

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554**

In the Matter of)	
)	
Amendments of Parts 73 and 74 to Improve the Low Power FM Radio Service Technical Rules)	MB Docket No. 19-193
)	
Modernization of Media Regulation Initiative)	MB Docket No. 17-105

To: The Commission

**COMMENTS OF
NATIONAL PUBLIC RADIO, INC.**

Introduction

Pursuant to Section 1.415 of the Commission’s rules, 47 C.F.R. § 1.415, National Public Radio, Inc. (“NPR”) hereby submits its Comments in support of the Commission’s proposal to sunset the obligation of noncommercial educational (“NCE”) FM stations operating on the reserved band to protect adjacent television channel 6 (“TV6”) stations from interference.¹

NPR is a non-profit membership corporation that produces, acquires, and distributes programming to more than 1,000 public radio stations nationwide for broadcast to the American people. NPR Members and other public radio stations are also significant program producers and media outlets in the communities and regions they serve. NPR operates the Public Radio Satellite System, provides a variety of digital services to its Members, and represents public radio’s collective interests in public policy matters.

¹ See *In the Matter of Amendments of Parts 73 and 74 to Improve the Low Power FM Radio Service Technical Rules*, Notice of Proposed Rulemaking, MB Docket No. 19-193, 17-105 (rel. July 30, 2019) (“*NPRM*”). The relevant rules are codified at 47 C.F.R. §§ 73.525 & 74.1205.

**NPR Supports the Commission’s Proposal to Sunset Its Rules
Requiring NCE Reserved Band FM Radio Stations
to Protect TV6 Stations from Interference**

Shortly after the June 2009 deadline for full power television stations to transition from analog to digital television (“DTV”) operation, NPR petitioned the Commission to eliminate the obligation of reserved band NCE FM stations to protect adjacent TV6 stations from interference.² NPR did so because the TV6 protection rules had by then become obsolete and antithetical to spectrum efficiency. The intervening years have increased the justification for eliminating those rules, and NPR therefore endorses wholeheartedly the Commission’s proposal to sunset them.³

1. The TV6 protection rules are obsolete and unnecessary.

As NPR previously explained, the TV6 protection rules are obsolete in myriad respects. At the most basic level, the current rules are based on analog television receiver technology from the 1960s and 1970s.⁴ Absent an analog-to-digital converter, any such television receivers still in existence are of no practical use. As the Commission previously acknowledged when the current rules were adopted, NCE-FM induced TV6 interference was widely recognized as a problem in the design of analog television receivers then in use.⁵ Indeed, the TV6 protection

² Petition for Rulemaking of National Public Radio to Repeal Section 73.525 of the Commission's Rules, RM 11579, filed Oct. 20, 2009 (“NPR Petition”).

³ *NPRM* at ¶ 12.

⁴ See *Second Further Notice of Proposed Rule Making, In the Matter of Changes in the Rules Relating to Noncommercial, Educational FM Broadcast Stations*, 47 Fed. Reg. 24,144 ¶ 9, citing FCC/OST Lab Report No. 79-01 (Tests of TV Receivers for “Just Perceptible” Interference to TV Channel 6 from Educational FM Signals), September, 1979 (noting that the sample group of receivers included 20 “older” receivers, manufactured between 1968 and 1976, as well as twenty “newer” receivers, manufactured in 1977 and 1978).

⁵ *FCC to Withhold Action on Certain FM Educational Applications Because of Potential Interference to Television Channel Six*, Public Notice, FCC 81-340, (rel. July 22, 1981).

rules were adopted in 1985 explicitly to provide “an interim solution” until better performing television receivers were designed.⁶ Although it took longer than the Commission may have envisioned, that time arrived with the DTV transition. As the Commission now recognizes, “[t]he transition to digital and the use of digital receivers with improved selectivity reduces the need for radio stations to provide protection to TV6 stations.”⁷

2. NPR’s studies showing DTV receivers to be highly resistant to interference remain valid.

As referenced in the *NPRM*, and in anticipation of the DTV transition, NPR conducted substantial testing of a wide variety of DTV receivers to assess the channel selectivity and interference immunity of DTV receivers generally.⁸ NPR’s testing and related comparative analysis found DTV receivers to be far more immune to adjacent channel interference compared to analog television receivers,⁹ a finding the *NPRM* tentatively endorses.¹⁰ That conclusion is still valid after more than 10 years of experience with DTV broadcasting.¹¹ As addressed more fully in the attached Engineering Statement, experience with DTV broadcasting since the NPR

⁶ *Changes in the Rules Relating to Noncommercial Educational FM Broadcast Stations*, Memorandum Opinion and Order, Docket No. 20,735, FCC 85-328, at para. 3 (rel. June 27, 1985).

