



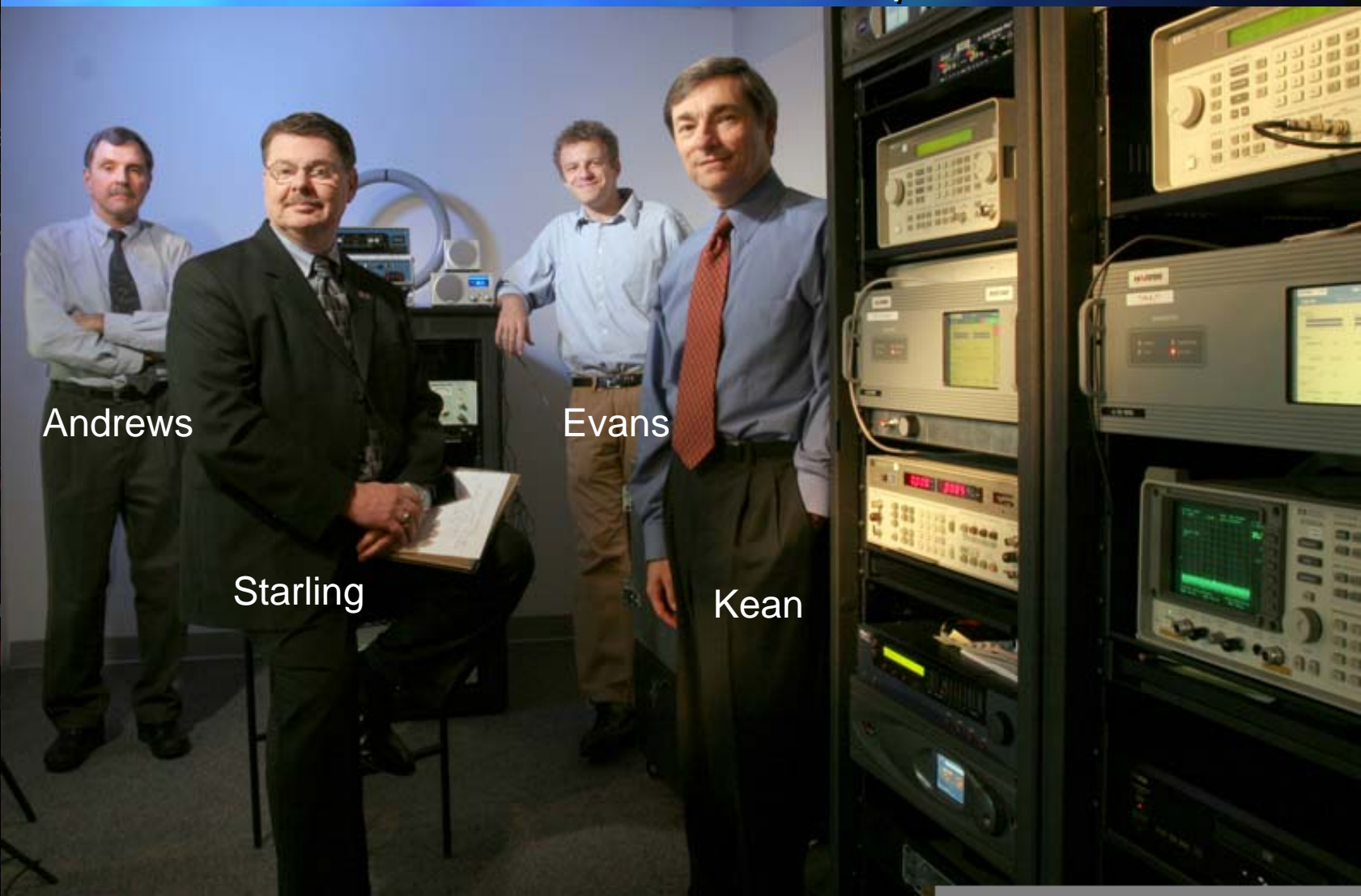
Accessible Digital Radio Broadcast Services Project

Developing and Demonstrating
Specialized Digital Radio Services for:

Deaf and Hard of Hearing &
Blind and Print Handicapped

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America's Only Not-for-Profit Radio Broadcast Technology R&D Center Established October, 2005



