DuPage Amateur Radio Club

Repeater FAQs

Q: Someone also told me that CTCSS eliminates interference but that isn't happening.

A: You were given incorrect information. CTCSS only prevents you (or the repeater) from hearing co-channel traffic. Interference is prevented or, more appropriately, "managed" by adjusting distances between systems, while accounting for power levels and antenna height above average terrain. The frequency coordinator, in our case the Illinois Repeater Association, performs that management function. Our systems do not experience harmful interference from each other even though it is possible for us to hear Elkart on occasion and they undoubtedly hear us as well.

Q: I was able to bring up the Elkhart machine from my house when I didn't have CTCSS turned on. What gives? **A:** The Elkhart machine does not run CTCSS decode because the trustee tells me that he wants to keep the machine "open". That means that our base stations (not HTs) may bring up that machine but that is AA9DG's problem to solve if he so chooses. Repeater coordinating bodies strongly recommend that all systems run full time CTCSS. You can elect not to do that but you will not be afforded any protection from co-channel users.

Q: Wait a minute, if we unintentionally bring up the Elkhart machine, isn't that considered interference?
A: No more so than their machine unsquelching your rig. CTCSS allows repeaters to effectively share channels because it allows you to selectively use one machine while not hearing or keying up co-channel systems. This works well with FM because the strongest signal "captures" your receiver so you won't hear the weaker signals. Since the amateur service does not have a large number of channels available for repeater use it is not reasonable to think that any one system can have exclusive use of a frequency over as many miles as its signal can possibly reach. Of course, "band openings" increase coverage of all systems so you'll hear various systems pop up from time to time. This is why all frequency coordinators strongly advocate the use of CTCSS. Also, if a system operator complains to their coordinator or FCC about interference and is not running CTCSS, the coordinator and FCC will simply advise them to apply CTCSS.

Q: Someone said I should never run more than low power to keep from interfering with the other system. Is that true?

A: Keep in mind that FCC Rule 97.313(a) says, "An amateur station must use the minimum transmitter power necessary to carry out the desired communications." So, if you can make it into our repeater effectively with 2 Watts, you are violating that rule if you run 50 Watts to do the same thing. Keeping your power as low as necessary is not only required by law it also reduces the chances that you'll interfere with other users. That doesn't mean you shouldn't crank it up if you NEED to but don't just pump out the Watts simply because you can.

Q: If DARC is running CTCSS, how come I can bring up the machine with NO PL?

A: The 2 Meter and 220 machines have employed a little "trick" for quite awhile. If the machine has been idle for more than 60 seconds, CTCSS (107.2Hz on 2 Meters, 110.9Hz on 220) is required to bring up the machine. However, once the machine is up you can continue to use it without CTCSS. When you hear the "For Club Information..." message, the machine has gone back to requiring CTCSS to key up. This

gives us a fairly good compromise of co-channel protection while making the machine more "open". Of course, you can always dial "75" to switch off CTCSS if your rig does not have encode capability. NOTE: We will continue to operate this way as long as we do not experience undue problems with co-channel users keeping the system up. Our control operators can suspend this feature at any time and require full time CTCSS, even during nets, if necessary. We recommend that you program your rigs to always use at least CTCSS encode.

Q: But CTCSS tones make my audio sound lousy!

A: The Amateur Service is a communications service, not a broadcast service. Good communications practice is to keep voice audio energy in the range of 300Hz to 3kHz. CTCSS tones are in the range of about 65Hz to 250Hz so they can be filtered out without affecting your audio. Our repeaters filter out the CTCSS tone from your rig, insert accurate, low distortion, CTCSS tone on the transmit audio, and keep your audio bandwidth within the 300-3000Hz range. We also apply over-modulation limiting and a bit of compression to boost up the level of stations with weaker audio. As part of our 2 Meter frequency change we installed a lower distortion FM modulator so the CTCSS tone is much less audible than it was before. It's not "broadcast quality" but it is excellent communications quality.

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Q: Why does the 440 machine have much greater range than the 2 meter machine?

A: In a word, "gain." It is MUCH easier to get very high antenna gain on a 440 system than it is on 2 Meters. For instance, a 5dBd gain antenna on 2 Meters is about the same height as a 10dBd gain antenna on 440 -- we have a 10dBd gain antenna on 440. It is also possible that you have more gain on your antenna. We are also running with a compromise antenna on 2 meters that allows us to operate 2 meters and 220 from the same "stick". It has only about 3dBd gain on 2 Meters. We plan to change that this summer which should improve 2 Meter coverage.