⁷ *NPRM* at ¶ 12.

⁸ *Id.* at ¶ 10 and nn. 43 & 44.

⁹ NPR Petition at 5-8.

¹⁰ *NPRM* at ¶ 10 (“tentatively accept[ing] NPR’s conclusion that digital television receivers including digital-to-analog converter boxes are substantially less vulnerable to FM-induced TV6 interference than analog sets”).

¹¹ *See id.* (“we seek comment on whether this conclusion is still valid after so many additional years of experience with digital broadcasts”).

studies confirms their conclusions.¹² NPR's studies, demonstrating a radical reduction in the susceptibility of DTV receivers to adjacent NCE FM interference, were made on the earliest generations of DTV tuners, which have undergone continued generational development in the years since. An increase in the number of stations in the television bands has further prompted manufacturers to improve tuner selectivity and cross-modulation characteristics to increase DTV-to-DTV interference resistance, which would also improve FM-to-DTV6 interference performance. We are unaware of any subsequent DTV receiver studies of DTV6 interference relative to NCE FM service that supersede the results of the NPR studies.¹³

Moreover, the past decade has further confirmed a widening disparity in the public's demand for over-the-air radio and television broadcasts. As evidenced by the instant proceeding, for instance, the Commission continues to revise its FM broadcast engineering and related rules to accommodate the increasing demand for more FM radio services.¹⁴ During the same period, the Commission has reduced the amount of spectrum allocated for over-the-air television broadcasting by another 84 MHz, from 49 channels (2-51)¹⁵ to a reorganized band of 35

¹² See Cavell, Mertz & Associates, Inc., Engineering Statement (Oct. 21, 2019) (attached hereto as Attachment A).

¹³ *Id.*

¹⁴ Similarly, the recent changes to the FM translator interference complaint rules were intended in part to address the "substantial growth in the number of FM translators in recent years, as well as the increased financial importance of translators to many AM operators and to FM operators rebroadcasting digital subchannels." *In the Matter of Amendment of Part 74 of the Commission's Rules Regarding FM Translator Interference*, Report and Order, 34 FCC Rcd 3457, 3458 (2019).

¹⁵ *In the Matter of Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, Notice of Proposed Rulemaking, 27 FCC Rcd 12357, 12362 (2012) ("*Broadcast Television Spectrum Auction NPRM*").

channels (2-36),¹⁶ after having previously reallocated 192 MHz (52-83)¹⁷ for other uses.

Compounding this trend, only a small fraction of TV households rely on over-the-air broadcasting to watch television programming.¹⁸

Despite these trends, the TV6 protection rule continues to deprive the public of NCE FM radio service, while providing no practical protection for TV6 broadcast viewers. That is because the adjacent NCE FM stations have singularly borne the burden of avoiding the supposed interference, with the principal means being to limit the station's interfering contour and therefore its coverage area. The TV6 interference protections are therefore an inefficient use of spectrum at the expense of the public's access to NCE FM service. For all these reasons, sunsetting the TV6 protections is clearly warranted and long overdue.

3. The FM radio-type service of certain TV6 stations is no obstacle to sunsetting the TV6 protection rules.

The continued operation of certain TV6 stations as FM radio stations poses no obstacle to moving forward with sunsetting the TV6 protection rules.¹⁹ As a threshold matter, NPR looks

¹⁶ See www.fcc.gov/about-fcc/fcc-initiatives/incentive-auctions/post-auction-transition

¹⁷ See *In the Matter of Reallocation and Service Rules for the 698-746 MHz Spectrum Band (Television Channels 52-59)*, Report and Order, 17 FCC Rcd 1022 (2002); *In the Matter of Reallocation of Television Channels 60-69, the 746-806 MHz Band*, Report and Order, 12 FCC Rcd 22953 (1998); *Amendment of Parts 2, 89, 91, and 93*, First Report and Order, 23 FCC 2d 325 (1970).

