Edition No.31 **September 2009**

DVB-SCENE

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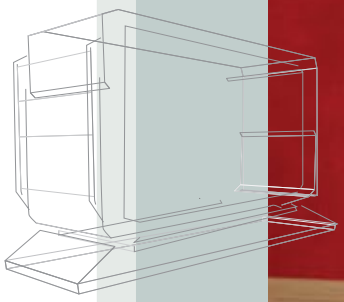

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T2 time

DVB

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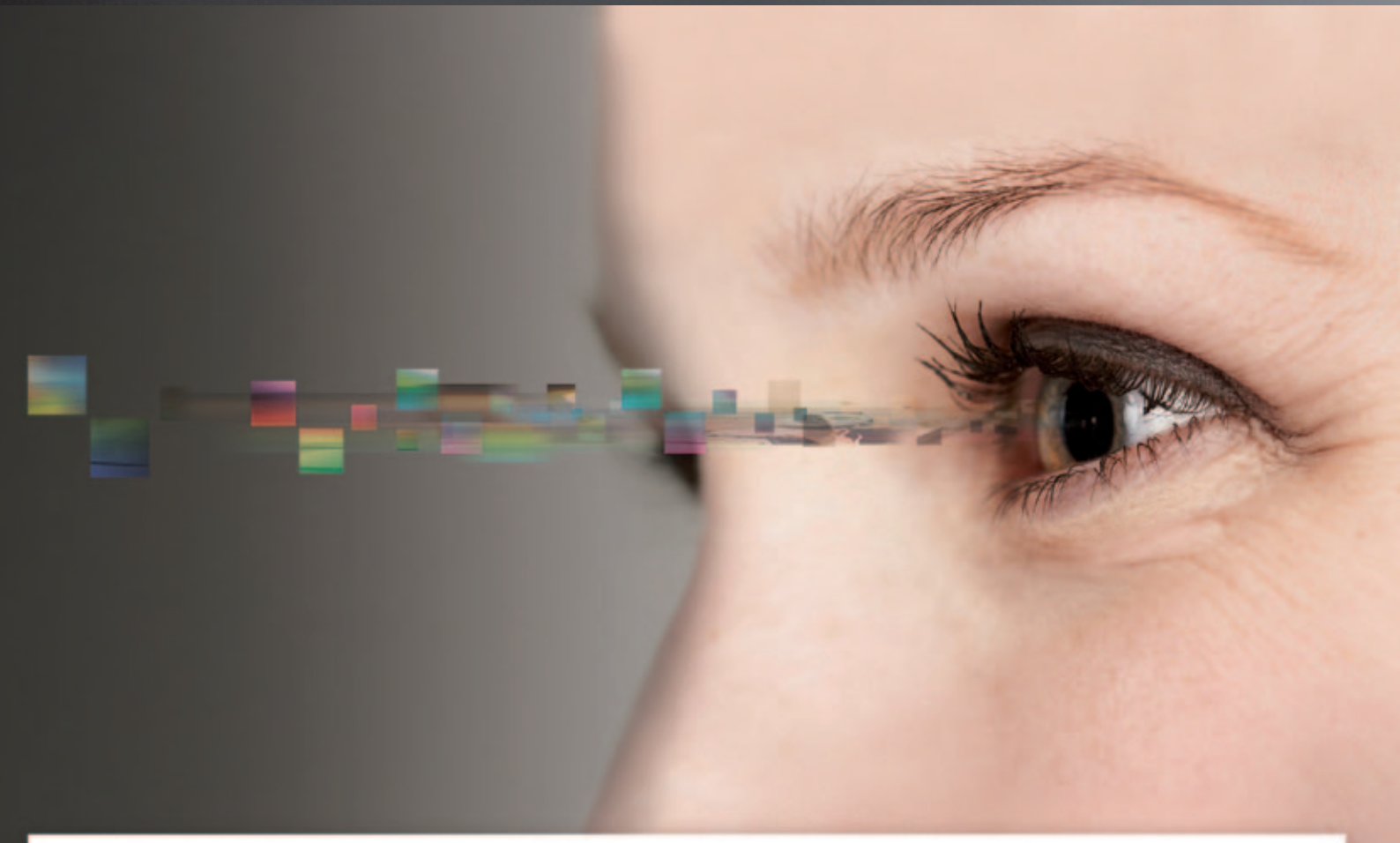
This issue's highlights

A shared vision



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FAMILY TIES

Peter Siebert, Executive Director

A word from the DVB Project Office

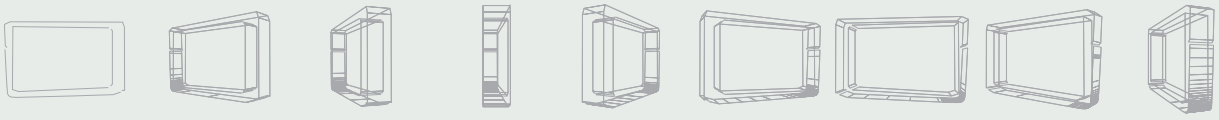
For most of you April 9th was probably just the beginning of a long Easter weekend. However, it was a special day for the DVB Project as it was the date the Steering Board approved the DVB-C2 specification. This latest specification joins the growing family of second generation DVB transmission standards and, like its siblings DVB-S2 for satellite and DVB-T2 for terrestrial, the new cable standard offers improved performance and increased flexibility for the cable operator, which is what they need to introduce HDTV and other services in their networks.
What does this mean for the first generation transmission systems DVB-S, DVB-C and DVB-T? Will they become obsolete because the second generation offers better performance? When answering this question we should not forget that there are several hundred million first generation receivers out there. A big part of the world's population relies on these standards for the reception of TV signals. It is perceived that these first generation standards will be used for many years to come. Also, we should not forget that these receivers will continue to be significantly lower priced for a long time to come. Therefore, the first generation standards are, and will be, relevant for price sensitive markets. The second generation of DVB standards are not a replacement, but complement the existing standards. Both systems will remain in use, at least until the difference in equipment costs becomes negligible.
Along with the latest addition to the standards family, the Project Office also welcomed a new arrival. Our new colleague Feyo Kolff has joined the team as Marketing Communications Executive. A Dutch national, Feyo will bring his professional experience in the marketing and branding industries. His colleagues in the Project Office are pleased to have him on board.

