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Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, DC 20554

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Amendment of Part 73 of the )	
Commission's Rules To Permit the )	RM-9395
Introduction of Digital Audio Broadcasting )	
in the AM and FM Broadcast Services; )	
_____ )	
Petition for Rulemaking of USA Digital )	
Radio Partners, L.P. )	
_____ )	

COMMENTS OF FORD MOTOR COMPANY

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## Table of Contents

<b>SUMMARY</b> .....	<b>i</b>
<b>I. FORD SUPPORTS ADOPTION OF THE BEST DIGITAL STANDARD</b> .....	<b>2</b>
<b>II. PROCEDURAL CONCERNS: HOW TO IMPLEMENT THE CHANGES</b> .....	<b>3</b>
A. IMPLEMENTATION OF DIGITAL AUDIO BROADCASTING WILL REQUIRE THE USE OF A STANDARDS SETTING BODY .....	3
<b>III. SUBSTANTIVE STANDARDS</b> .....	<b>7</b>
A. DIGITAL RADIO SHOULD BE IMPLEMENTED WITHOUT SIGNIFICANTLY DEGRADING EXISTING SERVICE .....	7
B. ADOPTION OF AN IBOC DAB STANDARD SHOULD CONSIDER HOW CURRENT TECHNOLOGY HAS CHANGED THE PARAMETERS OF BROADCAST OPERATIONS.....	7
C. FORD RECOMMENDS THAT THE COMMISSION CONSIDER SPECIFIC SYSTEM PERFORMANCE CRITERIA .....	10
1. <i>Interference</i> .....	10
2. <i>Service Range</i> .....	10
3. <i>Audio Quality</i> .....	11
4. <i>Data Capacity</i> .....	11
<b>IV. A PUBLIC INFORMATION CAMPAIGN WILL BE NEEDED TO EDUCATE CONSUMERS ABOUT THE CHANGES IN THEIR ANALOG RECEPTION</b> .....	<b>11</b>
A. THE CHANGES TO RADIO RECEPTION .....	11
B. AN EDUCATION PROGRAM WOULD BE NECESSARY TO EDUCATE CONSUMERS ABOUT THE IMPACT OF IBOC ON THEIR CURRENT RADIO EXPECTATIONS .....	12
<b>V. CONCLUSION</b> .....	<b>14</b>

## SUMMARY

When it comes to implementing a digital audio broadcasting (“DAB”) technology for AM and FM radio, Ford’s position is simple – adopt the best DAB standard to bring digital quality to listeners while preserving the integrity of the current analog signals.

Bringing DAB technology to the broadcast bands will benefit from a standards setting body comprised of both private and government membership, including the Commission. The current structure of the AM and FM radio marketplace is such that, without a standards setting body with Commission participation, the implementation of any set of DAB standards would very likely be impossible. Further, any standards adopted by the standards setting body would need force of regulation. Such a body should include a variety of private members. Ford, for its part, would be pleased to be a part of this process.

In any set of DAB standards, it is critical that the standards setting body be required to consider how current technology has changed the parameters of broadcast operations. Today’s receivers have improved sensitivity and selectivity capabilities. This, in turn, has affected the listening patterns and expectations of the radio audience. Any new set of standards should, at the very least, satisfy the characteristics of the existing radio market. To that end, Ford recommends four objective standards – interference, service range, audio quality and data capacity – be a part of any evaluation of a DAB solution. These standards would ensure that the introduction of a DAB system would not impinge upon the existing expectations of the listening public.

Finally, the Commission should initiate a program to educate consumers about any impact a DAB technology would have on their current listening patterns and expectations. Such a program would be vital to the successful implementation of DAB because adverse experiences on the part of consumers would stifle the deployment of digital technologies. An educational

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program is not unprecedented for the Commission. Currently, the Commission is actively engaged in teaching consumers about various aspects regarding the implementation of digital television. In fact, Chairman Kennard has cited education as one of the key roles of the Commission in this process.

