



General License Class

1



General License Class

Chapter 3 Rules & Regulations

2



Regulatory Agencies

International Rules & Regulations

- HF signals extend across national boundaries.
- Some system of international rules & regulations is required.
- An organization is required to administer those international rules & regulations

3



Regulatory Agencies

International Telecommunications Union (ITU)

- United Nations Agency.
- Responsible for international radio regulations.
- Responsible for radio frequency allocations.
- Assigns call sign blocks.

4



Regulatory Agencies

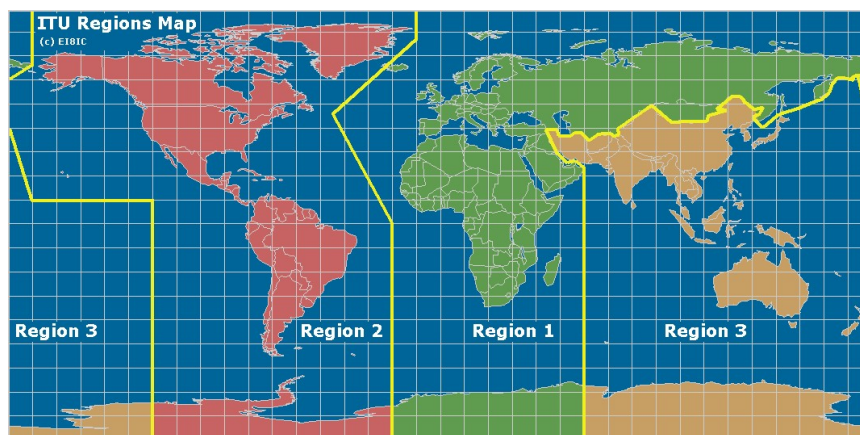
International Telecommunications Union (ITU)

- The ITU World divides the world into 3 regions.
- US is in Region 2.
- Frequency allocations vary by region.
 - e.g. – 40m above 7200 kHz only in Region 2.

5



Regulatory Agencies



6



Regulatory Agencies

National Regulations

- Each national government establishes and administers rules & regulations governing radio communications in their territory.
 - In the US & its territories, regulations governing radio communications are administered by the Federal Communications Commission (FCC).

7



Regulatory Agencies

Federal Communications Commission (FCC)

- Established by the Communications Act of 1934.
- Has authority over all non-governmental communications in the United States & territories.
 - Note that some US territories are not in ITU Region 2, & different frequency allocations may apply.

8



Regulatory Agencies

Federal Communications Commission (FCC)

- The control operator of an amateur radio station located in the United States or its territories must have an amateur radio license issued by the FCC, regardless of what country the operator is in.

9



Regulatory Agencies

Federal Communications Commission (FCC)

- Code of Federal Regulations (CFR) Title 47
 - Part 2 -- Frequency allocations and radio treaty matters; general rules and regulations
 - Part 17 -- Antenna Structures
 - Part 97 -- Amateur Radio Service
 - <http://arrl.org/part-97-amateur-radio>

10



Regulatory Agencies

Federal Communications Commission (FCC)

- Voluntary Monitoring Program (VMP).
 - Previously known as the Official Observer (OO) program.
 - Amateurs who volunteer to monitor amateur radio operations & encourage self-regulation and compliance with the FCC rules.
 - They are officially recruited to serve as monitors.

11



Regulatory Agencies

Federal Aviation Administration (FAA)

- The FAA also has jurisdiction over the Amateur Radio Service with regards to antennas & antenna structures.
 - If your antenna structure exceeds specified heights, you must:
 - Notify the FAA.
 - Register with the FCC.

