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From: Michel Guillien-Steinbach

To: Ms Ling Pek Ling, Director (Digital Broadcasting Deployment Office), Media Development Authority of Singapore
             Mr Raymond Lee, Director (Resource Management and Standards), Infocomm Development Authority of Singapore

CC: Jean-Christophe Jubin, httv, Asia-Pacific VP.

Subject: Comments and proposal for the DVB-T2 broadcast in Singapore.

We are very happy to see that Singapore will take advantage of the excellent spectrum usage, flexibility and coverage enabled by DVB-T2 and that it will be used for all current free to air channels with high definition capabilities.
However we think that it would be a pity to miss out some more advanced capabilities, which can bring improvements to community and security communication as well as adding new business possibilities for the broadcaster, all at a very small increment in the set top box cost.

In order to fully benefit from TV convergence with connected or not connected STB, we propose to add HbbTV to the specification, or as a minimum to specify the hardware to be capable of handling a HbbTV software. We will give application example to justify this proposal and an indication of what this implies in terms of hardware.

HbbTV is the growing standard for all DTT platforms in Europe but also in neighbouring countries in Asean, in India and in Australia.

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1. About HbbTV

HbbTV (Hybrid broadcast and broadband TV) is the new standard emerging in Europe for connected devices (TV and STB) led by German and French broadcasters. This standard /middleware is providing an alternative to the proprietary TV technologies and an open platform for broadcasters to deliver value added interactive and on-demand TV services to the end-consumers.

As more and more TV devices are connected to the internet, the purpose of HbbTV is to harmonize the broadcast and broadband delivery of video (Catch-up TV, VOD) and data (news, games, programmes). In Europe HbbTV has been adopted by in German (Astra), France (DTT), Spain (DTT), Turkey (Digiturk) and many trials are in progress in Poland, Netherlands, Russian, Czech, Switzerland, etc..

As many ASEAN countries are switching from analogue to digital, (DTT and cable), the issue of middleware is often raised and HbbTV seems to be a very competitive choice for the upcoming years: Malaysia is requesting HbbTV the specification of its DVB-T2 DTT platform and Vietnam DTT and Satellite operators have decided to use the HbbTV standard: Thailand, Myanmar, Indonesia and India are also experimenting HbbTV for their DVB-T2 DTT platform. Australia is also recently showing interest to replace the obsolete MEGH5 standard by HbbTV for their DTT network.

HbbTV is based on well establish and widely used open standard which make the development of HbbTV application very accessible to html developers and open to an existing portfolio of services.
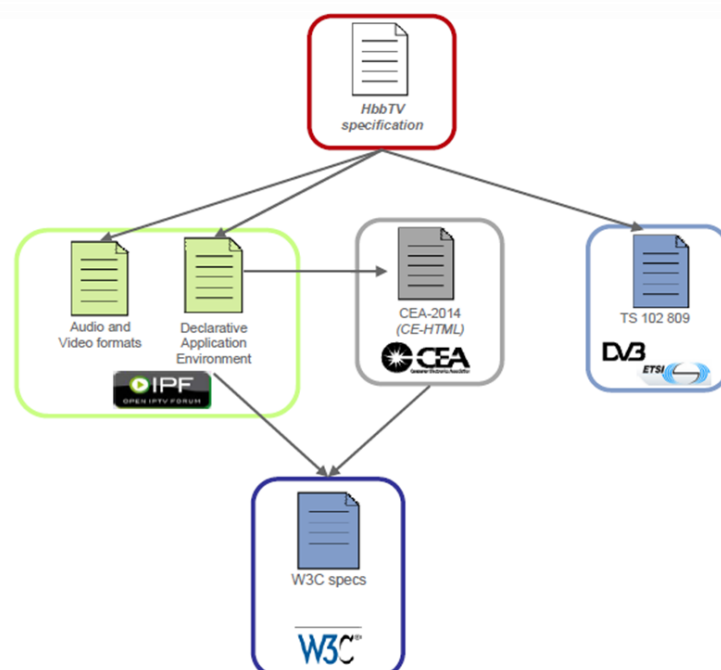
2. Development

This document describes a few concrete examples, which could work with proprietary software solutions. However we propose to add an open standard capability to the set top boxes, namely HbbTV, because it opens a wealth of possibilities including many yet to be invented. Note that the set top boxes would not need to include HbbTV from day one as long as the hardware is ready, thanks to the over the air download mandatory capability.

