Abstract

This document provides feedback to the United Kingdom Department of Energy and Climate Change Consultation on Draft Licence Conditions and Technical Specifications for the Rollout of Gas and Electricity Smart Metering Equipment, Reference Number 11 D/836.

Introduction

The ZigBee Alliance supports the evaluation being undertaken by the Department and believes it is prudent and in the best interest of consumers to provide a competitive and standards-based approach to smart metering in the United Kingdom. We are pleased to offer the following replies to specific questions on the noted consultation and stand ready to provide any additional feedback, expert contribution or other advice where needed. For those questions where analysis showed either no response was needed or there was no significant opinion, we have not provided a response. If there are specific follow-up discussion points or questions, please do not hesitate to contact us. We look forward to continuing support for this important programme.

ZigBee Alliance Responses

Q4: Do you agree that Smart Metering Equipment should be compliant with the SMETS extant at the time of installation and that it should continue to be compliant with that version of the SMETS through the operational life of the equipment? Please explain your reasoning.

ZigBee Alliance Response:
To provide 20 year life expectancy of installed Smart Metering Equipment, it should be compliant with the SMETS at the time of installation and continue to be compliant through the operational life of the equipment. This means software and equipment upgrades should also be compliant with the SMETS.

Q8: What contribution do you think the interoperability licence condition as drafted could play in ensuring that suppliers work together to ensure Smart Metering Equipment is interoperable? Please explain your reasoning.

ZigBee Alliance Response:

The interoperability licence condition should ensure that stakeholders agree on pervasive standards and equipment manufacturers adhere to those standards. This will greatly enhance the likelihood of equipment interoperating successfully and limit the likelihood of equipment replacement due to change of supplier.

Q9: Do you think the licence conditions as drafted effectively underpin the policy intention to ensure Smart Metering Equipment is interoperable? Please explain your reasoning?

ZigBee Alliance Response:

The licence condition statements AA 8.a.i and BB 7.a.i disallowing replacement of equipment essentially underpins the intent for interoperability. However, licence condition statements AA 8.a.ii and BB 7.a.ii state that remote modification or reconfiguration is allowed. Remote configuration is acceptable, however routine remote modification should be discouraged as this does not ensure that system developers will work to a common standard. We would propose a path of interoperability through certification. ZigBee supports robust, managed Over the Air upgrade to provide an ability for remote modification.

Q10: What role could a dispute resolution mechanism have a role in ensuring interoperability? What key features should such a mechanism have?

ZigBee Alliance Response:

A proactive approach is the preferred way to deal with ensuring interoperability, to avoid manufacturers disagreeing on implementations. The ZigBee Alliance already has in place independent and rigorous interoperability testing programmes to ensure interoperability in the field by way of example.

Q24: Do you think that there are other requirements that the Government should adopt in the SMETS? Please explain your reasoning.

ZigBee Alliance Response:

The Government should adopt a requirement for strong interoperability to ensure the marketplace can support both the Smart Meter HAN as well as consumer devices through a gateway. The market will develop only with tested and interoperable equipment. The SMETS should ensure Open Standards with Certification and Interoperability testing are used.

Q25: Do you agree that all the requirements recommended in the IDTS should be adopted by the Government in the SMETS? Please explain your reasoning.

ZigBee Alliance Response:

Our review shows some very important components, and we believe the requirements should be adopted. We base this position on the notion that there must be a balance between the greatest possible flexibility to allow innovation, whilst providing a reliable and known framework from which to work from. By laying out requirements in the SMETS, the Government provides that framework and certainty.

Q26: Do you agree that the security requirements recommended in the IDTS are proportionate to the level of risk that the End-to-end Smart Metering System faces? Please explain your reasoning.

ZigBee Alliance Response:

The security requirements are generally proportionate to the level or risk the end-to-end Smart Metering System faces as they identify the key requirements pertaining to a system which has critical assets and also maintains private data.

Q30: Do you agree that the Government should include a requirement for a Communications Hub in the SMETS? Please explain your reasoning.

ZigBee Alliance Response:

The ZigBee Alliance can support the logical partition of a comms hub whether that is physically separate from the electric meter or not.