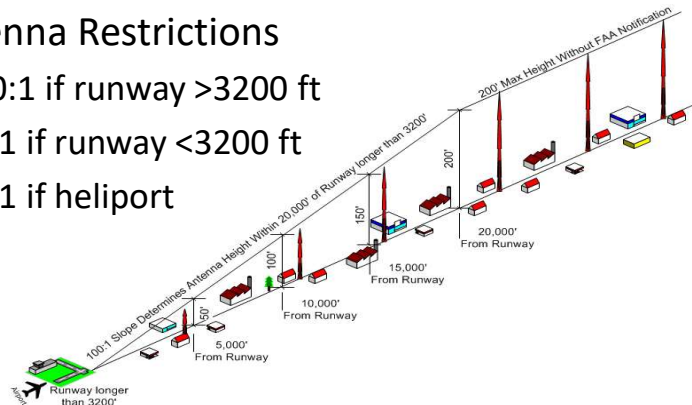
12



Regulatory Agencies

Federal Aviation Administration (FAA)

- Antenna Restrictions
 - 100:1 if runway >3200 ft
 - 50:1 if runway <3200 ft
 - 25:1 if heliport



13



Regulatory Agencies

Federal Aviation Administration (FAA)

- Antenna Restrictions
 - If more than 200 ft above ground level or near public-use airport, must notify FCC & FAA.
 - Exceptions:
 - <20 ft above existing man-made structure.
 - <20 ft above ground.
 - Shielded by terrain or by taller structures in congested urban area.

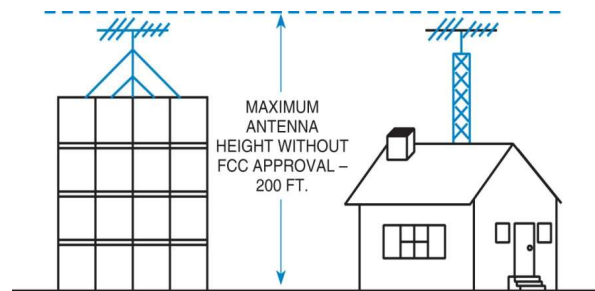
14



Regulatory Agencies

Federal Aviation Administration (FAA)

- Antenna Restrictions



15




Regulatory Agencies

Local Building Authorities

- Local authorities, such as Zoning Boards, have the authority to regulate amateur radio antenna structures.
 - Amateur Service communications must be reasonably accommodated.
 - Regulations must be the minimum necessary.


16

G1B01 -- What is the maximum height above ground for an antenna structure not near a public use airport without requiring notification to the FAA and registration with the FCC?

- A. 50 feet
- B. 100 feet
-  C. 200 feet
- D. 250 feet


17

G1B06 -- 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


18

G1D05 -- When operating a US station by remote control from outside the country, what license is required of the control operator?

-  A. A US operator/primary station license
- B. Only an appropriate US operator/primary license and a special remote station permit from the FCC
- C. Only a license from the foreign country, as long as the call sign includes identification of portable operation in the US
- D. A license from the foreign country and a special remote station permit from the FCC


19

G1D12 -- When operating a station in South America by remote control over the internet from the US, what regulations apply?

- A. Those of both the remote station's country and the FCC
- B. Those of the remote station's country and the FCC's third-party regulations
-  C. Only those of the remote station's country
- D. Only those of the FCC


20

G1E06 -- 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


21

G2D01 -- 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


22

G2D02 -- Which of the following are objectives of the Volunteer Monitor Program?

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

23

G2D03 -- What procedure may be used by Volunteer Monitors to localize a station whose continuous carrier is holding a repeater on in their area?

- A. Compare vertical and horizontal signal strengths on the input frequency
-  B. Compare beam headings on the repeater input from their home locations with that of other Volunteer Monitors
- C. Compare signal strengths between the input and output of the repeater
- D. All these choices are correct

24



Amateur Licensing Rules

Volunteer Examiner Rules

- Volunteer Examiner Coordinator (VEC)
 - Created by signed agreement with the FCC.
 - Accredits Volunteer Examiners (VEs).
 - Coordinates exam sessions.
 - Maintains records of all exam sessions, including passes & failures.
 - Forwards successful applications to the FCC for processing.

25



Amateur Licensing Rules

Volunteer Examiner Rules

- Volunteer Examiner Coordinator (VEC)
 - Currently 14 VECs nationwide.
 - Top 3 VECs ranked by number of exams administered:

	VEC	Exam Fee
#1	ARRL-VEC	\$15
#2	Laurel ARC VEC	No Fee
#3	W5YI-VEC	\$14

26



Amateur Licensing Rules

Volunteer Examiner Rules

- National Conference of Volunteer Examiner Coordinators (NCVEC)
 - Organization of VECs.
 - Coordinates actions of the VECs.
 - Provides liaison between the FCC & the VECs.
 - Establishes the Question Pool Committee (QPC).

