





What is Amateur Radio?

Section 1.1 contains a lot of interesting background & introductory material.

- Read it at your leisure.
- Not covered in class.
- No questions over this material.

3











The FCC and Licensing

Licensing Overview.

- Amateur Radio Service.
 - Wide Range of frequencies across entire RF spectrum.
 - Many types of operation.
 - Equipment may be purchased off the shelf or may be home-built.

















Amateur Radio Activities

Identification and Contacts.

• In the USA, a call sign might indicate what part of the country an amateur lives in.















Amateur Radio Activities

Awards and Contests.

- Many amateur operators work to win awards for certain operating achievements:
 - WAS, DXCC, etc.
- Many try to win trophies or certificates by participating in contests.







Getting Your Ham Radio License

The Technician License.

- Entry-level license.
- A little over 50% of all US amateurs hold a Technician class license.
 - 385,181 out of 760,054 as of August 31, 2019.
- Primarily local area communications.









Getting Your Ham Radio License

Testing Process.

- Test sessions are coordinated by a Volunteer Examiner Coordinator (VEC).
 - FCC recognizes 14 VECs.
 - Individual VEC's may or may not charge a test fee.
 - ARRL = \$15
 - W5YI = \$14
 - Laurel VEC = No test fee
- Team of at least 3 Volunteer Examiners (VEs) required to administer exam.





Technician Class

Chapter 2 Radio and Signals Fundamentals



	Me	t <mark>ric Unit</mark> s	
Table 2	2-1		
Interna	itional System	n of Units (SI)—Metric Units	
Pretix	Symbol		
Tera		$10^{12} = 1,000,000,000,000$	- -
Giga	G	$10^9 = 1,000,000,000$	
Mega	Μ	$10^6 = 1,000,000$	
Kilo	k	$10^3 = 1000$	
Hecto	h	$10^2 = 100$	
Deca	da	$10^{1} = 10$	
Deci	d	$10^{-1} = 0.1$	
Centi	С	10-2 = 0.01	
Milli	m	10-3 = 0.001	
Micro	μ	$10^{-6} = 0.000001$	
Nano	n	10 ⁻⁹ = 0.00000001	1 - C
Pico	р	$10^{-12} = 0.00000000001$	

















T5B08 -- Which is equal to 1,000,000 picofarads?

- A. 0.001 microfarads
- B. 1 microfarad
- C. 1000 microfarads
- D. 1,000,000,000 microfarads









Radio Signals and Waves

Radio Waves.

- Radio waves (electromagnetic radiation) are AC waves.
- Created by an electrical signal that rapidly changes direction.
 - a.k.a. Radio signal.
- Travel at the speed of light.
- Radio waves are used to carry the information you want to convey to someone else.





Radio Signals and Waves

Radio Waves.

- Before we study radio waves, we need to learn some vocabulary.
 - Amplitude.
 - Frequency.
 - Period.
 - Wavelength.
 - Harmonics.















Radio Signals and Waves

Frequency and Phase.

- The difference in phase between 2 signals is measured in "degrees".
 - 1 cycle = 360°.
- If 2 signals cross zero at the same time but in different directions they are 180° out of phase.















Radio Signals and Waves

The Radio Spectrum.

- The radio spectrum is the range of signal frequencies which will leave an antenna and travel through space.
- The radio spectrum is divided into segments of frequencies that basically have similar behavior.

























Radio Signals and Waves

Radio Bands.

- The RF spectrum is divided into "bands".
- Bands are named by their **approximate** wavelength.
 - 40m Band = 7.000 MHz to 7.300 MHz
 - 300 / 40 = 7.5
 - 20m Band = 14.000 MHz to 14.350 MHz
 300 / 20 = 15
 - 2m Band = 144 MHz to 148 MHz

• 300 / 2 = 150





- A. Speed of light
- B. Speed of sound
- C. Speed inversely proportional to its wavelength
- D. Speed that increases as the frequency increases



T3B06 -- What is the formula for converting frequency to approximate wavelength in meters?

- A. Wavelength in meters equals frequency in hertz multiplied by 300
- B. Wavelength in meters equals frequency in hertz divided by 300
- C. Wavelength in meters equals frequency in megahertz divided by 300
- D. Wavelength in meters equals 300 divided by frequency in megahertz



T3B11 -- What is the approximate velocity of a radio wave in free space?

- A. 150,000 meters per second
- B. 300,000,000 meters per second
- C. 300,000,000 miles per hour
- D. 150,000 miles per hour









Radio Equipment Basics

Repeaters.

- Repeaters are a transmitter and receiver connected together so that a signal received on the receiver is simultaneously re-transmitted by the transmitter on a different frequency.
 - Repeaters are normally installed in high locations (hills, towers, buildings, etc.) to improve the range of mobile or handheld stations.

79

T1F09 -- What type of amateur station simultaneously retransmits the signal of another amateur station on a different channel or channels?

- A. Beacon station
- B. Earth station
- C. Repeater station
- D. Message forwarding station