Q36: Do you agree there should be no restrictions on the HAN standards adopted by suppliers, provided they are available as a European (CEN, CENELEC or ETSI) or International (IEC or ISO) standard? Please provide evidence to support your position.

ZigBee Alliance Response:

There must be a single standard around the HAN, otherwise there will effectively be no interoperability among disparate devices, and manufacturers will not be able to produce devices and products with confidence.

For technical interoperability we need the main SM HAN standard to be common across the deployment unless limited by problem sites. We do not believe there is such a technology that is currently an approved full European standard as defined above for the network and application layers that will meet all of the GB requirements across all the property types.

The ZigBee Alliance is committed to and expect to achieve European Standardisation for the Smart Energy Profile by November 2013, if not substantially sooner. The Alliance's work in this respect is well advanced; we have secured liaisons with all three of the major European standards bodies noted in the M441 mandate (CEN/CENELEC/ETSI) and are in the process of final review by their respective executive boards, and in particular with the relevant smart metering and home automation technical committees (CEN TC294, CLC TC205&TC13, ETSI M2M). We can provide detailed information about the work programmes inherent in this process, and the deliberation methods required to achieve both consensus and adoption. While the ZigBee Alliance is an international organization that freely publishes its work for adoption, we also work closely with regional standards bodies to support harmonization and adoption, such as in the United States where we worked with the North American Energy Standards Board to help them create an energy usage information model.

By way of reference, we note that the HAN working group assessed referencing standards they proposed that there should be a timeframe for standardization, e.g. demonstrate that the proposed HAN is formally identified as a work item by a European or International Standards Organisation.

(RESPONSE TO Q36 CONT'D)

Additionally the HAN working group proposed to use the European definition of openness in the shorter term:

· All stakeholders have the same possibility of contributing to the development of the specification, and public review is part of the decision-making process

· The specification is available for everybody to study

· Intellectual property rights related to the specification are licensed on Fair, Reasonable and Non-Discriminatory (FRAND) terms, or on a royalty-free basis in a way that allows implementation in both proprietary and open source software.

Q37: The IDTS has recommended that all standards should be recognised or be in the process of being recognised by 31 December 2014; do you agree with this recommendation? Please explain your reasoning.

ZigBee Alliance Response:

While we do not believe this process is fundamentally necessary for a successful GB program, we recognise the direction of Mandate 441 and have taken steps to ensure the ZigBee Alliance standards align with the mandate.

The ZigBee Alliance is committed to and expect to achieve European Standardisation for the Smart Energy Profile by November 2013, if not substantially sooner. The Alliance's work in this respect is well advanced; we have secured liaisons with all three of the major European standards bodies noted in the M441 mandate (CEN/CENELEC/ETSI) and are in the process of final review by their respective executive boards, and in particular with the relevant smart metering and home automation technical committees (CEN TC294, CLC TC205&TC13, ETSI M2M). We can provide detailed information about the work programmes inherent in this process, and the deliberation methods required to achieve both consensus and adoption. While the ZigBee Alliance is an international organization that freely publishes its work for adoption, we also work closely with regional standards bodies to support harmonization and adoption, such as in the United States where we worked with the North American Energy Standards Board to help them create an energy usage information model.

Q38: Do you think that regulatory obligations are needed to underpin a systematic approach to testing of HAN standards during the Foundation phase? Please explain your reasoning.

ZigBee Alliance Response:

The Government should ensure Standards are chosen that provide the required functionality, interconnectivity, interoperability and security. The Standards chosen should provide their own testing and certification process that can be tested and validated by the Government rather than have a separate process established for the UK.

Q39: Do you agree with industry's recommendation that DLMS should be adopted as the application layer for communications with the DCC? Do you believe there are any consumer, economic or technical issues with this solution which could be circumvented by an alternative approach? Do you have any economic, technical or consumer evidence to assist Government in evaluating industry's proposal?

ZigBee Alliance Response:
The ZigBee Alliance standards and specifications support multiple architectures. While we do not have any comment on the choice of architecture or the DCC, we note that the ZigBee Alliance has a fully approved and implemented specification for a ZigBee Gateway which was specifically developed to standardize the way ZigBee SEP communications are transported over a variety of IP-based WAN networks, including GPRS. In addition, the Alliance has developed methods to tunnel DLMS and other protocols. Simply stated, the ZigBee Alliance is able to implement the proposed industry approaches.

