Amateur Radio License Class
Communicating with Other Hams

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Communicating with Other Hams
Operating Rules

◆ Your primary station/operator license is issued by the FCC

◆ You are required to operate according to FCC rules when operating in areas regulated by the FCC

◆ FCC rules include permissible frequency bands for your license class, certain types of communications

Operating Rules

- When a situation isn't addressed by the rules, you are required to operate according to "good engineering and amateur practices"
- Some important rules:
  - Use the minimum amount of power necessary to carry out communication
  - Listen before transmitting to determine if a frequency is in use

Operating Rules

- There are certain types of prohibited communication in the Amateur Service
  - Business communication
  - Indecent or obscene communication
  - Encrypted transmissions *
- There isn't an official list of obscene words

Frequency Selection

- ◆ No station has rights to a specific frequency, except during an FCC-declared communication emergency
- ◆ Many groups often use specific amateur frequencies on a regular basic, but amateur spectrum is shared on an equal basis
- ◆ You can transmit on any frequency allowed by your license class as long as you observe the rules for that frequency
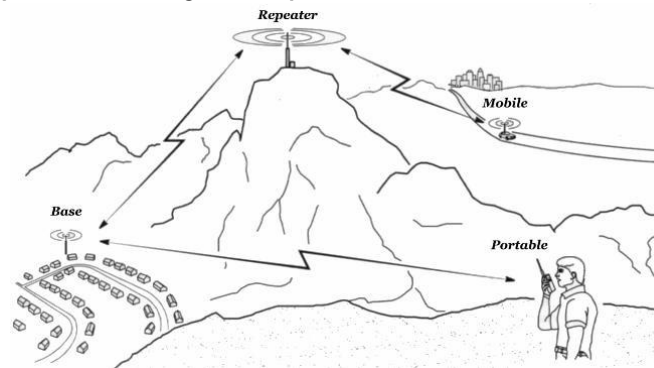
Frequency Coordination

- ◆ Frequency coordination is handled by local frequency coordinators
- ◆ Frequency coordination exists to
  - • Make efficient use of radio spectrum
  - • Reduce interference between coordinated stations
- ◆ Coordination applies to repeater sub-bands

Repeaters

- Repeaters are set up by individuals or groups to allow stations to communicate over a larger area
- Repeaters may be open or closed

Repeaters

- Many repeaters have a courtesy tone to remind you to pause between transmissions to allow time for other stations to break in
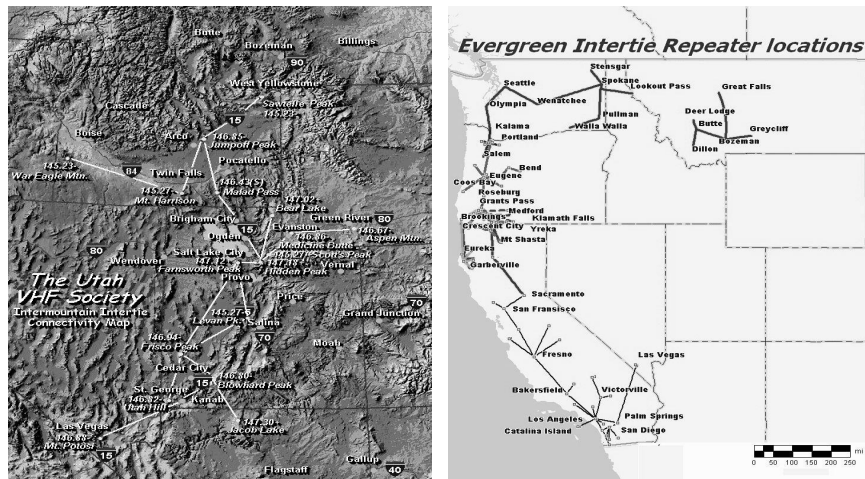- You are responsible for your transmissions when using a repeater

Repeaters

- ◆ To indicate that you are listening for any station on a repeater, simply announce your call sign (and perhaps add "monitoring")
- ◆ If you are calling a specific station on a repeater, send the other station's call sign followed by your own call sign

Repeaters

- ◆ A linked repeater system is several repeaters tied together to cover a wide geographic area

Repeaters

Simplex Operation

◆ Simplex operation on VHF should be used when possible to avoid tying up a repeater

◆ You can determine whether you can communicate simplex by listening for the other station's signal on the repeater input frequency

