



Federal Communications Commission
Washington, D.C. 20554

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Small Entity Compliance Guide

Digital Low Power Television/Television Translators

DA 05-605

MB Docket No. 03-185

This Guide is prepared in accordance with the requirements of Section 212 of The Small Business Regulatory Enforcement Fairness Act of 1996. It is intended to help small entities—small businesses, small organizations (non-profits), and small governmental jurisdictions—comply with the above-referenced FCC rule. This Guide is not intended to replace the rule, and final authority rests solely with the rule. While we have attempted to cover all parts of the rule that might be especially important to small entities, the coverage may not be exhaustive. In any civil or administrative action against a small entity for a violation of a rule, the content of the Small Entity Compliance Guide may be considered as evidence of the reasonableness or appropriateness of proposed fines, penalties or damages. This Guide may not apply in a particular situation based upon the circumstances, and the FCC retains the discretion to adopt approaches on a case-by-case basis that may differ from this Guide, where appropriate. Any decisions regarding a particular small entity will be made based on the statute and regulations. Interested parties are free to file comments regarding this Guide and the appropriateness of its application to a particular situation; the FCC will consider whether the recommendations or interpretations in the Guide are appropriate in that situation. The FCC may decide to revise this Guide without public notice to reflect changes in the FCC's approach to implementing a rule, or to clarify or update text. Direct your comments and recommendations, or calls for further assistance, to the FCC's Consumer Center:

1-888-CALL-FCC (1-888-225-5322)

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1. Compliance Requirements

Digital Class A TV Station Protection of Other Stations

- The Commission will not accept applications for **Digital Television (DTV) Operation** of an existing **Class A TV station** or to change the facilities of a digital Class A TV station that do not protect authorized TV broadcast stations, applications for **minor changes** in authorized TV broadcast stations filed on or before November 29, 1999, and applications for new TV broadcast stations that had been **cut-off** without competing applications or that were the winning bidder in a TV broadcast station auction as of November 29, 1999, or that were the proposed remaining applicant in a group of mutually-exclusive applications for which a settlement agreement was on file as of November 29, 1999. The Commission will also deny applications for digital operation of an existing Class A TV station or to change facilities of a digital Class A TV station that do not protect authorized Class A and digital Class A stations with applications for changes filed prior to the date the digital Class A application under consideration is filed. Class A station applications will be denied if they do not protect the DTV service that would be provided by the facilities specified in the DTV Table of Allotments in 47 C.F.R. § 73.622, by authorized DTV stations, and by applications that proposed to expand DTV stations' allotted or authorized coverage contour in any direction if that application was filed before December 31, 1999, or filed between December 31, 1999, and May 1, 2000, by a DTV station licensee or permittee that had notified the Commission of its intent before December 31, 1999. Additionally, applications for digital operation of an existing Class A TV station or to change facilities of a digital Class A TV station will not be accepted if they fail to protect authorized **low power television (LPTV), TV translator, digital LPTV, and digital TV translator stations** whose applications were filed prior to the date the digital Class A station under consideration was filed. Finally, an application for digital operation of an existing Class A TV station or to change the facilities of an existing Class A TV or digital Class A TV station will be denied if it fails to protect stations in the **land mobile radio service** as specified in 47 C.F.R. § 74.709. In addition, Class A TV and digital Class A TV stations must not cause interference to land mobile stations operating on channel 16 in New York, New York. 47 C.F.R. §§ 73.6016, 73.6017, 73.6018, 74.6019, and 73.6020
- **Digital Television (DTV)** is a new broadcast technology for transmitting and receiving broadcast television signals that provides clearer picture resolution and sound quality by conveying the information used to make a TV picture and sound as “data bits,” similar to a computer. The use of data bits allows digital broadcasters to carry more information than is currently possible with the existing analog broadcast technology, resulting in dramatically better picture and sound quality than is currently available.
- **Low Power Television (LPTV)** is a broadcast service that permits program origination, subscription, or both by use of low powered television translators. Because they operate using lower power, LPTV stations are able to provide important broadcast services to areas that full power stations cannot reach because of, for example, rural local or mountainous terrain. LPTV service operates on a secondary basis, meaning that such stations may not cause interference to, and must accept inference from primary service stations such as full-service TV stations.
- **Class A TV Stations** are similar to LPTV stations, but, unlike other LPTV, stations qualify for certain interference protection rights afforded full-power TV stations. Class A TV stations are

primary stations and as such are less susceptible than other LPTVs to displacement during the transition to DTV.

