

**Before the
Federal Communications Commission
Washington, D.C. 20554**

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

COMMENTS OF IBIQUITY DIGITAL CORPORATION

iBiquity Digital Corporation (“iBiquity”) hereby submits these comments in the above-referenced proceeding.¹ iBiquity applauds the Commission’s efforts to focus attention on the need to protect and improve AM service and the important public interest in maintaining AM broadcasting. The Commission has identified many of the challenges currently confronting the AM service and offered several proposals to provide immediate regulatory relief to AM broadcasters. As is explained below, iBiquity generally is supportive of the Commission’s proposals for near term relief. At the same time, iBiquity encourages the Commission to look for longer term solutions that can contribute to more sustained stability and growth for AM broadcasting.

Since its inception in the early 1990s, iBiquity has been dedicated to the enhancement and improvement of over-the-air radio broadcasting through the development and commercialization of digital radio. iBiquity’s HD Radio™ technology has offered AM and FM broadcasters the first major technical upgrade to their service in many decades. iBiquity invested hundreds of millions of dollars in the development and commercialization of HD Radio technology, and a significant portion of those funds was devoted to upgrading AM. As the Commission is aware, HD Radio

¹ *Revitalization of the AM Radio Service*, MM Docket No. 13-249, *Notice of Proposed Rule Making* (Oct. 31, 2013)(“NPRM”).

technology allows broadcasters to introduce a new digital signal alongside their established analog broadcasts. HD Radio technology has allowed FM broadcasters to offer higher audio quality, new multicast channels and a range of datacasting features, such as artist images, iTunes Tagging and navigation services. For AM, HD Radio technology has allowed broadcasters to dramatically upgrade their audio quality to a level comparable to analog FM, thereby allowing broadcasters to offer stereo sound and reintroduce music programming on AM.

The commercial rollout of HD Radio technology is well established. As of the end of 2013, approximately 340 AM and 1,890 FM stations had licenses to operate digitally using HD Radio technology, and broadcasters had established more than 1,450 multicast channels. There also were approximately 17.5 million HD Radio receivers in use. In 2014, more than one third of all new vehicles sold in the United States will include HD Radio receivers as original equipment. Almost every major automobile brand has embraced the technology, and HD Radio receivers are available at thousands of online and traditional retailers.

1. The Commission Should Ensure Any Changes to the AM Technical Rules Do Not Negatively Impact the Rollout of HD Radio Broadcasting

The NPRM proposes a number of changes to the Commission's technical rules for the AM service to make it easier for AM stations to relocate their antenna facilities. For example, the Commission proposes to reduce the daytime community coverage standards² and to eliminate the nighttime coverage requirement³ for existing AM stations. iBiquity agrees that relaxation of the existing rules in these areas may provide greater flexibility for AM stations to relocate antenna facilities in order to reduce interference, obtain less expensive facilities and better serve changing population patterns. As a result, iBiquity generally supports these Commission proposals, but only

² NPRM at 11.

³ NPRM at 12.

with the following caveat.

The Commission must ensure any antenna relocations the rule changes enable do not impact the ongoing digital AM rollout. iBiquity is concerned that stations that take advantage of these rule modifications and relocate their antenna facilities may inadvertently change the potential for interference from existing or future digital broadcasts. Although antenna relocations may solve immediate analog constraints, they may complicate future digital conversions. Any stations implementing antenna modifications pursuant to these proposed changes to the Commission's Rules should be required to accept any new digital interference they receive as a result of the modifications. Similarly, stations that implement antenna modifications under the proposed rule changes should not be allowed to increase their analog interference to adjacent or co-channel digital broadcasts. iBiquity is not proposing that stations be required to accept all interference. Rather, iBiquity believes antenna relocations that create new interference problems should not be recognized by the Commission as a valid basis for complaints against HD Radio broadcasters.

2. The Commission Should Not Require Stations Implementing MDCL to Reduce their Digital Power

iBiquity supports the Commission's proposal to allow stations to adopt MDCL techniques without prior Commission authorization or notification.⁴ However, iBiquity disagrees that HD Radio stations broadcasting using the hybrid mode should be required to implement pro rata reductions of their digital signal.

iBiquity has participated in the National Radio Systems Committee ("NRSC") work analyzing MDCL, and has studied the tests the industry conducted on both adaptive carrier control and amplitude modulation MDCL systems. Dynamic MDCL techniques reduce carrier power dynamically, but leave AM sideband power unaffected. They reduce carrier power at low

⁴ NPRM at 15.

modulation levels, and return the carrier to full power as the modulation is increased. iBiquity's analysis of dynamic systems indicates that AM carrier and modulated sideband adjustments, with a constant digital level, will not measurably affect digital signal performance in HD Radio receivers. Dynamic systems do not reduce the analog modulation sidebands, and the level of the digital portion of the signal can also remain constant. Therefore, iBiquity concludes that dynamic systems can safely accommodate an HD Radio hybrid signal without a loss in performance.

