



Australian Government

# **MEA285 Repair or overhaul aircraft radio frequency communication and navigation system components**

Release: 2

# MEA285 Repair or overhaul aircraft radio frequency communication and navigation system components

## Modification History

Release 2. Equivalent to MEA285 Repair or overhaul aircraft radio frequency communication and navigation system components with amended prerequisite codes.

## Application

This unit of competency requires application of hand skills, test equipment and knowledge of analogue and digital theory to repair or overhaul radio frequency (RF) components from aircraft communication and navigation systems.

Applications include RF communications and navigation system components from fixed and rotary wing aircraft that are repaired or overhauled in aviation maintenance workshops during scheduled or unscheduled maintenance. Work may be performed individually or as part of a team.

The unit is part of the Avionic Certificate IV (Component Workshop Maintenance Stream) training pathway.

Repair of circuit boards is covered by MEA262 Modify/repair aircraft component single layer printed circuit boards and MEA263 Modify/repair aircraft component multi-layer printed circuit boards.

The unit is used in workplaces that operate under the airworthiness regulatory systems of the Australian Defence Force (ADF) and the Civil Aviation safety Authority (CASA).

## Pre-requisite Unit

MEA261            Use electronic test equipment

MEA296            Use electrical test equipment in aviation maintenance activities

## Competency Field

Aviation maintenance

## Unit Sector

## Elements and Performance Criteria

Elements describe the essential outcomes.

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

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|----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Determine requirements                                                  | 1.1 Communication and navigation system component defect reports (removal tags) or customer order are correctly interpreted and matched by part and serial numbers                                                                                            |
|                                                                            | 1.2 Circuitry is correctly prepared and connected to the applicable test equipment and is functionally tested or cycled through the prescribed test procedures in accordance with the maintenance documentation for evidence of serviceability or malfunction |
|                                                                            | 1.3 Modification status is clearly established to assist in determining the overhaul requirements for the components                                                                                                                                          |
|                                                                            | 1.4 Extent of overhaul or repair is correctly identified and documented                                                                                                                                                                                       |
| 2. Troubleshoot RF communication and navigation system components          | 2.1 Available information from maintenance records and inspection and test results is used, where necessary, to assist in fault determination                                                                                                                 |
|                                                                            | 2.2 Maintenance manual fault diagnosis guides and logic processes are used to ensure efficient and accurate troubleshooting                                                                                                                                   |
|                                                                            | 2.3 Faults are located and the causes of the faults are clearly identified and correctly recorded in maintenance documentation, where required                                                                                                                |
|                                                                            | 2.4 Fault rectification requirements are determined                                                                                                                                                                                                           |
| 3. Dismantle and inspect RF communication and navigation system components | 3.1 Component parts are dismantled in accordance with maintenance manuals while observing all relevant work health and safety (WHS) requirements                                                                                                              |
|                                                                            | 3.2 Component parts are assessed for serviceability in accordance with the relevant maintenance documentation                                                                                                                                                 |
|                                                                            | 3.3 Parts requiring specialist repair are tagged and repair instructions are accurately specified                                                                                                                                                             |
|                                                                            | 3.4 Parts lists are compiled and processed in accordance with standard enterprise procedures                                                                                                                                                                  |
| 4. Repair and/or modify                                                    | 4.1 Component parts are repaired or replaced in                                                                                                                                                                                                               |

|                                                                                |                                                                                                                                                           |
|--------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| RF communication and navigation system components                              | accordance with the relevant maintenance documentation                                                                                                    |
|                                                                                | 4.2 Modification of components or parts is undertaken, where required, by relevant manufacturers' bulletins or procedures                                 |
| 5. Assemble, test and adjust RF communication and navigation system components | 5.1 Assembly of component parts is carried out in accordance with specified tolerances and the applicable maintenance documents                           |
|                                                                                | 5.2 Assembled components are tested and adjusted/aligned in accordance with the applicable maintenance documentation using the appropriate test equipment |
|                                                                                | 5.3 Required maintenance documentation and modification records are completed and processed in accordance with standard enterprise procedures             |