- **Minor Change Applications** are applications in this context refers to any applications that do not involve any change in the frequency not related to DTV displacement relief or transmitting antenna location where the protect contour resulting from the change does not overlap some portion of the protect contour of the authorized facilities of the existing station.
- **Cut-off** means that the Commission is no longer accepting applications.
- **TV Translator Stations** are LPTV stations that receive the signal of a television station and simultaneously retransmit it on another TV channel. TV translators are often used to deliver only the off-air television service available to rural communities, particularly in the western regions of the country.
- **Land Mobile Service** is a public or private radio service providing two-way communication, paging, and radio signaling.

Transmission Standards and System Requirements

- Digital Class A stations must meet the emission requirements of 47 C.F.R. § 74.794, regarding use of a **simple** or a **stringent emission mask**. 47 C.F.R. §§ 6024(d)
- **Simple and stringent emission mask**. The term “emission mask” describes required levels of signal reduction below a reference power value at specified frequency intervals outside of the bandwidth of an adjacent channel. Unless sufficiently reduced, out-of-channel emissions could cause co-channel interference to signals received in an adjacent channel. An emission mask is the technical specification that limits the distribution of power of a radio transmitter as a function of frequency. The Simple emission mask and the Stringent emission mask each have their own associated required adjacent desired to undesired (D/U) signal strength ratio. The Simple mask “allows simple and cost-effective translator implementation” and the Stringent make “still allows a reasonable cost effective implementation but allows larger D/U ratios between interfering signals and thus is more efficient for spectrum utilization in crowded regions.”¹

Class A TV Notifications Concerning Interference To Radio Astronomy, Research, and Receiving Installations

- Applicants for digital operation of an existing Class A TV station or to change the facilities of an existing Class A TV or digital Class A TV station are subject to the requirements of 47 C.F.R. § 73-1030, regarding notifications concerning interference to radio astronomy, research, and receiving installations. For example, in order to minimize harmful interference at the National Radio Astronomy Observatory site at Greene, West Virginia, applicants must notify in writing the Interference Office at the National Radio Astronomy Observatory of their proposal. Any applicant for a station located or to be located on the islands of Puerto Rico—Desecheo, Mona, Vieques,

¹ “DTV Repeater Emission Mask Analysis,” Gary Sgrignoli, *IEEE Transactions on Broadcasting*, March 2003, Volume 49, Number 1 ISSN 0018-9316.

and Culebra— must notify the Interference Office, Arecibo Observatory, Arecibo, Puerto Rico of their proposal. 47 C.F.R. § 73.6027

Interference

- A digital LPTV or TV translator station operating on channels 52-69 must eliminate at its expense any interference caused to existing and future commercial or public safety wireless licensees in the 700 MHz bands. The digital station must cease operation upon receiving notification of interference by any primary wireless licensee once the digital LPTV or translator station has been proved to be the source of the interference. 47 C.F.R. § 74.703
- An existing or future wireless licensee in the 700 MHz band may notify by certified mail, return receipt requested, a digital LPTV or TV translator operating on the same channel or first adjacent channel of its intention to initiate or change wireless operations and the likelihood of interference from the LPTV or translator station within its licensed geographic service area. Upon receipt of such notice, the digital operator must cease operation within 120 days unless it obtains the agreement of the wireless licensee to continue operations, the commencement or modification of the wireless service is delayed beyond that 120 days (in which case the period to start to cease operation will be extended), or the Commission stays the effect of the interference notification, upon request. 47 C.F.R. § 74.703

