

Technician Licensing Class

Operating Procedures

T 2 A - T 2 C

Valid

July 1, 2018 Through June 30, 2022

T 2 A

subelement topics

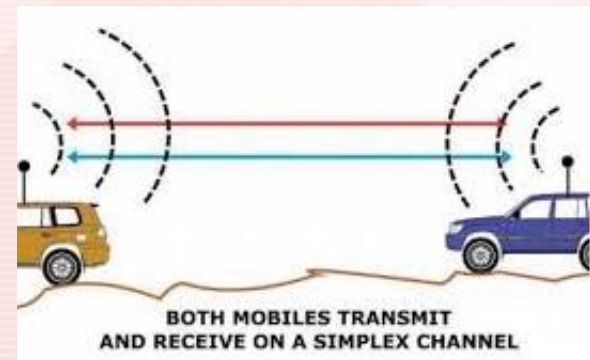
- Station operation:
 - choosing an operating frequency;
 - calling another station;
 - test transmissions;
 - procedural signs;
 - use of minimum power;
 - choosing an operating frequency;
 - band plans;
 - calling frequencies;
 - repeater offsets

T 2 A

- The “repeater offset” is the difference between a repeater’s transmit frequency and its receive frequency. T2A07
- The most common repeater frequency offset in the 2 meter band is plus or minus 600 kHz. T2A01
- The common repeater frequency offset in the 70 cm band is plus or minus 5 MHz. T2A03

T 2 A

- Simplex communication is the term used to describe an amateur station that is transmitting and receiving on the same frequency. T2A11



- The national calling frequency for FM simplex operations in the 2-meter band is 146.520 MHz. T2A02

T 2 A

- The procedural signal “CQ” means calling any station.
T2A08
- When responding to a station calling CQ, transmit the other station’s call sign followed by your call sign. T2A05
- Your call sign is the brief statement often transmitted in place of CQ to indicate that you are listening to a repeater. T2A09
- An appropriate way to call another station on a repeater if you know the other station’s call sign is to say the station’s call sign then identify with your call sign. T2A0

