

**BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, D.C. 20554**

In the Matter of)	
)	
CoxCom, LLC)	CSR - 8909 - A
)	
For Modification of the Market of)	MB Docket No. 15 - 120
WMDE, Dover, Delaware)	

To: The Secretary's Office
Attention: Chief, Media Bureau

REPLY TO OPPOSITION

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July 20, 2015

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SUMMARY

The Bureau should grant Cox's Petition for Special Relief (the "**Petition**") to exclude the Cox cable communities in Fairfax County, Virginia (the "**Cox Communities**") from the must-carry market of Delaware's WMDE. Cox's Petition presented extensive evidence indisputably confirming that no market nexus exists between this distant Delaware Station and the Cox Communities based on the relevant statutory factors, other determinative market facts, and the Commission's precedents. Cox demonstrated, among other things, that WMDE fails to provide any actual signal coverage or any local programming directed specifically to the Cox Communities, that abundant local programming is provided by other broadcast stations carried in the Cox Communities, that enormous distances and geographical, political, and commercial barriers prevent any market nexus between WMDE and the Cox Communities, that WMDE has no history of carriage and no audience share in the Cox Communities, and that no multichannel video programming distributors ("**MVPDs**") in or around the Cox Communities carry any other distant Delaware or eastern Maryland stations. In short, no reasonable doubt can exist that the Cox Communities and WMDE are located in different markets.

WMDE's Opposition fails to deny and consequently admits all the substantive demonstrations in Cox's Petition that the Station and the Cox Communities operate in separate economic markets. Instead, the Opposition essentially ignores evidence in the record and simply repeats that WMDE is entitled to mandatory carriage because Nielsen re-assigned it from the Philadelphia DMA to the Washington DMA. As both Cox's Petition and this Reply to Opposition demonstrate, however, WMDE's claims are baseless.

Given these facts and circumstances, the Bureau should grant the Petition forthwith and exclude the Cox Communities from WMDE's must-carry market.

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CoxCom, LLC ("**Cox**"), by its attorneys and pursuant to Section 76.7(c) of the Commission's rules, hereby submits this Reply to the unverified Opposition to Petition for Special Relief (the "**Opposition**") filed in the above-captioned matter by Western Pacific Broadcast, LLC ("**Western Pacific**"), licensee of television station WMDE (Channel 5, Dover, Delaware) ("**WMDE**" or the "**Station**").¹

The Bureau should grant Cox's Petition for Special Relief (the "**Petition**") and exclude the Cox cable communities in Fairfax County, Virginia (the "**Cox Communities**")² from the must-carry market of Delaware's WMDE. All the evidence in the record indisputably confirms that no market nexus exists between this distant Delaware Station and the Cox Communities based on the relevant statutory factors, other undisputed market facts, and the Commission's precedents. In fact, beyond repeating evidence Cox already placed in the record — *e.g.*, that Nielsen assigned the Station to the Washington DC – Hagerstown Designated Market Area

¹ This Reply is timely filed pursuant to an extension of time granted by the Media Bureau and agreed to by the parties. *See* letter, dated June 30, 2015, to Steven A. Broeckaert, Esquire (Senior Deputy Chief, FCC Media Bureau, Policy Division) from Gary S. Lutzker (Counsel to Cox).

² Namely, Fairfax City, Vienna, Fairfax County, Falls Church, Herndon, and Clifton, Virginia; *see* Petition, Ex. 1.

("DMA") (at the Station's request)³ and that Verizon and Comcast very recently began carrying the Station (pursuant to mandatory carriage)⁴ — the Opposition does not deny any of the substantive demonstrations in Cox's Petition that the Station and the Cox Communities operate in separate economic markets. The Station misses the point entirely and in essence simply repeats that it is entitled to mandatory carriage solely because Nielsen re-assigned it from the Philadelphia DMA to the Washington DMA.

BACKGROUND

In a letter dated September 22, 2014 (the same day WMDE commenced broadcasting), the Station purported to elect mandatory carriage on Cox's cable systems in the Washington DMA.⁵ Despite Western Pacific's hyperbolic attempts in the Opposition to falsely portray Cox as a "carrier who has refused to work with Western Pacific,"⁶ the Opposition otherwise admits that what followed its election notice was "several months of productive communications between Western Pacific and CoxCom representatives, and their respective technical consultants, regarding carriage of WMDE."⁷ What the Opposition fails to report, however, is that those "several months of productive discussions" included multiple signal tests, all of which undeniably confirmed that neither Delaware's WMDE nor an unaffiliated low-power station in Washington, DC that apparently rebroadcasts some WMDE programming, could provide an actual over-the-air signal to Cox's principal headend or anywhere else in the Cox Communities.⁸ WMDE has never denied this fact.

Cox understood that absent a market modification, it arguably may have been required under the Commission's rules to surrender its scarce channel capacity to WMDE, even though

³ Petition at 1, 5, and Ex. 4.

⁴ *Id.* at 3, n.7, 7, and Ex. 3.

⁵ Opposition at Ex. 1.

⁶ *Id.* at 2.

⁷ *Id.* at n.5

⁸ *See, e.g.*, Petition Ex. 2 (Chesapeake RF Consultants, LLC Engineering Statement), Ex. 5 (Sample of Cox Signal Strength Tests), Ex. 6 (Meintel, Sgrignoli & Wallace, LLC Signal Tests), and Petition n.38.

WMDE is a distant broadcaster serving a different economic market and even though WMDE fails to provide any actual broadcast signal or any local programming to the Cox Communities. Cox therefore sought to clarify the scope of its mandatory carriage obligations by submitting a legitimate request to redraw DMA boundaries consistent with market realities.

Cox filed its Petition on May 20, 2015. The Petition demonstrated that despite Nielsen's assignment of WMDE to the Washington DMA (at WMDE's request), the Station and the Cox Communities operate in separate economic markets as confirmed by each of the market modification factors set forth in Section 614(h) of the Communications Act, 47 U.S.C. § 534(h) (the "Act"), as well as a variety of other determinative market facts. The Opposition fails to deny or provide any evidence to rebut (and therefore admits),⁹ the Petition's specific demonstrations that, among other things:

- the Station's city of license and the Cox Communities are located in separate markets an average of 98 miles apart and are separated by a minimum two hour drive;¹⁰
- the Station and the Cox Communities are divided by substantial market-separating political, geographic, and economic barriers, including but not limited to the states of Virginia, Maryland, and Delaware, the congested Washington, DC metropolitan area, the Chesapeake Bay, the Potomac River, and both the Philadelphia DMA and the Baltimore DMA (where the Station's transmitter is situated on Maryland's eastern shore);¹¹
- the Station has no significant historical carriage in the Cox Communities or the Washington, DC (Hagerstown) DMA,¹² and no Fairfax County, Virginia Multichannel Video Programming Distributors ("MVPDs") carry any other stations licensed to Dover or anywhere else in Delaware or nearby eastern Maryland;¹³

⁹ See 47 C.F.R. §§ 76.7(b)(2)(v), 1.724(d) (averments in a complaint are deemed to be admitted when not denied in the answer).

¹⁰ Petition at 13-14, 23, Ex. 2, Figure 4 (maps of locations and distances between each of the Cox Communities and WMDE's city of license), Ex. 7 (distance calculations), and Ex. 8 (driving distances and times).

¹¹ Petition at 21-26.

¹² As demonstrated in the Petition, of the seven MVPDs operating in Fairfax County, Virginia, only Verizon and Comcast very recently began carrying WMDE pursuant to mandatory carriage. See Petition, Ex. 3 (channel Line-Ups for Dish Network, DirecTV, Verizon FiOS, Comcast, RCN-Starpower, and Cox). Therefore, Western Pacific's implication that Cox is the only "material" MVPD in and around the Cox Communities not carrying the Station, Opposition at 4-5, is not only unsupported, it is false.

¹³ Petition at 5-7.

