

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

In the Matter of	)	
	)	
Interference Immunity Performance Specifications for Radio Receivers	)	ET Docket No. 03-65
	)	
Review of the Commission's Rules and Policies Affecting the Conversion to Digital Television	)	MM Docket No. 00-39
	)	
	)	

**JOINT COMMENTS OF  
THE ASSOCIATION FOR MAXIMUM SERVICE TELEVISION, INC., AND  
THE NATIONAL ASSOCIATION OF BROADCASTERS**

Dated: July 21, 2003

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## SUMMARY

For years, broadcasters have supported the adoption of performance standards for television receivers. The Commission correctly recognizes that problems of interference are frequently a function of the interference-rejection characteristics of receivers. Because television broadcasting is an open architecture system, broadcasters exert little if any control over the design of television receivers, but nonetheless bear the burden (along with the public) of the inadequate reception by DTV receivers of free over-the-air broadcast signals. While recent studies suggest that DTV receivers are improving in quality, much work remains to be done.

MSTV and NAB support the Commission's call for industry groups to work together to develop voluntary DTV receiver performance specifications. As the Commission is well aware, the digital transition for free over-the-air television is at a critical stage, and the Commission's positive involvement in encouraging voluntary guidelines for DTV receiver performance could trigger a bandwagon effect that will accelerate consumer acceptance of and investment in DTV technology and hasten the completion of the digital transition. ATSC has already commenced a process to develop such voluntary guidelines; MSTV and NAB are encouraged by the efforts so far, including the involvement of the consumer electronics industry. The Commission should continue to monitor ATSC's progress, maintaining its oversight role and stepping in as necessary if the ATSC discussions fail or are delayed.

The development of receiver standards for digital television is essential for promoting the DTV transition and ensuring that the public enjoys the full benefits of digital technology. DTV receiver performance standards are needed to improve and eliminate problems associated with existing over-the-air DTV reception in an environment already challenged by multiple users and interference trade-offs. Voluntary receiver standards are needed to preserve

the public's over-the-air television service in this complex environment and should not be used as a justification to permit potentially interfering unlicensed devices in broadcast spectrum.

Finally, the broadcast radio industry is in the midst of a transition from traditional analog services to a hybrid analog/digital in-band/on-channel (IBOC) service. As more experience with IBOC is collected, NAB believes that an industry-sponsored effort to develop voluntary AM and FM receiver interference immunity standards or recommended practices may be an appropriate way to mitigate reception problems and offer consumers greater certainty that the radios they purchase will not suffer from an excess of interference-related problems. The FCC should encourage this sort of action by the radio industry and recognize that it can play an important and positive role in the transition from analog to IBOC radio.

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**JOINT COMMENTS OF  
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THE NATIONAL ASSOCIATION OF BROADCASTERS**

The Association for Maximum Service Television, Inc. ("MSTV") and the National Association of Broadcasters ("NAB")<sup>1</sup> file these comments in response to the Commission's Notice of Inquiry ("NOI") in the above-captioned proceeding.<sup>2</sup>

MSTV and NAB have historically urged the Commission to become more involved in setting standards for digital television receiver performance and immunity.<sup>3</sup> The

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<sup>1</sup> MSTV is a non-profit trade association of local broadcast television stations committed to achieving and maintaining the highest technical quality for the local broadcast system. NAB is a non-profit, incorporated association of radio and television stations that serves and represents the American broadcast industry.

<sup>2</sup> Notice of Inquiry, *Interference Immunity Performance Specifications for Radio Receivers; Review of the Commission's Rules and Policies Affecting the Conversion to Digital Television*, ET Docket No. 03-65, MM Docket No. 00-39, FCC 03-54 (rel. Mar. 24, 2003) ("*NOI*").