27



Amateur Licensing Rules

Volunteer Examiner Rules

- Exam Preparation
 - Question Pools are maintained by the NCVEC Question Pool Committee.
 - All VECs are jointly responsible for the question pools.

28



Amateur Licensing Rules

Volunteer Examiner Rules

- Volunteer Examiner (VE) Requirements
 - Accredited by a VEC.
 - At least 18 years of age.
 - Never had license suspended or revoked.

NOTE: A VE does **NOT** have to be a US citizen – they only have to hold an amateur radio license issued by the FCC with an operator class of General or higher.

29



Amateur Licensing Rules

Volunteer Examiner Rules

The book states that a prospective VE must also pass a multiple-choice test on the *Volunteer Examiner's Manual* to become accredited.

The *Volunteer Examiner's Manual* is an ARRL publication for ARRL-accredited VEs.

Not all VECs require an examination to be accredited.

30



Amateur Licensing Rules

Examination Rules

- Team of at least 3 VEs required.
 - Conducts local exam sessions in accordance with policies adopted by the coordinating VEC.
 - Forwards all exam session paperwork to VEC for processing.



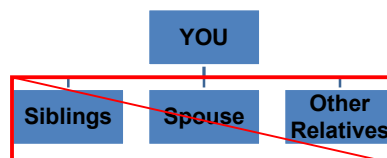
31



Amateur Licensing Rules

Examination Rules

§97.511(d) -- No VE may administer an examination to his or her spouse, children, grandchildren, stepchildren, parents, grandparents, stepparents, brothers, sisters, stepbrothers, stepsisters, aunts, uncles, nieces, nephews, and in-laws.



32



Amateur Licensing Rules

Examination Rules

- Volunteer Examiner (VE) Requirements

VE License Class	Can Prepare & Administer
General	Element 2 (Technician)
Advanced	Element 2 (Technician) Element 3 (General)
Amateur Extra	Element 2 (Technician) Element 3 (General) Element 4 (Amateur Extra)

33



Amateur Licensing Rules

Examination Rules

- The same 3 VEs must be present & observing the examinees while they are taking the examination.
- The examinees must follow the instructions of the VE team or have their examination terminated.

34



Amateur Licensing Rules

Examination Rules

- 3 VEs must immediately grade the examination & notify the applicant whether they passed or failed.
- If they failed, the team returns the application to the applicant.
- If they passed, 3 VEs must sign the application & issue a CSCE.

35



Amateur Licensing Rules

Examination Rules

- Certificate of Successful Completion of Examination (CSCE).
 - Issued to certify that applicant has passed examination elements and/or earned a specific class of license.
 - Signed by 3 VEs.
 - Signed by applicant.
 - Valid for upgrade credit for 365 days

36



Amateur Licensing Rules

American Radio Relay League VEC
Certificate of Successful Completion of Examination

Test Site: _____ Test Date: _____

CREDIT FOR ELEMENTS PREVIOUSLY PASSED: For 300 points, you may receive credit for any element you have passed in the past 12 months. For the purpose of this certificate, you must have passed the element on the test date.

LICENSE UPGRADE NOTICE: If you have held a valid FCC-issued Amateur Radio license, this Certificate satisfies the requirements of the FCC for the upgrade of your license. If you are upgrading your license, you must have passed the element on the test date.

LICENSE STATUS REQUIRED: You must be at least 18 years of age to be licensed by the FCC. You must be a U.S. citizen or permanent resident alien. You must be at least 18 years of age to be licensed by the FCC. You must be a U.S. citizen or permanent resident alien. You must be at least 18 years of age to be licensed by the FCC. You must be a U.S. citizen or permanent resident alien.

