



Vodafone's response to Ofcom's consultation

Mobile call termination market review 2015 - 2018

August 2014

Non - confidential version

Summary and conclusions

Vodafone welcomes the opportunity to respond to this consultation. We do not believe that based on the facts relevant to a decision in 2014/15 that Ofcom has come to the right result in its provisional conclusions – its proposed charge control is set too low, and drops too fast, and as a result there is a real risk of consumer harm.

Ofcom's focus this time is clearly on LRIC rather than LRIC+, although the choice between two cost standards appears at best marginal. There is in fact not much of a positive case for LRIC made by Ofcom, and what little there is evaporates on examination by Vodafone. The key test should be the overall impact on consumers, balancing short term impacts with longer term dynamic effects on investment.

The risk of setting mobile termination rates (MTRs) 'too high' or 'too low' are asymmetric. Ofcom has not sufficiently considered how this relates to the task now before it, and properly examined the contrast between the present situation and that in 2011. In 2011 the perceived gap between LRIC and LRIC+ was much greater than it is now, and the existing termination rate was well above both. But even then the choice of cost standard was finely balanced. In 2014, a considerably reduced differential between LRIC and LRIC+ must mean a correspondingly reduced 'benefit' expected from LRIC rather than LRIC+. It is also relevant that the existing termination rate is already between the future levels of LRIC and LRIC+. Meanwhile, other intervening market and regulatory changes mean the risk of setting a rate below the real LRIC, resulting in subnormal returns that undermine investment incentives, is significantly increased. Faced with such asymmetric risk, Ofcom must err on the side of caution (as it has recently recognised for ALF¹).

One way of mitigating this risk would be to target LRIC+ rather than LRIC. This remains a perfectly respectable approach, although Ofcom gives it scant consideration. Failing that, if Ofcom remains determined to adopt a LRIC standard, it must take special care to satisfy itself that the collective effect of individual and cumulative errors and uncertainties does not result in a mobile termination rate that undershoots the level of LRIC that operators can be reasonably be expected of being capable of achieving.

One significant new factor since the last MCT review is Ofcom's own intervention on GC9, which undermines previous assumptions about the ease and speed of price rebalancing through the waterbed. The intended consequence of the GC9 Statement is to make price increases more difficult. However, the unintended consequence is to imperil recovery of efficiently incurred fixed and common costs, damaging long term investment incentives, and to make downward price adjustments less likely because of the now asymmetric difficulty of reversal. This exacerbates the risk that MNOs may not be able to recover their efficiently incurred costs if MCTs are set too low, and will further inhibit any prospect of fixed pass through (of which there is remarkably little evidence historically in any event). This contrasts starkly with the fixed narrowband

¹ Annual Licence Fees for 900MHz and 1800MHz spectrum – further consultation August 2014

market review, where reductions in termination due to the move from LRIC+ to LRIC were largely offset by corresponding increases in regulated origination charges.

Whichever cost standard Ofcom selects, the underlying cost modelling requires close attention. Ofcom is right to treat the average efficient operator as a combined 2G, 3G and 4G one, and not 4G only as suggested by BT. However, Ofcom's present modelling assumptions on spectrum holdings and other elements of the model need review to ensure that they are appropriate for an average efficient operator. A corrected view of the outputs of the model appropriate to what the average efficient operator can be expected to reasonably achieve shows appreciably higher LRIC and LRIC+ outputs.

Finally, Ofcom's proposal for a P0 adjustment is unsound. In the first place it departs from Ofcom's normal practice of a glidepath, without adequate reasoning. In the second place a proper evaluation of the current facts should have led Ofcom to the conclusion that a glidepath secures a better balance of benefits, in particular where the risks of modelling and forecasting error are compounded by any premature drop to a modelled LRIC that may be unreliable.

We continue to prefer LRIC+ as a cost standard over LRIC, but in any event we conclude that the proper outcome of the MTR review should be a glidepath transition to a revised model output in the last year of the charge control that is at a level appreciably above Ofcom's provisional model outputs.

The structure of this response is as follows:

- In section 1 we consider the merits of the alternative cost standards of LRIC and LRIC+, based on the current situation and the likely range of the future levels of LRIC and LRIC+;
- In section 2 we consider what assumptions should be made in the modelling of an average efficient operator in order to generate model outputs that are suitable for imposing a charge control on operators;
- In section 3 we identify necessary adjustments to the model;
- In section 4 we consider the design of the charge control and in particular the erroneous provisional preference for an immediate adjustment over a glidepath;
- In section 5 we respond to Ofcom's specific questions with respect to matters which are not otherwise addressed elsewhere in the main body of this response.

Section 1: The application of the LRIC cost standard

1.1 Summary

Vodafone continues to believe that the LRIC+ cost standard is the appropriate one to use for mobile call termination. Ofcom's review of the historic evidence provided by the experience over the last charge control fails to consider that most of the reduction in MTR over the last four years was in fact not to do with the shift from LRIC+ to LRIC at all. Under LRIC+ rates would have fallen by more than 50% anyway. As a result there is even less discernible evidence on any consumer advantage of LRIC over LRIC+ than Ofcom suggests.

Ofcom's argument in 2011 in favour of LRIC was finely balanced. But this was when the difference between LRIC and LRIC+ was rather more than 1p and the existing termination rate was well above LRIC+. It has much less force under the changed facts of 2014, when the difference between LRIC and LRIC+ is barely 0.5p and the current termination charge is positioned *between* the future rates of LRIC and LRIC+.

- Given that the forward looking alternatives of LRIC and LRIC+ that Ofcom is currently contemplating in the future charge control are both low and not that different from each other (particularly in comparison with past changes and differences), the putative future advantages to the mobile consumer of LRIC over LRIC+ must be correspondingly small. There is certainly evidence of the advantage to fixed operators of lower MTRs, but the evidence that fixed consumers have actually benefitted from the fixed operator windfall is hard to find.
- But it is certain that there is some degree of detriment to MNOs from a lower MTR (even if the relative differences between LRIC and LRIC+ are small) in terms of cash denied that would otherwise be available for future investment, particularly as Ofcom's recent intervention in the mobile retail market (in the form of its GC9 statement) has significantly punctured and damped down the effect of the waterbed and limited the ability of mobile operators to rebalance fixed and common cost recovery through offsetting retail price increases.

Therefore the evidence basis for LRIC over LRIC+ is not strong. We appreciate however that changing cost standard may be more difficult a step for Ofcom than remaining on the existing one.

Most certainly however the asymmetric risk of a blended rate set below the "true" blended LRIC suggests that Ofcom's biggest concern should be not to charge too low a LRIC (assuming it decides to continue with LRIC). This means that Ofcom should set the inputs to the LRIC model in a conservative manner, and the profile of costs over the charge control period should be set by a glidepath not by an immediate drop to a modelled LRIC, to a level in 2015/16 that may not be achievable by the average efficient operator – we return to this latter point in section 4.

We note that this conservative approach is one that Ofcom states that it has adopted in the current ALF consultation²:

“1.34 We consider that we should exercise the necessary regulatory judgement by adopting a conservative approach when interpreting the evidence. This is for the following key reasons:

- *Asymmetry of risk as between the effects on spectrum efficiency from inadvertently setting ALFs either above or below market value, given the uncertainty about the correct estimates for market value.”*

In the ALF consultation Ofcom’s concern was with the risk of setting spectrum fees too high, whereas in the context of MTR the risk is of setting MTR’s too low, but the asymmetric risk of too high a cost or too low a recovery of costs is similar and analogous.

In the remainder of this section we consider these points more fully.

1.2 Alternative cost standards – LRIC or LRIC+

Since 2010 there has been extensive debate in the UK on the appropriate cost standard to apply in wholesale voice termination regulation. The mobile side of this debate culminated with a determination in 2012 by the Competition Commission who supported Ofcom’s conclusion that based on the circumstances in 2012, the LRIC cost standard should be applied to mobile wholesale voice regulation. But this does not obviate the need to consider the choice of cost standard in the light of the changed facts that relate to the next charge control.

There was subsequently less debate concerning the application of LRIC to fixed voice termination. This may have been because both termination and originating voice wholesale services are regulated for fixed operators, and Ofcom took the decision that the fixed and common costs notionally “displaced” from fixed voice termination by the change from LRIC+ to LRIC, i.e. the “+”, should be recovered solely from fixed voice origination, in effect converting the LRIC+ of origination to a regulated LRIC++ wholesale charge control. To a considerable extent therefore the change of cost standard from two sides with LRIC+ to one side with LRIC and one side with LRIC++ was in itself in practice broadly neutral, at least for operators with a reasonable balance of wholesale termination and origination.

As a result of these past decisions, both mobile and fixed voice termination are thus currently regulated with charge controls that have already been set on a LRIC cost standard. In the present consultation, based on its assessment of current facts, Ofcom’s provisional view with regard to the cost standard to be applied in the future would appear not to be strongly weighted in favour of LRIC over LRIC+:

² Annual licence fees for 900 MHz and 1800 MHz spectrum, further consultation, August 2014

“We believe an MTR cap at LRIC is more likely to encourage effective competition, which, all else equal, will result in improved economic efficiency. It does not appear to us that consideration of the other criteria provide any significant counter-arguments for a move to LRIC+. In particular:

- considering the impact of LRIC and LRIC+ on economic efficiency, over and above the effect on competition, does not provide any additional arguments in favour of LRIC or LRIC+;*
- while there are some theoretical grounds to suggest that LRIC+ could have a preferential effect on certain “vulnerable” consumers, the evidence does not suggest this is at all significant; and*
- we do not consider that regulatory or commercial impact considerations are particularly decisive in this case, but we note that continuing with LRIC will involve less regulatory and commercial change for industry.”³*

“We also note that this is in line with the 2009 EC Recommendation in favour of LRIC and consistent with our recent decision to cap FTRs at LRIC (over the period 2014 to 2016).”⁴

This is hardly a ringing endorsement of LRIC – the conclusion could be paraphrased as “since mobile wholesale termination is already on LRIC, there is no pressing reason suggesting a move away from that standard”.

Vodafone still believes that LRIC+ is the appropriate cost standard to use. We understand that Ofcom’s provisional preference is to continue with LRIC, rather than to revert to LRIC+, but believe that there are difficulties with Ofcom’s evaluation of the merits of the alternative LRIC and LRIC+ cost standards in section 6 of the consultation. Our view is that Ofcom’s evidence for the advantages of LRIC over LRIC+ is even weaker than Ofcom suggests. If Ofcom does continue to persist with LRIC, this paucity of evidence on the merits of LRIC over LRIC+, together with the asymmetric risk of setting a termination rate below LRIC, should mean that the decisions that Ofcom makes on the choice of model inputs, parameters and sensitivities in arriving at a LRIC output should be made in a conservative rather than an aggressive manner when setting the level of LRIC.

Ofcom argues, as quoted above, that the principal driver for the preference for LRIC over LRIC+ (apart from the Recommendation) is the greater encouragement of effective competition – yet it is hard to see from the evidence that Ofcom advances that there is much real strength for this argument, at the differential levels of the alternatives of LRIC and LRIC+ that Ofcom proposes for this future charge control period.

One final point is that Ofcom represents the choice of cost standard as either LRIC or LRIC+. We do not see it as of necessity a simple either/or choice. Where the

³ Consultation at paragraph 6.5

⁴ At paragraph 6.6

arguments in favour of, or against, each are finely balanced, then the weight of the arguments on the adverse effects of a rate that is above LRIC may be balanced by the weight of the arguments on adverse effects of a rate that is below LRIC+. The low strength of the “pull” in either direction that is discussed in the sections below also suggests that, on a balanced view, the level of overall consumer detriment that may arise from a rate that is between LRIC and LRIC+ may be small, or in practice non-existent. This contrasts with the risk of setting a rate below true LRIC. Ofcom has as yet not considered this matter, as far as we are aware. It has application not only in the setting of the rate to be employed in the charge control, but also, as we consider in section 4, the path of the rates that are set, given the erroneous suggestion by Ofcom of an immediate cut to LRIC.

In fact in the MTR Statement of March 2011 Ofcom discussed the case for a MTR between LRIC and LRIC+:

“We consider that abstracting from competition considerations (discussed later in this annex), it is possible that pure LRIC would allow too little common cost recovery from termination compared to what would be optimal. At the same time LRIC+ as historically implemented in the UK may allow too much common cost recovery from MTRs. Therefore abstracting from competition considerations, we consider that there could be a theoretically optimal level of common cost recovery from termination which sits between pure LRIC and LRIC+ (with the “+” in LRIC+ determined by the MCT cost model), and which would be set according to Ramsey pricing principles⁵”.

This argument gathers strength in the facts relevant to 2014/15, where there is little or no competition advantage that can be discerned from the prospective levels of LRIC over LRIC+.

In order to evaluate the evidence that Ofcom has on future LRIC vs. LRIC+, it is first necessary to quantify the past and prospective MTRs at LRIC and LRIC+ levels, and the differences between them.

1.3 Quantification of the effect of the cost standard change, historically and prospectively

In principle, there are two distinct evaluations that can be attempted, one historic, and one forward looking:

- From a historic point of view one might consider what the effect has been of the termination rates that have actually been applied during the current charge control vs. those that would have applied in the alternative, i.e. between the actual outcome of one year of transition and three years of LRIC and the counterfactual of four years of LRIC+, with a presumed straight line glidepath to the 2014/15 LRIC+ output.

⁵ MTR Statement March 2011 at paragraph A.3.45

- On a forward looking basis one might then apply the understanding of the past into consideration of the advantages and disadvantages between continuing with LRIC against reverting to LRIC+, at the likely future levels of each.

What Ofcom has actually failed to do in its analysis is to consider these two evaluations separately – they have become somewhat intertwined in that to a considerable extent the forward looking analysis on LRIC vs. LRIC+ has become underpinned with a historical analysis of the effect of reducing MTRs, but not from the LRIC+ counterfactual level - rather from the very much higher exit point of the previous charge control, of 4.43p.

Ofcom reports in paragraph 6.8 that:

“In 2011, after extensive analysis and consultation, we decided to move from a LRIC+ to a LRIC cost standard in our regulation of MCT. That decision, which was subsequently upheld on appeal to the Competition Appeal Tribunal (CAT) and Court of Appeal, had the effect of lowering, on a glide path, the price ceiling from 4.180ppm (for Vodafone/Telefónica/EE, 4.480 ppm for H3G) in 2010/11 to 0.670ppm in 2014/15, leading therefore to a reduction of over 80% in that period.”⁶

But this is not the whole picture. Had Ofcom not elected to switch to LRIC, but remain with LRIC+, termination rates would have fallen very substantially anyway, to approximately 2.01p⁷ in 2014/15, rather than to the actual LRIC based rate of 0.845p. This means that in practice less than half of the overall decrease in termination – and indeed only the last slice of that decrease (and thus the last part of any discerned overall effect of the decrease) - can be ascribed to the switch in the cost standard.

Ofcom in its analysis in the consultation of the historical effect on competition of the decrease in termination rates from 4.43p to 0.845p i.e. by 3.585p is failing to find a strong impact on competition from this overall decrease. But in particular relation to the cost standard change from 2.01p to 0.845p (a difference of 1.165p) Ofcom has not found a specific impact from this last tranche of the overall decrease. It follows from this that if a 3.585p reduction has not much effect, and the final 1.165p of this reduction even less, then any effect on future competition when the prospective difference between LRIC and LRIC+ is, according to Ofcom, around 0.5p⁸ cannot be very significant.

We look at the various arguments that Ofcom has made on the alternative cost standards, but first, some factual context needs to be established.

⁶ These rates are in the 2008/09 real terms of the 2011 model. However the 2014 model provides outputs in 2012/13 prices. To maintain comparability between different sets of real prices, Vodafone in this section primarily makes use of nominal prices for each year, for instance 4.43p in 2010/11 rather than 4.18p

⁷ We discuss the origin of this value below

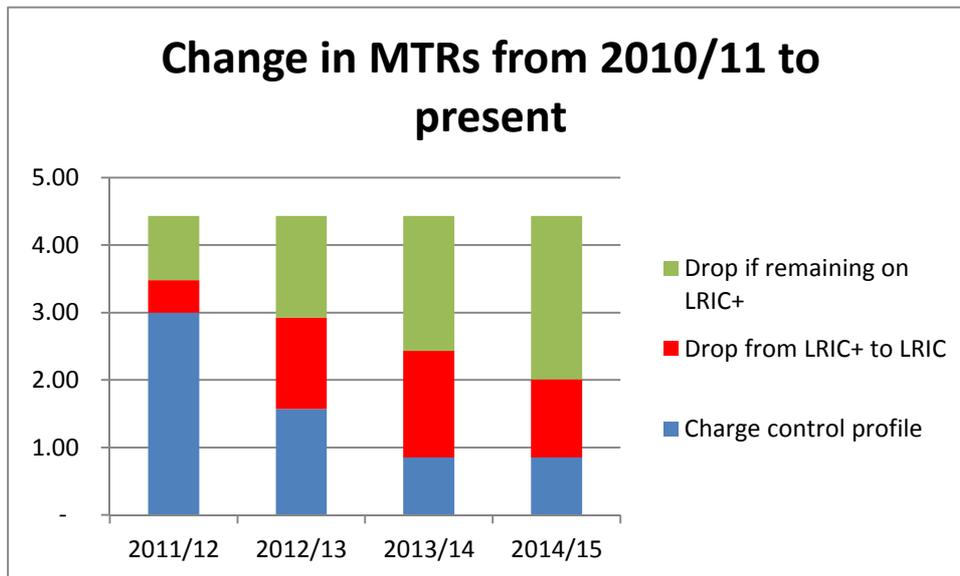
⁸ Representing either a small decrease or a small increase from the current 2014/15 rate

What would MTRs have been historically under LRIC+?

It is simple to identify from the CC and CAT papers the level of the LRIC+ that would have resulted had Vodafone and EE’s appeal on which cost standard to use been upheld. The CC in the final stages of their determination process requested Ofcom to run several alternative paired LRIC and LRIC+ outcomes of the model, and the version finally adopted by the CAT was for a LRIC of 0.67p for 2014/15. From Ofcom’s submissions to the CC, we can see that the equivalent LRIC+ output that used the same, final set of inputs was 1.59p⁹. Given that the 0.67p LRIC for 2014/15 was computed in 2008/09 prices and has become in the charge control a nominal value of 0.845p, then the 1.59p LRIC+, when similarly translated would have been around 2.01p.

So had LRIC+ been charged rather than LRIC, on a glidepath basis from the exit rate of the previous charge control of 4.43p to the last year of the present charge control (2014/15) of 2.01p, the intervening levels would have been approximately 3.48p in 2011/12, 2.93p in 2012/13, and 2.43p in 2013/14. We can plot these possible outcomes against the actual path of the LRIC charge control.

Chart 1.1 below is in the form of a stacked bar, showing for each year how the MTR profile would have differed from the 4.43p in 2010/11. The blue bar shows the actual path of the charge control, and the bars above split the difference between that and 4.43p between staying on LRIC+ (green) and dropping from LRIC+ to LRIC (red). It can be readily seen that the size of the reduction that would have occurred from remaining on LRIC+ is greater than the size of the further drop from LRIC+ to LRIC¹⁰.



⁹ From the Ofcom Excel workbook, “analysis for the CC 08 Feb”

¹⁰ The actual sums charged for 2011/12 and 2012/13 are different in nature from the later years since for the first two years a glidepath to LRIC (rather than a full P0) was being applied. Thus the actual charges were only at Ofcom’s view of LRIC for the last two years

Chart 1.1 Historic MTR changes

The table below shows the values used in the chart.

	2010/11	2011/12	2012/13	2013/14	2014/15
End of previous charge control	4.43p				
If LRIC+ had been applied		3.48p	2.93p	2.43p	2.01p
Drop vs. opening position		-0.95p	-1.50p	-2.00p	-2.42p
Actual charge control level		3.00p	1.57p	0.85p	0.85p
Drop from LRIC+ to LRIC		-0.48p	-1.36p	-1.58p	-1.16p
Total drop		-1.43p	-2.86p	-3.58p	-3.58p
% of drop re LRIC+ to LRIC		34%	48%	44%	32%

Table 1.1 Historic MTR changes

As the table shows, less than half of the overall drop from 4.43p to the actual MTRs charged can be attributed to the cost standard change.

This means that any inferences that may be made from this decline in MTRs need to be made carefully to disentangle the first impact of the drop from continuing with LRIC+ from the second impact of the further drop from LRIC+ to LRIC.

What does Ofcom's model suggest for the future track of LRIC vs. LRIC+?

Clearly the past change is only of value in the present context in assisting with the determination of the future cost standard, but the level of this too needs quantification. Ofcom provides information on the provisional future path of LRIC and LRIC+ supplied by the base case of its model in section 7 in tables 14 and 15. This is as in the table below.

	2015/16	2016/17	2017/18
LRIC	0.515p	0.498p	0.476p
LRIC+	1.010p	0.936p	0.855p

Table 1.2 Ofcom model outputs in the base case

But these model outputs are in 2012/13 prices; to maintain comparability with the prior charge control we can apply an estimated annual 2% CPI inflation indexation factor, and show these in nominal terms, and compare these against the closing point of the current charge control, i.e. the 2014/15 nominal rate of 0.845p.

	2014/15	2015/16	2016/17	2017/18
LRIC	0.845p	0.547p	0.539p	0.526p
LRIC+		1.072p	1.013p	0.944p
LRIC diff from 14/15		-0.298p	-0.306p	-0.319p
LRIC+ diff from 14/15		+0.227p	+0.168p	+0.099p
LRIC to LRIC+ diff		+0.525p	+0.474p	+0.418p

Table 1.3 Difference between 2014/15 MTR to future LRIC+ or LRIC

Obviously therefore the 2014/15 rate is between the 2015/16 LRIC and LRIC+ levels.

The future alternative outcomes, using Ofcom's model outputs, can be charted as well, in Chart 1.2 below. Here the blue bar shows the LRIC, the red the difference between LRIC and the 2014/15 exit rate of 0.845p, and the green the difference between the exit rate and the LRIC+. Two differences between the two charts are very obvious – the scale of the second shows that the levels at issue are very much smaller than in 2011, and the 2014/15 exit rate is between the LRIC and LRIC+ alternatives, rather than the previous position where the 2010/11 exit rate was some way above the level of LRIC+. Effectively therefore the choice facing Ofcom is a small decrease (red) versus a small increase (green).

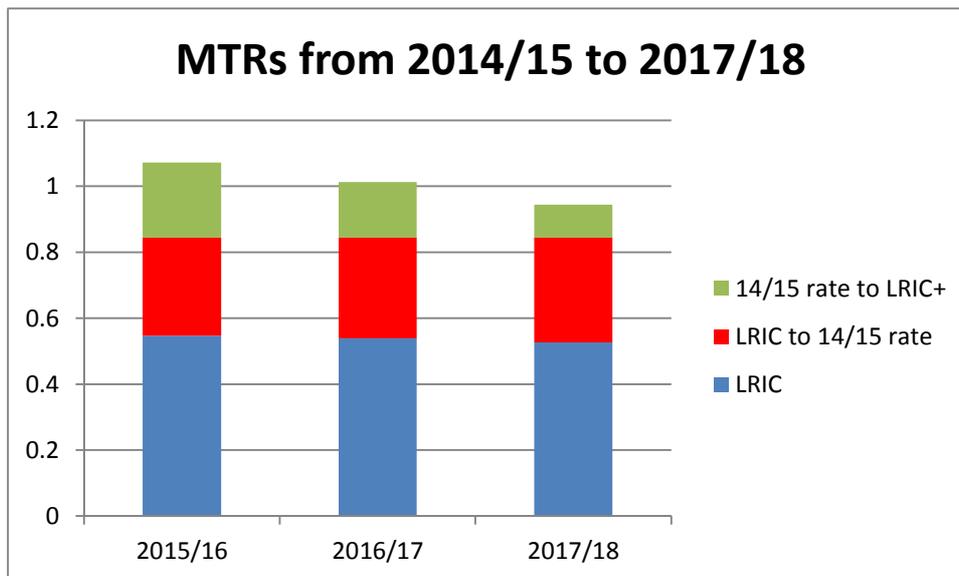


Chart 1.2 Future path of MTR under LRIC or LRIC+

Thus comparing the present level to the 2015/16 position, continuing with LRIC (ignoring for the moment any glidepath or transition issues) might mean a reduction of 0.298p whereas a shift to LRIC+ might mean an increase of 0.227p. Over the three years of the proposed charge control, a continuation with LRIC might give an overall reduction of 0.319p, whilst a shift to LRIC+ might give an overall increase of 0.099p. It is obvious that the differences are very much less than the ones contemplated in 2011, when Ofcom made its original decision to change cost standard.

Before looking at Ofcom's current analysis of the choice of cost standard however, we need to briefly consider the accuracy of what are obviously currently provisional model outputs, since the size of the difference between LRIC and LRIC+ must be pertinent to the analysis.

Model outputs

Of necessity the computation of the prospective difference between LRIC and LRIC+ that Ofcom has made relies on the current outputs of the Ofcom model. It is obvious therefore that to the extent that the model outputs may change, then the Ofcom analysis in section 6 may also need to be revisited. We believe that currently neither the LRIC nor the LRIC+ produced by the current version of the model is correct, and that the revised outputs therefore need to be taken account of in any forward looking cost standard evaluation. Our analysis of the necessary modelling changes is in sections 2 and 3 of this document: we have issues with both the LRIC+ and the LRIC levels produced by the model.

Significantly, the assumption that Ofcom has made in section 6 of the consultation that the current model can actually provide a meaningful LRIC+ output for the dynamic efficiency analysis is flawed. In practice Ofcom's June 2014 LRIC model does not pay much attention to the production of a LRIC+ output. As we show in section 3.3 of this document Ofcom has been very clear about its focus on LRIC and its relative indifference to LRIC+ in the present MCT consultation.

Unfortunately this somewhat undermines the quality of the reasoning in section 6 of the consultation. If Ofcom has prejudged the LRIC vs. LRIC+ question in favour of LRIC and is not going to attempt to fully develop a LRIC+ output of the model it cannot then attempt to use the LRIC vs. LRIC+ differential outputs of its model to quantify its analysis as to which cost standard is appropriate.

As we have seen above, the Ofcom base case generates a LRIC to LRIC+ differential in 2015/16 of 0.52p in 2015/16 prices. Vodafone has done some limited work on LRIC+ outputs as part of its review of the model. This suggests, as we show in section 3.3 below, that from merely addressing obvious defects in the recovery of fixed and common costs, the LRIC+ output in 2015/16 is likely to be around 1.20p in 2012/13 prices or 1.27p in 2015/16 prices. This would give a LRIC vs. LRIC+ difference in 2015/16 of 0.69p in 2015/16 prices.

