3G Rollout obligations
Statement and Consultation

Introduction

Vodafone welcomes Ofcom's guidance on enforcement and the opportunity to comment on this consultation.

In short, Vodafone supports the choice of option 3 to measure compliance with the 3G coverage obligation i.e., the use of engineering estimates supplemented by tests in the field. However, Vodafone is concerned that insufficient detail is available on the mechanics of this process to give Vodafone sufficient comfort that the results will yield an accurate reflection of its population coverage.

In the response below, Vodafone provides some brief comments on Ofcom's guidance on enforcement and then tackles the four questions posed by Ofcom.

Ofcom's Guidance on Enforcement

Vodafone reiterates its belief that issuing draft guidance on enforcement sufficiently in advance of the coverage deadline is helpful. Vodafone has a number of comments:

- In paragraph 6.8, Ofcom lists the factors that it is likely to consider in any detailed investigation of non-compliance. Vodafone submits that propagation modelling is an extremely complex task and the results of any measurements will depend upon the tools, clutter data, terrain data and prediction algorithms deployed. Vodafone therefore suggests that, as part of its detailed review, Ofcom should consider an operators own measurement of its coverage obligation and be prepared to adjust and augment its estimates if this can be shown to be appropriate.[1] Ofcom will appreciate that coverage continues to be a key dimension of competition for MNOs who have, by necessity, invested millions of pounds in hardware, software and expertise to become proficient in this area. In the case of Vodafone, we have developed our own propagation model supported by a vast library of drive trial measurements captured from across the whole UK. Furthermore, Vodafone's investment in quality digital terrain and clutter data provides highly accurate input metrics to any prediction algorithm and hence improves the coverage predictions generated by the radio planning tool itself.

- It is not clear how the factors listed in paragraph 6.8 will relate to the sanctions levied by Ofcom. For example, if more than one MNO had not met their licence obligation then how would this affect how Ofcom would view the breach?

- Vodafone suggests that Ofcom should consider rewarding operators who meet their licence obligation as well as sanctioning those that do not. For example, only those licencees who have met their coverage obligation should be permitted to convert their licences to one containing Spectrum Usage Rights or an undated licence period.

[1] Vodafone suggests that this is consistent with Ofcom's legal requirement, stated in paragraph 6.6 "…to act reasonably and to take all relevant considerations into account in relation to dealing with any non-compliance with the rollout obligation".

- Since the obligation on operators is to "install, maintain and use Radio Equipment…in such a way as to enable the provision of, by no later than 31 December 2007, **and to maintain thereafter**, a telecommunications service by means of the Radio Equipment to an area where at least 80% of the population of the UK live." (our emphasis) it would be helpful if Ofcom could explain whether it envisages an ongoing monitoring of compliance for those operators deemed to have met this obligation by the end of 2007. Vodafone suggests that once compliance has been established by Ofcom it is then more appropriate for operators to self-certify continued compliance (akin to option 4) since market forces will be sufficient to ensure that MNOs do not subsequently reduce 3G coverage. Alternatively, Ofcom should consider removing the coverage obligation from licences.

Answers to the specific questions:

Question 1 – Do you have any comment on Ofcom's proposed basic methodology?

In principle, Vodafone supports Option 3 (a mixture of engineering analysis and field strength measurements by Ofcom). The engineering analysis will reduce the volume of costly and time consuming field strength measurements required to assess the coverage obligation, at the same time limited field strength measurements allow calibration of the output of the results of the engineering analysis. However, Vodafone is concerned that there is insufficient detail provided in the consultation document concerning the tools, engineering analysis methodology and input metrics (digital terrain and clutter data) used by Ofcom to give Vodafone enough confidence that an accurate assessment of its population coverage will be reached by Ofcom. For example, no further details of the planning tool(s) are given other than to state they are "…robust, industry standard models [sic]…" (A5.19). If the 3G rollout compliance process is meant to be transparent, then the chosen software tool used for measuring it should be defined by Ofcom. Moreover, if operators are to be expected to modify their rollout plans in order to ensure that they meet the 80% coverage requirement then they need to be able to anticipate, with reasonable accuracy, what Ofcom's estimate of coverage will be.

