

# Turnkey Microwave Services

/// FIXED NETWORK ENGINEERING SERVICES PORTFOLIO ///



## TURNKEY MICROWAVE SERVICES

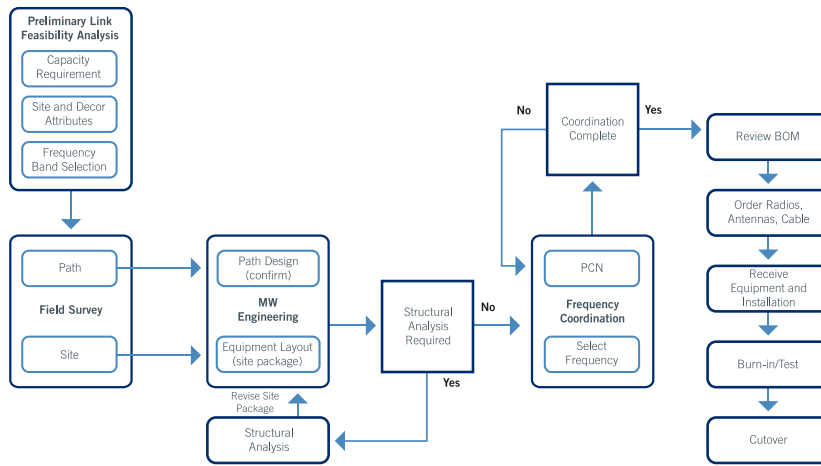
LCC has successfully designed and deployed over 5,000 licensed and unlicensed microwave paths for private and commercial network operators. As a pillar of our end-to-end Transport Engineering practice area, LCC brings fieldproven experience in providing Turnkey Microwave Services. LCC provides end-to-end microwave engineering services for individual links and for entire markets. Through its extensive experience, LCC has established standard processes that cover the various stages of the link engineering and deployment engagement.

## SERVICES OFFERED

- > **Preliminary Analysis** – LCC will evaluate interconnectivity objectives, capacity requirements, geographical constraints, and reliability criteria to determine frequency range selection and develop a preliminary architecture design.
- > **Site and Path Surveys** – LCC will use established processes and forms to evaluate site parameters that impact equipment placement, link budget calculations, construction requirements, tower space availability, and site security. LCC will also prepare a path profile and walk each prospective propagation path to determine link clearance and identify critical points of interest that may affect the link design.
- > **Final Path Engineering and Link Design** – LCC will evaluate the findings from the field surveys and compile a final link budget and design package that specifies the frequency channel, design parameters, and Bill of Materials (BOM), among other things.
- > **Frequency Selection and FCC Licensing** – If licensed channels are required, then LCC can support the client with the submittal of the Prior Coordination Notice (PCN) and filing the FCC form 601 for license applications.
- > **Installation and Commissioning** – LCC will install the antennas, cabling, and radio system and perform standard commissioning and testing procedures before handing over a complete and active link to the client.

Beyond standard microwave services, LCC's FNE Department can also support any customer's need for RF measurement services, such as interference analysis and Maximum Permissible Exposure (MPE) studies.

## TYPICAL MICROWAVE ENGINEERING PROCESS



## PROJECT EXAMPLES

- > LCC has recently been engaged in multiple projects for a fiber/microwave hybrid backhaul service provider. By performing preliminary market evaluations to identify and qualify customer prospects, and by generating preliminary market designs, including fiber and microwave topologies, LCC has supported the customer in the selection process for new market launches. LCC has also been directly involved in market launches by performing services such as site acquisition, microwave design, field surveys, and installation and commissioning. Throughout the course of the project, LCC has been responsible for 400+ microwave links, using 10/11, 18, and 23 GHz point-to-point systems.
- > LCC has recently been engaged in nationwide market designs for a wireless data services provider. LCC's engineers have been responsible for path designs and field surveys for 500+ microwave links, using both licensed and unlicensed point-to-point systems. They have performed horizon sweeps in a number of cases to measure the noise floor for unlicensed deployments and to confirm spectrum clearing in licensed applications. LCC has also been responsible for filing FCC license applications.
- > LCC has maintained a team of microwave engineers supporting multiple customers in Puerto Rico for most of the last decade. This team has been responsible for path designs, field surveys, FCC licensing, installation and commissioning, maintenance, and troubleshooting for 2000+ microwave links. These services have been performed for unlicensed deployments and all common carrier bands.
- > LCC has been engaged in thousands of point-to-point and point-to-multipoint microwave network designs and deployments throughout the nation for a multitude of other projects. Individual engagements have ranged from 1 or 2 links to full market solutions, and have covered all unlicensed and licensed bands up to 39 GHz. These projects have also covered a broad range of radio models, and LCC is well equipped to support any equipment selection.

LCC has the expertise and experience to address all of your Fixed Network Engineering needs.

### Service Offerings Include:

- > Transport Design
- > Turnkey Microwave Services
- > Network Optimization Services
- > Circuit Provisioning & Testing Services
- > Switch Support Services
- > Network Database Services
- > Network Inventory Services
- > RF Testing & Measurement Services
- > BSS Expansion & Integration Services
- > Broadband Wireless Services
- > IP Solutions

For more information on LCC and our Fixed Network Engineering services, please contact us at (703) 873.2000 or visit us on line at [www.lcc.com](http://www.lcc.com).



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