Overview of the DAB+ System

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Contents

The DAB Family of Standards
  DAB+ Features
  Ensemble Structure
  Service structure
  Systems and Networks
  Transmission
  Receivers
  The Future
Welcome to the DAB Family of Standards

One family provides the most cost effective delivery of digital radio and mobile TV
WorldDAB

Primary mission:
To facilitate adoption of DAB digital radio around the world

www.worlddab.org
The DAB family of standards

<table>
<thead>
<tr>
<th>DAB</th>
<th>1995</th>
<th>Original audio with PAD and data services standard</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>EN 300 401 Main document</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TR 101 496 Guidelines of use and operation</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>T-DMB</th>
<th>2006</th>
<th>Added video services for Mobile TV and enhanced data streaming</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>TS 102 427 Data Broadcasting - MPEG-2 TS streaming</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TS 102 428 DMB video service; User Application</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DAB+</th>
<th>2007</th>
<th>Enhanced audio service efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>TS 102 563 Transport of AAC audio</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hybrid</th>
<th>2015</th>
<th>Optimised digital broadcast radio and IP connectivity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>TS 101 499 Hybrid Digital Radio (DAB, DRM, RadioDNS); SlideShow; User Application Specification</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TS 102 818 Hybrid Digital Radio (DAB, DRM, RadioDNS); XML Specification for Service and Programme Information (SPI)</td>
</tr>
</tbody>
</table>

One family provides the most cost effective delivery of digital radio and mobile TV

www.etsi.org/standards
DAB+ Features
Audio – room for lots of services

Simulcast stations (AM / FM)

new DAB+ only stations
For broadcasters: opportunity to extend brand portfolios

Analogue and digital

Digital-only services
For broadcasters: opportunity to extend brand portfolios

Analogue and digital

Digital-only services
DAB+ offers flexibility – pop-up stations
Choose the station from a list

No more need to remember the station’s frequency!!!

Services are listed alphanumerically

Increasing use of logos for brand recognition

Easy to choose a station, listener has more information about the services available
Programme Associated Data (PAD)

Dynamic Label Segment (DLS) - Text

- Straight forward, effective
- Up to 128 characters per text segment
- All DAB+ receivers have DLS text display
- Good receivers block text display or have an appropriate scrolling speed
Programme Associated Data (PAD)

SlideShow (SLS) - Images

- Further strengthens the audio message
- Standalone advertising during song items
- Promotion of station activities
- Traffic and weather reports
- Sports results and stock market information
- Local news, happenings, community events
Data services

Traffic e.g. TMC and TPEG can provide up to the moment information on
• current traffic flow and congestion
• fuel locations and prices
• parking

Journaline
• Hierarchical categorised data service

Custom Applications can be developed
**Video services**

T-DMB is the video delivery service within the DAB family of standards

Currently transmitted in South Korea, Norway and the Netherlands

Can received on variety of devices including smartphones and handheld portable receivers and USB stick receivers
Support features

Service and Programme Information (SPI)
• Station/service logos
• Website links
• Programme schedules

Announcements
• Traffic information / channel
• News, weather, travel information

Service Following
• Links services in different areas on different ensembles
• Provides continuity of service for services across multiple service areas

In-car listening can continue on the same service in different transmission and licence areas
Emergency features - Signalling

Emergencies can be signalled using Announcements in DAB+

- There are also alarms within the Announcements signalling
- These can be used for switching on receivers from standby mode
- Can be used to switch the ensemble being received to the one with the emergency warning information
- Announcement switching is also used for other services such as Traffic Announcements and traveller information

There are other alarms and signals that can also be used

- the EWS signal
- the alarm indicator in the MOT/SLS
Emergency features - Hybrid Radio

DAB can provide rich multimedia to support information delivery

Text and Images can have embedded links to provide additional information if the radio receiver is connected to the internet

Accessing a website from a URL delivered associated with the information provided
Emergency features - Tunnel emergency example

Tunnel emergency systems have been deployed in many countries, e.g. Norway, UK, Switzerland…

Operation is local and controlled by the tunnel operator

Often known as Emergency break-in systems – their role is to provide information to as many people / vehicles in the tunnel as possible

There are 2 main ways the system can operate:

Audio replacement

• When the emergency system is activated the audio on all services is replaced with the audio message from the tunnel operations controller

