Amateur Radio License

Introduction
Amateur Radio

- What Can You Do?
- US Spectrum Allocation
- Types of Amateur Licenses
- Test Format
- Study Aids
What Can You Do

- Talk to people (near and far)
- Build stuff (amps, sdr’s, antennas, receivers)
- Emergency communications (emcom)
- First person view (FPV) vehicles (drones), High altitude balloons, rocket telemetry
- Bounce signals off of satellites, moon
- APRS, packet radio
- Repeaters, networks
Line of Sight Radio

Packard EE to Cory Hall, UCB

LOS coverage from Packard

Propagation Path
HF Long Distance Radio
Low Power Radio

100 mW on 20 m
Frequencies

- Licenses give you access to different frequency bands
  - HF: Long distance contacts, big amps, big antennas, expensive radios
  - VHF, UHF: Mostly FM handheld or mobile radios, repeaters, packet radio, digital radio
  - Above UHF: experimental, remote control (FPV), mesh nets, packet radio
UNITED STATES FREQUENCY ALLOCATIONS
THE RADIO SPECTRUM

3 kHz — 300 kHz

300 kHz — 3 MHz

3 MHz — 30 MHz

30 MHz — 300 MHz

300 MHz — 3 GHz

3 GHz — 30 GHz

30 GHz — 300 GHz
Amateur Bands

- 50 MHz
- 144 MHz (VHF)
- 420 MHz (UHF)
Types of Amateur Licenses

- Technician: all bands from 50 MHz and up, CW in HF bands, SSB band on 28 MHz
- General: voice and data in most of the HF bands
- Extra: A little more spectrum in HF
US Amateur Radio Bands

Effective Date
March 5, 2012

Published by
ARRL
The national association for AMATEUR RADIO
225 Main Street, Newington, CT USA 06111-1494

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.

160 Meters (1.8 MHz)
Avoid interference to radilocation operations from 1.900 to 2.000 MHz
E, A, G
1.800
1.900
2.000 MHz

80 Meters (3.5 MHz)
Avoid interference to fixed services outside the US.
E, A, G
3.600
3.700
4.000 MHz

50.1
6 Meters (50 MHz)
E, A, G, T
50.0
54.0 MHz

20 Meters (14 MHz)
Avoid interference to fixed services outside the US.
E, A, G
14.000
14.100
14.350 MHz

1.25 Meters (222 MHz)
E, A, G, T
144.0
148.0 MHz

17 Meters (18 MHz)
E, A, G
18.068
18.110
18.168 MHz

70 cm (420 MHz)*
E, A, G, T
420.0
450.0 MHz

15 Meters (21 MHz)
E, A, G
21.000
21.200
21.450 MHz

33 cm (902 MHz)*
E, A, G, T
902.0
928.0 MHz

12 Meters (24 MHz)
E, A, G
24.890
24.930
24.990 MHz

23 cm (1240 MHz)*
E, A, G, T
2300.0
1240.0 MHz

10 Meters (28 MHz)
E, A, G
28.000
28.300
29.700 MHz

All licensees except Novices are authorized all modes on the following frequencies:
2300-2310 MHz 10.0-10.5 GHz
1225-1230 MHz
2390-2405 MHz 24.0-24.25 GHz
134-141 MHz
3300-3500 MHz 47.0-47.2 GHz
241-250 MHz
5650-5925 MHz 76.0-81.0 GHz
All above 275 GHz

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.
Narrowband transmissions are authorized above 50.1 MHz, except for 219-220 MHz.

KEY

E = RTTY and data
A = phone and image
G = CW and RTTY
T = CW only
N = SSB phone
E = USB phone, CW, RTTY, and data
N = Novice
E = Advanced Extra
A = General
G = Technician

General, Advanced, and Amateur Extra licensees may operate on these five channels on a secondary basis with a maximum effective radiated power of 100 W PEP. Permitted operating modes include upper sideband voice (USB), CW, RTTY, PSK31 and other digital modes such as PACTOR III as defined by the FCC Report and Order of November 18, 2011. USB is limited to 2.8 kHz centered on 5332, 5348, 5358.5, 5373 and 5405 kHz. CW and digital emissions must be centered 1.5 kHz above the channel frequencies indicated above. Only one signal a time is permitted on any channel.

Phone and image modes are permitted between 7.075 and 7.100 MHz for FCC licensed stations in ITU Region 2 West of 130 degrees West longitude or South of 20 degrees North latitude. See Sections 97.305(c) and 97.307(f)(11).

Novice and Technician licensees outside ITU Region 2 may use CW only between 7.025 and 7.075 MHz and between 7.100 and 7.125 MHz. 7.200 to 7.300 MHz is not available outside ITU Region 2. See Section 97.301(e). These exemptions do not apply to stations in the continental US.

ARRL
We're At Your Service
ARRL Headquarters:
860-594-0200 Fax 860-594-0259
email: hq@arrl.org

Publication Orders:
www.arrl.org/shop
Toll Free: 1-888-277-5289 (860-594-0355)
email: orders@arrl.org

Membership/Circulation Desk:
www.arrl.org/membership
Toll Free: 1-888-277-5289 (860-594-0338)
email: membership@arrl.org

Getting Started In Amateur Radio:
Toll Free: 1-800-336-3942 (860-594-0355)
email: newham@arrl.org

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

Copyright © ARRL 2012 rev. 4/12/2012
License Test Areas

- Radio Signals and Modulation
- Electricity, Components, Circuits
- Antennas and Propagation
- Radio Equipment
- Radio Operation
- Regulations
- Safety
- Each license grade covers the same material, in more detail
Test Format

• 35 questions from a pool of 300

• You need to get 26 right (74%)

• Multiple choice

• Calculators allowed (but you don’t really need one)

• You have to take this on-line
Study Aids

- Your book: includes all 300 questions, written for a very broad audience

- New edition 2022, make sure you get the latest
Study Aids

- Web sites: interactive quizzes (eHam.net, HamExam.org, radioexam.org)
- iPhone/Android apps
- Many other books and web resources
- All slides, other information at http://www.stanford.edu/~pauly/AmateurRadio
Test

- No Stanford test due to Covid
- Several online sites
  - [hamstudy.org](http://hamstudy.org) has a list
- You schedule it yourself
- Not as much fun
Plan

- Cover about 1-2 chapters/week over the next four weeks
- Demos
- Online test whenever you feel ready