Examiner's Signature: _____ VE: _____ Call Sign: _____

Candidate's Name: _____ Address: _____ City: _____ State: _____ Zip: _____

City: _____ State: _____ Zip: _____

CERTIFICATE OF SUCCESSFUL COMPLETION OF EXAMINATION
 Laurel Amateur Radio Club Volunteer Examiner Coordinator
 Laurel Amateur Radio Club, Inc., P.O. Box 9146, Laurel, Maryland 20725-0146

Date: _____ VE Team Name: _____ Test Site: _____

The Applicant Named Below Has Passed The Indicated Elements:				The Applicant Is Eligible To Receive The Indicated Class License:			
Technician	General	Extra	None	Technician	General	Extra	None
2	3	4					

This certificate is not valid unless all elements other than the ones earned are crossed out. This certificate is valid for 365 days from the date of issue. Please retain this certificate for your records.

Listing of the license grant on the FCC Universal Licensing System (ULS) establishes you as an amateur operator and entitles you to operate. If you hold a valid FCC-issued Amateur Radio license, this certificate allows you to operate with all privileges of your new operator class until your license has been granted by the FCC or for a period of 365 days from the date of issue of this certificate, whichever comes first.

Applicant Information: _____ Volunteer Examiner Signature and Call Sign: _____

Name: _____ #1: _____ Call Sign: _____

Address: _____ #2: _____ Signature: _____ Call Sign: _____

City, State, Zip: _____ #3: _____ Signature: _____ Call Sign: _____

Applicant's Signature: _____

37



Amateur Licensing Rules

Examination Rules

- The VE team must forward the session paperwork to the VEC within 10 days after the testing session.



38



Amateur Licensing Rules

Identification Requirements

- After the Exam
 - New licensees can operate as soon as their call sign appears in the FCC Universal Licensing System (ULS).
 - <http://wireless.fcc.gov/uls>

39



Amateur Licensing Rules

Identification Requirements

- Amateurs who upgrade to a higher license class can start using their new privileges immediately.
 - When using their new privileges, they must use a special station identification until their new license class appears in the FCC Universal Licensing System (ULS).

40



Amateur Licensing Rules

Identification Requirements

- Must add a special indicator after their call sign.
 - Upgrade to Technician = <call>/KT
 - Upgrade to General = <call>/AG
 - Upgrade to Amateur Extra = <call>/AE
- Remember: Station identification must be made using the English language.

41



Amateur Licensing Rules

Credit for Previous Licenses

- An individual who can show proof of having held an amateur radio license that has expired more than 2 years ago, can receive credit for certain examination elements.
 - They still must pass Element 2 to get a license.

42



Amateur Licensing Rules

Credit for Previous Licenses

- An applicant can receive credit for Element 3 if they show proof that they:
 - Currently hold or previously held a Technician-class license issued prior to March 23, 1987.
 - Previously held a General-class license.
 - Previously held an Advanced-class license.
 - Previously held an Extra-class license.

43



Amateur Licensing Rules

Credit for Previous Licenses

- An applicant can receive credit for Element 4 if they show proof that they previously held an Extra-class license.

44

G1D01 -- 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 expired not less than 5 and not more than 15 years ago
- 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


45

G1D02 -- What license examinations may you administer as an accredited Volunteer Examiner holding a General class operator license?

- A. General and Technician
- B. None, only Amateur Extra class licensees may be accredited
- ➡ C. Technician only
- D. Amateur Extra, General, and Technician


46

G1D03 -- On which of the following band segments may you operate if you are a Technician class operator and have an unexpired 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 you have a receipt for the FCC application fee payment
-  C. On any General or Technician class band segment
- D. On any General or Technician class band segment except 30 meters and 60 meters


47

G1D04 -- Who must observe the administration of a Technician class license examination?

-  A. At least three Volunteer Examiners of General class or higher
- B. At least two Volunteer Examiners of General class or higher
- C. At least two Volunteer Examiners of Technician class or higher
- D. At least three Volunteer Examiners of Technician class


48

G1D06 -- Until an upgrade to General class is shown in the FCC database, when must a Technician licensee identify with "AG" after their call sign?

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

49

G1D07 -- 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

50

G1D08 -- Which of the following criteria must be met for a non-US citizen to be an accredited Volunteer Examiner?

- A. The person must be a resident of the US 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-US citizen cannot be a Volunteer Examiner


51

G1D09 -- 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


52

G1D10 -- What is the minimum age that one must be to qualify as an accredited Volunteer Examiner?

