Digital Video Broadcasting – Handheld

«Digital video broadcasting services to handheld devices»

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What is DVB-H?

- Digital video broadcasting to mobile users
- A generic way of receiving digital video
- An extension of DVB-T
- A non-proprietary open standard from the DVB Project
The DVB Project

- Committed to designing global standards for the delivery of digital television and data services
- Industry-led consortium
  - Broadcasters
  - Equipment manufacturers
  - Network operators
  - Software developers
  - Regulatory bodies
- www.dvb.org

Quick recap of DVB-T

- Standard for digital terrestrial television (DTT) broadcasting
- Designed for fixed reception of digital TV
- Has flexibility and capacity to deliver a whole range of services, in a range of channel bandwidths
DVB-T technical details

• Specifies:
  • Framing structure
  • Channel coding
  • Modulation

• Flexibility in terms of:
  • Modulation options
  • Forward error correction rates
  • Guard interval options
  • Carrier choice
  • Operating bandwidth

The harsh reality for mobile, wireless devices

• Wireless
  • Interference
  • Multi-path fading

• Mobility
  • Hand-off
  • High speeds
  • Different environments

• Limited resources
  • Battery
  • Bandwidth
  • Processing power
  • Storage capacity
DVB-T and handheld devices

- DVB-T actually performs quite well in a mobile environment
- BUT:
  - No power saving functionality
  - No support for cellular environment
  - Receptions problems at high speeds

The goals of DVB-H

- Significant power saving in receiver compared to DVB-T
- Excellent performance and robustness in a cellular environment
- Enhanced support for single antenna reception in single frequency networks
DVB-H protocol stack

- DVB-H is built on top of DVB-T
- DVB-H and DVB-T are multiplexed onto the same MPEG-2 TS using multi-protocol encapsulation

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<td>MPE sections</td>
<td>MPE-FEC sections</td>
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<td>MPEG-2 TS</td>
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Link layer extensions

- **Time-slicing**
  - Reduces average power in receiver by up to 90 – 95%
  - Enables smooth and seamless frequency handover
  - Mandatory in DVB-H
Link layer extensions (cont'd)

- Forward error correction for multi-protocol encapsulated data (MPE-FEC)
  - Improved forward error correction
  - Adds parity information at the MPE layer
  - Improves carrier-to-noise performance
  - Improves Doppler performance
  - Improves tolerance to impulse interference
  - Optional in DVB-H

Physical layer extensions

- TPS signaling includes two extra bits
  - Indicates presence of DVB-H services
  - Indicates possible use of MPE-FEC
- New 4K OFDM mode
- New way of using the DVB-T symbol interleaver
- 5-MHz channel bandwidth
Technical details

- Operates in the following frequency bands:
  - VHF-III: 170 – 230 MHz
  - UHF-IV/V: 470 – 862 MHz
  - L: 1.452 – 1.492 GHz
- Audio/video transported in a MPEG-2 TS
- Allows 30+ services in a multiplex
- Can share spectrum and investment with existing DVB-T networks
The DVB-H standard is fully specified and published.

Commercial networks launched in Italy, Finland, Vietnam and Albania.

Mobile units with DVB-H support are under development:
- Nokia: N77, N92
- Samsung: SGH-P910, SGH-P920, SGH-P930, SGH-P940, SGH-F510
- And others...
Summary

- DVB-H is the leading global technology standard for the transmission of digital TV to handheld receivers
- DVB-H can share spectrum and investment with existing DVB-T networks
- DVB-H combines low power consumption with high data throughput

For more information, see

- Lecture notes on Digital TV
- www.dvb.org
- www.dvb-h.org
References

• DVB Fact Sheets, DVB Project Office, 2007
• «DVB-H: Digital Broadcast Services to handheld Devices», Faria et. al, IEEE, 2006
• “Digital Video Broadcasting (DVB); Transmission System for Handheld Terminals (DVB-H)”, ETSI EN 302 304 v. 1.1.1., 2004
• «Digital Video Broadcasting (DVB-H Implementation Guidelines», ETSI TR