Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington DC 20554

In the Matter of	)	
	)	
Revitalization of the AM Radio Service	)	MB Docket No. 13-249

To: The Commission

REPLY COMMENTS OF UNIVISION LOCAL MEDIA INC.

Univision Local Media Inc. ("Univision") respectfully submits these reply comments in response to the Further Notice of Proposed Rule Making ("FNPRM") and the Notice of Inquiry ("NOI") in the captioned proceeding.[1]

INTRODUCTION

Univision, through its subsidiaries, is the licensee of fifteen Spanish-language AM radio stations serving eleven markets — ranging from large urban areas to small towns — across the country.[2] These stations have been important not only to Univision's efforts to empower, educate, and entertain U.S. Hispanics but also to the continued evolution and relevance of the AM radio service. The breadth and quality of programming and services delivered by three Univision-owned AM radio stations that are discussed herein, for example, point up the pivotal role AM stations can play in the lives of the communities they serve.

> **WRTO, Chicago,** broadcasts news, sports and other valuable programming to the Chicago-area Latino community. Its *Nuestra Comunidad* program features interviews with local community leaders, and recent programs have addressed topics such as school violence,

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[1] *Revitalization of the AM Radio Service*, First Report and Order, Further Notice of Proposed Rule Making, and Notice of Inquiry, MB Docket No. 13-249, 30 FCC Rcd. 12145 (rel. Oct. 23, 2015) ("*FNPRM*," or "*NOI*," as applicable).

[2] Some of these stations are heritage stations, dating back as far as 1946. Indeed, Univision believes that KCOR, its AM radio station in San Antonio, was the first Spanish-language radio station in the United States.

opportunities for Latinos in the Chicago Police Department, and the need for Latino mentors. Another program, *Vida Independiente*, is hosted by Horacio Esparza, who is the visually-impaired leader of the Chicago disability movement and focuses on resources and opportunities for Univision's disabled listeners. *La Hora Picante* is produced and hosted by DePaul University journalism students and speaks to the challenges, opportunities, and activities available to millennials and students in the Chicago area while serving as a training vehicle for future on-air personalities. WRTO also provides Spanish-language broadcasts of games of the Chicago White Sox, the Chicago Cubs, the Chicago Bulls, the Chicago Bears and, most recently, the Chicago Blackhawks.

WAQI, Miami ("Radio Mambi"), is a news, political analysis and sports station focused on Miami's unique demographics and lifestyle, which gives voice to the area's significant Cuban and Cuban-American communities. Radio Mambi targets adults 50 and over with coverage of politics,[3] health, education, technology and finance. Like WRTO, WAQI is the official "Spanish-language voice" of premier local sports teams (namely, the Miami Heat and the Miami Marlins).

KTNQ, Los Angeles, presents programming dedicated to improving the daily lives of first-generation Latinos and their families. For example, *Rumbo a Casa (On the Way Home)*, which airs during peak traffic hours, addresses national and global topics of interest to and involving Hispanics, with guests including local political and community leaders.[4] *Cirugia al Corazón (Heart Surgery)* focuses on health, nutrition and wellness. And *Las Voces del Pueblo (The People's Voices)* opens its microphones to enable members of the Hispanic community to ask questions and express their opinions.

Univision urges the Commission to ensure that the proposals under consideration in this proceeding do not impair the reach of these stations' programming, and their ability to address the needs of historically underserved communities. These comments focus on five issues in particular. *First*, Univision is concerned that the Commission's proposed use of current

[3] Recent guests on various programs have included the Mayor of the City of Miami, Tomás Regalado, who was formerly News Director of WAQI; the Mayor of Miami-Dade County, Carlos Giménez; Senator and former U.S. Presidential candidate Marco Rubio; Members of Congress Mario Díaz-Balart and Ileana Ros-Lehtinen; the former Secretary of Commerce; the President of Florida International University; the Director of the Miami International Airport; the Director of the Miami-Dade Police Department; and a number of other state and local elected representatives. All day-parts feature listener participation on news, community, and politics.

daytime groundwave protection ratios at the 2 millivolt per meter ("mV/m") contour will degrade existing service. *Second*, Univision believes continued protection of the skywave, secondary service area of Class A AM stations will limit opportunities for Class B AM stations to enhance their primary, local service. *Third,* Univision believes that the calculation of root-sum-squared nighttime ("RSS") interference levels should retain the current 25% exclusion factor and that the Commission's proposed exclusion of adjacent-channel interference from the calculation of the nighttime interference-free contour value should be independently considered in a separate rulemaking. *Fourth*, Univision has determined that the Commission's proposal regarding the siting of FM cross-service translators would risk depriving large swaths of listeners of any AM radio service. *Fifth*, Univision agrees that the Commission's "main studio rule" and full-time, in-studio personnel requirements should be relaxed to ease the financial challenges facing AM stations and to permit more flexibility in AM station operations.

I. THE COMMISSION SHOULD REFRAIN FROM TAKING ANY ACTION THAT WOULD HARM THE CURRENT GROUNDWAVE SERVICE.

AM stations are protected from "objectionable" groundwave interference caused by other AM stations.[5] Interference is considered objectionable if, at the defined protection boundary, a potentially interfering station's signal is predicted to exceed the bounding signal level less the desired-to-undesired ("D/U") signal ratio. The current daytime groundwave contour field strength value for co-channel and first adjacent-channel relationships is 0.5 mV/m, and the D/U ratio — which is keyed to the 0.5 mV/m value — is 26 dB with respect to co-channels stations and 6 dB with respect to adjacent channel facilities. In the FNPRM, the

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[4] In one recent segment, Los Angeles Mayor Eric Garcetti spoke about initiatives to keep the City of Los Angeles clean and safe, investment in infrastructure, homelessness and other issues.

[5] *See* 47 C.F.R. §73.14 (defining "primary service area").

