

Panasonic R&D Center Germany GmbH (PRDCG)
Panasonic Frankfurt Laboratory (PFL)



Coexistenz von DVB-H und DMB?

(Martin Schlockermann)

Summer 2006



Summer 2006



debitel[®]
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started

WORLD

DMB

Digital Multimedia Broadcasting

Radio • Mobile TV • Multimedia • Traffic Data



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WORLD



Digital Multimedia Broadcasting

Radio • Mobile TV • Multimedia • Traffic Data

- ~10.000 DMB phones sold in Germany
- No advertisement by Debitel or Mobilcom
- No Samsung DMB phone at IFA fair

- More than 500.000 DVB-H phones sold in Italy
- EU-Kommission (Vivianne Redding) pushes DVB-H



Why do we need to talk about DMB?

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Channel Bandwidths



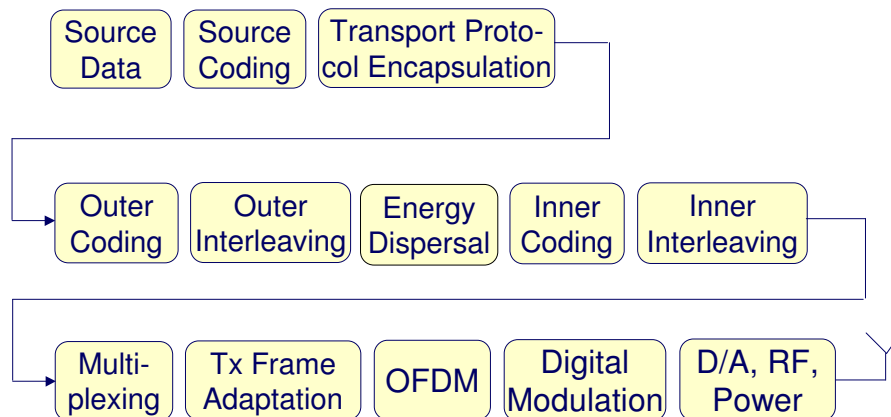
5, 6, 7 or 8 MHz

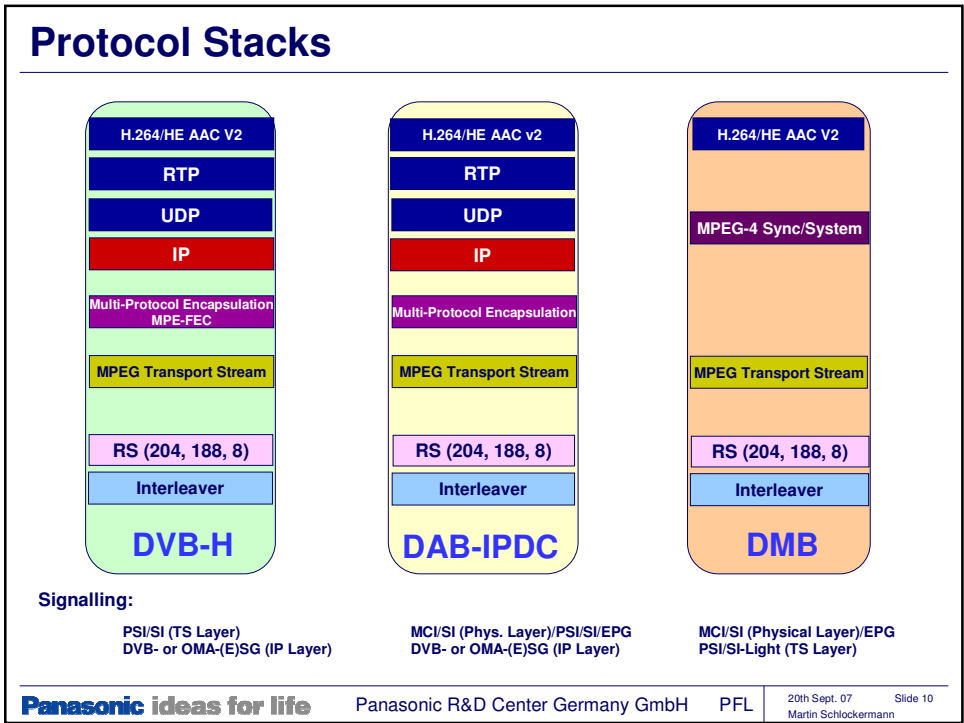
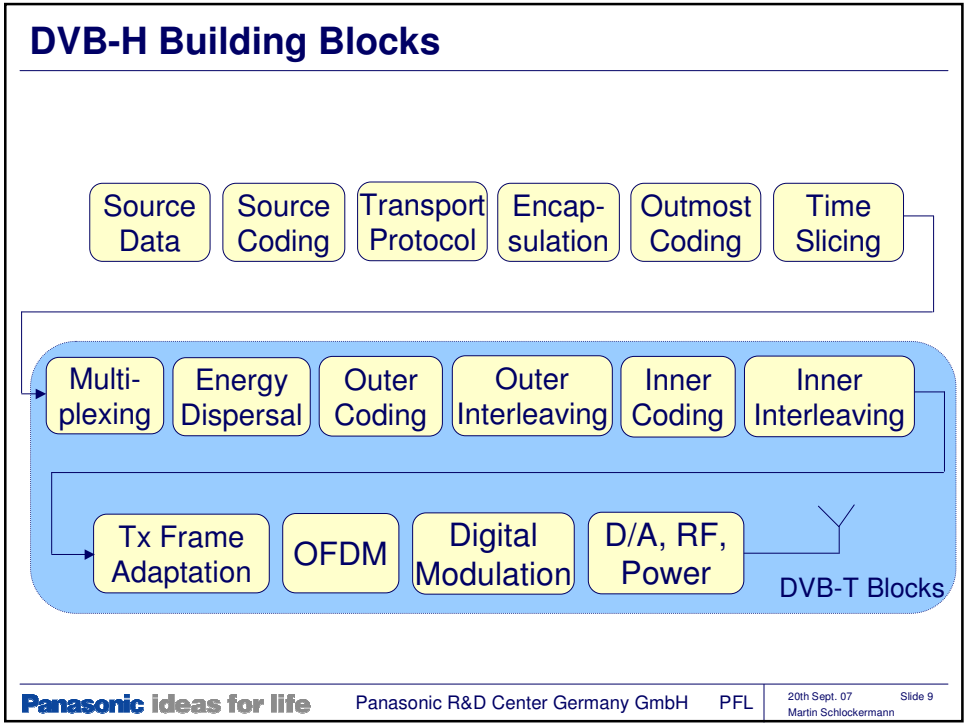


1,71 MHz







Depending on available channel bandwidth and grid as well as the number of services, the „right system“ might be chosen

DMB/DAB-IPDC Building Blocks








Video, Audio and Transport Comparison

			
