30 September 2010

Jill Faure
Strategy and Market Developments
Ofcom

By email   infrastructurereporting@ofcom.org.uk

Ofcom Infrastructure consultation

Vodafone welcomes the opportunity to respond to Ofcom's consultation 'The UK Communications Infrastructure Report: Ofcom's proposed approach to its new reporting duty', published on 22 July. Our response inevitably concentrates on the mobile-specific aspects of each of Ofcom's questions posed in the consultation. As a result our individual responses may not be relevant in the context of the other sectors of the communications industry which are considered in scope for this report.

Our response is structured around the groups of specific questions Ofcom raises in its general discussion of the proposed report as well as the individual topics highlighted by Ofcom for inclusion.

Overall Approach

Question 1. Have we got the scope right? Is the set of networks, services and operators we propose to report on appropriate and is our approach to data gathering and analysis correct?

We would obviously expect the mobile industry to be included within the scope of any UK Communications Infrastructure Report. The concept of a report that provides a picture of the state of the country's communications infrastructure is reasonable; the difficulty will be to establish, in the words of paragraph 1.4 of the consultation, "*an efficient and proportionate process which ensures that the obligations under the Act are met and that the potential benefits of the new report can be realised while minimising the burden on operators*".

Our response to this question and to the consultation in general focuses on the latter point, that of minimising the burden on operators of the data gathering process without unduly compromising what is possible to be reported. Ofcom makes clear in section 2 of the consultation that the principal tool to obtain information from the operators will be a set of Section 135 requests. Vodafone believes there are two important guiding principles on the use of Section 135 requests that are particularly pertinent to a general report such as that on the UK Communications Infrastructure (as opposed to a more focussed market review):

- Vodafone would endorse Ofcom's view given in the consultation document that any request for the provision of information should be governed by the principle of proportionality. In practical terms, this means that the approach Ofcom follows when requesting data from industry stakeholders should be the least onerous one to achieve its stated objective. Such a principle is entirely consistent with the criteria already provided for in sections 135 and 137 of the Communications Act 2003, which stipulate that any information requests issued by Ofcom must be proportionate to the use to which the information will be put.

- Equally importantly, as well as justifying the need for such information, Vodafone would urge Ofcom to ensure that sufficient time is provided to industry stakeholders for the provision of relevant data. Based on Vodafone's experience to date, preparation of responses to requests for information issued pursuant to statutory powers typically requires the diversion of resources within an organisation, which may not be possible at short notice or within a very limited timeframe. Once again, such a policy would be consistent with the provisions of section 135 of the Communications Act which require Ofcom to provide stakeholders 'reasonable time' to respond to information requests.

For its part Vodafone takes its regulatory obligations seriously and obligations imposed by a Section 135 request are no exception. We always strive to answer each request as fully as possibly in the time allowed. We respect the acknowledgement made in the consultation that "*any collection of data by the regulator imposes a burden on industry*". However we have observed an emerging trend in recent years for Ofcom teams undertaking market reviews to produce increasingly large and apparently unfocused Section 135 requests that trawl for a large volume of information. These requests are frequently coupled with a subsequent apparent failure to use most of the information requested in the resulting consultation document. We would ask therefore that for the purposes of the UK Communications Infrastructure Report Ofcom applies restraint in the volume and depth of the Section 135 questions imposed on each operator and only asks for that information that it needs, does not already have and is able to use in the report.

In terms of the information that Ofcom already has we are impressed by the quality and depth of content of the existing annual Communications Market Report published by Ofcom (together with its Nations and Regions edition) and note that this is produced without any additional specific formal information requests being made of industry. In this document Ofcom already reports on several of the topics proposed for the first UK Communications Infrastructure Report. So for example on mobile coverage, Figure 5.9 of the Communications Market Report of 2010 for England shows by region, the percentage of postcode districts where at least one, two, three, four or five operators had at least 90% 2G area coverage. Another potentially useful source is the set of Consumer Experience research reports which hold for example a time series data set of service availability and consumer satisfaction relating to the communications industry.

