

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

In the Matter of )  
 )  
The Mitre Corporation's Technical Report, )  
"Experimental Measurements of the Third- ) MM Docket No. 99-25  
Adjacent-Channel Impacts of Low-Power )  
FM Stations" )  
 )

To: The Commission

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

Neal A. Jackson  
Vice President for Legal Affairs  
General Counsel and Secretary  
Michael Riksen  
Vice President for National Affairs  
Dana Davis Rehm  
Vice President for Member Services  
Michael Starling  
Vice President for Engineering  
Gregory A. Lewis  
Associate General Counsel

635 Massachusetts Avenue, N.W.  
Washington, DC 20001  
202/513-2040

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**COMMENTS OF  
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**Introduction and Summary**

Pursuant to the Public Notice dated July 11, 2003,<sup>1</sup> National Public Radio, Inc. ("NPR") hereby submits its Comments on the Mitre Corporation's Technical Report entitled, "Experimental Measurements of the Third-Adjacent-Channel Impacts of Low-Power FM Stations" ("Mitre Study" or "Study").<sup>2</sup>

NPR is a non-profit membership corporation that produces and distributes noncommercial educational programming through more than 750 public radio stations nationwide. In addition to broadcasting award winning NPR programming, including *All Things Considered*<sup>®</sup>, *Morning Edition*<sup>®</sup>, *Talk Of The Nation*<sup>®</sup>, and *Performance Today*<sup>®</sup>, NPR's Member stations originate significant amounts of news, informational, and cultural programming. NPR also operates the

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<sup>1</sup> Public Notice, MM Docket No. 99-25, DA 03-2277 (July 11, 2003)

<sup>2</sup> By Order, dated August 29, 2003, the comment deadline was extended from September 12, 2003 to October 14, 2003. See Order, MM Docket No. 99-25, DA 03-2767, at 2 (rel Aug. 29, 2003).

Public Radio Satellite Interconnection System and provides representation and other services to its Member stations.

Throughout this proceeding, NPR has supported the principle of a low power FM ("LPFM") service because we believe, as the Supreme Court found long ago, the public interest is best served by "the widest possible dissemination of information from diverse and antagonistic sources."<sup>3</sup> Given public radio's origins as an inherently local media,<sup>4</sup> moreover, we share LPFM's mission of producing and disseminating programming responsive to the needs of un-served and underserved listeners. Accordingly, as community-based resources and sources of locally-responsive programming, NPR's Member stations support the Commission's effort to authorize additional noncommercial educational ("NCE") low power stations to serve the same purpose on a more localized basis.

At the same time, we do not believe the public interest in additional, highly localized service should come at the expense of existing NCE services. Our participation in this proceeding has therefore sought to ensure that the Commission's rules are adequate to prevent harmful interference and to remediate interference when it does occur, especially in the fringe areas of a station's protected coverage area. This concern is borne out of experience: we have witnessed the

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<sup>3</sup> Associated Press v. United States, 326 U.S. 1, 20 (1945). See Comments of National Public Radio, In the Matter of Creation of a Low Power Radio Service, MM Docket NO. 99-25, at 2, 4-8 (filed Aug. 2, 1999).

<sup>4</sup> As envisioned in the Public Broadcasting Act of 1967: "Local stations are the bedrock of this system [of public radio broadcasting] and as such must be responsive to the needs and desires of the public which they serve." S. Rep. No. 222, 90th Cong., 1st Sess. 7 (1967). Public radio station licensees represent a broad range of public and private, generally community-based organizations, including universities (188 licensees), non-profit community organizations (136 licensees), local governments (26 licensees), and state governments (8 licensees). See Corporation for Public Broadcasting, Frequently Asked Questions About Public Broadcasting, [http://www.cpb.org/pubcast/-who\\_runs](http://www.cpb.org/pubcast/-who_runs).

demise of the AM band as a medium for high fidelity audio programming because of the Commission's zeal to authorize new service,<sup>5</sup> and NPR Member stations continue to suffer from the proliferation of unlicensed "pirate" broadcast stations.<sup>6</sup> Given public radio's longstanding relationship with radio reading services, moreover, we have been and remain particularly concerned with protecting these important "lifeline" sources of news and information for the print-impaired.

It is from this perspective of favoring new NCE service, while assuring the protection of existing NCE service, that we have reviewed the Mitre Study.

As a general matter, we are encouraged by the conclusions of the Mitre Study, which found that third adjacent channel 100 watt LPFM stations could be authorized without causing significant interference problems. We are also constrained to conclude, however, that the Mitre Study's methodology and testing were less than perfect.

