



**Presentation to the European Commission
Brussels, July 18, 2006**

Digital Radio Mondiale/DRM

THE DRM CONSORTIUM

**by
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Deutsche Welle Director DRM**

Agenda

- **About myself**
- **How did it started**
- **How did the consortium developed**
- **Membership**
- **DRM-System**
- **DRM transmissions on air**
- **First Receivers**
- **World-wide interest**
- **DRM+**
- **Conclusion**



Why do we need DRM:

- After the cold war no more high power SW-transmitter were ordered
- Transmitter industry nearly collapsed (ABB, Telefunken)
- Broadcasters started using internet
- Listeners were asking for better audio and reception quality (CD)
- Analogue SW broadcasting was reduced, no more jamming
- Industry could disclose high standard technology from military
- 20 organisation went together in 1998 to start DRM not only for international but also for national and even local broadcasters
- Today ITU-request fulfilled: DRM replaces analogue Long-, Medium- and Short-Wave broadcasting and soon also FM

Spectrum of electro-magnetic Waves

AC 50 Hz

Audio Frequencies

Ultraviolet Light

Electro-magnetic Waves

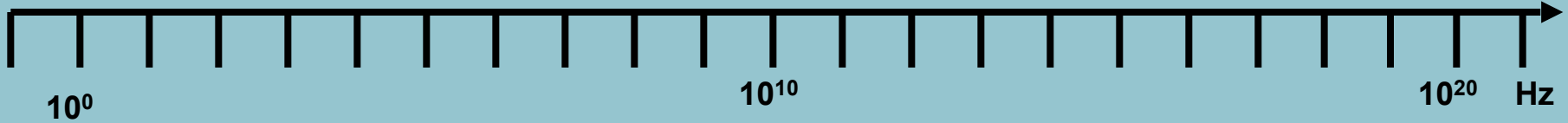
Heat-Radiation

X-Ray

Visible Light

Radio waves:
LW, MW, SW
DRM+
D R M

FM
D A B



Reach of Radio Waves in km

(depending time of the day and year, weather and sun-spot number)

FM up to 100 (DRM 26 MHz and soon DRM+)

Short-Wave up to 20.000

AM/Medium-Wave between 50 - 2000

Long-Wave between 800 - 1500



DRM-Consortium:



- A NOT-FOR-PROFIT consortium for the development of a digital transmission system in the Long-, AM/Medium- and Short-Wave broadcasting bands
- NEW: Also for the FM-Bands
- Registered in Geneva/Switzerland, Project Office at DW in Bonn/Germany
- Nearly 100 members from 32 countries
- DRM members are coming from all continents and the whole broadcast industry
- Membership increases now with the availability of DRM receivers
- DRM has cooperation agreements with WorldDAB and iBiquity/HD-Radio
- DRM is open for other cooperation such as WorldSpace
- DRM decision to extend the system up to 108 MHz has created great interest
- Soon broadcasters can choice DRM for all radio broadcasting bands

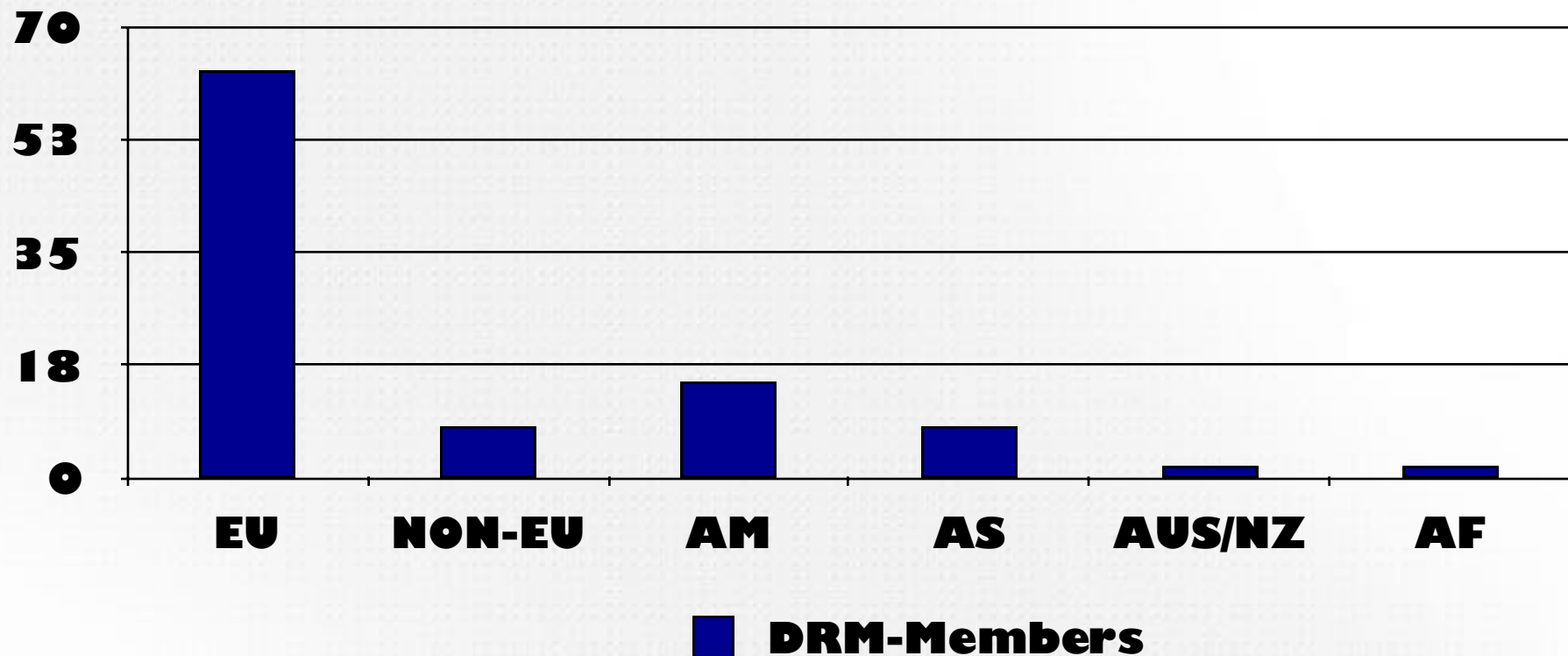
98 DRM-Members from 32 Countries (July 2006)

