



ARRL The national association for
AMATEUR RADIO®

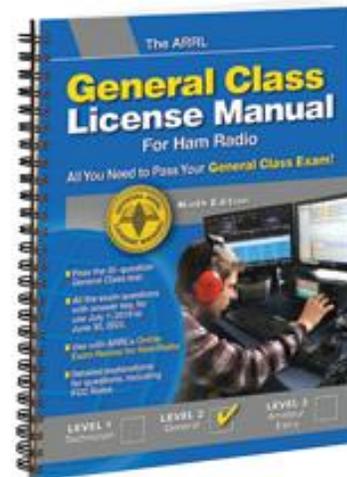
The ARRL General Class License Course

All You Need to Pass Your General Class Exam
LEVEL 2: General

For use with *The ARRL General Class License Manual*, Ninth Edition



General Class License Manual and other resources



<http://www.arrl.org/shop/Licensing-Education-and-Training/>



Module 3

ARRL General Class

Chapter 3 (3.1, 3.2, 3.3, 3.4)

Regulatory Agencies, Amateur Licensing Rules, Control Operator Privileges & Rules, Technical Rules & Standards

Regulatory Agencies

- ITU: International Telecommunication Union
 - Responsible for all international radio regulations
 - Each country decides how to administer & implement regulations
 - Countries may impose additional regulations (as long as they don't conflict with ITU rules)
 - 3 administrative regions (next slide)
 - Individual regions have their greatest effect on amateurs in frequency allocations, and individual country allocations can also vary

General Class License Course

Discovering the Excitement of Ham Radio

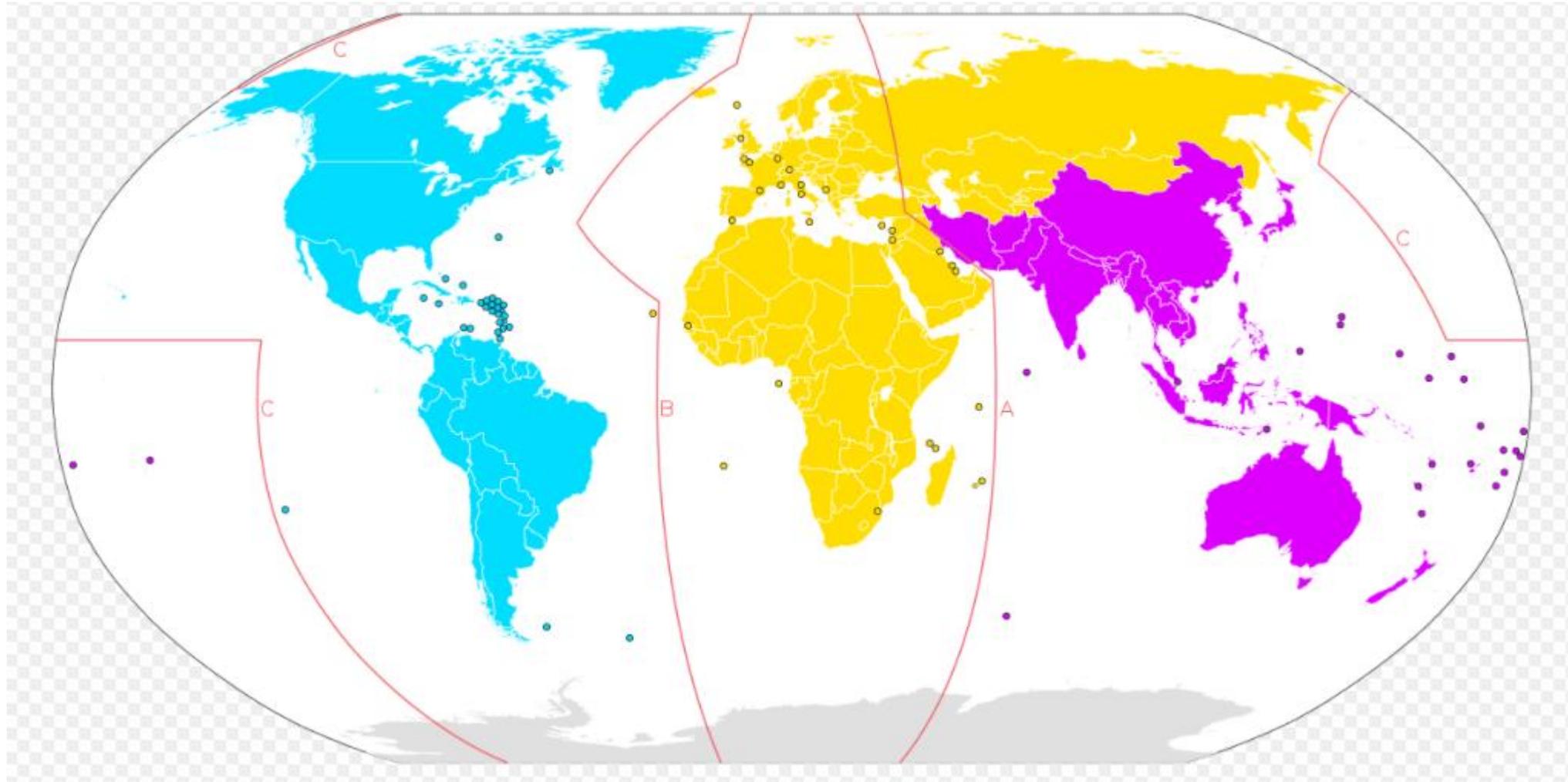


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ITU Regions

- REGION 1 
- REGION 2 
- REGION 3 

*North & South
America, Alaska,
Hawaii, and most
US territories are
in Region 2.*





Regulatory Agencies (cont.)

