

# Distributed Antenna Systems

Services by  
**TELEVATE**

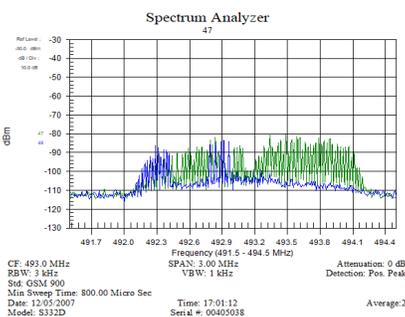
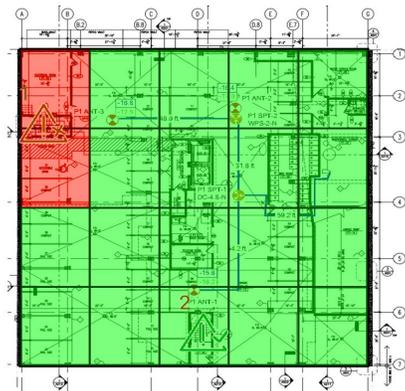
Televate is uniquely qualified in the development of distributed antenna systems (DAS), from simple single antenna and amplifier systems to fiber fed systems serving hundreds of bi-directional amplifiers (BDAs) and many miles of radiating coaxial cable. Our team has a deep understanding of the various DAS technologies, their applications, and risks. Our design experience includes cellular/LMR hybrid systems, as well as channelized (Class A) and broadband (Class B) approaches. We are intimately familiar with the communications limitations DAS systems can solve and equally knowledgeable about how a poorly designed system can result in DAS coverage issues, or worse, how they can adversely affect host site performance and place mission critical communications at risk.

## *Design*

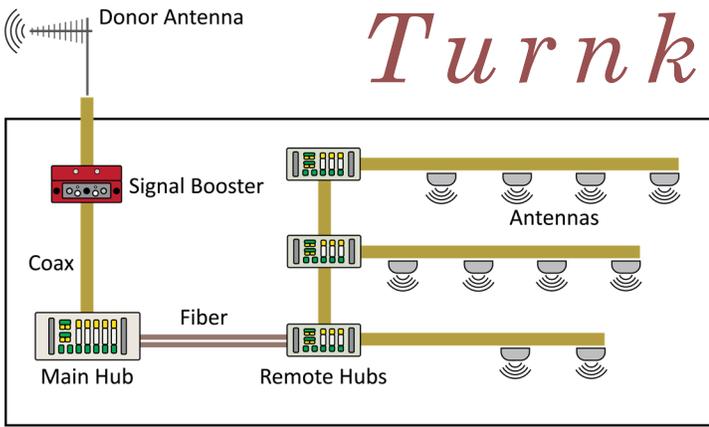
Our engineers design DAS systems that meet mission critical requirements and serve the unique needs of land mobile radio systems – systems that can support Project 25 Phase II requirements, balance power distribution, avoid overdriving amplifiers, mitigate noise/interference impacts on host systems, mitigate bleedover coverage issues, and address near-far signal challenges. Each design is customized to the specific requirements of the jurisdiction, including high-priority locations such as stairwells, basements and underground parking and tunnels. Our team will develop detailed system designs and bills of material (BOM) necessary, including the BDAs, antennas, fiber, coaxial cable, and other equipment needed to implement a comprehensive distributed antenna system.

## *Testing and Troubleshooting*

Televate offers a comprehensive suite of testing services that help customers determine the effectiveness of DAS implementations and whether a DAS implementation is functioning according to the design requirements. And when it's not, Televate engineers can identify, isolate, and mitigate issues, such as insufficient signal levels, RF interference, system installation or configuration errors, or a host of other potential performance gaps and problems.



Our team is experienced in cellular and land mobile radio system evaluation and has the latest equipment needed to conduct routine and advanced system testing. This includes testing according to fire code and TSB-88 standards to ensure the DAS implementation meets public safety grade requirements and signal level testing in common DAS frequency bands – from VHF to 5 GHz, as well as bi-directional voice quality tests for all major land mobile radio and cellular technologies. DAS measurement testing and analysis facilitate the determination of intermodulation, receiver desensitization, and other unwanted artifacts of radio frequency systems. Our standard deliverables include high-quality maps and diagrams overlaid on floor plans to identify system performance results and highlight DAS network strengths and problem areas.



# Turnkey Solutions

Televate and its industry partners can deliver quality turnkey DAS solutions to building owners, wireless service providers, property managers, and others. Alongside our partners, we bring substantial collective experience to provide design, installation, configuration, and testing of complete DAS systems using best of breed hardware and systems. Televate will wrap these services around comprehensive project management processes, including coordination and

communication with Authorities Having Jurisdiction (AHJ), and supporting activities to achieve our customers' objectives on time, on budget, and with superb quality.

## Experience In Action

Televate was retained by a major metropolitan transit authority to evaluate and remedy poor audio quality on underground radio communication. The underground DAS consists of more than 1,000 bi-directional amplifiers in two frequency bands fed by fiber and serving dozens of transit stations and many miles of underground track. Televate engineers conducted a comprehensive testing of the network and provided network engineering analysis of the affected service areas, provided coverage mapping, and delivered a novel plan to remediate the identified issues. Other vendors recommended major changes costing tens of millions of dollars, while Televate's methodical approach resolved the issues at a fraction of the cost and in a fraction of the time. Televate's efforts resulted in a network performance of over 95% reliability of high-quality radio service across the underground system. Televate also provided guidance and engineering support to replace the antiquated architecture with a modern, easier-to-maintain solution supporting both cellular and land mobile radio service.

## Policy and Administration Management

Distributed antenna systems are powerful tools when properly implemented and operated. Televate's direct experience managing DAS implementation and operations provides us with a detailed understanding of the dos and don'ts of DAS. Without well-thought-out policies and procedures, DAS can hinder high-quality and reliable communications. Televate has developed and managed comprehensive programs to facilitate the identification, proper application and permitting policy and process development, acceptance and annual testing, and inventories to fully benefit from DAS systems. Our staff has detailed knowledge of standard fire codes and how initial and operational policies can go further to protect public safety operations and mobile radio coverage within the city. Our extensive experience includes the development of building codes and jurisdictional policies and procedures to manage BDAs (including their uptime and noise contribution to host LMR networks).

In one major metropolitan market, Televate designed a comprehensive DAS program to ensure that new building permits were assessed according to the adopted International Fire Code ordinance to determine whether public safety radio communications would be affected. Once validated, building owners are provided with detailed information package explaining their DAS implementation design, equipment, frequencies, testing and alarming requirements. The procedure includes the Fire Marshal acceptance testing and annual testing methodology. The program additionally incorporates a database of the DAS solutions and the owner and authorized technical contact to simplify outreach and communications.

Contact Televate today to find out how we can help you solve your most challenging DAS problems.