

(h) Measurements to determine the field strength of the signal leakage emanated by the cable television system shall be made in accordance with standard engineering procedures. Measurements made on frequencies above 25 MHz shall include the following:

(1) A field strength meter of adequate accuracy using a horizontal dipole antenna shall be employed.

(2) Field strength shall be expressed in terms of the rms value of synchronizing peak for each cable television channel for which signal leakage can be measured.

(3) The resonant half wave dipole antenna shall be placed 3 meters from and positioned directly below the system components and at 3 meters above ground. Where such placement results in a separation of less than 3 meters between the center of the dipole antenna and the system components, or less than 3 meters between the dipole and ground level, the dipole shall be repositioned to provide a separation of 3 meters from the system components at a height of 3 meters or more above ground.

(4) The horizontal dipole antenna shall be rotated about a vertical axis and the maximum meter reading shall be used.

(5) Measurements shall be made where other conductors are 3 or more meters (10 or more feet) away from the measuring antenna.

(i) For systems using cable traps and filters to control the delivery of specific channels to the subscriber terminal, measurements made to determine compliance with § 76.605(a) (5) and (6) may be performed at the location immediately prior to the trap or filter for the specific channel. The effects of these traps or filters, as certified by the system engineer or the equipment manufacturer, must be attached to each proof-of-performance record.

(j) Measurements made to determine the differential gain, differential phase and the chrominance-luminance delay inequality (chroma delay) shall be made in accordance with the NCTA Recommended Practices for Measurements on Cable Television Systems,

2nd edition, November 1989, on these parameters.

[37 FR 3278, Feb. 12, 1972, as amended at 37 FR 13867, July 14, 1972; 41 FR 10067, Mar. 9, 1976; 42 FR 21782, Apr. 29, 1977; 49 FR 45441, Nov. 16, 1984; 57 FR 11004, Apr. 1, 1992; 57 FR 61011, Dec. 23, 1992; 58 FR 44952, Aug. 25, 1993]

**§ 76.610 Operation in the frequency bands 108-137 and 225-400 MHz—scope of application.**

The provisions of §§ 76.611 (effective July 1, 1990), 76.612, 76.613, 76.614 and 76.1803 and 76.1804 are applicable to all cable television systems transmitting carriers or other signal components carried at an average power level equal to or greater than  $10^{-4}$  watts across a 25 kHz bandwidth in any 160 microsecond period, at any point in the cable distribution system in the frequency bands 108-137 and 225-400 MHz for any purpose. For grandfathered systems, refer to §§ 76.618 and 76.619.

NOTE 1: See the provisions of § 76.616 for cable operation near certain aeronautical and marine emergency radio frequencies.

NOTE 2: Until January 1, 1990, the band 136-137 MHz is allocated as an alternative allocation to the space operation, meteorological-satellite service and the space research service on a primary basis. After January 1, 1990, the space service will become secondary to aeronautical mobile service radio. Until January 1, 1990, the band 136 to 137 MHz is excluded from the rule sections regarding protection of aeronautical frequencies.

[50 FR 29399, July 19, 1985, as amended at 65 FR 53616, Sept. 5, 2000]

**§ 76.611 Cable television basic signal leakage performance criteria.**

(a) No cable television system shall commence or provide service in the frequency bands 108-137 and 225-400 MHz unless such systems is in compliance with one of the following cable television basic signal leakage performance criteria:

(1) prior to carriage of signals in the aeronautical radio bands and at least once each calendar year, with no more than 12 months between successive tests thereafter, based on a sampling of at least 75% of the cable strand, and including any portion of the cable system which are known to have or can reasonably be expected to have less leakage integrity than the average of the

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system, the cable operator demonstrates compliance with a cumulative signal leakage index by showing either that (i)  $10 \log I_{3000}$  is equal to or less than  $-7$  or (ii)  $10 \log I_{\infty}$  is equal to or less than  $64$ , using one of the following formula:

$$I_{3000} = \frac{1}{\theta} \sum_{i=1}^n \frac{E_i^2}{R_i^2},$$

$$I_{\infty} = \frac{1}{\theta} \sum_{i=1}^n E_i^2,$$

where:

$$R_i^2 = r_i^2 + (3000)^2$$

$r_i$  is the distance (in meters) between the leakage source and the center of the cable television system;

$\theta$  is the fraction of the system cable length actually examined for leakage sources and is equal to the strand kilometers (strand miles) of plant tested divided by the total strand kilometers (strand miles) in the plant;

$R_i$  is the slant height distance (in meters) from leakage source  $i$  to a point 3000 meters above the center of the cable television system;

$E_i$  is the electric field strength in microvolts per meter ( $\mu\text{V/m}$ ) measured pursuant to §76.609(h) 3 meters from the leak  $i$ ; and

$n$  is the number of leaks found of field strength equal to or greater than  $50 \mu\text{V/m}$  pursuant to Section 76.609(h).