- FCC: Federal Communication Commission
 - Governed by Electronic Code of Federal Regulations Part 97
 - <http://www.arrl.org/part-97-amateur-radio>
 - Charged with writing and administering rules for US amateurs
 - FCC jurisdiction includes all US states, possessions, territories, and US-flagged vessels in international waters
 - Note that this includes some US territories in Region 3 (American Samoa, Guam, etc.). These have the same rules as amateurs in Region 2.



FCC Volunteer Monitoring Program

- Amateur Radio Service is self-policing
- ARRL created the Amateur Auxiliary in 1982 so amateurs could assist FCC with enforcement (Official Observers) and interference issues (Local Interference Committees)
- Official Observer Program changed to Volunteer Monitoring Program (VMP) in 2018 ... Goal: self-regulation & compliance
- VMP made up of volunteer amateurs, monitoring airwaves for rules violations



VMP (cont.)

- Training activities for *monitoring* include ...
 - Foxhunting
 - Radio direction-finding (RDF)
- Used for quickly locating hidden transmitters
 - Volunteer monitors might use these skills to locate stations violating FCC rules, intentionally or not
- More information ...
 - www.homingin.com



Regulatory Agencies (cont.)

- **FAA: Federal Aviation Administration**
 - FAA has jurisdiction over antenna structures more than 200 ft. high and within 4 miles of a public use airport or heliport
 - Must register such structures with FCC (to avoid aircraft hazards)
- **Local Building Authorities**
 - Local building codes may apply to towers & antennas
 - FCC Rule PRB-1: Amateur Service communications must be reasonably accommodated ... regulations must be the minimum practical and have legitimate purpose



PRACTICE QUESTIONS



Which of the following may apply in areas under FCC jurisdiction outside of ITU Region 2?

- A. Station identification may have to be in a language other than English
- B. Morse code may not be permitted
- C. Digital transmission may not be permitted
- D. Frequency allocations may differ



What is the maximum height above ground to which an antenna structure may be erected without requiring notification to the FAA and registration with the FCC, provided it is not at or near a public use airport?

- A. 50 feet
- B. 100 feet
- C. 200 feet
- D. 300 feet



Under what conditions are state and local governments permitted to regulate Amateur Radio antenna structures?

- A. Under no circumstances, FCC rules take priority
- B. At any time and to any extent necessary to accomplish a legitimate purpose of the state or local entity, provided that proper filings are made with the FCC
- C. Only when such structures exceed 50 feet in height and are clearly visible 1000 feet from the structure
- D. Amateur Service communications must be reasonably accommodated, and regulations must constitute the minimum practical to accommodate a legitimate purpose of the state or local entity



The frequency allocations of which ITU region apply to radio amateurs operating in North and South America?

- A. Region 4
- B. Region 3
- C. Region 2
- D. Region 1



What is the Volunteer Monitoring Program?

- A. Amateur volunteers who are formally enlisted to monitor the airwaves for rules violations
- B. Amateur volunteers who conduct amateur licensing examinations
- C. Amateur volunteers who conduct frequency coordination for amateur VHF repeaters
- D. Amateur volunteers who use their station equipment to help civil defense organizations in times of emergency



Which of the following are objectives of the Volunteer Monitoring Program?

- A. To conduct efficient and orderly amateur licensing examinations
- B. To encourage amateur radio operators to self-regulate and comply with the rules
- C. To coordinate repeaters for efficient and orderly spectrum usage
- D. To provide emergency and public safety communications



What skills learned during hidden transmitter hunts are of help to the Volunteer Monitoring Program?

- A. Identification of out-of-band operation
- B. Direction finding used to locate stations violating FCC rules
- C. Identification of different call signs
- D. Hunters have an opportunity to transmit on non-amateur frequencies



Amateur Licensing Rules

- Volunteer Examiner Rules

- Volunteer licensing program is administered by *Volunteer Examiner Coordinators* (VECs)
- VECs have agreements with FCC to coordinate examinations
- **VE accreditation** requirements listed in FCC §97.509(b) ...
 - Be accredited by a VEC
 - Be at least 18 years of age
 - Hold a General class or higher license
 - Have never had your license suspended or revoked

- *No cost!*
- *Allows you to administer exams*

Examination Rules

- Rules listed in FCC §97.509
- Exams sessions coordinated by a VEC
- Exams administered by three (3) accredited VEs
 - VEs must hold necessary license class
 - General class may administer Technician (Element 2) exams
 - Advanced class ... General (Elem 3) and Technician (Elem 2)
 - Amateur Extra class ... Amateur Extra (Elem 4), General (Elem 3), Tech (Elem 2)



Exam Rules (cont.)