Q40: Do you agree with industry's recommendation that DLMS and ZigBee SEP 1.x should be adopted as the application layer for communications within the consumer premises, provided they install the necessary translation equipment? Do you believe there are any consumer, economic or technical issues with this solution which could be resolved by an alternative approach? Do you have any economic, technical or consumer evidence to assist Government in evaluating industry's proposal? This would be subject to standard specifications being agreed where components are exchangeable between different manufacturers products and excluding the option of a fully integrated electricity meter and Communications Hub.

ZigBee Alliance Response:
The ZigBee Alliance is able to implement the proposed industry approaches. While ZigBee Alliance have no particular preference, the Alliance standards and specifications support multiple architectures. For communications within the home to and from the IHD, metering devices, and any consumer HAN bridging device we recommend SEP 1.x is used, as this is a protocol already well suited to the purpose. As noted in other responses, SEP 1.1 supports tunneling of DLMS and other protocols. In addition, it is worth noting ZigBee SEP 1.1 is well suited to battery-powered devices like gas meters.

Q46: Do you agree with the proposed approach for consumers to access data and transfer it from the HAN via a separate "bridging" device? Please explain your reasoning.

ZigBee Alliance Response:
Yes, we agree. Initially, the level of consumer interaction with networks is likely to be low, at least initially, and their preference of network technology will depend on what products are available. The proposals for connecting via a "bridging" device maximises future flexibility without adding cost to the core components. We anticipate the development of enhanced devices to facilitate this bridging link.

Q48: Do you agree with industry's proposals for an overall architecture of an application layer standard with translation through a Communications Hub to a HAN? Do you believe there are any consumer, economic or technical issues?

ZigBee Alliance Response:
The ZigBee Alliance is able to implement the proposed industry approaches. While ZigBee Alliance have no particular preference, the Alliance standards and specifications support multiple architectures. For communications within the home to and from the IHD, metering devices, and any consumer HAN bridging device we recommend SEP 1.x is used, as this is a protocol already well suited to the purpose. As noted in other responses, SEP 1.1 supports tunneling of DLMS and other protocols.

Q49: Where do you believe that translation is best managed:
a) At the Communications Hub; Or
b) At the DCC?
Do you have any economic, technical or consumer evidence to assist Government in evaluating the options?

ZigBee Alliance Response:
The ZigBee Alliance have no particular preference, and the Alliance standards and specifications support multiple architectures. The ZigBee Alliance is able to implement the proposed industry approaches. For communications within the home to and from the IHD, metering devices, and any consumer HAN bridging device we recommend SEP 1.x is used, as this is a protocol already well suited to the purpose. As noted in other responses, SEP 1.1 supports tunneling of DLMS and other protocols. With ZigBee gateway supporting DLMS transport as well as ZigBee native transport, there is no need for translation.

Q50: Do you agree that the IHD should only be required to display ambient feedback based on energy usage? Please explain your answer.

ZigBee Alliance Response:

Individual vendors may have specific views on this, and the Smart Energy profile supports multiple scenarios and use cases to handle the information required to achieve simple ambient to more complex functions.

Q51: Do you agree that Smart Metering Equipment should be designed to support the calculation and/or display of account balances as described above, even though suppliers may not initially be mandated to invoke such functionality for credit customers?

ZigBee Alliance Response:

Individual vendors may have specific views on this, and the Smart Energy profile supports multiple scenarios and use cases to handle the information required to achieve simple ambient to more complex functions.

Q52: What do you think the costs and benefits are of mandating suppliers to display an account balance (over-and-above those arising from display of information on cumulative cost of consumption) for credit customers on their IHD?

ZigBee Alliance Response:

Individual vendors may have specific views on this, and the Smart Energy profile supports multiple scenarios and use cases to handle the information required to achieve simple ambient to more complex functions.

Q53: Do you agree with or have any comments on the Government's proposals for the outstanding issues from the Response? Please explain your reasoning.

ZigBee Alliance Response:

We have some significant concerns on the data catalogue as there does not appear to have been any significant work to assess this against standard application protocols for WAN and HAN (e.g. DLMS and SEP 1.X). We propose that DECC consider the approach here and request assessment from groups looking at metering equipment protocols e.g. with SSWG and each protocol user association. Within the UK the ZigBee Alliance have been working with an industry group SSWG to develop enhancements to the SEP 1.1 to meet the main GB requirements.