In particular, Mitre and Comsearch utilized a limited "test bed" of receivers and failed to establish through technical performance, sales volume, cost, or other relevant factors that the chosen receivers were, in fact, representative of the universe of receivers now in common use.

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<sup>5</sup> The Commission itself found in this proceeding that the AM band was unsuitable for new low power stations because "[t]he interference potential and present congestion in the AM band, where many stations currently experience significant interference and degraded reception, make it a poor choice for a new radio service." In the Matter of Creation of Low Power Radio Service, Notice of Proposed Rulemaking, MM Docket No. 99-24, 14 FCC Rcd. 2471, at ¶ 17 (1999) [hereinafter "LPFM NPRM"].

<sup>6</sup> Operators of pirate stations apparently have little fear of Commission enforcement action. See C.J. Hughes, In a Small Walk-Up, A Radio Signal is Born. But Mum's the Word, N.Y. Times, Sept. 28, 2003, § 14, at 6 (reporting on pirate station EVR, operated by a local restaurant owner, who is quoted as saying, "the FCC doesn't really come bother you as long as you're not stepping on anybody's toes."). The station apparently operates on 88.1 FM, spectrum reserved for NCE use and second adjacent to NPR Member station WBGO, Newark, NJ. See <http://www.eastvillageradio.com/forum/viewtopic.php?t=10>.

Mitre and Comsearch also relied on the subjective assessment of a single individual with no apparent listening training, and without other standardized safeguards, to determine whether interference occurred, and they only acknowledged interference that occurred in an otherwise unimpaired listening environment. Finally, there are questions whether Mitre and Comsearch properly measured the signals of the full power and translator stations at issue and whether the test LPFM stations are representative of LPFM stations in actual operation.

Similar methodological flaws are also found in the Mitre Study's testing of third adjacent interference to radio reading services. Comsearch tested only a single SCA receiver, even though there are many more types of SCA receivers in use. Comsearch also only tested a single reading service, even though radio reading services operate on one of two subcarriers, and the full power station at issue operates monaurally, making the reading service it carries less vulnerable to interference. Finally, the imprecision of the interference perception and measurement methodology significantly obscured the nature and extent of the interference that the third adjacent LPFM station likely caused.

Indeed, in the case of radio reading services, we think the Mitre Study is of limited value in assessing the likelihood and severity of third adjacent channel LPFM interference. If anything, the interference that occurred during the Mitre Study is probably consistent with the Commission's prior laboratory testing which showed that SCA receivers are particularly susceptible to interference from all sources. Accordingly, we believe there is a continuing need to protect radio reading services from third adjacent channel stations.

In the case of full power stations, however, we believe third adjacent channel LPFM stations might be authorized without causing undue interference, so long as certain safeguards are implemented. First, the Commission might authorize a limited number of third adjacent LPFM

stations on a trial basis and assess the actual interference consequences of siting the stations. Second, the Commission should include an additional "buffer zone," along the lines of the separation formula proposed in the Mitre Study, and take other processing steps to minimize the occurrence and severity of interference. Finally, the Commission should maintain the interference remediation rule it adopted to address interference to translator inputs, but implement a more meaningful interference remediation rule to address interference to full power and translator station signals.

This approach, we believe, offers an effective and timely way of authorizing additional LPFM service, while protecting the existing services on which Americans have come to rely. We believe the public desires and deserves more local NCE media, not less, and authorizing third adjacent channel 100 watt LPFM stations, while protecting existing local services, can be an important step in that direction.

#### **I. The Mitre Study Suffers From Significant Methodological Flaws**

As much as we would like to accept the conclusions of the Mitre Study at face value, we cannot overlook a number of flaws in the Study's methodology and testing. These flaws include the manner in which interference was detected and measured, as well as unstated, and questionable, assumptions about the receiving and transmission equipment used in the study. Notwithstanding these flaws, we believe third adjacent 100 LPFM stations can be authorized if certain conditions, set forth in Section III, below, are implemented.

First and foremost, in determining whether a given LPFM station degraded the full power station signal, the Mitre Study depended on the opinion of a signal individual -- a Comsearch field engineer. Only when that individual reported a so-called "N Y transition"<sup>7</sup> did another Mitre

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<sup>7</sup> An N Y transition is described as "a transition in which the field engineer did not detect

engineer review the audio recording made of the "before" and "after" conditions to confirm the presence of interference.<sup>8</sup> No information is provided about the circumstances in which these listening tests were made, such as whether headphones or speakers in a noisy van were used, or whether any special expert-listener training was provided to the individuals making these key interference determinations. Recommended and standardized procedures have long existed for subjective listening tests,<sup>9</sup> but no such procedures appear to have been used in connection with these tests.

