
IEC TC100
New TA Establishment
for standardization of WPT
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Background

- WPT (Wireless Power Transfer) is a newly emerging technology in the Consumer Electronics (CE) market.
- The interest in the WPT technology keeps increasing especially in the CE industry.
- It is expected that the market size of WPT will be $23.9 billion in 2016 with CAGR 87%.
- New organizations for WPT standardization have been established, and existing SDOs have established working groups for WPT standardization.

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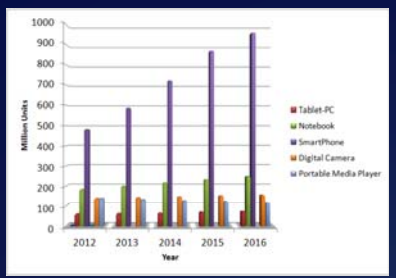
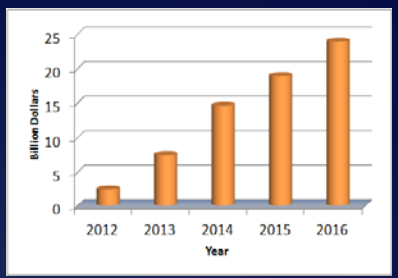
WPT Market for the IEC TC100

- WPT market size has drastically increased with CAGR 87%
  - WPT will penetrate into the market of portable devices such as 35% of smartphone, 25% of table PC, etc.
  - The market sales revenue is expected to be $23.90 billion in 2016





Smartphone: 35%
Tablet PC: 20~25%
Notebook: 10~15%
Portable media players: 10~15%
Digital camera: 5~10%

Expected Market (WPT related)
- $23.90 billion in 2016
- CAGR 87%

Source: GBI Research , Wireless Charging Market to 2016

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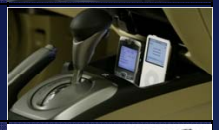
Technology Trends (1)

- There have been worldwide efforts for realization of WPT technologies.

- **PalmPre**
  - Contact type
  - Retails at $70~90 US

- **Qualcomm-Wipower**
  - Vehicle-based power transfer system in development

- **Fulton**
  - eCoupled inductive charger
  - Mobile devices, Evs



- **LG Electronics**
  - Induction type
  - Commercialized in 2011

- **Panasonic**
  - Induction type
  - Free positioning charging by a moving coil

- **Powermat**
  - Induction type
  - Will be released in 2013

- **Samsung Electronics**
  - Induction type
  - 3D glasses charging
  - Over 50 WPT related IPs

- **HanrimPostech**
  - WPC regular member
  - Conducts research on resonance type

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Technology Trends (2)

- As the next step, range-enhanced WPT technologies have recently been in development

- **Witricity**
  - Resonance type
  - Home appliances, mobile devices, EVs

- **Qualcomm**
  - Resonance type
  - eZone for mobile devices

- **WisePower**
  - Resonance type
  - eZone for mobile devices

- **Sony**
  - Resonance type
  - WPT to a 22 inch TV

- **Witricity-Haire**
  - Resonance type
  - Transferred power to Full HD TV at CES 2010

- **KETI**
  - Resonance type in development
  - 3 devices multi-charging

- **Intel**
  - Resonance type
  - WPT 12W of power to netbook 3 ft. away

- **Fujitsu**
  - Wireless desktop monitor
  - Smart Universal Power Access

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Standardization Trends

- Aware of high potential of WPT market, pioneer companies and institutes have started to establish their own individual stakeholder organizations to develop their own standards.
- The number of individual stakeholder organizations keep increasing as the future market size of the WPT started to have more enormous potential.
  - International standardization activities are as below:
    - WPC
    - A4WP
  - Domestic standardization activities of each country:
    - CEA (US)
    - BWF (Japan)
    - CCSA (China)
    - TTA & MFAN Forum (Korea)

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Standardization Trends – International

WPC (Wireless Power Consortium)

- **WPC was established in 2008**
- **WPC consists of 119 regular and associate members in 2012**
- **Standard Qi 1.0 on interface was released in July 2010**

- **Test specification**
  - **Performance Requirements Specification**
  - **Compliance Test Specification**

