

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of)
)
Authorizing Permissive Use of the “Next) GN Docket No. 16-142
Generation” Broadcast Television Standard)
)
Amendment of Section 73.626 of the) RM- _____
Commission’s Rules to Facilitate the Deployment)
Of Single Frequency Networks)

To: Office of the Secretary

JOINT PETITION FOR RULEMAKING

America’s Public Television Stations
National Association of Broadcasters

October 3, 2019

Contents

I. Introduction.....1

II. The Existing DTS Rules Limit the Utility of DTS Deployments.....3

III. The Commission Can Update Its Rules While Remaining Faithful to the Intent of the Existing Regime.....7

IV. Conclusion.....11

Attachment A

Proposed Revision to Section 73.626 of the Commission’s Rules

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of)	
)	
Authorizing Permissive Use of the “Next Generation” Broadcast Television Standard)	GN Docket No. 16-142
)	
Amendment of Section 73.626 of the Commission’s Rules to Facilitate the Deployment Of Single Frequency Networks)	RM- _____
)	

To: Office of the Secretary

**JOINT PETITION FOR RULEMAKING OF
AMERICA’S PUBLIC TELEVISION STATIONS AND
THE NATIONAL ASSOCIATION OF BROADCASTERS**

I. Introduction

Nearly two years ago, the Commission set the stage for the future of television by authorizing the voluntary deployment of the ATSC 3.0 (“Next Generation TV”) standard.¹ With permission to innovate, broadcasters have been actively engaged in testing and experimentation to demonstrate the capabilities of the new standard as well as elements of the voluntary transition. As they plan to roll out ATSC 3.0 deployments, many broadcasters are interested in exploring the advanced capabilities of ATSC 3.0 to facilitate the use of Distributed Transmission Systems (“DTS”), also known as single frequency networks. As the Commission acknowledged when it adopted the current rules governing DTS operations, such systems could have numerous benefits for the public.

¹ *Authorizing Permissive Use of the “Next Generation” Broadcast Television Standard, Report and Order and Further Notice of Proposed Rulemaking, 32 FCC Rcd 9930 (2017).*

They could improve service throughout a station's coverage area and, in particular, near the edge of the coverage area.² They could also improve mobile reception and allow more efficient use of broadcast spectrum by reducing the need for television translators using separate channels.³

ATSC 3.0 permits a simplified design for single frequency networks that makes the deployment of such networks significantly more cost effective. However, the Commission's current DTS rules limit broadcasters' ability to deploy additional transmitters near the edge of a station's coverage area, hampering the deployment of such networks. In practice, these limitations have foreclosed the significant public benefits the Commission cited with respect to DTS operations.

Accordingly, pursuant to Section 1.401 of the Commission's rules, America's Public Television Stations and the National Association of Broadcasters (collectively "Petitioners")⁴ ask the Commission to amend its methodology for determining DTS

² *Digital Television Distributed Transmission System Technologies*, Report and Order, 23 FCC Rcd 16731, ¶ 14 (2008) (DTS Order) ("DTS techniques will distribute more uniform and higher-level signals throughout a DTV station's service area. This will offer improved service within stations' coverage areas, including near the edges where signals can be low using traditional means. We agree that this should increase viewership through improved reception without causing more interference to neighboring operations, as well as minimize the preclusive impact on existing and future surrounding stations.")

³ *Id.* at ¶¶ 6-7.

⁴ Petitioner America's Public Television Stations ("APTS") is a nonprofit membership organization that represents the overwhelming majority of public television stations nationwide. APTS fosters strong and financially sound noncommercial television and works to ensure member stations' commitment and capacity to perform essential public service missions in education, public safety and civic leadership for the American people.

Petitioner National Association of Broadcasters ("NAB") is the nonprofit trade association that advocates on behalf of free local radio and television stations and broadcast networks before Congress, the Federal Communications Commission and other federal agencies, and the courts.

service limits while preserving the current interference requirements.⁵ As explained in more detail below, small changes in the current rules will allow broadcast television stations to unlock the benefits of DTS operations to better serve their viewers while preserving their commitment to localism and avoiding interference issues. We urge the Commission to adopt these changes expeditiously.