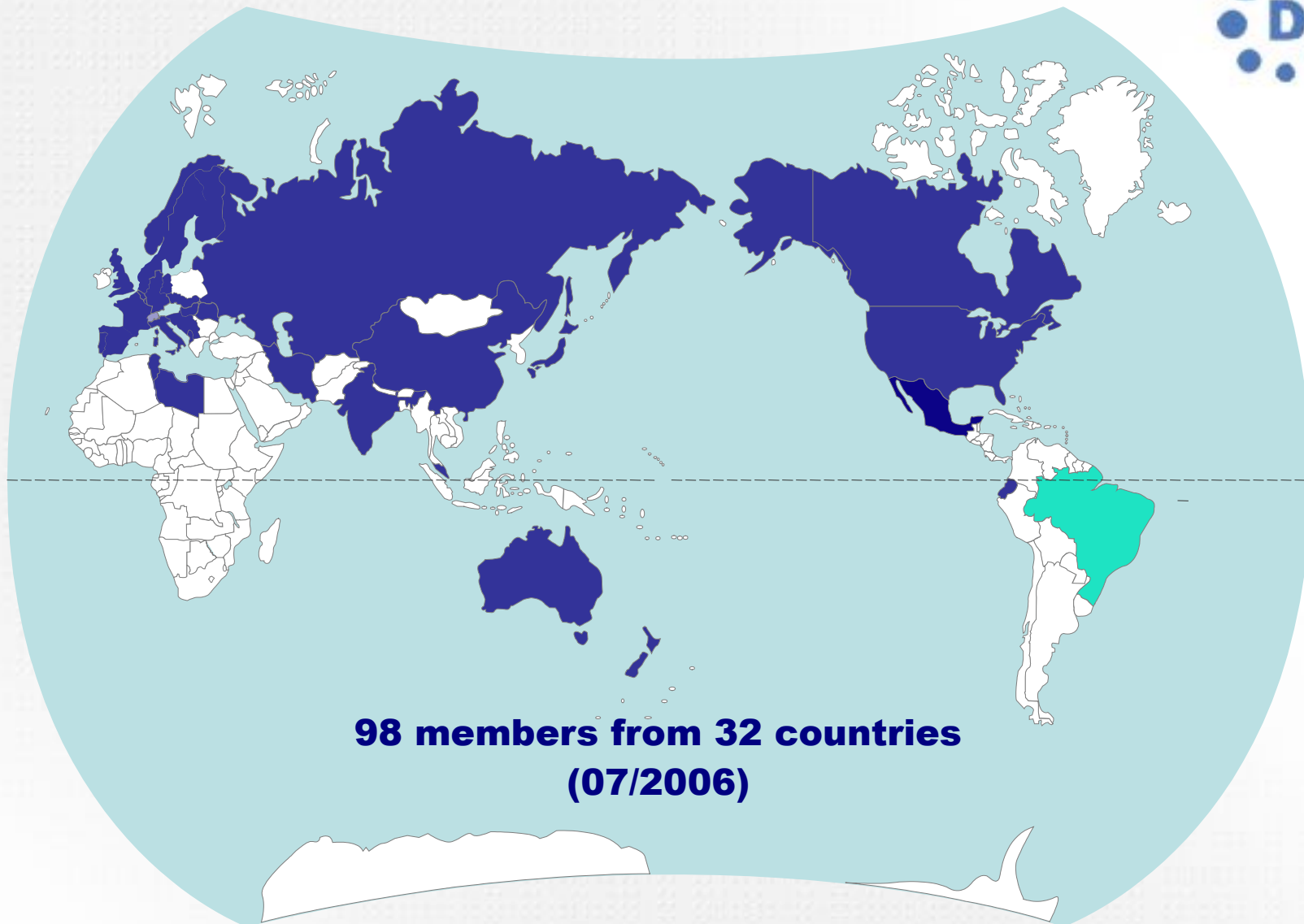


Commercial Radio Australia (**Australia**); TDP, TDP Radio (**Belgium**); Nautel Ltd., Radio Canada International/CBC (**Canada**); Academy of Broadcasting Science of China, Communications University of China (**China**); RIZ Transmitters (**Croatia**); HFCC (**Czech Republic**); Aalborg University (**Denmark**); ESPOL, HCJB World Radio (**Ecuador**); Digita Oy, Kymenlaakso Polytechnic (**Finland**); CCETT, Comité DRF, Digidia, Radio France, Radio France Internationale, TDF, Thales Broadcast & Multimedia (**France**); ADDX, APR, Atmel Germany GmbH, Deutsche Welle, DeutschlandRadio, DLM, Sender Europa 1, Fraunhofer IIS, Georg-Simon-Ohm – University of Applied Sciences Nuremberg, Harman Becker AS GmbH, IRT, Medienanstalt Sachsen-Anhalt/Digitaler Rundfunk Sachsen-Anhalt, Micronas GmbH, NERO Ahead Software AG, Panasonic Automotive Systems Europe GmbH, Robert Bosch GmbH, Sony International Europe, SWR Südwestrundfunk, Transradio Sendersysteme Berlin AG, Texas Instruments GmbH, T-Systems International GmbH, University of Applied Sciences - FH Merseburg, University of Hanover, University of Kassel, University of Ulm, VPRT (**Germany**); Antenna Hungaria, National Communications Authority Hungary (**Hungary**); RAI Way, ST Microelectronics (**Italy**); Basamad College Tehran (**Iran**); Hitachi Kokusai Electric Ltd., NEC Corporation, NHK (**Japan**); Samsung Electronics Co, Ltd. (**Korea**); Libyan Jamahiriya Broadcasting (**Libya**); Broadcasting Centre Europe, RTL Group (**Luxembourg**); Asia Pacific Broadcasting Union (**Malaysia**); La Red de Radiodifusoras y Televisoras Educativas y Culturales de Mexico (**Mexico**); Agentschap Telecom, Philips Semiconductors, Radio Nederland Wereldomroep, Technical