- Those passing receive a Certificate of Successful Completion
- CSCE good for 365 days ... use the CSCE until your new license arrives from FCC (or listed in FCC database)
- You may use all General class privileges as soon as receive the CSCE. As long as you have a call sign in the FCC database, you don't need to wait for the FCC update.
 - But, add an *indicator* to your call sign!
 - Using voice, say “*slash AG*” ... CW or digital modes, add “*/AG*”

General Class License Course

Discovering the Excitement of Ham Radio



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Sample CSCE

American Radio Relay League VEC Certificate of Successful Completion of Examination		ARRL The national association for AMATEUR RADIO®	NOTE TO VE TEAM: COMPLETELY CROSS OUT ALL BOXES BELOW THAT DO NOT APPLY TO THIS CANDIDATE.
Test Site (City/State): <u>Newington, CT</u> Test Date: <u>1/23/19</u>			The applicant named herein has presented valid proof for the exam element credit(s) indicated below. Element 3 credit Element 4 credit
CREDIT for ELEMENTS PASSED VALID FOR 365 DAYS You have passed the written element(s) indicated at right. You will be given credit for the appropriate examination element(s), for up to 365 days from the date shown at the top of this certificate.			EXAM ELEMENTS EARNED Passed written Element 3 <input checked="" type="checkbox"/> Passed written Element 4 <input type="checkbox"/>
LICENSE UPGRADE NOTICE If you also hold a valid FCC-issued Amateur radio license grant, this Certificate validates temporary operation with the operating privileges of your new operator class (see Section 97.9[b] of the FCC's Rules) until you are granted the license for your new operator class, or for a period of 365 days from the test date stated above on this certificate, whichever comes first.			NEW LICENSE CLASS EARNED
LICENSE STATUS INQUIRIES You can find out if a new license or upgrade has been "granted" by the FCC. For on-line inquiries see the FCC Web at http://wireless.fcc.gov/uls/ ("Click on Search Licenses" button), or see the ARRL Web at http://www.arrl.org/fcc/search ; or by calling FCC toll free at 888-225-5322; or by calling the ARRL at 1-860-594-0300 during business hours. Allow 15 days from the test date before calling.			GENERAL <input checked="" type="checkbox"/> EXTRA <input type="checkbox"/> NONE <input type="checkbox"/>
THIS CERTIFICATE IS NOT A LICENSE, PERMIT, OR ANY OTHER KIND OF OPERATING AUTHORITY IN AND OF ITSELF. THE ELEMENT CREDITS AND/OR OPERATING PRIVILEGES THAT MAY BE INDICATED IN THE LICENSE UPGRADE NOTICE ARE VALID FOR 365 DAYS FROM THE TEST DATE. THE HOLDER NAMED HEREON MUST ALSO HAVE BEEN GRANTED AN AMATEUR RADIO LICENSE ISSUED BY THE FCC TO OPERATE ON THE AIR.			
Candidate's Signature <u>Amanda</u> Call Sign <u>N1NHL</u> (if none, write none)	VE #1 <u>Maria Somma</u> <u>AB1FM</u> Signature Call Sign		
Candidate's Name <u>Amanda Grimaldi</u>	VE #2 <u>Steve Ewald</u> <u>WV1X</u> Signature Call Sign		
Address <u>225 main Street</u>	VE #3 <u>Denny Green</u> <u>WY50</u> Signature Call Sign		
City <u>Newington</u> State <u>CT</u> ZIP <u>06111</u>	COPIES: WHITE-Candidate, YELLOW-VE Team, PINK-ARRL VEC MVE 07/2015		

Figure 3.2 — The CSCE (Certificate of Successful Completion of Examination) is your test session receipt that serves as proof that you have completed one or more exam elements. It can be used at other test sessions for 365 days.



Credit for Previous Licenses

- As of 2019, amateurs with expired licenses may receive credit for exam elements passed. Specifically ...
 - If you pass Element 2 (tech) exam, and provide documentation for previously-held General, Advanced, or Amateur Extra licenses, you will be credited with having passed those written exam elements.



PRACTICE QUESTIONS



Who may receive partial credit for the elements represented by an expired Amateur Radio license?

- A. Any person who can demonstrate that they once held an FCC-issued General, Advanced, or Amateur Extra class license that was not revoked by the FCC
- B. Anyone who held an FCC-issued Amateur Radio license that has been expired for not less than 5 years and not more than 15 years
- C. Any person who previously held an amateur license issued by another country, but only if that country has a current reciprocal licensing agreement with the FCC
- D. Only persons who once held an FCC issued Novice, Technician, or Technician Plus license



What license examinations may you administer when you are an accredited VE holding a General class operator license?

- A. General and Technician
- B. General only
- C. Technician only
- D. Amateur Extra, General, and Technician



On which of the following band segments may you operate if you are a Technician class operator and have a Certificate of Successful Completion of Examination (CSCE) for General class privileges?

- A. Only the Technician band segments until your upgrade is posted in the FCC database
- B. Only on the Technician band segments until your license arrives in the mail
- C. On any General or Technician class band segment
- D. On any General or Technician class band segment except 30 meters and 60 meters



Which of the following is a requirement for administering a Technician class license examination?

