

## **SMART METERING IMPLEMENTATION PROGRAMME:**

***Consultation on draft license conditions and technical specifications for the roll-out of gas and electricity smart metering equipment (August 2011)***

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## **COMMENTS OF SIGMA DESIGNS, INC. PERTAINING TO THE PROPOSED SMART METERING IMPLEMENTATION PROGRAMME**

## INTRODUCTION

Pursuant to the *Smart Metering Implementation Programme* issued August 2011, Sigma Designs, Inc. respectfully submits these comments to the Roll-Out Team.

For your reference, Sigma Designs is a Milpitas, CA-based semiconductor company with deep expertise in smart energy, home connectivity and media processing. The company is active in many standards organizations including both ITU and IEEE and is active in the HomePNA, HomePlug, HomeGrid, and Z-Wave special interest groups.

Sigma's Z-Wave technology is the most popular Home Area Network (HAN) technology with over 8 million Energy Management and HAN devices in the field and over 500 interoperable, smart-ready devices – more than any other solution by far. These devices can be purchased in over 8,000 retail locations globally. Presently, over 25 manufacturers make Z-Wave-enabled devices for sale in the U.K. Today, Z-Wave is the energy management solution for Verizon, Docomo and other Tier 1 service providers globally.

In addition, Sigma is a leading provider of Home Entertainment Networking (HEN) chipsets and is actively selling HomePNA (ITU standard G.9954), HomePlug and G.hn (ITU standard G.9960/G.9961). The company is a leading patent-holder in powerline communications, has deployed over 25 million home network chips across 70 global service providers and employs over 140 engineers dedicated to home networking. Thus, Sigma is also an expert in home networking-related technologies.

We use this unique know-how to shape the enclosed suggestions.

## **COMMENTS**

### **Energy Management Comes from Home Area Networks, Not Smart Meters**

In the introduction (1.1 Policy Context), the Government proposes that “smart meters will give people far better information about, and control over, their energy consumption.”

We dispute this fundamental premise. Smart meters are aggregators of consumer power demand. They neither provide details regarding the consumption of power on a device by device basis, nor do they provide direct control over the energy consumption beyond a household level of granularity. Only with the addition of Home Area Networks (HAN) functionality implemented into specific power consuming devices (or connected to these devices) can specific device level measurement and control take place. Without this fundamental access, the U.K. Government risks missing the key fulcrum in controlling energy demand – the actual devices that demand electricity.

### **The HAN Should Be Independent of the Smart Meter Initiative**

Smart Meters have long deployment cycles and remain in use for a sustained period of time – often 15-20 years. Therefore, investments made in defining and deploying the smart meter happen over decades, not years. Consumer products have a different product lifecycle which is measured in years, not decades. As a result, creating specifications that will affect consumer product features and attaching them to the lifecycle of a smart meter will dampen innovation and slow down the actual adoption of energy management services. Sigma Designs encourages the U.K. Government to define an interface between the Smart Meter and the HAN and allow the HAN to exist independent of the Smart Meter (both physically and logically).

### **The U.K. Government Should Not Mandate In-Home Displays (IHD).**

In-home Displays (IHD) are an important part of a residential energy management solution. However, Sigma Designs disagrees with the “obligation to provide an In-Home Display” as set forth in Tranche 1 requirements 1.2.15 (and in 2.7a.71-74). Customers should have an ability to control their electricity. This is a reasonable and obvious objective. Nonetheless, empirically, we find customers prefer using their smart phones, tablets, PCs and even television screens (all are in deployment today) instead of a dedicated display device. Sigma’s OEM partners and service providers do sell IHDs and we will continue to see success in these products. Yet, mandating IHDs will unnecessarily increase the deployment costs overall, but won’t necessarily provide consumers with their preferred method of control.

As a result, Sigma Designs recommends the U.K. Government resist the temptation to specify the hardware needed inside an IHD. Who can envision what technologies might be possible in as late as 2019? We encourage the Government to promote the kind of information consumers should access and allow industry to create the latest, more advanced options available at each time within the scheduled timeframe.

