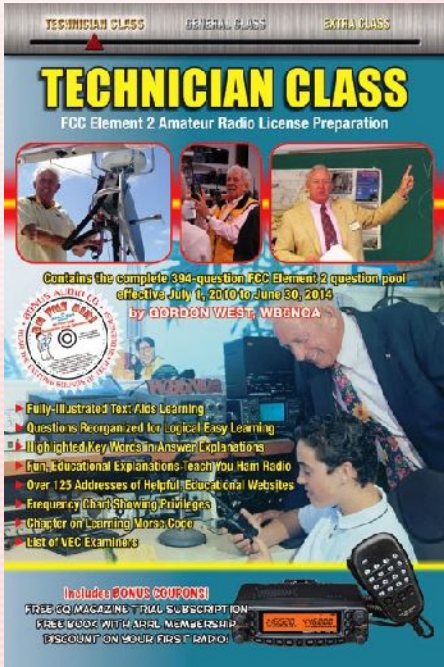
Technician Licensing Class

Tech Frequencies

Presented by

Ryan Caron
NX1U



Amateur Radio Technician Class
Element 2 Course Presentation

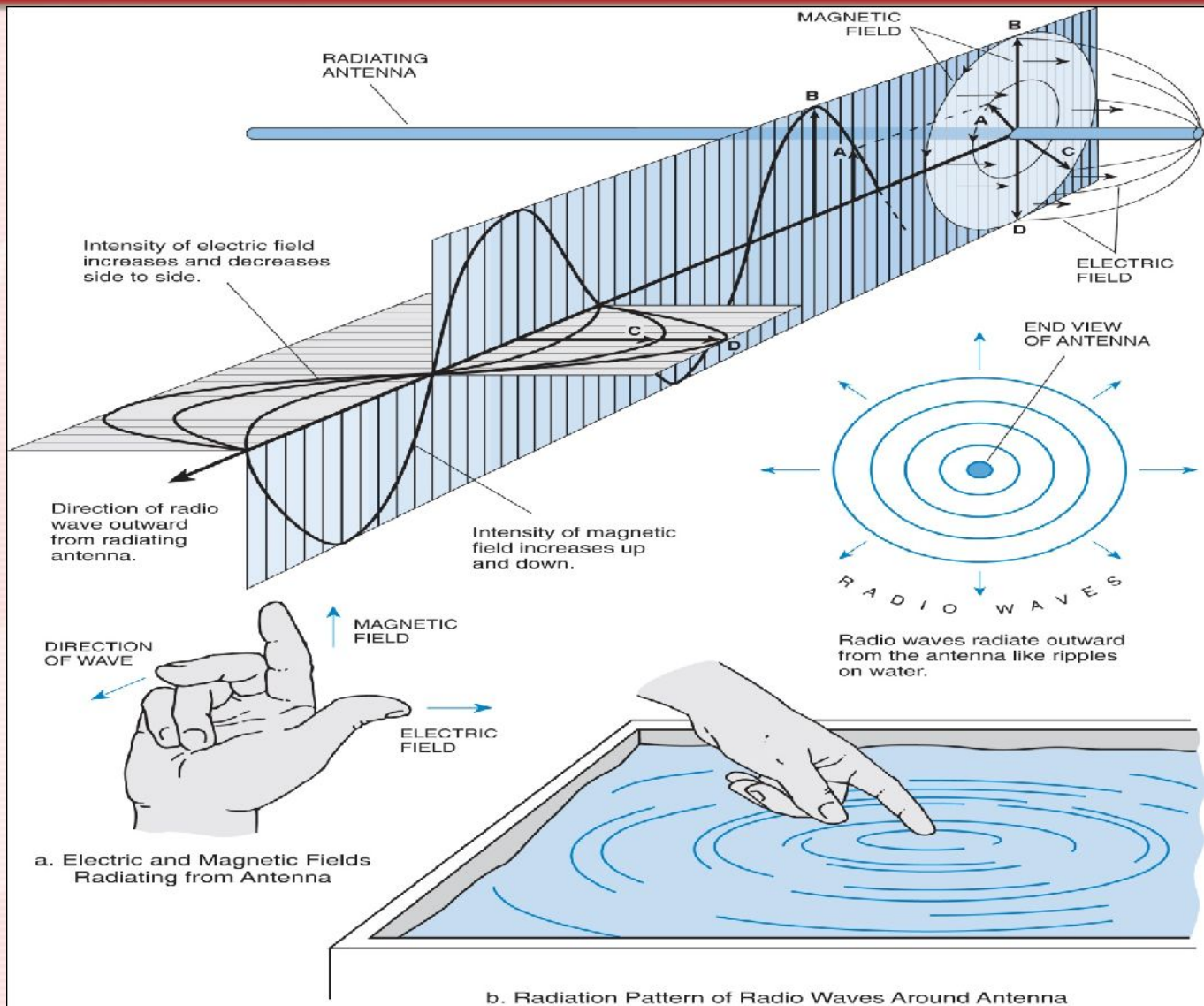
- **ELEMENT 2 SUB-ELEMENTS**
  (Groupings)

