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Scenario description for multiband/multimode UWB home environment applications

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Abstract

Rapid developments in two parallel consumer electronic application fields are highlighted: an increasing diversity of access to high definition multimedia content in a plethora of platforms and rapid advancement in display technologies that enable multimedia content to be experienced in increasingly higher quality.

This document describes a scenario that multi-mode wireless radio (based on UWB) can be used as an enabler for creating a new user experience: to realise the advent of seamless connectivity between various devices and the TV in a simple and fast way so that intelligent sharing of high quality audio and video content within the living room becomes a possibility.

Keywords

High definition, Multi-Mode Radio, Wireless Connectivity, HD, Seamless connection, TV, Media Centre.

Table of Contents

1 Executive summary 4

2 Introduction 5

3 Application scenario 7

References 9

Acknowledgement 9

List of Figures

Figure 1: A wireless TV-Media Centre system enabling seamless connectivity among different classes of devices 8

Abbreviations

BD Player	Blu-ray Disc Player
DVI	Digital Visual Interface
EUWB	CoExisting Short Range Radio by Advanced Ultra-WideBand Radio Technology
HD	High Definition
HDMI	High Definition Media Interface
PMP	Portable Multimedia Player
STB	Set Top Box
UWB	Ultra Wide Band
VGA	Video Graphics Array

1 Executive summary

This document defines an application scenario that provides the focus for EUWB's multiband/multimode UWB platform development activities for use in the home environment cluster. The multi-mode radio platform described here should support two distinct applications:

- Proximity range very fast data transfer;
- HD AV streaming within the living room.

A statement of the use-case scenario is made and the areas where UWB multiband/multimode can help to address the related issues are identified.

Details of system and interface requirements will be covered in separate documents.

2 Introduction

In today's consumer market, availability and use of different classes of devices that can serve and/or consume multimedia content are rapidly increasing. Here a brief outline of these classes of devices is described to help the underlying relevance and importance of the application scenario that is presented later in the document.

- **Portable Devices category:** portable CE devices (digital cameras and camcorders), portable media players and mobile phones have become indispensable parts of people's lifestyle. They are also becoming smarter and more powerful with increasing functionalities: they serve their user's needs for communication, infotainment and capturing and sharing of experiences. These devices are capable of storing large amounts of data and are also increasingly used for mobile TV viewing, download of content and social networking purposes.
- **Personal computer category:** PCs, notebooks, netbooks and tablet PCs are also becoming more powerful with better connectivity, allowing the user to have access to both online multimedia content as well as TV viewing experience. In addition to the services outlined in the mobile category, these devices are also capable of downloading, streaming and displaying HD content.
- **Multimedia CE category:** TVs, game consoles, Set top Boxes, DVD/BD players, digital video recorders are among classes of devices in this category. These devices are aiming for the best possible user experience with support for the highest quality of content. These are becoming increasingly better connected, more powerful and are also taking on tasks not normally associated with their original function: for example TVs are also providing access to online services, same with BlueRay players.

It can be seen from the above picture that generating content, access to content, storing and sharing of the content is possible among different platforms with very different characteristics. And the trend is towards an even increasing number of such devices.

In this landscape, within the home environment the TV is perceived to be the ultimate provider user experience: it has the largest display of all devices, gives the user the best audio and video experience and is on its way to becoming the central control point for sharing and consuming the wide range of contents available within the user's network of connected devices.

The key enabler, and challenge, in this scenario is the inter-connectivity among the different categories of devices, especially with respect to the TV. Key challenges to realise good user experience in this inter-connectivity scenario include:

- Different device categories use different connectivity options (HDMI, USB, VGA, DVI, etc. depending on PC, TV or portable device platforms);
- Principles of ease of use and simple user experience are key to the user and have to be respected.

To add to this already complicated picture one should also consider the wide range of device platform capabilities in terms of:

- Processing power;
- Memory;

- Power consumption;
- Display resolution.

With the current trend in TV displays becoming ever slimmer, lighter and more design oriented, the need for wireless connectivity will become clearer as an enabler of two key user expectations:

- Clean design without the clutter of multiple cables;
- Ease of use and seamless connectivity.

It becomes clear that no single wireless solution will be able to adequately meet these needs among such diverse platforms and applications. Hence, it is a logical assumption that the wireless TV requirements solutions should be based on multi-mode radio principles. Such approach ensures that for each application scenario the communicating devices can intelligently select the best connectivity approach depending on their capability.

This document describes one such scenario in the home that can improve user experience in sharing and experiencing high quality entertainment content. The focus of the application is within the living room with the TV as the main display centre for consumption of entertainment content. Multiple sources of content will be connected to the TV. Connectivity options traditionally placed on the TV itself will be moved away to an entertainment hub or Media Center that can be placed anywhere in the living room wirelessly connecting to the TV. Thus freeing the TV from the cable clutters and allowing the user flexible placement options.

At the Media Center, wireless connectivity will be served by using a multimode radio system that allows wireless video streaming to the TV as well as enabling devices like notebooks and portable media players to connect and transfer their stored content to the Media Center for viewing on the TV.

3 Application scenario

John owns a slim HDTV in his living room currently connected to a number of boxes with different types of cables: an STB, a BD player, a game console and a network attached storage drive.

John would like the installation of his TV in his room to be clean and free of these cables. He prefers a wireless solution that can seamlessly stream a content of his choice to the TV. He would also like to have a simple control interface to all the source devices that he connects to his TV.

John also owns a notebook on which he has downloaded and stored not only full length movies, but also other low quality video content.

He might go to a concert, and stop by a special video shop at the concert hall, where the whole recording can be purchased and uploaded wirelessly to his portable player or smart phone. Or maybe he would go to a video kiosk, hold his PMP in front of a machine and have his selected rental movie downloaded to his player.

Back at home, he would like to play this content. Not on his portable device (where he would probably have an additional low definition copy), but rather on his big HD display.

By putting his PMP in the close proximity of the Media Box, it will automatically pair with it and within a few seconds the movie will start playing on the TV hanging on the opposite wall. The experience being seamless and fast, with no use of cables.

John may have some friends visiting and one of them wants to share with others an interesting clip that he has taken on his smart phone. The screen on the phone is too small for all to watch the video together so by putting the phone at close range of the Media Box, he can initiate the pairing and then they can watch the clip on the TV. The quality of the content can be enhanced by the Media Box to better suit viewing on the HD screen.

In the above scenario, the common factor is that all the devices and technologies are already available in a fragmented and rather disjoint way. Today, standard and intelligent connectivity is one key missing element to realise the full story.

Figure 1 depicts the concept of Display-Media Centre combination as well as the eco system around the TV for which a suitable connectivity solution is required.



Figure 1: A wireless TV-Media Centre system enabling seamless connectivity among different classes of devices

Applications of the multiband/multimode system

From the physical connectivity point of view, for the above scenario to work effectively, two different types of wireless connectivity would be required.

- Fast data transfer of content in close range (<3 m) between portable devices and Media Box;
- Video streaming of HD content from the Media Centre to the TV (within the living room).

The concept of multiband/multimode radio system may be implemented in a number different ways. Figure 1 is only one depiction of how it can be realised for the given scenario. In a simplest form it can be a wireless switch-box connecting to various source devices and allowing the user to select the desired source via the TV menu. In any case, either the TV itself, or the Media Box need to incorporate a multi-mode radio while all the other devices need only one of the radios described above (depending on their platform).

An overview of the implications of different device capability, content quality and system requirements will be described in the technical requirements document.

References

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