<sup>3</sup> *See, e.g.*, Broadcasters' Comments on the Fourth Notice of Proposed Rulemaking, MM Docket No. 87-268, at 36-38 (Nov. 20, 1995); Broadcasters' Reply Comments on the Fourth Notice of Proposed Rulemaking, MM Docket No. 87-268 (Jan. 22, 1996); Joint Broadcasters Comments, MM Docket No. 87-268, at 32-34 (July 11, 1996); Petition for Clarification and Partial Reconsideration of the Fifth and Sixth Reports and Orders, Association for Maximum Service Television, Inc., The Broadcaster Caucus, and Other Broadcasters, MM Docket No. 87-268, at 43-45 (June 13, 1997); Joint Broadcasters Comments, MM Docket No. 00-39, at 22-24 (May 17, 2000); MSTV Reply Comments, MM Docket No. 00-39, at 10-11 (June 16, 2000); (continued...)

Commission correctly recognizes that inadequate reception of broadcast signals may stem from inadequate performance characteristics of receivers.<sup>4</sup> In a closed system, such as most commercial wireless networks, the network operator controls both the transmitters and receivers, and is thereby able to optimize its network to minimize interference with little need for government involvement. However, in an open system such as broadcasting, in which broadcasters have no control over the devices that are used to receive the transmitted signals, there is a need for greater coordination and some form of standardization to ensure that television sets purchased by consumers are able to adequately receive over-the-air broadcast signals.

While receivers are getting better, many DTV receivers currently on the market need further improvement. For example, some do not conform to the technical assumptions underlying the DTV Table. This has caused leading broadcasters to push for DTV receiver performance standards for close to a decade now. Recent studies indicate that while DTV sets have improved somewhat, the task is far from finished.<sup>5</sup> Unlike analog television, digital television is an all-or-nothing technology in which interference may cause the elimination of the television picture and sound altogether. Good reception is the key to consumer confidence, and reception problems will erode consumer confidence and hinder the digital transition. In light of this state of affairs, MSTV and NAB renew their historical stance that the Commission should play an active role in monitoring receiver performance. As the Commission recognized in the

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MSTV/NAB/ALTV Petition for Reconsideration in MM Docket No. 00-39, at 10–13 (Mar. 15, 2001).

<sup>4</sup> *NOI* at 1, ¶ 1.

<sup>5</sup> See Doug Lung, *RF at NAB2003: DTV Reception*, TV Technology, July 9, 2003, at 27 (describing a test of six DTV receivers at the Advanced Television Technology Center which revealed that “current DTV receivers do not meet the FCC DTV planning factors.”).

NOI,<sup>6</sup> guidelines for DTV receiver performance and immunity are important components in the digital transition and for promoting spectrum efficiency.

**I. THE COMMISSION SHOULD MONITOR AND, IF NECESSARY, PROMOTE THE PROCESS TO IMPROVE OVER-THE-AIR DTV RECEIVER TECHNOLOGY.**

**A. MSTV and NAB Support The Commission's Call For Industry Groups To Work Toward Developing Voluntary Receiver Performance Specifications.**

As discussed above, MSTV and NAB have long called for the Commission to establish DTV receiver performance standards, and are heartened by the Commission's recognition that such standards are necessary to encourage manufacturers to produce DTV receivers with adequate tuning capability.<sup>7</sup> MSTV and NAB support the Commission's call to industry groups to work together to "identify the relevant DTV receiver performance parameters, develop appropriate minimum performance specifications for those parameters, and publish them."<sup>8</sup> Such voluntary performance guidelines or best practices would go a long way toward establishing consumer confidence in broadcast DTV and promoting the completion of the digital transition.

In keeping with the Commission's call for voluntary guidelines, the Advanced Television Systems Committee, Inc. ("ATSC") has already commenced a process to develop a formal Recommended Practice for receiver performance for broadcast DTV receivers.<sup>9</sup> MSTV and NAB are encouraged by ATSC's efforts so far, and, in particular, by the participation of the

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<sup>6</sup> *NOI* at 15, ¶¶ 35–36.

<sup>7</sup> *Id.* at 15, ¶ 35.

<sup>8</sup> *Id.* at 15, ¶ 36.

<sup>9</sup> Advanced Television Systems Committee Press Release, *ATSC To Develop Recommended Practice for DTV Receivers*, June 30, 2003, available at [http://www.atsc.org/news\\_information/press/2003/PR\\_Receiver%20RP.htm](http://www.atsc.org/news_information/press/2003/PR_Receiver%20RP.htm).

