



Australian Government

ICTRFN802 Analyse a cellular mobile network system

Release: 1

ICTRFN802 Analyse a cellular mobile network system

Modification History

Release	Comments
Release 1	This version first released with ICT Information and Communications Technology Training Package Version 2.0.

Application

This unit describes the skills and knowledge required to study 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 or 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

Elements	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 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 to validate interoperability of individual systems 1.2 Research latest generation of mobile radio systems and develop plan for integration of emerging cellular technologies to meet future demands and client expectations
2. Analyse constraints imposed by	2.1 Analyse techniques to increase system capacity for fixed spectrum bandwidth

frequency spectrum allocations	2.2 Plan frequency allocation for cellular network from derived specifications 2.3 Develop simulation that plots carrier to interference radiation pattern for given cell geometry in reflective environment
3. Analyse operations of major subsystems of cellular network	3.1 Evaluate major subsystem functions of cellular network and analyse subsystem components to determine capability for upgrades 3.2 Research and report how major subsystems interface to other network subsystems 3.3 Simulate transmission path for cellular network
4. Analyse system capability	4.1 Simulate traffic flow measurements in microcellular environment 4.2 Produce analytical report on cellular mobile convergence with plan for cellular mobile system integration to existing networks

Foundation Skills

This section describes language, literacy, numeracy and employment skills incorporated in the performance criteria that are required for competent performance.

Skill	Performance Criteria	Description
Reading	1.2, 3.2	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	1.2, 3.2, 4.2	Uses clear, specific and industry related terminology to complete and update specific workplace documentation and when presenting recommendations to relevant personnel
Oral Communication	3.2	- Liaises with personnel about technical and operational issues using specific and relevant language - Uses listening and questioning techniques to confirm understanding
Numeracy	2.2, 3.3, 4.1	Interprets the results of complex numerical measurements
Get the work done	1.1, 2.1-2.3, 3.1, 3.3, 4.1	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 • Demonstrates a sophisticated understanding of principles, concepts, language and practices associated with the digital world and understands the potential of new technology • Uses systematic, analytical processes in complex situations, gathering relevant information and identifying and evaluating options against predetermined criteria • Undertakes testing procedures in different situations, adapts procedures and modifies activities depending on operational contingencies, risk situations and environments • Uses digital technologies to manage business operations and actively investigates new technologies for strategic and operational purposes
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Unit Mapping Information

Code and title current version	Code and title previous version	Comments	Equivalence status
ICTRFN802 Analyse a cellular mobile network system	ICTRFN8180B Analyse a cellular mobile network system	Updated to meet Standards for Training Packages	Equivalent unit

Links

Companion Volume implementation guides are found in VETNet -

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

Assessment Requirements for ICTRFN802 Analyse a cellular mobile network system

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Performance Evidence

Evidence of the ability to:

- plan a frequency allocation for a cellular network
- analyse techniques to increase system capacity for a fixed spectrum bandwidth
- develop a plan for integration of emerging cellular technologies
- analyse the interfaces between a mobile network and clients
- research and report the interfacing of major subsystems to other network subsystems
- produce an analytical report on cellular mobile convergence with a plan for cellular mobile system integration to existing networks.

Note: If a specific volume or frequency is not stated, then evidence must be provided at least once.

Knowledge Evidence

To complete the unit requirements safely and effectively, the individual must:

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

- outline network components and their functions
- provide a detailed summary of transmission lines, transmitter and receiver architecture
- summarise radio spectrum in use, specifying restrictions and characteristics
- describe radio frequency (RF) and electromagnetic energy (EME) hazards
- investigate and evaluate antenna performance and mobile components, and their impact on mobile spectrum interference
- explain spectrum efficiency
- describe system configuration procedures
- outline testing network components
- summarise the types of adjustments that need to be made when measuring cellular transmission
- outline the types of networks that will influence the transmission on the radio path and/or transmission line.

Assessment Conditions

Gather evidence to demonstrate consistent performance in conditions that are safe and replicate the workplace. Noise levels, production flow, interruptions and time variances should be typical of those experienced in the telecommunications – radio frequency networks field of work and include 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.

Links

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