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MP082 ‘2.4GHz Channel Management’

December 2019 Working Group Meeting Summary

MP082 overview

[MP082 ‘2.4GHz Channel Management’](#) proposes to develop a simple mechanism to allow the Communications Hub to change the radio channel remotely after installation. This would provide an additional tool for Energy Suppliers to attempt to resolve the impacts of poor Home Area Network (HAN) performance.

What is the issue?

The 2.4GHz band is one of the Industrial, Scientific and Medical (ISM) radio bands defined by the ITU (International Telecommunication Union) Radio Regulations. The usage of this band is not exclusive to smart metering Devices which compete for channels with other devices. Also, the communication in different Smart Meter Home Area Networks (SM HANs) is not coordinated which may lead to interference where many Devices on different SM HANs are operating in close vicinity.

SECAS noted two cases for which this proposal could be utilised. The first being in Multi Dwelling Units (MDUs), where there could be well over a hundred Communications Hubs and Smart Meters in some meter rooms operating constantly. The other being in single premises, where customer devices, such as high capacity streaming solutions occupy the same channels as the HAN.

The Working Group agreed that there isn’t a large-scale issue with the 2.4GHz band and that it has always worked reliably. They noted the SMETS1 rollout as an example which has been ongoing for several years and hasn’t experienced any common issues with the 2.4GHz band.

However, members advised that they had seen a small number of cases in which the HAN had lost connectivity due to the cases noted above. Furthermore, it is not fully understood how the Communications Hub selects a channel when it is commissioned. Therefore, the Working Group agreed that it would be prudent to mitigate any future risks and find a solution now. The solution would provide an option to deal with the current issues and when the SMETS2 rollout increases, by which time these issues may become unmanageable.

Areas of assessment

SECAS noted the Panel’s recommendation to investigate how can channel frequency demand be measured. If data is available for channel frequency demand, Parties could utilise this to efficiently select the optimum channel, if the solution for this modification can provide an effective channel management tool.

Frequency Agility proposal

What is Frequency Agility?

Frequency Agility is a mechanism employed in ZigBee Sub-GHz bands that enables a device to move between radio channels. This movement isn't continuous and once a channel is selected, the device will remain on that channel until either the channel quality degrades or the device is commanded to change the channel. Frequency Agility is only specified for the Sub-GHz bands and is an optional feature when operating in the 2.4 GHz band.

An Other SEC Party advised it had raised a proposal to use Frequency Agility previously with the BEIS-led HAN WAN Transitional Business Design Group (TBDG) sub-group. Neither the ZigBee Smart Energy (ZSE) Standard nor the GB Companion Specification (GBCS) forbid moving channels; however, they do not mandate it. With it being optional, it leaves the risk that not all Parties will implement it, leaving some Devices not capable of carrying out Frequency Agility.

The Party stressed that Frequency Agility is not the only way to resolve the issue identified under MP082. However, it noted the need to find a solution that has minimal disruption to the overall smart meter implementation programme, and that Frequency Agility would be able to facilitate this.

How could you carry out radio channel changes?

The Party explained how the Trust Centre Swap Out (TCSO) could be used to initiate a radio channel change. The TCSO is mandated in the ZSE and the GBCS and all Devices support it, both on the 2.4GHz and sub GHz bands. As part of the TCSO process a Communications Hub can assess the radio channels and move to new channel showing less radio interference. A virtual TCSO would enable a Party to remotely instruct the Communications Hub to evaluate the radio channels, without any external intervention on site. In effect, the virtual TCSO would emulate Frequency Agility, achieving similar results. Perusing a virtual TCSO wouldn't require Frequency Agility to be defined in the SEC Technical Specifications, which would save a considerable amount of time. Other benefit of the TCSO method is its minimal impact on the HAN Devices, as it does not require a de-commissioning of the HAN and subsequent recommissioning.

A Working Group member noted the current method of changing channels on the Communications Hub, requiring an engineer to decommission and subsequently recommission the HAN whilst the premise is de-energised. This causes disruption to the customer and isn't an efficient method of selecting the channel. Selecting a channel whilst a premise is decommissioned doesn't show a true reflection of channel demand as the impacting customer devices would be switched off. The Other SEC Party advised that the TCSO can be carried out whilst the premise is energised and would therefore mitigate against this.

The Proposer questioned if any changes would be required to Devices in order to implement Frequency Agility, noting that some manufacturers may have not chosen to implement it. However, a Working Group member advised that the Device doesn't need to support Frequency Agility in order to carry out a virtual TCSO. The Device as a minimum must have the capability to be able to change channel. They explained that once the TCSO is carried out, the Communications Hub should select the optimum channel. During this process the HAN Devices will lose connectivity with the HAN and subsequently scan to find the Extended PAN identifier (PAN ID) for the HAN. As consequence the Devices will move to the same channel as the Communications Hub.

The Other SEC Party advised that if this method were to be followed, the criteria for which it is triggered needs to be explained under this modification. A suggestion was made that Supplier Parties could trigger the process via a new Service Request.

Advantages

The Other SEC Party noted the following advantages:

- No changes required to the ZSE
- The use of a Service Request to trigger the virtual TCSO would give Suppliers greater control over 2.4GHz channel management
- The proposal would be of considerable use when commissioning HANs in MDUs where crowded meter rooms are common

Disadvantages

The Other SEC Party noted the following disadvantages:

- The use of a new Service Request to trigger the TCSO would require new GBCS Use Cases
- This would lead to increased cost for both the DCC and Parties, as well as increased testing requirements

Working Group discussions

The scale of the issue

The DCC advised the problem statement is not clear why a channel management tool is needed. It understood that there is a risk to MDUs but noted that SMETS1 has not seen a considerable amount of issues with the 2.4GHz band. It suggested incorporating the 'listen before talk' method into the 2.4GHz band. This is already in use with Devices operating in the sub GHz band; however, this feature is mandated neither by the ZSE nor the GBCS for the 2.4GHz radio band.

A Working Group member noted their experience managing channels with customer owned devices such as audio streaming equipment. The HAN was operating on a channel at the higher end of the 2.4GHz band. Whilst the audio streaming equipment was active, the IHD which is situated close to the Communications Hub was able to communicate. Whereas the GSME, which was situated further away from the Communications Hub couldn't communicate across the HAN. Subsequently by recommissioning the HAN in the premise whilst the streaming equipment was still active, the Communications Hub re-established the HAN on the lower end of the 2.4GHz band.

A Working Group member stated that a report had been commissioned on channel management issues for Telefonica and that this could be used as evidence. However, other Working Group members noted that the smart metering rollout is still in low numbers so the report may not be a true reflection of any future issues Parties may encounter.

The Working Group agreed that there are indications that there will be issues with 2.4GHz channel management in the future. Therefore, it would be better to find a solution now, rather than wait until these issues materialise where they be harder to manage. Members agreed that the solution does not need to be gold plated.

Next steps

The Working Group agreed that the Other SEC Party's proposal is feasible but wanted to gather more ideas before proceeding to assess it.

SECAS agreed to liaise with the Technical Architecture and Business Architecture Sub-Committee (TABASC) and the BEIS-led HAN WAN TBDG sub-group to gather other proposals. If more proposals are gathered, SECAS will organise a workshop to assess these and narrow them down to a solution that can be carried forward for assessment.