Consumer Electronics Association and individual television set manufacturers. The issues to be discussed and resolved by the ATSC group are highly technical, and will no doubt call upon broadcasters, consumer electronics manufacturers, and other experts to cooperate toward establishing performance guidelines or recommended practices for DTV receivers. As with any highly technical standard-setting process, care must be taken to avoid “freezing” technology while at the same time providing sufficient clarity to all interested parties. Moreover, ATSC should adopt a process that will challenge the industries toward continued improvement in receiver design and performance.

MSTV and NAB believe there are a number of outstanding issues regarding receiver characteristics that warrant attention. Many of these issues are now being discussed before the ATSC. Such discussions should, at a minimum, include the following issues:

- Antenna control interface
- RF signal operating range, including both UHF and VHF sensitivity
- Noise performance
- Phase noise performance
- DTV to DTV and NTSC to DTV interference immunity (co-channel, adjacent channel and taboo channel)
- Equalizer performance, including equalizer range, as well as multi-path performance

At a minimum, receiving devices should be manufactured to perform to the level assumed under the planning factors of the DTV Table of Allotments. The future re-packing in the television band will require this critical assumption to be addressed.

The Commission correctly recognizes that DTV tuners will soon become mandatory in many television receivers, and that the voluntary standard-setting process for DTV receiver performance therefore needs to be resolved in a timely fashion.<sup>10</sup> MSTV and NAB

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<sup>10</sup> *NOI* at 15, ¶ 36.

support the Commission's suggestion that recommendations be developed within six to nine months after convening an industry group to develop receiver performance standards — which would call for ATSC to publish recommendations before April 2004. ATSC believes this timetable is feasible. As the Commission notes,<sup>11</sup> however, it should continue ongoing oversight and encouragement of these discussions and its monitoring role over the performance of DTV receivers. In the event the ATSC discussions fail or are delayed, the FCC should take appropriate action.<sup>12</sup>

**B. The Commission Should Oversee The Relationship Between Broadcasters And Manufacturers On A Variety Of DTV Issues.**

The Commission has recognized the special challenges posed by the open architecture of the free, over-the-air broadcast system, in which broadcasters do not control the performance of television receivers.<sup>13</sup> By their nature, such open architecture networks require greater government coordination and oversight than closed networks, where limited and flexible regulation is typically appropriate. The need for government involvement in the open architecture broadcasting system is heightened by the reality that the incentives of broadcasters and DTV receiver manufacturers do not always line up. Therefore, the public's interest in free over-the-air digital television must be guarded by FCC oversight.

Regardless of the progress being made by ATSC, the Commission should establish a process whereby it is in a position to oversee inter-industry discussions regarding

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<sup>11</sup> *Id.* at 15-16, ¶ 36.

<sup>12</sup> MSTV and NAB agree with the Commission's conclusion that it has the necessary statutory authority to mandate receiver performance guidelines and standards. *NOI* at 9, ¶ 22.

<sup>13</sup> FCC Spectrum Policy Task Force, Report of the Spectrum Rights and Responsibilities Working Group, at 43 (Nov. 15, 2002); *see also* Comments of MSTV and NAB, Docket No. 02-135, at 15 (Jan. 27, 2003).

various issues arising between the broadcasting and consumer electronics industry. As discussed above, the Commission should remain vigilant in its oversight of the process for developing voluntary guidelines for DTV receiver performance, and should promptly step in if necessary. As part of this oversight, the Commission should urge manufacturers to submit voluntary reports detailing current and future DTV receiver performance characteristics. In addition, the Commission should monitor the impact on free over-the-air broadcast service of the plug-and-play agreement between cable operators and the consumer electronics industry.<sup>14</sup>

The necessity for such oversight is due to the fact that the digital transition is at a critical stage. Inadequate reception by new DTV receivers may delay or derail the off-air digital transition. Also, some in the consumer electronics industry are sending mixed signals. While some television set manufacturing companies have been strong supporters of the off-air DTV transition, the commitment of others to the transition may be characterized as uncertain.