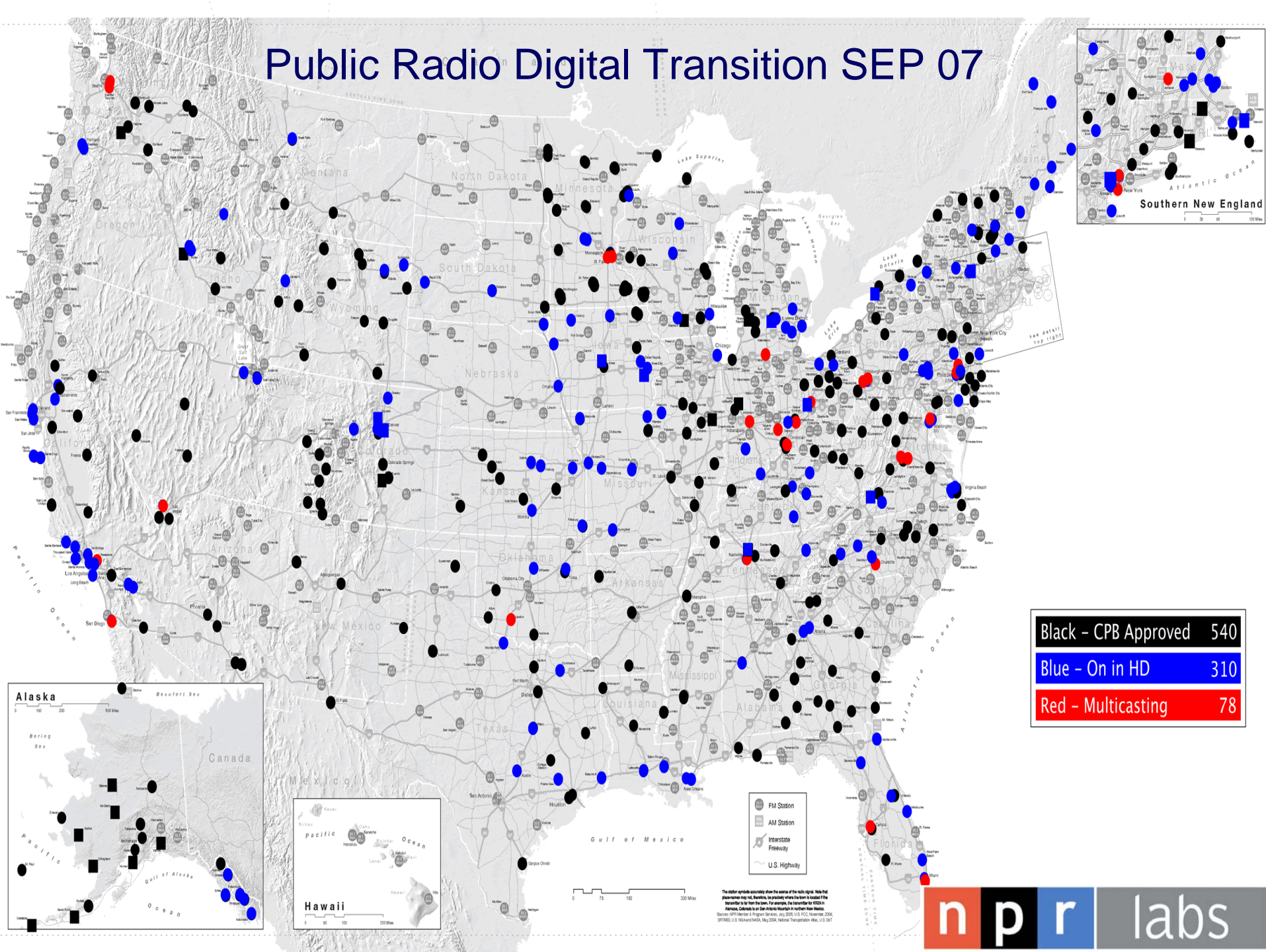
Andrews

Evans

Starling

Kean

Public Radio Digital Transition SEP 07



Why Accessible Radio?