II. The Existing DTS Rules Limit the Utility of DTS Deployments

Following the Commission's approval of the Next Gen TV standard, broadcasters have continued to test and experiment with multiple aspects of the new standard, including service parameters and performance as well as innovative business models. One result of this ongoing, collaborative experimentation has been a heightened interest in the use of single frequency networks to allow broadcasters to better serve their viewers and offer new kinds of services.

Broadcast television stations typically operate from a single transmitter site. This architecture typically provides a strong signal near the transmitter and a weaker signal as distance from the transmitter site increases. This means that viewers near the edge of a station's service area may receive very weak over-the-air signals. Of course, a station can also have a weak signal even in areas close to the transmitter if terrain or morphological features attenuate that signal. Particularly in rural and mountainous regions, stations may use television translators to repeat the main transmitter's signal and provide better over-

⁵ Thus, these facilities would need to meet to meet the currently required interference analysis and they would not be protected from interference beyond the current limits. *See* 47 CFR § 73.626(f)(5) and Attachment A.

the-air coverage to some viewers. Translators typically utilize a different channel which is becoming a significant limitation as broadcast spectrum is reduced.

When it adopted the current DTS rules in 2008, the Commission cited the many potential benefits DTS operations could provide. Among other things:

- DTS can allow stations to reach viewers that could not otherwise be served by a single transmitter architecture. This includes serving rural and remote areas with improved coverage and filling in gaps in coverage caused by terrain.
- DTS can improve service within stations' coverage areas, particularly near the edges, by allowing the distribution of higher-level and more uniform signals throughout the service area.
- DTS can improve reception quality and reliability on mobile devices and enhance indoor reception.
- DTS solutions may enhance spectrum efficiency because single frequency networks require only a single channel, rather than multiple channels used by translators.⁶

These continue to be significant potential benefits. In practice, however, broadcasters have been unable to take advantage of DTS solutions. The limitations of the ATSC 1.0 transmission standard made it largely impractical to deploy single frequency networks due to design difficulty and costs. The transmission system employed by ATSC 3.0, however, solves this challenge by permitting a simplified single frequency network design that can finally make these operations cost-effective.

Unfortunately, the Commission's existing DTS rules have served as an additional obstacle, limiting the potential benefits of single frequency networks by constraining stations' ability to deploy transmitters near the edges of their service areas. Under the

⁶ DTS Order at ¶ 14.

current rules, the noise limited service contour (“NLC”) of any DTS transmitter may not extend beyond either: (1) the NLC of the reference facility on which the DTS is based; or (2) a circle around that facility with a radius that depends on the station’s band and location.⁷ These restrictions materially limit the ability of DTS deployments to improve service near the edges of a station’s service area – precisely the location where such improvements would have the most consumer benefit. The following illustrations demonstrate the problem:

⁷ 47 C.F.R. § 73.626

Figure 1. DTS Rule Violation Under Current Rules.

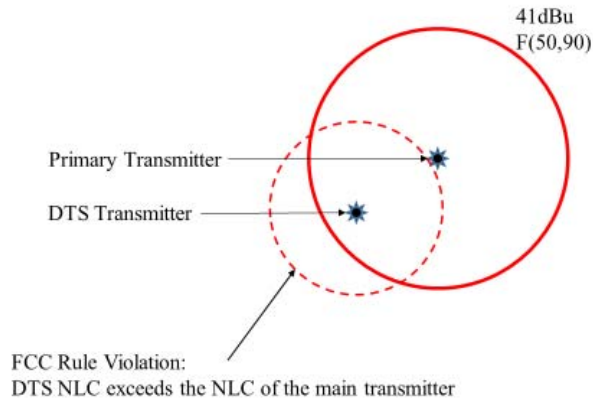


Figure 2. DTS Rule Violation Under Current Rules.