  • Many radios have a reverse function to simplify this operation

Simplex Operation

◆ VHF and UHF bands have established calling frequencies for stations looking for a contact
- 146.52 MHz
- 446.00 MHz
- 52.525 MHz

Simplex Operation

◆ CQ is used to indicate you are looking for any station for a contact

◆ To respond to CQ, send the other station's call sign followed by your own call sign

Operating Practices

- ◆ To break into a conversation, send your call sign in a pause between transmissions
  - • You can also use the word "break"
- ◆ Listen before transmitting to determine if a frequency is in use
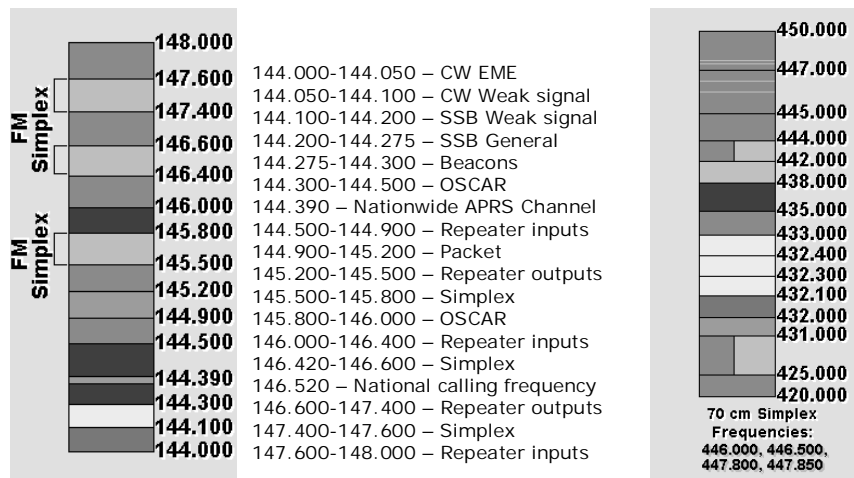
Operating Practices

- ◆ The ITU alphabet is an internationally recognized substitute for letters
- ◆ Cute phrases may be confusing

- ◆ Q signals provide an amateur shorthand
  - • QSY – Change frequency
  - • QSL – I understand
  - • QTH – My location
  - • QRP – Low power
  - • QRM – Interference

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Band Plans

◆ A band plan is a voluntary guideline established by the amateur community to promote efficient use of radio spectrum

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Band Plans

FM Simplex

FM Simplex

148.000	
147.600	144.000-144.050 – CW EME
147.400	144.050-144.100 – CW Weak signal
	144.100-144.200 – SSB Weak signal
146.600	144.200-144.275 – SSB General
	144.275-144.300 – Beacons
146.400	144.300-144.500 – OSCAR
146.000	144.390 – Nationwide APRS Channel
145.800	144.500-144.900 – Repeater inputs
	144.900-145.200 – Packet
145.500	145.200-145.500 – Repeater outputs
145.200	145.500-145.800 – Simplex
144.900	145.800-146.000 – OSCAR
144.500	146.000-146.400 – Repeater inputs
	146.420-146.600 – Simplex
144.390	146.520 – National calling frequency
144.300	146.600-147.400 – Repeater outputs
144.100	147.400-147.600 – Simplex
144.000	147.600-148.000 – Repeater inputs

450.000
447.000
445.000
444.000
442.000
438.000
435.000
433.000
432.400
432.300
432.100
432.000
431.000
425.000
420.000

70 cm Simplex Frequencies: 446.000, 446.500, 447.800, 447.850

Additional Operating Modes

- ◆ Fast-scan television uses the NTSC standard
  - • NTSC uses 6 MHz of bandwidth
  - • Typically in the 70-centimeter band

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Additional Operating Modes

- ◆ Automatic Position Reporting System
- ◆ Uses a global positioning system receives
- ◆ Transmits position and other information using packet format on 144.390 MHz

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Additional Operating Modes

- ◆ Digital operating modes may be more reliable because some include error correction
- ◆ Packet is a common VHF digital mode
- ◆ PSK31 (Phase Shift Keying) is a low data rate mode that works well in noisy conditions
- ◆ CW is the original digital mode
  - • Send CW using a speed at which you can reliably receive
  - • CW is useful on repeaters for listening to repeater IDs

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Additional Operating Modes

- ◆ Internet Radio Linking Project and EchoLink use Voice Over Internet Protocol (VOIP) to connect radios together
- ◆ IRLP is normally used for linking radio to radio
- ◆ EchoLink also supports computer to radio communication
- ◆ IRLP and EchoLink use a repeater controlled by the transmitter keypad using DTMF tones

Amateur Radio License Class
Communicating with Other Hams

Exam Questions

Which of the following should you do when selecting a frequency on which to transmit?