Digital Low Power TV and TV Translator Station Protection

- An application to construct a new LPTV, TV translator, or **TV booster station** or to change the facilities of an existing station will be denied if it fails to protect an authorized digital LPTV or TV translator station or an application for a digital LPTV or translator station filed before the date the LPTV, translator or TV booster application is filed. Protection requirements include that (a) an application must not specify an antenna site within the protect contour of a co-channel or adjacent channel digital LPTV or TV translator station; (b) the ratio in decibels of the field strength of the LPTV, TV translator, or TV booster station at the protected contour of a co-channel or adjacent channel digital LPTV or translator station must meet the requirements specified in 47 C.F.R. § 74.706(d)(1) (for example, -2 dB or less for co-channel operations); (c) the ratio in decibels of the field strength of the LPTV, translator, or booster station at the protected contour of a digital LPTV, or TV translator on the lower and upper adjacent channels must not exceed 49 dB and 48 dB respectively; and (d) the analysis should use the propagation methods specified in 47 C.F.R. § 74.706(c). Finally, as an alternative to these four requirements, an applicant for an LPTV, TV translator or TV booster station may make full use of terrain shielding and terrain dependent propagation prediction methods to demonstrate that the proposed facility would not be likely to cause interference to digital LPTV or TV translator stations. 47 C.F.R. § 74.710
- **TV Booster Stations** are intended to provide fill-in service to areas within the predicted Grade B contours of full-service television stations. TV boosters simultaneously retransmit the programming of full-service TV stations and may be licensed only to full-service licensees and permittees. TV boosters transmit on the same TV channel as that of the full-service station they re-broadcast and are permitted to broadcast only within the Grade B contour of the associated full-service station.

Digital Channel Assignments

- An applicant for a new LPTV or TV translator digital station or for changes in the facilities of an authorized digital station should attempt to select a channel on which its operation is not likely to cause interference. The applications must be specific with regard to the channel requested. Only one channel will be assigned to each station. Any one of VHF Channels 2-13 may be assigned to a VHF digital LPTV or translator station. Channels 5 and 6 assigned in Alaska shall not cause harmful interference to and must accept interference from non-Government fixed operation authorized prior to January 1, 1982. UHF Channels 52-59 may be assigned to a digital LPTV or translator station for use as a **digital conversion channel** and may also be assigned as a **companion digital channel** if the applicant can demonstrate that a **suitable in core channel** is not available. Applicants proposing use of these channels shall notify no later than 30 days prior to the submission of their completed FCC Form 346, all potentially affected 700 MHz wireless licensees comprising the same TV channel and the adjacent channel located in the same licensed geographical boundaries as the proposed digital station. They must also notify licensees of co-channel and adjacent channel spectrum whose service boundaries lie within 75 miles and 50 miles of the proposed station location. UHF Channels 60-69 may be assigned to a digital LPTV or TV translator station for use only as a digital conversion channel. Stations proposing use of these channels must notify all potentially affected 700 MHz commercial licensees as described above. Additionally, stations proposing use of channels 63-64 and 68-69 must secure a coordinated spectrum use agreement with the pertinent 700 MHz public safety regional planning committees and state administrators (in the region and state within which the proposed station is to be located, as well in the adjoining regions and states within 75 miles of the proposed station location) no less than 30 days prior to the submission of their FCC Form 346. 47 C.F.R. § 74.786
- Digital LPTV or TV translator stations proposing use of channels 62, 65, and 67 for digital conversion channels, must notify the pertinent regional planning committees and state administrators (in the region and state within which the proposed station is to be located, and those of adjoining regions and states within 50 miles of the proposed station location) no later than 30 days prior to the submission of their FCC Form 346. The Commission will not accept for filing applications for new analog LPTV or TV translator stations seeking operation above Channel 51. Applications for displacement relief (for stations displaced by new digital stations) on channels above 51 will continue to be accepted. 47 C.F.R. § 74.786
- **Digital Conversion Channel** refers to a channel previously authorized to an existing low power television or television translator station that has been converted to digital operation.
- **Companion Digital Channel** refers to a digital channel authorized to an existing LPTV or TV translator station to be associated with the station's analog channel.
- **Suitable In-Core Channel** refers to a channel that would enable a digital LPTV or translator station to produce a protected service area comparable to that of its associated analog LPTV or translator station.