2.1. Civil Defence or other emergency messages.

2.1.1. Current solution:

When for instance specific group of NSmen are required to report to a given location, on screen coded messages are added to the video of all TV channels for a few seconds and repeated regularly.
Drawbacks:
- In order not to disturb too much the viewer the messages cannot be broadcast continuously. As a result there is a possibility that a not attentive viewer misses the messages.
- Since the message is part of the video, if the viewer records the program, he will see the message again every time he plays it back, which is then meaningless and annoying.
- If the targeted person is using a tablet without 3G connection, for any other matter than watching a Singapore broadcast, he will miss the messages completely.

2.1.2. Proposed solution:

The messages could be a HbbTV application with mandated autostart status. Furthermore, NSmen would be required to install on their tablets and smart phones an application that would get automatic notifications via the home network whenever the main set to box receives a warning via HbbTV to do so.
As a result, the following advantages are achieved:
- Until the viewer presses the Exit key, the message remains on the screen
- The message can be more elaborate and include sound and links to any additional information, which can be contained either in the broadcast data or on a web site.
- If the user records the program, only the normal audio and video is recorded.
- If the target person is using a tablet he still gets the notification via the home network.
Note that this is not implied by the HbbTV specification but can be achieved with a suitable software once the hardware improvement needed by HbbTV is available.

2.2. General HbbTV capabilities, new business opportunities.

From the users' perspective, HbbTV is a convenient way to get additional information or access to more programs. The purpose of HbbTV is to benefit from the convergence Internet and TV broadcast to offer a large range of services, video content, catch-up Tv, OTT channels, etc…

2.2.1. For broadcasters:

From the broadcaster point of view HbbTV is the best way to retain their viewers. A recent study shows that 80% of viewers who have mobile devices (the so-called second screen) use their mobile device while watching TV. This is a major threat to advertising revenue on the TV.
The development of non-linear TV is also a straight for DTT broadcasters audience and advertising revenues. With connected devices and HbbTV, broadcasters can offer additional services including free catch-up TV which is help them to retain their audience and to compete with pay-TV and internet non-linear TV content.

Examples of popular such interactive applications are:
- Catch up TV
- Enhanced program guide, with pictures and links to trailers
- Play along games synchronised with the live program.

2.2.2. For public authorities:

Hbbtv can also be an efficient way to reduce the digital divide within the community and to offer digital content to a population with limited access to broadband content - mainly for cultural/IT education reasons because broadband penetration in Singapore is very high.
Many services with limited content if the STB is broadcast only and not connected to internet - and with a large content if the STB is connected can be offered to the viewers.

Government services such as education, learning content and video, health information, public information, etc… can be offer to a non IT educated audience with a user friendly TV environment. The cost of development HbbTV application is limited because is very similar to WEB/html adapted to the TV Device.

3. Cost considerations.

Compared with a very minimalist non HbbTV implementation, the proposed addition requires typically:
- 0 to 128 MB more DDR
- Replacing a 4 or 8 MB NOR Flash by 128 MB NAND Flash.
- Adding a RJ45 connector.
On the pure cost point of view this is only a few dollars. Even with the HbbTV software stack, we are looking at an increment within the 10 S$ range.

(If every dollar counts, you could consider removing the constraint to transcode HE-AAC into Dolby Digital, or even giving up HE-AAC altogether in order to save licensing cost, or save even more by transcoding Dolby broadcast into AAC and removing the Dolby obligation completely. You could also remove the MISO option from the DVB-T2 modes).

4. Statement of Interest

4.1. What httv can propose, develop and supply:

- The full software for the set top box (software team located in Singapore)
- HbbTV applications
- Broadcast/ head-end equipment to insert the applications and their signalling (AIT, SI...)

5. Conclusion

Considering that Singapore is a wealthy country, that the choice of DVB-T2 and H.264 is anyway a high end specification, we are convinced that such a small increment in price is fully justified as it makes the resulting set top box future proof.

Please feel free to contact us for any question or clarification you may wish.
Many examples of HbbV commercial and public service from Europe can be demonstrated to you and

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Best regards

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