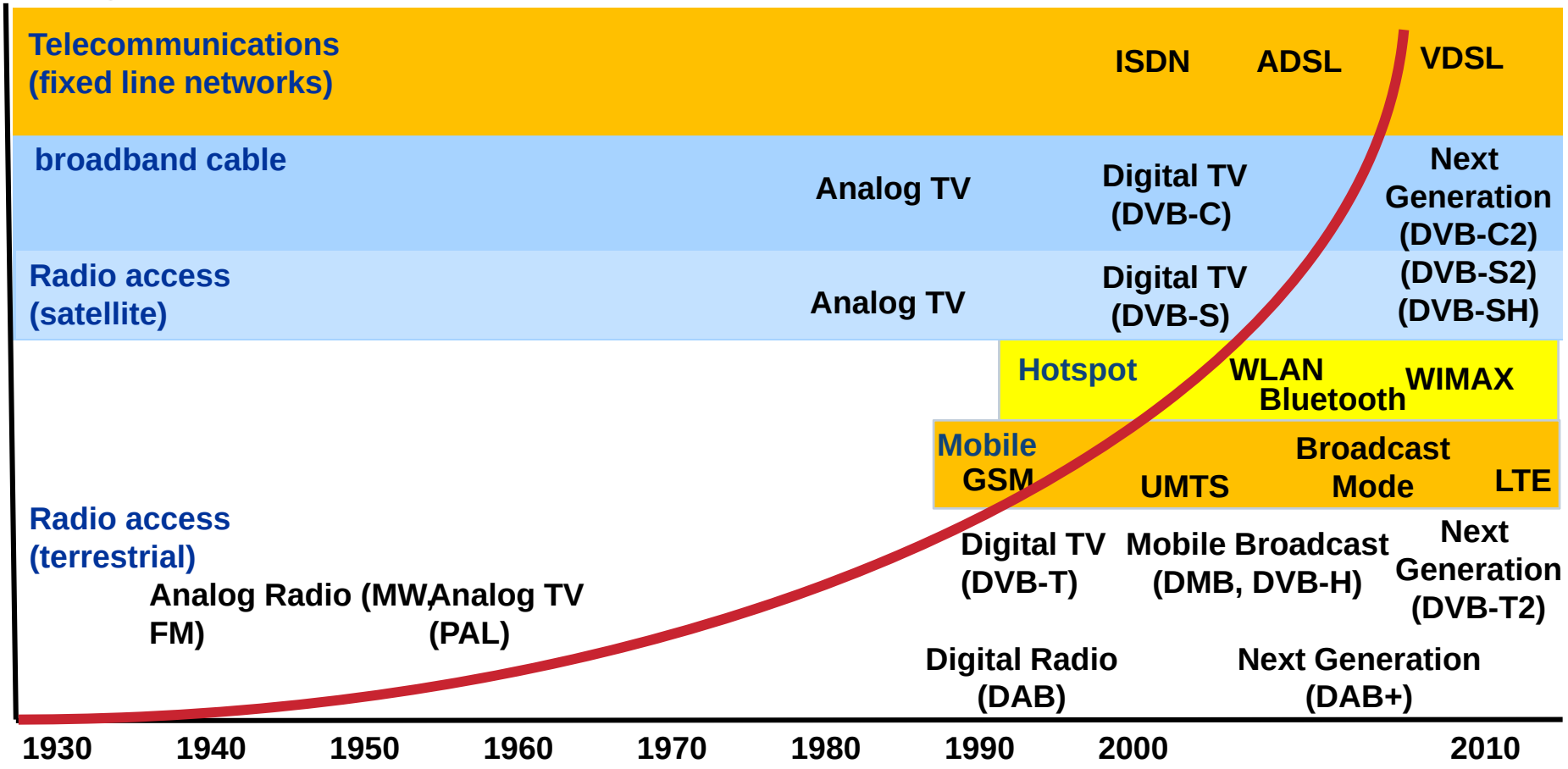
Service and technology neutrality - universal service obligations

Jochen Mezger
General Manager
Program Distribution

Digital Distribution Links in Europe



Source: EBU

European Commission – Telco package

Goals of EC:

