Technician Licensing Class

Technician Class Privileges

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Through

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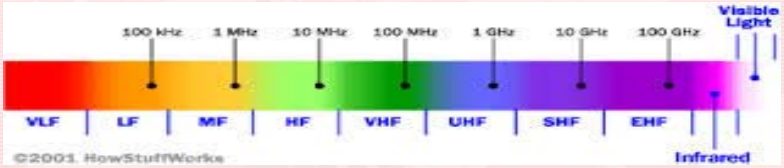
You have now shown an interest in getting into ham radio. Exactly what is this hobby in which you have shown an interest?.

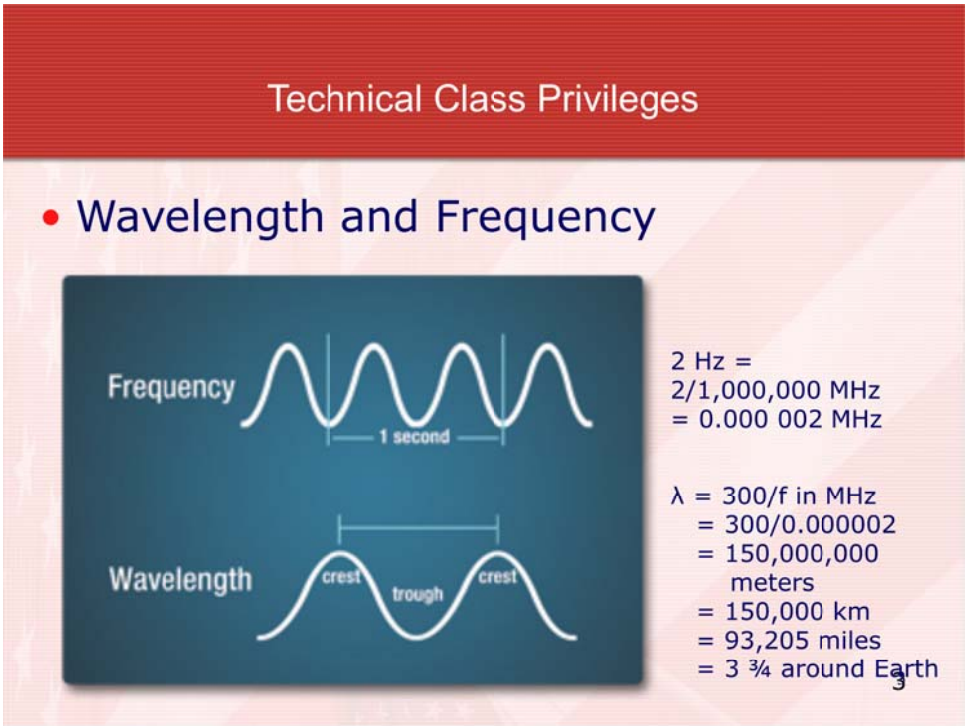
Technical Class Privileges

- Spectrum
  - All radio transmission are at a specific frequency,
    - WAKR is at 1590 kHz
    - W8PVP is at 147.270 MHz
  - FCC regulates electro-magnetic waves (radio waves) from 30 kHz to 300 GHz.



The FCC following the International Telecommunications Union (ITU) requirements has allocated ranges of radio frequencies to various services. An example is that the AM station WAKR is allocated the frequency of 1590 kHz. Within the 2 m band (144 to 148 MHz) the CFARC repeater is coordinated at 147.270 MHz.

Each decade of frequencies is broken into groups from Very Low Frequencies (VLF), Low Frequency (LF), Medium Frequencies (MF), High Frequencies (HF), Very High Frequency (VHF), Ultra High Frequency (UHF), Super High Frequency (SHF), and Extremely High Frequencies (EHF).

