

FCC CABLE RULES

**CODE OF FEDERAL REGULATIONS
TITLE 47 -- TELECOMMUNICATION
CHAPTER I -- FEDERAL COMMUNICATIONS COMMISSION
SUBCHAPTER C -- BROADCAST RADIO SERVICES
PART 76--CABLE TELEVISION SERVICE**

§76.605 Technical Standards

- (a) As of December 30, 1992, unless otherwise noted, the following requirements apply to the performance of a cable television system as measured at any subscriber terminal with a matched impedance at the termination point or at the output of the modulating or processing equipment (generally the headend) of the cable television system or otherwise as noted. The requirements are applicable to each NTSC or similar video downstream cable television channel in the system:
- (1)
- (i) The cable television channels delivered to the subscriber's terminal shall be capable of being received and displayed by TV broadcast receivers used for off-the-air reception of TV broadcast signals, as authorized under part 73 of this chapter; and
- (ii) Cable television systems shall transmit signals to subscriber premises equipment on frequencies in accordance with the channel allocation plan set forth in the Electronics Industries Association's "Cable Television Channel Identification Plan, EIA IS-132, May 1994" (EIA IS-132). This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 522(a) and 1 CFR Part 51. Cable systems are required to use this channel allocation plan for signals transmitted in the frequency range 54 MHz to 1002 MHz. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 522(a) and 1 CFR Part 51. Copies of EIA IS-132 may be obtained from: Global Engineering Documents, 2805 McGraw Ave., Irvine CA 92714. Copies of EIA IS-132 may be inspected during normal business hours at the following locations: Federal Communications Commission, 1919 M Street, NW, Dockets Branch (Room 239), Washington, DC, or the Office of the Federal Register, 800 North Capitol Street, NW., suite 700, Washington, DC. This requirement is applicable on May 31, 1995, for new and re-built cable systems, and on June 30, 1997, for all cable systems.
- (2) The aural center frequency of the aural carrier must be 4.5 MHz - 5 kHz above the frequency of the visual carrier at the output of the modulating or processing equipment of a cable television system, and at the subscriber terminal.

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§76.605 Technical Standards (continued)

- (3) The visual signal level, across a terminating impedance which correctly matches the internal impedance of the cable system as viewed from the subscriber terminal, shall not be less than 1 millivolt across an internal impedance of 75 ohms (0 dBmV). Additionally, as measured at the end of a 30 meter cable drop that is connected to the subscriber tap, it shall not be less than 1.41 millivolts across an internal impedance of 75 ohms (+3 dBmV). (At other impedance values, the minimum visual signal level, as viewed from the subscriber terminal, shall be the square root of $0.0133(z)$ millivolts and, as measured at the end of a 30 meter cable drop that is connected to the subscriber tap, shall be 2 times the square root of $0.00662(z)$ millivolts, where Z is the appropriate impedance value).
- (4) The visual signal level on each channel, as measured at the end of a 30 meter cable drop that is connected to the subscriber tap, shall not vary more than 8 decibels within any six-month interval which must include four tests performed in six-hour increments during a 24-hour period in July or August and during a 24-hour period in January or February, and shall be maintained within:
 - (i) 3 decibels (dB) of the visual signal level of any visual carrier within a 6 MHz nominal frequency separation;
 - (ii) 10 dB of the visual signal level on any other channel on a cable television system of up to 300 MHz of cable distribution system upper frequency limit, with a 1 dB increase for each additional 100 MHz of cable distribution system upper frequency limit (e.g., 11 dB for a system at 301-400 MHz; 12 dB for a system at 401-500 MHz, etc.); and
 - (iii) A maximum level such that signal degradation due to overload in the subscriber's receiver or terminal does not occur.
- (5) The rms voltage of the aural signal shall be maintained between 10 and 17 decibels below the associated visual signal level. This requirement must be met both at the subscriber terminal and at the outputs of the modulating and processing equipment (generally the headend). For subscriber terminals that use equipment which modulate and demodulate the signal (e.g., baseband converters), the rms voltage of the aural signal shall be maintained between 6.5 and 17 decibels below the associated visual signal level at the subscriber terminal.
- (6) The amplitude characteristic shall be within a range of +/- 2 decibels from 0.75 MHz to 5.0 MHz above the lower boundary frequency of the cable television channel, referenced to the average of the highest and lowest amplitudes within these frequency boundaries.