- **Service neutrality**
- **Technology neutrality**

EC:
- National administrations not able to evaluate market realities due to
  - Speed of development
  - complexity

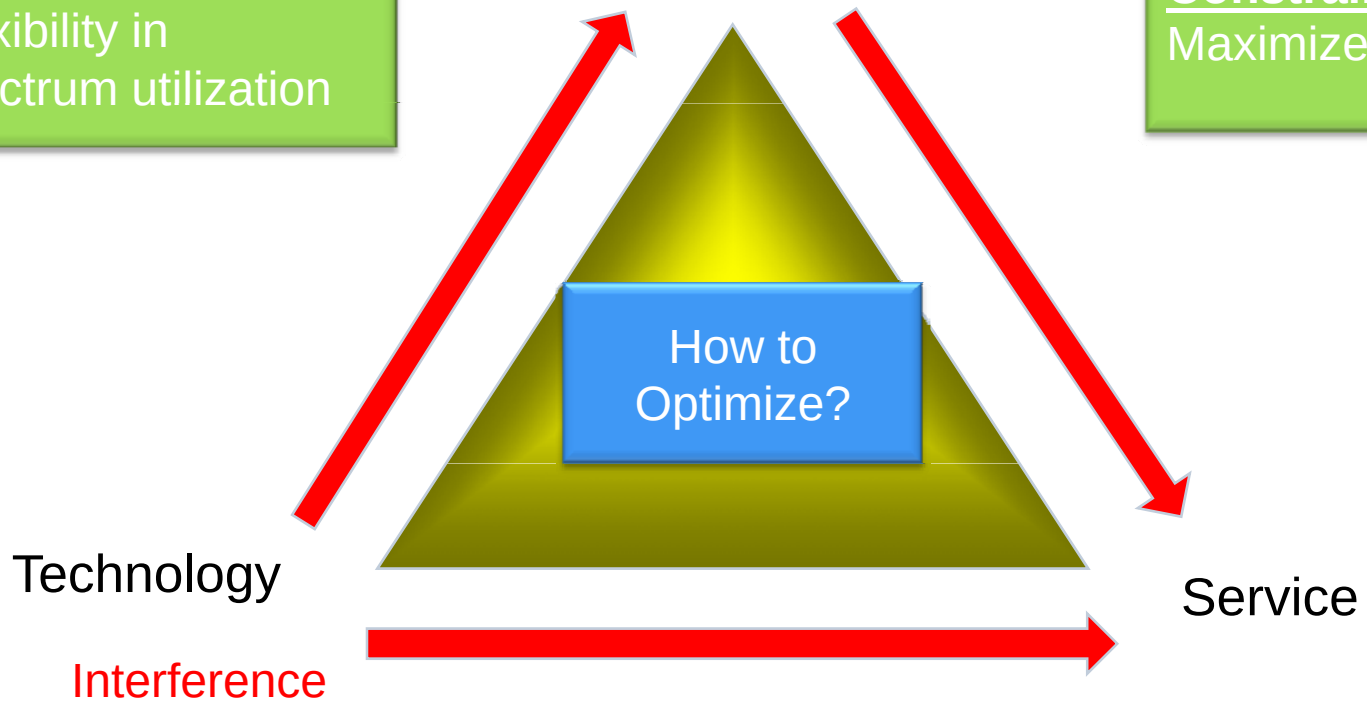
- DVB-H is the best technology !

Which spectrum, technology and service to choose?