Announcement signalling and service switching

• When the emergency system is activated the audio on one service is replaced with the audio message and the radio receivers are commanded using the DAB announcement feature to switch to that service
Emergency features - Tunnel system example

Normal operation

- Receive off-air signal
- Tunnel control centre
- Leaker feeder antenna system
- DAB signals are retransmitted in the tunnel for the reception by in-vehicle receivers
- Tunnel operator observes the tunnel status

- Rx
- PA
- Modulator
- Multiplexer system
Emergency features - Tunnel system example

Emergency operation

Tunnel control centre

Leaker feeder antenna system

Receive off-air signal

Rx

PA

DAB rebroadcast system

Multiplexer system

Modulator

Tunnel operator provides audio instructions to tunnel occupants
Ensemble Structure
Ensemble structure

Multiple different radio stations transmit on the same frequency

Multiple different radio stations use the same transmitter

Multiple different radio stations share the cost of that single transmission

The flexible ensemble structure allows broadcasters to deliver the content they provide in the most cost effective manner
**Ensemble structure**

An Ensemble will typically carry multiple services from multiple radio networks, for example:

<table>
<thead>
<tr>
<th>Stations (services)</th>
<th>Capacity used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radio network 1</td>
<td>2</td>
</tr>
<tr>
<td>Radio network 2</td>
<td>4</td>
</tr>
<tr>
<td>Radio network 3</td>
<td>3</td>
</tr>
<tr>
<td>Radio network 4</td>
<td>9</td>
</tr>
<tr>
<td><strong>Total 18 stations</strong></td>
<td><strong>1152kbps</strong></td>
</tr>
</tbody>
</table>

- Each network can have their own allocated capacity on the ensemble
  - No other network has access to that capacity

- Each network can **reconfigure** their allocated capacity anytime without impacting the other networks’ services
  - **Pop-up services** change their name and sometimes bit rate regularly
Ensemble structure

**Ensemble 1**

**Network 1** allocation, e.g. 128kbps
- **Sub-Channel 0**
  - Station A: 64kbps
- **Sub-Channel 1**
  - Station B: 64kbps

**Network N** allocation, e.g. 192kbps
- **M**
  - Station X: 32kbps
- **M+1**
  - Station Y: 64kbps
- **M+2**
  - Station Z: 96kbps

Total Capacity = 1152kbps (FEC = EEP3A)

Ensemble capacity allocated to a network or group of stations can be operated independently of the other capacity allocations within the ensemble.
### Ensemble structure

#### Reconfiguration and popup services

<table>
<thead>
<tr>
<th>Network</th>
<th>Network Capacity</th>
<th>The Music network</th>
<th>The multi Network</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>128</td>
<td>256</td>
</tr>
<tr>
<td>service bit rate</td>
<td>64</td>
<td>64</td>
<td>64</td>
</tr>
<tr>
<td>Service</td>
<td>Pop music</td>
<td>Rock music</td>
<td>Classical music</td>
</tr>
<tr>
<td>Day</td>
<td>Monday</td>
<td>Tuesday</td>
<td>Wednesday</td>
</tr>
<tr>
<td></td>
<td>Sport 1</td>
<td>Sport 2</td>
<td>Sport 3</td>
</tr>
</tbody>
</table>

- **The Music network** is consistent in content across the whole week.
- **Classical music** has more bitrate for “concerts on Wednesday”.
- **Regional news** still operates but on reduced bitrate at the weekend (64 reduced to 32kbps).
- **Classical and Mixed music** replaced with 3 sport channels on the weekend (3 x 48kbps).
- **Current affairs** splits to 2 services on the weekend (48 + 32kbps).
Ensemble structure

Each ensemble has
• its own Ensemble Label
• its own unique Ensemble ID code
• can carry a unique identifying code of the transmitter (TII)
• a Signalling Channel – the Fast Information Channel (FIC)
  • Provides details about all services (stations) carried
    • Service labels
    • Bit rates
    • Data location in the stream
  • Provides details of all data services and PAD
  • Provides announcements and warnings

Fast Information Groups (FIGs) provide a hierarchical structure to deliver information associated with the ensemble and the services / sub-channels contained within it.
Ensemble structure

The Fast Information Channel (FIC) provides a range of signals from the head-end system to the receiver.