¹⁸ See *Broadcast Television Spectrum Auction NPRM*, 27 FCC Rcd. at 12363 (citing Nielsen Company data for the 2011-2012 television season that “only 10.7 million television households, or approximately 10 percent of the total, rely solely on over-the-air broadcast television service”). With cable “cord-cutting” in recent years, the percentage has increased to approximately 16 million homes, representing approximately 14 percent of TV households. www.nielsen.com/us/en/insights/report/2019/nielsen-local-watch-report-the-evolving-ota-home/#

¹⁹ See *NPRM* at ¶ 13.

forward to a final resolution of the issue whether TV6 stations may continue to operate primarily as analog FM radio stations past the July 13, 2021 deadline for low power TV (“LPTV”) stations to convert to digital broadcasting and a prior opportunity to comment on the Commission’s proposed resolution of that issue.

As NPR has previously commented, these “Franken FMs” often make no pretense about offering a television service.²⁰ Given the primary FM radio-like purpose of these operations, moreover, the effective radiated power of the aural carrier can often be well in excess of permitted levels.²¹ Maximizing aural power is necessary to produce a signal capable of meaningful reception, particularly indoors, but at the expense of interference to the station’s DTV service,²² to the extent one is offered, as well as to adjacent NCE FM stations.

The fundamental problem with these TV6 operations, however, is their grossly inefficient use of a scarce and extremely important public resource – the radiofrequency spectrum. Assuming for the sake of argument that a “Franken FM” radio service offers content of the highest quality to a diverse and underserved audience, that finding would not justify granting a 6 MHz spectrum license to offer a service that requires only 200 kHz of spectrum to provide. If

²⁰ *E.g., In the Matter of DFW Broadcasting, Inc.*, Notice of Violation, File No. EB-FIELDSCR-13-00006934 (2013) (“At the time of inspection, Station KZFW-LP was not transmitting a visual carrier. The low power television station was only transmitting audio.”).

²¹ *E.g., In the Matter of Syncom Media Group, Inc.*, Notice of Violation, File No. EB-FIELDNER-18-00027853, at 2 (2018) (finding the aural carrier ERP to be 12.4 kW, almost 20 times the authorized ERP of 660 Watts).

²² *See* Comments of Linley Gumm and Charles Rhodes to Section E, “Operation of Analog Radio Services by Digital LPTV Stations as Ancillary or Supplementary Services,” MB Docket No. 03-185, filed Nov. 12, 2014.

“diversification of ownership” has any meaning,²³ it cannot permit a single TV6 “Franken FM” station to supplant the many FM radio stations that could be licensed as such instead.

Conclusion

For the foregoing reasons, NPR endorses the Commission’s proposed sunseting of the TV6 interference protection obligation of NCE reserved band FM stations.

Respectfully submitted,

NATIONAL PUBLIC RADIO, INC.

Gregory A. Lewis

Jonathan D. Hart
Chief Legal Officer and General Counsel
Michael Riksen
Vice President, Policy & Representation
Joni Lupovitz
Senior Director, Public Policy
Gregory A. Lewis
Deputy General Counsel
1111 North Capitol Street, N.E.
Washington, DC 20002
202/513-2040

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²³ See *Promoting Diversification of Ownership in Broadcasting Services, Sixth Further Notice of Proposed Rulemaking*, 28 FCC Rcd. 461, 463 (2013) (“It has been a longstanding goal of the Commission to promote diverse ownership of broadcast stations, including ownership by women and minorities.”).