NEW STANDARDS

TR 102 768 Ver. 1.1.1 - Interaction channel for Satellite Distribution Systems; Guidelines for the use of EN 301 790 in mobile scenarios (20/04/2009)
TS 102 611-1 Ver. 1.2.1 - IP Datacast: Implementation Guidelines for Mobility; Part 1: IP Datacast over DVB-H (29/04/2009)
TS 102 611-2 Ver. 1.1.1 - IP Datacast: Implementation Guidelines for Mobility; Part 2: IP Datacast over DVB-SH (29/04/2009)
TS 102 471 Ver. 1.3.1 - IP Datacast over DVB-H: Electronic Service Guide (ESG) (24/04/2009)
TS 102 770 Ver. 1.1.1 - System Renewability Messages (SRM) in DVB Systems (12/05/2009)
EN 301 790 Ver. 1.5.1 - Interaction channel for satellite distribution systems (13/05/2009)
TR 102 679 Ver. 1.1.1 - Register of DVB URNs and Classification Schemes (13/05/2009)
TS 102 472 Ver. 1.3.1 - IP Datacast over DVB-H: Content Delivery Protocols (09/06/2009)
TR 102 377 Ver. 1.4.1 - DVB-H Implementation Guidelines (16/06/2009)
TS 102 771 Ver. 1.1.1- Generic Stream Encapsulation (GSE) implementation guidelines (16/06/2009)
TS 102 591 Ver. 1.2.1 - IP Datacast over DVB-H: Content Delivery Protocols (CDP) Implementation Guidelines (25/06/2009)
TR 101 211 Ver. 1.9.1 - Guidelines on implementation and usage of Service Information (SI) (26/06/2009)
TS 101 162 Ver. 1.2.1 - Allocation of Service Information (SI) and Data Broadcasting Codes for DVB systems (01/07/2009)

NEW MEMBERS

Albis Technologies AG is a worldwide technology company that develops and markets innovative electronic systems. www.albistechnologies.com
Avanti Communications is a supplier of satellite communications services for business, institutional and residential customers. www.avantiplc.com
The SatLabs Group is an international, not-for-profit association whose members are committed to bringing the deployment of the DVB-RCS standard to large-scale adoption. www.satlabs.org
T**he Bureau Telecommunicatie en Post** is the telecommunications regulatory body of the Netherlands Antilles. www.btnp.org



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COUNTDOWN TO T2

DVB-T2 Update: From Specification to Service Introduction

Nick Wells, BBC R&D & Chairman of DVB-T2 Working Group

Introduction

DVB-T2 is the latest standard for digital terrestrial television broadcasting offering around 50 percent more capacity than DVB-T and enhanced performance for single frequency network operation. Also, within a T2 multiplex, individual services can be given different levels of robustness thereby enabling services to be targeted to different classes of receiver.

T2 was developed through an intense international collaborative effort between June 2007 and April 2008 and the standard was published as a Blue Book (A122) in June 2008 along with Implementation Guidelines (A133). The ETSI standardisation documents are EN 302 755 and TR 102 831 respectively.

The UK has chosen to broadcast HD services terrestrially using DVB-T2 because of the additional capacity and ruggedness provided by T2. These new services will be launched at the end of this year. The first test transmissions of T2 started in the UK in June 2008 - on the day after the specification was published by DVB - and the first working DVB-T2 demodulator was demonstrated by the BBC in September 2008 at IBC.

Since the specification was published, work within the DVB-T2 group has continued in support of the roll-out of T2 services.

Validation & Verification Activities

T2 is a complicated specification and it is important to make sure that the text is accurate and can be interpreted unambiguously. Consequently, the DVB-T2 group has defined a model of a T2 chain with multiple test points throughout the chain. Then, based on standard input signals, implementers have generated bitstreams/waveforms for each test point and compared these against those generated by other implementers. Eventually, fully agreed streams can be considered as reference or 'golden' streams for different modes of the system.

These activities have been greatly aided by the existence of collaboratively developed software models for the T2 modulator and demodulator.

A significant milestone in the Validation & Verification activities was a 'Plug Fest' that was held in March 2009 at RAI Research Labs in Turin. At this Plug Fest, six modulator manufacturers and five demodulator/receiver manufacturers demonstrated full interoperability for a number of different modes of the T2 specification.

Modulator Interface Specification

In a single frequency network (SFN) it is essential that an identical signal is broadcast by every transmitter in the network and that the transmission timing is accurately controlled. The framing of the T2 multiplex is more complicated than that for DVB-T and therefore a new distribution interface has been defined (Blue Book A136 and ETSI standard TS102773) in which the T2 frames are constructed at a central 'T2 gateway' and these frames are then distributed (over IP or ASI) to all modulators/transmitters in the SFN.

DVB-T2 Plug Fest, RAI Research Labs, Turin

BBC R&D Engineers Martin Thorp & Justin Mitchell, DVB-T2 team in front of a UK transmitter

Transmitter Identification

It would be very helpful to a network operator if standard mechanisms were available to test the correct operation of transmissions within an SFN and to test that reception from individual transmitters is according to coverage planning predictions. The DVB-T2 group is in the process of defining standard signals that, by exploiting the flexibility of the T2 signal, will enable professional receivers to monitor and check the operation of the network.

UK Lab & Field Tests

As part of the digital switchover process, the UK will start introducing HD services (on a single T2-based multiplex) in the North West of England. In addition, HD services will be broadcast across London in order to increase the number of people that can potentially receive these services, up to15 million, from the launch of service. Full population coverage will be achieved by 2012.

In order to determine optimum transmission mode parameters and receiver performance targets, lab and field measurements have been done using prototype receivers made available by certain manufacturers. Although timing is tight, it is expected that consumer receivers will be available in time for launch.

Summary

DVB-T2 is the latest generation terrestrial transmission standard that achieves a performance that is close to what is theoretically possible. Given its flexibility and feature set, it is expected that DVB-T2 will have a long life into the future. The timetable for the development of the T2 specification and the subsequent efforts to develop broadcast equipment and consumer receivers has been driven by the timetable for digital switchover in Europe - in particular the UK which will be starting T2-based HD services at the end of this year.

