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**DIGITAL TV:
Status of DVB and IPTV
at ETSI**

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Digital broadcast standards and work plan

Joint Technical Committee (JTC) Broadcast

Who they are?

- ❑ The **Joint Technical Committee Broadcast** between European Broadcasting Union (EBU) and ETSI was established in 1990 to co-ordinate the drafting of standards for broadcasting and related fields.

- ❑ Since 1995 the JTC Broadcast became a **tripartite body** by including in the Memorandum of Understanding also **CENELEC**, which is responsible for the standardization of radio and television receivers.

- ❑ **The European Broadcasting Union (EBU)** is a professional association of broadcasting organizations whose work includes the co-ordination of its members' activities in the technical, legal, programme-making and programme-exchange domains. The Union has 74 active Members in 54 countries of Europe, North Africa and the Middle East, and 44 associate Members in 25 countries

JTC BROADCAST – What they do?

- ❑ assesses the work performed within organizations like DVB Project, WorldDAB...
- ❑ is responsible for broadcast systems (emission-reception combination) for television, radio, data and other services via satellite, cable and terrestrial transmitters.
- ❑ CENELEC is responsible for the standardization of radio and television receivers.

JTC BROADCAST Technical activities

- ❑ Digital Video Broadcasting (DVB) and Multimedia Home Platform (MHP)
- ❑ Digital Audio Broadcasting (DAB)
- ❑ Analogue TV: Programme Delivery Control (PDC), Wide-Screen Signaling (WSS), Electronic Programme Guide (EPG), Teletext, NICAM, PAL/SECAM ghosting
- ❑ Analogue RADIO: DAta Radio Channel (DARC) and VHF FM Sound Broadcasting Transmitters
- ❑ Audio/Video Coding: ETSI has published guidelines on the use of compression formats. Amongst other things, these make more viable the implementation of HDTV services over DVB by the inclusion of the high performance compression in MPEG-4.

Digital Video Broadcasting (DVB)

- ❑ **The Digital Video Broadcasting Project (DVB) is an industry-led consortium of over 260 broadcasters, manufacturers, network operators, software developers, regulatory bodies and others in over 35 countries committed to designing global standards for the global delivery of digital television and data services.**
- ❑ **Services using DVB standards are available on every continent with more than 120 million DVB receivers deployed.**

DVB-S

- ❑ **Modulation and channel coding system for satellite digital multi-programme Television (TV)/High Definition Television (HDTV) services to be used for primary and secondary distribution in Fixed Satellite Service (FSS) and Broadcast Satellite Service (BSS) bands.**
- ❑ **The System is intended to provide Direct-To-Home (DTH) services for consumer Integrated Receiver Decoder (IRD), as well as collective antenna systems (Satellite Master Antenna Television (SMATV)) and cable television head-end stations**

- ❑ **The System is suitable for use on different satellite transponder bandwidths.**
- ❑ **Compatibility with Moving Pictures Experts Group-2 (MPEG-2) coded TV services**

- ❑ **All service components are Time Division Multiplexed (TDM) on a single digital carrier.**

Digital Terrestrial Television

DVB-T DVB-H (EN 300 744 and EN 302 304)

- ❑ describes a transmission system for digital terrestrial TeleVision (TV) broadcasting. It specifies
 - the channel coding/modulation system intended for digital multi-programme LDTV/SDTV/EDTV/HDTV terrestrial services.
 - the global performance requirements and features of the System, in order to meet the service quality targets;
- ❑ DVB-H (Handheld DVB) is an optimisation of the terrestrial DVB-T standard to allow broadcasting to handheld devices. The modifications include:
 - optimisations for battery management and for the speed of movement of the receiver
 - the transmission parameters to operate the transmission system in 5 MHz channel bandwidth, even outside of the traditional broadcasting bands
 - as DVB-H aims to provide a generic way to serve handheld terminals, in various part of the world, the transmission system offer the flexibility to be used in various transmission bands and channel bandwidths.