- WMDE fails to provide any actual signal coverage¹⁴ or any local programming directed specifically to the Cox Communities;¹⁵
- unlike WMDE, numerous other truly local broadcast stations that Cox already carries offer extensive news coverage regarding issues of concern in the Cox Communities and provide carriage and coverage of sporting and other events of interest to viewers in the Cox Communities;¹⁶ and
- WMDE has no measurable broadcast or MVPD viewership in the Cox Communities or the Washington, DC (Hagerstown) DMA.¹⁷

DISCUSSION

I. The Station Fundamentally Misunderstands The Relevance Of Its DMA Assignment To This Proceeding.

Having effectively admitted the absence of any market nexus between the Station and the Cox Communities under the statutory factors and the Commission's policies, and having failed to adduce any contrary evidence of its own (for understandable reasons), the Station's Opposition apparently stands solely on the repeated assertion that because "The Nielsen Company . . . has assigned WMDE to the Washington" DMA, "and because the CoxCom Cable Communities are all within" "the bullseye of the Washington DMA . . . WMDE is clearly entitled to carriage on CoxCom's cable systems."¹⁸ In essence, WMDE ignores the market modification factors relevant to this proceeding and instead argues that Nielsen's assignment of a Delaware Station to the Washington DMA automatically entitles the Station to carriage throughout the Washington DMA.

WMDE fundamentally misunderstands the relevance of its DMA assignment to this proceeding, however, and its argument is irreconcilable with the Commission's and the Act's broadcast carriage policies. In fact, the Bureau recently and specifically rejected Western Pacific's argument that the Commission:

should rely completely on Nielsen's DMA assignment for market modification purposes. To the contrary, the purpose of market modification is to determine a station's market based on an analysis of

¹⁴ *Id.* at 8-13.

¹⁵ *Id.* at 14-17.

¹⁶ *Id.* at 19-20.

¹⁷ *Id.* at 20-21.

¹⁸ Opposition at 1, 2, 3; *see also* Opposition at 6, 9.

certain statutory and other factors, a process distinct from that which Nielsen performs to determine its DMA assignments.¹⁹

Even more fundamentally, and contrary to the Station's argument, Congress never would have created the cable television market modification procedure reflected in Section 614 of the Act if it had intended to establish DMA-wide mandatory carriage requirements for cable operators, and the courts have recognized as much.²⁰ The Second Circuit Court of Appeals found that to support the value of localism and therefore "to better effectuate the purposes' of the 1992 Cable Act, [the FCC] must ensure the continuation of the local origination of programming;"²¹ *i.e.*, programming originated in the station's city of license.²² The Commission, moreover, has explicitly held that granting a station the ability to reach all viewers in its DMA, as WMDE essentially is advocating, would be inconsistent with the value of localism. The Commission specifically found that permitting the transmission of a station's signal "throughout a station's DMA, even on a secondary basis, threatens localism by distracting a station's focus from its community of license."²³ The Commission explained that this focus on the community of license was an essential goal of the broadcasting service:

¹⁹ *WHIO*, 28 FCC Rcd 16011, 16017 at para. 17 (Med. Bur. 2013). The Bureau similarly has held repeatedly that "the broadcast signal carriage rules were not intended to transform an otherwise local station into a regional 'super-station' that must be automatically carried in every single community in a [DMA]" *Time Warner Entertainment-Advance/Newhouse Partnership*, 11 FCC Rcd 6541, 6554 at para. 25 (1996); *see also, e.g., Time Warner Entertainment-Advance/Newhouse Partnership d/b/a Time Warner Cable*, 20 FCC Rcd 4249, 4253 (Med. Bur. 2005) (quoting *Time Warner v. KHIZ*, 19 FCC Rcd 18618, 18621 (2004)); *Frontiervision Operating Partners, L.P.*, 17 FCC Rcd 9332, 9340 at para. 17 (Med. Bur. 2002); *MetroCast Cablevision of New Hampshire, LLC*, 16 FCC Rcd 5244, 5251 at para. 18 (Cab. Serv. Bur. 2001).

²⁰ As Cox observed in the Petition, Congress understood that "a community within a station's [DMA] may be so far removed from the station it cannot be deemed part of the Station's market," H.R. REP. NO. 102-628, at 97 (1992) ("House Report"), and therefore authorized the Commission to better reflect those service and market realities by excluding certain communities from a station's must-carry market in light of the value of localism. Petition at 2.

²¹ *WLNY-TV, Inc. v. FCC*, 163 F.3d 137, 143 (2d Cir. 1998).

²² As demonstrated in the Petition, WMDE provides no local origination programming of any kind and no programming directed specifically to the Cox Communities in Fairfax, Virginia or to the Station's city of license in Dover, Delaware.

²³ Digital Television Distributed Transmission System Technologies, *Report and Order*, 23 FCC Rcd 16731, 16746 at para. 25 (2008) ("*DTS Order*").

Broadcasters . . . are licensed to local communities, not DMAs, and for good reason. This ensures that broadcasters are responsive to the unique interests and needs of the individual communities to which they are licensed. . . . [W]hen the Commission allocates channels for a new broadcast service, its first priority is to provide general service to an area, but its next priority is for facilities to provide the first local service to a community.²⁴

Contrary to the Station's claims, therefore, Nielsen's assignment of WMDE to the Washington DMA at Western Pacific's request is inapposite to this proceeding, and Cox's Petition is entirely consistent with congressional intent to allow DMA market modifications that will align carriage requirements with market realities and support the value of localism on which the Commission's broadcast carriage rules are based.

Western Pacific also conveniently fails to mention the circuitous route by which Delaware's WMDE came to be assigned to the Washington DMA,²⁵ but the Station's journey from the Salisbury DMA to the Philadelphia DMA, and then (upon request)²⁶ to the Washington DMA begs the question of whether Western Pacific has been gaming the Commission's rules to secure MVPD carriage of its Delaware Station in the Washington, DC metropolitan area. The Station's success in persuading Nielsen to re-assign WMDE from the Philadelphia DMA to the Washington DMA notwithstanding, however, the Commission has previously found that DMA reassignment made at a station's request, as in this case, creates no market nexus,²⁷ and all the other evidence in the record confirms that no market nexus exists between WMDE and the Cox Communities.

²⁴ *DTS Order*, 23 FCC Rcd at 16744-5, para. 22 (internal citations omitted). As this proceeding demonstrates, WMDE essentially has abandoned its city of license in Dover, Delaware to focus its attention on the more lucrative but distant Washington, DC metropolitan area.

²⁵ See Petition at 4-5.

²⁶ See *id.*, Ex. 4.

²⁷ *TCI of Illinois, Inc.*, 12 FCC Rcd 23231, 23242, n.34 (Cab. Serv. Bur. 1997); *Charter Communications*, 12 FCC Rcd 12173, 12184, para. 27 (Cab. Serv. Bur. 1997); *Market Modifications and the New York Area of Dominant Influence, Memorandum Opinion and Order*, 12 FCC Rcd 12262, 12271-72 at para. 19 (1997) ("*New York ADI Order*"), *aff'd*, *WLNY-TV, Inc. v. FCC*, 163 F.3d 137 (2d Cir. 1998).

II. WMDE Does Not Deny That The Statutory Factors And Other Determinative Market Facts Confirm The Station's Market Does Not Extend To The Cox Communities.

A. Historic Carriage.

Cox's Petition demonstrated that although WMDE is a relatively new station, WMDE's lack of historical carriage in the Cox Communities fully supports modification of the Station's market in light of the overwhelming additional evidence Cox provided.²⁸ That evidence, which WMDE tellingly fails to deny (because it cannot be denied), established the absence of any market nexus between the Station and the Cox Communities, and included indisputable evidence demonstrating, *e.g.*, no actual signal coverage, no local programming, abundant local programming provided by other broadcast stations carried in the Cox Communities, enormous distances and geographical barriers, no audience share, and no carriage of other distant Delaware or eastern Maryland stations by MVPDs in or around the Cox Communities.

Western Pacific's Opposition ignores the Commission's holdings that historic carriage is "not entirely discounted for new stations, nor are such stations exempt from the market modification process"²⁹ and claims that "historical carriage of WMDE in the CoxCom Cable Communities is simply not possible."³⁰ Western Pacific nevertheless points to very recent brief carriage by Verizon and Comcast in parts of the Washington DMA.³¹ As Cox explained in its Petition, however, of the seven MVPDs operating in Fairfax, County, Virginia, those are the only two carrying WMDE, and their carriage of WMDE pursuant to must-carry fails to satisfy the historic carriage factor under the Commission's precedents.³²

²⁸ Petition at 5-7.

