ZigBee Standard: Enabling Interoperability in the Smart Home

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Agenda

- ZigBee Alliance Overview
- Interoperability:
  - foundation for the Smart Home
  - Based on complete standards and certification
- ZigBee 3.0 – Bringing it Together
  - Green Power Evolution
- Industry Collaboration with EnOcean Alliance and Thread Group
ZigBee Alliance

Who We Are

- Founded in 2002
- Open, global, not-for-profit
- More than 415 companies worldwide
- Membership is approximately 40% Americas, 35% Asia, 25% EMEA
- Board of 12 companies reflects geographic & segment diversity
Board of Directors

Promoter Companies

- COMCAST
- Kroger
- Schneider Electric
- legrand
- Landis+Gyr
- PHILIPS
- Itron
- NXP
- Wulian
- Texas Instruments
- SmartThings
- Silicon Labs
ZigBee Alliance

What We Do

- The ZigBee Alliance Creates, Maintains and Delivers Specifications, Standards and Solutions for the Wireless Internet of Things

- ANSI Member and practitioner of ANSI standards processes

- Hold more than 80 Technical Meetings a Month
ZigBee Alliance

What We Do

– Cooperate with other industry organizations and governments to ensure proper technologies are developed and delivered

– Certify products to help insure interoperability through the ZigBee Certified programs follow ISO Guide 65 and 67-1B

– Promote the use and development of ZigBee Alliance standards around the world
Some ZigBee Certified Products
What is a light bulb?
What is on?
What is off?
What is dim?

How does the network form?
What is the network size?
How do devices join?
How are messages encrypted?

What frequency is used?
How does transmission work?
Standardized at all Layers

OSI Model

- Application Layer
- Presentation Layer
- Session Layer
- Transport Layer
- Network Layer
- Data Link Layer: MAC
- Physical Layer

ZigBee Application Standards

ZigBee Networks

IEEE 802.15.4
ZigBee Certified Program

- Follows international certification guidelines
  - Designed as ISO Guide 67 Type 1b Program
  - Substantially complies with ISO Guide 65 “General Requirements for Bodies operating product certification systems”
- Maintains distinction between testing and certification
  - Testing performed by independent test service providers
  - Certification performed only by ZigBee Alliance
- Certification policy is well documented and available publicly at www.zigbee.org
Why ZigBee 3.0?

- Empower end users with a unified IoT standard
- Consolidate the ZigBee application profiles into a single library
- Takes next step to address industry push for interoperability in the smart home
3.0 Technical Details

- Utilizes most advanced version of the ZigBee Pro Mesh network, ZigBee Pro 2015
- Uses the globally available 2.4Ghz unlicensed band, IEEE 802.15.4, 2011
- Unique Green Power support for energy harvesting devices
- Scalable security features to suit end-user’s needs
ZigBee 3.0 Standard Documents

- **ZigBee PRO Specification**
  - Device networking

- **ZigBee 3.0 Base Device Behavior Specification**
  - How devices join and form a network

- **ZigBee 3.0 Application Architecture**
  - Implementation guidance

- **ZigBee 3.0 Cluster Library**
  - Defines application level functionality
What is Green Power?

- Green Power is a feature of ZigBee PRO networks

- Integrating battery-less (energy harvesting-based) or life-long battery operated devices into the ZigBee network
  - Key benefit: adds nodes/devices to the network that are virtually completely maintenance free

- Green Power adds green capability to ZigBee by eliminating battery usage and waste
A large set of Device Types

- Device Types built from set of underlying capabilities in the cluster library
- Can include behavioral requirements on the device
- Listed for example are some of the connected home devices defined, this is not the full list.
  - These are logical devices. A physical product may contain multiples of these.

### Home Automation Devices
- Configuration Tool
- Remote control
- Mains powered outlet
- Door Lock and Controller
- Simple Sensor
- Home gateway
- Smart plug
- White goods
- Meter interface
- Shade and Controller
- Window Covering and Controller
- Thermostat
- Temp Sensor
- Pump and Controller
- Pressure Sensor
- Flow Sensor
- Intruder Alarm devices

### Lighting Devices
- On/off light
- Dimmable light
- Color light
- Extended color light
- Color temp light
- On/off plug in unit
- Dimmable plug in unit
- Color controller
- Non-color controller
- On/off sensor
Key Initiatives Supporting Interoperability in the Smart Home

Expanding reach of ZigBee Application Library through additional batteryless profiles and future IP-support

EnOcean Alliance Liaison
- Combines ZigBee Green Power and EnOcean Equipment Profiles
- Enables battery-free devices using mechanical, thermal and solar energy collections
- The only 2.4GHz energy harvesting solution on the market

Thread Group Liaison
- Combines Thread Group networking solution, with ZigBee Application Library
- Resolving appropriate market segmentation
- Same 802.15.4-based radio

ZigBee 3.0 endorsed by The connected Lighting Alliance for residential lighting
- Announced March 11, 2016