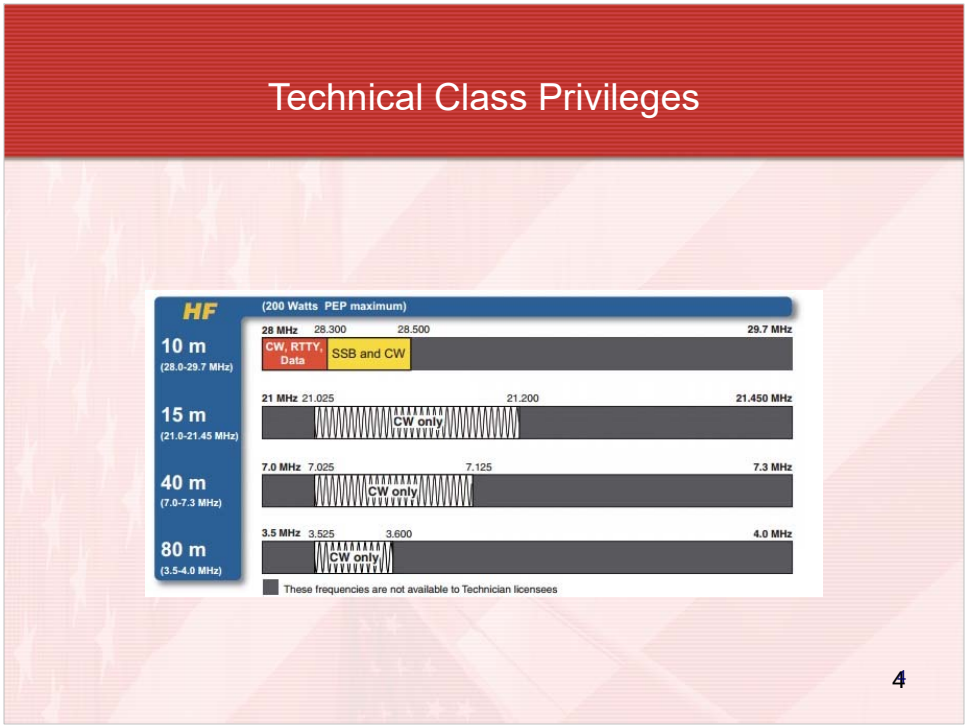


At a given point in the atmosphere the intensity of the electric field has a value. This value increases to a maximum then to zero then to a maximum in the opposite direction then to zero and back to maximum in the original direction. This is called a cycle and the magnitude is represented by a sine wave

The frequency (f) is the number of peak or trough of wave that passes a given point in space per second on its 300 meter per second trip through the atmosphere. In the example above the trough is being used and the frequency is 2 Hz. Hertz or Hz is the replacement for cycles per second.

The wave length (λ) is the distance between the peak or trough of the wave between in adjacent cycles. The frequency and wave length are related by λ = 300/f where f is in MHz (Megahertz) and λ is in meters. Mega is the Systems International prefix for million. That is radio science says 1,000,000 Hz is 1 MHz and not 1 million Hertz.

From the calculation above we see that a 2 Hz electromagnetic wave would be 150,000 km (kilometer) or 93,205 miles long. That is a distance of 3 and ¾ times around the earth. Kilo is the Systems International prefix for one-thousand (1,000).



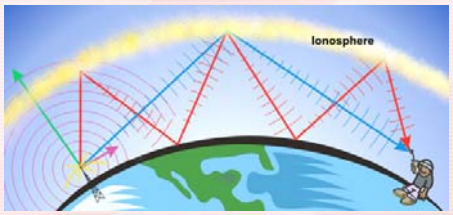
In the UHF and above bands, technician class licensees have the same privileges general and amateur extra class licensees.

In at the upper frequencies of 10 m the technician class allows us of digital modulation in the form of CW, RTTY (Radio Teletype) and other digital modes along with some phone SSB (Single Sideband). Each of these modulations are discussed later in the book.

On the lower frequencies of HF, that is 15, 40 and 80 meters, the technician class licensee is only allowed CW privileges. Phone privileges on these bands is reserved for General and Amateur Extra class licensees.

Technical Class Privileges

- Magic Band 50 to 54 MHz (6 meters)
- Supports skywaves which can go around the world
- Modes for Techs
  - CW and other digital modes
  - Amplitude Modulation (AM)
  - Single Sideband
  - Frequency Modulation (FM)



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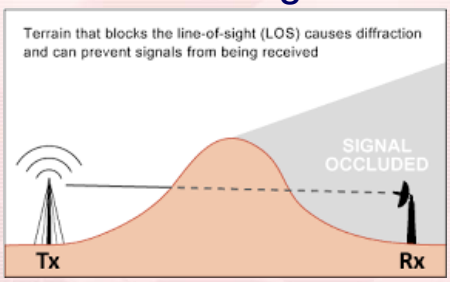
Amateurs don't get the entire radio spectrum. Radio location, safety services, broadcast, etc. get their share. We will now discuss some of the spectrum allocated to amateur radio.