Regulators Goal:
Flexibility in spectrum utilization

Spectrum planning

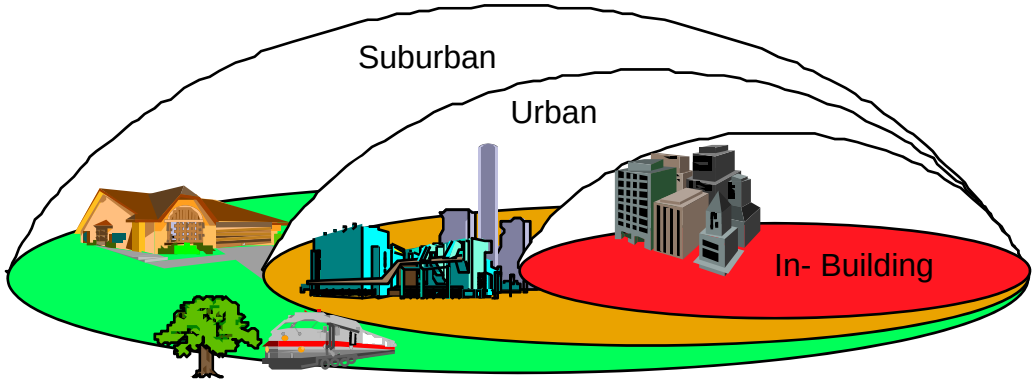
Constraint:
Maximize efficiency



Some thoughts about services and economics

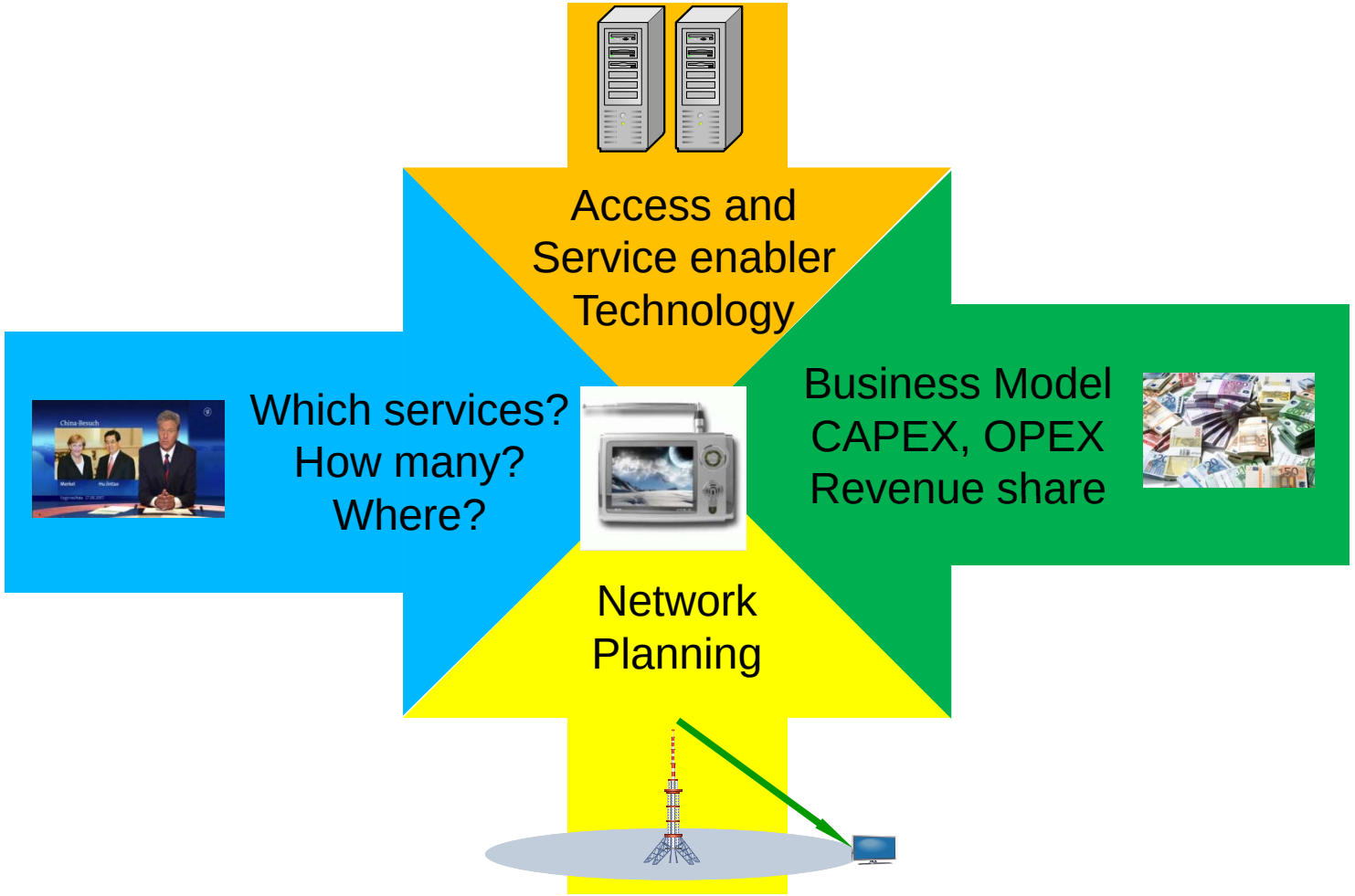
Answer needed for

- Type of services
- Usage types
- Coverage of a service
- Where is my audience
- Wow-effect for consumers
  - compelling and differentiating in the market

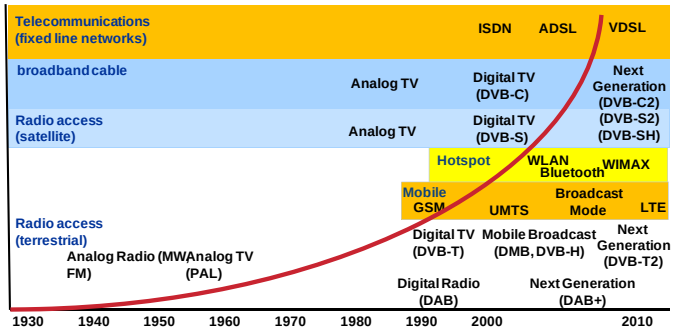


Decision about access technology is steered by balancing
- Service requirements
- Economical constraints

What's necessary for a successful new service?



Technology Neutrality



- Technology develops rapidly
  - much faster than at the advent of GSM 1990
  - no one can foresee the options in 5 years
- Established infrastructure is operational for a very long time (GSM beyond 2020)
  (problem of huge amounts of legacy devices in the market)
- Technology is selected such, that a <u>business model</u> can optimally be implemented (maximize profit)
  - Business models have to be driven by **services** accepted by the consumer

<u>Attention:</u>
Public services and socio-cultural services follow different rules
→ Serve everybody, no profit, cultural diversity

Service Neutrality

Network technology gets more and more independent of services

- UMTS → communications network
  - integrates high speed data downlink (HSDPA) and broadcast mode (MBMS)
- WIMAX → HotSpot technology (wireless DSL), bidirectional communications
  - supports mobility and in principle also broadcast

BUT

- All wireless networks of today are designed for a particular service
  - despite MBMS MNOs eye on DVB-H
- For economical reasons
  - design constraints (e.g. coverage) are fundamentally different between a broadcast and a communications network
  - design constraints differ from country to country (topology, population density and population spread, constitutional requirements, etc.) (mobile networks are designed independently for each country)