Profile	Current Regular Members
Wireless Power Technology	ConvenientPower, Fulton Innovation, Hanrim
Semiconductor / components	Freescale Semiconductor, ST-Ericsson, Sony, Texas Instruments, Toshiba
Broad Electronics	Haier, Philips, LG Electronics
Mobile Phone	Huawei, Nokia, Sangfei
Battery	Panasonic, Energizer
Manufacturers of mobile computers, net books and tablets. Manufacturers of po wer supplies for mobile computers. OD Ms of mobile computers	Delta
Automotive (OEMs and Tier-1 suppliers to the OEMs)	Continental Automotive
Other (camera, infrastructure, power too ls, etc.)	Leggett & Platt, Powerkiss
total	20

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Standardization Trends – International

A4WP (Alliance for Wireless Power)

- **A4WP was established in 2012**
- **A4WP consists of 14 regular members**
- **The goals of A4WP are**
  - **To establish an industry standardization**
  - **To grow the use of WPT worldwide**
- **Specification**
  - **Multi-device charging**
  - **Spatial freedom**
  - **Wide power range support**

Member List	
BURY	Deutsche Telekom
E&E Magnetic Products Limited	Ever Win International Corporation
Gill Indsutries	Integrated Device Technology, Inc.
NXP Semiconductors	Peiker Acustic GmbH & Co.
Powermat Technologies	Qualcomm
RadioPulse	Samjin
Samsung	SK Telekom

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Standardization Trends – US

CEA (Consumer Electronics Association)

- **R6.3 of CEA was established in 2010**
- **R6.3 develops standards, recommended practices, and related documentation related to wireless charging**
- **It consists of over 50 members (Fulton, Intel, Qualcomm, etc.)**
- **Scope**
  - Highly resonant WPT, Tightly coupled WPT
  - WPT efficiency, safety, etc.

CEA Member List	
Audiovox Corporation	Mojo Mobility Inc.
Belkin Corporation	Motorola Mobile Devices - Companion Products
Brilliance Audio	National Semiconductor Corporation
Consumer Electronics Association	Nielsen Media Research
Dell, Inc.	Panasonic Corporation of North America
Delphi	Philips Electronics N.A. Corp.
Duracell	Pioneer Research Center, USA, Inc.
EchoStar Corp.	PowerMat LLC
Energizer Battery Company	Pure Energy
Foxconn International Inc.	Qualcomm Incorporated
Fulton Innovation	Samsung Elec Co., Ltd.
General Motors Corporation	Scosche Industries Inc.
Gill Industries	Sima Products Corporation
GoldLantern, LLC	SIRIUS XM Radio, Inc.
Intel Corporation	SMSC -Standard Microsystems Corporation
Lawrence Berkeley National Laboratory	Superior Communications
Leggett & Platt	Visteon Corporation
Mercedes-Benz Research & Development North America, Inc.	W W Johnston Technologies, LLC
Microsoft Corporation	WiPower Inc

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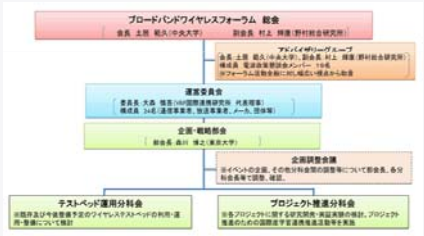
Standardization Trends – Japan

BWF (Broadband Wireless Forum)



- WPT WG of BWF was established in 2009
- The scope of the WG is standardization activities on resonance type such as
  - Frequency regulatory issues and RF radiation
  - Conformance test

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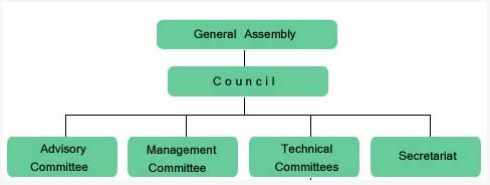
Standardization Trends – China

CCSA (China Communications Standards Association)



- WPT WG of CCSA was established in 2010
- The scope of the WG is interface and charging efficiency on induction type, frequency, human exposure, and regulatory issues

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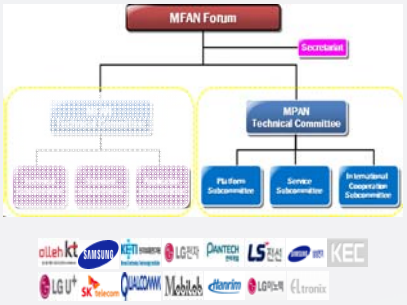
Standardization Activities – Korea

