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## Annex I

### **Charge cap mechanism: The calculation of the target average charge for the charge controls on 2G mobile voice call termination services**

#### **Introduction**

I.1 The Director is proposing to introduce an RPI-X cap on the charges for 2G mobile voice call termination of O2, Orange, T-Mobile and Vodafone (see Chapter 6 of this explanatory statement for more details). This control aims to reduce, over a period of time, the average termination charges of these four MNOs to a level consistent with the LRIC of supplying this service plus a mark-up for common costs and a network externality surcharge.

I.2 Each MNO has different termination charges for different times of day/week (currently all the four MNOs levy three different charges for day, evening and weekend). The Director does not intend to regulate the specific level of these charges. The proposed control consists in setting a Target Average Charge (TAC), which the regulated operator is required to comply with by setting its termination charges so that their weighted average, referred to as the Average Interconnection Charge (AIC), does not to exceed the TAC for that control period.

#### ***Average Interconnection Charge***

I.3 The AIC in a control period is calculated as:

*Charges by time of day and month in this control period,  
multiplied by volume weights by time of day and month in the previous year*

I.4 The weights reflect the volumes of minutes of terminating traffic<sup>84</sup> experienced by each MNO during the relevant period in the previous year.

I.5 The control period in general covers a 12-month period and runs from 1st April of one year to 31<sup>st</sup> March of the following year. Annex H in the May consultation provides more details on the calculations for deriving the AIC.

#### ***Variation of AIC with changes in weights***

I.6 The expression in italics at paragraph I.3 above shows that the AIC depends both on the volume weights and on the level of the specific charges. Hence, the AIC can vary with changes in the traffic mix, even if the charges for specific times of day/week remain unchanged. For example, in recent years that there have been significant increases in termination volumes in evening and weekend periods relative to daytime. This rise in the evening and weekend weights has determined a

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<sup>84</sup> Since there are two separate caps for fixed-to-mobile and mobile-to-mobile off net termination charges, the weights shall only reflect the volume of relevant traffic, except if the Director otherwise consent.

reduction in the annual AIC from one year to another, even at unchanged day, evening and weekend charges.

I.7 Under the control mechanism previously used for Vodafone and O2, a change in the AIC, such as the one described above, could contribute towards satisfying compliance with the TAC set for that control period. In an extreme case, if the weights were to change by a sufficient amount and in the right direction, it is possible that an MNO could achieve compliance with the TAC without reducing any charges (or even by increasing them). Movement of the weights in this direction would provide the regulated MNO with an unearned gain.

I.8 The effect is symmetric so, if the time of day weights were to move in the opposite direction (e.g. with an increase in the proportion of traffic in the daytime), the AIC would increase, even if no change occurred in any of the termination charges by time of day/week. Such a change in the traffic mix would make it more difficult for the regulated operator to comply with the TAC and impose an unjustified loss on it.

### ***The Target Average Charge***

I.9 In previous charge controls on Vodafone and O2 termination charges the TAC in any control period was equal to:

*The TAC in the previous control period multiplied by the sum of 100% and the Controlling Percentage (i.e. RPI-X%)*

If there had been changes in the weights from one year to the other, this was not reflected in the level of the TAC. This generated a discrepancy between the TAC and the AIC as the latter was affected by changes in weights, while the former was not. This discrepancy reflected on the charges the MNOs were allowed to levy and, thus, on their termination revenues.

### **The May proposal**

I.10 In the May consultation, the Director proposed to address this discrepancy by changing the way in which the TAC is calculated in this new control. The proposal consisted in deriving the TAC in each control period using as weights the volume of called minutes experienced by each MNO in the prior year.

I.11 The expression for calculating the TAC for a specific current control period proposed in May was thus equal to:

*Charges by time of day and month in the previous year,  
multiplied by volume weights by time of day and month in the previous year,  
multiplied by the sum of 100% and the Controlling Percentage (i.e. RPI-X%)  
(plus an Adjustment Factor if an under/over-shoot occurred in the previous control  
period)<sup>85</sup>.*

<sup>85</sup> An under (over)-shoot happens when the AIC is lower (higher) than the TAC in a control period. In such a case the Adjustment Factor ensures that the TAC in each control period is not distorted by this under (over)-shoot. No Adjustment Factor is necessary if in the last control period the AIC was equal to the TAC.

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I.12 The aim of the proposed change was to render the TAC in every control period dependent on the same weights used to calculate the AIC and, thus, guarantee consistency in the calculation methods.

### **Comments to the consultation**

I.13 This proposal has attracted comments from Orange and Vodafone, which are summarised below together with the Director's response.

#### *The new methodology and changes in underlying costs*

I.14 Orange complains that this proposal is based on the unjustified assumption that a change in traffic mix leads to a variation in average costs (e.g. that a shift towards more off peak traffic causes a reduction in average termination costs). Orange claims that the Director's new methodology implies a near linear relationship between changes in traffic profile and the average recovery permitted, which Orange believes does not exist. Hence, Orange considers that, if the Director's objective in setting a charge control is to achieve a specified target charge at the end of the control period (which is based on costs), then the proposed methodology for the TAC contradicts the intention of the control.

