Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	MB Docket No. 12-217
Cable Television Technical and Operational Requirements	)	

NOTICE OF PROPOSED RULEMAKING

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By the Commission: Chairman Genachowski and Commissioners McDowell, Clyburn, Rosenworcel and Pai issuing separate statements.

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I. INTRODUCTION

1. With this Notice of Proposed Rulemaking ("NPRM"), we propose to update our cable television technical rules to facilitate the cable industry's widespread transition from analog to digital transmission systems.[1] Specifically, we seek comment on our proposals to modernize and modify the Commission's proof-of-performance rules[2] and basic signal leakage performance criteria.[3] In addition, we propose modifications throughout Part 76 to remove outdated language, correct citations, and make other minor or non-substantive updates. This NPRM promotes the goals of Executive Order 13579 and the Commission's plan adopted thereto, whereby the Commission analyzes rules that may be outmoded, ineffective, insufficient, or excessively burdensome and determines whether any such regulations should be modified, streamlined, expanded, or repealed.[4] As set forth below, we seek to adopt clear and effective rules that reflect technological advancements in the cable television industry, and apply them to cable operators in a way that is minimally burdensome.

II. BACKGROUND

2. The cable television industry is rapidly transitioning to digital service. The vast majority of cable system operators offer digital service,[5] and several cable system operators have already migrated to "all-digital" service.[6] Today, more than 80 percent of cable customers subscribe to some level of digital service, and that percentage is expected to increase to 84 percent by the end of this year.[7] Cable television operators' transition to more efficient digital technology has freed up their limited bandwidth so they can offer new and improved products and services, such as high-definition ("HD") video programming, high-speed Internet access, and digital voice services.[8] For this reason, we expect most

[1] *See* Appendix A – Proposed Rules (proposing revisions to 47 C.F.R. §§ 76.55-1909).

[2] *See* 47 C.F.R. §§ 76.601, 605, 609, 1704, 1705, and 76.1713.

[3] *See* 47 C.F.R. §§ 76.610-620, 76.615(a)(12), 76.1706, 76.1803-1804.

[4] *See* Executive Order No. 13579, § 2, 76 FR 41587 (July 11, 2011); *Final Plan for Retrospective Analysis of Existing Rules*, Public Notice, 2012 WL 1851335 (rel. May 18, 2012) (also available at http://transition.fcc.gov/Daily_Releases/Daily_Business/2012/db0521/DOC-314166A1.doc).

[5] While digital service has become the most prevalent cable service, most cable systems that offer digital service still maintain some analog channel offerings. These cable systems are called "hybrid" systems.

[6] We note, for example, that BendBroadband and RCN have completed their transition to all-digital service, and Comcast and Cablevision are rapidly transitioning to all-digital service. *See Carriage of Digital Television Broadcast Signals: Amendment to Part 76 of the Commission's Rules*, CS Docket 98-120, Fifth Report and Order, FCC 12-59, 27 FCC Rcd 6529 at 6539, ¶ 13, n.58 (2012) ("*Viewability Sunset Order*"). Comcast expects to have completed transitioning to all-digital service in 50% of its footprint by the end of 2012. *See* Comcast Comments in MB Docket No. 11-169 at 4.

[7] *See* SNL Kagan, "Video growth enjoys seasonal lift in Q1; service providers notch sub gains," (May 16, 2012) ("More than 80% of basic subs are now digital."); SNL Kagan, "SNL Kagan's 10-Year Cable TV Projections," (Jul. 28, 2011). SNL Kagan projects that the percentage of cable subscribers subscribing to digital cable service will reach about 84 percent by year-end 2012, 88 percent by year-end 2013, 91 percent by year-end 2014, and 93 percent by year-end 2015. *Id*. *See also* NCTA's statistics, available at http://www.ncta.com/statistics.aspx (last visited June 9, 2012) (indicating an 80.2% digital penetration rate (the percentage of total cable video customers that subscribe to a digital tier of cable service)).

[8] *See, e.g., Viewability Sunset Order*, 27 FCC Rcd at 6543, ¶ 16. *See also* NCTA News Release, "Cable's Digital Transformation Providing Consumers with Advanced Technology, Lower Prices and Enhanced Competition," (dated Jul. 29, 2009), available at http://www.ncta.com/ReleaseType/MediaRelease/Cables-Digital-Transformation-Providing-Consumers-with-Advanced-Technology-Lower-Prices-and-Enhanced.aspx.

cable operators will eventually transition to all-digital systems.[9] Accordingly, in this NPRM, we propose revisions and updates to our technical standards that would apply to the operation of "all-digital" and "hybrid" cable systems.

3. We specifically examine several of our technical rules ranging from those that ensure cable customers receive a good quality signal to those that protect spectrum users from interference by cable systems. This examination is necessary because our cable television technical rules were largely established when analog technology was predominant and digital technology was rare. As a result, our current rules treat the use of digital technology as an exception rather than the rule. For example, our current proof-of-performance (or signal quality) rules permit cable operators that use "non-conventional" technologies (i.e., non-analog) to file individual waivers in which the Commission might substitute alternative technical standards to ensure a good quality signal.[10] The Commission has received several such petitions based on cable operators transitioning to all-digital operation.[11] Instead of addressing these issues on a case-by-case basis, however, we believe that it is necessary to establish clear and generally applicable technical rules governing the signal quality of digital channels. In the cumulative signal leakage context, our existing rules require multichannel video programming distributors (MVPDs) operating coaxial cable systems to protect certain aeronautical frequencies from interference by analog signals, but provide no guidance about how to provide aeronautical protection from their digital signals. Additionally, we address numerous technical rules that have become outdated as a result of external factors. By addressing the gaps in our rules arising from these industry changes, we intend to provide operators with greater certainty regarding the standards that must be met in order to establish a good quality signal. In addition, updating our rules will help protect aeronautical distress and safety frequencies from interference and, at the same time, allow operators to utilize their spectrum more efficiently.

4. *Proof-of-Performance*. The Commission has maintained technical standards since 1972 to govern the signal quality cable television systems deliver to consumers.[12] Our rules focus on the electrical characteristics of analog television signals and set thresholds for numerous aspects of the signals when measured at subscribers' terminals to ensure that subscribers receive good quality cable signals.[13] These standards, plus the requirement that operators test their systems and maintain the results of these tests in their public files, are collectively called "proof-of-performance" rules. The Cable Television Consumer Protection and Competition Act of 1992 added Section 624(e) of the Communications Act to

[9] *See, e.g.*, *Viewability Sunset Order*, 27 FCC Rcd at 6539, ¶ 13. An all-digital cable system offers only digital service to its subscribers, while a hybrid cable system offers both analog and digital cable service to its subscribers.

[10] 47 C.F.R. § 76.605(b).

[11] *See, e.g., RCN Corporation Petition for Special Relief,* CSR-8166 and CSR-8301-Z (2010), *Bend Cable Communications, LLC, Petition for Special Relief,* CSR-8294-Z (2010), *Petition of the City of Burlington, VT, D/B/A Burlington Telecom, for Relief from Proof of Performance Testing,* CSR-8273-Z (2009), *Massillon Cable TV, Inc. and Clear Picture, Inc., Petition for Special Relief,* CSR-8274-Z (2010), *Jackson Energy Authority Petition for Special Relief,* CSR-6936-Z (2005).

[12] *See Amendment of Part 74, Subpart K, of the Commission's Rules and Regulations Relative to Community Antenna Television Systems,* Report and Order, 36 FCC 2d 143 (1972).

[13] Specific signal characteristics that the rules address include aural carrier center frequency location and relative signal level; visual signal carrier signal level, amplitude characteristics of each subcarrier, and signal level to noise ratio; terminal isolation, hum modulation, and color carrier signal characteristics. *See* 47 C.F.R. § 76.605; *Cable Television Technical and Operational Requirements,* MM Docket No. 91-169, Report and Order, 7 FCC Rcd 2021, 2024-30 (1992) ("*1992 Order"*), *aff'd in part and modified in part*, MM Docket No. 91-169, Memorandum Opinion and Order, 7 FCC Rcd 8676 (1992) ("*1992 Reconsideration Order*").

establish a statutory mandate for cable TV signal quality standards.[14] The statute requires the Commission to "update such standards periodically to reflect improvements in technology."[15] Since 1992, the Commission has adopted slight modifications to these rules,[16] but the underlying assumption of the rules, analog transmission technology, remains unchanged.

5. When the Commission adopted the current technical standards in 1992, it declined to extend the standards to the then-nascent practice of delivering cable television using digital signals.[17] The Commission explained that technical standards for "digital transmission techniques … may be vastly different than those for analog NTSC signals," but that it "retain[s] authority … to address this issue at a later time should the adoption of technical standards … appear necessary or desirable."[18] Since the analog rules were adopted in 1992, an increasing number of cable television systems have adopted digital delivery technologies. The majority of digital signals today are being delivered digitally via quadrature amplitude modulation ("QAM") over hybrid fiber-coax ("HFC") cable plant.[19] Non-QAM digital cable systems have also emerged, though in far smaller numbers than QAM/HFC systems, and primarily utilize Internet Protocol ("IP") delivery over either fiber-optic cable or DSL-based transmission[20] over twisted-pair copper wires. Most recently, QAM-based operators have begun trials of DOCSIS-based[21] IP delivery of cable service over HFC cable plant.[22] Therefore, in this NPRM, we propose to establish proof-of

[14] 47 U.S.C. § 544(e) (requiring the establishment of "minimum technical standards relating to cable systems' technical operation and signal quality").

[15] *Id*.

[16] *See, e.g., Metric Conversion of Parts 1, 2, 18, 21, 22, 23, 25, 36, 61, 6368, 69, 73, 74, 76, 78, 80, 87, 90, and 94 of the Commission's Rules*, Order, 8 FCC Rcd 3720 (1993) (converting the Commission's rules to metric); *Implementation of Section 17 of the Cable Television Consumer Protection and Competition Act of 1992; Compatibility Between Cable Systems and Consumer Electronics Equipment*, First Report and Order, 9 FCC Rcd 1981 (1994) (requiring cable systems to adopt the EIA IS-132 standard channel plan); *Amendment of Part 76 of the Commission's Rules to Extend Interference Protection to the Marine and Aeronautical Distress and Safety Frequency 406.25 MHz*, MB Docket No. 03-05, Report and Order, 19 FCC Rcd 7244 (2004) ("*406 MHz Order*") (requiring cable systems to adopt the CEA-542-B channel plan and removing various expired clauses).

[17] *1992 Order*, 7 FCC Rcd at 2024, ¶ 16.

[18] *Id*. NTSC refers to the analog television system developed by the National Television System Committee and was the standard employed for analog broadcast television and analog cable television in the United States.

[19] Digital (QAM) transmission differs from analog (NTSC) transmission in two key ways. First, the digital carrier encodes multiple video and audio streams as well as associated meta-data as a single data stream which is parsed by the subscriber's equipment. Second, as a radio frequency signal, the QAM signal no longer contains the three distinct sub-carriers that make up an analog television signal, but instead appears in the spectrum in what is commonly referred to as a "haystack." Therefore, concepts such as the aural carrier separation from the video carrier are simply no longer applicable as these carriers are no longer distinct radio frequency components. Further, even where a signal characteristic could be measured for both an analog and digital signal, such as signal to noise ratio, the level of performance required for a digital QAM signal to be received and properly decoded is not the same as the signal to noise ratio required for the visual carrier of an analog television signal. *See* Walter Ciciora, et al., *Modern Cable Television Technology* 148-151 (2nd Ed. 2004).

[20] *See 1992 Order*, 7 FCC Rcd at 2024. "DSL" stands for Digital Subscriber Line and is the technology employed by many MVPDs that utilize telephone networks to deliver video signals. Video is typically provisioned over VDSL (Very-high-bitrate DSL), providing up to 52Mbps downstream or ADSL2+ (Asynchronous DSL version 2+), providing up to 24 Mbps downstream.

[21] DOCSIS is the Data Over Cable Service Interface Specification, and is the standard by which cable operators provide cable modem service to customers. *See* H. Newton, *Newton's Telecom Dictionary* 265, (20th ed. 2004).

[22] *See* Sean Portnoy, *Comcast Testing out IPTV Service at MIT to Compete Better Against Online Video Rivals*, ZDNet (May 26, 2011).

performance rules that specifically address these advances in digital technology.

6. *Cable Signal Leakage – Protection of Aeronautical Channels.* In addition to the minimum technical standards for signal quality, the Commission maintains a comprehensive testing, reporting, and repair regime to address the issue of interference caused by unintentional emissions from MVPDs. Established in 1984 after the Commission convened an advisory committee on the issue, the signal leakage rules require MVPDs that operate coaxial cable plants (specifically, what are commonly referred to as "cable systems" as well as additional "non-cable"[23] systems) and use the designated aeronautical communications bands at 108 to 137 MHz and 225 to 400 MHz to notify the Commission prior to doing so and to begin a regimen of routine monitoring to identify and correct any instances of signal leakage. These rules were established prior to the current widespread deployment of digital cable technology by cable and non-cable operators, and must be updated to provide adequate protection to aeronautical frequencies. Specifically, with regard to the "offset" requirement for analog signals, the Commission must account for the inability of digital signals to be "offset" relative to aeronautical channels and the implications this has on the interference potential of the signals. In this NPRM, we propose adjustments to our various signal leakage thresholds and modify our procedures for systems utilizing digital transmission to provide adequate protection of the aeronautical channels.

III. DISCUSSION

7. Below, we seek comment on proposed modifications to our cable television technical rules to specifically address the provision of digital cable service. The Commission especially seeks comment on the costs and benefits of the rule changes proposed below, along with data supporting the assessments. The Commission further welcomes comment on any other technical rules that may have become unworkable or ineffective as a result of the transition to digital, the diversification of transmission technologies now employed by the cable industry, or other developments in technology.[24]

A. Proof of Performance

8. Our proof-of-performance rules require a cable operator to provide a good quality signal to its customers and enable the Commission to evaluate compliance with this requirement.[25] These rules include the following: Section 76.601 (testing requirement), Section 76.605 (technical standards), Section 76.609 (methods and requirements for performing the tests), Sections 76.1704 and 76.1705 (recordkeeping requirements), and Section 76.1713 (process for resolving complaints regarding signal

[23] "Non-cable" systems are those MVPDs that are exempted from the Commission's legal definition of a cable system, but that are subject to some the Commission's cable technical rules based on their technical characteristics. *See* 47 C.F.R. § 76.5(a). Examples of these systems include facilities that serve only to retransmit the television signals of one or more television broadcast stations (such as master antenna systems), facilities that serve subscribers without using any public right-of-way (such as private cable operations, hotels, motels, prisons, and so on), and "open video systems" that comply with Section 653 of the Communications Act. *See* 47 C.F.R. § 76.5(a)(1)-(5). These systems are required to comply with the Commission's aeronautical frequency notification and signal leakage rules where technically applicable.

[24] *See* 47 C.F.R. §§ 76.601-640 ("Subpart K – Technical Standards").

[25] We note that the Commission's proof-of-performance rules are used not just by the Commission, but also by local franchising authorities who frequently operate as the first line in addressing constituent complaints against a local cable operator. Local Franchising Authorities enter into agreements with cable operators (among other service providers in their communities), and establish the conditions under which cable operators may use public rights-of-way and other community resources. As a result of this contractual relationship, cable operators may have obligations to local franchising authorities in addition to those required by the Commission. Further, while some franchising has transitioned to the state level, local franchising authorities typically retain control over their local public rights-of-way. *See 1992 Order* at 2023, ¶ 5.

quality).[26] In keeping with our statutory mandate to update our proof-of-performance rules to reflect improvements in technology,[27] we seek comment on updating these rules as they apply to QAM digital systems and non-QAM digital systems. In addition, we consider testing and recordkeeping issues, such as how many points in a system must be tested, how many channels on a system must be tested, and certain ancillary issues.

9. In this NPRM, we specifically address the issue of how to establish digital proof of performance standards that are similar in function to the analog proof of performance standards we adopted in the *1992 Order*.[28] At the time of the *1992 Order*, analog cable transmission was predominant and possessed uniform characteristics, which made adoption of technical standards relatively straightforward. As mentioned above, today, QAM transmission is the dominant form of digital cable transmission. Unlike analog cable transmission, however, QAM is not uniform and may appear in a variety of configurations such as 64 QAM, 256 QAM, and potentially 1024 QAM, each requiring different performance standards.[29] Further, non-QAM digital systems using such technologies as VDSL, ADSL2+,[30] or transmitting via fiber-optic cables, now make up an increasing percentage of digital systems. We are also confronted with the potential decoupling of the concept of signals of "good technical quality" (*i.e.*, a highly reliable signal) from the concept of signals of "good visual quality." In analog transmission, operators would replicate the exact electrical signal provided by the programming provider and the primary factor impacting signal quality was the quality of the electrical transmission (*i.e.*, a highly reliable signal provides good visual quality). In contrast, with digital transmission, operators will often re-compress the signal to relieve capacity constraints or support different devices.[31] If the operator is too aggressive in this re-compression, or if the signal processing equipment in the head-end introduces errors, a viewer may perceive a poor quality of video even though the transmission is perfect. Accordingly, we seek comment on whether we should consider qualitative measures to assess consumer perceptions of video quality. We seek specific comment on the pros and cons of adopting subjective consumer perception measures as opposed to or in addition to adopting objective measurements for assessing signal quality. Overall, we seek to develop the optimal approach to ensure that digital cable subscribers receive good quality signals, while imposing a minimal regulatory burden on cable operators, and we seek comment on the costs and benefits associated with our proposals.

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[26] *See* 47 C.F.R. §§ 76.601, 605, 609, 1704, 1705, and 76.1713. We also note that the Commission has placed certain technical performance requirements on digital cable operators with more than 750MHz of activated channel capacity as part of their required support for unidirectional cable products. *See* 47 C.F.R. § 76.640(b)(1)(i) (requiring compliance with SCTE 40 2003: "Digital Cable Network Interface Standard"). We draw on this precedent in our proposal regarding QAM-based digital cable proof-of-performance requirements.

[27] *See* 47 U.S.C. § 544(e).

[28] *See* 47 C.F.R. §§ 76.601, 76.605, and 76.609. These standards measure the electrical characteristics of an analog cable signal on coaxial cable.

[29] Quadrature Amplitude Modulation, or QAM is a sophisticated modulation technique, using variations in signal amplitude and phase, that allows multiple bits to form a single "symbol," which is then impressed on a single sine wave. "Quadrature" refers to the fact that four distinct amplitude levels are defined. 16 QAM creates a symbol of 4 bits through 16 distinct signal points, or variations in amplitude and phase (2 raised to the 4th power equals 16). 64 QAM, by extension, conveys 6 bits through 64 distinct signal points (2 raised to the 6th power equals 64). 256 QAM conveys 8 bits per symbol, and 1024 QAM conveys 10. *See* H. Newton, *Newton's Telecom Dictionary* 674, (20th ed. 2004).

[30] *See* fn 20, *supra*.