We appreciate however that in the case of the mobile landscape the overall view of the industry in terms of customer numbers and traffic volumes is somewhat hampered by the lack of public domain traffic and customer data from H3G comparable with that published by Ofcom (and prior to that Oftel) for the other mobile operators in the regular quarterly report now called the telecoms data updates, but this is no obvious reason to impose Section 135 requests on all mobile operators. Equally the omission of H3G data does not appear to have materially hindered Ofcom in the production of the existing Communications Market Reports.

For the sake of proportionality Ofcom should also confine itself to asking for what can actually be used in the final Communications Infrastructure Report. Apart from whatever is already in the public domain, most network information for a given operator is confidential to that operator, and at any disaggregated level may indeed constitute a business secret. Also operators will not always use identically defined metrics, in such areas as availability and coverage, so there is a limit to data comparability for more complex measures. The scope of reporting available to Ofcom in the prospective Communications Infrastructure Report must therefore follow in large part that of the existing Communications Market reports, i.e. measures on a total industry basis: either total levels of volume/value etc, or calculated averages of whatever metric is being considered on a per customer basis for the total market, rather than identifying individual values of say total or per customer activity for particular operators. This necessarily limits the scope of the information that it is proportionate to obtain.

These points all suggest that Ofcom should apply considerable restraint in its use of Section 135 information requests for the production of the Communications Infrastructure Report.

Question 2. Do you agree with our approach to classifying different types of networks and services? Are there better ways to define them?

NON-CONFIDENTIAL

We believe that Ofcom's proposed split of services shown in table 1 of the consultation is reasonable, although if radio broadcast is to be included, it is not clear why the principal method of radio reception, analogue, is being excluded.

Question 3. Do you agree with our proposal to prioritise 2G mobile coverage and broadband speeds for the first report?

Vodafone recognises that research projects into 2G mobile coverage and mobile broadband speeds are already in Ofcom's work programme and that presenting the fruit of these projects, if conveyed in the right way, can be useful for consumers. Vodafone therefore supports this focus for the initial report, subject to the caveats about presentation, comparability and burden set out below. It might also reasonably be expected that whatever data is already being gathered in the course of these workstreams should be more than sufficient to satisfy the more general information requirement of a wide-ranging and general report, so there should be no need for additional Section 135 requests on these matters for the purpose of the prospective Communications Infrastructure Report.

Question 4. Do you agree with our proposed reference date for the report as a date in June 2011 and are we allowing enough time for the provision of data?

Question 5. How can we improve the comparability of data between different operators?

We respond to these two questions jointly. From the timetable suggested by Ofcom in table 3 of the consultation document a very tight turnaround period for reporting by the operators is required. With a suggested reference date sometime in June 2011[1] and a report completion date of August 2011, a very short period for data production and compilation is implied for each operator. Whether this time is sufficient will depend on what Ofcom actually asks for, in both depth and extent. If the Section 135 request is limited to readily available 'off-the-shelf' data already produced and used by the operator as management information in the running of its business then a short response period may be sufficient, subject to the usual problems associated with sourcing and compiling a volume of data for submission to Ofcom. If however Ofcom is looking for a large volume of detailed data that requires extensive and complex ad-hoc data mining queries or significant narrative explanation as appears to be the suggestion in 2.16 for network availability data at least, then the suggested timeframe (one week!) will by no means be sufficient. Clearly the tight

---

[1] Ofcom should be aware that some metrics are only assembled on a monthly basis, so an 'as of' date different from a month end may be impossible to respond to.

timetable is not just a problem for operators, but also for Ofcom, which will have only a very limited period between receipt of the data and production of the report – the more data Ofcom draws down, the greater the problems of "*additional processing and careful handling*[2]" and of report production become.