The “magic band” or the 6 m band runs from 50 MHz to 54 MHz. The magic band requires the radiation from the Sun to heavily ionizing the upper atmosphere so that the 6 meter wave reflex back to earth and do not penetrate out into space. When the reflection takes place the amateur can communicate long distances. This is most prevalent during summer days and during peak solar activity.

Technical Class Privileges

- Very High Frequency or VHF
- 30 MHz to 300 MHz
- 6 m, 2 m and 1.25 m bands
- 2 m and 1.25 m are line of sight
  - Many 2 meter repeaters
  - FM
  - Satellite & EME
  - CW and other digital modes



The VHF or Very High Frequency bands are in the range of 30 MHz to 300 MHz or just above 10 meters up to 1 meter wave length. The amateur's have 6 m, 2 m, and 1.25 m bands. Most of VHF is line of sight. That is because above 30 MHz the radio wave only refracts a little and does not reflect back to earth. It travels for ever in outer space.

Some times 6 m bends back to earth. 2 m and 1.25 m never bend back to earth because of the ionosphere.

In the 2 m and 1.25 m bands you will find FM repeaters, amateur satellites, Earth-Moon-Eart bounce and many digital modes, including CW.

Technical Class Privileges

- Ultra High Frequencies or UHF
- 70 cm (440 MHz), 33 cm (900 MHz), 23 cm (1.2 GHz) and 13 cm (2.4 GHz)

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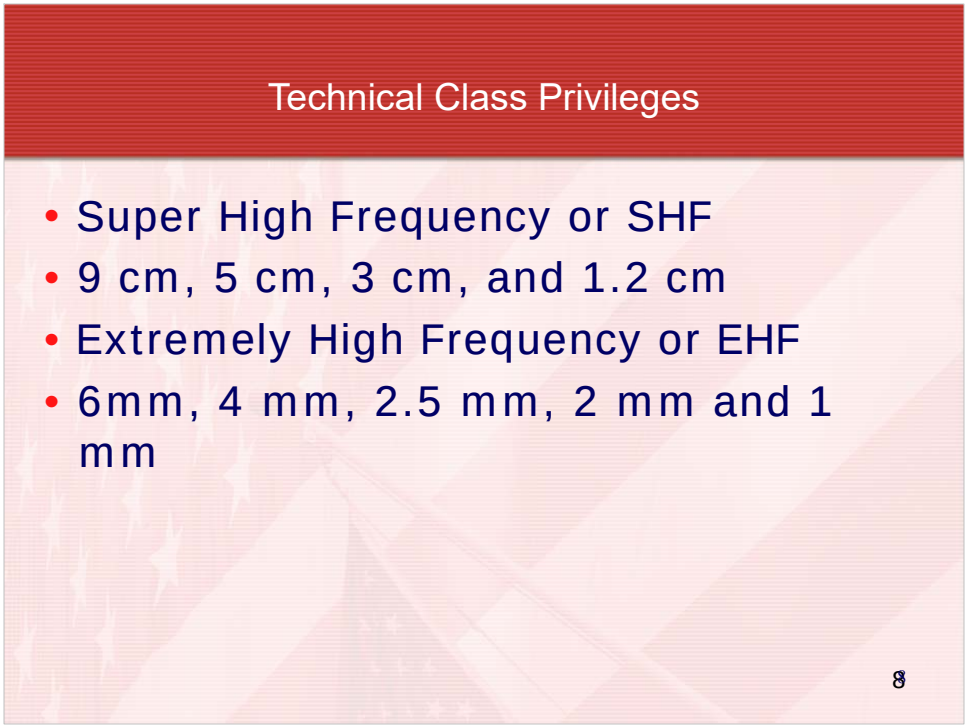
Above VHF is Ultra High Frequency (UHF) from 300 MHz to 3,000 MHz (3 GHz). All of this band is line-of-site. Technicians have full privileges in this band. The amateur's have the 70 cm (or 440 MHz), 33 cm (or 900 MHz), 23 cm (or 1.2 GHz) and 13 cm (or 2.4 GHz).

