

## The Difference between VHF and UHF radios and Beyond

Amateur radio has a long history of being a reliable communication method through the utilization of radios. Some of the early modes of amateur radio are Morse code, CW, and Medium Frequency and more. After the initial stages of amateur radio then there came the VHF and UHF radio. In fact, in 1908 a Wireless Telegraph Club of Columbia University started which later got renamed to the Columbia University Amateur Radio Club. Amateur radio is not used for profit or gain but can be utilized as a hobby, in emergencies, a trunked systems radio, satellites, and beyond but to begin this discussion and to explore amateur radio in depth, it is important to start with the VHF and UHF radio.

VHF stands for very high frequency and it is a frequency in the radio spectrum from 30 MHz to 300 MHz that people utilize to communicate. UHF stands for ultra-high frequency and has a frequency of 300 MHz to 3 GHz. The difference in frequencies of the VHF and the UHF radio is a very important factor in radio communication. Since VHF has frequencies of 30 to 300 MHz, this means that VHF is the more powerful frequency in regards with how far the frequency can go when compared to UHF. This could be illustrated with a metaphor of VHF where according to Rugged (2016) “[VHF is like] the larger wave [where it can get] over or around [a] rock, while the smaller wave [like a UHF] is drastically deflected leaving less water to go around the rock.” What this metaphor attempts to illustrate is that VHF have stronger and wider radio waves and because of this can travel longer distances than UHF. VHF can be effectively used for long distance communication in comparison with UHF.

In addition, VHF are best utilized in outdoor settings and areas where there is a large geographical area. It is also best to utilize in construction sites, and outdoor venues like festivals that have a large area. However, though most amateur radio operators utilize VHF to make contacts and to talk on amateur radio outside, UHF is just as important with its short radio waves. The UHF frequency is important because UHF is best utilized indoors, in buildings and in stadiums or on racetracks for example. Warehouses as well utilize UHF radios. Depending on the area for where you want to communicate, deciding on whether to utilize a VHF or a UHF can make the communication much clearer.

This distinction is very important in disaster and emergency communication which utilize both radios and frequencies. For example a reason why the NYC Transit Police Department utilized VHF for close to 50 years is because of the range that VHF gave them. The Port Authority as well as the Subway trains also utilize VHF because of the long ranges that it provides them with. However, the NYPD and the NYC Housing Police used UHF because UHF provides better in-building coverage and is highly reliable in building circumstances. In addition, according to Urgent Communications Administrator (2011) “to deal with the issue of in-building coverage, high power Kenwood UHF TK8150 portables have been issued to all fire divisions and battalions, as well as EMS.”

VHF and UHF frequencies are powerful tools that one can utilize to continue radio operations. However, depending on the type of physical terrain that you are using the radio in, warehouses and or short ranges where the short frequency waves can be heard clearly while the VHF is used for larger and longer distances. Depending on the areas where an emergency is in, it could utilize UHF or VHF and or both. Therefore, it is important to navigate UHF and VHF frequencies closely and choose the correct frequency that will work for your specific need. Sometimes, an organization needs to utilize a stronger radio system for communication and this radio system that utilizes elements of both the UHF and the VHF capabilities is the Trunked Radio System.

The Trunked Radio System started because of the problem of when a frequency or spectrum has too many users. According to The RadioReference Wiki (2020) “spectrum crowding, especially in urban areas ...eventually led to the development of Trunked Radio Systems. Trunking is the use of several repeaters, on different frequencies in the same band, operating together under computer control to allow the pooling of resources for several agencies.” What the trunked radio system is then is that it is an evolved much easier to use radio that utilizes a computer to be able to handle a larger level of VHF and UHF traffic. This radio is much more efficient in controlling traffic and actually does so with the help of the computer that automatically opens various channels for people to speak on. Nevertheless, the issue with the trunked radio system is that it is very expensive and this is one of the reasons why the NYPD did not utilize it when it first came out because it was too expensive. Perhaps the most impressive quality besides the Trunked Radio System though is the capability of Amateur Radio operators to operate via satellites.

This capability of Amateur Radios started in 1961 during the era of the Cold War. According to Space Today Online (2006) “A California group of Amateur Radio operators, calling itself Project Oscar, built the first Amateur Radio satellite in 1961.” This awesome capability of Amateur Radio for communication purposes is one of the main reasons why Amateur radio is still around today.

Amateur radio’s usage of VHF and UHF and how it has evolved is quite exceptional. VHF and UHF can be used in radio as a hobby and or in emergency communication. Also, if the frequencies of the amateur radio system gets overcrowded, a computer based radio system called the Trunked Radio System could be used to make communication clearer. However, utilizing a Trunked Radio System could be costly so the cost of the radio system is always an issue. This is not the only evolved version of VHF and UHF but rather it was proven in early 1961 that amateur radio can also be sent to space via satellite for communication. This all started with some radio enthusiasts wanting to communicate. Due to this want, the amateur radio community has grown and left its footprint all around the world.

## References

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