

January 4, 2010

Marlene Dortch
Secretary
Federal Communications Commission
445 Twelfth Street, SW
Washington, DC 20554

Re: Written *Ex Parte* Notice
MM Docket No. 99-325 (Digital Audio Broadcasting)

Dear Ms. Dortch:

On behalf of Prometheus Radio Project, Media Access Project submits this written *ex parte* notice in response to the results of the NPR Labs Advanced IBOC Coverage and Compatibility Study (“NPR Labs Study”). Prometheus commends NPR Labs for its research; however, after reviewing the study, Prometheus continues to urge the Commission to deny the requested across the board power increase for both technical and policy reasons. Instead, Prometheus urges the Commission to adopt a case-by-case approach to permitting power increases that would safeguard analog broadcasting, which the vast majority of FM listeners continue to rely upon.

I. The Technical Results of the Study Do Not Support a Power Increase.

The results of the NPR Labs Study do not support a blanket power increase. In its study, NPR Labs conducted a series of subjective listening tests to determine what ratio of Desired/Undesired signals would be acceptable to listeners. Listeners rated signals 2 for “Poor,” 3 for “Fair,” 4 for “Good,” and 5 for “Excellent.”

For the purposes of setting a standard, NPR chose a Mean Opinion Score of 2.7, which is below a rating of “fair,” and according to the NPR Labs study, a “substantial percentage of listeners” would be expected to turn off their radio at a Mean Opinion Score of 2.7.¹ Although interference is relative to context (there is no single standard that the Commission has consistently used in earlier proceedings to determine what level of interference is unacceptable), this “below fair” standard is low and would cause great disruption to a majority of listeners. In other words, the vast majority of radio listeners (those who use analog receivers) would see the quality of their reception in some areas inside the protected contour drop from “Good” in the all-analog context to “Less than Fair” with an IBOC power increase.

In fact, according to an article written by NPR Chief Engineer Mike Starling in *Radio World*, the requested increase could result in very significant interference:

Based on initial results of the tests, listeners noticed interference in the audio, with nearly half indicating they would likely turn off the radio when power was turned up to –14 dB and –10 dB on closely-spaced stations with lightly processed formats such

¹National Public Radio, *Report to the FCC on the Advanced IBOC Coverage and Compatibility Study* at 31(November 3, 2009) (“NPR Report”).

as news and classical music in some portions of a coverage area, according to Dr. Ellyn Sheffield of NPR Labs and Towson University.²

While results may not be as severe when the spacing is less cramped, the Commission should be concerned that “nearly half” of listeners would turn-off their radios within a significant portion of a station’s protected coverage area due to interference. Thus, the Commission should only consider the increase after the NPR Labs Study can provide results of interference levels within the protected contours of stations, since, given the magnitude of the results as currently reported, it is likely that the interference inside the protected contours also will be significant.

The NPR Labs Study represents a “best case scenario” test of interference to analog. The NPR Labs Study seems to have been conducted with impeccable, although limited, technical procedure, and the results must be understood as a “best case scenario” for the impact of IBOC interference to existing analog radio stations, rather than an average case (or, better, an appropriate spectrum of scenarios) needed to evaluate a change to spectrum usage of this magnitude.

Although the NPR Labs Study showed troubling levels of interference, the decision to use a single, highly selective receiver dramatically limited the extent to which these results can be extrapolated. For instance, four receivers (chosen as a cross section of typical radios) were used in previous tests to determine levels of IBOC interference to analog stations on the first adjacent channel.³ Further, in the LPFM proceeding, the Commission determined that 75 receivers, an aggregate of all receivers tested across numerous studies, was a sufficient basis for evaluating interference. In fact, the Commission considered this testing pool a “relatively limited sample of FM receivers”⁴ that made it “difficult to draw statistical inferences with regard to the general population of FM receivers.”⁵ Yet, unlike the LPFM service, IBOC will eventually impact every station on the dial, thus making the “relatively limited sample” of one receiver even less suitable.

Furthermore, NPR characterizes the single receiver tested as having “better-than-average sensitivity and selectivity.”⁶ This indicates that the receiver is unlikely to be as susceptible to interference as most radios on the market, thus it is a poor choice for demonstrating the real-world consequences of an IBOC power increase. The Commission itself noted the unacceptability of such a test design in the LPFM proceeding when it noted: “In this regard, we believe that good engineering practice suggests that evaluations of the potential impact of new interference from low

²Mike Starling, Radio World, *Why an NPR Labs Digital High-Power Study?* (October 21, 2009) available at <http://www.radioworld.com/article/89178>.