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ASO IN EUROPE

Natalie Mouyal, DigiTAG

DVB-T services continue to roll-out in Europe. With the European Commission's recommended 2012 deadline for the completion of digital switchover looming, five member states (Bulgaria, Greece, Ireland, Latvia, and Poland) have announced plans to launch DTT services by the end of 2009 while a further three (Cyprus, Romania, Slovakia) will do so by 2010. Assuming that these plans are not delayed, it can be expected that by the end of 2010, all 27 European Union Member States will have launched DTT services. In Western Europe, most public service broadcasters have played a leading role in the establishment of the DTT platform. Governments have generally ensured sufficient funding and DTT multiplex capacity for public service broadcasters to roll-out new services.
The relative importance of the terrestrial television platform has also been a determining factor in the selection of the DTT business model. Countries where a majority of households rely on the terrestrial platform to access their primary television services have opted to launch many new free-to-air services on the DTT platforms, with a limited number of pay services. In smaller countries, emphasis has been placed on pay-DTT services while highly cabled countries have focused on portable and mobile reception.
In Eastern Europe, most countries have opted to offer a combination of both free-to-air and pay-DTT services. The Czech Republic has been a notable exception having launched an exclusively free-to-air DTT platform financed through advertising revenue. Telecom operators have demonstrated an interest in operating DTT platforms and, despite tenders made in numerous countries, have only successfully obtained licences in three countries (Latvia, Lithuania, Macedonia). In general, broadcast network operators, whether local or foreign, have agreed to operate DTT platforms with limited involvement of public service broadcasters.
The widespread availability of MPEG-4 AVC compression combined with the decreasing cost of receivers has permitted many countries to adopt this technology, especially in launches since 2006.
The choice of MPEG-4 AVC also allows operators to prepare for an eventual launch of HDTV services. However, the debate on which compression technology to use continues, and it is not ruled out that some countries will launch DTT platforms using MPEG-2. Because the price difference between MPEG-2 and MPEG-4 AVC receivers is not insignificant, some countries have opted to launch free-to-air services using MPEG-2 while using MPEG-4 AVC for the pay platform. This is the case in Croatia which launched its free-to-air platform in 2009, and is likely in Serbia. In Slovakia, where the national regulator recently closed its tender for licences to operate the DTT platform, the choice of the compression format will be decided by the licence holder. In a previous tender, the regulator's decision to mandate the use of MPEG-4 AVC resulted in its cancellation.
Several countries that launched DTT services before the availability of MPEG-4 AVC have begun investigating migration from MPEG-2. Such a migration, which will require viewers to purchase new receiving equipment, may be combined with the launch of HD/DTT services, and perhaps DVB-T2, as is the case in Finland and the United Kingdom. In France, where free-to-air HD services are available, the government has mandated the provision of MPEG-4 AVC decoders in all HD ready displays over 26 inches while Spain will do the same as of April 2010.
Nearly all countries in Europe plan to complete digital switchover by 2012 as per the European Commission's recommendation. Six countries have already completed the process (Finland, Germany, Luxembourg, Netherlands, Sweden, and Switzerland) while a further nine countries (Austria, Belgium, Czech Republic, Estonia, France, Italy, Norway, Spain, and the United Kingdom) have begun to switch-off region by region.
While the amount of time necessary to reach a significant DTT household penetration level has decreased in recent years, it will take significant time in those countries with limited communication budgets and large numbers of households relying on the terrestrial platform for their primary television services. Completing digital switchover by 2012 will be an ambitious target for many countries, especially those that have only recently launched DTT services.

Country	Launch Date	Compression format	Completion of ASO
United Kingdom	1998	MPEG-2	2012
Sweden	1999	MPEG-2 / MPEG-4 AVC	Completed (2007)
Spain	2000/2005	MPEG-2	2010
Finland	2001	MPEG-2	Completed (2007)
Switzerland	2001	MPEG-2	Completed (2008)
Germany	2002	MPEG-2	Completed (2008)
Belgium (Flemish)	2002	MPEG-2	Completed (2008)
The Netherlands	2003	MPEG-2	Completed (2006)
Italy	2004	MPEG-2	2012
France	2005	MPEG-2 / MPEG-4 AVC	2011
Czech Republic	2005	MPEG-2	2011
Denmark	2006	MPEG-2 / MPEG-4 AVC	2009
Estonia	2006	MPEG-4 AVC	2010
Austria	2006	MPEG-2	2010
Slovenia	2006	MPEG-4 AVC	2011
Norway	2007	MPEG-4 AVC	2009
Lithuania	2008	MPEG-4 AVC	2012
Hungary	2008	MPEG-4 AVC	2011
Portugal	2009	MPEG-4 AVC	2012
Croatia	2009	MPEG-2 / possibly MPEG-4 AVC for pay	2011
Latvia	2009	MPEG-4 AVC	2011
Poland	2009	MPEG-4 AVC	2013
Greece	2009	MPEG-4 AVC	2012
Ireland	2009	MPEG-4 AVC	2012
Slovakia	TBC	TBC	2012
Russia	TBC	MPEG-4 AVC	2015

Source: DigiTAG

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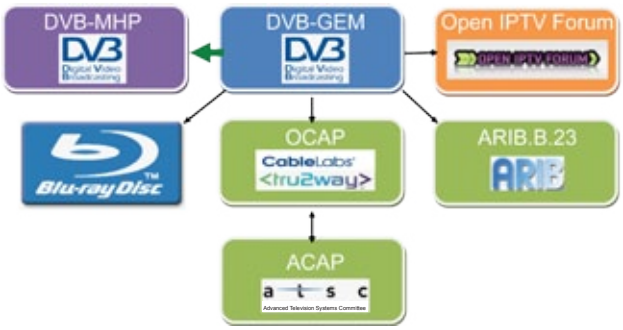


GEM Replaces MHP As DVB's Primary Middleware Standard

Michael Lagally, Sun Microsystems, Inc. & Chairman TM-MUG

A new release of DVB's specifications for interactive TV was recently approved by the DVB Project. The new versions of the GEM 1.2.2 and MHP 1.2.2 specifications revert the specification structure, and GEM is now a self-contained specification. GEM takes over the role of DVB's primary middleware specification, and MHP becomes a derived specification based on GEM.

What Is MHP?

MHP is a Java based middleware platform for broadcast receivers in digital TV systems based on the signalling and transmission standards defined by DVB. Since the publication of the first MHP 1.0 specification in 2000, several MHP versions were created - the latest version of MHP is version 1.2, which extends the scope of MHP beyond broadcast and introduces support for IPTV for the use in bidirectional broadband networks. It permits embedding Java applications into the A/V transport stream, which can execute in parallel and be synchronised with the A/V programme.

What Is GEM?

To permit the use of MHP applications in other markets, the GEM specification (Globally Executable MHP) was derived from MHP. It abstracts from DVB specific signalling and network protocols and defines a common middleware core of APIs for digital TV receivers. This allows writing iTV or Web-2.0 style applications that don't need to know anything specific about the network it is carried on. GEM enables the creation of interoperable TV applications, which can run on various digital TV devices like terrestrial, satellite and cable set-top boxes, IPTV terminals and gateways, and Blu-ray players.

The fact that GEM is essentially network independent makes it particularly useful in IPTV and hybrid broadcast/broadband environments.

GEM Adoption

GEM has already been adopted for the creation of TV receiver specifications for other markets, such as the tru2way specification defined by CableLabs, which is used in North American cable deployments. It is also used as the common middleware for other Java-based TV receiver specifications such as ATSC's ACAP A/101, the Japanese ARIB B23 specification and the Procedural Application Environment in the Open IPTV forum. GEM was also successfully adopted as the Java-based middleware for Blu-ray and is deployed in every Blu-ray player.

GEM Targets

A GEM target is a category of a GEM terminal, determined by the mechanism used to transport applications from the content producer to the viewer.

GEM defines three targets: Broadcast, Packaged Media and IPTV, which are all used in derived specifications.