We note also that Ofcom is proposing in 2.11 iv) to apply a threshold to determine which operators to include for each network and service, suggesting for example to confine information requests to "*the six largest fixed broadband service providers, which together account for over 90% of connections*". Whilst this is clearly the most practical approach from Ofcom's point of view, it suffers from the problem that any overall industry total or average derived from this method is an estimate rather than absolute, and one that is only reliable to the extent that whatever attribute on which information is being sought varies consistently between the sampled and not sampled population. This may not be the case with low frequency events – e.g. in another context slamming where the smaller operators representing the say 10% not being surveyed may very well make a disproportionate contribution to the industry total. In these circumstances the results of an onerous and detailed request on the 90% may give a spurious air of precision to the extrapolated industry total that cannot justify the collection effort.

Clearly the two points are interlinked – in the case above, the ability of Ofcom to report on time on 90% of the market from submissions from six operators is dependant on all six operators being able to produce relevant data within the very tight timetable. This is another argument for not seeking too detailed a set of data from the sampled operators.

But there is a further problem, on data comparability, in that whilst simple measures such as traffic volumes and customer numbers are generally consistently defined by operators[3], other more complex measures of network performance may not be. Where different metrics are used by different operators, then it is not practical or appropriate to add "chalk and cheese" to derive some industry aggregate. In other words to sum differently prepared operator specific metrics will not produce a consistent and meaningful reportable total or average for the industry as a whole. Equally therefore in these circumstances there is little valid basis for any attempt to compare the relative performance of different operators. This problem is most likely to be the case for network outages, as is discussed in the appropriate section below, but will no doubt also arise elsewhere. It may not be useful or proportionate therefore to seek to collect such information from operators in the first place where it cannot be used in the report – survey or trials data may provide a valid alternative source in some circumstances, or very simple aggregated measures may be usable.

---

[2] Consultation at 2.10

[3] Although active customer numbers may on occasions suffer from inconsistent interpretation between operators

These points suggest that there are practical limits to what Ofcom can and should ask for in the prospective Section 135 information requests for the purposes of production of the new Communications Infrastructure Report.

We set out below our responses to Ofcom's individual areas of questioning in the consultation document.

Use of Electromagnetic Spectrum

Question 6. Do you agree with our approach for reporting on the use of electromagnetic spectrum?

The use of existing Ofcom data would appear to be perfectly reasonable for any assessment of the allocation of spectrum. In the case of most spectrum bands, allocation is synonymous with usage. It is less clear that this is true for some spectrum allocations, particularly in the case of bands allocated for temporary use, such as PMSE. Here some additional data on the utilisation of spectrum may also be required in due course, if this proves to be a relevant topic for Ofcom's attention.

Coverage

Question 7. Do you agree with our approach to measuring coverage?

It is essential that Ofcom's approach to measuring coverage should be based on the 'real user' experience, rather than on theoretical test models. It is also essential that any public-facing output is of genuine use to consumers and that its presentation drives the right operator behaviours – in other words perverse incentives must be avoided where real service improvement is at odds with the *appearance* of service improvement.

For 2G voice, the real user experience means being able to make and receive a call, rather than a mobile signal being visible to test equipment. To return to the 'perverse incentive', a reporting model purely looking at a signal being visible to test equipment creates a situation in which making the signal visible to such equipment at the cost of the call connecting in reality would make an operator look better, but actually offer a worse customer experience. It is also vital to present 2G coverage data in the right way. On a large scale map the provision of very poor 2G coverage over extensive rural areas would superficially appear significantly better than an improvement to the quality of coverage over areas where people actually live and work; but it is the latter that provides more overall customer satisfaction.

For 2G coverage, it is essential that Ofcom ensures that the data it receives is comparable between operators – without this any data Ofcom receives is worse than useless. Vodafone has invested considerable time and resource in making its coverage checkers highly reflective of the real consumer experience, both being very careful to represent the real situation on the ground and offering indications of indoor v. outdoor coverage and 2G v. 3G services. In using operators' data, Ofcom must ensure that no perverse incentive to overstate coverage is created and that all data is objectively comparable.

For 3G data speed, assessment is even more complex: the consumer experience viewpoint means that what is relevant are real upload and download speeds achieved with existing traffic loadings as well as reliability and consistency of service (i.e. very high maximum speeds in an empty network are not useful measures if users either cannot access the network or are regularly thrown off the network).