<p>WORLD</p>  <p>Digital Multimedia Broadcasting Radio • Mobile TV • Multimedia • Traffic Data</p>	H.264	HE AAC V2 MPEG-4 BSAC	MPEG-2 TS
<p>WORLD IPDC</p>  <p>The future of DIGITAL BROADCASTING Radio • Mobile TV • Multimedia • Traffic Data</p>	Free Choice	Free Choice	DAB-DG IP
 <p>HANDHELD</p>	H.264 VC-1	HE AAC V2 AMR-WB+	MPEG-2 TS IP
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Error Protection Comparison

<p>WORLD</p>  <p>Digital Multimedia Broadcasting Radio • Mobile TV • Multimedia • Traffic Data</p>	Convolutional, Reed-Solomon-FEC (204, 188)		
<p>WORLD IPDC</p>  <p>The future of DIGITAL BROADCASTING Radio • Mobile TV • Multimedia • Traffic Data</p>	Convolutional, Reed-Solomon-FEC (204, 188)		
 <p>HANDHELD</p>	Convolutional, Reed-Solomon-FEC (204, 188) Reed-Solomon-FEC (255, 191)		
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Trade-Offs

- Coding/Spectral Efficiency
- Mobility
- Access to Application & Transport Standards from the Shelf (i.e. OMA, CBMS, RFC's)
- RoHC for IP/UDP/RTP
- Initial Access and Zapping Delays
- Power Consumption (next generation of mobile phone displays consumes 10 mW !)

