**Appendix A**

CATALOG OF POTENTIAL EXPENSES AND ESTIMATED COSTS FOR LOW POWER TELEVISION (LPTV) STATIONS, FM STATIONS AND FM AND TV TRANSLATORS

**September 2018**

**Catalog of Potential Expenses and Estimated Costs for LPTV Stations,**

**FM Stations and FM and TV Translators**

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1. **ABOUT THIS CATALOG**

This catalog of expenses (Catalog) contains descriptions of the expenses that LPTV stations, FM stations and FM and TV translators are most likely to incur as a result of broadcaster repacking. While we believe the Catalog is relatively comprehensive, it does not cover every possible expense for every situation, nor is it an exhaustive list of all expenses that may potentially qualify for reimbursement.

Widelity, Inc. (Widelity) developed the original Catalog for Full Power and Class A broadcasters and multichannel video programming distributors (MVPDs) in 2013 for the Federal Communications Commission (FCC) as part of the Widelity Report, which was published for comment in 2014 (DA/FCC: DA-14-389). As part of the ongoing Broadcast Television Incentive Auction, periodically, the Catalog for Full Power and Class A broadcasters and MVPDs was updated to reflect the current pricing for the equipment and services that repacked broadcasters may need to purchase to facilitate the moves to their new channel assignments, and the current pricing for equipment and services that MVPDs may need to purchase to continue to carry broadcasters.

This Catalog is provided for LPTV stations, FM stations and FM and TV translators. The categories and costs contained in this Catalog build upon the work conducted by Widelity; however, as certain cost components and types of equipment are not applicable to LPTV stations, FM stations and FM and TV translators and certain costs are applicable only to these types of facilities, the cost categories and price ranges vary from the Catalog for Full Power and Class A broadcasters and MVPDs. Accordingly, there are inherent differences in various cost component and cost ranges, which are clarified to for LPTV stations, FM stations and FM and TV translators.

The categories and costs contained in the Catalog are intended to serve as a reference guide, and are not intended to identify the particular expenses for which individual LPTV stations, FM stations and FM and TV translators would be eligible for reimbursement. Individual LPTV stations, FM stations and FM and TV translators may incur only some of the expenses listed in the Catalog, depending upon the LPTV stations, FM stations and FM and TV translators existing equipment and the particular transition changes that the entity must make.

Supply and demand constraints may have an impact on future costs.

1. **LPTV AND TV TRANSLATOR COSTS**
   1. **TRANSMITTERS** **AND ANCILLARY COSTS**
      1. **Minor Rechanneling Issues**

Some LPTV stations or translator facilities may be able to re-use their existing transmitters or translators by replacing external receivers, transposers, or exciters to operate on the displacement channel. This replacement or reconfiguration may involve professional installation or reconfiguration. Mask filters are assumed to be required.

|  |  |  |
| --- | --- | --- |
| **LPTV Reconfiguration Costs** | | **Range of Estimated Costs** *(in dollars)* |
|  | UHF and VHF - minor re-channel issues | 2,000 - 20,000 |
| **"Simple" mask filters (includes UHF and VHF):** | | **Range of Estimated Costs** *(in dollars)* |
|  | 10 - 100W Mask Filter | 435-1,210 |
|  | 100 - 300W Mask Filter | 695 - 2,550 |
| **"Stringent" mask filters (includes UHF and VHF):** | | **Range of Estimated Costs** *(in dollars)* |
|  | 100W - 200W Mask Filter | 525 - 3,000 |
|  | 200 - 300W Mask Filter | 1,300 - 2,550 |
|  | 350W - 600W Mask Filter | 1,800 - 4,100 |
| **"Full Service" mask filters (includes UHF and VHF):** | | **Range of Estimated Costs** *(in dollars)* |
|  | 500 -750W Mask Filter | 1,400 - 3,900 |
|  | 1 kW Mask Filter | 2,200 - 4,500 |
|  | 1.1 - 2 kW Mask Filter | 2,100 - 6,000 |
|  | 2.1 - 3 kW Mask Filter | 4,000 - 8,400 |
|  | 3.1 - 5 kW Mask Filter | 6,500 - 12,800 |

* + 1. **New Transmitters**

Solid State Transmitter prices are based on a specific channel and include the cost of a new mask filter. Costs for installation and engineering are additional and pricing for these services can be found in Section II.A.3 below. Costs vary by manufacturer and power level. Most new transmitter prices include exciters.