## **II. THE COMMISSION SHOULD CONSIDER PROCEDURES TO ENSURE QUALITY AND INTERFERENCE IMMUNITY FOR NEW DTV RECEIVERS.**

### **A. The DTV Transition For Free Over-The-Air Television Is At A Critical Stage.**

The DTV transition promises to enhance greatly the nation's free over-the-air television broadcast service, while also allowing the Commission to reclaim valuable spectrum for other wireless services. However, as the Commission is no doubt aware, the DTV transition is now at a critical stage. Economists have noted that a critical mass of consumers must adopt DTV in order to trigger the "bandwagon effect" that will enable DTV to reach its potential and

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<sup>14</sup> FCC News Release, *FCC Seeks Comment on Cable-Consumer Electronics Agreement on "Plug and Play,"* Jan. 10, 2003 (citing Dec. 19, 2002 Memorandum of Understanding between the cable and consumer electronics industries).

the digital transition to be completed.<sup>15</sup> Government policy plays an important role in spurring along or hindering the effort to reach such a critical mass.<sup>16</sup> On the one hand, negative effects such as DTV receivers that are subject to significant levels of interference or loss of picture — whether caused by inadequate receiver performance or by the introduction of interfering unlicensed devices in broadcast spectrum — could send the over-the-air DTV transition into a downward spiral from which it would not be able to recover.<sup>17</sup> Any steps taken by the government to exacerbate DTV interference problems could lead to such a downward spiral, which would delay the digital transition and limit the public's access to over-the-air television broadcasting.

On the other hand, government policy could play a positive role by promoting adoption of voluntary minimum performance guidelines for DTV receivers, which could lead to a bandwagon effect for the DTV transition.<sup>18</sup> For such a bandwagon effect to take place, it is extremely important that the current generation of DTV receivers work well. Industry adoption of voluntary receiver performance guidelines would help provide the necessary consumer confidence in DTV receivers' ability to receive over-the-air DTV signals, leading to greater marketplace acceptance of DTV and, ultimately, to the triggering of the bandwagon effect for the DTV transition.

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<sup>15</sup> John Haring & Jeffrey Rohlfs, Strategic Policy Research, *Permitting Unlicensed Devices on Broadcast Spectrum During the DTV Transition: Substantial Costs and Risks, Largely Speculative Benefits*, at 12–14 (April 2003) (“*SPR Report*”), submitted as an attachment to Joint Comments of MSTV, NAB, and The Association of Public Television Stations (“APTS”) in ET Docket No. 02-380 (Apr. 17, 2003).

<sup>16</sup> *Id.* at 13.

<sup>17</sup> *Id.* at 14–15.

<sup>18</sup> *Id.* at 12–14.

**B. Manufacturers' Incentives To Produce Top Quality Receivers Are At Present Uncertain.**

Because of the open nature of the broadcast system, broadcasters, DTV receiver manufacturers, and others need to coordinate with each other to ensure that DTV receivers are capable of receiving transmitted over-the-air broadcast signals. In a perfect world, interested parties would work together to ensure that DTV receivers operate as anticipated, obviating the need for a government role. However, it remains unclear whether manufacturers perceive the over-the-air DTV market as being important. For example, the Consumer Electronics Association has challenged<sup>19</sup> an FCC Order requiring that DTV tuners be installed in all television sets larger than 13 inches by July 2007 — a requirement that was adopted to ensure consumer access to over-the-air DTV service and to promote the digital transition.<sup>20</sup> In addition, representatives of the consumer electronics industry appear to have shifted their focus to the manufacture of digital receiving devices for cable as opposed to over-the-air television.<sup>21</sup>

We recognize that in response to FCC inquiries, leading television set manufacturers have stated that they will include over-the-air digital tuners in all digital “cable ready” television sets. This is a positive development. The inclusion of over-the-air tuners in “cable ready” television sets is critically important to the digital transition.<sup>22</sup> We would observe, however, that some manufacturers conditioned their support for including off-air digital tuners in

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<sup>19</sup> *Consumer Elecs. Ass'n v. FCC*, No. 02-1312 (D.C. Cir. filed Oct. 11, 2002); *see also CEA Petitions D.C. Appeals Court to Block DTV Tuner Mandates*, *Comm. Daily*, Oct. 17, 2002, at 6.

