Arqiva's Smart Meter Network

Supporting Technical Justification for Site Reference S029

1. Introduction

1.1. This document has been prepared to support the planning application to develop a base station as part of Arqiva's planned Smart Meter communications network. Smart Metering is a Government programme to roll out, between 2014 and 2020, smart electricity and gas meters to homes and small businesses across Great Britain.

1.2. The Smart Meter initiative is a key part of the Government's programme to cut greenhouse gas emissions, decarbonise the economy and support the creation of new green jobs and technologies. Arqiva has been appointed to build the Smart Meter communications network in the north of England and Scotland.

1.3. The document provides supporting technical information and justification on the following matters:

- The operation of the base station
- The extent of coverage provided from the base station
- Health and Safety information, including compliance with the guidelines of the International Commission on Non-Ionizing Radiation Protection (commonly referred to as the ICNIRP guidelines)

2. How the Base Station Operates

2.1. Smart Meters are the next generation of gas and electricity meters. They will offer a range of intelligent functions and provide consumers with more accurate information, bringing an end to estimated billing. Consumers will have near real-time information on their energy consumption to help them control and manage their energy use, save money and reduce emissions. The UK Government's aim is for all homes and small businesses to have smart meters by 2020.

2.2. In order to deliver these benefits, a network of radio base stations needs to be built to connect customers' Smart Meters with their energy supplier.

2.3. A base station consists of a cabinet or cabinets containing radio transmitting and receiving equipment and an electrical power system, coupled to a set of antennas. The base station communicates with Smart Meters in the local area. It requires a power supply and also needs to be connected into the wider Smart Meter network. This will normally be achieved by connection to underground ADSL cables. In the rare occasions where this is not feasible, then the transmission link will be provided by a small VSAT dish, similar in size to a domestic satellite dish.

2.4. The main function of the mast, or alternatively the host building or other structure, is to elevate the antennas above obstacles such as tall trees, buildings, or valley sides that would otherwise block radio signals and prevent coverage from being provided.

3. Technical Information

3.1. Arqiva is licensed by Ofcom, the independent regulator and competition authority for the UK's communication industries, to provide electronic communications services in the public interest.

3.2. Smart gas and electric meters within premises will connect to Arqiva's network by means of the Communications Hub, which will be installed separately from the Smart Meter unit. The system uses Long Range Radio in the UHF band at 412-414 MHz for the uplink and 422-424 MHz for the downlink, using licensed spectrum. The network equipment is provided by a US company, Sensus and operates over a proprietary radio protocol, which has been customised for utilities messaging services. This solution is ideal for covering the varied terrain and building types of the UK, and is in wide deployment in the US.

3.3. The typical operation of the Smart Metering system consists of meters sending readings to their Communications Hub by a pre-set schedule e.g. every hour or every four hours, etc. (Communications between the meter and the Communication Hub are typically in the 2.4 GHz or 870 MHz bands). Also on a pre-arranged schedule, the base station sends a message to each Communications Hub (at 424MHz) to request readings. The Communications Hub then responds (at 414MHz) with its stored readings. Each message is typically of the order of several hundred bytes sent for durations of less than half a second.

3.4. Arqiva is under a legal obligation to comply with the conditions of its licence granted by Ofcom. These conditions ensure avoidance of interference with other radio systems, other electrical equipment, instrumentation or air traffic systems. The conditions of the licence are mandated by Ofcom who are responsible for the regulation of the civilian radio spectrum. Ofcom also has powers to investigate and remedy any reported significant interference.

4. Technical and Operational Requirements

4.1. The location of the base station has been selected following a comprehensive search of a number of alternative locations, which is summarised in the Planning Statement provided with the planning application. From the technical and operational perspectives, the location of the base station is determined by the following factors:

- The need to provide an acceptable level of coverage to the local area
- The terrain in which the base station will be located and the height of any potential blockages, such as trees or buildings, nearby
- Proximity to a power source
- An accessible route for construction and future maintenance access
- Feasibility of providing the Ground Based Transmission network

5. Predicted Coverage

5.1. The radio propagation plots in Appendix A show the geographical extent of the expected coverage from the site and its role within Arqiva's wider Smart Meter network.

5.2. The plot has been produced by computer modelling software in order to predict the extent of coverage and signal quality provided by the base station. The extent of coverage is dictated by many factors including the height of the antennas above ground level, the frequency and type of the antennas, the nature of the surrounding topography, and the presence of buildings and trees that can cause reflections or absorb the radio signals.

5.3. The following information is shown on the plots:

- The location of the base station, which is indicated by its site reference
- The orientations and type of the antennas, which are indicated by the various site symbols
- The extent of coverage is illustrated by the **Red** shading.

6. Compliance with Health and Safety Guidelines

6.1. The proposed base station has been designed, and will be constructed and operated, in accordance with all relevant health and safety requirements, including the guidelines of the International Commission for Non-Ionizing Radiation Protection (ICNIRP) as adopted in the EU Council Recommendation of 12 July 1999 on the limitation of exposure of the general public to electromagnetic fields (0Hz to 300GHz). The ICNIPR guidelines are accepted by the UK Government as the appropriate safeguard to public health.

6.2. ICNIRP is a non-governmental organisation formally recognised by the World Health Organization. The ICNIRP guidelines were developed following reviews of all the relevant peer-reviewed scientific literature. The ICNIRP Public Guidelines, which incorporate a precautionary safety factor of 50 times, are designed to protect all members of the public 24 hours a day.

6.3. The certificate submitted with the planning application certifies that the base station, when operational, will meet the precautionary ICNIRP guidelines. For the avoidance of doubt, the certification relates to the radio coverage provided from the base station and any other electronic communications installations at the site.