|  |  |  |
| --- | --- | --- |
| **UHF – Air Cooled Solid State Transmitter/Translator** | | **Range of Estimated Costs** *(in dollars)* |
|  | 5-50 Watts | 8,000 - 12,400 |
|  | 50-150 Watts | 10,000 - 17,500 |
|  | 160-300 Watts | 11,000 - 37,600 |
|  | 320-700 Watts | 12,700 - 43,500 |
|  | 750-1000 Watts | 19,000 - 40,700 |
|  | 1.1 - 2.4 kW | 39,000 - 97,700 |
|  | 2.5 - 4 kW | 57,000 - 155,600 |
| **UHF – Liquid Cooled Solid State Transmitter** | | **Range of Estimated Costs** *(in dollars)* |
|  | 1.5 - 4 kW | Variable |
| **High VHF – Air Cooled Solid State Transmitter/Translator** | | **Range of Estimated Costs** *(in dollars)* |
|  | 10-100 Watts | 8,000 - 14,600 |
|  | 150-350 Watts | 11,000 - 32.500 |
|  | 400-1000 Watts | 14,000 - 46,000 |
|  | 1.2 - 3 kW | 21,600 - 100,000 |
| **Low VHF – Air Cooled Solid State Transmitter/Translator** | | **Range of Estimated Costs** *(in dollars)* |
|  | 50-500 Watts | 8,000 - 14,600 |
|  | 600 W - 3 kW | Variable |

**3. Other Transmitter Expenses**

In limited situations, these expenses may apply in addition to those listed in Sections II.A.1 or II.A.2, above.

|  |  |  |
| --- | --- | --- |
| **Other Transmitter-Related Expenses** | | **Range of Estimated Costs** *(in dollars)* |
|  | Frequency agile exciter | 20,500 |
|  | Transmitter Site Survey/Installation | 8,000 - 30,000 |
|  | **Electrical Service** - In limited situations, a station installing replacement transmitter equipment may have to change the electrical wiring to the new transmitter or perform other electrical work (prices include labor and installation). | Variable |

