



Australian Government

MEA229 Test and troubleshoot aircraft radio frequency navigation and communications systems and components

Release: 2

MEA229 Test and troubleshoot aircraft radio frequency navigation and communications systems and components

Modification History

Release 2. Equivalent to MEA229 Test and troubleshoot aircraft radio frequency navigation and communications systems and components with amended prerequisite codes.

Application

This unit of competency 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 radio frequency (RF) navigation systems and components of fixed and rotary wing aircraft 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 (Aircraft Maintenance Stream) training pathways.

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).

Where a CASA licensing outcome is sought this unit forms part of the CASA requirement for the granting of the chosen maintenance certification licence under Civil Aviation Safety Regulation (CASR) Part 66, in accordance with the licensing provisions in the Companion Volume Implementation Guide.

Pre-requisite Unit

MEA226 Inspect aircraft electronic systems and components

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. Prepare for troubleshooting | 1.1 Relevant maintenance documentation and modification status, including system defect reports where relevant, |
|------------------------------------|--|

- are used to identify an unserviceability
- | | | | |
|----|---|-----|---|
| 2. | Test/adjust RF navigation and communications systems | 2.1 | Aircraft and system are prepared in accordance with applicable maintenance manual for the application of power/system operation |
| | | 2.2 | RF navigation or communication system is functionally tested in accordance with maintenance manual for evidence of serviceability or malfunction while observing all relevant work health and safety (WHS) requirements |
| | | 2.3 | System calibration or adjustments are performed in accordance with maintenance manual, as appropriate |
| 3. | Troubleshoot RF navigation and communications systems | 3.1 | Available information from maintenance documentation and inspection and test results is used, where necessary, to assist in fault determination |
| | | 3.2 | Maintenance manual fault diagnosis guides and logic processes are used to ensure efficient and accurate troubleshooting to line replacement level |
| | | 3.3 | Specialist advice is obtained, where required, to assist with the troubleshooting process |
| | | 3.4 | RF navigation or communication system faults are located and the causes are clearly identified and correctly recorded in maintenance documentation, where required |
| | | 3.5 | Rectification requirements are determined |

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.

RF navigation or communication systems include:

- Control and sensing associated with cockpit radio, ground and flight crew communications including frequency modulation (FM) and amplitude modulation (AM) modes of operation in the high frequency (HF), ultra-high frequency (UHF), and very high frequency (VHF) bands, microwave systems and satellite communications (SATCOM)
- Passenger communications, cockpit voice recorder (CVR), audio integration system, cabin intercommunication data systems and cabin network services (where applicable to the enterprise)
- Information systems, such as air traffic and information management systems, and network server systems (where applicable to the enterprise)
- Instrument landing system (ILS), very high frequency omni-range (VOR), automatic direction finding (ADF), global navigation system (GNS), emergency beacons and aircraft communications addressing and reporting system (ACARS)
- Antennae, impedance audio matching devices, microphones and headphones, transmission lines, computer controls, line replaceable units, transmitters/receivers and indicators

Procedures and requirements include:

- Industry standard procedures specified by manufacturers, regulatory authorities or the enterprise

Unit Mapping Information

Release 2. Equivalent to MEA229 Test and troubleshoot aircraft radio frequency navigation and communications systems and 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 MEA229 Test and troubleshoot aircraft radio frequency navigation and communications systems and 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 maintenance documentation and aircraft publications relating to the RF and communications system being maintained
- recognition of system and component defects/external damage, correct installation, and attaching hardware (including cabling/harnesses/transmission lines) and security in:
 - external communications systems:
 - HF
 - UHF
 - VHF
 - SATCOM and microwave
 - internal communications systems, including:
 - intercommunication
 - cabin intercommunication data systems (where applicable to the enterprise)
 - cabin network services (where applicable to the enterprise)
 - CVR
 - information systems, such as air traffic and information management systems, and network server systems (where applicable to the enterprise)
 - RF navigation systems:
 - ILS
 - VOR
 - ADF
 - GNS
 - ACARS
 - ELT systems
- applying logic processes, taking and interpreting system measurements to accurately and effectively isolating malfunctions within the systems
- performing system testing to isolate system faults and assess post-maintenance serviceability.

It is essential that system testing procedures, cleanliness requirements and safety precautions applicable to the aircraft communication and RF navigation system 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 and troubleshooting applications (including the timely involvement of supervisors or other trades) is critical.

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 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 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, including:
 - intercommunication
 - cabin intercommunication data systems (where applicable to the enterprise)
 - cabin network services (where applicable to the enterprise)
 - CVR
 - information systems, such as air traffic and information management systems, and network server systems
 - 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
- WHS requirements
- system and component maintenance requirements and troubleshooting procedures
- relevant maintenance manuals
- relevant regulatory requirements and standard procedures.

Assessment Conditions

- Competency should be assessed in the workplace or simulated workplace using tools and equipment specified in the maintenance manuals. It is also expected that applicable general and special purpose tools, and test and ground support equipment would be used where appropriate.
- 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.
- 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 at least one (1) system and its major components from each of the following groups:
 - control and sensing associated with cockpit radio, ground and flight crew communications including FM and AM modes of operation in the HF, UHF, and VHF bands, microwave systems and SATCOM
 - passenger communications, CVR, audio integration system, cabin intercommunication data systems and cabin network services (may be omitted if not applicable to the enterprise)
 - information systems, such as air traffic and information management systems, and network server systems (may be omitted if not applicable to the enterprise)
 - ILS, VOR, ADF, GNS, emergency beacons and ACARS
- and the following general associated components:
 - antennae, impedance audio matching devices, microphones and headphones, transmission lines, computer controls, line replaceable units, transmitters/receivers and indicators.
- 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).
- Where the unit is to be used for CASA licensing purposes the Assessor must also meet the criteria specified in the CASR Part 147 Manual of Standards.

- Individuals being assessed who have already attained any of MEA214 Inspect, test and troubleshoot aircraft basic communication and radio navigation systems and components, MEA215 Inspect, test and troubleshoot advanced aircraft communications systems and components, MEA216 Inspect, test and troubleshoot instrument landing systems and components, MEA234 Inspect, test and troubleshoot aircraft global navigation systems and components, MEA276 Maintain basic aircraft communication and radio navigation systems and components and MEA297 Maintain basic 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 of Conditions variables. The Log of Industrial Experience and Achievement records relating to these units may be accepted as also meeting the evidence requirements for this unit in the applicable areas.

Links

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