



6. Identify the action to take if you experience frequency interference.

**ORGANIZATIONAL PATTERN:** Topical

**SUGGESTED COURSE(S) OF INSTRUCTION:** Disaster Preparedness Support Team  
Shelter Management  
Contamination Control  
Control Center Operations

**STRATEGY:** Explain the purpose of the Land Mobile Radios and handling procedures before issuing the radios to the students. During student performance, stress the samples of behavior. Brief procedures for radio use during exercises. Customer education guides for land mobile radios are produced locally and incorporate policy, operating techniques, operating procedures, and maintenance practices. Consult the land mobile radio guide for your class.

**INSTRUCTOR'S NOTE:** Operate the radios in overseas areas according to local communication instructions. Use the attachments to help standardize communication and provide a quick reference for the students after they complete training.

**LESSON OUTLINE:**

MAIN POINT 1. DESCRIPTION OF LAND MOBILE RADIOS

MAIN POINT 2. OPERATION OF RADIOS

- A. Operator Maintenance
- B. Transmission
- C. Call Signs
- D. Using Code
- E. Radio Checks

MAIN POINT 3. OPERATIONS SECURITY

- A. Open Systems
- B. Security Indicators
- C. Transmission Security
- D. Common Sense

MAIN POINT 4. ELECTROMAGNETIC INTERFERENCE

- A. EMI Causes
- B. EMI Reporting
- C. Security Classification of EMI Reports
- D. Report Format

**PART II**  
**TEACHING PLAN**  
**INTRODUCTION**

ATTENTION:

We've just received word we may have leaking chemical munitions on the other side of the base. We'll have to send two of you to test the area. Once you determine whether there is contamination, come back and let us know.

MOTIVATION:

If you had responded to this type of incident and needed help while testing, a radio could have saved a lot of time getting help.

OVERVIEW:

Today we'll cover:

⇒ description of land mobile radios.

⇒ operation of radios.

⇒ operations security.

⇒ electromagnetic interference

TRANSITION:

Now, let's begin.

## **BODY**

### **MAIN POINT 1. DESCRIPTION OF LAND MOBILE RADIOS**

Land mobile radios or LMRs provide two-way communication. A system normally consists of a base station or remote control, and portable or mobile units.

LMRs include base support radios, pagers, cellular telephones, and combat deployable radios.

### **YOU MAY ENCOUNTER “DEAD SPOTS”**

The maximum range of your radio system is the distance to the horizon as it appears from the radio’s antenna. Other factors may affect coverage, such as high steel buildings or irregularities, in the terrain that cause “dead spots.” Dead spots can normally be overcome by changing location or by physically turning and facing an alternate direction.

Range is affected by the power of your system, the frequency range (i.e. HF, VHF, UHF, FM, etc.), weather conditions, location of repeaters or sub-stations, and line of sight.

Portable units usually have less power than base stations and may have difficulty reaching the base station antenna.

MAIN POINT 2.  
OPERATION OF  
RADIOS

A. OPERATOR  
MAINTENANCE

**INSTRUCTOR'S NOTE:** Explain the controls on your particular type of radio before issuing them to the students. Attachment 1, in Part IV, provides guidance on radio operations to help the students. Identify local procedures and explain them before making any transmission.

Operation is divided into three main areas:

- ⇒ operator maintenance
- ⇒ transmission
- ⇒ radio checks

A. Everyone using radio equipment should ensure that they:

- ⇒ Keep outside covers clean. Don't allow water or cleaning materials to enter the unit and don't use cleaning materials that will harm the finish of the unit.
- ⇒ Charge portable units to provide peak performance. Eight hours of continuous use is about maximum for portable units.

**INSTRUCTOR'S NOTE:** Consult the particular owner's manual for charging recommendations.

## B. TRANSMISSION

B. Radio transmissions should be short and concise. Speak in natural phrases, not word-by-word. During transmission of a message:

⇒ Pause periodically to allow other stations to break in, if necessary.

⇒ Listen and make sure that the circuit is clear before transmitting to avoid interfering with other radio traffic.

⇒ Use full call signs when contacting other stations.

⇒ When using radios on trunking systems, delay your broadcast one second, when transmit button is pushed.

**INSTRUCTOR'S NOTE:** Identify which nets are shared and with whom. Explain local call signs and prowords (i.e. over, out, etc.) to the students. Use the phonetic alphabet to avoid confusion when using letters and numbers.