²⁹ *See, e.g., Western Pacific Broadcast, LLC*, 29 FCC Rcd 1835, 1845 at para. 19 (Med. Bur. 2014). As discussed in the Petition, in such cases, the Commission typically relies more on Grade B coverage, geographic distance, non-cable audience share, and other market delineating factors to determine the scope of a station's market. *See* Petition at 6, nn.20-21 and cases cited therein.

³⁰ Opposition at 4.

³¹ *Id.* at 5-6.

³² Petition at 7 and n. 23 (citing *Bitmore Broadcasting, L.L.C.*, 17 FCC Rcd 7984, 7989-90 at para. 10 (Med. Bur. 2002); *Comcast Cablevision of Santa Maria, Inc.*, 13 FCC Rcd 24192, 24197, at para. 13 (Cab. Serv. Bur. 1998); *Dynamic Cablevision of Florida, Ltd.*, 11 FCC Rcd 9880, 9889, at para. 20 (Cab. Serv. Bur. 1996)).

Western Pacific also claims without support that Comcast carries WMDE “on nearly all its cable systems” in the Washington DMA.³³ Western Pacific fails to point out, however, that Comcast in fact declined to carry WMDE on any cable system where the Station failed to “deliver a good quality over-the-air signal.”³⁴ Cox’s Petition of course demonstrated, and Western Pacific admits (as it must), that WMDE cannot provide a “good quality over-the-air signal” to Cox’s Fairfax County, Virginia headend or in fact to any broadcast television viewers in the Cox Communities.

B. Signal Coverage And Local Programming Service.

Cox’s Petition demonstrated that WMDE fails to provide either a significant theoretical service contour or an actual viewable broadcast signal to Cox’s principal headend in Fairfax County or anywhere in the Cox Communities, that the Station is located approximately 100 miles from each of the Cox Communities, and that the Station provides no local programming directed to the Cox Communities. Cox supported its Petition with extensive evidence, including but not limited to a detailed and substantive Engineering Statement and no less than seventeen individual Signal Strength studies conducted pursuant to the Commission’s standards both at Cox’s principal headend and throughout the Cox Communities. The Station does not deny, and therefore admits, that it fails to provide an actual broadcast signal to any location in the Cox Communities, and, as further demonstrated below, its comments regarding WMDE’s theoretical signal coverage either are simply wrong or are irrelevant.

i. WMDE Admits It Fails To Provide Actual Signal Coverage To The Cox Communities.

Cox’s Petition included a certified Engineering Statement from Chesapeake RF Consultants, LLC.³⁵ That certified Engineering Statement established, among other things, that

³³ Opposition at 5.

³⁴ *Id.* Ex. 4 at 1. Comcast, of course, operates cable systems throughout Maryland, including on Maryland’s eastern shore nearby WMDE’s transmitter, so some of its cable systems, unlike Cox’s in Fairfax County, Virginia, may be able to receive WMDE’s signal.

³⁵ Petition, Ex. 2 (Certified Engineering Statement of Chesapeake RF Consultants, LLC). Cox’s Engineering Statement included, among other things, nine maps illustrating relevant

(continued . . .)

the Station's predicted 28 dB μ noise-limited service contour ("NLSC") fails to cover all but a *de minimis* portion of either the Cox Communities (10.9% overall) or the Washington DMA (13%), compared to nearly all of the Baltimore DMA (87.4%).³⁶ In addition, however, the Engineering Statement demonstrated that although signal levels predicted by the Longley-Rice methodology for a 28 dB μ threshold covered less than half of the Cox Communities (48.8%), the Commission has acknowledged that the signals of Low-Band VHF digital stations such as WMDE in fact cannot be received at a 28 dB μ level and instead would need a 20 dB increase in power (*i.e.*, a 48 dB μ receive signal level) for successful reception.³⁷ In addition to a 28 dB μ study, therefore, the Engineering Statement also applied a conservative 12 dB correction (rather than a justifiable 20 dB) to calculate a more accurate 40 dB μ minimum signal level threshold for WMDE. This additional Longley-Rice study demonstrates that only 4.7% of the Cox Communities are predicted to receive signals of 40 dB μ or more from WMDE and that a 40 dB μ contour fails to reach any of the Cox Communities.³⁸

Cox's Petition went far beyond simply offering evidence of predicted coverage, however. It also provided additional and extensive actual signal measurements, which as a factual matter verified the accuracy of the Engineering Statement's corrected 40 dB μ predicted contour for WMDE. These additional actual signal measurements provide "clear proof that the [28 dB μ] contour fails to reflect actual coverage,"³⁹ and confirms that WMDE's predicted 28 dB μ NLSC

(. . . *continued*)

community locations, geographic features, the Station's transmitter site, the cable system headend location, mileage between the Cox Communities and the Station's transmitter site and city of license, transportation routes, NLSC contours delineating the Station's predicted technical service area and showing the location of the cable system headend and the Cox Communities in relation to the Station's predicted service area.

³⁶ Petition at 9-10, Ex. 2 at 2-3 and Figures 2 and 3. As demonstrated in the Petition, under the Commission's precedents, such *de minimis* predicted coverage of the Cox Communities, is insufficient to demonstrate a market nexus. *See Mountain Broadcasting Corp.*, 27 FCC Rcd 2231, 2241 at para. 23 (Med. Bur. 2012); *Tennessee Broadcasting Partners*, 23 FCC Rcd 3928 at para. 74 (Med. Bur. 2008).

³⁷ Petition at 12-13, Ex. 2 at 3, 5-6 and Figures 6, 8, and 9.

³⁸ *Id.*

³⁹ *See New York ADI Order*, 12 FCC Rcd at 12271, para. 17; *see also* Petition, Ex. 2 (Engineering Statement).

and predicted 28 dB μ Longley-Rice signal thresholds do not reliably reflect the Station's actual technical service. Cox engineers conducted multiple tests of WMDE's (and WWTD's) signal at Cox's principal headend location in Fairfax, Virginia in strict accordance with the Commission's standards; despite Cox's use of a properly oriented antenna at a height of approximately 200 feet, and despite a Longley-Rice predicted signal level of 30.4 dB μ at Cox's headend, the distant WMDE repeatedly failed to deliver any detectable signal or of course any picture.⁴⁰ Fifteen additional actual signal tests conducted by the firm of Meintel, Sgrignoli & Wallace, LLC throughout the Cox Communities — including in areas both inside and outside the Station's 28 dB μ NLSC where Longley-Rice predicted field strength levels as strong as 38-48 dB μ — also demonstrated that no reception of WMDE is possible in the Cox Communities.⁴¹ Therefore, no reasonable doubt is possible that WMDE's signal cannot actually be received by Fairfax County broadcast television viewers inside or outside the Station's NLSC, even where Longley-Rice may predict 28 dB μ or greater field strength.

Western Pacific does not deny, and therefore admits, that WMDE fails to provide any actual broadcast signal coverage to the Cox Communities.⁴² Indeed, its Opposition neither acknowledges, addresses, disputes, nor attempts to rebut Cox's actual signal measurement evidence confirming the absence of WMDE's signal in the Cox Communities. Ignoring the inconvenient truths demonstrated in Cox's Petition, the Opposition instead either repeats irrelevant data regarding WMDE's predicted coverage that Cox irrefutably addressed and disproved in the Petition, or affirmatively misstates the relevance and application of WMDE's predicted coverage to this proceeding.

For example, Western Pacific asserts that if Cox "has, for some reason, conducted its Longley-Rice study using a cell size at variance from the guidance set out in OET Bulletin No. 69, [it] should not be permitted to impose reliance on a nonstandard study without any

⁴⁰ Petition, Ex. 5 (Cox Signal Tests, Documentation, and Declarations); *see also* Petition, Ex. 2 at 4.

⁴¹ Petition, Ex. 6 (Meintel, Sgrignoli & Wallace, LLC Signal Test, Documentation, and Declaration); *see also* Petition, Ex. 2 at 4 and Figure 7.

