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TECHNICAL REPORT

colour inside

Smart television –
Part 1: Conceptual model for smart television

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FOREWORD

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IEC TR 63122-1, which is a technical report, has been prepared by subcommittee TA 1: terminals for audio, video and data services and contents, of IEC technical committee 100: Audio, video and multimedia systems and equipment.

The text of this technical report is based on the following documents:

Enquiry draft	Report on voting
100/2903/DTR	100/3053/RVC

Full information on the voting for the approval of this technical report can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 63122 series, published under the general title *Smart television*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

This part of IEC 63122 discusses the background of cloud computing, the Internet, the mobile Internet industry, the principle of open innovation, the vertical integration of the industry chain, technology and encourages the digital TV (television) industry to seize the opportunity to upgrade and strengthen innovation in smart television technology. The innovations of business models and institutional mechanisms will be explored, and we will explain how acceleration is needed to broaden the application market and put forward the concept of smart television models and standardization needs.

The reception of digital TV and high-definition broadcasting in the home has recently been well established for various areas. Internet TV and delivery of multimedia content to the user at home, via the Internet, are also becoming increasingly common.

Smart television systems are intended to extend the reach of multimedia content to the TV set in a seamless, viewer-friendly manner. The viewer can more conveniently access both broadcast digital content and Internet multimedia content on a TV set using a single user-interface device and a single on-screen interface.

There are three major key factors leading smart television development. Lifestyle changes from the user side, the building of network infrastructure according to the rapid development of wired and wireless networks, and the emergence of TV alternatives.

An individualized lifestyle accelerates personalization and customization of contents, and the experience from other smart electronic devices drives the user to long for the smart television as the core of entertainment at home.

The rapid development of high-speed Internet access and the emergence of home network techniques assigning an IP address to electronic devices will make TV smarter.

In addition, the market requires a change from TV to smart television because of the emergence of TV alternatives, such as the tablet, the smartphone and the media player.

SMART TELEVISION –

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1 Scope

The focus of this part of IEC 63122 is the conceptual definition of smart television, basic features, use cases and current technologies based on applications and requirements. They make it clear where further existing standards can be used and highlight where work on standards is needed.

In addition, this document was developed taking into account ISO/IEC Guide 71. The objective of this document is to highlight potential areas for standardisation for smart televisions.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1
smart television system
television system consisting of a smart television service platform, transmission network and smart television terminal

3.2
smart television service platform
service platform that is capable of providing smart television terminal with such applications or services as digital TV broadcast or Internet service

Note 1 to entry: The services could be VOD, catch-up, games, web searches, interactive advertising, personalization, voting, social networking, etc.

3.3
transmission network
network for interactive data transmission in smart television systems, which includes the home network (family local network), radio and television broadcasting network, the Internet, and other networks (i.e. accident or secure private network)

3.4
smart television terminal
digital television set (TV set and set-top box) with integrated Internet capability and an operating system, which can use a variety of contents through services by using a convenient user interface/experience

Note 1 to entry: Usually, smart televisions allow the user to install and run more advanced applications or plug-ins/add-ons based on a specific platform.

3.5
smart television set
TV set that supports smart television terminal function, capability and audio/video presentation function

3.6
smart television set top box
set top box that supports smart television terminal function, capability and without audio/video presentation function

3.7
application store
online store for purchasing and downloading software applications for smart televisions and other smart devices

3.8
health service
diagnosis, treatment and prevention of disease, illness, injury and other physical and mental impairments in human beings though smart television system