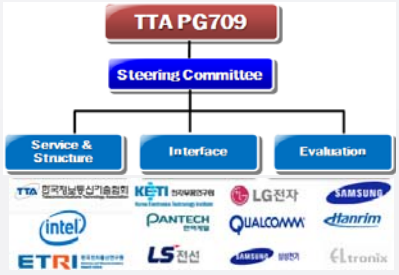
MFAN Forum – WPT TC (Magnetic Field Area Network)

- MFAN Forum was established in 2009
- MFAN Forum consists of 15 regular members
- Scope
  - Service scenario
  - Use case
  - Use requirement



TTA PG 709 (Wireless Charging and Application)

- TTA PG709 was established in 2011
- PG709 consists of 12 regular members
- Scope
  - Roadmap
  - WPT interface
  - Control mechanism



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Summary – Needs for Standardization

- It is clear that WPT is a promising technology with respect to the expectation of the potential market size and the worldwide technical trends in global companies and organizations
- Aware of high potential of WPT market, pioneer companies and institutes have started to establish their own individual stakeholder organizations (Fora, Consortia, Alliance, etc.) to develop their own standards.
- The number of individual stakeholder organizations keep increasing as the future market size of the WPT has more enormous potential.
- However, those individual WPT organizations could cause interoperability problem which will inevitably discourage customers due to inconveniences.
- It is obvious that interoperability among various WPT devices is the most important issue which will obstruct the growth of WPT market
- To satisfy both vendors and customers, harmonization of activities among those WPT groups is necessary, so it is strongly required to establish a new TA specialized in standardization of the WPT in IEC TC100.

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Proposed Title and Scope

- Title of the new TA
  - Wireless Power Transfer for Multimedia Equipment and Systems
- Scope of the new TA
  - To develop international standards related to wireless power transfer (WPT) for multimedia equipment and systems and corresponding receiving systems. The scope also includes specifications and requirements for management, and control protocols, interfaces, WPCU (Wireless Power Control Unit), conformance, energy efficiency, applications, and related works

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Secretariat for the new TA

- TAM: TBD
- TS: Dr. Seung-Ok Lim (Korea)
  - Director / Wireless Convergence Platform Research Center / KETI
  - Director / Wireless Energy R&BD Center
  - Editor / IEC TC100 Stage 0 WPT TR Project
  - Convener / ISO/IEC JTC1 SC6 WG1
  - Chair / WPT SIG / CJK IMT
  - Convener / WPT HIS / GSC
  - Vice-chair / PG709(Wireless Charging & Application) / TTA
  - Chair / Magnetic Power Area Network TC / MFAN
  - Project Manager / Wireless Charging System for Portable Device / Ministry of Knowledge Economics (Korea)
  - Project Manager / 1kW Wireless Power Transfer System / Ministry of Knowledge Economics (Korea)

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Activities Proposal

- Prospective new work items for standardization of WPT are summarized below
  - Control protocols
  - Interface
  - Requirements of WPT power control unit (H/W)
  - Conformance test
  - Safety & regulation, etc.
- Promotion of relationship and co-operation with other TCs & SDOs is one of the main roles of the new TA
  - TC66: Safety of measuring, control and laboratory equipment
  - TC69: Electric road vehicles and electric industrial truck
  - TC77: Electromagnetic compatibility
  - TC108: Safety of electronic equipment within the field of audio/video, information technology and communication technology

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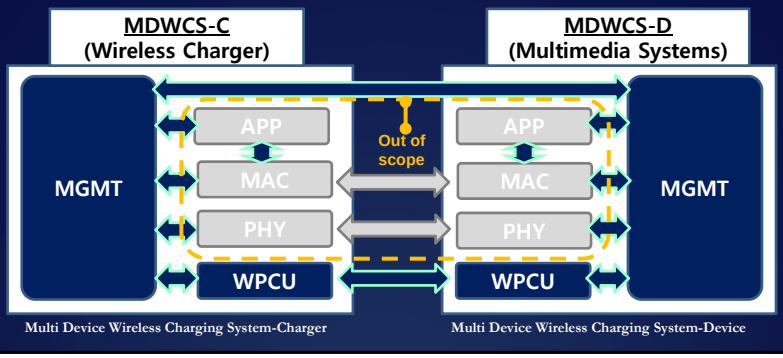
Thank You !!