Commission proposes to reduce interference protection for Class B, C, and D AM stations from the 0.5 mV/m daytime groundwave contour to the 2 mV/m contour and asks whether the rules should be modified in order to utilize the D/U signal ratios designed for the 0.5 mV/m contour at the 2 mV/m contour .[6]

Contrary to the views of the AM Radio Preservation Alliance ("AMRPA") and du Treil, Lundin & Rackley, Inc. ("dLR"),[7] and given Commission precedent,[8] the FNPRM wisely concludes that the 2 mV/m contour — rather than the 0.5 mV/m contour — is the appropriate determinant of objectionable interference. But the application of the D/U signal ratio to the 2 mV/m contour, even though it is keyed to the 0.5 mV/m contour, is problematic. Indeed, *de facto* protection levels at the 2 mV/m contour today are far higher than what the FNPRM proposes. In other words, the Commission's proposed use of the current 0.5 mV/m protection ratio at the 2 mV/m contour will degrade existing service. This is because all stations cannot increase power equally: some are constrained by limits on transmitter power, existing interference or international agreements. Accordingly, stations in paired interference relationships that cannot increase power will be at risk of increased interference within their 2

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[6] *See FNPRM* at 12172-73 (¶¶ 64-65). The Commission also invited comment on whether to revert the second adjacent channel interference standard to its pre-1991 value. *See id.* at 12172-73 (¶ 64). Univision does not support this proposal.

[7] *See* Comments of the AM Radio Preservation Alliance at 33-40, *Revitalization of the AM Radio Service*, MB Docket No. 13-249 (filed Mar. 21, 2016) ("AMRPA Comments"); Comments of du Treil, Lundin & Rackley, Inc. at 7, *Revitalization of the AM Radio Service*, MB Docket No. 13-249 (filed Mar. 21, 2016) ("dLR Comments").

[8] Currently, the rules set 2 mV/m as the threshold groundwave signal strength required to render primary service for communities of 2,500 or more people, while 0.5 mV/m is the threshold for communities with a population of less than 2,500. 47 C.F.R. §73.182(d). In an order issued in 2012, however, the Commission reasoned that, although the primary service area for less populous (and, by extension, less noisy) areas could be considered the 0.5 mV/m contour, the Commission's rule "implicitly recognizes that all areas, of whatever population, receive primary service within an AM station's daytime 2.0 mV/m groundwave contour," so the 2 mV/m contour is the appropriate one to use. *Policies to Promote Rural Radio Service and to Streamline Allotment and Assignment Procedures*, Second Order on Reconsideration, MB Docket No. 09-52, 27 FCC Rcd. 12829, 12838 (2012).

mV/m contours. Also, the effective reduction in minimum spacing between stations would allow move-ins that would significantly diminish service within the 2 mV/m contour.

The Commission could take an alternative approach, however. As demonstrated in "Groundwave Contour Protection," a study prepared by Karl Lahm, P.E., Univision's Director of Radio Frequency Systems (attached hereto as Appendix 1), any increase in the protected signal contour could be accompanied by an offsetting increase in the protection ratio in order to limit degradation of existing service. And adopting protection ratios based on the existing *de facto* protection ratios at the 2 mV/m contour and International Telecommunication Union Recommendations would protect service within that contour while allowing some flexibility for station improvements.[9] Accordingly, the co-channel D/U ratio used at the 2 mV/m contour should be 40 dB (versus 26 dB), and the first-adjacent channel D/U ratio should be 20 dB (versus 0 dB).

II. CONTINUED PROTECTION OF THE SKYWAVE SERVICE AREA OF CLASS A STATIONS WOULD DISSERVE THE PUBLIC INTEREST.

Under the Commission's existing rules, Class A stations are protected from interference from co-channel stations during nighttime hours to their 0.5 mV/m-50 percent skywave contour,[10] and, during critical hours,[11] to their 0.1 mV/m groundwave contour.[12] The FNPRM seeks comment on whether the Commission should limit the expansive interference protection afforded to Class A AM radio stations. Specifically, the Commission proposes to protect Class A stations, regardless of the time of day, only to the 0.1 mV/m groundwave contour

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[9] Protection of the 2 mV/m contour would serve to narrow the sectors of required signal suppression.

[10] 47 C.F.R. § 73.182(a)(1)(i)(B).

[11] "Critical hours" refers to the two hours following local sunrise and prior to local sunset. *Id.* § 73.187(a)(1).

[12] *Id.*

for co-channel stations and to the 0.5 mV/m groundwave contour for adjacent channel facilities, and to eliminate altogether critical-hours protection for Class A stations.[13]

In its opening comments, AMRPA claimed that "tens of millions" of listeners would lose service if protection of the nighttime skywave service area of Class A stations was eliminated.[14] This argument ignores the fact that local service is provided by FM radio stations and that, in many circumstances, Class A stations' skywave service actually is diminished by adjacent-channel Class A stations. Further, AMRPA's argument betrays a lack of understanding of how listeners receive skywave service. Skywave service areas are "donut-shaped" — with two 0.5 mV/m skywave contours, one closer to the station and a function of its antenna height, and the other far from the station — for non-directional Class A stations and crescent-shaped, or "separated figure 8-shaped," for directional Class A stations. To be counted in the skywave service population, a location must be beyond the inner ring, which could extend beyond the 0.1 mV/m contour in areas of poor ground conductivity. Thus, the lack of protection of a Class A station's skywave service by one or two stations does not mean that it has no such service; rather, it just means that the service is degraded in a crescent-shaped area toward such stations. Elsewhere, the station's service remains, if not subject to foreign interference. To identify with specificity the areas where skywave service would be lost requires more rigor than the AMRPA's comments provide.

Univision supports the idea advanced by dLR in its opening comments to reduce Class A protection to the 0.5 mV/m contour.[15] Continued protection of the skywave secondary

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[13] *FNPRM* at 12170 (¶ 56).

[14] AMRPA Comments at ii.

[15] *See* dLR Comments at 4. Univision believes, however, that the *method* of preserving 0.5 mV/m groundwave service should be the subject of an independent rulemaking.

service contours of Class A stations disadvantages Class B stations, such as WRTO, WAQI, and KTNQ (the three Univision stations described above at pages 1-2), because it prioritizes distant secondary services over local primary services. Such protection also precludes meaningful primary service improvements by Class B stations. Given that FM radio services provide service to small communities and rural areas, continuing safeguards for the skywave service are unnecessary and disserve the Commission's twin public interest goals of competition and diversity.

The benefits to Class B stations of eliminating skywave protection are not merely speculative. As demonstrated in part I of our study, "Nighttime Skywave Interference Protection" (attached here as Appendix 2), eliminating skywave service protections would give Class B stations potential opportunities to improve nighttime service in densely populated urbanized areas. As shown in Appendix 2, under the assumption that skywave secondary service of Class A stations was not protected during nighttime hours, it is estimated that WRTO, WAQI, and KTNQ collectively would be able to increase primary, local service to a more than 1.1 million people.[16]

In addition, Univision strongly supports continued critical hours Class A skywave protection. Deletion of critical hours protection is not necessary to allow improvements in Class B service, and as AMRPA and dLR noted in their opening comments, ending such protection could cause significant interference in the AM band.[17] However, Univision takes dLR's

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[16] Univision emphasizes that its concerns regarding daytime groundwave contour protection apply equally to *all* Univision AM stations. WRTO, WAQI, and KTNQ are cited here as examples because they use frequencies that are also occupied by Class A stations — whose skywave service must be protected at night — not because of anything unique about their daytime circumstances. Class B stations on former "regional" frequencies (such as Univision's AM stations near Dallas and in San Antonio) do not protect any skywave service at night but have the same daytime issues.