University Delft (**Netherlands**); Radio New Zealand International (**New Zealand**); Telenor AS/Norkring (**Norway**); RDP Radiodifusao Portuguesa (**Portugal**); RTRN/Voice of Russia (**Russia**); Cadena SER, Government of Catalonia, Universidad del Pais Vasco (**Spain**); Coding Technology AB, Swedish Radio International (**Sweden**); Association of Swiss Private Radios, European Broadcasting Union, International Committee of the Red Cross, ITU (**Switzerland**); Arab States Broadcasting Union (**Tunisia**); BBC, Christian Vision, Digital One Ltd., Imagination Technologies, QinetiQ Ltd., RadioScape Ltd., VT Communications, WRN (**U.K.**); Analog Devices, Broadcast Electronics Inc., Dolby Laboratories Inc., Dolby Laboratories Licensing Corporation, Continental Electronics, Harris Corporation, IBB/VOA, National Association of Shortwave Broadcasters, TCI International Inc., Via Licensing Corporation (**U.S.A.**); Radio Vaticana (**Vatican City State**).



DRM-Member by Continent





**98 members from 32 countries
(07/2006)**

Digital transmission system for Long-, Medium- and Short-Wave, Recommended by the ITU and standardised by ETSI and IEC



Advantages for the listener:

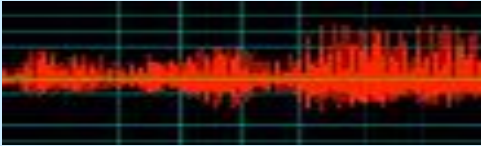
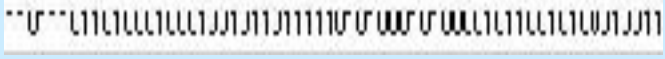
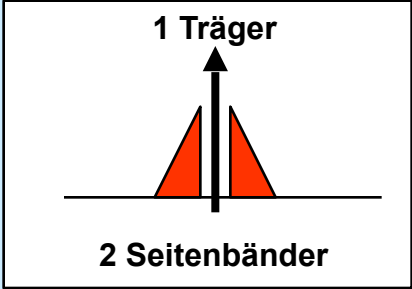

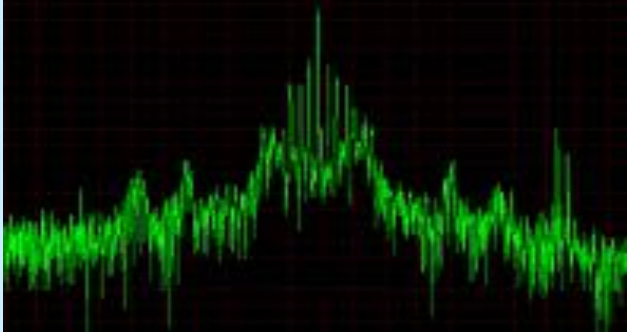
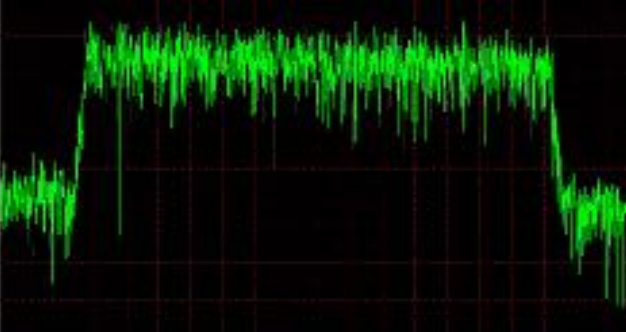
- near FM audio quality
- Stereo
- reception without noticeable interference, noise and fading
- transmission frequency not to be known, station name on the display
- receiver switches automatically to the best frequency without interruption
- Associated data possible such as: Text, pictures, HTML, storage

Advantages for the broadcasters:

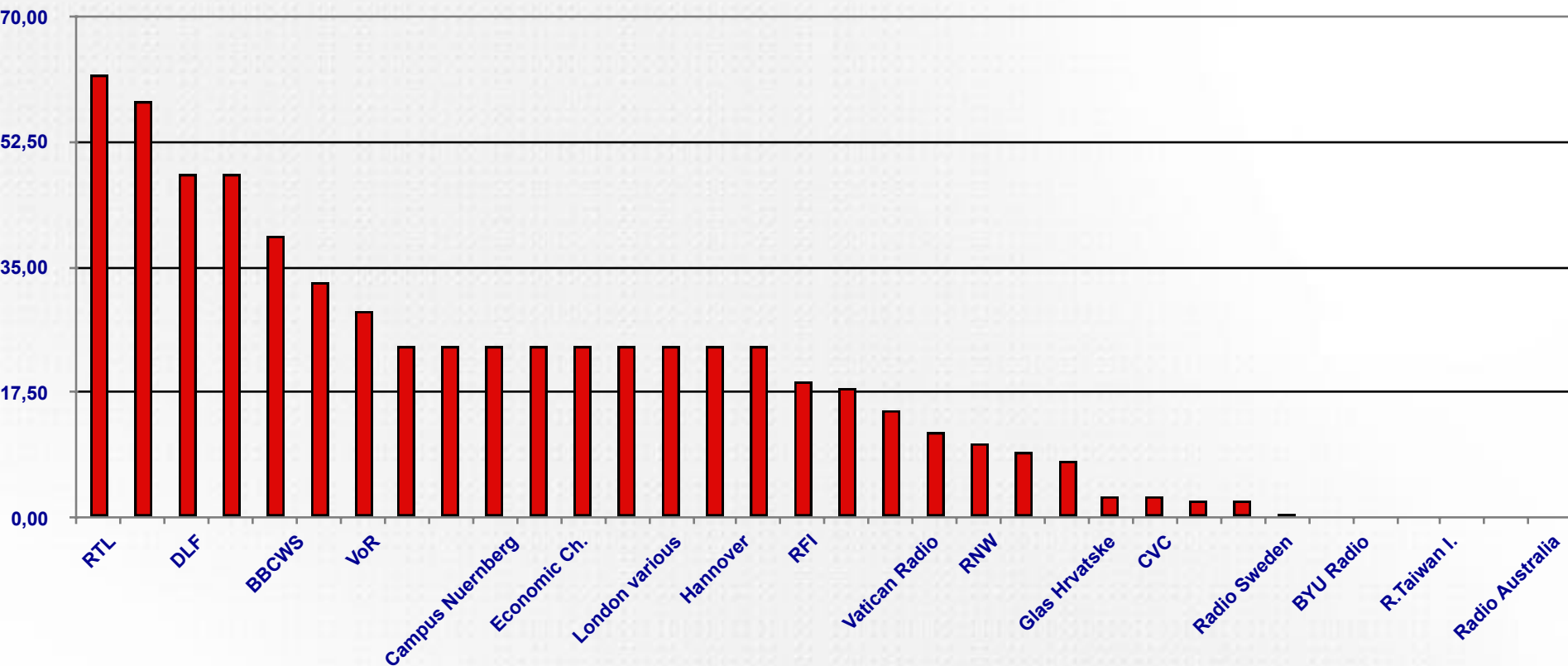
- existing transmitters can be used
- Investment for DRM upgrade about 15-20% of the price of a new transmitter
- power consumption reduced by about 40%
- new types of programme are possible
- DRM transmissions are reaching status of local stations