A. Call CQ to see if anyone is listening

B. *Listen to determine if the frequency is busy*

C. Transmit on a frequency that allows your signals to be heard

D. Check for maximum power output

T3A01

How do you call another station on a repeater if you know the station's call sign?

A. Say "break, break" then say the station's call sign
B. *Say the station's call sign then identify your own station*
C. Say "CQ" three times then the other station's call sign
D. Wait for the station to call "CQ" the answer it

T3A02

How do you indicate you are looking for any station with which to make contact?

A. *CQ followed by your callsign*
B. RST followed by your callsign
C. QST followed by your callsign
D. SK followed by your callsign

T3A03

What should you transmit when responding to a call of CQ?

A. Your own CQ followed by the other station's callsign
B. Your callsign followed by the other station's callsign
C. *The other station's callsign followed by your callsign*
D. A signal report followed by your callsign

T3A04

What is the meaning of the procedural signal "CQ"?

A. Call on the quarter hour
B. New antenna is being tested (no station should answer)
C. Only the called station should transmit
D. *Calling any station*

T3A08

Why should you avoid using cute phrases or word combinations to identify your station?

A. *They are not easily understood by some operators*
B. They might offend some operators
C. They do not meet FCC identification requirements
D. They might be interpreted as codes or ciphers intended to obscure your identification

T3A09

What brief statement is often used in place of "CQ" to indicate that you are listening for calls on a repeater?

A. Say "Hello test" followed by your call sign
B. *Say your call sign*
C. Say the repeater call sign followed by your call sign
D. Say the letters "QSY" followed by your call sign

T3A10

Why should you use the International Telecommunication Union (ITU) phonetic alphabet when identifying your station?

A. *The words are internationally recognized substitutes for letters*
B. There is no advantage
C. The words gave been chosen to represent amateur radio terms
D. It preserves traditions begun in the early days of amateur radio

T3A11

What is a band plan?

A. *A voluntary guideline, beyond the divisions established by the FCC for using different operating modes within an amateur band*
B. A guideline from the FCC for making amateur frequency band allocations
C. A guideline for operating schedules within an amateur band published by the FCC
D. A plan devised by a local group

T3B01

Which of the following statements is true of band plans?

A. They are mandated by the FCC to regulate spectrum use
B. They are mandated by the ITU
C. *They are voluntary guidelines for efficient use of the radio spectrum*
D. They are mandatory only in the US

T3B02

Who developed the band plans used by amateur radio operators?

A. The US Congress
B. The FCC
C. *The amateur community*
D. The Interstate Commerce Commission

T3B03

Who is in charge of the repeater frequency band plan in your local area?

A. The local FCC field office
B. RACES and FEMA
C. *The recognized frequency coordination body*
D. Repeater Council of America

T3B04

What is the main purpose of repeater coordination?

A. *To reduce interference and promote proper use of spectrum*
B. To coordinate as many repeaters as possible in a small area
C. To coordinate all possible frequencies available for repeater use
D. To promote and encourage use of simplex frequencies

T3B05

Who is accountable if a repeater station inadvertently retransmits communications that violate FCC rules?

A. The repeater trustee
B. The repeater control operator
C. *The transmitting station*
D. All of these answers are correct

T3B06

Which of these statements is true about legal power levels on the amateur bands?

A. Always use the maximum power allowed to ensure that you complete the contact
B. An amateur may use no more than 200 Watts PEP to make an amateur contact
C. An amateur may use up to 1500 Watts PEP on any amateur frequency
D. *An amateur must use the minimum transmitter power necessary to carry out the desired communication*

T3B07

What is the proper way to break into a conversation between two stations that are using the frequency?

A. *Say your call sign between their transmissions*

B. Wait for them to finish and then call CQ

C. Say "Break-break" between their transmissions

D. Call one of the operators on the telephone to interrupt the conversation

T3C01

What is considered to be proper repeater operating practice?

A. Monitor before transmitting and keep transmissions short

B. Identify legally

C. Use the minimum amount of transmitter power necessary

D. *All of these answers are correct*

T3C02

What should you do before responding to another station's call?