* 1. **ANTENNAS**

Most stations moving to a new channel will require new antennas. The price of an antenna does not include installation or removal of existing antennas (for those expenses, see Section II.D, Tower Related Costs). In some cases, new transmission lines will also be required (for those expenses, see Section II.C, Transmission Lines). Additionally, antennas are rated based on input power level. Price does not include de-icing equipment. Panel antennas are priced per panel.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **UHF Low-Power Antennas** | | | | | | | | **Range of Estimated Costs** *(in dollars)* |
|  | Yagi/Cross-Dipole/Log Periodic Transmit antenna | | | | | | | 450 - 1,800 |
|  | 1 - 2 kW 8-bay slot antenna, horizontally-polarized side mount | | | | | | | 4,250 - 12,000 |
|  | 1 - 2 kW 8-bay slot antenna, elliptically- or circularly-polarized side mount | | | | | | | 6,750 - 12,900 |
|  | 2.5 - 5 kW 8-bay slot antenna, horizontally-polarized side mount | | | | | | | 17,750 - 25,800 |
|  | 2.5 - 5 kW 8-bay slot antenna, elliptically or circularly-polarized side mount | | | | | | | 19,500 - 28,500 |
|  | 2.5 - 5 kW slot antenna, 12-30 bays | | | | | | | Variable |
|  |  | | | | | | |  |
|  | Broadband panel antenna (per panel), horizontally-polarized | | | | | | | 750 - 2,750 |
|  |  |  |  |  |  |  |  |  |
| **High-VHF Low Power Antennas** | | | | | | | | **Range of Estimated Costs** *(in dollars)* |
|  | Yagi/Cross dipole/Log Periodic Transmit antenna | | | | | | | 840 - 1,400 |
|  | 250 - 500 W panel antenna (per panel), horizontally-polarized | | | | | | | 850 - 1,550 |
|  | 1 - 2 kW panel antenna (per panel), horizontally-polarized | | | | | | | 13,150 |
|  | 2-bay 2 kW slot antenna - side mount, horizontally polarized | | | | | | | 10,000 |
|  | 2-bay 2 kW slot antenna - side mount, elliptically polarized | | | | | | | 14,000 |
|  | 4-bay 2 kW slot antenna - side mount, horizontally polarized | | | | | | | 18,000 - 44,000 |
|  | 4-bay 2 kW slot antenna - side mount, elliptically polarized | | | | | | | 22,000 - 56,050 |
|  | 8-bay 2kW slot antenna - side mount, horizontally polarized | | | | | | | 75,950 |
|  | 8-bay 2 kW slot antenna - side mount, elliptically polarized | | | | | | | 90,950 |
|  | 12-bay 2 kW slot antenna - side mount, horizontally polarized | | | | | | | 117,400 |
|  | 12-bay 2 kW slot antenna - side mount, elliptically polarized | | | | | | | 141,400 |
|  |  |  |  |  |  |  |  |  |
| **Low-VHF Low Power Antennas** | | | | | | | | **Range of Estimated Costs** *(in dollars)* |
|  | Yagi/Cross dipole/Log Periodic Transmit antenna | | | | | | | 990 - 1,200 |
|  | Panel antenna (per element), horizontally-polarized | | | | | | | 19,450 - 20,600 |
|  | Panel antenna (per element), circularly-polarized | | | | | | | 33,500 |
|  |  |  |  |  |  |  |  |  |
| **Other Antenna-Related Items** | | | | | | | | **Range of Estimated Costs** *(in dollars)* |
|  | Antenna sweep (existing or new) | | | | | | | 4,610 - 6,550 |
|  | 7/8" input elbow complex, single channel (if needed) | | | | | | | 6,550 |
|  | 1-5/8" input elbow complex, single channel (if needed) | | | | | | | 6,900 |
|  | 3-1/8" input elbow complex, single channel (if needed) | | | | | | | 7,600 |
|  | 250 W VHF Combiner (per channel) | | | | | | | 2,050 - 2,950 |
|  | 1 kW UHF Combiner (per channel) | | | | | | | 4,150 - 5,250 |
|  | 2 kW VHF Combiner (per channel) | | | | | | | 5,000 - 8,550 |
|  | Side Mount antenna brackets | | | | | | | 2,250 - 7,000 |
|  | Power Dividers (each, for panel antenna system, if not included in antenna cost) | | | | | | | 1,300 |
|  | Cable harness (each, for panel antenna system, if not included in antenna cost) | | | | | | | 1,000 |

* 1. **TRANSMISSION LINE**

In most situations, existing flexible transmission line can be reused in the event of a channel change. If an LPTV station is utilizing rigid transmission line, the existing transmission line may be reusable (e.g., if the move is to a non-prohibited channel or if the transmission line is broadband capable). See Fig.3 in the Appendix A for the table of transmission line lengths and prohibited channels. New transmission lines, if needed for purchase, are generally priced per foot. The price generally includes elbows and hangers.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | | | | | **Range of Estimated Costs** *(in dollars)* |
| **Flexible transmission line** | | | | | |
|  | 1/2" foam dielectric | | | | 3.5 |
|  | 7/8" foam dielectric | | | | 10 |
|  | 1-5/8" foam dielectric | | | | 24 |
|  | 1-5/8" air dielectric |  |  |  | 32 |
|  | 3" air dielectric | | | | 57 |
|  | 4" air dielectric | | | | 72 |
|  |  | | | | |
| **Rigid Transmission Line** | | | | | |
|  | 7/8" rigid line | | | | 28 - 66 |
|  | 1-5/8" rigid line | | | | 40 - 72 |
|  | 3-1/8" rigid line | | | | 79 -101 |
|  |  | | | | |
| **Interior RF Systems** - RF plumbing for inside the transmitter building between the transmitter and the transmission line leaving the transmitter building | | | | | |
|  | Inside RF system including switching, patch panels, and dehydrators | | | | Variable |