[17] *See* AMRPA Comments at 24-33; dLR Comments at 5.

additional view that this protection should be limited to the 0.5 mV/m groundwave contour, inasmuch as usable service at the 0.1 mV/m contour is precluded by man-made noise.[18] Moreover, protection of the 0.1 mV/m contour would unnecessarily restrict operations by Class B stations.

III. RSS INTERFERENCE LEVELS SHOULD RETAIN THE CURRENT EXCLUSION FACTOR, AND THE COMMISSION SHOULD NOT ADDRESS ADJACENT CHANNEL NIGHTTIME INTERFERENCE IN THIS FNPRM.

Prior to 1991, nighttime RSS values of interfering field strengths and nighttime interference-free coverage were calculated using the RSS of all interfering signals using the 50 percent exclusion method, and under the pre-1991 methodology, only co-channel interfering signals were considered.[19] In 1991, the Commission modified its methodology to include adjacent-channel signals and to use a tiered system of RSS calculations that draws distinctions among (1) high interferers that contribute to another station's RSS (50 percent exclusion), (2) medium interferers that contribute to the RSS (25 percent exclusion) but not the RSS (50 percent exclusion), and (3) low interferers that are no greater than the RSS (25 percent exclusion).[20] The FNPRM proposes to return the exclusion factor to its pre-1991 value of 50 percent and to eliminate the inclusion of adjacent-channel interference in the calculation of the nighttime interference-free contour value, essentially restoring pre-1991 standards for nighttime interference evaluation.[21] Several commenters in this proceeding — including AM Broadcast Licensees, dLR, and Hatfield & Dawson Consulting Engineers, LLC — have attempted to tie the post-1991 imposition of a 25 percent exclusion to the inclusion of adjacent channel signals in the

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[18] *See* dLR Comments at 5.

[19] *FNPRM* at 12171 (¶ 59).

[20] *Id.*

RSS calculation or to the now-defunct "Ratchet Rule."[22] As demonstrated in part II of our study, "Nighttime Skywave Interference Protection" (Appendix 2), there was no such link among these concepts. Rather, the 25% exclusion factor was intended to limit RSS interference increases, caused by new or modified station operations, to ¼ dB. The prior 50 percent exclusion method limited such increases to 1 dB. The proposed restoration of the 50 percent exclusion factor, therefore, unnecessarily reduces interference protection. This is of particular concern for several Univision AM stations, which operate with high night powers and/or serve densely populated urban areas, as any increase in nighttime interference could degrade the consumer experience.

In addition, as noted in Appendix 2, the inclusion of weighted adjacent channel interference in the nighttime RSS calculation certainly carries with it certain drawbacks. However, adjacent channel interference has long been a problem at night and has contributed significantly to the reduction of receiver bandwidth by the consumer electronics industry, and some degree of adjacent channel protection is necessary to maintain and improve the consumer experience. Thus, instead of simply eliminating adjacent channel consideration and returning to a methodology that takes account only of co-channel interfering signals, the Commission should specifically address the adjacent channel protection question and its technical parameters in a separate rulemaking proceeding.

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[21] *Id.* at 12172 (¶ 62).

[22] *See* Comments of AM Broadcast Licensees at 3-4, *Revitalization of the AM Radio Service*, MB Docket No. 13-249 (filed Mar. 21, 2016); dLR Comments at 6; Comments of Hatfield & Dawson Consulting Engineers, LLC at 3, *Revitalization of the AM Radio Service*, MB Docket No. 13-249 (filed Mar. 21, 2016). Under the Ratchet Rule, high interferers were not permitted to make facility changes without reducing their RSS contribution by ten percent or more. *FNPRM* at 12171 (¶ 59). Conversely, medium interferers were permitted to make facility changes so long as the changes did not cause an increase in radiation, while low interferers could increase radiation as long as they did not exceed the RSS (25 percent exclusion) threshold. *Id.*

IV. THE COMMISSION SHOULD MODIFY ITS PROPOSAL TO REVISE THE FM CROSS-SERVICE TRANSLATOR SITING RULES IN ORDER TO ENSURE THAT IT DOES NOT HARM THE AM SERVICE.

Under the Commission's current rules, an AM station may employ an FM station's cross-service translator only if the translator's 1 mV/m (60 dBμ) coverage contour is located within the lesser of (1) the AM station's 2 mV/m daytime contour and (2) a 25-mile (40 km) radius of the AM transmitter site.[23] The FNPRM proposes to require that the service contour of an FM translator rebroadcasting an AM station as its primary station be contained within the *greater* of (1) the AM station's 2 mV/m daytime contour and (2) a 25-mile (40 km) radius centered from the AM transmitter site, but in no event would the translator's contour be permitted to exceed a 40-mile (64 km) radius from the AM transmitter site.[24]

Univision endorses the Commission's proposal to change the FM cross-service translator siting requirement from the "lesser" to the "greater" of the AM station's 2 mV/m daytime contour and a 25-mile (40 km) radius of the AM transmitter site, as adopting this change would lessen the coverage challenges that persist under the current rule.[25] However, the proposed 40-mile (64 km) contour limitation is unnecessary, as "the existing 2 mV/m contour cap effectively constrains operation to the station's core service area."[26] Even if this were not the case, a 40-mile cap would create unique service challenges for potential listeners who reside beyond the 40-mile (64 km) boundary but within the 2 mV/m daytime contour (the "Prohibited

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[23] 47 C.F.R. § 74.1201(g).

[24] *FNPRM* at 12174 (¶ 68).