Furthermore, in regard to Consultation Question 18, we believe that customer choice is the best way to handle all aspects of displaying the personal data consumers need. Customers should have the ability to see their data on any device they want. Therefore, we oppose mandating IHDs in any manner.

### **Ensure Low Switching Costs by Becoming Physical Layer and MAC Layer Agnostic**

In Spring Package 1.2.18, the goal was to “help ensure customers do not face barriers to switching.” This is an admirable goal which we support wholeheartedly. Yet, the Government’s smart meter recommendations mandate standards that will increase switching costs for consumers – all unnecessarily. Today, it mandates ZigBee SEP 1.x. SEP 1.x is a proprietary technology controlled by a single entity (ZigBee).

Sigma Designs recommends the Government remove the mention of ZigBee altogether in the document and instead propose SEP 2.x which is the next generation beyond SEP 1.x, is nearing completion, and is MAC and PHY agnostic. SEP 2 is supported by the WiFi Alliance, the HomeGrid Alliance, the HomePlug Alliance and the Z-Wave Alliance. By using SEP 2.x, the Government will ensure more consumer options and reduce switching costs for consumers and utilities.

### **Avoid Locking In Communications Standards. Instead Lock in Performance or Features**

It is easy to get caught up in specifying explicit communications standards on the hope it will simplify the roll-out and interoperability of standards. Yet, this isn't true in practice. Today, ZigBee modems that comply with the IEEE radio specification and SEP 1.x standard do not work with the ZigBee in-home protocols. In fact, there are as many as 6 different implementations of ZigBee as it relates to connecting home devices and smart meters – resulting in massive incompatibilities, installation problems and so forth.

Fortunately, it doesn't matter in practice which technology is used, as long as the market is open. For example, in September 2011, Sigma Designs announced a bridge that allows ZigBee SEP 1.x smart meter devices to interoperate with over 500 Z-Wave HAN based devices by using a ZigBee to Z-Wave Bridge. Utilities no longer need to worry about what is in the smart meter and what is in the home network. In the future, bridges could easily exist between wired networking standards such as G.hnem and Z-Wave, between ZigBee and G.hn, between WiFi and HomePlug, etc. Flexibility is useful to the Smart Meter initiative. Unfortunately, by restricting the recommendation to a single communication protocol, the Government is limiting the potential of its network and the potential innovativeness of industry.

Moreover, the rate of change in communications is quick – doubling performance every 18-24 months. By way of example, most Internet users 8 years ago were using dial-

up modems. Now, broadband bandwidth is common. Imagine if the Internet had mandated dial-up modems 8 years ago and we didn't have the benefits from broadband innovations. Today, the same principle is applying to the current proposed Smart Metering Implementation Programme where the Government would prefer to lock in technology for deployment 8 years from now that is already obsolete and will be generations behind when deployed for 10-20 years afterwards.

Therefore, in regard to Consultation Question 4, we do not agree that SMETS should mandate a communications protocol, nor mandate continued compliance with a single mandated communications standard. Instead, we propose the Government adopt a MAC/PHY agnostic approach and suggest performance targets and interoperability of devices (through whatever means is available at that time). Finally, using a standard interface such as USNAP instead of a standard protocol will allow for both flexibility and innovation while simplifying implementations.

### **Set the Utility Demarcation at the Edge of the Residence**

In 3.2a 93 (rationale for development of the SMETS), there is a fundamental belief that the smart meter is and should be at the center of an energy management solution. Sigma Designs believes there is a better approach for delivering a positive experience, avoiding unnecessary replacement of Smart Meter Equipment – all while reducing greenhouse gases.

Sigma Designs strongly encourages the Government to follow the example set by the telecommunications industry where the utility is responsible for devices outside of the customer's premises and not responsible for devices inside the home. This model has proven to be highly effective. It allowed for an exemplary level of compatibility and interoperability, fostered tremendous innovation, and enabled very low prices for consumers.