## HAZARDOUS AREAS

Prior to transmitting in a hazardous environment, make sure you follow established operational procedures for using intrinsically safe LMRs in hazardous environments. Your base LMR Frequency Monitor with the Communications Squadron can provide the information and precautions needed when transmitting in hazardous areas.

## C. CALL SIGNS

Use voice callsigns to identify military aircraft, organizations, activities, bases, units, operational facilities, staff personnel, and geographical locations when establishing and maintaining voice communications.

Use a spoken dictionary word as the basic callsign with a single- or two-digit suffix. For example, "SPARROW-5". Aircraft callsigns are restricted to 4- to 6-letter words, but other callsigns may be one or two words, with a maximum of 15 characters.

Change callsigns periodically to the maximum extent practicable to enhance the security of the Air Force.

Do not use the term "Air Force" (for example, "Air Force One", "Air Force Rescue", and so forth) in the acronym or a major command's (MAJCOM) name, or any other acronym, abbreviation, or phonetic alphabet, as a callsign prefix except those specifically authorized.

## EXCEPTIONS

### Exceptions to Standard Procedures:

⇒ Global HF systems are identified by the geographical name of the station or location (for example, "Kelly AFB", "Andrews AFB", "Luke AFB", and so forth).

⇒ Aircraft control facilities are identified by using the base, location, and service required (for example, "Kelly Homer Beacon", "Andrews GCA", "Nellis Tower", and so forth).

**INSTRUCTOR'S NOTE:** AFKAO-1 contains detailed procedures for requesting, assigning, and using USAF voice callsigns. Order this specialized COMSEC publication through the host base COMSEC account.

D. USING CODE

D. Most transmissions are plain English. However, Transportation uses a 10-series radio code and you may find it useful in certain situations. Other codes may be added as required.

**INSTRUCTOR'S NOTE:** Attachment 1, in Part IV, lists the 10-series radio code.

E. RADIO CHECKS

E. Use radio checks to determine readability and signal strength between two units. A station is understood to have good signal strength and readability unless otherwise notified.

If you notify another unit of their signal strength and readability, use a short and concise report, such as; “weak but readable”, “loud, but distorted”, “weak with interference”, etc.

MAIN POINT 3.  
OPERATIONS  
SECURITY

Each one of you should have had some OPSEC training, however, this is a good time to review key points.

A. OPEN SYSTEMS

A. LMRs are open information systems. An open information system is any information system or activity which may be accessed or observed by personnel outside of the system and provides information by open sources or OPSEC indicators.

**B. SECURITY  
INDICATORS**

B. The following is a list of those operations and communications indicators:

⇒ stereotyped activities such as schedules, test preparations, range closures.

⇒ visits of VIPs associated with a particular activity or technology.

⇒ abrupt changes or cancellations of schedules.

⇒ specialized equipment.

⇒ specialized training.

⇒ increased telephone calls, conferences, and longer working hours (including weekends).

⇒ rehearsals of operations.

⇒ unusual or increased trips and conferences by senior officials.

⇒ specialized and unique communications equipment.

⇒ power sources.

C. TRANSMISSION  
SECURITY

⇒ increases and decreases in  
communications traffic.

⇒ call signs.

⇒ transmitter locations.

C. Rules for transmission security are strictly enforced on all military radio nets. Avoid the following practices:

⇒ violation of radio silence.

⇒ transmitting personal signs or names.

⇒ unauthorized use of plain language.

D. COMMON SENSE

D. Common sense should suffice for operating requirements not covered under communication security. Good radio discipline also avoids the following practices;

⇒ unofficial conversation between  
operators.

⇒ excessive testing or radio checks.

⇒ profane, indecent, or obscene language.

⇒ giving false distress calls or call signs.

MAIN POINT 4.  
ELECTROMAGNETIC  
INTERFERENCE

REPORT EMI WITHIN 24  
HOURS

⇒ casualty information, i.e. names, rank unit, or other information which could lead to speculative identification of the casualty before family is notified.

⇒ release of sensitive information

Electromagnetic Interference (EMI) is defined as any electromagnetic disturbance that interrupts, obstructs, or otherwise degrades or limits the effective performance of electronics/electrical equipment. It can be induced intentionally, as in some forms of electronic warfare, or unintentionally.

A unit affected by an EMI incident must begin an investigation to identify the source. Submit an EMI report within 24 hours of the incident. Once you identify the interference source, report it. When the source of interference cannot be identified, include in your report:

⇒ the sources checked

⇒ the results of the investigation

A. EMI CAUSES

A. EMI may have occurred due to difficulties with assigning frequencies to different units. When the EMI has clearly resulted from problems in assigning a frequencies, ask the Air Force Frequency Management Agency (AF FMA), through command frequency management channels, for assistance.