[25] For example, the current rules "can make it difficult for stations to cover a core service area that is located beyond the 25-mile radius but within the 2 mV/m contour, preventing stations from using an FM translator where it is needed the most." Comments of the National Association of Broadcasters at 2, *Revitalization of the AM Radio Service*, MB Docket No. 13-249 (filed Mar. 21, 2016) ("NAB Comments"). The current rules also fail to consider "the directionality of numerous AM stations and the possibility that a null in the directional pattern of an AM station may exclude otherwise suitable translator locations." *Id.*

Area"). In another study by Univision's Karl Lahm, "Limitation on FM Translator Placement" (attached hereto as Appendix 3), Mr. Lahm has calculated the number of people living in the Prohibited Areas associated with three Univision AM stations — KFLC, Benbrook, Texas (located in the Dallas-Fort Worth metropolitan area); KLAT, Houston; and WAQI, Miami. The results are troubling, to say the least: approximately one million people live within KFLC's and WAQI's Prohibited Areas, while nearly 300,000 people live within KLAT's Prohibited Area. These findings confirm that a ceiling of 40 miles (64 km) is just as detrimental as one of 25 miles (40 km), so the Commission's line-drawing in this respect would be just as arbitrary. Finally, the proposed 40-mile contour cap would preclude usable nighttime service to communities within an AM station's 2 mV/m daytime coverage contour, further highlighting the problematic nature of this proposal.

V. THE COMMISSION SHOULD RELAX THE MAIN STUDIO RULE AND ITS CORRESPONDING STUDIO STAFFING REQUIREMENTS FOR AM STATIONS.

The Commission's "main studio rule" requires that the main studio of an AM or FM station be located within (1) the station's community of license; (2) the principal community contour of any broadcast radio or television station licensed to the same community (including the station's own principal community contour); or (3) 25 miles of the center coordinates of the station's community of license.[27] In addition, a radio station's main studio "must, at a minimum, maintain full-time managerial and full-time staff personnel."[28] The NOI seeks comment on the financial impact of these two requirements, asking in particular whether the Commission should,

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[26] *Id.* at 3.

[27] 47 C.F.R. § 73.1125(a)(1)-(3).

[28] *Jones Eastern of the Outer Banks, Inc.*, 6 FCC Rcd. 3615, 3616 (¶ 9) (1991).

as a matter of course,[29] allow AM stations to co-locate in studio facilities owned by stations outside the parameters specified in the main studio rule and whether AM stations that have not co-located should be permitted to reduce the full-time management and staff presence at their main studios.[30]

The National Association of Broadcasters ("NAB") argued in its opening comments that the Commission should relax the main studio rule and studio staffing requirements for AM stations.[31] Permitting stations to co-locate would yield administrative and operational cost savings, encourage collaboration among station staff, and result in the redirection of resources toward additional programming and public service opportunities.[32] Further, as NAB explained, recent technological advances have diminished the need for large numbers of full-time, on-site staff members and managers, as stations are much more likely today to interface with the public via telephone or e-mail than in person at a physical location.[33] Univision wholly supports NAB's views and endorses its proposed modifications to the main studio rule.

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[29] The Commission has authority to waive the application of the main studio rule for good cause shown. *See* 47 C.F.R. § 73.1125(b)(2). As a practical matter, however, commercial stations rarely succeed in securing this exemption, and, in any event, good-cause determinations must be made on a case-by-case basis. NAB Comments at 8, 12.

[30] *See NOI* at 12181-82 (¶ 88).

[31] NAB also urged the Commission to undertake a rulemaking proceeding to relax these requirements for FM stations. *See id.* at 8 & n.26. Univision seconds this request. The main studio rule and related staffing requirements create burdens for FM stations that are licensed to smaller communities and have smaller coverage contours, which precludes them from being able to use the consolidated main studio facilities of their sister radio and television stations. Univision therefore urges the Commission to undertake a rulemaking proceeding to relax the main studio rule and studio staffing requirements as they apply to FM stations.

[32] *See id.* at 8-9, 12.

[33] *Id.* at 10-11. The Commission itself has acknowledged the consistency between the proposed rules and its recently adopted order requiring broadcast radio stations to post their public files to a Commission-hosted online database. *See NOI* at 12181 (¶ 87); *see also Expansion of Online Public File Obligations to Cable and Satellite TV Operators and Broadcast and Satellite Radio Licensees*, Report and Order, MB Docket No. 14-127 (rel. Jan. 29, 2016).

CONCLUSION

For the foregoing reasons, Univision requests that the Commission abstain from adopting rules that will prove detrimental to the AM radio service (and to non-Class A stations, in particular). Instead, the Commission should act to ensure that any regulations promulgated pursuant to this proceeding are adequately calibrated to guarantee that listeners who rely on AM radio service for their informational and educational needs are able to receive the services they desire.

Respectfully submitted,

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Appendix 1

Groundwave Contour Protection

Univision Local Media Engineering – April 2016

1. All AM stations are protected from *objectionable* interference caused by other AM stations. Interference is *objectionable* if, at the protection boundary defined, a potentially-interfering station's signal is predicted to exceed the bounding signal level less the desired-to-undesired (D/U) signal ratio. For co-channel and first adjacent-channel relationships, 0.5 mV/m (54 dBμ) is the bounding contour field strength value and the D/U ratio is 26 dB for the co-channel case and 6 dB for adjacent channel situations. Prior to 1991, the latter was 0 dB.

2. These co-channel and first adjacent channel assignment standards ensure that a much higher D/U ratio exists today at the 2 mV/m contour. The desired signal is 12 dB higher than that at the protected contour, while the additional distance from the interfering station reduces its signal below the value permitted at the 0.5 mVm contour. The *de facto* D/U ratios at the 2 mV/m contour that result from today's assignment standards are in the 40s of dB for the co-channel case and 20s of dB for the first adjacent channel case, as detailed herein.

3. The Commission wisely concluded that service is seldom realized at the 0.5 mV/m contour, due to increased man-made noise, and has proposed to redefine *objectionable* interference at the 2 mV/m (66 dBμ) contour.[1] However, it erroneously proposed to use the current co-channel and the pre-1991 0 dB adjacent channel D/U ratios at that contour, to define *objectionable* interference, going forward. As today's *de facto* D/U ratios at that contour are far higher, the Commission's proposal will significantly degrade the quality of service and consumer experience at the 2 mV/m contour of many, if not most, stations. The degradation of existing service has been noted by the AM Radio Preservation Alliance in its comments.

4. If all AM stations increased power by 12 dB, these changes would be acceptable, as the stations' areas of interference would not change. Today's quality of service at the 2 mV/m (66 dBμ) contour would be realized at the 8 mV/m (78 dBμ) contour, but the distance of the latter contour from each transmitter site would match today's 2 mV/m distance. However, no station operating at a power greater than 3 kW can realize such a power increase, due to the "hard" 50 kW limit on transmitter power. International protections and differing assignment relationships also impose power limits that preclude a 12 dB increase in power for most stations. These variations have been detailed in the comments submitted by the National Association of Broadcasters.