- A. At least three General class or higher VEs must observe the examination
- B. At least two General class or higher VEs must be present
- C. At least two General class or higher VEs must be present, but only one need be Amateur Extra class
- D. At least three VEs of Technician class or higher must observe the examination

Which of the following must a person have before they can be an administering VE for a Technician class license examination?

- A. Notification to the FCC that you want to give an examination
- B. Receipt of a Certificate of Successful Completion of Examination (CSCE) for General class
- C. Possession of a properly obtained telegraphy license
- D. An FCC General class or higher license and VEC accreditation



When must you add the special identifier “AG” after your call sign if you are a Technician class licensee and have a Certificate of Successful Completion of Examination (CSCE) for General class operator privileges, but the FCC has not yet posted your upgrade on its website?

- A. Whenever you operate using General class frequency privileges
- B. Whenever you operate on any amateur frequency
- C. Whenever you operate using Technician frequency privileges
- D. A special identifier is not required if your General class license application has been filed with the FCC



Volunteer Examiners are accredited by what organization?

- A. The Federal Communications Commission
- B. The Universal Licensing System
- C. A Volunteer Examiner Coordinator
- D. The Wireless Telecommunications Bureau



Which of the following criteria must be met for a non-U.S. citizen to be an accredited Volunteer Examiner?

- A. The person must be a resident of the U.S. for a minimum of 5 years
- B. The person must hold an FCC granted Amateur Radio license of General class or above
- C. The person's home citizenship must be in ITU region 2
- D. None of these choices is correct; a non-U.S. citizen cannot be a Volunteer Examiner



How long is a Certificate of Successful Completion of Examination (CSCE) valid for exam element credit?

- A. 30 days
- B. 180 days
- C. 365 days
- D. For as long as your current license is valid



What is the minimum age that one must be to qualify as an accredited Volunteer Examiner?

- A. 12 years
- B. 18 years
- C. 21 years
- D. There is no age limit



What is required to obtain a new General Class license after a previously-held license has expired and the two-year grace period has passed?

- A. They must have a letter from the FCC showing they once held an amateur or commercial license
- B. There are no requirements other than being able to show a copy of the expired license
- C. The applicant must be able to produce a copy of a page from a call book published in the U.S. showing his or her name and address
- D. The applicant must pass the current Element 2 exam



Control Operator Privileges & Rules

- With so many new privileges, keep a reference handy (next slide)
 - When you tune bands, check to make sure you're within the proper segment before transmitting (*several questions on this*)
- Generals have privileges on 160, 60, 30, 17, 12, and 10 meters
- Two HF bands have special regulations ...
 - 60 meters only permit channelized operation on USB, CW, and certain digital modes with power limit of 100 V ERP (effective radiated power)
 - 30 meters permit only CW, RTTY, and data signals with limit of 200 W PEP

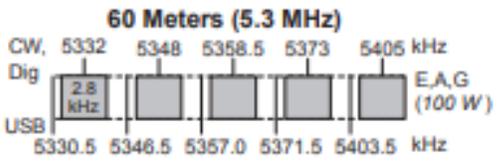
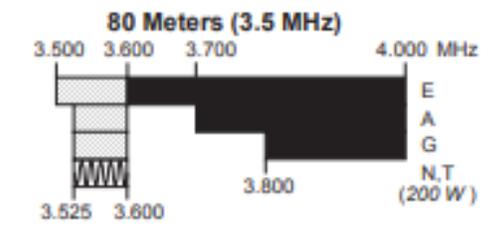
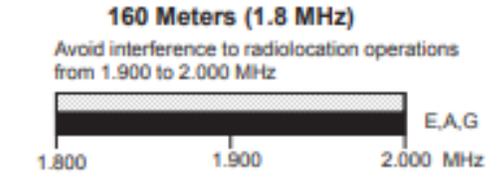
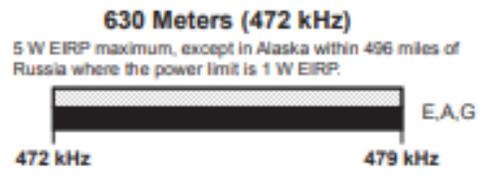
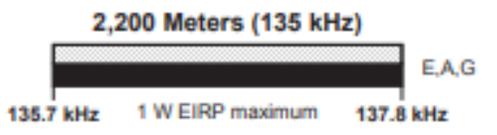
US Amateur Radio Bands

US AMATEUR POWER LIMITS

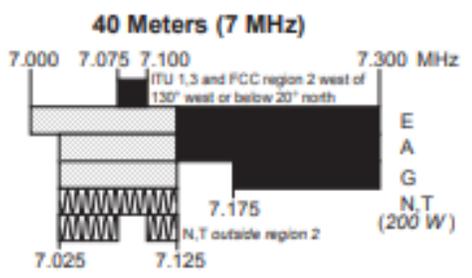
FCC 97.313 An amateur station must use the minimum transmitter power necessary to carry out the desired communications.
 (b) No station may transmit with a transmitter power exceeding 1.5 kW PEP.