There are several reasons why separating the utility-owned infrastructure and the consumer owned infrastructure is good for utilities, good for ratepayers and good for industry.

1. **Enables Innovation.** Consumers are not uniform. Their needs, preferences and capabilities differ from user to user, region to region and home to home. By separating the consumer's home network from the utility's network, industry will be better able to address each consumer's needs and situation. This demarcation will foster competition and lead to greater choice and lower costs for ratepayers.
2. **Improves Performance.** Industry moves fast and consumer device lifecycles are 5-6 times faster than utility/meter life cycles. In communications semiconductor sectors, each life cycle tends to result in a doubling of price performance. Therefore, over the life of a single meter, the communications price/performance of consumer devices will have improved 30-60 times. Within the timeframe proposed by the Government, performance of smart energy related communications will have quadrupled or more.
3. **Avoids Privacy Issues.** By separating the aggregated, cumulative data collected by the smart meter from the disaggregated usage/behavior data generated by consumer-owned devices, the Government can avoid concerns about privacy and objections to outsider control of consumer-owned devices. Furthermore, this avoids legal issues about the jurisdiction of the Government dictating behavior of consumer-owned devices versus utility-owned devices.
4. **Increases Flexibility.** Each home is unique. There are structural/construction differences and technical variances across consumer-owned and utility-owned devices. The consumer will benefit from the innovation of industry to build unique solutions to meet these variances. For example, in some homes, wireless technology is perfect. In other homes, it doesn't work. In some homes, electrical interference makes some communications protocols more viable than others. By separating the distribution (including access) from the consumer-side, the Government will allow for better-tailored solutions inside the home at lower prices for a broader number of U.K. citizens.

5. **Simplifies the Grid.** Home networks are laden with traffic. The grid doesn't need to be. By separating the two WAN and HAN networks, the Government can ensure only grid-relevant information is shared to the grid and utilities. This will ensure greater reliability and keep costs in check.
6. **Clarifies Responsibility.** Home energy management services will be offered by a wide range of companies including telephone companies, cable companies, Internet service providers, alarm companies, retailers, device makers and electric utilities. Since consumers will purchase Smart Grid-enabled devices from a broad range of sources – including retailers, it will be difficult for the user to identify who is responsible for ensuring uptime and performance of the network. By creating a demarcation at the edge of the house, the Government will protect the utility companies from being seen as responsible for installation and management of home area reliability issues. As way of an example, imagine if the utility had to provide technical support to ensure customer's WiFi networks.
7. **Improves Security.** Home area networks and home entertainment networks are often connected to the public Internet. Special care needs to be given to ensure that consumer's access to public networks do not compromise the Smart Grid. By creating a demarcation between the consumer and utility devices, it is more likely that some form of "airlock" can be created to ensure the Smart Grid isn't compromised.

## **Resist Mandating Communications Protocols**

Sigma Designs strongly encourages the U.K Government. to resist mandating specific communications protocols. There are several reasons why we believe it is not in the public interest for the Government to mandate specific standards or protocols at the PHYSICAL or MAC layer.

1. **Ensures Best-of-Breed Technology.** Technology lifecycles are faster than regulatory life cycles. In the communications industry, price performance doubles every 18-24 months. Regulatory life cycles are of similar length (or often longer).



As a result, the utility will, at best be suggesting standards that are already obsolete by the time the regulation is put into place. By resisting setting specific protocols, the Government will continue to foster the innovation it desires in the Smart Grid arena.