In section 3 of this document we have also suggested other revisions to the outputs of the model in general. When we overlay these with the corrections to the fixed and common cost recovery as above, we obtain as can be seen in section 3.8 a LRIC vs. LRIC+ difference in 2015/16 in nominal prices of around 0.53p. Vodafone's LRIC+ adjustments on their own thus increase the LRIC to LRIC+ differential, but when combined with Vodafone's general model adjustments the differential contracts back to a level broadly similar to Ofcom's.

Depending on the view that is taken of the Vodafone adjustments, we conclude from this that the likely range of the LRIC to LRIC+ differential is thus approximately 0.52p to 0.69p in 2015/16 nominal terms. It is this approximate quantification of the differential that should be used in the evaluation of the prospective impact of the use of alternative cost standards.

Summary of historic and prospective MTR levels

Four things are therefore clear from this analysis:

- Termination rates have come down considerably in the present charge control, but they would have declined significantly anyway had the LRIC+ standard been maintained;
- The prospective changes to MTRs are much smaller in absolute terms than the historic ones;
- The difference between prospective LRIC and LRIC+ alternatives is approximately 0.52p to 0.69p in 2015/16, much smaller than in 2014/15 when it was 1.165p (and rather more than that in 2011/12);
- The “exit MTR rate” of 2014/15 is not above the future LRIC+ rate, as it was in 2011, but firmly between the LRIC and LRIC+ rates for 2015/16 to 2017/18.

The factual grounding for the cost standard evaluation is thus quite different from that in 2011.

This historic and prospective information on LRIC and LRIC+ levels can then be used to inform the debate on the application of the alternative cost standards, and the way that they would determine the future levels of termination rates¹¹.

The immediate impact of a decrease in mobile termination rates will be:

- there will be a decrease of mobile revenue – measured by the amount of the reduction in ppm multiplied by the total volume of mobile termination traffic;
- based on the distribution of mobile to mobile traffic between mobile operators, there may be some transfers of net value between mobile operators – there may (or may not) also be changes in profitability of customers by segment, where their inbound/outbound calling patterns differ;
- there will be a transfer of value out of the UK mobile industry towards other originating operators and this will effect mobile margins and mobile cash flows;

¹¹ In making this evaluation, given that a LRIC of termination is less than a LRIC+, it is easier to consider LRIC representing a reduction over LRIC+; but in fact even in Ofcom’s base case, a switch to LRIC+ from the present rates would represent a small increase and a continuation with LRIC a small decrease

- the bulk of this transfer of value will be to UK fixed operators, (and the balance to overseas telecom operators);

Subsequently there may be other changes that follow on from the termination rate reduction:

- the mobile operators may seek (and may be able) to recover the lost mobile revenue and lost margin and cash by revising their retail charges;
- the level of competition for certain customer segments may change;
- the fixed operators may pass on their windfall to their customers.

The principal area where in the present consultation Ofcom sees an advantage of the lower termination rates implied by LRIC over LRIC+ relates to an increasing level of competition – we consider this first.

1.4 Advantage to the mobile consumer of lower MTRs - competitive effects

In the analysis of the supposed competitive benefit of LRIC over LRIC+, Ofcom to a large extent relies on evidence that relates to the historic larger decline in MTRs, a decline that as chart 1.1 above shows in reality only in the minority relates to the change in cost standard.

Ofcom in section 6 of the consultation evaluates the role of the level of the termination rate on competition, in terms of the putative advantage to the mobile consumer that may arise from increased competition that may be caused by lower MTRs. In its theoretical analysis of the impact of the cost standard from paragraph 6.56 onwards, Ofcom sums up and repeats those arguments that have been made before, that a lower termination rate is preferable to a higher one, by increasing competition between MCPs through various means. The problem is that all of the factors will have a shrinking forward looking impact as the absolute levels of LRIC, LRIC+ and of the differential fall:

- Lowering the retail price floor for off-net calls¹², thus allowing MCPs to reduce prices. It is questionable however, that at present MTR levels, whether a small change to MTR will have a measurable impact on this. For example at Ofcom's base case, the change that is involved is a reduction of 0.3p to LRIC or an increase of 0.2p to LRIC+.
- Assisting with the costs of supporting customers¹³ with a net off-net call balance (assumed to be a characteristic of more attractive, higher usage post-pay customers) and hence removing any alleged traffic/cost imbalance for smaller operators. But on this point Ofcom notes that "*the data provided in response to our formal information requests do not allow us to draw strong conclusions*

¹² At paragraph 6.58

¹³ Paragraph 6.59

about the current balance of calls for different customer segments.¹⁴ Ofcom goes on to say that “the limited data suggests that for some post-pay segments it may no longer be the case that post-pay customers are net makers of calls”¹⁵.

This new data and the conclusion undermines the old case on this point very considerably, but then in subsequent paragraphs Ofcom through little more than speculation considers that its own new evidence may not be relevant and therefore LRIC is still the appropriate standard to use as a lower MTR supplies a level playing field “*in that market shares do not differentially affect an MCP’s ability to compete depending on the balance of calls made by the customer segment and the MCP’s market share*¹⁶”. This is much weaker than previous conclusions made, and for it to continue to be relevant would require a material difference in level to exist between LRIC and LRIC+ - but this is not the case prospectively.

- Eliminating on-net off-net price differentials that “*can make MCPs with a lower market share less attractive to consumers as a greater proportion of calls from a MCP with a lower market share will be off-net*¹⁷”. Ofcom appears to be at best lukewarm on this effect in its analysis in paragraph 6.68.

Ofcom concludes that these arguments suggest that at a theoretical level competition will be stronger under LRIC than under LRIC+, and then goes on to consider the empirical evidence that it has available on competition in the mobile sector, as to whether competition between MCPs has increased because of the change to the cost standard on MTRs.

In this however, Ofcom has little ability to conduct any rigorous analysis. As Ofcom itself points out in paragraph 6.20:

“Prior to 2011, MTRs were set using a LRIC+ cost standard. In 2011, we switched to a LRIC regime for MTRs. The market developments that followed provide some indication of the empirical effects of moving to LRIC-based MTRs which can be compared with the pre-2011 evidence under LRIC+ MTRs. However, we cannot establish causality with certainty as the developments will have been affected by a range of other factors such as changes in costs.”

Obviously therefore there is a real risk of post hoc speculation rather than informed reasoning. Furthermore Vodafone would not put changes in costs on the top of the list of other market developments since 2011 – possibly the premature liberalisation of 4G spectrum for one operator only and the resulting impact on the other operators, and the penetration of smartphones might be seen to have had a greater effect on competition.

¹⁴ At paragraph 6.63

¹⁵ Ibid

¹⁶ Paragraph 6.65

¹⁷ Paragraph 6.67

(Although indubitably the future increase in spectrum fees planned by Ofcom represents a major increase in costs.)

But in any event in practical terms any evidence of increased competition that Ofcom can legitimately ascribe to the MTR change from 2011 must in the first instance relate to the overall drop of the MTR from 4.43p to 2.01p that would have happened under the continued use of the LRIC+ standard. It is only if Ofcom can see a further benefit arising from the further drop from 2.01p to 0.845p that can be attributed to the switch from LRIC+ to LRIC, can any advantage from the cost standard change be claimed.

It is very difficult to see how such an analysis could be conducted. In reality, Ofcom does not attempt any disaggregation to isolate the cost standard impact alone – in effect therefore the evidence that Ofcom cites relates to the total absolute drop from 4.43p to 0.845p. But even for a reduction of this size, the evidence for favourable competitive effects is not strong, and inevitably risks post hoc inference error. We consider each of Ofcom’s competitive effects in the paragraphs below.

In paragraph 6.70 Ofcom notes that “*there have been some changes in retail market shares over the past two years, which are consistent with increasing competition for subscribers. The most market movement relates to H3G, which has increased its market share by 3 percentage points between 2010 and 2013.*” Whilst this may be factually correct it does little to advance the argument that the increase is dependant on the rate of MTR.

The historical data we have on H3G’s customer base suggests that it would require rose-tinted spectacles to conclude that H3G’s increase in customer base directly resulted from the switch in cost standard:

[§<]

Table 1.4 H3G annual customer increase

The table shows that H3G’s largest annual growth occurred in 2008/09, when MTRs were 5.75p. At best a fall in MTR may have been one of the factors in H3G’s growth, but the evidence for this is hardly determinative. In any event, for the purposes of any forward looking evaluation on the appropriate MTR cost standard, if H3G could grow in size quite successfully when MTRs lay between 6p - 1p what does this say about the relevance to H3G’s growth rate of a termination rate of 0.8p plus or minus 0.3p? Furthermore in fact H3G has just reported a 1% *decline* in registered customers in the 12 months to June 2014¹⁸, a period when termination rates have been at their lowest - it is not at all clear how this might fit in with the competitive analysis.

¹⁸ Hutchison Whampoa Limited, unaudited results for the period ended 30 June 2014

Ofcom makes further observations in paragraph 6.71 on H3G's growth: given their confidential status it is difficult to be clear on the point Ofcom is making. However H3G's rising growth rate in the post-pay segment is not unexceptional in order for H3G to be able to establish scale. Equally Ofcom has not attempted to separate H3G's growth in post-pay from the market trend away from pre-pay to post-pay that has occurred at the same time. Ofcom is also, as it concedes, reasoning from the specific to the general.

This evidence does not allow Ofcom to conclude that a termination rate of 0.5p (LRIC) would be significantly superior to 1.0p (LRIC+) in the future.

Ofcom's pricing analysis in 6.72 is incomplete in that its conclusion that retail prices have fallen does not consider the possibility that with higher MTRs some retail prices could have fallen faster. Ofcom does not attempt to consider what might have happened under regulated LRIC+, which is the only appropriate counterfactual to use – an assumption that MTRs would have continued at 4.43p is simply wrong.

It is not clear what to read from Ofcom's figure 9 concerning any relationship between the levels of MTR and profitability – we agree that H3G's rising margin is a result of its increasing scale. The biggest driver of EE's EBITDA change must be the effect of its consolidation from the previous two separate operators. In any event EBITDA % is the wrong measure to use, since a lower MTR could give rise to either a larger or a smaller EBITDA %, depending on the relative impacts of falling revenue and falling interconnect cost. The correct measure for Ofcom to use to examine MNO margin changes over the same period as MTR rate changes would be EBIT, not EBITDA and this Ofcom has as yet not done.

Ofcom's discussion in paragraph 6.77 of the effect of competition between fixed and mobile operators does not take account of the size of the fixed to mobile retail mark-up that fixed operators are able to make – as we discuss below, the current mark-up is 10-11p when MTRs are 0.845p. Given the size of this mark-up a prospective change of +0.2p or –0.3p is hardly going to make any dent in the ability of fixed operators to recover their costs against such calls. Ofcom's analysis therefore fails to properly take account of the significant transfer of value from mobile to fixed operators that has taken place from the past MTR reductions, and the apparently limited pass through to fixed customers that has occurred. We return to this in section 1.6 below.

Ofcom then considers the distributional effects on vulnerable customers, who may be faced with higher retail charges as a result of lower MTRs. Here, unlike in the topics quoted above where Ofcom believes that there is evidence of benefit, Ofcom struggles to discover evidence of harm:

“it is possible that growth in ownership could have been slightly higher under LRIC+, but we have no reason to believe these impacts would have been significant¹⁹”

¹⁹ At paragraph 6.88

We consider that Ofcom is exposing itself to the risk of making one-sided inferences by seeing benefits from general observations that may only be coincident in time, such as the effect on H3G's growth, with no direct evidence of causality but at the same time Ofcom is failing to see dis-benefits from higher MTRs by refining its analysis to consider other potentially offsetting factors.

In relation to vulnerable fixed only customers, Ofcom states that "*fixed only customers will unambiguously gain.*"²⁰ However there is no obvious evidence as to how vulnerable fixed customers, particularly those making voice calls might have gained from MTR reductions. BT's calling plan for vulnerable customers, BT Basic, does not treat mobile calls as part of its inclusive minutes. Calls to mobiles from this tariff appear to be 12p a minute, plus rounding, plus a 15p call setup fee – this is when MTRs are 0.845p. The evidence for how such customers may have gained is non-existent. This would appear to be an error by Ofcom, and no weight should be attached to this conclusion on the benefits to fixed consumers (as opposed to the certain benefits to fixed operators – this we discuss in section 1.6 below).

Our conclusion is that Ofcom appears to be struggling to find much evidence of the historic beneficial impact on competition of reducing MTRs even when they have been observed to be falling from 4.43p to 0.845p. Thus the evidence for the beneficial impact of the cost standard proportion of that charge, from 2.01p to 0.845p must be considered to be even more muted.

But as we have said, the context in which such a discussion and a review of the available evidence should be fleshed out however is not an arbitrary high vs. low MTR or one based on 4.43p vs. 0.845p, but a forward looking analysis that consistently reflects on the real future MTR alternatives being currently considered by Ofcom. If one accepts Ofcom's view of the LRIC and LRIC+ being described in the previous section, of a LRIC around of 0.5 and a LRIC+ differential as low as 0.5p, or if one amends the values on the lines suggested by Vodafone above to a differential somewhere between 0.5p and 0.7p above a LRIC of 0.5p to 0.7p, then these are the alternative prospective levels on which any future competitive effects of the application of alternative cost standards should have been considered.

One final point on competition is that it is widely accepted that the UK mobile market is one of the most competitive markets in the world, and that it is very much more competitive than the UK fixed voice market. In these circumstances it is not obvious how much more competitive the market could be made by a small change in voice termination rates and how much incremental benefit would arise from such a change.

Vodafone thinks that is really hard therefore to suggest that there is much here from the evidence that Ofcom cites with respect to the power of the future differential competitive effect of a 0.5 - 0.7p LRIC vs. a 1.0 - 1.3p LRIC+. There is very little usable evidence from the past to help with the future, and the data Ofcom obtained on traffic balance per segment has not been helpful. Vodafone cannot see therefore that there is much of a positive case left for the competitive advantage of a slightly smaller

²⁰ At paragraph 6.94

LRIC. Given that, the weight that Ofcom can attach to such evidence must be proportional to the materiality of the future change, i.e. only small.

1.5 The value of the difference between LRIC and LRIC+ to mobile operators – dynamic efficiency

Ofcom's framework for analysis

Where Ofcom does see that there is an advantage to mobile operators in LRIC+ over LRIC (or more accurately in higher MTRs rather than lower) is in the area of forward looking dynamic efficiency. In order to quantify its evaluation Ofcom states in paragraph 6.6 that for 2015/16 “we estimate the difference in net termination revenues between LRIC and LRIC+ as c. £54m”, and explains that this is sourced from an estimate of 11bn net terminated minutes for the mobile operators as a whole, multiplied by its provisional view of the LRIC to LRIC+ differential²¹. Ofcom then proceeds to evaluate the significance of this sum to the mobile operators.

As we have discussed above, a better estimate of the likely future difference between LRIC and LRIC+ may be around 0.5p to 0.7p per minute. This would give a “net termination revenue” in nominal terms of approximately £60m to £80m (at 11bn minutes).

Ofcom then applies its figure of £54m to compare against mobile industry revenues of £15.6bn, capex of £2bn, and EBITA of £4.5bn to conclude that the difference between LRIC and LRIC+ is immaterial. These comparisons however are not correctly posed.

The problem with describing this traffic flow as net termination *revenue* is that this is not correct. This traffic is an approximate expression of the mobile industry net wholesale traffic charged at MTR. But it is a misnomer to call this net position *revenue*, since it is total inbound traffic flows that represent revenue to a MNO, but outbound traffic flows are a *cost* to the MNO. More realistically therefore this net flow should be seen as an impact on margin, but also on profit contribution, since in the event of a change in MTR, this net outcome flows directly through to the profit before tax. (Subject of course to the view of the operation of the waterbed, a topic we consider below.)

Ofcom's comparison of £54m against turnover of £15.6bn is therefore quite simply wrong. Any comparison against turnover should take the total inbound traffic that is charged at MTR, not the net. According to Ofcom's model, the total inbound traffic volume in 2015/16 is forecast at 14.881bn for an operator with 24% market share – this is equivalent to an industry total of 62.0bn inbound minutes. Based on a 0.5p to 0.7p LRIC to LRIC+ differential this would amount to £300m to £430m of revenue

²¹This is based on the model outputs in 2012/13 prices, and if restated to 2015/16 prices would give a total of £58m

differential. So instead of the impact on revenue that Ofcom reports of very much less than 1%, a change from LRIC+ to LRIC would be change in mobile revenues of 2-3%.

The correct metric to compare the increase in contribution margin of £60m to £80m that would result from a transition from LRIC to LRIC+ is not revenue or EBITDA but EBIT. We are not aware that this comparison has been done, but given that EBIT is a very much smaller number than EBITDA we would expect that the proportionate impact of a termination reduction on industry EBIT will be very much greater than the impact on industry EBITDA.

Vodafone concludes from this that the potential impact of the choice between LRIC and LRIC+ is not as small as Ofcom appears to suggest.

But the other obvious point about the “net termination revenue” approach is that if there is an adverse impact on mobile operators, then there must be gainers elsewhere. We know that these are predominantly the UK fixed operators – as a guide to what might happen in the future, what have these operators done with their historical windfall of lower mobile termination rate costs?

We can quantify their gain using the “net termination revenue” approach, by multiplying the size of the unit rate reduction identified in table 1.3 above with the volume of mobile terminating minutes.

	2010/11	2011/12	2012/13	2013/14	2014/15
End of previous charge control	4.43p				
MTR outcome		3.00p	1.57p	0.85p	0.85p
Reduction		-1.43p	-2.86p	-3.58p	-3.58p
Net termination volume in mins		11bn	11bn	11bn	11bn
Net termination windfall to beneficiaries £m		£157.3m	£314.6m	£393.8m	£393.8m

Table 1.5 Historic net termination windfall

Quite clearly there has been a substantial transfer of value between the mobile and the fixed industry, in that fixed operators have paid significantly less for mobile termination than before 2011. Over the four years the total from table 1.5 above is over £1.25 billion. It is worth considering what have the fixed operators actually done with this saving in their cost base? Have fixed consumers actually benefitted, in terms of F2M call costs, or fixed voice costs, or fixed line rental costs?

The second question is whether mobile operators been able to recover this lost net revenue from outgoing services? And if not, have there been adverse effects on the mobile industry and consumers? We consider these two matters in sequence.

1.6 The advantage to the fixed industry of lower MTRs – has the fixed consumer benefitted?

In the Ofcom Statement from 2011 Ofcom expected fixed consumers to benefit from the fall in MTRs, and in particular through the change in cost standard from LRIC+ to LRIC:

“As we have found the fixed retail market to be competitive, we expect the waterbed effect to ensure that cost savings from lower MTRs are passed through to fixed consumers. The fact that FCPs offer a range of services means we cannot be certain that this will translate into lower F2M prices (rather than other prices), although we consider that there is some evidence that this will be the case. In any event, fixed consumers will benefit from these price reductions. However, we consider that this benefit will mainly manifest itself in increased usage (either for F2M calls or fixed services more generally) and lower prices rather than in an increase in fixed-line take-up.”

In our appeal in 2011 Vodafone said that “none of the evidence referred to by Ofcom supports the view that a reduction in MTRs would lead to a reduction in fixed retail prices or an increase in usage²²”. We believe that subsequent events support our point. There is much less discussion of this presumed fixed consumer benefit in the current consultation than in previous Ofcom papers. In annex 9, Ofcom is rather defensive:

“A9.53 As also noted in Section 6, it is possible that fixed line consumers have benefitted by other means. In theory, FCPs could have decreased line rental charges to attract more customers given the profit margins on calls to mobiles have increased. However, it is particularly difficult to disentangle such indirect effects of reductions in MTRs from other factors that affect line rental charges. Indeed, the 2013 Consumer Market Report notes that line rental revenues per fixed line have been increasing since 2009 as these increasingly include a bundled call allowance or ‘bolt-on’.”

The underlining is Vodafone’s. From all the evidence that Vodafone can see, it is not at all clear that the substantial windfall that fixed operators have received from lower MTRs have been applied to the benefit of those customers who make fixed to mobile calls, or to fixed voice customers in general. But more than that, in order to establish that fixed consumers have benefitted from the switch from LRIC to LRIC+, it would be necessary to show that operators have passed on not only the decline in MTRs from 4.43p to 2.01p i.e. to LRIC+, but also the decline from 2.01p to 0.845p, i.e. from LRIC+ to LRIC.

In annex 9 Ofcom shows an analysis of how fixed to mobile rates have declined against MTRs. We however have some difficulty understanding Ofcom’s calculations, since they appear to report calendar year outputs, when the charge control works in years commencing 1st April, and so Ofcom’s annual averaging does not show a fully

²² Vodafone Notice of Appeal at 5.2

rounded picture. For this reason, we have redone the calculation, using the actual quarterly data reported by Ofcom in its Market Information releases.

Unfortunately due to a change in reporting of the quarterly data by Ofcom, it is no longer possible to separately report data in respect of BT from the rest of the fixed operators; reporting is only possible at total industry level. The chart below shows for all fixed customers, the average retail ppm (derived from a calculation of the reported revenue and traffic data). It is a stacked bar to show the combined effect of the fixed retention and the MTR rate, so that the top of the red shaded area marks the progression of the average retail fixed to mobile rate over time.

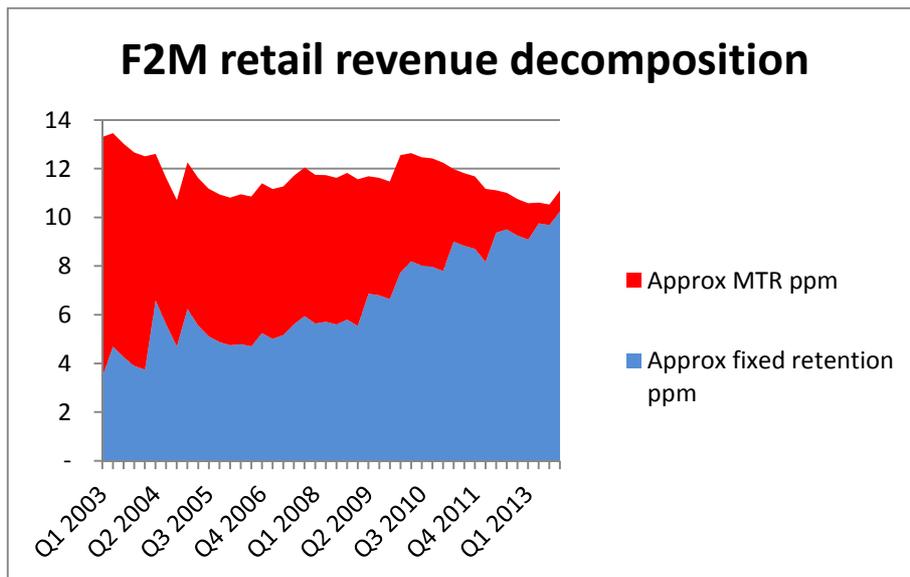


Chart 1.3 Fixed to mobile retail revenue in ppm

We can readily see that the average retail rate has fallen only very slowly over time. It has dropped from 12.24p in the last quarter of the previous charge control (Q1 2011) to 11.11p in the last quarter for which data is currently available (Q4 2013). At the same time the MTR has fallen from 4.43p to 0.85p – so a 3.58p fall in fixed operator wholesale cost has been matched with a 1.13p fall in retail charges, a benefit to the fixed operators of 2.45p. Quite clearly therefore, not even the whole of the decline to the LRIC+ level has been passed on, and therefore none of the benefit of the change in cost standards has been passed to fixed to mobile callers in the form of F2M pricing. The inexorable upwards march of the blue area shows how the sum retained by fixed operators has risen over time.

We can obviously also show the proportionate decomposition of the fixed to mobile call charge:

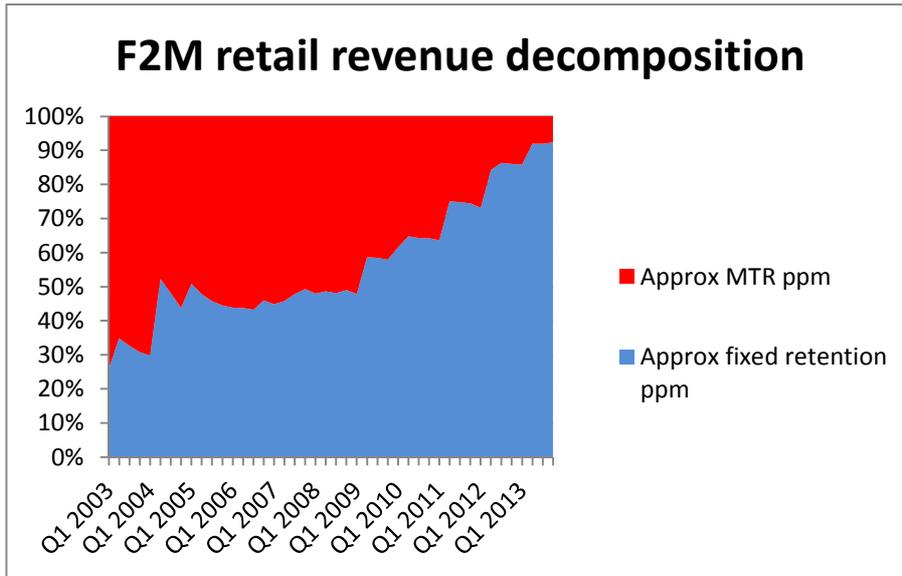


Chart 1.4 Fixed to mobile retail revenue % split

This shows that over the duration of the current charge control, the proportion of the fixed to mobile call revenue retained by the fixed operators has risen from 64% in Q1 2011 to 92% in Q4 2013.

The two charts show that calling a mobile may still be expensive from a fixed customer point of view, but it is not so from a fixed operator's point of view.

But this is from the viewpoint of all fixed consumers, both business and consumer. Looking at the residential/consumer data only an even more unhelpful position to the customer can be seen.