In UHF we see Amateur Television (ATV) appearing because the wide signal required for fast scan TV can be supported by the UHF bands. All the analog and digital modes are also supported.



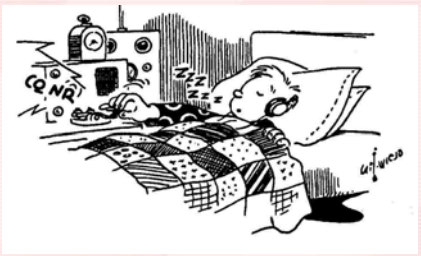
3,000 MHz (or 3 GHz) to 30,000 MHz (or 30 GHz) band is called the Super High Frequency (SHF) bands. Amateurs have 9 cm (3300 MHz or 3.3 GHz), 5 cm (5650 MHz or 5.65 GHz), 3 cm(10,000 MHz or 10 GHz) and 1.2 cm (24,000 MHz or 24 GHz).

From 30,000 MHz (30 GHz) to 300,000 (300 GHz) is the Extremely High Frequency (EHF) band. Amateurs have the 6 mm(47,000 MHz or 47 Ghz), 4 mm(75,500 MHz or 75.5 GHz), 2.5 mm(122,500 MHz or 122.5 GHz), 2 mm (134,000 MHz or 134 GHz) and 1 mm (241,000 or 241 GHz) bands.

In the SHF and EHF design and building of antennas and radios requires a great deal of knowledge and skill.

Technical Class Privileges

- High Frequency or HF
- 80 m, 40 m, 15 m is CW only for techs
- 10 m is cw and phone
- General class license is HF class



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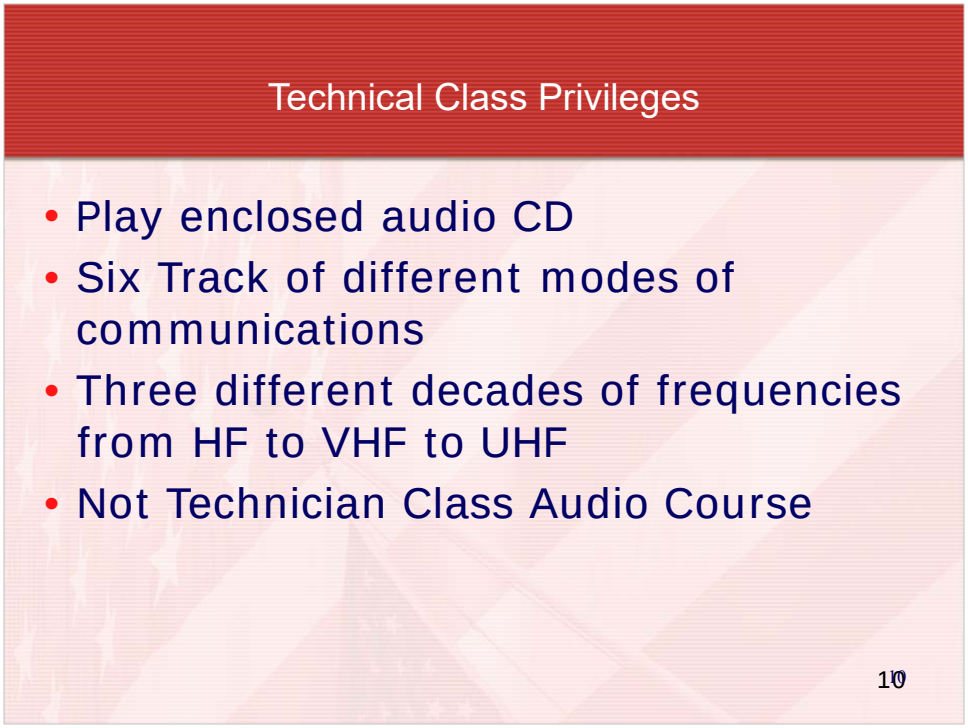
Now going the other way is the High Frequency or HF bands. This set of HF runs from 3 MHz to 30 MHz. Amateurs have the 10 m (or 28 MHz), 12 m (or 24 MHz), 15 m (or 21 MHz), 7 m (or 18 MHz), 20 m (or 14 MHz), 30 m (or 10 MHz), 40 m (or 7 MHz), 60 m (or 5.3 MHz channelized, 80 m(3.5 MHz) bands. World wide communications can be accomplished in the HF bands.