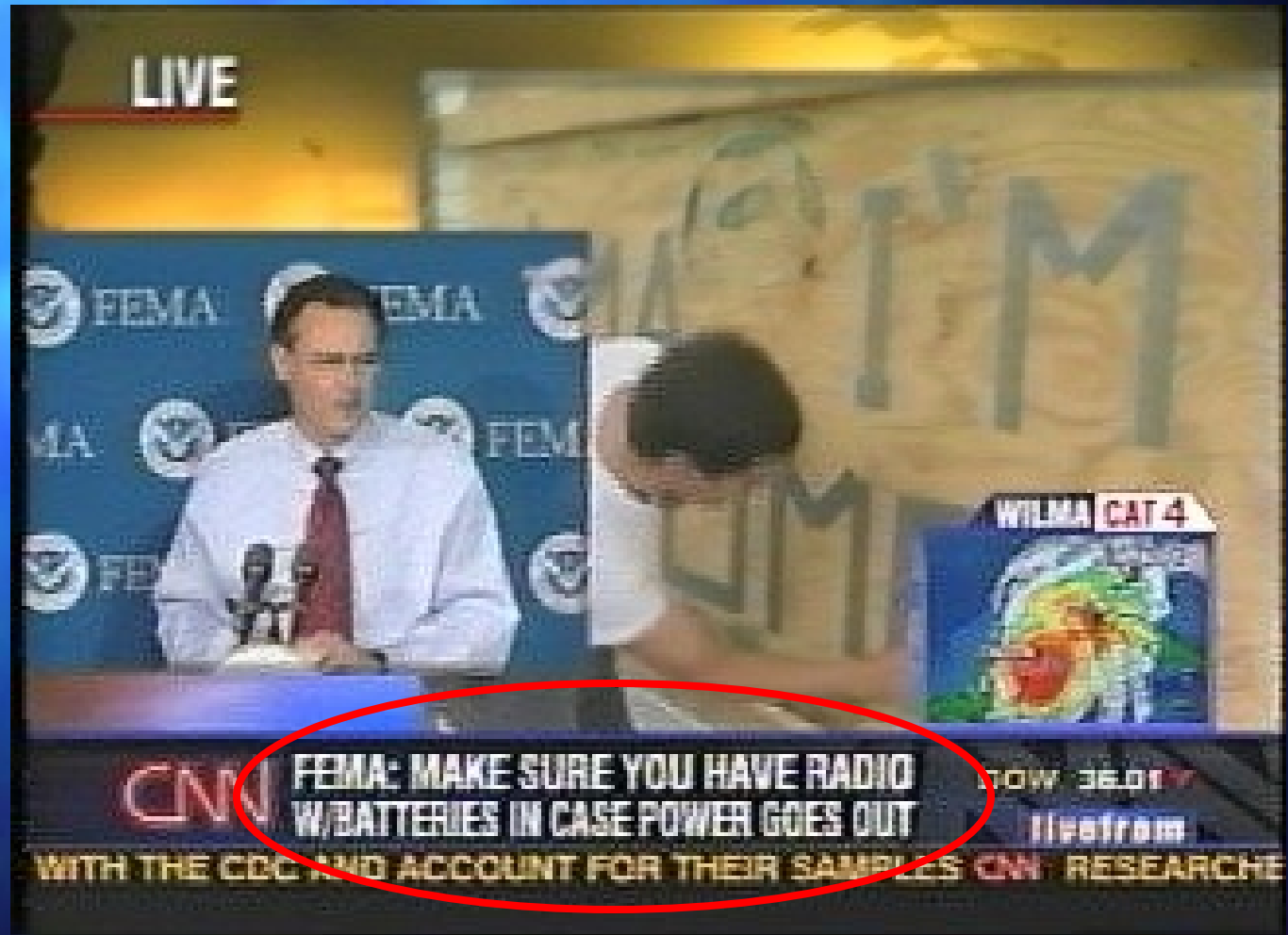
- Radio is immediate, companion medium
- Radio = hundreds of programs not on TV or web
- Radio works during emergencies with no power grid
- Since 1971 NPR has worked on extending signal reach to the public, now we're working on reaching the public *better – accessibly, thanks to digital radio!*

The Accessible Digital Radio Service Project:

- Digital radio reading services for the visually impaired and print handicapped
- First ever Captioned Radio for the Deaf and Hard of Hearing

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Radio is Primary During Emergencies Accessible Emergency Information Important for 32 Million Visually and Hearing Impaired in US



Accessible Radio Partners



Conditional Access Demonstration Configuration

Functionality:

- Full HD Radio functionality – can receive “Free” over the air broadcasts
- Plus the ability to receive and play-out locally generated scrambled audio service (test station KIBI).



Receiver A: Radio ID01
CA Entitled Receiver - HD4



- ☒ 88.3 HD1 – Free to air
- ☒ 88.3 HD2 – Free to air
- ☒ 88.3 HD3 – CA audio service
Not Authorized Pearl Jam
- ☒ 88.3 HD4 – CA audio service
Authorized Radio Reading