- The Broadcast target, which is adopted by GEM terminal specifications in a broadcast environment, such as MHP, ATSC and ARIB.
- The Packaged media target where the media is packaged on a physical medium, which is possibly read-only, such as an optical disc like Blu-ray.
- The IPTV target, where media is transmitted over a bidirectional broadband connection, such as in the Open IPTV Forum.

GEM Powered: GUI Designed & Implemented for Korea Telecom by Alticast

The first two of these, Broadcast and Packaged Media, are further subdivided into two profiles: The Enhanced Profile which does not require a return channel to the broadcaster, and the Interactive Profile which provides an IP based interaction channel.

Why Refactoring?

The original GEM specification had been derived from the MHP specification and thus contained many references, selections, clarifications and bug fixes to MHP.

The DVB Project acknowledged the importance of GEM due to the adoption in Blu-ray, tru2way and other Java based TV standards and decided to make GEM the primary middleware specification.

This simplified the formerly complex specification structure. Formerly GEM had to be read in conjunction with MHP, even though MHP specific signalling and DVB transport mechanisms were not used. Bug fixing often required modifying both specifications.

What Has Been Done?

In a major editing task the specification structure was reversed, i.e. all references from MHP to GEM were resolved and the corresponding sections of the MHP specification were included into GEM. During this process cross references were updated. Some specification bugs were identified and could be resolved among GEM and MHP specification experts.

The Refactoring Process

The GEM specification, which at the beginning of the refactoring consisted of 143 pages, now contains 1059 pages. MHP, which was 1367 pages long, now consists of 492 pages.

More than 700 cross references have been resolved and the MHP source document has been converted from FrameMaker to Word to enable publication through ETSI. Additionally, two sets of API documentation packages in JavaDoc format have been updated to correspond to the split of the specification structure.

The Future Of GEM & MHP

GEM is now a self-contained specification, which can be used for the creation of new specifications for digital TV systems. We expect that new versions of tru2way, ARIB and others will adopt the latest version of GEM. The new GEM and MHP BlueBooks are published on the DVB and MHP websites.

HOME ALONE?

Hybrid Broadcast/Broadband & Family Life

Franc Kozamernik, Senior Engineer, EBU

In his concluding speech at DVB World 2009, Phil Laven offered a few of his reflections on some issues related to so-called Hybrid Broadcast/Broadband (HBB) television. He expressed the following worry1: “Can Hybrid Broadcast/Broadband work when there is more than one person viewing the TV? Or will screens that combine pictures with multimedia overlay just irritate when there are many viewers of the same set?” David Wood, in his DVB World blog, asked: “Will Hybrid broadcast/broadband break up families?”

These questions are not surprising. In over 50 years of its existence television has made significant progress both in terms of its technical quality and service choice (or selection). However, the most dramatic changes are yet to come as a result of the Internet which will radically change television viewing habits (when, where, and how television is viewed). But the greatest change will be the possibility for viewers to personalise their TV services according to their perceived or chosen preferences.

The Internet brings new opportunities. But it brings new worries too.

HBB is a spin-off of the overall trend of embracing the Internet and web technologies. It is nothing really new, though; it is simply a combination of conventional, well proven broadcast and more recent broadband technologies funnelled towards a common, integrated television display. HBB takes the best of two, so far disparate, worlds. It builds on the ubiquitous broadcast infrastructure and combines it with ever emerging broadband connections that are already widely available in Europe and elsewhere. No new networks are required. To some, HBB is seen as a full-fledged, new generation television replacing MHP. To others, HBB is simply an Internet-enabled TV service (like YouTube or Hulu) viewable on a typical large home TV display.

To many broadcasters, HBB represents an interesting media delivery opportunity arising from the synergy of both broadcast (i.e. terrestrial, cable, satellite, managed IPTV) and broadband environments. In order to achieve a sustainable market success, we need a range of compelling content, sustainable business models and the openly standardised, affordable, and future proof HBB-embedded CE devices.

A follow up to the Internet TV vendor-specific solutions such as Philips NetTV, Panasonic Vieracast and Samsung Internet@TV has been an international, industry-led HBB TV standardisation effort pioneered by Philips, IRT, APS, ANT, Open TV and French HD Forum. Currently, Version 0.7 of the prospective standard has been agreed. EBU expectations from HBB technology and HBB TV in particular are high: HBB should allow for rapid enhancements of digital TV services by bringing more user-friendly and interactive content. With HBB, viewers should be able to access linear and nonlinear (on-demand) services, enhanced teletext, as well as broadcast-independent applications, all rendered on a broadband-connected TV display. Ideally HBB would use existing media and delivery technologies taken from the Open IPTV Forum and other appropriate bodies like DVB, W3C and IETF. When introduced in a specific market, it should not disenfranchise existing TV receivers using MHP, MHEG-5 or other middleware. Rather, the HBB platform should be open to any content provider and should not be based on a single controlling authority or aggregator. The HBB terminal should be capable of rendering all applications and should be upgradeable. Finally, the HBB system should allow for country/market specific solutions. An essential non-technical requirement of broadcasters is the possibility for viewers to access broadcast catch-up TV services portals (such as BBC iPlayer or ARD/ZDF Mediathek) with a simple push of a button on a remote control. As with other interactive TV systems, IPR presents a particular challenge in the HBB domain, but the EBU remains.

“...the HBB platform should be open to any content provider and should not be based on a single controlling authority or aggregator.”

It is expected that a HBB capable TV set or STB will be much more powerful than a standalone Internet TV, as it is available today. Using the high quality, reliable broadcast networks, millions and millions of concurrent users could enjoy any live football match or a pop music concert and, at the same time, request a large variety of additional personalised multimedia content for display on the same screen. It is well known that the Internet alone is currently unable to accommodate hundreds of millions of simultaneous streams. For this reason, broadcast networks continue to play an essential role in the delivery of media to homes.

What, then, about the families – will HBB ‘destroy’ them? Will HBB entice family members to quarrel about which applications to be displayed on the screen in the living room? Possibly; but the guilt should not be assigned to HBB but to the family members themselves.

[1]David Wood’s DVB World blog: http://dvbworld.wordpress.com/2009/03/11/some-take-aways-will-hybrid-broadbandbroadband-break-up-familes-will-brussels-ever-listen/

MEASURING UP

Jürgen Lauterjung, Rohde & Schwarz Broadcasting Division & Chairman DVB Measurement Group

In May 1997 the first version of the DVB Measurement Guidelines (MG) was published by ETSI as ETR 290. At the time this was the result of drafting work that had been ongoing for a couple of years. The aim had been to provide the DVB community with a document that could help to make test and measurement results comparable by providing unambiguous definitions for these tests. Amendments and clarifications went into an updated version published in May 2001 as TR 101 290.

