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BSI Standards Publication

Activities and considerations related to wireless power transfer (WPT) for audio, video and multimedia systems and equipment

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National foreword

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A list of organizations represented on this committee can be obtained on request to its secretary.

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Activities and considerations related to wireless power transfer (WPT) for audio, video and multimedia systems and equipment

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ACTIVITIES AND CONSIDERATIONS RELATED TO WIRELESS POWER TRANSFER (WPT) FOR AUDIO, VIDEO AND MULTIMEDIA SYSTEMS AND EQUIPMENT

FOREWORD

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IEC 62869, which is a technical report, has been prepared by 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
100/2134/DTR	100/2166/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 publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

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

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- withdrawn,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

A bilingual version of this publication may be issued at a later date.

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

IEC TC 100 established a Stage 0 project on wireless power transfer (WPT) to develop a technical report on WPT technical standardization in relation to audio, video and multimedia systems and equipment. A survey was developed to investigate the global positioning of the technology and its uptake. Twelve National Committees provided responses. Four National Committees (China, Japan, Korea, USA) provided responses to all questions. The key research undertaken and information gathered from the survey responses included: a) terms and definitions used for WPT by IEC TC 100 members; b) regulations, national laws, public policies and industry practices related to WPT; c) status of activities and discussions in various organizations relating to regulatory activities, standards projects, and market research; d) potential topics to be addressed in IEC TC 100 TR: and e) potential role for IEC TC 100 in the domain of WPT technical standards development.

This Technical Report combines survey results with Stage 0 project expert group contributions and extensive public information to develop and present a holistic understanding of WPT and, in so doing, respond to the Stage 0 TR objectives. This understanding is developed through a progression of four interrelated topics.

- Clause 4 considers the overall WPT market, including use cases, public benefit, academic research activities, and an overview of WPT products and services.
- Clause 5 discusses leading commercial WPT technical approaches and briefly surveys additional WPT technologies by reviewing a system reference model. The system reference model can be understood at a very high level as consisting of the lowest layer of a power handling layer, where upper layers implement signaling and systems interfaces.
- Clause 6 presents the major elements of the applicable international and regional regulatory frameworks, one of whose key outputs is product categorization. Product categorization, in turn, is closely related to the topic of spectrum. Key regulatory drivers for WPT products and services as well as technical standards development include RF emissions, RF exposure and compliance.
- Clause 7 reviews global industrial consortium and standards development organization (SDO) activities, and critically discusses WPT technical standard development challenges and opportunities.

With market, technology, regulatory and standards development foundations established, the TR concludes in Clauses 8-10 with observations and recommendations about the potential for future WPT technical standards development within the scope of IEC TC 100.

ACTIVITIES AND CONSIDERATIONS RELATED TO WIRELESS POWER TRANSFER (WPT) FOR AUDIO, VIDEO AND MULTIMEDIA SYSTEMS AND EQUIPMENT

1 Scope

This technical report addresses activities and considerations related to wireless power transfer for audio, video and multimedia systems and equipment. It combines public information, contributions by experts and completed IEC TC 100 WPT survey responses and reviews global market conditions. The TR describes a range of WPT technical approaches with the aid of a system reference model, outlines the impacts on WPT of applicable regulation and surveys standards development organization (SDO) and private industry consortium-led activities in support of WPT technical standards development. The TR concludes with observations and recommendations for potential future technical standards development activities that lie within scope of IEC TC 100.

2 Executive summary

2.1 Market

A variety of metrics indicate that the commercial market is in its early phases. Annual revenue projections range from a current level of a few hundred millions to some billions of dollars (US) by the 2016-2018 timeframe. Geographic coverage spans major markets in Asia, Europe and North America, and is expected to mirror the larger CE market. Market participants range from small, focused start-ups to the largest integrated global CE market leaders. Currently, market share, or market “excitement” may be characterized as being split amongst a few small companies, each with a proprietary solution, and a broader range of companies who have coalesced around private industry consortia, each of which is seeking to promote a particular technical approach.

2.2 Technology

Commercial application of WPT technology has its origins in the pioneering work of Nikola Tesla in the early 1900s and is already well-established in several industrial and specialized application areas, such as power supply to “people mover” systems in airports, material handling systems in manufacturing and warehousing, and “mission critical” control systems that isolate power supply from environmental disruption. Within the scope of IEC TC 100, a system reference model consists of one or more WPT “sources” and one or more WPT “sinks” that interact through a “coil subsystem.” This reference model captures commonalities and differences across the wide range of approaches already in the market, those expected to come to market in the near term and long-term prospective market entrants. The WPT technology environment today consists of multiple, largely non-interoperable approaches.

2.3 Regulation

The development of the WPT market is subject to applicable regulations. These serve the purpose of protecting people and services in the areas of safety, efficient use of spectrum, harmful interference and electromagnetic compatibility and immunity. WPT regulatory categorization sets the overall framework. Designs are subject to different regulations depending at least on WPT spectrum selection and signalling method. Categorization, in turn, drives RF exposure limits and highlights the importance of methods for demonstration of compliance. Currently, individual markets and regions have similar, but not uniform approaches. Policy development opportunities and challenges relate primarily to global harmonization as a means to promote technology innovation and market development.