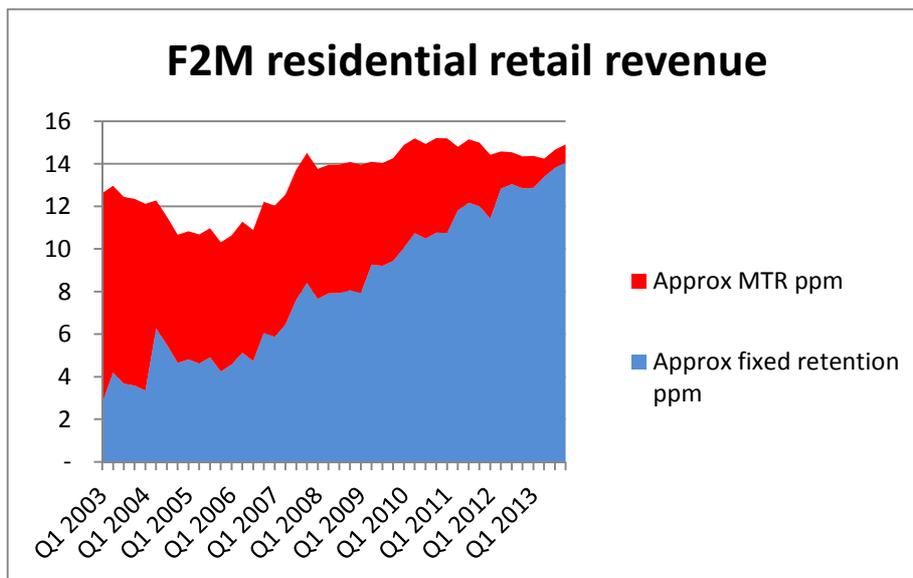


Chart 1.5 Fixed to mobile residential retail revenue in ppm

In Q1 2011, the average consumer retail F2M rate was 15.19p – by Q4 2013, with a 3.58p decline in interconnection costs, this rate had “dropped” to 14.90p²³. So the fixed operators have passed on only 0.29p of the overall 3.58p decline – this is clearly only a tiny proportion of the LRIC+ to LRIC+ decline, and in no way is any component of the change in cost standard being passed on.

The final chart below shows that on every fixed to mobile consumer minute, the fixed retention was in Q4 2013 94% and the mobile wholesale cost 6% of the retail revenue: this compares with 71% and 29% in Q1 2011.

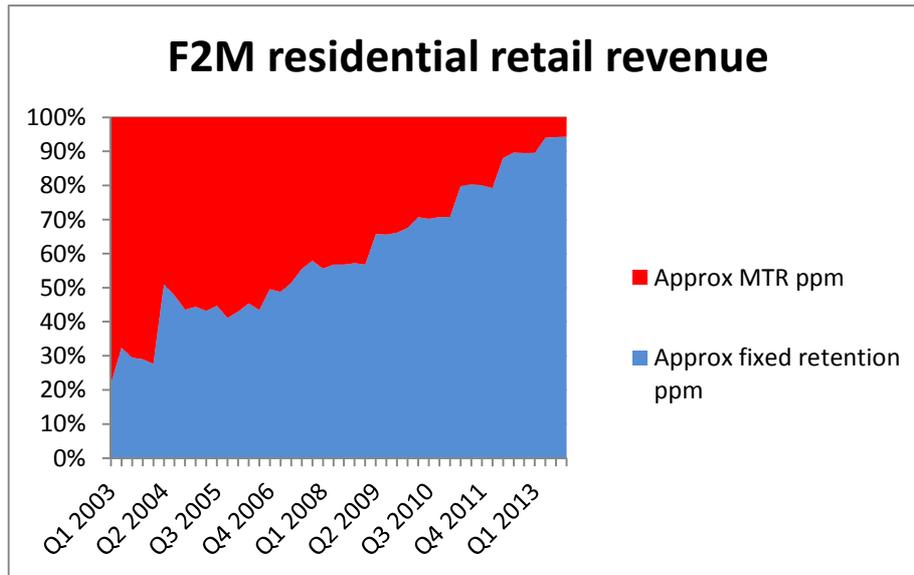


Chart 1.6 Fixed to mobile residential retail revenue % split

It is quite clear therefore that whilst fixed to mobile callers might have received a very small reduction in their average retail charges, this reduction is nowhere near the size of the reduction of MTR over the period from LRIC+ to LRIC+: by no way could fixed to mobile callers be thought to have benefitted from the change in cost standard from LRIC+ to LRIC. By implication, Ofcom more or less concedes this in 6.92:

“The data in Annex 9 shows that while the retail price of F2M calls has not come down as much as the reduction in MTRs, there has still been a significant degree of pass-through.”

From the data that Ofcom has published, we would quibble somewhat with the use of “significant”.

Has the benefit been passed down to fixed consumers in other ways than in fixed to mobile calls? Ofcom suggests in footnote 216:

²³ These rates exclude VAT

“Where FCPs compete for retail subscribers across both retail line rental and usage prices, any margin in usage services – such as calls to mobiles – would be expected to be competed away in the pricing of the retail line rental. The greater the competition in the retail market – particularly for the primary service of the line rental – the greater the degree of profit from the secondary services (such as calls to mobiles) that will be competed away.”

We struggle to find the evidence for this – even if one can assume passing through benefits in this way will mean that fixed callers of mobiles will obtain the benefits in a targeted way. In reality as far as Vodafone is aware, line rental for fixed consumers has gone up over the period at a rate that is higher than inflation. Ofcom in A 9.53 says:

“Indeed, the 2013 Consumer Market Report notes that line rental revenues per fixed line have been increasing since 2009”

We can look at the published residential tariff pricing of fixed operators:

- In October 2010 BT line rental was increased to £13.29²⁴. By May 2011 it was £13.90²⁵, and then in December 2011 went up to £14.60²⁶, and so on. The current BT line rental is £15.99 per month²⁷. Overall this would represent an increase of 20% over 3 years: this is quite clearly more than twice the rate of inflation, so represents a significant real increase.

Similarly the call set up fee has gone up from 12.5p in July 2011 to 15p in July 2014, also a 20% increase. A chargeable call was 7.6p in July 2011, and is now 9p, an 18% increase, and so on.

- Similarly, by way of example, Vodafone looked at Virgin Media prices as well. Comparing the February 2011 residential guide with the February 2014 residential guide²⁸, we see the following:
 - Line rental up from £12.24 to £15.99, an increase of 31%
 - Basic voice calls outside the bundle from 8.68p to 10.6p an increase of 22%
 - Call connection fee up from 12.24p to 15.94p an increase of 30%
 - All of these are above the level of inflation
- We note \propto , where it was suggested that a low MTR would allow really cheap bundles of fixed to mobile calls to be offered by fixed operators.

²⁴ BT customers face 10% rise in phone charges, www.theguardian.com/money/2010/jul/17/bt-rise-phone-charges

²⁵ <http://www.which.co.uk/news/2011/03/bt-increases-line-rental-and-call-charges-in-april-249148/>

²⁶ <http://www.bbc.co.uk/news/business-14677298>

²⁷ BT tariff guide for residential customers, 26th July 2014, at page 2

²⁸ Both are available online

However BT is conspicuous in its absence from Ofcom's table A9.2 in the consultation of the list of those operators that currently offer such a fixed to mobile bundle²⁹.

It is hard therefore to see that fixed customers who make voice calls can have benefitted from MTR reductions and extremely hard to see that any benefit of the change in mobile cost standards has reached fixed voice customers at all. If the fixed operators are merely using the transferred funds to improve their profit margins, or to invest in other markets such as TV or superfast broadband it is not obvious that the value transfer from mobile to fixed is of benefit to fixed consumers who make voice calls.

1.7 Have mobile operators been able to recover the lost revenue from MTR from outgoing rate increases?

We considered in section 1.5 that Ofcom's analysis with respect to the dynamic efficiency disadvantage of lower MTRs needs to be somewhat reworked, in part to reflect the potentially larger difference between LRIC and LRIC+ that can be seen from some of Vodafone's revisions to the model, which suggests that impact on the operators may be greater than Ofcom estimates, and also to consider the impact of termination changes as more relevantly being on EBIT rather than on EBITDA or total turnover. But irrespective of its relative size, the potential impact on the operators of a change from LRIC+ to LRIC needs to be considered

The waterbed

Ofcom assumes in its analysis in 6.48 that the waterbed is not complete and thus not all of the loss of contribution margin arising from the difference between LRIC+ and LRIC can be recovered from retail customers. We would tend to agree, and go rather further, since Ofcom's analysis in the consultation fails to take account of the new development of its GC9 Statement³⁰. This has limited the ability of MNOs to react to MTR reductions in terms of retarding both the speed and extent of price increases.

There is a very clear co-incidence in time between the MTR price reduction from 2011 and customer complaints on mobile retail price rises. Ofcom noted in the GC9 statement:

“2.7 Following price rises announced by a number of CPs in late 2011 and during 2012, we became aware of issues regarding the interpretation of the term “material detriment” in the part of the condition (GC9.6) relating to CPs’ obligation to notify

²⁹ BT has 52% of the residential market by revenue according to the latest Ofcom quarterly reporting

³⁰ Price rises in fixed term contracts, Decision to issue Guidance on General Condition 9.6, October 2013

subscribers of certain modifications made to the contract and their ability to cancel the contract without penalty.

2.8 We noted a significant increase in complaints to our Consumer Contact Team (CCT) from consumers affected by price rises. Ofcom examined 1644 consumer complaints about changes to terms and conditions in the period from September 2011 to May 2012”

Vodafone responded to the earlier GC9 consultation as follows:

“One obvious consequence is price ossification; prices, once set, simply would not change. Yet inability to change prices in response to changes in supply and demand conditions strikes at the very heart of a well-functioning market. It is basic economics that prices convey information that allow markets to allocate scarce resources efficiently. Erecting major institutional barriers to price adjustments to reflect underlying supply and demand conditions is therefore a very major departure from all established regulatory practice.

Ofcom generally assumes that prices can and do adjust to externally imposed shocks. For example, in the context of determining mobile termination rates, Ofcom explicitly assumed and espoused the idea of the ‘waterbed’; i.e. recognition that disallowing recovery of fixed and common costs on inbound calls would force rebalancing of other prices to compensate. Nowhere in the extensive and detailed deliberations before the Competition Appeal Tribunal (“CAT”) and the Competition Commission (“CC”) did Ofcom suggest that waterbed effects were subject to the proviso that prices could only ever change in relation to new customers, which is what a literal interpretation of Ofcom’s preferred option would imply.³¹”

The practical impact of the GC9 statement is that price rises inside the period of mobile contracts have become difficult. We consider that there may be a secondary effect as well that prices are less likely to fall in response to a change in underlying costs, given that operators would then be unable to react to a subsequent rise in costs by being able to then put prices up. In effect therefore GC9 may well have increased the “stickiness” of prices.

Given that an increasing proportion of mobile revenue comes from the contract terms that are the focus of GC9 (post-pay revenues are increasing over pre-pay, and revenues inside the bundle are increasing over the revenues outside the bundle), we consider that GC9 has punctured the waterbed, or at least damped down its effectiveness.

Resulting impact on operators

³¹ Vodafone’s response to Ofcom’s consultation ‘Price rises in fixed term contracts – options to address consumer harm’, March 2013, at page 23/24

Ofcom then proceeds to consider that the overall impact on operators of lost “net termination revenue” arising from the use of LRIC rather than LRIC+ is small. But this analysis is flawed, as we discussed in section 1.5 above, and in any event this is not the whole picture.

The current investment programme of all UK mobile operators arises from the need of each operator to remain competitive by offering 4G services (including voice) to the benefit of its customers. However the sums currently committed are finite, and when the current investment cycle is complete, what then?

The impact of MTR reductions in the past, and the impact of LRIC vs. LRIC+ in the future undoubtedly has had and will have an adverse impact on the profitability of the UK operators. This will inevitably colour the provision of funds in the future, particularly for marginal investment such as for coverage not-spots. For mobile operators with mobile operations in multiple countries, then if the UK is a more adverse environment for investment than other countries, it is likely that the UK investment will be lower than otherwise as a result of MTR reductions.

But mobile termination rate reductions are not the only adverse regulatory impact on mobile in the UK. We can see in the response that Enders made to the October 2013 ALF consultation the following observations³²:

“In reality, pan-European telecoms groups tend to decide upon a group capex budget at a pan-European level, and then allocate it to countries based on individual market requirements and opportunities. The danger to UK mobile investment levels is that given the (proposed) ALF decision and a number of other recent Ofcom decisions, the UK is seen as a hostile regulatory environment, and capex budgets are thus diverted elsewhere. If Ofcom was being harsh but fair we might conclude ‘so be it’; but given that Ofcom appears to be being both harsh and unfair, we would urge them to reconsider.”

Enders elsewhere makes other observations about the mobile and fixed network operators in the UK:

- UK mobile network capex levels are behind those from incumbents in other major developed nations outside Europe
- UK mobile revenue growth significantly lags the growth of UK fixed line revenue
- UK mobile EBITDA margins are well below those of the fixed operators who won their own networks
- All of the four largest fixed line operators make higher cash flow margins than all of the mobile operators

Ofcom has in fact in part reconsidered with respect to its earlier view of the levels of ALF that was characterised by Enders as “harsh and unfair”. In the second

³² Enders report on ALF, as submitted to the ALF review: “UK 2G licence fee proposals: Higher and higher, January 2014

consultation in August 2014 Ofcom has somewhat reduced the size of the proposed ALF charge, and has suggested that it “*should exercise the necessary regulatory judgement by adopting a conservative approach when interpreting the evidence*”³³. We believe that Ofcom should do the same in the MTR consultation.

1.8 Asymmetry of risk from setting LRIC too low

It is very clearly established that an asymmetry of risk exists in relation to setting a rate that is below an appropriate level through the charge control.

In 2007, when the concern was with LRIC+, Ofcom noted in the MCT Statement:

“9.168 Ofcom has noted previously that there is potentially an asymmetry in the risks and impact of setting charges that turn out to be too low. Charge controls which, in practice, fail to enable recovery of efficient costs may have an adverse impact on investment, which would be detrimental to consumers generally. Ofcom has noted that charge controls should not be so tight as to impact adversely prospects for investment, particularly in the light of uncertainty about future traffic levels on 2G and 3G networks. On the other hand, although Ofcom's view is that the waterbed effect is unlikely to be complete, even an incomplete waterbed effect ameliorates the impact of the level of termination charges on MNOs' profitability and thus reduces the risk that MNOs fail to recover their efficiently incurred costs overall. There is potential, therefore, for the impact on MNOs' incentives to invest and on consumers to be overstated. Nevertheless, Ofcom believes that the presence of this asymmetric risk also supports a charge control level that is above the midpoint of its range of benchmarks.”

The concern related to setting a rate too low is manifestly greater with the much more stringent LRIC standard – with LRIC+ the issue is whether operators are being allowed to recover the appropriate proportion of fixed and common costs, whereas with LRIC a rate set too low will not allow operators to recover even the incremental costs of providing that service.

Ofcom itself makes this point, in paragraph 8.77 of the present consultation, where Ofcom considers (in the context of charge control and glidepath design) its necessary actions if it were to discover that the MTR were to be below LRIC:

“8.77 In principle, we would be concerned if a glide path resulted in MTRs being set below LRIC at any point during the charge control period. This is because it would not accord with our main economic objectives for setting charge controls of:

8.77.1 Allocative efficiency, meaning that prices reflect forward looking marginal (or incremental) costs.

8.77.2 Productive efficiency, meaning that MCPs face incentives to minimise costs and there are efficient “build or buy” signals.

³³ ALF consultation August 2014 at paragraph 1.34

8.77.3 Dynamic efficiency, meaning that there is scope for increases in output possible from existing resources as techniques of production are improved and/or new services are developed. Dynamic efficiency is driven by successful investment and innovation. Delivering dynamic efficiency in regulated markets typically involves providing the opportunity (but not a guarantee) for firms to recover efficiently incurred costs, consistent with what would be expected in a competitive market.

8.77.4 Effective competition, meaning that our intervention promotes competition (i.e. those able to do things more efficiently can do so using their own resources and infrastructure) but does not unnecessarily restrict the ability of MCPs or other CPs already operating in regulated markets from competing.

8.78 In the event that MTRs at the start of a charge control period were below LRIC, we would be likely to make a one-off adjustment to the regulated MTR so that MCPs were able to recover the LRIC of providing MCT.”

Because of this risk Ofcom needs to be very cautious in setting a LRIC rate in case it inadvertently sets one that is below the true LRIC. This suggests the need for conservative assumptions to be adopted in the model. The problem is exacerbated by the multi-technology nature of the average efficient operator, and the fact that the LRICs of 2G, 3G and 4G are different. Furthermore there is very great uncertainty on 4G and the transfer of traffic from other technologies to 4G. As we can see from the table below, the 4G LRIC in 2017/18 is according to the model, very much less than the 2G or 3G LRIC.

Ofcom base case 2017/18	2G	3G	4G	Blended
LRIC+	1.1585	0.8719	0.2574	0.8553
LRIC	0.6023	0.4785	0.2555	0.4764

Table 1.6 Ofcom base case model outputs by technology

This means that irrespective of the details of the modelling, if the mix of 2G, 3G and 4G voice termination traffic is incorrectly weighted too heavily towards the less costly 4G termination traffic, then the weighted average LRIC calculated by the model will lie below the true LRIC. As we discuss in section 3.4, we consider that the underlying LRIC cost for 4G is rather lower than table 1.6 shows (and by implication the 2G and 3G costs a little higher). This substantial differentiation between costs by technology amplifies the possibility of setting too low a LRIC through too high a 4G mix of traffic.

But, whilst we agree that 4G should be a component of the average efficient operator's voice termination services for the purposes of the next charge control (in issue we return to in section 2.1), it is obvious that 4G is in the very early stages of deployment and there is only a short timeline of experience on which to draw any extrapolation into the future – and in particular as we discuss in section 2.4 it is not at all clear what the path of 4G development for the average efficient operator should be presumed to be up to 2017/18. For these reasons, there is particularly high uncertainty over forecasts of

traffic in general, traffic by network and how the networks will develop in response to such challenges.

It is critical that Ofcom fully takes into account this uncertainty in developing its modelling approach. If Ofcom continues to retain LRIC as its preferred cost standard, it should recognise the asymmetric costs of error in charge control setting:

- A charge control level that is set somewhat above the optimised level of LRIC but below LRIC+ will do little harm;
- On the other hand, if Ofcom errs by setting charges that are below the actual level of LRIC, then operators will be forced to incur a loss on every minute of voice termination they supply. This would seriously undermine economic efficiency with potential consequences for the efficient use of services and ongoing investment.
- Too low a LRIC would encourage operators not to invest in additional network capacity to terminate inbound calls. This risk is not material if rates are set using conservative assumptions – we suggest in subsequent sections of this document what these might be.

Too low a charge control would also be in direct conflict with the Access Directive (Directive 2002/19/EC as amended by Directive 2009/140/EC) requirement for regulators to set charges that allow operators a reasonable return on capital employed.

Due to the asymmetric cost of errors, we consider that Ofcom should only adopt values in relation to uncertain parameters where Ofcom has a high degree of confidence that the values so adopted will not lead to charges below the actual level of pure LRIC. As we noted above, Ofcom has said it is taking a conservative view towards the setting of ALF – for very similar reasons a conservative view also needs to be taken in the setting of the MTR.

1.9 Legal assessment of the choice of cost standard

Our analysis above of Ofcom's approach to the setting of mobile termination rates reveals a fundamental flaw in Ofcom's analytical framework. Whilst Ofcom rightly devotes much of its consultation to computing the prospective mobile termination rates, Ofcom neglects to consider and take into account to the requisite standard the wider purposes or legal duties that should govern both why and how Ofcom should set termination rates.

In simple terms, the setting of mobile termination rates is not a mechanistic exercise involving an automatic year-on-year reduction in the level of those rates that is an end in itself; rather the setting of termination rates is a means to an end, which means that Ofcom must consider whether its approach is the most apt to attain its legal duties and

obligations. We consider these obligations and their application to this case in more detail below. What our analysis points to is that:

- (i) Ofcom is not in a position to claim that very low termination rates result in any net benefit for consumers when considered against the backdrop of its legal duties and obligations;
- (ii) This is largely because Ofcom has not engaged in a meaningful analysis to understand the potential risks for the mobile industry and consumers (whether in terms of dynamic or allocative efficiency) of further material reductions in mobile termination rates;
- (iii) These risks are particularly acute when determining whether or not to phase in reductions through the use of a glidepath. Principles of consistency and legal certainty mean that Ofcom needs to weigh up and assess these risks before it can safely conclude that it should depart from established regulatory practice and move immediately to a LRIC based mobile termination rate in Year 1 of the charge control. Ofcom has simply not undertaken this exercise to the standard of proof to which it is required to adhere when conducting a prospective analysis;
- (iv) Ofcom is therefore, not able to assert, as it does at paragraphs 8.84 (and those immediately following) that its proposed approach would attain its statutory objectives and duties. In the first instance, Ofcom has done no more than explain why it is appropriate to impose a Significant Market Power condition with minimal passing references to competition and consumers and the briefest statements confirming that Ofcom's Community law duties have been taken into account. With respect, simply name checking Ofcom's Community law duties cannot constitute a sufficient explanation to industry stakeholders of why and how Ofcom's considers that these duties and obligations have been fulfilled. In simple public administrative law terms, Ofcom's own reasoning for its proposed approach is accordingly non-existent;
- (v) In the circumstances, Ofcom's approach should therefore be: (a) to proceed with caution and adopt a conservative approach when faced with a range of values for prospective termination rates derived from any modelling exercise; and (b) to ensure that reductions to a new mobile termination rate are phased in over the period of the charge control consistent with established regulatory practice.

Legal and regulatory framework governing the setting of termination rates

Ofcom's duties when setting termination rates flow clearly from the provisions of the pan-European harmonised Common Regulatory Framework governing the communications sector (which are transposed into UK law by the Communications Act 2003). The most relevant provisions are those to be found in the Access Directive relating to the imposition of access obligation upon undertakings found to be in a

position of Significant Market Power, which are expressly intertwined with specific duties mandated upon Ofcom in the Framework Directive. By virtue of Article 8(4) of the Access Directive, when imposing access obligations (including the most intrusive form of access obligation, a price control), Ofcom must take into account the objectives of Article 8 of the Framework Directive. The most salient of those objectives in Article 8 of the Framework Directive are Ofcom's duty to:

"...promote competition in the provision of electronic communications networks, electronic communications services and associated facilities and services by inter alia:

(a) ensuring that users, including disabled users, elderly users, and users with special social needs derive maximum benefit in terms of choice, price, and quality;

(b) ensuring that there is no distortion or restriction of competition in the electronic communications sector, including the transmission of content"

That the form and nature of access regulation, competition and consumer welfare are inextricably intertwined is even more explicitly recognised by the provisions of Article 13(2) of the Access Directive governing the setting of price controls, which specify that:

"National regulatory authorities shall ensure that any cost recovery mechanism or pricing methodology that is mandated serves to promote efficiency and sustainable competition and maximise consumer benefits."

With those wider obligations and objectives Article 8 of the Framework also provides for directions as to how Ofcom should go about its task of achieving the objective of serving competition and consumers by requiring that Ofcom should:

"apply objective, transparent, non-discriminatory and proportionate regulatory principles by, inter alia:

(a) promoting regulatory predictability by ensuring a consistent regulatory approach over appropriate review periods... (d) promoting efficient investment and innovation in new and enhanced infrastructures, including by ensuring that any access obligation takes appropriate account of the risk incurred by the investing undertakings and by permitting various cooperative arrangements between investors and parties seeking access to diversify the risk of investment, whilst ensuring that competition in the market and the principle of non-discrimination are preserved."

The linkage between an environment conducive to investment and consumer welfare is further reinforced by provisions of Article 13(1)(d) of the Access Directive which replicate the provisions of Article 8 verbatim in terms of the obligation upon Ofcom to promote:

“efficient investment and innovation in new and enhanced infrastructures, including by ensuring that any access obligation takes appropriate account of the risk incurred by the investing undertakings and by permitting various cooperative arrangements between investors and parties seeking access to diversify the risk of investment, whilst ensuring that competition in the market and the principle of non-discrimination are preserved.”

Such a proposition should be entirely uncontroversial since a cost recovery methodology that, for instance, effectively denied recovery of efficiently incurred costs would be highly likely to dis-incentivise infrastructure providers to continue to invest and innovate prospectively.

The fact that the regulatory regime effectively recognises the potential adverse consequences for competition and consumers through ill-considered or inappropriate regulatory intervention points to the need for a high standard of proof upon the regulator when seeking to impose access obligations upon an SMP operator. Put another way, given that Ofcom is undertaking a prospective analysis that involves a analysis balancing of a number of different issues considerations and with significant consequences for the mobile communications industry and its subscribers, there is a compelling need for Ofcom act with a high degree of rigour and care in that analysis as the Community courts have noted when considering the burden of proof upon competition authorities engaged in a prospective analysis whose outcome may have material ramifications for industry and consumers:

“[B]ecause the likelihood of error is greater in a prospective analysis, the prospective analysis must be proportionately more rigorous to account for this possibility”³⁴.

That legal proposition has also been described in other cases as the double proportionality obligation that is relevant to any regulator assessing a matter with significant consequences for industry stakeholders:

“the more important a particular factor seems likely to be in the overall proportionality assessment, or the more intrusive, uncertain in its effect, or wide-reaching a proposed remedy is likely to prove, the more detailed or deeper the investigation of the factor in question may need to be...”³⁵

“...within a wide margin of appreciation, the depth and sophistication of analysis called for in relation to any particular relevant aspect of the inquiry needs to be tailored to the importance or gravity of the issue within the general context of the Commission's task.”³⁶

³⁴ This language comes from a decision of the Irish Electronic Communications Appeals Panel referring to a decision of the European Court of First Instance, cited with approval by the CAT in *Hutchison 3G (UK) Limited v Ofcom* [2005] CAT 39 at 33.

³⁵ *Tesco v Competition Commission* (2009), CAT 6 paragraph 139

³⁶ *PPI* (2009) CAT 27, paragraph 21

The implied duty of care upon a regulator engaged in a prospective analysis is particularly germane in this case where Ofcom must consider the potential effects on the competitive landscape, the extent to which its approach may diminish or inhibit incentives to invest and consequently consumer welfare.

Additionally, Parliament has supplemented Ofcom's Community-wide duties with a number of overarching obligations that govern how Ofcom should go about seeking to achieve its duties. The most relevant of these obligations are those provided for by section 3(3)(a) and (b) of the Communications Act 2003, which require Ofcom to:

"...have regard, in all cases, to—

(a) the principles under which regulatory activities should be transparent, accountable, proportionate, consistent and targeted only at cases in which action is needed; and

(b) any other principles appearing to OFCOM to represent the best regulatory practice."

These obligations are important because they provide industry stakeholders with a degree of assurance about Ofcom's likely approach to particular policy issues and thus enable them to take planning and investment decisions on the basis that regulatory decisions will not be unpredictable or arbitrary. As we describe further in our analysis of Ofcom's modelling and its approach to phasing in a new termination rate in the next charge control period, Ofcom appears to have scant regard for considerations of consistency and legal certainty.

We now turn to consider the extent to which these legal and regulatory duties and obligations have been taken into account in Ofcom's provisional approach to the setting of mobile termination rates. As we reveal below, Ofcom's approach does not appear to take sufficient account of its wider objectives and thus places it in a position where it cannot safely conclude that it is able to meet its duties and obligations under the CRF.