In addition to relying on a single field engineer, the test methodology used only a single condition -- the N Y transition -- as the determiner of interference. By Mitre's own admission, it omitted instances in which "the signal degradation increased after the LPFM was turned on, but degradation already existed prior to the LPFM transmitting."<sup>10</sup> Thus, the analysis is limited to cases where the existing reception conditions were relatively pristine, and the operation of the LPFM station caused degradation from that state. Because the degree or severity of interference was not adequately addressed, it is impossible to know to what extent the presence of an LPFM station would change a less-than-pristine, but tolerable, reception environment into an intolerable one.

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degradation when the LPFM was off, but detected degradation during the LPFM transmission." Mitre Study at 2-7.

<sup>8</sup> Id.

<sup>9</sup> See ITU-R, "Subjective Assessment of Sound Quality," Recommendation BS.562-3 (1990); ITU-R, "Methods for the Subjective Assessment of Sound Quality - General Requirements," Recommendation BS.1284 (1997). See also Robert Oban, et al., "A Proposed Test Procedure for Assessing the Effects of Audio Processing Upon Adjacent Channel Interference in FM Broadcasting, July 1990; Communications Research Centre, "Subjective Tests of Audio Quality and Transmission Impairments," July 1995.

<sup>10</sup> Mitre Study at 2-9.

In addition to flaws in the perception and measurement of interference, the Mitre Study made a number of unstated assumptions about the equipment used to conduct the tests. While Mitre states that "the most important element in the field testing was the type of radio receiver subjected to interference," the Study does not disclose the criteria for selecting the particular receivers that were chosen. One is left to guess how representative the individual receivers are among their respective category of receivers in terms of technical performance, sales volume, or cost.<sup>11</sup>

With respect to clock and auto radios, in particular, the requirement that each receiver include a headphone jack and a digital tuner may mean that the chosen clock and auto receivers were, in fact, atypical because most such radios do not meet those specifications.<sup>12</sup> While Mitre considered the offerings of Best Buy and Circuit City in selecting the equipment, moreover, such a sampling of currently available radios does not account for the millions of older clock radios, "boom boxes," and other receivers currently in use. We do not believe the Mitre Study was intentionally skewed, but the failure to establish that the chosen receivers are representative of receivers in general use makes it difficult to conclude with certainty that third adjacent LPFM interference would not, in fact, occur.

Mitre and Comsearch apparently also did not verify the operational status of the full power stations that were measured as part of the study. In at least one instance, a full power station was

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<sup>11</sup> While the Study asserts that "FM receivers selected for the experimental program are representative of equipment in use by the public at large," *id.*, Appendix III, at 12, equipment "in use" is not necessarily the same as equipment commonly used by the public.

<sup>12</sup> Of course, clock radios are among the most vulnerable to interference because of their low cost.

operating significantly at variance with its licensed parameters.<sup>13</sup> If the full power station's coverage was different from the expected values, the resulting desired-to-undesired ("D/U") ratios and related interference distances would also be different from the values that were intended to be representative of typical operations. The Mitre Study also described the program content of the station at issue, KNOW-FM, as "unprocessed music,"<sup>14</sup> even though KNOW-FM broadcasts a news and information service.<sup>15</sup> Nor did the Study acknowledge that KNOW-FM operates in monaural mode, which makes the station far more immune to interference than stations operating in stereo mode. Indeed, one is left to wonder whether Comsearch properly identified the station it was purporting to measure.

In another case, the full power station at issue, KFRC-FM, San Francisco, CA, operates a co-channel FM booster, KFRC-FM3, located in Walnut Creek, CA, and it is unclear whether the booster station signal may have unintentionally served as the "desired" signal. If so, operating differences between the full power and booster stations may have affected the interference measurements. It is also possible that mutual interference between KFRC-FM and its co-channel booster station may have produced a Y Y false negative result.<sup>16</sup>

With respect to the translator input test, it is not clear where in relation to the translator's

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<sup>13</sup> KNOW-FM, which is licensed at 400 meters HAAT, see Mitre Study at 1-7, has been operating since July 2000, at a significantly lower HAAT pursuant to FCC Special Temporary Authority. See [http://access.mpr.org/pub\\_docs/know/index.html](http://access.mpr.org/pub_docs/know/index.html).

<sup>14</sup> Mitre Study at 1-7.

<sup>15</sup> See <http://news.mpr.org/standard/documents/schedule/>. The Mitre Study program content category that accurately describes KNOW's content, "News/Talk," is described in the Mitre Study as having "little, if any, music." Mitre Study at 1-8.