Recent activities

- ❑ **Multimedia Home Platform (MHP)** – middleware system for interactive digital television. The MHP enables the reception and execution of interactive, Java-based applications on a TV-set.
 - ETSI is the Custodian of the MHP Test Suites.
 - MHP: Personal Video Recorder (PVR)/ Personal Data Recorder (PDR) extensions to MHP; Globally Executable MHP (GEM).
- ❑ **DVB Satellite: DVB-S2** – European Standard EN 302 307 details extensions of the satellite transmission standard DVB-S (EN 300 421) to provide improved modulation and coding schemes, improving the efficiency of the space segment and giving a basis for providing interactive services.
- ❑ **DVB Return Channel by Satellite (RCS)** – revised EN 301 790 approved August 2005. Revision of the DVB-RCS Guidelines (TR 101 790) has been recently completed.



DVB-S versus DVB-S2

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DVB-S

- Multiple streams: No
- Input bit rate: fixed
- Coding: Reed Solomon plus convolutional encoding

- Coding rates: $\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, $\frac{7}{8}$

- Symbols mapping: Gray
- Modulation format: QPSK

- Pilot symbols: None

- Symbols shaping: Square-Root Raised Cosine filter $\alpha = 0.35$

- Input I/F: MPEG TS
- Transmission mode: constant Coding and Modulation

DVB-S2

- Multiple streams: Yes
- Input bit rate: variable frame-by-frame
- Coding: BCH + Low-Density Parity Check Codes (LDPC)

- Coding rates: $\frac{1}{4}$, $\frac{1}{3}$, $\frac{2}{5}$, $\frac{1}{2}$, $\frac{3}{5}$, $\frac{2}{3}$, $\frac{3}{4}$, $\frac{4}{5}$, $\frac{5}{6}$, $\frac{8}{9}$, $\frac{9}{10}$

- Symbols mapping: BICM (Gray)
- Modulation format: QPSK, 8PSK, 16APSK, 32APSK

- Pilot symbols: Optional

- Symbols shaping: Square-Root Raised Cosine filter $\alpha = 0.2, 0.25, 0.35$

- Input I/F: MPEG-TS, IP

- Transmission modes: Constant Coding and Modulation, Variable Coding and Modulation, Adaptive Coding and Modulation

DVB-S2/DVB-S Summary

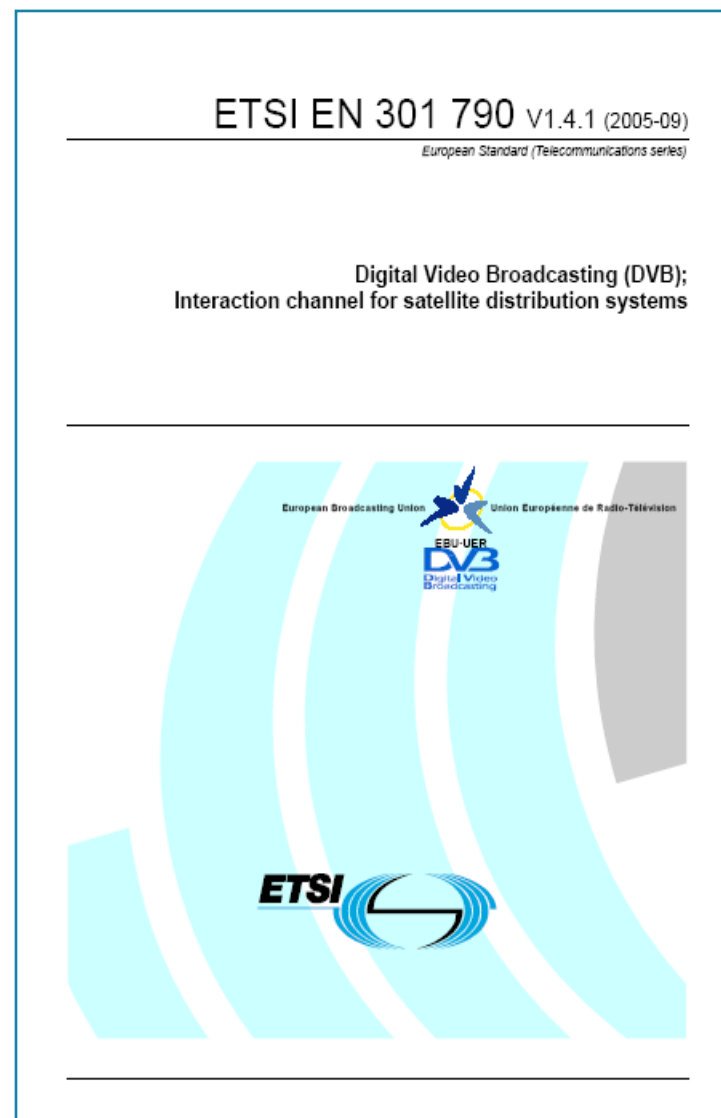
- bit-rate gain (same C/N and symbol-rate):
25-35% depending on modes and applications
- Large flexibility to potentially match any transponder characteristics:
- Spectrum efficiencies from 0.5 to 4.5 bit/s/Hz
- C/N range from -2.4 to $+16$ dB with 1 dB granularity