2. **Gains Economies of Scale.** New standards are always emerging. Today, for example, both the ITU (International Telecommunications Union) and the IEEE (Institute of Electrical and Electronic Engineers) are establishing Smart Grid standards for global deployment. Selecting a preferred protocol and restricting these future, global standards will reduce the ability for U.K. ratepayers to benefit from efficiencies created by the global marketplace. Moreover, as these standards processes are continual (there will always be new standards), it is structurally impractical for the Government to determine a given standard is “the” standard the Government should select.
3. **Avoids Unnecessary Restrictions.** Industry is creative and flexible. The marketplace determines what consumers want and what companies need better than regulators. It is relatively easy to bridge between one technology to another. For example, Sigma Designs already has solutions that bridge between Ethernet and HomePNA, Ethernet and HomePlug AV, Z-Wave to WiFi, and Z-Wave to ZigBee. In practice, what this means is a home area network running Z-Wave can talk to a Smart Meter running ZigBee (or vice versa). It is relatively inexpensive to achieve and doesn’t require regulation to accomplish.
4. **Reduces the Chances for Coexistence Problems.** Communications standards in the Smart Grid can impact performance of other communications technologies including telephony, Internet access and PayTV distribution. The Government is a regulator, not a comprehensive testing laboratory. By avoiding mandates, the Government will reduce the potential for inadvertently mandating standards that interfere with other current or planned networks.
5. **Improves Cost Efficiency.** In addition to the cost benefits of global efficiencies and state-of-the-art standards, there are other financial considerations. The Government is not as intimately aware of the subtleties of costing communications solutions. These subtleties include optimizing bandwidth,

managing memory and defining error correction methods. Each of these (and more) can dramatically alter the price of a given technology. The Government is not well equipped to understand these choices nor is able to make “reasonable” judgment in regard to the optimal cost or value of a specific protocol. The market is. Service providers have the deep technical staff and financial incentives to make the optimization decision. Therefore, by avoiding specifying a single standard, Industry will be allowed to choose the best technologies for their needs. For example, the mandating of a WAN chip inside the meter will result in a substantial increase in deployment cost compared to alternative approaches.

6. **Increased Choice Increases Adoption.** Limiting customer choice by standardizing on a single, outdated protocol will reduce customer choice and reduce customer demand. For example, if a consumer has an existing home area network (which millions do) and the Government requires them to replace this network with a network that matches the recommended protocol selected by the Government, the customer will be resistant to change. Yet, if the customer is allowed to use the technology they already have and simply add some mechanism to accept demand response signals, adoption could be much faster.
7. **Avoids Confusion.** The standards business is often messy and consumers can be left unclear about what to buy. For example, HomePlug is not a single standard, but many incompatible standards. HomePlug 1.0, HomePlug Command and Control and HomePlug AV are all incompatible with each other. ZigBee has eight different flavors and most devices cannot interoperate with each other (even though the radio itself is uniform). How does the Government educate the consumer on the flavor of the standard? It is better for the Government to let the market sort this out.
8. **Ensures Greater Real-World Coexistence.** Many companies are contemplating entering the home energy management space – including pay TV service providers. These service providers already have home entertainment networks that can be leveraged to support Smart Grid communications within the home. They know the communications protocols they intend to use and they know what communications protocols will coexist or will kill their networks and will deploy

the right technology accordingly. Since these service providers know their networks and will pay the price for a lack of coexistence, they have the incentive to ensure a proper working environment and will do so.

### **The Smart Meter Doesn't Have To Be at the Centre**

In 3.2c.99, the Government concludes that there are four recommended architectures. In all the architectures outlined (3.3ii.121.4), the Smart Meter is at the centre of the architecture. While these are all valid architectures, there is an underlying presumption that these options are the only options available to solve the greenhouse emissions/energy conservation problem. Yet, additional options are available.

For example, in North America, the telecommunications carrier Verizon is implementing home control and energy management solutions using Z-Wave technology. In this implementation, the control of energy consumption is completely independent from the smart meter. Energy is monitored on a device by device basis and controlled through a residential gateway that isn't associated at all with the smart meter. Furthermore, Z-Wave-enabled monitors can be attached to non-smart meters allowing for complete visibility to energy consumption. Monitoring of the energy consumption is possible on smart phones, tablets, PCs, in-home displays and even the television.