DMB/DAB-IPDC



Advantages:

- Only two FEC layers
- Finer granularity in terms of number of services per multiplex
- Higher content efficiency for (D)QPSK
- Nearly full coverage of DAB in Germany

Disadvantage:

- Just one constellation defined (although backwards-compatible extension would be feasible - e.g. hierarchical modulation)

DVB-H



Advantages:

- Selection of constellations (but only QPSK implemented up to now)
- Several Guard Interval lengths defined

Disadvantage:

- Cascading of weak FEC stage and subsequent strong FEC stage is not the best system design (but was necessary for backwards-compatibility reasons -> DVB-T)
- Coarse Granularity regarding number of services

Conclusions

- Degree of Commonalities is high
- Mobile TV will be a standard element of Mobile Phones as the MP3 Player is nowadays
- Systems could coexist - ...
- when proper handover between systems has to be enabled (-> Automatic Service Following)
- The latter issue is handled by a small experts group of the DVB Project and the WorldDMB Forum -> see later slide

DXB Project Members

DXB is a system concept, not a system!

 is an R&D project supported by BMBF



Atmel (D), Frontier Silicon (UK), Landesmedienanstalt NRW (D)

<http://dxb.hhi.de>

Thanks to Dr. Ralf Schäfer (Fraunhofer-HHI) for providing his slides

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DXB/eDAB Design Objectives

Main targets for the work executed in the DXB Project:

Harmonize IPDC via DAB and DVB-H as much as possible:

- Re-use as many existing and standardized technologies
- Create highest amount of commonality with DVB-H in terms of IPDC
- Enable the usage of DVB-H IPDC protocol stack for DAB
- Enable Statistical Multiplexing
- Enable Power Saving options in conjunction with Statistical Multiplex

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Main difference between DMB and DVB-H

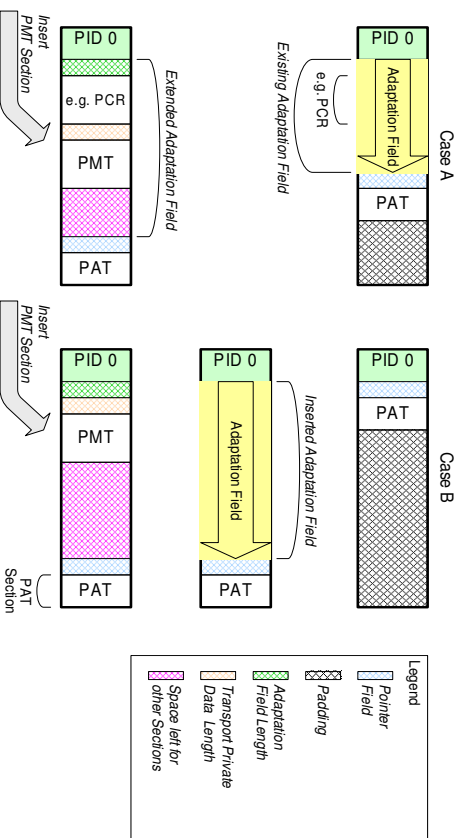
DMB is not IP based!

But why should IP be used for mobile TV?

- IP is main stream! (**All IP World**)
- All digital media are going IP (IP-TV, UMTS/MBMS, DVB-H, ...)
- Content and service providers need to set-up the contents only once and distribute it over any network (DVB-H, UMTS/MBMS, "DMB")
- Interactivity is easier with IP
- There is a huge amount of cheap and easy to use content creation tools for IP systems, which can even be operated by users