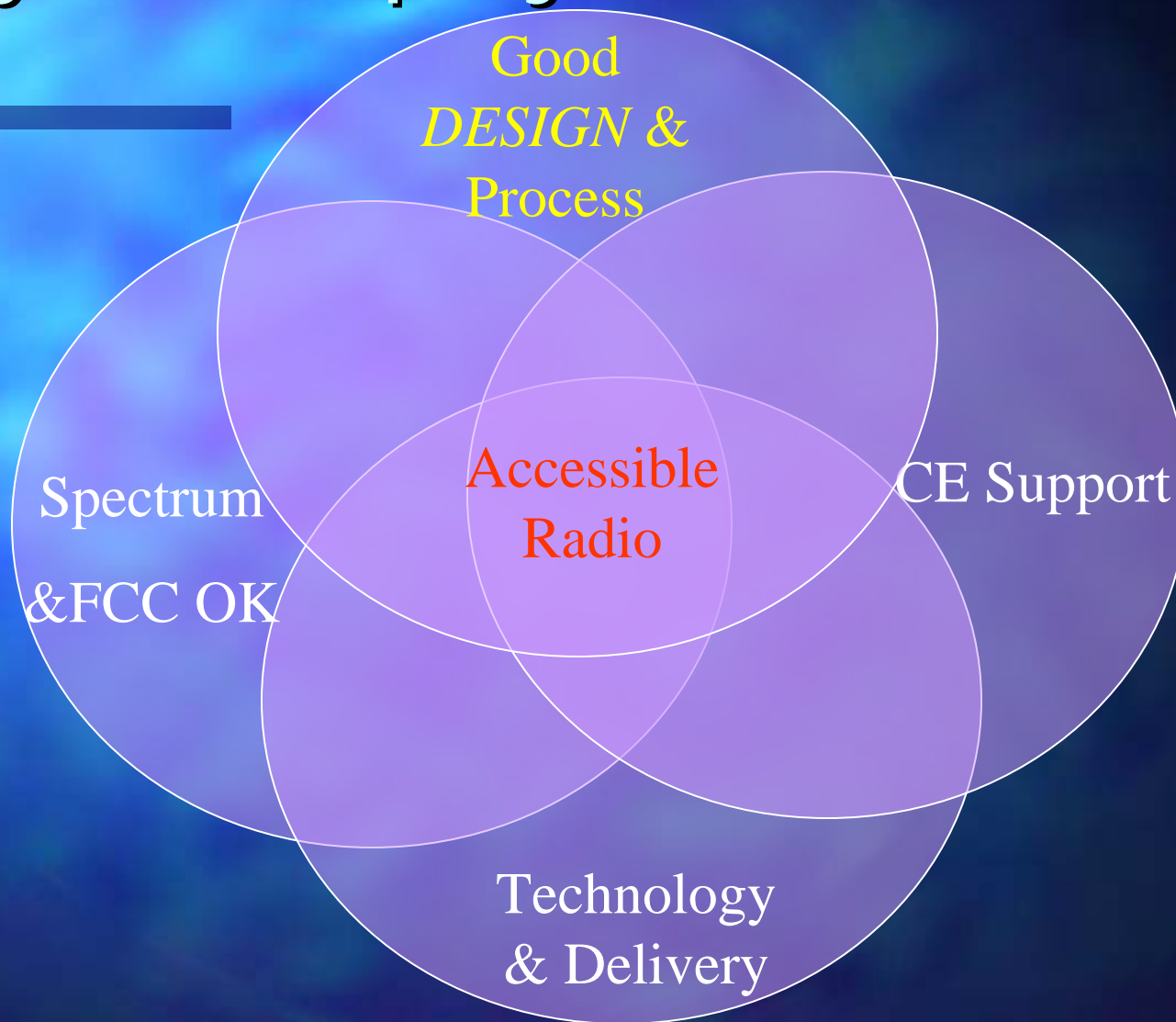


Receiver B: Radio ID02
CA Entitled Receiver – HD3



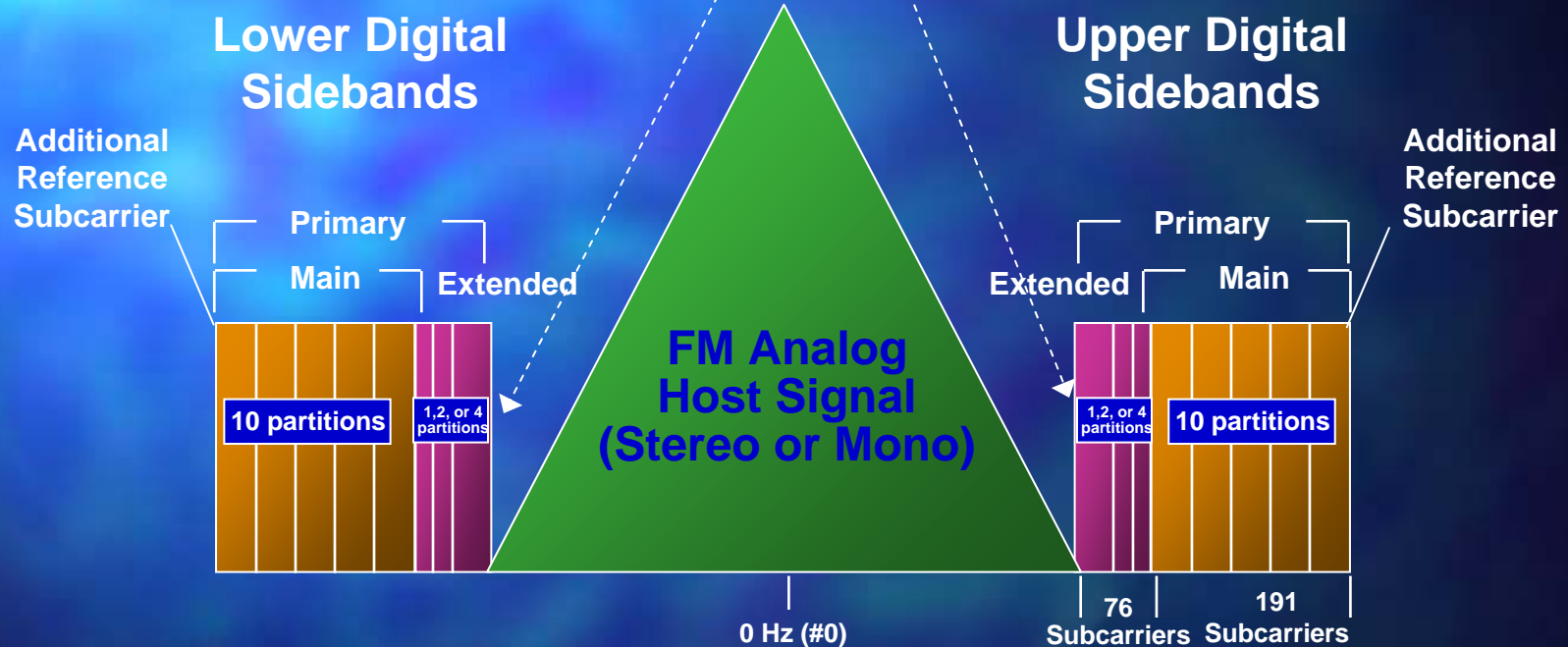
- ☒ 88.3 HD1 – Free to air
- ☒ 88.3 HD2 – Free to air
- ☒ 88.3 HD3 – CA audio service
Authorized Pearl Jam
- ☒ 88.3 HD4 – CA audio service
Not Authorized Radio Reading