There are security benefits to separating the home area network and the smart meter (as was mentioned earlier). Moreover, the lifecycle of consumer devices and the lifecycle of the smart meters are quite different. Therefore, having the consumer premise equipment separate from the smart meter will result in less meter obsolescence and more consumer flexibility and choice. Additionally, the Government has assumed a very high cost to deploy WAN communications (estimated at £15 for the transceiver in Table 4). This is unnecessary when using a pre-existent broadband connection. Finally, by integrating the communications functionality into home entertainment systems or other broadband services, it is easier to enable energy management user interfaces on televisions – something that customers have shown a strong interest in.

Therefore, we believe that in regard to Consultation Question 39, that there are many alternative approaches to to circumvent the DCC approach.

### **Recommendations in the IDTS Should Not be Adopted Universally**

Regarding Consultation Question 25, “Do you agree that *all* the requirements recommended in the IDTS should be adopted by the Government in the SMETS?” Sigma Designs does not concur with this recommendation in totality. As mentioned earlier, the architecture options are incomplete, the IDTS recommendations mandate non-standard, closed communications protocols, the communications protocols are locked in far too early, industry innovation is being ignored and the demarcation between the inside applications and networks (HAN) and the outside network (WAN) isn’t strong enough.

### **Both the WAN and HAN Modules Should Be Exchangeable**

In 3.3a.113, the Government proposes that the WAN module should be interchangeable, but the HAN transceiver doesn’t need to be. Sigma Designs disagrees with this recommendation. We believe both the HAN and WAN should be swappable. There are several reasons for this. In regards to the WAN, there are valid technologies such as ITU’s G.hn powerline technology which has potential application for sub-meter to meter communications and for other WAN-based communications over powerline. The meter shouldn’t assume that wireless networking technology will be technically sufficient in all households. Therefore, we agree that the WAN should be exchangeable.

In the HAN, choice of consumer devices and consumer features should not be restricted or mandated because of compliance issues with old, out-dated HAN protocols found in the Smart Meter. Between 2012 and 2020, consumer devices will have gone through 3-4 product lifecycles. As a result, the performance of HAN communications technology will have likely quadrupled or more in this timeframe. Yet, if the Government mandates compliance to current (or old) standards, consumers will suffer (or not use the systems as

defined. The best remedy is to mandate some interface functionality such as found in USNAP so that modules can be swapped when necessary without replacing not only the smart meters, but the consumer appliances. Therefore, Sigma Designs recommends that the Government ensure that HAN modules are exchangeable, too.

Sigma Designs does not agree with 3.3.127 where the Government suggest there are no agreed standards for a WAN module to be exchangeable or replaceable. The USNAP alliance offers a practice and affordable solution that makes replaceability practical.

In response to Consultation Question 35, Sigma Designs recommends an approach where the WAN and the HAN are exchangeable modules that can swapped by using the USNAP protocol or other similar approach.

### **The Government Should Not Specify the Communications Hub Standards**

In response to Consultation Question 30, the Government should not require a specific communication hub since it shouldn't standardize the communications protocol but be MAC/PHY agnostic. Plus, it shouldn't mandate the communication exist through the Smart Meter or over the WAN connection at all. We recommend the Government specify a simple interface such as USNAP in the Smart Meter, describe the target functionality it should contain (such as connect to Utility back-end servers), and allow the market to evolve naturally.

### **Keep the Consumer at the Center to Ensure Faster Adoption**

The challenge for the Government is to fairly balance the needs of the utilities and ratepayers. The utilities desire the ability to better manage demand and the consumers desire better control over their consumption and payment. Yet, today perhaps the weighting being proposed by the Government is too strongly on the side of utilities to the detriment of ratepayers. This can be seen most vividly in the areas regarding mandating

consumer device behavior. Sigma Designs therefore recommends the Government resist mandating behavior of consumer-owned devices.