Ofcom's approach to setting mobile termination rates in the context of the legal and regulatory framework

Limitations in Ofcom's dynamic efficiency analysis

As noted above, the impact of the approach to the computation of mobile termination rates on dynamic efficiency is a central consideration for Ofcom from both a policy and legal perspective. In this regard, Ofcom is simply not in a position to form conclusions about the effects of its approach to investment and expansion by mobile operators because it has not developed a model enabling the recovery of some measure of fixed and common costs from termination (LRIC+) that is capable of delivering a credible or reliable termination rate output. Given that Ofcom is seeking to understand the dynamic efficiency effects by examining the different outcomes with the use of a pure LRIC or LRIC+ methodology, there is a clear need for Ofcom to be correspondingly rigorous and develop a model that is capable of delivering a reliable LRIC+ output.

Ofcom's current attempt to model a LRIC+ termination rate approach could not, on any objective analysis, be said to be consistent with its general duty to discharge its role with the requisite degree of skill and rigour implied by existing jurisprudence. Thus it is clear that Ofcom can, as matters stand, draw no safe conclusions about whether 'lower' mobile termination rates will not lead to adverse effects from a dynamic efficiency perspective. As such and in the absence of a decision to develop a credible LRIC+ model that enables it to form a more robust view of the different impact of LRIC+ and pure LRIC on dynamic efficiency, Ofcom will need to be commensurately more cautious in setting the level of mobile termination rates (whether using a LRIC+ or LRIC methodology) where a range of values is generated by modelling work.

No positive case for 'low' mobile termination rates arising from competition effects

In 2011, Ofcom advanced a competition effects argument which it considered justified a move away from a termination rate derived from a LRIC+ methodology to one based on pure LRIC. Its view at the time was that the intensity of the competition in the retail mobile market would be strengthened since a 'lower' mobile termination rate using a LRIC methodology would enhance the position of small operators and strengthen their ability to compete (when compared against a counterfactual of a 'higher' termination rate derived from a LRIC+ methodology). No credible argument or compelling evidence has been adduced in this consultation as to whether a particular 'lower' level of termination rate will be more apt to improve the competitive dynamics of the retail mobile market (or at least to any significant extent). As we note elsewhere in our submission, H3G whose interest appears to be the primary focus or concern of Ofcom, gained significant market share during the period when Ofcom adopted a LRIC+ cost standard; by contrast, its position has remained unchanged in the market in the three years following the use of the pure LRIC methodology.

To the extent that Ofcom considers that the competitive interaction between mobile and fixed line operators is a relevant element of its analytical framework, Ofcom's own limited analysis does not suggest that there will be any material benefit to fixed line subscribers. Vodafone's previous submissions about BT's retention and Ofcom's own findings that less than 50% of previous reductions in mobile termination rates had been passed through to fixed line consumers serves to reinforce that the competition (or more specifically substitution) between mobile and fixed line operators is very limited; were it otherwise, economic theory would point to the vast majority of any savings in mobile termination rates would be passed through to fixed line consumers in the form of lower fixed to mobile call origination charges. Fixed line operators may elect to pass on these savings in another form – something which Ofcom cannot substantiate in this consultation – but these alleged benefits are too remote and cannot as a matter of fact support Ofcom's claim that there is an element of mobile-fixed competition that will be enhanced by any approach that imposes material reductions in termination rates.

Thus, the competition effect on the retail market for (call origination) as between 'higher' or 'lower' mobile termination rates is essentially neutral or unproven as things

stand. It is therefore necessary to consider whether other benefits arise from an approach that brought about an immediate further reduction in mobile termination rates.

Allocative efficiency reveals negligible benefits to consumers from low termination rates

What remains is an analysis of the outcome for mobile consumers in allocative efficiency terms; in this respect, Ofcom's attempt to investigate and assess the potential consequences for (vulnerable) pre-pay subscribers is notable for a number of bald assertions with little empirical evidence or detailed investigation of these consequences. There is no meaningful analysis of the extent to which incentives to serve such (typically unprofitable) customers would be reduced following were significant reductions to termination rates, nor whether the quality of service to such customers could be adversely affected. Nor does Ofcom appear to have investigated the effects on prepay vulnerable subscribers of the withdrawal of handset subsidy in the pre-pay market which occurred following the move to a pure LRIC methodology in 2011. Ofcom cannot be sanguine that mobile operators would not be forced to mitigate their position by adopting further measures (incremental to those already adopted) that could lead to harm for such subscribers.

To the extent that Ofcom considers that it is appropriate to consider the position of fixed line consumers as part of its analytical framework, no obviously tangible benefit arises from seeking to depress termination rates further in terms of pass through of lower mobile termination rates to fixed line consumers. The evidence submitted in our consultation response clearly demonstrates that BT, as the largest provider of fixed line voice services to consumers, has persistently failed to share fully the reductions in interconnect costs with its customers in the form of lower fixed-to-mobile calls for almost a decade. In this regard, we would draw Ofcom's attention to the view of the Competition Commission in the appeals against Ofcom's previous mobile termination statement that which also recognised that BT had failed to share all of the benefits of lower mobile termination rates with its fixed line customers; it therefore could not be confident that full pass through would occur. It could not point to any compelling evidence of likely pass through of lower interconnection costs to fixed line subscribers. Ofcom is therefore right to concede in its consultation document that the prospect of such pass through to fixed line subscribers is 'ambiguous'.

Summary

Ofcom therefore is, on the basis of the meagre evidential base adduced and the limitations in its own model, simply not in a position to assert with confidence that its proposed approach to the setting of mobile termination rates will be consistent with its duties to promote investment. Its preferred pure LRIC methodology is neutral, at best, in competition effects, whilst the effects upon consumers in allocative efficiency terms is, given the paucity of the evidence, uncertain with potential risks to be borne by mobile consumers.. Ofcom cannot be certain that its preferred methodology will therefore be consistent with its Community law duties when setting a charge control; unless it is able to remedy these deficiencies through a revised consultation document,

Ofcom must, if it decides to proceed with a LRIC-based approach to setting termination rates, err on the side of caution when faced with a potential range of LRIC-based outputs derived from any modelling exercise. In such a scenario, on the basis of Ofcom's current evidence, there is a real risk to consumer welfare from using values at the lower end of any range.

1.10 Overall assessment on LRIC vs. LRIC+

Vodafone concludes that Ofcom needs to revisit its analysis;

- It is not at all obvious that there is much benefit to mobile consumers from any likely competition effects that might arise from any future difference in MTRs between the LRIC and LRIC+ alternatives that are output by the model;
- It is not at all clear that any further reduction in MTRs will yield any benefit to fixed to mobile callers, or to fixed customers in general, but it is certain that it will immediately benefit fixed operators;
- But inevitably money taken out of the mobile industry through reduced MTRs will adversely impact industry margins and investment;
- A very major risk if Ofcom continues with using LRIC as its preferred cost standard is that it may inadvertently set a rate that is below true LRIC.

These points give rise to the general conclusion that if Ofcom were to continue with LRIC rather than LRIC+, then it should be conservative in setting any modelling outcome to ensure that the rate is not inadvertently set too low. A LRIC approach most certainly leaves Ofcom no room for error. But the risk of modelling error plus the general uncertainty in relation to the timing and level of 4G outcomes both give rise to an asymmetric risk problem that can only be addressed by ensuring that a conservative rate is set.

Section 2 – the average efficient operator

The proposed wholesale mobile voice termination charge control is underpinned by the outputs for the model that are run for a representative average efficient operator. Precisely what this average efficient operator is considered to be of is therefore very germane to the final charge control outcome.

It has been determined from prior reviews that in terms of market size, the average efficient operator has in the long run a 25% market share³⁷. We have no present disagreement with the principle of 25% market share and see no virtue in discussing alternative overall market share proportions for the average efficient operator, involving three or five equally sized operators.

However there are other components of the average efficient operator that Ofcom has adopted in the modelling that do need careful consideration:

- The technology base of the average efficient operator
- 4G spectrum holdings
- 2G spectrum holdings
- The use of operator data to calibrate the model

We discuss these in turn in this section.

2.1 – Technology base of the average efficient operator

We support Ofcom's view that the average efficient operator should be one that operates 2G, 3G and 4G technologies. BT's claim that the average efficient operator should be a 4G only one is entirely mistaken. Ofcom has already rejected this incorrect argument from BT more than once, in the present consultation and in the dispute about the level of origination charges for calls to freephone numbers.

Simply put, BT's case is that MTRs should be based on the LRIC of a 4G network, arguing that "*an efficient new entrant would not build a national 2G/3G network*" and that "*the best available technology for an efficient operator entering the market now is LTE, with voice to be provided either as an OOTT service, or as VoLTE*"³⁸. "*Ofcom did not allow dual running costs in the fixed market and should not do so for MTRs.*"³⁹

We agree with Ofcom that these statements do not assist in the assessment of the technologies that need to be employed by an average efficient mobile operator with a 25% market share, to service the planned levels of voice call termination in the proposed charge control period. There are several grounds under which it can be

³⁷ In detail this is coupled with historic adjustments associated with the emergence of H3G as a fifth operator and the reduction from five to four operators arising from the merger of Orange and T-Mobile to form EE.

³⁸ Quoted in paragraph A11.26 of the consultation

³⁹ From paragraph A11.27

established that BT's suggested approach is not appropriate, as Ofcom noted in the present consultation and in its provisional determination on 080⁴⁰.

“4.50 We disagree with BT's submission that it is appropriate to take account of market changes and therefore to update the MCT cost models, e.g. to an MEA approach based on 4G technology. As explained in our June 2014 MCT consultation, we believe it is appropriate to model a hypothetical average efficient mobile communications provider using a combination of 2G, 3G and 4G technologies. We consider that while modelling only a 4G network might better reflect replacement costs of the MEA (and hence competitive/contestable market principles), it could threaten the opportunity to recover the efficiently incurred costs of the existing 2G and 3G networks and hence undermine dynamic efficiency. Additionally, the presence of 2G and 3G networks is necessary to serve customers with 2G and 3G handsets and to support international roaming customers who require access to 2G and 3G networks.”

We believe that Ofcom is correct in this approach, and that BT has mischaracterised Ofcom's approach with respect to fixed narrowband regulation. Ofcom was careful to say that NGN, (the technology it adopted for the modelled fixed operator) *“should not be characterised as the Modern Equivalent Asset (MEA), but can be considered as an appropriate basis for establishing costs associated with providing wholesale call origination and wholesale call termination services⁴¹”*. The modelling of a 2G/3G/4G operator for the purposes of mobile wholesale regulation is entirely consistent with this approach.

We discuss the various aspects of this decision in turn.

Customer handsets and 4G capability

Ofcom makes the following points in the present consultation:

“A11.44 In addition, we consider that it would be unreasonable to assume that an MCP in the UK would be able to reach the market share of our modelled average efficient MCP if it offered a 4G only network. This is because the current take-up of active 4G handsets is too low. In other words, an MCP is unlikely to be able to reach the market share we assume for our modelled MCP without deploying a 2G and 3G network.

A11.45 Reinforcing this point, we consider it relevant that industry expectations point to the continued existence of 2G and 3G networks over the next charge control period. The presence of 2G and 3G networks is necessary to serve customers with 2G and 3G handsets and to support international roaming customers who require access to 2G and 3G networks. In this vein, we note

⁴⁰ Ofcom determination on 080 dispute, July 2014

⁴¹ Fixed narrowband statement, September 2013, at A5.4

that other NRAs continue to model 2G and 3G technologies through the period of the next charge control, as shown in Table A11.1 above.

Fixed and mobile termination regulation is very different, not only in terms of what components of the network is being regulated by wholesale voice call termination, but also in terms of the nature of the customer access to the network, in order to be able to make and receive calls. For fixed operators, with their access network regulated in a separate market, the portion of their network that is in scope for voice call termination regulation is specifically not the access network, i.e. that portion from the customer to the local exchange⁴², but the rest of the network, i.e. effectively the core switching network. The portion of the network that is being regulated by fixed voice call termination is thus remote from the customer device, and assumptions made as to which generation of technology to model in the fixed core have no bearing on the ability of the call to be terminated via the access network, to the customer. The specific fixed network customer device adopted to terminate a fixed voice call is thus irrelevant to the modelled network, provided it is capable of being plugged in at the customer's premises.

By very great contrast, it is the entire mobile network that is in the scope of the mobile voice call termination modelling, and in particular the mobile access network, i.e. from the radio spectrum to the cell site and back to the core network is included. Manifestly therefore, one implication of this is that the network considered to be in the scope of regulation must connect directly with the customer device. The ability of the device held by the customer to be able to connect with the network of the average efficient operator is thus paramount. In the specific context of mobile voice call termination regulation, if the customer does not have a handset that can connect with the average efficient operator's network, then the terminated call cannot happen. Under these circumstances the notional "average efficient operator", if it cannot handle the calls of all potential mobile customers, is anything but efficient and average.

Voice termination services are therefore required on all access network technologies demanded by customers. In the real world, mobile operators have 2G, 3G and 4G networks, and customers have, as Ofcom's modelling shows, a mix of voice enabled handsets that are 2G only capable, or 2G and 3G capable, or 2G, 3G and 4G capable. But at present no operator in the UK has launched voice services on 4G, so even if a handset includes within its capabilities the ability to function on a 4G network, and the customer has a contract that enables 4G connectivity, this will not permit voice calls to be conducted on 4G. At present such a device will handover to 3G or 2G to enable a voice call to take place.

Ofcom's model assumes a slow progressive penetration of 4G voice call capability on 4G handsets during the charge control period from a level of zero in the first quarter.

⁴² The cost of this part of the fixed network is generally recovered via regulated wholesale line rental

✂ But even by the final quarter of the proposed charge control, i.e. by the fourth quarter of 2017/18, the model forecasts that only 15% of incoming voice traffic will be capable of being handled on 4G. On an annualised basis, the model predicts in 2015/16 1% of the voice termination traffic will be on 4G, in 2016/17 5%, and in 2017/18, 12% - the overall average for the three years of the charge control is 6%.

BT's suggestion that the average efficient operator should only be 4G for mobile voice termination for the 2015/16 to 2017/18 charge control period is therefore not reasonable or realistic. It effectively would allow only 6% of all inbound voice calls to be terminated by the average efficient operator, unless it also included an assumption that all eighty million or so customer devices were replaced before the start of the charge control period with ones that are capable of sustaining 4G voice calls, and that the average efficient operator has a VoLTE service capable of sustaining all demanded traffic. This set of assumptions can only be considered to be totally hypothetical – it is very obviously not capable of being satisfied in practical terms. Even if such an assumption were to be assumed to be acceptable, it could not be used without a further assumption in relation to the very considerable cost of handset replacement. Such a cost, which would be multiple £ billions (and would be incurred by both operators and customers), would need to be factored into the modelling (together with the consequences of loss of service for a pre-pay customer who was inadvertently not upgraded). These costs have not been included in the model at present, but would be necessary in order to permit the average efficient operator to be assumed to be able to terminate all demanded voice calls during the charge control period.

Stranding of existing 2G and 3G network assets

If Ofcom were to assume that a 4G only operator could be the average efficient operator, then this would lead to a stranding of all the 2G and 3G investments that have historically been deemed necessary in the current and previous charge controls to carry termination traffic. This would be a very substantial sum. Ofcom notes in A11.41 that:

“While modelling only a 4G network might better reflect replacement costs of the MEA (and hence competitive/contestable market principles) it could threaten the opportunity to recover the efficiently incurred costs of the existing 2G and 3G networks and hence undermine dynamic efficiency. As noted in paragraph A11.20, signalling that past investments in 2G and 3G assets can be ignored (at least until there has been an opportunity to recover efficiently incurred expenditure) risks undermining regulatory predictability for MCPs and may compromise future incentives to invest.”

We concur. In the fixed narrowband statement Ofcom carefully considered the need to be able to recover outstanding historic investment if there were to be a change in the nature of the technology employed by the assumed average efficient operator. Its conclusion in that context was that there was not an issue, largely because BT's traditional TDM network was very heavily depreciated already, and the modelled cost

recovery from the TDM network for future periods was in fact lower than the suggested cost recovery levels under NGA.

The position would be very different in mobile, where investment on all technologies is ongoing, and book values are high. As the Ofcom mobile model itself shows, switching to a 4G only recovery would mean setting a rate a long way below that which is necessary for the recovery of 2G and 3G historic and future network investment.

International roaming

From a practical point of view any assumption that a 4G only network would be appropriate to represent the average efficient operator would mean that such an operator would no longer be able to maintain roaming agreements with international operators to allow their customers to roam onto the average efficient operator's network when travelling in the UK and to receive calls, unless it could somehow be assumed that all such customers had use of a 4G handset capable of receiving voice calls under VoLTE.

Given that international roaming is a significant feature of the mobile service set (and one that is specifically recognised in the definition of termination traffic) it would be a strange choice to assume that in the UK, the average efficient operator was one that did not allow roaming on its network. This would place the UK conspicuously out of step with the rest of the world.

Network coverage

As a matter of practicality, and as modelled by Ofcom, the extent of 4G coverage is somewhere behind 2G and 3G networks, and likely to remain so for some time.

For example taking the values from the model as to what it expects the average efficient operator to achieve, in the current quarter (Q2 2014/15) 2G has 99.1% population coverage, 3G 95.3% population coverage, but 4G only 60.6% population coverage. At the commencement of the new charge control period, Q1 2015/16, whilst the population coverage of 4G is modelled as having increased substantially, it is still only at 84.7%. This would mean that were 4G adopted as the sole technology for the average efficient operator then more than 15% of the UK population would be out of the coverage area of that operator at the commencement of the charge control.

This disenfranchisement is also not reasonable.

International consensus

As Ofcom reports in table A11.1 other NRAs have taken the same line – those that have included 4G at all in mobile regulation have built 2G/3G/4G models.

“A11.43 Although BT refers to the adoption of LTE technology in China, the USA, South Korea and a number of other countries, we are not aware of any MCPs in Europe that have deployed a national 4G only network that is currently capable of conveying the total traffic volumes assumed in our modelling. Instead, MCPs that have or are deploying 4G networks are continuing to deploy and develop their 2G and 3G networks to provide both coverage and capacity for traffic. This is particularly the case for UK voice traffic because VoLTE technology has yet to be deployed by any of the four largest MCPs, meaning that 2G and 3G technologies remain necessary to deliver voice traffic.

We agree with this argument, but it does raise the question as to whether 4G, given that it is still a nascent set of services, should be included at all in the termination model.

Should 4G be included?

Our view is that on balance, the exclusion of 4G technology from the termination model would be incorrect. Its exclusion would necessitate serious (and unacceptable) compromises in assumptions on the nature of the average efficient operator. All four major operators have invested heavily in 4G spectrum, and continue to invest in 4G network deployment. 4G capable handsets are being sold to customers. Data traffic volumes are increasing significantly as a result of the adoption of 4G technology, and are forecast to continue to grow for some time. An average efficient operator that ignored all of this would not be representative.

Beyond doubt however there is a difficulty with modelling voice on 4G, with a short baseline of actual information on data traffic, networks still being rolled out, and VoLTE not yet launched.

The introduction of 4G into the termination model thus gives rise to very considerable modelling uncertainties that are much greater than those in relation to 2G and 3G. Whilst many of these uncertainties relate more to data than to voice, voice costs are not independent of other service costs, for either LRIC or LRIC+ outputs. It is important therefore that Ofcom is conservative in its modelling assumptions about the average efficient operator's implementation of 4G – we discuss this elsewhere in sections 1.8 and 2.4.

But whatever assumptions that are made for 4G should be made in a coherent manner, and in particular need to assume that the operator will seek to handle data efficiently, as well as pursuing the efficient conveyance of voice. For example an assumption of data growth without an assumption of rising efficiency in carrying that data will have an adverse impact on the cost of carrying voice. This was quite clear in the previous termination review process, where the adoption of increasingly efficient HSPA 3G data technologies allowed the operator's costs of carrying data to fall. Ofcom in fact did not

adopt in 2011 the most efficient HSPA technology likely to be adopted in the course of the 2011-2015 charge control, but has now corrected this assumption⁴³.

Modelling assumptions made about 4G need to relate to three different periods:

- The historic, for example the launch date of 4G for the average efficient operator;
- The future, inside the next charge control period, for example the date of launch of VoLTE, and the adoption rate of VoLTE capable handsets;
- But also for the future, beyond the next charge control period. Of necessity Ofcom is assuming traffic change in this period – but it must also assume other changes in this period that are consistent with the efficient operator's likely reaction to that traffic increase, such as the quantity of spectrum that is necessary. It may also be necessary to assume other developments on the technology roadmap.

Given the fact that the modelling approach relates to long run costs, the future of 4G beyond the planned charge control period is relevant to the LRIC and LRIC+ voice termination costs in the planned charge control period. We discuss this with reference to spectrum in the next section.

2. 2 – 4G Spectrum holdings of the average efficient operator

Ofcom in table A11.4 lays out its assumptions of what spectrum the average efficient operator deploys in each technology. The focus in this particular section relates to the assumption that for 4G the operator will use 10MHz of 800MHz, 10MHz of 1800MHz, and 10MHz of 2600MHz, a total of 30MHz paired⁴⁴, over the entire modelled period. We show this table below.

⁴³ As we note in section 3.1 below

⁴⁴ For simplicity of exposition we tend to refer to 2*10MHz paired spectrum simply as 10MHz

Table A11.4: Proposed spectrum holdings for our modelled MCP

Band	Holding (paired MHz)	Technology	
800MHz	10	4G	
900MHz	0	n/a	
1800MHz	30	20	2G
		10	4G ⁶⁵
2.1GHz	10, increasing to 15 in 2012/13	3G	
2.6GHz	10	4G	

Current 4G spectrum holding assumed

The assumption is made that for the average efficient operator, this spectrum was acquired in 2013 for 800MHz and 2600MHz (from the auction) and by reassignment from 2G for the 1800MHz. The 30MHz total that results may be approximately correct for the 4G spectrum that is currently available.

The four mobile operators acquired in total from the auction in February 2013 30MHz of 800MHz and 55MHz of 2600MHz⁴⁵. H3G acquired 15MHz of 1800MHz from EE in 2012/13, but this spectrum was (and will be) released in two tranches, 10MHz in October 2013 and 5MHz in October 2015. EE was able to free up 20MHz of its 1800MHz spectrum for service launch of “double-speed 4G” by June 2013⁴⁶. This in total represents 120MHz of spectrum suitable for 4G use, so the average efficient operator might be assumed to have one quarter of this, or 30MHz, available to use from 2013/14.

We have no particular view as to whether this specific mix of spectrum, three tranches of 10MHz in three different frequencies is preferable to be modelled than any other. Although it is obvious that the particular mix adopted cannot be held by any of the four specific operators, this represents a fair spread of the available bands. From inspection of the model, it would tentatively appear that the particular mix by band of the 30MHz spectrum that is modelled makes relatively little difference to the model outputs of LRIC and LRIC+.

Future spectrum holdings assumed

However there is no further assumption in the model of any additional spectrum being used for 4G in the rest of the modelling period. However there is an assumption of

⁴⁵ Ignoring, as Ofcom has done, the unpaired TDD 2600MHz spectrum

⁴⁶ From EE press releases

very greatly increasing traffic volume under 4G up to 2025/26. These are internally inconsistent and in complete conflict with the actions of Ofcom’s spectrum team, which is taking steps, to release additional spectrum for 4G use by 2025/26 to cope with the assumed “capacity crunch” arising from the forecast traffic increase.

Nor is it consistent with Ofcom’s strategic priorities, as listed in the 2014/15 annual plan – one of the major work areas is to:

“secure optimal use of spectrum - as in 2013/14, spectrum issues make up a significant part of our 2014/15 work programme, covering, for example, a programme of potential future spectrum release including 2.3GHz, 3.4GHz and 700MHz bands”⁴⁷

Ofcom’s Mobile Data Strategy Statement (MDS) of May 2014 lays out the following bands on which it is working to release spectrum for mobile use in the table 1 below:

Table 1: Summary of our work to prepare for future growth in mobile data services
(band priorities changed since consultation document shown in *italics*)

Prioritisation and high level aims for band specific work	Bands
Current priorities <ul style="list-style-type: none"> Continue existing work to enable mobile use 	<ul style="list-style-type: none"> 700 MHz 2.3 GHz*, 3.4 GHz UHF white space (shared)
High <ul style="list-style-type: none"> Enable cleared bands to be brought into use as demand emerges Establish feasibility / conditions for sharing as soon as possible Secure relevant international agreements as appropriate 	<ul style="list-style-type: none"> 1452-1492 MHz 1980-2010 / 2170-2200 MHz ('2GHz MSS') 3.6-3.8 GHz (shared) 5-6 GHz Wi-Fi (5350-5470 MHz, 5725-5925 MHz) (shared)
Medium-High <ul style="list-style-type: none"> Establish viability of shared access Promote international support 	<ul style="list-style-type: none"> 1427-1452 MHz (<i>shared</i>) 3.8-4.2 GHz (<i>shared</i>)
Medium <ul style="list-style-type: none"> Further develop our understanding of longer term use scenarios 	<ul style="list-style-type: none"> 470-694 MHz (very long term) 1492-1518 MHz 2.7-2.9 GHz 5.925 – 6.425 GHz (<i>shared</i>)
Low <ul style="list-style-type: none"> No pro-active action at this stage 	All other bands

Ofcom then produces a tentative timetable for and quantification of such release in Table 2 of the MDS:

⁴⁷ At paragraph 1.17 of the 2014/15 annual plan

Table 2: Illustrative implications for spectrum availability

Scenario	Bands available for mobile data	Total MHz available for mobile data (downlink estimate)
2012	• 900 MHz, 1800MHz • 2.1 GHz	162 MHz
2014	As 2012 plus: • 800 MHz • 2.6 GHz	290 MHz
2016	As 2014 plus: • 2.3 GHz, 3.4 GHz • 1452–1492 MHz	491 MHz
2022	As 2016 plus: • 700 MHz • 3.6-3.8 GHz • 2 GHz MSS • 1427-1452 MHz	671 MHz
2028	As 2022 plus: • 2.7-2.9 GHz • 3.8-4.2 GHz • 1492-1518 MHz	941 MHz

This represents an additional 381MHz between now and 2022 – spread across four operators this might be approximately 100MHz⁴⁸ per operator. However in the present consultation no increase in spectrum quantity for 4G beyond the initial 30MHz is assumed. We find this incomprehensible.

As the tables show, preparations are under way for the release of some of these bands already, particularly the 2.3GHz, 3.4GHz and the 700MHz⁴⁹ bands. The assumption in the present version of the MTR model of no additional 4G spectrum cannot be a realistic position to take with regard to the future of 4G networks.

We accept that it is unlikely that any of the additional spectrum will be brought into use inside the prospective charge control period. However this is not a relevant consideration to a long run model, when the appropriate level of cost recovery in the charge control period is influenced by input assumptions and cash outflows in all other years – it is thus important that all major changes beyond the prospective charge control period are taken into account.

