

## **Tutorial on “Smart Metering Utility Networks (SUN) Standard – IEEE802.15.4g”**

This tutorial gives an overview of the IEEE802.15.4g standard, shows how the standard can be applied to smart grid communications and the impact of its publication, presents the important features of the standard that are critical to SUN system implementation, and discusses potential future standard work.

### **Background and content**

The IEEE802.15.4g radio standard is a global wireless networking standard enabling interoperable communications between smart grid devices, including smart meters and smart home appliances. The publication of this new standard represents a huge leap forward in establishing common and consistent communication specifications for utilities deploying smart grid technologies.

Prior to the publication of IEEE802.15.4g, a MAC sublayer amendment - IEEE802.15.4e was published. Some of the MAC functions in IEEE802.15.4e are relevant to the implementation of the IEEE802.15.4g standard. While talking about IEEE802.15.4g, these MAC functions will be presented as well.

The intent of this tutorial is to give a high-level overview of the IEEE802.15.4g standard and to present in-depth analysis of its important features. To achieve these goals, the following topics are covered:

- Introduction of various wireless technologies that are used in different application domains of smart grid and illustration of how 802.15.4g applies to smart grid communications
- The impact of the IEEE802.15.4g standard to the smart grid standardization effort
- High-level overview of the standard
- Important PHY functions of the standard
- Unique options of the standard
- Major MAC changes that are needed to support the PHY
- MAC functions in IEEE802.15.4e that are related to the IEEE802.15.4g standard
- Potential future standard work

### **Who should attend**

Scholars and researchers who are interested in wireless communications for smart grid. IC designers, system implementers, and engineering management that are developing SUN related products. Application engineering and marketing/business management that are in SUN business.

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**Education:**

Ph.D. in Electrical Engineering, Texas A&M University, College Station, Texas  
B.S. in Telecommunication Engineering, National Chiao-Tung University, Taiwan

**Short Bio:**

Dr. Kuor-Hsin Chang is currently a Principal System Engineer of Elster Solutions working on Smart Grid standards and next generation AMI (Advance Meter Infrastructure) system development. He is also an editor of the IEEE 802.15.4g (Smart Metering Utility Network) Task Group. He was the Vice Chair/Technical Editor of the IEEE 802.15.4c Task Group which was standardized on March 2009 and has been actively involved in the IEEE 802.15 Working Group since early 2005.

Before Elster, Dr. Chang was a Sr. System Architect of Freescale Semiconductor and worked on the next generation IEEE 802.15.4/Zigbee platform. He was the system architect of Freescale's first single-chip IEEE 802.15.4/ZigBee Platform-in-Package (PiP) solution.

Dr. Chang has over fifteen years of development/application experience in the wireless/semiconductor industry working on emerging wireless technologies such as Wireless Personal Area Network (WPAN), Smart Utility Network, CDMA/TDMA cellular, fixed-point wireless (pre WiMAX), and Wireless Local Area Network (WLAN).

**Past Talk:**

“Wireless Communication for Smart Grid”; Institute of Communication Standard Research, China Academy of Telecommunication Research of MIIT, Beijing, China; April 10, 2012

“Wireless Communication for Smart Grid”; Department of Engineering Science, National Cheng Kung University, Tainan, Taiwan; March 10, 2011

“Smart Grid: Its impact on our life and IT technology”; Taiwan Smart Grid Industry Association, Taipei, Taiwan; March 7, 2011

“Wireless Communication for Smart Grid”; IEEE ComSoc/NATEA-SV Workshop on “Smart Grids, M2M Platforms, “the Internet of Things” and Other Networks for Smart Devices”, Santa Clara, USA, September 25, 2010

“Smart Grid: Its impact on our life and IT technology”; Silicon Valley Taiwanese American Industrial Technology Association, Mountain View, USA; August 26, 2010

“ZigBee Architecture/IC/system”; Chinese American Semiconductor Professional Association, Mountain View, USA; June 30, 2010

“ZigBee - The Next Big Thing in Wireless”; NATEA SIG Wireless Seminar, Mountain View, USA; March 27, 2006

“System Challenges for Designing a Zigbee Baseband Chip”; 7th IEEE/NATEA Annual Conference on New Frontiers in Computing Technology, Palo Alto, USA; May 7, 2005