![Diagram of Fast Information Channel (FIC)]

<table>
<thead>
<tr>
<th>FIG type/extension</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIG 0/0</td>
<td>Ensemble information</td>
</tr>
<tr>
<td>FIG 0/1</td>
<td>Sub-channel organisation</td>
</tr>
<tr>
<td>FIG 0/2</td>
<td>Service organisation</td>
</tr>
<tr>
<td>FIG 0/3</td>
<td>Service component in packet mode</td>
</tr>
<tr>
<td>FIG 0/4</td>
<td>Service component with CA in stream mode</td>
</tr>
<tr>
<td>FIG 0/5</td>
<td>Service component language</td>
</tr>
<tr>
<td>FIG 0/6</td>
<td>Service linking information</td>
</tr>
<tr>
<td>FIG 0/7</td>
<td>Configuration information</td>
</tr>
<tr>
<td>FIG 0/8</td>
<td>Service component global definition</td>
</tr>
<tr>
<td>FIG 0/9</td>
<td>Country, LTO and International table</td>
</tr>
<tr>
<td>FIG 0/10</td>
<td>Date and time</td>
</tr>
<tr>
<td>FIG 0/11 and 0/12</td>
<td>Reserved</td>
</tr>
<tr>
<td>FIG 0/13</td>
<td>User Application information</td>
</tr>
<tr>
<td>FIG 0/14</td>
<td>FEC sub-channel organisation</td>
</tr>
<tr>
<td>FIG 0/15 and 0/16</td>
<td>Reserved</td>
</tr>
<tr>
<td>FIG 0/17</td>
<td>Programme Type (PTy)</td>
</tr>
<tr>
<td>FIG 0/18</td>
<td>Announcement support</td>
</tr>
<tr>
<td>FIG 0/19</td>
<td>Announcement switching</td>
</tr>
<tr>
<td>FIG 0/20</td>
<td>Service component information</td>
</tr>
<tr>
<td>FIG 0/21</td>
<td>Frequency information</td>
</tr>
<tr>
<td>FIG 0/22 and 0/23</td>
<td>Reserved</td>
</tr>
<tr>
<td>FIG 0/24</td>
<td>OE services</td>
</tr>
<tr>
<td>FIG 0/25</td>
<td>OE announcement support</td>
</tr>
<tr>
<td>FIG 0/26</td>
<td>OE announcement switching</td>
</tr>
<tr>
<td>FIG 0/27 to 0/31</td>
<td>Reserved</td>
</tr>
</tbody>
</table>

Summary of type 0 FIGs
Service Structure
Service Structure

DAB+ audio

Why DAB+

• 2.5 times more audio services than DAB due to the use of HE AAC+ v2
  • Typically 48kbps DAB+ service has the same audio quality as a 128kbps DAB service
• Slightly better coverage: 1 to 2dB better than DAB due to concatenated FEC coding
• Greatly improved signal robustness for Programme Associated Data delivery
System structure

DAB+ audio encoding

Outer layer of FEC coding and interleaving provides protection for PAD – especially important to ensure robust SLS image delivery

Signal Flow with outer layer FEC

- HE AAC v2 audio encoder
- Audio super framing
- Reed-Solomon outer FEC encoder
- Virtual interleaver
- Main service channel multiplexer
## Service Structure

### DAB+ audio

**HE AAC+ V2 audio encoding table combinations**

<table>
<thead>
<tr>
<th>Sampling rate (kHz)</th>
<th>SBR on</th>
<th>Stereo</th>
<th>Parametric Stereo</th>
<th>Mono</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Min</td>
<td>Max</td>
<td>Min</td>
</tr>
<tr>
<td>48</td>
<td>no</td>
<td>24</td>
<td>192</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>yes</td>
<td>24</td>
<td>136</td>
<td>24</td>
</tr>
<tr>
<td>32</td>
<td>no</td>
<td>24</td>
<td>192</td>
<td>-</td>
</tr>
<tr>
<td>16</td>
<td>yes</td>
<td>24</td>
<td>136</td>
<td>24</td>
</tr>
</tbody>
</table>

Many combinations to allow the most cost effective delivery of different audio content types.
System structure

DAB+ audio coding – spectral band replication (SBR)