<sup>16</sup> Under Mitre's interference measurement scheme, a Y Y designation denotes an instance in which the field engineer detected degradation in audio quality both before and after the LPM station was turned on. Mitre Study at 2-7.

input the D/U ratios were measured. Depending on where the measurements were taken, the actual D/U ratios at the point of the translator input could have been very different from the reported levels because of multipath propagation, standing waves, or other factors. Even though no make, model, or other specifications of the translator used in the tests are disclosed, moreover, it is assumed that this particular translator is representative of the entire universe of installed translators. Such an assumption is certainly subject to question.

In the case of the test LPFM stations themselves, it is clear that the stations were meticulously constructed to ensure precise compliance with FCC rules, including effective radiated power ("ERP") and frequency deviation. Given the stated assumption that LPFM stations would be constructed and operated at low cost by individuals with little or no broadcast engineering expertise,<sup>17</sup> it is reasonable to expect LPFM transmitters to operate beyond their authorized parameters, including with increased frequency deviation to enhance the apparent "loudness" of the station.<sup>18</sup> Except in the case of audio processing, however, receiver sensitivity was not tested in relation to transmitter deviation.

As a related matter, it is unfortunate that Mitre and Comsearch did not conduct additional objective tests using "worst case" assumptions or test for the receiver-induced third order intermodulation effect, or so-called "RITOIE." With respect to the former, the use of a 5 kilocycle tone at 100 percent modulation on the interfering carrier, along with a quiet carrier on the

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<sup>17</sup> See LPFM NPRM at ¶ 1 ("In creating these new classes of stations, our goals are to address unmet needs for community-oriented radio broadcasting, foster opportunities for new radio broadcast ownership, and promote additional diversity in radio voices and program services.")

<sup>18</sup> Compare In the Matter of Creation of Low Power Radio Service, Memorandum Opinion and Order, MM Docket No. 99-24, 15 FCC Rcd. 2205, at ¶¶ 31-32 (2000) (rejecting suggested requirement that LPFM stations employ calibrated modulation monitors or other means to prevent improper transmitter operation) [hereinafter "LPFM Memorandum Opinion and Order"].

interfered with station, would have helped document the circumstances in which interference-free operation could be assured. Likewise, Mitre and Comsearch should have tested for RITOIE interference, which occurs when two signals (in this case, the full power and LPFM test stations) mix inside the front end of a receiver, creating a third frequency which can interfere with reception of the desired station.<sup>19</sup> The RITOIE interference problem is not specific to LPFM stations -- indeed, it derives from inferior demodulation circuitry of radio receivers -- but testing for its occurrence would have provided a more comprehensive assessment of the likelihood of third adjacent channel interference.

Finally, even accepting the Mitre Study at face value, it acknowledges that significant interference will result in the vicinity of the LPFM transmitter.<sup>20</sup> The extent of this interference zone depends on where within a third adjacent full power station's protected contour the LPFM transmitter is located. According to the Mitre Study, the radius of the interference zone surrounding the LPFM transmitter will range from a few meters to a "worst case" of approximately 1100 meters.<sup>21</sup>

To understand the potential significance of such individual interference zones, it is helpful to consider the population densities of more urbanized areas of the country. According to a spectrum availability analysis the Commission conducted when it first proposed to establish an LPFM class of broadcast service, in 20 U.S. cities with populations of more than 500,000 persons,

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<sup>19</sup> See Comments of the Society of Broadcast Engineers, In the Matter of the Creation of a Low Power Radio Service, MM Docket No. 99-25, at 3 (filed Aug. 2, 1999). The classic RITOIE example is a "2A-B" mix, in which the second harmonic of station "A" on 90.7 FM mixes with Station "B" on 91.9 FM, producing a third "ghost" station on 88.5 FM.

<sup>20</sup> Mitre Study at xxvi.

<sup>21</sup> Id.

as many as 67 100 watt LPFM stations could be sited if the third adjacency protection were eliminated.<sup>22</sup> In the case of San Antonio, TX, for instance, the Commission determined that as many as 13 100 watt LPFM stations could be sited. With an average population density of approximately 1257 people/km<sup>2</sup>,<sup>23</sup> the potential interference could affect significant numbers of San Antonio residents.<sup>24</sup> Since the foregoing analysis is based on average population density, moreover, the interference consequence could be even more severe to the extent LPFM transmitters were located on top of apartment buildings or other multiple dwelling units.

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<sup>22</sup> LPFM NPRM, Appendix D.