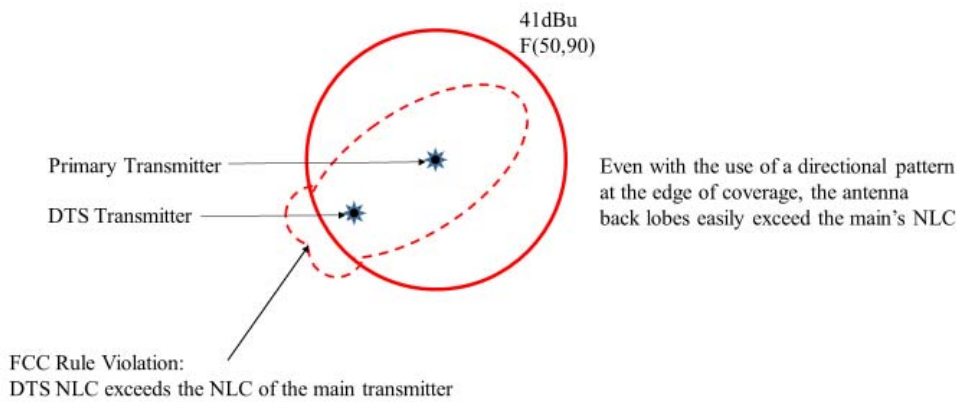
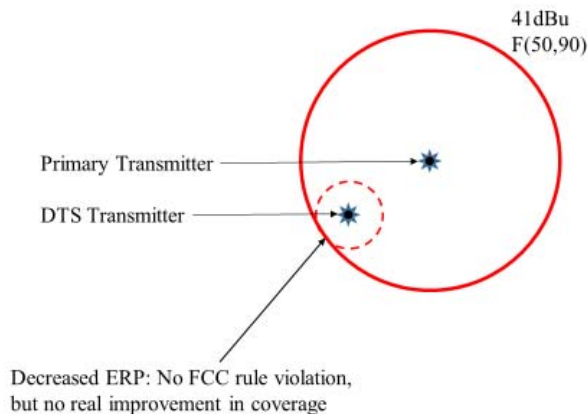


Figure 3. No Rule Violation But Little Value.



III. The Commission Can Update Its Rules While Remaining Faithful to the Intent of the Existing Regime

In 2008, when the Commission adopted its existing DTS rules, it chose to adopt this “Comparable Area Approach” instead of an “Expanded Area Approach” because it did not want to allow stations to use DTS transmitters to achieve “dramatically expanded primary coverage rights.”⁸ The Commission cited a number of reasons for this conclusion, including the effort to foster localism by restricting a station’s focus to its primary coverage area and the Commission’s desire to ensure consistent treatment for both single-transmitter and DTS stations.⁹ Accordingly, the Commission rejected calls from some stakeholders to allow broadcasters to expand their service by using DTS operations to cover their entire DMAs. The Commission has allowed *de minimis* extension of a station’s coverage area on a case-by-case basis.

⁸ DTS Order at ¶¶ 17-18.

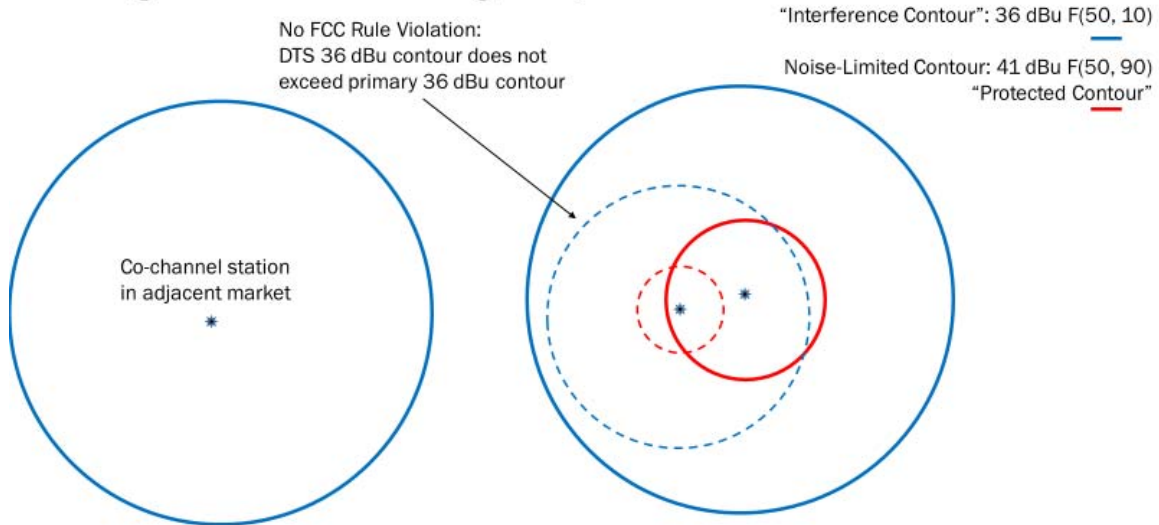
⁹ *Id.* at ¶ 18.

