



Australian Government

ICTRFN805 Analyse cellular mobile network systems

Release: 1

ICTRFN805 Analyse cellular mobile network systems

Modification History

Release	Comments
Release 1	This version first released with ICT Information and Communications Technology Training Package Version 7.0.

Application

This unit describes the skills and knowledge required to analyse the detailed architecture and operation of individual cellular mobile elements and develop a plan to integrate emerging cellular technologies.

It applies to individuals working as telecommunications engineers and senior technical officers as they prepare to upgrade to next generation mobile networks.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

Unit Sector

Telecommunications – radio frequency networks

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
1. Research cellular mobile network systems and interfaces to interconnected networks	1.1 Analyse interfaces between cellular mobile network and clients, including public switched telephone network (PSTN) and internet, and validate interoperability of individual systems 1.2 Research latest generation of mobile radio systems and develop plan for integration of emerging cellular technologies 1.3 Establish client expectations and required characteristics of cellular mobile network system proposed for analysis
2. Analyse constraints imposed by frequency spectrum allocations in cellular mobile network systems	2.1 Analyse techniques to increase system capacity and fixed spectrum bandwidth 2.2 Plan frequency allocation for cellular network 2.3 Develop simulation that plots carrier to interference radiation pattern for given cell geometry in reflective environment

ELEMENT	PERFORMANCE CRITERIA
3. Analyse operations of major subsystems of cellular mobile network	3.1 Evaluate major subsystem functions of cellular network and analyse subsystem components 3.2 Research and report how major subsystems interface to other network subsystems 3.3 Simulate transmission path for cellular network
4. Analyse capability of cellular mobile network system	4.1 Simulate traffic flow measurements in microcellular environment 4.2 Produce analytical report on cellular mobile convergence with plan and explain how cellular mobile systems can be integrated into existing networks

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance but not explicit in the performance criteria.

SKILL	DESCRIPTION
Numeracy	Interprets the results of complex numerical measurements
Oral communication	- Liaises with personnel about technical and operational issues using specific and required language - Uses listening and questioning techniques
Reading	Interprets complex technical information in a variety of forms and applies the knowledge gained to evaluate different types of technical data and compare with theoretical values and approved specifications
Writing	Uses clear, specific and industry related terminology to complete and update specific workplace documentation and when presenting recommendations to relevant personnel
Planning and organising	Operates from a broad conceptual plan, developing the operational detail in stages, regularly reviewing priorities and performance during implementation, and identifying and addressing issues as the work progresses
Problem solving	- Uses systematic, analytical processes in complex situations, gathering required information and identifying and evaluating options against predetermined criteria - Conducts testing procedures in different situations, adapts procedures and modifies activities depending on operational contingencies, risk situations and environments
Technology	Demonstrates sophisticated knowledge of principles, concepts, language and practices associated with the digital world and

SKILL	DESCRIPTION
	evaluates the potential of new technology • Uses digital technologies and manages business operations and investigates new technologies for strategic and operational purposes

Unit Mapping Information

Supersedes and is equivalent to ICTRFN802 Analyse a cellular mobile network system.

Links

Companion Volume Implementation Guide is found on VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=a53af4e4-b400-484e-b778-71c9e9d6aff2>

Assessment Requirements for ICTRFN805 Analyse cellular mobile network systems

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Performance Evidence

The candidate must demonstrate the ability to complete the tasks outlined in the elements, performance criteria and foundation skills of this unit, including evidence of the ability to:

- produce at least two analytical reports that analyse the implications of integrating at least two emerging technologies into a cellular mobile network system.

In the course of the above, the candidate must:

- research existing and emerging technologies in cellular mobile network systems
- plan frequency allocations for at least one cellular network
- analyse techniques to increase system capacity for a fixed spectrum bandwidth
- develop a plan for integration of emerging cellular technologies
- functions and features of interfaces between mobile networks and clients
- research and report the interfacing of major subsystems to other network subsystems.

Knowledge Evidence

The candidate must be able to demonstrate knowledge to complete the tasks outlined in the elements, performance criteria and foundation skills of this unit, including knowledge of:

- allocations and bandwidth requirements of cellular systems
- efficiency and system capacity given the spectrum allocation, number of channels required and grade of service
- equipment subsystem diagnosis and repair procedures
- features and differences between major frequency bands and their allocation of licences
- features and operating requirements of cellular test equipment
- key features of cellular mobile radio systems
- major element functions of a mobile radio system
- major frequency bands and their allocation of licences
- features of microcellular systems
- features of minimising latency

- components and functions of network components
- features of transmission lines, transmitter and receiver architecture
- restrictions and characteristics of radio spectrum in use
- hazards of radio frequency (RF) and electromagnetic energy (EME)
- components and impacts of antenna performance and mobile components on mobile spectrum interference
- spectrum efficiency
- system configuration procedures
- testing network components
- types of adjustments required to measure cellular transmission
- types of networks that influence radio path/line transmission.

Assessment Conditions

Skills in this unit must be demonstrated in a workplace or simulated environment where the conditions are typical of those in a working environment in this industry.

This includes access to:

- sites on which cellular network analysis, research and simulation may be conducted
- test equipment currently used in industry
- manufacturer's and enterprise technical documentation.

Assessors of this unit must satisfy the requirements for assessors in applicable vocational education and training legislation, frameworks and/or standards.

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