Efficient sample rate and bit rate reduction method

Only slight audio degradation

128kbps

64kbps – high frequencies removed

64kbps with high frequencies SBR encoded

100

80

60

40

20

0

Original

sacdplus

mp3PRO

AAC

Real 8

7kHz LPF

WMA 8

MP3

Real G2

3kHz LPF

EBU subjective listening test at 48 kbps stereo
System structure

DAB+ Audio channel PAD

PAD for DLS and SLS delivery

XPAD size, music/speech flag, command channel

Figure 2: Coding of the PAD field

Table 10: Maximum bit rate of F-PAD and X-PAD data

<table>
<thead>
<tr>
<th>AAC core sampling rate</th>
<th>Maximum bit rate for F-PAD data (2 bytes)</th>
<th>Maximum bit rate for X-PAD data (196 bytes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>16 kHz</td>
<td>267 bps</td>
<td>26133 bps</td>
</tr>
<tr>
<td>24 kHz</td>
<td>400 bps</td>
<td>39200 bps</td>
</tr>
<tr>
<td>32 kHz</td>
<td>533 bps</td>
<td>52267 bps</td>
</tr>
<tr>
<td>48 kHz</td>
<td>800 bps</td>
<td>78400 bps</td>
</tr>
</tbody>
</table>

Typical use: SBR on @ 24kHz core sampling rate, 3 frames per super-frame, 1 super-frame per 120mS
System structure

DAB+ Audio bit rates v PAD bit rate

Need to ensure the correct balance between audio bit rate, audio settings and PAD

Audio bit rate ≈ Sub-Channel bit rate *0.9 – PAD bit rate

SLS images are best synchronised with audio using pre-delivered images and header update display triggers, either

TriggerTime = time/date or

TriggerTime = now

<table>
<thead>
<tr>
<th>Sub-Channel bit rate (kbps)</th>
<th>FEC Overhead 10%</th>
<th>Payload capacity (kbps)</th>
<th>PAD (kbps)</th>
<th>Audio bit rate (kbps)</th>
</tr>
</thead>
<tbody>
<tr>
<td>32</td>
<td>3.2</td>
<td>28.8</td>
<td>1</td>
<td>27.8</td>
</tr>
<tr>
<td>32</td>
<td>3.2</td>
<td>28.8</td>
<td>2</td>
<td>26.8</td>
</tr>
<tr>
<td>32</td>
<td>3.2</td>
<td>28.8</td>
<td>4</td>
<td>24.8</td>
</tr>
<tr>
<td>32</td>
<td>3.2</td>
<td>28.8</td>
<td>8</td>
<td>20.8</td>
</tr>
<tr>
<td>48</td>
<td>4.8</td>
<td>43.2</td>
<td>1</td>
<td>42.2</td>
</tr>
<tr>
<td>48</td>
<td>4.8</td>
<td>43.2</td>
<td>2</td>
<td>41.2</td>
</tr>
<tr>
<td>48</td>
<td>4.8</td>
<td>43.2</td>
<td>4</td>
<td>39.2</td>
</tr>
<tr>
<td>48</td>
<td>4.8</td>
<td>43.2</td>
<td>8</td>
<td>35.2</td>
</tr>
<tr>
<td>64</td>
<td>6.4</td>
<td>57.6</td>
<td>1</td>
<td>56.6</td>
</tr>
<tr>
<td>64</td>
<td>6.4</td>
<td>57.6</td>
<td>2</td>
<td>55.6</td>
</tr>
<tr>
<td>64</td>
<td>6.4</td>
<td>57.6</td>
<td>4</td>
<td>53.6</td>
</tr>
<tr>
<td>64</td>
<td>6.4</td>
<td>57.6</td>
<td>8</td>
<td>49.6</td>
</tr>
<tr>
<td>64</td>
<td>6.4</td>
<td>57.6</td>
<td>16</td>
<td>41.6</td>
</tr>
<tr>
<td>80</td>
<td>8</td>
<td>72</td>
<td>1</td>
<td>71</td>
</tr>
<tr>
<td>80</td>
<td>8</td>
<td>72</td>
<td>2</td>
<td>70</td>
</tr>
<tr>
<td>80</td>
<td>8</td>
<td>72</td>
<td>4</td>
<td>68</td>
</tr>
<tr>
<td>80</td>
<td>8</td>
<td>72</td>
<td>8</td>
<td>64</td>
</tr>
<tr>
<td>80</td>
<td>8</td>
<td>72</td>
<td>16</td>
<td>56</td>
</tr>
</tbody>
</table>
Service structure