5. To maintain the existing quality of service at the 2 mV/m contour, the co-channel D/U ratio at that contour should be raised to 40 dB and the first adjacent channel ratio should be raised to 20 dB. The inefficiency of protecting the 2 mV/m service via lesser protection of the 0.5 mV/m surrogate should be eliminated. This would narrow the arcs of protection for many stations, allowing simplification of directional antennas and service improvements. It would ensure adequate protection of today's *usable* service while providing many broadcasters with additional flexibility in locating and realizing their stations' facilities and services.

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[1] Since 1939, the 2 mV/m contour has been defined as the threshold for service to communities with populations exceeding 2,500. See §73.182(d). The record in this proceeding has demonstrated conclusively that groundwave service is seldom longer realized at the 0.5 mV/m contour, due to man-made noise.

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Introduction

6. The protected contour signal level and the D/U ratio enforced at that level are not absolute, go/no-go inflection points in service. They are the technical standards intended to achieve the administrative need to balance the quality of reception with the demand for stations.

7. The Commission's rules for AM broadcasting repeatedly note that the *primary* service area of a station is where its service is free of *objectionable* interference.[2] Note that there is no definition of practical D/U ratios for satisfactory consumer reception specified in the rules. Interference is *objectionable* if it would frustrate the FCC's administrative objective of balancing reception quality with station population.

8. The current AM technical standards have their roots in the 1939 Standards of Good Engineering Practice. At that time, the development of AM broadcasting was not yet mature. Much of the country lacked reliable broadcast service, especially at night, from AM stations. FM, TV, and satellite stations did not exist. Further growth and improvement of the AM band service was necessary. The definition of *objectionable* interference sought to foster such development.

9. Since 1939, a 2 mV/m signal level has been defined in the rules as the minimum for service to communities of 2,500 people or more.[3] Such communities contain the vast majority of the American population, as rural populations have declined since 1939 and metropolitan populations have grown strongly. Assuming the existing definition of objectionable interference, the *de facto* D/U ratios for usable service to communities of modest size and larger, implied by the 1939 Standards at the 2 mV/m contour, are at least 12 dB higher than those enforced at the 0.5 mV/m contour, as the required signal level is 12 dB greater.

10. To maintain the freedom from co-channel and adjacent-channel interference that exists today at the 2 mV/m contour, the co-channel D/U ratio must be a *minimum* of 38 dB (26+12) and the first adjacent channel D/U ratio must exceed 12 (0+12) to 18 (6+12) dB, depending on whether one is using the pre-1991 or existing ratio as the reference. The international protection standards for the AM band are near these numbers.[4] This is not what the Commission has proposed.

Analysis of *de facto* D/U Ratios at 2 mV/m

11. The variation of ground conductivities and changing "exceptions" to station assignment criteria over the years cause some variation of *de facto* D/U ratios at any specified signal contour. This analysis does not attempt to define or even provide a representative sample of the range of such situations. Instead, hypothetical examples are offered based on a mid-band frequency, mid-range ground conductivity, and typical station power levels, to illustrate D/U

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[2] See the definition of *primary service* in §73.14

[3] See §73.182(d)

[4] See ITU-R Recommendation BS.560-4. The co-channel protection ratio is specified at 40 dB. The adjacent channel ratio is specified as a function of program content and degree of audio processing, but is not based on the audio processing practices common in North American stations. It is typically higher than 6 dB.

ratios that can be expected at the 2 mV/m contour today. Any substantial degradation of the *de facto* D/U ratio that exists today will diminish, not enhance, the consumer's listening experience.

12. Specifically, the D/U ratio relationship of hypothetical 950 kHz stations, one pair operating at 5 kW each and the other pair operating at the dissimilar powers of 10 kW and 1 kW were studied. Quarter-wavelength radiators (1 km radiation values of 305 at 1 kW, 680 mV/m at 5 kW, and 970 mV/m at 10 kW) and a uniform ground conductivity of 8 mS/m were presumed.

Co-Channel Case

13. Both pairs of hypothetical stations were spaced such that their 0.5 mV/m and 0.025 mV/m groundwave contours do not overlap, which requires a separation of 430 km for both pairs under the conditions specified. The signal level of each station at the 2 mV/m contour position of the other was determined using standard methods, thereby yielding the *de facto* D/U ratio at that contour resulting from the present co-channel groundwave protection standard. The distances and field strengths at which the ITU-recommended 40 dB D/U ratio is realized were also determined. The field strength and D/U relationships for these stations are shown by Figure 1 for the 5 kW stations and Figure 2 for the 10 kW and 1 kW stations. The *de facto* D/U ratio can be readily determined for any candidate protected signal level, using these graphs.

Table I: Co-Channel 2 mV/m Contours
430 km Site Separation

Station	2 mV/m Distance, km	2 mV/m D/U Ratio, dB	40 dB D/U Distance, km	40 dB D/U Field, mV/m
5 kW	64	43	72	1.51
10 kW	74	49	100	0.935
1 kW	44	42	40	1.68

Adjacent-Channel Case

14. Following a similar approach, the *de facto* first adjacent channel protection ratio, at the 2 mV/m contour, can be found. The transmitter site spacing necessary to comply with the post-1991 rule is 260 km for the 5 kW stations and 250 km for the 10 kW / 1 kW station pair. The *de facto* D/U ratios, based on the current rules, along with 20 dB D/U distances and contour values, are shown in Table II. Figure 3 illustrates the situation of the paired 5 kW stations, while Figure 4 illustrates that for the 10 kW / 1 kW station pair.

Table II: First Adjacent Channel 2 mV/m Contours
260 / 250 km Site Separation

Station	2 mV/m Distance, km	2 mV/m D/U Ratio, dB	20 dB D/U Distance, km	20 dB D/U Field, mV/m
5 kW	64	25	76	1.33
10 kW	74	29½	98	1.01
1 kW	44	23½	50	1.54

15. Most AM broadcast stations were authorized prior to 1991, when the first adjacent channel protection ratio was 0 dB at the 0.5 mV/m contour. Accordingly, the

transmitter site spacing between the 5 kW stations was set to 225 km and spacing between the 10 kW / 1 kW pair was set to 210 km, avoiding 0.5 mV/m contour overlap. The above data were regenerated for these states, as shown in the following table. Figure 5 shows the field strength, D/U ratio, and distance relationships for the 5 kW station pair, while Figure 6 illustrates that for the 10 kW / 1 kW station pair.