* 1. **TOWER RELATED COSTS**

In many cases, a broadcaster replacing or adding an antenna will incur rigging and installation costs. In addition to these expenses, it may be necessary to modify the existing tower or to construct a new tower to accommodate these new antennas and transmission line.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Existing Tower Reinforcement** | | | | | | | | **Range of Estimated Costs** *(in dollars)* |
| **Existing Towers** - Towers without sufficient documentation of tower specifications may need to be mapped prior to completion of a tower load study. | | | | | | | | |
|  | Tower mapping and report for structural engineer | | | | | | | 16,400 - 25,600 |
|  | Structural engineering study for guyed or free-standing tower | | | | | | | 5,100 - 12,300 |
|  | Structural engineering study for a candelabra tower | | | | | | | 15,350 - 19,450 |
|  | Tower reinforcement | | | | | | | Variable |
|  |  |  |  |  |  |  |  |  |
| **New Tower Construction** | | | | | | | | **Range of Estimated Costs** *(in dollars)* |
| **New Towers** - Cost includes constructing a new tower, per foot | | | | | | | | |
|  | New towers shorter than 500' | | | | | | | 1,700 |
|  | New towers between 500' and 1000' | | | | | | | 2,100 |
|  | New towers between 1000' and 1500' | | | | | | | 2,560 |
| **Note:** Costs may be higher for tower sites with difficult soil conditions. Footings, piers and foundations, and guy anchors may not be included in this price | | | | | | | | |
|  |  |  |  |  |  |  |  |  |
| **Rigging and Antenna Installation/Removal** | | | | | | | | **Range of Estimated Costs** *(in dollars)* |
| **Tower Rigging -** fees paid to tower crews to install/remove antennas and/or transmission line. | | | | | | | |  |
|  | Tower shorter than 500' | | | | | | | 31,190 - 81,190 |
|  | Towers between 500' and 1000' | | | | | | | 102,500 - 205,000 |
|  | Towers over 1000' or Complex tower (Candelabras, stacked antennas, terrain-constrained ) | | | | | | | Variable |

* 1. **PROFESSIONAL SERVICES**

Stations without sufficient internal resources, either at the station itself or at an affiliated station or company, may have to obtain professional services from an outside vendor to complete the various aspects of the station’s channel relocation.

|  |  |  |
| --- | --- | --- |
|  | | **Range of Estimated Costs** *(in dollars)* |
| **RF Consulting Engineer Fees** | | |
|  | Engineering Study for displacement application | 800 - 2,800 |
|  | Prepare Engineering Section of Construction Permit | 1,025 - 3,070 |
|  | Prepare Engineering Section of License to Cover | 510 - 1,535 |
|  | Prepare Form 601 | 510 - 1,000 |
|  |  | |
| **Attorney Fees** | | |
|  | Prepare and file Construction Permit | 770 - 5,120 |
|  | Prepare and file License to Cover | 770 - 2,305 |
|  | Lease negotiation or other legal matters | 2,255 - 4,095 |
|  |  | |
| **Other Professional Fees** | | |
|  | Project Management, if needed (per hour) | 51 - 154 |
|  | Prepare and/or review reimbursement forms | 770 - 2,560 |
|  | Form 399 assistance or other Program Management costs | Variable |
|  |  | |
| **Field Engineering** | | |
|  | Outside engineering assistance (per day) | 1,000 - 2,750 |
|  | Coverage verification of new facility | 20,500 - 81,900 |
|  | AM Pattern disturbance study/remediation | 2,560 - 7,680 |
|  | RF Exposure Measurements | 3,050 - 20,500 |

* 1. **OTHER POTENTIAL COSTS**

Stations may incur miscellaneous costs while constructing displaced facilities, such as: FCC form filing fees and in some isolated cases, new fixed microwave links to replace existing STL, ICR and/or general interconnect systems where frequency coordination of existing links cannot be achieved at the new location.

|  |  |  |
| --- | --- | --- |
|  | | **Range of Estimated Cost***s (in dollars)* |
| **FCC Filing Fees** | | |
|  | FCC Form 2100 Major Change Construction Permit | 4,960 |
|  | FCC Form 2100 Minor Change Construction Permit | 1,110 |
|  | FCC Form 2100 License to Cover | 335 |
|  | FCC Form 601 STL | 305 |
|  |  | |
|  | Equipment Disposal Cost | Variable |
|  | Equipment Storage | Variable |
|  | Equipment Delivery and Handling Charges | Variable |
|  |  | |
| **Point to Point Microwave (STL/ICR)** | | |
|  | Frequency Coordination (per license - 2 needed for bi-directional link) | 350 - 750 |
|  | Unlicensed systems (includes antennas attached to the radios. Larger antennas are additional) | 500 - 4,000 |
|  | 6/11 GHz Licensed Part 101 Systems (price includes 6-foot antennas. Single link and redundant systems are included in this price range). | 18,000 - 39,000 |
|  | 7/13 GHz Licensed Part 74 Systems (price includes 6-foot antennas. Single link and redundant systems are included in this price range). | 27,700 - 74,900 |

