

# Consultation

**Intimate Communications Hub Interface Specification and Communication Hub Supporting Information changes for Radio Frequency interference at 900MHz (WAN), 868MHz (HAN) and 2.4GHz (HAN) WAN frequencies**

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**Classification:** DCC Public

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## 1 Introduction

The purpose of this consultation is to invite views on amendments to the Intimate Communications Hub Interface Specification (ICHIS) and Communication Hub Supporting Information (CHSI), which are specifications required under H12 of the Smart Energy Code (SEC) and clause 1.5 of the Communications Hub Handover Support Materials (CHHSM), respectively. The amendments are focussed on the introduction of a temporary relaxation to the limit of Radio Frequency (RF) interference that a Host (SMETS2 Electricity Smart Metering Equipment (ESME)) may emit in the 900MHz (WAN) and 2.4GHz (HAN) frequency band. The consultation also seeks views on the introduction of a noise limit for the 868MHz (HAN) frequency band.

## 2 Background (900MHz frequency band)

The ICHIS defines a common interface between Intimate Communications Hubs and Electricity Smart Meters which will be deployed for the GB Smart Metering Implementation Programme.

ICHIS Part F describes requirements and testing pertaining to the RF implementation of Hosts (SMETS2 ESME) such that they do not adversely affect other radios included in the DCC Communications Hubs. ICHIS Part F describes radiated (wireless) RF interference.

The current level of RF interference permissible in the 900MHz frequency band for the Central and South Region is 3.5dB rise above noise floor. It is noted that the current noise limits specified in the relevant communications hub data sheets require alignment to this number. Testing of some SMETS2 ESMEs being installed in the Central and South Region has indicated that the level of RF interference being emitted in the 900MHz frequency band is greater than 3.5dB and so will impact the receiver sensitivity of the Communications Hub variant of interest<sup>1</sup> and in turn may potentially impact WAN coverage. A number of energy suppliers have stated that they are looking for regulatory assurance that current ESMEs close to meeting 3.5dB RF interference in the 900MHz frequency can be installed for a temporary period while meter versions are being refined, without risk of such current devices being considered to be non-compliant.

Two separate measures are proposed to address this. Firstly, DCC are proposing to introduce a temporary adjustment to the limit of RF interference permissible in the 900MHz frequency band to 6.5dB rise above noise floor. Secondly, for those ESME models that do not meet the temporary 6.5dB limit, the nature of the noise may be such that it has a minimal impact on the cellular communications network. Further testing of each ESME model is required to assess this impact. Those ESME which are tested and confirmed to have a low impact will be confirmed as approved for use during the temporary adjustment period.

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<sup>1</sup> This phrase is used within ICHIS to relate an electricity meter to the Communications Hub to which it will eventually be connected. For the avoidance of doubt, the ESME need only meet with the noise limits relevant to the Communications Hub variant of interest to which it is connected.

### 3 Amendments to ICHIS and CHSI

DCC have added a new sub-section (F5.0) to ICHIS Part F which provides a temporary relaxation to the RF interference limit relevant in the 900MHz frequency band. This temporary relaxation will apply to devices installed in the period up to and including 30 September 2019 such that ESME which emit RF interference levels equal to or below a 6.5dB RF interference level in the 900MHz frequency band will be considered to have met the provisions of ICHIS Part F2.0. After 30 September 2019 the RF interference limit relevant in the 900MHz frequency band will be reset back to the 3.5dB threshold for any meters being installed.

The proposed amendments to the ICHIS also specify that ESMEs installed prior to the 9 month deadline (for clarity this means ending on 30 September 2019) that emit a level of RF interference equal to or below 6.5dB shall still be considered compliant with Part F2.0 of the ICHIS beyond the 9 month deadline.

DCC can accommodate an increase to 6.5dB for installations over a limited period of 9 months to ensure minimal impacts/disruption on performance and to prevent any geographical restrictions. This temporary increase could result in a connection success failure rate of up to 1.4% for installation cases where an ESME emitting a level of RF interference greater than 3.5dB is used.

A higher level of RF interference would increase the connection failure rate to a level which DCC could not readily accommodate within the existing installation and maintenance regime. Wider impacts could also include a material increase in use of external antennae, changes to the Comms Hub supply chain, and potential infrastructure deployment to compensate for loss of coverage.

DCC will update the SM WAN Coverage Checker Database to identify the 1.4% of premises at risk such that energy suppliers can take steps to avoid installation of an ESME above 3.5dB at those premises. This will be shown in the "Additional Information" field within the Coverage Checker Database.

DCC recommends that ESME emitting a level of RF interference greater than 3.5dB in the 900MHz frequency band should not be installed where the SM WAN Coverage Database recommends that a SKU2 Comms Hub and antenna be used. It has also been recommended that if an ESME emitting a level of RF interference greater than 3.5dB is to be deployed deep indoors (i.e. more than one wall between ESME and outside), then to minimise risk of communications failure the ESME should be deployed using a SKU2 Comms Hub and T2 antenna rather than SKU1 Comms Hub. A new sub-section will be added to the Communications Hub Supporting Information (CHSI) to include these instructions.

