

February 8, 2017

BY ELECTRONIC FILING

Marlene H. Dortch, Secretary
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Re: Joint Petition for Rulemaking of America’s Public Television Stations, the AWARN Alliance, the Consumer Technology Association, and the National Association of Broadcasters Seeking to Authorize Permissive Use of the “Next Generation TV” Broadcast Television Standard, GN Docket No. 16-142

Dear Ms. Dortch:

The American Cable Association would like to thank Chairman Pai for issuing a *Draft NPRM* on the proposed transition to the ATSC 3.0 broadcast standard.¹ We salute the Chairman’s commitment to transparency, and greatly appreciate the opportunity to provide our input on the item before the Commission votes on it. This new process, we believe, will help lead to a better NPRM than otherwise would have been possible. We also appreciate the broad nature of the item itself, which asks many of the questions that we and others have raised about how the new standard will affect multichannel video programming distributors (“MVPDs”).²

The Commission will of course want to examine both the benefits accruing from and the burdens associated with the proposed ATSC 3.0 transition—particularly as they relate to small entities such as ACA’s members.³ In response to questions from Commission staff during an *ex*

¹ Joint Petition for Rulemaking of America’s Public Television Stations, the AWARN Alliance, the Consumer Technology Association, and the National Association of Broadcasters (filed Apr. 13, 2016) (“Petition”); *Authorizing Permissive Use of the “Next Generation” Broadcast Television Standard*, FCC-CIRC#1 (rel. Feb. 2, 2017) (“*Draft NPRM*”). Unless otherwise indicated, all Commission pleadings cited in this letter were filed in GN Docket No. 16-142.

² See Comments of the American Cable Association (filed May 26, 2016) (“ACA Comments”).

³ 5 U.S.C. § 603(a) (providing that initial regulatory flexibility analyses “shall describe the impact of the proposed rule on small entities”).

parte meeting,⁴ we would like to provide additional information on one potential burden associated with the proposed transaction—the additional capacity required to carry ATSC 3.0 signals, especially in the higher-resolution formats⁵ cited as one of the primary benefits of the transition.⁶ While the Commission acknowledged the capacity concerns raised by ACA and others,⁷ we believe additional information on this subject will be helpful to the Commission and to other interested parties.

As ACA explained in its comments, this proposed transition will result in broadcasters consuming dramatically more capacity on already-constrained cable networks, requiring them to either eliminate other programming or reduce the quality of their broadband Internet service.⁸ Below, we provide more detail on the scope of the problem. As we understand the facts, a small cable operator would have to eliminate at least six HD cable channels or sharply degrade broadband performance in order to carry the four major network affiliates in a higher-resolution format. Either outcome would result in significant harm to both these small or rural cable operators and the customers they serve.

Below, we provide additional detail about these capacity issues based on the facts as we understand them. We also provide questions about this subject that we believe should be added to the *Draft NPRM* as the Commission finalizes it. Consideration of these questions will ultimately help the Commission better manage what promises to be a complicated transition.⁹

I. Carriage of Higher-Resolution Signals Will Consume Additional Capacity on Small Cable Systems.

The ATSC 3.0 transition appears to give broadcasters the latitude to transmit in formats ranging from standard definition to 8K Ultra High Definition (and, in the future, as-yet-invented

⁴ See Letter from Michael Nilsson to Marlene Dortch (filed Aug. 26, 2016) (describing meeting with Media Bureau and the Office of Engineering and Technology).

⁵ By “higher resolution formats,” we mean formats in higher resolution than high definition, to include both Ultra HD, or “UHD” (including 4K and 8K versions thereof), see *Draft NPRM*, ¶ 4 n.9, as well as formats in lower resolution than UHD but higher resolution than HD. See n.11, below (referencing a “Super HD” format).

⁶ See, e.g., Petition at ii (citing 4K television and “visually stunning pictures on large-screen televisions with superior reception.”); see also *id.* at 2, 4 (same); Letter from Patrick McFadden to Marlene Dortch at 1 (filed June 3, 2016) (arguing that the transition “has the potential to dramatically enhance the viewing experience, providing stunning pictures and immersive audio”).