<sup>23</sup> <http://www.demographia.com/db-uauscan.htm>

<sup>24</sup> The area of a circle is determined according to the formula -- Area = 3.14 x radius<sup>2</sup>. <http://math.about.com/library/weekly/aa062502a.htm>. If one uses a radius of 333 meters, based on the finding of actual interference to the tested boom box within 333 meters of the Benicia, CA site, the area of the interference zone would be 3.14 x 333<sup>2</sup>, or 348,191 meters. To ascertain the potentially affected population within a circular zone of interference based on population density data expressed in square kilometers, it is necessary to compare the areas of the two. Since the area of a square with a 1 km, or 1000 meter, side is equal to 1,000,000 (1000<sup>2</sup>) meters, the ratio of the two areas is 348,191/1,000,000, or, expressed as a percentage, .348. Therefore, in the case of a single third adjacent 100 watt LPFM station located in San Antonio, TX, approximately 438 (.348 x 1257) persons could suffer materially degraded FM broadcast service based on the results of the Mitre Study.

## **II. The Mitre Corporation's Examination of Third Adjacent Channel Interference to Radio Reading Services Is Plainly Inadequate and Does Not Justify Siting 100 Watt LPFM Stations on Third Adjacent Channels to Full Power and Translator Stations That Offer Such Services**

As the record in this proceeding more than amply reflects, radio reading services are crucially important sources of basic news and information to the approximately 3 million Americans who are print disabled.<sup>25</sup> Despite their importance, radio reading services are also especially vulnerable to interference because of commonly understood attributes of SCA receivers.<sup>26</sup> Yet, in concluding that SCA receivers generally performed well in the tests, the Mitre Study appears to have fundamentally misapprehended the data it generated. It did so, we believe, because of methodological flaws that ultimately vitiate the Mitre Study's assessment of third adjacent LPFM interference to radio reading services.

First, the Mitre Study tested only a single radio reading service, carried by KNOW-FM, St. Paul, MN. As a general matter, given obvious variances in terrain, station technical parameters, and other variables among stations that carry radio reading services, it is impossible to draw conclusions about all radio reading services based on the results of a field test of a single one.

The testing of a single radio reading service is also inadequate for reasons unique to such services, and in this case, specific to KNOW. Radio reading services typically use either the 67

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<sup>25</sup> Supplemental Comments of the International Association of Audio Information Services, In the Matter of Creation of a Low Power Radio Service, MM Docket No. 99-25, at 3 (filed August 2, 1999). See also LPFM Memorandum Opinion and Order, 15 FCC Rcd. 19208, at ¶ 24 ("Like NPR, the Commission is concerned about the differential vulnerability of radio reading service receivers to 3<sup>rd</sup> adjacent channel interference. In this regard, we recognize the important and unique services that radio reading operations provide to blind and other print-disabled persons and the unique role of each radio reading service in its community.").

<sup>26</sup> As a general matter, SCA receivers are designed for wide-band reception, which makes them inherently less selective in rejecting unwanted adjacent channel signals. Because SCA receivers are also designed to be modest in cost to meet the needs of a disabled constituency, their manufacture necessarily uses components that offer limited overload rejection and IF selectivity.

kHz or 92 kHz subcarrier. KNOW-FM's radio reading service is offered via KNOW's 67 kHz subcarrier. Since 92 kHz SCAs operate with a 3 dB noise penalty relative to 67 kHz SCAs, the difference in the SCA frequency of a given radio reading service could be a significant factor in whether a third adjacent 100 watt LPFM station will materially degrade the reading service signal. In addition, stations that operate monaurally, like KNOW, can use more SCA subcarriers at potentially higher injection levels.<sup>27</sup> Thus, the testing may not be representative of the majority of FM stations that broadcast in stereo, and it cannot resolve whether the siting of a LPFM station on a third adjacent channel to a 92 kHz radio reading service would produce benign or harmful results.

Second, the imprecision with which Comsearch perceived (through the ears of a single engineer) and measured (through a simple N → Y transition notation) interference, noted above,<sup>28</sup> similarly obscures the extent of the interaction between the LPFM signal and the radio reading service. Once again, however, factors unique to radio reading services make these flaws even more damaging.

Of the 96 total observations related to the radio reading service test, 69, or 72%, were Y → Y transitions, meaning that interference was perceived both before and after the LPFM was turned on. Mitre concluded from this data that "there was no significant LPFM interference to the RSVI [reading service for the visually impaired] receiver when it was located more than 80 meters away from the LPFM antenna."<sup>29</sup> Yet, because of the well known characteristics -- and failings -- of

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<sup>27</sup> Comsearch apparently did not record the level of subcarrier injection as part of the test data.

<sup>28</sup> See pages 5-7, supra.

<sup>29</sup> Mitre Study at xxvi.

SCA receivers, Mitre's conclusion is simply not credible.

