

Cable or Air? – What's your choice?

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Most TVs default to Cable, so if you get your TV programming via a cable company like Spectrum or Frontier, you don't have to answer this question. But if you want to get "broadcast TV," you will have to select "air" when given the choice. (Your specific television may use the term "broadcast" or over the air (OTA) instead of "air".)

Way back in the 30's/40's when Television was being developed, the inventors had to establish the bandwidth for a broadcast television channel. Based on the video and audio information needed to be packed into the signal, the decision was made to allocate 6 MHz to a broadcast channel. So every television broadcast channel signal was designed to take up 6 MHz of bandwidth. Remember, that was in the prehistoric days of Analog television signals. We are now in the digital television age, as evidenced by the many nice slim, large screen TVs around us. If you'll remember, this transition took place way back in 2009, June 12, 2009, to be exact. That was the day our old Television sets could no longer bring us entertainment and information unless we acquired an analog to digital converter box.

The government even gave us the opportunity to purchase two of these devices for \$35 each, in advance of the transition, so we could make the transition and not miss a single television show. (I only had one TV at the time, so I only purchased one of these devices, and believe it or not, I still have it. I used it for a while until I stepped into the digital television age. Anybody still need a converter box?)

Now we have digital television, but we still have the 6 MHz television channel bandwidth. The bandwidth of a signal is related to the modulation scheme used to create the modulated signal. The modulated signal must fit within the bandwidth allocated, otherwise, the Federal Communications Commission (FCC) will be very unhappy. (First, just a quick technical explanation. Modulation is the process of putting a signal (video or audio) on a carrier frequency signal. The carrier frequency signal (think WCTQ is on 96.3 MHz) is the frequency used to carry the signal from the transmitting antenna to the receiving antenna. Then at the receiving television set, the modulated signal is demodulated to recover the original signal. End of explanation.)

So when the transition to digital was being explored, in the latter days of the last millennium and the early days of this millennium, the broadcast industry and the cable TV industry had to decide what type of modulation scheme to use with the new digital television signals. (By the way, here's a nearly useless piece of trivia, the analog television modulation scheme was called Vestigial Sideband modulation.) When TV was invented there was only one industry, that was the broadcast industry, but now there two ways of getting television signals to

customers, over the air, and over the cable. Due to the differences in transmitting signals over the air and transmitting signals over a cable, the two industries decided on two different modulation schemes. Here are two other pieces of trivia. The Over the air signal is modulated using an Eight Level Vestigial Sideband (8VSB) modulation technique and the cable signal is modulated using a Quadrature Amplitude Modulation (QAM) technique.

The meaning of each of these is not germane to this discussion except for the fact that they are different. And it is that fact that forces the television manufacturer to include both types of de-modulators on the television. So, all digital televisions are capable of using either signal. Most, if not all, are defaulted to use the cable signal, probably because nowadays most people receive their television from a cable TV provider rather than over the air. So, if you are a cord-cutter, you will have to go into the settings of your TV and find the location where “Air” or “Cable” is chosen. Once you have made the “Air” choice, you will have to let the TV scan for all of the channels in your area. Once scanned, your TV will be set up for your local, over the air, television channels. (A cord cutter is someone who has decided to stop receiving their television entertainment from their cable provider, which means they no longer get cable channels. They receive over the air television channels using an antenna, and they stream entertainment from such providers as Netflix, Amazon Prime, and Hulu, over their internet connection. Streaming services require a subscription, and there are some streaming providers that include cable channels.)

Now we still have a 6 MHz broadcast channel but, because we have digital modulation schemes which are more efficient than the older analog modulation schemes, the television stations can now fit more channels into the 6 MHz bandwidth. That means that where we may have had one analog channel, say channel 8, we now have multiple digital sub-channels, maybe 8.1, 8.2, and 8.3. In fact, WEDU, the local educational channel has six sub-channels, 3.1, 3.2, 3.3, 3.4, 3.5, and 3.6, all transmitted within the basic 6 MHz bandwidth (isn't digital wonderful). Typically the base sub-channel, the .1 channel is a High Definition (HD) channel, and the other sub-channels are Standard Definition (SD) channels. (High or Standard Definition refers to the quality or resolution of the picture displayed on the television screen. HD is referred to as 1080p or sometimes 720p, while SD is referred to as 480p. (The number is the number of horizontal lines used to create the picture and the “p” indicates a progressive scan, as opposed to an interlaced scan that was used for analog TV.) SD is about the same quality as the old analog TV picture. HD channels will also typically provide 5.1 audio, but that's entirely another story.)

So it turns out that the original decision to allocate 6 MHz for a television channel seems to have been a pretty good design decision. Or, at least the designers of the digital television equipment have been very clever in using the allocated bandwidth to their and our advantage.