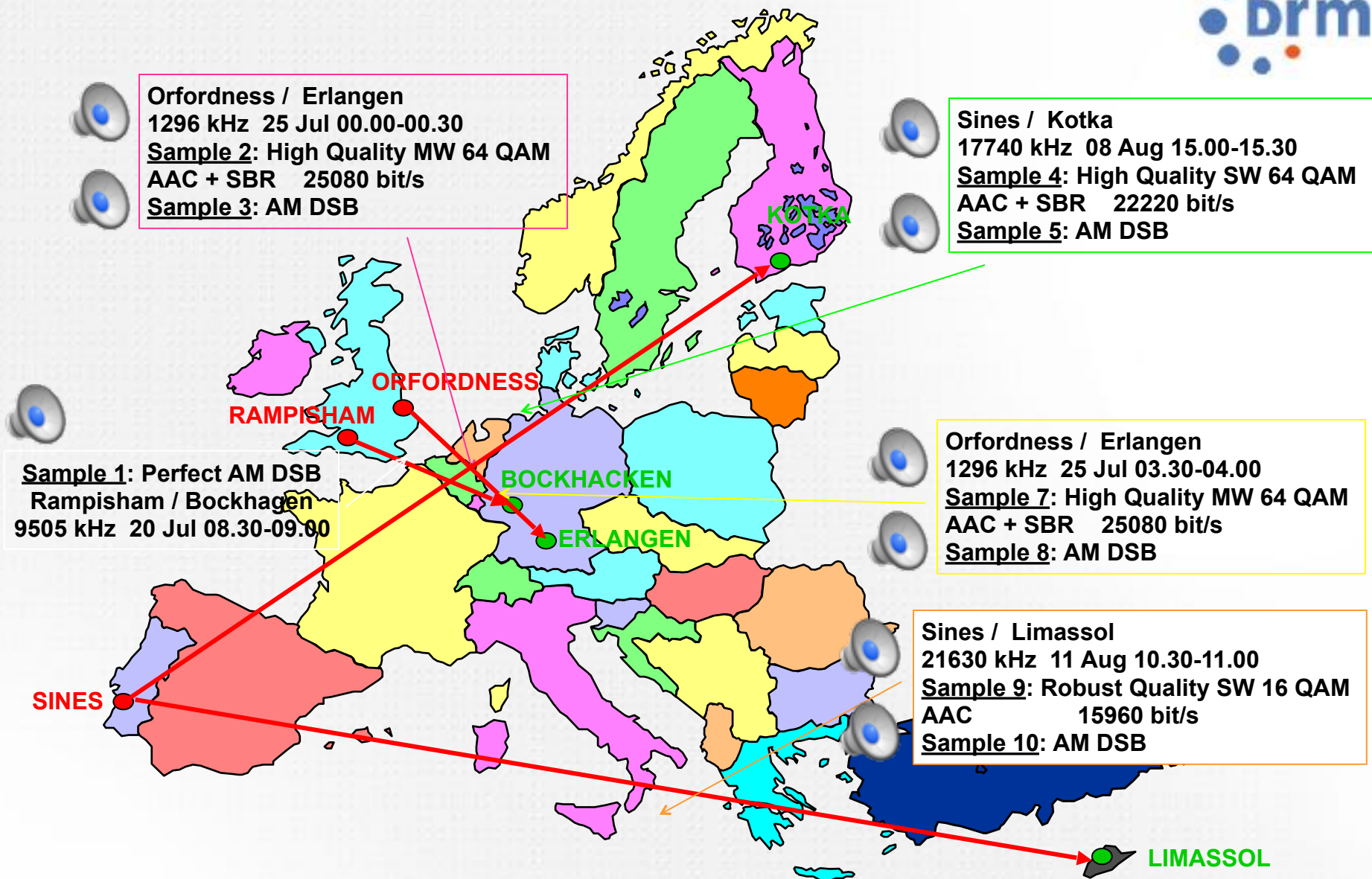
Differenz between analogue and digital Transmission



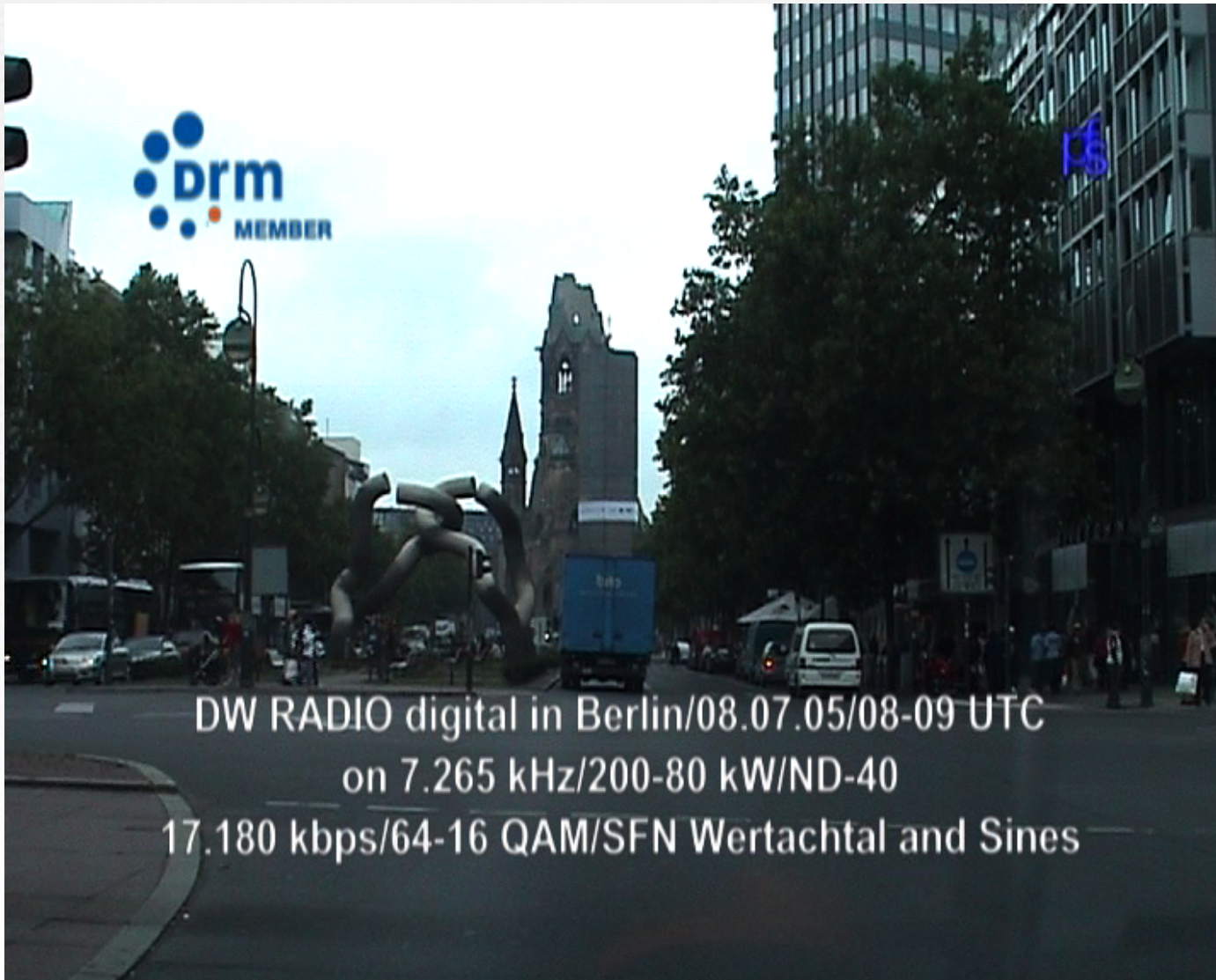
	AM	DRM
Information		Digitalisation + Data Reduction 
Modulation	 <p>1 Träger 2 Seitenbänder</p>	ca. 200 carriers modulated with  And a Bit-Duration of 5,3ms = ca. 40.000 bit/s 27kbit/s usable bitrate
RF-Signal		

