshoot RF navigation and communications systems | 3.1 | Available information from maintenance documentation and results is used, where necessary, to assist in fault determinati |
| | | 3.2 | Maintenance manual fault diagnosis guides and logic proces ensure efficient and accurate ***troubleshooting*** |
| | | 3.3 | Specialist advice is obtained, where required, to assist with t process |
| | | 3.4 | RF navigation or communication system faults are located ar clearly identified and correctly recorded in maintenance docu required |
| | | 3.5 | Rectification requirements are determined |

# Required Skills and Knowledge

Look for evidence that confirms knowledge of:

- evidence of knowledge of component attachment methods
- explaining the basic layout (block diagram level), function and operation of:
  - external communications systems:
    - HF
    - UHF
    - VHF
    - SATCOM and microwave
  - internal communications systems:
    - intercommunication
    - cabin intercommunication data systems
    - cabin network services
    - CVR
  - information systems, such as air traffic and information management systems, and network server syst
  - RF navigation systems:
    - ILS
    - VOR
    - ADF
    - GNS
    - ACARS
  - ELT systems
- explaining basic principles/functions relating to the above systems and associated with:
  - electromagnetic radiation and propagation
  - basic AC and DC circuit theory
  - digital fundamentals
  - analogue fundamentals
  - antenna characteristics
  - transmission line characteristics
- OHS requirements
- system and component maintenance requirements and troubleshooting procedures
- relevant maintenance manuals
- relevant regulatory requirements and standard procedures

Look for evidence that confirms skills in:

- applying relevant OHS practices
- using approved maintenance documentation and aircraft publications relating to the RF and communicatio maintained
- recognition of system and component defects/external damage, correct installation, and attaching hardwar cabling/harnesses/transmission lines) and security in:

- external communications systems:
  - HF
  - UHF
  - VHF
  - SATCOM and microwave
- internal communications systems:
  - intercommunication
  - cabin intercommunication data systems
  - cabin network services
  - CVR
- information systems, such as air traffic and information management systems, and network server syst
- RF navigation systems:
  - ILS
  - VOR
  - ADF
  - GNS
  - ACARS
- ELT systems
- applying logic processes, taking and interpreting system measurements to accurately and effectively isola within the systems
- performing system testing to isolate system faults and assess post-maintenance serviceability

# Evidence Guide

| The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package. | |
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| **Overview of assessment** | A person who demonstrates competency in this unit must be able to test and troubleshoot communication and RF navigation systems and components while observing all relevant safety precautions. |
| **Critical aspects for assessment and evidence required to demonstrate competency in this unit** | The underlying skills inherent in this unit should be transferable across a range of testing and troubleshooting applications (including the timely involvement of supervisors or other trades) associated with aircraft communication and RF navigation systems and components. It is essential that system testing procedures, cleanliness requirements and safety precautions applicable to the system being maintained are fully observed, understood and complied with.<br>Ability to interpret inspection procedures and specifications (allowable limits) and apply them in practice is critical.<br>Evidence of transferability of skills and knowledge related to testing and troubleshooting is essential. This is to be demonstrated through application across a range of aircraft communication and RF navigation systems and components listed in the Range Statement. The application of testing procedures should clearly indicate knowledge of system operation, the relationship of individual components and the links with other systems (if applicable) within the limits of the aircraft/system fault-finding guide before undertaking any action. The work plan should take account of applicable safety and quality requirements in accordance with the industry and regulatory standards.<br>A person cannot be assessed as competent until it can be demonstrated to the satisfaction of the workplace assessor that the relevant elements of the unit of competency are being achieved under routine supervision on at least one system and its major components from each of Groups 1 to 4 (Groups 2 and 3 may be omitted where the listed systems are not applicable to the enterprise) and the general associated components in Group 5, as listed in the Range Statement. This shall be established via the records in the Log of Industrial Experience and Achievement or, where appropriate, an equivalent Industry Evidence Guide. |

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| **Context of and specific resources for assessment** | Competency should be assessed in the workplace or simulated workplace using tools and equipment specified in the maintenance manuals. It is also expected that general and special purpose tools, test and ground support equipment would be used where appropriate. |
| **Method of assessment** | |
| **Guidance information for assessment** | Individuals being assessed who have already attained any of MEA214C Inspect, test and troubleshoot aircraft basic communication and radio navigation systems and components, MEA215C Inspect, test and troubleshoot advanced aircraft communications systems and components, MEA216C Inspect, test and troubleshoot instrument landing systems and components, MEA234C Inspect, test and troubleshoot aircraft global navigation systems and components, MEA276A Maintain basic aircraft communication and radio navigation systems and components and MEA289A Maintain basic light aircraft avionic systems and components, will have covered Element 1 plus a significant proportion of the Performance Criteria for Elements 2 and 3 and will have covered common Range Statement variables. Log of Industrial Experience and Achievement records relating to MEA214C Inspect, test and troubleshoot aircraft basic communication and radio navigation systems and components, MEA215C Inspect, test and troubleshoot advanced aircraft communications systems and components, MEA216C Inspect, test and troubleshoot instrument landing systems and components, and MEA234C Inspect, test and troubleshoot aircraft global navigation systems and components, may be accepted as also meeting the evidence requirements for this unit in the applicable areas. |

# Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

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| **Note** | Range statements listed below are numbered to facilitate specification of the assessment requirements included in the Evidence Guide |
| **RF navigation or communication systems** | RF navigation or communication systems may include:<br>1. Control and sensing associated with cockpit radio, ground and flight crew communications and may comprise FM and AM modes of operation in the HF, UHF, and VHF bands, microwave systems and SATCOM<br>2. Passenger communications, cockpit voice recorder, audio integration system, cabin intercommunication data systems and cabin network services<br>3. Information systems, such as air traffic and information management systems, and network server systems<br>4. ILS, VOR, ADF, GNS, emergency beacons and ACARS<br>5. Antennae, impedance audio matching devices, microphones and headphones, transmission lines, computer controls, line replaceable units, transmitters/receivers and indicators |
| **Troubleshooting** | Troubleshooting involves the use of fault-finding charts or similar, to line replacement level |
| **Application** | Application of this unit may relate to:<br>• scheduled or unscheduled maintenance activities<br>• individual or team-related activities |
| **Procedures and requirements** | Refer to industry standard procedures specified by manufacturers, regulatory authorities or the enterprise |

# Unit Sector(s)

Aviation maintenance

# Custom Content Section

Not applicable.