

# WHAT IS A REPEATER TONE?

Definition 1: A repeater tone, often referred to as CTCSS (Continuous Tone-Coded Squelch System), is a sub-audible tone used in radio communications to control access to a repeater. It helps prevent unwanted transmissions from activating the repeater by ensuring that only signals with the correct tone can open the squelch and allow communication.

Definition 2: CTCSS, also known as “PL tone” (Private Line), works by superimposing a low-frequency audio tone onto the transmitted signal. This tone will open the squelch when present. This effectively filters out all other signals that do not carry the specified tone. Additionally reducing the likelihood of unwanted interference from other users sharing the same frequency.

DCS takes this concept a step further by encoding digital data directly onto the transmitted signal. Instead of using audible tones, DCS encodes a unique digital code for each channel or group of channels. Receivers equipped with DCS decoding capability can be programmed to open their squelch when the correct digital code is received. This provides a higher level of selectivity and security compared to CTCSS

| Freq.<br>(Hz) | Freq.<br>(Hz) | Freq.<br>(Hz) | Freq.<br>(Hz) |
|---------------|---------------|---------------|---------------|
| 67.0          | 97.4          | 141.3         | 206.5         |
| 69.3          | 100.0         | 146.2         | 210.7         |
| 71.9          | 103.5         | 151.4         | 218.1         |
| 74.4          | 107.2         | 156.7         | 225.7         |
| 77.0          | 110.9         | 162.2         | 229.1         |
| 79.7          | 114.8         | 167.9         | 233.6         |
| 82.5          | 118.8         | 173.8         | 241.8         |
| 85.4          | 123.0         | 179.9         | 250.3         |
| 88.5          | 127.3         | 186.2         | 254.1         |
| 91.5          | 131.8         | 192.8         |               |
| 94.8          | 136.5         | 203.5         |               |

The following explanation is from:

<https://hamshackreviews.com/understanding-ctcss-dcs-with-tone-tone-squelch/>

## **Advantages of CTCSS and DCS**

Both CTCSS and DCS offer several advantages in amateur radio communication. By selectively filtering out unwanted signals, they help improve communication reliability. This is especially helpful in crowded or noisy operating environments. They also enhance security by ensuring only the signals with the correct tone or digital code are received.

In addition to their benefits, CTCSS and DCS have some limitations that operators should know. While effective at filtering out unwanted signals, they do not provide complete immunity to interference. In particularly congested frequency bands, it's still possible for signals to bleed through or for adjacent-channel interference to occur. Additionally, CTCSS and DCS require coordination and standardization among users to ensure compatibility and avoid conflicts.

## **Understanding CTCSS/DCS Value with Repeaters**

Despite these limitations, CTCSS and DCS remain valuable tools in the amateur radio operator's toolkit. Whether used to enhance communication reliability, improve privacy and security, or simply reduce unwanted interference. These technologies play a vital role in ensuring clear and effective communication on the airwaves. As technology continues to evolve, CTCSS and DCS are likely to remain essential components of amateur radio communication.

## **Tone and Tone Squelch**

Along with understanding CTCSS/DCS technology, Tone/Tone Squelch also play an important role in amateur radio. Also known as tone-coded squelch or a sub-audible tone. Also found in modern transceivers, tone squelch helps filter out unwanted signals and interference. It allows operators to focus on the transmissions they want to hear.

At its core, tone squelch works by adding a low-frequency audio tone to the transmitted signal. Also known as a Continuous Tone-Coded Squelch System (CTCSS) tone or PL tone (Private Line). Amateur radio transceivers can decode this tone, even if it is inaudible to the human ear. Each tone corresponds to a specific frequency. Receivers equipped with tone squelch capability can be set to only open their squelch when the correct tone is received.

The benefits of tone squelch are manifold. By selectively filtering out signals without the specified tone, tone squelch helps reduce the likelihood of interference from other users sharing the same frequency. This is particularly useful in crowded or busy operating environments, such as repeater systems or contesting events, where multiple users may be transmitting simultaneously.

## **Key Advantage of Tone Squelch**

One of the key advantages of tone squelch is its flexibility and versatility. Operators can choose from a wide range of CTCSS tones, typically ranging from 67 Hz to 254 Hz, allowing for precise tuning and customization based on specific operating requirements. This versatility extends to both transmit and receive settings, enabling operators to configure their radios to transmit with a specific tone while receiving on a different tone or without tone squelch altogether.

Despite its many benefits, tone squelch is not without its limitations. In particularly congested frequency bands, it's still possible for signals to bleed through or for adjacent-channel interference to occur. Additionally, tone squelch requires coordination and standardization among users to ensure compatibility and avoid conflicts. However, when used properly and in conjunction with other best practices in amateur radio operation, tone squelch remains an invaluable tool for improving communication reliability and reducing interference on the airwaves.