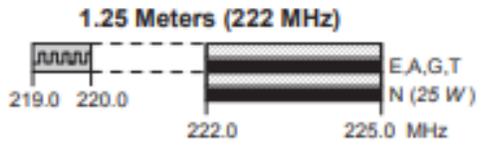
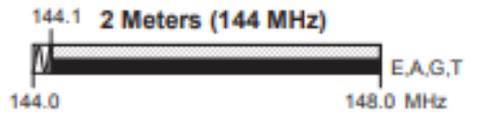
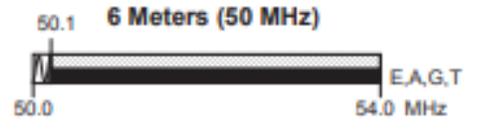
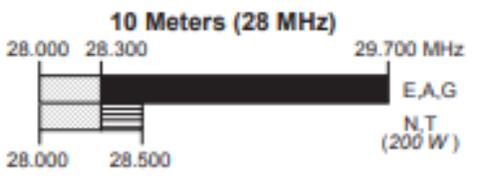
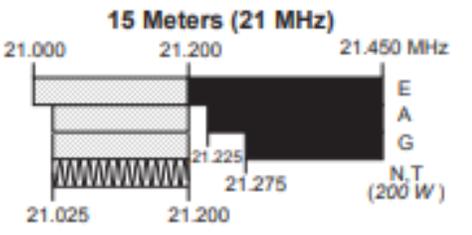
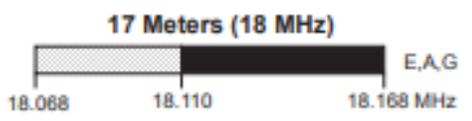
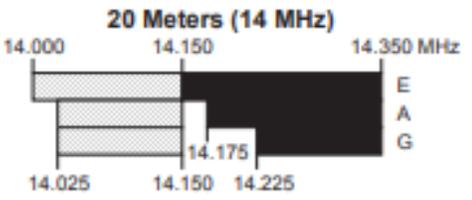
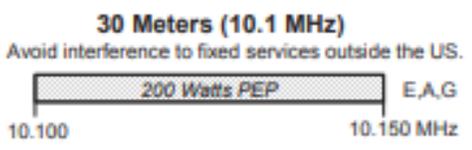
Amateurs wishing to operate on either 2,200 or 630 meters must first register with the Utilities Technology Council online at <https://utc.org/plc-database-amateur-notification-process/>. You need only register once for each band.



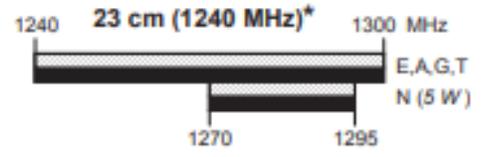
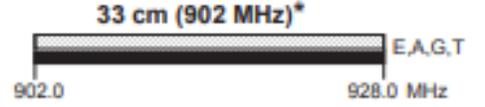
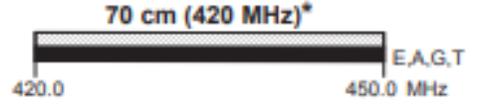
General, Advanced, and Amateur Extra licensees may operate on these five channels on a secondary basis with a maximum effective radiated power (ERP) of 100 W PEP relative to a half-wave dipole. Permitted operating modes include upper sideband voice (USB), CW, RTTY, PSK31 and other digital modes such as PACTOR III. Only one signal at a time is permitted on any channel.



See Sections 97.305(c), 97.307(f)(11) and 97.301(e). These exemptions do not apply to stations in the continental US.



*Geographical and power restrictions may apply to all bands above 420 MHz. See The ARRL Operating Manual for information about your area.



All licensees except Novices are authorized all modes on the following frequencies:
 2300-2310 MHz 10.0-10.5 GHz ‡ 122.25-123.0 GHz
 2390-2450 MHz 24.0-24.25 GHz 134-141 GHz
 3300-3500 MHz 47.0-47.2 GHz 241-250 GHz
 5650-5925 MHz 76.0-81.0 GHz All above 275 GHz
 ‡ No pulse emissions

KEY

Note:
 CW operation is permitted throughout all amateur bands.
 MCW is authorized above 50.1 MHz, except for 144.0-144.1 and 219-220 MHz.
 Test transmissions are authorized above 51 MHz, except for 219-220 MHz

- = RTTY and data
- = phone and image
- = CW only
- = SSB phone
- = USB phone, CW, RTTY, and data.
- = Fixed digital message forwarding systems only

E = Amateur Extra
 A = Advanced
 G = General
 T = Technician
 N = Novice

See ARRLWeb at www.arrl.org for detailed band plans.

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 email: newham@arrl.org

Exams: 860-594-0300 email: vec@arrl.org

FREQUENCY PRIVILEGES

<http://www.arrl.org/graphical-frequency-allocations>

Control Operator Privileges & Rules (cont.)