³National Radio Systems Committee, *NRSC-R203: Evaluation of the iBiquity Digital Corporation IBOC System-Part -FM IBOC* at 19 (November 29, 2001).

⁴Report and Order, *In the Matter of Creation of Low Power Radio Service*, 15 FCCRcd 2205, 2243 (2000) (“First Report and Order”).

⁵*Id.*

⁶NPR Report at 18 (“The receiver used to provide audio recordings for the listener testing was carefully selected from a group of more than a dozen automotive receivers. The group, which includes both OEM and aftermarket models, was extensively tested for performance as part of the DRCIA project. The chosen receiver, a 2003 Chevrolet Suburban, exhibited better-than-average sensitivity and selectivity.”).

power FM stations *should not be based on either the worst or best performing radios.*⁷

Finally, the NPR Labs Study was limited because only mobile reception was tested. Although NPR did conduct tests of potential *improvements* to indoor digital reception, interference to analog was only studied in the mobile context. This shifting standard again limits the usefulness of the results. A more complete test would have included interference to stationary devices. Since automotive receivers are generally the best at shutting out unwanted adjacent signals,⁸ it must be assumed that results would have been worse if a variety of receivers had been tested.

In all, even in the automotive context with a “better-than-average” receiver, results continued to show dramatically reduced audio quality in the presence of heightened power IBOC signals. Though far from sufficient, the little evidence provided by the NPR Labs Study actually indicates that a blanket power increase would be harmful to analog service.

II. The Commission Should Consider Other Alternatives to a Blanket Power Increase.

As demonstrated above, the NPR Labs Study does not provide sufficient technical evidence to justify a blanket increase. Thus, the Commission should consider other alternatives to ensure that the analog service is not disrupted while also providing flexibility to those stations that need a power increase.

A. Each station seeking a power increase should document the potential for interference, and provisional authorization should be granted prior to any permanent authorization. Prometheus recommends that a power level increase should not be in the form of a blanket rule change allowing higher power. Rather, stations that seek an increase should submit a showing that interference to analog operations is unlikely to occur with a power increase. To ensure a lack of interference, the full power station should be granted a 90-day provisional authorization to conduct program tests, and all stations, including LPFM stations and translators, that are likely to be affected by the digital broadcast should receive notice from the station immediately prior to the 90-day test period.

Stations that do not receive complaints should be granted a license to maintain the increase. However, in cases where listeners to analog signals of full power, low power, or translator stations experience verifiable interference, the HD station should have a reasonable opportunity to correct the interference through asymmetrical power and other remediation methods. If the interference cannot be remediated, then the provisional authorization should not be renewed. This recommended process is in addition to, not instead of, the process recommended by NPR and iBiquity in their joint comments.

B. Stations seeking to raise their power should have wider distance spacing or a wider ratio for first adjacent channels than the current first adjacent standard. Stations wishing to raise their IBOC power should have wider distance spacing or a wider ratio for first

⁷First Report and Order at 2244 (emphasis added).

⁸*See id.* at 2243-2244 (“In addition, all of the studies found that automobile radios and home stereo/component receivers tend to be more effective at rejecting adjacent channel interference than clock, personal and portable radios.”).

adjacent channels than the current first adjacent standard. For instance, a first adjacent Desired to Undesired (D/U) Ratio of 10dB, rather than the existing analog standard of 6dB, might be appropriate. Many stations will easily meet this higher standard, but those who do not should not be allowed to move ahead with a power increase. Another related option is to implement an additional buffer zone requirement, similar to the extra distance added into the LPFM minimum distance separations.

C. The Commission could consider other levels of a power increase. An analog LPFM or translator signal only has one opportunity to get from its transmitter site to its listeners: its analog carrier. However, an IBOC signal has two opportunities: (1) its main analog channel and (2) a signal on each side of its main analog signal. This redundant signal is one of the advantages of the iBiquity system, and this important design element should be wisely used to trim the sails of the digital hybrid signal when it is too close to an existing analog service. Thus, if interference is predicted or experienced by LPFMs or translators, the IBOC signal should be held to a lower level on the side that the interference would not be caused.