## Foundation Skills

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

## Range of Conditions

This field allows for different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

|                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
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| <b>Communication and navigation system components are from any or all of the following aircraft systems:</b> | <ul style="list-style-type: none"> <li>• Very high frequency (VHF) communications</li> <li>• High frequency (HF) communications</li> <li>• Ultra-high frequency (UHF) communications</li> <li>• Satellite communications</li> <li>• Emergency location transmitter (ELT)</li> <li>• Aeronautical Radio Incorporated (ARINC) Communication Addressing and Reporting System</li> <li>• Intercommunication and public address</li> <li>• Automatic direction finding (ADF) navigation</li> <li>• Very high frequency omni-directional range (VOR) navigation</li> </ul> |
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**Procedures and requirements include:**

- Instrument landing system (ILS)
- Ground positioning system (GPS)
- Industry standard procedures specified by manufacturers, regulatory authorities or the enterprise

## **Unit Mapping Information**

Release 2. Equivalent to MEA285 Repair or overhaul aircraft radio frequency communication and navigation system components

## **Links**

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=ce216c9c-04d5-4b3b-9bcf-4e81d0950371>

# **Assessment Requirements for MEA285 Repair or overhaul aircraft radio frequency communication and navigation system components**

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## **Performance Evidence**

Evidence required to demonstrate competency in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria under the specified conditions of assessment, and must include:

- applying relevant WHS practices
- using approved repair/overhaul manuals, procedures and processes relating to analogue circuitry
- recognising the serviceability state and repair or overhaul requirements for aircraft RF communication and navigation system components
- applying logic processes, and using test equipment and appropriate wiring diagrams and manuals to isolate component faults
- performing component testing to isolate/confirm component fault and assess post-repair/overhaul serviceability
- correctly aligning components listed above to operate within prescribed specifications.

It is essential that component testing procedures, cleanliness requirements and safety precautions applicable to the system components being maintained are fully observed, understood and complied with. Ability to interpret inspection procedures and specifications (allowable limits) and apply them in practice across a range of inspection, testing, alignment and troubleshooting applications (including the timely involvement of supervisors or other trades) is critical.

Evidence of transferability of skills and knowledge related to testing, aligning and troubleshooting is essential. This may be demonstrated through application across a representative range of the components from systems listed in the Assessment Conditions.

## **Knowledge Evidence**

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

- component and system operation
- the basic function and operation of components of radio frequency communication and navigation systems to enable testing for fault isolation/confirmation, to determine repair or overhaul requirements, and serviceability status post-repair or overhaul
- basic principles/functions relating to radio frequency communication and navigation system components and associated with:

- advanced analogue fundamentals
- digital fundamentals
- AC and DC electrical systems
- electromagnetic radiation
- antenna and transmission line (including waveguide) characteristics
- radio transmission/signal propagation and frequency modulation
- GPS
- satellite communications (industry specific).

## Assessment Conditions

- Competency should be assessed in the work environment, or simulated work environment, using tools and equipment specified in maintenance documentation. It is also expected that general and special-purpose tools and test equipment would be used where appropriate.
- The application of testing procedures should clearly indicate knowledge of system operation before undertaking any action. Knowledge of system operation and the relationship of individual components will be necessary to supplement evidence of ability to troubleshoot component faults. The work plan should take account of applicable safety and quality requirements in accordance with the industry and regulatory standards. Use of high precision, high reliability soldering techniques and handling of components, including application of anti-static equipment, must be demonstrated.
- Assessment should be made across a sufficient number of components to establish the ability to apply attained skills and knowledge across the full range of RF components with the aid of applicable maintenance manuals and data.
- The following conditions of assessment represent the requirements of the Regulators (ADF and CASA) and maintenance stakeholders and must be rigorously observed.
- A person cannot be assessed as competent until it can be demonstrated to the satisfaction of the workplace assessor that the relevant elements and performance criteria of the unit of competency are being achieved under routine supervision on a representative range of components, applicable to the enterprise, from the following systems:
  - VHF communications
  - HF communications
  - UHF communications
  - satellite communications
  - ELT
  - ARINC Communication Addressing and Reporting System
  - intercommunication and public address
  - ADF navigation
  - VOR navigation
  - ILS
  - GPS.

- This shall be established via the records in the Log of Industrial Experience and Achievement or, where appropriate, an equivalent Industry Evidence Guide (for details refer to the Companion Volume Assessment Guidelines).
- Assessors must satisfy the requirements of the National Vocational Education and Training Regulator (Australian Skills Quality Authority, or its successors).

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=ce216c9c-04d5-4b3b-9bcf-4e81d0950371>