In summary, the Commission must not, in the name of progress, sacrifice the gains achieved in the past. Sensitivity to the existing listening patterns and expectations of consumers is essential to the development of any standards and rules. Ford looks forward to the transition to digital radio, stands ready to aid the Commission in this process, and hopes the Commission will adopt the best DAB standard possible.

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**COMMENTS OF FORD MOTOR COMPANY**

Ford Motor Company ("Ford"),<sup>1</sup> pursuant to the Commission's Public Notice on digital audio broadcasting ("DAB"),<sup>2</sup> hereby respectfully submits these comments in response to the Petition for Rulemaking filed by the USA Digital Radio Partners, L.P. ("USADR").<sup>3</sup> In its Petition, USADR requests a rulemaking to permit the introduction of DAB in the AM and FM bands. USADR requests the adoption of an in-band, on-channel ("IBOC") DAB technology that would enable the simultaneous broadcast of analog and digital signals.

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<sup>1</sup> Ford Motor Company produces a wide variety of systems for automobiles. Ford's Electronics Systems Division, Visteon, is the second largest automobile radio manufacturer in the world, producing some 6 million receivers, 1.6 million amplifiers, and 1.2 million antenna systems a year. Its audio engineers have 140 original patents to their credit since 1971 and have published over 60 technical papers in the last 15 years.

<sup>2</sup> Petition for Rulemaking, RM-9395, *Public Notice*, DA 98-2244 (Nov. 6, 1998).

<sup>3</sup> Amendment of Part 73 of the Commission's Rules to Permit the Introduction of Digital Audio Broadcasting in the AM and FM Broadcast Services, *Petition for Rulemaking* (filed Oct. 7, 1998) ("*Petition*").

For its part, Ford's position in this matter is simple: it supports the adoption of the best DAB standard that supports new digital broadcasts and maintains the integrity of the analog broadcast signal. One aspect of this approach concerns the effect of today's radio technology on the public's ability to receive a highly listenable signal. Ford hopes that the Commission will recognize and take into consideration the profound changes that have occurred in the area of analog receiver technology, especially with regards to automobile receivers, before it formally adopts any specific digital standard. To that end, Ford recommends several guiding principles to evaluate the different DAB standards that will eventually be brought before the Commission for consideration.

#### **I. FORD SUPPORTS ADOPTION OF THE BEST DIGITAL STANDARD**

Ford takes no formal position at this time on the appropriate DAB standard the Commission should adopt. Simply put, not all of the facts are in now – USADR is not the only entity working on the design of a digital audio broadcast system. Ford is aware of other companies that are also working on systems to bring DAB to the AM and FM listening public.<sup>4</sup> Each of these systems will undoubtedly have its advantages and disadvantages, as well as unique strengths and weaknesses.

Rather than requesting the Commission to adopt or reject a specific DAB standard, Ford urges the Commission to adopt the standard that will best bring the benefits of digital audio broadcasting to the listening public without sacrificing the current quality of analog service. One

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<sup>4</sup> For example, Lucent Technologies and Digital Radio Express are also working on IBOC systems. There is a consortium of companies examining the Eureka-147 system. Moreover, CD Radio and XM Satellite Radio are implementing Satellite Digital Audio Radio at S-band.

important element of whatever specific standard the Commission eventually adopts – considering the longevity of the existing AM & FM broadcast systems – should be the continued satisfactory performance of analog service for as long as the service exists. Finally, the agency should consider the effect of any decision on both the broadcast and consumer electronics industries.

In short, Ford urges the Commission to act to adopt the best digital standard without sacrificing the current quality of analog service.

## **II. PROCEDURAL CONCERNS: HOW TO IMPLEMENT THE CHANGES**

### **A. Implementation of Digital Audio Broadcasting Will Require the Use of a Standards Setting Body**

It is Ford's view that the implementation of any DAB technology would be vastly improved through the use of a standards setting body. Such a body would need both industry and government representation. Given its significant expertise and interest in this area, Ford would be pleased to participate in this body.