Unlike the dynamic MDCL system, adaptive modulation companding systems reduce the analog modulation sidebands. Under the rule change proposed in the NPRM, broadcasters using these systems would be required to proportionally reduce the power of their digital sidebands.⁵ Any reduction in digital power will result in a corresponding loss of digital reception performance. So in this case, MDCL power savings equate directly to digital coverage loss. Also, amplitude modulation techniques can change the level of analog sidebands by up to 6 dB, within a time constant of less than 1 ms. But such abrupt changes in digital signal power would necessarily cause corruption in the coherent digital receiver's CSI estimation and equalization. Specifically, just a 1 dB step in digital companding power will result in bit errors for the core 64-QAM digital signal. At very high signal-to-noise ratios, forward error correction decoding may correct these errors, although significant degradation would occur at moderate signal-to-noise ratios.

iBiquity's analysis of adaptive modulation companding MDCL shows that digital signal performance is virtually unaffected by companding, but only if the digital power is not adjusted along with the analog modulation. Any deduction in digital power results in a proportional loss of digital coverage. Due to the already reduced power level of the digital signal, however, the impact on digital may be greater than for analog. The AM hybrid signal already operates at less than 6%

⁵ NPRM at 16-17.

of the analog power. Reductions in digital power necessary to comply with MDCL reductions in analog power have the potential to drive the digital signal below the existing noise floor in the AM band.

Therefore, iBiquity proposes that the Commission's final rules on MDCL allow broadcasters to maintain their existing digital power levels even if they choose to reduce analog power. iBiquity recognizes this may increase the risk of digital self-interference to a station's analog signal, but that is an issue that is wholly within the control of the station adopting MDCL techniques. The Commission should not object if a station chooses to accept some level of host interference in order to support the viability of its digital service. Moreover, it is likely that audible effects from host interference may be self-masking, in the manner originally intended for MDCL systems. Thus, there is little risk to the public interest.

iBiquity also notes that its proposal to maintain digital power levels is consistent with the testing equipment manufacturers conducted concerning MDCL. The amplitude modulation testing that was conducted and analyzed by the NRSC did not reduce digital power levels and successfully demonstrated the viability of this approach. The Commission should modify its proposal to permit MDCL without prior authorization but to allow stations to implement MDCL without reducing digital power.

3. The Commission Should Authorize AM Broadcasters to Convert to All Digital Broadcasts

The HD Radio all digital mode offers AM broadcasters the best long term solution to the problems that have caused listeners to turn to alternative forms of programming and entertainment. The NPRM highlights that analog AM's poor audio quality is a significant reason why listeners have migrated to other services for news and entertainment.⁶ The Commission also emphasized

⁶ NPRM at 2.

the limitations imposed by the AM interference environment.⁷

The HD Radio system can address these problems in several ways. First, the dramatic audio quality upgrade the digital signal enables will address many of the concerns about analog AM audio. As was noted above, the stereo quality of the digital signal allows broadcasters to offer viable music programming and to address the overall listener dissatisfaction with analog audio. The reintroduction of music formats to AM can help rejuvenate AM broadcasting, facilitate innovation and allow AM stations to compete with other sources of entertainment. Second, the all digital system increases the power levels of the OFDM carriers. This enhances the range of the digital signal and reduces susceptibility to power line interference, further improving the listening experience. By combining an extend coverage range and superior audio quality, the all digital system offers AM broadcasters the opportunity to offer a truly competitive service. Third, the all digital mode allows for the introduction of new services that can help keep existing listeners and attract new listeners. The all digital system enhances the ability to introduce both multicasting and datacasting services in the AM band by offering greater capacity for these services and more coverage. Hybrid AM broadcasts already offer CAP compliance for digital emergency notifications. In an all digital world, the increased robustness of the digital carriers will make it easier to introduce a second audio channel and datacasting services such as traffic/navigation services, album art, and news updates. These new services have the potential to allow AM broadcasters to capture both new listeners and new sources of revenue.

Although many of the benefits of the AM HD Radio system are available today through the hybrid mode of operation, some stations have found it difficult to introduce hybrid AM broadcasts without interference to host analog signals or, in a handful of cases, interference to

⁷ NPRM at 3.

adjacent channel stations. The requirement that the hybrid digital signal spread under the existing analog signal and the adjacent channel signals increases the interference risk for some stations due to the extreme limitations of the AM band. It also limits the coverage and robustness of the digital signal. The all digital AM mode relocates the core digital carriers into the center of the channel eliminating any adjacent channel interference risk that might be associated with the hybrid mode. The absence of the analog signal also eliminates host interference concerns. As a result, stations that cannot convert using the hybrid mode may find it attractive to move directly to all digital operations. Moreover, the increased coverage and robustness of the all digital signal may better justify the capital investment required to convert some AM stations.

There are analog AM stations today that have few existing listeners but cannot convert to digital due to interference constraints. If these stations were allowed to convert to all digital operations, they could enjoy the upgrade in audio quality digital can offer and develop a more commercially viable path to success. With more than 17.5 million receivers in the marketplace and millions of new digital receivers being introduced each year, there are enough receivers in use for all digital broadcasters to continue to serve the public. iBiquity envisions all digital broadcasts will allow broadcasters to introduce new and innovative programming that will attract new listeners to the AM band as well as new datacasting services. The Commission should facilitate the digital transition by allowing stations to voluntarily adopt all digital broadcasting if that best serves the needs of their listeners.

4. Conclusion

iBiquity approves of the Commission's efforts to work with broadcasters to ensure the long term viability of AM broadcasting. iBiquity respectfully requests that the Commission consider

the proposals contained in these comments when finalizing the proposed changes to the rules for AM service.

Respectfully submitted,

/s/

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