Table III: First Adjacent Channel 2 mV/m Contours
225 / 210 km Site Separation

Station	2 mV/m Distance, km	2 mV/m D/U Ratio, dB	20 dB D/U Distance, km	20 dB D/U Field, mV/m
5 kW	64	20½	64½	1.95
10 kW	74	23½	81	1.57
1 kW	44	20½	45	1.92

16. These data show that the de facto D/U ratios at the 2 mV/m contour are in the 40s for the co-channel case and in the 20s for the first adjacent channel case.

Power Increase Impact of Applying the Proposed D/U Ratios at 2 mV/m

17. The primary purpose that the Commission cites for changing the rules is to facilitate station power increases to overcome noise. Most stations would likely seek to do that without changing transmitter sites.

18. Equal percentage power increases of both stations in a paired interference relationship will not change the D/U ratios that exist now at any particular location. At the present 2 mV/m contour distance, the signal strength will be increased, but the D/U ratio would remain what it is today. However, the 2 mV/m contour would be located farther from the transmitter site and the D/U ratio at that contour would worsen.

19. There will be many cases where one station in an interference-paired relationship can increase power, but the other cannot. This may be caused by the 50kW power limit, the need to hold cross-border signal strengths at their present values, or other assignment constraints. Where stations cannot increase power equally, the station making the lesser or no improvement may suffer a deterioration of service quality at its 2 mV/m contour location. The dB change in the D/U ratio will follow the change in operating power in dB.

20. Taking the example of the 5 kW stations from above, a power increase to 50 kW of one station will lessen the D/U ratios at the 2 mV/m contours of both, by 10 dB for the 5 kW station and by 6 dB for the 50 kW station. However, the contour of the station increasing its power is extended, so its current listeners experience no degradation.

21. When stations presently have normally protected and potentially interfering contours close to each other, any dissimilar percentage increase in power will improve the higher percentage station's service at the expense of the station not increasing power or increasing it to a lesser degree. These impacts can be evaluated for the hypothetical examples by adjusting the field strength values on Figures 1-5 by the dB differences in power.

Move-In Impact of Applying the Proposed D/U Ratios at 2 mV/m

22. The Commission has proposed application of the co-channel D/U ratio of the current rules and the pre-1991 adjacent channel D/U ratio at the 2 mV/m contour. This proposal appears to presume that these ratios define a quality service. They do not, particularly given the far greater audio signal-to-noise ratios of FM broadcasting, satellite broadcasting, and even Internet streaming. The present protection standards exist to as a surrogate to ensure a quality service at the 2 mV/m contour, by their definition at the 0.5 mV/m contour. The degradation of the existing *de facto* D/U ratios at the 2 mV/m contour and shrinkage of the service range to achieve present D/U ratios will be detailed in this section, using the same hypothetical example stations as above.

Co-Channel Case

23. Both pairs of hypothetical stations were spaced such that their 2 mV/m and 0.1 mV/m groundwave contours do not overlap, which requires a minimum separation of 270 km for the 5 kW station pair and 305 km for the 10 kW / 1 kW station pair. The distances and field strengths at which the ITU-recommended 40 dB D/U ratio is realized were also determined. The field strength and D/U relationships for these stations are shown by Figure 7 for the 5 kW stations and Figure 8 for the 10 kW and 1 kW stations.

Table IV: Co-Channel 2 mV/m Contours
270 / 305 km Site Separation

Station	2 mV/m Distance, km	2 mV/m D/U Ratio, dB	40 dB D/U Distance, km	40 dB D/U Field, mV/m
5 kW	64	26	35	6.65
10 kW	74	36½	65	2.74
1 kW	44	26	26	5.33

24. Comparing the data of Table I to that of Table IV, the 5 kW stations could suffer a 17 dB D/U ratio loss, the 10 kW station could suffer a 12½ dB loss, and the 1 kW station could suffer a 16 dB degradation. The 40 dB D/U service ranges are reduced by 51% for the 5 kW stations, 20% for the 10 kW station, and 35% for the 1 kW station.

Adjacent-Channel Case

25. The minimum transmitter site spacing necessary to comply with the proposed 0 dB protection at the 2 mV/m contour is 130 km for the 5 kW stations and 125 km for the 10 kW / 1 kW station pair. The D/U ratios, based on the proposed rules, along with 20 dB D/U distances and contour values, are shown in Table IV. Figure 9 illustrates the situation of the paired 5 kW stations, while Figure 10 illustrates that for the 10 kW / 1 kW station pair.

Table V: First Adjacent Channel 2 mV/m Contours
130 / 125 km Site Separation

Station	2 mV/m Distance, km	2 mV/m D/U Ratio, dB	20 dB D/U Distance, km	20 dB D/U Field, mV/m
5 kW	64	½	34	7.40
10 kW	74	2½	47	5.58
1 kW	44	2	20	8.15

26. Given that most AM stations were assigned under the pre-1991 0 dB first adjacent channel D/U ratio, the data above was compared to that of Table III. The D/U ratio at the 2 mV/m contour is degraded by 20 dB for the 5 kW stations, 21 dB for the 10 kW station, and 18½ dB for the 1 kW station. The distance at which a 20 dB D/U ratio exists is reduced by 47% for the 5 kW stations, 42% for the 10 kW station, and 56% for the 1 kW station.

Protection Arc Sectors and Application of Criteria Recommended

27. Figures 11 and 12 illustrate the co-channel contour overlap situations of the 5 kW and 10 kW / 1kW station pairs, spaced 430 km apart. The assumed "touching" 0.5 mV/m and 0.025 mV/m contours define an arc of protection of 30 degrees between each 5 kW station. The 2 mV/m contour and the 0.02 mV/m interfering contour that is implied from the 40 dB D/U ratio described herein are shown in green. Figure 9 shows the impact of both stations increasing power to 8.5 kW, the point at which their blue 2 mV/m and 0.02 mV/m contours would touch and the arc of protection is reduced 43%, to 17 degrees. Figure 10 shows that one station could achieve 10 kW of power (blue contour) if the other one remains at 5 kW. In this case, the arcs of protection are 17 degrees for the 10 kW station toward the 5 kW station and 20 degrees for the 5 kW station, toward the 10 kW station. The arc of protection for all these cases is significantly reduced by recognizing the 2 mV/m contour as that protected, in lieu of the 0.5 mV/m contour.