As illustrated in USADR's Petition, market forces alone would not promote, but would actually hinder, the development of uniform standards for DAB technologies.<sup>5</sup> The radio market provides a true "Catch-22" situation. Consumers may not buy receivers unless broadcasters are transmitting programming, but broadcasters may have little incentive to expend the necessary capital needed to put themselves in a position to transmit if consumers do not have receivers. This problem becomes more complex when the manufacturing element is added – especially if the United States is the only market for a specific type of DAB equipment.<sup>6</sup> Given the nature of

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<sup>5</sup> See *Petition* at 92-100.

<sup>6</sup> This would be particularly true if the U.S. adopted an IBOC DAB solution because Canada and  
(Continued...)

consumer and automotive fabrication timelines, a manufacturer would be required to make a large investment of capital to produce these new receivers before a single consumer sale had been made.

The problem is further exacerbated by the nature of the radio market with its vast number of participants and different groups, each with widely divergent agendas and interests. For example, there are currently thousands of different owners of radio stations. Each station faces a variety of different factors that it must consider before it would make a decision as to which new technology to adopt. For example, each station has its own programming format, broadcast power, interference environment, and competitive market that it must consider. When a new technology is introduced, each station must engage in its own cost/benefit analysis examining each of the different factors when looking at what type of technology to adopt. This analysis is likely to result in wildly divergent results for each station. Without a set of standards around which the industry could coalesce, it is likely that the different stations would fail to implement any new technologies given the nature of the market.

Given these conditions, Ford believes that some sort of a standards setting body is the best alternative to merely delegating the decision to the marketplace. The question therefore is what type of body should be established.

One fundamental consideration in establishing a standards setting body is to determine what sort of structure will be used. One option would be to use an FCC in-house committee. However, the use of an in-house body would certainly tax the Commission's already scarce

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much of Europe have adopted EUREKA 147, operating in separate spectrum in the L-Band and VHF Band III, as the standard for their DAB systems.

resources. Further, such an approach would fail to take advantage of the considerable expertise outside of the Commission that exists in this area. However, FCC involvement remains critical – without an agency representative that can serve as a “disinterested” moderator, it will be more difficult for industry representatives to reach consensus.

Another option would be to use a purely private standards-setting body. Ford agrees with the conclusions reached in the USADR Petition that a solely private standards setting body might find it difficult to reach a consensus, for many of the same reasons discussed above. Further, this approach already has been tried and has not succeeded. Recently, the Electronics Industries Associations (“EIA”) and the National Association of Broadcasters (“NAB”) have been engaged in the process of attempting to develop a digital audio standard. These organizations have conducted a number of trials and tests involving several different types of DAB technologies, including IBOC solutions, but these tests have not been without their problems. For example, testing for some systems was premature as it was conducted while the technology was still being developed. In the end, despite the testing and evaluations, the committees charged with establishing a digital radio standard failed to reach consensus on a DAB standard.

The best alternative, in Ford’s view, would be for the Commission to create a public/private committee, subject to the Federal Advisory Committee Act (“FACA”), with active FCC participation. This would allow the Commission to tap the expertise of the private sector and conserve its own scarce resources. However, the presence of the Commission on the panel would ensure that some type of consensus would eventually be reached. In this case, the public entities sitting on the standards board could mediate any potential deadlock.<sup>7</sup>

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<sup>7</sup> In fact, in the digital television context, Chairman Kennard noted that “government can

(Continued...)

Given the need to create such a public/private group, the next issue is to determine what entities would comprise this body. Public representation could include members from the FCC and the Department of Commerce. Private sector membership would be open – as it must under the FACA – and would include any interested entity. Ford would expect that representatives from consumer groups, broadcasters, manufacturers, and distributors of products would participate, and Ford itself would be pleased to be part of this process.

The final issue to address is the role this public/private body would play in this process. One option is that it would play a strictly advisory role. In that case, the board would simply recommend a standard to the community at large without taking official action. In other words, the board would establish voluntary standards for the industry. However, given the different positions of the industry and for the same reasons a market-based solution would fail, an approach requiring the voluntary adoption of standards would also likely fail to lead to the deployment of any DAB technologies. The strong individual forces and “Catch-22” nature of the market might not be solved by such an approach.