[31] We note that cable operators receive digital signals that are already compressed; therefore, any alteration to the signals is considered recompression.

1. Standards for QAM-based Digital Cable Systems

10. We propose to adopt the standard established by the Society of Cable Telecommunications Engineers, the SCTE 40 Digital Cable Network Interface Standard, as the signal quality standard for QAM-based digital cable systems and, in addition, propose to require testing and documentation that demonstrates compliance with the metrics associated with this standard.[32] We tentatively conclude that the relatively straightforward SCTE 40 standard provides the best source of the digital proof-of-performance metrics. This standard is currently incorporated into our rules supporting unidirectional digital cable televisions and products, and is thus already followed by a significant portion of QAM digital cable operators.[33] In the unidirectional CableCARD proceeding, the Commission, consumer electronics industry, and cable industry determined that standardizing certain attributes of the network would be necessary for such products to be successful.[34] The Commission noted that such digital standards were already supported by some systems, with widespread adoption forthcoming, and that such standards encapsulated the common performance metrics well.[35] As a result, selection of SCTE 40 2003 was unopposed by any party.[36] For these same reasons, we believe that selecting an existing industry-developed standard and well-focused set of measurements for digital cable places little to no additional burden on cable operators yet will ensure that consumers receive good signal quality. The SCTE has subsequently updated the SCTE 40 standard and it has received the American National Standards Institute (ANSI) approval.[37] Accordingly, we tentatively conclude that we should incorporate the current version of that standard, SCTE 40 2011, into our rules as minimum signal quality standards for QAM digital cable service. We seek comment on our proposal and tentative conclusions. We also seek comment on any alternative standards that could be used to ensure a good quality digital signal.

11. We continue to believe that testing and documentation is essential to ensuring compliance and permitting effective enforcement of our proof-of-performance rules. Therefore, in addition to adopting SCTE 40 2011 as the standard for digital proof-of-performance, we propose to require QAM-based cable operators to document the successful completion of proof-of performance testing to demonstrate compliance. SCTE 40 2011 contains tables with entries detailing the metrics for compliance. We tentatively conclude that operators should perform a test for each of the entries located on those tables dealing with the delivery of cable video signals, but not those dealing with upstream or downstream data performance.[38] We seek comment on this tentative conclusion. Additionally, similar to the analog

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[32] *See Society of Cable Telecommunications Engineers ANSI/SCTE 40 2011: Digital Cable Network Interface Standard*, available at http://www.scte.org/documents/pdf/standards/SCTE_40_2011.pdf ("SCTE 40 2011"). SCTE 40 2011 describes the basic technical operational characteristics for digital cable systems using QAM, including such characteristics as relative channel power, carrier-to-noise ratios, and adjacent-channel characteristics.

[33] *See* 47 C.F.R. § 76.640(b)(1)(i). The rules apply to cable systems operating at 750 MHz or greater.

[34] *See Implementation of Section 304 of the Telecommunications Act of 1996*, *Commercial Availability of Navigation Devices*, CS Docket No. 97-80, Report and Order, FCC 03-225, 18 FCC Rcd 20885 (2003) ("*CableCARD Order*") (incorporated for use by 47 C.F.R. § 76.640(b)(1)(i)). In the unidirectional CableCARD proceeding, the Commission incorporated SCTE 40 2003 into its rules. In Section III.D below, we propose to update our incorporation for § 76.640 to the 2011 version of this standard as well, as these versions are substantively the same, and only minor updates to certain parameters, administrative clarifications, and ANSI certification have been changed.

[35] *See CableCARD Order* at 20895.

[36] *Id*.

[37] *See ANSI/SCTE 40 2011 Digital Cable Network Interface Standard*, American National Standards Institute, available at http://webstore.ansi.org/RecordDetail.aspx?sku=ANSI/SCTE+40+2011.

[38] We observe that these parameters primarily relate to two-way services, such as data service and video-on-demand, which we do not propose including within the testing requirements. *See* ¶ 19, *infra*. In SCTE 40, these parameters are contained in Table 2 and Table 3, the Forward and Reverse Data Channel (FDC and RDC) Tables. Table 1, the (continued….)

context, while operators are required to comply with the standard on every applicable channel, we only propose to require operators to test all channels and document their compliance with the standard's parameters that pertain to the relationships between channels, and to test and document a subset of channels for compliance with the standard's parameters that pertain to individual channel characteristics. Thus, we propose to require the Adjacent Channel Levels[39] and Nominal Power Levels[40] to be tested across every QAM channel on the system. Similarly, we propose that the channel-specific standards for normal video channels contained in the Forward Application Transport[41] table be tested only on a subset of channels.[42] We provide more specifics on the number of channels to be sampled, as well as other aspects of testing and recordkeeping, below.[43] We seek comment from cable operators that have implemented periodic testing procedures based on the SCTE 40 standard regarding their experiences with implementing this metric and what procedures they have put into place to measure and ensure compliance with this standard.

12. We seek comment on whether to supplement, or otherwise modify, the SCTE 40 2011 standard for purposes of establishing our digital signal quality standard. In particular, we seek comment on whether we should adopt elements of the SCTE's recent Fourth Edition of its Measurement Recommended Practices for Cable Systems (SCTE Recommended Practice).[44] The SCTE Recommended Practice provides a comprehensive and extensive set of best practices covering nearly every potential aspect of cable operation for both analog and digital cable operators. More specifically, the SCTE Recommended Practice provides guidance to cable system operators about how to comply with the SCTE 40 standard. We recognize that, given the scope of the SCTE Recommended Practice, it may be more than is necessary to ensure digital cable consumers receive good quality signals. Nevertheless, we seek comment on whether any particular parts of the SCTE Recommended Practice would be effective as an enhancement to the SCTE 40 2011. In addition, we seek comment on whether other metrics, such as the measurement of visual signal quality or the MPEG stream would be appropriate as an enhancement to the SCTE 40 2011.

2. Non-QAM Cable Systems and Qualitative Signal Quality

13. As noted above, ready sources of widely-followed industry standards exist on which we can base our rules for digital cable transmission via QAM on hybrid fiber-coax systems. In contrast, non-QAM systems such as the fiber optic, hybrid fiber/twisted pair, and the VDSL and ADSL2+ systems do not possess uniform characteristics.[45] Accordingly, unlike for QAM systems, the SCTE 40 standard is not

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Digital Cable Network Frequency Bands, indicates the frequency bands in which various channels may operate, and while compliance with this provision is required, testing and documentation of compliance is not. *See* SCTE 40 2011 at Tables 1, 2, 3.

[39] *See* SCTE 40 2011 at Table 6.

[40] *See* SCTE 40 2011 at Table 5.

[41] *See* SCTE 40 2011 at Table 4. SCTE 40 defines the Forward Application Transport (FAT) Channel as "the data channel carried from the headend to the terminal device in a modulated channel at a rate of 26.97 or 38.81 Mbps. MPEG-2 transport is used to multiplex video, audio, and data into the FAT channel. The FAT Channel is also considered the "In-band" channel. The FAT channel is used for MPEG-2 compressed video and audio." *See* SCTE 40 2011 at 9.

[42] *See* Appendix A, Proposed Rule 47 C.F.R. §§ 76.601(c)(1)-(2). The tables referenced here are reprinted as Appendix C to this NPRM.

[43] *See* Sections III.A.3, ¶¶ 17-22, *infra*.

[44] *See* Society of Cable Telecommunications Engineers, *SCTE Measurement Recommended Practices for Cable Systems* (4th ed., 2012) ("SCTE Measurement Recommended Practice").

[45] *See* fn 30, *supra*.

relevant to non-QAM systems, nor do we have available equivalent industry standards or guidance for each particular new technology. Therefore, we seek comment on how to establish proof of performance standards for non-QAM systems that are functionally comparable to the proof of performance standards proposed above for QAM systems. Similarly, we seek comment on the testing and documentation that should be required to demonstrate compliance with performance standards for non-QAM systems. If we are not able to adopt a uniform proof-of-performance standard for non-QAM systems, we propose, as discussed below, to establish a case-by-case approach for evaluating non-QAM system signal quality.

14. We seek comment on whether there are appropriate industry standards against which to determine signal quality in non-QAM systems. In the absence of any industry-developed standards, is it possible to formulate a uniform signal quality standard, or set of standards, that could apply to the various types of non-QAM systems? In the absence of a uniform standard for measuring the electrical signal characteristics for non-QAM systems, we seek comment on alternative means to objectively measure and evaluate whether a non-QAM digital cable system is providing a "good quality signal." We also ask commenters to address whether objective methods exist to establish if "good quality signals" are reaching cable subscribers of non-QAM systems, either as a complement to, or in place of, regulating carrier signal quality, including: (1) an analysis of errors in the transmission of the compressed video stream, (2) a means by which to measure perceived visual signal quality, (3) a combination of the two, or (4) some alternative method. For example, we ask commenters to consider whether a standard regarding transmission errors would be useful in addressing audio-related problems, such as a lack of synchronization of the audio and video signal, or closed captioning related problems, such as poor or missing caption data. In this regard, we note that the vast majority of cable systems encode video using MPEG-2 or MPEG-4 AVC.[46] We seek comment on the potential of establishing standards based on the transmission of the compressed video stream and whether the technical qualities of the decoded signal, such as bit errors in the MPEG stream, are a possible substitute for or supplement to regulating carrier signal quality. With regard to perceived visual signal quality, we note the problem of "pixelization" or "tearing"[47] of a video image that may occur as a result of bandwidth constraints or other non-transmission related network conditions. We seek comment on the suitability of testing visual signal quality, the availability of objective criteria, the availability of equipment, and the desirability of using metrics regarding perceived visual signal quality. Are there any entities currently analyzing and developing standards for visual signal quality? If so, please describe in detail. Finally, we seek comment on whether instead of, or in addition to, adopting objective technical requirements, there are other approaches we should consider to establish standards concerning non-QAM cable operators' signal quality.

15. To the extent that any type of uniform objective measurement is not possible to encompass the variety of existing or future non-QAM system platforms, we propose to establish a case-by-case approach whereby the non-QAM digital cable systems would demonstrate that they are providing a "good quality signal" to their customers by submitting a plan for Commission approval.[48] As proposed for QAM systems, the non-QAM system proof-of-performance plan must include a testing and documentation component. This case-by-case approach would replace the existing case-by-case approach

[46] MPEG-2 and MPEG-4 AVC are standards for digitally encoding and compressing video and other signals developed by the Motion Picture Experts Group. MPEG-2 is used by terrestrial broadcast television stations and most QAM-based cable operators with respect to their traditional linear services; MPEG-4 is used by most IPTV operators.

[47] "Pixelization" and "tearing" describe the appearance to viewers of an underlying loss of signal. Pixelization appears as large blocks of the video image that either turn black or cease updating. Tearing appears as the moving portion of an image continues its motion over a background which has ceased updating, causing part of the image to appear separated from that immediately adjacent to it.

[48] *See* Appendix A – Proposed Rule § 76.605(e).

for cable systems using "non-conventional" techniques.[49] We propose to require each non-QAM digital cable systems to submit its own proof-of-performance plan for ensuring subscribers receive good quality signals.[50] We envision these plans would contain a set of parameters, whether electrical signal characteristics, MPEG stream characteristics or other metrics to demonstrate signal quality.[51] We seek comment on whether there are minimum components that each performance plan should contain. We seek to establish objective criteria that the Commission would be able to readily evaluate and that the public could comment upon. For example, should each plan contain an explanation of the technical parameters of the equipment employed, nominal error rates, or other common criteria? Are there objective criteria that are common across all non-QAM systems and that can be used to evaluate proof-of-performance submissions? We would expect that each non-QAM system will have their own internal signal quality guidelines and may wish to use these guidelines as the basis for their proof-of-performance plan. We seek comment on how the Commission should evaluate the adequacy of performance plan submissions. Should we require operators to send a copy of their plan to local franchise authorities (LFAs) with jurisdiction over the system and to provide a mechanism for LFAs to comment on such plans?

3. Testing and Recordkeeping

16. In addition to proposing to adopt a new standard for QAM-based digital cable systems and seeking comment on how to determine signal quality on non-QAM systems, we also propose some minor updates to our current proof of performance testing and recordkeeping rules. Some of these proposed changes would only affect digital systems and others would also apply to analog systems.

a. Number of Channels Tested

17. We propose to simplify the formula by which both analog and QAM digital operators determine how many channels must be tested to ensure compliance with the proof-of-performance rules regarding channel-specific characteristics. Currently, a formula exists for very small systems (systems with less than 300 MHz of activated spectrum) that requires a minimum of four channels and then adds channels as various additional blocks of spectrum are activated.[52] We continue to believe that testing every channel is unnecessary, except for those limited tests regarding adjacent channel power limits and nominal power levels, and that testing the channel-specific characteristics is particularly burdensome for small systems with more limited resources. Therefore, we propose to revise the testing formula to reflect a more simplified approach: a cable system with a total activated channel capacity up to 550 MHz will be required to test 5 channels, and any system with a total activated channel capacity of 550 MHz or greater must test 10 channels. We believe that this proposal simplifies compliance for all operators and will continue to ensure that a sufficient representative sample of channels is tested to accurately reflect the experience consumers receive. We seek comment on this proposal.

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[49] Currently, the Commission's rules provide that cable systems using non-conventional techniques (today, this applies to any non-analog cable service) may be granted relief from the technical standards subject to assurances that subscribers to such systems will receive an equivalent level of "good quality service." *See* 47 C.F.R. § 76.605(b).

[50] We propose that these showings be made electronically, through the Commission's Electronic Comment Filing System, through a similar process to that implemented for other Cable Special Relief (CSR) petitions. *See Amendment of Certain of the Commission's Part 1 Rules of Practice and Procedure and Part 0 Rules of Commission Organization*, GC Docket No. 10-44, FCC 11-16, Report and Order, 26 FCC Rcd 1594 (2011).

[51] This submission should also contain an explanation of the parameters, including how they are measured and documented, and the means by which these parameters are evaluated by system engineers to ensure good signal quality.

[52] 47 C.F.R. § 76.601(b)(2). Currently, the Commission uses a formula which requires every system to test a minimum of 4 channels for the first 100 MHz, plus one channel for each additional 100 MHz of cable system upper frequency limit (or fraction thereof). For example, a 750 MHz system is required to test a total of 11 channels (4 channels for the first 100 MHz plus 7 additional channels for each additional 100 MHz block of spectrum).

18. Although cable operators are increasingly transitioning to all-digital systems, most cable systems still deliver both analog and digital channels.[53] Therefore, where only a sampling of channels is called for, we propose to require operators to test each transmission format in proportion to its presence on the system. We propose that systems that deliver both analog and digital channels would be required to divide their proof-of-performance obligation between analog and digital channels proportionally with the percentage of the system that is allocated, by MHz, to each type of transmission, except that in no circumstances would fewer than two channels of a particular type be tested.[54] We seek comment on this proposal. We believe that there are no hybrid systems operating partially analog and partially non-QAM, or partially QAM and partially non-QAM. We seek comment on whether any such systems exist and, if so, how we should address this situation.

19. Currently, our analog proof-of-performance rules only apply to each NTSC or similar downstream cable television channel.[55] As we discuss above, we propose to require proof-of-performance testing on all QAM channels (or a subset, as appropriate),[56] and seek comment on addressing non-QAM digital video channels. These comments should also address switched-digital channels to the extent they deliver video programming that is comparable to traditional, pre-scheduled video programming on linear channels. Traditionally, the Commission has excluded channels used for other purposes, such as video-on-demand and cable modem service.[57] However, in some cases multiple services (*e.g.*, both linear video and video-on-demand) may be combined in a single QAM channel. We seek comment on which QAM channels are appropriate to include in the testing requirements.

b. Number of Test Points

20. Our current rules specify testing requirements for all cable television systems, regardless of whether they are analog or digital.[58] Specifically, two times per year, a cable operator must measure the technical characteristics contained in Section 76.605 at specific points throughout its system.[59] The ultimate number of specific test points within a system is determined by the number of subscribers to the

[53] For example, we note that as of December 31, 2010, approximately 92 percent of cable subscribers were served by a hybrid analog-digital cable system. *See Carriage of Digital Television Broadcast Signals: Amendment to Part 76 of the Commission's Rules*, CS Docket No. 98-120, Fourth Further Notice of Proposed Rulemaking and Declaratory Order, FCC 12-18, 27 FCC Rcd 1713, 1717, ¶ 9, n.32, Appendix B at 1729 (2012).

[54] For example, a 750 MHz system would be required to test 10 channels under our proposal. Assuming this system maintains 36 channels of analog transmission and 80 channels of digital, the percentage of the system allocated to analog would be 31%. Therefore, we would expect the system to test 3 analog channels against our analog standards, and 7 digital channels against our digital standards. However, should the system maintain fewer than 23 analog channels (20% of its capacity by MHz), the operator would continue to be required to test 2 analog channels until the system transitions to all-digital operation.

[55] *See* 47 C.F.R. § 76.605(a).

[56] SCTE 40 2011 contains detailed specifications defining a "channel" for purposes of meeting the technical standards, including that it be 6 MHz wide, operate in specific frequency bands, be comprised of QAM carriers, and comply with numerous other standards. *See* SCTE 40 2011 at 17.

[57] At the time, the Commission observed that standards were not available for the delivery of non-traditional services such as pay-per-view or data services, but that operators would have a "distinct incentive to fix" any problems that occurred on these services. *See 1992 Order*, 7 FCC Rcd at 2024.

[58] 47 C.F.R. § 76.601(a) ("The operator of each cable television system shall be responsible for insuring that each such system is designed, installed, and operated in a manner that fully complies with the provisions of this subpart."); *see also* 47 C.F.R. § 76.5(a) (defining a "cable system or cable television system").

[59] 47 C.F.R. § 76.605.

system.[60] Technological advancements, however, have resulted in less clear distinctions among physical components that make up a system or separate one system from another. This has resulted in the potential for subscribers to be allocable to more than one system. Additionally, the industry is increasingly moving toward consolidating headends to form regional clusters. For example, Verizon's fiber-to-the-home (FTTH) offering, FiOS, has largely done away with the notion of local headends, utilizing region-wide facilities instead.

