COMMS CONNECT
VIRTUAL SERIES
EVENTS FOR CRITICAL COMMUNICATIONS USERS AND INDUSTRY

RADIO COMMUNICATIONS 101 WORKSHOP
AUGUST 2021

Dates

TBA	10.00am-12.30pm (AEST)
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Course length
12.5 hours (5 x 2.5-hour sessions)

Delivery method
Online

Pricing
$1450 + GST

Prerequisites
NIL. This course is designed for students (individual) new to the radio/critical communication industry.

Course Objectives
This course introduces the student to radio communications and associated technologies. Modules include an overview of radio service as a transmission media, how transmitters and receivers work, an overview of wave propagation and radio antenna systems. The information is introductory in nature and designed for all audiences. Students will acquire a basic understanding of radio communications theory.

COURSE OUTLINE

Introduction to Radio Communications
- What is radio communications?
- What are the use cases?

Radio Frequency
- RF fundamental operating principles and terminology
- Rules and regulations
- Licensing and ACMA
- What is propagation?
- Frequency spectrum band allocations
- RF modulation and demodulation
- Coverage modelling and planning

Radio Types and Systems
- Radio technology
- Analog systems and standards
- Digital systems and standards
    - NXDN
    - dPMR
    - DMR (Tier 2 & 3)
    - Tetra
    - P-25 (Phase 1 & 2)
- Radio components types
    - Transmitters
    - Receivers
    - Amplifiers
- Radio (terminal) types
- Radio systems types

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Radio Antenna Systems
- How antennas work
- Antenna types
- Antenna gain & bandwidth
- Antenna polarisation
- Antenna resonance
- Transmission lines
- Common antenna configuration
- Grounding overview
- Antenna testing

Transmission Lines and Feeders
- What are transmission lines and feeders?
- Transmission line power
- Transmission line frequency and impedance
- Connectors
- Earthing and lightning protection

Filters and Multi-coupling
- What is multi-coupling?
- Types of multi-coupling
- Choosing the correct type

Tower and Site
- What is a radio communications site?
- Describe co-location
- Applications and licensing
- Fire suppression systems
- Site HVAC systems
- Vermin and pests
- Engineering
- Site safety
- Electromagnetic radiation (EME)

Power Systems
- What are power systems?
- Voltage
- Polarity
- Fuses and circuit breakers
- Uninterrupted power supply (UPS) systems
- DC power systems
- AC power
- Renewable energy power systems

Earthing
- What is earthing?
- Earthing considerations
- Site earthing
- Antenna earthing
- Equipment earthing
- Standards and principles

Interference
- What is RF interference?
- Types of interference
- Interference mitigation strategies

Data Networks and Linking
- What are data networks?
- Serial data and types
- Internet Protocol (IP) and basics
- IP layers and networks
- IP network types
- Telephone and telephone circuits
    - 2-wire
    - 4-wire
- Site links types
    - Point-to-point
    - Point-to-multi-point
    - Mesh
    - Hun and spoke
- Radio over IP (RoIP)

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Fibre-optic Systems

- Basic fibre-optic cable fundamentals and terminology

Satellite Communications

- Define “Low Earth Orbit” (LEO) satellites
- Broadband Global Area Network (BGAN)
- Global Positioning System (GPS)

Radio Communications Testing and Equipment Maintenance

- What radio communications testing is required?
- Acceptance testing
    - Factory acceptance testing
    - Site acceptance testing
    - Network acceptance testing
    - Coverage acceptance testing
- Preventive maintenance
- Test equipment
- Equipment testing best practices
- Lock Out/Tag Out procedures

Standards and Quality Control

- Australian Standards
- Qualifications and Education
- Design and engineering
- Vendor selection