The guidelines addressed – where this was possible – checks on the input/output signals of each building block of the DVB baseline systems (satellite, cable, terrestrial), including the input signal for all baseline systems, i.e. the MPEG-2 Transport Stream, and the RF output signals. They aimed, for example, at a health check for Transport Stream parameters - and not a set of compliance tests. They also allowed the identification of certain modulator and transmitter issues and they provided proper definitions for the measurement of parameters at the physical layer of the different DVB baseline systems.

A fortunate combination of interests from different camps or constituencies, as they are called in DVB, helped to promote the work. Content providers needed well-defined quality parameters for the interface at which they could hand over their programmes to the network operators. The latter were interested in a description of the quality of the incoming signal and in the quality of service aspects of their own output signal. The receiver manufacturers demanded a clear specification based on a mutual understanding of what was necessary to measure, what was nice to have and what was not; and the test and measurement equipment vendors had a significant interest in a horizontal market so that their instruments could be utilised at many points of the DVB delivery chain.

Now when we look back over the last twelve years, the overriding impression is that the Measurement Guidelines have provided a solid foundation for the work areas they were targeting. The document could not only be kept stable but became well established as a reference for all sorts of measurement related questions. There has hardly been a tender published for monitoring or other test equipment for protocol checks in DVB that does not refer to the Transport Stream analysis and the three priority levels of parameters in TR 101 290. Admittedly some parameters turned out to be less useful than others but, in general, congruence with the MG definitions is a strong requirement. The same applies in many cases with respect to the definitions for PCR (Program Clock Reference) measurements and the definitions for data rate measuring and averaging.

In the field of transmission systems and modems, one of the most frequently used parameters became the Modulation Error Ratio (MER), which is very well suited to characterise the quality of the output signal of a transmission system or a modulator since it can be interpreted as an extended version of SNR that also includes systematic errors stemming from modulator-specific impairments such as amplitude imbalance, phase jitter and quadrature error.

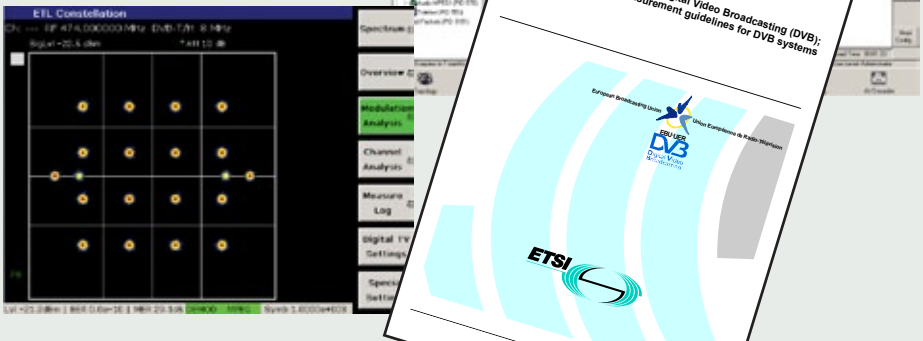
At the receiver site the MER value describes the signal quality including those systematic impairments caused by the transmission system that cannot be attributed to the propagation path of the RF link. Nowadays users are familiar with MER measurement values and understand what is behind a figure of 37 dB or 43 dB. The same applies to the typical measurement values of bit error rate before and after the different stages of the Forward Error Correction schemes.

For the set-up of terrestrial SFNs, the MIP (Modulator Information Packet) syntax and consistency checks turned out very helpful for adjusting the site-specific parameters. In addition, with the computational power of modern test instruments, even small drifts in frequency or delay of a single transmitter in a SFN can be identified.

After the standardisation of DVB-H and DVB-SH, the second generation of DVB baseline systems (DVB-S2, DVB-T2, DVB-C2), one after the other, are currently being introduced in different markets and it might be the time to revive the Measurement Group to review its recommendations. Items for review could include new parameter definitions that are requested for the second generation systems and other issues that have been lingering in the background. There is also the question of how to deal with components in the Transport Stream that – deliberately or unintentionally – are not signalled in the PSI/SI tables, or the proper monitoring of TS components with varying but potentially very low bitrate such as subtitles.

A first step has been made to start the discussion on the MG reflector, and from September 2009 onwards it should become clear which work items can be addressed. And hopefully, there will be another edition of the guidelines document that can again provide for all these applications consistent and comparable measurement results from different test instruments that follow the recommendations of an updated TR 101 290.

> **“ ...the overriding impression is that the Measurement Guidelines have provided a solid foundation for the work areas they were targeting.”**



In My Opinion – Dr. Klaus Illgner

BROADBAND & THE DIGITAL DIVIDEND

This intensively debated topic is another example of where a purely technical evolution triggered the change of an entire environment with a far reaching impact on political positions, society, strategies, business models, and economical opportunities. The DVB-T specification enables the transmission of television signals over digital terrestrial networks more efficiently than over analogue networks. How much spectrum is effectively being freed up is left to individual interpretation as there are no neutral criteria. The whole context and ecosystem needs to be taken into account to draw conclusions. ITU WRC-07 finally agreed on a definition, that the upper UHF spectrum ranging from 790-862MHz is co-allocated for IMT and mobile services. The national allocation is left to the national regulator.

No doubt, as spectrum is a scarce resource, it has to be used as efficiently as possible. The demand for spectrum is reflected in the intense race for it, once a real perspective of spectrum availability appeared on the horizon. The tricky part of the discussion has been the trade-off between cultural values (broadcasting), society (broadband access in rural areas), and economic values reflected in business interests (deep indoor coverage for mobile networks), with all of them being reasonable and important. Unfortunately, the discussions at all levels revealed that the arguments were simplified and sometimes even ignored technical grounds to optimise the political message.

To which extent can the digital dividend solve the problem of broadband services in rural areas? Since UHF frequencies show a good propagation and a low attenuation, a single transmitter can cover large areas and at the same time achieve good indoor coverage, leading to low infrastructure costs. So UHF frequencies are a natural choice to supply sparsely populated areas with broadband services. Broadband services split the gross capacity of a cell among the simultaneously active users in that cell. From spectral efficiency and minimum bandwidth of at least 1Mbps/user (DL) one can easily calculate the maximum number of simultaneous users within a cell. Taking the good propagation characteristics into account the population density must be pretty small not to exceed the capacity limit of a cell. With a growing density the cell size shrinks and the benefit of UHF frequencies tends to zero. It even gets harmful due to interference issues and in densely populated urban areas higher frequencies appear to be advantageous. One could conclude that it would be sufficient to assign UHF frequencies only to dedicated rural regions. However, operating a dedicated network only in rural, sparsely populated areas can hardly cover the investments and operational costs. Note that Internet access costs in average about 10-20 Euros a month (flat rate). Therefore, the option of deep indoor coverage with UHF frequencies particularly in urban areas opens up the business opportunities needed to cover the costs for the coverage of rural areas. The financial power needed to implement a nationwide network favours big MNOs.