DCC will work with meter manufacturers to provide additional assurance on a case by case basis for meters that have been evaluated and shown to emit RF interference levels above 6.5dB inside the CSP Central/South frequency band, where meter manufacturers believe that the nature of the interference will have a minimal impact on the cellular communications network. DCC and CSP Central/South are proposing additional analysis with regards to the review of meter manufacturer interference plots from the DCC's test lab on the impact on the 900MHz frequency band, and working through a qualification and assurance process which will allow these meters emitting

beyond 6.5dB to be deployed in the Central and South Regions network during the 9 month relaxation period (ending 30 September 2019).

Meter manufacturers are encouraged to contact DCC if they wish to submit their devices for this evaluation. Subject to successful evaluation by the DCC test lab, the DCC will write to the meter manufacturer to confirm that the device model in question meets the criteria needed to be deployed during the temporary relaxation period. Such evidence can then be provided to the relevant energy supplier to demonstrate compliance.

It is proposed that ICHIS will be updated to allow the installation of an ESME up to 30 September 2019; that:

- emits up to and including 6.5dB of RF noise at the 900MHz frequency band;
- emits above 6.5dB of RF noise at the 900MHz frequency band and has received written confirmation from the DCC as to having undergone successful RF noise evaluation.

## 4 2.4GHz HAN RF Interference

Testing of electricity meters to date has demonstrated that the large majority are emitting well below the allowable level of RF interference in the 2.4GHz Home Area Network (HAN) frequency band. Further refinement will, however, be required to some devices to reduce the level of RF interference at this frequency. Discussions with energy suppliers suggest there is an appetite for a temporary relaxation to be made to the relevant 2.4GHz HAN RF interference limit to allow the installation of additional devices, providing such a relaxation does not have a material impact on 2.4GHz HAN propagation.

Working with the BEIS HAN Working Group, DCC has determined that an RF interference limit of 4dB at 2.4GHz, an increase of 0.5dB, can be temporarily accommodated without a material impact on installations or long term 2.4GHz HAN coverage. It is envisaged that this temporary relaxation will provide energy suppliers and their device manufacturers with sufficient time to make necessary refinements to their electricity meters. We do not have sufficient data to consider larger derogations and as such the precautionary principle of a small short term relaxation is justified as it minimises risk but facilitates additional installs.

Energy suppliers should be advised that any further increase in the RF interference emitted by the ESME above the limit at 2.4GHz will decrease HAN propagation and increase the number of households that require a sub-GHz installation.

We invite industry members to submit relevant evidence if they feel different approaches are justified. We will in any case, through the BEIS HAN Working Group, work with energy suppliers to understand and support monitoring of existing 2.4GHz installs.

We proposed to update the ICHIS to allow the installation an ESME that emit up to and including 4dB of RF interference at 2.4GHz (HAN) until the end of September 2019.

## 5 868MHz HAN RF Interference

The RF interference limit within the Sub GHz HAN frequency band<sup>2</sup> is important since those households who cannot create a HAN network using either 2.4 GHz or Sub GHz devices installed will move into scope of energy supplier Alternative HAN arrangements. As such it is important the interference limit minimises the impact on the CH Sub GHz HAN receiver sensitivity to preserve the assumed levels of HAN propagation and coverage. Setting such a limit requires an understanding of the capability of the CH dual band HAN radio and other variables such as background interference in the Sub GHz band.

A 7dB limit for the Sub GHz HAN has been proposed by the BEIS HAN Working Group and has been considered by many of the relevant industry participants. Using available data and modelling techniques it is assessed that at this level of RF interference the overall impact on Sub GHz HAN coverage would be minimal. While the conservative nature of the modelling techniques and assumptions being used in addition to the level of planning margin available means that it is unlikely that even this minimal impact on HAN coverage would be realised in the real world, we consider it prudent that an interference limit of 5dB be set to maximise longer term Sub GHz HAN coverage.

It is proposed that a temporary interference limit of 7dB be implemented, with a move to the long term interference limit of 5dB on 1 October 2019. This date aligns to other temporary changes to RF interference limits currently included within ICHIS. We will use data from initial Sub GHz installs, gathered through the BEIS HAN Working Group, to keep this under review. We invite industry members to submit relevant evidence if they feel different approaches are justified.

By way of reference and background, the 7dB figure for Sub GHz HAN is higher than the 3.5dB figure for Sub GHz Mesh as this reflects the difference in antenna designs. The Mesh antenna is more directional than the HAN antenna, which effectively means it has reduced ability to pick up signals (and interference) from all directions compared to the Sub GHz HAN antenna.

It is proposed that ICHIS will be updated to allow the installation of an ESME that emit up to and including 7dB of RF interference in the sub GHz HAN band until the end of September 2019.

## 6 How to respond

Please provide a response on the amendments to the ICHIS and CHSI by 17:00 on 7 December 2018 to DCC at [consultations@smartdcc.co.uk](mailto:consultations@smartdcc.co.uk). If you have any questions about the consultation documents, please contact Sasha Townsend at [sasha.townsend@smartdcc.co.uk](mailto:sasha.townsend@smartdcc.co.uk).

Consultation responses may be published on our website [www.smartdcc.co.uk](http://www.smartdcc.co.uk). Please state whether all, or any part, of your consultation response is confidential. Please note that responses

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<sup>2</sup> 862-876 MHz band

in their entirety (including any text marked confidential) may be made available to the Department Business, Energy and Industrial Strategy (BEIS) and Ofgem (the Authority).

## **7 Next Steps**

Following this consultation, DCC will consider the responses received and finalise the amended ICHIS and CHSI and publish it on the DCC website.

DCC aims to respond to the consultation on 17 December 2018.