We believe the Commission can balance the goals of preserving localism while allowing stations to provide superior service by modifying its rules. In particular, Petitioners ask the Commission to allow a station to deploy single frequency networks where a DTS transmitter's NLC may exceed the reference facility's NLC but, for UHF stations, the DTS transmitter's 36 dBu F(50,10) "interference" contour may not exceed the reference facility's 36 dBu F(50,10) contour. This value was selected to avoid interference with co-channel Class A and LPTV operations. That is, the service contour field strength of Class A and LPTV stations is 51 dBu and the nominal desired-to-undesired ratio necessary to avoid interference is 15 dB, resulting in an "interference" contour value of $51 - 15 = 36$ dBu.¹⁰ Similarly, the 15 dB desired-to-undesired ratio is applied to the NLC values for the Low-VHF and High-VHF channels, resulting in the contour values tabulated in the proposed Table of Distances.¹¹

¹⁰ 47 C.F.R. § 73.6010(c)(1).

¹¹ 47 C.F.R. § 73.626(c).

Figure 3. SFN Using Proposed Modifications



This change would significantly enhance the utility of single frequency networks without undermining localism. Stations could enhance service to viewers by improving coverage throughout their service areas and offering improved mobile coverage without the risk of encroaching on the service of stations in adjacent markets. In addition, the rule change would promote the efficient use of spectrum by, in some cases, obviating the need for separate channels for television translators used to fill in service gaps. Importantly, this Petition does not seek any changes to the interference requirements in Section 73.626(f)(5), which require “all the DTS transmitters in a network [to] not cause interference to another station in excess of the criteria specified in Section 73.616 . . .”¹² This ongoing requirement ensures that DTS must be deployed in a manner that does not

¹² 47 CFR § 73.626(f)(5).

generate additional interference and will not be protected from interference beyond the current limits.

With respect to consistency, we respectfully submit that the current approach of giving equal treatment to single- and multiple-transmitter operations means that DTS facilities are constrained to unnecessarily weak signals throughout large portions of their service areas to match the correspondingly weak signals of single-transmitter facilities in the outer portions of their service areas. This lowest-common denominator approach to DTS operations limits the value of these deployments based on the decisions of stations that choose not to take advantage of DTS deployments and does not serve stations or their viewers.

As described above, following the Commission's approval of voluntary ATSC 3.0 deployment, broadcasters have been working collaboratively to explore not only the capabilities of Next Gen TV but also the business models and negotiated arrangements that will be necessary in a voluntary transition. Broadcasters working in the Phoenix model market have proven out various aspects of the transition, including how service can be maintained pursuant to the Commission's simulcasting requirement, laying the groundwork for Next Gen deployment in more than 60 markets in 2020.¹³

These deployments will be more efficient, and broadcasters will be better able to plan for successful implementation, if stations can take advantage of revised DTS rules early in the process. Significantly, the proposed rule changes are minimal. No changes are needed to the Commission's methodology for computing interference from a DTS

¹³ Letter from Gerard J. Waldron to Marlene H. Dortch, GN Docket No. 16-142 (September 9, 2019).

Attachment A

Proposed Revision of Section 73.626

§73.626 is revised as follows:

§73.626 DTV distributed transmission systems

(a) A DTV station may be authorized to operate multiple synchronized transmitters on its assigned channel to provide service consistent with the requirements of this section. Such operation is called a distributed transmission system (DTS). Except as expressly provided in this section, DTV stations operating a DTS facility must comply with all rules applicable to DTV single-transmitter stations.