⁷ *Draft NPRM* ¶ 29 and n.68; *id.* ¶ 39.

⁸ ACA Comments at 20-23.

⁹ ACA may make further suggestions for additions or modifications to the *Draft NPRM* in future days.

higher-capacity formats).¹⁰ We assume—because broadcasters have told us so—that the ATSC 3.0 transition will in many cases involve the transmission of higher-resolution signals, including those in 4K.¹¹ And we fear, for reasons expressed in our comments on the Petition, that carriage of such signals will be anything but “voluntary” for small cable operators.¹² Just as broadcasters have strained the capacity of small cable systems by bundling unwanted multicast channels and affiliated programming, we expect them to strain the capacity of small cable systems by requiring carriage of ATSC 3.0 signals.

If so, cable carriage of such signals will consume additional capacity in two significant ways. First, for the foreseeable future, cable operators will have to carry new higher-resolution signals *in addition to* the existing HD, SD, and (in some cases) analog signals that they already carry today. Until all of a cable operator’s subscribers own televisions or set-top boxes capable

¹⁰ See *Draft NPRM* ¶ 4 n.9 (referencing different UHD formats); *id.* ¶ 10 (“Under Section 73.624(b) of the Commission’s Rules, each television licensee must broadcast one free-to-air DTV signal in at least standard-definition (SD) quality”); *id.* ¶ 47 (“[W]e propose to require Next Gen TV broadcasters to provide at least one free stream comparable to a DTV signal to ensure viewers within the ‘DTV-equivalent’ service area continue to receive programming service at the current DTV protection levels.”).

¹¹ See n.1, above; see also, e.g., Comments of the Advanced Television Systems Committee at 3 (filed May 26, 2016) (“ATSC 3.0 will enable ultra high definition, high dynamic range, and wide color gamut video, along with personalized and immersive audio.”); Comments of Pearl Mobile DTV Company LLC at 3 (filed May 26, 2016) (“Not only will Next Generation TV support the current latest technology—4K ultra-high definition (‘UHD’) transmissions—it will ensure that advances to come, including 8K transmissions and beyond, will be able to be implemented without any need for additional regulatory action.”); Reply Comments of Hearst Television, Inc. at 3 (filed June 27, 2016) (citing “[n]ext generation video quality, including the potential for 4K video and HDR (high dynamic range) offering an immediately noticeable expansion of light/color contrast, wider color gamut, and higher frame rates”). The *Draft NPRM* appears to use the term “Ultra HD” to include a variety of formats, to include 4K and even higher resolution. *Draft NPRM* ¶ 4 n.9. Other sources, however, refer to “Super HD” as a lower format resolution than 4K. See Louis Libin, Senior Director New Technology, Sinclair Broadcast Group, “The Promise of the Next Generation Broadcast Standard, And More!” at 50 (2015) (“Sinclair Presentation”), available at <http://www.sbe24.org/WBA-SBE-Shows/archives/Clinic2015/Libin-2015.pdf>. ACA takes broadcasters at their word, and assumes for capacity purposes that at least some transmissions will be in 4K, not just “Super HD.”

¹² See ACA Comments at 3 (“As ACA and others have pointed out on many occasions, broadcasters possess sufficient market power in retransmission consent negotiations to dictate terms. This market power, moreover, stems largely from the suite of regulations promulgated over the years designed to favor broadcasters over MVPDs. Given their track record, there is no reason to think that broadcasters will not exercise this power in connection with any transition to ATSC 3.0.”).

of processing such signals, the cable operator will have to carry these reverse-compatible formats even after the end of the ATSC 3.0 transition to ensure that all of its subscribers will be able to view the broadcasters' programming.¹³ Thus, even if the higher-resolution signal consumed the same amount of capacity as an HD signal, adding an additional signal would approximately double the capacity needed for each broadcaster.