example: DVB-T-Service in Bavaria

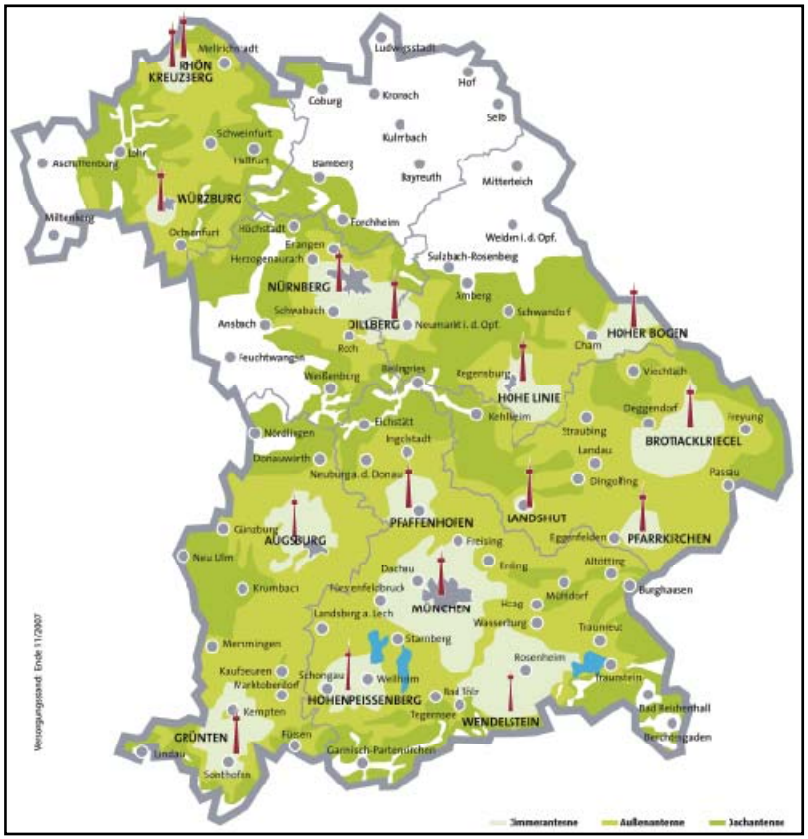
Broadcast network

complete area coverage(in 2008)
portable/mobile reception
Indoor coverage in big cities

Frequency: 600 MHz

Low transmitter density:

20 transmitter for 300 x 400 km



example: mobile service in London

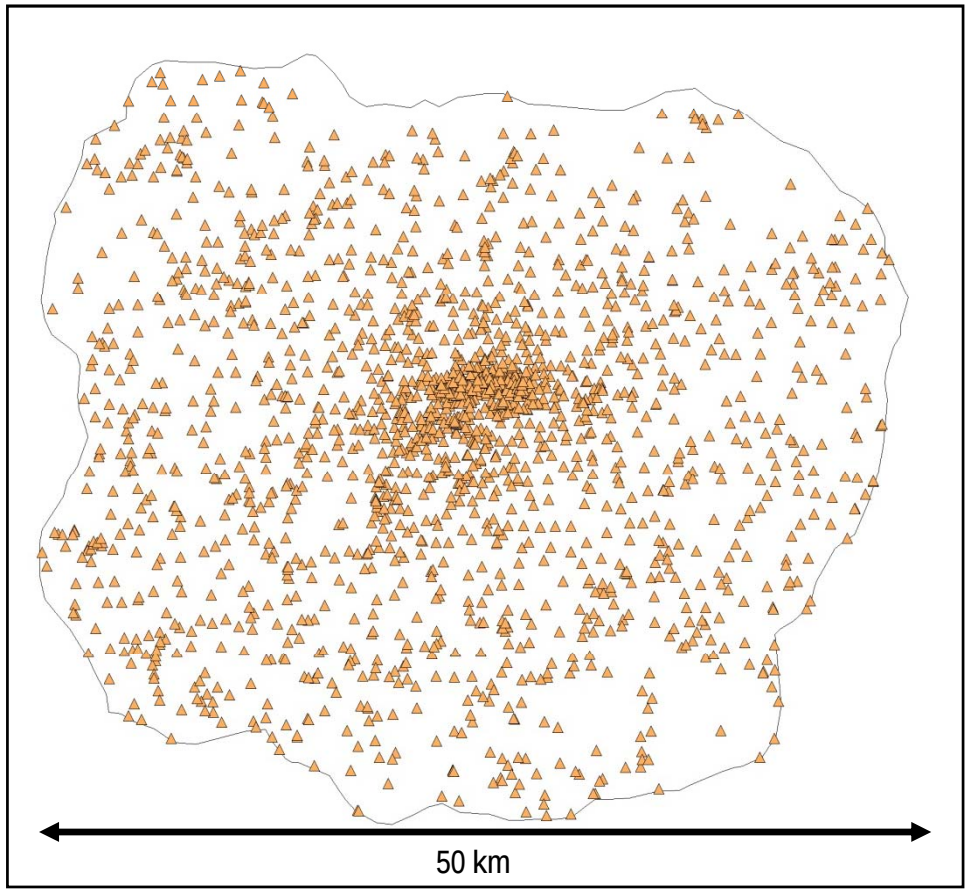
Cellular network:

Distributionn of mobile network cells within Motorway M25 (London)

Frequency: 1800 MHz

High transmitter density:

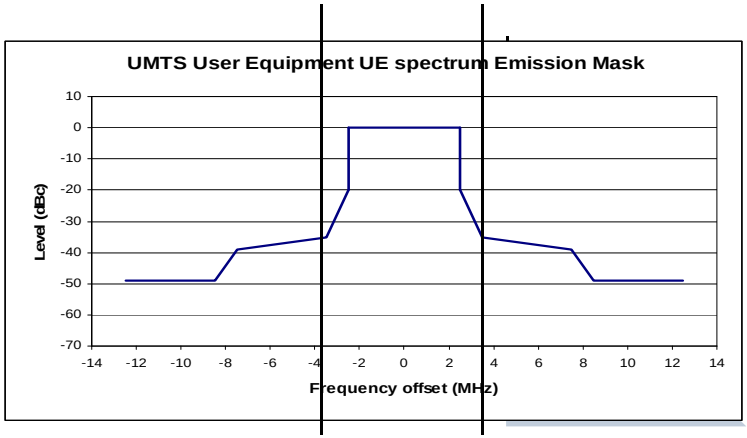
app. 2000 sites



Source: EBU Tech 3327

What is the issue about Interference?

Transmitters produce emissions for physical reasons outside the intended frequency range (band) regardless of transmission technology



Emission level depends on implementation

- broadcast transmitters suppress out-of band emissions to the minimum

- mass market products (mobile phones) trade-off suppression level with production cost

→ out-of-band emissions higher compared to broadcasters transmitters (in relation to the transmitted power)

→ interference level highest in adjacent channels, but do not ignore harmonics!

→ Mobiles appear in large volumes in small areas

Options to counter Interference

ONLY by careful frequency management and network planning

- Within a technology (DVB-T/H or UMTS)
  → account for interference levels of transmitters of same technology
- From other technologies
  → agreed definition of maximum tolerable interferer levels
  → introduction of guard bands to keep technologies as much apart as possible
- Guidelines for receiver manufacturers for adjacent channel immunity

There is no service / technology neutral spectrum planning possible

Service and technology neutrality

The investor takes the risk => technology/service neutrality is crucial

but

Network planning is service/technology specific due to economy

and

Interference is specific - there is no technology/service neutral spectrum planning

Impact of Network Planning on Commercial Aspects

Capacity and coverage costs money

- Key expense factors are number of sites and transmission power

Content cost money

- Creating specialized attractive formats

Sources of income to cover expenses (incl. profit margin & device subsidization)

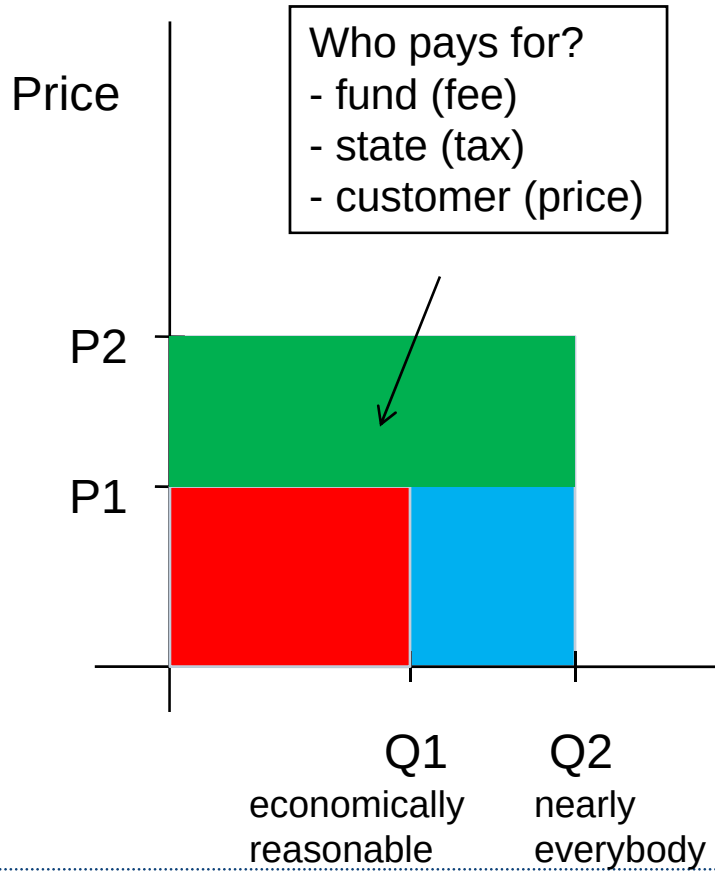
- Consumers are willing to pay only a certain amount of money
- Advertisement requires large number of potential recipients
- Communications and personalized content / functionality