  - **About Ham Radio**
  - **Call Signs**
  - **Control**
  - **Mind the Rules**
  - **Tech Frequencies**
  - **Your First Radio**
  - **Going On The Air!**
  - **Repeaters**
  - **Emergency!**
  - **Weak Signal Propagation**

Tech Frequencies

- T5C6 RF is the abbreviation that refers to **r**adio **f**requency signals of all types.

- Term “RF” refers to **r**adio **f**requency



Tech Frequencies

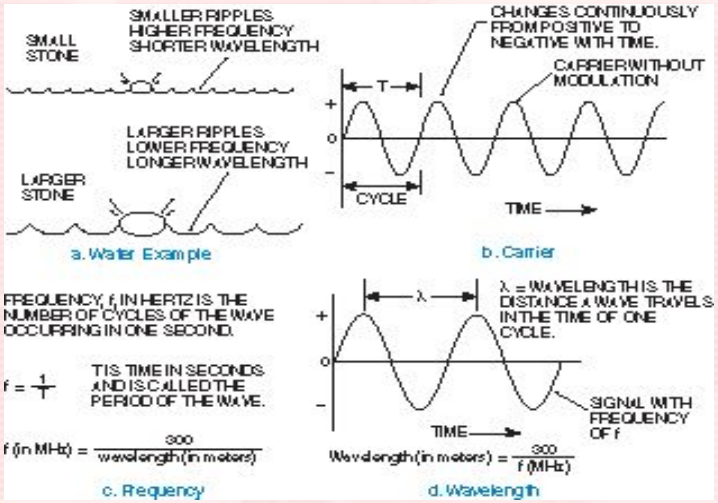
- T3A7 Electromagnetic waves carry radio signals between transmitting and receiving stations.
- T3B3 Electric and magnetic fields are the two components of a radio wave.

They are at right angles to each other and together are called "electromagnetic" radio waves

- T3B4 Radio waves travel through free space at the speed of light.
- T3B11 The approximate velocity of a radio wave as it travels through free space is 300,000,000 meters per second.
- T5C5 Hertz is the unit of frequency.

Tech Frequencies

- T5B7 If a frequency readout calibrated in megahertz shows a reading of 3.525 MHz, it would show 3525 kHz if it were calibrated in kilohertz.
- T3B1 The name for the distance a radio wave travels during one complete cycle is wavelength. Keywords: distance and wavelength



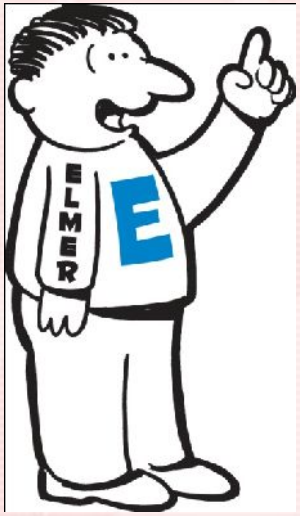
Carrier, Frequency, Cycle, and Wavelength