DRM transmission hours/day from more than 30 Broadcasters





DRM transmission of DW received in Berlin from Sines/Portugal (2.500 km)



DW RADIO digital in Berlin/08.07.05/08-09 UTC
on 7.265 kHz/200-80 kW/ND-40
17.180 kbps/64-16 QAM/SFN Wertachtal and Sines

New Programme Possibilities:

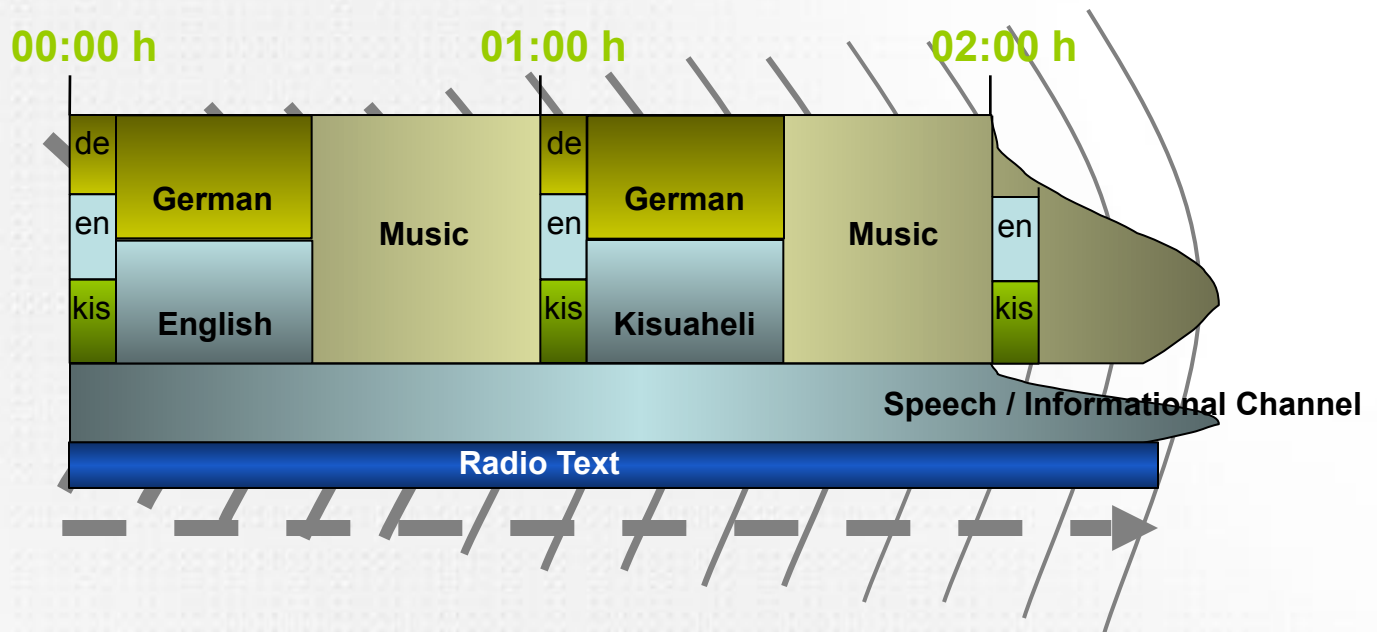
1. Stage: Main-Programme 24 kbps
Simple text displayed