Rather than demonstrating the absence of harmful interference from third adjacent 100 LPFM stations, we believe the prevalence of Y Y transitions reflects the particular vulnerability of SCA receivers to interference, whether from LPFM stations or other sources. To demonstrate this point, it is useful to consider the cases in which interference to other receivers was detected but interference to the SCA receiver was not. Specifically, N Y transitions were recorded at locations 4 (0.232 km) and 5 (0.550 km) in the case of the boom box and clock radio receivers, but a Y Y transition was recorded in the case of the SCA receiver.<sup>30</sup> Mitre interprets this to mean that no interference occurred to the SCA receiver at those locations, but the far more likely explanation is that the LPFM station caused interference to an SCA receiver that was already receiving interference from other sources.

Obviously, the fact that SCA receivers are already vulnerable to interference does not support the conclusion that siting LPFM stations on third adjacent channels to radio reading services would not result in additional, harmful interference to reception of the adjacent radio reading service or that such additional interference to a "lifeline" service is acceptable. Among other things, additional degradation of service exacerbates "listener fatigue"<sup>31</sup> and generally undermines the utility of the degraded service.

The final flaw of decisional significance is the Mitre Study's reliance on a single SCA receiver with unknown performance characteristics. Again, as in the case of the receiver sample

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<sup>30</sup> Id. at 2-11.

<sup>31</sup> Fatigue from listening to degraded broadcast service, or so-called "listener fatigue," "makes people 'tune out' by flicking across the dial." See The Fix For IBOC, Radio Magazine, Aug. 1, 2003. In the case of a radio reading service, the "listener fatigue" threshold may be higher, but that is only because radio reading services are a lifeline service for the print-impaired.

generally, there is no way of knowing whether the chosen SCA receiver is representative of the receivers generally used by reading service listeners. To the contrary, logic compels that a single receiver cannot be representative of an entire universe of receivers.

In that regard, it is useful to consider the Commission's laboratory testing of SCA receivers in an earlier phase of this proceeding.<sup>32</sup> The FCC tested 13 SCA receivers for adjacent-channel and co-channel interference performance. Even with a receiver sample of far greater size, the FCC cautioned that, "[b]ecause of the small sample size, the test results presented [t]herein were not extrapolated to the general receiver population."<sup>33</sup>

Moreover, to the extent the SCA receiver tested in the Mitre Study was affected by third adjacent LPFM interference, notwithstanding the Study's flawed interference perception and measurement methodology, those results are consistent with the FCC's prior laboratory testing of SCA receivers. The FCC's laboratory testing confirmed that, at least in the case of the 13 receivers tested, the SCA receivers are vulnerable to adjacent channel interference.<sup>34</sup> "[O]ne may reasonably conclude that most of the receivers in this sample could experience some interference when used in close proximity to an LPFM station that is operating on the third adjacent channel."<sup>35</sup> Indeed, "[o]nly three of the receivers tested exceeded the 40 dB U/D for a 1% increase in THD+N [total harmonic distortion plus noise] on both the upper and lower third adjacent channel" -- the

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<sup>32</sup> Office of Engineering and Technology, Federal Communications Commission, "A Study of Co-channel and Adjacent-Channel Interference Immunities of Subsidiary Communications Authorization (SCA) FM Broadcast Receivers," Project TRB-99-3, Preliminary Report (Dec. 1. 2000).

<sup>33</sup> Id. at 2.

<sup>34</sup> Id.

<sup>35</sup> Id. at 6.

Commission's baseline for unimpaired service.<sup>36</sup>

More ominously, there was a tremendous range in U/D performance among the 13 SCA receivers. In the case of an undesired signal on a lower third adjacent channel, the U/D ratio for a 1% increase in THD+N ranged from 15.8 db to 62.9 db. In the case of an undesired signal on an upper third adjacent channel, the U/D ratio for a 1 % increase in THD+N ranged from approximately 23.4 db to 61.5 db. These ranges indicate a wide disparity among SCA receivers in receiving a quality signal in the presence of a third adjacent channel station. Unfortunately, bringing about the use of better performing SCA receivers is a task far easier said than done.<sup>37</sup>

### **III. Recommendations for Authorizing Third Adjacent 100 Watt LPFM Stations**

We, as much as anyone, favor Commission initiatives to permit greater NCE access to spectrum in this proceeding and generally.<sup>38</sup> In many, more rural communities, NCE stations provide the only extensive local news coverage, the only outlet for classical music and related fine arts programming, as well as access to talented new contemporary music performers, particularly regional and local performers. Authorizing new such services, on an even more localized basis, can obviously further serve the public interest.