Appendix

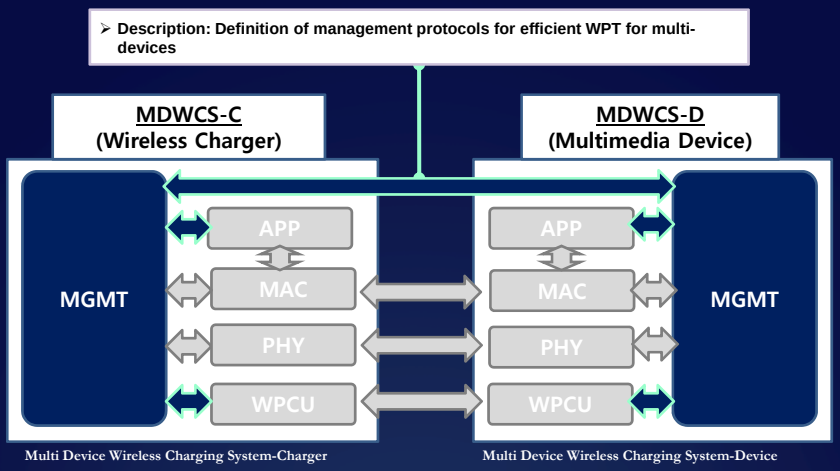
TA Title/Scope

- Title: Wireless Power Transfer for Multimedia Equipment and Systems
  - Scope: To develop international standards related to wireless power transfer (WPT) for multimedia equipment and systems, and corresponding charging systems. The scope also includes specifications and requirements for management and control protocols, interfaces, WPCU (Wireless Power Control Unit), conformance, energy efficiency, applications, and related works



Management protocols of WPT for multi-devices

- Description: Definition of management protocols for efficient WPT for multi-devices



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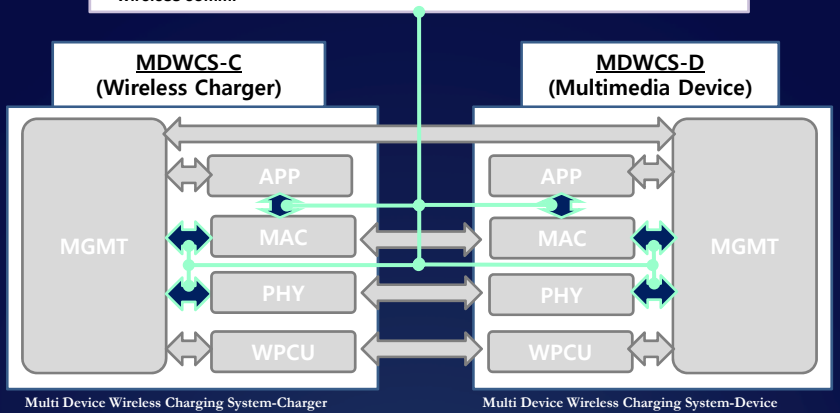
Interface

- Description: Definition of primitives for interfacing with other systems such as wireless comm.