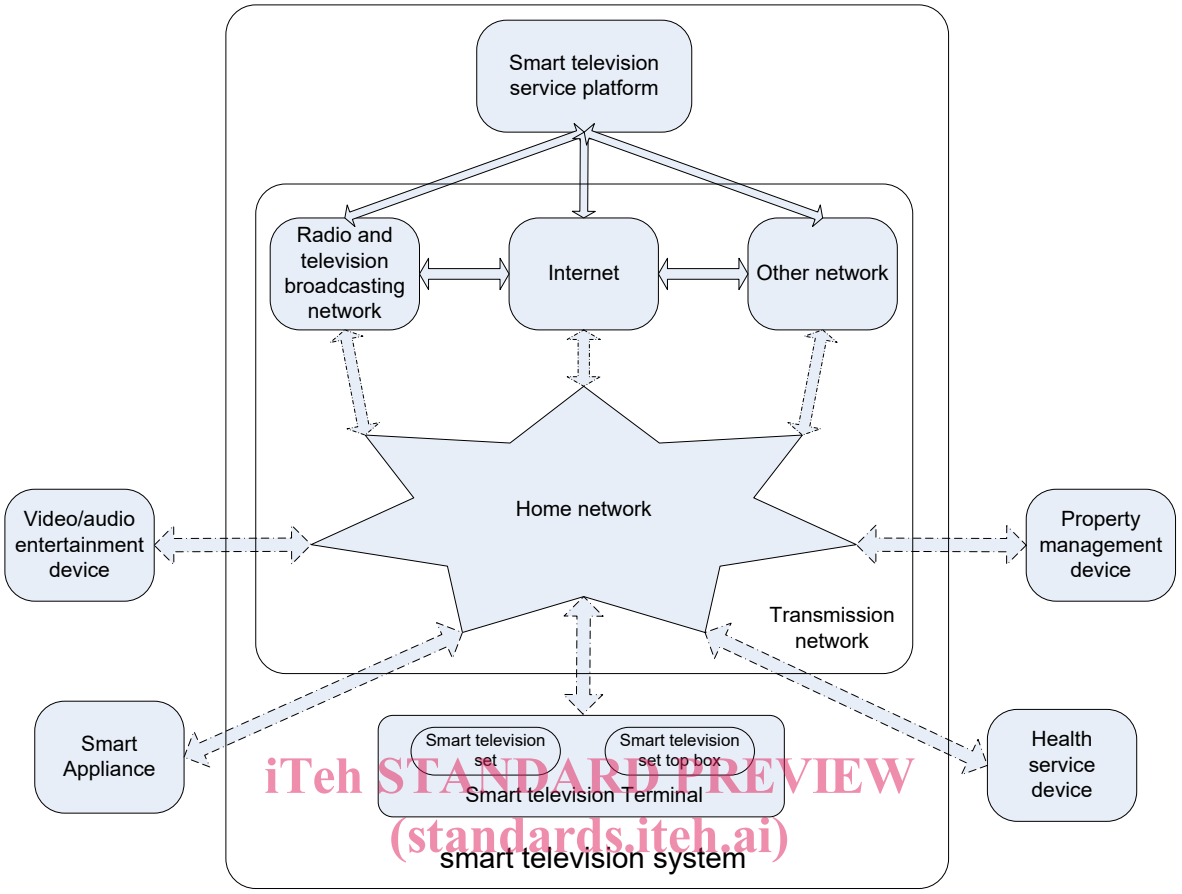
3.9
application programming interface
API
set of routines, protocols, and tools for building software applications

3.10
NGB
next generation broadcasting network
network constructed on the basis of achievements of cable television digitalization and mobile multimedia broadcasting and with support of its innovative core technology of "high-performance broadband information network", integrated "triple-play", combining wired with wireless modes and a network

4 General features

4.1 Framework of smart television system

The framework of the smart television system is shown in Figure 1, based on the study of existing smart television technologies, described in Annex A.



Key

Smart television service platform:	radio and television broadcasting stations, Internet or other network sites, application stores, etc.
Transmission network:	radio and television broadcasting networks, Internet and other networks, etc.
Smart television terminal:	smart television set, smart television set top box, video game console with TV tuner and video recorder with TV tuner, etc.
Smart appliance:	refrigerator, washer, etc.
Video/audio entertainment device:	sound system, MP3, MP4, personal tablet, laptop, etc.
Health service device:	blood glucose meter, pulse monitor, blood pressure monitor, etc;
Property management device:	remote meter reading, access control and video camera, etc.

Figure 1 – Block diagram of smart television system

The smart television service platform incorporates various application links of TV programmes and network service into the TV programme stream, EPG or network information stream and transmits them to the smart television terminal through the transmission network channel via a home network or other network. The smart television service platform also pushes various application links and network services relating to TV programmes through different channels synchronously.

In addition to the conventional watching of live digital TV programming and Internet TV programmes, the smart television terminal also realizes a seamless connection between TV media and social media, thereby allowing user interaction in a convenient and quick manner.

With such means as application stores, a smart television terminal offers search, news, weather, music, video, games, photos, video calls, shopping, chatting, multi-screen interaction and advertising information relating to current live content.

By interconnection with other smart devices, smart television terminals may realize extended application in such fields as smart appliance, audio/video entertainment, health service and property management.

4.2 Smart television terminal

4.2.1 Hardware

Smart television hardware configurations have been greatly improved in order to meet rising consumer entertainment enjoyment expectations and the demand of smoothly operating smart televisions. Expected specifications include a dual-core CPU processor 1,5 GHz or higher, more than 2 GB of memory, a peripheral SD card slot supporting memory expansion in the form of an SD card of 2 GB to 32 GB, soft codecs and hard codecs providing a variety of codecs such as MPEG.x and H.26x, and support for multiple resolutions from QVGA to 8Kx4K (UHDTV).

A smart television terminal shall be provided with a supported hardware capacity.

Generally, smart television terminal hardware consists of a central computing unit, a storage unit, a signal input interface unit, a signal output interface unit and a display:

- central computing unit: includes CPU and GPU, video decoder supporting formats such as HEVC, MPEG2, MPEG4, H.264, AVS, and audio decoder supporting formats such as MP3, AAC, AC-3, WMA9, DRA;
- storage unit: includes RAM, ROM, HDD, SSD, etc.;
- signal input interface unit: used to receive digital TV and radio signals, or receive IP signals through the Internet, LAN or other network;
- signal output interface unit: used to output audio/video signals through a digital interface or an audio interface;
- display: used to present video content.

4.2.2 Software

4.2.2.1 Software block diagram

Smart television terminal software consists of a hardware layer, a kernel driver layer, a smart television adapting layer, a smart television framework layer and a smart television application layer, as shown in Figure 2.

Generally, a smart television terminal operation system consists of a kernel driver layer, a smart television adapting layer and a smart television framework layer.