Notwithstanding the methodological flaws described above, we believe that, in the case of full power and translator stations, third adjacent 100 watt LPFM stations could be authorized if

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<sup>36</sup> Id.

<sup>37</sup> While the Commission's technical staff noted that the adjacent channel interference could be avoided by retrofitting the vulnerable SCA receivers with filters and antennae, for instance, it also recognized that such an approach would likely be cost prohibitive. Id. at 2, 6.

<sup>38</sup> Indeed, in response to the Report of the Commission's Spectrum Policy Task Force, we questioned the Task Force's complete failure to address NCE uses of spectrum other than to suggest imposing user fees on NCE licensees and other nonprofit licensees. See Comments of National Public Radio, In the Matter of Spectrum Policy Task Force Report, ET Docket No. 02-135, at 2-6 (filed Jan. 27, 2003).

certain safeguards are implemented. These safeguards are necessary to assure that existing services, particularly at the fringe of a station's protected coverage area, are not seriously degraded. The adoption of reasonable safeguards, however, need not unduly delay the construction and operation of third adjacent 100 watt LPFM stations.

**A. Authorizing Third Adjacent Channel 100 Watt LPFM Stations on a Trial Basis**

As a threshold matter, the Commission might authorize a limited number of third adjacent 100 watt LPFM stations on a trial basis and subject either to (1) additional field testing that corrects for the Mitre Study flaws described above or (2) an obligation to alert listeners to and remediate interference to third adjacent channel full power and translator stations. In particular, the Commission might authorize third adjacent channel LPFM station in each of the top 20 markets that otherwise have sufficient vacant spectrum to accommodate such stations. For a period of 12 months after such stations are constructed, and in lieu of comprehensive field testing, the Commission might require the LPFM stations (and permit the third adjacent channel full power and/or translator stations) to broadcast periodic announcements (1) alerting listeners that interference they may be suffering may be the result of the third adjacent channel LPFM broadcasts and (2) instructing affected listeners to contact the station to report the matter. The LPFM stations, in turn, could be obligated to notify the affected third adjacent channel station and the Commission of any interference complaints and cooperate in measures to remediate the interference.

Such an incremental approach to authorizing third adjacent 100 watt LPFM stations would serve to bridge the gap between the Mitre Study and full scale authorization of third adjacent 100 watt LPFM stations. If the Commission conducted additional field tests during this trial period, the Commission could proceed to generally authorize third adjacent 100 watt LPFM stations if the

field tests demonstrate the absence of interference. If, on the other hand, the Commission proceeded based on a regime of broadcast announcements and ad hoc interference complaint resolution, then generally authorizing third adjacent channel 100 watt LPFM stations would depend on the occurrence and severity of interference and the success of interference remediation efforts. In either event, the Commission could publish and request public comment on the results of the additional field tests or the ad hoc interference remediation efforts and proceed accordingly to authorize third adjacent channel 100 watt stations generally, discontinue such stations, or authorize such stations subject to additional safeguards.

**B. Additional Processing Measures to Minimize the Occurrence and Severity of Interference**

In addition to authorizing third adjacent channel 100 watt LPFM stations on a trial basis, we support additional processing measures, including the distance separation that the Mitre Study recommends.<sup>39</sup> The modest additional distance separation Mitre and Comsearch recommend is unlikely to materially affect the number of third adjacent 100 watt LPFM stations that can be authorized. At the same time, the additional separation is likely to reduce the amount and severity of interference to full power and translator stations, particularly on the fringe of a station's protected coverage area. We would also encourage the Commission to explore whether collocating the transmitters of the LPFM station and a third adjacent channel full power station would avoid interference without substantially limiting the LPFM station's service area.<sup>40</sup> In addition, since third adjacent channel interference is expected to occur in the immediate vicinity of the LPFM station's transmitter, the Commission should take steps to avoid authorizing the siting of

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<sup>39</sup> See Mitre Study at xxvi and 5-3 to -4.

<sup>40</sup> Collocation is one of the means by which reserved FM band NCE stations avoid causing adjacent channel interference to television channel 6 stations. See 47 C.F.R. § 73.525(d).

a 100 watt LPFM station transmitters on apartment buildings or other high density multiple dwellings.

**C. Assuring A Complaint Process That Is More Responsive to Cases of Actual Interference**

The Commission should also reassess the process it adopted in the Memorandum Opinion and Order for remediating third adjacent channel LPFM interference to full power stations.<sup>41</sup> In particular, we believe the Commission should amend Section 73.809 of the Commission's rules to bring third adjacent channel interference within the ambit of the rule. Doing so would assure the remediation of actual interference of a regularly used signal that is impaired by the signals radiated by the third adjacent channel LPFM station.