I.15 Vodafone believes that the Director's proposal is based on a misunderstanding of the effect of changes in an MNO's traffic profile on its average termination costs. Vodafone argues that peaks in traffic depend on both incoming and outgoing calls and that they may not necessarily be coincident. Hence, Vodafone claims that a change in the mix of incoming traffic may not necessarily shift the peak and, thus, it may not affect average termination costs. Thus, it concludes that a change in traffic profile does not justify a change in the amount to be recovered under the charge control.

I.16 The Director's view is that the above comments are based on a misunderstanding of his proposal. The new TAC method is not based on the assumption that average termination costs change as the traffic mix varies and the Director is not introducing the new methodology to accommodate changes in average costs. The aim of the new TAC methodology is to avoid the MNOs retaining an unearned gain, or symmetrically to avoid that MNOs are harmed by the charge control becoming tougher, just as a consequence of a change in traffic mix. Hence, this proposal is only aimed at redressing an imbalance between the ways in which the AIC and the TAC are calculated.

I.17 Table 1 below takes an extreme and hypothetical example to illustrate the Director's point that his proposed change in the TAC calculation is necessary because under the old TAC method a change in traffic mix without a change in costs affects the MNOs' termination revenues. In the example, based on a two-year charge control, the average cost of termination does not change, but peak-time traffic changes drastically from 90% of total traffic in Year 0 to only 10% in Year 1 and remains constant in Year 2. For illustration, the example also assume that cost movements are forecast correctly at RPI-X=0% (i.e. constant nominal costs). For simplicity, average cost is assumed to be the same as average revenue in Year 1

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and does not change in Year 2 because of the assumption noted above that the change in cost is equal to  $RPI-X=0\%$ .

I.18 Table 1 is organised so as to show both the effects of the old and of new method for calculating the TAC when such a shift in traffic takes place. In the set of columns that portray the situation under the old method the TAC in Year 2 is simply the TAC in Year 1 multiplied by  $(1+RPI-X)$ . Hence, the sharp change in traffic mix has no impact on Year 2's TAC, while it causes the AIC to drop. With a peak charge of 10 and an off-peak charge of 5 a change in the peak-time weight from 90% to 10% substantially reduces the AIC from 9.5 to 5.5<sup>86</sup>. Hence, with the old method the AIC falls while the TAC remains constant and the regulated operator can increase its headline charges by 73% without breaching the cap ( $RPI-X=0$ )<sup>87</sup>, thus making an unearned gain.

I.19 The second set of columns shows that under the new method the shift in traffic mix causes both the AIC and the TAC to vary in the same direction, thus preventing the operator from making an unearned gain. The TAC in Year 2, therefore, becomes much lower than the TAC in Year 1. With unchanged charges, the TAC and AIC thus remain equal and the average revenue remains in line with the average cost.

**Table 1: Illustrative example of old and new methods**

		<i>Old method</i>		<i>New method</i>	
	Year 0	Year 1	Year 2	Year 1	Year 2
Target Average Charge		9.5	9.5	9.5	5.5
<i>Headline prices</i>					
Peak charge		10	17.27	10	10
Off-peak charge		5	8.64	5	5
AIC (using weights)		9.5	9.5	9.5	5.5
<i>Weights (prior year volumes)</i>					
Peak weight		90%	10%	90%	10%
Off-peak weight		10%	90%	10%	90%
<i>Current year volumes</i>					
Peak volume	90%	10%	10%	10%	10%
Off-peak volume	10%	90%	90%	90%	90%
<i>Revenue, cost and unearned gains</i>					
Average revenue (using current year volumes)		5.5	9.5	5.5	5.5
Average cost (assumed equal to average revenue in Year 1)		5.5	5.5	5.5	5.5
Unearned gain (supra-normal profit)		0	4.5	0	0

I.20 This hypothetical example supports the Director's proposal by showing that:

<sup>86</sup>  $10 \times 90\% + 5 \times 10\% = 9.5$

$10 \times 10\% + 5 \times 90\% = 5.5$

<sup>87</sup>  $(10 \times 1.73) \times 90\% + (5 \times 1.73) \times 10\% = 9.5$

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- 1) The new method to calculate the TAC does not rely in any way upon the presumption that there are cost changes.
  - 2) The old method allows the regulated MNO to increase headline prices if peak traffic goes down, even though (by assumption) there is no change in average cost. This results in a substantial unearned gain.
  - 3) The new method avoids this problem because both the AIC and the TAC vary by the same amount as a consequence of a change in traffic mix, even at unchanged costs.

I.21 The above example is based on a reduction in peak traffic. Since the effects are symmetric, if the weights moved in the other direction (increase in peak-time weight), the new method would similarly avoid the regulated operator suffering an unearned loss.