Digital licensing

- The Commission will issue a Public Notice establishing a time period or “window” for filing applications for companion digital channels. During this window, only existing LPTV, translator stations, or Class A or licensees or permittees may submit applications for companion digital channels. Applications filed before the window will be returned as premature. Applications for companion digital channels filed during the window shall be filed in compliance with 47 C.F.R. §§ 1.2105 and 73.5002 regarding the submission of the short-form application, FCC Form 175, with all appropriate certifications, information and exhibits identified with that form. No application fee applies with FCC Form 175. Applications filed during the window must also submit the engineering data contained in FCC Form 346 as a supplement to its short-form application. This engineering data will not be studied for technical acceptability, and determinations as to the acceptability or grantability of an applicant’s proposal will not be made prior to an auction. After the close of the initial window, the Commission will issue another Public Notice identifying the short-form applications received during the window found to be **mutually exclusive**. Mutually exclusive applications will be resolved according to the Commission’s Part I and broadcast competitive bidding rules found at 47 C.F.R. §§ 1.2100 *et seq.* and 73.5000 *et seq.* The Commission will allow mutually exclusive applicants to submit settlements and engineering solutions to resolve mutual exclusivity pursuant to 47 C.F.R. § 73.5002(d). The Commission will also issue a Public Notice after the window closes identifying short-form applications that are not found to be mutually exclusive. These applicants will need to file an FCC Form 346 pursuant to 47 C.F.R. § 73.5005, which will be processed pursuant to 47 C.F.R. § 73.5006. The Commission will issue another Public Notice announcing the start of a filing procedure in which applications will be accepted on a first-come, first-served basis not restricted to existing stations licensees and permittees. 47 C.F.R. § 74.787
- The Commission will issue a Public Notice announcing the date upon which interested parties may begin to file applications for new stations and **major facilities changes** to existing LPTV stations. Applications submitted prior to the date provided in the Public Notice will be returned as premature. These applications must be filed on FCC Form 346 and the Commission will accept such applications on a first-come, first-served basis. A filing fee will apply. Mutually exclusive applications will be resolved pursuant to the Commission’s Part I and broadcast competitive bidding rules found in 47 C.F.R. §§ 1.2100 *et seq.* and 73.5000 *et seq.* The Commission will allow mutually exclusive applicants to submit settlements and engineering solutions to resolve mutual exclusivity pursuant to 47 C.F.R. § 73.5002(d). A digital LPTV or TV translator station which is causing or receiving interference or is predicted to cause or receive interference to or from an authorized TV broadcast station, DTV station or allotment, or other protected station or service may, at any time, file a displacement relief application for change in channel, together with technical modifications that are necessary to avoid interference or continue serving the station’s protected service area, provided the proposed transmitter site is not located more than 30 mile from the reference coordinates of the existing station’s community of license. Displacement relief applications must be filed on FCC Form 346, will be considered a minor change, and will be placed on public notice for a period of at least 30 days to permit petitions to deny. These applications will not be subject to the filing of competition applications. Regarding certain displacement relief applications, the Commission will afford priority to the displacement relief application filed by the digital LPTV or TV translator station to the exclusion of other applications. Mutually exclusive displacement relief applications for digital LPTV and TV translators shall be resolved as provided by the Commission’s Part I and broadcast competitive

bidding rules in 47 C.F.R. §§ 1.2100 *et seq.* and 73.5000 *et seq.* The Commission will also provide mutually exclusive applicants with an opportunity to submit settlements and engineering solutions to resolve the situation pursuant to 47 C.F.R. § 73.5002(d). 47 C.F.R. § 74.787

- **Mutually Exclusive** refers to two or more applications competing for the same broadcast spectrum.
- **Major Facilities Changes** for digital LPTV and TV translator stations refers to applications including change in frequency not related to displacement relief or transmitting antenna location where the protected contour resulting from the change does not overlap some portion of the protected contour of the authorized facilities of an existing station.