<sup>20</sup> FCC News Release, *FCC Introduces Phase-In Plan for DTV Tuners: Plan Minimizes Costs and Allows Consumers to Access DTV Signals*, Aug. 8, 2002.

<sup>21</sup> *See Tauzin to Introduce Bill in Sept. Addressing DTV Transition*, *Comm. Daily*, July 16, 2002, at 3, 4 (quoting CEA President Gary Shapiro as being dismissive of the importance of over-the-air delivery of DTV signals).

<sup>22</sup> These responses from television set manufacturers address one of broadcasters' primary concerns with the “plug and play” agreement that is now before the FCC for approval.

their products on the FCC's approval of the "plug and play" memorandum of understanding entered into between the consumer electronics and cable television industries. Moreover, many manufacturers responding to the FCC's inquiry regarding receiver performance quality were not specific when answering the questions posed. For example, while some indicated that their products were improving, many did not provide specific information regarding the performance characteristics of their receivers.

These actions raise questions as to whether manufacturers have the necessary incentives to engage in a process to continually improve DTV receivers. The promising news is that DTV receivers are getting better; however, significant improvements are still necessary. A series of tests recently conducted at the Advanced Television Technology Center ("ATTC") in Alexandria, Virginia, studied the performance of several DTV receivers and found that they had limitations.<sup>23</sup> Specifically, the ATTC study found that current DTV receivers do not meet all the planning factors that are the basis for the DTV Allotment Table.<sup>24</sup> The ATTC study reached the conclusion that target requirements are necessary for DTV receivers. Such requirements would address, at minimum, RF performance, equalizer performance, and receiver functionality.<sup>25</sup> MSTV and NAB suggest that the ATTC study provides further proof that voluntary performance guidelines are necessary.

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<sup>23</sup> Doug Lung, *RF at NAB2003: DTV Reception*, TV Technology, July 9, 2003, at 27.

<sup>24</sup> *Id.*

<sup>25</sup> *Id.* at 30.

**III. UNLICENSED DEVICES SHOULD NOT BE PERMITTED IN BROADCAST SPECTRUM IRRESPECTIVE OF WHETHER AND WHEN DTV RECEIVER PERFORMANCE STANDARDS ARE ADOPTED.**

While supporting minimum interference immunity performance standards for DTV receivers, NAB and MSTV caution against using receiver performance standards as a reason to justify the addition of unlicensed devices in broadcast spectrum.<sup>26</sup> Permitting unlicensed devices to operate in broadcast spectrum would introduce a host of problems that could not be solved simply by adopting standards for DTV receiver interference immunity performance. First, unlicensed devices operating in broadcast spectrum may cause significant interference to DTV receivers, in part because the technology necessary to ensure that such devices are able to detect spectrum “white spaces” is at present unreliable and untested. Unlicensed devices may have had much success operating in spectrum bands that are either dedicated to unlicensed use or that are shared with relatively sporadic users. Nonetheless, there is little experience with unlicensed devices sharing spectrum with broadcast services, let alone sharing spectrum that is used as intensively and that is in as much of a state of flux as the broadcast spectrum. Second, once they are introduced into the market, unlicensed devices cannot easily be monitored or controlled, making impossible any attempts broadcasters might make to alleviate interference concerns once they arise. This concern is related to the fact discussed above that, unlike wireless carriers, broadcast systems have an open architecture in which broadcasters have no control over DTV receiver performance (let alone the characteristics of potentially interfering unlicensed devices).

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<sup>26</sup> See Notice of Inquiry, *Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Band*, 17 FCC Rcd 25,632 (2002) (“*Unlicensed Devices NOP*”).

