



# Spectrum Management



# International Association for Radio, Telecommunications and Electromagnetics (iNarte)

## *Certifications*

Qualified engineers and technicians in the fields of

- Telecommunications
- Electromagnetic compatibility/interference (EMC/EMI)
- Product safety (PS)
- Electrostatic discharge control (ESD)
- Wireless device Professional
- Spectrum Management



# Spectrum Management

Certification testing started in 2019

Created by the IEEE EMC Technical Committee 6  
Spectrum Engineering

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# History



As of May 2023, there are 400 active certified Spectrum managers.

- NARTE Inc. was founded as a non-profit membership/certification organization in 1982.
- US Navy selected NARTE for the certification of engineers and technicians in the field of electromagnetic compatibility (EMC) in 1988.
- FCC authorized to administer all examinations elements for the FCC commercial operators license (COLE) in 1993.
- ESD Association selected NARTE for the electrostatic discharge control engineers and technicians certification program in 1994.
- IEEE EMC Society working with iNARTE on the EMC/Spectrum Management Certification.
- Over 16,000 telecommunications and EMC engineers and technicians in 26 countries have been certified.
- Spectrum Management Certification program started 2010
- Spectrum Management Certification program kicked off 2019





# Spectrum Management

Certification for qualified engineers and technicians/practitioners who have a vested interest in advancing their profession and the industry in the field of spectrum management.

## *Purpose*

Foster technical excellence in spectrum management and engineering. This approach establishes technical competency criteria for spectrum management and enforces these criteria for technical personnel performing spectrum management tasks.

## *Objectives*

Create certified spectrum managers and frequency coordinators.

Assure a uniform level of expertise and quality

# Certification?

- Advantages
  - iNARTE Certification is a recognized credential in lieu of licensure where no such licensure requirements exist.
  - A measurable level of expertise and quality that provides proof of technical competency
  - It establishes the individual as a top performer in the industry, judged against an international standard of excellence.
  - Maintaining iNARTE Certification provides evidence of dedication to remaining current in the field of expertise.

# Spectrum Management

- The availability of adequate spectrum to support commercial, government and military electronic systems and equipment is critical to maximizing mission and performance effectiveness.
- Spectrum planning and frequency management must be given appropriate and timely consideration during the development, procurement, and deployment of assets that utilize the electromagnetic spectrum.
- To ensure maximum compatibility among the various worldwide users of the electromagnetic spectrum, it is essential that spectrum-dependent equipment comply with spectrum usage and management requirements.
- The DoD's use of the spectrum is constantly being challenged by the commercial sector. It is expected that the military's control of the spectrum will diminish in favor of commercial use.
- As more and more spectrum is taken away, the available spectrum must be managed as efficiently as possible to ensure the success of all commercial, government and military operations.

# Spectrum Management

- The field of spectrum management (SM) involves highly specialized technology dealing with the management of the electromagnetic spectrum.
- The rapid advancement of wireless technology and the attendant probability of electromagnetic interference (EMI) require that the management of wireless spectrum be carefully engineered.
- Critical shortage of qualified spectrum management engineers and technicians to assist in controlling the use of spectrum.
- Spectrum management theory is seldom taught as part of any engineering curricula.



# Current Topics to be covered

- Basic Theory
  - Electromagnetic Field Theory
  - Basic EMC Theory
  - Vector Mathematics
  - Spectrum Analysis
  - Communication Theory
  - Radio Wave Propagation and Multipath
  - Transmission Lines and Waveguides
  - Terminology
- Spectrum Management, and Engineering
  - Spectrum Management
  - Spectrum Allocation
  - Frequency Licensing and Assignment
  - Spectrum Policy (Rules and Regulations)
- Radio Technology
  - Basic Spectrum Electronic Principles
  - Transmitters, Receivers and Antennae Characteristics
  - Signals & Transforms
  - Amplifiers & Attenuators
  - Radars
  - Cellular 3/4/5G Technology
  - Spread spectrum, Direct Sequence and Frequency Hopping
  - Adaptive Antennae and Techniques
  - Diversity Techniques
  - Satellite Communications

# Current Topics to be covered (Cont.)

- EMC Design
  - Enclosure and Cable Shielding
  - Filters
  - Grounding and bonding
- Electromagnetic Radiation Hazards (EMRadHaz)
  - RF Safety
- Prediction and Analysis
  - Link Budgets
  - Inter-system and Intra-system Collocation Analysis & Prediction.
  - Radio Propagation and Collocation Simulations.
  - Interference Resolution
- Testing, Measurement and Validation
  - Spectrum Monitoring and Compliance
  - Spectrum Site Surveys
  - Test Facilities and Instrumentation
  - Specifications and Standards
  - Testing and Measurements
  - Test Plans & Procedures
  - Test Reports
- Program Management
  - SM Program Procedures
  - Design Reviews
  - Engineering Ethics
  - Team Leadership
  - "Soft Skills"

# Certification Requirements

SM Engineer	Associate Engineer	Engineer
Exam	Passing score of 70%	Passing score of 70%
References	Three (One supervisor and two peer)	Three (One supervisor and two peer)
Education	College/University Transcript/Diploma	College/University Transcript/Diploma
Work Experience	N/A	Nine years of work experience
SM Technician	Associate Technician	Technician
Exam	Passing score of 70%	Passing score of 70%
References	Three (One supervisor and two peer)	Three (One supervisor and two peer)
Education	College/University Transcript/Diploma	College/University Transcript/Diploma
Work Experience	N/A	Six years of related work experience



# Example

1. What is iNARTE:
  - A. A division of the Federal Communications Commission.
  - B. A division of the National Telecommunications and Information Administration.
  - C. Part of Exemplar Global (formerly known as RABQSA).
  - D. Part of the IEEE EMC Society.

Correct Answer: C

Reference(s): Study Guide and Question Preparation Guide for the iNARTE EMC  
Credentials Certification Exam, 2002 Edition, Published by iNARTE.

Category: Spectrum Management

Properly written Questions and Answers are always accepted

# Exam Preparation

- There is one part, four hours duration
- All questions are multiple choice
- The exam is 50 questions, and all should be attempted
- The exam is open book, open notes and a scientific calculator is allowed
- The pass mark is 70% average. Retake is possible after 90 days. There will be no credit for past exam scores.

**Get in touch  
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