Irdeto DVB-H Trial

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DVB-H technical trial demonstrates market-readiness

Irdeto recently teamed up with Broadcast Australia, Thomson and Samsung to complete a high-power technical trial of market-ready DVB-H technology, featuring a SIM-based OSF security system.

Irdeto, a major player in the field of Conditional Access and Security Technology, recently trialled its open security framework (OSF)-compliant Plsys conditional access system in a DVB-H environment in Australia. Having already enlisted digital video solutions group, Thomson, to provide the DVB-H head-end, Irdeto required Broadcast Australia’s expertise in mobile digital broadcast transmission to provided overall management and trial hosting to ensure it achieved its objectives.

The fourth partner to join the trial was Samsung, as the provider of the latest-generation mobile TV-ready handsets for field-testing. After a trial license was secured from the Australian Communications and Media Authority (ACMA) in April 2007, the project team was ready to design and deploy the system, which went live on 7 May 2007.

Security of mobile TV services

A key factor of the DVB-H trial was the use of the Irdeto OSF-compliant conditional access system (CAS) to provide secure transmission of services. Security systems for mobile TV deal with service and content protection, managing consumer access to content streams and enforcing post-delivery usage rights. Several different standardised methods exist. The OSF standard, specified by the DVB Project, defines a common set of rules and architecture for the largely ‘pay-TV’-derived CAS. An OSF-compliant CAS can support business models that provide subscription to individual channels for a specific time, preview, pay-per-view, pay-per-event, and pay-per series as well as pre-paid models using a multitude of on-line and retail payment options.

Diversity of Business Models

Advanced features such as parental control are also supported, in a manner similar to traditional pay-TV services. These features open up a wide variety of different business models, depending on the "time value" of the content that is being protected. In approximately one year, mobile phones with 1 inch diameter hard disk drives will be common. These handsets will have the capacity to store Video on Demand (VOD) content for watching at a later time. Within the protection system are the "rules" to determine the perishability of the content. These business rules such as, expire after first viewing, expire after one week etc, are embodied in the Digital Rights management (DRM) extensions to the Irdeto Plsys conditional access system. In summary, the Plsys Conditional Access System protects the content through encryption, the DRM extensions enforce the business rules, once the content has been stored on a disk drive or other memory.
Integration requirements
Integration of the OSF-CAS into the trial network was necessary at both ‘ends’ of the mobile TV chain: that of the handset and end-user, and that of the DVB-H head-end.

At the handset end, a significant feature of the trial was the fact that the security system was SIM-based. This meant that Irdeto and Samsung collaborated to ensure the SGH-P930 handsets had the required software and firmware to support the OSF SIM-based system. In addition, the SIM card in the handset needed to be configured to authenticate both the DVB-H and cellular 3G platforms separately and simultaneously. Broadcast Australia worked closely with various mobile network operators to achieve the required SIM card integration with their system. One of the advantages of the Irdeto SIM based system is the ease of adding additional mobile operators to the DVB-H service. The SIM cards for the target operator are sent for modification during their personalisation process. Once the necessary decryption applet has been added, the SIM card is “closed” and is then ready for use with the mobile phone operator’s network as well as the DVB-H network.

Partnered integration solution
At the transmission end of the chain, global networking partners Irdeto and Thomson had been working together prior to the trial’s commencement to achieve close integration of the security solution and the mobile TV head-end. As a result, the Irdeto PIsys system controlled the service scrambling performed by the Thomson encoders, and managed the distribution of keys and user authorisation via messages inserted into the signal generated by the Thomson system.

The important role of processing the IP content streams from multiple sources was carried out by the Thomson Grass Valley Opal DVB-H IP encapsulator, which performed IP encapsulation and dynamic time-slicing to generate the DVB-H data-stream. Other key components of the system were: the Thomson Grass Valley SmartVision service manager, which managed the delivery of audio and video content; the Thomson Grass Valley Jade DVB-SI server and Opencast multicast file server, which generated the electronic services guide (ESG) and ESG carousel respectively; and the Irdeto PIsys CAS manager and encryption system, which together formed the brains of the OSF mobile TV security solution.

Diversity of Content
The content for the trial was provided by multiple sources to yield several mobile TV services. These included Australian national broadcasters ABC, ABC2, and SBS, commercial free to air Channel Seven, various Foxtel channels including Fox 8, Turner Broadcasting channels CNN and Boomerang, and MTV.

Broadcast Australia managed overall integration of the end-to-end DVB-H system, taking responsibility for configuration of the platform and performing test integration of the completed system. This included the provision and integration of the DVB-H transmitter, various content encoders, and network monitoring equipment. Broadcast Australia also provided the transmission infrastructure for the trial, which was broadcast at 80kW ERP on UHF channel 29 from the company’s existing antenna at Gore Hill in Sydney. Thomson and Irdeto built and tested the head-end control system. Samsung provided and tested the handsets. With all four partners taking part, the system was fully integrated and on-air in just five days.
Management and Bandwidth Efficiency

A dedicated DVB-H network management system was used for ongoing monitoring of all equipment and the DVB-H data-stream, plus collection of alarms and fault rectification as appropriate. Comprising the very latest in DVB-H technology, the Thomson Grass Valley Opal DVB-H IP encapsulator allowed several advanced features to be explored. Chief among these was statistical or dynamic time-slicing, which enabled real-time adaptation of time-slice size on a content-needs basis. Similarly, statistical encoding enabled dynamic encoder bit rate allocation to optimally share the available transmission bandwidth between the encoders according to their time-varying requirements. These functions optimised the bandwidth efficiency of the DVB-H signal while preserving video quality, and ultimately permitted a greater number of services in the channel.

Another technology tested was the Enhanced AAC Plus v2 audio codec, broadcast at 32kbps to provide near-CD quality sound. This, coupled with the H.264/AVC video codec (also known as MPEG-4 Part 10) broadcast at a full frame rate of 25 frames per second, stood to provide a premium mobile TV viewing experience.

Next Generation Handsets provide new choices for consumers.

In this event, the Samsung SGH-P930 handset played a significant role, being required to support the DVB-‘convergence of broadcast and mobile services’ (DVB-CBMS) ESG format, H.264/AVC video at 25 frames per second, and Enhanced AAC plus v2 audio. The handset’s excellent performance in all of these areas ensured a very positive experience for the viewer. These next generation DVB-H handsets are small, light and delivered outstanding picture quality.

Market-ready

An important outcome of this trial has been the successful utilisation of the SIM-based OSF security system, coupled with the commercially available Thomson SmartVision Mobility service delivery platform. Significantly, the OSF-CAS provided the functionality for Broadcast Australia to provide various different service bundles to different trial participants, and change these as required. This functionality will be an essential capability for commercial mobile TV networks, as it will enable them to offer different subscriber packages according to a specific business model.

The trial also demonstrated that, with effective collaboration between technology suppliers and integrators, a multi-vendor DVB-H solution is a viable option. This includes familiarity with broadcast, mobile Telco and video content industry technologies, in order to apply the most appropriate solution for any particular market.

Finally, it is particularly significant that the latest DVB-H trial system—from head-end to handset—represented a fully market-ready solution. Once business models have been determined for broadcast mobile TV, the technology to make it happen is ready and waiting.
Diagram courtesy of Broadcast Australia