Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Digital Audio Broadcasting Systems	)	MM Docket No. 99-325
And Their Impact On the Terrestrial Radio	)	
Broadcast Service	)	

REPLY COMMENTS OF
THE NATIONAL ASSOCIATION OF BROADCASTERS

The National Association of Broadcasters[1] (NAB) hereby files reply comments in the above referenced docket on the issue of the National Radio Systems Committee DAB Subcommittee's "Evaluation of the iBiquity Digital Corporation IBOC System, Part I – FM IBOC" (NRSC Report).[2] The Commission's 1999 *Notice of Proposed Rulemaking* (NPRM) in this proceeding on the introduction of terrestrial DAB opened and concluded by noting the Commission's intention to develop a complete record on these issues "in order to be in a position to take informed and expeditious action at the proper time."[3] The comments filed in this phase of the proceeding show that now is the proper time for expeditious Commission action and, together with the comments filed in response to the NPRM, they indicate what that Commission action should be.

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[1] NAB is a nonprofit incorporated association of radio and television stations and broadcast networks. NAB serves and represents the American broadcasting industry.
[2] NAB and the Consumer Electronics Association (CEA) are co-sponsors of the NRSC.
[3] *Notice of Proposed Rulemaking*, MM Docket No. 99-325, rel. Nov. 1, 1999, at ¶ 58; *see also* ¶ 2.

The overwhelming weight of the comments here filed call for a rapid introduction of terrestrial DAB by immediate FCC endorsement of IBOC DAB utilizing iBiquity Digital's FM IBOC technology, which, in a second phase, should be adopted by the FCC as the single technical standard for FM IBOC on the basis of expedited standardization by the NRSC and, also in the second phase, development by the FCC of appropriate IBOC service and transition rules. Thus, NAB, along with virtually all industry commenters, call on the FCC to rapidly follow the now ineluctable steps leading to digital broadcasting for America's radio broadcasters and the listening public.

Commenters from the radio broadcasting industry were virtually unanimous in their support for swift Commission endorsement of IBOC as the digital future for American broadcasters and of iBiquity Digital as the FM IBOC technology for that digital future.[4] Broadcasters as varied in size and service as Disney/ABC, Evangelistic Alaska Missionary Fellowship, Radio One, Susquehanna, Cox Radio, Clear Channel, Bonneville, Infinity, Journal Broadcast Corp., and NPR endorse IBOC and iBiquity Digital's FM IBOC system.[5] These radio companies support IBOC and iBiquity Digital

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[4] Comments of Bonneville International Corp. (Bonneville), MM 99-325, filed Feb. 19, 2002 at 7; Comments of Clear Channel Communications (Clear Channel), MM 99-325, filed Feb. 19, 2002 at 2; Comments of Cox Radio Inc. (Cox), MM 99-325, filed Feb. 19, 2002 at 1-2; Comments of Evangelistic Alaska Missionary Fellowship (Evangelistic), MM 99-325, filed Feb. 12, 2002 at 1; Comments of Infinity Broadcasting Group (Infinity), MM 99-325, filed Feb. 19, 2002 at 2; Comments of Journal Broadcast Corp. (Journal), MM 99-325, filed Feb. 18, 2002 at 2; Comments of Radio One, Inc. (Radio One), MM 99-325, filed Feb. 19, 2002 at 1, 3; Comments of Susquehanna Radio Corp. (Susquehanna), MM 99-325, filed Feb. 19, 2002 at 4; Comments of Walt Disney Company and ABC, Inc. (Disney/ABC), MM 99-325, filed Feb. 19, 2002 at 1,2.

[5] *Id*. NPR's endorsement of the iBiquity IBOC FM system is subject to resolution of interference concerns regarding subsidiary communications services, Comments of National Public Radio, Inc. (NPR), MM 99-325, filed Feb. 19, 2002 (which concerns are shared by NAB, *see* Comments of NAB, MM 99-325, filed Feb. 19, 2002 at 6) and the Commission's allowing secondary program services, which NAB also supports. This

because of the system's enhanced audio quality and robustness,[6] compatibility with analog service,[7] opportunity for additional auxiliary services[8] such as mobile wireless information services as well as additional program services,[9] seamless and flexible path to digital service,[10] and spectrum efficiency,[11] among its other advantages and attributes, all validated in the NRSC Report.