Vodafone is involved in both of Ofcom's current work programmes that look at respectively 2G voice coverage and 3G mobile broadband speed. In these exercises we are more convinced of the utility of Ofcom's methodology on MBB speed, which is closely monitoring the experience of real users and taking care to examine reliability and consistency of service as well as speed. We are not so convinced of the utility of the drive trial-style testing being conducted on 2G voice, as it is predicated on the presence of a signal, not on a real user making a call.

Ofcom's analysis, and its subsequent presentation, must ensure that the characteristics of wireless networks are recognised. It is a technology affected by geography, contention, weather as well as even more localised factors such as building materials and height off the ground.

We would also wish to make again the significant point alluded to in our response to question 3 above, that whatever data collection and analysis is being performed inside these Ofcom work programmes should be sufficient for the purposes of producing the UK Communications Infrastructure Report – there should be no need whatsoever for additional informational requests to be made to the operators on these topics purely for the report production.

Question 8. How do you think we should establish an appropriate level of granularity and the right technical assumptions to make the data useful?

In making the right technical assumptions, Ofcom should recognise that there is the potential for data errors. There is the potential for some errors in databases for site configuration due to human error or other reasons such as physical tilts changing in extreme weather, antennae performance degrading and so forth.

NON-CONFIDENTIAL

It is naturally our policy to be as accurate as possible as often as possible but there is potential for localised anomalies.

Vodafone would suggest that using a common technical toolkit would be the best approach, which would allow it to be compared against our own. Vodafone aims at a high degree of accuracy with what we publish so we would be concerned if there was any compulsion or necessity to switch to another toolkit that might in any way reduce accuracy.

Infrastructure Sharing

Question 9. Do you agree our proposed approach will enable us to report adequately on arrangements for infrastructure sharing? Are there reasons why network operators would be unable to provide us with the data we have proposed to collect?

Ofcom states in 3.23 that "*information about infrastructure sharing can help improve our understanding of the role this plays in extending coverage and promoting investment in next generation networks*". We agree with Ofcom that some knowledge of the level of network sharing might be of some benefit but suggest that the level of network sharing is not in itself necessarily a decisive indicator of either coverage extension or future investment in next generation networks.

The proposed measures are, as per 3.25:

- "*The number of network sites where sharing takes place, including mobile masts, ducts, poles and other wayleaves;*
- *The proportion of the network that uses shared infrastructure, for example the number of masts and miles of duct that are shared, compared with the total;*
- *We are interested in reporting on such data on a geographic basis where this might help to assess the impact of sharing on rural coverage or regional variations in network resilience and;*
- *Whether and where other forms of sharing take place, such as co-location of equipment (for example in BT exchanges.*"

Our view, in relation to mobile site numbers, is that such network sharing information should be relatively easily available, at least at a UK total level.

In terms of Ofcom's actual reporting of the extent of mobile network sharing in the Communications Infrastructure Report there is a difficulty in that the information on the progress of individual network sharing arrangements is generally confidential. For the purposes of the report therefore we suggest that Ofcom should confine its information request to the number of sites shared and the total number of sites, across the whole of the UK, for the purposes of determining an average level of site sharing. Since site sharing agreements between mobile operators are relatively recent in origin and are likely to result in a future increase in sharing, this starting point should establish a baseline for a future time series. If in addition Ofcom is seeking information on the degree to which links utilised in a mobile network that are leased from another communications provider are shared along some of their route by more than one operator, then that information is only available from the link provider.

Wholesale Network Access

Question 10. Do you agree our proposed approach will enable us to report adequately on the provision of wholesale network access? Are there reasons why network operators would be unable to provide us with the data we have proposed to collect?