- T3B7 The property of radio waves often used to identify the different frequency bands is the approximate wavelength.
  - Wavelength of the band: 2 meters; 20 meters; 40 meters, etc

Tech Frequencies

- T3B5 The wavelength of a radio wave relates to its frequency inversely, as the wavelength gets shorter the frequency increases.
  - Higher in frequency the shorter the distance between each wave.
- T3B6 The formula for converting frequency to wavelength in meters is the wavelength in meters equals 300 divided by frequency in megahertz. (One answer ends with word Megahertz)

Elmer Tip



Conversions Between Wavelength and Frequency

Converting Frequency to Wavelength

To find wavelength (λ) in meters, if you know fre3quency (f) in megahertz (MHz) Solve:

$$\lambda(\text{meters}) = \frac{300}{f(\text{MHz})}$$

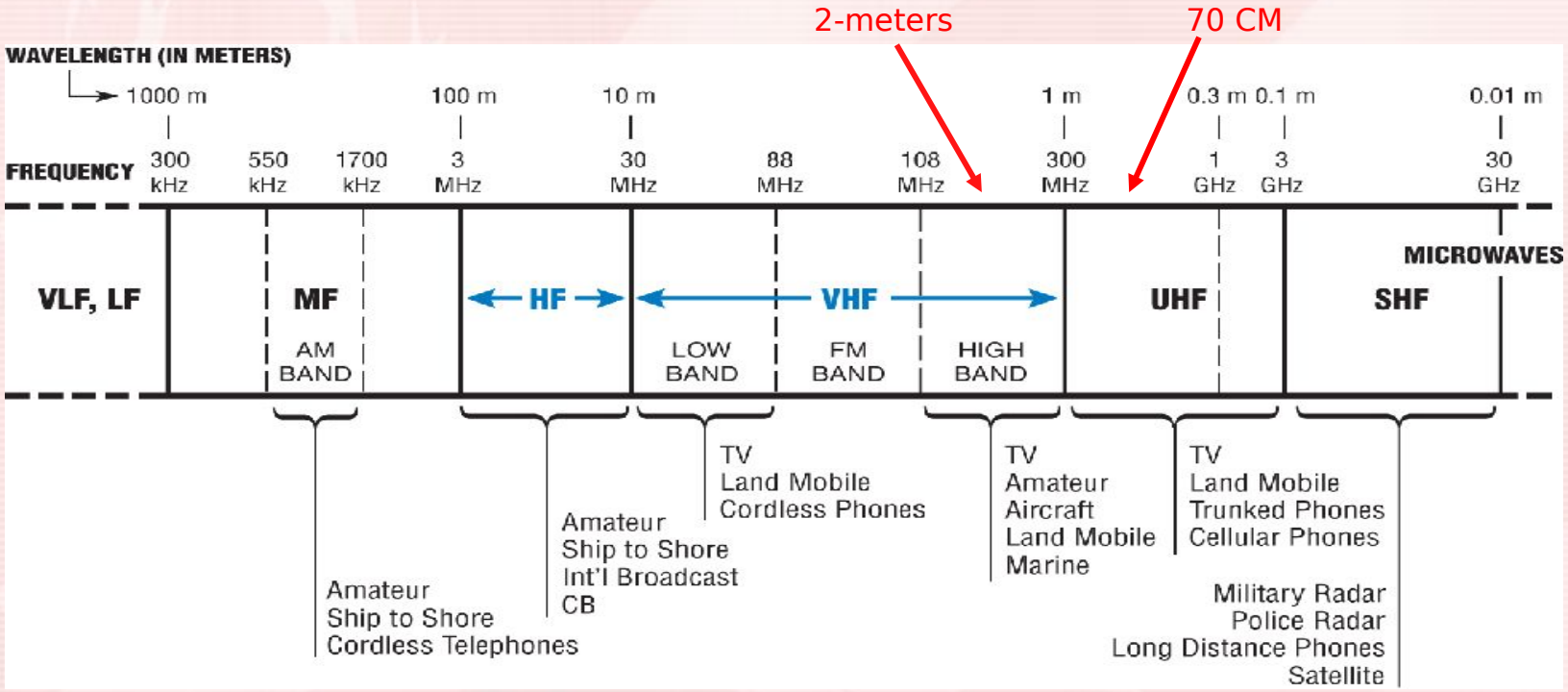
Converting Wavelength to Frequency

To find frequency (f) in megahertz (MHz), if you know wavel λ gth ( ) in meters, Solve:

$$f(\text{MHz}) = \frac{300}{\lambda(\text{meters})}$$

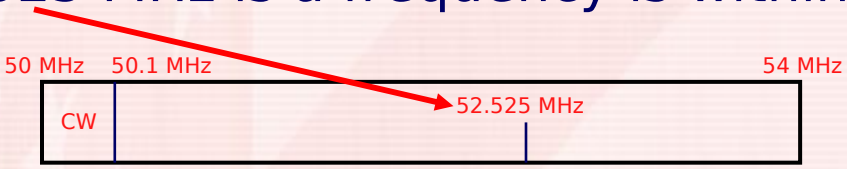
Tech Frequencies

- T3B10 The frequency range referred to as HF is 3 MHz to 30 MHz.
- T3B8 The frequency limits of the VHF spectrum are 30 MHz to 300 MHz.



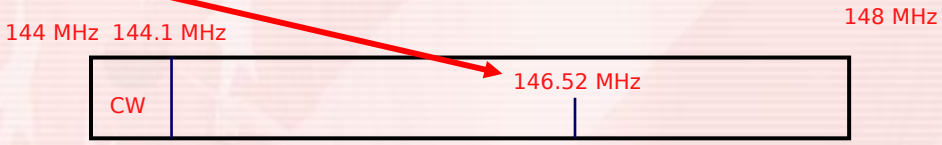
Tech Frequencies

- T1B3 52.525 MHz is a frequency is within the 6 meter band .



6-Meter Wavelength Band Privileges

- T1B4 146.520 MHz is a frequency is within the 2 meter band.



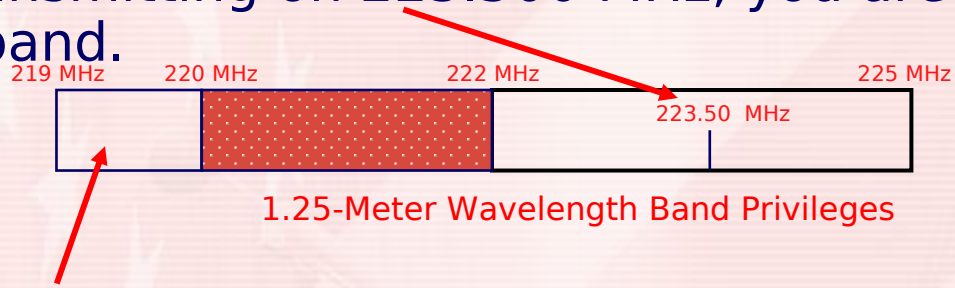
2-Meter Wavelength Band Privileges

- T1B10 The 6 meter, 2 meter, and 1.25 meter bands available to Technician Class operators have mode-restricted sub-bands.
  - 6 meters 50.0 – 50.1 No FM!
  - 2 meters 144.0 – 144.1 No FM!
  - 1.25 meters 222.0 – 222.34 No FM!

Tech Frequencies

- T1B11 In the mode-restricted sub-bands at 50.0 to 50.1 MHz and 144.0 to 144.1 MHz only CW emission modes are permitted.
  - CW only on these two sub-bands

- T1B7 Transmitting on 223.500 MHz, you are using the 1.25 meter band.