1. **FM AND FM TRANSLATOR COSTS**
   1. **TRANSMITTERS** **AND ANCILLARY COSTS**
      1. **New Facility or Auxiliary and Interim Transmitters**

There may be circumstances in which an FM station may need to construct an interim or auxiliary facility (in rare cases, a new main facility) in order to remain on the air during the TV repack, including stations on the same tower or nearby tower. Prices listed include notch and channel filtering as needed, but do not include installation, which can be found in Section III.A.2 below. Costs vary by manufacturer and power level, with additional pricing for hybrid models.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Air Cooled Solid State FM Transmitter (not including installation)** | | | | | | | | **Range of Estimated Costs** *(in dollars)* |
|  | 10-100 Watts Analog | | | | | | | 1,500 - 8,000 |
|  | 101-250 Watts Analog | | | | | | | 3,215 - 8,850 |
|  | 300 - 500 Watts Analog | | | | | | | 3,800 - 12,500 |
|  | 600-1000 Watts Analog | | | | | | | 4,550 - 15,000 |
|  | 1.5 - 3 kW Analog | | | | | | | 8,500 - 32,000 |
|  | 3.5 - 6 kW Analog | | | | | | | 12,000 - 52,500 |
|  | 7 - 10 kW Analog | | | | | | | 41,000 - 75,350 |
|  | 15 - 20 kW Analog | | | | | | | 68,900 - 120,500 |
|  | 30 kW Analog | | | | | | | 118,000 - 169,500 |
|  | 40 kW Analog | | | | | | | 132,500 - 231,300 |
|  |  | | | | | | | |
|  | 10-100 Watts Hybrid | | | | | | | 7,000 - 17,000 |
|  | 101-250 Watts Hybrid | | | | | | | 5,800 - 17,850 |
|  | 300 - 500 Watts Hybrid | | | | | | | 3,850 - 21,500 |
|  | 600-1000 Watts Hybrid | | | | | | | 7,000 - 24,000 |
|  | 1.5 - 3 kW Hybrid | | | | | | | 9,200 - 40,990 |
|  | 3.5 - 6 kW Hybrid | | | | | | | 19,200 - 61,500 |
|  | 7 - 10 kW Hybrid | | | | | | | 52,900 - 83,500 |
|  | 15 - 20 kW Hybrid | | | | | | | 78,900 - 129,500 |
|  | 30 kW Hybrid | | | | | | | 128,000 - 178,500 |
|  | 40 kW Hybrid | | | | | | | 142,500 - 240,400 |
|  |  |  |  |  |  |  |  |  |
|  | More than 40 kW Analog or Hybrid | | | | | | | Variable (requires a quote) |
|  |  |  |  |  |  |  |  |  |
| **Liquid Cooled Solid State FM Transmitter (not including installation)** | | | | | | | | **Range of Estimated Costs** *(in dollars)* |
|  | 10 kW Analog | | | | | | | 66,850 - 139,850 |
|  | 20 kW Analog | | | | | | | 102,500 - 195,850 |
|  | 30 kW Analog | | | | | | | 141,700 - 264,450 |
|  | 40 kW Analog | | | | | | | 181,550 - 351,050 |
|  |  | | | | | | | |
|  | 10 kW Hybrid | | | | | | | 128,650 - 149,850 |
|  | 20 kW Hybrid | | | | | | | 221,000 - 234,600 |
|  | 30 kW Hybrid | | | | | | | 289,600 - 351,800 |
|  | 40 kW Hybrid | | | | | | | 354,800 |
|  |  | | | | | | | |
|  | More than 40 kW Analog or Hybrid | | | | | | | Variable |
|  |  |  |  |  |  |  |  |  |
| **HD Importers/Exporters** | | | | | | | | **Range of Estimated Costs** *(in dollars)* |
|  | HD Importer | | | | | | | 1,600 - 3,500 |
|  | HD Exporter | | | | | | | 1,600 - 3,500 |

* + 1. **Other Transmitter Expenses**

In limited situations, these expenses may apply in addition to those listed in Section III.A.1, above.