EMI FROM HOSTILE  
SOURCES

When you suspect that the interference is coming from a hostile source, your frequency manager will have the Joint Electronic Warfare Center (JEWEC) assess the validity of the incident.

Use the identical format to report hostile and friendly interference.

B. EMI REPORTING

B. Before reporting EMI, check with equipment maintenance personnel to determine if the EMI is the result of maintenance actions or an equipment malfunction. If available, check with base or unit Communications Computer Systems Engineer to determine the source of the interference.

Some other guidelines provided:

DO NOT REPORT EMI  
FROM NATURAL  
SOURCES

C. SECURITY  
CLASSIFICATION OF  
EMI REPORTS

D. REPORT FORMAT

⇒ Check with other units in the geographical area to narrow down the areas affected. Knowing whether nearby units are experiencing the same type of EMI may aid in determining the interference source.

⇒ Clearly state if EMI is being reported as part of an exercise.

Do not report the incident when the interference is transient EMI from natural sources (for example, rain, solar activity, lightning, and so forth).

C. Units must evaluate the security sensitivity of the EMI on the affected system and classify the report accordingly. Stations of a nonsensitive tasking or that judge the EMI to be interference from a nonhostile source should not classify reports, unless such a report would reveal a system vulnerability. Stations located in combat areas or having a sensitive military mission are required to classify every interference report.

D. Submit an EMI report by electronic message and include:

⇒ The frequencies of the system experiencing the EMI.

- ⇒ The location of the system.
- ⇒ The system function, name, nomenclature, manufacturer with model number or other system description.
- ⇒ The description of the interference (noise, pulsed, continuous, intermittent, and so forth).
- ⇒ The effect of interference on performance (reduced range, false targets, reduced intelligibility, data errors, etc.).
- ⇒ The dates and times of interference.
- ⇒ The location of the interference source.
- ⇒ A list of other units also receiving the interference (if known) and their location or distance and bearing from your location.
- ⇒ A clear, concise narrative summary on what you know about the EMI and what local actions have been taken to resolve the problem.
- ⇒ A point of contact, giving name, Defense Switched Network (DSN) and commercial telephone numbers, and duty hours.

## CONCLUSION

### SUMMARY:

Today we covered:

⇒ a description of land mobile radios which also include pagers, cellular telephones, and combat deployable radios.

⇒ the operation of radios: operator maintenance, transmission, call signs, , using code, and radio checks.

⇒ operations security: open systems, security indicators, transmission security, and common sense.

⇒ electromagnetic interference: causes, reporting, security classifications.

### REMOTIVATION:

If you had responded to an incident involving chemical munitions and needed help, a radio would have saved a lot of time getting the help you needed.

### CLOSURE:

This concludes this lesson.

### TRANSITION:

(Develop locally to transition to the next topic.)

**PART III**  
**EVALUATION**  
**STUDENT PERFORMANCE STANDARDS**

**TEST ITEMS**

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1. LESSON OBJECTIVE: Identify the factors that may affect the range of your transmission.

QUESTION: (Multiple Choice)

Which of the following affect the range of your transmission?

- a. Irregularities in the terrain.
- b. Power of the system.
- c. Weather conditions.
- d. All the above

KEY: d

REFERENCE: Main Point 1

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2. LESSON OBJECTIVE: Identify the areas of concern for operating radios.

QUESTION: (MULTIPLE CHOICE)

Select the response that best identifies the operation for land mobile radios.

- a. Know radio transmission procedures and the hazards associated with using radios.
- b. Utilize Air Force security to the maximum extent practicable.
- c. Charge portable units and keep clean.
- d. All the above

KEY: d.

REFERENCE: Main Point 2

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3. LESSON OBJECTIVE: Identify some of the key points for operations security.

QUESTION: (MULTIPLE CHOICE) Select the answer that identifies the indicators for operations security.

- a. Abrupt changes or cancellations of schedules.
- b. Unusual or increased trips and conferences by senior officials.
- c. Preventive maintenance checks and services with the Communication Center.
- d. Both a and b.

KEY: d.

REFERENCE: Main Point 3

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4. LESSON OBJECTIVE: Identify Electromagnetic Interference (EMI).

QUESTION: (TRUE and FALSE) Electromagnetic Interference (EMI) can be induced intentionally, as in some forms of electronic warfare, or unintentionally.

- a. True
- b. False

KEY: b.