DVB-RCS Background

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- DVB-RCS defines a return channel over satellite for broadband systems based on DVB-S(2) forward link
 - Specification initially defined by satellite operators working under the auspices of ESA
 - Work taken over by DVB Project, which is responsible for standard maintenance
 - ETSI approves its publication as EN 301 790, according to their defined procedures
 - Definition started in Sept 1997
- Editions**
- 1st (v1.2.2) 12/00
 - 2nd (v1.3.1) 03/03: RSAT
 - 3rd (v1.4.1) 09/05: DVB-S2





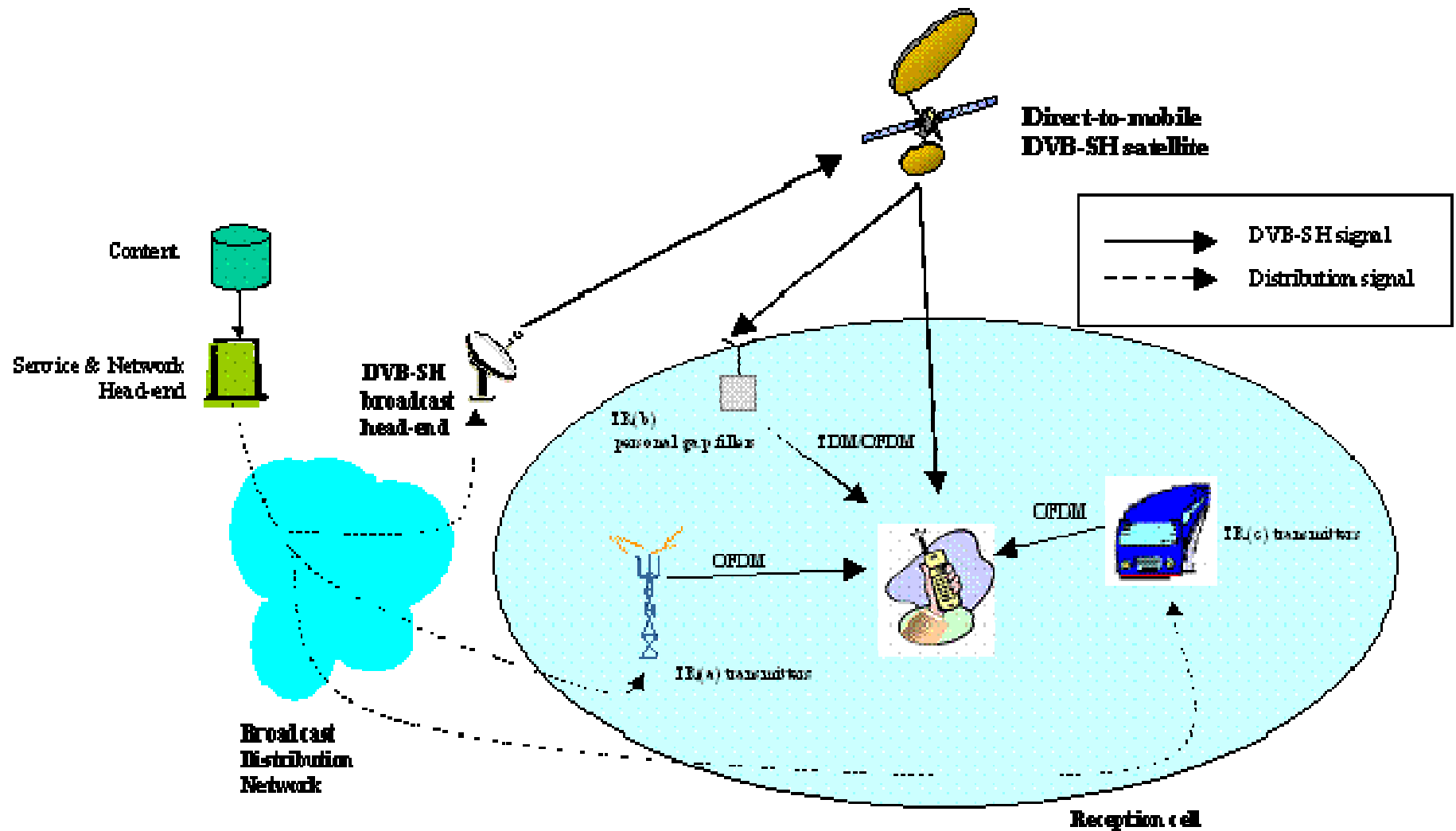
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DVB Return Channel by Satellite (RCS)