|  |  |  |
| --- | --- | --- |
| **Other Transmitter-Related Expenses** | | **Range of Estimated Costs** *(in dollars)* |
| **Additional Exciter** *(if required; most transmitters are shipped with one exciter)* | | 7,000 - 17,000 |
|  | | |
| **Installation Services** | |  |
|  | Transmitter Installation (includes daily rate and expenses) | 11,000 - 130,000 |
|  | Transmitter Building Site Survey (includes daily rate and expenses) | 5,000 - 15,000 |
|  |  | |
| **Electrical Service** - A station installing replacement transmitter equipment may have to increase the power supply to the transmitter or perform other electrical work (*prices include labor and installation)*. | | |
|  | Service entrance 3 phase/800 amp/208 volt | 14,050 |
|  | Switchgear – industrial 800 amp | 37,150 |
|  | Transformer 3 phase/480V – 150 KVA | 24,900 |
|  | Transformer 3 phase/480V – 300 KVA | 35,850 |
|  | Transformer 3 phase/480V – 500 KVA | 47,100 |
|  | 2" Rigid Conduit and Wiring (cost per foot) | 26 |
|  | 3" Rigid Conduit and Wiring (cost per foot) | 50 |
|  | 4" Rigid Conduit and Wiring (cost per foot) | 98 |
|  |  | |
| **HVAC Service - Cooling Only** - A station installing replacement transmitter equipment may need additional cooling capability *(prices include labor and installation).* | | |
|  | 5 Ton System | 19,700 |
|  | 10 Ton System | 37,900 |
|  | 15 Ton System | 54,300 |
|  | 25 Ton system | 89,100 |
|  | 50 Ton system | 168,000 |
|  |  | |
| **HVAC Service - Heating and Cooling -** A station installing replacement transmitter equipment may need additional air-handling capacity that includes both heating and cooling *(prices include labor and installation).* | | |
|  | 10 Ton System | 37,900 |
|  | 15 Ton System | 54,300 |
|  | 25 Ton system | 89,100 |
|  | 50 Ton system | 168,000 |
| **Transmitter Building Modifications** - In limited situations, expansions of the transmitter building may be required to accommodate new equipment (costs vary with location, site access and construction type). | | 100 - 250 per ft2 |
| ***Other Transmitter-Related Expenses (For stations that have to rebuild permanent facilities only)*** | | **Range of Estimated Costs** *(in dollars)* |
| Remote Control | | 1,500 - 3,300 |
| RDS Encoder | | 1,000 - 2,500 |
| **Audio Processing** | | |
|  | Audio Processing - Analog basic | 2,000 - 5,000 |
|  | Audio Processing - Analog/HD basic | 2,500 - 7,000 |
|  | Audio Processing - Analog /HD upgraded | 7,000 - 15,000 |