Ofcom's suggested informational requirements are, from paragraph 3.30 of the consultation:

- *"Which networks offer wholesale access;*
- *The number of service providers which use wholesale access on each network;*
- *The number and proportion of end users on the networks which are served via these wholesale arrangements; and*
- *The amount and proportion of wholesale traffic carried over each network."*

This information is fairly readily available, but specific operator level details are generally confidential – whilst some of the larger MVNOs have published some information on their customer numbers, others have been more reticent and traffic data is unlikely to be in the public domain at all. The scope for non-confidential disclosure in Ofcom's new report is thus probably limited to the:

- total number of MVNOs at industry level
- proportion of customers at total industry level that are managed by MVNOs, rather than network providers
- proportion of total traffic at total industry level generated by customers of MVNOs

The scope of any informational request on mobile wholesale network access should be constrained by this limited extent of publishable data.

Capacity

Question 11. How do you currently measure the capacity of the network?

Question 12. Do you agree that we should define specific metrics for different types of networks?

We agree that the most practical metric for collection of information on capacity for the purposes of the UK Communications Infrastructure Report will vary by network type, with fixed broadband, fixed voice, and digital broadcast all having different relevant metrics from those most suited to mobile networks. In relation to mobile networks (discussed by Ofcom in paragraphs 3.58 to 3.65) we do not agree with the method proposed for mobile access network capacity. Any assessment of capacity is only a meaningful measure when related to demand. Demand for mobile services varies both across space (i.e. by geographical location) and time (i.e. by time of day, time of year etc). Unlike a fixed network however, where by definition the demand from a specific user is limited to a specific point location, a customer with a mobile device can seek to use that device at locations that change as the customer moves around the UK, or in the case of roaming, the rest of the world as well.

To match this variation in demand, the capacity provided by a mobile operator therefore necessarily must vary across geographical area, in terms of the density of traffic that is possible per unit of area. In other words the volume of simultaneous mobile service activity that is supported by a mobile network varies substantially from location to location. However in order to provide any mobile area coverage, and since the area that can be covered from a single mobile cell site is finite, a certain level of capacity (per cell site area, or per sq km) is unavoidably provided. This may be, in areas of relatively low demand density, some degree above the actual level of demand. (To some extent the minimum provided capacity is dependant on the specific mobile technology deployed.)

It is not clear that measuring this unavoidable excess is meaningful to any overall assessment of capacity. Capacity for the mobile networks is only useful to the extent that it can be made available in a way that is matched to demand, i.e. there is sufficient capacity available that a call can be made at the peak hour inside the coverage area, subject to network blocking design tolerances. It is on this basis that mobile operators plan and build their networks.

Ofcom's present proposal in relation to mobile access network capacity however is to assess the total capacity provided across the UK, by apparently summing the physical capacity available at each cell site for each technology, using the measures of the:

- number of base stations and the number of radio sectors per base station
- number of radio channels utilised on each sector
- transmission technologies in use e.g. GPRS, HSDPA etc
- backhaul capacity connecting the base stations to the core network

We do not believe that this is a useful approach. The result of summing the number of base stations, sectors, and radio channels and technologies and so forth might be a conclusion that X simultaneous calls could be made in the UK on a particular operator's network (or obviously a rather larger total for all operators). There are two obvious difficulties with this. Firstly the measurement of the excess of supply over demand in areas of low demand as a result of the capacity provided with coverage is not of any obvious value – any issue of capacity measurement must surely relate to whether there is sufficient capacity where demand exists. In the event that there is excess capacity in one area but a shortfall in another there is little value in any metric of total national capacity. Secondly capacity when used for voice will deny capacity for data, and vice versa – it is difficult to see therefore how a calculation of total capacity might be useful in terms of understanding whether actual demand of both voice and data can be met at all locations where coverage is provided.

To Vodafone radio access network capacity when calculated as Ofcom implies is simply not a useful measure for collection or reporting. We note that for the core mobile network Ofcom is suggesting a different method i.e. that operators provide data on "capacity demand as a proxy for capacity supply". We suggest that the points Ofcom makes in connection with the core network are equally relevant to the radio access network, and that therefore the same measure of capacity demanded be provided as an appropriate measure of relevant supply in the radio access network as well.