EN 301 790

Interaction channel for satellite distribution systems

- ❑ The document forms the specification for the provision of the interaction channel for GEO satellite interactive networks with fixed Return Channel Satellite Terminals (RCST).
- ❑ The document facilitates the use of RCSTs for individual or collective installation in a domestic environment. It also supports the connection of such terminals with in-house data networks.
- ❑ The revision accomplished in 2003 provides the means to extend the applicability of the standard to **regenerative satellite systems**. This revision also allows for **reduction in terminal costs** without significantly impacting the performance.
- ❑ The revision accomplished in 2005 integrates the **DVB-S2** standard for forward link transmission.



DVB-SH

- ❑ transmission system to provide an efficient way of carrying multimedia services over hybrid satellite and terrestrial (DVB-SH) networks at frequencies below 3 GHz to a variety of mobile and fixed terminals having compact antennas with very limited directivity.
- ❑ Target terminals include handheld (PDAs, mobile phones), vehicle-mounted, nomadic (laptops, palmtops...) and stationary terminals.
- ❑ The DVB-SH standard provides a universal coverage by combining a Satellite Component (SC) and a Complementary Ground Component (CGC): in a cooperative mode, the SC ensures geographical global coverage while the CGC provides cellular-type coverage.
- ❑ All types of environment (outdoor, indoor) can then be served, either using the SC from its first day of service, and/or the CCG that is to be progressively deployed building on the success of DVB-H. A typical DVB-SH system is based on a hybrid architecture combining a Satellite Component and, where necessary, a CGC consisting of terrestrial repeaters fed by a broadcast distribution network of various kinds (DVB-S2, fiber, xDSL...).