## **Tying Them Together**

The PL tone can be positive or negative, and has multiple frequency choices. The Tone is telling the repeater to resend the transmission. While the Tone Squelch tells the receiver to open the radio squelch. Advantages of CTCSS and DCS

Both CTCSS and DCS offer several advantages in amateur radio communication. By selectively filtering out unwanted signals, they help improve communication reliability. This is especially helpful in crowded or noisy operating environments. They also enhance security by ensuring only the signals with the correct tone or digital code are received.

In addition to their benefits, CTCSS and DCS have some limitations that operators should know. While effective at filtering out unwanted signals, they do not provide complete immunity to interference. In particularly congested frequency bands, it's still possible for signals to bleed through or for adjacent-channel interference to occur. Additionally, CTCSS and DCS require coordination and standardization among users to ensure compatibility and avoid conflicts.

## **Understanding CTCSS/DCS Value with Repeaters**

Despite these limitations, CTCSS and DCS remain valuable tools in the amateur radio operator's toolkit. Whether used to enhance communication reliability, improve privacy and security, or simply reduce unwanted interference. These technologies play a vital role in ensuring clear and effective communication on the airwaves. As technology continues to evolve, CTCSS and DCS are likely to remain essential components of amateur radio communication.

## **Tone and Tone Squelch**

Along with understanding CTCSS/DCS technology, Tone/Tone Squelch also play an important role in amateur radio. Also known as tone-coded squelch or a sub-audible tone. Also found in modern transceivers, tone squelch helps filter out unwanted signals and interference. It allows operators to focus on the transmissions they want to hear.

At its core, tone squelch works by adding a low-frequency audio tone to the transmitted signal. Also known as a Continuous Tone-Coded Squelch System (CTCSS) tone or PL tone (Private Line). Amateur radio transceivers can decode this tone, even if it is inaudible to the human ear. Each tone corresponds to a specific frequency. Receivers equipped with tone squelch capability can be set to only open their squelch when the correct tone is received.

The benefits of tone squelch are manifold. By selectively filtering out signals without the specified tone, tone squelch helps reduce the likelihood of interference from other users sharing the same

frequency. This is particularly useful in crowded or busy operating environments, such as repeater systems or contesting events, where multiple users may be transmitting simultaneously.

### **Key Advantage of Tone Squelch**

One of the key advantages of tone squelch is its flexibility and versatility. Operators can choose from a wide range of CTCSS tones, typically ranging from 67 Hz to 254 Hz, allowing for precise tuning and customization based on specific operating requirements. This versatility extends to both transmit and receive settings, enabling operators to configure their radios to transmit with a specific tone while receiving on a different tone or without tone squelch altogether.

Despite its many benefits, tone squelch is not without its limitations. In particularly congested frequency bands, it's still possible for signals to bleed through or for adjacent-channel interference to occur. Additionally, tone squelch requires coordination and standardization among users to ensure compatibility and avoid conflicts. However, when used properly and in conjunction with other best practices in amateur radio operation, tone squelch remains an invaluable tool for improving communication reliability and reducing interference on the airwaves.

## **Tying Them Together**

The PL tone can be positive or negative, and has multiple frequency choices. The Tone is telling the repeater to resend the transmission. While the Tone Squelch tells the receiver to open the radio squelch.

Tone can be used without using a tone squelch. When [programming your radio for a repeater](#), you need to know these settings. The PL, direction, and Tone/Tone Squelch, plus knowing how to set them in your radio. To get this you can talk to someone that uses the repeater, or use a site called [Repeaterbook](#).

### **Conclusion**

Understanding CTCSS/DCS is powerful for enhancing communication reliability and reducing interference. By selectively filtering out unwanted signals based on specific tones, tone squelch helps operators maintain clear and effective communication in even the most challenging operating environments. As the amateur radio community continues to evolve and adapt to changing technologies and operating conditions, tone squelch is likely to remain a vital component of the amateur radio operator's toolkit for years to come.

Tone can be used without using a tone squelch. When [programming your radio for a repeater](#), you need to know these settings. The PL, direction, and Tone/Tone Squelch, plus knowing how to set them in your radio. To get this you can talk to someone that uses the repeater, or use a site called [Repeaterbook](#).

### **Conclusion**

Understanding CTCSS/DCS is powerful for enhancing communication reliability and reducing interference. By selectively filtering out unwanted signals based on specific tones, tone squelch helps

operators maintain clear and effective communication in even the most challenging operating environments. As the amateur radio community continues to evolve and adapt to changing technologies and operating conditions, tone squelch is likely to remain a vital component of the amateur radio operator's toolkit for years to come.