The utility company has a desire to see changes in demand based upon sending a demand response signal. This is a reasonable objective. Yet, this requirement does not need to be so granular as to require each consumer appliance to speak directly to the utility. Today, Smart Meters aggregate the total energy demand for each given residential entity. Within a given period of time, the utilities today can determine the cumulative energy demand from that entity and determine to what degree that entity has shed power based upon its request. Thus, there doesn't appear to be any public interest in identifying, nor choosing which device within the home shed the power, only that the total power was shed sufficiently. The ability to know the total load that was shed is already available with existing smart meters and any additional functionality will result in substantially higher costs across the entire system – all without adding benefits to anyone. By mandating a specific HAN functionality, the Government is inadvertently mandating the functionality of hundreds of consumer products.

### **Consider the Consumer's Perspective**

In 3.3.130, the Government asserts that “the most effective way to reduce complexity would be for the Government to mandate a single configuration of communications equipment in the premises.” Sigma Designs vigorously refutes this assertion from multiple perspectives. First, it assumes that one size fits all infrastructure, all technical environments, all technical challenges and so forth. Having sold tens of millions of communications devices globally, we have learned that there is no one technology that meets the infrastructure needs of the global customers. Even within single countries or even specific cities, building materials, construction approaches, age and so forth cause great diversity in implementation requirements. The utopian goal of having one approach doesn't take into consideration the practical realities of the real world.

Second, by mandating customer premise products (CPE) must comply with a single

communications standard will dramatically limit innovation and hurt citizens of the U.K. Imagine the simplicity of mandating every citizen must use Microsoft Windows. It would have simplified things for some people. However, it would have kept the consumers from the benefits of alternative approaches such as the Apple OS X operating system. Smart energy is no different. What is the Government interest in limiting innovation?

From a practical perspective, we see this innovation at work in the real world. Today, alarm companies put energy management functionality into alarm panels and smart phones. None connect to the Smart Meter. Telecommunications and PayTV providers who are adding energy management to triple play entertainment and communications services – again all without connecting to the Smart Meter. These services all connect to HANs that do not comply to the proposed standards being suggested by the Government. Imagine if millions of BT customers have home energy management services operating with tens of millions of devices that are not in compliance with the standard set by the Government. Is it in the best interest for these consumers to either abandon their purchases or be required to add costly new features only to comply with some out-dated standard that was designed in the middle of the first decade of the millenium? We think not.

Finally, any mandates of consumer premises devices should be avoided for the many reasons previously covered such as life cycle alignment, demarcation benefits of separating the meter from the CPE and the benefits on CPE devices between independent of the meter for security reasons.

### **Add Z-Wave and PLC Technologies to the HAN Definitions**

In 3.3.i.135, the Government specifies ZigBee for the HAN. Other technologies such as ITU G.9960, G.9955, IEEE P1901, G.wnb and other technologies are conspicuous in their absence. Our experience is that by mentioning a specific technology and not mandating others is often used by vendors in one technology to gain market advantage

over another technology – even if the Government never intended to give preference to one technology over another. Therefore, we encourage the Government to remove the mention of ZigBee or add the mention of other technologies such as Z-Wave, G.hn and others.

### **Clarify the HAN Interface Requirements**

In 3.3.i.136, the Government proposes one of three kinds of potential standards are mandatory for inclusion in the proposal. Sigma Designs would like clarity in the Government recommendation regarding what is included as an International Standards Organization. For example, is the International Telecommunications Union (ITU) considered an ISO under the Government's definitions. What about trade groups such as the HomePlug Alliance or the Z-Wave Alliance? The HomePlug Alliance has over 50 million chips installed in the market. Do they qualify as a standard? How about a standard such as Z-Wave with over 160 global members, over 500 certified products, multiple sources and millions of devices installed? Does that count? It is Sigma Designs' belief that these organizations should be included in such a definition and the market will benefit from greater clarity in the Government's definitions.

We agree with Consultation Question 36 that "there should be no restrictions on the HAN standards adopted by suppliers" with the caveat that mature standards such as Z-Wave and ITU standards are included in the definition of "International Standards."