Instead, Ford suggests that the board be used to develop publicly enforced standards. That is, the board would be required to reach a consensus and establish DAB standards that would be adopted by the Commission as a final order in a notice-and-comment rulemaking. By giving standards the effect of public rule, it would require each group in the industry to line-up behind a set of DAB standards, which would then bring DAB to the American listening public.

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advance the public interest by taking steps to prevent any breakdowns” when parties discuss establishing standards. Chairman William E. Kennard, FCC, Address to the “Dawn of Digital Television” Summit Meeting (Nov. 16, 1998) (“*Kennard DTV Speech*”).

### **III. SUBSTANTIVE STANDARDS**

#### **A. Digital Radio Should Be Implemented Without Significantly Degrading Existing Service**

The Commission already has recognized and has sought to introduce the benefits of the digital revolution in a number of different proceedings. In this context, digital technology promises to bring enhanced sound quality to both AM and FM broadcasts. It also will allow the development of ancillary services. Thus, given the public interest benefits of digital technology and capabilities, the FCC should act to bring the significant benefits of digital high fidelity audio to American radio listeners for the 21<sup>st</sup> Century.

While USADR uses its Petition to highlight the many advantages of its IBOC DAB system, any system squeezing new signals into a space where others currently reside, will have its share of weaknesses and potential problems. Thus, as noted earlier, the Commission's role is especially important in ensuring that the introduction of digital audio broadcasting in the United States will not make any American listeners significantly worse off than they are today.

#### **B. Adoption of an IBOC DAB Standard Should Consider How Current Technology Has Changed the Parameters of Broadcast Operations**

When examining any new DAB technology, it would be easy for the parties involved in the evaluation to lose sight of the subtle, but very real, effects of the "old" analog technology on the current state of the industry. In the case of AM and FM radio, one very important factor that should be considered in any examination of an IBOC DAB standard is the effect of the improvements in receiver design/technology.

The current "geography" of FM broadcast radio is the result of the FCC's Table of Allotments and separation requirements. On the AM side, a highly technical "go/no-go" system

based on signal propagation and interference patterns is used. These rules are grounded, in one way or another on the Commission's prediction of coverage rules.<sup>8</sup> On the FM side, the applicable rule uses the F(50/50) service standard, which defines a specific signal strength coverage to 50 percent of the locations in a geographic area for 50 percent of the time.<sup>9</sup> Of particular note regarding the Commission's FM technical rules is that there have been no major changes since the stereo beacon was adopted in the early 1960s.<sup>10</sup>

However, the hardware used to receive radio broadcasts has been the beneficiary of the rapid technological developments that have revolutionized all industries. As a result of these technological changes and improvements, the sensitivity and selectivity of today's receivers are far better than those receivers of the 1960s. In particular, today's receivers can more effectively discriminate between signals on adjacent channels.

One practical result of these developments is that today's listener enjoys highly listenable FM service at lower signal strengths and higher interference levels well beyond the areas which define the legal "geography." Thus, the radio receiver technology of today extends the usable range of FM signals beyond the existing predicted primary service contours.

This result in the FM band has brought several changes. First, it has changed the listening patterns of the radio audience. Without being conscious of any difference, the enhanced sensitivity and selectivity of today's FM receivers is so common and widespread that, despite

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<sup>8</sup> See, e.g., 47 C.F.R. § 73.313.

<sup>9</sup> 47 C.F.R. § 73.313(c).

<sup>10</sup> On the AM side, the Commission changed the AM transmission system emission limitations in 1982 and 1984. See 47 C.F.R. § 73.44.

being beyond any legally recognized service contours, consumers expect that they will be able to receive their station of choice in a given geographic location. Second, and concordantly, the practical limit of today's FM reception is set by adjacent channel interference in many areas of the country. In fact, USADR, in its Petition, indirectly acknowledges the current state of radio "geography." It recognizes that adjacent channel interference is a core issue and admits that implementation of their system could affect the level of this interference.<sup>11</sup>

With respect to the AM radio "geography" a different set of conditions govern. AM reception is often limited by non-radio sources of noise. Particularly, AM signals must fight through on-board vehicular noise (like ignition noise) and off-board noise (overhead powerlines, lightening, etc.). Given these factors, it is often difficult for radio manufacturers to achieve satisfactory reception inside a station's protected contour. Nevertheless, one factor that manufacturers have been successful at mitigating is that of adjacent channel interference. This interference can often be effectively mitigated by employing high amounts of selectivity into the radio chassis design. Again, as in the case of FM, the fact that an IBOC solution would introduce additional noise into the adjacent signal, an IBOC technology could affect the level of this source of interference and, therefore, the AM radio "geography."