For the same reasons, a number of related-industry commenters – from consumer electronics manufacturers[12] and their suppliers[13] and from broadcast equipment manufacturing[14] and datacasting development[15] – support the rapid introduction digital

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latter issue is properly addressed during the phase of this proceeding considering service rules for IBOC service.

[6] Comments of Bonneville at 2; Comments of Clear Channel at 1; Comments of Disney at 2; Comments of Evangelistic at 1; Comments of Infinity at 1, 3; Comments of Susquehanna at 2.

[7] Comments of Bonneville at 2; Comments of Clear Channel at 2; Comments of Cox at 2; Comments of Disney at 3; Comments of Evangelistic at 1; Comments of Infinity at 2, 4; Comments of Radio One at 3.

[8] Comments of Cox at 2; Comments of Disney at 2; Comments of Evangelistic at 1, 2; Comments of Infinity at 4; Comments of Radio One at 3.

[9] Comments of NPR at 5-10.

[10] Comments of Bonneville at 2; Comments of Cox at 2; Comments of Disney at 3; Comments of Infinity at 3, 5.

[11] Comments of Cox at 2; Comments of Disney at 3; Comments of Susquehanna at 1, 3.

[12] Comments of CEA, MM 99-325, filed Feb. 19, 2002 (significantly improved radio service); Comments of Kenwood Corporation (Kenwood), MM 99-325, filed Feb. 20, 2002 at 2-3 (IBOC and the iBiquity system will bring benefits to consumers, such as enhanced audio quality and reliability, auxiliary datacasting capacity); Comments of Visteon Corporation, MM 99-325, filed Mar. 14, 2002 (IBOC will provide performance and reception improvements and audio information capabilities).

[13] Comments of ALPS Electric (USA), Inc. (ALPS Electric), MM 99-325, filed Feb. 21, 2002; Comments of Texas Instruments Incorporated (Texas Instruments), MM 99-325, filed Feb. 15, 2002 (significantly enhanced performance and relatively minor tradeoffs).

[14] Comments of Harris Corporation (Harris), MM 99-325, filed Feb. 19, 2002 (IBOC DAB system provides the means by which terrestrial broadcasters can gain parity with other delivery methods as to enhanced audio quality and datacasting and preserve the unique and important roles they occupy); Comments of Nautel Limited and Nautel Maine, Inc. (Nautel), MM 99-325, filed Feb. 13, 2002 (improved audio quality and more reliable reception, without harm to existing analog reception).

broadcasting via IBOC and iBiquity Digital's FM IBOC system. Many commenters urged an early and strong Commission endorsement of iBiquity Digital's FM IBOC system to give the broadcast industry and consumer equipment manufacturers the confidence to make critical additional investments in FM IBOC technology.[16]

NAB notes that the comments of Virginia Center for The Public Press (VCPP) misrepresent the nature of the subjective evaluation portion of the NRSC testing process. Contrary to what is stated by VCPP regarding the subjects used in these tests, namely, "[w]e note the advanced age of the fifty-five subjects, attending an NAB convention (an inappropriately composed test group probably more likely to represent the broadcast interest advocacy position, than a neutral or skeptical position),"[17] NAB points out that firstly, these listeners were consumers from the Austin TX metropolitan area, and secondly, these tests strictly followed accepted scientific and psychoacoustic principles, as clearly noted in Appendix H of the FM IBOC Test Data Report submitted to the NRSC, specifically:

> The sample of listeners for the NRSC subjective experiments was stratified both for listener gender and age group. For each experiment listeners were recruited to represent approximately equal representation in eight categories: four *Age Groups* (16-24, 25-32, 33-42, 43-50) for each *Gender* (male, female).[18]

Furthermore, VCPP's suggestion that "only actual OBJECTIVE testing can prove or assure that the criteria for enhanced audio quality, using conventional audio distortion,

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[15] Comments of Impulse Radio, Inc., MM 99-325, filed Feb. 19, 2002 (clear, reliable sound; digital program-related text services; high degree of analog compatibility).
[16] Comments of Cox at 3; Comments of ALPS Electric at 2, 3; Comments of Nautel at 2; Comments of Kenwood at 3, 4.
[17] Comments of VCPP, MM 99-325, filed Feb. 20, 2002 at 2-3.
[18] "Dynastat – Audio Testing Methods and Procedures," FM Test Data Report, Appendix H at 3.

signal-to-noise ratio and spectral power density distribution," *id*., fails to recognize the well-known fact that these objective measures offer far less insight into the performance of a perceptually-coded audio system (such as iBiquity's FM IBOC system) than do subjective tests since *by design* perceptual audio coding system performance is keyed not to these objective measures but to the peculiarities of the human auditory system.