It is not correct to assume a very considerable increase in data demand, as the model does, without also assuming an increase in spectrum. Ofcom is very clear why the additional spectrum is planned to be released. In the executive summary to the current consultation on the future of 700MHz spectrum Ofcom says:

“1.3 Our analysis indicates that making the 700 MHz band available for mobile would result in significant benefits for citizens and consumers. We anticipate it would result in improved mobile network speeds and that it would help mobile network operators meet increases in demand for capacity in a more cost effective manner than without this spectrum. Because of the competitive nature of the mobile market, we would expect this to result in lower consumer prices for mobile data services than would otherwise be the case. “

⁴⁸ In the downlink

⁴⁹ Consultation on future use of the 700 MHz band - Cost-benefit analysis of changing its use to mobile services, May 2014

The current version of the model very clearly shows the consequences of the failure to assume additional spectrum in a sudden surge in required 4G sites from 2020 onwards. This is tabulated below.

	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26
4G macro sites built	14,081	16,367	18,307	20,104	21,809	22,432

Table 2.1 4G macro sites built by the model base case

The number of 4G macrosites built by the model only stops growing in 2025/26 as the traffic assumptions are frozen at that point.

The Analysys Mason mobile network operator model that accompanies Ofcom's 700MHz consultation employs a very much greater mix of spectrum emerging after 2013 for its view of the average operator, as shown in figure 3.12⁵⁰:

- 10MHz unpaired at 1452MHz – 1492MHz in 2018
- 10MHz unpaired at 2300GHz in 2016
- 45MHz unpaired at 3.5GHz in 2016
- 2*25MHz paired at 3.6GHz in 2018
- Plus 2*10MHz paired at 700MHz in 2020-2022
- Plus another 2*75MHz paired at 2.7GHz and 3.8GHz in 2025

This represents in excess of 100MHz of downlink capacity for the modelled operator.

If Ofcom is going to model 4G in the MTR model, and Vodafone believes that it would be correct to do so, then Ofcom should use a realistic but conservative data traffic estimate. If it does that, it should use as well a rational but restrained future increase in spectrum that is commensurate with such a forecast.

If Ofcom were to consider rejecting any new spectrum on the grounds that it is a future uncertain change that, given the uncertainty, should not necessarily be recognised, then this would be inconsistent with an assumption of high data growth, or even any data growth beyond the charge control period. The question that needs to be addressed is what would an efficient operator be likely to do when faced with high data growth – the answer is that the operator would seek to invest in new spectrum, as far as possible, since this would be the most efficient and economical way of allowing network capacity to grow.

This discussion would be irrelevant if the volume of additional spectrum assumed in the model made no impact on the LRIC or LRIC+ of mobile voice termination – but in fact it

⁵⁰ Op cit.

does, as we establish in section 3.5 below. Given this, the only acceptable alternative to modelling some additional 4G spectrum being made available to the average efficient operator, would be to assume that there is no increase in 4G data traffic volumes beyond the end of the prospective charge control period. We do not however see this scenario as a realistic modelling construct to employ for the average efficient operator.

Vodafone does not suggest adopting an assumption of increased spectrum as great as that assumed by the Analysys Mason 700MHz model – this model was built in the context of avoiding the risk of the future “data crunch” and thus uses a traffic volume that is quite naturally towards the outer edge of probability, and thus can be expected to be, and is, rather higher than the Ofcom MTR model’s base case⁵¹. We believe that it is perfectly reasonable to assume for the average efficient operator a minimum of one tranche of 2*10MHz of spectrum – for administrative convenience this could be assumed to be 700MHz spectrum. Given its similar properties to 800MHz, this can be accommodated in the model quite simply by assuming 20MHz of 800MHz spectrum is used by the average efficient operator, rather than the 10MHz that is currently in the model.

We believe that this is the absolute minimum spectrum that could be considered to be likely to be made available to the average efficient operator before 2025. Vodafone considers the inter-relationship between this spectrum assumption and Ofcom’s traffic forecasts in section 3.5 below.

2.3 – The average efficient operator’s spectrum holdings with respect to 2G

Ofcom’s current assumption is that the average efficient operator runs its 2G network on 1800MHz. This is basically a renewal of a decision that was made in 2007 in the context of LRIC+ modelling to adopt 30MHz of 1800MHz rather than 17.4MHz of 900MHz plus 5.8MHz of 1800MHz as the holding of the average efficient operator. The two alternative spectrum scenario holdings considered in 2007 reflected the position then of T-Mobile and Orange for 1800MHz and Vodafone and O2 for 900/1800MHz. In terms of a LRIC+ modelling exercise, the cost of the two alternative scenarios, each of which related to two operators, was found to be very similar.

Since then, there have been two changes:

- The number of 2G operators has reduced from four to three, as a result of the consolidation of T-Mobile and Orange into EE;
- The focus of Ofcom’s modelling has shifted from LRIC+ to LRIC.

However Ofcom has continued to model the average efficient operator as having 30MHz of 1800MHz spectrum. The only change that has occurred in the 2014

⁵¹ But as we see in section 3.5 below, the data traffic assumed in the MTR model’s high volume scenario is, surprisingly, not that different from the Analysys Mason 700MHz model.

consultation is that it is now assumed that the average efficient operator releases 10MHz of this spectrum to 4G use in 2012/13. In this assumption of 30MHz and 20MHz for 1800MHz, Ofcom is approximately mirroring one half of EE, rather than any real operator.

The creation of EE produced an operator with a holding of 60MHz of 1800MHz spectrum, of which it was then required to divest 10MHz in 2013 and 5MHz in 2015. Of the remainder, up to 20MHz has been released to EE's 4G use, meaning that EE must have currently between 25 and 30MHz in use, or available for use, for 2G.

On a simple headcount of 2G mobile operators, with two using 900/1800MHz and one using 1800MHz, it would appear logical to assume that the average efficient operator must be using 900/1800MHz, with the one using 1800MHz being the outlier. Where one operator has a position dissimilar to the others that would be the least unlikely approach to take, and it is one that Ofcom has taken elsewhere in other consultations. For example in adopting an industry cost of debt in the August 2014 ALF consultation, Telefonica is established by Ofcom in paragraphs A10.13 onwards to have a higher cost of debt premium than the rest, and its data is then excluded on those grounds.

Ofcom's discussion in the present consultation on the 2G spectrum of the average efficient operator is brief, and confined to LRIC+. Ofcom notes in Annex 15 of this consultation:

"A15.7 Our proposals do not include the use of 900MHz spectrum and, consistent with the March 2007 and March 2011 Statements, we assume that the average efficient MCP uses 1800MHz spectrum to provide 2G services. For the purposes of our LRIC+ calculations we are interested in the economic value of the average efficient MCP's stock of 1800MHz spectrum on a forward-looking basis. In the past we have observed that 1800MHz spectrum may be advantageous in terms of providing capacity, whereas 900MHz spectrum is beneficial from the point of view of providing coverage. However, given the introduction of market mechanisms for the valuation of 900MHz and 1800MHz spectrum and tradable licences we would expect any difference between the costs of offering services using the different spectrum bands to have reduced. As a result we consider it reasonable to continue to model 2G services using 1800MHz spectrum and do not model 900MHz spectrum."

This may very well be true for LRIC+; were Ofcom proposing to impose a charge control based on LRIC+, even though it would be odd to adopt the outlier operator as representative of the forward looking average efficient operator there would need to be no discussion of the design of the average efficient operator with respect to the holdings of 2G spectrum.

But it is not true for LRIC – as Ofcom notes, 1800MHz may be advantageous in terms of providing capacity, and 900MHz beneficial from the point of view of providing coverage. Ofcom made the point very clearly in the 2007 statement, where the

decision to use the 1800MHz rather than a 900/1800MHz as the average efficient operator was made:

9.97 The 1800MHz-only operators face higher coverage costs, other things being equal, because they need a greater number of coverage cells⁵². However, as traffic demand grows, the difference in the required numbers of cells (and by extension other network equipment such as BTSs and BSCs) narrows. The requirement to meet traffic demand becomes increasingly the binding constraint in network deployment, i.e. what were initially cells required for coverage purposes become capacity-constrained as demand increases⁵³.”

But LRIC is concerned with the cost of providing capacity. This immediately suggests that the LRIC costs of a 900/1800MHz operator will be different from **and higher than** those of an 1800MHz operator.

The point is quite straightforward – given that a 900/1800MHz operator requires fewer coverage sites and more traffic related sites, it follows that on a LRIC cost standard, which is looking for the number of traffic related sites arising from the increment of termination, a higher level of cost will be found by a 900/1800MHz operator than by an 1800MHz operator. This cost difference arises simply from spectrum holding differentiation.

Putting these two points together then, if two operators have a technology based LRIC cost floor of say 1p, and one other a technology based LRIC cost floor of say 0.8p, then not only is the single operator an outlier, but also imposing its lower cost floor on the other two operators would mean that they would be obliged to charge a LRIC below their own actual LRIC. Given the asymmetry of the risk of imposing a charge control that is below the appropriate charge control standard⁵⁴, then it is clear that the spectrum position of the majority 900/1800MHz operators should be used to produce the LRIC of the average efficient operator.

This is an argument that Ofcom needs to properly and actively consider in the present consultation in relation to LRIC⁵⁵. However we can see no evidence of where Ofcom has considered this matter in 2014 from a LRIC point of view – given Ofcom’s preliminary decision that LRIC is the correct cost standard to use, we find this surprising. Ofcom needs to think again.

⁵² As per Ofcom’s footnote 96 to the Statement: “Radio propagation characteristics exhibit an inverse relationship between maximum coverage area per cell and frequency of spectrum. Combined 900/1800MHz operators (i.e. Vodafone and O2) can therefore deploy fewer cells for a given coverage area compared with their 1800MHz-only counterparts by providing coverage using 900MHz spectrum. See Annex F, paragraph F.90 to the December 2003 Consultation”

⁵³ Vodafone emphasis

⁵⁴ As we discuss in section 1.8 above

⁵⁵ The point was raised by Vodafone in its appeal in 2011/12, (but not during the consultation phase). Ofcom defended its use of 1800MHz on LRIC+ grounds, and the CC simply supported Ofcom’s judgement. But Ofcom cannot rely on its prior judgement alone – and quite clearly Ofcom does not seek to do so in the paragraph above, where it forms a contemporaneous view of the matter, but it is a view that is only relevant in relation to LRIC+.

At the very least Ofcom needs to form a view, by the means of modelling, on the relative levels of LRIC for a 900/1800MHz operator vs. an 1800MHz operator to see if it is appropriate to model the LRIC of a 2G 1800MHz operator as being a representative cost for the average efficient operator on a forward looking basis. This Ofcom has as yet failed to do.

There is a further point in favour of the use of 900/1800MHz as the spectrum holding for 2G. One new modelled feature for 2014 is the use of infrastructure sharing, the idea that a pair of operators will share equipment at each technology. The problem for this for 2G at 1800MHz is that there are no other operators to share this technology with at this frequency, but nevertheless the model assumes that this is possible. The reality of the sharing arrangements that exist in the UK are that the two 900/1800 MHz 2G operators are infrastructure sharing, but the 1800MHz 2G operator is infrastructure sharing with an operator that does not operate 2G. Even if it were to be assumed that the average efficient 1800MHz 2G operator were to be sharing 2G infrastructure with another 2G capable operator, (which in practical terms is impossible) given the available spectrum this would be a 900/1800MHz operator, so the opportunities for sharing would be a little different from those currently assumed. Such logical difficulties do not exist if the choice of 900/1800MHz spectrum for the average efficient operator's 2G spectrum has been made.

It is reasonably straightforward to adjust the model to allow for the use of the 900/1800MHz spectrum for the modelled operator, particularly since the necessary input values can be obtained from previous MTR models (in particular the 2007 model) where 900/1800MHz spectrum was modelled for 2G services. Our calculations in section 3.6 show that the LRIC of a 900/1800MHz operator is approximately 15% higher than the LRIC of an 1800MHz operator.

Given the risk of charging a rate below LRIC for the majority of 2G operators, it is clear to Vodafone therefore that a scenario of 900/1800MHz spectrum for 2G should be used for the average efficient operator.

2.4 – The use of operator data to calibrate and inform the inputs of the average efficient operator

As part of the model building exercise Ofcom has informed itself, via information requests, of some of the actual values of the real four MNOs, in respect of customers, traffic, financial data etc. This is indubitably necessary to be able to build a picture of the average efficient operator in terms of traffic volumes, financial calibration and so on. It is a regular requirement in every mobile voice termination charge control review.

But there are particular difficulties in how Ofcom takes this data and uses it to develop a view of the past and future of the average efficient operator. The point is that the observed average of the operators may be different from the average efficient operator for perfectly sound reasons. Given that much of the data that Ofcom receives is

confidential, it is hard from an individual operator's viewpoint to assess what Ofcom has done. But there are some things that can be seen from the available data.

In 2011 Vodafone was able to successfully appeal on a particular point relating to datacard market share, where from publicly available data it was possible to see that H3G had a larger market share of datacards than the average of the others, and as H3G was not a representative operator to be included into the estimation of the average efficient operator, the datacard market share for the average efficient operator should reflect this, by being somewhat below 25% for an extended period. The CC supported this reasoning and the datacard market shares were adjusted in the final 2012 model, and continue to be so in the 2014 model, as Ofcom discusses in paragraphs A11.100 and A11.101.

This point manifestly has a wider implication. For example one question that occurs to Vodafone is that as H3G is not a 2G operator, has Ofcom taken its view on the historic mix of 2G and 3G voice traffic including or excluding H3G's voice traffic? We cannot tell, but with H3G's emerging market size in the last few years, the average traffic mix by technology is likely to be visibly different with or without H3G. We discuss in section 3.7 our belief that Ofcom has modelled too fast a decline in 2G voice traffic – it is possible that the inclusion of H3G in the calculation of historic averages of 2G vs. 3G traffic may be a reason why this has happened.

There are more issues of a similar nature in 2014 that arise from the differences that are outside individual operators' control with respect to 4G. The formation of EE uniquely gave it sufficient spectrum in a suitable band to build and launch a 4G network in advance of all the other operators. Ofcom's decision to permit EE's 1800MHz spectrum to be liberalised then allowed this to happen.

This 4G build and launch by EE was not an opportunity available to any of the other operators. It is quite clear to Vodafone therefore that EE's 4G network deployment, 4G customer growth, 4G data growth, 4G VoLTE, movement from 3G data to 4G data etc. should not be used in deriving the average efficient operator's experience, at least in the early years of 4G, from launch up to 2017/18⁵⁶. Vodafone cannot know the extent to which Ofcom has used EE's 4G historic data and short term forecasts to build its view of the average efficient operator, but we suspect that to some extent it has done so⁵⁷.

The problem is particularly important if Ofcom continues with the LRIC cost standard, as we discussed in section 1 above, since if the traffic weighted mix of 2G, 3G and 4G voice termination costs assumed in the model is not one that operators other than EE can be expected to match, then given that the 4G LRIC of voice termination is considerably less than that of 2G or 3G, the blended LRIC produced by the charge control may be below that which the other operators (and the average efficient operator) can possibly be expected to obtain, through no inefficiency of their own.

⁵⁶ By which stage, five years after EE's launch, the other operators might be assumed to have had sufficient opportunity to catch up

⁵⁷ ✂

To some extent this risk can be reduced by using a glide path to the 2017/18 costs, rather than an immediate adjustment to LRIC in 2015/16, but this while helpful, would be insufficient. As a result of the long run nature of the economic depreciation method, a different mix of 2G, 3G and 4G traffic and costs over the past and the near future will give a long run blended cost difference in all modelled years, as well as changing the costs in the first years of the next charge control.

Given that we cannot know what Ofcom has done on the exclusion of EE's 4G adoption profile and on the knock on effects on 2G and 3G assumptions in its derivation of the average efficient operator, we cannot carry out any specific modelling adjustments on this issue. We need Ofcom therefore to review this matter so it can confirm in its final Statement that EE's 4G experience of the past and the immediate future has not been factored into the formulation of the 4G deployment pattern (and the associated knock-on effects on 3G and 2G) of the average efficient operator.

Section 3 – the MTR model

3.1 Introduction

The present version of the model must be by some distance the largest and most complex yet, in what has been an evolving sequence of models with a common structure over more than a decade, from a 2G only LRIC+ that modelled both 900/1800MHz and 1800MHz operators to the present 2G/3G/4G LRIC that produces LRIC+ as a by-product.

Inevitably there are some elements of the model that only exist in the way that they do, or exist at all, as a result of this historical evolution – a model built from scratch to reflect a 2G/3G/4G average efficient operator would almost certainly look rather different in detailed structure, though the overall traffic -> network -> cash outflow -> cost recovery structure would no doubt look fairly similar.

This overlaid structure of the current model makes review and evaluation of it difficult and time consuming. As a consequence Vodafone has only been able to focus on what we have believed to be the most important elements of the model, and time has run out in the consultation review process to complete the review fully. This document thus contains our best view on what we have seen so far in the model. The absence of a comment in this document on a particular element of the model should not be read as an unequivocal agreement with it. If as time allows we uncover in the future other issues that are worth drawing to Ofcom's attention we will obviously do so.

We are disappointed that Ofcom has taken too much of the 2011 model without adjustment, and not taken the opportunity to rethink some of the assumptions, particularly in relation to how to obtain a proper LRIC output from a model built and calibrated as a full service LRIC+ model, where given the nature of the economic depreciation cost recovery method, it is important that the model is able to identify the incremental build arising from termination at all levels of traffic.

Other network dimensioning models have taken a somewhat different approach – for example the Analysys Mason 700MHz model uses a simplified site generation function to determine the number of traffic dimensioned sites required in each geotype as traffic rises. It is unclear to Vodafone at this stage what differences in the levels of incremental site build this simplified method would produce, but it is tentatively concluded that despite the fact that the traffic assumptions of the Analysys Mason 700MHz are of the same order of magnitude as the MTR model, the 700MHz employs a lot more spectrum for what may be an approximately similar network build.

We welcome the fact that some of the issues previously raised by Vodafone have now been addressed in this version of the model. For example Vodafone argued in 2011/12 that the model should allow for further increases in the level of HSPA technology beyond the 14.4Mbps version that was then modelled. Vodafone's view at the time was that even though not yet currently deployed in the UK, these more spectrally efficient methods of handling data on 3G should be recognised in the model since:

“by their failure to recognize the future technological enhancements that the efficient operator is bound to introduce to allow for (or more realistically enable) the modelled forecast growth in data traffic, Ofcom is actually penalising the efficient operator by not allowing them to recover the efficiently incurred cost of termination that will result from an appropriate mix of efficient technologies.”⁵⁸

Even though the CC found in favour of Ofcom’s judgement to omit these technologies in 2012, the position has been reassessed by Ofcom, and the model now allows for HSPA up to 42Mbps. We see this reassessment as being reasonable, as is the incorporation of cell breathing in the model. We would note however that given that cell breathing does have some small impact on the modelled LRIC, we are not sure why it has not been incorporated into the base case as a matter of course, given the need for conservatism in the face of the asymmetric risk of too low a LRIC output. We believe that consistent with its reassessment of HSDPA speeds and cell breathing, in the 2014/5 version Ofcom needs to judge anew other elements of the model, in line with the changes that have taken place since 2011.

The context in which such judgement needs to be set is one of conservatism. We have discussed in previous sections of this document the need for a conservative set of assumptions to be adopted, particularly if Ofcom continues with the use of LRIC as its preferred cost standard - this gives rise to the associated asymmetric risk of deriving in the modelling a blended LRIC that is below that which operators can actually achieve. This contrasts with a charge that is between “real” LRIC and “real” LRIC+. For a charge between the two cost standards, it is difficult to see much evidence of consumer harm. We will not repeat these arguments here, other than to state that this view of the need for a conservative approach has informed our approach to the review of the model.

Before looking at the outputs of the model in general, it is necessary to first consider two other modelling points: the LRIC+ outputs that the model provides, and the reliability of the LRIC outputs by technology. The rest of this section then examines other changes that are necessary to the modelling of the average efficient operator. Some of these we are able to model. Finally Vodafone considers the resulting outputs with respect to LRIC and LRIC+ in the next charge control period.

3.2 The differential between LRIC+ and LRIC outputs for cost standard evaluation

As we briefly noted in section 1.3 above, Ofcom has focussed its modelling work on the production of a LRIC output of the model. This is entirely natural if the decision were to have already been taken to continue with the LRIC cost standard. It equally would be of less significance had the 2014 model been unchanged from the 2011 version – but

⁵⁸ Roche Witness Statement 2 to the CC, at paragraph 7.57

clearly this cannot be so, in that the 2014 version includes for the first time 4G technology and in addition incorporates a very significant increase in data traffic that is enabled by that technology⁵⁹, as well as several other amendments, such as infrastructure sharing and S-RAN deployment.

It follows therefore that such changes, unless they are considered in some detail with respect to LRIC+, run the risk of disrupting the reliability of the allocation of the recovery of fixed and common costs to voice calls in the calculation of the LRIC+ of termination.

Ofcom itself makes the point that its concern for the accuracy and reliability of the LRIC+ output is low. For example in Annex 11 Ofcom concludes that there is insufficient difference in cost between the 4G termination LRIC and the 4G termination LRIC+, but having satisfied itself on the level of the 4G LRIC, declines to investigate the issue.

“A16.12 This effect, in combination with the fact that site costs are the dominant component of the LRIC of 4G MCT, is sufficient to produce the result that the LRIC of 4G MCT is only slightly lower than the LRIC+. We consider that the question of whether the LRIC+ of 4G MCT is too low could be investigated further, however since we propose to set MTRs using the LRIC outputs of the model do not consider this to be a sensible use of our resources.”⁶⁰

However there is a significant logical error and inconsistency in this approach since in section 6 of its consultation Ofcom makes use of the quantified difference between LRIC and LRIC+ in its evaluation of the pros and cons of the two alternative cost standards. Incontestably it cannot be correct to base a judgement that LRIC is the right standard to adopt on model outputs of the LRIC to LRIC+ differential that are not necessarily reliable since Ofcom has declined to investigate them since it has already decided that LRIC is the right outcome.

Ofcom must thus be very wary of any evaluations made on the basis of the present LRIC+ output of the model:

- In any quantification of the financial implications of the choice of cost standard; and
- In the glide path/charge control design, by locating the 2015/16 LRIC+ level closer to the exit 14/15 MTR charge that it really is. (We consider this point in section 4 of this document.)

There is thus a need to obtain a better fix on the LRIC+ level, to enable the evaluation of cost standards to be carried out in a proper manner. In other words Ofcom has a duty to consider the reasonableness of the LRIC+ outputs of the model in order to

⁵⁹ As we discuss below, the forecast to forecast increase in data traffic over the prospective charge control period is six-fold

⁶⁰ Vodafone emphasis

properly decide whether LRIC or LRIC is the correct cost standard to apply. It cannot pre-judge the issue and fail to inform itself of the forward looking quantitative difference between the two measures.

We have performed a high level analysis of the model that is documented in Section 3.3 below, and established several grounds for considering that the LRIC+ outputs are in fact too low, and hence the LRIC to LRIC+ differential may be greater than Ofcom suggests⁶¹.

3.3 – The LRIC+ outputs of the model

As we discussed above, Ofcom’s primary focus has been on the production of a LRIC output of the model. It is obvious that the design and modelling imperatives for a LRIC model are different from one that is required for LRIC+. Certain modelling features are relatively insensitive to voice LRIC, and some totally irrelevant, but many of these will have some bearing on the total fixed and common costs of the network and in the way that the costs are recovered across services. Thus, in order to provide confidence on the LRIC+ outputs of the model, a wider range of inputs and parameters needs to be considered than for LRIC.

In the section above we also made reference to the very substantial changes that have occurred between the 2011/12⁶² and the 2014 models, in particular the introduction into the modelling of 4G technology and the very substantial increase in data traffic that arises from and is enabled by this.

We can quantify this forecast to forecast change. Extracting the annual data forecasts from the two versions for the modelled operator, we can see that the anticipated data demand over the proposed charge control period in petabytes has increased six-fold:

Forecast traffic in PB	2015/16	2016/17	2017/18	Total
2011/12 model	41	47	53	141
2014 model	218	283	342	843
Ratio between forecasts	1:5.35	1:6.04	1:6.45	1:5.99

Table 3.1 2011 and 2014 forecasts for 2015/16 to 2017/18

At the same time, the volume of the other modelled services, voice and messaging have declined forecast to forecast. We believe this change in the mix of traffic when modelled without a change in the underlying cost drivers has had an unfortunate adverse and incorrect effect on the modelled distribution of common cost recovery between voice and data in these years. It is necessary therefore to evaluate the cost drivers to see if they are still fit for a LRIC+ purpose in the circumstances of the very

⁶¹ And the positioning of the 2015/16 LRIC+ with respect to the 2014/15 current termination rate is not correct

⁶² I.e. the Ofcom model contained in the 2011 statement and modified by the CC and the CAT under appeal in 2012

much greater traffic volumes, and greater data traffic proportion, than when the drivers were originally designed⁶³.

The clearest symptom of this problem can be seen in the recovery of admin costs, which are in the model at present recovered on a simple mark-up pro rata to volume. The proportion of admin costs that are recovered against voice services is as low as 25% in 2015/16, but by 2017/18 it has fallen even further to 20%. This is not reasonable. The allocation is a proxy for the administrative resources expended service by service on network activities – to suggest that voice attracts only 20-25% of resources, when voice services continue to be the biggest single revenue stream is not appropriate. This allocation method may have been perfectly serviceable in prior market reviews when the relative mix of voice and data traffic was different, but it will no longer serve.

The present method gives far too much weight to data over voice – for example one 2G minute of voice in the model apparently recovers the same sum of admin costs as only 2.4MB of 4G data, despite the massively greater spectral efficiency of the latter. What is needed is some form of driver to recover admin costs rather than the simple mark-up currently applied. Rather than create one from scratch, Vodafone suggests the use of one of the existing drivers already used in workbooks 2 and 4 of the model to allocate costs between services based on resource consumption. As a compromise we suggest the all radio traffic driver, which would appear to reflect a reasonable balance between alternatives. The driver emphasises the focus of the origin of network costs on the RAN rather than the core, but does not fully reflect the RAN allocation of resources between voice and data, by not using the erlangs up-weighting of voice.

It is relatively straightforward to use the all radio traffic driver to allocate the admin costs between services inside workbook 4. This change more reasonably pushes more of the admin cost recovery towards voice services, but obviously has no impact on LRIC.

Model outputs	2015/16	2016/17	2017/18
LRIC+ base case	1.0099	0.9360	0.8553
LRIC+ current outputs	1.0908	1.0261	0.9528
LRIC base case	0.5147	0.4975	0.4764
LRIC current outputs	0.5147	0.4975	0.4764

Table 3.2 Outputs with admin cost recovery adjusted

But this is not the whole of the necessary adjustments on common cost recovery. The significant swing of traffic volumes towards spectrally efficient 4G data means that several of the cost drivers related to the recovery of fixed and common costs deserve further analysis to consider if they are still appropriate to be used.