As an alternative, the Commission should revisit the conditions set forth in Section 73.810, which are likely to prevent remediation even in cases of relatively severe interference. As a threshold matter, listeners accustomed to some FM band interference are unlikely to spontaneously prepare and submit affidavits to a station upon the occurrence of even harmful interference.<sup>42</sup> Experience suggests they are far more likely to cease listening to the degraded service. Accordingly, the Commission should entertain other forms of evidence, including informal listener complaints and objective evidence that the affected station may obtain at its own expense.

Likewise, the Commission should consider complaints from listeners beyond 1 kilometer from the LPFM site,<sup>43</sup> listeners whose reception via mobile receivers is impaired,<sup>44</sup> listeners who

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<sup>41</sup> See id. § 73.810.

<sup>42</sup> See id. § 73.810(b)(2).

<sup>43</sup> See id. § 73.810(b)(3).

<sup>44</sup> See id.

complain more than 1 year after initiation of the LPFM service,<sup>45</sup> and listeners whose reception of translator service is impaired. Although the 1 kilometer distance limitation is based on the extent of predicted interference from an LPFM transmitter, the Commission should not refuse to address complaints of actual interference simply because such interference was not "predicted." Nor should the Commission ignore complaints of actual interference based on impaired mobile reception or complaints from listeners who may not have lived in the affected area, or who otherwise failed to complain, within one year of initiation of the LPFM service. The Commission should also extend the remediation process to translators, which serve as one of the few, and in some cases only, sources of news and information for many rural Americans.

While we appreciate the Commission's interest in assuring an easily administrable interference remediation scheme, the desire to facilitate new service should not override the need to protect existing services. A more flexible process also need not impose a materially greater administrative burden. In fact, adopting the safeguards described above is likely to avoid the occurrence of interference to a significant extent. We would also support affording LPFM stations in such circumstances greater flexibility to resolve interference problems through technical solutions, such as by facilitating the LPFM station's migration to a different frequency.

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<sup>45</sup> See id. § 73.810(b)(4).

**D. The Commission Should Continue to Bar 100 Watt LPFM Stations on Third Adjacent Channels to Full Power and Translator Stations that Carry Radio Reading Services**

Finally, in the case of radio reading services, we believe the Commission should not authorize any LPFM stations on third adjacent channels to full power or translator stations that carry radio reading services. In the Memorandum Opinion and Order in this proceeding, the Commission barred the siting of any LPFM station on a third adjacent channel to a full power station that was carrying a radio reading service at the time of the rule's adoption.<sup>46</sup> At the time the Commission adopted that rule, however, it also stated its intention to revisit the matter pending the outcome of the then-pending study of SCA receivers. In addition to possibly repealing the limited third adjacency protection, the Commission suggested that it might protect full power stations that subsequently carry radio reading services from future third adjacent LPFM stations if so warranted by the laboratory study.<sup>47</sup>

Based on the results of that study, and notwithstanding the flawed Mitre Study, we believe the appropriate course is clear: should Congress authorize third adjacent channel LPFM stations, the Commission should update its rule barring 100 watt LPFM stations on third adjacent channels to stations carrying radio reading services to include (1) stations carrying radio reading services as of the date third adjacent channel 100 watt LPFM stations are authorized and (2), on a prospective basis, stations that subsequently commence carrying a radio reading service.<sup>48</sup>

**Conclusion**

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<sup>46</sup> LPFM Memorandum Opinion and Order at ¶ 24.

<sup>47</sup> Id.

<sup>48</sup> With respect to the second category of stations, we would expect the Commission to "grandfather" third adjacent channel 100 watt LPFM stations that were constructed and commenced operation before the full power station elected to carry a radio reading service.

As providers of locally responsive NCE services and as outlets of community expression, NPR's Member stations support the fundamental principles of localism and diversity of ownership which the LPFM service is intended to advance. Accordingly, while the Mitre Study suffers from significant flaws, we believe 100 watt LPFM stations might be authorized on third adjacent channels to full power and translator stations if sufficient safeguards are adopted. In the case of radio reading services, however, we believe the record in this proceeding requires a continued prohibition on the siting of LPFM stations on third adjacent channels to stations that carry radio reading services.

Respectfully Submitted,

Gregory A. Lewis /s/

Neal A. Jackson  
Vice President for Legal Affairs  
General Counsel and Secretary  
Michael Rixsen  
Vice President for National Affairs  
Dana Davis Rehm  
Vice President for Member Services  
Michael Starling  
Vice President for Engineering  
Gregory A. Lewis  
Associate General Counsel

635 Massachusetts Avenue, N.W.  
Washington, DC 20001  
202/513-2040

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