- In some bands, amateurs share access with other services
 - Called *secondary amateur allocations* (*primary services* have priority); the amateur station must clear the frequency
 - Hams are not allowed to contact the primary service
- Amateurs are required to take special steps to mitigate interference in the following circumstances ...
 - Operating within one mile of an FCC Monitoring Station
 - Transmitting spread spectrum (SS) emissions
 - Using a band where the Amateur Service is secondary



Beacons

- Used for observation of propagation and reception and related activities
- Useful on HF, VHF, and UHF bands
- Beacon rules contained in §97.203 ... most important ones ...
 - No more than one signal in the same band from a single location
 - Limited to 100 W PEP output
- Only HF band where automatically controlled beacons can operate: 28.2 to 28.3 MHz
- Avoid transmitting on international beacon frequencies operated by Northern California DX Foundation (www.ncdxf.org)

Summary of Amateur HF Bands (Table 3.2)

WAVELENGTH (meters)	FREQUENCY (MHz)
160	1.800 – 2.00
80 and 75	3.500 – 3.600 and 3.600 – 4.000
60	5.3305, 5.3465, 5.3570, and 5.4035 (USB carrier frequency)
40	7.000 – 7.300
30	10.100 – 10.150
20	14.000 – 14.350
17	18.068 – 18.168
15	21.000 – 21.450
12	24.890 – 24.990
10	28.000 – 29.700

NOTE: On 60 meters, CW, and digital emissions must be centered 1.5 kHz above the carrier frequencies indicated above. Only one signal at a time is permitted on any channel.



PRACTICE QUESTIONS

On which HF/MF bands is a General class license holder granted all amateur frequency privileges?

- A. 60 meters, 20 meters, 17 meters, and 12 meters
- B. 160 meters, 80 meters, 40 meters, and 10 meters
- C. 160 meters, 60 meters, 30 meters, 17 meters, 12 meters, and 10 meters
- D. 160 meters, 30 meters, 17 meters, 15 meters, 12 meters, and 10 meters



On which of the following bands is phone operation prohibited?

- A. 160 meters
- B. 30 meters
- C. 17 meters
- D. 12 meters



On which of the following bands is image transmission prohibited?

- A. 160 meters
- B. 30 meters
- C. 20 meters
- D. 12 meters



Which of the following amateur bands is restricted to communication only on specific channels, rather than frequency ranges?

- A. 11 meters
- B. 12 meters
- C. 30 meters
- D. 60 meters



Which of the following frequencies is in the General class portion of the 40-meter band (in ITU Region 2)?

- A. 7.250 MHz
- B. 7.500 MHz
- C. 40.200 MHz
- D. 40.500 MHz



Which of the following frequencies is within the General class portion of the 75-meter phone band?

- A. 1875 kHz
- B. 3750 kHz
- C. 3900 kHz
- D. 4005 kHz



Which of the following frequencies is within the General class portion of the 20-meter phone band?

- A. 14005 kHz
- B. 14105 kHz
- C. 14305 kHz
- D. 14405 kHz



Which of the following frequencies is within the General class portion of the 80-meter band?

- A. 1855 kHz
- B. 2560 kHz
- C. 3560 kHz
- D. 3650 kHz



Which of the following frequencies is within the General class portion of the 15-meter band?

- A. 14250 kHz
- B. 18155 kHz
- C. 21300 kHz
- D. 24900 kHz



Which of the following frequencies is available to a control operator holding a General class license?

- A. 28.020 MHz
- B. 28.350 MHz
- C. 28.550 MHz
- D. All these choices are correct



When General class licensees are not permitted to use the entire voice portion of a band, which portion of the voice segment is generally available to them?

- A. The lower frequency end
- B. The upper frequency end
- C. The lower frequency end on frequencies below 7.3 MHz, and the upper end on frequencies above 14.150 MHz
- D. The upper frequency end on frequencies below 7.3 MHz, and the lower end on frequencies above 14.150 MHz



Which of the following applies when the FCC rules designate the Amateur Service as a secondary user on a band?

- A. Amateur stations must record the call sign of the primary service station before operating on a frequency assigned to that station
- B. Amateur stations can use the band only during emergencies
- C. Amateur stations can use the band only if they do not cause harmful interference to primary users
- D. Amateur stations may only operate during specific hours of the day, while primary users are permitted 24-hour use of the band



What is the appropriate action if, when operating on either the 30-meter or 60-meter bands, a station in the primary service interferes with your contact?

- A. Notify the FCC's regional Engineer in Charge of the interference
- B. Increase your transmitter's power to overcome the interference
- C. Attempt to contact the station and request that it stop the interference
- D. Move to a clear frequency or stop transmitting



What portion of the 10-meter band is available for repeater use?

- A. The entire band
- B. The portion between 28.1 MHz and 28.2 MHz
- C. The portion between 28.3 MHz and 28.5 MHz
- D. The portion above 29.5 MHz



With which of the following conditions must beacon stations comply?

- A. A beacon station may not use automatic control
- B. The frequency must be coordinated with the National Beacon Organization
- C. The frequency must be posted on the internet or published in a national periodical
- D. There must be no more than one beacon signal transmitting in the same band from the same station location



Which of the following is a purpose of a beacon station as identified in the FCC rules?

- A. Observation of propagation and reception
- B. Automatic identification of repeaters
- C. Transmission of bulletins of general interest to Amateur Radio licensees
- D. Identifying net frequencies



On what HF frequencies are automatically controlled beacons permitted?