21. We believe that the physical boundaries of a system – that is, the separation of one system from another – are not generally relevant to the purpose of proof-of-performance testing. Rather, the rules are subscriber focused, and so long as good quality signals are being delivered to subscribers, their specific origin need not be precisely defined. We propose, however, to modify the rules for the number of test points. While the Commission has preempted local franchising authorities from establishing their own standards,[61] local franchise authorities (LFAs) retain control over their public rights of way and have a much closer relationship with their cable operators and cable customers than does the Commission. Therefore, we propose to require that at least one test point, representative of the type of service (taking into account system architecture, channel delivery, and other technical characteristics) received by customers within that local franchise area, be located within each LFA's jurisdiction. We seek comment on the appropriate course of action if the number of LFAs exceeds the number of test points required by the existing formula. For example, should additional test points be added to the operator's obligations to equal the total number of LFAs served by that system? We seek to ensure that as system consolidation and technological innovation lead to ever larger system footprints, that our rules maintain the necessary geographic diversity and, at the same time, ensure that subscribers across an operator's system footprint receive good quality signals.

c. Recordkeeping

22. We propose to adopt recordkeeping obligations on digital cable operators identical to those placed on analog cable operators. Section 76.1704(a) of our rules provides that proof-of-performance test results shall be maintained on file at the operator's local business office for at least five years and shall be made available for inspection by the Commission or the local franchising authority, upon request.[62] In addition, Section 76.1700(a) of our rules, broadly referred to as the public file obligations of a cable operator, provides that the operator of a cable system shall either provide this information to the public upon request or maintain a public inspection file containing this information, depending on the size of the system.[63] While we believe that the current rule has been effective, we seek comment on what, if any, changes should be made to our recordkeeping rules. For example, we seek comment on whether the rules should be modified to make these records more available or to alter the length of time records are retained.

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[60] *See* 47 C.F.R. § 76.601(b)(1). The rules also specify the number of test points. Six test points are required for all systems with 1000 to 12,500 subscribers. For systems with more than 12,500 subscribers, an additional test point is added for each multiple of 12,500 subscribers. Additionally, each portion of the system separated by a non-physical link, such as microwave, must be tested. The rules direct operators to separate the test points in a geographically representative manner.

[61] *See Amendment of Part 76 of the Commission's Rules and Regulations Relative to the Advisability of Federal Preemption of Cable Television Technical Standards or the Imposition of a Moratorium on Nonfederal Standards,* Report and Order, 49 FCC 2d 470 (1974).

[62] *See* 47 C.F.R. § 76.1704(a).

[63] The operator of a cable system with fewer than 1000 subscribers is exempt from these requirements. *See* 47 C.F.R. § 76.1700(a). The operator of a cable system having 1000 to 5000 subscribers must provide this information upon request. *See id.* The operator of a cable system having 5000 or more subscribers must maintain this information in a public inspection file. *See id.*

d. Other Issues

23. We seek input regarding the extent to which a cable system's compliance with our technical standards depends on third parties. Are there factors outside of a cable system's control that could result in a degradation of signal quality? For example, to what extent does the signal quality received by cable subscribers depend on the reliability of networks controlled by third parties or on the programmer's original encoding of the material? Can a cable system contract with third parties to ensure compliance with our technical standards? What impact, if any, should a cable system's reliance on third parties have on our technical standards?

24. We also seek comment on what role, if any, set-top boxes should play in the Commission's efforts to ensure consumers receive good quality signals.[64] There appears to be some industry confusion regarding the proper role of set-top boxes in meeting a cable operator's proof-of-performance obligations.[65] In all-digital systems where most or all televisions require a set-top box, is it desirable to establish a testing regime which utilizes the output at the operator's leased set-top boxes as the testing point to determine whether a good quality signal is being delivered to subscribers? If so, do standards exist for the connections consumer now generally use to connect digital cable set-top boxes to televisions, such as HDMI and component video cables? Further, how could we ensure that subscribers owning non-operator-supplied set-top boxes or CableCARD-equipped televisions receive "good quality signals?"[66]

25. Finally, we also propose to rationalize the numbering scheme in our rules to accommodate our proposed rule changes. Specifically, we propose to relocate the analog proof of performance rules in a new subsection 76.605(b) and create subsection 76.605(c) for digital rules.[67] Section 76.605(a) will contain guidance for interpreting the rest of the section, and 76.605(d) will contain an updated general signal leakage provision previously located in 76.605(a)(12) that will apply both to analog and digital systems.[68] We also propose to renumber Section 76.601, to consolidate the analog instructions under 76.601(b)(2) and the digital instructions under 76.601(b)(3). We believe that these changes will make the rules easier to read and follow. Additionally, we propose to update the signal-to-noise requirements of a new section 76.605(b)(7), formerly 76.605(a)(7),[69] to reflect the completion of the transition to digital television broadcasting by amending any reference to Grade B Contour with a reference to the Noise-Limited Service Contour as the applicable, regulatory equivalent for digital

[64] *See* 47 C.F.R. § 76.605, Note 3 ("The requirements of this section shall not apply to devices subject to the TV interface device rules under part 15 of this chapter"). 47 C.F.R. § 15.3(e) defines a "cable system terminal device" is a "TV interface device that serves, as its primary function, to connect a cable system operated under part 76 of this chapter to a TV broadcast receiver or other subscriber premise equipment. . . ." Generally, these are referred to as "cable set-top boxes" and are generally leased by customers from their MVPD, but may be purchased at retail as well. Rather than focusing on signal quality as determined by the proof-of-performance rules, the Part 15 rules ensure that boxes do not harm connected televisions or cause interference. *See* 47 C.F.R. § 15.115.

[65] *In the Matter of Pace Micro Technology PLC Petition for Special and Interim Relief,* Order, 19 FCC Rcd 1945 (MB 2004).

[66] We note that in 2010 the Commission updated its rules regarding CableCARDs, largely with respect to customer support-related issues, but also with respect to some technical rules. *See Implementation of Section 304 of the Telecommunications Act of 1996: Commercial Availability of Navigation Devices*, *Compatibility Between Cable Systems and Consumer Electronics Equipment*, Third Report and Order, 25 FCC Rcd 14657 (2010).

[67] 47 C.F.R. § 76.605.

[68] We note that this general signal leakage requirement is separate from the more stringent signal leakage requirements pertaining to the aeronautical bands and discussed below. *See* Section III.B; 47 C.F.R. § 76.610, et al.

[69] 47 C.F.R. § 76.605(a)(7), *see* Appendix A – Proposed Rule § 76.605(b)(7).

broadcasting.[70] Finally, we propose to renumber the current 76.605(b) to subsection 76.605(e), to be modified as detailed below. We seek comment on these proposals.

B. Cumulative Signal Leakage

26. MVPDs that operate coaxial cable plants ("coaxial cable systems") use frequencies allocated for myriad over-the-air services within their system. Under ideal circumstances, those signals are confined within the cable system and do not cause interference with the over-the-air users of those frequencies. However, under certain circumstances, a coaxial cable plant can "leak" and interfere with over-the-air users of spectrum.[71] The Commission began looking at the issue of coaxial cable signal leakage in the 1970's, and in 1977 released a *First Report and Order* to address concerns that coaxial cable plants could leak electromagnetic radiation that could interfere with critical navigational and emergency frequencies.[72] Specifically, the Commission was concerned with interference to the aeronautical radio frequency bands, located at 108 to 137 MHz and 225 to 400 MHz, and that interference from leaks dispersed throughout the cable plant would constructively combine to appear as a single, much larger leak to receivers passing overhead. At the time, demonstrated incidents of interference were rare.[73] The order noted, however, that "the major reason for formulating the rules…is not to solve an existing problem of crisis proportions. Rather . . . [it is] because we expect that the near future is likely to bring more cable televisions systems, more extensive use of mid-band frequencies" and as a consequence, greater potential for interference.[74] While the *First Report and Order* established the basic framework for signal leakage that continues to be used today, the Commission at the time recognized the need for further analysis and commissioned a federal advisory committee for this purpose.[75]

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[70] While the Grade B contour defined an analog television station's service area, see 47 C.F.R. § 73.683(a), with the completion of the full power digital television transition on June 12, 2009, there are no longer any full power analog stations. Instead, as set forth in Section 73.622(e), a station's DTV service area is defined as the area within its noise-limited contour where its signal strength is predicted to exceed the noise-limited service level. *See* 47 C.F.R. § 73.622(e). Accordingly, the Commission has treated a digital station's noise limited service contour (NLSC) as the functional equivalent of an analog station's Grade B contour. *See*, *e.g.*, *Implementation of Section 203 of the Satellite Television Extension and Localism Act of 2010 (STELA)*, MB Docket No. 10-148, Report and Order and Order on Reconsideration, 25 FCC Rcd 16383, 16410, ¶ 51 (2010); *Report To Congress: The Satellite Home Viewer Extension and Reauthorization Act of 2004; Study of Digital Television Field Strength Standards and Testing Procedures*, 20 FCC Rcd 19504, 19507, ¶ 3, 19554, ¶ 111 (2005); *Implementation of the Satellite Home Viewer Extension and Reauthorization Act of 2004, Implementation of Section 340 of the Communications Act*, Report and Order, 20 FCC Rcd 17278, 17292, ¶ 31 (2005). *See also*, *e.g.*, KXAN, INC., *Petition For Waiver of Sections 76.92(f) and 76.106(a) of the Commission's Rules*, CSR-7825-N, KXAN, Inc., 25 FCC Rcd 3307, 3312, ¶ 8 n.32 (MB 2010) (using the NLSC in place of the Grade B contour for purposes of the cable network non-duplication and syndicated program exclusivity rules); Lenfest Broadcasting, LLC, 19 FCC Rcd 8970, 8974, ¶ 7 n.27 (MB 2004) (using the NLSC in place of the Grade B contour for purposes of the market modification rules).

[71] For example, leakage can occur when outside cabling becomes frayed due to age, damage caused by animals, or breaks due to severe weather.

[72] *Amendment of Part 76 of the Commission's Rules to Add Frequency Channeling Requirements and Restrictions and to Require Monitoring for Signal Leakage from Cable Television Systems,* Report and Order, 65 FCC 2d 813, FCC 77-541 (1977) ("*First Report and Order*").

[73] *First Report and Order*, 65 FCC 2d at 820, ¶¶ 17-19.

[74] *Id.* at 823, ¶ 28.

[75] *See Amendment of Part 76 of the Commission's Rules to Add Frequency Channeling Requirements and Restrictions and to Require Monitoring for Signal Leakage From Cable Television Systems*, Further Notice of Proposed Rulemaking, 76 FCC 2d 311 (1980) ("Subsequently, the Commission did appoint an Advisory Committee on Cable Signal Leakage and partially funded a research program in this area. The Advisory Committee provided suggestions and guidance throughout the research program, examined the results of the research, drew technical conclusions, and recommended a new regulatory approach to preventing interference based on those conclusions.").

27. In the wake of the *Final Report of the Advisory Committee on Cable Signal Leakage*,[76] the Commission adopted a *Second Report and Order* in 1984.[77] The *Second Report and Order* implemented the advisory committee's recommendations and established the comprehensive signal testing regime currently in use.[78] Importantly, the *Second Report and Order* affirmed the Commission's previous decision regarding the cumulative nature of leaks from cable systems and their potential for interference when aggregated by receivers in aircraft passing overhead.[79] It also noted that reported cases of interference increased between the adoption of the *First Report and Order* in 1977 and the *Second Report and Order* in 1984, lending credence to the *First Report and Order's* prediction that additional interference would appear as cable deployment continued.[80]

28. The rules established in 1984 by the *Second Report and Order* remained largely unchanged in the ensuing 25 years.[81] However, in 2004, the Commission extended protection to an emergency band near 406 MHz, and set limits for interference from both analog and digital cable systems.[82] The signal leakage rules are contained in Sections 76.610 to 76.620 (the technical rules), Sections 76.1706, 76.1803, 76.1804 (recordkeeping and reporting rules), and in Section 76.605(a)(12) (a general signal leakage performance rule) of the Commission's rules.[83] MVPDs that operate coaxial cable systems [84] are responsible for ensuring that system design, installation and operation comply with the

[76] UNITED STATES ADVISORY COMMITTEE ON CABLE SIGNAL LEAKAGE, FINAL REPORT OF THE ADVISORY COMMITTEE ON CABLE SIGNAL LEAKAGE TO THE CHIEF, CABLE TELEVISION BUREAU, FEDERAL COMMUNICATIONS COMMISSION (1979).

[77] *Amendment to Part 76 of the Commission's Rules to Add Frequency Channeling Requirements and Restrictions and to Require Monitoring for Signal Leakage from Cable Television Systems,* Second Report and Order, 99 FCC 2d 512, FCC 84-516 (1984) ("*Second Report and Order*"). *See also Amendment to Part 76 of the Commission's Rules to Add Frequency Channeling Requirements and Restrictions and to Require Monitoring for Signal Leakage from Cable Television Systems,* Memorandum Opinion and Order, FCC 85-333, 101 FCC 2d 117 (1985). (This MO&O addressed seven petitions for reconsideration, upholding the *Second Report and Order* broadly but relaxing the precision with which regular monitoring must be performed and expanding what system expansion may be performed under the grandfathering provision.)

[78] *Id.*

[79] *Second Report and Order*, 99 FCC 2d at 524, ¶ 36.

[80] *Id* at 515-518, ¶¶ 8-16.

[81] Minor changes to the rules have been made, including converting the rules to metric, non-substantive reorganization of the rules, and correction of typographical errors. *See, Oversight of Radio and TV Rules,* Order, 53 FR 2499 (Mass Media 1988) and *Oversight of Radio and TV Rules*, Correction, 53 FR 5684 (Mass Media 1988) (Correcting typographical errors); *In the Matter of Metric Conversion of Parts 1, 2, 15, 18, 21, 22, 23, 25, 36, 61, 63, 68, 69, 73, 74, 76, 78, 80, 87, 90 and 94 of the Commission's rules*, Order, 8 FCC Rcd 3720 (1993); *1998 Biennial Regulatory Review – Streamlining of Cable TV Services Part 76, Public File, and Notice Requirements*, CS Docket 98-132, FCC 99-12, 14 FCC Rcd 4653 (1999) (non-substantively reorganizing the rules); *Amendment to Part 76 of the Commission's Rules to Add Frequency Channeling Requirements and Restrictions and to Require Monitoring for Signal Leakage from Cable Television Systems,* Memorandum Opinion and Order, FCC 85-333, 101 FCC 2d 117 (1985) (order on reconsideration implementing uniform frequency offsets, routine monitoring, and other changes).

[82] *See 406 MHz Order* (extending protection to the emergency band near 406 MHz).

[83] 47 C.F.R. §§ 76.610-620, 76.615(a)(12), 76.1706, 76.1803-1804.

[84] *See* fn 23, *supra.* In addition to traditional cable operators, MVPDs such as hotels, motels, hospitals, apartment buildings, private settlements, university campuses, etc., who operate coaxial cable plants are responsible for complying with the signal leakage rules. MVPDs with fewer than 1000 subscribers are exempt from the recordkeeping requirements. *See* 47 C.F.R. § 76.1700(a).

rules and for compliance testing four times per year.[85] Once each year, operators of coaxial cable systems must calculate their cumulative signal leakage and report their results to the Commission.[86] As set forth below, we seek comment on the adequacy of these rules, our proposed modifications for digital cable operations, and the costs and benefits associated with them.

1. Adapting Regulations for Digital Cable

a. Aeronautical Frequency Notifications

29. The first component of the Commission's signal leakage regime is the Aeronautical Frequency Notification ("AFN"). Prior to commencing operation in the aeronautical radio frequency bands above an average power level equal to or greater than 10^{-4} watts across a 25 kHz bandwidth in any 160 microsecond time period,[87] MVPDs are required to notify the Commission and provide a "point and radius" description of their system, allowing the Commission to generally locate the geographic area from which interference might aggregate.[88] This power threshold and measurement window were developed for analog systems, and an equivalent for digital systems must be selected.

30. We propose to use the same power threshold and measurement window to trigger the notification requirement for AFN as the power threshold and measurement window that triggers the prohibition around the 406 MHz emergency frequencies.[89] Near the emergency distress frequencies, systems are *prohibited* from operating above a particular peak power level (10^{-5} watts over a 30 kHz bandwidth in any 2.5 millisecond time period).[90] In the *406 MHz Order*, the Commission determined that the power threshold should remain unchanged when considering interference from digital, rather than analog, coaxial cable systems, but that the measurement window needed to be adapted. Based on the relatively even distribution of power throughout the channel for digital signals, and the bandwidth of the devices receiving the interference,[91] the Commission determined that for digital systems, a 10^{-5} watt average power level should be calculated across a 30 kHz bandwidth for a time period of 2.5 milliseconds.[92] Given the similar channelization of aeronautical receivers (25 kHz for aeronautical receivers versus 24 kHz for satellite), for the AFN requirement, we tentatively conclude that the same power threshold and measurement window are appropriate.

31. Today, the vast majority of coaxial cable systems maintain an AFN on file with the

[85] 47 C.F.R. § 76.614.

[86] *See* 47 C.F.R. § 76.611(a)(1) (requiring operators to conduct a complete CLI calculation every 12 months), and 47 C.F.R. § 76.1803 (requiring operators to report the results of their CLI testing to the Commission).

[87] 47 C.F.R. § 76.1804.

[88] *Id*. This notification is submitted to the Commission on FCC Form 321, now collected electronically through the COALS system at www.fcc.gov/coals.

[89] *See* 47 C.F.R. § 76.616(b).

[90] *See* 47 C.F.R. § 76.616. Specifically analog systems are prohibited from operating with a peak power level of 10^{-5} watts within 100 kHz of 121.5 MHz, within 50 kHz of 156.8 MHz and 243 MHz, and at any point between 405.925 and 406.176 MHz.

[91] *406 MHz Order*, 19 FCC Rcd at 7248 ("The Search and Rescue Processor subsystem that receives the signals transmitted from the beacons has a receiver bandwidth of 24 kHz. It is critical that the transmitted signal be received by the processor subsystem without any interference. Therefore, we are imposing a limit on the average power of a digital signal over a resolution bandwidth of 30 kHz in order to protect the satellite receiver from interference.").

[92] 47 C.F.R. § 76.616(b).

Commission.[93] The change proposed above will only affect those systems that are operating a digital channel or channels in the aeronautical band between the existing analog threshold (10^{-4} watts peak power over a 25 kHz bandwidth in any 160 microsecond time period) and our proposed digital threshold (10^{-5} watts average power over a 30 kHz bandwidth in any 2.5 millisecond time period). Under our rule proposed above, operators of those systems that were not previously required to notify the Commission will need to amend or file an AFN. We note, however, that some systems have transitioned to digital operation in these bands and "withdrawn" their AFN as a result. We believe that these systems should file a new AFN so that the Commission (for aeronautical users) and the Cospas-Sarsat (for international satellite search and rescue) can identify both potential sources of interference. Conversely, most modern coaxial cable systems operate on frequencies inclusive of the aeronautical bands, and thus only have the burden of notifying the Commission when the size of their system changes. Therefore, for the majority of systems, there is little, if any, additional regulatory burden as a result of this proposal as they should already have an AFN on file with the Commission covering the complete aeronautical bands and their complete service footprint. For those systems operating digital channels in the aeronautical bands below the old analog threshold but above our proposed digital threshold of 10^{-5} watts average power across a 30 kHz bandwidth in any 2.5 millisecond period, we believe that the one-time burden of notification to the Commission and infrequent updating is necessary to ensure public safety and presents only a minor burden on coaxial cable operators.[94] We seek comment on this proposal.

b. Channel Frequency Offsets

32. We propose not to apply the channel frequency offset requirement to digital signals as digital signals simply cannot be offset in the way analog frequencies can. Channel frequency offsets have always played a critical role in minimizing the interference potential from analog coaxial cable systems to both aircraft communication and aircraft navigation services, such as the Instrument Landing System (ILS) and VHF Omnidirectional Range service (VOR). The power levels of an analog television channel are not uniform across the bandwidth; rather, power is significantly higher at the center frequencies of each of the subcarriers contained within the channel. The Commission's rules prohibit the subcarriers from lining up directly with the ILS, VOR, or communications carriers to diminish the possibility that a leak will cause harmful interference to these safety services.[95] As a result, the *Second Report and Order* established a channel frequency offset of 12.5 kHz, with a tolerance of ± 5 kHz.[96] This requirement is not meaningful with respect to digital signals, however, as digital signals do not have the discrete carriers necessary to effectuate an offset. Instead, digital signals operate at a nearly constant average power throughout the 6 MHz channel. Therefore, we propose to maintain the channel frequency offset requirement only with respect to analog signals but eliminate the requirement for digital signals. We note, however, that removing the offset requirements for digital signals does not exempt operators from compliance with the channelization and identification requirements of Section 76.605.[97] We seek

[93] Approximately 87% of active systems have an AFN on file with the Commission as of July 1, 2012. *See* FCC Cable Operations and Licensing System, www.fcc.gov/COALS.