Keys to Deployment



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Accessible Radio Resides as Advanced Applications Service in Recently Authorized Extended Hybrid Spectrum



IBC 07 - First International Demonstration Protected & Accessible HD Radio Channels

Four Channel Extended-Hybrid HD Radio mode:

Jazz & Oldies - 38 kbps

Classical - 34 kbps

Pay Per Listen Pearl Jam - 24 kbps

Blind Reading Service - 16 kbps

122 kbps total

Plus: Captioned Radio for Deaf - ~1.5 kbps

HD Radio Demonstration Powered by

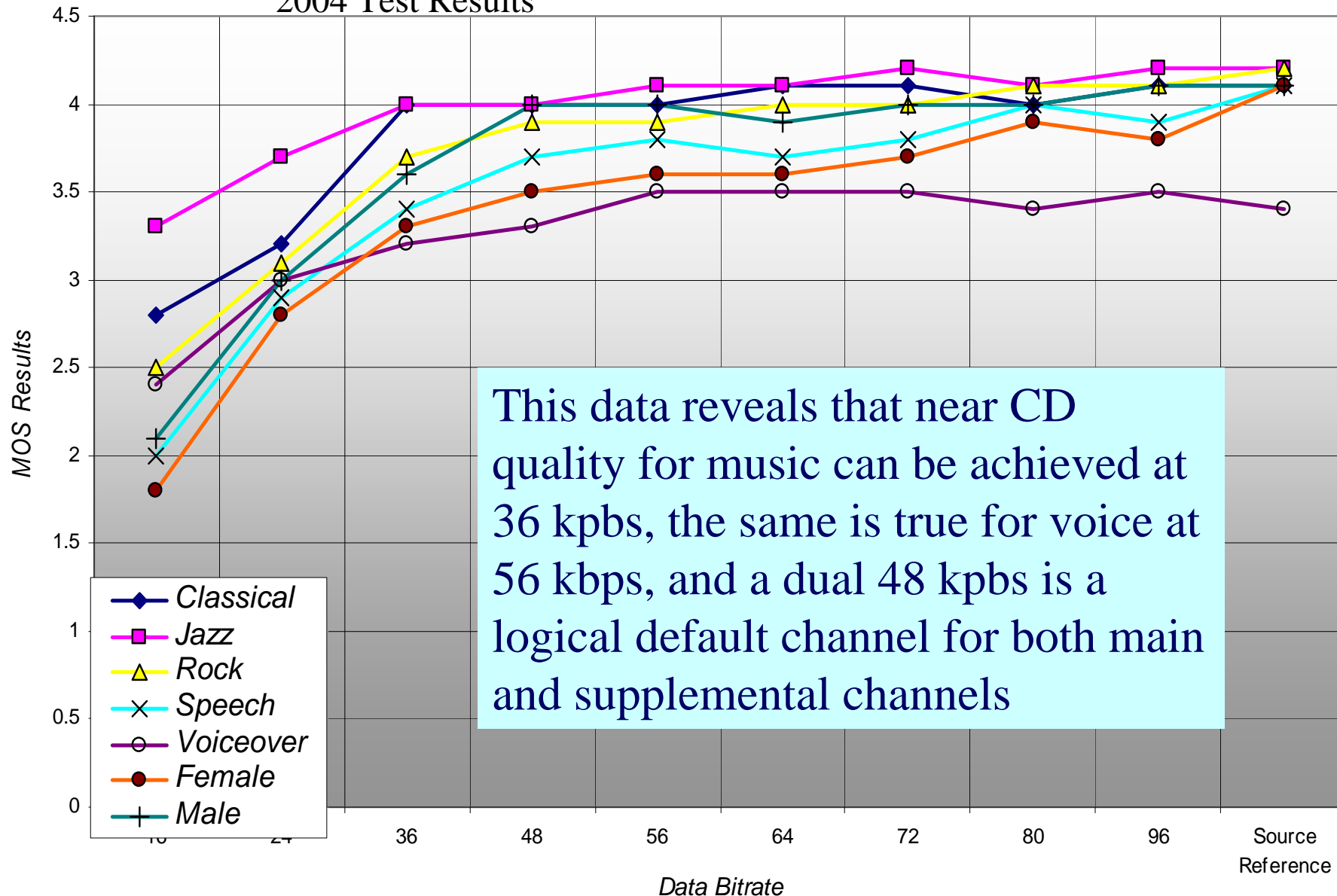


NPR Perceptual Test of HD Radio® Digital Audio Codec

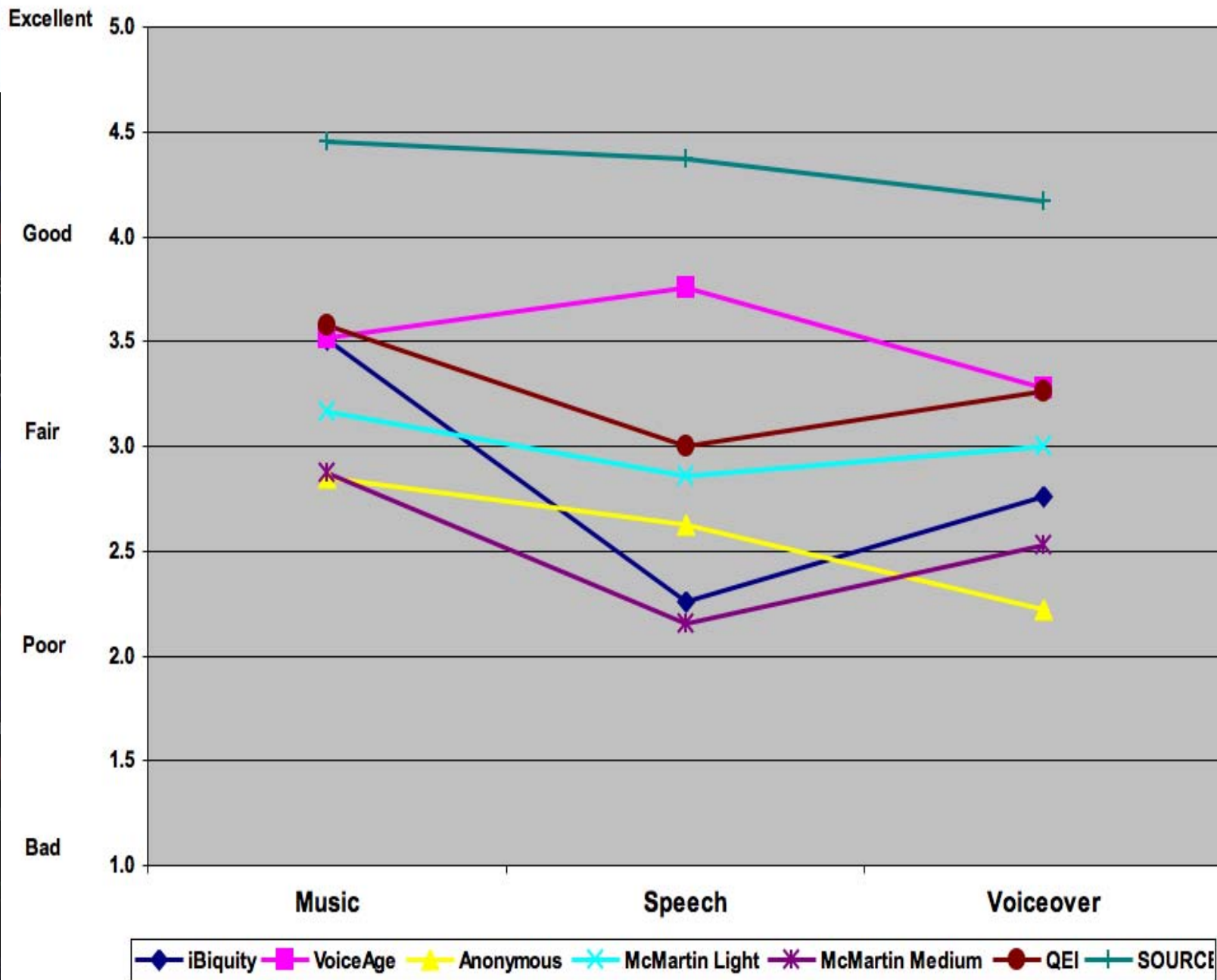
Mean Opinion Scores By Genre At Various Bit Rates