Thanks to Dr. Ralf Schäfer (Fraunhofer-HHI) for providing his slides

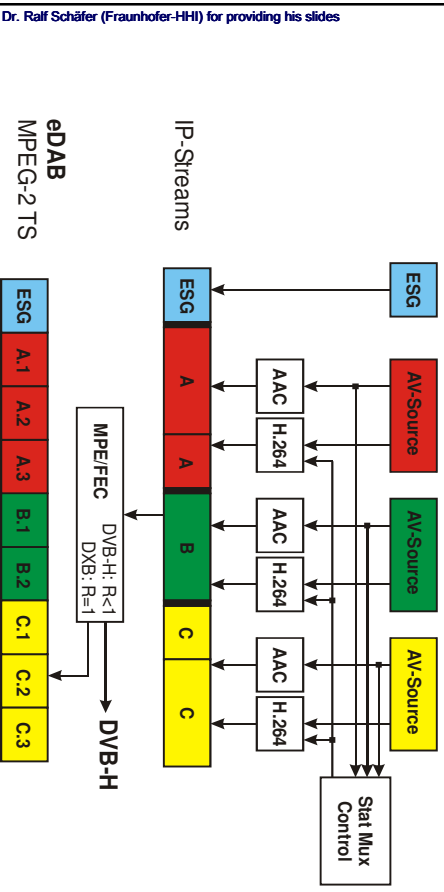
New proposal: Efficient transmission of PSI/SI and SAT sections



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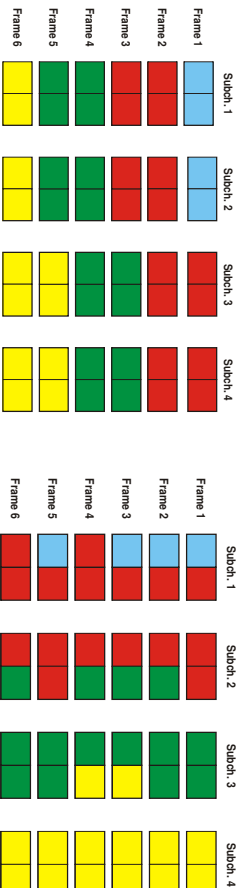
Transport of PMT Section in Private Data Block of Adaptation Field in PAT Packet

Mapping of VBR Streams into MPEG-2 TS in eDAB



Thanks to Dr. Ralf Schäfer (Fraunhofer-HHI) for providing his slides

Macro and Micro Time Slicing for Power Saving in eDAB



Macro Time Slicing
(adopted from DVB-H)

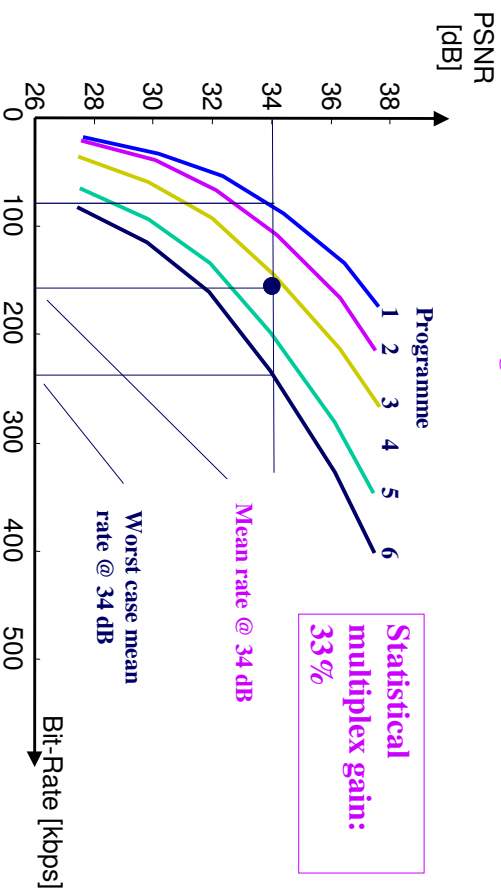
Micro Time Slicing
(known from DAB)

Mapping of AV-streams to “DAB sub-channels” is signalled in “Primary DAB sub-channel!”

Thanks to Dr. Ralf Schäfer (Fraunhofer-HHI) for providing his slides

Function of Statistical Multiplex

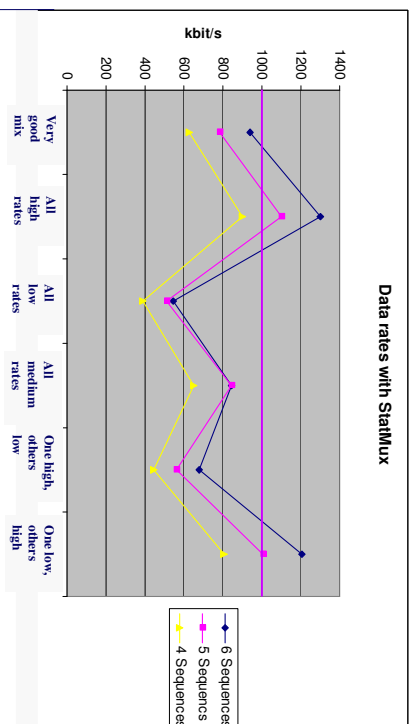
Each service gets the data rate its needs