2. Stage: Music programme 20 kbps Stereo
Plus information programme in parallel speech only 4 kbps: T

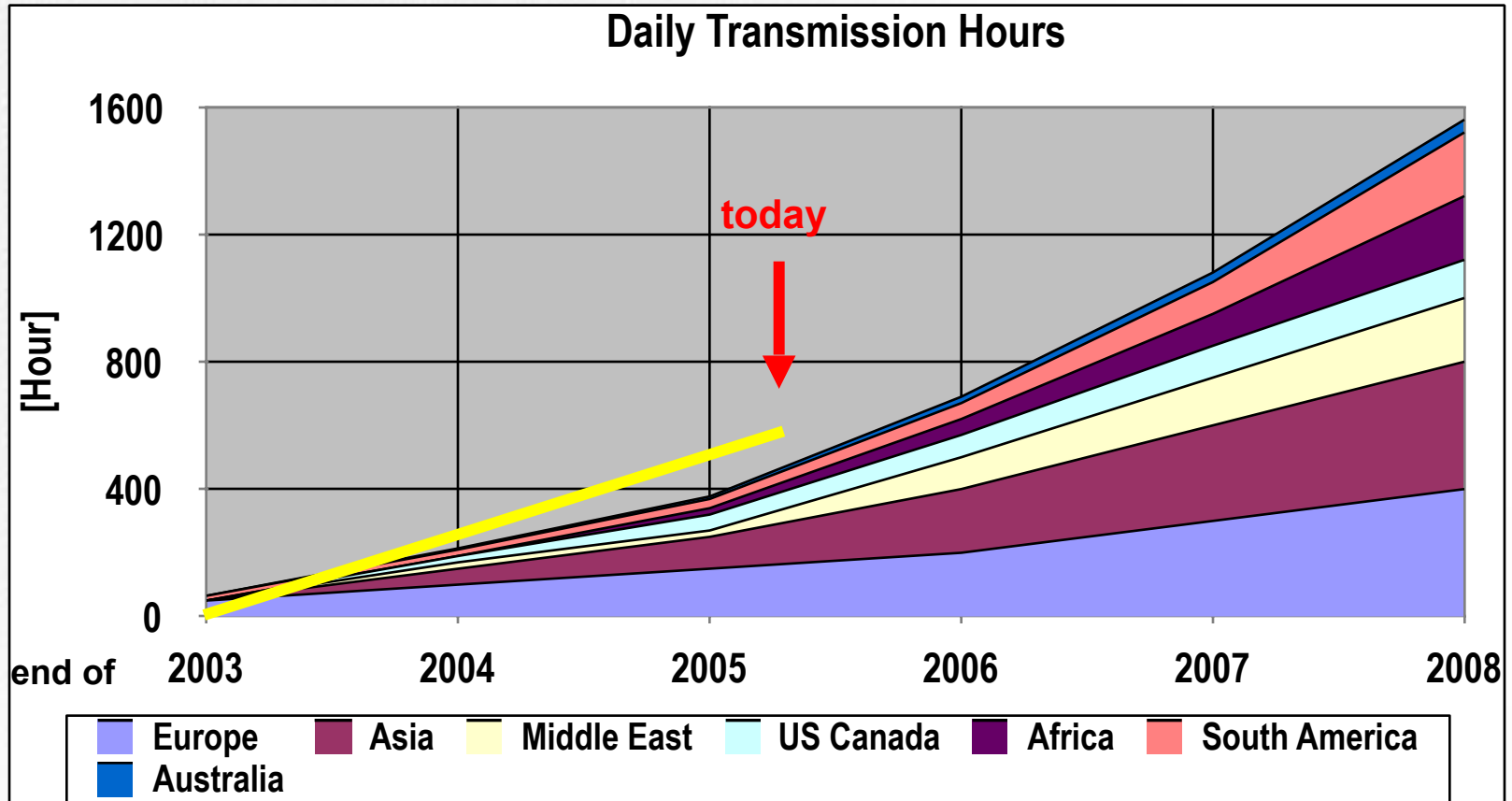
3. Stage: Main-Programme 24 kbps Stereo
Text, Graphic, Picture, HTML 800 bps

4. Stage:	Speech channel A 4 kbps	Music 24 Stereo	Speech channel A 4 kbps
	Speech channel B 4 kbps		Speech channel B 4 kbps
	Speech channel C 4 kbps		Speech channel C 4 kbps
24 kbps			