- A. On any frequency if power is less than 1 watt
- B. On any frequency if transmissions are in Morse code
- C. 21.08 MHz to 21.09 MHz
- D. 28.20 MHz to 28.30 MHz



What is the power limit for beacon stations?

- A. 10 watts PEP output
- B. 20 watts PEP output
- C. 100 watts PEP output
- D. 200 watts PEP output



Which of the following conditions require a licensed Amateur Radio operator to take specific steps to avoid harmful interference to other users or facilities?

- A. When operating within one mile of an FCC Monitoring Station
- B. When using a band where the Amateur Service is secondary
- C. When a station is transmitting spread spectrum emissions
- D. All these choices are correct



In what part of the 13-centimeter band may an amateur station communicate with non-licensed Wi-Fi stations?

- A. Anywhere in the band
- B. Channels 1 through 4
- C. Channels 42 through 45
- D. No part



Why should an amateur operator normally avoid transmitting on 14.100, 18.110, 21.150, 24.930 and 28.200 MHz?

- A. A system of propagation beacon stations operates on those frequencies
- B. A system of automatic digital stations operates on those frequencies
- C. These frequencies are set aside for emergency operations
- D. These frequencies are set aside for bulletins from the FCC



On what band do amateurs share channels with the unlicensed Wi-Fi service?

- A. 432 MHz
- B. 902 MHz
- C. 2.4 GHz
- D. 10.7 GHz



Third-Party Traffic

- Definition: Sending messages on behalf of someone else who is not an amateur
- Foreign governments have an interest in limiting this because it bypasses normal Internet, telephone, and postal systems
- FCC recognizes the value ... wants people trained to provide effective emergency communications
- Handling 3rd party messages is called *passing traffic*

Third-Party Traffic (cont.)

- 3rd party traffic must be exchanged between amateur stations operating under FCC rules ...
 - Non-commercial
 - Either be personal and unimportant OR relating to emergencies or disaster relief
- 3rd Party is the person or entity on whose behalf the message is being sent (may be an organization)
- 3rd Party does not need to be present



PRACTICE QUESTIONS



Which of the following would disqualify a third party from participating in stating a message over an amateur station?

- A. The third party's amateur license has been revoked and not reinstated
- B. The third party is not a U.S. citizen
- C. The third party is a licensed amateur
- D. The third party is speaking in a language other than English



What types of messages for a third party in another country may be transmitted by an amateur station?

- A. Any message, as long as the amateur operator is not paid
- B. Only messages for other licensed amateurs
- C. Only messages relating to Amateur Radio or remarks of a personal character, or messages relating to emergencies or disaster relief
- D. Any messages, as long as the text of the message is recorded in the station log



Prohibited and Restricted Communications

- One-way transmissions not permitted, except for *code practice*
- Can't retransmit a broadcast, except for weather or propagation predictions from US government stations (as long as it's occasional)
- Codes intended to obscure meanings of messages are prohibited



PRACTICE QUESTIONS



Which of the following transmissions is permitted?

- A. Unidentified transmissions for test purposes only
- B. Retransmission of other amateur station signals by any amateur station
- C. Occasional retransmission of weather and propagation forecast information from U.S. government stations
- D. Coded messages of any kind, if not intended to facilitate a criminal act



Which of the following one-way transmissions are permitted?

- A. Unidentified test transmissions of less than one minute in duration
- B. Transmissions necessary to assist learning the International Morse code
- C. Regular transmissions offering equipment for sale, if intended for Amateur Radio use
- D. All these choices are correct



What are the restrictions on the use of abbreviations or procedural signals in the Amateur Service?

- A. Only “Q” signals are permitted
- B. They may be used if they do not obscure the meaning of a message
- C. They are not permitted
- D. Only “10 codes” are permitted



When is it permissible to communicate with amateur stations in countries outside the areas administered by the Federal Communications Commission?

- A. Only when the foreign country has a formal third-party agreement filed with the FCC
- B. When the contact is with amateurs in any country except those whose administrations have notified the ITU that they object to such communications
- C. When the contact is with amateurs in any country as long as the communication is conducted in English
- D. Only when the foreign country is a member of the International Amateur Radio Union



When may a 10-meter repeater retransmit the 2-meter signal from a station that has a Technician class control operator?

- A. Under no circumstances
- B. Only if the station on 10-meters is operating under a Special Temporary Authorization allowing such retransmission
- C. Only during an FCC-declared general state of communications emergency
- D. Only if the 10-meter repeater control operator holds at least a General class license



Technical Rules and Standards

- Good Amateur Practices ...
 - Not all procedures are covered by FCC Part 97 rules
 - Amateurs themselves set day-to-day operating standards, although the FCC reserves the right to rule on what is and isn't *good engineering and good amateur practice*
 - Many publications available covering these practices, including ...
 - ARRL Handbook
 - ARRL Antenna Book



Technical Rules and Standards (cont.)