⁴² Opposition at 6-8.

justification whatsoever.”⁴³ This assertion is nothing more than a desperate, week-old red herring. First, inasmuch as Longley-Rice is a point-to-point methodology, decreasing the cell size increases the number of test points and correspondingly increases the resolution and accuracy of the predicted coverage. Second, WMDE’s feigned speculation regarding the cell size used in Cox’s Longley-Rice study is inappropriate; the Engineering Statement in Cox’s Petition explicitly reported that its predicted signal levels “were computed for a 0.1 km grid size using a terrain increment of 0.1 km with NED 3 arc-second digitized terrain data” (*i.e.*, twenty times more accurate than that suggested in OET 69).⁴⁴ Third, the Commission has explicitly stated that an OET 69 analysis “may be based on a finer resolution than that used in creating Appendix B of the *Order* and described in OET Bulletin No. 69 (cell size may be smaller than 2 km on a side).”⁴⁵ Fourth, nothing in the Commission’s rules requires adherence to OET 69 in market modification proceedings. Fifth, if WMDE prefers to restrict the analysis here to that specified in OET 69, it also must accept the limited Longley-Rice study area specified in OET 69, which is the Station’s 28 dB μ NLSC; in other words, OET 69 would exclude from consideration all but a *de minimis* portion of the Cox Communities,⁴⁶ and they *a fortiori* would be excluded from the Station’s market.

In addition, Western Pacific’s erroneous claim that the *Time Warner Cable, Inc.* case stands for the proposition that “‘pockets’ of [predicted] coverage in the cable communities is [*sic*] sufficient” to demonstrate actual signal coverage, is both wrong and misleading.⁴⁷ In fact, the *Time Warner* case more accurately stands for practically the opposite of what Western Pacific claims; namely, that the Bureau makes determinations under the signal coverage factor of the market modification test based on a totality of the evidence presented, and that evidence of

⁴³ *Id.* at 8 (footnote omitted).

⁴⁴ Petition, Ex. 2 at 3.

⁴⁵ Public Notice, *Additional Application Processing Guidelines for Digital Television (DTV)*, August 10, 1998.

⁴⁶ See OET Bulletin No. 69 (Feb. 6, 2004) at 2 and Table 2, attached hereto as Exhibit A.

⁴⁷ Opposition at n. 23.

actual signal coverage may supersede predicted signal coverage reflected by the Grade B and Longley-Rice methodologies.⁴⁸

In the final analysis, WMDE's broadcast signal cannot in fact be received anywhere in the Cox Communities, as the Station admits, which confirms the absence of any market nexus between the Cox Communities and the Station.

ii. WMDE Admits Enormous Distances Preclude Any Market Nexus Between The Station And The Cox Communities.

As Cox demonstrated in its Petition, WMDE's inability to provide an actual broadcast signal anywhere in the Cox Communities is easily explained by the vast distances between the Cox Communities in the Washington DMA and both the Station's Delaware city of license in the Philadelphia DMA and its transmitter on Maryland's eastern shore in the Baltimore DMA.⁴⁹ Cox also noted that such distances (an average of 97.8 miles between Dover, Delaware and the Cox Communities) exceed those the Commission previously has found to justify market modifications,⁵⁰ and, as a factual matter, preclude any market nexus between the Station and the Cox Communities.⁵¹

Western Pacific does not deny, indeed it fails to address in any manner, the issue of the enormous distances separating the distinct markets in which WMDE and the Cox cable system in Fairfax, Virginia operate. In a *res ipsa loquitur* moment, therefore, Western Pacific has admitted that the Station and the Cox Communities are not in the same market.

⁴⁸ *Time Warner Cable, Inc.*, 24 FCC Rcd 4423, 4433 at para. 14 (Med. Bur. 2009) (considering evidence of predicted Grade B coverage, predicted Longley-Rice coverage, actual signal coverage, geographic proximity, and geographic features such as mountain ranges, urban environments, and large bodies of water under the coverage and local service factor).

⁴⁹ Petition at 13-14, Ex. 2 (Engineering Statement), Ex. 7 (Distance Calculations), and Ex. 8 (Driving Distances and Estimated Driving Times).

⁵⁰ Petition at 14 and cases cited in Petition n.50.

⁵¹ Petition at 14.

iii. WMDE Admits It Fails To Provide Any Programming Directed Specifically To The Cox Communities.

Cox's Petition conclusively demonstrated that WMDE provides only general interest programming with no particular local focus, and no programming directed specifically to the Cox Communities.⁵² Cox provided extensive evidence to support its demonstration, including among other things WMDE's Program Schedule, WMDE's own Presentation and Programming Descriptions, and WMDE's Most Significant Issues Programs Lists.⁵³

The Station's response consists of a single completely unsupported and vague statement that its "programming is geared toward viewers throughout the DMA."⁵⁴ WMDE, however, fails to deny, provide any evidence to rebut, or otherwise address Cox's demonstration regarding the local programming factor. The Station therefore admits that it provides no programming directed specifically to the Cox Communities. Moreover, WMDE's assertion that its "programming is geared toward viewers throughout the [Washington] DMA,"⁵⁵ is an explicit admission that WMDE's programming is neither geared toward the Cox Communities nor toward any community specifically. This includes, of course, WMDE's city of license in Dover, Delaware, which is the Philadelphia rather than the Washington DMA. How WMDE's assertion that its programming is geared to viewers in a different DMA could be consistent with WMDE's heartfelt assertion that "WMDE takes its commitment to serve its community of license, Dover, Delaware, very seriously" is a mystery. In any case, WMDE has admitted it provides no programming directed specifically to the Cox Communities.

C. Local Coverage Of The Cox Communities By Other Broadcasters.

Cox's Petition demonstrated that in contrast to WMDE's failure to provide any local service to the Cox Communities, viewers in those communities receive abundant coverage of local interests and concerns from the numerous other local programming sources that Cox

⁵² Petition at 14-18.

⁵³ Petition Ex. 9, Ex. 10, and Ex. 11.

⁵⁴ Opposition at 6.

⁵⁵ *Id.*

carries.⁵⁶ As discussed in the Petition, those programming sources include at least six local broadcast stations, a 24-hour locally focused cable news channel, and fifteen (15) government, educational, and public access channels.⁵⁷ Cox's documentary evidence included channel guides, samples of local news programming and local programming hours, and electronic links to its local franchise agreements.⁵⁸ Cox also demonstrated that under the Commission's well-established policies, in these circumstances, local coverage by other broadcasters takes on greater weight in the market modification analysis.⁵⁹

Western Pacific does not deny, and therefore admits, that viewers in the Cox Communities receive abundant coverage of local interests and concerns from the other broadcast and non-broadcast programming Cox carries. Western Pacific claims, however, that "Congress intended the third statutory factor to serve only as an enhancement for a television station seeking to add communities to its market."⁶⁰ Western Pacific is wrong and its claim is misleading.⁶¹ In fact, the Commission uniformly has held that "when considering the exclusion of a station from a market, the Commission reviews whether other stations offer local programming" and has found the carriage of other "television stations [that are] more proximate

⁵⁶ See 47 U.S.C. § 534(h)(1)(C)(ii)(IV).

⁵⁷ Petition at 19-20.

⁵⁸ See *id.*, Petition Ex. 12 and Ex. 13.

⁵⁹ See, Petition at n.70 (citing *e.g.*, *Hispanic Broadcasters*, 19 FCC Rcd at 2614, para. 14; *Marcus Cable Associates, LLC*, 14 FCC Rcd 1 (Cab. Serv. Bur. 1998); *Service Electric Cable TV, Inc.*, 12 FCC Rcd 13299, 13309 at para. 24 (Cab. Serv. Bur. 1997)).

⁶⁰ Opposition at 8.