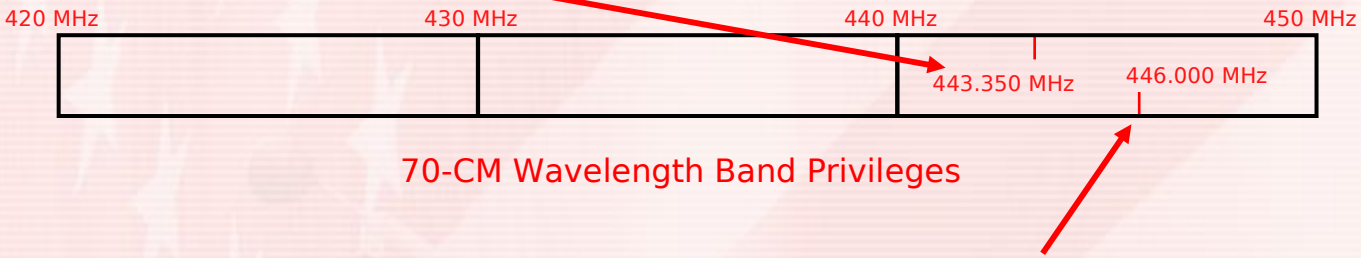


- T8D5 Data emission modes may be used by a Technician Class operator between 219 and 220 MHz.
  - 219 to 220 MHz for point-to-point digital message forwarding

- T3B9 The frequency limits of the UHF spectrum are 300 MHz to 3000 MHz.
  - UHF is 300 MHz to 3000 MHz

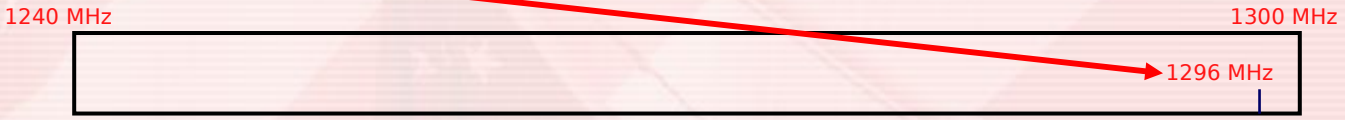
Tech Frequencies

- T1B5 443.350 is a 70 cm frequency authorized to a Technician Class license holder operating in ITU Region 2.
  - 443.350 MHz is in the upper third of the 70 cm band



70-CM Wavelength Band Privileges

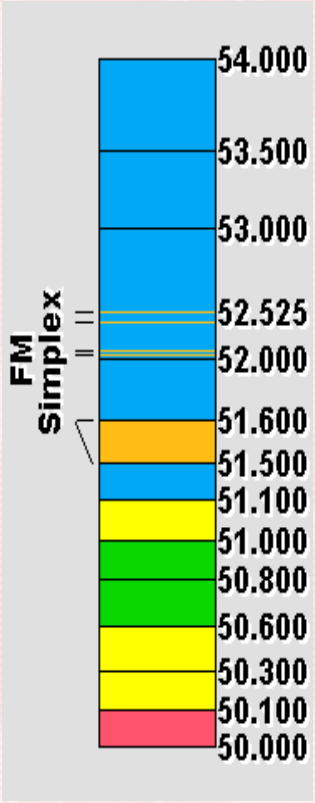
- T2A2 The national calling frequency is 446.000 MHz for FM simplex operation on the 70 cm band.
- T1B6 With a Technician Class operator license you are authorized to operate on 1296 MHz in the 23 cm band.