Digital Construction Period

- Applicants for construction of a new digital LPTV or TV translator station shall have a period of three years from the date of issuance of the original construction permit to complete construction and file an application for license. Any construction permit for which construction has not been complete and for which an application for license or extension of time has not been filed will automatically be forfeited upon expiration without any further affirmative cancellation by the Commission. The Chief of the Commission's Mass Media Bureau may grant an extension of time of up to six months beyond the construction permit if the digital licensee or permittee can show that failure to meet the construction deadline is due to circumstances that are unforeseeable or beyond the licensee's control where the licensee has taken all reasonable steps to resolve the problem expeditiously. The Bureau Chief may not grant more than two extension requests under delegated authority. Subsequent requests shall be referred to the Commission. Applications for extension of time must be filed 60-90 days prior to the construction deadline, absent a showing of sufficient reasons for filing within less than 60 days of the construction deadline. 47 C.F.R. § 74.788

Broadcast Regulations Applicable to Digital LPTV and TV Translator Stations

- The following rules in 47 C.F.R. are applicable to digital LPTV and TV translator stations:

Section 73.1030—Notifications concerning interference to radio astronomy, research and receiving installations.

Sections 74.600—Eligibility for license.

Section 74.703—Interference

Section 74.709—Land mobile station protection.

Section 74.732—Eligibility and licensing requirements.

Section 74.734—Attended and unattended operation.

Section 74.735—Power limitations.

Section 74.751—Modification of transmission systems.

Section 74.763—Time of operation.

Section 74.765—Posting of station and operator licenses.

Section 74.769—Copies of rules.

Section 74.780—Broadcast regulations applicable to translators, low power, and booster stations (except Section 73.653 – operation of TV aural and visual transmitters and Section 73.1201 – station identification).

Section 74.781—Station records.

Section 74.784—Rebroadcasts.

Permissible Service of Digital TV Translator and LPTV Stations

- A digital TV translator may be used to receive the signals of a TV broadcast or DTV broadcast station, another digital TV translator station, or other suitable sources, for the retransmission of the programs and signals of a TV or digital TV broadcast station. Translator operators may complete such transmissions by reception of TV broadcast or DTV broadcast station programs and signals directly through space and conversion to a different channel, or by **demodulation, remodulation, and amplification** of TV broadcast or DTV broadcast station programs and signals received through a **microwave transport**. A digital TV translator station must not be operated solely to relay signals to one or more fixed receiving points for retransmission, distribution, or further relaying. A digital TV translator station shall not retransmit the programs and signals of any TV broadcast or DTV broadcast station(s) without the prior written consent of such station(s). A digital TV translator may **multiplex** on its output channel the video programming services of two or more TV broadcast and/or DTV broadcast stations, pursuant to arrangements with all affected stations, and for this limited purpose, is permitted to alter a TV broadcast and/or DTV broadcast signal. Finally, a digital TV translator may transmit locally originated visual and/or aural messages limited to emergency warnings of imminent danger, to local public service announcements, and to seeking or acknowledgments of financial support deemed necessary to the continued operation of the station. Financial support messages and PSAs may be no longer than 30 seconds, and emergency transmissions may be no longer or more frequent than necessary to protect life and property. Such originations may be accomplished by any technical means agreed upon between the TV translator and DTV station whose signal is being retransmitted, but must be capable of receipt on consumer DTV broadcast equipment. 47 CFR § 74.790
- **Demodulation** is the process of decoding an analog signal into digital data.
- **Remodulation** is the reencoding of digital signals for transmissions.
- **Amplification** refers to increasing the power of a signal
- **Microwave Transport** is a method of providing migration from analog to digital transmission.
- **Multiplex** or multi-casting is a feature of DTV that will allow broadcasters to offer multiple standard definition TV programs in a single digital signal, thus allowing a broadcaster to compete with other multichannel media such as cable and direct broadcast satellite systems.