- Output Power

- General, Advanced, and Amateur Extra limited to max transmitter output of 1500 W PEP (*peak envelope power*) on HF bands
- Two Q-signals for indicating power level ...
 - QRP: *Reduce power* or *I am using low power* (usually 5W or less)
 - QRO: *Increase power* or *I am using high power*
- Two max power restrictions on HF ...
 - 200 W PEP on 30 meters (10.1 MHz)
 - 100 W PEP with respect to half-wave dipole on 60 meters (5 MHz) with max bandwidth of 2.8 kHz



PRACTICE QUESTIONS



Who or what determines “good engineering and good amateur practice,” as applied to the operation of an amateur station in all respects not covered by the Part 97 rules?

- A. The FCC
- B. The control operator
- C. The IEEE
- D. The ITU



What is the maximum transmitting power an amateur station may use on 10.140 MHz?

- A. 200 watts PEP output
- B. 1000 watts PEP output
- C. 1500 watts PEP output
- D. 2000 watts PEP output



What is the maximum transmitting power an amateur station may use on the 12-meter band?

- A. 50 watts PEP output
- B. 200 watts PEP output
- C. 1500 watts PEP output
- D. An effective radiated power equivalent to 100 watts from a half-wave dipole



What is the maximum bandwidth permitted by FCC rules for Amateur Radio stations transmitting on USB frequencies in the 60-meter band?

- A. 2.8 kHz
- B. 5.6 kHz
- C. 1.8 kHz
- D. 3 kHz



Which of the following limitations apply to transmitter power on every amateur band?

- A. Only the minimum power necessary to carry out the desired communications should be used
- B. Power must be limited to 200 watts when using data transmissions
- C. Power should be limited as necessary to avoid interference to another radio service on the frequency
- D. Effective radiated power cannot exceed 1500 watts



What is the limit for transmitter power on the 28 MHz band for a General Class control operator?

- A. 100 watts PEP output
- B. 1000 watts PEP output
- C. 1500 watts PEP output
- D. 2000 watts PEP output



What is the limit for transmitter power on the 1.8 MHz band?

- A. 200 watts PEP output
- B. 1000 watts PEP output
- C. 1200 watts PEP output
- D. 1500 watts PEP output



What is the maximum power limit on the 60-meter band?

- A. 1500 watts PEP
- B. 10 watts RMS
- C. ERP of 100 watts PEP with respect to a dipole
- D. ERP of 100 watts PEP with respect to an isotropic antenna



What measurement is specified by FCC rules that regulate maximum power output?

- A. RMS
- B. Average
- C. Forward
- D. PEP



What is the maximum PEP output allowed for spread spectrum transmissions?

- A. 100 milliwatts
- B. 10 watts
- C. 100 watts
- D. 1500 watts



What is QRP operation?

- A. Remote piloted model control
- B. Low-power transmit operation
- C. Transmission using Quick Response Protocol
- D. Traffic relay procedure net operation



Digital Transmissions

- FCC rules for digital transmissions are primarily concerned with the bandwidth of the transmitted signal
 - Bandwidth is tied to the *symbol rate* ... signal events per second
 - Covered in §97.305(c) and §97.307(f) ... see Table 3.4 (next slide)
- As the size of the amateur bands increases with frequency, faster (wider) signals are allowed
 - At 33 cm (902 MHz) and above, there is no limit except for the band edges themselves



Max Symbol Rates & Bandwidth (Table 3.4)

BAND	SYMBOL RATE (baud)	BANDWIDTH (kHz)
160 thru 12 m	300	1
10 m	1200	1
6 m, 2 m	19.6k	2
1.25 m, 70 cm	56k	100
33 cm and above	No limit	No limit

There are new protocols being introduced all the time. The FCC recognized the need for amateurs to receive and understand signals must be balanced with the benefits of innovation. This is why the FCC requires the technical characteristics of the protocol be publicly documented before using it on the air.



PRACTICE QUESTIONS



What is the maximum symbol rate permitted for RTTY or data emission transmission on the 20-meter band?

- A. 56 kilobaud
- B. 19.6 kilobaud
- C. 1200 baud
- D. 300 baud



What is the maximum symbol rate permitted for RTTY or data emission transmitted at frequencies below 28 MHz?

- A. 56 kilobaud
- B. 19.6 kilobaud
- C. 1200 baud
- D. 300 baud



What is the maximum symbol rate permitted for RTTY or data emission transmitted on the 1.25-meter and 70-centimeter bands?

- A. 56 kilobaud
- B. 19.6 kilobaud
- C. 1200 baud
- D. 300 baud



What is the maximum symbol rate permitted for RTTY or data emission transmissions on the 10-meter band?

- A. 56 kilobaud
- B. 19.6 kilobaud
- C. 1200 baud
- D. 300 baud



What is the maximum symbol rate permitted for RTTY or data emission transmissions on the 2-meter band?

- A. 56 kilobaud
- B. 19.6 kilobaud
- C. 1200 baud
- D. 300 baud

What must be done before using a new digital protocol on the air?

- A. Type-certify equipment to FCC standards
- B. Obtain an experimental license from the FCC
- C. Publicly document the technical characteristics of the protocol
- D. Submit a rule-making proposal to the FCC describing the codes and methods of the technique



END OF MODULE 3

General Class License Course

Discovering the Excitement of Ham Radio



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