⁶¹ Even the cases Western Pacific cites fail to support its claim. For example, in *WHIO*, the Bureau stated that "we believe Congress intended for this third statutory criterion to enhance a station's market modification claim where it could be shown that other stations did not serve the communities at issue. Because other stations do serve the communities, this factor neither weighs against nor in favor of WHIO's modification request." *WHIO*, 28 FCC Rcd at 16019, para 22 (emphasis added). In other words, where a station is seeking to add communities to its market, the absence of service to those communities by other broadcasters militates in favor of the station's request. Contrary to Western Pacific's claim, however, this does not in any way limit the applicability of this factor in considering the deletion of communities from a station's market.

and provide local service to the cable communities” to be a factor weighing in favor of a market modification deleting cable communities from a station’s market.⁶²

Therefore, as demonstrated in Cox’s Petition, this factor further confirms that deletion of the Cox Communities from WMDE’s must-carry market will implement Congress’s directive for the Commission to “afford particular attention to the value of localism” in market modification cases.⁶³

D. Evidence of Viewing Patterns.

Cox’s Petition demonstrated that WMDE had no reportable viewing for either MVPD or non-MVPD households in Fairfax County, and that the Station also is not included in the television program listings of the area’s major newspaper, *The Washington Post*.⁶⁴ Cox observed that “the Bureau relies more on the station’s service contour, together with all the other statutory and additional factors, to delineate a new station’s market,”⁶⁵ but nevertheless has held that “the dearth of audience is of evidential significance when linked with other information regarding the market, including lack of Grade B coverage, geographic distance, and the absence of noncable audience share in the relevant communities.”⁶⁶ As demonstrated in the Petition, in this case, that other information (the Station’s failure to provide any broadcast signal or any programming directed to the Cox Communities, the geographic distances separating these distinct markets, *etc.*) combined with WMDE’s failure to achieve any reportable cable or non-cable viewing, confirms that the Station and the Cox Communities operate in different economic markets.

Western Pacific does not deny, and therefore admits, that it has no reportable viewing in Fairfax County, and otherwise fails to adduce any other information or evidence that could

⁶² *Massillon Cable TV, Inc.* 26 FCC Rcd 15221, 15231 at para. 16 (Med. Bur. 2011). *See also, e.g., U.S. Cablevision Corp.*, 12 FCC Rcd 21144, 21152 (Cab. Serv. Bur. 1997) (another factor to consider could be the availability of other more local television stations in the relevant communities).

⁶³ 47 U.S.C. § 534(h)(1)(C)(ii).

⁶⁴ *See* Petition at 20-21, Ex. 14 (Nielsen ratings), and Ex. 15 (Washington Post television listings).

⁶⁵ *See id.* (citing *Western Pacific Broadcast, LLC*, 29 FCC Rcd at 1848, para. 27).

⁶⁶ *Cablevision of Monmouth, Inc.*, 11 FCC Rcd 9314, 9322 at para. 19 (Cab. Serv. Bur. 1996).

establish a market nexus with the Cox Communities.⁶⁷ This is unsurprising because no such evidence exists.

E. Determinative Geographic, Economic, And Political Factors.

In addition to the statutorily enumerated factors, which uniformly reflect the wholly distinct television markets to which WMDE and the Cox Communities belong, Cox's Petition documented a plethora of additional geographic, economic and political realities that further strengthen the conclusion that an analysis of the statutory factors confirms.⁶⁸ These additional factors include, for example: (i) market separating geographic features such as enormous distances, the expansive Washington DMA (which encompasses four states and the District of Columbia) as well as recognized market separating terrain features including the Chesapeake Bay and the Potomac River; and (ii) economic factors such as the dearth of commuting between the markets as reported by the U.S. Census, and the expert determinations of Rand-McNally's Rationally Metro Area standard and the U.S. Office of Management and Budget's Metropolitan Statistical Area classification.⁶⁹

For what are understandable reasons, Western Pacific fails even to address any of these market determinative factors, and it therefore admits that these factors demonstrate the Station and the Cox Communities belong in different television markets.

III. The Bureau Should Reject Western Pacific's Unsupported And Unverified Opposition.

Under both the Commission's rules and its precedents, Western Pacific's failure to deny the substantive factual bases of Cox's Petition constitutes an admission that the Station and the Cox Communities operate in different markets.⁷⁰ Moreover, the Commission routinely and

⁶⁷ Opposition at 9.

⁶⁸ Petition at 21-26.

⁶⁹ *Id.*, Ex. 2, figure 2; Ex. 7, Ex. 8, Ex. 17, Ex. 18, Ex. 19.

⁷⁰ See 47 C.F.R. §§ 76.7(b)(2)(v), 1.724(d) (averments in a complaint are deemed to be admitted when not denied in the answer); see also, e.g., *Star Broadcasting Limited v. Brownwood Cable*, 18 FCC Rcd 16446, 16447 (Med. Bur. 2003); *APCC Services, Inc. v. Intelco*, 28 FCC Rcd 1911, 1915 (Enf. Bur. 2013); *APCC Services, Inc. v. TS Interactive*, 17 FCC Rcd 25523, 25526 (Enf. Bur. 2002).

properly rejects unsupported assertions, such as Western Pacific's, that are countered by documentary evidence, verified statements, or affidavits, such as the ones Cox has submitted in this proceeding.⁷¹

The Commission's rules require that "[f]acts must be supported by relevant documentation or affidavit,"⁷² and that "[e]ach submission must contain a written verification that the signatory has read the submission and to the best of his or her knowledge, information and belief formed after reasonable inquiry, it is well grounded in fact and is warranted by existing law or a good faith argument for the extension, modification or reversal of existing law; and that it is not interposed for any improper purpose."⁷³ In light of these requirements and Western Pacific's failure to abide by them, Bureau should reject Western Pacific's unsupported and unverified assertions and credit Cox's fully supported and verified demonstrations that the Cox Communities and the Station operate in separate markets.

⁷¹ See, e.g., *Mid-Maine Community Broadcasting*, 13 FCC Rcd 20324 at n.8 (1998) (representations in opposition supported only by general declaration without further evidence not credited); *International Telecharge Inc. v. Southwestern Bell Telephone Company, et al.*, 11 FCC Rcd 10061, 10076 (Comm. Car. Bur. 1996) (rejecting "unverified chart" because "counsel's argument cannot substitute for evidence"); *Comcast Cablevision of Philadelphia, Inc.*, 18 FCC Rcd 22020, 22024 n.19 (Med. Bur. 2003) ("no evidentiary value may be given to the unverified "Longley-Rice" contour provided by Comcast"); *Engle Broadcasting v. Comcast of Southern New Jersey*, 16 FCC Rcd 17650, 17652 (Cab. Serv. Bur. 2001) ("We resolve this evidentiary conflict by accepting the verified statement offered by Comcast.").

⁷² 47 C.F.R. § 76.6(a)(3).

⁷³ 47 C.F.R. § 76.6(a)(4).

CONCLUSION

As Cox's Petition and the foregoing demonstrate, affording must-carry status to Delaware's WMDE in the Cox Communities would contradict congressional intent to support the value of localism. The Media Bureau, therefore, should grant Cox's Petition forthwith and exclude the Cox Communities from WMDE's must-carry market.

Respectfully submitted,

CoxCom, LLC



Gary S. Lutzker

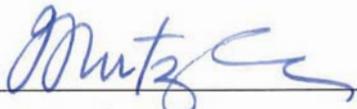
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July 20, 2015

Verification

To the best of my knowledge, information and belief formed after reasonable inquiry, this Reply to Opposition is well grounded in fact and is warranted by existing law or a good faith argument for the extension, modification or reversal of existing law, and it is not interposed for any improper purpose.



Gary S. Lutzker

July 20, 2015

CERTIFICATE OF SERVICE

I, Sandra Jeter, a secretary at the law firm of BakerHostetler, LLP, certify that on this twentieth day of July 2015, I caused the foregoing Reply to Opposition to be served by first-class mail, except where electronic delivery is indicated, on the following:

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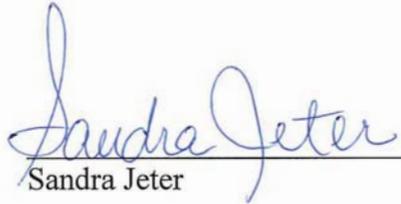
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EXHIBIT A

OET Bulletin No. 69



OET BULLETIN No. 69

Longley-Rice Methodology

for

Evaluating TV Coverage and Interference

February 06, 2004

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I. INTRODUCTION

This Bulletin provides guidance on the implementation and use of Longley-Rice methodology for evaluating TV service coverage and interference in accordance with Sections 73.622, 73.623 and 74.704 of the FCC rules, 47 C.F.R. §§ 73.622, .623, and 74.704. Bulletin No. 69 explains technical details of the *Sixth Report and Order* in MM Docket No. 87-268, FCC 97-115, adopted April 3, 1997. The Longley-Rice radio propagation model is used to make predictions of radio field strength at specific geographic points based on the elevation profile of terrain between the transmitter and each specific reception point. A computer is needed to make these predictions because of the large number of reception points that must be individually examined. Computer code for the Longley-Rice point-to-point radio propagation model is published in an appendix of NTIA Report 82-100, *A Guide to the Use of the ITS Irregular Terrain Model in the Area Prediction Mode*, authors G.A. Hufford, A.G. Longley and W.A. Kissick, U.S. Department of Commerce, April 1982. Some modifications to the code were described by G.A. Hufford in a memorandum to users of the model dated January 30, 1985. With these modifications, the code is referred to as Version 1.2.2 of the Longley-Rice model. This version is used by the FCC for its evaluations.