Thanks to Dr. Ralf Schäfer (Fraunhofer-HHI) for providing his slides

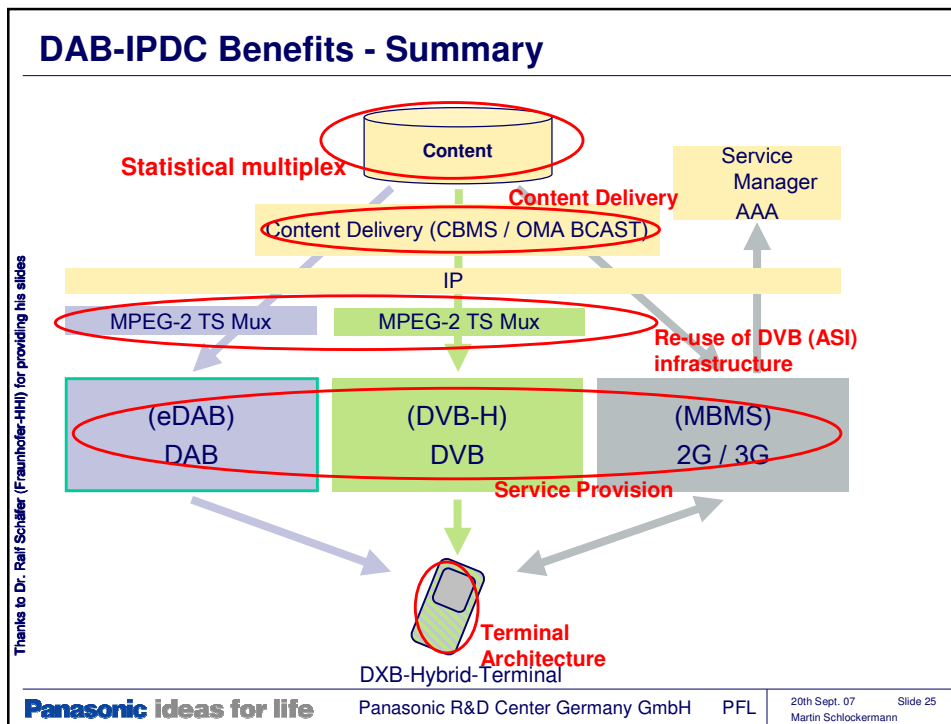
Gain of Statistical Multiplexing for DAB-IPDC

- Cumulative Data Rates for 4, 5 and 6 TV Programs



5-6 programs per DAB multiplex are possible
=> 1-2 additional programs compared to DMB!

Thanks to Dr. Ralf Schäfer (Fraunhofer-HHI) for providing his slides



Conclusions

- DXB is a system concept for harmonizing mobile TV systems above the physical layer.
- eDAB is a system proposal for IP Datacast (IPDC) over DAB developed by the DXB project.
- eDAB uses the Enhanced Streaming Mode of DAB (as T-DMB) and adds an IP layer via Multi Protocol Encapsulation (MPE).
- eDAB offers a high degree of commonalities with DVB-H (and MBMS) thus providing interoperability.
- eDAB improves spectrum efficiency by StatMux while allowing power saving at the receivers.
- There are good chances that the modified eDAB proposal using Compact PSI will be accepted by WorldDMB for DAB-IPDC.

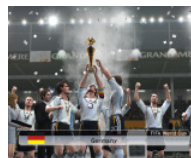
WorldDMB/DVB Joint Technical Group, WorldDMB TC TF Alignment

- Cross-referencing and automatic service following from DAB to DVB-H and vice-versa under development
- Recommendation issued regarding adoption of the DVB-H stack for DAB IPDC (apart from MPE-FEC)

Outlook Summer 2008



started in major European Countries



Upper Layer:
OMA-BCAST



Upper Layer:
DVB-IPDC

Again: How do we combine DVB-H and DAB-IPDC?