28. Figure 13 illustrates the adjacent channel interference situation of the 5 kW station pair, spaced 225 km apart, to avoid overlap of their 0.5 mV/m contours, as required prior to 1991. With both stations at 5 kW, the green 0.02 mV/m interfering contour barely clears the 2 mV/m protected contour. It is not possible for either station to increase power under this scenario. However, changing the protected contour significantly decreases the sector of protection, from 60 to 33 degrees.

29. The situations of the 10 kW and 1 kW paired stations are not illustrated, but are generally more favorable to improvement, particularly for the 1 kW station, than the 5 kW stations described above. The point of Figures 11-13 is to illustrate the concept of robust protection at the 2 mV/m contour, not evaluate a general case of stations' abilities to make improvements.

Conclusion

30. The foregoing data clearly show that the Commission's proposed protection criteria at the 2 mV/m contours fail to maintain the present quality of service at and near that contour. Adequate protection can be ensured by increasing the protection ratios, while retaining 2 mV/m as the new contour value protected from interference. Even with this maintenance of protection, stations should be able to improve facilities and service, in many cases.

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Appendix 2
Nighttime Skywave Interference Protection

Univision Local Media Engineering – April 2016

I. Class B Service Improvements Resulting from Class A Skywave Contour Protection Deletion

1. Class A stations are presently protected from interference at night to their 0.5 mV/m skywave secondary service contours and, where such contours are not produced in some directions due to the use of directional antennas, the 0.5 mV/m groundwave contour. They also receive protection during critical hours to their 0.1 mV/m groundwave contours.[1]

2. These protections are the residue of an era long gone, dating to the 1939 rules and Standards of Good Engineering Practice. At that time, AM radio had not been fully developed and there were no FM, TV, or satellite-delivered aural services. Much of the rural parts of the country relied exclusively on the skywave services of then-Class I stations for news, information, and entertainment at night. Today, local AM, FM, and TV services are delivered to nearly all of the country, while satellite-based aural services cover the miniscule remaining "white areas".

3. Continued protection of the skywave secondary service contours of Class A stations prioritizes *distant secondary* service over *local primary* services. If the skywave contour protection of Class A stations were eliminated, many Class B stations in major markets, including many owned by the members of the AM Radio Preservation Alliance, could improve *local* service.[2]

4. To illustrate the potential opportunities for high-powered Class B stations to improve nighttime service in densely populated urbanized areas, the situations of Univision Radio's WRTO, Chicago, KTNQ, Los Angeles, and WAQI, Miami, were evaluated under an assumption that the skywave *secondary* service of Class A stations would not be protected during nighttime hours. With that protection deleted, it is estimated that *these three stations alone* can increase *primary, local* service to a combined population of 1.1 million people.

A. WRTO: 1200 kHz, 20 kW-D, 4.5 kW-N, DA-2, Chicago, IL

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[1] The record in this proceeding has demonstrated conclusively that groundwave service is no longer realized at the 0.1 mV/m contour due to man-made noise. It is therefore recommended that the critical hours protection be afforded to the 0.5 mV/m groundwave contours of Class A stations, pending further consideration of the best means of protecting their *usable, primary, local* service during daytime and nighttime hours.

[2] It is presumed that the 0.5 mV/m groundwave service of Class A stations would continue to be protected from skywave interference, on a single limit basis, by Class B stations. The Commission's proposal to protect Class A stations from groundwave interference only and at the 0.1 mV/m contour (see footnote 1) is not supported, as it would not ensure the continued availability of *usable primary local service* from Class A stations..

5. WRTO utilizes a six-tower directional antenna array, with four towers used during the day and all six towers used at night. The combination of its night power and incoming interference limits its service during those hours. The station has multiple protection requirements to other Class B stations, but its primary limitation during nighttime hours is the protection of the skywave secondary service contour of WOAI, San Antonio, TX.

6. The WRTO nighttime directional antenna radiation pattern was modified to protect the 0.5 mV/m groundwave contour of WOAI but not that station's skywave secondary service area. This evaluation assumed use of the existing towers, but nighttime-only towers #5 and #6 were repositioned slightly to maximize the prospective service increase. With the WOAI skywave contour protection ignored, it appears possible for WRTO to operate at 6 kW at night.

7. Figure 1 illustrates the expansion of the WRTO 10.3 mV/m nighttime interference-free service contour that would result from the prospective 6 kW operation. Coverage is extended over the suburbs of Dixmoor and Robbins, as well as over the City of Chicago itself. The modified directional radiation pattern increases the population within the 10.3 mV/m nighttime interference-free contour by 278,882 people.

B. KTNQ: 1020 kHz, 50 kW DA-2, Los Angeles, CA

8. KTNQ, licensed to Los Angeles, operates on 1020 kHz with fulltime 50 kW power and a directional antenna array that produces different radiation patterns during daytime and nighttime hours. The station's most critical protections during nighttime hours are toward the skywave secondary service contour of KDKA, Pittsburgh, PA, and groundwave service contour of KCKN, Roswell, NM.

9. The nighttime directional antenna radiation pattern was modified to protect the 0.5 mV/m groundwave contour of KDKA but not that station's skywave secondary service area. Use of the existing four towers was assumed, with no evaluation done of the possibility of adding the fifth tower (presently used only during daytime hours) to the array. The unusual construction of the KTNQ site, with warehouses built around the towers and an elevated imaging screen above those warehouses and their parking lots, effectively precludes tower repositioning.

10. Figure 2 illustrates the coverage expansion that results from the modified directional radiation pattern. The population within the 7.3 mV/m nighttime interference-free contour increases by 465,947, extending service in the Pomona area and in Orange County. The latter improvement is essentially a "dividend" of the radiation relaxation toward KDKA that, by the mathematics of the directional antenna system, becomes possible.

C. WAQI: 710 kHz, 50 kW DA-2, Miami, FL

11. WAQI, licensed to Miami, operates on 710 kHz with fulltime 50 kW power and a directional antenna array that produces different radiation patterns during daytime and nighttime hours.

12. The station's licensed nighttime directional antenna pattern is unusual in that it was converted to a "standard pattern" 35 years ago using a reduced "Q factor" and fitted pattern augmentations toward the skywave secondary service contour of WOR, New York. The normal "Q factor", specified by §73.150(b)(1) of the rules, cannot be applied without causing presumed interference to the WOR protected skywave secondary contour. Because the station's licensed nighttime radiation pattern preceded the adoption of the standard pattern concept and its component "Q factor", this atypical pattern description and authorization is "grandfathered".

13. WAQI is presently in the process of relocating to a new transmitter site. At any such location, its nighttime directional antenna radiation pattern must use the "Q factor" specified by §73.150(b)(1) to define its standard radiation pattern. To comply with the present rules, WAQI is limited to 15 kW during nighttime hours, a 70% reduction in operating power.

