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Simulcast Implementation
The Basics

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Why Simulcast?

- Spectrally efficient technology
- Many rural areas near suburban or metropolitan areas cannot get new frequencies
- Coupled with receiver voting improves both talk-in and talk-out
- Modern technology reduces the maintenance requirements
Simulcast Basics

- Frequency stability – Use GPS disciplined oscillators.
- Audio adjustments –
  - Phase/timing about 80 usecs is the maximum. Less if high frequency tones are used. About 30 degrees of phase difference maximum
  - Includes CTCSS
- Modulation recovery all sites within .2 dB or better.
- Use a test receiver that can receive a signal of at least 25 dBQ. Monitor audio at the discriminator.

Simulcast Basics

- Audio speech processing can make a difference
- Recommend using a common audio source for both voice and CTCSS to make adjustments easier
- Channel bank cards need to go down to 5 Hz
- Can use CTCSS generated at each site but adjustments are more difficult
- Do not guess at the adjustments
Simulcast Basics

- Control your RF through the use of antenna patterns. Long range overlap can be a big problem at VHF unless there is significant terrain blocking.
- The transmitter spacing is not the controlling factor, it is the size of the overlap area. It needs to be 15-16 miles maximum. At VHF, use antennas with 10-12 degrees of downtilt to keep the signal out of the horizon.
- Remember the overlap areas are those with signals from two or more sites that are within 15-20 dB in level from each other.

Coverage and Delay Interference
Wideband versus Narrowband
Simulcast Implementation

- Do not build the system in the field!
  - It will take many trips
  - Wasted time
  - Help the gas stations

- Fully stage it in the shop!
  - Equipment/parts across the room
  - Testing and level setting is a walk not a drive
  - Time saved is many dollars earned
Simulcast Implementation

- This is not staging!

Staging is building all of the equipment into their racks, making all of the interconnections, doing the programming, and setting levels. The racks are taken to the sites fully assembled and ready to go.
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- Complete staging seems like more work since people like to see things at the sites
- If done correctly, virtually all the troubleshooting, level setting, etc. will be done before installation
- Be sure to do make sure all of the transport links, including RF links work. Set them up in the staging area with “real RF” or whatever the interconnection is doing the transport
- This process will take days or weeks off the project installation effort
- No whining about how much work it is

Simulcast Implementation

- Everyone wants a successful project
- Success equals
  - Happy customer
  - Project profit
  - Low/easy maintenance
  - Small number of warranty calls
- Resist the temptation to cut corners
Questions?

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