A. *Make sure you are operating on a permissible frequency for your license class*
B. Adjust your transmitter for maximum power output
C. Ask the station to send their signal report and location
D. Verify the other station's license class

T3C03

What rule applies if two amateur stations want to use the same frequency?

A. The station operator with a lesser class of license must yield the frequency to a higher-class licensee
B. The station operator with a lower power output must yield the frequency to the station with a higher power output
C. *No frequency will be assigned for the exclusive use of any station and neither has priority*
D. Station operators in ITU Regions 1 and 3 must yield the frequency to stations in ITU Region 2

T3C04

Why is indecent and obscene language prohibited in the Amateur Service?

A. Because it is offensive to some individuals

B. Because young children may intercept amateur communications with readily available receiving equipment

C. Because such language is specifically prohibited by FCC rules

D. *All of these choices are correct*

T3C05

Why should amateur radio operators avoid the use of racial or ethnic slurs when talking to other stations?

A. Such language is prohibited by the FCC

B. *It is offensive to some people and reflects a poor public image on all amateur radio operators*

C. Some of the terms used may be unfamiliar to other operators

D. Your transmissions might be recorded for use in court

T3C06

What should you do if you hear a newly licensed operator that is having trouble with their station?

A. Tell them to get off the air until they learn how to operate properly

B. Report them to the FCC

C. *Contact them and offer to help with the problem*

D. Move to another frequency

T3C07

Where can an official list be found of prohibited obscene and indecent words that should not be used in amateur radio?

A. On the FCC web site

B. *There is no official list of prohibited obscene and indecent words*

C. On the Department of Commerce web site

D. The official list is in the public domain and is found in all amateur study guides

T3C08

What type of subjects are not prohibited communications while using amateur radio?

A. Political discussions
B. Jokes and stories
C. Religious preferences
D. *All of these answers are correct*

T3C09

When circumstances are not specifically covered by FCC rules what general operating standard must be applied to amateur station operation?

A. Designated operator control
B. Politically correct control
C. *Good engineering and amateur practices*
D. Reasonable operator control

T3C10

Who has exclusive use of a specific frequency when the FCC has not declared a communication emergency?

A. Any net station that has traffic
B. The station first occupying the frequency
C. Individuals passing health and welfare communications
D. *No station has exclusive use of any frequency*

T3D06

What rules apply to your station when using amateur radio at the request of public service officials or at the scene of an emergency?

A. RACES
B. ARES
C. *FCC*
D. FEMA

T3D09

What is a courtesy tone?

A. A tone used to identify the repeater
B. *A tone used to indicate when a transmission is complete*
C. A tone using to indicate that a message is waiting for someone
D. A tone used to activate a receiver in case of severe weather

T5C02

Why should you pause briefly between transmissions when using a repeater?

A. To let your radio cool off
B. To reach for pencil and paper so you can take notes
C. *To listen for anyone wanting to break in*
D. To dial up the repeater's autopatch

T5C04

What is a reason to use simplex instead of a repeater?

A. When the most reliable communications are needed
B. *To avoid tying up the repeater when direct contact is possible*
C. When an emergency telephone call is needed
D. When you are traveling and need some local information

T5C09

How might you find out if you could communicate with a station using simplex instead of a repeater?

A. *Check the repeater input frequency to see if you can hear the other station*
B. Check to see if you can hear the other station on a different frequency band
C. Check to see if you can hear a more distant repeater
D. Check to see if a third station can hear both of you

T5C0

What is the term for a series of repeaters that can be connected to one another to provide users with a wider coverage?

A. Open repeater system
B. Closed repeater system
C. *Linked repeater system*
D. Locked repeater system

T5C11

What is the main reason repeaters should be approved by the local frequency coordinator before being installed?

A. *Coordination minimizes interference between repeaters and makes the most efficient use of available frequencies*
B. Coordination is required by the FCC
C. Repeater manufacturers have exclusive territories and you could be fined for using the wrong equipment
D. Only coordinated systems will be approved by the officers of the local radio club

T5C12

Which of the following statements regarding use of repeaters is true?

A. All amateur radio operators have the right to use any repeater at any time
B. *Access to any repeater may be limited by the repeater owner*
C. Closed repeaters must be opened at the request of any amateur wishing to use it
D. Open repeaters are required to use CTCSS tones for access

T5C13

What term is used to describe a repeater when use is restricted to members of a club or group?