I.22 The problem the Director is trying to avoid with this proposal is simply the inconsistency between the method for calculating the TAC and the method for calculating the AIC. An alternative solution to the one above could have been to calculate the AIC in each control period using constant weights (e.g. weights reflecting the traffic mix in the last year before the start of the control). This would also achieve the same effect of bringing in line the AIC and the TAC methodologies by changing the calculation of the AIC rather than the one of the TAC. Holding constant the traffic mix by time of day/week the TAC would have simply decreased over time because of the RPI-X factor and the AIC would have only reflected changes in the time of day/week termination charges levied by the MNOs. The fact that both this solution and the one being proposed achieve similar consistency between the calculation of TAC and of AIC shows that the aim of the “correction” is not to accommodate changes in average costs. The reason why the Director has decided not to propose to calculate the AIC on the basis of constant weights is that with his preferred approach the weights are less prone to become out of date as time goes by.

#### *Efficiency of MNOs and the new method*

I.23 Vodafone claims that MNOs may have been less efficient than assumed in the charge control (e.g. have higher average costs because of a more peak-loaded traffic structure) and that a movement towards the efficient level of costs should not be penalised by a lower TAC. It also adds that if an MNO did manage to achieve more efficient utilisation of its network than envisaged in the charge control, it should be able to benefit from it as this is in the spirit of the concept of the charge control. Orange too objects to the lack of flexibility the new TAC methodology introduces in relation to an MNO’s ability to set different charges by times of day/week and thus affect its traffic patterns and the utilisation of its network.

#### *The Director’s response to efficiency of MNOs*

I.24 The Director considers that his LRIC model assumes the appropriate level of efficiency of the MNOs for determining the level of the cap. In addition, as explained above, the proposed “correction” to the TAC is not meant to accommodate changes in average costs, but just to prevent effective erosion of the price control or arbitrary losses to the MNOs from shifts in the traffic mix. Hence, the Director does not agree

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that this methodology discourages MNOs from varying charges to shift the traffic mix. In the example above, the MNOs would benefit from the traffic mix, despite the change in the TAC, to the extent that their average costs fell with the relative increase in off-peak traffic.

I.25 Just as the value of X reflects a forecast of changes in cost because of, for example, declining equipment prices or efficiency gains, so it also reflects a forecast of variation in cost with the traffic mix. The key relevant parameter in the LRIC model is the proportion of total traffic that occurs in the busy hour and this is forecast to remain the same for the duration of the charge controls. If the MNOs achieve a different traffic mix which leads to a reduction in their average costs, the Director's proposed TAC methodology does not prevent the MNOs from retaining those savings.

#### *Alternative proposal*

I.26 Vodafone suggests an alternative methodology which consist in using current year volume weights when calculating the AIC (eventually with a correction factor for previous undershoot and overshoot) and leaving the calculation of the TAC unchanged.

#### *The Director's response to the alternative proposal*

I.27 The Director does not consider Vodafone's alternative proposal to be beneficial. The proposal does not seem to solve the problem that has led the Director to propose the change in methodology herein discussed (i.e. that variation in the volume mix impact on the AIC independently of any charge change). Furthermore, Vodafone's proposal creates a new problem, as it would require the MNOs to accurately forecast call volumes to ensure there was no an under-shoot or over-shoot of the AIC with respect to the TAC. Using a correction factor (as suggested by Vodafone itself) could mitigate the problem, but for the correction to be effective it would have to extend past the control period to avoid gaming from the operators.

#### *Different TACs*

I.28 Vodafone raises the possibility that this methodology may lead to the four MNOs having different TACs.

#### *The Director's response to different TACs*

I.29 The Director is aware that this new methodology may lead to different TACs for the four MNOs, but he does not consider this to be a problem because there would an exactly compensating change in the AIC. The differences between the TACs would only be due to differences in traffic weights and would not affect the underlying objective of the charge control of bringing termination charges down to cost-based levels.

### **Conclusions**

I.30 The sole purpose of the proposal herein discussed is to rectify the discrepancy between the weights used in calculating the TAC and the AIC. Allowing the AIC to change because of variation in the traffic mix, but not adjusting the TAC would mean that the prime objective of the price control (i.e. forcing MNOs to reduce charges to move them closer to cost) could be undermined. Hence, to preserve the

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effectiveness of the charge control the Director considers he has to ensure that a shift in traffic has the same effect on both the AIC and the TAC. This could be achieved by keeping the weights in the AIC constant, so that neither the TAC nor the AIC would be affected by shifts in traffic patterns, or by allowing the two charges to change exactly in the same proportion. The Director has preferred the latter solution because it means that the weights are less prone to become out of date during the course of the control.

I.31 The Director considers his proposed methodology for setting the TAC to be perfectly in line with the aim of the charge control, more so than the previous one. In addition, the Director is of the view that it does not undermine the MNOs' incentives to alter their traffic mix to achieve cost reductions.

I.32 The Director wishes to point out that the TAC mechanism herein proposed is neither new nor unproven: an equivalent mechanism has operated in BT's retail and network price<sup>88</sup> caps since 1984.

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<sup>88</sup> BT's controls do not formally have a TAC as does the mobile control, but it is implicitly contained in the formulation of the control

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