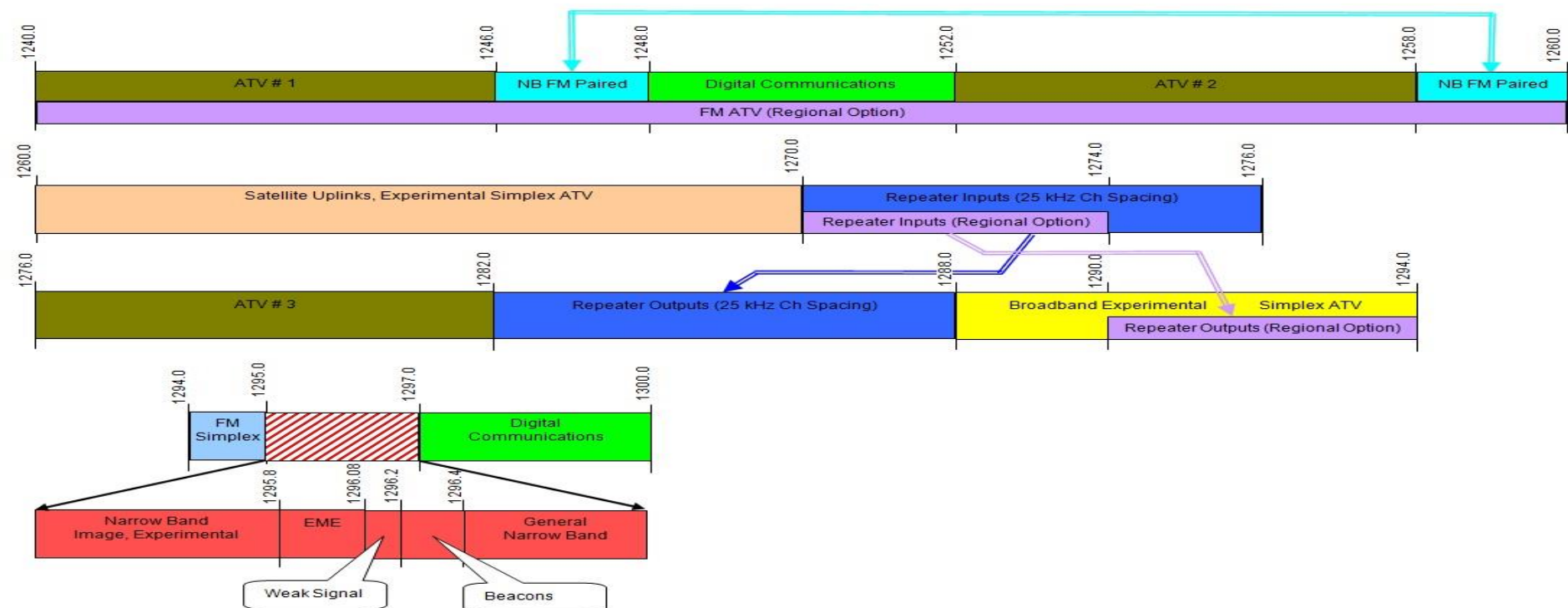
T 2 A

- When an amateur operator makes on-air transmission to test equipment or antenna, properly identify the transmitting station. T2A06
- When making a test transmission, station identification is required at least every ten minutes during the test **and** at the end of the test. T2A07

T 2 A

- A band plan is a voluntary guideline for using different modes or activities within an amateur band, beyond the privileges established by the FCC. T2A10

Proposed Band Plan for the Amateur 23 cm Band (1240 – 1300 MHz) Rev. June 18, 2012



T 2 A

- Under normal, non-distress circumstances, FCC rules regarding power levels used in the amateur bands restricts, while not exceeding the maximum power permitted on a given band, use the minimum power necessary to carry out the desired communications. T2A11

T 2 A

- When choosing an operating frequency for calling CQ:
 - Listen first to be sure that no one else is using the frequency
 - Ask if the frequency is in use
 - Make sure you are in your assigned band
 - All of these choices are correct. T2A12

T 2 B

- VHF/UHF operating practices:
 - SSB phone;
 - FM repeater;
 - simplex;
 - splits and shifts;
 - CTCSS;
 - DTMF;
 - tone squelch;
 - carrier squelch;
 - phonetics;
 - operational problem resolution;
 - Q signals

T 2 B

- The most common use of the “reverse split” function of a VHF/UHF transceiver is to listen on a repeater’s input frequency. T2B01
- CTCSS is the term used to describe the use of a sub-audible tone transmitted with normal voice audio to open the squelch of a receiver. T2B02

CTCSS Tones In Use

67.0 Hz	94.8 Hz	131.8 Hz	171.3 Hz	203.5 Hz
69.3 Hz	97.4 Hz	136.5 Hz	173.8 Hz	206.5 Hz
71.9 Hz	100.0 Hz	141.3 Hz	177.3 Hz	210.7 Hz
74.4 Hz	103.5 Hz	146.2 Hz	179.9 Hz	218.1 Hz
77.0 Hz	107.2 Hz	151.4 Hz	183.5 Hz	225.7 Hz
79.7 Hz	110.9 Hz	156.7 Hz	186.2 Hz	229.1 Hz
82.5 Hz	114.8 Hz	159.8 Hz	189.9 Hz	233.6 Hz
85.4 Hz	118.8 Hz	162.2 Hz	192.8 Hz	241.8 Hz
88.5 Hz	123.0 Hz	165.5 Hz	196.6 Hz	250.3 Hz
91.5 Hz	127.3 Hz	167.9 Hz	199.5 Hz	254.1 Hz

T 2 B

- If a station is not strong enough to keep a repeater's receiver squelch open you might listen on the repeater input frequency. T2B03
 - Some reasons you are unable to access a repeater whose output you can hear are:
 - Improper transceiver offset
 - The repeater receiver may require a CTCSS tone from your transceiver
 - The repeater receiver may require a DCS tone from your transceiver
- ✓ All of these choices are correct. T2B04

T 2 B

- You could be talking too loudly if a repeater user says your transmissions are breaking up on voice peaks?.

T2B05

- The Internet Relay Linking Project (IRLP) protocol uses DTMF tones to control repeaters.