A. A beacon station
B. An open repeater
C. A auxiliary station
D. *A closed repeater*

T5C14

What is one of the reasons to use digital signals instead of analog signals to communicate with another station?

A. Digital systems are less expensive than analog systems

B. *Many digital systems can automatically correct errors caused by noise and interference*

C. Digital modulation circuits are much less complicated than any other types

D. All digital signals allow higher transmit power levels

T5D13

What is the normal bandwidth required for a conventional fast-scan TV transmission using combined video and audio on the 70-centimeter band?

A. More than 10 MHz

B. *About 6 MHz*

C. About 3 MHz

D. About 1 MHz

T6A11

How is information transmitted between stations using Echolink?

A. APRS
B. PSK31
C. *Internet*
D. Atmospheric ducting

T6B01

What does the abbreviation IRLP mean?

A. *Internet Radio Linking Project*
B. Internet Relay Language Protocol
C. International Repeater Linking Project
D. International Radio Linking Project

T6B02

Who may operate on the Echolink system?

A. Only club stations
B. *Any licensed amateur radio operator*
C. Technician class licensed amateur radio operators only
D. Any person, licensed or not, who is registered with the Echolink system

T6B03

What technology do Echolink and IRLP have in common?

A. *Voice over Internet Protocol*
B. Ionospheric propagation
C. AC power lines
D. PSK31

T6B04

What method is used to transfer data by IRLP?

A. VHF Packet radio
B. PSK31
C. *Voice over Internet Protocol*
D. None of these answers is correct

T6B05

What does the term IRLP describe?

A. A method of encrypting data
B. *A method of linking between two or more amateur stations using the Internet*
C. A low powered radio using infra-red frequencies
D. An international logging program

T6B06

Which one of the following allows computer-to-radio linking for voice transmission?

A. Grid modulation
B. *EchoLink*
C. AMTOR
D. Multiplex

T6B07

What are you listening to if you hear a brief tone and then a station from Russia calling CQ on a 2-meter repeater?

A. An ionospheric band opening on VHF
B. A prohibited transmission
C. *An Internet linked DX station*
D. None of these answers are correct

T6B08

Where might you find a list of active nodes using VoIP?

A. The FCC Rulebook
B. From your local emergency coordinator
C. *A repeater directory or the Internet*
D. The local repeater frequency coordinator

T6B10

When using a portable transceiver how do you select a specific IRLP node?

A. Choose a specific CTCSS tone
B. Choose the correct DSC tone
C. Access the repeater autopatch
D. *Use the keypad to transmit the IRLP node numbers*

T6B11

Which of the following is an example of a digital communications method?

A. Single sideband voice
B. Amateur television
C. FM voice
D. *Packet radio*

What does the term APRS mean?

A. *Automatic Position Reporting System*
B. Associated Public Radio Station
C. Auto Planning Radio Set-up
D. Advanced Polar Radio System

What item is required along with your normal radio for sending automatic location reports?

A. A connection to the vehicle speedometer
B. A connection to a WWV receiver
C. A connection to a broadcast FM sub-carrier receiver
D. *A global positioning system receiver*

T6C03

What type of transmission is indicated by the term NTSC?

A. A Normal Transmission mode in Static Circuit
B. A special mode for earth satellite uplink
C. *A standard fast scan color television signal*
D. A frame compression scheme for TV signal

T6C04

What does the abbreviation PSK mean?

A. Pulse Shift Keying
B. *Phase Shift Keying*
C. Packet Short Keying
D. Phased Slide Keying

T6C06

What is PSK31?

A. A high-rate data transmission mode used to transmit files
B. A method of reducing noise interference to FM signals
C. A type of television signal
D. *A low-rate data transmission mode that works well in noisy conditions*

T6C07

What sending speed is recommended when using Morse code?

A. Only speeds below five WPM
B. The highest speed your keyer will operate
C. *Any speed at which you can reliably receive*
D. The highest speed at which you can control the keyer

T6C08

What is a practical reason for being able to copy CW when using repeaters?

A. To send and receive messages others cannot overhear
B. To conform with FCC licensing requirements
C. To decode packet radio transmissions
D. *To recognize a repeater ID sent in Morse code*

T6C09

What is the "Q" signal used to indicate that you are receiving interference from other stations?

A. QRM
B. QRN
C. QTH
D. QSB

T6C10

What is the "Q" signal used to indicate that you are changing frequency?

A. QRU
B. QSY
C. QSL
D. QRZ

T6C11