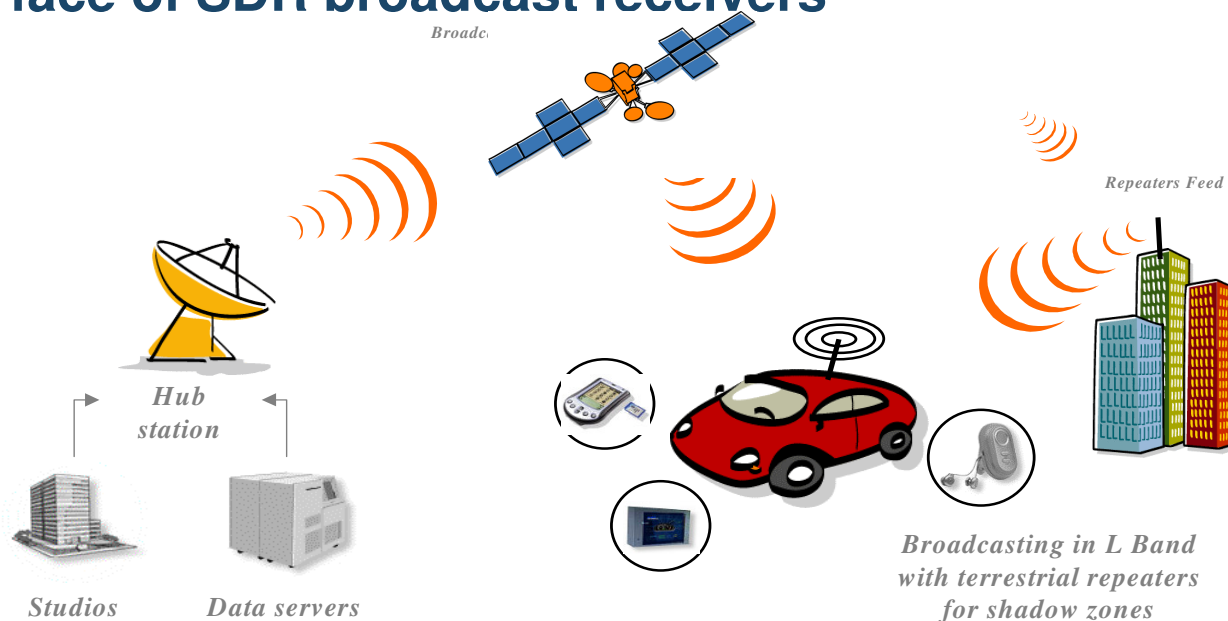
DVB Common Scrambling Algorithm

- ❑ ETSI acts as Custodian for the four Companies which have developed the Common Scrambling Algorithm.
- ❑ The Common Descrambling System will be licensed to manufacturers of Decoders and their components, and to providers, designers and other entities engaged in conditional access.
- ❑ The Scrambling Technology will be licensed to manufacturers of Scramblers, which will in turn sublicense the purchasers of Scramblers.
- ❑ DVB Common System Licence and Non-Disclosure Agreement have to be signed for receiving the confidential information.

Working Group Satellite Digital Radio SDR

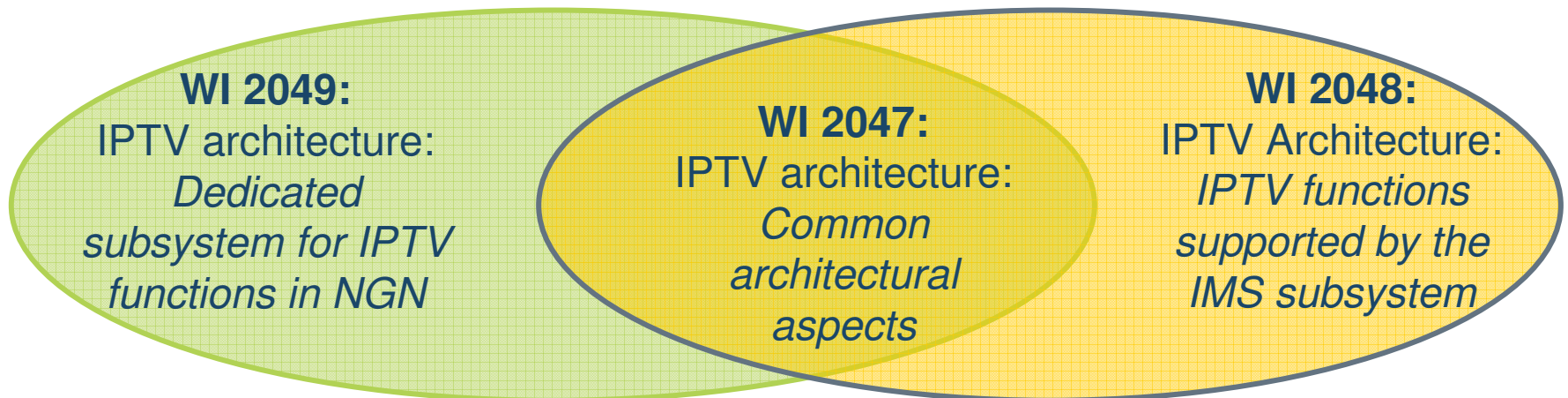
- ❑ SDR: Satellite broadcast to fixed and mobile receivers, mainly for audio, with or without terrestrial repeater network