REFERENCE: Main Point 4

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5. LESSON OBJECTIVE: Identify communications security practices that are specific violations of Operation Security.

QUESTION: (MULTIPLE CHOICE) Select the answer that identifies a security practice that is a violation of OPSEC.

- a. Transmitting the operator's personal callsign or name.
- b. Violation of radio silence.
- c. Unauthorized use of plain language.
- d. All the above.

KEY: d.

REFERENCE: Main Point 3

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6. LESSON OBJECTIVE: Identify the action to take if you experience frequency interference.

QUESTION: (MULTIPLE CHOICE) If frequency interference is experienced, you should do all the following except:

- a. Submit an EMI report by electronic message.
- b. Report the incident regardless the source of interference.
- c. Evaluate the security sensitivity of the EMI on the affected system.
- d. Check with equipment maintenance personnel to determine if the EMI is the result of maintenance actions or an equipment malfunction.

KEY: b.

REFERENCE: Main Point 4



**PART IV**  
**RELATED MATERIALS**

**ATTACHMENT 1.** Mobile radio operators' instructions.

**ATTACHMENT 2.** 10-Series Radio Code.

**ATTACHMENT 3.** Phonetic Alphabet.



## **Attachment 1**

### **MOBILE RADIO OPERATOR'S INSTRUCTIONS**

#### **TO TURN THE EQUIPMENT "ON"**

##### **ALL MODELS**

Turn the OFF-VOLUME control clockwise until the on-off switch is in the "ON" position. The green lamp will go on to indicate the "standby" condition. The receiver is in full operation. Turn on the ignition switch. The transmitter filaments are energized. For multi-frequency radio sets, place the frequency selector switch in the desired position.

**NOTE:** The Private Line switch must remain in the "OFF" position at all times or you will not be able to receive.

#### **TO RECEIVE**

##### **CARRIER SQUELCH RADIO SETS**

- (1) Turn the VOLUME control to the full clockwise position.
- (2) Turn the SQUELCH control to the full counterclockwise position.
- (3) Adjust the SQUELCH control by turning the control slowly clockwise until the noise is squelched (cuts out). Advancing the control beyond this point will slightly reduce receiver sensitivity.
- (4) Set the VOLUME control to the desired listening level with a received signal.

#### **TO TRANSMIT**

##### **CARRIER SQUELCH RADIO SETS**

Remove the microphone from the hang-up bracket. Hold microphone about one inch from the lips turned about 30 degrees away from the face. Press the "push-to-talk" button. The red pilot lamp will come on and the transmitter will be on the air. Speak slowly and clearly across the microphone in a normal or slightly louder-than-normal voice. At the end of the message release the "push-to-talk" button and replace the microphone.

## Attachment 2

## 10 - Series Radio Code

<b>CODE</b>	<b>EXPLANATION</b>
10-1	Receiving Poorly
10-2	Receiving Well
10-3	Stop Transmitting
10-4	Acknowledge, Will Comply
10-5	Standby
10-6	Station Clear
10-7	Out of Service
10-8	In Service
10-9	What's Your Location
10-10	Return to Vehicle Operations
10-11	Passenger Has Not Released Vehicle
10-12	Call by Phone
10-13	Violation Requested by Passenger
10-14	Latrine Break
10-15	Arrived at Destination
10-16	Need Directions
10-17	Passenger Picked Up
10-18	Radio Check
10-19	Disregard Previous Transmission
10-20	Repeat Previous Transmission
10-21	Time Check
10-22	Last Assignment Complete
10-23 THRU 10-30	For Local Use

## PHONETIC ALPHABET

Phonetic equivalents are desirable in expressing lettered coordinates, in operational orders, or ordering equipment by letter and number. They will not be used:

1. When names are transmitted; example, use J C Porter or John Cook Porter, instead of Juliet Charlie Porter.
2. When the actual work might better be used; example, 26 degrees, west, instead of 26 degrees whiskey.

LETTER	EQUIVALENT	LETTER	EQUIVALENT
A	ALPHA	N	NOVEMBER
B	BRAVO	O	OSCAR
C	CHARLIE	P	PAPA
D	DELTA	Q	QUEBEC
E	ECHO	R	ROMEO
F	FOXTROT	S	SIERRA
G	GOLF	T	TANGO
H	HOTEL	U	UNIFORM
I	INDIA	V	VICTOR
J	JULIET	W	WHISKEY
K	KILO	X	XRAY
L	LIMA	Y	YANKEE
M	MIKE	Z	ZULU



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