Information on capacity demanded could be supplied to Ofcom for the purposes of this exercise, as is suggested in paragraph 3.65, of the monthly total of voice or data traffic volume, or an average volume per customer. If appropriate this could be supplemented by some objective measure of demanded call success, using as Ofcom states in 3.62 "*Ofcom's own data on measured performance experienced by a sample of consumers*" or by seeking this information from network operators.

Some periodic traffic volume data for mobile operators apart from H3G is already in the public domain, in Ofcom's quarterly updates to the communications market reports. The Communications Market Report for 2010 in addition already reports on activity levels both in total volumes, for example in figure 5.43, and on a per customer level, for example in figures 5.72 and 5.73. It is not clear that further disaggregation into a per operator basis, except insofar as already in the public domain, would be practical.

Availability

Question 13. Do you agree with the proposed approach of gathering specific reports of outages above a certain threshold, and how do you think such thresholds should be set?

Question 14. For smaller outages, which statistical data do you think it is valuable to gather?

Question 15. Is a three-month reporting period sufficient to assess availability performance?

We do not think that Ofcom's proposed approach is practical for the mobile industry. The problem of assessing the degree of network availability in a complex mobile network is not a simple one. It is very hard to see that collection of statistics on outages from the recording systems of the mobile operators, even if the data were to be available in the format requested, would provide a meaningful result that Ofcom could use in the prospective Communications Infrastructure Report as a view of network availability. In our view the topic of network availability for the mobile industry is multifaceted and difficult and not one that can be addressed lightly.

The root problem is that in a complex multi-service mobile network, a network problem may or may not lead to an 'outage' and an 'outage' may take many forms. An inability of a customer to make or receive a call in a particular location at a particular time may not be caused by a network 'outage' – there may be coverage or capacity issues at that place and time, or the individual phone is defective, or out of charge, or out of calling credit. Alternatively the customer may be able to make and receive calls, but not texts, or a particular data service, e.g. downloading a specific ringtone does not work (either in general or in the case of the particular customer device), whilst all other data services do. Which of these events constitute network outages? One obvious problem therefore in any objective network availability assessment is that an 'outage' needs to be clearly defined in terms of cause and symptoms, and in order to compare over time and between operators some materiality grading must performed of every such event.

Any such reporting and recording system however is bound to involve subjectivity and local prioritisation. Some outages are planned. Bringing a new piece of network infrastructure into service, or upgrading some component of network software, may require some form of outage across some part of the network for some services for some period of time. Clearly any such outage will be planned to minimise any potential disruption of service to customers i.e. will generally take place when traffic levels are very low, but there may be offsetting customer benefits from early implementation. Should all of these network enhancement events be counted as network outages – the consequence might be that operators are incentivised not to develop their networks?

If we assume that planned outages are excluded, then the concern must be with unanticipated network problems that cause 'outages'. A network problem may impact one or more network services to a greater or lesser extent, across some part of the network, for some period of time. Whether this actually leads to an 'outage' and the size of that outage is another matter. For example, in the event of a failure of a link, then if a secondary route is available, it is possible there will be no service disruption whatever. It might be however that overall capacity may be reduced, possibly below the level of peak demand, so that at peak periods call success rates for example may, or may not, fall. Or, in the alternative, no secondary route exists, in which case there may be a local service outage. But the size of any such outage will vary. If a cell site has gone out of service as a result of the link failure, then because of the overlapping coverage supplied by adjacent cells, particularly given the co-existence of 2G and 3G technologies, the real area of impact may prove to be very limited. The actual impact in terms of say the number of calls that customers were unable to make that they desired to make may, to all intents and purposes, be impossible to measure. In any event Vodafone would ✂, and strive to correct the problem in as short a time as possible.

An alternative example of an incident might be the failure of a specific platform, say a voicemail server. Provided there is sufficient capacity provided by alternative voicemail servers, this may have no 'outage' impact whatsoever. But given the fluctuations of demand over time, even if one imagines that the absence of one particular platform does have an impact, this is likely to be restricted to the busiest hours of the day. Again there is no automatic correspondence of 'incident' with 'outage'.