⁶³ It must be recalled that many of the drivers were originally conceived in a modelling situation where the only data traffic was GPRS on 2G

The most important one of these is the driver that allocates the costs of the cell sites. Cell sites are not provided by network operators for their own sake, but only exist to enable customers to make use of voice and data services on the air interface. Coverage per se is not a service against which costs can be recovered. (Such a calculation has never been attempted in any of the versions of the model, nor would it be correct to attempt to do so.) In a LRIC+ allocation the purpose is to recover all costs against all services, in relation to resource use. It is logical therefore that cell site costs should be recovered pro rata to the resources expended at cell sites in providing that service. It is quite clearly the cell site equipment that is installed at each site, together with the operator's spectrum, that enables the service to be performed.

In the model, it is the routing factor table in the element output sheet of workbook 2 where cost drivers are matched to asset types to control the cost recovery under economic depreciation. Looking at that table, we can see that the cost of 2G cell site equipment is recovered against 2G services through a driver entitled "2G total traffic alloc", that the cost of 3G cell site equipment is recovered through the "3G radio traffic alloc" driver, and that the cost of 4G cell site equipment is recovered through the "4G total traffic" driver. One might logically expect therefore that the cell site costs, which are incurred only when 2G, 3G or 4G equipment is installed at a site, are recovered through a driver that is a composite of the three separate drivers, after allowing for the correct weighting between the three with respect to spectral efficiency. This is not the case in the model as it stands.

Cell site costs are in fact recovered through a driver entitled "all radio traffic", which adjusts for spectral efficiency between the three technologies with respect to data, but does not replicate the voice to data weighting of the 2G and 3G radio drivers. (No similar weighting would appear on first inspection to be required for the 4G radio traffic driver.) There is in the model a driver called the "all traffic alloc", which combines the 2G, 3G and 4G radio drivers with respect to the relevant weighting of data to voice, but this driver fails to weight between the three technologies by reason of spectral efficiency. This is because this driver is employed by Ofcom to control the cost recovery of backhaul links, where the spectral efficiency differences of the three technologies do not directly apply⁶⁴. This particular driver is therefore not suitable for the recovery of cell site costs.

It is straightforward however to build such a driver, using both required weighting elements, voice vs. data, and 2G to 3G to 4G. Respecting Ofcom's terminology, Vodafone has called the driver the "all radio traffic alloc". Its values are:

⁶⁴ Although the point is somewhat debateable, given that the number of backhaul links in a given geotype is in a traffic dimensioned area ultimately determined by the air interface carrying capacity of the cell site

Service	2G	3G	4G
Incoming voice	1.51	2.24	0.96
Outgoing voice	1.57	2.34	1.00
On-net voice	3.08	4.58	1.96
SMS	1.00	1.00	1.00
MMS	0.70	0.33	1.00
Data	0.54	0.29	0.088
Data HSPA	N/A	0.29	N/A

Table 3.3 Values for the all radio traffic alloc driver

This cost driver can then be selected in the routing table for cell sites, instead of the all radio traffic driver. When run as a standalone adjustment, i.e. without the admin cost adjustment above, it gives the following result:

Model outputs	2015/16	2016/17	2017/18
LRIC+ base case	1.0099	0.9360	0.8553
LRIC+ current outputs	1.0859	1.0130	0.9297
LRIC base case	0.5147	0.4975	0.4764
LRIC current outputs	0.5447	0.5275	0.5014

Table 3.4 Outputs with the cell site cost driver corrected

Although this change does not in any way impact the total dimensioned cash outflows of the LRIC solution (a fact that can be established with reference to the linked inputs sheet of workbook 4), it does have an effect on the LRIC output in each year. This we believe occurs as a result of the change that has been made by the corrected driver to the values across time of the network element outputs that are used in the economic depreciation (ED) calculation to recover the total cash outflows of cell site asset types. The change gives a slightly flatter recovery profile over the years.

The next cost driver adjustment necessary is to correct the recovery of the 3G spectrum licence, which is currently recovered in a different manner from the 3G cell site equipment that actually uses this spectrum, in that the voice to data weighting of the cell site equipment is not reflected in the 3G spectrum cost recovery driver. This is illogical – like cell sites, spectrum is only acquired to be used, and is obviously used by mobile traffic. It is necessary therefore to recover its cost in the way in which it is used by that traffic, i.e. reflecting a proper weighting between voice and data resource usage. This gives the following outcome.

Model outputs	2015/16	2016/17	2017/18
LRIC+ base case	1.0099	0.9360	0.8553
LRIC+ current outputs	1.0377	0.9641	0.8822
LRIC base case	0.5147	0.4975	0.4764
LRIC current outputs	0.5147	0.4975	0.4764

Table 3.5 Outputs with the 3G spectrum driver corrected

Here as would be expected, the LRIC recovery is totally unchanged from the base case.

Although it is very minor, for consistency the same adjustment between voice and data also needs to be made for 2G, swapping out the 2G total traffic driver, and substituting the 2G total traffic alloc driver. This has the following effect:

Model outputs	2015/16	2016/17	2017/18
LRIC+ base case	1.0099	0.9360	0.8553
LRIC+ current outputs	1.0177	0.9421	0.8603
LRIC base case	0.5147	0.4975	0.4764
LRIC current outputs	0.5147	0.4975	0.4764

Table 3.6 Outputs with the 2G spectrum driver corrected

These changes can be run collectively. Amending the cell site cost recovery driver to control for the proper weighting between voice and data and between technologies, and similarly amending the 3G and 2G licence cost drivers to also weight resource use between voice and data, when run simultaneously produces the following outputs:

Model outputs	2015/16	2016/17	2017/18
LRIC+ base case	1.0099	0.9360	0.8553
LRIC+ current outputs	1.1216	1.0473	0.9616
LRIC base case	0.5147	0.4975	0.4764
LRIC current outputs	0.5447	0.5275	0.5014

Table 3.7 Outputs with cell site and spectrum drivers corrected

Finally, overlaying this with the adjustment to the admin costs recovery to better reflect the underlying drivers of such cost gives the following:

Model outputs	2015/16	2016/17	2017/18
LRIC+ base case	1.0099	0.9360	0.8553
LRIC+ current outputs	1.2003	1.1361	1.0583
LRIC base case	0.5147	0.4975	0.4764
LRIC current outputs	0.5447	0.5275	0.5014

Table 3.8 Outputs with cell site, spectrum and admin drivers corrected

In summary therefore an improved way to allocate fixed and common costs of the RAN in the face of the very considerable increase volume of data traffic than in previous charge controls, giving a better view of the relative weight of voice and data, results in an increase in the LRIC+ output of the model.

A result of this change is that the LRIC to LRIC+ differential has increased. In 2015/16, from table 3.8 above it can be seen to be 1.20p minus 0.55p, or 0.65p. But this is in 2012/13 prices – after adjusting for 2% annual CPI inflation, the differential in 2015/16 nominal prices is 0.69p. This view of the LRIC to LRIC+ differential is used by Vodafone in section 1.3 above to inform the discussion of the choice of the two cost standards.

3.4 Individual LRIC outputs by technology

Before considering other modelling changes, it is necessary to consider a problem that exists in the reported model outputs, with respect to the individual LRIC costs by technology that the model calculates.

Our issue with the individual outputs by technology is that it is not in practice difficult to get the model to produce an apparently impossible result, that the LRIC of 4G voice termination is greater than the 4G LRIC+. For example changing the 4G data downlift factor in the network workbook from 10 to 1 produces the following bizarre outcome:

Outputs in 2017/18, ppm	2G	3G	4G	Blended
LRIC+	1.080	0.779	0.191	0.766
LRIC	0.600	0.474	0.263	0.474

Table 3.9 base case model outputs by technology, sample output

There would appear to be an inverse mark-up for 4G produced by the model! (We are not for one minute suggesting that this particular adjustment is appropriate – rather that it should be impossible given the subtractational approach of the model for such an inverted outcome to occur at all.) We suspect that this “feature” of the model may possibly have led to Ofcom taking little account of model outcomes where the apparent 4G LRIC becomes very close to or above the apparent 4G LRIC+.

Our evaluation of this issue is separate from any consideration of the appropriate level of weighted average LRIC or LRIC+. The output shown for 4G above of a LRIC greater than LRIC+ must be a logical impossibility. Vodafone's investigation of this suggests that the problem lies in the way that the economic depreciation recovery operates in the subtractive run of the model. Our initial conclusion is that in practice, for LRIC outputs of the model, the individual reported recoveries by technology are not reliable – it is only the blended result that supplies a usable output. But since it is the blended value that Ofcom proposes to use, for any charge control this is not in itself a significant problem unless inferences on the cost per individual technology are attempted from the modelled values.

In the second or incremental run of the model for the purposes of obtaining a LRIC output, the incremental cash flows calculated as arising when termination is calculated as the last increment have been derived by subtraction from the run of the model with all traffic services included. In this second run the economic depreciation module of workbook 4 attempts to recover these incremental costs over time and against the three distinct termination services of 2G, 3G and 4G, using the same basic resource allocation methods i.e. the cost drivers that are employed in the LRIC+ run of the model. We believe that this allocation in the incremental run is not in line with cost causation.

One way to explore this is to decompose the LRIC recovery of 0.4764p in 2017/18 in Ofcom's base case into individual assets for each of 2G, 3G and 4G traffic. These results can then be regrouped back into asset types. This shows that for 2G, the recovery of 0.6023p can be broken down as follows by asset type:

- 29.7% site build – common to all technologies
- 31.7% site equipment – specific to 2G
- 12.4% backhaul – common to all technologies
- 1.7% BSC – specific to 2G
- 23.6% core switching – specific to 2G
- 1.0% core buildings – common to all technologies

Summarising this, 57% of the cost recovery arises from assets that are 2G only, and 43% from those that are common.

The 0.4785p 3G recovery breaks down:

- 32.5% site build – common to all technologies
- 17.0% site equipment – specific to 3G
- 20.9% backhaul – common to all technologies
- 2.1% RNC – specific to 3G
- 26.3% core switching – used by both 2G and 3G
- 1.0% core buildings – common to all technologies

So this represents 45% specific and 55% common asset types.

However the 0.2555p recovery for 4G can be seen as coming from:

- 63.1% site build - common
- 1.8% site equipment - specific
- 16.7% backhaul - common
- 16.2% core switching - specific
- 2.0% core buildings – common

This is then 18% specific and 82% common asset types, a very different mix from the other two.

But what is it that triggers the build and thus the cost of the common asset types, particularly the site build and the backhaul? Largely these common asset types are made necessary by the need to establish technology specific equipment on each incremental site⁶⁵. But from the numbers above the relationship for each technology between the incremental technology specific equipment cost recovery and the incremental common to all technology assets cost recovery is different in the model. So for example, there is rough parity for 2G between the site equipment cost and the site build cost recovery, but for 4G the former is 30 times smaller than the latter, giving the impression that for 4G it is the tail that is wagging the dog in that a small amount of cell site equipment cost apparently leads to a much larger amount of cell site cost.

We see that the problem with this inconsistent outcome lies in the use of the resource allocation methodology that is built into the cost drivers – this means that there is a gap between causation and recovery. The cost recovery methodology is attaching for assets that are common to all technologies, such as incremental cell site build, an equal weight/cost recovery to one minute of 2G, one minute of 3G and one minute of 4G, irrespective of how many incremental sites are actually being caused by 2G incremental voice traffic, how many are caused by 3G incremental traffic, and how many by 4G incremental traffic. This cannot be correct, given that inspection of the model shows that far more incremental sites are being required for 2G and 3G than for 4G.

So, when looking at the 0.4764p blended recovery by asset type, we see that this total in fact breaks down as follows:

- 8.1% is from 2G only asset types
- 13.2% is from 3G only asset types
- 21.4% is from 2G/3G assets (specifically the shared 2G/3G MSCs)
- 1.1% is from 4G only
- 56.2% is from shared assets that are common to all technologies

If one splits the 56.2% common assets on a dependant basis i.e. across the technology specific assets (on an EPMU method), then this would give a split of the total cost recovery of:

- 2G recovery 37.1%
- 3G recovery 60.3%
- 4G recovery 2.6%

⁶⁵ Particularly so in the case of a LRIC rather than a LRIC+ recovery

But taking the total cost by technology reported by the model and weighting these by the traffic proportions of each, based on the blended approach suggested by the model, gives an implied split of:

- 2G recovery 24.9%
- 3G recovery 68.7%
- 4G recovery 6.4%

There is an evident mismatch here, particularly with 4G. This suggests that on a causation basis, the individual LRIC recoveries by technology are not representative – in particular the 4G LRIC is too high, given the relatively small cost of the incremental 4G specific equipment assets that are being considered to be incremental by the model. In simple terms too much of the cost of incremental sites and backhaul made necessary by incremental 2G and 3G sites is being recovered from 4G (and by extension therefore too little by 2G and 3G).

This is not to say that the blended overall recovery is wrong, it is just that the way that it is split down into individual recoveries by technology is not necessarily representative of underlying causality. As far as Vodafone is concerned therefore, inferences drawn from the relationship between LRIC and LRIC+ on an individual technology basis are not meaningful – the only focus should be on the blended output of the model.

What this does suggest however is that the underlying 4G LRIC recovery is rather lower than the value given in the model. This is significant in that it increases the sensitivity of the asymmetric risk issue discussed elsewhere in sections 1.8 and 2.4. If Ofcom inadvertently models a higher proportion of 4G voice traffic than is realistic or achievable for operators in the period of the charge control, then the blended LRIC output by the model will give a result that will be too low, and below the LRIC that can reasonably be expected to be the real LRIC of the average efficient mobile operator⁶⁶.

Since the individual LRICs by technology output by the model are not necessarily reliable, in the rest of this section we generally pay little attention to the costs by technology output by the model, and focus for simplicity on the LRIC and LRIC+ blended outputs over the three years of the charge control. For ease of exposition, each topic is considered for its individual impact on the Ofcom base output of the model, rather than accumulatively.

The table below gives the outputs of the model in the Ofcom base case scenario in this format, with weighted average ppms of LRIC+ and LRIC in each of the proposed charge control years.

⁶⁶ This consideration does not apply to the LRIC+ outputs by technology, since these are generated by a different run of the model.

Ofcom base case	2015/16	2016/17	2017/18
LRIC+	1.0099	0.9360	0.8553
LRIC	0.5147	0.4975	0.4764

Table 3.10 Ofcom base case weighted average outputs by year

This then provides the starting point for our subsequent analysis.

3.5 The average efficient operator – increasing the 4G spectrum quantity in the face of rising data traffic

We have discussed in section 2.2 above the point that the model does not allow for a realistic volume of 4G spectrum appropriate to that which might reasonably be expected to be held by the average efficient operator over the modelling period. The modelled expectation that the initial holding of 30MHz will remain without further supplement between now and 2025/26 is quite simply not appropriate. We do not repeat here in detail the argument already made in section 2.2.

The only way in which it might possibly be appropriate to model the average efficient operator as receiving no additional spectrum after 2013 would be if an assumption were to be made of minimal data traffic growth from 2017/18. But in fact the traffic levels forecast by the model grow very significantly beyond 2017/18 and are not that different from for example those forecast by the 700MHz consultation or by the MDS statement. Ofcom specifically states that the forecast used in the MTR is at a similar level to these:

“A11.159 We have cross checked our data forecasts externally to ensure we are consistent with the direction and approximate magnitudes predicted by third party sources. In particular we have compared our forecasts to those produced by Analysys Mason and Real Wireless.”

“A11.167 This comparison with third party forecasts shows our forecasts are broadly consistent in direction of change, and within a reasonable range of the magnitude of change predicted by external sources.”

But in both these cases such traffic forecasts are coupled with an assumption of a very extensive release of additional spectrum both before 2025 and after that date. However such an assumption is not currently present in the MTR model. This is wrong.

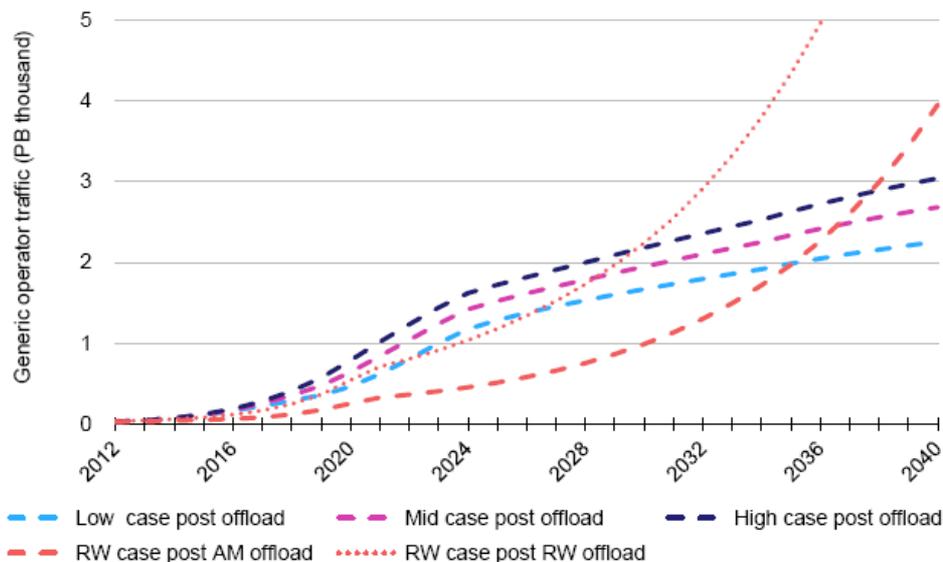
The purpose of the data traffic forecast in the Mobile Data Strategy statement and the 700MHz spectrum consultation is rather different from that of the MTR modelling. In the MDS the outer edge of the range of probabilities is being used by Ofcom to

measure of the risk of a “data crunch” in the future, and to explore the quantity of additional mobile spectrum release that is necessary and practical to avoid the risk of this data crunch. Quite naturally therefore the MDS will need to be informed by the risk of a low probability high data forecast.

For the purposes of MTR modelling, a more central and more probable forecast of data traffic is required. The needs of modelling to derive a regulated termination charge suggest the use of a lower traffic outcome of more certainty, where some account is implicitly taken of the restraint on demand provided by customers’ willingness to pay for increasing mobile data, i.e. for data delivered to mobile devices through the mobile air interface, rather than by any other means. Quite rightly the data forecast in the MTR model does not attempt to grapple with the issue of wi-fi (or other) offload from mobile devices⁶⁷ – but it is obvious that the likely proportion of such offload (and estimates vary considerably) is not independent of the alternative costs of mobile or wi-fi provision.

Looking at the Analysys Mason May 2014 work for the release of 2*30MHz (or possibly 2*40MHz) of spectrum, a variety of alternative traffic forecasts are provided that are consistent with the need for, and an anticipated release of, the 700MHz spectrum plus considerably more additional spectrum:

Figure 3.6: Modelled traffic forecasts, post offload²⁰ [Source: Analysys Mason, 2014]



Converting the Ofcom MTR forecasts to a similar basis, the Ofcom base case of a medium data forecast gives by Vodafone’s calculation 914PB in 2025/26, which is right in the middle of the forecast range of figure 3.6 above. Switching all the traffic sensitivities to “high” in the scenario sheet of workbook 0 gives 1,402PB in 2025/26 – a value which is up in the upper bands of the Analysys Mason forecasts. The “Low” setting on all traffic sensitivities gives 664PB, which in fact does not look all that low in comparison with the chart above.

⁶⁷ Its forecasts are thus implicitly of data demand after such offload

Certainly the low setting is far too high to be considered to be appropriate for a no extra spectrum scenario. With respect to the positioning of the medium scenario on the chart above, whilst we understand Ofcom's point that it is below the upper edge of possible data volume forecasts, it is in reality not that far away from them. This appears to be excessive for a central MTR forecast, and it may be worth dialling back somewhat by Ofcom. We do not attempt it here, but consider this to be a matter worthy of more detailed review by Ofcom.

Additional 4G spectrum for the MTR model

We have concluded that the model needs some more 4G spectrum to be consistent with its forecast of an average efficient 4G operator. Vodafone is not suggesting that Ofcom forecasts a very large quantity of additional spectrum – we consider that 2*10MHz is the minimum necessary increment to assume, but any more than this would not appear to be indicated by the present version of the model. Given the somewhat complex way that spectrum is modelled, for simplicity we have merely added an extra 2*10MHz of 800MHz into the “allocated MHz” table on the scenario sheet of workbook 2⁶⁸. A more formal modelling adjustment would probably drop the additional spectrum into 2019 or so, given the range of dates of future mobile spectrum availability across different bands that Ofcom is working with.

This additional spectrum has an impact on the model as follows:

Model outputs	2015/16	2016/17	2017/18
LRIC+ base case	1.0099	0.9360	0.8553
LRIC+ current outputs	1.0068	0.9331	0.8525
LRIC base case	0.5147	0.4975	0.4764
LRIC current outputs	0.5565	0.5400	0.5178

Table 3.11 Outputs with additional 10MHz of 4G spectrum

Traffic growth

We have discussed in section 2.4 the issue of the profile of 4G growth in the first few years after launch, up to 2017/18. We will not repeat the argument here of the importance of reflecting the growth profile of the average efficient operator rather than of the one (EE) that the other operators cannot emulate, particularly because of the risk that this might give a LRIC in the model that is below that which the other operators could expect to be able to match. We have not attempted to adjust for this in the model since we do not have Ofcom's overall view of operator forecasts that is necessary, but it is a point that we believe Ofcom needs to properly address.

⁶⁸ This simplified approach means that the resulting LRIC+ output may not be quite correct, but since spectrum cost is not recovered in Ofcom's LRIC calculation, should have no bearing on the LRIC output

The only other observation we have at present on the data traffic volumes is that Ofcom's forecast is very linear, and shows no sign of flattening off, unlike the more S-shaped curves of figure 3.6 of the Analysys Mason study above. We show the growth of the model's base case in the chart below:

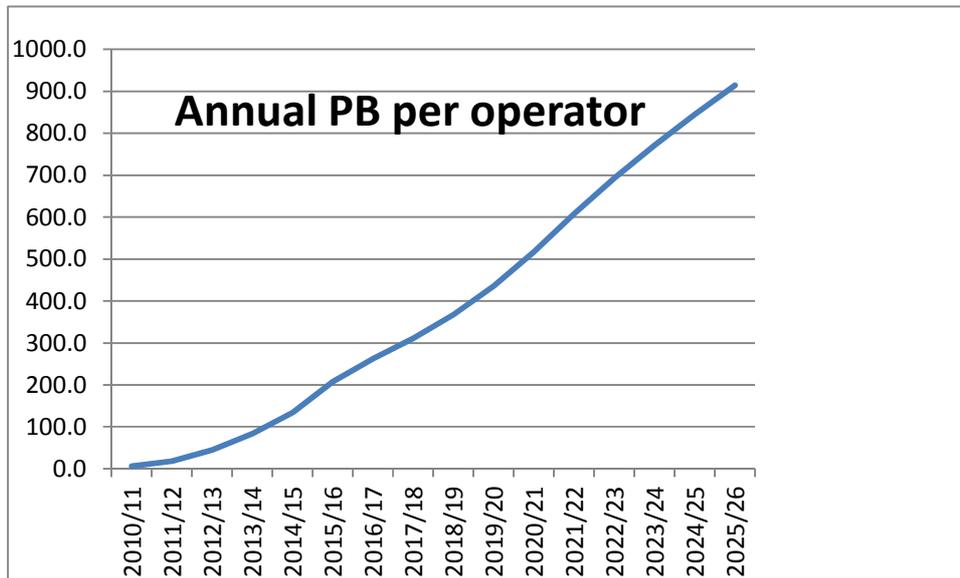


Chart 3.1 Base model data traffic growth

Obviously the point at which the data demand may start to flatten off, as penetration of active 4G users stabilises, is unknown – it may or may not be before 2025. But we can see from Ofcom's forecasts that whilst 4G smartphone penetration appears to flatten off somewhat from 2021/22, the data usage per device keeps on growing from that point, and even accelerates slightly. This is not necessarily the most likely outcome of a flattening of device growth, given the probable lower use levels of later rather than earlier adopters. A growth profile that starts to flatten off beyond 2020/21 is also more consistent with the model's assumption of zero traffic change after 2025.

Vodafone has built a more S-shaped growth rate for data that still converges on the same absolute level in 2025/26. We have achieved this by modifying the 4G handset per user growth so that it is less linear. This produces the following more flattened result, that may very well be more representative of a 4G smartphone penetration stabilisation, in the circumstances of the overall medium data growth scenario.

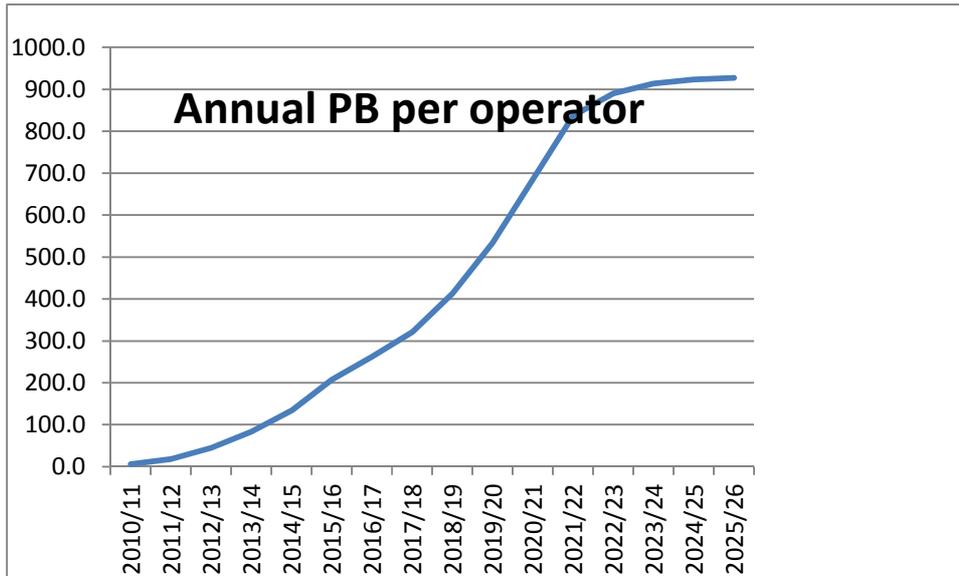


Chart 3.2 Model with data traffic growth in S-shape profile

This profile gives the following result when modelled with 10MHz additional spectrum for 4G.