[94] We expect this rule change to impact only cable systems which have completed the transition to all-digital operation and deactivated their AFN and new, all-digital cable systems which have never filed an AFN with the Commission.

[95] *See First Report and Order*, 65 FCC 2d at 824. A 10 kHz offset can result in undesired signal strength diminishing by up to 40 dB. *Id.* at 824-825.

[96] *Second Report and Order*, 99 FCC 2d at 520.

[97] *See* Section III.A. *infra.* Proposed rule 47 C.F.R. § 76.605(b)(1)(ii) (currently 47 C.F.R. § 76.605(a)(1)(ii)) (requiring analog channel compliance with CEA-542-B: "Standard: Cable Television Channel Identification Plan") and proposed rule 47 C.F.R. § 76.605(c) (requiring digital channel compliance with ANSI/SCTE 40: "Digital Cable Network Interface Standard," which requires compliance with CEA-542-B: "Standard: Cable Television Channel Identification Plan").

comment on this proposal.

c. Analog to Digital Interference Equivalency

33. The Commission must address the implication of not having the interference protection afforded by the channel frequency offset requirement for digital channels. For analog signals, channel frequency offsets function to lower the strength of an undesired signal and our rules factored this offset into the signal leakage limit calculation.[98] Digital signals, however, distribute their power evenly throughout the 6 MHz channel.[99] While the result of this even distribution is a signal which cannot be offset like an analog signal, it does provide an average power level well below the peak power of the visual carrier of an analog signal. Further, because we limit our analysis of interference potential to the receiver bandwidth of an aircraft receiver, which should be no larger than 25 kHz, these two offsetting effects can be quantified. In their comments for the *Second Report and Order*, the FAA stated that absent frequency offsets, the cumulative signal leakage threshold would need to be decreased by 25 dB.[100] This analysis, of course, was based on 1980s receiver technology. Accordingly, we seek comment on improvements in receiver components and hardware that have resulted in improved receiver sensitivity, selectivity, and other performance characteristics and might alter this calculation. However, we tentatively conclude that we do not need to consider improvements in receiver selectivity, as we are considering, by definition, undesired signals on-channel with desired signals. Comparing the average power level of a digital cable signal to the peak power level of an analog signal, the digital signal creates substantially less interference. Specifically, the peak power of the analog visual carrier is narrowly constrained, delivering essentially all of its power directly into the 25 kHz receiver front-end. A digital signal operating at a particular average power over 6 MHz delivers only a small subset of its power into any particular 25 kHz bandwidth. This results in a digital signal operating at a particular average power level across a 6 MHz channel delivering 23.8 dB less power into a receiver having a 25 kHz bandwidth than an analog television signal operating at the same peak power.[101] While the lack of frequency offsets increases the potential for signal interference to aviation receivers by 25 dB, the use of digital modulation decreases signal the level of potential interference by 23.8 dB, resulting in a net increase in interference potential of 1.2 dB for a receiver having a 25 kHz bandwidth.

34. We therefore propose to amend our rules to account for this increase of 1.2 dB to interference from digital signals. The general signal leakage requirement, stated in Section 76.605(a)(12),[102] provides that the field strength of signal leakage should not exceed 15 microvolts per meter (μV/m) measured at 30 meters for frequencies below 54 MHz and above 216 MHz, and 20 μV/m measured at 3 meters for frequencies between 54 MHz and 216 MHz. Accordingly, we propose to decrease the maximum leakage level for both of these bands by 1.2 dB, which when rounded to the nearest 0.1 μV/m, results in a 17.4 μV/m threshold between 54 MHz and 216 MHz, and a 13.1 μV/m threshold at all other frequencies. We seek comment on this proposal. Additionally, the requirement for regular signal leakage monitoring requires the use of a detector capable of detecting a leak in excess of 20 μV/m at 3 meters.[103] Following our reasoning above, we propose to permit the use of analog detectors with this sensitivity when measuring analog signals in a system which operates no digital signals in the

[98] *Second Report and Order*, 99 FCC 2d at 525.

[99] *See* fn 19, *supra*.

[100] *Second Report and Order*, 99 FCC 2d at 525.

[101] The Relative bandwidth ratio of digital QAM signals to aviation receiver bandwidth can be calculated by the formula 10 * log (6 MHz / 25 kHz), which equals 23.8 dB less effective interference power from the perspective of a 25 kHz wide aviation receiver. Wider receivers would receive more interference power and narrower receivers would receive less.

[102] 47 C.F.R. § 76.605(a)(12).

[103] 47 C.F.R. § 76.614.

aeronautical bands, but to require analog and digital detectors to have sufficient sensitivity to detect the 1.2 dB decrease in the maximum signal leakage level we propose above, or 17.4 μV/m, in those systems which operate digital signals in the aeronautical bands. Further, we propose to require digital leakage in excess of this threshold to be noted and repaired within a reasonable time, factoring in the severity of the leak and operational considerations. We seek comment regarding any potential burdens that this change in the general signal leakage requirement may have on operators. For instance, would cable operators have to acquire new or more sensitive equipment, or modify their testing procedures, to comply with the proposal? To the extent there are increased costs, are there also countervailing benefits?

35. For cumulative signal leakage, there are three thresholds that we propose adjusting to address digital transmission. They are the threshold at which the rules become applicable, the threshold at which leaks must be included in the cumulative leakage index ("CLI") calculation, and the maximum leakage and CLI permissible. Under Section 76.610, the CLI rules apply where operations in the aeronautical frequency bands exceed an average power level of 100 microwatts (10^{-4} watts) or 38.75 dBmV in transmitting carriers or any signal component in a 25 kHz bandwidth in any 160 microsecond period at any point in the cable distribution system.[104] We propose to decrease the signal level at which the rules become applicable by 1.2 dB for digital signals resulting in a threshold power level of 75.85 microwatts or 37.55 dBmV. Once an operator is subject to CLI, the operators may demonstrate compliance based either upon a Section 76.611(a)(1) ground-based measurement or by a Section 76.611(a)(2) airspace measurement.[105] For ground-based measurements, operators must include analog leaks in excess of 50 μV/m in the signal leakage index calculation, and an I_{3000} of less than or equal to -7 or I_{∞} of less than or equal to 64 is permissible.[106] Therefore, by subtracting 1.2 dB from each of these components, we propose that digital leaks in excess of 43.6 μV/m be included in the calculation (and reported to the Commission) and that the maximum acceptable I_{3000} becomes -8.2 and the maximum acceptable I_{∞} becomes 62.8. For airspace measurements, coaxial cable operators may not exceed a field strength of 10 μV/m RMS at any point 450 meters above the average terrain of the coaxial cable system. Converting for digital leakage, the new maximum field strength becomes 8.7 μV/m. We seek comment on these proposals and any other issues that may arise from this conversion, especially on the equivalency of our ground and air based measurements. We also seek comment regarding any potential burdens that this change in the general signal leakage requirement may have on operators. For instance, would cable operators have to acquire new or more sensitive equipment, or modify their testing procedures, to comply with the proposal? To the extent there are increased costs, are there also countervailing benefits?

2. Miscellaneous Issues

36. We seek comment on several additional issues associated with the appropriate regulation of signal leakage with regard to digital transmissions. First, Section 76.609(h) contains a detailed methodology for performing signal leakage measurements.[107] This methodology, however, is specific to analog signals and may not be appropriate for digital signals. We maintain this requirement for analog signals, and we seek comment on an appropriate measurement technique for digital signals. To the extent that Section 76.1803 requires submission to the Commission of a description of the method by which compliance with the basic signal leakage criteria is achieved, we will continue to require such submission in the absence of a common procedure for digital signal as we believe this is necessary to permit verification of sound engineering practices. However, we may revisit this issue if measurement of digital signal leakage becomes widely standardized in the future.

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[104] 47 C.F.R. § 76.610.

[105] 47 C.F.R. §§ 76.611(a)(1), (2).

[106] *Id.*

[107] 47 C.F.R. § 76.609(h). For example, 47 C.F.R. § 76.609(h)(2) directs the operator to express the field strength in terms of the rms (root mean square) value of the synchronizing peak for each cable television channel. Digital channels do not have a "synchronizing peak."

37. Next, we address the issues of what type of signal, analog or digital, an operator must test and what signal leakage limit they must adhere to. The decreased signal levels we propose in the section above are designed to be equivalent in interference potential to analog signals. Accordingly, we propose to allow operators to choose to test either an analog carrier using either their existing analog signal leakage test equipment and an offset analog signal, or a digital carrier using new digital signal leakage test equipment.[108] Either method should yield the same peak signal leakage from the coaxial cable plant. Thus, we tentatively conclude that operators are allowed to select whether to perform tests on an analog carrier or a digital carrier at their discretion, except that where an operator transmits any digital signals in the aeronautical bands, the operator would be required to use the digital limits we described above.

38. We seek comment on whether our signal leakage performance criteria rules are sufficient, whether or not we need to expand the frequencies protected, and whether to maintain the requirement that the test frequency be located within the 108-137 MHz band.[109] We note that at the time of the *Second Report and Order*, 400 MHz was near the upper limit of the bandwidth of coaxial cable systems deployed at the time.[110] Today, coaxial cable systems routinely deploy in excess of 750 MHz, and deployments up to 1 GHz exist. We seek comment on potential and actual interference from coaxial cable systems to critical infrastructure operating above 400 MHz and the implications of extending signal leakage protection to higher bandwidths.[111] We further seek comment on our current testing and recordkeeping requirements,[112] including the requirement that tests be performed every three months, that tests be reported to the Commission once per year, the duration of time that records must be kept, and any other associated burdens that might be reduced without diminishing the efficacy of the Commission's signal leakage program. We seek comment on whether to retain or modify these rules.

39. Finally, we propose limiting, or potentially eliminating, the I_{3000} method of calculating CLI, favoring the I_{∞} method.[113] I_{3000} differs from I_{∞} in that it provides discounting of leaks based on their distance from the geographic center of the system, whereas I_{∞} considers all leaks equally. The respective total CLI values for each, however, are designed to result in equivalent levels of permissible leakage. At the time these formulas were established, systems were much smaller than they are today. Now that systems generally cover much larger geographical areas; the discounting based on distance results in a previously unforeseen breakdown in the I_{3000} formula. Specifically, for sufficiently large systems, significant leaks, which alone would be impermissible under the I_{∞} formula, become minimized due to their distance from the center of the system. By calculation, we can determine that a single leak of

[108] "A carrier is an electrical signal at a continuous frequency capable of being modified to carry information. For analog systems, the carrier is usually a sine wave of a particular frequency, such as [121.2625 MHz, commonly used for signal leakage]. It is the modifications or the changes from the carrier's basic frequency that become the information carried. Modifications are made via amplitude, frequency, or phase. The process of modifying a carrier signal is called modulation. A carrier is modulated and demodulated (the signal extracted at the other end) according to fixed protocols." H. Newton, *Newton's Telecom Dictionary* at 152 (20th ed. 2004).

[109] 47 C.F.R. § 76.611(b).

[110] *Second Report and Order*, 99 FCC 2d at 520.

[111] *See, e.g.* Ron Hranac, *Some Thoughts on LTE Interference*, Communications Technology (Oct. 1, 2011) *available at* http://www.cable360.net/ct/sections/columns/broadband/48482.html. "In one case, a leak on the order of 1,000 microvolts per meter (μV/m) was found, despite the fact that leakage in the VHF aeronautical band was well-below the FCC's 20 μV/m limit. The problem was a defective tap. A replacement tap took care of the leakage, but follow-up lab testing of the defective tap showed it had about 40 dB less shielding effectiveness at 750 MHz than it did at 133 MHz because of a flaky faceplate gasket. That correlated well with the approximately 1,000 μV/m leakage field strength at 750 MHz versus the approximately 10 μV/m leakage field strength at 133 MHz, also a 40 dB difference."

[112] 47 C.F.R. §§ 76.614, 76.1706, 76.1803-1804.

[113] *See* 47 C.F.R. § 76.611.

1340.05 μV/m located at the center of a coaxial cable system results in that system exceeding the maximum allowable CLI. However, that leak, if located more than 80.32 km from the system center, would appear to be equivalent to a 50 μV/m leak located at the system center. Such a leak, would be potentially strong enough to interfere with aircraft receivers alone, but would not be captured in an I_{3000} measurement. Therefore, we propose to limit the application of I_{3000} to systems with a total geographic diameter of less than 160 km. However, we also note that very few systems choose to calculate CLI using the I_{3000} method due to the increased recordkeeping and calculation burden associated with determining the distance of a particular leak from the center of a system. Thus, in the alternative, we propose eliminating I_{3000} as a calculation method altogether and requiring operators to use only I_{∞}. We seek comment on both of these proposals.

C. Reorganizations, Corrections, and Other Updates in Part 76

40. We further propose edits to remove references to effective dates that have passed, make editorial corrections, delete obsolete rules, update various technical standards that are incorporated by reference into our rules, and clarify language in Part 76 of our rules. The proposed changes are intended to set forth existing compliance requirements more clearly for MVPDs, franchising authorities, and the public. We seek comment on any other requirements that have been implemented by Commission order, but that have inadvertently been omitted from our rules.

41. Specifically, we propose to remove obsolete references to dates in Sections 76.56(b), 76.57(e), 76.64(a), 76.105(b), 76.127(f), 76.309(c)(1), 76.606, 76.1204(a), 76.1601, and 76.1602. We propose to correct citation references in Sections 76.56(a)(1)(i), 76.612(b)(2), 76.1508, 76.1509, 76.1510, and 76.1701(d). We propose to correct the numbering and references in Section 76.1205, and to eliminate the duplicative reporting requirements found in Section 76.1610(f) and (g).[114] We seek comment on these proposed changes, and encourage commenters to propose any other non-substantive changes to Part 76 of our rules that will correct errors or more clearly convey the Commission's intent.

42. We propose to delete Section 76.1909, which was created as part of the Commission's Broadcast Flag rules in 2003, since it is obsolete and without legal effect.[115] The Broadcast Flag rules were vacated by the Court of Appeals for the District of Columbia Circuit in 2005 insofar as they required demodulators to give effect to the Broadcast Flag.[116] The Media Bureau released an order on August, 24, 2011 deleting the Broadcast Flag rules in Parts 15 and 73 of the Commission's Rules, but did not delete Section 76.1909 from the CFR.[117] Although this provision was not vacated by the Court, without the obligation that equipment respect the Broadcast Flag, these rules would seem to be ineffective. Our proposed deletion of Section 76.1909 would remove the obsolete Broadcast Flag Rule. We seek comment on this proposed deletion.

43. We propose to update the various incorporations by reference in Part 76 to the most current versions made available by the relevant standards bodies.[118] We believe the standards incorporated in Part 76 have changed in minor ways since their original adoption by the Commission, correcting typographical errors, adding clarification, and updating various requirements in minor ways to reflect improvements in technology and continued innovation. Further, we expect that most industry

[114] For the complete list of rule changes, with additions indicated in **bold** and deletions indicated by ~~strikethrough~~, see Appendix A, *infra.*

[115] *See Digital Broadcast Content Protection*, MB Docket No. 02-230, Report and Order and Further Notice of Proposed Rulemaking, 18 FCC Rcd 23550 (2003). The broadcast flag rules were intended to prevent the indiscriminate redistribution of television broadcast content over the Internet.

[116] *See American Library Association, et al. v. FCC*, 406 F3d 689 (D.C. Cir. 2005).

[117] See *Amendment of Parts 1, 73 and 76 of the Commission's Rules*, 26 FCC Rcd 11422 (2011).

[118] *See* 47 C.F.R. § 76.602, Incorporation by reference.

participants are adhering to the current versions of these standards, even though they are not required to by our rules. The standards we are proposing to update are as follows:[119]

(1) ATSC A/65D: "ATSC Standard: Program and System Information Protocol for Terrestrial Broadcast and Cable (Revision D)," IBR used for §76.640. Note: Part 76 of the Commission's rules currently incorporates revision B of this standard. Revision C was adopted for broadcast purposes in the 3rd DTV Periodic Review.[120] Regarding cable television, revision D primarily adds language to reflect the Commission's rules implementing the standard. Additionally, the potential exists for revision E of this standard to be released before the end of 2012.

(2) CEA–542–C, "CEA Standard: Cable Television Channel Identification Plan," IBR used for §76.605. Note: In the update from version B to version C, the channel plan has been extended from 864 MHz to 1002 MHz, accommodating the largest cable systems.

(3) CEA–931–C, "Remote Control Command Pass-through Standard for Home Networking," IBR used for §76.640. Note: This revision primarily extended the existing specifications to work over IP connections, among other minor changes.

(4) ANSI/SCTE 26 2010 (formerly DVS 194): "Home Digital Network Interface Specification with Copy Protection," IBR used for §76.640. Note: The 2010 revision to SCTE 26 provides for numerous minor updates, adding requirements to support additional features, such as powering-on and off, passing through tuning, mute, and restore volume functions, and other minor protocol additions.

(5) SCTE 28 2012 (formerly DVS 295): "Host-POD Interface Standard," IBR used for §76.640. Note: The most recent version of SCTE 28 has not yet been ANSI approved, and merely updates and adds references. Previous revisions have made minor changes to the ID reporting mechanism, application interface, and baseline HTML profile requirements.

(6) ANSI/SCTE 40 2011 (formerly DVS 313), "Digital Cable Network Interface Standard," IBR used for §§ 76.605 and 76.640. Note: The 2011 update to SCTE 40 updates internal citations, renumbers various tables, and makes minor adjustments to the performance specifications that generally loosen the standard.

