

WE DO WIRELESS SO YOU CAN DO MORE



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Microwave Backhaul Design

Comsearch offers the tools and experience necessary for successful planning, management, and implementation of wireless backhaul systems. Our engineers utilize industry leading software, databases and unique regulatory expertise to design reliable and scalable backhaul systems.

Preliminary Design

Determine best topology for your network that meets connectivity, reliability and redundancy requirements. Ensure sufficient throughput on each network segment with scalability for growth. Evaluate LoS (line-of-sight) feasibility for each link based on clearance criteria and antenna height possibilities.

Field Surveys

Conduct site visit with photo documentation to confirm existing equipment, site parameters, installed inventory and site feasibility. Confirm LoS with field survey that identifies any potential obstructions. Document site coordinates and possible antenna heights for input into final design.

Final Design

Perform frequency band selection based on path length and reliability calculations considering multipath and rain outage. Using information from field surveys, conduct analysis to determine final equipment selection, antenna types and heights, transmission line lengths and other operating parameters.

Frequency Engineering and Licensing

Perform interference analysis to assign appropriate frequencies to ensure system will not be degraded by interference. Conduct FCC required Prior Coordination with other wireless users; prepare FCC applications and submit for electronic filing.

Site Audits

Perform a comprehensive audit to document existing equipment at the site prior to installation. This includes available rack space, AC and DC power, battery backup, transmission lines and generator.

Installation

Includes procurement of equipment, installation of radios, antenna, transmission lines, interface equipment and power systems, as well as final acceptance testing.



Test and Measurement

Comsearch field engineers utilize the latest test equipment and methods to accurately document real world site parameters and measure RF transmissions while identifying sources of potential interference. Field measurements will enhance the modeling of a site by determining actual operational parameters or by identifying undocumented RF transmissions which would otherwise be impossible to detect with just a theoretical study.

Setting up a telecommunications system is a complex undertaking. Hire an experienced, dedicated, and specialized team to ensure it will operate reliably with minimal interference.

Site Audits for Telecommunication Sites

Verify technical and geographic parameters and determine general site conditions. Evaluate viability for installation, potential radiation hazard issues, and feasibility of collocating additional telecommunications infrastructure.

Satellite Earth Station Measurements

Perform transmit and receive earth station measurements, determine the actual footprint of a satellite (Satellite EIRP),

identify look angle obstructions, or document blockage from terrain or structures which can be used to resolve interference cases.

RF Interference Investigation ("Troubleshooting")

Unknown interference sources can plague otherwise well-designed communications facilities. We utilize highly portable and sensitive test sets to determine the source of unknown interference, pinpoint its origin and then recommend ways to mitigate or eliminate the interference.

RF Sweeps for Unlicensed Systems

Assess the interference environment in the unlicensed bands and determine the feasibility of deploying an unlicensed system at a particular site.

Electromagnetic Interference (EMI) Testing

Determine the level of RF energy in a given area that may affect sensitive communication, network, or electronic devices.



Radio Frequency Safety

RF Safety is a primary consideration when planning deployment of RF transmitters. Millions of devices are in existence today around the globe. Under most circumstances these transmitters are harmless, but depending on power, access, type of antennas, etc., there are scenarios where a hazard will exist and exposure to unsafe levels of RF radiation will occur. It is the licensee's responsibility to ensure that all FCC as well as any local RF Safety guidelines are met.

Comsearch has a long history of performing Radio Frequency Safety studies and developing RF Safety plans including site specific recommendations.

RF Safety Analysis

Theoretical RF power density calculations to define radiation hazard areas, controlled/uncontrolled boundaries and locations for appropriate signage. The theoretical analysis is a key first step when designing a new system or when adding additional transmitters to an existing facility.

RF Safety Measurements

On-site measurements using broadband (isotropic probes) or narrowband (spectrum analyzers or test receivers) instrumentation to determine the radiated levels throughout a facility. Field measurements allow for identification of all collocated transmitters at a facility. There

is no substitute for on-site measurements to ensure that all accessible areas around transmitters remain safe for both general population and occupational exposures.

RF Safety Signage

Placement of correct signage and barricades at customer transmitter locations. The signage and barricade plan will be developed based on both the RF Safety Analysis and RF Safety Measurements.

RF Safety Training

General: Covers EME theory, practical applications and all safety regulations. Site Specific: Includes all of the general Radiation Safety training plus site-specific conditions of a customer's facility.

RF Safety Plan

Development of safety procedures and practices. It is critical that all individuals working around RF transmitters be made aware of the potential hazards. A Comsearch RF Safety Plan includes a comprehensive set of documents and site specific procedures that should be followed at transmit facilities. It often will include a regular training plan as part of the overall procedures plan.

FCC Licensing Support

Preparation of RF Safety Exhibit and other supporting documentation for FCC license applications.



Radio Frequency Design

Comsearch has a unique combination of engineering staff, tools, and regulatory expertise to effectively design your radio access network (RAN). Our four decades of experience with RF design, field testing, and model tuning along with expert knowledge of signal propagation theory will help you achieve your goals.

Site Selection

Visit search ring areas and identify potential site candidates for macrocells, microcells, or picocells. Prioritize site candidates to meet desired engineering and cost objectives while avoiding any regulatory hurdles.

Site Acquisition

Full Site Acquisition services available to take your project from initial site identification through final construction. Our services include lease negotiation, document preparation, zoning filings, and permitting.

RF Coverage Planning

Perform RF coverage simulation to determine gaps throughout the service area and identify new search rings. Recommend appropriate RF propagation model based on frequency band, local terrain, and clutter.

Capacity Planning

Ensure a quality user experience by planning sufficient traffic capacity in areas of congestion. Identify specific areas where new sites should be added based on network statistics and predicted demand.

Radio Parameter Planning

As new sites are added for coverage and capacity, perform frequency or physical cell ID (PCI) planning to mitigate intra-system interference in the uplink or downlink bands.

Drive Testing

Collect field measurement data to verify coverage simulations and document areas with poor coverage. Post-process data and perform statistical comparison with predicted coverage plots.

Propagation Model Tuning

Adjust RF propagation model parameters based on measured data to increase accuracy of network coverage and interference predictions. Update coverage and interference plots accordingly.