In short, the Commission must remain aware of the existing state of the radio "geography." For example, the Commission's current rules underestimate the actual service areas of FM broadcast stations. Specifically, the FM protected contour underestimates the area where listeners actually enjoy FM analog broadcast service. In this case, the FCC should not be content merely to ensure that any new technology standard that it adopts conform to its existing

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<sup>11</sup> *Petition at 27.*

rules. The existing rules should not be the sole basis for establishing a desired service range of the IBOC DAB system. Rather, when examining and evaluating a proposed DAB IBOC standard, the FCC and any standards committee should seek to ensure that the performance capabilities and “geography” of today’s radio service – on which the public relies for news, information, and entertainment, representing billions of dollars of manufacturer R&D and broadcaster investment – remain intact and undiminished, to the greatest extent possible, following the proposed introduction of any new IBOC DAB system.

**C. Ford Recommends That the Commission Consider Specific System Performance Criteria**

Ford believes that the Commission should consider three basic tenets when evaluating and adopting DAB standards and technologies. First, the DAB system should use a technology that is capable of providing high-quality digital transmission with the service range and audio quality that exceeds that of the existing analog broadcast systems. Second, the DAB system should not significantly degrade reception of the existing analog broadcast system. And, third, the DAB system should have meaningful ancillary data capacity.

In line with these three fundamental tenets, Ford recommends the following general criterion for its evaluation of IBOC DAB systems:

1. **Interference:** Any adopted standard must minimize any additional interference to the lowest level possible.
2. **Service Range:** The Commission should attempt to match the *practical* experience of the current analog “geography,” not the current legal definition of service area.

3. Audio Quality: FM broadcast must, at a minimum, transmit CD quality sound or its subjective equivalent; AM systems must, at a minimum, transmit FM quality sound.
4. Data Capacity: Any DAB system should provide enough throughput to handle a standard Internet-type connection on FM at the time the standard is adopted.

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It is critical that the introduction of IBOC DAB does not impinge upon the existing expectations of the listening public. After all, the primary reason to expend the resources needed to implement digital technology is to improve the audio listening experience, not degrade it.

#### **IV. A PUBLIC INFORMATION CAMPAIGN WILL BE NEEDED TO EDUCATE CONSUMERS ABOUT THE CHANGES IN THEIR ANALOG RECEPTION**

##### **A. The Changes to Radio Reception**

Ford hopes that, in the end, any DAB standard the Commission adopts will not alter or impair the existing radio environment. That is, a new standard will not degrade the quality or range of the analog signal listeners currently receive.

However, if the USADR IBOC proposal is an indicator of things to come, it is likely that the current “geography” will change. For example, under USADR’s proposal, the reduced power of the digital signal may result in a digital radio service range shorter than that of current analog systems.<sup>12</sup> Further, modern receivers often dynamically change their internal operating parameters (mono/stereo blending, diversity antenna switching) based on high-frequency noise measurements of the recovered baseband signal. With the addition of an increased power density

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<sup>12</sup> See *Petition* at 48.

between 100-200 kHz from an IBOC FM DAB signal, there exists the real potential that this additional signal will cause undesired, *and still unknown*, performance changes to existing analog receivers.

Therefore, if consumers notice a change in the quality of the reception they are accustomed to receiving or familiar stations are no longer listenable, they will need to be educated about the reasons for the changes. They may not understand that the change is due to a new broadcasting technology. Moreover, because reception problems will affect stations across the radio dial, it is likely that consumers will assume the problems they are experiencing lie with their receiver. As a manufacturer of receivers, this problem is important to Ford.