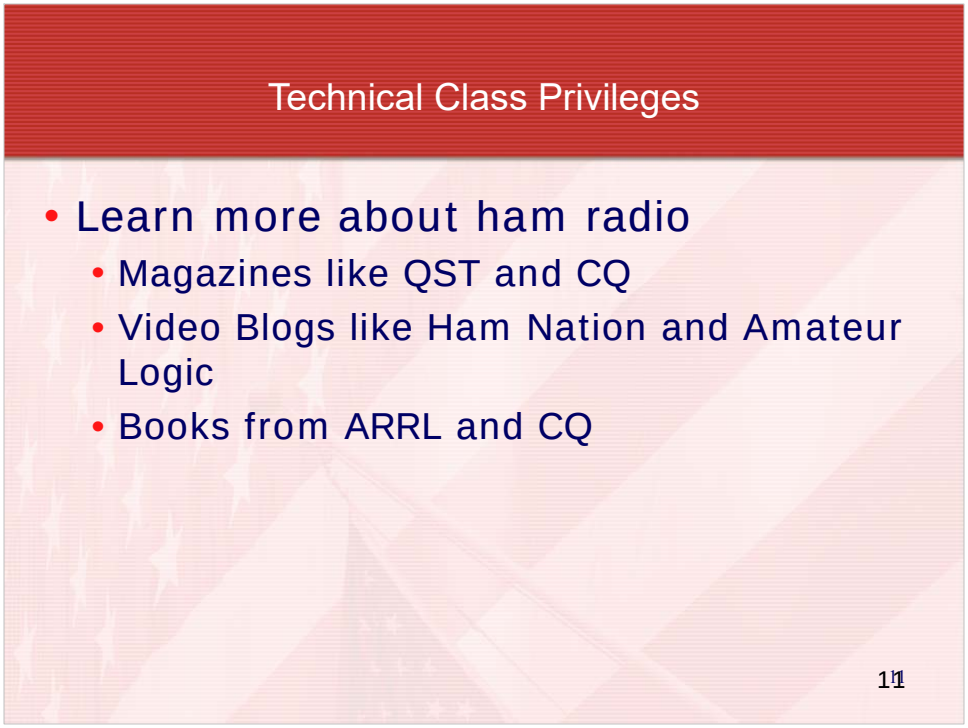
On 10 m near the upper end, technician has some phone privileges and CW. On 15m, 40 m, and 80 m, technician class licensees have limited CW and no phone privileges On the other amateur bands in HF, technician class licensees have no privileges

The Medium Frequency (MF) and Low Frequency (LF) bands have some amateur bands but none that the technician class licensees can use.



The audio CD that comes with the book has many examples of communication using the various amateur bands to which the technician class licensee has access. Note this is not the Technician Class Audio Course which is available from W5YI for an additional fee.

Various modes of communication are covered on the six tracks.



You can learn more about ham radio by reading QST from the ARRL and CQ magazine An archive of 73 magazine is also available online.

There are two video blogs that I watch regularly. They are Ham Nation and Amateur Logic TV. Both of these are available on the web and other streaming video sources. YouTube has several more.

There are many books available from both ARRL and CQ Publications, that discuss topics of interest to amateurs radio operators.

Technical Class Privileges

- An important word about shared frequencies
  - 1 ¼ m is shared with other services with amateur as secondary
  - 33 cm, 23 cm, 5 cm, 3 cm and 3 cm plus is shared with radiolocation with amateur as secondary
  - If amateur is interfering, then amateur must cease transmission

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Amateurs share many of the bands with other non-amateur users. These are often radio-navigation systems. Radio-navigation is the primary user and amateurs are secondary users. That means that we cannot interfere with the primary users and vacate frequencies if there is a conflict, even if the amateur was there first.

Any Questions???

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If there are any questions you may contact me via N8PZL@arrl.net.