Attachment A

Engineering Statement

In Support of Comments Filed by National Public Radio
Regarding Amendments of Parts 73 and 74 to Improve the
Low Power FM Radio Service Technical Rules, MB Docket Nos. 19-193, 17-105

This Engineering Statement is prepared for National Public Radio (“NPR”) regarding the FCC’s Notice of Proposed Rulemaking in MB Docket Numbers 19-193 and 17-105 (“NPRM”). The NPRM seeks comment on amendments to the Commission’s rules, including, in particular, the elimination of certain protection requirements at the completion of the LPTV digital transition on July 13, 2021. The protection requirements obligate noncommercial educational (“NCE”) FM stations operating on reserved NCE FM channels to protect all television stations operating on TV Channel 6 (“TV6”). As a basis for its proposed elimination of the TV6 protections, the FCC relies on technical measurements of digital television (“DTV”) receiver performance conducted by NPR in late 2007 and a comparative analysis of the predicted interference to analog and digital receivers conducted in 2008 (collectively, the “NPR Studies”). *See* NPRM nn. 43 & 44. The NPR Studies were performed by the undersigned. The NPRM asks whether the NPR Studies remain valid after the intervening years of experience with DTV broadcasting.

My qualifications as a telecommunications consulting engineer are a matter of record with the FCC. I have supported a variety of broadcast and telecommunications client activities, applying 40 years of experience in television and radio technology, as summarized on my attached resume. In the decade following the NPR Studies, my professional work has continued focus on radiofrequency engineering related to the interference susceptibility of digital television. As indicated in my resume, this includes investigation and development of signal propagation and coverage models for digital television and FM radio. Related work also includes extensive field studies of RF signal interference and technical performance of VHF band transmitters and receivers.

The NPR Studies were conducted and submitted to the FCC in anticipation of the completion of the 2009 DTV transition, in which full service television stations were obligated to replace their analog transmission systems. The original TV6 protection rules were based on analog TV receivers, which would no longer be used with the new digital TV system. The NPR Studies

Engineering Statement

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collectively found the interference susceptibility of consumer digital television receivers to be far superior to the NTSC analog receivers tested by the Commission in 1979 on which the Commission's current TV6 protection rules are based.

My work in digital television engineering in the past decade supports elimination of the current TV6 protection rules based on the results of the NPR Studies. I draw this conclusion based on several factors. For one, NPR's tests were made on the earliest generations of DTV tuners, which have undergone continued generational development in the years since. Second, the NPR Studies demonstrated a radical reduction in the potential for TV6 interference. Third, an increase in the number of stations in the television bands has prompted manufacturers to improve tuner selectivity and cross-modulation characteristics to increase DTV-to-DTV interference resistance, which would improve FM-to-DTV6 interference performance, as well. Finally, there have been no known DTV receiver studies of DTV6 interference relative to NCE FM service that supersede the results of the NPR Studies.

The TV6 protection requirements were put in place to address potential interference to analog television receivers, which no longer operate. The Commission recognized in the NPRM that full power TV6 stations have all transitioned to digital operations and most of the remaining LPTV stations on TV6 will transition by July 13, 2021. In view of the robust reception characteristics of today's television receivers, the current TV6 protection requirements are no longer necessary or appropriate.

A handwritten signature in black ink, appearing to read "John C. Kean". The signature is written in a cursive, somewhat stylized font.

John C. Kean, Senior Engineer
Cavell Mertz & Associates Inc.

John Kean, Senior Engineer
Cavell Mertz & Associates
7724 Donegan Drive, Manassas, VA 20109
Tel: (703) 392-9090; Email: jkean@cavellmertz.com

Resume

John Kean's qualifications as a telecommunications consulting engineer are a matter of record with the FCC. As the following narrative indicates, he has supported a variety of broadcast and telecommunications client activities, applying 40 years of experience in television and radio technology.

Mr. Kean is a member of the consulting engineering firm of Cavell Mertz & Associates Inc. as a Senior Engineer. His special projects have included analysis of broadcast signal reradiation effects from large wind turbines, development of a mobile system for AM groundwave measurement and design of RF signal instrumentation for an unmanned aerial vehicle. As discussed below, he has experience in FCC regulations and procedures and has prepared numerous filings for broadcast, satellite and microwave facilities.

Before joining Cavell Mertz, Mr. Kean was Senior Technologist for National Public Radio, from 2004 until 2015, where he developed projects, procedures and standards and supervised all technical projects of NPR Labs, the only not-for-profit broadcast engineering laboratory in the U.S. Mr. Kean also was a Senior Engineer at NPR from 1980 to 1986, where he supported new broadcast technology and pioneered expansion of FM transmission services.

