

Interference

Technician Exam Preparation Class
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Session 15

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The FCC Rules

The FCC regulates any device that emits radio frequency emissions. Commercial radio equipment is regulated under Part 90 and amateur radio equipment under Part 97. Everything else is regulated under Part 15.

Part 15 devices are either “unintentional emitters” such as computers or TV receivers (they may generate RF signals as part of their operation but they aren’t intended to transmit them) or “low power intentional emitters” such as garage door openers, cordless phones, wireless microphones, etc. which must transmit / receive RF signals to function.

Part 15 devices must not interfere with Part 90 and Part 97 devices and must accept normal emissions from those devices.

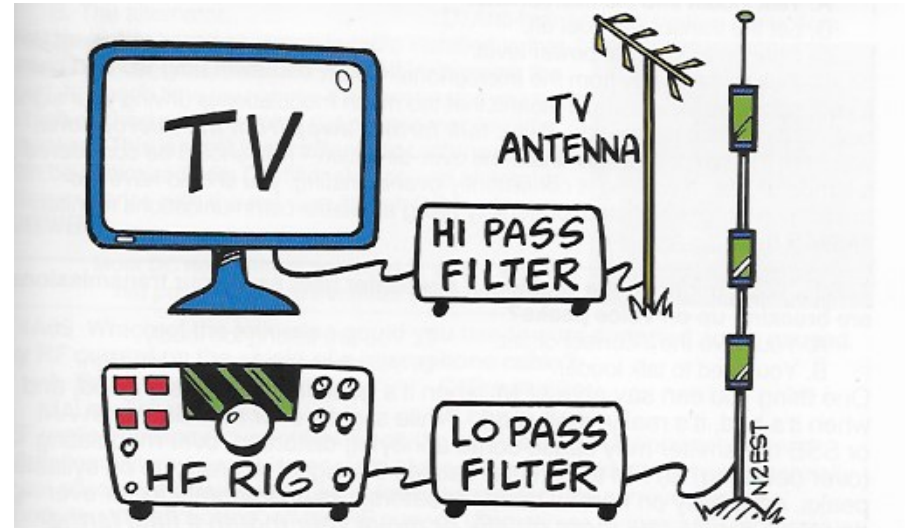
Who's at Fault?

If your neighbor feels his TV is being interfered with by your transmissions from a certified Part 97 device, the FCC says it's your neighbor's TV that's the problem....

The FCC relies on the manufacturer of Part 15 devices to do the required testing and submit the results as part of the application for Part 15 certification. Some foreign manufactories are less than comprehensive with their testing and compliance. Particular offenders for amateur radio are grow lights, LED lights, and wall-wart power supplies. Cheap TVs from Asia are emitter offenders and often don't include the filtering needed to accept normal interference from Part 90 / 97 devices,

Interference Mitigation

- First, carefully check your station equipment that all connections are tight and are made of quality materials
 - Does your TV see the interference?
- While you may employ a low-pass filter on your antenna feed line, never install a filter on your neighbor's equipment. That must be done by their service provider
- Snap-on ferrite chokes are helpful to prevent RF on microphone cables and phone lines



More on Interference

High-pass filter: allows high frequencies to pass, attenuates frequencies below the cut-off frequency.

Low-pass filter: allows low frequencies to pass, attenuates frequencies above the cut-off frequency

There are also “**bandpass filters**” (attenuates frequencies above and below a specific bandwidth) and “band-reject filters” (attenuates frequencies in a specific bandwidth, such as the FM band)

Distorted audio caused by RF current on the shield or your microphone cable can be eliminated by a ferrite choke.

Causes of interference:

- Fundamental overload (overmodulation, too much speech processing, etc.)

- Harmonics (multiples of fundamental operating frequency not being sufficiently suppressed)

- Spurious emissions (overdriving the amplifier, too much microphone gain, etc.)

I'm Being Interfered With!

- Check for local noise sources such as wall-warts, LED lights, USB chargers, etc.
- If it's coming from a neighbor?
 - Work with the neighbor to identify the source
 - Inform the neighbor of the relevant FCC regulations (you're licensed, their device is not)
 - Make sure your station meets good practice standards
- Use shielded ethernet cables to reduce propensity to couple
- Ferrite cores on cables where applicable

How About Mobile Interference?

- Connect power directly to battery and battery ground. Fuse both leads close to the battery
 - The cigarette lighter is a poor power source
- Alternator whine? Turn on the mobile radio's noise blanker. Employ DC / AC filters on the positive lead
- Poor audio reports?
 - Right frequency?
 - Sufficient voltage?
 - Bad location?



**Jot down any questions
you may have to ask
during the online meeting**