**B. An Education Program Would Be Necessary To Educate Consumers About the Impact of IBOC on Their Current Radio Expectations**

If an IBOC DAB system is implemented and if consumers are not educated about the changes in the technology, the speed with which IBOC DAB is implemented by broadcasters could be negatively affected. Also, if consumer expectations about the new technology are not met, the market penetration of IBOC DAB will be hurt, resulting in a slow, fragmented, and chaotic transition process. In addition, the industry itself could be faced with costs that would drain away the resources needed for implementation. Absent a consumer education program, for example, radio manufacturers and distributors could face many warranty calls and consumer complaints about product performance.

Thus, it is vitally important that the Commission consider implementing an educational program in conjunction with adoption of a DAB standard that changes the nature of analog signal reception. Such a program would be required to explain to consumers the changes they are experiencing. For example, they will need to understand why their analog reception will not be

as robust as it once was and that, initially, digital broadcasting service areas might not equal those of the older analog technology until the technology is fully implemented.

Such an educational program is not unprecedented for the Commission. In fact, such a program has accompanied the introduction of another digital technology – digital television (“DTV”). For example, the Commission recently released a DTV consumer bulletin “to provide consumers with more information on what promises to be one of the most significant developments in television technology since the advent of color television in the 1950s.”<sup>13</sup> The bulletin includes, among other things, information explaining why the change was made, what consumers need to do to receive the signals, and how digital television works. Further, the value of an educational program has also been recognized in the DTV context. In a speech discussing the “Dawn of Digital Television,” Chairman Kennard remarked:

One challenge for DTV to overcome is consumer acceptance. I know that many in industry are pursuing consumer education efforts and spending heavily to raise awareness of DTV.

To support these efforts, today, the FCC’s Office of Engineering and Technology is issuing a Consumer Information Bulletin that provides information about the current status of DTV topics such as deployment, reception and cable compatibility.<sup>14</sup>

In fact, the Chairman saw the two roles of the Commission in the transition process as “safeguard[ing] the public interest and provid[ing] information to consumers.”<sup>15</sup>

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<sup>13</sup> *News: FCC Releases Digital Television Consumer Bulletin*, Rept. No. ET 98-10 (Nov. 16, 1998).

<sup>14</sup> *Kennard DTV Speech*.

<sup>15</sup> *Id.*

The consumer awareness campaign must be maintained over an extended period of time. First, the transition period is likely to run several years (a decade or more). Second, consumers may not notice the difference in reception until the time a new product is purchased. Once again, the Commission is no stranger to a prolonged educational effort of this type. In its DTV information bulletin, the Commission has promised to “provide additional consumer bulletins in the future to keep consumers informed as the DTV transition progresses.”<sup>16</sup>

In summary, consumer education is important and must not be overlooked. A sustained public awareness effort must be part of any IBOC DAB implementation program.

## **V. CONCLUSION**

DAB represents the next revolutionary step in AM & FM broadcasting. However, the Commission must not, in the name of progress, sacrifice the gains achieved in the past. The Commission must be sensitive to the existing radio landscape and should develop standards and rules that will bring in the new without damaging the old. This is a tricky process.

Ford looks forward to the transition to digital radio, and to bringing the technology for the next century to the American radio public.

Ford thus recommends the creation of a Federal Advisory Committee to formulate standards recommendations that ultimately will be adopted in a Commission rule. Further, Ford suggests, in conjunction with any DAB rulemaking, that the agency commit to a public education campaign, similar to that recently begun regarding digital television, on the changes in radio technology and reception. Ford would be pleased to work with the Commission, with system

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<sup>16</sup> *Bulletin* (Answer to Question 15).

proponents, broadcasters, and other radio manufacturers and distributors to make the transition period as smooth as possible.

Respectfully submitted,

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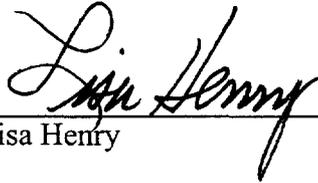
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The undersigned hereby certifies that the preceding document was delivered by United States first class mail (except as otherwise indicated), postage prepaid, to the persons listed below.

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