

## **Appendix A** **Relocation Costs**

**Alternate Transport Equipment.** This is the replacing of an existing microwave path by some other means of communications. This could include fiber optics, coax, or copper wire. These lines could be leased or purchased and would include the terminal equipment required.

**Antenna Upgrade.** The replacing of the microwave antenna(s) required to relocate to a new frequency, this includes the antenna mounting hardware and radomes if required.

**Back-up AC Power Equipment.** This could be needed due to re-routing power due to construction of a new microwave system or a generator for improved system reliability.

**Control Equipment.** A centralized control and monitor system which evaluates the status of numerous paths of microwave equipment and the site's housekeeping alarms (intrusion, fire, air conditioning, heating, tower lighting, and etc.). Normal to divide this cost per total number of paths being relocated for specific incumbent.

**Remove and Dispose of Old Equipment.** The removing of the old equipment and the permits required for disposal of items like batteries.

**Electrical Grounding System.** This is to build or totally rebuild a site grounding system. Minor modifications and connecting to existing grounding system would be covered under installation.

**Dehydrator and Feed Lines.** This is to provide the waveguide, dehydrator (provides dry air under pressure) and associated equipment for the RF transmission system.

**HVAC.** The need for additional air conditioning due to the addition of new equipment.

**Monitor Equipment.** The alarm system in each radio to collect and transport faults to the Control Equipment (see above)

**Mux/Modems.** Equipment required to change the microwave radio signal to an audio or digital format used by the terminal equipment (telephone, two-way radio, and computers).

**DC Power Plant Upgrade.** Replace or add to DC power system as necessary due to additional or different power needs of the new microwave system.

**Microwave Radio Equipment.** New microwave radios to provide the equivalent channel capacity, and reliability of the original system.

**Spare Equipment.** The spare parts recommended by manufacture to keep in inventory to support the new microwave system. Normal to divide this cost per five paths.

**Test Equipment-Required.** RF and digital test equipment recommended by manufacture to maintain the new microwave system. Normal to divide this cost per five paths.

**Civil Works.** The purchase and installation of a new shelter complete with grounding, access road, water drainage, fencing, landscaping, and other site improvements.

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**Leased Facilities** A lease due to equipment requiring additional equipment space on a new facility, a lease for additional space on an existing tower or a lease for a new tower due to distance restrictions of 6GHz versus 2GHz.

**Site Acquisition.** The acquiring of a new site.

**Site Lease Negotiation.** The process associated with acquiring a lease.

**Zoning Cost.** The acquiring of the required zoning.

Note: Site Acquisition, Site Lease Negotiation and Zoning Cost are used when a new real estate site is required. Not all relocations will require new real estate.

**Engineering Cost.** The design of the overall system. For a single path this information is normally provided by incumbent.

**FCC Filing Cost.** The filing fee paid to the FCC plus the cost of generating the forms.

**Installation.** The installing of all equipment, DC power, antennas, waveguide, radios, mux, etc.

**Path Design.** The design of a microwave path to provide the necessary reliability. This provides information like antenna height, antenna size and radio power.

**Path Survey.** Going to the sites, documenting any potential obstructions and providing the obstruction information (trees, buildings, etc) between the microwave sites for Path Design.

**Prior Coordination Notification.** The notification provided to other microwave companies regarding the technical information required to show there will be no interference with their 2GHz systems. It is required by FCC.

**Project Management.** This is someone to coordinate all of the different tasks required to plan, purchase, install, and test a new microwave path.

**System Testing.** Testing of the new equipment to verify it performs as specified by the manufacturer and satisfies the incumbent that the new system is the acceptable replacement as was negotiated.

**Training** Provide the incumbent's technicians training to maintain the new equipment. Normal to divide this cost per total number of paths being relocated for specific incumbent.

**Tower/Site Feasibility.** Determining if the site will be suitable for a tower, will the site perform adequately.

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**Tower Structure & Engineering Analysis.** RF engineering and structural costs, if required, to determine that the relocation to another tower is necessary for purposes of operation of the incumbent's microwave system, as well as, if required, structural analysis to the replacement or modified tower, for the relocation of new antennas and equipment. The process of having a tower analyzed to verify it meets the required specifications to safely support the new equipment installed. This usually involves a physical site visit as well as computer modeling which depicts load as well as permitting costs, interference engineering studies and RF exposure studies. It could involve comparing alternative tower options such as having to replace two existing towers with three new ones due to length of path. Path surveys could be necessary. It could also include determining what type of tower to be used (ie., guy, monopole, etc.)

**Tower Modification.** The modification of an existing tower to meet required specifications due to installation of new antennas and wave guide. Modifications can include tower extensions and additional structural bracing.

**Tower Construction.** The purchase and installation of a new tower complete with grounding. This can be for new site or the replacement of a tower at an existing site

**Transaction Expense.** Incumbent transaction expenses that are directly attributable to the relocation, subject to a cap of 2% of the 'hard' costs involved with the relocation.