### **HAN Standards Recognition Dates Should Not Be Mandated by the Government**

While Sigma recognizes that at some point standards must be finalized, we don't agree that an arbitrary date should be set by the Government. In Consultation Question 37, the Government recommends that "all standards should be recognised or be in the process of being recognised by 31 December 2014." While our technologies all comply with this date, we still believe it is not in the Government's best interests. The current standards will all be obsolete by 2020. Does the Government want to restrict the use of some new,



incredibly powerful standard that might be invented and ready for deployment by 2016 or 2017? It makes sense to allow the market to innovate and allow the utilities and consumers to benefit from whatever innovations occur over time.

We caution the Government from setting arbitrary dates, nor allowing industry to encourage dates that might cause one viable technology to be blocked from usage due to such an arbitrary date.

### **Interoperability Testing Is Paramount**

In Consultation Question 38, the Government inquires whether there should be “testing of HAN standards during the Foundation phase.” Sigma Designs agrees – with some conditions. We believe that testing the “standard” is less relevant than testing the interoperability of the systems. As we have indicated previously, companies can comply with standards and yet not be interoperable. We used the IEEE P1901 and ZigBee technologies as current examples of such problems. The U.K. Government should mandate all devices interoperate. They should be allowed to use whatever mechanism to create that interoperability. This can include adding bridging technologies, stand-alone chips, software or some still undefined approach. The goal should be interoperability not just compliance.

Moreover, the Government should recognise there are many technical and logistical challenges in creating such testing procedures. Sigma Designs is actively involved in creating and managing such efforts in HomePlug, HomeGrid, HomePNA and in the Z-Wave Alliances. We caution the Government to be thoughtful about specifying tests without deep interactions between utilities, OEMs and silicon manufacturers.

### **Not All Standards Are Alike**

In 3.3.i.137, the Government asserts that “meter operators...can be confident that their hand-held terminals will interact with the HAN, because it is based on an internationally

recognised standard.” Empirically, this is not true. Some standards such as ZigBee only are international standards for the radio. They don’t mandate standardisation at the protocol level. As a result, there is no interoperability between the HAN and the WAN variants of ZigBee. If the operator wishes to have a universal testing device for both the smart meter’s WAN capability and the smart meter’s HAN capabilities, there is no guarantee the device will be able to talk to both networks currently.

We encourage the Government to be cautious of making broad claims regarding the true interoperability of given standards. For example, in PLC technology, IEEE P1901 supports two MACs and two PHY protocols that don’t interoperate. If the Government were to propose P1901 for use in Smart Meters and assumed the test equipment would work, there would be no guarantee since there are two potential variants.

### **Diversity Suggests Against Recommending a Single HAN Standard**

Sigma Designs agrees with 3.3.i.138 where the Government suggests that it is “unlikely that a single HAN standard will be suitable for all properties in GB.” We recommend against selecting one single HAN over all other technologies – even if our technology was the one selected.

### **Remove ZigBee Smart Energy Profile (SEP) 1.x**

Sigma Designs strongly opposed standardising the IDTS around ZigBee SEP 1.x in 3.3.145. If the Government feels compelled to specify a HAN, they should standardise around SEP 2.x as it is not a proprietary technology, but an open standard being embraced by the U.S. NIST for use in their smart grid initiatives and is open to multiple technologies including WiFi, HomeGrid, HomePlug, ZigBee and Z-Wave.

Therefore, Sigma Designs does not agree with Consultation Question 40 where ZigBee SEP 1.x should be adopted.

## **SUMMARY**

Sigma Designs thanks the Department of Energy and Climate Change for the opportunity to share our broad experience developing powerline and wireless network technologies for use in home energy management and entertainment networking. We encourage the commission to let the market decide what technologies are best suited for the home. The Internet is an excellent model of where light regulation combined with enormous potential has led to tremendous innovation and superior outcomes for consumers.

We encourage the GOVERNMENT to set the demarcation of the Smart Grid at the edge of the home, resist mandating specific protocols that will instantly be obsolete and expensive, and avoid the temptation to regulate all the way to the consumer's devices.

Thank you for your time and consideration of our comments.