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- (i) Prior to December 30, 1999, the amplitude characteristic may be measured after a subscriber tap and before a converter that is provided and maintained by the cable operator.
 - (ii) As of December 30, 1999, the amplitude characteristic shall be measured at the subscriber terminal.
- (7) The ratio of RF visual signal level to system noise shall be as follows:
- (i) From June 30, 1992, to June 30, 1993, shall not be less than 36 decibels.
 - (ii) From June 30, 1993 to June 30, 1995, shall not be less than 40 decibels.
 - (iii) As of June 30, 1995, shall not be less than 43 decibels.
 - (iv) For class I cable television channels, the requirements of paragraphs (a)(7)(i), (a)(7)(ii) and (a)(7)(iii) of this section are applicable only to:
 - (A) Each signal which is delivered by a cable television system to subscribers within the predicted Grade B contour for that signal;
 - (B) Each signal which is first picked up within its predicted Grade B contour;
 - (C) Each signal that is first received by the cable television system by direct video feed from a TV broadcast station, a low power TV station, or a TV translator station.
- (8) The ratio of visual signal level to the rms amplitude of any coherent disturbances such as intermodulation products, second and third order distortions or discrete-frequency interfering signals not operating on proper offset assignments shall be as follows:
- (i) The ratio of visual signal level to coherent disturbances shall not be less than 51 decibels for noncoherent channel cable television systems, when measured with modulated carriers and time averaged; and
 - (ii) The ratio of visual signal level to coherent disturbances which are frequency-coincident with the visual carrier shall not be less than 47 decibels for coherent channel cable systems, when measured with modulated carriers and time averaged.

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- (9) The terminal isolation provided to each subscriber terminal:
 - (i) Shall not be less than 18 decibels. In lieu of periodic testing, the cable operator may use specifications provided by the manufacturer for the terminal isolation equipment to meet this standard; and
 - (ii) Shall be sufficient to prevent reflections caused by open-circuited or short-circuited subscriber terminals from producing visible picture impairments at any other subscriber terminal.
- (10) The peak-to-peak variation in visual signal level caused by undesired low frequency disturbances (hum or repetitive transients) generated within the system, or by inadequate low frequency response, shall not exceed 3 percent of the visual signal level. Measurements made on a single channel using a single unmodulated carrier may be used to demonstrate compliance with this parameter at each test location.
- (11) As of June 30, 1995, the following requirements apply to the performance of the cable television system as measured at the output of the modulating or processing equipment (generally the headend) of the system:
 - (i) The chrominance-luminance delay inequality (or chroma delay), which is the change in delay time of the chrominance component of the signal relative to the luminance component, shall be within 170 nanoseconds.
 - (ii) The differential gain for the color subcarrier of the television signal, which is measured as the difference in amplitude between the largest and smallest segments of the chrominance signal (divided by the largest and expressed in percent), shall not exceed +/- 20%.
 - (iii) The differential phase for the color subcarrier of the television signal which is measured as the largest phase difference in degrees between each segment of the chrominance signal and reference segment (the segment at the blanking level of 0 IRE), shall not exceed +/-10 degrees.
- (12) As an exception to the general provision requiring measurements to be made at subscriber terminals, and without regard to the type of signals carried by the cable television system, signal leakage from a cable television system shall be measured in accordance with the procedures outlined in §76.609(h) and shall be limited as follows:

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Frequencies	Signal leakage limit (microvolts/meter)	Distance in meters (m)
Up to and include 54 MHz:	15	30
Over 54 up to and including 216 MHz:	20	3

- (b) Cable television systems distributing signals by using methods such as nonconventional coaxial cable techniques, noncoaxial copper cable techniques, specialized coaxial cable and fiber optical cable hybridization techniques or specialized compression techniques or specialized receiving devices, and which, because of their basic design, cannot comply with one or more of the technical standards set forth in paragraph (a) of this section, may be permitted to operate: Provided, that an adequate showing is made pursuant to §76.7 which establishes that the public interest is benefited. In such instances, the Commission may prescribe special technical requirements to ensure that subscribers to such systems are provided with an equivalent level of good quality service.

Note 1: Local franchising authorities of systems serving fewer than 1000 subscribers may adopt standards less stringent than those in §76.605(a). Any such agreement shall be reduced to writing and be associated with the system's proof-of-performance records.

Note 2: For systems serving rural areas as defined in §76.5, the system may negotiate with its local franchising authority for standards less stringent than those in §§76.605(a)(3), 76.605(a)(7), 76.605(a)(8), 76.605(a)(10) and 76.605(a)(11). Any such agreement shall be reduced to writing and be associated with the system's proof- of-performance records.

Note 3: The requirements of this section shall not apply to devices subject to the provisions of §§15.601-15.626.

Note 4: Should subscriber complaints arise from a system failing to meet §76.605(a)(6) prior to December 30, 1999, the cable operator will be required to provide a converter that will allow the system to meet the standard immediately at the complaining subscriber's terminal. Further, should the problem be found to be system-wide, the Commission may order all converters on the system be changed to meet the standard.

Note 5: Should subscriber complaints arise from a system failing to meet §76.605(a)(10), the cable operator will be required to remedy the complaint and perform test measurements on §76.605(a)(10) containing the full number of channels as indicated in §76.601(c)(2) at the complaining subscriber's terminal. Further, should the problems be found to be system-wide, the Commission may order the full number of channels as indicated in §76.601(a)(2) be tested at all required locations for future proof-of-performance tests.

Note 6: No State or franchising authority may prohibit, condition, or restrict a cable system's use of any type of subscriber equipment or any transmission technology.