T2B06

- The “talk group” on a DMR digital repeater is a way for groups of users to share a channel at different times without being heard by other users on the channel.

T2B09

- You join a digital repeater’s “talk group” by programming your radio with the group’s ID or code.

T2B07

T 2 B

- A linked repeater network is a network of repeaters where signals received by one repeater are repeated by all the repeaters. T2B14

T 2 B

- When two stations transmitting on the same frequency interfere with each other, common courtesy should prevail, but no one has absolute right to an amateur frequency. T2B08
- QRM is the Q signal that indicates you are receiving interference from other stations. T2B10
- QSY is the Q signal that indicates you are changing frequency. T2B11

T 2 B

- Simplex channels are designated in the VHF/UHF band plans so that stations within mutual communications range can communicate without tying up a repeater. T2B12
- The use of SSB phone is permitted in at least some portion of all the bands above 50 MHz. T2B13

T 2 C

- Public service:
 - emergency and non-emergency operations;
 - applicability of FCC rules;
 - RACES and ARES;
 - net and traffic procedures;
 - operating restrictions during emergencies

T 2 C

- There are never a situation when FCC rules do not apply to the operation of an amateur station. T2C01
- Amateur station control operators are permitted to operate outside the frequency privileges of their license class but only if necessary in situations involving the immediate safety of human life or protection of property. T2C09

T 2 C

- Both RACES and ARES organizations may provide communications during emergencies. T2C04



**Radio Amateur Civil
Emergency Service (RACES)**

**Amateur Radio Emergency
Service (ARES)**



- The Amateur Radio Emergency Service (ARES) is licensed amateurs who have voluntarily registered their qualifications and equipment for communications duty in the public service. T2C12

T 2 C

- The term “NCS” in net operations means Net Control Station. T2C02
- To insure that voice message traffic containing proper names and unusual words are copied correctly by the receiving station, such words and terms should be spelled out using a standard phonetic alphabet. T2C03

T 2 C



- An accepted practice for an amateur operator who has checked into a net is to remain on frequency without transmitting until asked to do so by the net control station. T2C07
- An accepted practice to get the immediate attention of a net control station when reporting an emergency is to begin your transmission by saying “Priority” or “Emergency” followed by your call sign. T2C06

T 2 C

- In a net operations, the term “traffic” refers to formal messages exchanged by net stations. T2C05
- A characteristic of good emergency traffic handling is passing messages exactly as received. T2C08

T 2 C

- The preamble in a format traffic message contains information needed to track the message. T2C10

 ARRL — the national association for Amateur Radio™ 		RADIOGRAM					
NUMBER	PRECEDENCE	HX	STATION OF ORIGIN	CHECK	PLACE OF ORIGIN	TIME FILED	DATE
TO PHONE NUMBER E-MAIL 				<div style="border: 1px solid black; padding: 5px;"> THIS RADIO MESSAGE WAS RECEIVED AT AMATEUR STATION _____ PHONE _____ NAME _____ E-MAIL _____ STREET _____ CITY, STATE, ZIP _____ </div>			
FROM				TO			
DATE				DATE			
TIME				TIME			
REC'D <small>This message was handled at no charge by a licensed Amateur Radio operator, whose address is shown in the box at right above. No compensation can be accepted by a "ham" operator. A return message may be filed with the "ham" delivering this message to you. Further information on Amateur Radio may be obtained from ARRL Headquarters, 225 Main Street, Newington, CT 06111 or www.arrl.org.</small>				SENT <small>The ARRL is the national association for Amateur Radio and the publisher of QST magazine. One of its functions is promotion of public service communication among Amateur Radio operators. To that end, the ARRL has organized the National Traffic System for daily nationwide message handling.</small>			

T 2 C

- The term “check” in reference to a formal traffic message is a count of the number of words or word equivalents in the text portion of the message. T2C11

Element 2 Technician Class Question Pool

T 2 A - T 2 C

T2A01 Which of the following is a common repeater frequency offset in the 2 meter band?

- A. Plus or minus 5 MHz
- B. Plus or minus 600 kHz
- C. Plus or minus 500 kHz
- D. Plus or minus 1 MHz

What is the national calling frequency for FM simplex operations in the 2 meter band?