Broadcasters applauded the spectrum efficiency and seamless transition offered by iBiquity Digital's FM IBOC system, without the need for allocation of additional spectrum, and many commenters urged abandonment of the out-of-band approach raised in the NPRM.[19] NPR stood virtually alone[20] in continuing to advocate allocation of additional spectrum (specifically TV channel 6), but did so for new digital-only radio stations and new public safety and other services, rather than as the path to digital broadcasting for existing radio broadcasters,[21] which it agrees should be IBOC and iBiquity Digital. NAB notes that the weight of the comments in response to the NPRM, as well as the weight of comments here, does not support allocation of additional spectrum for digital radio services.[22]

NPR's comment in support of this proposal that demand for radio broadcast facilities has long exceeded the currently allocated spectrum, NPR at 11, does not bolster its suggestion here, for the same could be said whatever the allocation of spectrum for

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[19] Comments of Clear Channel at 2; Comments of iBiquity Digital, MM 99-325, filed Feb. 19, 2002 at 15; Comments of Kenwood at 5; Comments of ALPS Electric at 3; Comments of Nautel at 2.

[20] The comments of VCPP, at 12, advocated an additional band, potentially L-Band, for Eureka 147 or other wide band terrestrial system.

[21] Comments of NPR at 3, 11-13.

[22] *See* Reply Comments of NAB, MM 99-325, filed Feb. 22, 2000 at 6, 7.

radio services, given the limited nature of and multitudinous competing demands for spectrum.

As to NPR's specific suggestion for the re-allocation of TV channel six to radio, NAB notes that many existing television broadcasters operating on channel six in analog NTSC are expecting to switch their DTV operations to channel six when the analog service is terminated.[23] Given that IBOC DAB has proven out and can accommodate all existing radio broadcasters, NAB suggests that channel six would be best retained for digital television purposes, particularly given the difficult re-packing of all digital television broadcasters into a reduced amount of spectrum.

NAB was joined by most commenters in urging the Commission to announce its intention, based on the NRSC Evaluation Report,[24] to adopt iBiquity Digital's FM IBOC technology as the single DAB FM standard.[25] Many commenters noted that Commission endorsement of iBiquity as the single FM IBOC standard was important for continued investment in IBOC technology.[26] CEA made the well-accepted point that receiver manufacturers, broadcasters and consumers need the certainty that an FCC-mandated single standard provides in order to have confidence in the long-term usefulness of IBOC DAB equipment to invest in it. CEA at 2. *See also* Nautel at 2; Texas Instruments at 1.

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[23] *See* Reply Comments of NAB, MM 00-39, filed June 16, 2000.

[24] iBiquity Digital has now submitted test data for the iBiquity proprietary audio coding system that will replace the MPEG-2 AAC system used for purposes of the NRSC Evaluation Report. The NRSC will be issuing an evaluation report soon on this latest test data.

[25] Comments of Disney at 4; Comments of Evangelistic at 2; Comments of Radio One at 7; Comments of Journal at 2; Comments of Susquehanna at 4; Comments of Cox at 2; Comments of Bonneville at 4; Comments of Infinity at 8,9; Comments of Texas Instruments at 1; Comments of Harris at 2.

[26] Comments of Kenwood at 3-5; Comments of Texas Instruments at 1; Comments of Infinity at 9.

CEA also pointed out that the Commission must specify the technical parameters of the IBOC DAB signal to be transmitted by FM broadcasters in order for manufacturers to have confidence that the equipment they build will work for anyone listening to an FM IBOC signal anywhere in the country. CEA at 2. Infinity Broadcasting made the related points that a single standard protects investments, guarantees compatibility and encourages a prompt roll-out of DAB technology by providing a level of assurance to broadcasters and receiver manufacturers that their investment in this new technology will be supported. Infinity at 9.

