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- CHIEF ENGINEER AT WNCN CBS17
- PITT COMMUNITY COLLEGE WITH A DEGREE IN ELECTRONICS ENGINEERING TECH.
- I BEGAN MY BROADCAST ENGINEER CAREER AT WNCT IN 2017
- I STARTED AT WNCN AT THE END OF 2022 AS THE ASSISTANT CHIEF
- MOVED INTO THE CHIEF ROLE MID 2023



## Advanced Television Systems Committee 3

# WHAT IS THE ATSC

"The Advanced Television Systems Committee, Inc. is an international, nonprofit organization developing voluntary standards for digital television."

-www.atsc.org

# HISTORY OF ATSC

- 1941 NTSC (National Television System Committee) was the first American broadcast standard
- 1953 NTSC II (System M) allowed television to be broadcast in color
- 1996 ATSC is approved by the FCC
- 1998 ATSC consumer receivers hit the market
- 1999 FCC requires ABC, CBS, FOX, & NBC affiliates in the top 10 markets to start broadcasting an ATSC signal (Small markets to follow)
- 2009 The FCC requires almost all TV stations to stop broadcasting NTSC analog signals

## WHAT IS ATSC 1

- H.264 encoding for video and audio compression
- Supports 5.1 surround sound with Dolby Digital AC-3
- Can handle up to 1920x1080 at 60fps progressive and 30fps interlaced
- 8VSB (Vestigial Sideband Modulation)
- Is the current "standard" for American television

#### MPEG-4 VS MP4 VS H.264

- IN SHORT MPEG-4 IS A SERIES OF COMPRESSION ALGORITHMS THAT SHRINK DOWN THE FILE SIZE/BITRATE OF A DIGITAL AV SIGNAL.
- MP4 is short for "MPEG-4 part 14"
- H.264 OR AVC IS "MPEG-4 PART 10" BY FAR THE MOST COMMON

## WHAT IS ATSC 3

- H.265 encoding for video and audio compression
- Up to 7.1.4 surround sound with Dolby Digital AC-4
- Can handle resolutions up to 7680x4320 "8K" at 60fps
- Uses OFDM (Orthogonal Frequency Division Multiplexing) digital modulation
- Is available but not widely used

#### ATSC 1 VS ATSC 3

- H.264 encoding
- 5.1 surround sound
- Up to 1920x1080
- 8VSB modulation
- Very common

- H.265 encoding
- 7.1.4 surround sound
- Up to 7680x4320
- OFDM modulation
- Not common

## H.264 VS H.265

H.265 is capable of greater compression than H.264 without sacrificing quality, allowing for higher resolution video to fit inside the same bandwidth.

However, H.265 also requires more processing power from the receiving device.

#### 5.1 VS 7.1.4 AUDIO

5.1 audio consists of 5 ear-level speakers and one LFE (Low Frequency Effect) speaker.

7.1.4 audio consists of 7 ear-level speakers, one LFE speaker, and 4 overhead speakers.

#### 1920X1080 VS 7680X4320

- A 1920x1080 image will have just over 2 million individual pixels.
- A 7680x4320 image will have a little over 33 million.

Thanks to the encoding protocols used in ATSC 1 & 3 not every pixel is updated on every frame.

#### BAD MATH

H.264 uses a 10bit color depth meaning there are 1,024 levels of red, green, and blue. That means that there are 1,073,741,724 different colors that each pixel can be. Multiply that by the number of pixels and you get 2,226,511,046,246,400 possible 1920x1080 images.



#### **8VSB VS OFDM**

Amplitude modulation
Frequency modulation

 Uses 8 different signal
Transmits multiple levels to represent data

streams of data simultaneously

## WHAT ABOUT ATSC 2?

ATSC 2 was a planned revision to ATSC that incorporated many of the features included in ATSC 3, but by the time it was set to be completed many of the technologies it utilized were outdated.

#### TRANSITIONING FROM ATSC 1 TO ATSC 3

- Currently there is no timeline for a forced transition by the FCC
- The game plan is for each station in a market to all broadcast their ATSC 3 signals off of the same transmitter, then later down the line, once most users have ATSC 3 receivers we would swap to individual transmitters.

#### MY THOUGHTS Pros

- ATSC 3 will allow us to broadcast our signal in a smaller bandwidth without a loss of quality, to send a higher quality image in the same bandwidth, or to keep quality and bandwidth the same but add more sub channels.
- ATSC 3 can give us a much more accurate idea of the number of viewers watching our station at any given time. This number is one of the factors that dictates commercial prices.
- Your TV signal could have clickable interactive content (working alongside an internet connection)
- Targeted advertisements

#### MY THOUGHTS Cons

- Pretty much all TV station's infrastructure is geared towards 1920x1080 or lower resolutions. Transitioning to 4K would mean a full redesign.
- Other than a higher resolution there is not much benefit to the average user. Without the FCC subsidizing the tuners like they did in 2009 viewers do not have a reason to make the swap.
- At least for now ATSC 3 tuners are hard to find, and the ones that are out there can be relatively expensive.
- Targeted advertisements

Electronics > Computers & Accessories > Computer Components > External Components > External TV Tuners



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