



Digital Duplex Repeater

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Description:

By leveraging the Cross-band mobile repeater system, John used this method to devise a fixed base digital station repeater using a cavity filter (duplexer) to isolate transmitted and received signals within our SCDOT frequency band. This digital cross-band/repeater combination is at the Sumter 350 ft Tower and significantly enhances radio coverage in the Sumter area by allowing simultaneous transmission and reception on a single antenna, improving signal strength and eliminating dead zones. It provides increased range and clearer, reliable communication for the vehicle's mobile NX5600 digital radios. Also, as part of the team, Teresa Beeson physically constructed the specialized cables needed to build the Cross-band Repeater and beyond the initial hardware build, Adam Cobbs was instrumental in conducting comprehensive system range tests and gathering vital data that validated the Crossband system's real-world capabilities.

How does this Innovation benefit SCDOT:

This system provides several key benefits for the Sumter area, including expanded radio coverage, clearer and more reliable signal quality, reduced communication dead zones, and simplified infrastructure through the use of a single antenna for transmitting and receiving.

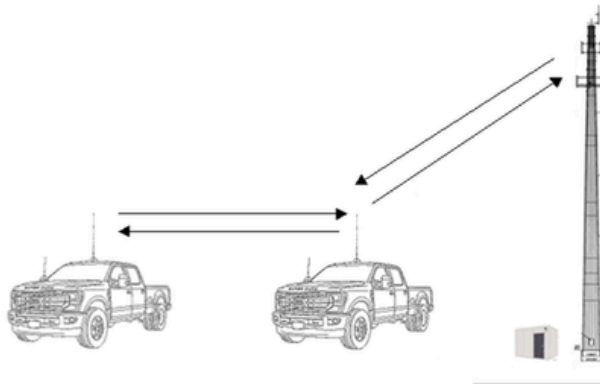
The duplexer plays a critical role in filtering interference and allowing the repeater system to operate efficiently, which is especially valuable in crowded VHF/UHF frequency environments like Sumter.





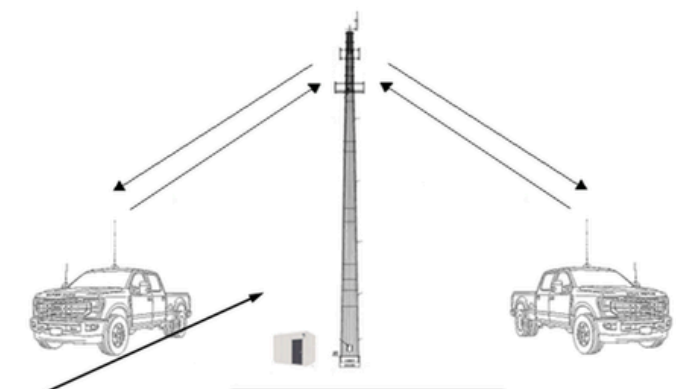
Digital Duplex Repeater

BEFORE



30 Mile coverage from Radio Tower to SCDOT Vehicle
10 mile range from vehicle to vehicle

AFTER



Duplex Repeater

30 Mile coverage each side of Radio Tower to SCDOT Vehicle
Total 60 mile range from vehicle to vehicle