Second, a broadcaster's higher-resolution signal may consume significantly *more* capacity than its HD signals. ACA understands that a single broadcast HD stream, encoded using MPEG2, typically consumes roughly 9 Mbps today. By contrast, we understand that the handful of 4K streams that cable operators carry today, on an experimental basis, consume approximately 20 Mbps, even though they are encoded using the more modern HEVC codec.¹⁴ While the ATSC 3.0 standard is not yet complete, and we have not seen definitive statements from broadcasters on the issue, it seems at least possible that 20 Mbps will be representative of the bitrate required for broadcast 4K signals as well.¹⁵ Indeed, the Petition would appear to allow a broadcaster to transmit at even higher bitrates, based on its unilateral business decisions regarding picture quality and signal coverage. We understand, for example, that one broadcaster transmitted a 4K channel at a bitrate as high as 34 Mbps during an ATSC 3.0 test broadcast this summer.¹⁶

Of course, broadcasters may offer higher-resolution signals at comparatively lower bitrates, especially if they choose to offer less than the most "visually stunning pictures" available. For example, some may instead choose to use the increased capacity of an ATSC 3.0 signal to add subscription data services. Yet the fact that the ATSC 3.0 standard allows broadcasters to transmit at high bitrates—and that broadcasters have not suggested any cap on their bitrate—means that cable operators faced with possible "voluntary" carriage of ATSC 3.0 signals will have to budget for capacity accordingly, even if many broadcasters ultimately choose

¹³ We take no position on whether such dual or triple-carriage would be *required* under the statutory obligation to make must-carry television stations "viewable" to all subscribers—or the constitutionality of any must-carry requirement interpreted to encompass such dual or triple carriage. 47 U.S.C. § 534(b)(7); *Carriage of Digital Television Broadcast Signals: Amendment to Part 76 of the Commission's Rules*, Fourth Further Notice of Proposed Rulemaking and Declaratory Order, 27 FCC Rcd. 1713, ¶ 1 (2012).

¹⁴ In addition, some cable operators today re-encode MPEG2 broadcast streams using MPEG4 in order to save additional capacity without compromising image quality. MPEG4 typically yields capacity savings of approximately 50% over MPEG2, which results in a typical bitrate of approximately 5 Mbps for HD video. It is not possible, however, to achieve similar gains with 4K video in this way. This means that, for these cable operators, replacing a broadcast HD stream with a 4K stream may *quintuple* the capacity consumed.

¹⁵ Sinclair Presentation at 50 (suggesting that "Super-4k – HEVC" will consume between 18 and 30 Mbps).

¹⁶ See The News & Observer, *WRAL Unveils Next-Generation Broadcast Technology* (June 29, 2016), available at <http://www.newsobserver.com/news/business/article86753697.html>

to operate at lower bitrates. Indeed, we understand that broadcasters may even be able to change bitrates “on the fly,” making “budgeting” for capacity even more difficult.

Broadcasters seek to use ATSC 3.0, in part, because they will be able to operate at higher bitrates *within* the 6 MHz channels allocated to each broadcaster. This is because ATSC 3.0 includes a change to the modulation scheme used to translate bits of information into radio waves.¹⁷ While ATSC 1.0 is limited to approximately 19 Mbps per 6 MHz channel, ATSC 3.0 substantially increases that capacity. Because ATSC 3.0 remains in its infancy, and because broadcasters may choose to reduce coverage in exchange for greater picture quality or vice versa,¹⁸ it is unclear what the total capacity of the typical 6 MHz channel will be for ATSC 3.0 broadcasters. But, as the test broadcast seems to indicate—and in light of promises that broadcasters have made about offering better than HD picture quality—this capacity *can* be substantial.

Cable systems, on the other hand, are likewise divided into 6 MHz channels, but use a different modulation technology to transmit data on these channels. Most cable systems today operated by ACA members use a modulation technology called QAM256, which provides a capacity of 38.6 Mbps for each 6 MHz channel. Each of these QAM channels, therefore, can typically carry four broadcast HD streams (at 9 Mbps each), but only two or three higher-resolution streams (depending on the bitrate used to transmit the streams).