D. Functional asymmetric power software is necessary prior to any power increase to avoid likely interference before it occurs. The capacity for asymmetric power cannot be an afterthought, but should be a tool used to remediate interference experienced and avoid predicted interference. A power increase should not be permitted until the asymmetric power software upgrade is complete and implementation is possible.

E. Complaint-driven interference mitigation should include a process by which neighboring stations are notified when an IBOC signal power increase is granted. NPR and iBiquity both recommend adopting a complaint procedure in concert with any power increase. The procedure would require the Commission to take action within 90 days to address unresolved interference complaints. Without action within that timeframe, the interfering station would immediately be forced to turn down its digital power. The procedure also specifies that the complaints describe tests used to identify the IBOC-related interference.

Prometheus commends the Joint Parties for recommending a procedure that encourages swift action on the part of the Commission to resolve interference complaints. However, without a provisional authorization period that allows for testing, identifying IBOC interference will be difficult to confirm. Additionally, Prometheus is concerned that the proposal does not specify the type of action that the Commission should take with respect to interference complaints. Further, the complaint procedure does not include a process by which potentially impacted stations can be notified about interference that can occur as a result of an IBOC power increase. A notification process is particularly needed because the specific interference that digital radio causes can be more difficult to identify than traditional interference caused by competing analog stations. While there have been relatively few interference complaints received thus far from stations operating with 1% IBOC power, this disparity may be due to the public's unfamiliarity with the sound of the interference caused by IBOC.

Thus, Prometheus recommends that the Commission should require notification to those analog stations that neighbor IBOC licensees about any digital power increase. The Commission must also lay out a procedure that addresses interference complaints to the satisfaction of the stations impacted by the interference. Further, the Commission should explicitly state its intention to protect all analog service, including LPFM, from interference within the 60 dBu protected contour.

III. The Commission Must Ensure the Public Interest is Not Harmed By Any Power Increase.

Since the overwhelming majority of the listening public continues to rely on analog signals for radio reception, the Commission should proceed with caution and must continue to ensure that the interest of analog listeners is not compromised.

The transition to full digital broadcasting in radio will not be short. To date, no timeline for a full transition to digital has been set and broadcasters have been allowed to adopt digital technology at their own pace. Currently, less than 20% of broadcasters have chosen to adopt digital technology, especially since the price of digital implementation and its recurring costs are high, its short and medium term benefits are few, and it will be difficult for small owners to finance a transition with such dubious prospects. Moreover, receiver sales and adoption in automobiles is not widespread. Thus, the Commission should require higher levels of receiver penetration before considering the levels of interference described in the NPR Labs Study as an acceptable trade-off.

IBOC is a new technology that will impact the entire band. The scope of the transition to digital radio merits a thorough approach to management interference. As an advocate of LPFM, Prometheus is sympathetic to those who seek to introduce more service to the FM band. However, as detailed above, the doubts surrounding IBOC technology are well founded. Consequently, the scope of the transition has a great potential for harm to the FM band; harmful interference from an IBOC power increase could impact any and all analog signals, an implication that demands an extremely cautious approach. Thus, while Prometheus expresses confidence in the research presented by NPR, the results of the NPR Labs Study does not warrant the regulatory prescription described by NPR and iBiquity and the Joint Parties have not provided recommendations which are adequate to protect existing analog stations from harmful interference.

All analog broadcasters, including LPFM stations and translators, must be protected from interference. From the very start of this proceeding, the authorization of IBOC was predicated on the safeguarding of analog service. Specifically, the Commission stated, “IBOC systems are designed to allow the simultaneous broadcast of analog and digital radio signals in the AM and FM bands without disrupting existing analog service.”⁹ The Commission also noted that “[i]n the hybrid mode, an IBOC system must make certain trade-offs to avoid interference to in-band analog transmissions.”¹⁰ The Commission further noted:

A DAB system must be compatible with the continued operation of existing radio broadcast stations. This appears to be a criterion of relevance primarily to in-band systems. Most commenters agree with NAB’s position that “the implementation of an IBOC DAB service that causes significant impairment to existing analog service would raise serious questions

⁹Notice of Propose Rule Making, *In the Matter of Digital Audio Broadcasting Systems And Their Impact On the Terrestrial Radio Broadcast Service*, 15 FCCRcd 1722, 1723 (1999). See also, *id.* at 1725-1726 (“IBOC system proponents believe that digital signal processing techniques will permit the transmission of a digital “pair” of each analog signal in the AM and FM bands, without disrupting existing analog service.”).