- A. 146.520 MHz
- B. 145.000 MHz
- C. 432.100 MHz
- D. 446.000 MHz

What is a common repeater frequency offset in the 70 cm band?

- A. Plus or minus 5 MHz
- B. Plus or minus 600 kHz
- C. Plus or minus 500 kHz
- D. Plus or minus 1 MHz

What is an appropriate way to call another station on a repeater if you know the other station's call sign?

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

T2A05 How should you respond to a station calling CQ?

- A. Transmit CQ followed by the other station's call sign
- B. Transmit your call sign followed by the other station's call sign
- C. Transmit the other station's call sign followed by your call sign
- D. Transmit a signal report followed by your call sign

T2A06

Which of the following is required when making on-air test transmissions?

- A. Identify the transmitting station
- B. Conduct tests only between 10:00 p.m. and 6 a.m. local time
- C. Notify the FCC of the transmissions
- D. All of these choices are correct

- A. The difference between a repeater's transmit frequency and its receive frequency
- B. The repeater has a time delay to prevent interference
- C. The repeater station identification is done on a separate frequency
- D. The number of simultaneous transmit frequencies used by a repeater

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

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

What brief statement indicated that you are listening on a repeater and looking for a contact?

- A. The words "Hello test" followed by your call sign
- B. Your call sign
- C. The repeater call sign followed by your call sign
- D. The letters "QSY" followed by your call sign

What is a band plan, beyond the privileges established by the FCC?

- A. A voluntary guideline for using different modes or activities within an amateur band
- B. A mandated list of operating schedules
- C. A list of scheduled net frequencies
- D. A plan devised by a club to indicate frequency band usage

T2A11

What term describes an amateur station that is transmitting and receiving on the same frequency?

- A. Full duplex
- B. Diplex
- C. Simplex
- D. Multiplex

T2A12

Which of the following is a guideline when choosing an operating frequency for calling CQ?

- A. Listen first to be sure that no one else is using the frequency
- B. Ask if the frequency is in use
- C. Make sure you are in your assigned band
- D. All of these choices are correct

T2B01

What is the most common use of the “reverse split” function of a VHF/UHF transceiver?

- A. Reduce power output
- B. Increase power output
- C. Listen on a repeater's input frequency
- D. Listen on a repeater's output frequency

What term describes the use of a sub-audible tone transmitted along with normal voice audio to open the squelch of a receiver?

- A. Carrier squelch
- B. Tone burst
- C. DTMF
- D. CTCSS

T2B03 If a station is not strong enough to keep a repeater's receiver squelch open, which of the following might allow you to receive the station's signal?

- A.** Open the squelch on your radio
- B.** Listen on the repeater input frequency
- C.** Listen on the repeater output frequency
- D.** Increase your transmit power

Which of the following could be the reason you are unable to access a repeater whose output you can hear?

- A. Improper transceiver offset
- B. The repeater may require a proper CTCSS tone from your transceiver
- C. The repeater may require a proper DCS tone from your transceiver
- D. All of these choices are correct

What might be the problem if a repeater user says your transmissions are breaking up on voice peaks?

- A. You have the incorrect offset
- B. You need to talk louder
- C. You are talking too loudly
- D. Your transmit power is too high

T2B06

What type of tones are used to control repeaters linked by the Internet Relay Linking Project (IRLP) protocol?

- A. DTMF
- B. CTCSS
- C. EchoLink
- D. Sub-audible

T2B07 How can you join a digital repeater's "talk group"?

- Register your radio with the local FCC office
- Join the repeater owner's club
- Program your radio with the group's ID or code
- Sign your call after the courtesy tone

Which of the following applies when two stations transmitting on the same frequency interfere with each other?

- A. Common courtesy should prevail, but no one has absolute right to an amateur frequency
- B. Whoever has the strongest signal has priority on the frequency
- C. Whoever has been on the frequency the longest has priority on the frequency
- D. The station which has the weakest signal has priority on the frequency

T2B09 What is a “talk group” on a DMR digital repeater?

- A. A group of operators sharing common interests
- B. A way for groups of users to share a channel at different times without being heard by other users on the channel
- C. A protocol that increases the signal-to-noise ratio when multiple repeaters are linked together
- D. A net that meets at a particular time

T2B10

Which Q signal indicates that you are receiving interference from other stations?