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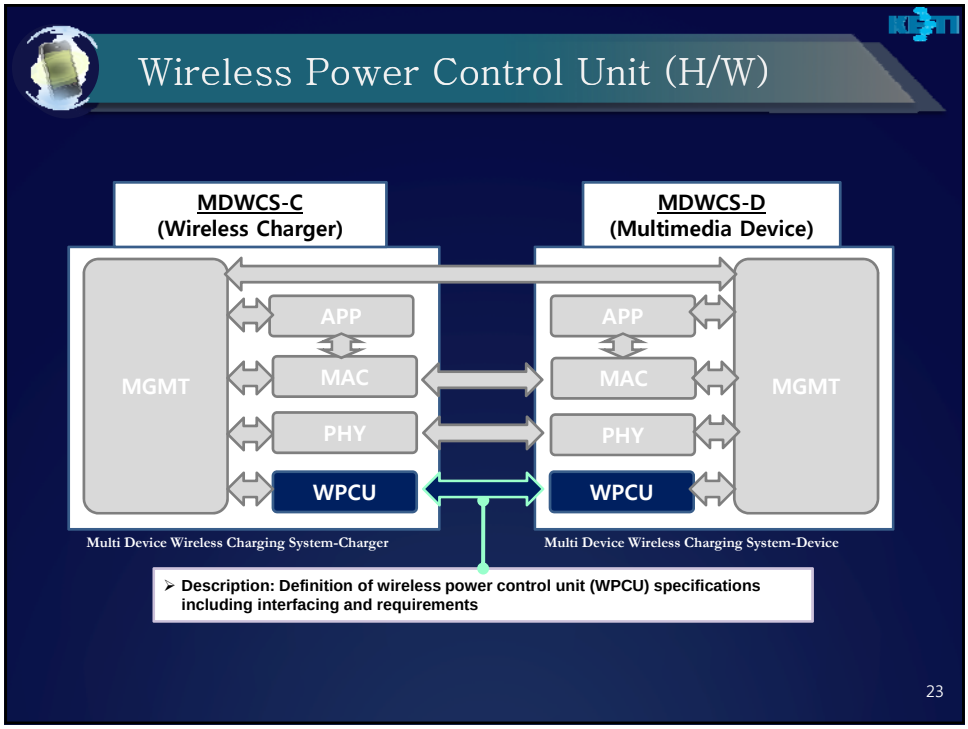
Wireless Power Control Unit (H/W)
MDWCS-C
(Wireless Charger)
MDWCS-D
(Multimedia Device)
MGMT
APP
MAC
PHY
WPCU
APP
MAC
PHY
WPCU
MGMT
Multi Device Wireless Charging System-Charger
Multi Device Wireless Charging System-Device
➢ Description: Definition of wireless power control unit (WPCU) specifications including interfacing and requirements
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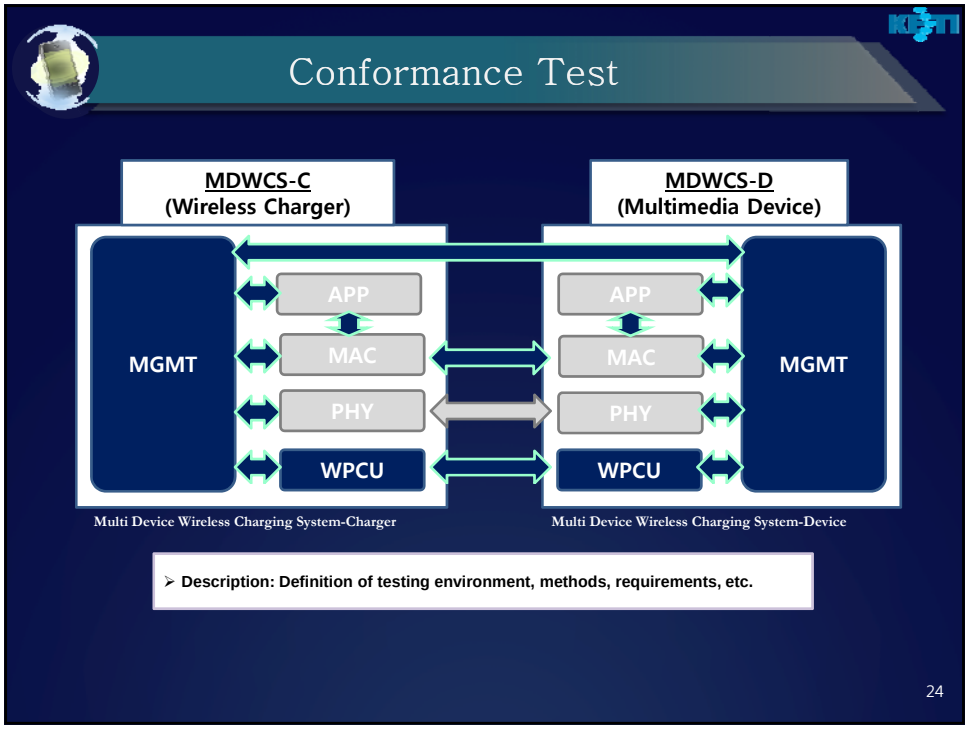
Conformance Test
MDWCS-C
(Wireless Charger)
MDWCS-D
(Multimedia Device)
MGMT
APP
MAC
PHY
WPCU
APP
MAC
PHY
WPCU
MGMT
Multi Device Wireless Charging System-Charger
Multi Device Wireless Charging System-Device
➢ Description: Definition of testing environment, methods, requirements, etc.
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