Challenge: Number of programs between consumer satisfaction and competition

- Urban area: significant audience to create revenue for large number
- Rural areas: audience insufficient to create necessary revenue

How to cover rural areas?
Not at all – with limited bandwith – different technology?

…what about a “universal service” to cover rural areas?



Who pays for?
- fund (fee)
- state (tax)
- customer (price)

present universal services are e.g.:

- running water
- electricity
- telephone
- broadcast

red:	market price p1 for quantity q1
blue:	market price p2 for quantity q2
green:	necessary subsidy to get price p1 for increased quantity q2

e.g. universal service for (mobile) broadband

- everybody gets everywhere in Europe an Internet access per satellite

sat-2.000	Downstream: maximal 2.048 kbit/s, Upstream: maximal 156 kbit/s - inklusive FUP 3.000	39,90 €/Monat[4]

- various alternative technologies available:
  - satellite
  - ongoing ADSL-deployment in rural areas (Deutsche Telekom invests 600M€ in 2008)
  - WiMAX@3,5GHz in rural areas
  - EDGE
  - microwave links + WLAN
  - …

- There's no need for a universal service "Broadband"
- There's no need for UHF frequencies for Broadband@rural areas

Where are we heading in the “terrestrial domain”?

- Development of spectrally more efficient access interfaces
  → Efficiency at the expense of flexibility (DVB-T2)

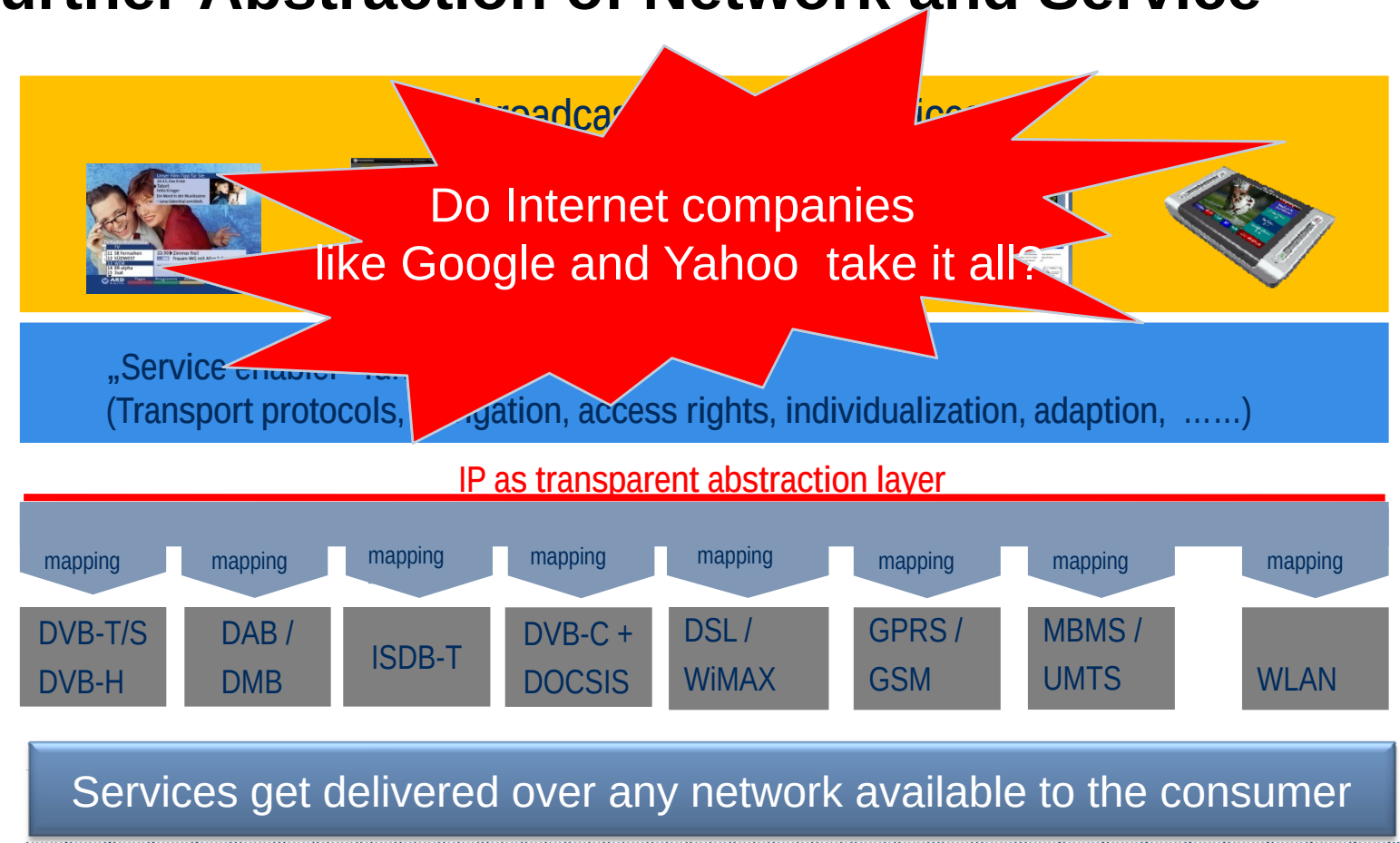
- Development of flexible access systems
  - more flexibility for jointly operated very different types of services
    → MBMS in UMTS or WiMAX