So, if one considers these examples from a customer point of view, in the former, it may be that a number of customers over a particular period may be unable to obtain coverage/any service (except for emergency calls, where national roaming is available) whilst they are at particular locations (or possibly the restriction may only apply at peak times), but could find coverage relatively nearby. Depending on the circumstances the area of loss of service may vary with the capabilities of the customer's device (2G only vs. 2G and 3G). This might also impact which services e.g. high-speed data become unavailable at each location. Whilst a

customer may be unable to make calls, calls *to* that customer will go to voicemail and may be subsequently picked up – how should this delayed communication be weighted?

Ofcom suggests in 3.69 measuring the severity of outage in terms of "*the product of the number of customers affected and the average time they lost service due to the outage*". It is difficult to see how this might actually be done in an objective manner – things are really not as simple as they may seem. Since mobile customers do not have a fixed location, how many were actually in the impacted area and how many of these were actually unsuccessfully attempting a mobile service over the relevant period and which services were successful and which were not are not really measurable. In the latter example above of the loss of a voicemail platform, there is no general loss of service, it is only that potentially a particular service, voicemail, may or may not be available to some customers at particular times of the day. How could such an 'outage' be included in Ofcom's simple schema?

Vodafone is not suggesting that the difficulty with identifying and objectively measuring the customer impact of a specific incident arises from any lack of concern on network problems. On the contrary Vodafone takes network problems very seriously – it is just that the way we monitor and report on network issues is more complex than the simple measurements of customer outage that Ofcom suggests. We see our superior network quality as an important differentiator, and have invested extensively in further increasing the quality of our network and our network management systems, recently opening a world class Network Operations Centre at our Newbury headquarters and ✂. We are at the forefront of mobile network quality in the UK. As part of our effort to resolve network incidents that do occur as quickly and effectively as possible, we have developed our own categorisation of them into ✂. Our grading of problems is based ✂ across a variety of criteria.

✂. The criteria ✂ thus cannot provide the sort of categorisation of outage impact that Ofcom is seeking.

✂. This suggests the paradoxical possibility that an operator that is more concerned with network quality might report a higher number of incidents than another operator which actually had a lower quality network but was less concerned with recording and addressing problems!

It is inconceivable that other mobile operators have adopted identical methodologies for measuring and resolving network problems. It is not obvious that any operator-specific grading and assessment of non-availability issues, in terms of threshold, materiality, impact etc will be comparable or transferable between operators. But furthermore, the lack of correspondence between network problem and network outage (whatever the latter is deemed to mean) would mean that if Ofcom were to come up with a single

classification of outages that it seeks information on, then every operator would have to examine every incident that it has recorded and re-analyse it into Ofcom's methodology – even assuming this were to be possible this would be both very subjective and very onerous. (But this still would only produce comparable results if operators had identical minimum thresholds and similar standards for recording incidents.)

It is unlikely therefore that any meaningful and objective picture of outages could be assembled at total mobile industry level. It is also not clear if Ofcom is suggesting grading outages into two or more categories, how it proposes to compare them – is an operator with say one major and two minor outages 'better' or 'worse' than an operator with no major but seven minor outages? What might either of these actually mean for a user of some or all of the services offered by a mobile network?

There is also the problem that the root cause of an outage may lie with another communications provider's network – for example if a backhaul link from a mobile cell site to the mobile core network provided by a fixed operator goes down. More significantly, most services do not exist on one operator only, so customers can be affected by problems on other networks. If customer X is unable to call customer Y, is this indicative of a problem of the network where X resides, or where Y resides? If a mobile data customer is unable to access a particular URL (or experiences a low download speed at that URL), where is the point of failure?

Even if all of these problems can be addressed and an objectively comparable methodology defined, clearly there are also major problems of confidentiality that will restrict the way that outages might be reported at industry level by Ofcom in a way that might be meaningful to the report user whilst also being fair to the individual operator and the industry as a whole.