* 1. **ANTENNAS**

Most FM stations building a separate facility will require a new antenna. The price of an antenna does not include installation or removal of existing antennas (for those expenses, see Section III.D, Tower Related Costs). Additionally, new transmission line may also be required (for those expenses, see Section III.C, Transmission Line). All antennas are rated based on input power and priced per bay. Antenna prices do not include radomes or de-icing equipment.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **FM Low-Power Antennas** *(price includes fine matcher(s))* | | | | | | | | **Range of Estimated Costs** *(in dollars, per bay)* |
|  | 200 Watt to 1 kW Log-periodic antennas | | | | | | | 1,200 - 1,750 |
|  | 200 Watt to 1 kW Yagi antennas | | | | | | | 850 - 2,400 |
|  | 200 Watt - 1 kW Vertically or horizontally-polarized | | | | | | | 620 - 2,050 |
|  | 200 Watt - 1 kW Circularly-polarized | | | | | | | 1,250 - 1,350 |
|  | 1 kW - 2.5 kW Vertically or Horizontally-polarized | | | | | | | 1,100 |
|  | 1 kW - 2.5 kW Circularly-polarized | | | | | | | 1,000 - 1,800 |
|  | 2.5 kW - 5 kW Circularly-polarized | | | | | | | 3,805 - 6,070 |
|  |  |  |  |  |  |  |  |  |
| **FM High-Power Antennas***(price includes fine matcher(s))* | | | | | | | | **Range of Estimated Costs** *(in dollars, per bay)* |
|  | 6 kW - 10 kW Circularly-polarized | | | | | | | 4,200 - 7,570 |
|  | 11 kW - 25 kW Circularly-polarized | | | | | | | 5,300 - 10,500 |
|  | 26 kW - 50 kW Circularly-polarized | | | | | | | 3,500 - 6,700 |
|  | 26 kW - 50 kW Panel (3 panels per bay) | | | | | | | 16,500 - 44,650 |
|  | 51 - 100 kW Circularly-polarized | | | | | | | 7,200 - 12,000 |
|  | 51 - 100 kW Panel (3 panels per bay) | | | | | | | 19,500 - 47,200 |
|  | More than 100kW | | | | | | | Variable |
|  | Directional antenna fabrication and testing | | | | | | | Variable |
|  | Dual polarization antennas, H-only or V-only antennas more than 2 kW | | | | | | | Variable |
|  | Broadband (community or combined) antennas | | | | | | | Variable |
|  |  |  |  |  |  |  |  |  |
| **Other Antenna-Related Items** | | | | | | | | **Range of Estimated Costs** *(in dollars)* |
|  | Antenna sweep | | | | | | | 4,610 - 6,550 |
|  | New FM combiner, cost per channel (depends on power input and min. frequency separation) | | | | | | | 6,865 - 36,700 |
|  | FM Band pass filter (depends on power input and number of sections) | | | | | | | 5,325 - 26,190 |
|  | Notch Filter (depends on power input and number of sections) | | | | | | | 5,020 - 16,260 |
|  | Mounting Brackets | | | | | | | Variable |
|  | De-Icers (per bay) | | | | | | | 1,000 - 2,000 |
|  | Radomes (per bay) | | | | | | | 900 - 1,800 |

* 1. **TRANSMISSION LINE**

New transmission line, if needed for purchase, is priced per foot, based on a length of 1,000 feet. The price generally includes elbows and hangers.

|  |  |  |
| --- | --- | --- |
|  | | **Range of Estimated Costs** *(in dollars per foot)* |
| **Flexible transmission line** | | |
|  | 1/2" foam dielectric | 3 |
|  | 7/8" foam dielectric | 10 |
|  | 1-5/8" foam dielectric | 24 |
|  | 1-5/8" air dielectric | 32 |
|  | 3" air dielectric | 57 |
|  | 4" air dielectric | 72 |
| **Rigid Transmission Line** | | |
|  | 7/8" rigid line | 28 - 66 |
|  | 1-5/8" rigid line | 39 - 61 |
|  | 3-1/8" rigid line | 79 - 101 |
|  | 4-1/16" rigid line | 101 - 138 |
|  | 3-1/8" broadband line | 91 - 117 |
|  | 4-1/6" broadband line | 117 - 159 |
| **Interior RF Systems** - RF plumbing for inside the transmitter building between the transmitter and the transmission line leaving the transmitter building | | |
|  | Elbows, fitting, hangers, etc. | Variable |
|  | Inside RF system including switching, patch panels and dehydrators | Variable |

* 1. **TOWER RELATED COSTS**

FM broadcasters replacing or adding an antenna may incur rigging, installation, and removal costs. In addition to these expenses, it may be necessary to modify the existing tower or to construct a new tower to accommodate the additional antenna(s).

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Existing Tower Reinforcement** | | | | | **Range of Estimated Costs** *(in dollars)* | | | |
| **Existing Towers** - Towers without sufficient documentation of tower specifications may need to be mapped prior to completion of a tower load study. | | | | | | | | |
| Tower mapping and report for structural engineer | | | | | 16,400 - 25,600 | | | |
|  |  | | | | | | | |
|  | Structural engineering study for guyed or free-standing tower | | | | 5,100 - 12,300 | | | |
|  | Structural engineering study for a candelabra tower | | | | 15,350 - 19,450 | | | |
|  |  | | | | | | | |
|  | Tower reinforcement | | | | Variable | | | |
|  |  | | | |  | | | |
| **New Tower Construction** | | | | | **Range of Estimated Costs** *(in dollars per foot)* | | | |
| **New Towers** - Cost includes constructing a new tower, per foot | | | | | | | | |
|  | New towers shorter than 500' | | | | 1,700 | | | |
|  | New towers between 500' and 1000' | | | | 2,100 | | | |
|  | New towers over 1000' and 1500' | | | | 2,560 | | | |
| **Note:**  Costs may be higher for tower sites with difficult soil conditions. Footings, piers and foundations, and guy anchors may not be included in this price. | | | | | | | | |
|  |  |  |  |  |  |  |  |  |
| **Rigging and Antenna Installation/Removal** | | | | | **Range of Estimated Costs** *(in dollars)* | | | |
| **Tower Rigging -** fees paid to tower crews to install/remove antennas and/or transmission line. | | | | | | | | |
|  | Tower shorter than 500' | | | | 61,400 - 81,900 | | | |
|  | Towers between 500' and 1000' | | | | 102,500 - 205,000 | | | |
|  | Towers over 1000' or Complex tower (Candelabras, stacked antennas, terrain-constrained ) | | | | 102,500 - 409,500 | | | |
|  | Helicopter installation/removal (for antennas on top of high-rise buildings, a complex tower, or tower that is terrain-constrained so that antennas can't be lifted using a gin pole or winches) | | | | Variable | | | |
| **Other Tower Expenses** | | | | | | | | |
|  | Temporary Tower Rent | | | | Variable | | | |