- A. 16 years
-  B. 18 years
- C. 21 years
- D. There is no age limit

53

G1D11 -- What action 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. Contact the FCC to have the license reinstated
-  D. The applicant must show proof of the appropriate expired license grant and pass the current Element 2 exam

54



Break



55



Control Operator Privileges and Rules

Frequency Privileges

- With the General class license, you get access to many more frequencies than with the Technician class license.

56



Control Operator Privileges and Rules

Frequency Privileges

- US Amateur HF Bands

Band	Frequency Range
160m	1.800 MHz to 2.000 MHz
80m	3.500 MHz to 3.600 MHz
75m	3.600 MHz to 4.000 MHz
40m	7.000 MHz to 7.300 MHz
30m	10.100 MHz to 10.150 MHz

Band	Frequency Range
20m	14.000 MHz to 14.350 MHz
17m	18.068 MHz to 18.168 MHz
15m	21.000 MHz to 21.450 MHz
12m	24.890 MHz to 24.990 MHz
10m	28.000 MHz to 29.700 MHz

57



Control Operator Privileges and Rules

General Class HF Band Segments

160m	CW	1.800 MHz to 2.000 MHz	17m	CW	18.068 MHz to 18.110 MHz
	SSB	1.800 MHz to 2.000 MHz		SSB	18.110 MHz to 18.168 MHz
80m	CW	3.525 MHz to 3.600 MHz	15m	CW	21.025 MHz to 21.200 MHz
75m	SSB	3.800 MHz to 4.000 MHz		SSB	21.275 MHz to 21.450 MHz
60m	Any	(5 specified channels)	12m	CW	24.890 MHz to 24.930 MHz
40m	CW	7.025 MHz to 7.125 MHz		SSB	24.930 MHz to 24.990 MHz
	SSB	7.175 MHz to 7.300 MHz	10m	CW	28.000 MHz to 28.300 MHz
30m	CW	10.100 MHz to 10.150 MHz		SSB	28.300 MHz to 29.700 MHz
20m	CW	14.025 MHz to 14.150 MHz	<div></div> = The entire band is available. <div></div> = Only a portion of the band is available.		
	SSB	14.225 MHz to 14.350 MHz			

58



Control Operator Privileges and Rules

Frequency Privileges

- When the entire CW portion of the band is not available to a General class operator, the bottom 25 kHz is reserved for Amateur Extra class operators.
- When the entire phone portion of the band is not available to a General class operator, the upper end of the band is available.

59



Control Operator Privileges and Rules

Frequency Privileges

- Two HF bands have special restrictions.
 - 60 meters.
 - 5 channelized frequencies.
 - Maximum power output = 100W **ERP**.
 - Maximum bandwidth = 2.8 kHz.
 - CW & data signals must be in center of the channel.
 - 30 meters.
 - CW & data only.
 - Maximum power output = 200W PEP.

60



Control Operator Privileges and Rules

Frequency Privileges

- 60m Frequency Assignments

Center Frequency	Carrier (VFO) Frequency
5332.0 kHz	5330.5 kHz
5348.0 kHz	5346.5 kHz
5358.5 kHz	5357.0 kHz
5.373.0 kHz	5371.5 kHz
5405.0 kHz	5403.5 kHz

61



Control Operator Privileges and Rules

Frequency Privileges

- 2.4 GHz & WiFi.
 - Some of the frequencies used by wireless routers fall within the 13cm amateur band.
 - Hams have been modifying 2.4 GHz wireless routers to build data networks that operate under Amateur Radio Service rules.
 - Amateur radio routers are prohibited from communicating with unlicensed routers.

62



Control Operator Privileges and Rules

Frequency Privileges

- Special circumstances.
 - Amateurs are required to take special steps to avoid interference if they are:
 - Operating within 1 mile of an FCC monitoring station.
 - Transmitting spread spectrum emissions.
 - Operating on a band where the Amateur Radio Service is secondary.