The Bulletin is divided into three parts. Part 1 provides information on evaluating TV service area or coverage. Part 2 provides information on evaluating interference to the service areas of both analog NTSC and digital television (DTV) stations. Part 3 provides information on implementation of the FCC's Longley-Rice Computer program.

The present document updates the previous version that was published on July 2, 1977. Internet references point to currently available FCC web pages. Certain adjacent-channel D/U ratios have been corrected as indicated in Table 5A. Otherwise, the changes are of an editorial nature, and the program parameters given here are exactly those used by the Media Bureau in processing applications for new or modified stations.

II. PART 1: EVALUATION OF SERVICE

The Area Subject to Calculation

Under the FCC's rules, computation of a TV station's service area or coverage using the Longley-Rice methodology is limited to the areas within certain specific geographic contours.

For analog TV, computations are made inside the conventional Grade B contour defined in Section 73.683 of the FCC rules, 47 C.F.R. § 73.683, with the exception that the defining field for UHF channels is modified by subtracting a dipole factor equal to $20 \log[615/(\text{channel mid-frequency in MHz})]$. Thus the area subject to calculation for analog TV consists of the geographic points at which the field strength predicted for 50% of locations and 50% of time by FCC curves is at least as great as the values given in Table 1 below. The relevant curves for predicting these fields are the F(50, 50) curves found in Section 73.699 of FCC rules, 47 C.F.R. § 73.699.

Table 1
Field Strengths Defining the Area Subject to Calculation for Analog Stations

Channels	Defining Field Strength, dBu, to be predicted using F(50, 50) curves
2 - 6	47
7 - 13	56
14 - 69	$64 - 20 \log[615/(\text{channel mid-frequency in MHz})]$

For digital television stations, service is evaluated inside contours determined by DTV planning factors in combination with field strength curves derived for 50% of locations and 90% of the time from curves which are also found in Section 73.699 of FCC rules. The family of FCC propagation curves for predicting field strength at 50% of locations 90% of the time is found by the formula $F(50, 90) = F(50, 50) - [F(50, 10) - F(50, 50)]$. That is, the F(50, 90) value is lower than F(50, 50) by the same amount that F(50, 10) exceeds F(50, 50).

The defining field strengths for DTV service are shown in Table 2. They are determined from the DTV planning factors identified in Table 3. They are used first to determine the area subject to calculation using FCC curves, and subsequently to determine whether service is present at particular points within this area using Longley-Rice terrain-dependent prediction.

Table 2
Field Strengths Defining the Area subject to Calculation for DTV Stations

Channels	Defining Field Strength, dBu, to be predicted for 50% of locations, 90% of time
2 - 6	28
7 - 13	36
14 - 69	$41 - 20 \log[615/(\text{channel mid-frequency in MHz})]$

For digital TV three different situations arise:

1) For DTV stations of the initial allotment plan located at the initial reference coordinates, the area subject to calculation extends in each direction to the distance at which the field strength predicted by FCC curves falls to the value identified in Table 2. The bounding contour is identical, in most cases, to that of the analog station with which the initial allotment is paired. The initial allotment plan and reference coordinates are set forth in Appendix B of the *Sixth Report and Order* in MM

Docket No. 87-268 concerning Digital Television Allotments, adopted April 3, 1997, 12 FCC Rcd 14588 (1997).

- 2) For new DTV stations, the area subject to calculation extends from the transmitter site to the distance at which the field strength predicted by FCC curves falls to the value identified in Table 2.
- 3) In the case where a DTV station of the initial allotment has moved, the area subject to calculation is the combination (logical union) of the area determined for the initial allotment and the area inside the contour which would apply in the case of a new DTV station.

Planning Factors

The planning factors shown in Table 3 lead to the values of field strength given above in Table 2 to define the area subject to calculation for DTV stations. These planning factors are assumed to characterize the equipment, including antenna systems, used for home reception. They determine the minimum field strength for DTV reception as a function of frequency band and as a function of channel number in the UHF band.

Table 3
Planning Factors for DTV Reception

Planning Factor	Symbol	Low VHF	High VHF	UHF
Geometric mean frequency (MHz)	F	69	194	615
Dipole factor (dBm-dBu)	K_d	-111.8	-120.8	-130.8
Dipole factor adjustment	K_a	none	none	see text
Thermal noise (dBm)	N_t	-106.2	-106.2	-106.2
Antenna Gain (dBd)	G	4	6	10
Downlead line loss (dB)	L	1	2	4
System noise figure (dB)	N_s	10	10	7
Required Carrier to Noise ratio (dB)	C/N	15	15	15

The adjustment, $K_a = 20 \log[615/(\text{channel mid-frequency in MHz})]$, is added to K_d to account for the fact that field strength requirements are greater for UHF channels above the geometric mean frequency of the UHF band and smaller for UHF channels below that frequency. The geometric mean frequency, 615 MHz, is approximately the mid-frequency of channel 38.

The modified Grade B contour of analog UHF stations is determined by applying this same adjustment factor to the Grade B field strength given in Section 73.683 of the rules. With this

dipole factor modification, the field strength defining the Grade B of UHF channels becomes $64 - 20 \log[615/(\text{channel mid-frequency in MHz})]$ dBu, in place of simply 64. Thus the modified Grade B contour for channel 14 is determined by a median field strength of 61.7 dBu, and the value for channel 51 is 66.3 dBu. This modified Grade B contour bounds the area subject to Longley-Rice calculations for analog stations.

The values appearing in Table 2 follow from the planning factors. They are found from Table 3 by solving the equation: $\text{Field} + K_d + K_a + G - L - N_t - N_s = C/N$.

For a new DTV station with a particular authorized set of facilities, the values given in Table 2 will determine the contour within which the FCC will make all subsequent calculations of service and interference.

Reference Value of ERP for DTV Operation

The initial allotment plan, set forth in Appendix B of the *Sixth Report and Order*, establishes a reference value for the effective radiated power (ERP) of DTV stations. This ERP is the maximum of the values needed to match the service contour of the paired analog station in each direction supposing that the new station operates at the same location with the same antenna height. The reference ERP was calculated using the following methodology:

The distance to the existing analog grade B contour was determined in each of 360 uniformly spaced compass directions starting from true north using linear interpolation of available data as necessary. This determination was made using information in the FCC engineering database of April 3, 1997, including directional antenna data, and from terrain elevation data at points separated by 3 arc-seconds of longitude and latitude. FCC curves (Section 73.699 of FCC rules) were applied in the usual way, as described in Section 73.684 of the rules, 47 C.F.R. § 73.684, to find this grade B contour distance, with the exception that dipole factor considerations were applied to the field strength contour for UHF.

Height above average terrain was determined every 45 degrees from terrain elevation data in combination with the height of the transmitter radiation center above mean sea level, and by linear interpolation for compass directions in between. In cases where the Media Bureau Consolidated Database System (CDBS) indicates that a directional antenna is employed, the ERP in each specific direction was determined through linear interpolation of the relative field values describing the directional pattern. (The directional pattern stored in the CDBS provides relative field values at 10 degree intervals and may include additional values in special directions. The result of linear interpolation of these relative field values is squared and multiplied by the overall maximum ERP listed for the station in the CDBS to find the ERP in a specific direction.)

The corresponding values of ERP for DTV in each direction were then calculated by a further application of FCC curves, with noise-limited DTV coverage defined as the presence of the field strengths identified in Table 2 at 50% of locations and 90% of the time. These ERP values were computed for all 360 azimuths using the same radial-specific height above average terrain as for the analog TV case, but now in conjunction with F(50, 90) curves.