14. If protection of the WOR skywave secondary service contour were eliminated, WAQI could retain its 50 kW nighttime power at its new transmitter site. With related directional pattern changes, the station's 8.6 mV/m service population would exceed that of the 15 kW facility, compliant with the present rules, by 372,800 people at the 25 mV/m contour and 400,488 people at the 8.6 mV/m contour. Figure 3 illustrates the compliant and prospective coverage contours.

15. It is notable that Cuba operates two high-powered stations on 710 kHz, not recognized by the ITU Region II Plan, which have caused considerable interference to all United States stations on that frequency for the past 30 years. The night interference limits of these Cuban stations along the WOR protected contours, both the skywave secondary service and the groundwave primary service, far exceed the limits that WAQI would impose with its prospective 50 kW nighttime operation. In essence, WOR has had no meaningful skywave service southward for 30 years, yet the rules require its continued protection.

16. The contour maps of Figures 3 and 4 present both the 25 mV/m and 8.6 mV/m contours. Service to the 8.6 mV/m contour is not realized due to the substantial incoming Cuban interference. It is believed that the 25 mV/m contour better approximates the boundary of usable service, based on measurements of the incoming Cuban groundwave signals.

17. As previously noted, strict application of §73.150(b)(1) to WAQI at its new transmitter site will force a reduction in its authorized nighttime operating power from 50 kW to 15 kW. Figure 4 illustrates the impact of this reduction. The 25 mV/m service population would be reduced by 282,923 people and the 8.6 mV/m service population would drop by 172,384 people.

II. RSS Interference Calculations

18. The Commission has proposed to return the "exclusion factor" to its pre-1991 value of 50% and eliminate the inclusion of adjacent-channel interference in the calculation of the nighttime interference-free contour value, essentially restoring pre-1991 standards for nighttime

interference evaluation. Commenters in this proceeding attempted to tie the imposition of 25% exclusion to the rescinded "ratchet rule".

19. This writer attended most of the meetings between industry representatives and FCC staff during the consideration of the rule changes made in 1991. No link between 25% exclusion and the "ratchet rule" is recalled. The 25% exclusion factor was intended to limit additional interference, while the "ratchet rule" was a misguided attempt to reduce interference by penalizing the oldest stations which suffered the least interference and provided the greatest service. Nor was the 25% exclusion factor tied to the inclusion of adjacent channel signals in the RSS calculation. That factor, the "ratchet rule", and inclusion of adjacent channel interference were considered independently of each other.

20. The function of the 25% exclusion principle is to limit RSS interference increases, caused by new or modified station operations, to ¼ dB. The prior 50% method limited such increases to 1 dB. The proposed restoration of 50% unnecessarily reduces interference protection. This is of particular concern at several Univision AM stations, which operate with high night powers and/or serve densely populated urban areas, as any increase in nighttime interference could degrade the consumer experience.

21. The inclusion of weighted adjacent channel interference in the nighttime RSS calculation has significant deficiencies. However, adjacent channel interference has long been a problem at night and has contributed significantly to the reduction of receiver bandwidth by the consumer electronics industry. Rather than simply eliminating adjacent channel consideration and returning to the pre-1991 situation without explanation, the Commission should specifically address the adjacent channel protection question and its technical parameters in a FNPRM. Some degree of adjacent channel protection is necessary to maintain and improve the consumer experience

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Appendix 3

Limitation of FM Translator Placement

Univision Local Media Engineering – April 2016

1. The Commission has proposed to limit the coverage areas of FM translators carrying AM stations' programming to the 2 mV/m contour or a 64 km radius, whichever is larger. The National Association of Broadcasters and other commenters believe that the 64 km limitation is counterproductive. Several Univision AM stations were evaluated to determine whether they have significant daytime service, beyond the proposed 64 km boundary but inside their 2 mV/m daytime coverage contours, where an FM translator could provide meaningful service, particularly at night, when the stations reduce power and/or change directional radiation patterns to protect co-channel stations from skywave interference. Three Univision AM stations, KFLC, KLAT, and WAQI illustrate well the limitation on prospective translator service that the proposed 64 km outer boundary would cause.

2. For each Univision station analyzed, the 2 mV/m contour location was determined based on the station's antenna system record in the Media Bureau's Consolidated Data Base System and Figure M3 ground conductivity values.[1] Populations within the "prohibited" area, between the 64 km circle and the more-distant 2 mV/m contour, were determined based upon 2010 Census data.

A. KFLC: 1270 kHz, 50 kW-D, 5 kW-N, DA-2, Benbrook, TX

3. KFLC utilizes a six-tower directional antenna array, with four towers used during the day and all six towers used at night. The station has multiple protection requirements to other Class B facilities during nighttime hours.

4. Figure 1 illustrates the prohibited translator service area in orange, beyond the 64 km circle but within the 2 mV/m daytime contour. Slightly over one million people reside within this area. The Dallas suburb of McKinney, for example, has substantial population that might justify use of an FM translator. Likewise, the cities of Corsicana and Terrell lie within this zone.

B. KLAT: 1010 kHz, 5 kW-d, 4.5 kW-N DA-2, Houston, TX

5. KLAT operates from separate daytime and nighttime transmitter sites, with directional antennas at both. Figure 2 illustrates the prohibited translator service area in orange, which includes the city of Galveston. Nearly 300,000 people reside within the prohibition area.

[1] Although measured conductivities would increase the accuracy of these analyses, the intent here is to show general trends, across several stations, not precise details of each station. An application for an FM translator would be prepared with measured conductivities and greater rigor.

C. WAQI: 710 kHz, 50 kW DA-2, Miami, FL

6. WAQI, licensed to Miami, operates on 710 kHz with fulltime 50 kW power and a directional antenna array that produces different radiation patterns during daytime and nighttime hours. The "prohibited translator area" inside its 2 mV/m daytime coverage contour and outside the 64 kilometer circle is shown on Figure 3. Like KFLC, the population contained therein is near one million people.

7. As also described in Appendix 2, it is notable that Cuba operates two high-powered stations on 710 kHz, not recognized by the ITU Region II Plan, which have caused considerable interference to WAQI for the past 30 years. The Cuban stations impose day and night groundwave interference limits approximating 15 to 35 mV/m. Put another way, any area outside the WAQI 25 mV/m contours is likely subject to audible interference from Cuba. Because of this interference, WAQI has a need for potential FM translators that is more extensive and different than most US major market stations.

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