The sum is carried over all leaks  $i$  detected in the cable examined; or

(2) prior to carriage of signals in the aeronautical radio bands and at least once each calendar year, with no more than 12 months between successive tests thereafter, the cable operator demonstrates by measurement in the airspace that at no point does the field strength generated by the cable system exceed  $10$  microvolts per meter ( $\mu\text{V/m}$ ) RMS at an altitude of  $450$  meters above the average terrain of the cable system. The measurement system (including the receiving antenna) shall be calibrated against a known field of  $10 \mu\text{V/m}$  RMS produced by a well characterized antenna consisting of orthogonal resonant dipoles, both parallel to and one quarter wavelength above the ground plane of a diameter of two meters or more at ground level. The dipoles shall have centers collocated

and be excited  $90$  degrees apart. The half-power bandwidth of the detector shall be  $25$  kHz. If an aeronautical receiver is used for this purpose it shall meet the standards of the Radio Technical Commission for Aeronautics (RCTA) for aeronautical communications receivers. The aircraft antenna shall be horizontally polarized. Calibration shall be made in the community unit or, if more than one, in any of the community units of the physical system within a reasonable time period to performing the measurements. If data is recorded digitally the 90th percentile level of points recorded over the cable system shall not exceed  $10 \mu\text{V/m}$  RMS; if analog recordings is used the peak values of the curves, when smoothed according to good engineering practices, shall not exceed  $10 \mu\text{V/m}$  RMS.

(b) In paragraphs (a)(1) and (a)(2) of this section the unmodulated test signal used on the cable plant shall: (1) Be within the VHF aeronautical band  $108-137$  MHz or any other frequency in which the results can be correlated to the VHF aeronautical band and (2) have an average power level equal to the average power level of the strongest cable television carrier on the system.

(c) In paragraph (a)(1) and (2) of this section, if a modulated test signal is used, the test signal and detector technique must, when considered together, yield the same result as though an unmodulated test signal were used in conjunction with a detection technique which would yield the RMS value of said unmodulated carrier.

(d) If a sampling of at least  $75\%$  of the cable strand (and including any portions of the cable system which are known to have or can reasonably be expected to have less leakage integrity than the average of the system) as described in paragraph (a)(1) cannot be obtained by the cable operator or is otherwise not reasonably feasible, the cable operator shall perform the airspace measurements described in paragraph (a)(2).

(e) Prior to providing service to any subscriber on a new section of cable plant, the operator shall show compliance with either: (1) The basic signal leakage criteria in accordance with

paragraph (a)(1) or (a)(2) of this section for the entire plant in operation or (2) a showing shall be made indicating that no individual leak in the new section of the plant exceeds  $20 \mu\text{V/m}$  at 3 meters in accordance with § 76.609 of the Rules.

(f) Notwithstanding paragraph (a) of this section, a cable operator shall be permitted to operate on any frequency which is offset pursuant to § 76.612 in the frequency band 108–137 MHz for the purpose of demonstrating compliance with the cable television basic signal leakage performance criteria.

[50 FR 29399, July 19, 1985, as amended at 53 FR 2499, Jan. 28, 1988; 53 FR 5684, Feb. 25, 1988; 58 FR 44952, Aug. 25, 1993]

**§ 76.612 Cable television frequency separation standards.**

All cable television systems which operate in the frequency bands 108–137 and 225–400 MHz shall comply with the following frequency separation standards:

(a) In the aeronautical radiocommunication bands 118–137, 225–328.6 and 335.4–400 MHz, the frequency of all carrier signals or signal components carried at an average power level equal to or greater than  $10^{-4}$  watts in a 25 kHz bandwidth in any 160 microsecond period must operate at frequencies offset from certain frequencies which may be used by aeronautical radio services operated by Commission licensees or by the United States Government or its Agencies. The aeronautical frequencies from which offsets must be maintained are those frequencies which are within one of the aeronautical bands defined in this subparagraph, and when expressed in MHz and divided by 0.025 yield an integer. The offset must meet one of the following two criteria:

(1) All such cable carriers or signal components shall be offset by 12.5 kHz with a frequency tolerance of  $\pm 5$  kHz; or

(2) The fundamental frequency from which the visual carrier frequencies are derived by multiplication by an integer number which shall be 6.0003 MHz with a tolerance of  $\pm 1$  Hz (Harmonically Related Carrier (HRC) comb generators only).

(b) In the aeronautical radionavigation bands 108–118 and 328.6–335.4 MHz, the frequency of all carrier signals or signal components carrier at an average power level equal to or greater than  $10^{-4}$  watts in a 25 kHz bandwidth in any 160 microsecond period shall be offset by 25 kHz with a tolerance of  $\pm 5$  kHz. The aeronautical radionavigation frequencies from which offsets must be maintained are defined as follows:

(1) Within the aeronautical band 108–118 MHz when expressed in MHz and divided by 0.025 yield an even integer.

(2) Within the band 328.6–335.4 MHz, the radionavigation glide path channels are listed in Section 87.501 of the Rules.

NOTE: The HRC system, as described above, will meet this requirement in the 328.6–335.4 MHz navigation glide path band. Those Incrementally Related Carriers (IRC) systems, with comb generator reference frequencies set at certain odd multiples equal to or greater than 3 times the 0.0125 MHz aeronautical communications band offset, e.g.  $(6n + 1.250 \pm 0.0375)$  MHz, may also meet the 25 kHz offset requirement in the navigation glide path band.

[50 FR 29400, July 19, 1985]

**§ 76.613 Interference from a multi-channel video programming distributor (MVPD).**

(a) Harmful interference is any emission, radiation or induction which endangers the functioning of a radionavigation service or of other safety services or seriously degrades, obstructs or repeatedly interrupts a radiocommunication service operating in accordance with this chapter.

(b) An MVPD that causes harmful interference shall promptly take appropriate measures to eliminate the harmful interference.

(c) If harmful interference to radio communications involving the safety of life and protection of property cannot be promptly eliminated by the application of suitable techniques, operation of the offending MVPD or appropriate elements thereof shall immediately be suspended upon notification by the District Director and/or Resident Agent of the Commission's local field office, and shall not be resumed until the interference has been eliminated to the satisfaction of the District Director and/or Resident Agent. When