Digital Low Power TV and TV Translator Station Protection of Broadcast Stations

- An application to construct a new digital LPTV or TV translator station or change the facilities of an existing station will not be accepted if it fails to meet the Commission's interference protection requirements in 47 C.F.R. § 74.793. Except as provided in the rules, interference prediction analysis is based on the thresholds (D/U signal strength ratios) and other criteria and methods specified in 47 C.F.R. § 73.623(c)(2)-(c)(4). The following D/U signal strength ratios (dB) shall apply to the protection of stations on the first adjacent channel. The D/U ratios for "Digital TV-into-analog TV" shall apply to the protection of TV broadcast, Class A TV, LPTV and TV translator stations. The D/U ratios for "Digital TV-into-digital TV" shall apply to the protection of DTV, digital Class A TV, digital LPTV and digital TV translator stations. For analysis of predicted interference from digital low power TV and TV translator stations, the relative field strength values of the assumed antenna vertical radiation pattern in Table 8 in OET Bulletin 69 shall be doubled up to a value of 1.0.
- Protection to the authorized facilities of DTV broadcast stations shall be based on not causing predicted interference to the population within the service area defined and described in 47 C.F.R. § 73.622(e) of this chapter, except that a digital low power TV or TV translator station must not cause a loss of service to 0.5 percent or more of the population predicted to receive service from the authorized DTV facilities.
- Protection to the authorized facilities of TV broadcast stations shall be based on not causing predicted interference to the population within the Grade B field strength contours defined and described in 47 C.F.R. § 73.683 except that a digital low power TV or TV translator station must not cause a loss of service to 0.5 percent or more of the population predicted to receive service from the authorized TV broadcast facilities.
- Protection to the authorized facilities of Class A and digital Class A TV stations shall be based on not causing predicted interference to the population within the service area defined and described in 47 C.F.R. § 73.6010 (a)-(b) and (c)-(d) except that a digital low power TV or TV translator station must not cause a loss of service to 0.5 percent or more of the population predicted to receive service from the authorized Class A TV or digital Class A TV facilities.
- Protection to the authorized facilities of low power TV and TV translator stations and digital low power TV and TV translator stations shall be based on not causing predicted interference to the population within the service area defined and described in 47 C.F.R. §§ 74.707(a) and 74.792, except that a digital low power TV or TV translator station must not cause a loss of service to 2.0 percent or more of the population predicted to receive service from the authorized low power TV, TV translator, digital low power TV or digital TV translator station. 47 C.F.R. § 74.793

Digital Emissions

- An applicant for a digital LPTV or TV translator station construction permit must specify that the station will be constructed to confine out-of-channel emissions within either a simple or stringent emission mask. In addition to meeting the emission attenuation requirements of the simple stringent mask, digital LPTV and TV translator stations authorized to operate on TV channels 22-24, 36, 38, and 65-69 must provide specific "out-of-band" protection to **Radio Navigation**

Satellite Services in the bands L5, L2, and L1. An FCC-certificated transmitter specifically certified for use on one or more of these bands must include filtering with an **attenuation** of not less than 85 dB in the **Global Position System (GPS)** band. This attenuation must be demonstrated to the Commission as part of the certification application. An installation on one of these channels with a digital transmitter not specifically FCC certificated for the channel must include a **low pass filter** or equivalent device rated by its manufacturer to have an attenuation of at least 85 dB in the GPS band. The low pass filter must be installed in a manner that will prevent the harmonic emission content from reaching the antenna. A description of the low pass filter or equivalent device must be retained with the station license. 47 C.F.R. § 74.794