To put this all in perspective, suppose a small cable operator carries each of the “Big Four” network affiliates today in HD.¹⁹ This requires 36 Mbps of total capacity—or a single QAM channel. Now suppose the cable operator has to add those same “Big Four” signals in better than HD resolution. Suppose further that each broadcaster, elects to not offer the highest resolution possible, instead transmitting using only 12 Mbps of capacity.²⁰ And suppose that each broadcaster irrevocably commits to limit its bandwidth, such that the cable operator does

¹⁷ Petition at 2.

¹⁸ See ACA Comments at 18.

¹⁹ For simplicity’s sake, this example assumes that the small cable operator carries only one stream per broadcaster. Broadcasters can, of course, compel small cable operators to carry multicast signals as well. It is not clear how an ATSC 3.0 transition might change this—although it seems at least possible that broadcasters may attempt to fit even more multicast feeds into an ATSC 3.0 signal than they do today.

²⁰ According to at least one source, this would mean that broadcasters would be transmitting in “Super HD,” not in true 4K. See Sinclair Presentation at 50 (describing “Super HD” transmissions at 12 Mbps of capacity and “4K” transmissions requiring much more capacity). We make this conservative assumption, however, both because there remains some ambiguity about the format in which broadcasters plan to transmit and because the capacity concerns described herein apply even if broadcasters choose to transmit at comparatively lower bitrates. Again, the Petition would allow broadcasters to unilaterally make such decisions.

not have to “budget” additional capacity. Even under these fairly conservative assumptions, the cable operator will have to find room for at least an additional 48 Mbps of capacity (or at least an additional two QAM channels) to accommodate those broadcast signals.²¹

Taken together, dual carriage and increased bandwidth dramatically increases the capacity that a cable operator must devote to broadcast signals. Taking the “Big Four” signals described above, a cable operator will continue to retransmit the four ATSC 1.0 streams to maintain reverse compatibility with existing televisions and set-top boxes, consuming 36 Mbps. Adding higher-resolution streams for each of these channels will consume an additional 48 Mbps. Therefore, in total, the ATSC 3.0 transition would increase the bandwidth consumption of just these four channels on a cable system from 36 Mbps to 84 Mbps, an increase of 230%.

II. Small Cable Systems Will Have to Drop Existing Channels or Degrade Broadband Service to “Make Room” for Higher-Resolution Signals.

Many small cable systems do not have “spare” capacity to devote to higher-resolution carriage. To the contrary, as ACA has explained, essentially all QAM channels not used for video are now used for high-speed Internet service, allowing higher speeds or improved network reliability at existing speeds.²²

Carriage of broadcast stations in higher resolution will thus leave small cable system operators with two choices. One is to remove existing programming from its lineup. Using our bitrate assumptions above, a cable operator would have to remove at least six HD cable channels in order to make room for higher-resolution versions of the “Big Four.”²³ Of course, a rational

²¹ Under assumptions closer to today’s cable 4K transmissions, the cable operator would have to find room for 72 Mbps of capacity (also corresponding to two QAM channels).

²² See Comments of the American Cable Association, MB Docket No. 16-41 at 8 (filed Mar. 30, 2016) (“ACA Diversity NOI Comments”). To the extent small cable operators can afford to upgrade their system to provide additional bandwidth, moreover, their customers invariably demand that they devote this additional capacity to improved broadband rather than broadcast television. In other contexts, the National Association of Broadcasters has suggested that this is somehow an illegitimate choice. See, e.g., Comments of the National Association of Broadcasters, MB Docket No. 16-41 at 6 (filed Jan. 26, 2017) (suggesting that small cable operator concerns about capacity reflect an “unwillingness to invest in their pay-TV businesses, rather than true capacity limits”). As ACA has already explained, however, many small cable operators already face zero or negative video margins. ACA Diversity NOI Comments at 6. It is not “choice” to make investments that one knows will lose money.