At NPR Labs, he completed a thorough study of the compatibility of AM Modulation-Dependent Carrier Level with HD Radio®, for the National Radio Systems Committee. Also for the NRSC, he conducted a study of the performance of Single-Sideband FM Stereo and its compatibility with present-day FM receivers. He developed and supervised a major study for the Consumer Electronics Association into loudness range preferences of listeners. Through published articles and training, he introduced ITU loudness measurements to the public radio industry, which is now adopted by all NPR departments and is used to normalize all network audio content.

For the U.S. Dept. of Commerce/NTIA Public Telecommunications Facilities Program, he developed and supervised the production of detailed terrain-sensitive coverage maps and population demographic studies of more than 850 FM stations, all 750 public television stations, and their associated translators. Other studies include a measurement of interference susceptibility of consumer DTV receivers with NCE-FM signals and, for Sirius-XM Radio, a study of protection ratios with over-the-air signals from potential high-power FM modulators.

In 2008, he directed an 18-month project for the CPB on the coverage capabilities of HD Radio®, the U.S. digital audio broadcast system. Comprehensive software on the ESRI ArcMap GIS platform produced nearly four-thousand detailed signal-interference maps of U.S. public radio stations. From this research he developed a technical algorithm for determining the signal coverage capability of In-Band On-Channel ("HD Radio") broadcasting for which he was issued a U.S. patent (#8,374,556 B2). This model was extensively field-verified for accuracy.

Other Employment

Director of Wireless Architecture, XO Communications, 3/2000 to 1/2004

Key responsibility for fixed wireless technology at one of the largest spectrum holders in the U.S. (101 LMDS licenses totaling 1.5 billion MHz-Pops). Provided wireless network design oversight and integration into metro optical-fiber networks. Provided regulatory representation on FCC technical rules and rulemaking proceedings. Performed business case analysis and model development for fixed wireless networks, to determine product sets, price points, and return on investment (including development of fixed wireless for cellular backhaul applications).

Director of Engineering, Moffet Larson & Johnson, Inc., 05/1987 - 3/2000

Consulting engineering in the fields of analog and digital TV and radio facilities, FCC regulations, microwave and satellite systems, and mobile cellular networks.

- Telecommunications client projects included:
 - RFP development with Israel's Ministry of Communications for the first private cellular telephone license; provided follow-on bidder evaluations and selection.
 - Supervised engineering design teams in Seattle, Houston and other cities for major PCS clients using advanced RF mapping and GIS tools;
 - Led cellular phone systems design in Egypt, Ghana-W. Africa using GIS tools and data developed in-house.
 - Consultant to the South African Telecommunications Regulatory Authority to allocate of spectrum for a nationwide mobile cellular network, which required extensive GIS mapping and demographic analysis of South Africa.
 - Research and development of mobile RF field measurement systems for real-world PCS and cellular propagation studies using custom mapping engines.
 - Technology selection and business case study of LMDS service for Orange LP, Israel.
 - Lead engineer on a feasibility study for the first VHF marine radiotelephone system in the Sultanate of Oman.

Professional Activities and Honors

- Recipient of the 2016 NAB Engineering Achievement Award for Radio
- As a member of the Institute of Electrical and Electronics Engineers (IEEE), Past President of the IEEE Broadcast Symposium.
- Past president of the Audio Engineering Society (Washington DC Section)
- Chairman of the National Radio Systems Committee *AM Study Task Group* and *Document Management Working Group*.
- Principal researcher for the NRSC DRB subcommittee on studies of digital audio broadcasting performance and compatibility.
- Contributing author to the National Associations of Broadcasters' *NAB Engineering Handbook*, Editions 7, 8, 9 and 11.
- Co-author of the Audio Engineering Society *Recommendation for Loudness of Audio Streaming and Network File Playback*, providing metrics for Internet audio, Oct. 2015.
- Presenter of numerous papers in the field of radio systems engineering to the National Association of Broadcasters' Engineering Conference, the International Engineering Consortium, the Wireless Communications Association, and Public Radio Conferences.