(7) ANSI/SCTE 41 2011 (formerly DVS 301): "POD Copy Protection System," IBR used for §76.640. Note: The 2011 revision to SCTE 41 updates internal references to other standards, requires PODs and Hosts to support an "ID reporting screen," and removes the section on Two-Way System Host Authentication Message Protocol."

(8) ANSI/SCTE 54 2009 (formerly DVS 241), "Digital Video Service Multiplex and Transport System Standard for Cable Television," IBR used for §76.640. Note: The 2009 revision to SCTE 54 updates internal references to other standards, and containing minor revisions to the MPEG-2 registration descriptor, program identifier, audio elementary stream identifier, among others and adds a section for Emergency Cable Alert as adopted

[119] SCTE standards are available from the Society of Cable Telecommunications Engineers website, located at http://www.scte.org/standards/Standards_Available.aspx, CEA standards are available from the Consumer Electronics Association website, located at http://www.ce.org/Standards/, and ATSC A/65 is available from the Advanced Television Systems Committee website located at http://www.atsc.org/cms/index.php/standards.

[120] *See Third Periodic Review of the Commission's Rules and Policies Affecting the Conversion to Digital Television*, MB Docket No. 07-91, Report and Order, 23 FCC Rcd 2994 (2007).

by the Commission's EAS orders.[121]

(9) ANSI/SCTE 65 2008 (formerly DVS 234), "Service Information Delivered Out-of-Band for Digital Cable Television," 2008, IBR used for §76.640. Note: The most recent revisions to SCTE 65 primarily update internal references, including requiring compliance SCTE 28 for host-POD interaction.

We believe that the updated versions of these standards are generally backwards-compatible, such that parties following the version currently incorporated in the Commission's rules would also be in compliance with the current versions of these standards.[122] We seek comment on our proposal to revise our rules by incorporating these updated standards.

44. Finally, we propose to amend the note to Section 76.55(d).[123] Section 76.55 contains the definitions applicable to the Commission's must-carry rules, and subpart (d) lists the requirements to be considered a "qualified low power station." Among the requirements, Section 76.55(d)(4) requires the station to deliver a "good quality signal" to the appropriate cable system headend, and the Note to Paragraph (d) provides the definition of "good quality signal" in this context. In 2001, the Commission established the standard for digital television, but the Note to Paragraph (d) was never updated.[124] We propose, then, to amend the paragraph to list the digital threshold of -61 dBm at all channels. We also propose to strike the phrase, "or a baseband signal" from the note. This phrase contradicts both the plain language and the purpose of the section it clarifies. Section 76.55(d)(4), requires a low power television station to deliver a good quality *over-the-air* signal to qualify for carriage on the system. A baseband signal, in contrast, is not an over-the-air signal, instead being the result of an alternate means of delivery.[125] Therefore, we tentatively conclude that the inclusion of the phrase "or a baseband signal" was inadvertent, and propose removing it for clarity.

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[121] *See Review of the Emergency Alert System; Independent Spanish Broadcasters Association, the Office of Communication of the United Church of Christ, Inc., and the Minority Media and Telecommunications Council, Petition for Immediate Relief*, Second Report and Order and Further Notice of Proposed Rulemaking, FCC 07-109, 22 FCC Rcd 13275 (2007).

[122] For example, SCTE 40 2011 has been updated from SCTE 40 2003 by being reordered for clarity, extended to cover systems operating up to 1002 MHz from 864 MHz, and revised to require less stringent technical performance, such as permitting stronger adjacent signals. Operators wishing to continue to follow the more-strict requirements of SCTE 40 2003 would not need to alter their systems to comply with an update to SCTE 40 2011. *See* ANSI/SCTE 40 2011: "Digital Cable Network Interface Standard," available at www.scte.org/documents/pdf/standards/SCTE_40_2011.pdf.

[123] 47 C.F.R. § 76.55(d).

[124] *Carriage of Digital Television Broadcast Signals; Amendments to Part 76 of the Commission's Rules et al*, Report and Order, CS Docket No. 98-120, FCC 01-22, 16 FCC Rcd 2598 (2001) at ¶ 46.

[125] This note was introduced by the Memorandum, Opinion, and Order resolving petitions for reconsideration arising from the 1993 Must-Carry order (*See Implementation of the Cable Television Consumer Protection and Competition Act of 1992 Broadcast Signal Carriage Issues,* MM Docket No. 92-259, Memorandum, Opinion, and Order, FCC 94-251, 9 FCC Rcd 6723 (1994). *Resolving petitions for reconsideration arising from Implementation of the Cable Television Consumer Protection and Competition Act of 1992, Broadcast Signal Carriage Issues, *EFFECTIVE DATES* April 2, June 3, June 17, and May 3, 1993,* Report and Order, FCC 93-144, 8 FCC Rcd 3965, 58 FR 17350 (1993)). In so doing, the Commission *sua sponte* moved to clarify the relevant signal carriage standards for must-carry purposes, answering the question of under what circumstances "noncommercial stations place adequate signal levels over a cable system's principal headend" (*see the Cable TV Act of 1992* at 6735-6). This standard also relates to over-the-air measurement, for which providing a baseband signal would not be appropriate. Further, the term baseband is not used in the item except in the appendix listing new rule language.

IV. PROCEDURAL MATTERS

A. Initial Regulatory Flexibility Act Analysis

45. As required by the Regulatory Flexibility Act of 1980 ("RFA"),[126] the Commission has prepared an Initial Regulatory Flexibility Analysis ("IRFA") relating to this *NPRM*. The IRFA is attached to this *NPRM* as Appendix B. Written public comments are requested on the IRFA. Comments must be identified as responses to the IRFA and must be filed by the deadlines for comments provided *supra* in Section IV.D. of this *NPRM*. The Commission will send a copy of the *NPRM,* including this IRFA, to the Chief Counsel for Advocacy of the Small Business Administration ("SBA").[127]

B. Initial Paperwork Reduction Act of 1995 Analysis

46. This NPRM has been analyzed with respect to the Paperwork Reduction Act of 1995 ("PRA")[128] and contains proposed modified information collection requirements.[129] It will be submitted to the Office of Management and Budget (OMB) for review under Section 3507(d) of the PRA.[130] The Commission, as part of its continuing effort to reduce paperwork burdens, invites OMB, the general public, and other interested parties to comment on the information collection requirements contained in this document, as required by the PRA.

47. Written PRA comments on the proposed information collection requirements contained herein must be submitted on or before 60 days after the date of publication in the Federal Register. Comments should address: (a) whether the proposed collection of information is necessary for the proper performance of the functions of the Commission, including whether the information shall have practical utility; (b) the accuracy of the Commission's burden estimates; (c) ways to enhance the quality, utility, and clarity of the information collected; and (d) ways to minimize the burden of the collection of information on the respondents, including the use of automated collection techniques or other forms of information technology.[131] In addition, we seek specific comment on how we might "further reduce the information collection burden for small business concerns with fewer than 25 employees," pursuant to the Small Business Paperwork Relief Act of 2002.[132]

48. In addition to filing comments with the Office of the Secretary, a copy of any PRA comments on the proposed information collection requirements contained herein should be submitted to the Federal Communications Commission (FCC) via email to PRA@fcc.gov and to Nicholas A. Fraser, Office of Management and Budget, via email to nfraser@omb.eop.gov or via fax at 202-395-5167. For additional information concerning the information collection requirements contained in this NPRM, send an email to PRA@fcc.gov or contact Cathy Williams, Cathy.Williams@fcc.gov, of the Office of Managing Director, Performance Evaluation and Records Management, (202) 418-2918.

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[126] *See* 5 U.S.C. § 603. The RFA, *see* 5 U.S.C. § 601 et. seq., has been amended by the Small Business Regulatory Enforcement Fairness Act of 1996 ("SBREFA"), Pub. L. No. 104-121, Title II, 110 Stat. 847 (1996). The SBREFA was enacted as Title II of the Contract with America Advancement Act of 1996 ("CWAAA").

[127] *See* 5 U.S.C. § 603(a). In addition, the *NPRM* and IRFA (or summaries thereof) will be published in the Federal Register. *Id*.

[128] The Paperwork Reduction Act of 1995 ("PRA"), Pub. L. No. 104-13, 109 Stat 163 (1995) (codified in Chapter 35 of title 44 U.S.C.).

[129] *See* OMB Control Nos. 3060-0289 (proof-of-performance test data), 3060-0332 (signal leakage logs and repair records), and 3060-0316 (records to be maintained locally by cable system operators for public inspection).

[130] *See* 44 U.S.C. § 3507(d).

[131] *See* 44 U.S.C. § 3506(c)(2).

[132] The Small Business Paperwork Relief Act of 2002 ("SBPRA"), Pub. L. No. 107-198, 116 Stat 729 (2002) (codified in Chapter 35 of title 44 U.S.C.); *see* 44 U.S.C. § 3506(c)(4).

C. Ex Parte Presentations

49. Permit-But-Disclose. This proceeding will be treated as a "permit-but-disclose" proceeding in accordance with the Commission's *ex parte* rules.[133] *Ex parte* presentations are permissible if disclosed in accordance with Commission rules, except during the Sunshine Agenda period when presentations, *ex parte* or otherwise, are generally prohibited. Persons making oral *ex parte* presentations are reminded that a memorandum summarizing a presentation must contain a summary of the substance of the presentation and not merely a listing of the subjects discussed.[134] More than a one- or two-sentence description of the views and arguments presented is generally required.[135] Additional rules pertaining to oral and written presentations in "permit-but-disclose" proceedings are set forth in section 1.1206(b) of the rules.[136]

D. Filing Requirements

50. Comments and Replies. Pursuant to Sections 1.415 and 1.419 of the Commission's rules,[137] interested parties may file comments and reply comments on or before the dates indicated on the first page of this document. Comments may be filed using: (1) the Commission's Electronic Comment Filing System ("ECFS"), (2) the Federal Government's eRulemaking Portal, or (3) by filing paper copies.[138]

- Electronic Filers: Comments may be filed electronically using the Internet by accessing the ECFS: http://www.fcc.gov/cgb/ecfs/ or the Federal eRulemaking Portal: http://www.regulations.gov.
- Paper Filers: Parties who choose to file by paper must file an original and four copies of each filing. If more than one docket or rulemaking number appears in the caption of this proceeding, filers must submit two additional copies for each additional docket or rulemaking number.

  Filings can be sent by hand or messenger delivery, by commercial overnight courier, or by first-class or overnight U.S. Postal Service mail. All filings must be addressed to the Commission's Secretary, Office of the Secretary, Federal Communications Commission.

  - All hand-delivered or messenger-delivered paper filings for the Commission's Secretary must be delivered to Room TW-A325 at FCC Headquarters, 445 12th Street, SW, Washington, DC 20554. All hand deliveries must be held together with rubber bands or fasteners. Any envelopes must be disposed of before entering the building. The filing hours are 8:00 a.m. to 7:00 p.m.
  - Commercial overnight mail (other than U.S. Postal Service Express Mail and Priority Mail) must be sent to 9300 East Hampton Drive, Capitol Heights, MD 20743.

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[133] *See* 47 C.F.R. § 1.1206 (rule for permit-but-disclose" proceedings); *see also id.* §§ 1.1200-1.1216.

[134] *See id.* § 1.1206(b)(2).

[135] *See id*.

[136] *See id.* § 1.1206(b). *See also Commission Emphasizes the Public's Responsibilities in Permit-But-Disclose Proceedings*, Public Notice, 15 FCC Rcd 19945 (2000). We note that the Commission recently amended the rules governing the content of *ex parte* notices. *See Amendment of the Commission's Ex Parte Rules and Other Procedural Rules*, Report and Order and Further Notice of Proposed Rulemaking, GC Docket No. 10-43, FCC 11-11, ¶¶ 35-36 (rel. Feb. 2, 2011).

[137] *See id*. §§ 1.415, 1419.

[138] *See Electronic Filing of Documents in Rulemaking Proceedings*, GC Docket No. 97-113, Report and Order, 13 FCC Rcd 11322 (1998).

- U.S. Postal Service first-class, Express, and Priority mail must be addressed to FCC Headquarters, 445 12th Street, SW, Washington, DC 20554.

51. Availability of Documents. Comments, reply comments, and *ex parte* submissions will be publically available online via ECFS.[139] These documents will also be available for public inspection during regular business hours in the FCC Reference Information Center, which is located in Room CY-A257 at FCC Headquarters, 445 12th Street, SW, Washington, DC 20554. The Reference Information Center is open to the public Monday through Thursday from 8:00 a.m. to 4:30 p.m. and Friday from 8:00 a.m. to 11:30 a.m.

52. People with Disabilities: To request materials in accessible formats for people with disabilities (braille, large print, electronic files, audio format), send an e-mail to fcc504@fcc.gov or call the FCC's Consumer and Governmental Affairs Bureau at 202-418-0530 (voice), 202-418-0432 (tty).

53. Additional Information. For additional information on this proceeding, contact Jeffrey Neumann of the Media Bureau, Engineering Division, Jeffrey.Neumann@fcc.gov, (202) 418-2046.

V. ORDERING CLAUSES

54. Accordingly, **IT IS ORDERED** that, pursuant to the authority contained in Sections 1, 4(i), 4(j), 301, 302a, 303, 307, 308, 624(e), and 624A of the Communications Act of 1934, as amended, 47 U.S.C. §§ 151, 154(i), 154(j), 301, 302a, 303, 304, 307, 308, 544(e), and 544a, NOTICE IS HEREBY GIVEN of the proposals and tentative conclusions described in this Notice of Proposed Rulemaking.

55. IT IS FURTHER ORDERED that the Reference Information Center, Consumer and Governmental Affairs Bureau, shall send a copy of this Notice of Proposed Rulemaking, including the Initial Regulatory Flexibility Analysis, to the Chief Counsel for Advocacy of the Small Business Administration.

FEDERAL COMMUNICATIONS COMMISSION

Marlene H. Dortch
Secretary

[139] Documents will generally be available electronically in ASCII, Microsoft Word, and/or Adobe Acrobat.

APPENDIX A

Proposed Rules

Part 76 of the Commission's rules are to be revised as follows:

PART 76 – Multichannel Video and Cable Television Service:

1. The Authority Citation for Part 76 continues to read as follows:

AUTHORITY: 47 U.S.C. 151, 152, 153, 154, 301, 302, 302a, 303, 303a, 307, 308, 309, 312, 315, 317, 325, 339, 340, 341, 503, 521, 522, 531, 532, 534, 535, 536, 537, 543, 544, 544a, 545, 548, 549, 552, 554, 556, 558, 560, 561, 571, 572, 573.

2. Revise § 76.55 to read as follows

§ 76.55 Definitions applicable to the must-carry rules.

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Note to Paragraph (d): For the purposes of this section, **for over-the-air broadcast,** a good quality signal shall mean a signal level of either -45 dBm for analog VHF signals, -49 dBm for analog UHF signals, or **-61 dBm for digital signals (at all channels)** at the input terminals of the signal processing equipment~~, or a baseband video signal~~.

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3. Revise § 76.56 (a)(1)(i) and (b) to read as follows

§ 76.56 Signal carriage obligations.

(a) * * *

(1) * * *

(i) Systems with 12 or fewer usable activated channels, as defined in §76.5(oo) ~~§76.6(oo)~~, shall be required to carry the signal of one such station;

* * * * *

(b) *Carriage of local commercial television stations*. ~~Effective June 2, 1993,~~ A cable television system shall carry local commercial broadcast television stations in accordance with the following provisions:

(1) * * *

* * * * *

4. Revise § 76.57 (e) to read as follows

§ 76.57 Channel positioning.

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(e) At the time a local commercial station elects must-carry status pursuant to §76.64, such station shall notify the cable system of its choice of channel position as specified in paragraphs (a), (b), and (d) of this section. A qualified NCE station shall notify the cable system of its choice of channel position when it requests carriage. ~~Channel positioning requests from local commercial stations shall be fulfilled by the cable operator no later than October 6, 1993~~.

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5. Revise § 76.64 (a) to read as follows

§76.64 Retransmission consent.

(a) ~~After 12:01 a.m. on October 6, 1993,~~ No multichannel video programming distributor shall retransmit the signal of any commercial broadcasting station without the express authority of the originating station, except as provided in paragraph (b) of this section.

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6. Revise § 76.105 (b) to read as follows:

§ 76.105 Notifications.

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(b) : Broadcasters entering into contracts ~~on or after August 18, 1988,~~ which contain syndicated exclusivity protection shall notify affected cable systems within sixty calendar days of the signing of such a contract. ~~Broadcasters who have entered into contracts prior to August 18, 1988, and who comply with the requirements specified in §76.109 shall notify affected cable systems on or before June 19, 1989.~~ A broadcaster shall be entitled to exclusivity protection beginning on the later of:

(1) * * *

* * * * *

7. In § 76.127, remove (f).

8. Revise § 76.309 (c) to read as follows:

§ 76.309 Customer service obligations.

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(c) ~~Effective July 1, 1993,~~ Cable operators are subject to the following customer service standards:

(1) * * *

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9. Revise § 76.601(b) to read as follows

§ 76.601 Performance tests.

(a) * * *

(b) The operator of each cable television system shall conduct complete performance tests of that system at least twice each calendar year (at intervals not to exceed seven months), unless otherwise noted below. The performance tests shall be directed at determining the extent to which the system complies with all the technical standards set forth in § 76.605~~(a)~~ and shall be as follows:

(1) For cable television systems with 1000 or more subscribers but with 12,500 or fewer subscribers, proof-of-performance tests conducted pursuant to this section shall include measurements taken at six (6) widely separated points. However, within each cable system, one additional test point shall be added for every additional 12,500 subscribers or fraction thereof (e.g., 7 test points if 12,501 to 25,000 subscribers; 8 test points if 25,001 to 37,500 subscribers, etc.). In addition, for technically integrated portions of cable systems that are not mechanically continuous (~~i.e.~~**e.g.**, employing microwave connections), at least one test point will be required for each portion of the cable system served by a technically integrated ~~microwave~~ hub. The proof-of-performance test points chosen shall be balanced to represent all geographic areas served by the cable system **and should include at least one test point in each local franchise area.** At least one-third of the test points shall be representative of subscriber terminals most distant from the system input and from each microwave receiver (if microwave transmissions are employed), in terms of cable length. The measurements may be taken at convenient monitoring points in the cable network: ~~P~~**p**rovided, that data shall be included to relate the measured performance of the system as would be viewed from a nearby subscriber terminal. An identification of the instruments, including the makes, model numbers, and the most recent date of calibration, a description of the procedures utilized, and a statement of the qualifications of the person performing the tests shall also be included.

(2) Proof-of-performance tests to determine the extent to which a cable television system complies with the standards set forth in § 76.605~~(a)~~**(b)** (3), (4), and (5) shall be made on each of the NTSC or similar video channels of that system. Unless otherwise ~~as~~ noted, proof-of-performance tests for all other standards in § 76.605~~(a)~~**(b)** shall be made on a minimum of ~~four (4) channels plus one additional channel for every 100 MHz, or fraction thereof, of cable distribution system upper frequency limit (e.g., 5 channels for cable television systems with a cable distribution system upper frequency limit of 101 to 216 MHz; 6 channels for cable television systems with a cable distribution system upper frequency limit of 217–300 MHz; 7 channels for cable television systems with a cable distribution upper frequency limit to 300 to 400 MHz, etc.)~~ **five (5) channels for systems operating a total activated channel capacity of less than 550 MHz, and ten (10) channels for systems operating a total activated channel capacity of 550 MHz or greater.** The channels selected for testing must be representative of all the channels within the cable television system.