Finally, the ERP for DTV was modified so that it does not exceed 1 megawatt and is not less than 50 kilowatts. This was been done by scaling the azimuthal power pattern rather than by truncation. Thus if replication by FCC curves as described above requires an ERP of 2 megawatts, the power pattern is reduced by a factor of 2 in all directions. The resulting ERP is the reference value cited in Section 73.622 of the rules.

DTV Transmitting Antenna Patterns

In general, these computations of DTV power to match the distance to the grade B contour of an analog station result in ERP values which vary with azimuth. For example, the azimuthal ERP pattern which replicates in UHF the grade B contour of an omnidirectional VHF operation will be somewhat distorted because terrain has a different effect on propagation in the two bands. In addition, the 90% time variability allowance for DTV has an effect on the DTV pattern. Thus the procedure described above effectively derives a new directional antenna pattern wherever necessary for a precise match according to FCC curves.

These DTV azimuthal patterns may be calculated using the procedure outlined above. In addition, these patterns are retained in the CDBS. They are available for downloading at <http://www.fcc.gov/mb/databases/cdbs>, and searches can be made for particular antennas at <http://www.fcc.gov/mb/video>. The format for describing DTV transmitting antenna patterns is identical to the historical format for analog stations. Relative field values are given at intervals of 10 degrees, and supplemental values are given at special azimuths. For DTV patterns, special azimuths are included where the pattern factor is unity but both bracketing factors at 10-degree azimuths are less.

Application of the Longley-Rice Methodology

The area subject to calculation is divided into rectangular cells, and the Longley-Rice point-to-point propagation model Version 1.2.2 is applied to a point in each cell to determine whether the predicted field strength is above the value found in Table 1 or Table 2, as appropriate. The values identified in those tables are considered to be thresholds for reception in the absence of interference. For cells with population, the point chosen by the FCC computer program is the population centroid; otherwise it is the geometric center; and the point so determined represents the cell in all subsequent service and interference calculations. The station's directional transmitting antenna pattern, if any, is taken into account in determining the ERP in the direction of each cell. Cells 2 kilometers on a side were used to produce the service and interference data appearing in Appendix B of the *Sixth Report and Order*.

Those desiring to implement the Longley-Rice model in their own computer program to make these calculations should consult NTIA Report 82-100, *A Guide to the Use of the ITS Irregular Terrain Model in the Area Prediction Mode*, authors G.A. Hufford, A.G. Longley and W.A. Kissick, U.S. Department of Commerce, April 1982. The report may be obtained from the U.S. Department of Commerce, National Technical Information Service, Springfield, Virginia, by requesting Accession No. PB 82-217977.

Parameter values set in the Longley-Rice Fortran code as implemented by the FCC are given in Table 4. In addition to these parameters, execution of the code requires a specification of the percent of time and locations at which the predicted fields will be realized or exceeded, and a third percentage identifying the degree of confidence desired in the results. To predict DTV service at cells of the area subject to calculation, the FCC sets the location variability at 50% and the time variability at 90%. The percent confidence is set at 50% indicating that we are interested in median situations. All of these values are the same as the ones used in the computer program developed in the years 1996-1997 by an industry group, the Broadcasters' Caucus, to evaluate various DTV allotment tables.

Table 4

Parameter Values Used in FCC Implementation of the Longley-Rice Fortran Code

Parameter	Value	Meaning/Comment
EPS	15.0	Relative permittivity of ground.
SGM	0.005	Ground conductivity, Siemens per meter.
ZSYS	0.0	Coordinated with setting of EN0. See page 72 of NTIA Report.
EN0	301.0	Surface refractivity in N-units (parts per million).
IPOL	0	Denotes horizontal polarization.
MDVAR	3	Code 3 sets broadcast mode of variability calculations.
KLIM	5	Climate code 5 for continental temperate.
HG(1)	see text	Height of the radiation center above ground.
HG(2)	10 m	Height of TV receiving antenna above ground.

HG(1) in Table 4 is the height of the radiation center above ground. It is determined by subtracting the ground elevation above mean sea level (AMSL) at the transmitter location from the height of the radiation center AMSL. The latter is found in the CDBS while the former is retrieved from the terrain elevation database as a function of the transmitter site coordinates also found in the CDBS. If the coordinates are wrong, the antenna may be seen as under ground. This shouldn't happen, but if it does the FCC computer program replaces the radiation center height AMSL with the ground elevation at the given coordinates plus the height above average terrain found for the station in the CDBS.

Finally, terrain elevation data at uniformly spaced points the between transmitter and receiver must be provided. The FCC computer program is linked to a terrain elevation database with values every 3 arc-seconds of latitude and longitude. The program retrieves elevations from this database at regular intervals with a spacing increment which is chosen at the time the program is compiled; the

computer runs that evaluated service and interference for the *Sixth Report and Order* used a spacing increment of 1 kilometer. The elevation of a point of interest is determined by linear interpolation of the values retrieved for the corners of the coordinate rectangle in which the point of interest lies.

Evaluations of service coverage and interference using finer spacing increments are expected to be consistent with those using 1 kilometer. Evaluations using cells smaller than 2 km on a side are also expected to be consistent with the evaluations given in Appendix B of *Sixth Report and Order*.

III. PART 2: EVALUATION OF INTERFERENCE

The presence or absence of interference in each grid cell of the area subject to calculation is determined by further application of Longley-Rice. Radio paths between undesired TV transmitters and the point representing each cell are examined. The undesired transmitters included in the analysis of each cell are those which are possible sources of interference at that cell, considering their distance from the cell and channel offset relationships. For each such radio path, the Longley-Rice procedure is applied for median situations (that is, confidence 50%), and for 50% of locations, 10% of the time.

The interference analysis examines only those cells that have already been determined to have a desired field above the threshold for reception given in Table 1 for analog stations and Table 2 for DTV stations. A cell being examined is counted as having interference if the ratio of the desired field to that of any one of the possible interference sources is less than a certain critical minimum value. The comparison is made after applying the discrimination effect of the receiving antenna. The critical value is a function of the channel offset relationship.

Cells of the area subject to calculation for an analog station are examined first as to whether the desired signal is above the threshold for reception, second with regard to whether there is interference from another analog station, and finally as to whether there is interference from DTV stations. Thus a DTV station does not cause interference to analog stations in places where there is no service because of a weak desired signal, or in places where interference from other analogue stations already exists.

D/U Ratios

Criteria for the ratio of desired to undesired field strength are specified in Section 73.623 of FCC rules for interference involving DTV stations as desired or undesired. These criteria are summarized in Tables 5A, 5B, and 5C.

Tables 5A, 5B, and 5C also include the criteria for interference between analog stations used in preparing the service and interference evaluation in Appendix B of the *Sixth Report and Order*. The FCC continues to apply an analog-into-analog interference analysis using these criteria for consistency with the *Sixth Report and Order*. DTV stations are therefore allowed to modify their facilities without consideration of possible interference to analog stations where interference from other analog stations already exists.

Table 5A
Interference Criteria for Co- and Adjacent Channels¹

Channel Offset	D/U Ratio, dB			
	Analog into Analog	DTV into Analog	Analog into DTV	DTV into DTV
-1 (lower adjacent)	-3	-14	-48	-28
0 (co-channel)	+28	+34	+2	+15
+1 (upper adjacent)	-13	-17	-49	-26

The evaluation of service and interference in Appendix B of the *Sixth Report and Order* considered taboo channel relationships for interference into DTV. However, the D/U ratios (approximately -60 dB) were such that they rarely if ever had an effect on the results, and the FCC rules adopted in the *Sixth Report and Order* do not require attention to UHF taboo interference to DTV stations.

The D/U ratios for co-channel interference to DTV service in Table 5A are only valid at locations where the signal-to-noise ratio is 28 dB or greater for interference from DTV and 25 dB or greater for interference from analog TV service. At the edge of the noise-limited service area, where the signal-to-noise (S/N) ratio is 16 dB, the co-channel D/U ratios are 21 dB and 23 dB for interference from analog TV and DTV, respectively. At locations where the S/N ratio is greater than 16 dB but less than 28 dB, D/U values for co-channel interference to DTV are as follows:

To protect DTV reception from DTV co-channel interference, minimum D/U ratios are computed from the following formula:

$$D/U = 15 + 10\log_{10}[1.0/(1.0-10^{-x/10})], \quad \text{where } x = S/N - 15.19 \text{ dB.}$$

The quantity x is the amount by which the actual desired S/N exceeds the minimum required for DTV reception.