Finally, there is very little “unused” spectrum in the broadcast band, particularly during the DTV transition. During the transition, DTV receivers must operate in a particularly challenging environment, as full power television stations broadcast both analog and digital signals. Already, trade-offs with respect to the public’s free, over-the-air television service have been required to undertake a transition within the existing broadcast spectrum — new interference to existing analog broadcast service, limitations with respect to digital service areas, and displacement of secondary services such as low power stations and translators have been necessary to accomplish this historic feat. After the transition, maximized DTV facilities, Class A stations, low power stations, translators, and boosters need to be accommodated within the core broadcast spectrum. Moreover, both during and after the transition, other devices such as wireless microphones, wireless assist video devices, remote control devices, and medical telemetry equipment add to the crowding of the broadcast spectrum. This leaves very little, if any, “white space” spectrum available for unlicensed use, making the potential harm from interference to DTV receivers far greater than any potential gain realized from unlicensed devices (that would be better off using dedicated spectrum elsewhere). These problems, discussed in greater detail by MSTV and NAB in the *Unlicensed Devices NOI* proceeding,<sup>27</sup> all caution against the introduction of unlicensed devices in broadcast spectrum, particularly during the DTV transition, and would not be solved by the introduction of receiver performance standards for DTV receivers.<sup>28</sup> In short, DTV receiver performance standards are needed to

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<sup>27</sup> Joint Comments of MSTV, NAB, and The Association of Public Television Stations (“APTS”) in ET Docket No. 02-380 (Apr. 17, 2003); Joint Reply Comments of MSTV, NAB, and APTS in ET Docket No. 02-380 (May 16, 2003).

<sup>28</sup> Moreover, establishing receiver standards going forward would do nothing to protect existing DTV sets and analog sets from experiencing interference from any unlicensed devices that are permitted to operate in broadcast spectrum. The Commission must ensure that analog viewers (continued...)

improve and eliminate problems associated with *existing* DTV reception, and should not be used as a justification to introduce an “overlay” of unlicensed operations in broadcast spectrum.

**IV. THE COMMISSION SHOULD ACTIVELY MONITOR THE INTERFERENCE IMMUNITY PERFORMANCE OF AM AND FM RADIO RECEIVERS.**

The NOI raises the issue of interference immunity performance with respect to AM and FM radio receivers, recognizing that the radio industry is in the midst of a transition from traditional analog services to a hybrid analog/digital in-band/on-channel (IBOC) service.<sup>29</sup> Indeed, during the development and testing of IBOC systems, interference immunity of existing analog receivers to the digital portion of an IBOC signal was one of two critical parameters investigated (the other being the performance of the digital signal into the IBOC receiver itself).<sup>30</sup>

During the National Radio Systems Committee’s (“NRSC”) evaluation and specifically its characterization of analog receiver interference immunity performance, it confirmed what is a well-known fact in the radio industry — receiver performance varies tremendously as a function of manufacturer, receiver application (*e.g.*, automotive, home hi-fi, etc.) and cost. Test data collected during the evaluation of IBOC demonstrated that even in the existing analog broadcast environment, radio performance can be degraded by adjacent channel

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remain protected from interference and able to receive high quality free over-the-air broadcast signals until the end of the digital transition, and that early adopters of DTV technology are not further penalized by additional interference from unlicensed devices.

<sup>29</sup> *NOI* at 14, ¶ 33. This section represents the position of the National Association of Broadcasters. Because MSTV deals exclusively with issues related to television broadcasting, it takes no position on this section.

<sup>30</sup> *See, e.g., Evaluation of the iBiquity Digital Corporation IBOC System*, DAB Subcommittee, National Radio Systems Committee (NRSC), 11/29/01 (Part I – FM) and 4/6/02 (Part II – AM). Appendix D in both reports focuses on analog receiver characterization and documents various aspects of receiver performance pertaining to interference immunity.

interference depending on the decisions made by the receiver manufacturer regarding how well various receiver sub-systems will perform. These decisions are motivated by market forces and with the knowledge that consumers typically purchase specific receivers for specific applications.

As thorough as the NRSC's evaluation of IBOC was, there are still many unknowns to be faced as IBOC transmissions become more and more prevalent. As more experience with IBOC is collected, an industry-sponsored effort to develop voluntary AM and FM receiver interference immunity standards or recommended practices, taking into account both existing realities of analog interference and the hybrid analog/digital signal environment of the future, may be an appropriate way to mitigate reception problems and offer consumers greater certainty that the radios they purchase will not suffer from an excess of interference-related problems. The FCC should encourage this sort of action by the radio industry and recognize that it can play an important and positive role in the transition from analog to IBOC radio.

\* \* \*

Respectfully submitted,

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