7. ICNIRP Certification - National Planning Policy Guidance

7.1. Section 5 'Supporting high quality communications infrastructure' of the National Planning Policy Framework for England provides the following guidance to local planning authorities on health safeguards and base station development:

'46. Local Planning authorities must determine applications on planning grounds. They should not seek to prevent competition between different operators, question the need for the telecommunications system, or determine heath safeguards if the proposal meets International Commission guidelines for public exposure.'

7.2. Essentially the same guidance is provided paragraph 300 of Scottish Planning Policy, which states that where planning applications are supported by a declaration that the equipment and installation is designed to be in full compliance with the appropriate ICNIRP guidelines for public exposure to radiofrequency radiation (paragraph 296) then:

'*300. Planning authorities should not question the need for the service to be provided nor seek to prevent competition between operators. The planning system should not be used to secure objectives that are more properly achieved under other legislation. Emissions of radiofrequency radiation are controlled and regulated under other legislation and it is therefore not necessary for planning authorities to treat radiofrequency radiation as a material consideration'.*

8. Further Information

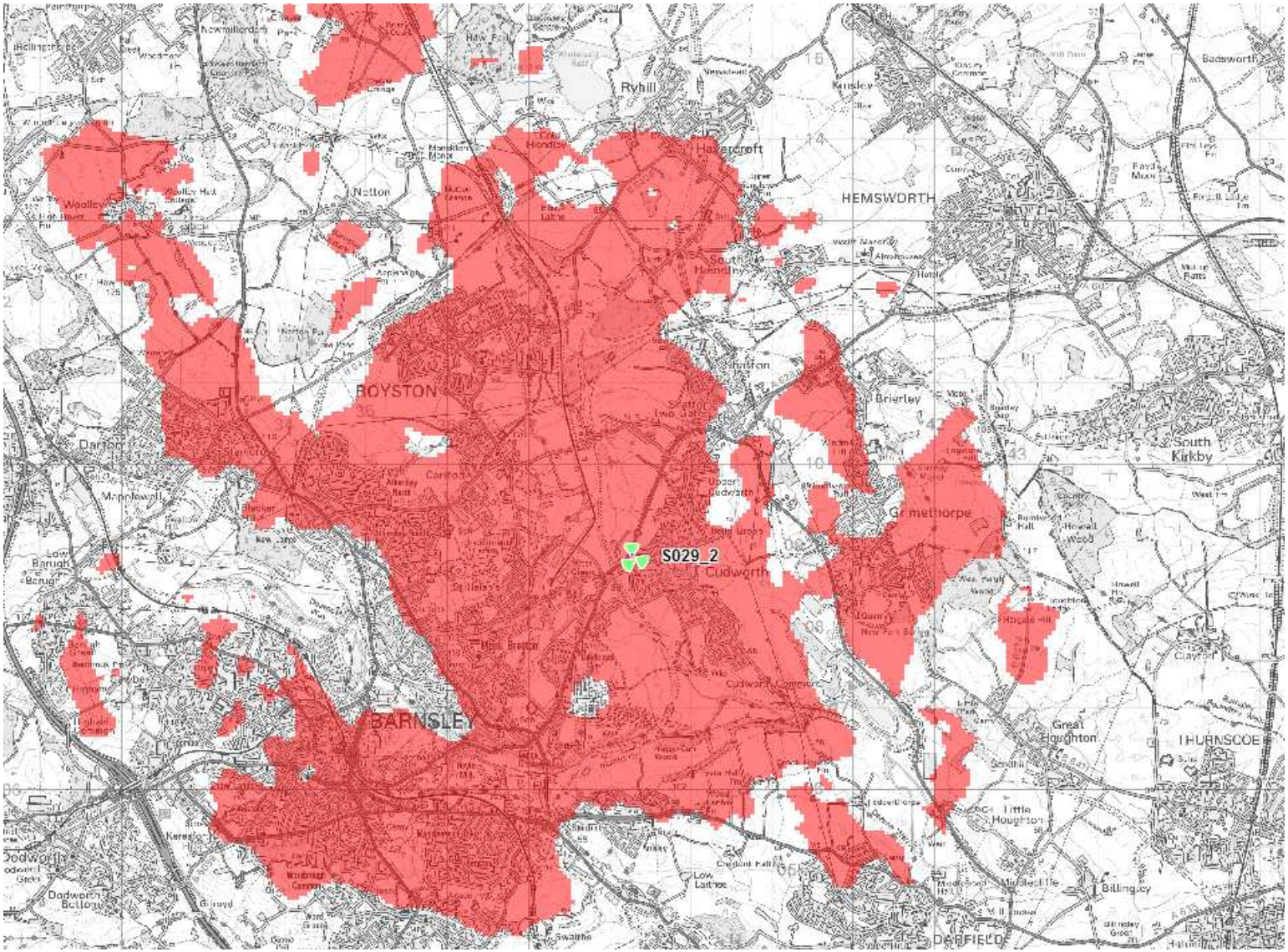
8.1. Further information on health and safety guidelines can be found from the following sources:

ICNIRP: http://www.icnirp.org/

World Health Organization: http://www.who.int/topics/electromagnetic_fields/en/

Public Health England: http://www.hpa.org.uk/HPAwebHome/

Appendix A


S029_2
HEMSWORTH
ROYSTON
BARNSLEY
Cudworth
Brierley
South Kirkby
Grimethorpe
Great Houghton
THURNSCOE
Darton
Notton
Ryhill
Billingley
DARFIELD