Data services

Enhanced Packet Mode

• Data services are uni-directional (UDP)
• Outer layer coding adds significant protection for data services - RS(204,188)
• Need specific applications to process the data on the receiver
• Can be made secure though the use of encryption / Conditional Access

Example services

- TPEG
- Journaline
Service structure

Video services: T-DMB

Video service structure

Example receiver e.g. LG smartphone
### Service structure

Forward Error Correction (FEC) codes are applied per sub-channel

#### Comparative performance

<table>
<thead>
<tr>
<th>FEC Code</th>
<th>Code Rate</th>
<th>Capacity (kbps)</th>
<th>Number of 64kbps channels</th>
<th>Approximate power required relative to 3A</th>
</tr>
</thead>
<tbody>
<tr>
<td>1A</td>
<td>1/4</td>
<td>576</td>
<td>9</td>
<td>-3 to -6dB</td>
</tr>
<tr>
<td>2A</td>
<td>3/8</td>
<td>864</td>
<td>13</td>
<td>-2 to -3dB</td>
</tr>
<tr>
<td>3A</td>
<td>1/2</td>
<td>1152</td>
<td>18</td>
<td>0</td>
</tr>
<tr>
<td>3B</td>
<td>2/3</td>
<td>1536</td>
<td>24</td>
<td>+3dB</td>
</tr>
<tr>
<td>4A</td>
<td>3/4</td>
<td>1728</td>
<td>27</td>
<td>+6dB</td>
</tr>
</tbody>
</table>

Payload capacity and transmit power can be traded
Stronger FEC protection = lower capacity BUT lower power for the same coverage area
Systems and Networks
**System and Networks**

**Example DAB+ network**

IP is generally preferred for both contribution and distribution networks.

Studio 1

- **PAD system**
- Audio Encoders x N
- Local Controller
- Service Mux (Opt)

Broadcast System

- Ensemble Controller
- EMUX
- DMUX

Studio K

- **PAD system**
- Audio Encoders x M
- Local Controller
- Service Mux (Opt)

Switch / Router

- Studio and multiplexer site equipment can now be virtualised on single servers

Distribution Telecommunications cloud

- COFDM

Repeater Transmitter

Main Transmitter
System and Networks

Star network

- Central multiplexing equipment
- Individual links per studio site
- Simple networking
- Stations are in control of their content
- Privacy

This architecture is often used for stand-alone / isolated installations such as single city or area transmissions.
System and Networks

Star network

Number of service encoders, PAD and redundancy can vary between broadcasters

Redundant common ensemble multiplexing and transmitters
System and Networks

Mesh network

- Transparent interconnect between sites
- High Redundancy and Reliability
- Typically uses a multicast enabled VPN
- Content produced at any site can be transmitted at any site

Suitable for distributed broadcast networks such as national multi-studio networks
Network Management is essential for rapid fault detection and correction.

Virtually all equipment now has SNMP fault reporting.

Remote access via web interface allows best grade of service.
System and networks

Examples
Transmission
Transmission

Signal flow

Figure 4.3.1: Conceptual block diagram of the EUREKA DAB system transmitter drive
Transmission
Transmission

Modulation

• DQPSK
  - Robust modulation for mobile channels
• Standard definition

\[ z_{l,k} = z_{l-1,k} \cdot y_{l,k} \]
for \( l = 2, 3, 4, \ldots, L \)

\[ \frac{K}{2} \leq k \leq \frac{K}{2} \]

• Detection is based on phase difference detection between the current and previous received symbol
  - \( \hat{d}_k = r_k \cdot r_{k-1}^* \)
Transmission

Transmission channels
- Line of Sight / Ricean
- Rayleigh

The received signal is composed of multiple signal paths and USUALLY has no direct line of sight component, i.e. is a Rayleigh channel.