- **Radio Navigation Satellite Service** offers interference protection to such critical safety-of-life services as civil aviation.
- **Attenuation** describes any reduction in signal strength, usually expressed in dBs.
- **Global Position System (GPS)** is a service funded and controlled by the U.S. Department of Defense that is used by thousands of civilians and public safety entities to pinpoint the location of an emergency and of the closest source of help to that emergency. It provides satellite signals used to compute positions, velocity, and time.
- **Low Pass Filter** is an electronic filter used to block unwanted high frequency signals while allowing lower frequency signals to pass through.

Digital Low Power TV and TV Translator Transmission System Facilities

- To qualify for Commission certification, a digital LPTV or TV translator transmitter must: (a) be designed to produce digital TV signals that can be satisfactorily viewed on consumer receiving equipment as detailed in 47 C.F.R. § 73.682(d); (b) produce emissions on frequencies outside the authorized channel, measured at the output terminals of the transmitter that meet the applicable requirements of 47 C.F.R. § 74.794; (c) be equipped to display the digital power (*i.e.*, average power over a 6 MHz channel) and be designed to prevent the power out from exceeding the maximum rated power output under any condition; (d) when subjected to variation in ambient or atmospheric temperature between 0 and 40 degrees Centigrade and variations in power main voltage between 85% and 115% of the rated power supply voltage, maintain the frequency stability of the local oscillator in the RF channel upconverter within 10% of the nominal value; and (5) be equipped with suitable meters and jacks so that appropriate voltage and current measurements may be made while the transmitter is in operation. Alternatively, the transmitter may be modified for digital operation as provided in 47 C.F.R. § 74.796. **Digital heterodyne translators** must have a maximum rated power output (digital average power over a 6 MHz channel) that does not exceed 30 watts for transmitters operating on channels 14-69 and 3 watts for transmitters operating on channels 2-13, and must have a transmitter that contains circuits which will maintain the digital average power output constant within 1 dB when the strength of the input signal is varied over a range of 30 dB. 47 C.F.R. § 74.795
- **Digital heterodyne translators** mix the incoming frequencies of the input signal with frequencies generated by a tuned local oscillator to generate an IF frequency (such as 44 MHz) that is passed through a band pass filter and upconverted by the same process to the final RF output channel for amplification.

Modification of Digital Transmission Systems and Analog Transmission Systems for Digital Operation

- The provisions of 47 C.F.R. § 74.751 shall apply to the modification of existing analog transmissions systems and the modification of existing analog transmission systems for digital operation. Additional provisions apply to the modification of existing analog transmission systems for digital operation, including installation of manufacturers' certificated equipment (field modification kits) and **custom modifications**. For example, the final amplifier stage of an analog transmitter modified for digital operation shall not have an average digital power output greater than 25% of its previous NTSC or current analog peak sync power output unless the amplifier has been specifically refitted or replaced to operate at a higher power. Also, after completion of the modification, suitable tests and measurements shall be made to demonstrate compliance with the applicable requirements, including those in 47 C.F.R. § 74.795. Upon installation of a field modification kit, the transmitter must be performance-tested in accordance with the manufacturer's instructions. The station licensee must notify the Commission upon completion of the transmitter modification. In the case of custom modifications, the licensee must certify compliance with all applicable transmission system requirements. In connection with the on-channel conversion of existing analog transmitters for digital operation, a limited allowance is made for transmitters that do not meet the attenuation of the Simple emission mask at the channel edges. Station licensees may obtain equivalent compliance with the attenuation requirement by: (a) measuring the level of attenuation of emissions below the average digital power output at the channel edges in a 500 kHz bandwidth; (b) calculating the difference in dB between the 46 dB channel-edge attenuation requirement of the Simple mask; (c) subtracting the value determined in the previous step from the authorized effective radiated power (ERP) of the analog station being converted and then subtracting an additional 6 dB to account for the approximate difference between analog peak and digital average power; (d) converting the ERP calculated in step (c) to units of kilowatts; and (e) this ERP value should be specified as the digital ERP in the minor change application for an on-channel digital conversion. The transmitter may not be operated to produce a higher digital ERP than this value. 47 C.F.R. § 74.796
- **Custom Modifications** are those not related to installation of manufacturer-supplied and FCC-certificated equipment.