In urging that the Commission adopt a single FM IBOC standard, CEA suggested the availability of the NRSC to aid in the development of a standard, "should the Commission desire such assistance." CEA at 2. NAB agrees that the NRSC would be the appropriate expert body, already steeped in the intricacies of IBOC and iBiquity technology, to quickly set down the specifics of the iBiquity FM IBOC system in the form of an industry standard, including audio system, service multiplex and transport system and RF transmission system characteristics, which the FCC could then, after proper review and comment, expeditiously adopt. This method of standardizing FM IBOC would also be in keeping with the Commission's reliance on industry consensus rather than involving the Commission in the tedious work of actual standardization.[27]

A number of commenters also urged the Commission, as did NAB, to identify a method for stations to go on air with the iBiquity Digital FM IBOC system as soon as possible, and in advance of final authorization of the new FM IBOC service.[28] Clear

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[27] *See* NPRM at ¶ 58.

[28] Comments of Nautel at 3; Comments of ALPS Electric at 3; Comments of Clear Channel at 2; Comments of Kenwood at 4; Comments of iBiquity at 16,17.

Channel and Kenwood note that, since the iBiquity system is compatible with analog reception of both the host station and other stations within the protected contours, interim IBOC operations should be authorized.[29]

As iBiquity suggested in its comments, at 14-17, the Commission could act to facilitate and encourage the commercial introduction of IBOC technology by quickly moving to a First Report and Order that would endorse FM IBOC and iBiquity Digital's FM IBOC system on the basis of the complete record in this proceeding, including the NRSC Report, and also establish a method for interim station operations using the FM IBOC system. It could then proceed to issue a Further Notice of Proposed Rulemaking with specific proposals for final IBOC service rules[30] and a proposal for adoption of an FM IBOC standard. The second phase, if initiated this Summer, iBiquity notes, at 17, would allow the Commission to complete its consideration of IBOC prior to the anticipated availability of receivers early in 2003. The overwhelming majority of the commenters here urge prompt introduction of FM IBOC,[31] and iBiquity has set out a reasonable path to achieve that goal.

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[29] Comments of Clear Channel at 2; Comments of Kenwood at 4.

[30] CEA in its comments, at 2-3, suggests that the Commission "should mandate that an FM station's main audio program material be broadcast over the IBOC DAB signal." Since the iBiquity system design incorporates a blend to analog feature whereby the digital audio signal blends to the analog signal under conditions of weak signal, etc., concerns about the digital signal containing the main channel audio are not well founded.

The question of adopting a regulatory framework analogous to DTV licensee fees for certain ancillary services, raised in the NPRM at ¶ 30 and mentioned by iBiquity, at 11, should be dismissed. The assessment of fees for subscription ancillary services in DTV was authorized (and required) specifically by statute, whereas here there is no such authorizing statute to permit such a provision.

[31] Many commenters, including NAB, pointed out that terrestrial radio broadcasters must begin IBOC operations as soon as possible to remain competitive in the increasingly digital age. Comments of Infinity at 8; Comments of Harris at 1,2; Comments of Bonneville at 7; Comments of Cox at 3; Comments of iBiquity at 16.

NAB thus urges the FCC to facilitate the rapid deployment and authorization of DAB, by undertaking, on the basis of the full record before it, the following steps:

1) Promptly adopt a First Report and Order endorsing IBOC as the appropriate method for introducing terrestrial digital radio broadcasting and endorsing iBiquity Digital's FM IBOC system as the accepted, proven IBOC technology.

2) Announce in that First Report and Order the Commission's intention to adopt a single technical standard for FM digital broadcasting based on iBiquity's FM IBOC technology and request the NRSC to undertake expeditious documentation of that standard, to be recommended to the Commission.

3) Announce in the First Report and Order a method under which stations could commence interim FM IBOC operations using the iBiquity FM IBOC system.

4) Issue a Further Notice of Proposed Rulemaking proposing specific service and transition rules for FM IBOC, as well as amendment of any Commission rules necessary for IBOC implementation.

5) Establish rigorous but realistic timeframes for completion of the standards work and final adoption of an FM IBOC standard.

NAB joins with the vast majority of the commenters here to urge expeditious deployment of iBiquity Digital's IBOC technology, adoption of a single technical standard based on that technology and development of IBOC service and transition rules,

all to bring the benefits of digital technology to America's radio broadcasters and its listening public.

Respectfully submitted,

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