Differences between CTCSS and DCS

CTCSS? DCS? Sub-channels? Yes, Continuous Tone Coded Squelch System. Introduced by Motorola in the early 1960s, as “Private Line” (also known as GE/Ericsson’s “Channel Guard”, E.F. Johnson’s “Call Guard”, RCA’s “Quiet Channel”), known by many as simply “tone squelch”. This is like a mains hum on the modulation, a constant musical note… almost as if someone is standing by you humming as you talk. The receiver can be set to only open its squelch if this tone is received. Any interference would not have the correct tone present, and so the radio would remain quiet. CTCSS was developed into a system with numerous standard tones to choose from, often 38. When CTCSS is used, the audio is filtered out below about 300Hz, so that the only audio frequency energy that ends up being transmitted between 0 and 300Hz is the CTCSS tone itself (almost always any one tone between 67 and 254.1 Hz). The tone is then sometimes called ‘sub audible’ because it’s below the range of THEN audible voice frequencies – but it would be audible if played on full range speakers without the filtering that CTCSS radio receivers also use on receive (we can hear down to 20Hz or so).

Some Amateur Radio Repeaters are configured, that the tone may not be transmitted only received, this allows the security of the the encode ability of your transceiver. so depending on your manufactures software it may be labeled Tone, or Encode. If the repeater is configured to transmit the same or different tone your setting may be labeled Tone Squelch, TSquelch, or Encode/Decode. The most common tone for or FRC District #5 is 103.5 CTCSS and 411DPL. This helps us from hearing other systems on the same frequency from other Florida Distracts when conditions are rolling. These stations are not “Bleeding Over” that is something completely different. They have the same rights on the frequency that you have.

DCS

DCS (Digital Coded Squelch) is digital data or code word that is transmitted with the voice audio. This data is sub-audible with most of it's energy below 300Hz. However is does have a wide bandwidth from 2 to 300 Hz. Unlike CTCSS (Continuous Tone Coded Squelch System) which uses continuous tones below 300 Hz., DCS uses digital data or code words. Each code word is unique and all code words may be used on the same channel without interference. At the end of the radio transmission and about 1/2 second before the transmitter un-keys, the radio will encode a 134 Hz tone that serves as a turn off code. The FM deviation level of DCS data should be in the range of 500 to 800 Hz.

Unlike CTCSS, DCS signal spectrum occupies considerable more bandwidth. A poor low frequency response in the transmitter or receiver may not seriously distort a single frequency tone signal but may seriously degrade a wide band signal containing multiple frequency components. The distortion risk is especially high if the frequency response delays the wide band frequency components.

DCS is operated at a low baud rate (134.4 bits per second) and because DCS may have extended periods of all ones and zeros almost all components in the transmitter and receiver chain must be coupled down to at lease 2 Hz or lower. This requirement means that certain transmitters and receivers must be modified before they are capable of DCS operation. Phase modulators, in particular, need special consideration because they theoretically are incapable of being directly modulated by dc, unlike direct FM modulation methods. Low frequency response is the primary requirement for DCS systems.

You will find that it is extremely important for the receiver and transmitter to be on frequency to achieve maximum performance of the DCS function. Errors in the transmitter and receiver frequencies show up a the discriminator output as a step function. Because of the long time constant required for the low frequency response, a step function can block the decoder momentarily. With DCS, error correction is necessary. But if too many errors occur, you may experience some blocking out of the decoder. Errors can occur because of unwanted low frequency energy. The DCS decoders can be effected by voice energy that falls below 300 Hz. Some radios do not remove this energy before transmission and can cause voice blocking of the decoder. A sub audio filter that removes this low frequency energy before the audio is re-transmitted is necessary for reliable DCS operation.

Now there are a few systems that use both the DCS and CTCSS on one side or the other and even using both.

CTCSS Encode DCS Decode – DCS Encode CCTCSS Decode – CTCSS/DCS ENCODE CTCSS/DCS Decode.

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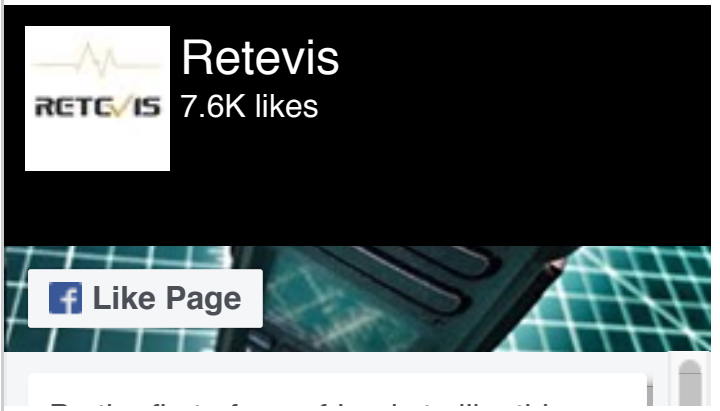

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