2. Internet Links

- Report and Order – FCC 04-220
Amendment of Parts 73 and 74 of the Commission's Rules to Establish Rules for Digital Low Power Television, Television Translator, and Television Booster Stations and to Amend Rules for Digital Class A Television Stations
http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-04-220A1.pdf
- News Release –
FCC Establishes Rules For Digital Low Power Television And Television Translator Stations
<http://www.fcc.gov/dtv>
- DTV Glossary and Other Information
<http://www.fcc.gov/dtv>
- OET Bulletin No. 69
Longley-Rice Methodology for Evaluating TV Coverage and Interference
<http://www.fcc.gov/oet/info/documents/bulletins>
- Information to Notify Wireless Licensees (§74.786)
http://wireless.fcc.gov/auctions/default.htm?job=auctions_home
- Information to Notify Public Safety Regional Planning Regional Committees and State Administrators (§ 74.786)
<http://wireless.fcc.gov/publicsafety/700MHz/regional.html>
<http://wireless.fcc.gov/publicsafety/700MHz/state.html>
<http://wireless.fcc.gov/publicsafety/700MHz/interop-contacts.html>
- Electronic FCC Forms
<http://www.fcc.gov/formpage.html>

3. Payment of Fees

LPTV and TV translator stations file digital conversion applications and applications for digital companion channels on FCC Form 346. Class A stations will file digital conversion applications and digital companion channel applications on FCC Form 301-CA. In all cases, these applications are filed as a minor change without an application filing fee.

Applications for new or major change digital LPTV and TV translator stations are filed on FCC Form 346 and are treated as an application for a new station or major change, and pay the standard application fee. Requests for Special Temporary Authority (STA), for extension of construction permit, for assignment or transfer of a digital-only station, for a station license and for renewal of license are filed in the same manner as analog stations and pay the same application fees for those filings.

4. Recordkeeping and Reporting Requirements

- Digital LPTV and TV translator stations operating on TV channels 22-24, 32-36, 38, and 65-69 with a digital transmitter not specifically FCC-certificated for the channel must retain with their station license, a description of the low pass filter or equivalent device with the manufacturer's rating or a report of measurements by a qualified individual.
- A digital LPTV or TV translator station licensee that modifies its existing analog transmission system for digital operation must maintain with the station's records for a period of not less than two years, a description of the modifications performed and performance tests or, in the case of installation of a manufacturer-supplied modification kit, a description of the nature of the modifications, installation and test instructions and other material provided by the manufacturer, the results of performance tests and measurements on the modified transmitter, and copies of related correspondence with the Commission.
- In situations where protection of an existing analog LPTV or translator station without a **frequency offset** prevents acceptance of a proposed new or modified LPTV, TV translator or Class A station, the station without the offset must install, at its expense, offset equipment and notify the Commission that it has done so. Alternatively, the station without the offset may notify the Commission that it has reached an interference agreement with the new station. If the existing non-offset station does not cooperate in this regard, the Commission will direct it to operate with a frequency offset different than that specified in the application proposal.
- **Frequency Offsetting** involves positioning the TV station's signal so that its visual carrier frequency is at its normal position of 1.25 MHz above the lower edge of a TV channel (zero offset), 10 kHz above the nominal frequency (plus offset), or 10 kHz below (minus offset). For stations with the same or no offset, co-channel interference is predicted to occur when the D/U ratio is 45 dB, while for stations with different offsets the co-channel interference D/U level is reduced to 28 dB.