63



Control Operator Privileges and Rules

Frequency Privileges

- Primary versus Secondary.
 - Amateurs have primary status on most bands.
 - Exceptions: 60m, 30m, 70cm, & some microwave bands.
 - Amateurs can use bands where the Amateur Radio Service is secondary **ONLY** if they do not cause harmful interference to primary users.

64



Control Operator Privileges and Rules

Frequency Privileges

- Primary versus Secondary.
 - Secondary users **MUST** take any necessary steps to avoid interfering with primary users.
 - If interference occurs, the secondary user must stop transmitting or change frequency.

65



Control Operator Privileges and Rules

Frequency Privileges

- Beacons.
 - Used for observation of propagation and reception.
 - Limited to 100 Watts PEP output power.
 - Only one beacon per band at any one location.
 - Automatic control is restricted to specified frequency segments in each band.
 - Only 28.200 MHz to 28.300 MHz on HF.

66



Control Operator Privileges and Rules

Frequency Privileges

- Beacons.
 - A beacon may be automatically controlled only if it is transmitting within the following frequency segments:

28.200-28.300 MHz	222.050-222.060 MHz
50.060-50.080 MHz	432.300-432.400 MHz
144.275-144.300 MHz	33 cm and shorter wavelength bands

67



Control Operator Privileges and Rules

Frequency Privileges

- Beacons.
 - Avoid operating on frequencies used by beacon stations.
 - Common HF beacon frequencies are:
 - 14.100 MHz
 - 18.110 MHz
 - 21.150 MHz
 - 24.930 MHz
 - 28.200 MHz.

68



Control Operator Privileges and Rules

Frequency Privileges

- Repeater Operations.
 - Restricted to 29.500 MHz to 29.700 MHz on HF.
 - Repeater Coordinators work with repeater operators in selecting frequencies to minimize interference.
 - If interference occurs between a coordinated repeater and an uncoordinated repeater, the licensee of the uncoordinated system is responsible for resolving the interference.


69

G1A01 -- On which HF and/or MF amateur bands are there portions where General class licensees cannot transmit?

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


70

G1A02 -- On which of the following bands is phone operation prohibited?

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


71

G1A03 -- On which of the following bands is image transmission prohibited?

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


72

G1A04 -- 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


73

G1A05 -- On which of the following frequencies are General class licensees prohibited from operating as control operator?

-  A. 7.125 MHz to 7.175 MHz
- B. 28.000 MHz to 28.025 MHz
- C. 21.275 MHz to 21.300 MHz
- D. All of the above


74

G1A06 -- 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 may use the band only during emergencies
-  C. Amateur stations must not cause harmful interference to primary users and must accept interference from 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


75

G1A07 -- On which amateur frequencies in the 10-meter band may stations with a General class control operator transmit CW emissions?

- A. 28.000 MHz to 28.025 MHz only
- B. 28.000 MHz to 28.300 MHz only
- C. 28.025 MHz to 28.300 MHz only
-  D. The entire band


76

G1A08 -- Which HF bands have segments exclusively allocated to Amateur Extra licensees?

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


77

G1A09 -- 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


78

G1A10 -- 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

79

G1A11 -- When General class licensees are not permitted to use the entire voice portion of a band, which portion of the voice segment is available to them?

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

80

G1B02 -- With which of the following conditions must beacon stations comply?

- ➔ A. No more than one beacon station may transmit in the same band from the same station location
- 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. All these choices are correct


81

G1B03 -- 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. All these choices are correct


82

G1B09 -- 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


83

G1B10 -- 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


84

G1E04 -- 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 of these choices are correct


85

G1E07 -- In what part of the 2.4 GHz 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


86

G1E10 -- 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

87

G8C01 -- 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

88



Control Operator Privileges and Rules

Third-Party Traffic

- A third-party message is any message sent by licensed amateur radio operators on behalf of a "third party".

89



Control Operator Privileges and Rules

Third-Party Traffic

- A third party can be:
 - A non-licensed individual.
 - An organization.
 - A licensed amateur radio operator who is not eligible to be the control operator of the station sending/receiving the message.

90



Control Operator Privileges and Rules

Third-Party Traffic

- A third party can **NEVER** be:
 - Any individual whose amateur radio license has been suspended or revoked.