* 1. **PROFESSIONAL SERVICES**

Stations without sufficient internal resources, either at the station itself or at an affiliated station or company, may have to obtain professional services from an outside vendor to complete the various aspects of the station’s channel relocation.

|  |  |  |
| --- | --- | --- |
|  | | **Range of Estimated Costs** *(in dollars)* |
| **RF Consulting Engineer Fees** | | |
|  | Prepare Engineering Section of Construction Permit | 1,025 - 3,070 |
|  | Prepare Engineering Section of License to Cover | 510 - 1,535 |
|  | Prepare Engineering STA | 510 - 2,050 |
|  | Prepare Form 601 | 510 - 1,000 |
|  |  | |
| **Attorney Fees** | | |
|  | Prepare and file Construction Permit | 770 - 5,120 |
|  | Prepare and file License to Cover | 770 - 2,305 |
|  | Prepare and file STA | 770 - 3,585 |
|  | Lease negotiation or other legal matters | 510 - 2,050 |
|  |  | |
| **Other Professional Fees** | | |
|  | Project Management, if needed (per hour) | 51 - 154 |
|  | Prepare and/or review reimbursement forms | 770 - 2,560 |
|  | Form 399 assistance or other Program Management costs | Variable |
|  |  | |
| **Field Engineering** | | |
|  | Outside engineering assistance (per day) | 1,000 - 2,750 |
|  | Coverage verification of new primary facility | 20,500 - 81,900 |
|  | AM Pattern disturbance study/remediation | 2,560 - 7,680 |
|  | RF Exposure Measurements | 3,050 - 20,500 |

* 1. **OTHER POTENTIAL COSTS**

This section contains a number of miscellaneous costs that LPTV stations may encounter while constructing displaced facilities, which includes FCC form filing fees, equipment handling and disposal costs, and in some isolated cases, new fixed microwave links to replace existing STL, TSL and ICR systems where frequency coordination of existing links cannot be achieved at the new location.

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|  | | **Range of Estimated Costs** *(in dollars)* |
| **FCC Filing Fees** *(from the 2018 Filing Fee Guide)* | | |
|  | FCC Form 2100 Major Change Construction Permit | 1,110 |
|  | FCC Form 2100 Minor Change Construction Permit | 200 |
|  | FCC Form 2100 License to Cover | 335 |
|  | FCC Form 601 STL | 305 |
|  |  | |
| Equipment Disposal Cost | | Variable |
| Equipment Storage | | Variable |
| Equipment Delivery and Handling Charges | | Variable |
|  |  | |
| **Point to Point Microwave (STL/ICR)** | | |
|  | Frequency Coordination (per license - 2 needed for bi-directional link) | 350 - 750 |
|  | Unlicensed systems (includes antennas attached to the radios. Larger antennas are additional) | 2,000 - 4,000 |
|  | 6/11 GHz Licensed Part 101 Systems (price includes 6-foot antennas. Single link and redundant systems are included in this price range). | 18,000 - 39,000 |
|  | 950 MHz Licensed Part 74 Systems (price includes 6-foot antennas. Single link and redundant systems are included in this price range). | 12,000 - 25,000 |
|  | 1 pair IP-only Codecs for fiber, internet or IP microwave systems | 4,000 - 7,700 |