Ofcom's suggested approach of collecting data on major and minor outages as a means of illuminating service availability for the mobile industry as a whole for the purposes of the Communications Infrastructure Report would not thus seem to be workable.

It is difficult to see how these problems can be overcome if Ofcom focuses on outages. But Ofcom entitles this topic availability, not non-availability – the issue is defined in 3.66 as a "*report on the amount of time for which networks and services are available and on steps taken by providers to maintain or improve availability*". Whilst the latter point is largely qualitative, and might well be satisfied in Vodafone's case by ✂, the former is quantitative. This suggests to us an alternative approach. It may be preferable for Ofcom to focus on relatively simple measures of service availability rather than non-availability. These may be capable of being sourced from operators (or obtained more generally). Possible measures might be call set-up success rates, call completion success rates, and so forth.

If Ofcom is considering comparing fixed, mobile and broadcast networks in terms of availability it is obvious that the very different nature of each in terms of complexity should be considered – whilst each will consider they have individual problems, the problems of mobility management i.e. the need to cater for a mobile device whose location varies across the UK, both between and during calls, and of multiple mobile services, add a unique and substantial level of complexity to the mobile operator.

Resilience

Question 16. Do you agree with our approach to reporting resilience and emergency planning and the list of data we would ideally collect from CPs?

In principle we would agree, but we do have serious concerns over the level of detail expected for the risk assessments; focused on:

- high levels of reporting and data management for Vodafone
- Vodafone being compelled to expose commercially confidential detail on security / resilience risks and incidents

Vodafone has serious concerns over how such reporting requirements could be implemented as a 'standard' given that communications providers are of such variety in terms of products and services, scale and resource. As discussed in detail above, each provider will have its own definition of a 'major incident' in its own standard; and as each provider uses significantly different criteria and scale for determining 'major' the data Ofcom arrives at may well not be comparable.

It will be necessary to discuss, review and agree the level of standards that will be set and the levels of reporting required. This should ideally result in agreement and clarity on requirements by the communications provider community, BIS and Ofcom. Vodafone understands that at the Electronic Communications Resilience and Response Group (EC-RRG) it was agreed that a workshop involving legal, security, operations, and resilience representatives from the communications provider community, BIS and Ofcom should work through the level of standards that will be set and levels of reporting required. Vodafone supports this process, and Ofcom's commitment to discussions with EC-RRG[4]. Vodafone sees a clear agreement via the EC-RRG as essential if an excessive and unhelpful burden on providers is to be avoided.

---

[4] Consultation at 3.80

Vodafone would also look for significant re-assurance over its concern over how to guarantee the security and confidentiality of the highly commercially confidential information that communications providers would have to supply on incidents and risks.

Question 17. Do you already provide information to other organisations and government agencies around resilience issues? If so, what are they?

We provide a considerable amount of information, to organisations including:

- ✂

Question 18. Do you agree that there are additional networks and services which are of sufficient importance to include in the report? If so, what are they?

International Comparisons

Question 19. Are there other sources of international data which we should consider? Are we focusing on the right networks and metrics? In particular, have we got the right metric for commenting on next-generation access deployments?

Vodafone would endorse Ofcom's proposed approach to undertaking a comparative analysis of UK communications infrastructure with that in other jurisdictions. We agree with Ofcom's proposal in paragraph 3.90 to use publicly available data on international comparison rather than asking operators to provide further data. In Vodafone's view the sources mentioned in paragraph 3.90, together with whatever additional sources and materials that Ofcom has used in preparing its International Communications Market Report publications series, are likely to provide sufficient information.

In any case, as Ofcom will appreciate, Vodafone Limited is not in possession of data relating to other markets and would need to undertake a time-consuming exercise to obtain such data. Furthermore the utility of international comparisons may ultimately be limited given the differences across national telecommunications markets in the EU (something that has been recognised by the Competition Appeal Tribunal). As a result any requests requiring operators to provide data about other markets are likely to be disproportionate.

Vodafone Ltd