To protect DTV reception from analog co-channel interference, minimum D/U ratios are found from Table 5B. Use linear interpolation for S/N values between those given in the table.

¹ The adjacent-channel D/U ratios given in this table for interference from DTV transmissions are corrections of those published with the July 1997 version of this bulletin. The values given here agree with those used in the *Sixth Report and Order* and with the computer program now used by the Media Bureau to evaluate applications for new and modified stations as well as predecessors of that program.

Table 5B

Minimum Co-channel D/U Ratios for Analog Interference to DTV

DTV Signal-to-Noise Ratio (S/N) in the Absence of Interference, dB	Desired-to-Undesired Ratio to Protect DTV reception from Co-channel Analog Transmissions, dB
16.00	21.00
16.35	19.94
17.35	17.69
18.35	16.44
19.35	7.19
20.35	4.69
21.35	3.69
22.35	2.94
23.35	2.44
25.00	2.00

Receiving Antenna Pattern

The receiving antenna is assumed to have a directional gain pattern which tends to discriminate against off-axis undesired stations. This pattern is a planning factor affecting interference. The specific form of this pattern was chosen by a working group of the FCC Advisory Committee for Advanced Television Service. It is built into the service and interference computer program developed by the Broadcasters' Caucus and also used in the FCC program.

The discrimination, in relative volts, provided by the assumed receiving pattern is a fourth-power cosine function of the angle between the lines joining the desired and undesired stations to the reception point. One of these lines goes directly to the desired station, the other goes to the undesired station. The discrimination is calculated as the fourth power of the cosine of the angle between these lines but never more than represented by the front-to-back ratios identified in Table 6. When both desired and undesired stations are dead ahead, the angle is 0.0 giving a cosine of unity so that there is no discrimination. When the undesired station is somewhat off-axis, the cosine will be less than unity bringing discrimination into play; and when the undesired station is far off axis, the maximum discrimination given by the front-to-back ratio is attained.

Table 5C
Interference Criteria for UHF Taboo Channels
(NC means Not Considered)

Channel Offset Relative to Desired Channel N	D/U Ratio, dB			
	Analog into Analog	DTV into Analog	Analog into DTV	DTV into DTV
N - 8	-32	-32	NC	NC
N - 7	-30	-35	NC	NC
N - 4	NC	-34	NC	NC
N - 3	-33	-30	NC	NC
N - 2	-26	-24	NC	NC
N + 2	-29	-28	NC	NC
N + 3	-34	-34	NC	NC
N + 4	-23	-25	NC	NC
N + 7	-33	-43	NC	NC
N + 8	-41	-43	NC	NC
N + 14	-25	-33	NC	NC
N + 15	-9	-31	NC	NC

Table 6
Front-to-Back Ratios Assumed for Receiving Antennas

TV Service	Front-to-Back Ratios, dB		
	Low VHF	High VHF	UHF
Analog	6	6	6
DTV	10	12	14

IV. PART 3: THE FCC LONGLEY-RICE COMPUTER PROGRAM

The FCC computer program is available as Fortran code. It is complex, and many of its options are available only by recompilation for each case of interest. The individual installing it should have computer programming skills and experience as a system administrator of the computer system on which it is to be installed because linking the data files, which occupy 1.6 gigabytes of disk space, will be a site-specific task. The FCC compiles and runs the program on Sun Microsystem Enterprise 3500 and UltraSPARC computers. The Fortran code currently used by the Media

Bureau to evaluate new proposals is available for downloading from the FCC internet site at <http://www.fcc.gov/oet/dtv>, and the code used to produce the information presented in Appendix B of the *Sixth Report and Order* is also available there.

Outline of Evaluation Procedure

The examination of each station proceeds as follows:

- 1) The area subject to calculation is boxed in latitude and longitude. This is performed by proceeding around the compass and finding the latitude and longitude of points at 5 degree azimuth increments on the bounding contour. The maxima and minima of the resulting list of latitudes and longitudes determine a coordinate box.
- 2) The coordinate box is divided into square cells of a chosen size which should be 2 km on a side or smaller, adjusting the coordinate box to be slightly larger if necessary to accommodate an integer number of cells. The cells must be an integer number of latitude seconds high and an integer number of longitude seconds wide.
- 3) The coordinates of census blocks falling inside each cell are retrieved along with the population of each block. From this information the total population and the coordinates of the cell centroid are determined for each cell.
- 4) The Longley-Rice propagation model is then applied as in Part 1, Evaluation of Service, and Part 2, Evaluation of Interference. The output information is organized as shown in Figure 1.

Longley-Rice Parameters

See Table 4 and accompanying text.

Identification of Potentially Interfering Stations

Stations that may be a source of interference are identified as a function of distance and channel relationships. This is performed independently for each cell. Only those stations whose distance from the cell of interest is less than the value given in Table 7 are considered as potential sources of interference.

Figure 1
Form of FCC Longley-Rice Program Output

Analysis of Analog Station IL SOME CITY, Channel 9		
	POPULATION	AREA (sq km)
within Noise Limited Contour	610288	14667.4
not affected by terrain losses	604312	14165.4
lost to NTSC IX	0	0.0
lost to additional IX by DTV	0	4.0
lost to all IX	0	4.0
Analysis of DTV Station IL SOME CITY, Channel 32		
	POPULATION	AREA (sq km)
within Noise Limited Contour	610288	14667.4
not affected by terrain losses	606241	14378.2
lost to NTSC IX	1347	84.3
lost to additional IX by DTV	425	44.2
lost to DTV IX only	425	44.2
lost to all IX	1772	128.5

Table 7
Culling of Undesired Stations

(NC means Not Considered; it is presumed that stations at the indicated offset do not cause interference even though they may be close in distance to the cell of interest.)

Offset Relative to Desired Channel N	Undesired Channel	Maximum Distance from Cell to Undesired Stations, km			
		Analog Into Analog	Digital into Analog	Analog into Digital	Digital into Digital
-8	N - 8	35.0	35.0	NC	NC
-7	N - 7	100.0	35.0	NC	NC
-4	N - 4	NC	35.0	NC	NC
-3	N - 3	35.0	35.0	NC	NC
-2	N - 2	35.0	35.0	NC	NC
-1	N - 1	100.0	100.0	100.0	100.0
0	N	300.0	300.0	300.0	300.0
+1	N + 1	100.0	100.0	100.0	100.0
+2	N + 2	35.0	35.0	NC	NC
+3	N + 3	35.0	35.0	NC	NC
+4	N + 4	35.0	35.0	NC	NC
+7	N + 7	100.0	35.0	NC	NC
+8	N + 8	35.0	35.0	NC	NC
+14	N + 14	100.0	35.0	NC	NC
+15	N + 15	125.0	35.0	NC	NC

Transmitting Antenna Patterns

The vertical patterns used in the FCC computer program are shown in Table 8. They represent typical patterns. These patterns were used in computing the evaluation of service and interference in Appendix B of the *Sixth Report and Order* and continue to be used in the Media Bureau computer program for evaluating applications for new and modified stations.

Table 8
Vertical Pattern Assumed for Transmitting Antennas

ANGLE, Degrees	Gain in Vertical Plane (expressed as relative field strength)				
	Low VHF Analog and DTV	High VHF		UHF	
		Analog	DTV	Analog	DTV
0.75	1.000	1.000	1.000	1.000	1.000
1.50	1.000	0.950	0.970	0.740	0.880
2.00	0.990	0.860	0.940	0.520	0.690
2.50	0.980	0.730	0.890	0.330	0.460
3.00	0.970	0.600	0.820	0.220	0.260
3.50	0.950	0.470	0.730	0.170	0.235
4.00	0.930	0.370	0.650	0.150	0.210
5.00	0.880	0.370	0.470	0.130	0.200
6.00	0.820	0.370	0.330	0.110	0.150
7.00	0.740	0.370	0.280	0.110	0.150
8.00	0.637	0.310	0.280	0.110	0.150
9.00	0.570	0.220	0.280	0.110	0.150
10.00	0.480	0.170	0.250	0.110	0.150