23-CM Wavelength Band Privileges

Tech Frequencies

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



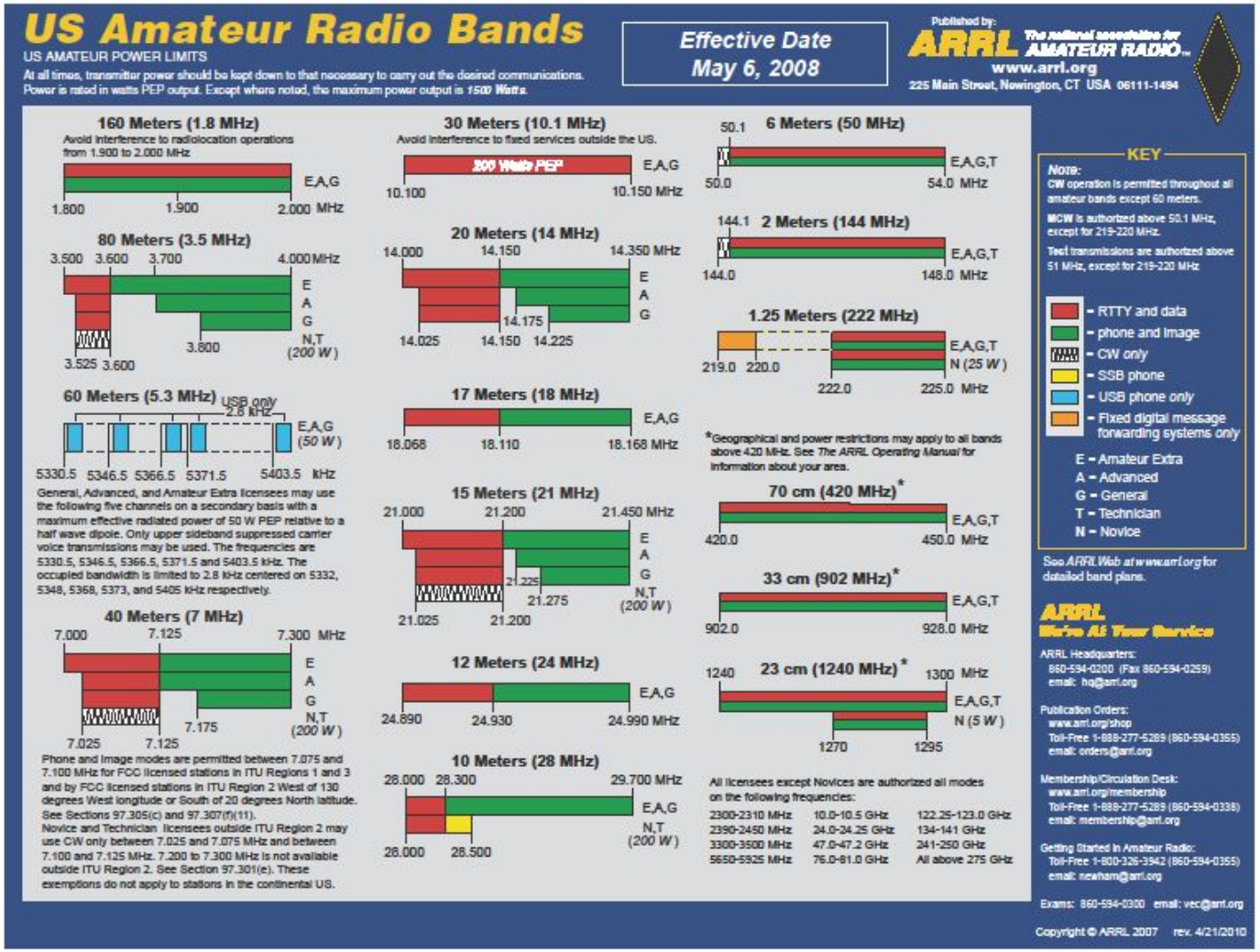
50.000-50.100: CW - *No voice modes allowed per FCC section §97.305*
50.060-50.080: CW/Beacon Sub band
50.100-50.300: Phone (SSB), etc. (no FM voice)
50.100-50.125: DX Window
50.300-50.600: All modes (simplex)
50.600-50.800: Digital modes (e.g. Packet)
50.800-51.000: Radio Control (R/C)
51.000-51.100: "Pacific DX window" (SSB/CW)
51.120-51.480: 6 Meter FM Repeater Inputs (areas w/500 KHz split)
51.500-51.600: Simplex FM, 6 channels: 51.500, 51.520, 51.540, 51.560, 51.580, and 51.600
51.620-51.980: 6 Meter FM Repeater Outputs (areas w/500 KHz split)
52.000-52.480: 6 Meter FM Repeater Inputs (for 500 KHz and 1 MHz split)