91



Control Operator Privileges and Rules

Third-Party Traffic

- The third party may or may not be at either station location.
- The third party may participate in sending/receiving the message.
 - May speak into the microphone.
 - May manipulate the key or keyboard.

92



Control Operator Privileges and Rules

Third-Party Traffic

- International Considerations.
 - Messages on behalf of a third party can **ONLY** be sent internationally under the following circumstances:
 - Message must be non-commercial and of a personal and inconsequential nature.
 - Country involved specifically allows third-party traffic to/from US amateurs.

93




Control Operator Privileges and Rules

Third-Party Traffic

- International Considerations.
 - During an emergency, special temporary agreements can be established to permit third-party traffic while the emergency exists.


94

G1E01 -- Which of the following would disqualify a third party from participating in sending a message via an amateur station?

-  A. The third party's amateur license has been revoked and not reinstated
- B. The third party is not a US citizen
- C. The third party is speaking in a language other than English
- D. All these choices are correct

95

G1E05 -- What are the restrictions on messages sent to a third party in a country with which there is a Third-Party Agreement?

- A. They must relate to emergencies or disaster relief
- B. They must be for other licensed amateurs
-  C. They must relate to amateur radio, or remarks of a personal character, or messages relating to emergencies or disaster relief
- D. The message must be limited to no longer than 1 minute in duration and the name of the third party must be recorded in the station log

96

G1E12 -- When may third-party messages be transmitted via remote control?

- ➔ A. Under any circumstances in which third party messages are permitted by FCC rules
- B. Under no circumstances except for emergencies
- C. Only when the message is intended for licensed radio amateurs
- D. Only when the message is intended for third parties in areas where licensing is controlled by the FCC

97



Control Operator Privileges and Rules

Prohibited & Restricted Communications

- Amateur radio stations are prohibited from sending certain types of communications.

98



Control Operator Privileges and Rules

Prohibited & Restricted Communications

- Unidentified transmissions.
- False or deceptive communications.
 - False distress signals.
 - Using someone else's call sign without their permission.

99



Control Operator Privileges and Rules

Prohibited & Restricted Communications

- In general, a US amateur radio station may contact any other amateur radio station in the world.
 - However, if a country has notified the ITU that they object to communications with amateur stations in the US, then communications with stations in that country are prohibited.

100



Control Operator Privileges and Rules

Prohibited & Restricted Communications

- Codes & ciphers to obscure meaning.
 - Exception: When used to control a space station or model craft.
- Standard procedural signals & codes are allowed.
 - Q-signals, etc.

101



Control Operator Privileges and Rules

Prohibited & Restricted Communications

- Excessive tuning & testing.
- Obscene, indecent, or profane language or meaning.

102



Control Operator Privileges and Rules

Prohibited & Restricted Communications

- One-way transmissions.
 - In general, one-way transmissions are prohibited.
 - Exceptions:
 - Brief transmissions to test your equipment.
 - Code practice.

103



Control Operator Privileges and Rules

Prohibited & Restricted Communications

- Broadcasting.
 - The FCC defines broadcasting as “transmissions intended for reception by the general public, either direct or relayed.”
 - Bulletins of interest to and intended for amateur radio operators may be transmitted.

104



Control Operator Privileges and Rules

Prohibited & Restricted Communications

- Broadcasting.
 - Amateur stations may not re-transmit signals from any station other than another amateur radio station.
 - Exception: Propagation and weather forecast information intended for use by the general public and originated from United States Government stations may be re-transmitted if not done on a regular basis.

105



Control Operator Privileges and Rules

Prohibited & Restricted Communications

- Music.
 - Amateur stations may not transmit music.
 - Exception: Incidental to communications with a manned spacecraft.
 - Be careful of background noise being inadvertently re-transmitted.
 - Car radio.
 - TV.

106



Control Operator Privileges and Rules

Prohibited & Restricted Communications

- Cross-Band Repeaters.
 - Is it legal for a Technician class operator to transmit on a 2m or 70cm frequency to activate a repeater or satellite with an output on 10m?
 - Yes, as long as the control operator of the repeater or satellite has a General or higher class license.


107

G1B04 -- Which of the following transmissions is permitted for all amateur stations?