Now, that the spectrum is assigned for mobile Internet services targeting primarily rural areas, the discussions focus on technical implications. What interference thresholds between technologies operating in neighbouring bands are required to protect broadcast services? Also, new guidelines are needed for broadcast consumer devices to shield them from potentially harmful wireless emissions. Finally, a still unanswered question is - in which band and by which technology will wireless media production equipment (e.g. wireless micros) operate in future?

Technical innovation will continue and will always have an impact on the whole ecosystem. Therefore, it is vital to think of scenarios of how a technology might get implemented in the marketplace. Developing new technical systems requires more analysis of the effects on existing technology and the system design should minimise interference. Also, it should not be forgotten that the implementation of a technology demands support from a broader market and requires win-win partnerships between market participants.

The strength of DVB has always been that the standards are based on real market (commercial) requirements. Moreover, as the DVB membership, with over 270 members, reflects a significant portion of the entire value chain, the acceptance of specifications by consensus indicates a strong common market understanding. Therefore, DVB could utilise its position and even strengthen it by looking at the implications that the introduction of a technology imposes on other existing / deployed technologies. DVB could even go further to foster common understanding between market participants early on. For this to be successful, DVB, ideally, should strengthen its relationship with the mobile community.

"...new guidelines are needed for broadcast consumer devices to shield them from potentially harmful wireless emissions."

Dr. Klaus Illgner received his diploma degree in electrical engineering with an emphasis on communications engineering at Aachen University of Technology, Germany, in 1991, followed by a PhD on scalable video coding in 1998. In July 2000 Dr. Illgner joined Siemens AG, Corporate Technology, in Munich, where he was responsible for a team developing new technologies in the field of multimedia communications in heterogeneous networks. In November 2004 he was appointed managing director of the Institut für Rundfunktechink (IRT), Munich. As the research institute of the public broadcasters in Germany, Austria and Switzerland, IRT supports the European broadcast community on broadcast and digital media technology through the entire chain from acquisition to playback. IRT is internationally respected as a research and technology company positioned as a moderator between broadcast and industry.

WARNING! WARNING!

Television Can Save Lives - An Emergency Warning System (EWS) Using DVB-T

Alexander Adolf, Chairman, DVB TM-GBS

Despite the continuous increase in the quality of meteorological and geographical models, the lead time for natural disasters is still in the range of hours, if not minutes. To minimise the loss of lives, it is therefore of paramount importance that a broadcast system gets warning messages across in a fast, reliable and affordable way:

- Information gathering, processing and delivery infrastructure: due to DVB-T's worldwide adoption, a wide variety of competitively priced devices is available across the whole end-to-end chain.
- Signal delivery mechanism: DVB-T has excellent capabilities to deliver the alert signal to receivers through its robust and flexible modulation scheme and the use of DVB-SI which is inherent within the DVB-T standard framework.
- Consumer receiver alert support: in the case of DVB-T receivers, the capability already exists to automatically and dynamically respond to directions being provided through DVB-SI signalling.

These requirements were foreseen by DVB members long ago and are thus an inherent part of the DVB system. DVB-T has the capabilities built into the standard through its robust and flexible modulation scheme (ETSI EN 300 744) and the use of the Service Information specification DVB-SI (ETSI EN 300 468).

The DVB Solution

RF & Modulation Aspects

Every DVB-T demodulator is automatically configurable by the modulator. The modulation parameters and the FEC are conveyed in the TPS (Transmission Parameter Signalling) bits in the modulation frame. This enables an automatic switch during the delivery of emergency warnings to a more robust transmission scheme. Assuming that the normal transmission modulation parameters were set to 64 QAM and FEC 2/3, when disaster strikes the system would automatically switch to QPSK and FEC 1/2 by simply changing the modulator configuration. The QPSK mode is the most robust mode requiring very low C/N flux density. This will insure that all receivers in the coverage footprint will automatically switch to ensure they are capable of receiving the disaster information.

When transmission towers are destroyed, this also permits enlarging the normal coverage footprint of a tower. By first switching to full power and the modulation parameters last used by the destroyed towers, and then switching to the robust modulation parameters, the tower can 'catch' as many receivers in its vicinity as is physically possible. This might colloquially be compared to a 'run-flat' system built into DVB-T.

Announcement Services & Triggering

DVB supports audible announcements of several types which are indicated by the announcement support descriptor. This descriptor is carried in the Service Description Table (SDT) and points to one or more services (on the same or different multiplexes) which each carry one or more types of announcements. DVB-SI also provides for dynamic and automatic switching of the receiver to the announcement from any service during any event (advertisement or programme segment). This is realised by an announcement flag carried in the Adaptation Field of the Transport Stream packets carrying the announcement audio (**see Fig. 1**).

If the announcement service is in a different multiplex, a proxy service in the current multiplex duplicates the announcement switching flag. Therefore it is, at all times, sufficient to monitor just one additional audio PID in order to stay on top of any announcements being broadcast.

EWS Implementation Aspects

Warning messages should ideally contain both visual and audio indications. The viewer might not be looking at the screen (blind person or radio listener), or the sound might be muted or the speakers not connected (deaf person or shop display). The DVB system provides for an EWS implementation with the minimal use of audio messages. To cater for the above possible audience restrictions, it is at the discretion of the local authorities and broadcasters to arrange for a scheme where the audio message is accompanied by a visual message inserted into the video stream during the announcement.

As the receiver knows which service the announcement audio belongs to, authorities and broadcasters have all the freedom to use any or all other components of the current or the announcement service to enrich their EWS message and make it clearer and intelligible to as large an audience as possible. That way, the DVB system helps to save as many lives as possible at minimal effort and cost.