Note: 52.525, 52.400, 52.040, and 52.020 are widely used for simplex operation with 52.525 being the "national simplex" frequency.

52.500-52.980: 6 Meter FM Repeater Outputs
53.000-53.480: 6 Meter FM Repeater Inputs and Repeater Outputs
53.500-53.980: 6 Meter FM Repeater Outputs

Tech Frequencies

Valid Amateur Radio bands are different from ‘Band Plans’ which are a voluntary guidance over and above the bands authorized by the FCC.



Tech Frequencies

- T1B8 When an amateur frequency band is said to be available on a secondary basis, amateurs may not cause harmful interference to primary users.
- T1C5 If you are operating on the 23 cm band and learn that you are interfering with a radio location station outside the United States you must stop operating or take steps to eliminate the harmful interference.
- T1B9 You should not set your transmit frequency to be exactly at the edge of an amateur band or sub-band:
  - so that modulation sidebands do not extend beyond the band edge;
  - to allow for calibration error in the transmitter frequency display;
  - and to allow for transmitter frequency drift.

  All of these choices are correct

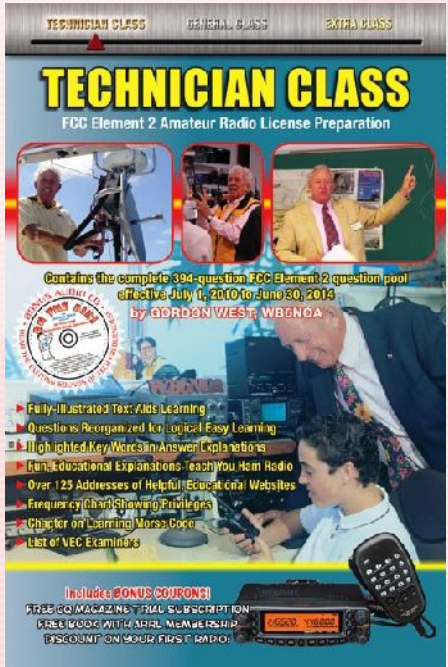
Element 2 Technician Class Question Pool

Tech Frequencies

Valid July 1, 2010

Through

June 30, 2014



T5C06 What is the abbreviation that refers to radio frequency signals of all types?

A. AF
B. HF
C. RF
D. VHF

T3A07

What type of wave carries radio signals between transmitting and receiving stations?

A. Electromagnetic
B. Electrostatic
C. Surface acoustic
D. Magnetostrictive

T3B03 What are the two components of a radio wave?

A. AC and DC
B. Voltage and current
C. Electric and magnetic fields
D. Ionizing and non-ionizing radiation

T3B04 How fast does a radio wave travel through free space?

A. At the speed of light
B. At the speed of sound
C. Its speed is inversely proportional to its wavelength
D. Its speed increases as the frequency increases

T3B11 What is the approximate velocity of a radio wave as it travels through free space?

A. 3000 kilometers per second
B. 300,000,000 meters per second
C. 300,000 miles per hour
D. 186,000 miles per hour

T5C05 What is the unit of frequency?

A. Hertz
B. Henry
C. Farad
D. Tesla

T5B07 If a frequency readout calibrated in megahertz shows a reading of 3.525 MHz, what would it show if it were calibrated in kilohertz?

A. 0.003525 kHz
B. 35.25 kHz
C. 3525 kHz
D. 3,525,000 kHz

T3B01 What is the name for the distance a radio wave travels during one complete cycle?