(b) For purposes of compliance with this section, a station's "authorized service area" is defined as the area within its predicted noise-limited service contour determined using the facilities authorized for the station in a license or construction permit for non-DTS, single-transmitter-location operation.

(c) *Table of Distances.* The following Table of Distances describes (by channel and zone) a station's maximum service area that can be obtained in applying for a DTS authorization and the maximum interference area that can be created by its facilities.

Channel	Zone	F(50,90) field strength (dBµV/m)	Distance from reference point
2-6	1	28	108 km. (67 mi.)
2-6	2 and 3	28	128 km. (80 mi.)
7-13	1	36	101 km. (63 mi.)
7-13	2 and 3	36	123 km. (77 mi.)
14-51	1, 2 and 3	41	103 km. (64 mi.)

[New Table of Distances as Follows]

Channel	Zone	Service Area		Interference Area	
		F(50,90) field strength (dBµV/m)	Distance from Reference Point	F(50,10) field strength (dBµV/m)	Distance from Reference Point
2-6	1	28	108 km. (67 mi.)	28	184 km (114 mi.)
2-6	2 and 3	28	128 km. (80 mi.)	28	209 km (130 mi.)
7-13	1	36	101 km. (63 mi.)	33	182 km (113 mi.)
7-13	2 and 3	36	123 km. (77 mi.)	33	208 km (129 mi.)
14-51	1, 2 and 3	41	103 km. (64 mi.)	36	245 km (153 mi.)

(1) DTV station zones are defined in §73.609.

(2) *DTS reference point.* A station's DTS reference point is established in the FCC Order that created or made final modifications to the Post-Transition DTV Table of

Allotments, §73.622(i), and the corresponding facilities for the station's channel assignment as set forth in that FCC Order.

(d) *Determining DTS coverage.* The coverage for each DTS transmitter is determined based on the F(50,90) field strength given in the Table of Distances (in paragraph (c) of this section), calculated in accordance with §73.625(b). The combined coverage of a DTS station is the logical union of the coverage of all DTS transmitters.

(e) *DTS protection from interference.* A DTS station must be protected from interference in accordance with the criteria specified in §73.616. To determine compliance with the interference protection requirements of §73.616, the population served by a DTS station shall be the population within the station's combined coverage contour, excluding the population in areas that are outside both the DTV station's authorized service area and the Table of Distances area (in paragraph (c) of this section). Only population that is predicted to receive service by the method described in §73.622(e)(2) from at least one individual DTS transmitter will be considered.

(f) *Applications for DTS.* An application proposing use of a DTS will not be accepted for filing unless it meets all of the following conditions:

(1) The combined coverage from all of the DTS transmitters covers all of the applicant's authorized service area;

(2) Each DTS transmitter's coverage is contained within either the DTV station's Table of Distances area (pursuant to paragraph (c) of this section) or its authorized service area, except where such extension of coverage beyond the station's authorized service area is of a minimal amount and necessary to achieve a practical design or to meet the requirements of paragraph (f)(1) of this section. In no event shall the F(50,10) interference contour of any DTS transmitter extend beyond that of its reference facility (described in paragraph (c)(2) of this section). The interference contour field strength is given in the Table of Distances (in paragraph (c) of this section) and is calculated using Figure 9a, 10a, or 10c of § 73.699 (F(50,10) charts);

(3) Each DTS transmitter's coverage is contiguous with at least one other DTS transmitter's coverage;

(4) The coverage from one or more DTS transmitter(s) is shown to provide principal community coverage as required in §73.625(a);

(5) The “combined field strength” of all the DTS transmitters in a network does not cause interference to another station in excess of the criteria specified in §73.616, where the combined field strength level is determined by a “root-sum-square” calculation, in which the combined field strength level at a given location is equal to the square root of the sum of the squared field strengths from each transmitter in the DTS network at that

location as corrected for the receiving antenna directivity in the direction of each transmitter.

(6) Each DTS transmitter must be located within either the DTV station's Table of Distances area or its authorized service area.

(g) All transmitters operating under a single DTS license must follow the same digital broadcast television transmission standard.