There is a risk if the DECC specification work continues based on the existing data catalogue, without attempts to align with the existing protocols and planned extensions, there could be a significant delay in defining the data items and protocol data objects required to be referenced from the SMETS.

Q54: Do you think that an assurance framework, underpinned by regulatory obligations, is needed to support the delivery of the required functionality, interconnectivity, interoperability, and security of Smart Metering Equipment? Please explain your reasoning.

ZigBee Alliance Response:

The Government should ensure Standards are chosen that provide the required functionality, interconnectivity, interoperability and security. The Standards chosen should provide their own testing and certification process that can be tested and validated by the Government rather than have a separate process established for the UK.

Q55: Do you agree that as part of any assurance framework adopted, there should be a testing regime in place to support the delivery of the required functionality, interoperability and security? Please explain your reasoning.

ZigBee Alliance Response:

It should be required that equipment used pass a testing and certification process that is administered by certified testing laboratories. Manufacturers of equipment can then have it tested and certified by these independent laboratories and only equipment that has passed testing can be used.

Q56: What are your views on the options outlined for a testing regime? Are there other options that should be considered?

ZigBee Alliance Response:

The Government should not administer a testing regime but instead select Standards that include an independent testing and certification process. These testing and certification process should require the use of test laboratories and validated test processes and procedures. Testing should include validation of the MAC/PHY, networking stack and application layer to ensure proper interoperability.

Q57: Do you think that a different approach to assurance is necessary for the Foundation and enduring phases? Please explain your answer.

ZigBee Alliance Response:

The same approach of using independent testing laboratories to validate equipment should be used in the Foundation and enduring phases. Equipment will need to be validated and tested to conform to existing deployed equipment and the same process should be used throughout. Initially deployed equipment will still need to interoperate with equipment installed years later and this can only be done through a rigorous testing and certification process maintained by the Standards Organizations.

Q58: Do you think that the activities outlined above are a suitable way for achieving interoperability across Smart Metering Equipment cryptographic functionality? How else could this be achieved?

ZigBee Alliance Response:

Development of an end-to-end trust hierarchy and cryptographic key management, along with common cryptographic interfaces and underlying standards and algorithms provides the ability for true end-to-end secure communication and would greatly increase the likelihood of interoperability. Such a system must be scalable so it can suit the wide range of devices present in the Smart Metering Equipment and DCC.

It may not be necessary to have a single PKI (public key infrastructure) and indeed may be preferable to distinguish the PKI for Smart Metering Equipment and DCC devices. If there are distinct security domains due to cryptographic differences, these must meet at entities trusted in both domains and at that point can have some vulnerability due to need to resecure communication data between the domains.

Q59: Do you agree that cryptographic/ key management is necessary to secure the End-to-end Smart Metering System? Please explain your reasoning.

ZigBee Alliance Response:

Cryptographic key management is necessary to secure the end-to-end Smart Metering System and this should preferably be based on public key cryptography and PKI. If symmetric keys are used, a clear key distribution and management policy must be in place.

Direct management by DCC of symmetric keys for devices in the SM HAN may add unnecessary administrative burden on the DCC infrastructure.

Q60: Do you agree with the Government's assessment of the advantages and disadvantages of the cryptographic solutions identified above? What other options should the Government consider? Please explain your reasoning.

ZigBee Alliance Response:

Some of the assertions in table 7 are incorrect, e.g.

- Digital certificates do not provide repudiation protection; individual message signing provides some repudiation protection

- Shared keys are typically established using key agreement in the hybrid approach but can also be securely transported

The advantages and disadvantages as listed do not actually recommend one method. It is suggested that the hybrid approach, as consistently used in all information networks is the one adopted.

Q61: Do you think that it would be appropriate for the DCC to be responsible for cryptographic key management for the End-to-end Smart Metering System? What other options should the Government consider? Please explain your reasoning.

ZigBee Alliance Response:

Our existing system assumes a central Certificate Authority, and we generally support the DCC as most suitable for key management of the end-to-end smart metering system.

END RESPONSE