A. Wave speed
B. Waveform
C. Wavelength
D. Wave spread

T3B07 What property of radio waves is often used to identify the different frequency bands?

A. The approximate wavelength
B. The magnetic intensity of waves
C. The time it takes for waves to travel one mile
D. The voltage standing wave ratio of waves

T3B05 How does the wavelength of a radio wave relate to its frequency?

A. The wavelength gets longer as the frequency increases
B. The wavelength gets shorter as the frequency increases
C. There is no relationship between wavelength and frequency
D. The wavelength depends on the bandwidth of the signal

T3B06 What is the formula for converting frequency to 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

T3B10 What frequency range is referred to as HF?

A. 300 to 3000 MHz
B. 30 to 300 MHz
C. 3 to 30 MHz
D. 300 to 3000 kHz

T3B08 What are the frequency limits of the VHF spectrum?

A. 30 to 300 kHz
B. 30 to 300 MHz
C. 300 to 3000 kHz
D. 300 to 3000 MHz

T1B03 Which frequency is within the 6 meter band?

A. 49.00 MHz
B. 52.525 MHz
C. 28.50 MHz
D. 222.15 MHz

T1B04 Which amateur band are you using when your station is transmitting on 146.52 MHz?

A. 2 meter band
B. 20 meter band
C. 14 meter band
D. 6 meter band

T1B10 Which of the bands available to Technician Class operators have mode-restricted sub-bands?

A. The 6 meter, 2 meter, and 70 cm bands
B. The 2 meter and 13 cm bands
C. The 6 meter, 2 meter, and 1.25 meter bands
D. The 2 meter and 70 cm bands

T1B11 What emission modes are permitted in the mode-restricted sub-bands at 50.0 to 50.1 MHz and 144.0 to 144.1 MHz?

A. CW only
B. CW and RTTY
C. SSB only
D. CW and SSB

T1B07 What amateur band are you using if you are transmitting on 223.50 MHz?

A. 15 meter band
B. 10 meter band
C. 2 meter band
D. 1.25 meter band

T8D05 Which of the following emission modes may be used by a Technician Class operator between 219 and 220 MHz?

A. Spread spectrum
B. Data
C. SSB voice
D. Fast-scan television

T3B09 What are the frequency limits of the UHF spectrum?

A. 30 to 300 kHz
B. 30 to 300 MHz
C. 300 to 3000 kHz
D. 300 to 3000 MHz

T1B05 Which 70 cm frequency is authorized to a Technician Class license holder operating in ITU Region 2?

A. 53.350 MHz
B. 146.520 MHz
C. 443.350 MHz
D. 222.520 MHz

T2A02

What is the national calling frequency for FM simplex operations in the 70 cm band?

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

T1B06 Which 23 cm frequency is authorized to a Technician Class operator license?

A. 2315 MHz
B. 1296 MHz
C. 3390 MHz
D. 146.52 MHz

T2A10 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 use a frequency band during a contest

T1B08 What do the FCC rules mean when an amateur frequency band is said to be available on a secondary basis?

A. Secondary users of a frequency have equal rights to operate
B. Amateurs are only allowed to use the frequency at night
C. Amateurs may not cause harmful interference to primary users
D. Secondary users are not allowed on amateur bands

T1C05 What must you do if you are operating on the 23 cm band and learn that you are interfering with a radiolocation station outside the US?

A. Stop operating or take steps to eliminate the harmful interference

B. Nothing, because this band is allocated exclusively to the amateur service

C. Establish contact with the radiolocation station and ask them to change frequency

D. Change to CW mode, because this would not likely cause interference

T1B09 Why should you not set your transmit frequency to be exactly at the edge of an amateur band or sub-band?

A. To allow for calibration error in the transmitter frequency display
B. So that modulation sidebands do not extend beyond the band edge
C. To allow for transmitter frequency drift
D. All of these choices are correct