¹⁰*Id.* at 1732.

as to the suitability of the system.” We tentatively conclude that IBOC systems should minimize interference to reception of host and adjacent-channel analog signals during hybrid mode operations including, for FM stations, interference to subcarriers.¹¹

Thus, the Commission stated its intention to safeguard analog service, and though some interference was expected (indeed Prometheus does not advocate a regime in which no interference from HD signals is tolerated), the Commission concluded that such interference should be minimized and should not significantly impair existing analog service. As an analog service, translators and LPFMs must be protected from interference from IBOC signals, thus stations that would cause predicted interference to LPFMs or translators should not be allowed a power increase.

Alternatively, as suggested above, the Commission should consider other options for increasing power levels to minimize interference. Also, LPFMs and translators that do receive actual interference should have the same recourse afforded to full power stations. These measures could help to ensure that the public interest is continuing to be met.

The Commission must first resolve the pending NPRM regarding public interest obligations as well as the pending Petition for Reconsideration. Public interest advocates have previously argued that IBOC allows licensees to increase their use new spectrum at the expense of other potential uses.¹² While some have argued that IBOC as originally designed did not represent the transfer of new spectrum to incumbent broadcasters, this argument is less plausible in the context of a power increase. As noted by broadcast engineer Mark D. Humphrey, an increase in power pushes the occupied bandwidth of a hybrid station far beyond the allowable 240 kHz:

Although FM broadcast channels are general considered to be 200 kHz wide, 73.317b of the FCC Rules clarifies that an FM station’s occupied bandwidth should not exceed 240 kHz. Therefore, the mean power emitted below 120 kHz from the center of the channel must not exceed 0.5% of the total mean power, and the mean power transmitted at frequencies above 120 kHz from the channel center must also remain within one-half percent of the total.

The iBiquity FM IBOC hybrid digital system relies on two digital sidebands which begin approximately 129 kHz either side of channel center and extend to about 198 kHz; therefore all the digital energy is transmitted beyond 120 kHz. However, if digital injection is kept at one percent or less, this conveniently takes advantage of a loophole in ITU’s occupied bandwidth definition -- the one percent digital power is divided equally so that each sideband indeed falls within the 0.5% limit. However, the proposed -10 dB digital power limit would allow the digital power to exceed this limit by a factor or ten. The proposed occupied bandwidth of a hybrid digital station, under ITU’s guidelines, would increase from 240 kHz to nearly 400 kHz if any increase above one percent injection is authorized. Because wider channels are required, the FCC needs to view this proposal as a request for “new” digital

¹¹*Id.* at 1732.

¹²*See, e.g.,* Petition for Reconsideration of New America Foundation, *et al., In the Matter of Digital Audio Broadcasting Systems And Their Impact On the Terrestrial Radio Broadcast Service* (September 14, 2007).

broadcast spectrum.¹³

Since an increase in allowable power would cause licensees' occupied bandwidth to exceed the limit of 240 kHz, it is imperative the Commission resolve the Petition for Reconsideration and the other issues raised in NPRM.

IV. Conclusion

Prometheus has traditionally been recognized before the Commission as an advocate on behalf of low power broadcasters and would-be new entrants. In this proceeding, however, Prometheus' concern is on behalf of all analog broadcasters, commercial and non-commercial, who continue to reach their audiences through analog receivers during radio's digital transition. Prometheus favors the advance of technology and the transition to digital, but believes it must protect the proven analog service used by nearly all radio listeners. The Commission must appropriately balance the need for flexibility with the new technology with the promises that were made for its performance and implementation. These proposals show a moderate way forward that will promote the digital transition without damaging the nation's existing analog FM radio infrastructure, which is what the vast majority of the public will use for the foreseeable future.

Pursuant to Section 1.1206(b), 47 C.F.R. §1.1206(b) of the Commission's rules, this letter is being filed electronically with your office today.

Respectfully submitted,



Parul P. Desai

¹³See Comments of Mark D. Humprey, *In the Matter of Digital Audio Broadcasting Systems And Their Impact On the Terrestrial Radio Broadcast Service* (December 4, 2008).