²³ Under assumptions closer to today’s cable 4K transmissions, the cable operator would have to remove at least 8 HD cable channels. The number could be much higher if either the cable operator employs MPEG4 compression (and can thus “fit” more HD programming in each QAM channel today) or if the broadcaster operates in a particularly bandwidth-hungry manner (as the test broadcast this summer apparently did).

cable operator would eliminate those channels with the least leverage first—meaning that independent programmers would likely be the first to go.

Alternatively, the cable operator could reduce network capacity allocated to high-speed Internet, potentially resulting in network congestion, or forcing the operator to reduce maximum speeds. This, of course, would likely prove unacceptable to subscribers who increasingly demand broadband performance²⁴ in turn leading to subscriber losses.

The following diagram illustrates these challenges for a simple cable network based on the assumptions described above:

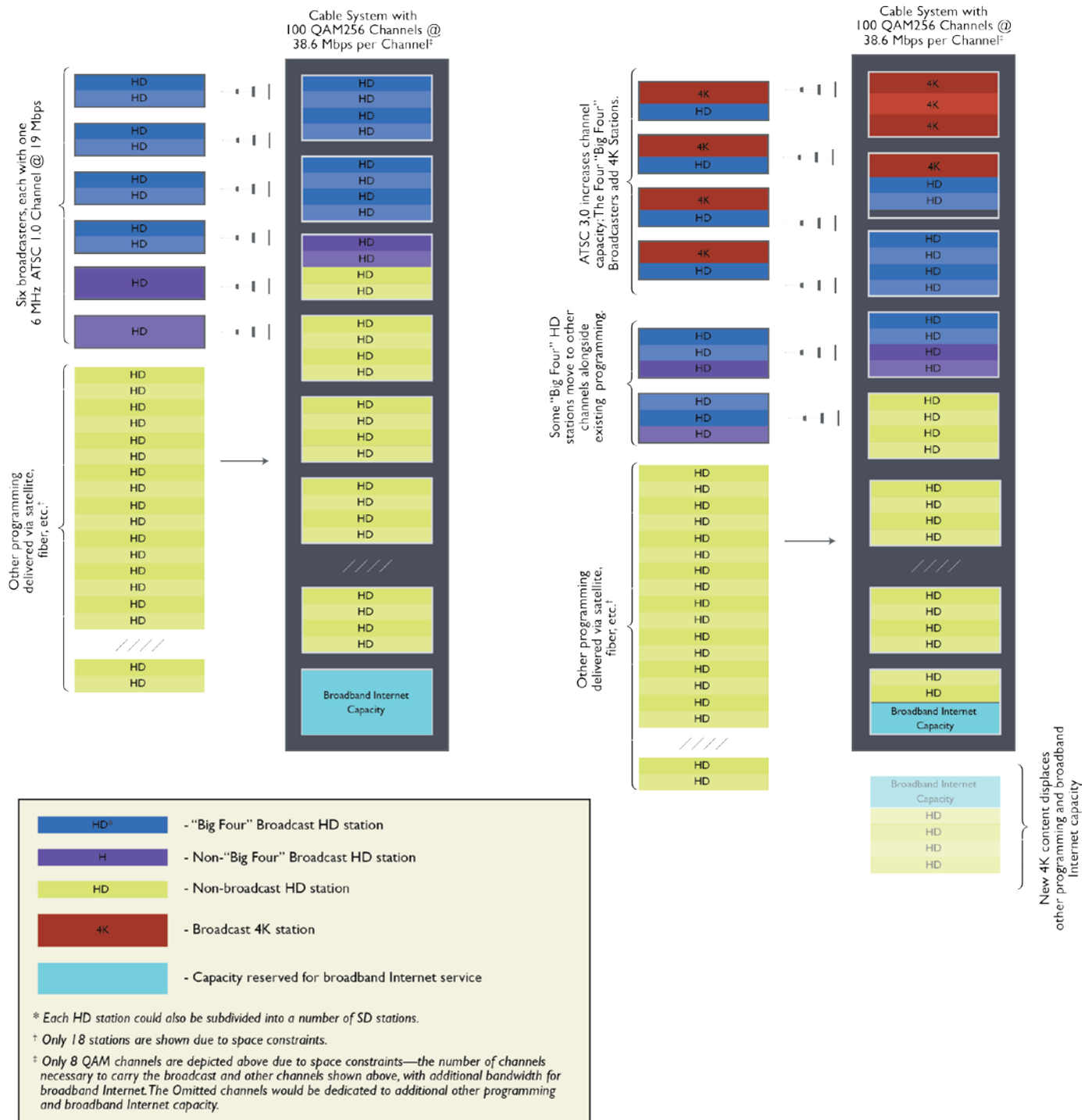
²⁴ ACA Diversity NOI Comments at 8.