In addition, Ofcom uses inconsistent terminology to describe the software applications that will be used in their engineering analysis. For example, the consultation document refers to 'tools' in paragraph 7.6 but then changes to refer to 'models' in Annex A5.19. ITU-R P.1546-2 is a (propagation) model and is not a tool per se and cannot be used without a counterpart radio planning software (tool) to manage the coverage predictions and analysis reporting.

Vodafone agrees that Option 2, a physical field strength measurement campaign alone, is not the most appropriate method to measure compliance. Not only is it a very costly option but it would also take an extremely long time to complete the process and analyse the results. Moreover, a majority of the UK land mass (not just vehicular drive trials) would need to be measured to ensure statistically valid results were obtained.

Vodafone does not support Option 1; relying on engineering analysis from predictions alone is not good practice. On the basis of engineering estimates alone Ofcom could not have sufficient confidence that a radio planning tool and its prediction model are predicting accurately. Actual real field measurements are required to verify the model's predictions.

Question 2 – Do you agree that this is an appropriate basis for measurement?

Vodafone utilises a percentage of the available Primary CPICH ('pilot signal') which is at the upper end of the range that Ofcom proposes to use. Vodafone supports a value of 10% as an appropriate basis for measurement.

Question 3 – Do you have any comment on this assessment criterion?

Vodafone concurs with 5.5dB being used as the value of standard deviation for slow fading in the engineering analysis. However, Vodafone has a number of concerns about the assumptions made regarding use of the model and the Cell Edge and Cell Area probability values leading to Service Availability assumptions. These concerns are covered in more detail below:

Assumptions made regarding use of the model

Vodafone notes that the ITU-R P.1546-2 model curves are applicable up to and including frequencies of 2000MHz. The model suggests that an extrapolation technique can be used for frequencies above 2000MHz but this would have to be validated by Vodafone before confidence in the results could be assured.

The ITU-R P.1546-2 model is valid for ranges above 1km. Vodafone proposes that full coverage is assumed up to 1km if this algorithm is used.

Finally, the value for the path loss exponent is not stated in the consultation document. Ofcom will need to clarify whether it intends to use the value provided in the ITU-R 1546-2 model or use a different value instead?

Cell Edge / Cell Area probability values leading to Service Availability assumptions

Vodafone is unsure what percentage values of cell edge and cell area Ofcom intends to use for the actual minimum coverage requirements as the text in paragraph 7.21 of the consultation document implies that they are only example values. Furthermore, it is also unclear if the values of 90% cell edge service availability leading to a cell area service availability of 97% can realistically extend the service availability over the *entire* coverage area to better than 99%.

Ofcom have assumed that the benefit from neighbour cells coverage and handovers will improve the overall service availability to better than 99% but offers no explanation of how this benefit is actually derived. Requiring operators to comply with 99% service availability is an extremely stringent requirement.

Question 4 – Do you have any comment on Ofcom's proposals in relation to population data?

Vodafone supports the use of the 2001 UK population census data as an input metric to an engineering analysis approach and already uses the 2001 census data to shape the design of its 3G network.

However, Vodafone have strong reservations against the methodology Ofcom proposes to use to apportion the residential population within each census Output Area (OA). Evenly distributing the population total over the whole Output Area (A6.10) is distorts the true nature of its distribution. Whilst less of an issue in smaller, urban Output Areas, it is especially noticeable in larger rural OAs where the population will only be located in limited parts of any given Output Area.

Figure 1 below illustrates this point showing an extract of Vodafone's 2001 population density surface and Output Areas for a rural environment.