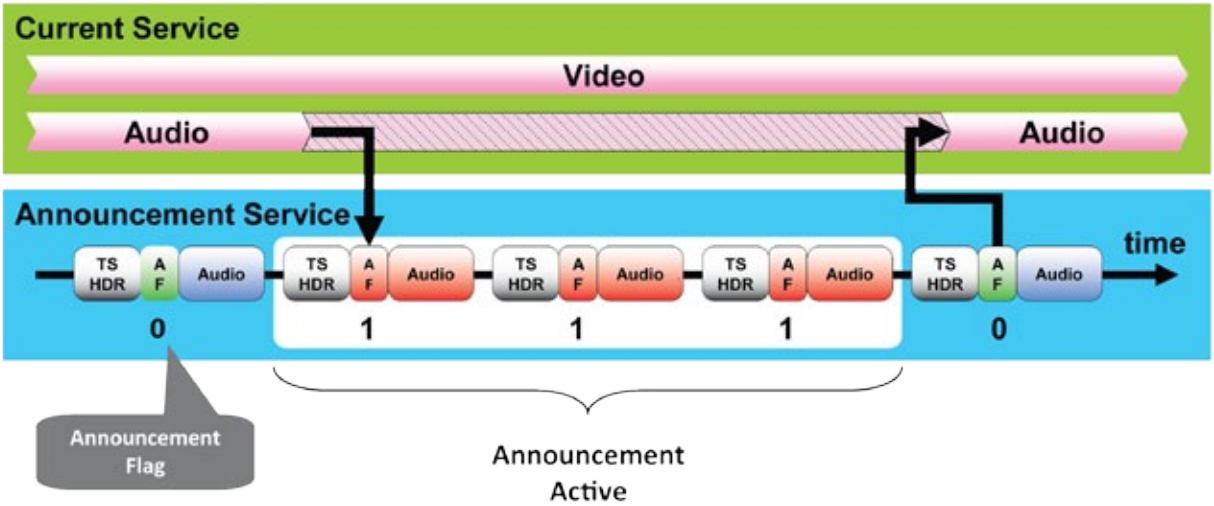


Fig. 1: Dynamic and automatic announcement switching

Moore Analysis

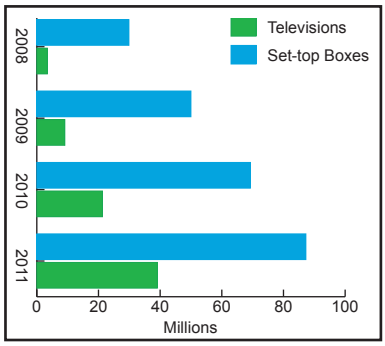
PLAYING IT OLD SCHOOL

Many industry observers believe that MPEG-4 AVC technology is cannibalising the well entrenched MPEG-2 video compression standard. But a recent market study conducted by DTC shows that it's not being replaced by its newer MPEG-4 AVC cousin.

This is especially true in the traditional broadcast categories, such as set-top boxes for terrestrial, cable, satellite, and IPTV services. Despite the gradual adoption of MPEG-4 AVC encoded programming for many of these broadcast services, more than 10 years worth of stored MPEG-2 programming is enabling a strong hybrid set-top box market where many anticipated there would be a large MPEG-4 only STB and TV market. Instead, millions of hybrid devices are shipping while there's currently no measurable market for single MPEG-4 AVC video codec receivers.

Many industry watchers make the assumption that concrete gains in technical efficiency equate to an automatic cannibalisation of its clunky predecessor. But other business factors are typically the ones that guide decisions of how the technology is used. In this case, existing infrastructure, archived programming, new found improvements in the 'old' technology, and manufacturing realities are creating a large market of hybrid codec devices that will keep MPEG-2 in the digital video broadcast soup for years to come.

Most digital TV deployments that are adopting the MPEG-4 AVC standard are still transmitting MPEG-2 encoded programmes, in part, because they only want to pay for incremental infrastructure changes while continuing to deliver programming to a large installed base of MPEG-2 compatible STBs. In addition, the makers of media processors for STBs haven't received



Hybrid MPEG-2 & MPEG-4 AVC Device Shipments

enough orders for MPEG-4 AVC only chip sets to justify the cost of creating a separate design and manufacturing process for an MPEG-4 only chip.

Hybrid codec boxes are actually being installed for the handful of services that only transmit MPEG-4 AVC programming. And the big broadcast encoder suppliers like Harmonic and Tandberg TV are still investing R&D money to realise improvements in the MPEG-2 standard. In this economic environment, the argument that service providers can squeeze just a little bit more out of their existing infrastructure is a compelling one.

What does this mean for DTV broadcasters? For those who are rolling out new services – whether they will travel over satellite, cable, terrestrial, or IP networks – deliberations of how to future proof the new infrastructures must be made with a clear eye to the past and the future.

Myra Moore is chief analyst for Digital Tech Consulting (DTC), a market research firm that tracks and analyses the consumer digital video marketplace. More information on the company and its latest research on the TV receivers, STBs, and other digital video activity is available at www.dtcreports.com.

MARKET WATCH

The R&S SCx8000 from **Rohde & Schwarz** is a compact and efficient TV transmitter for the low- to medium-power market segment. Although specifically developed for digital TV standards, it also performs flawlessly for analogue TV. In addition to new innovative redundancy concepts for this power class, its large-scale integration design reduces infrastructure, leasing, and installation costs, and its high efficiency saves energy. www.rohde-schwarz.com

R&S SCx8000 TV transmitter

Harmonic's Ellipse 2000 is designed to maximise broadcasters' investment in encoding technology and utilise the latest compression standards for future proof operations. It facilitates mobile operations for live news or event coverage by providing state-of-the-art encoding technology to DSNG vehicles. It has an advanced DVB-S2 modulator for satellite transmissions and cascading and multiplexing capabilities, and delivers bandwidth savings of up to 30 percent. It's claimed to be a powerful solution for reducing capital & operating expenses. www.harmonicinc.com

Harmonic Ellipse 2000 Encoder

ROVER Broadcast presents a monitoring system for DVB-S2 Multistream & DVB-T RF measurements for deployment at TV broadcasting sites. It allows local monitoring of the RF, Video/Audio and Transport Stream signals, as well as remote monitoring and control via SNMP and GUI web management. The system allows simultaneous measurement of up to 2 ASI transport stream signals and offers the possibility to trace errors via a data logger integrated in the GUI. www.roverbroadcast.com

TechniSat's DIGIT HD8-SX & DIGIT HD8-CX digital HD set-top boxes are equipped with HDMI, Ethernet and USB 2.0 interface, 2 CONAX card readers, 2 CI-slots and numerous other features. They have a user friendly OSD menu that is supported by an auto install function that is available in 14 languages. www.technisat.com

TechniSat DIGIT HD8-SX HD STB

Verimatrix has introduced Push VOD as an option within the Video Content Authority System (VCAS) for DVB. Push VOD enables pay-TV operators of 'one-way' DVB-S & DVB-T networks to improve service offerings and ARPU by downloading pre-encrypted movies, etc, to subscribers' digital video recorders for end-users to enjoy all the benefits of video on demand. VCAS operators can implement a variety of pay-TV business models, further enabled by secure self-provisioning via mobile phone & web, and prepaid vouchers. www.verimatrix.com

Comtech EF Data's CDM-740 Satellite Modem with high performance architecture, features an integrated DVB-S/S2 receiver and a Turbo Product Coding (TPC) Single Carrier per Channel Modulator. The combination of a shared, high speed outbound DVB-S/S2 carrier and TPC for the low latency data return channel facilitates efficient IP networking and transport over satellite. Packaged in a carrier-grade 1RU platform, it saves rack space and simplifies remote management compared to two box solutions. www.comtechefdata.com

Comtech EF Data's CDM-740 Modem

DekTec introduces T2Xpert, a software-only DVB-T2 receiver that runs on a Core i7 PC with the company's DTA-2135 receiver card. Both S-PLP and M-PLP demodulation are supported with any combination of DVB-T2 parameters. A GUI shows the DVB-T2 parameters and quality metrics. The demodulated Transport Stream is available as a TSoIP stream. www.dektec.com

