



Radio Communication Interim Study Guide

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NCATT Radio Communication Systems

Interim Study Guide

NCATT LEVEL DEFINITIONS

	Scale Value	Definition: The Individual
Task Performance Levels	1	<i>IS EXTREMELY LIMITED.</i> (Can do simple parts of the task. Needs to be told or shown how to do most of the task)
	2	<i>IS PARTIALLY PROFICIENT.</i> (Can do most parts of the task. Needs only help on hardest parts.)
	3	<i>IS COMPETENT.</i> (Can do all parts of the task. Needs only a spot check of completed work.)
	4	<i>IS HIGHLY PROFICIENT.</i> (Can do the complete task quickly and accurately. Can tell or show others how to do the task.)
Task Knowledge Levels	a	<i>KNOWS NOMENCLATURE.</i> (Can name parts, tools, and simple facts about the task.)
	b	<i>KNOWS PROCEDURES.</i> (Can determine step-by-step procedures for doing the task.)
	c	<i>KNOWS OPERATING PRINCIPLES.</i> (Can identify why and when the task must be done and why each step is needed.)
	d	<i>KNOWS ADVANCED THEORY.</i> (Can predict, isolate, and resolve problems about the task.)
*Subject Knowledge Levels	A	<i>KNOWS FACTS.</i> (Can identify basic facts and terms about the subject.)
	B	<i>KNOWS PRINCIPLE.</i> (Can identify relationship of basic facts and state general principles about the subject.)
	C	<i>KNOWS ANALYSIS.</i> (Can analyze facts and principles and draw conclusions about the subject.)
	D	<i>KNOWS EVALUATION.</i> (Can evaluate conditions and make proper decisions about the subject.)

Explanations

A task knowledge scale value may be used alone or with a task performance scale value to define a level of knowledge for a specific task. (Example: b and 1b)

*A subject knowledge scale value is used alone to define a level of knowledge for a subject not directly related to any specific task, or for a subject common to several tasks.

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A complete *Radio Communications Instructional Guide* and *Study Guide* are currently in development. In the interim this Study Guide outlines the areas that one should be familiar with prior to taking the Radio Communications Endorsement Exam.

The **Radio Communication Examination** includes the following standards.

1. **Transmitters**
2. **Receivers**
3. **Antennas**
4. **Transmission Lines**
5. **Satellite Communication**

A technician should be familiar with the following terms and definitions:

- AM (Amplitude Modulation)
- FM (Frequency Modulation)
- Active Antenna
- Automatic Gain Control
- Amplification
- Antenna Tuning Unit
- Attenuator
- Carrier
- Channel
- Circular polarization
- Critical angle
- Critical Frequency
- D-layer
- Decibel (dB)
- Dead Zone
- Deviation
- Dipole
- Direct wave
- Drift
- E-layer
- F-layer
- Feedline
- Filter
- Gain
- Ground Wave
- Harmonic
- Hertz (Hz)
- Heterodyne

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- High Frequency (HF)
- Horizontal Polarization
- Impedance
- Ionosphere
- Loop antenna
- Lower Side Band (LSB)
- Medium Wave
- Modulation
- Mono-band Antenna
- Omni directional Antenna
- Phase locked loop
- Polarization
- Preamp
- Resonant Frequency
- Selectivity
- Sensitivity
- Sideband
- Single sideband
- Skip
- Skip Zone
- Sky Wave
- Squelch
- Standing Wave Ratio
- Transceiver
- Ultra High Frequency (UHF)
- Unity Gain antenna
- Variable Frequency Oscillator
- Vertical Polarization
- Very High Frequency (VHF)
- Wavelength

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1. Within the **Transmitter Section** of the examination technicians will be asked to answer questions from the following sub-sets:
 - a. **Transmitter – Principles, Characteristics and Theory of Operation** (NCATT Level B)
 - RFI
 - Frequency Spectrum
 - Block Diagrams
 - Wave Propagation
 - Power Measurement Devices
 - Tuning Schemes
 - b. **Safety** (NCATT Level B)
 - c. **System Tie-in / Integration** (NCATT Level A)
 - d. **Perform Operational Checks** (NCATT Level 2b)
 - e. **Isolate Malfunctions** (NCATT Level 2b)
 - f. **Remove and Replace LRU's** (NCATT Level 2b)