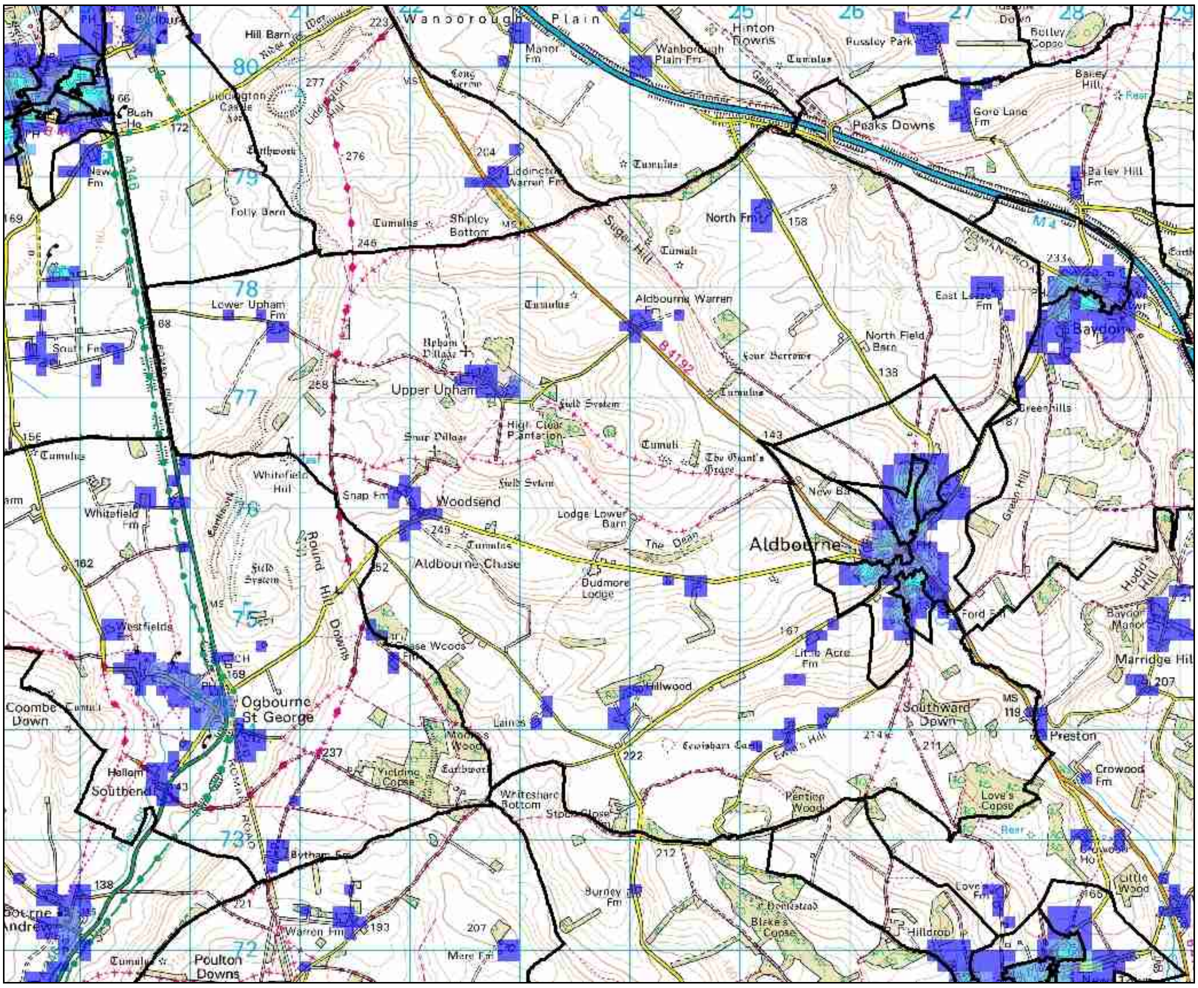

Figure 1 – Example of rural Output Area population distribution

A population density surface map is a more realistic representation of the actual distribution across census Output Areas.

Whilst Ofcom's method to apportioning the 2001 population census data has a standard and uniform approach, it will tend to underestimate the actual population totals in any given area. Ofcom's proposed method has the benefit of being repeatable and simple to implement; but this comes at the expense of inaccurate (under) reporting.

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