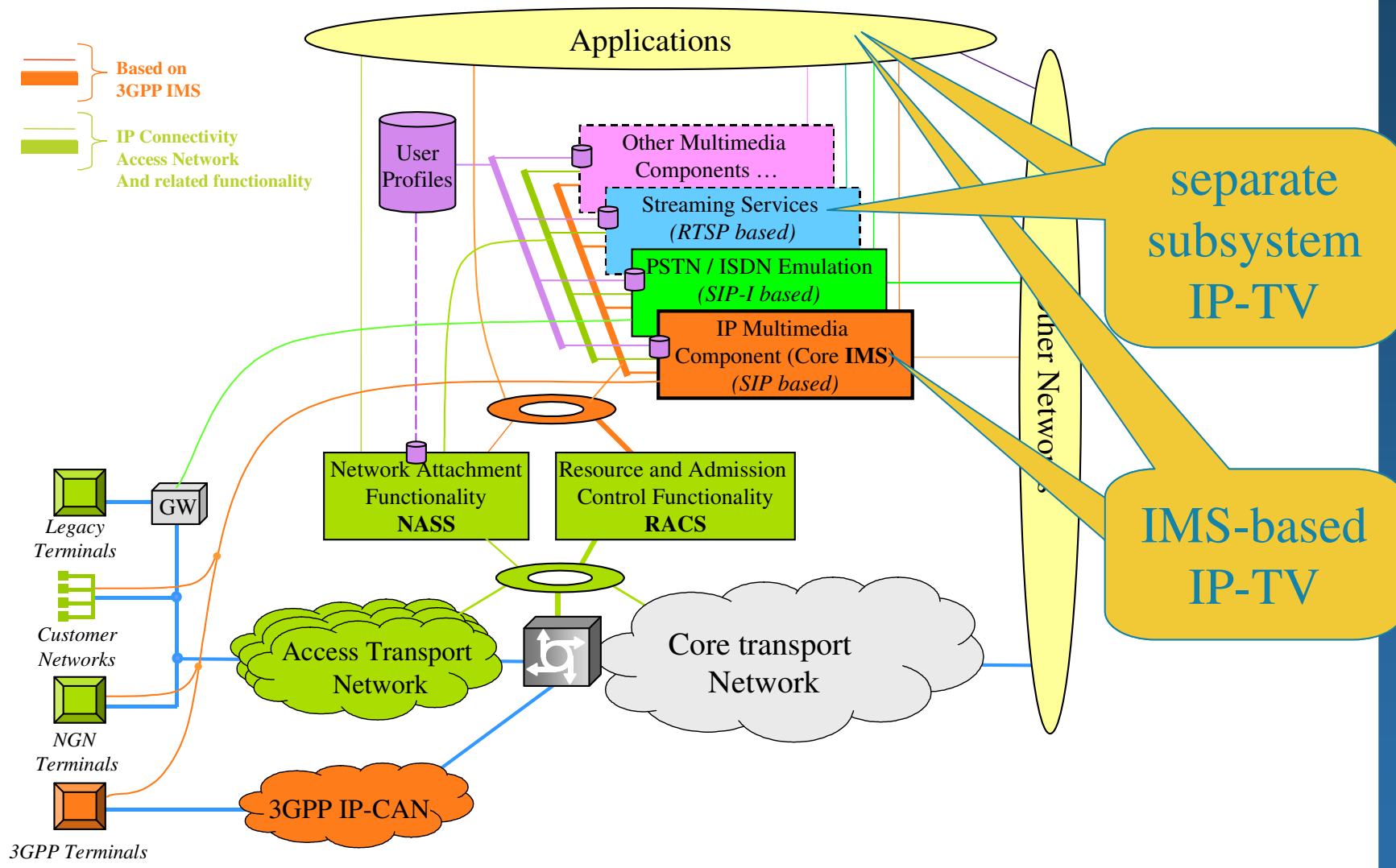
- ❑ Creation of a Technical Specification for the radio interface of SDR broadcast receivers



