IEC TR 63447-1

Edition 1.0 2023-12

TECHNICAL REPORT

Form factor of smart mobile devices – Part 1: Impact on multimedia services

IEC TR 63447-1:2023-12(en)

IEC Secretariat
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

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INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 33.160.60

ISBN 978-2-8322-7878-9

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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FOREWORD

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IEC TR 63447-1 has been prepared by subcommittee Technical Area 1: Terminal for audio, video and data services and content, of IEC technical committee 100: Audio, video and multimedia systems and equipment. It is a Technical Report.

The text of this Technical Report is based on the following documents:

Draft	Report on voting
100/4033/DTR	100/4067/RVDTR

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

The language used for the development of this Technical Report is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

A list of all parts in the IEC 63447 series, published under the general title *Form factor of smart mobile devices*, 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 webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

INTRODUCTION

Smart mobile devices (SMD) initially utilized communication services as a key element and are designed to interact both with users and other devices connected to the network. Along with advances in communication technology, various multimedia services other than communication are available on SMDs because of the developments in SMD hardware performance.

SMDs have changed and have become more compact to make it easier for users to use multimedia. For this purpose, hardware technology is developing.

This Technical Report introduces the main SMD form factors for multimedia services, explains how to design an effective SMD, and finally summarizes new work items to manage in TC 100 in the near future.

FORM FACTOR OF SMART MOBILE DEVICES –

Part 1: Impact on multimedia services

1 Scope

This document introduces various form factors of smart mobile devices and their impact on multimedia services.

It does not deal with:

a) SMD performance to process multimedia services;
b) hardware performance and technology for each part, such as the battery, the antenna, the display, the main processor, various sensors;
c) the characteristics of the SMD's operating system (Android[1], iPhone OS[2] etc.);
d) the generation characteristics of telecommunication and radio frequency (including wireless);
e) wearable devices, like smart watch, AR (augmented reality), VR (virtual reality) and so on.

2 Normative references

There are no normative references in this document.

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

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

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

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

3.1.1
smart mobile device
SMD
portable device with computing, networking, and capabilities to provide multimedia services, which works independently and/or interactively with other devices

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[1] Android is a trademark of a consortium of developers known as the Open Handset Alliance and commercially sponsored by Google LLC. This information is given for the convenience of users of this document and does not constitute an endorsement by IEC of the product named. Equivalent products may be used if they can be shown to lead to the same results

[2] iOS (formerly iPhone OS) is a trademark of Apple Inc. This information is given for the convenience of users of this document and does not constitute an endorsement by IEC of the product named. Equivalent products may be used if they can be shown to lead to the same results.

3.1.2
form factor
hardware design aspect that defines and prescribes the size, shape, and other physical specifications of components, particularly in electronics

3.2 Abbreviated terms

AF	auto focus
AR	augmented reality
CMOS	complementary metal-oxide semiconductor
DA	display area
HDR	high dynamic range
IP	ingress protection
OIS	optical image stabilization
OS	operating system
OTT	over the top
PDA	personal digital assistant
SMD	smart mobile device
USI	Universal Stylus Initiative

4 Overview

4.1 General

Today's SMD technology has become so widespread that users often take for granted the ability to access multimedia content, take pictures, access information from around the world, map their locations, and more, all from the convenience of their handheld device.

There are arguably a few main technologies:

- smaller and ever-more efficient computer chips;
- wireless network infrastructure;
- advanced battery technology;
- high resolution display and sensitive touch screen.

4.2 SMD history

A device that featured an early touch screen and had the ability to send and receive emails and faxes was available as a first personal communicator in 1994, named “Simon”. It was an important demonstration of what was possible.

In 2007, the physical keyboard-less smartphone was lunched, named “iPhone®[3]”. This device used only a touchscreen for typing and navigation functionality, instead of the physical trackball or keyboard form factor, also the antenna was embedded in the phone.

In 2018, there was a brief period of interest in foldable SMDs, which are devices with in-foldable or out-foldable displays. One such foldable SMD had a large inner display that could be folded up, with a secondary display on the front.

[3] iPhone® is a trademark of Apple Inc. This information is given for the convenience of users of this document and does not constitute an endorsement by IEC of the product named. Equivalent products may be used if they can be shown to lead to the same results.

As SMD hardware (such as batteries, displays, and housing cases) continues to develop, we can expect to see rollable and slidable SMDs in the market in the near future.

4.3 Usage trends of SMD

Early on, smartphones, which are one type of SMD, were marketed primarily towards the enterprise market, attempting to bridge the functionality of standalone PDA devices. Nowadays, SMDs come equipped with high-speed processors, cinematic cameras, high-resolution displays, and various sensors, such as accelerometers, light sensors, orientation sensors, LiDAR, and more [1][4]. As a result, the use of these devices is becoming increasingly widespread.

Most SMDs feature thin and slate-like form factors with large capacitive screens that support multi-touch gestures, rather than physical keyboards. They offer users the ability to download or purchase additional applications from a centralized store, use online storage and synchronization, virtual assistants, and mobile payment services. The display of the SMD has become increasingly larger and it has a high screen-to-body ratio – it is called the display area (DA) – as the bezel is thinner.

According to a report released by the market research company eMarketer, many smartphone users turned to their devices to find information, entertainment, and human connection, albeit remotely. As a result, time spent on devices has gone up across the board to enjoy multimedia. For example, people spent an average of 49% of total SMD usage time on audio and video services in 2021 as indicated in Figure 1 [2].

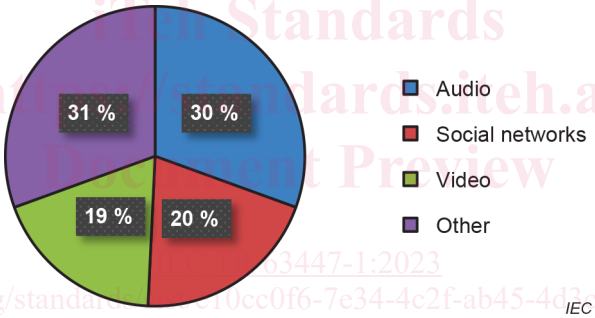

Figure 1 – Percentage of average SMD usage time per media in the USA

In 2020, roughly 3 hours and 40 minutes that people aged 16 to 64 spend using smartphones per day are spent using social and communications applications in the world and the average time spent on video and games is 30 %, as shown in Figure 2 [3]. There are some variations depending on countries where it is very different with internet users in Japan spending an average of just 45 minutes per day using social media while, in one area in the USA, many users spend 3 hours and 53 minutes using social media.

4 Numbers in square brackets refer to the Bibliography.