2004 Test Results

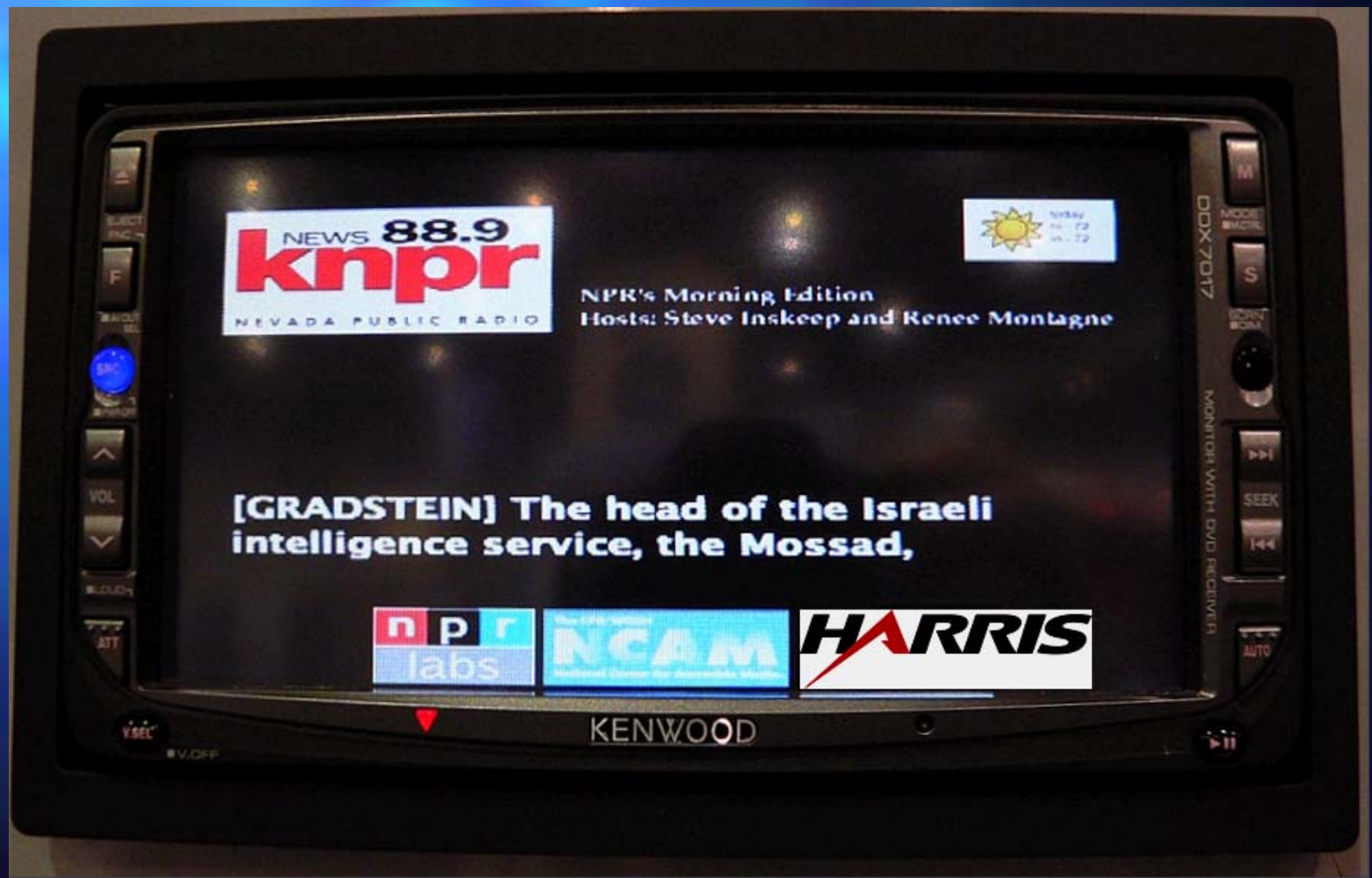


Quality Ratings at Very Low Bit Rates for Music, Speech and Voiceover



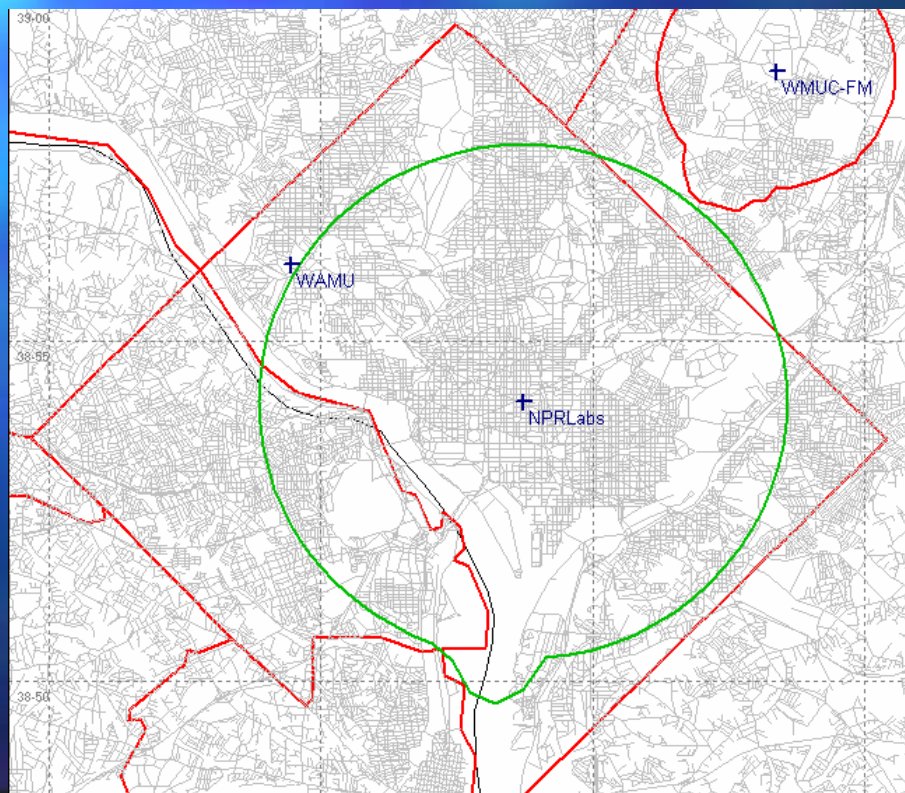
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Captioned Radio Concept Demo