- Are in future all air interfaces be based on OFDM?
  - consequences for spectrum planning for all types of services?

- Devices integrate more and more air interfaces (mobiles up to 7)
  → as technology advances a tuneable filter will be followed by an A/D-converter and digital demodulation?

Economical factors and service dependent constraints drive planning and structure of terrestrial networks

Technological Trend:
Further Abstraction of Network and Service



UHF bandplans for mobile services Ch 61-69

Option 1

61	62	63	64	65	66	67	68	69
790-798	798-806	806-814	814-822	822-830	830-838	838-846	846-854	854-862
Downlink				**Duplex gap**	**Uplink**			
32 MHz (4 blocks of 8 MHz)				**8 MHz**	**32 MHz (4 blocks of 8 MHz)**			

Option 2

61	62	63	64	65	66	67	68	69
790-798	798-806	806-814	814-822	822-830	830-838	838-846	846-854	854-862
Downlink				**Duplex gap**	**Uplink**			
30 MHz (6 blocks of 5 MHz)				**12 MHz**	**30 MHz (6 blocks of 5 MHz)**			

Source:
29th ECC PT1 MEETING
Dublin, 14 -16 May 2008

No participant from broadcasters at ECC PT1!

Where is the broadcast view?

Where are we heading in the “political domain”?

- Mobile industry attacks on spectrum is ongoing (WRC-11/15)
- Internet companies (Google/Yahoo) enter in the broadcast market
- What about Chinese Technology?
  impact on the European market because of economy of scale?
- EU / EC open for harmonized and market oriented approaches
  -> frequency trading, EU radio administration
- Public value of broadcaster less appreciated than GDP-promises of mobile industry -> New: broadcaster have to fight for spectrum!

What do we need ?

Conclusions…..what do we need?

- much more international lobbying
- EBU support on EU/EC-level
- intensify influence on national authorities
- Broadcaster participation in regulation bodies
- good technical work at EBU; increase strategic advice
- More manpower

Thank you for your attention!

Jochen Mezger
General Manager Program Distribution

Institut für Rundfunktechnik
Floriansmühlstraße 60
80939 München

Tel. +49-(0)89-32399-330
Fax +49-(0)89-32399-354
E-Mail: mezger@irt.de