DekTec T2Xpert DVB-T2 Receiver

Spectracom offers a GPS Clock to synchronise digital broadcast signals to improve quality of service and support efficient spectrum utilisation. The EC20S is the latest of the Epsilon Clock family of turnkey synchronisation solutions. New features include an increased number of synchronisation signals (7 each for timing and frequency, expandable to 10 each), improved network management tools for ease-of-use, including SFN compliance monitoring, and a signal squelching function for reliability. www.spectracomcorp.com

Spectracom Epsilon Clock EC20S

The cost effective **DiBcom** DIB29090D integrated circuit is aimed at the reception of mobile TV & digital radio in Europe. The circuit embeds a double multiband (VHF, UHF, L-band) tuner/demodulator chain compliant with DVB-T/H standards for mobile TV and T-DMB, DAB and DAB+ standards for digital radio. It can be configured in PVR or Diversity mode to improve the reception of mobile TV. www.dibcom.fr

TeamCast Full End-To-End DVB-T2 SFN Transmission Solution

TeamCast is introducing a full end-to-end DVB-T2 SFN transmission solution, including a T2 Gateway and the Power4-T2, a DVB-T2 high end modulator supporting the T2-MI input interface. The solution has been especially designed in partnership with a key manufacturer of DTV solutions for the head-end, to provide a fully interoperable solution for early DVB-T2 adopters who want to deploy SFNs. www.teamcast.com

Tektronix MTS415 MPEG/DVB Analyzer

The **Tektronix** MTS415 MPEG/DVB Analyzer combines the interface of its MTS430 with a comprehensive set of tools to verify, debug and check compliance of transport and elementary streams. It offers real time and deferred TS-, Buffer- & PES-analysis, Elementary Stream compliance checking, an MPEG player and a selection of TCLIPS test streams. RF and IP interfaces are available to monitor DVB-T/S and IP via a dedicated Ethernet interface. www.tek.com

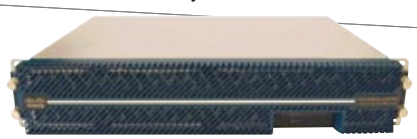
Imagination's latest advanced video decoder is targeted at a wide range of applications including mobile devices, HDTV, IDTV, STB, Blu-ray and media players. The POWERVR VXD390 is a low power, high performance, multi-standard, multi-stream, HD, hardware video decoder IP core. It supports all international broadcast standards and is capable of full HD H.264 L4.2 (1080P60) decoding and can decode multiple streams simultaneously. www.imgtec.com

MARKET WATCH

Latens ECO Cable Gateway

The **Latens** ECO Cable Gateway is a single platform with secure software based dynamically-upgradeable CA and middleware that allows new services such as Extended TV, VOD, YouTube, Flickr, Twitter and other Internet sites to be carried on existing DVB-C cablenets across an IP-based whole home network, complete with web-enabled DVR remote control. Conventional services are not affected, allowing simple digital transition on a home-by-home basis as each one is deployed. www.latens.com

Cisco has added transcoding functionality to its DCM Video Processing Platform. Two rack units space and 250W power is sufficient to convert up to 48 MPEG-2 SD channels into AVC/H.264. Audio channels can be transcoded to HE-AAC. MPEG processing features like remultiplexing, scrambling, transrating and digital program insertion are also supported. With this new transcoding feature, operators can add extra channels easily and cost effectively. www.cisco.com



Cisco DCM Video / Audio Transcoder

Vestel & SIDSA's T8000/T8010 is a DVB-T MPEG-4 SD/HD product based on NEC EMMA3SL with a built-in K1 security chip for CAS. The product supports AAC, AC-3, Dolby Digital+ audio codecs and SD/HD H.264 video codec, USB2.0 advanced features (software update, PVR and JPEG), low power standby and HDMI output. The K1 security chip is an open platform providing a secure environment for CAS implementations and enabling anti-card sharing and multicrypt solutions. www.vestel.com, www.sidsa.es

Vestel / SIDSA T8000/T8010

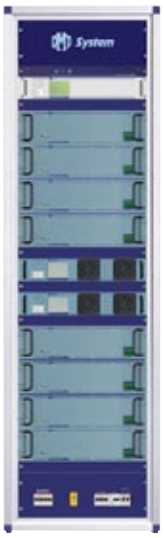
Neotion is introducing a USB dongle to receive TV on a PC with enhanced security features to descramble encrypted content and then apply copy protection on the content to maximise the security between the dongle and the PC with its hardwired AES-128 - highly appreciated by HD content providers. www.neotion.com

Neotion TV Receiver

The **Pixelmetrix** DVStation-Mini² DVB-T is a full featured monitoring probe designed for 24/7 operational monitoring, quality and continuity assurance of DVB-T services. It offers high fidelity RF measurements and comprehensive TS analysis. Extensive SFN network monitoring support helps broadcasters ensure network coverage. Ultra-high MER resolution and additional ASI input makes it the perfect transmitter monitoring tool. It comes with shock mounted hard disk for portable operation, configurable thresholds for custom monitoring requirements, configurable alarm actions and more. www.pixelmetrix.com

Pixelmetrix DVStation-Mini² DVB-T

DMT's Ultralinear solid state transmitters are aimed at providing more power and excellent signal with less energy and size. Equipment efficiency is more than 25 percent better than average, and power density is 50 percent higher. Response linearity makes 40dB shoulders well within reach. Air or liquid cooled, the transmitters deliver output power up to 15kW rms. Multimode configurations are available to facilitate the conversion to digital of analogue TV networks. www.dmtonline.com



DMT Ultralinear Transmitter

Albis Technologies' IPTV and Hybrid DVB STB product family offers a broad range of versatile possibilities to receive IPTV, broadcast television, on-demand and interactive services. Its third generation of STB is available, based on the latest System on Chip architecture. Together with a high performance chipset and the high quality of HD, the company provides an attractive solution. www.albistechnologies.com

Albis Technologies Set-Top Box

EchoStar Europe has recently introduced a range of set-top box and digital video recording platforms for cable and IPTV markets. It is also integrating market proven Slingbox technology from SlingMedia into its product portfolio, to add compelling home networking and place-shifting functionality. Its cable DVRs - including the HDC-600 have been integrated with DVB-MHP software from Alticast and feature a DOCSIS based modem to provide operators with a state-of-the-art interactive platform. www.echostar.com

EchoStar HDC-600 Series Cable DVR


UBSuccessful
Universal Modulator, Supporting Your Network
DVB-SH
DVB-T/H
DAB / DMB
ATSC-MH
ATSC-8VSB
CMMB
DTMB
Phone: 1 905 669 8533
Toll Free: 1 877 669 8533
Fax: 905 669 8516
Email: sales@uniquesys.com
www.uniquesys.com
UBS
Unique Broadband Systems Ltd.