Before ATSC 3.0 Transition

Cable operator retransmits 10 HD stations carried by 6 broadcasters with sufficient capacity remaining for additional HD stations and robust broadband Internet service.

After ATSC 3.0 Transition

"Big Four" broadcasters use capacity made available by ATSC 3.0 to offer 4K in addition to existing HD programming, moving HD to other channels, where necessary. Non-"Big Four" channels can accommodate this displaced content due to capacity increases from ATSC 3.0.



III. Proposed Additional Questions for the *Draft NPRM*

Below please find a series of questions related to capacity. In addition to summarizing ACA's findings in the NPRM, we urge the Commission to include these questions, or questions along these lines, in the *Draft NPRM*.

1. Are the facts as described by ACA accurate? Specifically, in what resolution will broadcasters offer their 3.0 signal (8K, 4K, UHD, Super HD, HD) and how many Mbps will this resolution require from MVPDs using different modulations and encoding compressions?²⁵
2. Should the Commission provide relief to MVPDs, or particular classes of MVPDs with capacity constraints? If so, how should the Commission define "capacity constrained" systems?²⁶
3. What might such relief look like?
 - a. Should, for example, MVPDs be allowed to downconvert ATSC 3.0 signals? Should such a rule apply to must-carry signals only, or also to those distributed through retransmission consent?²⁷
 - b. Should it be considered bad faith for a broadcaster to demand carriage of a higher resolution signal from a capacity constrained system?²⁸
 - c. Should stations be subject to any limitations on how they transmit in ATSC 3.0?²⁹
 - i. Should, for example, a "bitrate cap" apply to ATSC 3.0 transmissions? If so, what should that cap be? Should it apply only to must-carry signals, or also to those distributed through retransmission consent?³⁰

²⁵ This question could appear in or around paragraph 29 of the *Draft NPRM* (which discusses issues related to capacity).

²⁶ This question could also appear in or around paragraph 29.

²⁷ This question could appear in or around paragraphs 29, 31-38 (which discuss mandatory carriage issues), or 39-41 (which discuss retransmission consent issues).

²⁸ This question could appear in or around paragraphs 29 or 39-41.

²⁹ This question could appear in or around paragraphs 47-50 (which discuss "preservation of service").

³⁰ This question could also appear in or around paragraphs 47-50.

- ii. Should the Commission limit the extent to which stations can change the format in which they transmit, or the frequency in which they do so, in order to allow MVPDs to “budget” capacity for such stations? If so, what limitations should apply?³¹

- d. Should stations be required to notify MVPDs about changes to the format of their signals that might impact the MVPD’s capacity? If so, what should such notifications contain, and when should stations be required to provide them?³²

* * *

Broadcasters claim that the ATSC 3.0 transition holds tremendous promise. Perhaps it does. Yet from the perspective of small cable system operators, the proposed transition also holds great peril—not least of which are the capacity strains that the allegedly “voluntary” carriage of higher-resolution signals threatens to create. The Commission should fully consider all of these issues as it proceeds.

Respectfully submitted,



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³¹ This question could also appear in or around paragraphs 47-50.

³² This question could also appear in or around paragraphs 47-50.