



Australian Government

Department of Education, Employment and Workplace Relations

MEA229C Test and troubleshoot aircraft radio frequency navigation and communications systems and components

Release: 1

MEA229C Test and troubleshoot aircraft radio frequency navigation and communications systems and components

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit is part of the Avionic AME Certificate IV training pathways. It covers the competencies required to test and troubleshoot radio frequency navigation and communication systems and components of fixed and rotary wing aircraft. Where a CASA licensing outcome is sought this unit forms part of the CASA requirement for the granting of the B2 Aircraft Maintenance Engineer Licence under CASR Part 66, in accordance with the licensing provisions in Section 3, Assessment Guidelines.
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Application of the Unit

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 radio frequency navigation systems and components. Applications include fixed and rotary wing aircraft.
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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		
	MEA226C	Inspect aircraft electronic systems and components

Employability Skills Information

Employability skills	This unit contains employability skills.
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Elements and Performance Criteria Pre-Content

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.
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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
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. 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. 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. Determine rectification requirements.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- Application of relevant OH&S practices
- The use of approved maintenance documentation and aircraft publications relating to the radio frequency and communications system being maintained
- Recognition of system and component defects/external damage, correct installation, attaching hardware (including cabling/harnesses/transmission lines) and security in:
 - external communications systems - high frequency (HF), ultra high frequency (UHF), very high frequency (VHF), satellite communication (SATCOM), microwave
 - internal communications systems - Intercommunication, cabin intercommunication data systems, cabin network services, cockpit voice recorders (CVR)
 - information systems such as air traffic and information management systems and network server systems
 - radio frequency navigation systems - instrument landing system (ILS), VHF omni-directional range (VOR), automatic direction finding (ADF), global navigation system (GNS), ARINC communications addressing and reporting system (ACARS)
 - emergency location transmitter (ELT) systems.
- Applying logic processes, taking and interpreting system measurements to accurately and effectively isolate malfunctions within the systems
- Performing system testing to isolate system faults and assess post maintenance serviceability

Required 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, 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 systems
 - RF navigation systems - ILS, VOR, ADF, GNS, ACARS
 - ELT systems.

REQUIRED SKILLS AND KNOWLEDGE

- 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

Evidence Guide

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.

Overview of assessment

A person who demonstrates competency in this unit must be able to test and troubleshoot communication and radio frequency 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 radio frequency 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. Ability to interpret inspection procedures and specifications (allowable limits) and apply them in practice 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 radio frequency 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.

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

EVIDENCE GUIDE	
	Industrial Experience and Achievement or, where appropriate, an equivalent Industry .
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	

Range Statement

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.	
Note	Range statements listed below are numbered to facilitate specification of the assessment requirements included in the Evidence Guide.
RF navigation or communication systems	<i>RF navigation or communication systems may include:</i> 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 2. Passenger communications, cockpit voice recorder, Audio Integration system, cabin intercommunication data systems, cabin network services 3. Information systems such as air traffic and information management systems and network server systems 4. ILS, VOR, ADF, GNS, emergency beacons, ACARS 5. Antennae, impedance audio matching devices, microphones and headphones, transmission lines, computer controls, line replaceable units, transmitters/receivers and indicators
Troubleshooting	<i>Troubleshooting</i> involves the use of fault finding charts or similar, to line replacement level.
Application	Application of this unit may relate to: • Scheduled or unscheduled maintenance activities • Individual or team related activities
Procedures and requirements	Refer to industry standard procedures specified by manufacturers, regulatory authorities or the enterprise

Unit Sector(s)

Unit sector	
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Competency field

Competency field	Aviation maintenance
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Co-requisite units

Co-requisite units		