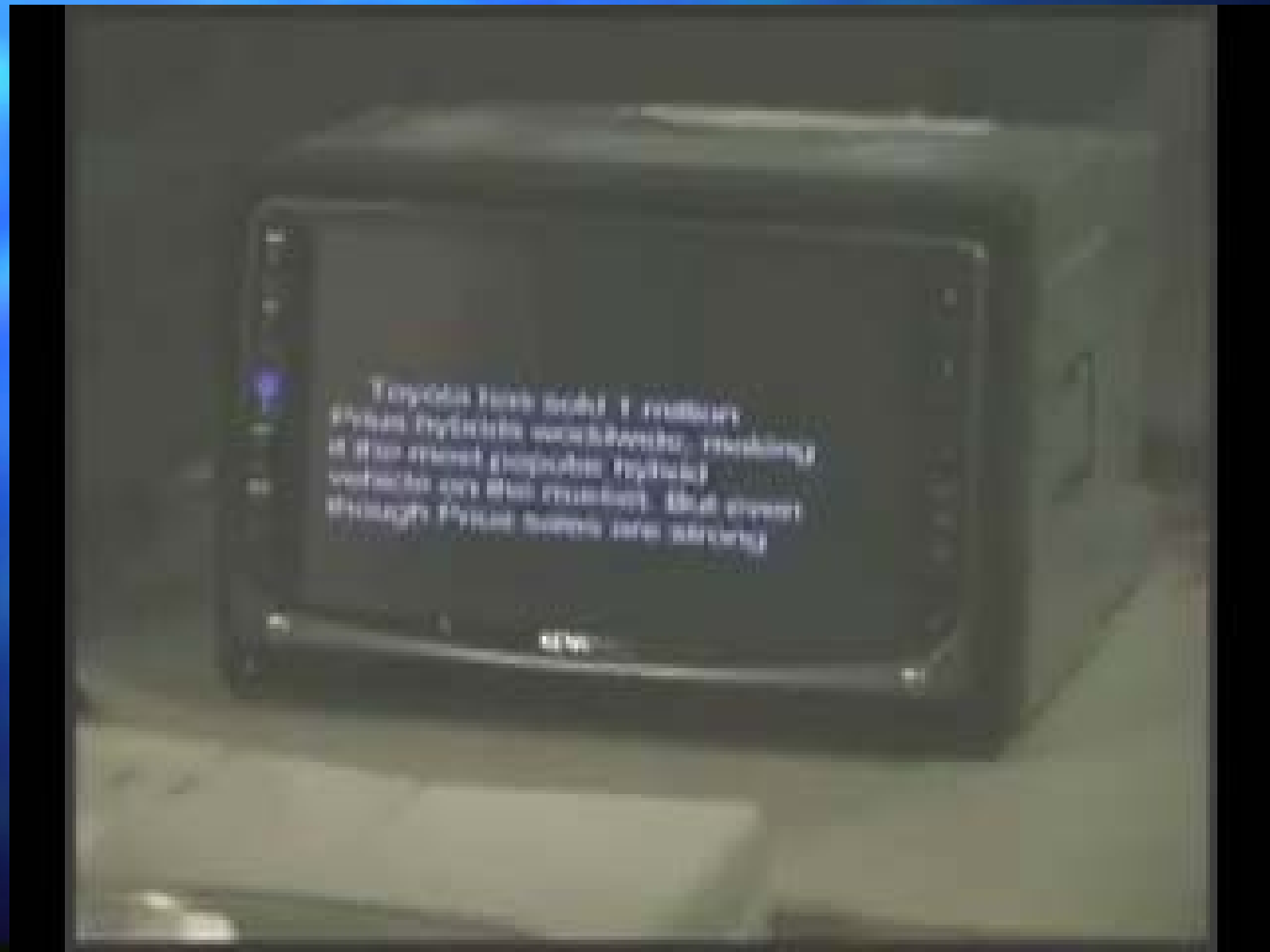
WX3NPR – NPR Labs On-Air Test Station for Captioned Radio and Digital Radio Reading Services for Visually Impaired

50w Experimental FM+HD station on 87.9 FM
Washington, D.C.



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1st Over-the-Air Captioned Radio Transmission Using Advanced Applications Services on HD Radio on WX3NPR - 10 AUG 07



Next Steps for Deaf and Hard of Hearing Sharp® Dual View Display Technology

Front seat "Captioning" Concept

- driver can see traffic map, while listening to radio –
- at the same time a D/HH passenger has same content on Captioned Radio view