Model outputs	2015/16	2016/17	2017/18
LRIC+ base case	1.0099	0.9360	0.8553
LRIC+ current outputs	1.0026	0.9285	0.8468
LRIC base case	0.5147	0.4975	0.4764
LRIC current outputs	0.5676	0.5524	0.5296

Table 3.12 – Outputs with S-shaped data growth with 10MHz extra 4G spectrum

We believe that these two adjustments should be incorporated into the model.

3.6 The average efficient operator – changing the 2G spectrum band adopted

We have discussed in section 2.3 above the point that the average efficient operator with 2G has 900MHz as its primary frequency, rather than 1800MHz. This therefore needs to be reflected in the model. It is relatively straightforward to swap this in, since Ofcom previously (up to 2007) modelled 900MHz operators in parallel to 1800MHz, back when there were two of each operator type. The adjustment is not a single one - there are several components of it:

- Change coverage radii;
- Change spectrum quantity;
- Change spectrum cost;
- Revise the calibration;

We go through each of these in turn.

Coverage radii

The coverage radii per geotype in the model are currently set for 1800MHz. The different values of coverage radii necessary for 900MHz, however are readily available from Ofcom's 2007 MTR model:

- Urban 1.9km
- Suburban 1 & 2 3.3km
- Rural 1 4.8km
- Rural 2 5.2km
- Rural 3 6.4km
- Rural 4 10.0km
- Highways 6.4km
- Railways 5.2km

The 1800MHz radius assumption also features a subsequent drop in cell site radius, an adjustment that Vodafone continues to believe to have no place in the model, since any such adjustment that subsequently increases the number of sites in a geotype after the initial coverage deployment should be modelled in a LRIC model as a traffic related item, not as a non-traffic related one. In any event the adjustment is 1800MHz specific. It is easily reversed.

The combined effect of these two adjustments is in the first place to reduce the LRIC+ of the model, whilst increasing the LRIC, as would be expected from the increasing proportion of sites in traffic dimensioned areas that are traffic related rather than coverage related:

Model outputs	2015/16	2016/17	2017/18
LRIC+ base case	1.0099	0.9360	0.8553
LRIC+ current outputs	0.9814	0.9156	0.8393
LRIC base case	0.5147	0.4975	0.4764
LRIC current outputs	0.5629	0.5465	0.5221

Table 3.13 900MHz for 2G radii, no subsequent reduction

Spectrum quantity and cost

But this is not correct yet, since the model still assumes a starting position of 30MHz of spectrum, when in reality the two 900/1800MHz operators have 23.2MHz of paired spectrum, with the bulk of this at 900MHz. We need to substitute the alternative volume of spectrum, and at the same time, ensure that the spectrum holding does not fall by 10MHz in 2012/13, whilst still leaving the 4G holding of the operator at 30MHz. The current version of the model assumes that the average efficient operator transfers

10MHz of 1800MHz to 4G use, but this is obviously not actually possible in the case of 900MHz spectrum – such an operator can be assumed however to have added the additional 4G spectrum via the 2013 auction. This change has the following result:

Model outputs	2015/16	2016/17	2017/18
LRIC+ base case	1.0099	0.9360	0.8553
LRIC+ current outputs	0.9964	0.9277	0.8494
LRIC base case	0.5147	0.4975	0.4764
LRIC current outputs	0.5695	0.5528	0.5282

Table 3.14 900MHz radii and spectrum quantity

This change makes little practical difference, other than a small fall in LRIC+, since this has in fact reduced the spectrum cost, incorrectly (since it is still using 1800MHz AIP/ALF spectrum prices per MHz). The next adjustment is then to reflect the higher unit licence fees of the 900/1800MHz spectrum mix per MHz compared to the 1800MHz only cost. We have used for spectrum prices the values from the October 2013 ALF consultation without revision, weighted for the 900/1800MHz mix of spectrum. Obviously in due course this will need to be adjusted for the final ALF statement outputs.

Model outputs	2015/16	2016/17	2017/18
LRIC+ base case	1.0099	0.9360	0.8553
LRIC+ current outputs	1.0427	0.9648	0.8801
LRIC base case	0.5147	0.4975	0.4764
LRIC current outputs	0.5695	0.5528	0.5282

Table 3.15 900MHz radii, spectrum quantity and cost

The spectrum costs of an operator with 17.4MHz of 900MHz and 5.8MHz of 1800MHz are 16% more than those of an operator with 30MHz of 1800MHz, so a higher LRIC+ is to be expected.

Calibration

However, as a result of the change to the cell site radii for coverage sites, the model is currently building less 2G cell site fixed assets than under the 1800MHz version, which has been calibrated to the average operator historically. It is easiest to see this through a comparison with the modelled operator GBV between the base version and the current output:

GBV	2010 £m	2011 £m	2012 £m	2013 £m
Base version	4,567.4	4,839.9	5,135.9	5,596.8
Current output	4,379.8	4,639.0	4,990.2	5,467.9

Table 3.16 Comparative GBVs

In order to restore this calibration, we need to very slightly increase the 2G cell site asset build in the model. The simplest way to achieve this is by means of a utilization adjustment on 2G cell site equipment, reducing the 2G cell site equipment design utilisation factor from 80% to 75%. This change brings the GBV calculation back into much closer alignment with the original version:

GBV	2010 £m	2011 £m	2012 £m	2013 £m
Base version	4,567.4	4,839.9	5,135.9	5,596.8
Current output	4,443.3	4,623.0	5,103.3	5,645.0

Table 3.17 GBVs after calibration adjustment

The impact of this final 2G 900MHz adjustment on the model outputs is as follows:

Model outputs	2015/16	2016/17	2017/18
LRIC+ base case	1.0099	0.9360	0.8553
LRIC+ current outputs	1.0494	0.9706	0.8852
LRIC base case	0.5147	0.4975	0.4764
LRIC current outputs	0.5937	0.5773	0.5519

Table 3.18 Model outputs 2G 900MHz adjustment complete

This patently demonstrates that the LRIC of the 900MHz operator is of the order of 15% above that of the 1800MHz operator in 2017/18 and all other periods of the charge control, and thus for the reasons discussed in section 2.3 above, it would be entirely wrong to allow a LRIC to be set based on the lower, outlier value of the one operator, exposing the other two operators to a LRIC below any level that they could be expected to achieve. It is entirely reasonable and appropriate therefore that the modelled average efficient operator be assumed to be one operating 2G with 900/1800MHz spectrum.

3.7 – Voice traffic by technology

Vodafone has examined the split of voice traffic per technology that emerges from the model, and compared it with the 2011/12 version⁶⁹. It would appear to show a lower 2G traffic proportion than the 2011/12 model version, not only in the historic period, but also in the future, where the model now shows 2G traffic volumes as a proportion of the total traffic dropping off much more quickly than before. We see no reason why this might be correct.



We see that there are likely to be several possible explanations for this difference:

- The traffic forecast by technology that is produced by the model is not an independent forecast per se, but is a product first of customer handset device adoption and usage per customer forecasts. But then also a subsequent traffic fall-back adjustment is applied. This fall-back adjustment has been preserved unaltered and apparently unexamined from the previous forecast and the impact of it on the final traffic mix may therefore have not been fully validated against the traffic mix data supplied by the operators.
- In the alternative, the termination traffic mix output by the model may have been compared against that submitted by the operators, but in doing so, the actual operator average traffic mix may have been computed using H3G's traffic mix as well as the others. Since obviously H3G has no 2G network, then such an average would underreport the 2G traffic proportion for an average 2G/3G/4G operator, as we discussed in more detail in section 2.4 above.

Irrespective of whether either explanation is the correct one, we believe the 2014 model is understating the 2G traffic mix for voice traffic. The culprit would appear to be the traffic fall-back adjustment entitled “3G traffic pushback factor” that resides on the

⁶⁹ From the output sheet of the traffic workbook

parameters sheet of workbook 0. This factor, that passes traffic on 2G/3G capable handsets to 2G rather than 3G, is held at a constant for most of the historical period, but then starts falling away rapidly from Q1 of 2010/11 so that by Q4 of 2012/13 it has halved in value.

Vodafone suggested in our 2011 appeal that this adjustment, which at the time was forward looking, was declining too rapidly and suggested a slower rate of reduction⁷⁰. We do not repeat the detail of the argument here. This matter was debated in front of the CC. The argument boiled down to a judgement on future forecast outcomes, which the CC decided at the time in favour of Ofcom's modelling assumption.

“As with most modelling assumptions, setting the value of this parameter involves making future-looking judgements. Vodafone's alternative position is based on the opinion of Mr Roche and it provides no substantive evidence on which to reject the 2011 cost model voice migration rate from 2G to 3G”.

But from the viewpoint of 2014 some of this adjustment is now historic, rather than totally forward looking, and we believe it is appropriate to examine it anew. It seems very clear that the adjustment, when coupled with the other forecasts of customer handset adoption etc. is biting too steeply in the historic period, and giving too low a proportion of 2G voice traffic both in the past and in the future.

We believe therefore that it is correct to change the size of this adjustment to slow down the rate of decline of 2G traffic, not only in the historic period, but also in the future.

We suggest the following, as shown in chart 3.3 below. We believe it gives a more reasonable view of the historic and prospective mix of voice traffic for the average efficient operator. We should point out that it is significantly less different from the Ofcom version than Vodafone's 2011 suggestion.

⁷⁰ Roche Witness statement 1 from paragraph 3.85, Roche Witness Statement 2 from paragraph 7.112, supported by 3<

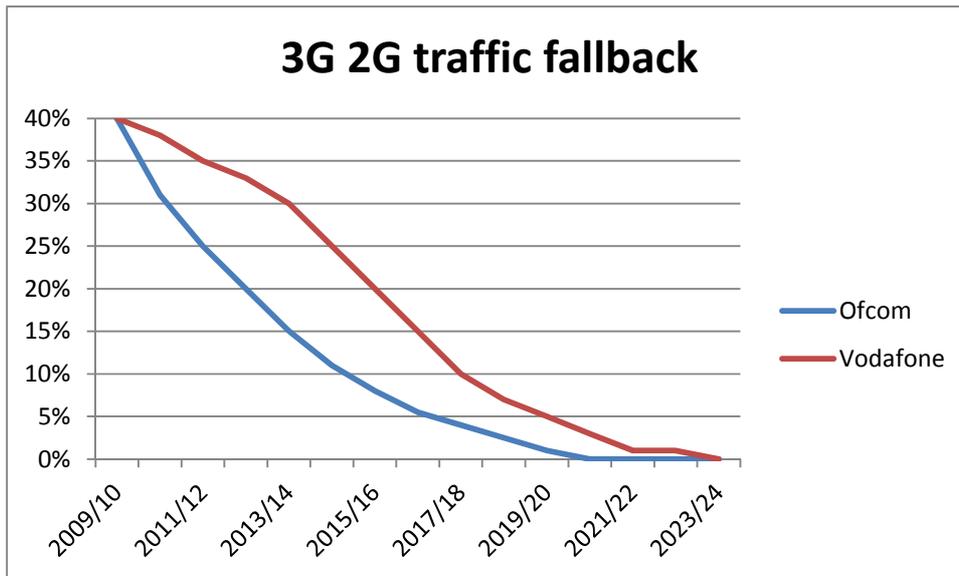


Chart 3.3 Traffic fall-back adjustments

When implemented, this adjustment somewhat increases the historic proportion of 2G traffic, as table 3.20 shows:

	2010/11 Q2	2010/11 Q3	2010/11 Q4	2011/12 Q1	2011/12 Q2	2011/12 Q3
Base case 2G %	76.9%	74.5%	72.0%	69.9%	67.8%	65.6%
Modelled 2G %	78.2%	76.5%	74.8%	73.2%	71.6%	69.9%

Table 3.20 Adjusted 2G traffic proportions

The modelled outcome with respect to LRIC and LRIC+ provided by this adjustment is shown in the table below:

Model outputs	2015/16	2016/17	2017/18
LRIC+ base case	1.0099	0.9360	0.8553
LRIC+ current outputs	1.0581	0.9812	0.8929
LRIC base case	0.5147	0.4975	0.4764
LRIC current outputs	0.5480	0.5292	0.5086

Table 3.21 Model with adjusted 2G traffic proportions

Vodafone believes this adjustment needs to be adopted in order for the model to be more properly representative of the average efficient 2G/3G/4G operator.

3.8 Summary of changes to the model

Vodafone has not as yet fully reviewed several significant features of the model that are new introductions to the 2014 version, or significant changes in value, such as S-RAN, the core network, or the level of WACC. If as time allows we uncover elements of these or other matters that are worth bringing to Ofcom's attention, we will obviously do so in the future.

We have briefly looked at the negative assets (or more properly the negative cash flows in a given year) that are relatively frequently generated by the LRIC model. We are concerned that there are significantly more negative assets than in 2011 and are not yet convinced that all of the negative investments that are output by the incremental run of the model are correct. (For some assets there is the situation that all the incremental cash flows are negative.) We also note with surprise that what we called in 2011 the year 0 adjustment⁷¹ has yet to be addressed, even though the fix is straightforward.⁷² We consider that these negative assets need further scrutiny by Ofcom to ensure that it is confident they are all reasonable – otherwise the suggestion will remain that the LRIC may be too low.

We do not see that Ofcom's sensitivity analysis is at present representative – its range of sensitivities are not as broad as possible, some of the on/off alternatives are not real modelling choices⁷³, and it focuses exclusively on scrutiny of the 2017/18 outputs, which is inconsistent with Ofcom's provisional decision that the path of the charge control should involve an immediate drop to LRIC in 2015/16. We return to the last point in section 4 below.

Our overall assessment of the present version of the model is that it is insufficiently conservative with respect to the asymmetric risk of too low a LRIC, and it is likely that the split of fixed and common costs recovery between voice and data is weighted too far towards data than voice, and as a result the LRIC+ of the model is too low.

We have discussed in section 3.5 above that the high traffic scenario, whilst suitable for use in the Mobile Data Strategy to consider the risk of a low probability event and how to avoid the resulting data crunch with the provision of a large volume of additional spectrum is not suitable for the level of certainty required for a cost modelling exercise where the objective is to derive an output suitable for a regulated charge control, particularly where there is a need for conservatism given the asymmetric risk of too low a LRIC output. We consider that the current medium traffic forecast to be a little on the high side, and that a more reasonable conservative medium traffic forecast would lie between the existing low and medium forecasts. We have not at this stage sought to formally adjust this in the model in the quantitative analysis presented in the document, but we do consider that such an adjustment would be reasonable for the modelling of the average efficient operator with 10MHz of additional 4G spectrum.

⁷¹ Where the LRIC version of the model builds equipment and then removes it in the year immediately following

⁷² Roche Witness statement 2, paragraph 7.133

⁷³ For example include/exclude 4G, VoLTE, S-RAN, infrastructure sharing

We also have not attempted the adjustment of the average efficient operator that we discussed in 2.4. Since EE was uniquely allowed to launch 4G early by a combination of its particular spectrum holding arising from its origin, and through regulatory permission, and no other operator could follow EE, Ofcom needs to ensure in modelling the average efficient operator that it strips out any reference to values and timings obtained from EE's 4G deployment and the associated transfer of traffic from 2G and 3G to 4G in the period up to 2017/18. We have not attempted this adjustment since we do not have access to the necessary confidential operator data, but we expect Ofcom to confirm that by the time of the final statement it has done so – otherwise there is a very significant risk that the modelled LRIC will have been set below the level of the LRIC that operators can be expected to achieve.

We have thus restricted our formally quantified adjustments in this modelling analysis to a subset of those that need to be addressed. The ones we have quantified are:

- Adjustments to the allocations of fixed and common costs to give a more reasonable allocation of such costs between voice and data;
- Giving the average efficient operator a little more 4G spectrum, and flattening off somewhat the projected path of data traffic growth;
- Changing the average efficient operator's 2G spectrum to 900/1800MHz, to avoid inadvertently setting a LRIC that is below the LRIC that operators can be reasonably be expected to achieve.
- Retarding the decline of 2G traffic, to a more realistic expectation for the average efficient operator.

When these adjustments are run together in the model, the following results are obtained by Vodafone.

Model outputs	2015/16	2016/17	2017/18
LRIC+ base case	1.0099	0.9360	0.8553
LRIC+ current outputs	1.2973	1.2247	1.1324
LRIC base case	0.5147	0.4975	0.4764
LRIC current outputs	0.8032	0.7874	0.7556

Table 3.22 Output with all Vodafone's quantified adjustments

We note that the increase to LRIC in this version is a little greater than the sum of its individual components – not unexpectedly there is some degree of synergy between the adjustments.

A final observation is that although the modelled LRIC+ and the LRIC have both increased as a result of these changes, the gap between them has somewhat

narrowed from that which existed after Vodafone's LRIC+ cost driver adjustments in section 3.3. In table 3.22 above, in 2015/16 the difference between LRIC+ and LRIC is 1.30p minus 0.80p or 0.50p. This in nominal terms is 0.53p. This value is used by Vodafone in section 1 above to set the lower bound of the likely size of the LRIC to LRIC+ differential.

Section 4 – design of the charge control

This section considers Ofcom's view on the design and application of the charge control, particularly in relation to the proposed profile of MTRs over the charge control period, and to the extension of other charge control obligations to all MCPs. We show below in section 4.1 that the Ofcom's provisional view of proposed immediate cut to LRIC in 2015/16 is not reasonable. We also discuss in section 4.2 that we support the inclusion of all mobile operators inside the scope of the charge control obligation but believe that Ofcom should have extended all four SMP conditions to all operators.

4.1 – The profile of MTRs over the charge control period – P0 vs. glidepath

Ofcom's argument on the profile of MTRs over the charge control period is not fully considered, and takes a very different line from that which it has adopted in other charge controls. As we discuss below, a glidepath to the level of cost modelled for the last year of the charge control period has been, and remains, Ofcom's default position.

Ofcom considers in the case of MTRs that:

“the practical regulatory objectives to balance were as follows:

- *reductions should be achieved sufficiently quickly in order to deliver substantial benefits to consumers; and*
- *reductions should allow sufficient time for operators and consumers to adjust to new levels and, in the case of consumers, potentially structures of mobile prices.”⁷⁴*

Ofcom has surprisingly concluded in the present consultation that an immediate adjustment to LRIC in the first year of the charge control is necessary.

We believe that this is wrong – a full evaluation of these objectives should, if LRIC is deemed to be the appropriate cost standard, result in a decision in favour of a simple straight line glidepath to the 2017/18 model outputs and not an immediate P0 adjustment to the LRIC 2015/16 model outputs⁷⁵.

We accept that as Ofcom suggests in 8.77 and 8.78 of this consultation an immediate upwards correction would be necessary if it were to find that the wholesale rate charged were to be below LRIC. (We discuss this asymmetric risk and the consequent necessity for conservative assumptions elsewhere in this consultation.)

But most importantly in 2014/15, the facts are very different from in 2010/11. At the present time, mobile wholesale voice termination rates are already regulated at the LRIC rate that was output by the previous MTR model from 2011/12. In effect therefore this prospective charge control (providing Ofcom continues to remain with LRIC) is no more than “business as usual”, refreshing the outputs of the model, rather

⁷⁴ Consultation at paragraph 8.64

⁷⁵ Clearly if Ofcom were to adopt the LRIC+ cost standard, then the facts might be different since the current 2014/15 rate sits below the 2015/16 LRIC+

than any form of radical shift. All that we see happening in the proposed charge control, providing Ofcom decides that it will continue with LRIC as the underlying cost standard is that the model is being refreshed with updated information.

Quite clearly therefore mobile wholesale voice termination regulation is already making use of the EU Recommended methodology and Ofcom is at the moment not suggesting that there is a need to move away from the cost standard that is currently being applied.

It is also necessary to note that Ofcom's view of the decision between LRIC and LRIC+ is a finely judged one – in effect in section 6 of the consultation Ofcom has simply concluded that there are not currently any pressing reasons for making a change back from LRIC to LRIC+, rather than there is a very strong imperative to apply LRIC rather than LRIC+.

Furthermore, the observed differences between the LRIC and LRIC+ outputs of the old and new models are much smaller than in 2011. Also, the rate currently charged in 2014/15 is *between* the LRIC and LRIC+ model outputs of 2015/16 and the other years of the future charge control even on Ofcom's current provisional outputs, rather than being some considerable way above both of them, as was the case at the beginning of the previous charge control, where a two year glidepath was imposed.

If there is little to choose as a matter of principle between the alternative standards, then Ofcom should not see the need for any urgent remedial action in circumstances where the existing rate is already sitting between the LRIC and LRIC+ outputs of the new model. We are not at all saying that having made a choice between LRIC and LRIC+, Ofcom should be content with permanently leaving the charge control placed somewhere between the two⁷⁶, but rather any urgency for an immediate change is removed and if or when Ofcom confirms its mild preference for LRIC, then a progressive glidepath to LRIC at the end of the charge control period should be adopted in the charge control design.

Legal analysis of the evaluation of the alternative paths of the charge control

In the context of any decision as to the implementation of any new cost-based termination rate that is derived from Ofcom's modelling exercise (irrespective of the methodology ultimately selected), Ofcom's past regulatory practice has correctly been to consider the effects of moving immediately to the new cost-based output derived from the relevant methodology and to assess the impact of doing so in terms of reduced profitability and (consequently) investment and the rebalancing of tariffs.

Vodafone would endorse that approach, and would also endorse Ofcom's recognition that the EC Recommendation on termination rates does not provide for any particular axiomatic approach in regard to the use of a glidepath to phase in a LRIC based

⁷⁶ Although there are arguments that have been previously made by Ofcom that some degree of fixed and common cost recovery on termination may in practice be the most efficient outcome, as we discuss in section 1.2 above

termination rate. As a matter of law, the Recommendation could not oblige Ofcom to adopt such a course of action if that course of action were to place it in breach of its primary Community law duties to promote the interests of competition and consumers.

Indeed, we would highlight that the Competition Commission recognised previously in 2012 that Ofcom's past practice in regard to phasing in the new cost-based termination rate was sufficiently previously well-entrenched so as to create an expectation on the part of mobile operators about the adoption of a glidepath prospectively. The CC's focus in was not on the use of a glidepath in principle, but its duration (causing it ultimately to reduce the length of the glidepath only by a year in its final determination).

We therefore welcome Ofcom's decision recognising that it must undertake such an assessment when determining how to implement a new charge control. However, having previously established a clear precedent in previous charge controls that there was need to enable mobile operators to adjust to an industry-wide cost shock in the form of a reduction in mobile termination rates, Ofcom must provide a credible justification for any departure from that previous position. Ofcom itself appears to endorse such an approach, most notably when it imposed equivalent fixed line access charge controls where it found that: (i) glidepaths were an important factor in enabling stability; and (ii) there would need to be compelling reasons for any decision to abandon a phasing-in approach:

3.143 The glide path approach approximates more closely than one-off adjustments the workings of a competitive market in which excess profits tend to be gradually eroded as rivals improve their own efficiency. It avoids discontinuities in prices over time and leads to a more stable and predictable background against which investment and other decisions may be taken, by both suppliers and customers, in the telecoms market.

3.144 The main benefit of this approach is that it has greater incentives for efficiency improvement as it allows the firm to retain the benefits of cost reductions made under a previous charge control for longer. One-off adjustments to prices would reduce the effective regulatory lag, and hence the incentives to reduce costs.

3.145 Whilst the above discussions relate to one-off cuts to prices, one-off increases would similarly raise concerns about incentives for efficiency. [...]

3.146 While the above suggests a general preference for the glide path approach in the context of price cap regulation, this does not mean we should rule out one-off adjustments in prices where there are good reasons to introduce them. We might make one-off changes if there are strong allocative efficiency or competition arguments for bringing prices into line with cost before the end of the control period. However, in assessing possible one-off adjustments, we would need to balance this against alternative (and potentially more proportionate) regulatory approaches.⁷⁷ [Emphasis added by Vodafone]

⁷⁷ WLR/LLU Charge Control Consultation, July 2013 at paragraphs 3.143 to 3.146

In this case, Ofcom has simply failed to meet the tests that it set out for itself in the fixed access charge control consultation; in this case, Ofcom provisionally concludes that it intends not to phase in any new charge control on the basis of little more than assertion. It confidently claims that the impact on network investment plans (and indirectly consumer welfare) will be limited given the amount of lost revenues (as against a counterfactual of a glidepath); yet it neglects to take into account or investigate the fact that all mobile operators face significant constraints on investment in a mobile market that Ofcom has previously found in its 2011 mobile call termination statement to have the lowest EBITDA margins of leading industrialised nations. Ofcom's analysis is also conspicuous for the absence of any analysis of the actual contribution that might be made to network investment (in the form of expanded coverage or enhanced network quality) by the lost interconnect revenues from a decision to abandon the glidepath; in other words Ofcom must investigate properly and assess whether and how consumer welfare may be improved in a counterfactual where the use of the glidepath may facilitate enhanced network investment before it reaches any firm views on this matter. Nor does Ofcom appear to consider the extent to which it is possible for mobile operators in fact to recoup lost revenues where Ofcom's regulatory regime governing increases in charges on the retail access and call origination market makes that prospect increasingly remote.

We have demonstrated at some length in this consultation response that the supposed competition benefit from one cost standard over another (or between higher and lower termination rates) is weak and lacks compelling empirical support. Thus, forcing mobile operators to adjust to implement the new cost-based termination rate in year 1 of any charge control period will not generate any meaningful competition benefit. Ofcom therefore has no credible competition grounds that would justify a decision not to adopt a glidepath. By Ofcom's own admission, the allocative efficiency analysis is inconclusive when considering the merits of the pure LRIC cost standard over the LRIC+ standard. Using Ofcom's own terminology, there are no 'strong allocative efficiency or competition grounds' for bringing termination in line with actual cost immediately.

The central question that Ofcom must therefore grapple with and address fully is whether it is appropriate to abandon the well-established practice of phasing in a new cost-based termination rate in circumstances, where: (i) there are no demonstrable risks to competition or consumers in Ofcom's own analysis from setting a rate that may be marginally above a cost-based termination rate for a finite period of time; and (ii) Ofcom has not investigated sufficiently the extent to which consumer welfare will in fact be adversely affected. This is what Ofcom has failed to do to date; until it is able to provide a robust evidence-based case for departing from its established practice, mobile operators are entitled to proceed on the basis that Ofcom's previous practice will prevail; any decision to eliminate the glidepath thus contravenes Ofcom's wider duty to operate in a consistent way that promotes consistency and legal certainty. That legal certainty is central to the ability to infrastructure operators to plan and invest in a way that operates to the benefit of consumers.

As things stand, Ofcom appears set to abandon the very principles it has previously espoused for reasons that are wholly opaque and which it has made no attempt to justify.