IPTV in TISPAN (Rel-2)

- **The status of standardization in TISPAN : 2 Options as 3 WI**
 - **IPTV subsystem : NGN architecture integrating IPTV functions such as DVB, ATIS IIF etc.**
 - Potential liaison with DVB-IP discussed in a joint meeting on Feb 2nd
 - **IMS based : IPTV system utilizing NGN IMS architecture and features**
 - SIP based service registration at IMS core level
 - **Common components for functions related to :**
 - Database, charging, attachment and resource reservation





□ Pros/Cons of the 2 options

➤ Subsystems :

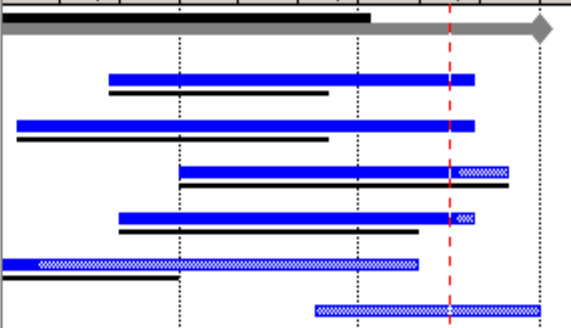
- (+) : takes legacy into account ;
- (+) : potential short term deployment
- (+) : no upgrade of terminals required.
- (-) : convergence of services less easy to implement

➤ IMS based :

- (+) : full benefit of IMS for convergence of networks and services
- (+) : secure, flexible charging and QoS enhanced
- (-) : Requires evolution of terminals ; more technical questions.
- (-) : not a simple path, will take time

IPTV in the TISPAN workplan

- IPTV is well on feature of TISPAN Rel-2 that is described in the TISPAN workplan http://portal.etsi.org/docbox/tispan/Open/Information/TISPAN_WorkPlan/

Name	Hyperlink	Resol Name: C	Qtr 3, 2006			Qtr 1, 2007			Qtr 3, 2007			Qtr		
			Jul	Sep	Nov	Jan	Mar	May	Jul	Sep	Nov	Jan		
☐ IP Television (IPTV)														
Requirements for network capabilities to support IPTV services: IPTV requirements	I-01042-NGN-R2	WG1												
Requirements to integrate NGN services and IPTV	I-01044-NGN-R2	WG1												
IPTV Architecture: Dedicated subsystem for IPTV functions: IPTV in NGN	PAN-02049-NGN	WG2												
IPTV Architecture: IPTV functions supported by the IMS subsystem: IPTV IMS-based	PAN-02048-NGN	WG2												
IPTV Architecture: Common architectural aspects	PAN-02047-Tech	WG2												
MS-based IPTV stage 3 specification	V-03127-NGN-R2	WG3												



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ETSI web site

<http://www.etsi.org>

ETSI portal

<http://portal.etsi.org/broadcast>

<http://portal.etsi.org/ses>

<http://portal.etsi.org/tispan>

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Thank you