- A. Unidentified transmissions of less than 10 seconds duration for test purposes only
- B. Automatic retransmission of other amateur signals by any amateur station
- ➔ C. Occasional retransmission of weather and propagation forecast information from US government stations
- D. Encrypted messages, if not intended to facilitate a criminal act


108

G1B05 -- Which of the following one-way transmissions are permitted?

- A. Unidentified test transmissions of less than 10 seconds in duration
-  B. Transmissions to assist with learning the International Morse code
- C. Regular transmissions offering equipment for sale, if intended for amateur radio use
- D. All these choices are correct


109

G1B07-- 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. They are limited to those expressly listed in Part 97 of the FCC rules


110

G1B08 -- 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. Only when the contact is with amateurs licensed by a country which is a member of the United Nations, or by a territory possessed by such a country
- D. Only when the contact is with amateurs licensed by a country which is a member of the International Amateur Radio Union, or by a territory possessed by such a country

111

G1E02 -- 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

112



Technical Rules and Standards

- Good Amateur Practices

§ 97.101(a) In all respects not specifically covered by FCC Rules each amateur station must be operated in accordance with good engineering and good amateur practice.

- Band plans.
- Repeater coordination.
- Courtesy.
- RFI.

113



Technical Rules and Standards

Good Amateur Practices

- What constitutes good amateur practice is determined by the FCC & includes:
 - Adherence to the band plans.
 - Repeater coordination.
 - Courtesy.
 - Making certain that your station is operating properly & meets all technical and safety standards.

114



Technical Rules and Standards

Output Power

- Except for the 60-meter band, the FCC always specifies output power in “peak envelope power” (PEP).
- On 60m, the maximum output power is specified in effective radiated power (ERP).

§97.313(a) -- An amateur station must use the minimum transmitter power necessary to carry out the desired communications.

115



Technical Rules and Standards

Output Power

- Maximum power output = 1500 Watts PEP.
- Exceptions:
 - 60m = 100 Watts ERP (referenced to a dipole).
 - Also 2.8 kHz maximum bandwidth.
 - 30m = 200 Watts PEP.
 - Spread Spectrum (SS) = 10 Watts PEP
 - Novice & Technician operators are limited to 200 Watts PEP on HF.

116



Technical Rules and Standards

Output Power

- QRO means “Increase power” or “Shall I increase power?”
 - “QRO operation” refers to operating with a high-power amplifier (>500W?).
- QRP means “Decrease power” or “Shall I decrease power?”
 - “QRP operation” refers to operating with a transmitter output power of 5 watts or less.


117

G1B11 -- 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


118

G1C01 -- 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


119

G1C02 -- 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


120

G1C03 -- What is the maximum bandwidth permitted by FCC rules for Amateur Radio stations when transmitting on USB frequencies in the 60-meter band?

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


121

G1C05 -- 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


122

G1C06 -- 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


123

G1C09 -- 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


124

G1C11-- What measurement is specified by FCC rules that regulate maximum power output?

- A. RMS output from the transmitter
- B. RMS input to the antenna
- C. PEP input to the antenna
-  D. PEP output from the transmitter

125

G1E08 -- What is the maximum PEP output allowed for spread spectrum transmissions?

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

126

G2D10 -- 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

127



Technical Rules and Standards

Digital Transmissions

- The technical specifications of a new digital protocol must be made public before it can be used on the air.
- Currently* the FCC limits the symbol rate depending on frequency.
 - Higher symbol rate ➔ wider bandwidth.

**There is a proposed rule change in process that may change this.*

128



Technical Rules and Standards

Digital Transmissions

- Maximum symbol rates:

Band	Maximum Symbol Rate	Maximum Bandwidth
160m – 12m	300 baud	1 kHz
10m	1200 baud	1 kHz
6m & 2m	19.6 kilobaud	20 kHz
1.25m & 70cm	56 kilobaud	100 kHz
33cm & up	No limit	No Limit


129

G1C07 -- 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


130

G1C08 -- 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

131

G1C10 -- 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

132



Questions?



133



General License Class

Next Week

Chapter 4

**Components & Circuits
(Part 1)**

134