2. Within the **Receiver Section** of the examination technicians will be asked to answer questions from the following sub-sets:
 - a. **Receiver – Principles, Characteristics and Theory of Operation** (NCATT Level B)
 - Frequency Spectrum
 - Block Diagrams
 - Signal Flow
 - b. **Safety** (NCATT Level B)
 - c. **System Tie-in / Integration** (NCATT Level A)
 - d. **Perform Operational Checks** (NCATT Level 2b)
 - e. **Isolate Malfunctions** (NCATT Level 2b)
 - f. **Remove and Replace LRU's** (NCATT Level 2b)

3. Within the **Antenna Section** of the examination technicians will be asked to answer questions from the following sub-sets:
 - a. **Antenna – Principles, Characteristics and Theory of Operation** (NCATT Level B)
 - Corrosion / Bonding
 - Install
 - Locations
 - VSWR
 - Coupler
 - Types Design
 - Construction

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- Interference
 - Active / Passive
 - Field Intensity
 - Power
 - Radiation Patterns
- b. **Safety** (NCATT Level B)
- c. **System Tie-in / Integration** (NCATT Level A)
- d. **Perform Operational Checks** (NCATT Level 2b)
- e. **Isolate Malfunctions** (NCATT Level 2b)
- f. **Remove and Replace LRU's** (NCATT Level 2b)
4. Within the **Transmission Lines Section** of the examination technicians will be asked to answer questions from the following sub-sets:
- a. **Transmission Line Principles, Characteristics & Theory of Operation** (NCATT Level B)
- Types
 - Pressurize
 - Corrosion
 - Separation
 - Testing
 - Use TDR
 - Use Voltmeter
 - Fabrication
 - Connectors
 - Maintenance
- b. **Safety** (NCATT Level B)
- c. **System Tie-in / Integration** (NCATT Level A)
- d. **Perform Operational Checks** (NCATT Level 2b)
- e. **Isolate Malfunctions** (NCATT Level 2b)
- f. **Remove and Replace LRU's** (NCATT Level 2b)
5. Within the **Satellite Communication (SATCOM) Section** of the examination technicians will be asked to answer questions from the following sub-sets:
- a. **SATCOM – Principles, Characteristics and Theory of Operation** (NCATT Level B)
- Space Ground & Aircraft Signals
 - Frequency Bands
 - Antenna Systems
 - Block Diagram (Path)

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- Basic Principles
- Coverage
- Encryption
- Service Providers
- b. **Safety** (NCATT Level B)
- c. **System Tie-in / Integration** (NCATT Level A)
 - Integration to IRS
- d. **Perform Operational Checks** (NCATT Level 2b)
 - Test Calls
- e. **Isolate Malfunctions** (NCATT Level 2b)
 - Path Failures
 - Antenna Maintenance
 - PTT
- f. **Remove and Replace LRU's** (NCATT Level 2b)

Suggested Resources:

PRINCIPLES OF AVIONICS-FOURTH EDITION

AUTHOR: DR. ALBERT HELFRICK
ISBN 9781885544261

AIRCRAFT ELECTRICITY/ELECTRONICS (GLENCOE'S AVIATION TECHNOLOGY SERIES)

AUTHOR: THOMAS K. EISMIN, RALPH D. BENT, AND JAMES L. MCKINLEY
ISBN 0-02-801859-1

AVIONICS TRAINING - SYSTEMS, INSTALLATION AND TROUBLESHOOTING

AUTHOR: LEN BUCKWALTER
ISBN 1-885544-21-9

ANTENNA ENGINEERING HANDBOOK

AUTHOR: JOHN L. VOLAKIS
CAT. No. AEN-01

ADDITIONAL AVIONICS TITLES CAN BE FOUND AT <http://www.avionics.com/www/titles.htm>