Example for the use of a dual Programme Structure

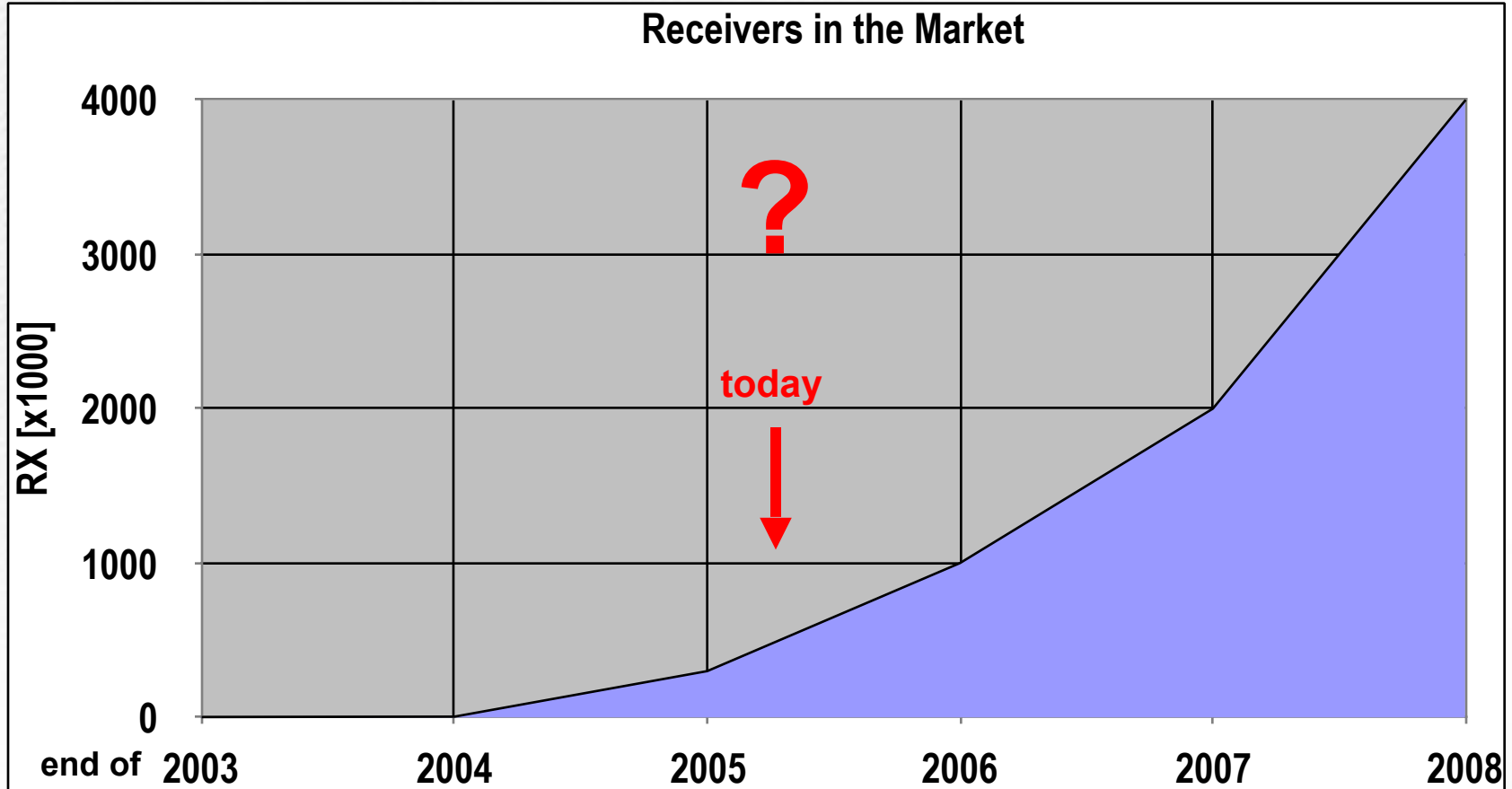


Market penetration



Source: DRM 2003

Market penetration



Source: DRM 2003

First DRM-Radio for mass market:
ROBERTS (Sangean) MP40

- DRM, DAB, UKW, RDS, LMK
- Storage audio and data
- < 299 €
- Q2/06 market access



morphy richards





DRM, FM-RDS, AM/MW, SW, LW, storage
Available August 2006,
price below 200 EURO

DRM-Radio in a mobile phone

NOKIA 3300 mobile phone
with FM-Stereo-Radio &
MP3 recorder and player



Market Launch in other parts of the World



- Many broadcasters in many countries have indicated to start DRM transmission once receivers are available for an affordable price
- Biggest mass market are countries like China and India
 - China has started with national MW/AM and international SW DRM transmission
 - China has announced DRM transmissions to India, Sri Lanka and Pakistan
 - China has announced to broadcast Olympic Games 2008 world-wide in DRM
- Government of India has decided to go for digital broadcasting from 2015 onwards
 - AM/Medium-Wave and Short-Wave from AIR will be DRM
 - First tests start end of this year with transmitter from Thales/France
 - BPL India will manufacture low price DRM-receivers
- DRM supports Mexico and Brazil with DRM tests on MW/AM, SW and 26 MHz
- Indonesia has announced DRM tests
- Australia is doing DRM tests
- ASBU has asked for DRM tests in Saudi Arabia, Tunisia and/or United Arab Emirates
- Russia has announced more DRM ready transmitters and DRM broadcast
- Turkey has announced DRM tests on AM/MW



Market Launch in Europe as a global Reference

- Radio market potential is about 2.5 Billion radios world-wide
- Condition for most countries in the world: Price of receiver must be sufficiently low
- First receivers will not be cheap, price falls with mass production
- DRM therefore has chosen Europe as first market entrance
 - Highest DRM transmission hours per day in Europe: 625 h out of 649 h (95 %)
 - sufficient interest and money available
- DRM receiver launch will start in Germany with most of DRM-Members (30 %) and most of DRM transmission hours (nearly 50%)
- First DRM mass receivers will be combined DRM/DAB receivers
- For DRM Consortium the German DRM Forum will coordinate all initiatives
- Similar coordinated market access in other countries like France and UK
- Sales will be accompanied by massive advertisement by several broadcasters
- Goal is to have high market penetration by end 2006 and new and cheaper DRM receivers on the market in following years

What is DRM+?

An extended version of the present system up to 108 MHz
Developed for all broadcasting bands between 30 and 108 MHz

Why is it needed?

Broadcasters need one single digital system for all bands
Allows for low price receivers

Present DRM-system is only developed for frequencies up to 30 MHz

Other digital broadcasting systems work in higher bands

Much more efficient use of the frequency spectrum:

4 times more channels as of today in CD-like quality

Surround sound possible

Closes the gap between DRM30 and DAB

Conclusion:

- The DRM-system is ready for introduction
- The interest of broadcasters and the industry increases world-wide
- The amount of DRM hours per day on air increases
- DRM-transmitters and equipment are available now!
- Some manufacturers will deliver DRM-receivers in 2006
- For markets with different digital systems combined receivers are possible
- In X-years analogue transmission will cease and digital only will exist
- Because of digital technology any digital device could also be a radio
- Competition between broadcasters will increase, content will be king!
- DRM offers broadcasters the chances to take part in the multimedia era
- With DRM broadcasters have a chance to keep their audience and win new listeners
- DRM offers broadcasters support for DRM-test activities

Thank you for

www.drm.org

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www.pfs-digitalradio.com

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