TABLE OF CONTENTS

I. INTRODUCTION 2

A. The Current Radio Broadcast Industry 3

B. Overview of IBOC Technology 6

C. Requested Rulemaking 8

II. BACKGROUND ON USADR 9

A. USADR Development Partners 9

B. Development History 11

III. THE COMMISSION SHOULD INITIATE A PROCEEDING TO ESTABLISH RULES FOR IBOC DAB 13

A. Digital Radio Broadcasting is in the Public Interest 13

1. Digital technology possesses significant advantages over current analog broadcasting 13

2. DAB possesses many superior intrinsic features 14

3. The Commission has determined that the introduction of digital radio is in the public interest 16

B. IBOC Technology is the Best Means of Implementing Digital Radio 17

1. IBOC is frequency efficient 19

2. IBOC ensures a seamless transition from analog to digital 20

3. IBOC benefits radio listeners 21

4. IBOC benefits broadcasters 21

5. IBOC will facilitate the introduction of enhanced auxiliary services 22

6. IBOC minimizes regulatory burdens on the Commission 22

7. USADR has demonstrated the technical viability of its IBOC DAB technology 23

IV. EXISTING RADIO BROADCAST ENVIRONMENT 23

A. FM Radio 24

1. Regulatory treatment 24

2. Impairments 26

a. Multipath 26

b. Noise 26

3. Interference environment 27

4. Subcarriers 29

B. AM Radio 30

1. Regulatory treatment 30

2. Impairments 31

a. Grounded conductive structures 32

b. Noise 33

3. Interference environment 34

a. Daytime interference 34

b. Nighttime interference (Skywave) 35

C. Receivers 36

D. Transmitters 37

E. Emergency Alert System 38

V. SYSTEM REQUIREMENTS FOR TRANSITION TO DIGITAL 41

A. General IBOC DAB Requirements 42

B. Transition Issues 44

VI. USADR FM IBOC DAB SYSTEM 45

A. System Description 45

1. Hybrid mode 48

2. All-digital mode 49

3. Compatibility 51

4. FM IBOC Signal Generation 57

5. FM IBOC Signal Reception 59

B. FM System Performance and Compatibility 61

1. Introduction 61

2. FM IBOC hybrid and all-digital mode performance 62

3. Analog FM performance in the presence of IBOC DAB signals 64

a. Effects of IBOC digital sidebands on analog host FM performance 64

b. Effects of interference on analog host FM performance 66

4. Summary 67

VII. USADR AM IBOC DAB SYSTEM 68

A. System Description 69

B. AM IBOC DAB System Performance and Compatibility 76

1. Introduction 76

2. Analog AM performance in the presence of IBOC signals 77

3. Hybrid digital system performance 78

VIII. IBOC DAB EQUIPMENT 81

A. Receivers 81

B. Transmitters/Exciters 82

IX. REGULATORY ISSUES 83

A. The Commission Should Designate IBOC DAB as the Appropriate Means to Implement Digital Radio 85

B. The Commission Should Develop Interference Protection Criteria 86

C. The Commission Should Establish Rules that Facilitate the Efficient Transition to All-Digital Environment 87

D. The Commission Should Designate a Transmission Standard for IBOC DAB 92

1. A standard is required to ensure the development of a DAB system in the United States. 94

2. A DAB transmission standard should include all technical elements to ensure compatibility 95

3. An IBOC DAB transmission standard will confer substantial public benefits 96

4. The Commission is the proper forum for setting the standard 99

E The Commission Should Establish a Process to Identify and Evaluate Proposed IBOC DAB Systems 101

X. THE DESIGNATION OF THE USADR IBOC DAB SYSTEM AS THE DAB TRANSMISSION STANDARD WILL SERVE THE PUBLIC INTEREST 104

XI. CONCLUSION 105

Appendices

Appendix A Proposed Amendments to Part 73 of the Commission's Rules

Appendix B Economic Analysis of Standard Setting for Digital Radio

Appendix C USADR FM IBOC DAB System Description

Appendix D FM Band Interference Study

Appendix E USADR FM IBOC DAB Technical Report

Appendix F USADR AM IBOC DAB System Description

Appendix G AM Band Interference Study

Appendix H USADR AM IBOC DAB Technical Report

Appendix I Reports on Modeling and Performance of the FM and AM DAB Systems

Appendix J Audio Quality and Coding

Appendix K Blending With Time Diversity

Appendix L Auxiliary Services

Appendix M Background on USADR Technical Partners