(i) The operator of each cable television system shall conduct semi-annual proof-of-performance tests of that system, to determine the extent to which the system complies with the technical standards set forth in § 76.605~~(a)~~**(b)**(4) as follows. The visual signal level on each channel shall be measured and recorded, along with the date and time of the measurement, once every six hours (at intervals of not less than five hours or no more than seven hours after the previous measurement), to include the warmest and the coldest times, during a 24-hour period in January or February and in July or August.

(ii) The operator of each cable television system shall conduct triennial proof-of-performance tests of its system to determine the extent to which the system complies with the technical standards set forth in § 76.605~~(a)~~**(b)**(11).

(3) Proof-of-performance tests to determine the extent to which a cable television system complies with the standards set forth in § 76.605(c)(1) shall be made on each of the QAM or similar video channels of that system. Unless otherwise as noted, proof-of-performance tests for all other standards in § 76.605(c) shall be made on a minimum of five (5) channels for systems operating a

total activated channel capacity of less than 550 MHz, and ten (10) channels for systems operating a total activated channel capacity of 550 MHz or greater. The channels selected for testing must be representative of all the channels within the cable television system.

(4) For cable televisions systems which operate both NTSC or similar and QAM of similar channels, proof-of-performance tests to determine the extent to which the cable televisions system complies with § 76.605(b)(1), (2), (6)-(11) and 76.605(c)(1) shall be apportioned relative to the proportion of channels allocated to each transmission type, except that at no time shall less than two channels of a particular type be tested.

(c) * * *

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10. Revise § 76.602(b)(7) to read as follows:

§ 76.602 Incorporation by Reference.

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(b) **ATSC.** * * *

(1) ATSC A/65~~B~~**D**: "ATSC Standard: Program and System Information Protocol for Terrestrial Broadcast and Cable (Revision ~~B~~**D**)," ~~March 18, 2003~~**April 14, 2009**, IBR approved for §76.640.

(2) ATSC A/85:2011 "ATSC Recommended Practice: Techniques for Establishing and Maintaining Audio Loudness for Digital Television," (July 25, 2011) ("ATSC A/85 RP"), IBR approved for §76.607.

(c) **CEA.** * * *

(1) CEA–542–~~B~~**C**, "CEA Standard: Cable Television Channel Identification Plan," July ~~2003~~**2009**, IBR approved for §76.605.

(2) CEA–931–~~A~~**C**, "Remote Control Command Pass-through Standard for Home Networking," ~~2003~~**2007**, IBR approved for §76.640.

(d) **SCTE.** * * *

(1) ANSI/SCTE 26 ~~2001~~**2010** (formerly DVS 194): "Home Digital Network Interface Specification with Copy Protection," ~~2001~~**2010**, IBR approved for §76.640.

(2) **ANSI**/SCTE 28 ~~2003~~**2012** (formerly DVS 295): "Host-POD Interface Standard," ~~2003~~**2012**, IBR approved for §76.640.

(3) **ANSI**/SCTE 40 ~~2003~~**2011** (formerly DVS 313), "Digital Cable Network Interface Standard," ~~2003~~**2011**, IBR approved for §**§ 76.605 and** 76.640.

(4) **ANSI**/SCTE 41 ~~2003~~**2011** (formerly DVS 301): "POD Copy Protection System," ~~2003~~**2011**, IBR approved for §76.640.

(5) ANSI/SCTE 54 ~~2003~~**2009** (formerly DVS 241), "Digital Video Service Multiplex and Transport System Standard for Cable Television," ~~2003~~**2009**, IBR approved for §76.640.

(6) ANSI/SCTE 65 ~~2002~~**2008** (formerly DVS 234), "Service Information Delivered Out-of-Band for Digital Cable Television," ~~2002~~**2008**, IBR approved for §76.640.

(e) * * *

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11. Revise § 76.605 to read as follows

§ 76.605 Technical standards.

(a) 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 noted. **The requirements of subsection (b) of this section are applicable to each NTSC or similar video downstream cable television channel in the system, the requirements of subsection (c) are applicable to each QAM or similar video downstream cable television channel in the system, and the requirements of subsection (d) are applicable to all downstream cable television channels in the system. Cable television systems utilizing other technologies to distribute programming must comply with subsection (e).**

(b) For 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 ~~CEA-542-B~~**CEA-542-C**: "Standard: Cable Television Channel Identification Plan," (Incorporated by reference, see § 76.602).

(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.

(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 (100 foot) 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 (100 foot) 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 output of the modulating and processing equipment (generally the headend). For subscriber terminals that use equipment which modulate and remodulate 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. The amplitude characteristic shall be measured at the subscriber terminal.

(7) The ratio of RF visual signal level to system noise shall not be less than 43 decibels. For class I cable television channels, the requirements of this section are applicable only to:

(i) Each signal which is delivered by a cable television system to subscribers within the predicted Grade B **or noise-limited service** contour**, as appropriate,** for that signal;

(ii) Each signal which is first picked up within its predicted Grade B **or noise-limited service** contour**, as appropriate**;

(iii) 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.

(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) 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.

(c) For each downstream QAM or similar video downstream cable television channel in the system the technical requirements of ANSI/SCTE 40 2011 (Formerly DVS 313): "Digital Cable Network Interface Standard" (incorporated by reference, *see* § 76.602) shall apply, provided:

(1) For purposes of demonstrating compliance with proof-of-performance, the RF transmission characteristics of Table 4 shall be tested and recorded pursuant to §§ 76.601 and 76.1706.

(2) For purposes of demonstrating compliance with proof-of-performance, the Adjacent Channel Characteristics of Table 6 and the Nominal Relative Carrier Power Levels of Table 5 shall be tested and recorded pursuant to §§ 76.601 and 76.1706.

(d) 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 shall be limited as follows:

Frequencies	Signal leakage limit	Distance in meters (m)
Analog signals less than and including 54 MHz, and over 216 MHz	15 μV/m	30
Digital signals less than and including 54 MHz, and over 216 MHz	**13.1 μV/m**	**30**
Analog signals over 54 MHz up to and including 216 MHz	20 μV/m	3
Digital signals over 54 MHz up to and including 216 MHz	**17.4 μV/m**	**3**

Where analog NTSC or similar signals are measured in accordance with the procedures outlined in § 76.609(h).

(e) 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,~~**other than 6 MHz NTSC or similar analog channels or 6 MHz QAM or similar channels on conventional coaxial or hybrid fiber-coaxial cable systems and** which, because of their basic design, cannot comply

with one or more of the technical standards set forth in paragraphs ~~(a)~~ **(b) and (c)** 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~~ **upon Commission approval on a case-by-case basis. To obtain Commission approval, the operator must submit to the Commission its own proof-of-performance plan for ensuring subscribers receive good quality signals.**

Note 1: Local franchising authorities of systems serving fewer than 1000 subscribers may adopt standards less stringent than those in § 76.605(b) and (c). 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)~~**(b)**(3), 76.605~~(a)~~ **(b)**(7), 76.605~~(a)~~**(b)**(8), 76.605~~(a)~~**(b)**(10) and 76.605~~(a)~~**(b)**(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 TV interface device rules under part 15 of this chapter.

~~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~~**4**: Should subscriber complaints arise from a system failing to meet § 76.605~~(a)~~**(b)**(10), the cable operator will be required to remedy the complaint and perform test measurements on § 76.605~~(a)~~**(b)**(10) containing the full number of channels as indicated in § 76.601(b)(2) at the complaining subscriber's terminal. Further, should the problem be found to be system-wide, the Commission may order that the full number of channels as indicated in § 76.601(b)(2) be tested at all required locations for future proof-of-performance tests.

Note ~~6~~**5**: 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.

12. Revise § 76.606 to read as follows:

§ 76.606 Closed captioning.

(a) ~~As of June 30, 1992,~~ The operator of each cable television system shall not take any action to remove or alter closed captioning data contained on line 21 of the vertical blanking interval.

(b) ~~As of July 1, 1993,~~ The operator of each cable television system shall deliver intact closed captioning data contained on line 21 of the vertical blanking interval, as it arrives at the headend or from another origination source, to subscriber terminals and (when so delivered to the cable system) in a format that can be recovered and displayed by decoders meeting ~~§15.119~~ **§79.101** of this chapter.

13. Revise § 76.610 to read as follows:

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

The provisions of §§~~76.605(a)(12)~~**76.605(d)**, 76.611, 76.612, 76.613, 76.614, 76.616, 76.617, 76.1803 and 76.1804 are applicable to all MVPDs (cable and non-cable) transmitting **analog** 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 **or transmitting digital carriers or other signal components at an average power level of 75.85 microwatts 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. Exception: Non-cable MVPDs serving less than 1000 subscribers and less than 1000 units do not have to comply with § 76.1803.

14. Revise § 76.611 to read as follows:

§ 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 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 for **analog** systems and **equal to or less than –8.2 for digital systems** or (ii) 10 log I_{∞} is equal to or less than 64 for **analog** systems and **equal to or less than 62.8 for digital systems**, using one of the following formula, **except that no system of diameter greater than 160 kilometers may utilize I_{3000}**:

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

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

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;

θ 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 (μV/m) measured 3 meters from the leak i; and

n is the number of leaks found of field strength equal to or greater than 50 μV/m for **analog** leaks measured pursuant to §76.609(h) **or 43.6 μV/m for digital leaks**.

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 (μV/m) RMS for **an offset analog signal or 8.7 microvolts per meter (μV/m) RMS for a digital signal** 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 μV/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 **8.7 μV/m or** 10 μV/m RMS as indicated above; if analog recordings is used the peak values of the curves, when smoothed according to good engineering practices, shall not exceed **8.7 μV/m or** 10 μV/m RMS **for digital or analog leakage, respectively**.

(b) In paragraphs (a)(1) and (a)(2) of this section the unmodulated test signal used for analog leakage measurements 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 for analog leakage measurements, 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 μV/m at 3 meters in accordance with § 76.609 ~~fo~~ **of** the Rules for **analog systems or 17.4 μV/m at 3 meters for digital systems**.

(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.

15. Revise § 76.612 to read as follows:

§ 76.612 Cable television frequency separation standards.

All cable television systems which operate **analog NTSC or similar channels** in the frequency bands 108-137 MHZ and 225-400 MHz shall comply with the following frequency separation standards **for each NTSC or similar channel:**

(a) * * *

* * * * *

16. Revise § 76.614 to read as follows:

§ 76.614 Cable television regular monitoring.

Cable television operators transmitting carriers in the frequency bands 108-137 and 225-400 MHz shall provide for a program of regular monitoring for signal leakage by substantially covering the plant every three months. The incorporation of this monitoring program into the daily activities of existing service personnel in the discharge of their normal duties will generally cover all portions of the system and will therefore meet this requirement. Monitoring equipment and procedures utilized by a cable operator shall be adequate to detect a leakage source from an analog signal which produces a field strength in these bands of 20 μV/m or greater at a distance of 3 meters **and from a digital signal which produces a field strength in these bands of 17.4 μV/m or greater at a distance of 3 meters**. During regular monitoring, any analog leakage source which produces a field strength of 20 μV/m or greater at a distance of 3 meters **or digital leakage source which produces a field strength of 17.4 μV/m or greater at a distance of 3 meters** in the aeronautical radio frequency bands shall be noted and such leakage sources shall be repaired within a reasonable period of time.

Note 1 to § 76.614: Section 76.1706 contains signal leakage recordkeeping requirements applicable to cable operators.

17. Revise § 76.640(b)(1)(i) to read as follows:

§ 76.640 Support for unidirectional digital cable products on digital cable systems.

(a) * * *

(b) ~~No later than July 1, 2004,~~ Cable operators shall support unidirectional digital cable products, as defined in §15.123 of this chapter, through the provisioning of Point of Deployment modules (PODs) and services, as follows:

(1) Digital cable systems with an activated channel capacity of 750 MHz or greater shall comply with the following technical standards and requirements:

(i) **ANSI**/SCTE 40 ~~2003~~**2011** (formerly DVS 313): "Digital Cable Network Interface Standard" (incorporated by reference, see §76.602), ~~provided however that with respect to Table B.11, the Phase Noise requirement shall be −86 dB/Hz, and also~~ provided that the "transit delay for most distant customer" requirement in Table ~~B.3~~ **4.3** is not mandatory.

(ii) **ANSI/**SCTE 65 ~~2002~~**2008** (formerly DVS 234): "Service Information Delivered Out-of-Band for Digital Cable Television" (incorporated by reference, see §76.602), provided however that the referenced Source Name Subtable shall be provided for Profiles 1, 2, and 3.

(iii) **ANSI/**SCTE 54 ~~2003~~**2009** (formerly DVS 241): "Digital Video Service Multiplex and Transport System Standard for Cable Television" (incorporated by reference, see §76.602).

(iv) For each digital transport stream that includes one or more services carried in-the-clear, such transport stream shall include virtual channel data in-band in the form of ATSC A/65~~B~~**D**: "ATSC Standard: Program and System Information Protocol for Terrestrial Broadcast and Cable (Revision ~~B~~**D**)" (incorporated by reference, see §76.602), when available from the content provider. With respect to in-band transport:

(A) * * *

(B) * * *

(C) The format of event information data format shall conform to ATSC A/65~~B~~**D**: "ATSC Standard: Program and System Information Protocol for Terrestrial Broadcast and Cable (Revision ~~B~~**D**)" (incorporated by reference, see §76.602);

(D) * * *

(E) * * *

(v) When service information tables are transmitted out-of-band for scrambled services:

(A) The data shall, at minimum, describe services carried within the transport stream carrying the PSIP data itself;

(B) A virtual channel table shall be provided via the extended channel interface from the POD module. Tables to be included shall conform to **ANSI**/SCTE 65 ~~2002~~**2008** (formerly DVS 234): "Service Information Delivered Out-of-Band for Digital Cable Television" (incorporated by reference, see §76.602).

(C) Event information data when present shall conform to **ANSI/SCTE 65 2008** (formerly DVS 234): "Service Information Delivered Out-of-Band for Digital Cable Television" (incorporated by reference, see §76.602) (profiles 4 or higher).

(D) * * *

(E) * * *

(2) All digital cable systems shall comply with:

(i) **ANSI**/SCTE 28 ~~2003~~**2012** (formerly DVS 295): "Host-POD Interface Standard" (incorporated by reference, see §76.602).

(ii) SCTE 41 ~~2003~~**2011** (formerly DVS 301): "POD Copy Protection System" (incorporated by reference, see §76.602).

(3) * * *

* * * * *

18. Amend § 76.1204 to revise paragraph (a), and delete paragraph (e) and redesignate (f) as (e) as follows:

§ 76.1204 Availability of equipment performing conditional access or security functions.

(a)(1) A multichannel video programming distributor that utilizes navigation devices to perform conditional access functions shall make available equipment that incorporates only the conditional access functions of such devices. ~~Commencing on July 1, 2007,~~ No multichannel video programming distributor subject to this section shall place in service new navigation devices for sale, lease, or use that perform both conditional access and other functions in a single integrated device.

* * * * *

~~(c) The requirements of this section shall become applicable on July 1, 2000.~~

(e) Paragraphs (a)(1), (b), and (c) of this section shall not apply to the provision of any navigation device that:

(1) Employs conditional access mechanisms only to access analog video programming;

(2) Is capable only of providing access to analog video programming offered over a multichannel video programming distribution system; and

(3) Does not provide access to any digital transmission of multichannel video programming or any other digital service through any receiving, decoding, conditional access, or other function, including any conversion of digital programming or service to an analog format.

19. Revise § 76.1205(b) to read as follows:

§76.1205 CableCARD support.

* * * * *

(b) A multichannel video programming provider that is subject to the requirements of ~~§76.1204(a)(1)~~ **Section 76.640** must:

* * *

(5) Separately disclose to consumers in a conspicuous manner with written information provided to customers in accordance with §76.1602, with written or oral information at consumer request, and on Web sites or billing inserts;

(i) Any assessed fees for the rental of single and additional CableCARDs and the rental of operator-supplied navigation devices; and,

(ii) If such provider includes equipment in the price of a bundled offer of one or more services, the fees reasonably allocable to:

(A) The rental of single and additional CableCARDs; and

(B) The rental of operator-supplied navigation devices.

(iii) CableCARD rental fees shall be priced uniformly throughout a cable system by such provider without regard to the intended use in operator-supplied or consumer-owned equipment. No service fee shall be imposed on a subscriber for support of a subscriber-provided device that is not assessed on subscriber use of an operator-provided device.

(iv) For any bundled offer combining service and an operator-supplied navigation device into a single fee, including any bundled offer providing a discount for the purchase of multiple services, such provider shall make such offer available without discrimination to any customer that owns a navigation device, and, to the extent the customer uses such navigation device in lieu of the operator-supplied equipment included in that bundled offer, shall further offer such customer a discount from such offer equal to an amount not

less than the monthly rental fee reasonably allocable to the lease of the operator-supplied navigation device included with that offer. For purposes of this section, in determining what is "reasonably allocable," the Commission will consider in its evaluation whether the allocation is consistent with one or more of the following factors:

(A) An allocation determination approved by a local, state, or Federal government entity;

(B) The monthly lease fee as stated on the cable system rate card for the navigation device when offered by the cable operator separately from a bundled offer; and

(C) The actual cost of the navigation device amortized over a period of no more than 60 months.

(c) A cable operator shall not provide misleading information regarding the ability of navigation devices to access switched digital channels.

20. Amend § 76.1508(a) to read as follows:

§76.1508 Network non-duplication.

(a) Sections 76.92 through ~~76.97~~ **76.95** shall apply to open video systems in accordance with the provisions contained in this section.

* * * * *

21. Amend § 76.1509 to read as follows:

§76.1509 Syndicated program exclusivity.

(a) Sections ~~76.151~~ **76.101** through ~~76.163~~ **76.110** shall apply to open video systems in accordance with the provisions contained in this section.

(b) Any provision of ~~§76.151~~ **§76.101** that refers to a "cable community unit" shall apply to an open video system.

(c) Any provision of ~~§76.155~~ **§76.105** that refers to a "cable system operator" or "cable television system operator" shall apply to an open video system operator. Any provision of ~~§76.155~~ **§76.105** that refers to a "cable system" or "cable television system" shall apply to an open video system except ~~§76.155(c)~~ **§76.105(c)** which shall apply to an open video system operator. Open video system operators shall make all notifications and information regarding exercise of syndicated program exclusivity rights immediately available to all appropriate video programming provider on the system. An open video system operator shall not be subject to sanctions for any violation of these rules by an unaffiliated program supplier if the operator provided proper notices to the program supplier and subsequently took prompt steps to stop the distribution of the infringing program once it was notified of a violation.