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

T2B11

Which Q signal indicates that you are changing frequency?

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

T2B12 Why are simplex channels designated in the VHF/UHF band plans?

- A. So that stations within mutual communications range can communicate without tying up a repeater
- B. For contest operation
- C. For working DX only
- D. So that stations with simple transmitters can access the repeater without automated offset

T2B13 Where may SSB phone be used in amateur bands above 50 MHz?

- A. Only in sub-bands allocated to General class or higher licensees
- B. Only on repeaters
- C. In at least some portion of all these bands
- D. On any band as long as power is limited to 25 watts

T2B14 Which of the following describes a linked repeater network?

- A. A network of repeaters where signals received by one repeater are repeated by all the repeaters
- B. A repeater with more than one receiver
- C. Multiple repeaters with the same owner
- D. A system of repeaters linked by APRS

When do the FCC rules NOT apply to the operation of an amateur radio station?

- A. When operating a RACES station
- B. When operating under special FEMA rules
- C. When operating under special ARES rules
- D. Never, FCC rules always apply

What is meant by the term “NCS” used in net operations?

- A. Nominal Control System
- B. Net Control Station
- C. National Communications Standard
- D. Normal Communications Syntax

What should be done when using voice modes to ensure that voice messages containing unusual words are received correctly?

- A. Send the words by voice and Morse code
- B. Speak very loudly into the microphone
- C. Spell the words using a standard phonetic alphabet
- D. All of these choices are correct

T2C04 What do RACES and ARES have in common?

- A. They represent the two largest ham clubs in the United States
- B. Both organizations broadcast road and weather information
- C. Neither may handle emergency traffic supporting public service agencies
- D. Both organizations may provide communications during emergencies

T2C05 What does the term “traffic” refer to in net operation?

- A. Formal messages exchanged by net stations
- B. The number of stations checking in and out of a net
- C. Operation by mobile or portable stations
- D. Requests to activate the net by a served agency

Which of the following is an accepted practice to get the immediate attention of the net control station when reporting an emergency?

- A. Repeat the words SOS three times followed by the call sign of the reporting station
- B. Press the push-to-talk button three times
- C. Begin your transmission with “Priority” or “Emergency” followed by your call sign
- D. Play a pre-recorded emergency alert tone followed by your call sign

Which of the following is an accepted practice for an amateur operator who has checked into a net?

- A. Provided that the frequency is quiet, announce the station call sign and location every 5 minutes
- B. Move 5 kHz away from the net's frequency and use high power to ask other hams to keep clear of the net frequency
- C. Remain on frequency without transmitting until asked to do so by the net control station
- D. All of the choices are correct

T2C08 Which of the following is a characteristic of good traffic handling?

- A. Passing messages exactly as received
- B. Making decisions as whether messages are worthy of relay or delivery
- C. Ensuring that any newsworthy messages are relayed to the news media
- D. All of these choices are correct

Are amateur station control operators ever permitted to operate outside the frequency privileges of their license class?

- A. No
- B. Yes, but only when part of a FEMA emergency plan
- C. Yes, but only when part of a RACES emergency plan
- D. Yes, but only if necessary in situations involving the immediate safety of human life or protection of property

What information is contained in the preamble of a formal traffic message?

- A. The email address of the originating station
- B. The address of the intended recipient
- C. The telephone number of the addressee
- D. The information needed to track the message

T2C11 What is meant by the term "check" in reference to a formal traffic message?

- A.** The number of words or word equivalents in the text portion of the message
- B.** The value of a money order attached to the message
- C.** A list of stations that have relayed the message
- D.** A box on the message form that indicates that the message was received and/or relayed

T2C12 What is the Amateur Radio Emergency Service (ARES)?

- A. Licensed amateurs who have voluntarily registered their qualifications and equipment for communications duty in the public service
- B. Licensed amateurs who are members of the military and who voluntarily agreed to provide message handling services in the case of an emergency
- C. A training program that provides licensing courses for those interested in obtaining an amateur license to use during emergencies
- D. A training program that certifies amateur operators for membership in the Radio Amateur Civil Emergency Service