The received signal is composed of multiple signal paths and USUALLY has no direct line of sight component, i.e. is a Rayleigh channel.
Transmission

Transmitter equipment chain

Optional change-over switches as this function can usually be done in the exciter units

Multiplexer A
  Change-over switch

Multiplexer B
  Change-over switch

Redundant exciters / modulators built into the transmitter

Exciter section
- Controller
- Exciter / modulator

Transmitter amplifier section
- Amplifier unit
- Amplifier unit
- Amplifier unit

Output summation

To antenna system
Termination

Multiple amplifier units provides in-built redundancy
Transmitter redundancy

Optional configurations

1 + 1 redundancy configuration

N + 1 redundancy configuration
Transmission

Antenna system

Vertically polarised VHF antenna panel used in high gain arrays

Example antenna switch frame / patch panel and combiner modules
Transmission

RF spectrum

Figure 4.3.4: Example of DAB transmitted signal spectrum (VHF band III)

Signal bandwidth = 1536 carriers at 1kHz each => 1.535MHz
Channel bandwidth = 1.712 MHz
Transmission

Frequency plan

Initial Band III allocation for Australian metro cities

UK channel allotments

2 DTV channels allocated = 14MHz = 8
DAB channels = 8A, B, C, D, 9A, B, C, D
to cover all of Australia
Transmission

Monitoring

Multiple monitoring points throughout the system allow rapid fault finding and rectification.

Listeners provide the ultimate feedback!!

ETI Monitor

Tx Monitor

ETI Monitor

Tx Monitor

Multiple monitoring points throughout the system allow rapid fault finding and rectification.

Listeners provide the ultimate feedback!!
Transmission

Example transmitters

Air cooled

liquid cooled
Receivers
DAB+ receivers

Over 500 consumer devices available

Prices from under €20

http://digitalradio.de/index.php/de/digitalradios-geraete
Home receivers

Different functionality for different areas of the home

Kitchen, Living room and Bedrooms
• Stand alone or HiFi connected
• Easy to operate
• Good sound and external connections to HiFi
• Good DLS display

Options
• More volume
• Colour screen
• Docking
• Smartphone control app
Personal / Portable / Smartphone receivers

Portable for a variety of situations
- Work
- Relaxing
- Exercising
Car / Automotive receivers

- Cars
  - factory fit
  - after market
- Commercial
  - trucks

TPEG traffic information

- Traffic flows
- Traffic events
- Weather
- Animals
- Police
- Air quality
- Events
- Weather
- Parking
- Speed camera
- Road tolls
- Petrol prices
- Bike stations
The future

Hybrid Radio
Hybrid Radio combines digital radio broadcast to deliver audio and common PAD to many AND the internet to provide individual actions and services

DL+ and CAT-SLS are examples of Hybrid Radio

Providing More Information to listeners on demand

Tagging and reminders for later content use

The standards are being written now!
What is Hybrid Radio

Transmission Information from Broadcaster

Free to Air DAB+ broadcast with PAD

WiFi connection

Bluetooth connection for browser actions

Hybrid Radio Touchscreen for basic actions

Telco network

3rd Party services

Broadcast interaction

Broadcasting
What is Hybrid Radio

Transmission Information from Broadcaster

Free to Air DAB+ broadcast with PAD

DAB+ capable mobile phone can use full range of hybrid functions

Mobile network

Broadcaster

Mobile internet

3rd party services

Broadcaster interaction

3rd party services
Hybrid Radio – use cases

More Information: Use Case Example 1 – connection to an advertiser

Accessing a website from a URL delivered associated with a product / service being advertised
Hybrid Radio – use cases

More Information: Use Case Example 2 – Artist Information

Listeners can access more information about the current artist, tour dates, biographical info, purchase.
Hybrid Radio – use cases

More Information: Use Case Example 3 – Public Information

Accessing a website from a URL delivered associated with the information provided
Hybrid radio – use cases

More Information: Use Case Example 4 – Sports Results

Drives listeners to use additional broadcaster facilities, value add advertising and cross promotion

What sport is on tonight, current and previous results, betting
Summary

- DAB+ is the best Digital Radio delivery system available
- Proven technology
- Cost effective infrastructure
- Deployed worldwide and expanding rapidly
- Very flexible operation for broadcasters
- Huge range of receiver products
- Great features including scrolling text, images, EPG and data services
- Many new developments including Interactivity
Thank you

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