



## Who will win the battle of the wireless standards for the Smart Home? Is there really a battle...?

Today, leading large Multi-Service Operators (MSOs) are driving the Smart Home applications through a variety of innovative service offerings like security, energy management and home care. The number of Smart Home devices connecting to the internet is steadily growing by several millions per month.

ZigBee has already been chosen as the preferred technology by a number of service providers, such as Comcast, DirecTV and EchoStar. However, there are a handful of other wireless networking technologies that are attempting to also gain traction in the Smart Home networking market. Which are these technologies and will they create a “Battle for the Smart Home”?

Below is an overview of the different technologies.

**1** Probably the best known is ZWave, a proprietary technology from Sigma Designs, a Milpitas, California, a US-based company, that uses various regional sub-GHz frequency bands in different parts of the world (USA, Europe, Japan, China). ZWave has achieved some early successes – in particular in the USA. It presents itself as a standard through the so-called ZWave Alliance. However, this Alliance is formed and controlled by Sigma Design and its membership is largely composed of Sigma Designs’ customers who have adopted Sigma Designs’ technology and have made themselves single source dependent on this company. ZWave is putting efforts into place to license its technology to other chip vendors, but so far with limited success.

**2** In Europe EnOcean is well known, also a proprietary technology developed by EnOcean GmbH, a Munich, Germany based company. Like ZWave it also using various regional sub-GHz frequency bands for different parts of the world (USA, Europe, Japan, China). It has achieved some early successes – in particular Europe – and managed to get their wireless technology accepted as a standard under ISO (ISO/IEC 14543-3-10). However, so far none of the other chip vendors has picked up this technology, so this is also a single source chip technology. Similar to ZWave, the EnOcean Alliance is essentially formed and controlled by EnOcean, and its membership is largely composed of EnOcean’s customers.

**3** DECT-ULE is different. It is not proprietary, it is an open protocol that is based on the original Digital European Cordless Telephony voice protocol. However, similar to both ZWave and EnOcean, it is very regionalized and uses various frequency bands in different parts of the world. Because of its connection oriented voice capabilities, it does not natively support networking, so therefore it is less suitable for sense and control networks. DECT-ULE technology is brought to market by a limited number of chip companies, of which DSP Group and Dialog are the most important. It is interesting to remember that in the past also efforts have been made to develop a version of DECT that would replace WiFi. However, this movement has never been successful either because of its region dependent implementations.

**4** Bluetooth Smart is a low-power derivative of Bluetooth. It is an open standard that uses a worldwide frequency band (2.4 GHz) and multiple large chip vendors provide this

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technology. However, Bluetooth Smart, just like Bluetooth, is a point-to-point connection technology, not a networking technology. So, it is very likely to follow the same market path as Bluetooth did: originally Bluetooth was proposed as a replacement for WiFi networking, but today, Bluetooth and WiFi are complementary technologies, used for complementary applications. In the same way, Bluetooth Smart and ZigBee are complementary technologies. For example: Bluetooth Smart is very suitable for Body Area Networks and ZigBee for Smart Home networking. One may well expect to see combo ZigBee-Bluetooth chips in the future, supporting both technologies.

### So, where is the battle?

Actually, there is no battle..., there is only confusion that sooner or later will clear up. There is market and technical confusion between Bluetooth Smart and ZigBee, just as there initially was confusion between Bluetooth and WiFi. Additionally confounding the market is the confusion between open worldwide standards (like Bluetooth, WiFi and ZigBee) and proprietary regional technologies that present themselves as worldwide standards but are really not (ZWave, EnOcean and DECT-ULE).

Large technology and consumer electronics companies want:

1. Worldwide solutions, as they loath developing/certifying different products (and different SKUs) for different regions in the world.
2. Open standards with multiple chip and technology providers, to guarantee lowest cost and continuity of supply.

So today, ZWave, EnOcean and DECT-ULE are making some limited regional progress, but they will not appeal to the large worldwide product makers. Bluetooth and Bluetooth Smart are open worldwide standards, but they are not networking technologies and therefore they play in different market segments, serving different sets of applications.

ZigBee however is: (1) an open standard networking technology standard (based on IEEE 802.15.4), supplied by more than 10 chip vendors (2) complementary to WiFi: WiFi pursues high data-rates to support internet content sharing and distribution, ZigBee is about long battery life: exceeding the life of the product and (3) ZigBee uses the worldwide (2.4GHz) frequency band, meeting the requirements of the large worldwide product makers. So, sooner or later, when the market of the smart/connected home truly develops, ZigBee will prevail, as there is simply no technology alternative.

Sometimes history repeats itself – this will be the case here as well. Today WiFi and Bluetooth are worldwide accepted open standards (based on IEEE 802.11 and 802.15.1). But a little over a decade ago, WiFi and Bluetooth went through a few years of market confusion, where they were pitted against each other and both had to compete with proprietary alternatives. For instance WiFi had to “battle” with HomeRF, a proprietary networking technology that is now forgotten, and today Bluetooth is still battling somewhat with ANT+ for some applications.

Currently no one is confused anymore. The wireless networking and communications market is dominated by WiFi and Bluetooth, each in their own application domain. WiFi has become the technology for high speed, high data rate communications in our homes and throughout larger buildings, while Bluetooth has become the standard short range, low data rate “cable replacement” technology connecting a wide range of devices from keyboards and mice to headsets.

Is it hard to predict then when the confusion is cleared up that for low power networks the market will be dominated by ZigBee and Bluetooth Smart? ZigBee for networked devices and sensors (e.g. Smart Home solutions) and Bluetooth Smart for simple one to one connections (e.g. connecting a heart-rate monitor or a step-counter to for instance a cell phone)?