Difference between 2014/15 MTR and prospective future MTRs

It is worth first examining where the current 2014/15 mobile termination rate sits against the prospective rates of the first year of the new charge control. The present MTR, i.e. the 2014/15 “exit rate” is 0.845p in 2014/15 terms. As discussed in section 1 above the Ofcom base case of the model gives, in nominal terms a LRIC+ of 1.072p and a LRIC of 0.545p in 2015/16. Very clearly therefore the 2014/15 exit rate sits inside the range of the LRIC and LRIC+ alternatives, as the chart below shows – the top of the red bar marks the level of the 2014/15 MTR.

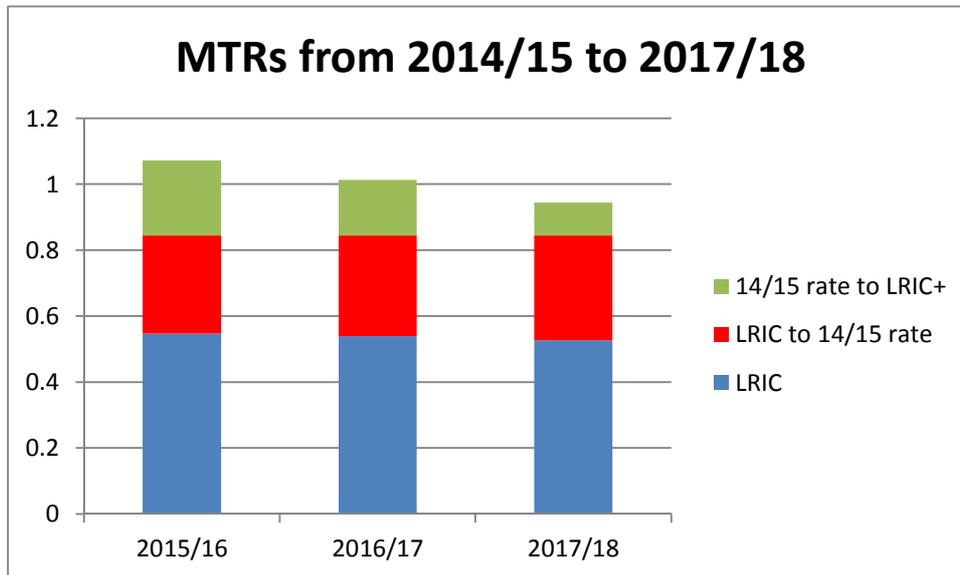


Chart 4.1 Future path of MTR under LRIC or LRIC+

Ofcom’s choice is thus between a small increase to LRIC+ (green) or a small reduction to LRIC (red). This is totally different from the position that existed in 2011. Then the 2010/11 exit rate of 4.43p, or 4.18p in 2008/09 prices⁷⁸ was some way above the LRIC+ of 2011/12 of 1.84p⁷⁹, which in turn was some way above the LRIC of 2011/12 of 0.68p⁸⁰.

The modelling adjustments that Vodafone has made in section 3 do not change this overall picture. However they do move the relative position of the 2014/15 exit rate inside the LRIC and LRIC+ range of 2015/16 values. In the initial Ofcom view of the

⁷⁸ Per Ofcom’s Statement – the H3G rate was slightly higher at 4.48p

⁷⁹ Or 1.95p in nominal terms

⁸⁰ Or 0.72p in nominal terms

model outputs the 2014/15 exit rate is rather closer to LRIC+ than LRIC, as Chart 4.1 shows.

But once proper attention is paid to the LRIC+ outputs of the model, and an improved view of the allocation of fixed and common costs between voice and data is made as in section 3.3 above, the LRIC+ is raised, so the 2014/15 exit rate can be seen to be below the mid-point between LRIC and LRIC+. When Vodafone's full set of model corrections in section 3 are applied as per table 3.22 above, the 2015/16 LRIC becomes almost identical to the 2014/15 exit rate. The chart below illustrates these three outcomes.

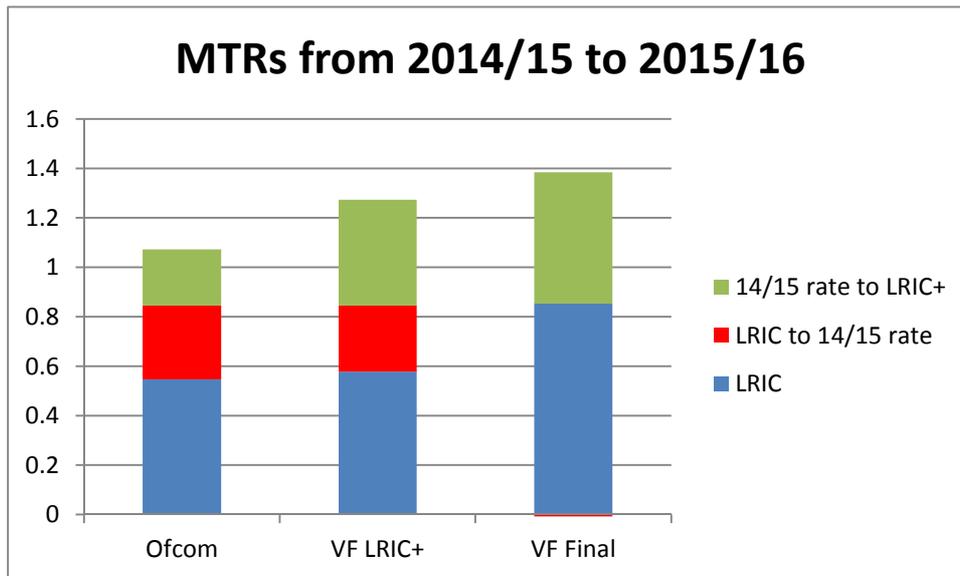


Chart 4.2 Alternative future paths of MTR under LRIC or LRIC+

Therefore depending on the particular model outputs adopted, the 2014/15 exit rate is either not far above or equal to the commencement 2015/16 LRIC rate, and very comfortably below the level of LRIC+. As we have noted, this is a very different set of facts from the transition at the beginning of the current charge control period in 2011/12.

Furthermore Ofcom's decision not to look too closely at the level of LRIC+ that is output by the model may have led it into an incorrect estimation of the relative position of the 2014/15 exit rate inside the LRIC to LRIC+ range, and hence for any need for urgent charge control adjustment.

The 2014/15 exit rate is nearer to the LRIC floor than Ofcom thinks – but also since Ofcom cannot be certain that their level of the floor is right, given the obvious uncertainties around the timing of the transition between and the deployment of the three mobile technologies, Ofcom needs to be cautious in pushing both the calculation of LRIC and the charge control down too low too quickly, given the asymmetric risk issue that is discussed elsewhere. We reiterate the point made elsewhere, that with LRIC Ofcom has no room for error. Ofcom therefore needs to take a conservative approach to glidepath design in the current context.

Consequence of an immediate change

Irrespective of the actual levels of LRIC and LRIC+ that are contemplated in the charge control, Ofcom's view on timing quoted above is that there should be a balance so that reductions in mobile termination rates arrive sufficiently quickly to deliver substantial benefits to consumers whilst allowing operators and consumers to adjust to new levels and new structures of mobile prices. We do not see that in reality an immediate cut would achieve such a balance.

As we have discussed in section 1.5 above, the immediate impact of a reduction in mobile termination rates will be:

- there will be a reduction of mobile revenue – by the amount of the reduction multiplied by the total volume of mobile termination traffic;
- based on the distribution of mobile to mobile traffic between mobile operators, there may be some transfers of net value between mobile operators – there may also be changes in profitability of customers by segment, where their inbound/outbound calling patterns differ;
- there will be a transfer of value out of the UK mobile industry towards other originating operators (this is the Ofcom “net termination revenue”) and this will effect mobile profitability and mobile free cash flows;
- the bulk of this transfer of value will be to UK fixed operators.

Also we discussed in section 1 above, Ofcom's methodology for quantifying the impact on operators is incorrect. The “net termination revenue” is not properly a measure of revenue, but of contribution margin. It is therefore wrong, in quantification of the impact of a PO against that of a glidepath to contrast, as Ofcom does in paragraph 8.74, the “net termination revenue” against measures of total industry revenue and total industry EBITDA. The correct KPI to use for a measure of the potential impact on margin would be EBIT, but this has not as yet been attempted by Ofcom. Any comparison against total industry revenue should properly use the impact of the change in the total inbound termination revenue – as we discuss elsewhere this is much greater than the “net termination measure” would suggest.

Subsequently there may be other changes that follow on from the termination rate reduction:

- the mobile operators may seek to recover the lost mobile revenue and lost margin and cash by revising their retail charges and may be able to do so;
- the level of competition for certain customer segments may change;
- the fixed operators may pass on their windfall to their customers.

With regard to these subsequent effects, it is very questionable as to how quickly they could benefit customers under an immediate change. We have established in section 1.6 that there is no axiomatic immediate reduction made by the fixed operators of fixed to mobile retail rates, and given that most other charges made by fixed operators to their customers with respect to voice calls appear to be rising at least as fast as inflation, there may be no pass on to fixed voice call customers whatsoever. So whilst it is not at all clear that customers of fixed operators are benefitting from termination reductions, directly or indirectly, it is very clear that whatever benefit they may eventually receive is not arriving quickly.

On the other side, as we discussed in section 1.7 the possibility of a P0 now needs to be weighed against the new regulatory decision of GC9. The old assumption made by Ofcom that mobile operators can swiftly pass on to their customers increases arising from termination rate reductions needs to be reconsidered in the light of the GC9 statement – this considerably limits the ability of operators to react quickly, particularly given the increasing proportion of post-pay customers over pre-pay, the much greater importance of post-pay revenue than pre-pay revenue, the increasing proportion of revenue that is inside rather than outside the bundle, etc. The waterbed has sprung a leak (or more accurately been punctured by Ofcom). The ability of mobile operators to react with speed to a termination rate cut is much reduced – an extended period is needed for any reaction to take place.

In other words a mobile termination rate P0 gives fixed operators an extended windfall, but MNOs will suffer from a protracted squeeze. Thus a glidepath rather than a P0 is necessary to allow the consequences of a MTR reduction to be properly passed on to customers.

The current level of MNO capital investment

Ofcom goes on to make a non sequitur on the impact on investment in 8.74:

“Moreover, the reduction from LRIC+ to LRIC in the previous control period represented a much larger reduction in MTRs in both ppm and £m terms and investment by MCPs has continued steadily.”

It is not clear how to interpret this remark – the fact that investment has “continued steadily” says nothing about how investment might have continued in the absence of MTR reductions, or in the presence of the lower MTR reductions that would have occurred had there been no change in cost standard – for example might network coverage have been deeper?

But in reality the one-off factor of the timing of the introduction of 4G inside the present MTR charge control and Ofcom’s decision to give EE a head start on 4G, and the consequent need for all other operators to invest heavily in order to be able to compete at 4G must inevitably have masked all other underlying drivers of investment activity. However as we discuss in section 1.7 above there is no guarantee that the mobile operator investment will be able to continue in the UK in the face of adverse regulatory

decisions. Ofcom judged in the ALF consultation that it should behave conservatively – exactly the same consideration applies in the case of the MTR charge control.

The fixed narrowband review cannot provide a relevant precedent

The fixed narrowband review had a different impact on fixed operators in terms of the switch in cost standard from LRIC+ to LRIC, so it is of little relevance as an authority on what is appropriate for mobile operators.

The application of a P0 in the fixed narrowband statement was in two directions, not one, and was more or less symmetrically applied in terms of the change in cost standard – we discuss this in more detail in section 1 above. As a result, any adverse impact on fixed operators of the fixed termination rate switch to LRIC was very much damped by the favourable impact of the switch to LRIC++ on fixed origination rates. This was particularly helped by the fact that fixed operators, and particularly BT were specifically allowed by wholesale origination regulation to recover the large part of the “lost” fixed and common costs from regulated termination from outbound regulated services. This made the change from the LRIC+ to the LRIC cost standard largely irrelevant to fixed operators.

By contrast, it is expected by Ofcom that mobile operators will be able to recover their displaced common costs from unregulated outbound services, despite Ofcom expecting that competition between operators on such services will increase as a result of mobile termination rate reductions – it is not at all clear where these displaced fixed and common costs will be recovered from, particularly as the waterbed has been punctured.

Inconsistency with Ofcom’s general approach to charge control regulation of wholesale services

Whether or not, as a general proposition, having a wholesale rate closer to its target cost standard in the first year of the charge control might be regarded as “a good thing”, this is not a consideration that is unique to mobile voice termination, and it is not a principle that Ofcom would appear to have applied before in fixed wholesale regulation.

We see that this is a major inconsistency. There is a very considerable contrast here between Ofcom’s proposal to set mobile termination rates on a P0 path whilst continuing in fixed wholesale regulation such as LLU, WLR etc. with a glidepath to a cost that is assessed in the final year of the charge control.

Ofcom has regularly stated that it has a “strong preference” for glide paths, in particular because they provide stronger cost reduction incentives and a more stable and predictable regulatory environment than immediate adjustments. For example in the leased lines statement in 2009 Ofcom said:

“3.103 However, we would note that when re-setting charge controls, Ofcom has, as a general principle, sought to bring prices down to cost over the duration of the charge control by means of a glide path. We have given high weight to the need to preserve efficiency incentives and we have taken into account the fact that regulating prices down to costs by means of one-off adjustments might undermine these incentives (particularly if efficiency savings rely on longer-term investments). Therefore, our preferred approach in this review has been to focus any starting charge adjustments only where there are particular regulatory concerns that might outweigh the benefits of the glide path approach.

3.104 One factor that we have looked at in assessing possible start charge adjustments is the overall profitability of particular services. BT should be able to take comfort from the fact that we have taken a balanced view on its profitability. High returns can be the result from innovation in new products and cash savings in new technologies not only the exploitation of SMP. Particularly where BT has been subject to a previous charge control, we have to take into account the incentive effects of a glide path relative to one-off adjustments. To encourage BT to make additional cost savings under the charge control, we accept the possibility of high profitability by the end of a charge control. In setting charge controls for a fixed duration, BT can keep those savings during the current control period and our preference is then to bring prices down to costs via a glide path at the time of the next charge control.”

This view has been re-expressed more recently in the 2013 BCMR Statement at paragraphs 18.101 to 18.105, and the 2014 FAMR statement from paragraphs 6.35 to 6.37, and 6.45. In both cases Ofcom has stressed its preference for a glidepath over the length of the charge control over an immediate P0 adjustment.

If Ofcom were to generally set immediate adjustments to model outputs in the first year of every charge control as a matter of course for all wholesale regulation then clearly the proposed application of a P0 for wholesale mobile termination would not be unexceptional, but where Ofcom has consistently defended its use of a glidepath in fixed wholesale regulation then its application of a P0 in mobile becomes both very questionable and inconsistent with its general practice.

Any departure from Ofcom’s general practice therefore would need to be justified very strongly, particularly in the context of the location of the current 2014/15 termination rate firmly between the two alternative cost standards of LRIC and LRIC+ in circumstances of virtual indifference between the two, as we have discussed in section 1 above. Ofcom has as yet totally failed to make a reasoned case in favour of what would be a significant departure from its general regulatory practice and as the CC noted in paragraphs 5.96 of the MCT determination the reasonable expectations of the mobile operators.

Lack of rigorous examination of 2015/16 and 2016/17 in the modelling analysis

If Ofcom is intending to impose LRIC immediately at the commencement of the next charge control on 1st April 2015, it manifestly follows that a primary concern in the modelling analysis should be not just to confirm that the model outputs for 2017/18 are at an appropriate level, but to do the same for those of 2015/16 and 2016/17. However all of Ofcom's evaluation of the model, for example in the sensitivity study is pointed at the 2017/18 outputs alone. Ofcom has acted in its modelling work as if the approach it will adopt is consistent with its general practice in other wholesale charge controls, i.e. to focus all the modelling effort on ensuring that in the final year of the charge control the modelled costs are correct, and to construct a glidepath to that point for the earlier years of the charge control. The result of its present modelling approach however is that Ofcom has acted inconsistently in the consultation between its approach to reviewing the outputs of the model and its proposed approach to the path of the cost control.

At the moment the 2015/16 number produced by the model is no more than an incidental and virtually undocumented by-product of the work Ofcom has taken in the sensitivity analysis to satisfy itself on the 2017/18 inputs. Any consideration of 2015/16 inputs and outputs is conspicuous by its absence from the consultation. This immediately gives rise to an obvious question as to if Ofcom is going to rely on the 2015/16 output of the model what steps has it taken to ensure that the 2015/16 is reasonable?

This consideration particularly applies to those components of the model where input values are different between 2015/16 and 2017/18, such as customer technology mix and customer traffic volumes. For example given that the proposed charge control is a weighted average of 2G, 3G and 4G costs, the particular mix of each to be adopted in each year becomes relevant – therefore the take up of 4G capable handsets between 2015/16 and 2017/18, the deployment of 4G coverage, the proportion of customers with 4G capable handsets actually taking a 4G capable subscription etc. all become very relevant, particularly given the need (that we discuss in section 2.4) to make sure that the values adopted in the model are representative of the average efficient operator and do not reflect the early 4G launch of EE. This is obviously of most importance with respect to ensuring that an excessively low LRIC is not inadvertently adopted.

Therefore if Ofcom is intending to set a charge control that moves to the model outputs immediately in 2015/16 it needs to properly satisfy itself that not only is the 2017/18 output reasonable, but also that the 2015/16 and 2016/17 outputs are acceptable for the purposes of setting a charge control, and in particular are not too low. A rigorous review of the inputs and outputs for 2015/16 and 2016/17 to ensure that they are appropriate for the average efficient operator is necessary (with particular focus on the risk of too low a LRIC). But as yet Ofcom has not done this.

Plainly in the absence of a P0 adjustment, scrutiny of both the inputs and outputs for all years of the charge control at this level is unnecessary. If Ofcom remains consistent with its professed standard regulatory practice and sets the path of the charge control

as a glidepath to the final year of the consultation then it requires confidence only in the 2017/18 outputs, and can largely continue to ignore the 2015/16 and 2016/17 outputs⁸¹.

A charge below LRIC – asymmetric risk

Ofcom examines in 8.77 its likely actions in the event that it were to discover that MTRs were currently set below LRIC. We entirely agree with its conclusions that in this event it should immediately raise MTRs to the level of LRIC – as we discuss elsewhere in this document this point gives rise to the need to ensure that if the LRIC cost standard were to be applied by Ofcom for the next MTR charge control, Ofcom needs to take care to set the LRIC outputs of the model on a conservative basis (and if it intends to set a P0, then this concern must relate to model outputs for all years of the charge control).

We do not however see the relevance of this point as any form of indirect justification for the reverse action, i.e. if Ofcom were to find MTRs above LRIC it should immediately reduce rates to LRIC. We have already discussed in section 1 above the asymmetry of the risk of rate setting above and below LRIC. Ofcom in its discussion in section 6 of the consultation quite clearly concludes that the advantages of LRIC over LRIC+ are at best not strong. An asymmetry of risk between a rate that is below LRIC and above LRIC cannot possibly be used to justify an immediate reduction, particularly since the existing rate is between the future levels of LRIC and LRIC+.

Furthermore, if Ofcom were to insist on considering that the risk of setting rates at a different level from that provided by given cost standard in every year of a charge control were to be symmetric rather than asymmetric, then this would be a consideration that should be present in the design of every regulated charge control, not just mobile termination – as we discussed in the previous section, quite clearly it is not.

Conclusion

We conclude from this analysis that if Ofcom does decide to continue with the use of LRIC as the relevant cost standard, then a straight-line glidepath to the 2017/18 model outputs is the correct choice for the path of the regulated rate over the charge control period. If Ofcom were to continue to argue for an immediate cut to LRIC in 2015/16, then it would have to produce much more evidence than it has presently done to justify the departure from its established regulatory precedent and to be much more certain than it presently is that the modelled 2015/16 LRIC is not too low.

⁸¹ It still obviously has to scrutinise the 2015/16 and 2016/17 inputs to ensure they are representative of the average efficient operator in relation to the issue we raise in 2.4 above.

B - Remedies

In relation to the discussion on remedies in section 5 of the consultation, we support Ofcom's conclusion in 5.21 that the charge control be extended to all mobile operators, but would have expected that this consideration would apply to all four SMP conditions. We believe Ofcom is wrong in this regard not to extend it to M2 as well.

SMP Condition M3 – charge control

Vodafone would clearly prefer not to be regulated with respect to its voice termination service. However given the decision that has been regularly made in each successive termination market review that regulation is appropriate, it is eminently reasonable that all operators are treated in a consistent manner with respect to such regulation, to avoid the possibility of competitive distortion being created by inconsistently imposed regulation. We note Ofcom's observation that some smaller MCPs have in fact charged above the MTR benchmark. We therefore welcome the proposed change to SMP condition M3 that the charge control from 1st April 2015 will be extended to all MCPs, not just the four largest MCPs.

We do consider however that the level of LRIC or LRIC+ output by a model that attempts to represent the average efficient operator cost for the four major MNOs may in fact be too high for an MCP with a sub-national network build. It may therefore be more appropriate to consider the charge control imposed on the major MNOs to be a ceiling, and that depending on circumstances the charge for a smaller MCP could be found to be lower than that benchmark.

SMP Condition M2 – no undue discrimination

We consider Ofcom's justification for any decision not to impose SMP non-discrimination obligations upon small MCPs to be deficient in its reasoning. Having identified that small MCPs have SMP on the same basis as larger MCPs and decided to impose some ex ante obligations upon these MCPs – notably a price control, the most intrusive form of regulatory intervention – Ofcom effectively recognises that these small MCPs are in a position of dominance and thus able to act in a way that may adversely affect competition and thus the interests of consumers.

Ofcom itself recognises that discrimination by an MCP may take a number of different forms (ranging from price through to quality of service); it is therefore simply not in a position to conclude that potential adverse outcomes not might arise from discriminatory behaviour on the part of these MCPs. In this context, Ofcom does not appear to consider the cumulative adverse effect on competition and consumers of a number of small MCPs all in a position of SMP engaging in discriminatory behaviour. That potential cumulative adverse effect is precisely what militates in favour of having a market-wide consistent approach to the treatment of small MCPs, in this case in the form of a non-discrimination obligation applicable to small and large MCPs. In this regard, we would highlight Ofcom's duty under section 3(3)(a) of the Act to promote

consistency in the way that it discharges its duties. Having decided that ex post competition law is insufficient to constrain the behaviour of large MCPs terminating voice calls, Ofcom must be satisfied that there are compelling reasons not to adopt a consistent approach in setting SMP obligations on an industry-wide basis. The consultation document, for the reasons explained here, provides no credible justification for the inconsistency in approach that Ofcom proposes.

The fact that Ofcom has not previously been made aware of concerns about the conduct of small MCPs is of limited relevance. The issue is whether or not a risk to competition and consumers arises, which is plainly the case involving a large number of dominant operators (irrespective of their size) providing a bottleneck service to their trading partners.

Section 5: Response to specific Ofcom questions

In the sections above, we have addressed Vodafone's principal issues arising from the consultation. In this section we provide brief responses to specific Ofcom questions that have not already been addressed in the sections above.

Question 3.1: Do you agree with Ofcom's view of the relevant market? If not, please explain why.

Vodafone response: We have no issues with the geographical market definition. However we consider that Ofcom has paid inadequate attention to the impact of adjacent services, particularly OTT services, which will provide on an increasing basis the ability to substitute for voice services, and in particular on 4G devices. The increasing ability of such services to provide a competitive constraint on mobile voice calls has not been properly or fully articulated by Ofcom.

Question 5.1: Do stakeholders agree with our assessment of the harm that would result from a lack of effective competition in MCT markets?

Vodafone response: It would be unrealistic to expect that after its conclusions in successive mobile termination market reviews, Ofcom would decide that some form of regulation is unnecessary. However we do not believe that the evidence of consumer harm or benefit that is available to Ofcom is sufficient for it to determine that LRIC is a superior remedy than LRIC+ in the present situation.

Question 5.2: Do you agree with our assessment that ex-post competition law would not be sufficient to address the competition problems we have identified, and that therefore deregulation is not a regulatory option?

Vodafone response: see our response to 5.1

Question 5.3: Do you agree with our proposal to impose an obligation to provide network access on reasonable request on all MCPs with SMP? If not, please explain why.

Vodafone response: Once an MNO has been found to hold SMP it follows that a requirement to provide access on reasonable request is reasonable.

Question 5.4: Do you agree with our proposal to impose a price transparency obligation on all MCPs with SMP? If not, please explain why.

Vodafone response: We agree that this is reasonable

Question 5.5: Do you agree with our proposal to impose a non-discrimination obligation on the four largest MCPs, but not on smaller MCPs? If not, please explain why.

Vodafone response: No, see section 4.2

Question 5.6: Do you agree that our proposal to impose a charge control on the four largest MCPs is appropriate? If not, please explain why.

Vodafone response: A form of charge control may be reasonable – however as we discuss in the main body of this document, the particular level and path of the charge control that is proposed in this consultation is not at all reasonable or appropriate.

Question 5.7: Do you agree that our proposal to impose a charge control on all other MCPs with SMP is also appropriate? If not, please explain why.

Vodafone response: As we discuss in section 4 above, the imposition of a charge control on all MCPs with SMP is necessary, and it is also necessary that the levels of the charge control that is imposed on the smaller operators is no greater than that imposed on the four main MCPs. We question however whether for some of the smaller MCPs with minimal network investment this level is in fact too high.

Question 6.1: Do you agree that the above framework is the appropriate one? If not, please explain why.

Vodafone response: Not completely, see section 1

Question 6.2: Do you agree with our analysis and views on allocative efficiency? If not, please explain why.

Vodafone response: We agree with Ofcom's conclusion that it is inconclusive as to whether LRIC or LRIC+ is preferable under the criterion of allocative efficiency. But to Vodafone this emphasises the weakness of any decision in favour of either LRIC or LRIC+, suggesting that Ofcom should not be concerned when the charge control outcome is between the two.

Question 6.3: Do you agree with our analysis and views on dynamic efficiency? If not, please explain why.

Vodafone response: No, see section 1

Question 6.4: Do you agree with our analysis and views on competition impacts? If not, please explain why.

Vodafone response: No, see section 1

Question 6.5: Do you agree with our analysis and views on the impact on vulnerable consumers? If not, please explain why.

Vodafone response: No, see section 1

Question 6.6: Do you agree with our analysis and views on regulatory and commercial impacts? If not, please explain why.

Vodafone response: No, see section 1

Question 6.7: Do you agree with our proposal that LRIC should continue to be the appropriate cost standard? If not, please explain why.

Vodafone response: No, see section 1

Question 7.1: Do you agree with our proposed modelling approach as discussed in this section, the supporting annexes and the 2014 MCT model? If not, please discuss the specific proposals that you disagree with.

Vodafone response: No, see sections 2 and 3

Question 8.1: Do you agree with our proposed approach to implementing the MCT charge control? If not, please discuss the specific proposals that you disagree with.

Vodafone response – No, see section 4

Vodafone Limited
August 2014