(d) Any provision of ~~§76.156~~ **§76.106** that refers to a "cable community" shall apply to an open video system community. Any provision of ~~§76.156~~ **§76.106** that refers to a "cable community unit" or "community unit" shall apply to an open video system or that portion of an open video system that operates or will operate within a separate and distinct community or municipal entity (including unincorporated communities within unincorporated areas and including single, discrete unincorporated areas). Any provision of ~~§§76.156 through 76.158, and 76.163~~ **§§76.106 through 76.108 that** refers to a "cable system" shall apply to an open video system.

(e) Any provision of ~~§76.159~~ **§76.109** that refers to "cable television" or a "cable system" shall apply to an open video system.

(f) Any provision of ~~§76.161~~ **§76.110** that refers to a "community unit" shall apply to an open video system or that portion of an open video system that is affected by this rule.

22. Revise § 76.1510 to read as follows:

§76.1510 Application of certain Title VI provisions.

The following sections within part 76 shall also apply to open video systems: §§76.71, 76.73, 76.75, 76.77, 76.79, 76.1702, and 76.1802 (Equal Employment Opportunity Requirements); §§76.503 and 76.504 (ownership restrictions); §76.981 (negative option billing); and §§76.1300, 76.1301 and 76.1302 (regulation of carriage agreements); §~~76.611~~**76.610** (signal leakage restrictions); ~~§76.1803 and 76.1804 (signal leakage monitoring and aeronautical frequency notifications);~~ provided, however, that these sections shall apply to open video systems only to the extent that they do not conflict with this subpart S. Section 631 of the Communications Act (subscriber privacy) shall also apply to open video systems.

23. Revise § 76.1601 to read as follows:

§76.1601 Deletion or repositioning of broadcast signals.

~~Effective April 2, 1993,~~ A cable operator shall provide written notice to any broadcast television station at least 30 days prior to either deleting from carriage or repositioning that station. Such notification shall also be provided to subscribers of the cable system.

Note 1 to §76.1601: * * *

24. Revise § 76.1602 (b) to read as follows:

§76.1602 Customer service—general information.

* * * * *

(b) ~~Effective July 1, 1993,~~ The cable operator shall provide written information on each of the following areas at the time of installation of service, at least annually to all subscribers, and at any time upon request:

(1) * * *

* * * * *

25. Remove §§ 76.1610(f) and (g).

§76.1610 Change of operational information.

The Operator shall inform the Commission on FCC Form 324 whenever there is a change of cable television system operator; change of legal name, change of the operator's mailing address or FCC Registration Number (FRN); or change in the operational status of a cable television system. Notification must be done within 30 days from the date the change occurs and must include the following information, as appropriate:

(a) * * *

* * * * *

~~(f) The operator's FCC Registration Number (FRN) as required under part 1, subpart W of this chapter.~~

~~(g) The FCC Registration Number (FRN).~~

26. Revise § 76.1701(d) to read as follows:

§76.1701 Political file.

* * * * *

(d) Where origination cablecasting material is a political matter or matter involving the discussion of a controversial issue of public importance and a corporation, committee, association or other unincorporated group, or other entity is paying for or furnishing the matter, the system operator shall, in addition to making the announcement required by ~~§76.1616(a)~~ **§76.1615**, require that a list of the chief executive officers or members of the executive committee or of the board of directors of the corporation, committee, association or other unincorporated group, or other entity shall be made available for public inspection at the local office of the system. Such lists shall be kept and made available for two years.

27. Amend § 76.1804 to read as follows:

§ 76.1804 Aeronautical Frequencies Notification

An MVPD shall notify the Commission before transmitting any carrier of other signal component with an average power level across a ~~25 kHz bandwidth in any 160 microsecond time period equal to or greater than 10^{-4} watts~~ **30 kHz bandwidth in any 2.5 millisecond time period equal to or greater than 10^{-5} watts** at any point in the cable distribution system on any new frequency or frequencies in the aeronautical radio frequency bands (108-137 MHz, 225-400 MHz). The notification shall be made on FCC Form 321. Such notification shall include:

(a) * * *

* * * * *

28. Remove and Reserve § 76.1909.

§ 76.1909 [Reserved]

APPENDIX B

Initial Regulatory Flexibility Analysis

1. As required by the Regulatory Flexibility Act of 1980, as amended ("RFA")[140] the Commission has prepared this Initial Regulatory Flexibility Analysis ("IRFA") of the possible significant economic impact on small entities by the policies and rules proposed in this Notice of Proposed Rulemaking ("NPRM"). Written public comments are requested on this IRFA. Comments must be identified as responses to the IRFA and must be filed by the deadlines for comments on the NPRM provided above. The Commission will send a copy of the NPRM, including this IRFA, to the Chief Counsel for Advocacy of the Small Business Administration.[141] In addition, the NPRM and IRFA (or summaries thereof) will be published in the Federal Register.[142]

A. Need for, and Objectives of, the Proposed Rules

2. With this NPRM, we propose to update our cable television technical rules to facilitate the cable industry's widespread transition from analog to digital transmission systems. Specifically, we seek comment on our proposals to modernize and modify the Commission's proof-of-performance rules and basic signal leakage performance criteria. In addition, we propose modifications throughout Part 76 to remove outdated language, correct citations, and make other minor or non-substantive updates. We seek to adopt clear and effective rules that reflect technological advancements in the cable television industry, and to apply them to cable operators in a way that is minimally burdensome.

3. *Cable Signal Quality (Proof-of-Performance).* The need for FCC action in this area derives from changing technology in the cable services market. Section 624(e) of the Communications Act requires the Commission to maintain standards for cable systems to ensure that consumers receive good quality signals. When the Commission adopted technical rules in the 1990s, digital cable service was in its infancy, and therefore the rules were adopted with analog cable service in mind. Today, digital cable service is common, but certain analog technical rules related to cable service do not translate well to digital cable. Therefore, the NPRM proposes to establish proof-of-performance rules that specifically address digital technology. Today, digital cable can be divided into those systems which utilize QAM, a type of digital modulation, and those that do not. QAM digital cable is used by the majority of systems to serve the vast majority of cable subscribers in the United States. Therefore, the NPRM proposes to adopt a QAM standard, SCTE 40, which was designed to ensure that unidirectional CableCARD products receive good quality service, and to apply it broadly as a new proof-of-performance standard for QAM digital cable systems. For non-QAM systems to which SCTE 40 cannot be applied, the NPRM proposes a new, streamlined process by which each such system can coordinate with the Commission to develop a plan to follow. Thus, the Commission seeks to ensure that consumers continue to receive good quality cable service while imposing the minimum possible compliance, testing, and recordkeeping burden on cable operators.

4. *Cable Signal Leakage (CLI).* The NPRM further tentatively concludes that the Commission's protection of spectrum used for aeronautical navigation and communication remains a critical need for public safety. However, the rules designed for analog systems were established prior to the current widespread deployment of digital cable technology and must be updated to provide adequate protection to aeronautical frequencies from digital systems. With the proposed digital rules, MVPDs utilizing coaxial cable systems will no longer be prohibited from operating above certain power

[140] *See* 5 U.S.C. § 603. The RFA, *see* 5 U.S.C. §§ 601-612, has been amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA), Pub. L. No. 104-121, Title II, 110 Stat. 857 (1996).

[141] *See* 5 U.S.C. § 603(a).

[142] *See id.*

thresholds. By updating our signal leakage standards, removing the required channel offsets, but retaining notification of operation above certain power levels and regular testing, recordkeeping, and reporting, operators will be permitted to operate above these thresholds provided they can demonstrate a lack of harm to other spectrum users. In so doing, cable operators will be able to offer additional and expanded services on these aeronautical frequency bands, thus utilizing their facilities more efficiently. Therefore, the Commission predicts that these rules will be a benefit to small entities, which have generally fewer resources to expand their facilities to higher frequencies to avoid causing interference to the aeronautical bands. Further, the Commission predicts that by adopting flexible rules for testing leakage, small entities will be able to demonstrate their lack of leakage with minimal, if any, additional burden.

5. Finally, by revising and updating the Commission's rules, the Commission seeks to make it easier for MVPDs to understand the Commission's rules, and therefore to make compliance more straightforward. By reducing the burden associated with reading and interpreting the Commission's rules, we believe that small entities will need to expend fewer resources to ensure compliance.

B. Legal Basis.

6. The authority for the action proposed in this rulemaking is contained in Sections 1, 4(i), 4(j), 301, 302a, 303, 307, 308, 624(e), and 624A of the Communications Act of 1934, as amended, 47 U.S.C. §§ 151, 154(i), 154(j), 301, 302a, 303, 304, 307, 308, 544(e), and 544a.

C. Description and Estimate of the Number of Small Entities to Which the Proposed Rules Will Apply.

7. The RFA directs the Commission to provide a description of and, where feasible, an estimate of the number of small entities that will be affected by the proposed rules.[143] The RFA generally defines the term "small entity" as having the same meaning as the terms "small business," "small organization," and "small governmental entity" under Section 3 of the Small Business Act.[144] In addition, the term "small business" has the same meaning as the term "small business concern" under the Small Business Act.[145] A small business concern is one which: (1) is independently owned and operated; (2) is not dominant in its field of operation; and (3) satisfies any additional criteria established by the Small Business Administration ("SBA").[146]

8. *Cable and Other Program Distribution*. Since 2007, these services have been defined within the broad economic census category of Wired Telecommunications Carriers; that category is defined as follows: "This industry comprises establishments primarily engaged in operating and/or providing access to transmission facilities and infrastructure that they own and/or lease for the transmission of voice, data, text, sound, and video using wired telecommunications networks.

[143] 5 U.S.C. § 603(b)(3).

[144] 5 U.S.C. § 601(3) (incorporating by reference the definition of "small business concern" in 15 U.S.C. § 632). Pursuant to the RFA, the statutory definition of a small business applies, "unless an agency, after consultation with the Office of Advocacy of the SBA and after opportunity for public comment, establishes one or more definitions of such the term which are appropriate to the activities of the agency and publishes such definition(s) in the Federal Register.

[145] 5 U.S.C. § 601(3) (incorporating by reference the definition of "small business concern" in the Small Business Act, 15 U.S.C. § 632). Pursuant to 5 U.S.C. § 601(3), the statutory definition of a small business applies "unless an agency, after consultation with the Office of Advocacy of the Small Business Administration and after opportunity for public comment, establishes one or more definitions of such term which are appropriate to the activities of the agency and publishes such definition(s) in the Federal Register."

[146] 15 U.S.C. § 632. Application of the statutory criteria of dominance in its field of operation, and independence are sometime difficult to apply in the context of broadcast television. Accordingly, the Commission's statistical account of television stations may be over-inclusive.

Transmission facilities may be based on a single technology or a combination of technologies."[147] The SBA has developed a small business size standard for this category, which is: all such firms having 1,500 or fewer employees.[148] According to Census Bureau data for 2007, there were a total of 955 firms in the subcategory of Cable and Other Program Distribution that operated for the entire year.[149] Of this total, 939 firms had employment of 999 or fewer employees, and 16 firms had employment of 1000 employees or more.[150] Thus, under this size standard, the Commission believes that a majority of firms operating in this industry can be considered small.

9. *Cable Companies and Systems (Rate Regulation Standard)*. The Commission has also developed its own small business size standards, for the purpose of cable rate regulation. Under the Commission's rules, a "small cable company" is one serving 400,000 or fewer subscribers, nationwide.[151] Industry data indicate that, of 1,076 cable operators nationwide, all but 11 are small under this size standard.[152] In addition, under the Commission's rules, a "small system" is a cable system serving 15,000 or fewer subscribers.[153] Industry data indicate that, of 6,635 systems nationwide, 5,802 systems have under 10,000 subscribers, and an additional 302 systems have 10,000-19,999 subscribers.[154] Thus, under this second size standard, the Commission believes that most cable systems are small.

10. *Cable System Operators*. The Act also contains a size standard for small cable system operators, which is "a cable operator that, directly or through an affiliate, serves in the aggregate fewer than 1 percent of all subscribers in the United States and is not affiliated with any entity or entities whose gross annual revenues in the aggregate exceed $250,000,000."[155] The Commission has determined that an operator serving fewer than 677,000 subscribers shall be deemed a small operator, if its annual revenues, when combined with the total annual revenues of all its affiliates, do not exceed $250 million in the aggregate.[156] Industry data indicate that, of 1,076 cable operators nationwide, all but 10 are small under

[147] U.S. Census Bureau, 2007 NAICS Definitions, "517110 Wired Telecommunications Carriers" (partial definition), http://www.census.gov/naics/2007/def/ND517110.HTM#N517110.

[148] 13 C.F.R. § 121.201, NAICS code 517110 (2007).

[149] U.S. Census Bureau, 2007 Economic Census, Subject Series: Information, Table 5, Employment Size of Firms for the United States: 2007, NAICS code 5171102 (located at http://factfinder.census.gov/servlet/IBQTable?_bm=y&-geo_id=&-_skip=600&-ds_name=EC0751SSSZ5&-_lang=en).

[150] *See id*.

[151] 47 C.F.R. § 76.901(e). The Commission determined that this size standard equates approximately to a size standard of $100 million or less in annual revenues. *Implementation of Sections of the 1992 Cable Act: Rate Regulation,* Sixth Report and Order and Eleventh Order on Reconsideration, 10 FCC Rcd 7393, 7408 (1995).

[152] These data are derived from: R.R. Bowker, *Broadcasting & Cable Yearbook 2006*, "Top 25 Cable/Satellite Operators," pages A-8 & C-2 (data current as of June 30, 2005); Warren Communications News, *Television & Cable Factbook 2006*, "Ownership of Cable Systems in the United States," pages D-1805 to D-1857.

[153] 47 C.F.R. § 76.901(c).

[154] Warren Communications News, *Television & Cable Factbook 2008*, "U.S. Cable Systems by Subscriber Size," page F-2 (data current as of Oct. 2007). The data do not include 851 systems for which classifying data were not available.

[155] 47 U.S.C. § 543(m)(2); *see also* 47 C.F.R. § 76.901(f) & nn.1–3.

[156] 47 C.F.R. § 76.901(f); *see FCC Announces New Subscriber Count for the Definition of Small Cable Operator*, Public Notice, 16 FCC Rcd 2225 (Cable Services Bureau 2001).

this size standard.[157] We note that the Commission neither requests nor collects information on whether cable system operators are affiliated with entities whose gross annual revenues exceed $250 million,[158] and therefore we are unable to estimate more accurately the number of cable system operators that would qualify as small under this size standard.

11. *Open Video Services.* Open Video Service (OVS) systems provide subscription services.[159] The open video system ("OVS") framework was established in 1996, and is one of four statutorily recognized options for the provision of video programming services by local exchange carriers.[160] The OVS framework provides opportunities for the distribution of video programming other than through cable systems. Because OVS operators provide subscription services,[161] OVS falls within the SBA small business size standard covering cable services, which is "Wired Telecommunications Carriers."[162] The SBA has developed a small business size standard for this category, which is: all such firms having 1,500 or fewer employees. To gauge small business prevalence for the OVS service, the Commission relies on data currently available from the U.S. Census for the year 2007. According to that source, there were 3,188 firms that in 2007 were Wired Telecommunications Carriers. Of these, 3,144 operated with less than 1,000 employees, and 44 operated with more than 1,000 employees. However, as to the latter 44 there is no data available that shows how many operated with more than 1,500 employees. Based on this data, the majority of these firms can be considered small.[163] In addition, we note that the Commission has certified some OVS operators, with some now providing service.[164] Broadband service providers ("BSPs") are currently the only significant holders of OVS certifications or local OVS franchises.[165] The Commission does not have financial or employment information regarding the entities authorized to provide OVS, some of which may not yet be operational. Thus, at least some of the OVS operators may qualify as small entities. The Commission further notes that it has certified approximately 45 OVS operators to serve 116 areas, and some of these are currently providing service.[166] Affiliates of Residential Communications Network, Inc. (RCN) received approval to operate OVS systems in New York City, Boston, Washington, D.C., and other areas. RCN has sufficient revenues to assure that they do not qualify as a small business entity. Little financial information is available for the other entities that are authorized to provide OVS and are not yet operational. Given that some entities authorized to provide OVS service have not yet begun to generate revenues, the Commission concludes that up to 44 OVS operators (those remaining) might qualify as small businesses that may be affected by the rules and

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[157] These data are derived from R.R. BOWKER, BROADCASTING & CABLE YEARBOOK 2006, "Top 25 Cable/Satellite Operators," pages A-8 & C-2 (data current as of June 30, 2005); WARREN COMMUNICATIONS NEWS, TELEVISION & CABLE FACTBOOK 2006, "Ownership of Cable Systems in the United States," pages D-1805 to D-1857.

[158] The Commission does receive such information on a case-by-case basis if a cable operator appeals a local franchise authority's finding that the operator does not qualify as a small cable operator pursuant to § 76.901(f) of the Commission's rules.

[159] *See* 47 U.S.C. § 573.

[160] 47 U.S.C. § 571(a)(3)-(4). *See 13th Annual Report*, 24 FCC Rcd at 606, ¶ 135.

[161] *See* 47 U.S.C. § 573.

[162] U.S. Census Bureau, 2007 NAICS Definitions, 517110 Wired Telecommunications Carriers, http://www.census.gov/naics/2007/def/ND517110.HTM#N517110.

[163] *See* http://factfinder.census.gov/servlet/IBQTable?_bm=y&-fds_name=EC0700A1&-geo_id=&-_skip=600&-ds_name=EC0751SSSZ5&-_lang=en.

[164] A list of OVS certifications may be found at http://www.fcc.gov/mb/ovs/csovscer.html.

[165] *See 13th Annual Report*, 24 FCC Rcd at 606-07 ¶ 135. BSPs are newer firms that are building state-of-the-art, facilities-based networks to provide video, voice, and data services over a single network.

[166] *See* http://www.fcc.gov/encyclopedia/current-filings-certification-open-video-systems (current as of July 2012).

policies adopted herein.

12. *Satellite Master Antenna Television (SMATV) Systems, also known as Private Cable Operators (PCOs)*. SMATV systems or PCOs are video distribution facilities that use closed transmission paths without using any public right-of-way. They acquire video programming and distribute it via terrestrial wiring in urban and suburban multiple dwelling units such as apartments and condominiums, and commercial multiple tenant units such as hotels and office buildings. SMATV systems or PCOs are now included in the SBA's broad economic census category, "Wired Telecommunications Carriers,"[167] which was developed for small wireline firms.[168] Under this category, the SBA deems a wireline business to be small if it has 1,500 or fewer employees.[169] Census data for 2007 indicate that in that year there were 1,906 firms operating businesses as wired telecommunications carriers. Of that 1,906, 1,880 operated with 999 or fewer employees, and 26 operated with 1,000 employee or more. Based on this data, we estimate that a majority of operators of SMATV/PCO companies were small under the applicable SBA size standard.[170]

D. Description of Reporting, Recordkeeping, and Other Compliance Requirements

13. The rules proposed in the NPRM will impose additional reporting, recordkeeping, and compliance requirements on cable operators. Currently, all cable operators are required to perform proof-of performance testing twice each year, in the warmest and coldest parts of the year, to document the successful completion of those tests, and to maintain the records in their public file for five years. Further, all operators of coaxial cable systems, which includes not just cable operators but non-cable operators, such as PCOs, Open Video Systems, SMATV operators, are required to perform signal leakage testing four times per year, to document the results of those test, to maintain those records in their public file for five years, and to submit the results of one of those tests on FCC Form 320 to the Commission. The NPRM proposes tests to new digital standards, to be performed by operators of hybrid and all-digital cable systems, but maintains the existing recordkeeping requirements.

E. Steps Taken to Minimize Significant Impact on Small Entities, and Significant Alternatives Considered.

14. The RFA requires an agency to describe any significant alternatives that it has considered in reaching its proposed approach, which may include the following four alternatives (among others): (1) the establishment of differing compliance or reporting requirements or timetables that take into account the resources available to small entities; (2) the clarification, consolidation, or simplification of compliance or reporting requirements under the rule for small entities; (3) the use of performance, rather than design, standards; and (4) an exemption from coverage of the rule, or any part thereof, for small entities.[171]

15. *Cable Signal Quality (Proof-of-Performance)*. In this NPRM, the Commission tentatively concludes that creating rules for digital cable systems using QAM will lead to benefits for consumers in the form of consistent, good quality signals, and will reduce the burden on operators by removing the need to file individual waivers for exemption from the analog rules. For non-QAM

[167] *See* 13 C.F.R. § 121.201, NAICS code 517110 (2007).

[168] Although SMATV systems often use DBS video programming as part of their service package to subscribers, they are not included in Section 340's definition of "satellite carrier." *See* 47 U.S.C. §§ 340(i)(1) and 338(k)(3); 17 U.S.C. §119(d)(6).

[169] 13 C.F.R. § 121.201, NAICS code 517110 (2007).

[170] http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ECN_2007_US_51SSSZ5&prodType=table

[171] 5 U.S.C. § 603(b).

systems, where simple standards are not readily available, the NPRM proposes a streamlined process which will reduce the economic burden on small operators of filing formal waivers by providing a case-by-case evaluation of a proof-of-performance plan based on the operator's internal guidelines. Therefore the Commission believes that this proposed streamlined process will result in minimal additional burdens on small entities. The Commission predicts that adopting a simple, easily understood signal quality standard already supported by numerous entities protects the public interest with a minimum of burden on cable operators.

16. With respect to the modification of technical standards for digital cable transmission, the Commission considered maintaining the *status quo*. The Commission has tentatively concluded that its proposal to adopt new standards for signal quality with respect to digital service will provide cable operators with certainty that the signals that they provide to their subscribers are of adequate quality, and permit them to operate within the Commission's rules without submitting individual waiver requests. The Commission's proposed rules are based on performance rather than design standards, and are already required of some cable systems as a result of their support for CableCARD products. Therefore, no new burdens of compliance will be imposed on these systems. The rules further reduce burdens on small entities because they contain provisions for small cable systems to test fewer channels, and to test those channels in fewer locations. The proposed rules further simplify the means by which these numbers are calculated. Finally, similar to the analog rules the recordkeeping burden associated with this testing is not required of very small systems.

17. *Cable Signal Leakage (CLI)*. With respect to the proposals regarding basic signal leakage performance criteria, the Commission has undertaken to create a digital rule equivalent in interference protection to basic signal rules for analog cable signals. The existing basic signal leakage rules as they apply to analog cable signals cannot apply to digital cable signals due to the differences in the physical attributes of the two types of signals. However, the Commission has proposed a testing procedure that permits systems with limited resources to continue utilizing existing equipment when complying with the new, digital standards.

18. We welcome comments that suggest modifications of any proposal if based on evidence of potential differential impact on smaller entities. We also seek comment on alternatives to the proposed rules that would assist small entities while ensuring the Commission's goals of providing good quality signals to consumers and protecting aeronautical communications and spectrum users from interference are met.

F. Federal Rules Which Duplicate, Overlap, or Conflict with the Commission's Proposals.

19. None.

APPENDIX C

Selected Tables from ANSI/SCTE 40 2011

The following tables are reprinted from ANSI/SCTE 40 2011 for convenience. The original versions of these tables can be found in the complete version of the standard on the Society of Cable Telecommunications Engineers website.[172] FAT stands for Forward Application Transport Channel, and is the standard digital video channel carried by the cable system. Additionally, the standard contains definitions of CTB, CSO, and FDC, which have been footnoted here, and explanatory text for Tables 4, 5 and 6, which is not included.

Table 4. Analog and FAT Channel: RF Transmission Characteristics

1.	RF Channel Spacing	6 MHz
2.	RF Frequency Range	54 MHz to 1002 MHz IRC/HRC/Standard Channel Plans.
3.	Transit delay from headend to most distant customer	< 0.800 ms (typically much less)
4.	Carrier-to-noise-plus-interference ratio, C/(N+I), in a 6-MHz band where C/(N+I) includes the simultaneous presence of all additive impairments in the 6-MHz channel bandwidth including CTB, CSO, and other forms of discrete interference. The carrier, noise, and interference are all subject to any linear channel distortions (micro-reflections) present in the transmission path. C/N (analog channels)	Not less than 27 dB for 64 QAM; 33 dB for 256 QAM; 43 dB for AM-VSB analog
5.	CTB[173]	Not greater than -53 dBc referenced to inband carrier levels for analog channels.
6.	CSO[174]	Not greater than -53 dBc referenced to inband carrier levels for analog channels
7.	Carrier-to-any other discrete interference (ingress)	Not greater than -53 dBc
8.	AM Hum Modulation	Not greater than 3% p-p
9.	Group Delay Variation	< 0.37 μs/MHz across the 6-MHz channel
10.	Chroma / Luma Delay	≤ 170 ns (AM-VSB analog)
11.	Phase Noise	< -86 dBc/Hz @ 10 kHz offset (relative to the center of QAM signal spectrum)

[172] Society of Cable Telecommunications Engineers, http://www.scte.org/standards/.

[173] CTB is defined as the "Composite Triple Beat," a third order distortion caused by mixing three carriers (A+B-C) that falls on the fundamental of a carrier.

[174] CSO is defined as the "Composite Second Order," the sum effect of all second order distortion products.

12.	Maximum Amplitude Variation across the 6-MHz channel (digital channels) Maximum Amplitude Variation across the 6-MHz channel (analog channels)	< 6 dB p-p < 4 dB p-p
13.	Bound for a single dominant micro-reflection	-10 dB at < 0.5 µs -15 dB at < 1.0 µs -20 dB at < 1.5 µs -30 dB at < 4.5 µs Micro-reflections longer than 4.5 microseconds are included under item 4 (of this table) as a contributor to the interference I in C/(N+I)). Micro-reflections, if present, shall not cause the channel Group Delay Variation and Maximum Amplitude Variation in Table 4.9 and 4.12 respectively to be exceeded.
14.	Carrier level at the terminal input	64 QAM: -15 dBmV to + 15 dBmV 256 QAM: -12 dBmV to +15 dBmV Analog Visual Carrier (c): 0 dBmV to +15 dBmV Analog Aural Carrier: -10 dBc to –17 dBc

Table 5. Nominal Relative Carrier Power Levels	
Analog NTSC	0 dB (reference level)
256 QAM FAT	-5 ± 2 dB
QPSK FDC[175]	-8 ± 5 dB
64 QAM FAT	-10 ± 2 dB

[175] FDC is defined as "Forward Data Channel," and is a data channel carried from the headend to the terminal device in a modulated channel at a rate of 1.544 to 3.088 Mbps.

Table 6. Adjacent Channel Characteristics			
	Desired (D) Channel Modulation	*Undesired (U) Adjacent Channel Modulation*	*Worst Case D/U Ratio*
1	Analog NTSC	64 QAM	+2 dB
2	Analog NTSC	256 QAM	-3 dB
3	Analog NTSC	QPSK FDC	-3 dB
4	64 QAM FAT	Analog NTSC	-18 dB
5	64 QAM FAT	256 QAM	-15 dB
6	64 QAM FAT	QPSK FDC	-15 dB
7	256 QAM FAT	Analog NTSC	-13 dB
8	256 QAM FAT	64 QAM	-5 dB
9	256 QAM FAT	QPSK FDC	-10 dB
10	QPSK FDC	Analog NTSC	-19 dB
11	QPSK FDC	64 QAM	-11 dB
12	QPSK FDC	256 QAM	-16 dB
13	Analog NTSC	Analog NTSC	-3 dB
14	64 QAM FAT	64 QAM	-6 dB
15	256 QAM FAT	256 QAM	-6 dB
16	QPSK FDC	QPSK FDC	-6 dB

• *Independent of the D/U ratios, the C/(N+I) and the absolute signal levels shall meet the requirements for those parameters as described elsewhere in the specification.*

• *Good engineering practice normally requires that only a single FDC channel be adjacent to a FAT channel.*

STATEMENT OF
CHAIRMAN JULIUS GENACHOWSKI

Re: Cable Television Technical and Operational Requirements, MB Docket No. 12-217

The cable industry has been transitioning from analog to digital, and that transition has already brought significant benefits to consumers and to our economy.

The investment in this transition has brought a dramatic increase in the ability of cable operators to carry more data on the same cable plant. This has begun to translate to higher broadband speeds and capacity, as well as digital voice service, more TV channels, and high-definition TV.

Because the cable plant reaches well over 90% of our country, this is helping achieve our goals of universal service and competition.

And over the past three years – thanks in large part to improvements in cable networks – we've gone from 20 percent of our population living in areas with broadband infrastructure capable of delivering 100+ megabits to 80 percent.

We've made real progress, but ongoing increases in broadband speed and capacity are essential to realizing the full potential of broadband. More robust networks will enable bandwidth-intensive applications like distance learning, remote healthcare, and the growth of multi-billion dollar industries like cloud computing, which in turn helps drive the growth of businesses large and small.

Bandwidth abundance drives innovation. It enables the cutting-edge innovations of today and the undiscovered innovations of tomorrow.

While we've seen real improvement in the speed and capacity of our broadband networks over the past three years, but we need to see more. We need to be talking about gigabits, not megabits. We need to ensure that the U.S. has a strategic bandwidth advantage to drive U.S.-based innovation and our global competitiveness.

Among the ways the Commission can help enhance broadband speed and capacity are removing barriers to infrastructure buildout and making sure our rules are updated for the digital age.

This proceeding implements those principles.

While we must ensure cable subscribers receive quality signals and protect critical aeronautical services, the current rules governing proof of performance and signal leakage are optimized for analog. They are wasteful and unnecessarily restrictive, often resulting in inefficient use of limited cable spectrum.

We propose to update our rules to recognize the importance of digital cable, to remove or modify requirements no longer needed, and to clear away unnecessary impediments to the full utilization of digital capacity.

We propose to eliminate one rule, reduce burdens under others, and clarify additional rules to increase certainty and predictability, and to increase digital capacity. This reflects the Commission's ongoing commitment to regulatory reform.

Just as in the recent Viewability Order, we are taking action to increase cable system efficiency and capacity while continuing to protect consumers. These proceedings modernize our rules, facilitate the digital transition, and allow systems to use even more of their available cable plant for advanced digital services, including broadband.

The FCC is doing its part. It is imperative that cable operators do theirs, and that we see ongoing expansion of broadband speed, capacity, and availability. That will be a win for everyone.

I look forward to an open and inclusive proceeding.

Thank you to my colleagues and to the bureau engineers and staff for your work on this item.

STATEMENT OF
COMMISSIONER ROBERT M. McDOWELL

Re: Cable Television Technical and Operational Requirements, MB Docket No. 12-217

I vote in support of this notice initiating a review of cable rules that establish standards to ensure subscribers receive good quality signals, as required under section 624(e) of the Communications Act, and protect spectrum users from potential harmful interference caused by so-called signal "leaks" from cable systems. Today, approximately 80 percent of cable subscribers use digital systems to access video programming, but these rules have been based on analog technologies and standards. In fact, these rules, for the most part, have remained unchanged for decades while technology and innovation have passed them by. For example, the majority of the interference rules date back to 1984 when "Beverly Hills Cop" was the top grossing film and Prince's "When Doves Cry" was Billboard's song of the year. The cable signal quality rules are vintage 1992 when "Aladdin" was the top grossing film and "End of the Road" by Boyz II Men topped the music charts. A lot has happened since those days. Thus, it makes sense – and is a matter of good government – to re-evaluate and modernize these rules based on today's marketplace.

The video market in general, and the cable industry in particular, are in a continuing state of evolution. Cable operators are investing heavily in all-digital systems but they are also building Internet Protocol platforms for the delivery of their cable offerings. Furthermore, this transformation is taking place in an environment where content is now delivered across multiple platforms blurring the boundaries between traditional and new media. For instance, cable operators offer traditional cable service, but they also offer broadband Internet access which can be directly connected to high-definition televisions and mobile devices to access programming, making content available anywhere, anytime.

This notice not only proposes quality standards for current industry delivery methods but also considers metrics for technologies in varying states of deployment. These potential standards could also be applied to technologies yet to be developed. As media convergence evolves, and as the cable industry migrates further into an all IP world, we need to ensure that, despite what may be the best of intentions, our regulations do not place an undue burden on industry, freeze tomorrow in yesterday's technology, cause regulatory uncertainty, exceed our legal authority or stifle innovation.

I look forward to engaging with all stakeholders regarding these matters as well as others this notice will assuredly raise. I hope we can reduce the burdens of testing and recordkeeping on industry, while complying with the letter and spirit of the law, thus ensuring that Americans have reliable cable signals and preventing harmful interference to spectrum users.

I applaud the Chairman for undertaking this review, along with proposing to eliminate and update other outdated cable regulations. I also thank the staff of the Media Bureau, especially the Engineering Division, for their diligent work on this item. This order, once again, proves the importance of engineers to the Commission's mission and our need to ensure that we can recruit and retain talented and dedicated engineers.

STATEMENT OF
COMMISSIONER MIGNON L. CLYBURN

Re: Cable Television Technical and Operational Requirements, MB Docket No. 12-217

Today we take a major step forward toward syncing our cable television technical and operational requirements with current realities. In light of the fundamental shifts in the industry since these rules were first put into place, these updates were necessary and are grounded in common sense. Through modernized rules on cable proof of performance and signal leakage, the FCC is being flexible and forward-looking when it comes to the industries that it regulates.

We offer a set of rules that seek to create quality standards for the performance of digital cable signals where only standards for analog signals existed. Eighty-percent of today's customers now receive some level of digital service. With this NPRM, no longer will cable providers who use digital signals to reach their customers have to seek waivers to the proof-of-performance rules or risk enforcement actions for non-compliance. Digital cable providers will now have a standard of performance against which their signals can be measured, and the FCC will have the means to ensure that consumers are receiving a minimum level of service.

Similarly, we are seeking to set standards for digital cable signal leakage where formerly only analog standards existed. Improperly maintained coaxial cable systems can potentially interfere with aircraft communications, and prior to this item, there were no interference standards that applied to digital signals. Approval of this item will mean that we are closer to establishing a standard that will provide aeronautical communications, the same level of protection from digital cable signal leakage as it currently has from analog cable signal leakage.

In sum, the changes that we seek are both consumer- and industry-friendly. In addition, these requirements will enhance public safety by minimizing needless interference with airline communications. And industry stands to benefit from the stability of standardized metrics and by no longer having to continually seek a waiver from a rule that may no longer make sense in light of a changed marketplace.

Today's updates provide a more coherent regulatory environment for all interested parties, and I wish to thank the Media Bureau, especially Jeff Neumann, for the great work on this item.

STATEMENT OF
COMMISSIONER JESSICA ROSENWORCEL

Re: Cable Television Technical and Operational Requirements, MB Docket No. 12-217

It is no secret that we are mid-course in a migration from the analog world to the digital world. This is true across so many sectors of our economy. But it is especially the case when it comes to communications.

One of the less-heralded parts of our digital march forward is the transition that is underway with cable systems. Like so many infrastructures public and private, it requires upgrade and modernization. In this case, modernization means moving from analog to digital technology. This facilitates new telephony services, frees bandwidth for high-definition programming, and creates more capacity for Internet access and Internet-enabled activities.

Today's Notice of Proposed Rulemaking clears the way for this kind of progress. It does this by updating old technical rules and ushering in new digital proof-of-performance and signal leakage policies. They will promote efficiency and grow the possibilities of our communications infrastructure. This rulemaking has my full support.

STATEMENT OF
COMMISSIONER AJIT PAI

Re: Cable Television Technical and Operational Requirements, MB Docket No. 12-217

In this Notice of Proposed Rulemaking, we seek comment on a variety of modifications to the Commission's Part 76 technical rules to account for the rise in digital cable service. Or, to put it another way, we begin the process of matching our cable regulations to the realities of the American marketplace. The ongoing transition from analog to digital cable systems is bringing widespread benefits to consumers, enabling them to enjoy more advanced services, a wider range of programming choices, and better picture quality. This item appropriately seeks to accelerate these trends.

I am pleased to support this effort and commend the Chairman for his leadership on this front. Given the pace of change in the communications industry, it is imperative that we review our rules regularly and assess whether they should be updated or eliminated to reflect changes in technology or marketplace conditions. As the technology used to transmit signals is changing, so too must the Commission's rules. In keeping with this approach, this item seeks to modernize our technical standards for cable systems while at the same time minimizing the burdens we place on the private sector.

I am optimistic that the proposals set forth in this Notice of Proposed Rulemaking represent a common-sense approach for moving ahead, and I look forward to reviewing the input of cable operators, consumer groups, local franchising authorities, and all other stakeholders. There are, however, a couple of issues that merit special attention.

First, I do not oppose asking for comment on whether we should supplement our current "proof-of-performance" rules with qualitative measures to assess subjective consumer perceptions of video quality, but I do think we should proceed with caution in this regard. Administrative rules should be clear and easy to administer, and it may be difficult to make an accurate judgment as to what is in the eyes of millions of beholders.

Second, we seek comment on a few ideas that could have the effect of increasing testing requirements on cable systems. In assessing such proposals, I will carefully examine the record to see if the costs of these proposals are outweighed by their benefits.

Finally, I hope that this item portends further reforms to our Part 76 rules. For example, I would support resolving another issue related to the transition from analog to digital cable service: basic tier encryption. I stand willing to work with the Chairman and my fellow Commissioners on this and other matters that could bring cable regulation more fully in line with the times.

In conclusion, I want to thank the Bureau staff for their hard work on this complicated and highly technical item. I particularly want to thank Jeff Neumann, Michelle Carey, and Alison Neplokh for translating several parts of it into plain English for me during a briefing earlier this week.