

## Details of the MMC model

### Introduction

1. This appendix sets out details of the ways we allocated operating expenditure between incoming calls, outgoing calls and PRS in developing our model. The details of the application of our model to Cellnet's costs are given in Appendix 5.5C;<sup>1</sup> corresponding details for Vodafone are given in Appendix 5.5V.<sup>2</sup>

### Cost of sales

2. We allocated the cost of sales entirely to outgoing calls.

### Marketing and service provider incentives

3. We allocated 0.5 ppm of marketing and service provider incentives to incoming calls in recognition of externalities (see paragraph 5.142).

### Network costs, overheads and depreciation

4. We allocated network costs, overheads, depreciation, and the return on the relevant assets, in five different ways. These were:

- entirely to outgoing calls;
- to incoming calls, outgoing calls and PRS, in proportion to the call minutes for each;
- to incoming and outgoing calls only, in proportion to the call minutes for each;
- to incoming calls, outgoing calls and PRS, in proportion to the transit minutes for each; and
- to incoming calls, outgoing calls and PRS, on the basis of the processor time required for each.

For Cellnet, the second and third mechanisms were identical, as it did not provide PRS.

5. We describe these in turn.

### *Cost allocated to outgoing calls only*

6. Some costs were allocated entirely to outgoing calls. Changes made in the value of these cost items would not affect the calculated cost of incoming calls. The costs categories allocated in this way were:

- POLOs
- Voicemail

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<sup>1</sup>Appendix 5.5C does not form part of the Vodafone report.

<sup>2</sup>Appendix 5.5V does not form part of the Cellnet report.

- Customer care
- Billing.

### ***Costs allocated in proportion to call minutes***

7. The next set of costs were allocated to incoming calls, outgoing calls and PRS in proportion to the number of call minutes for each type in the appropriate year. The number of call minutes in 1997/98 and the resulting allocation percentages are shown in Table 1. No allocation to PRS is shown for Cellnet, as Cellnet did not provide these services.

TABLE 1 **Call minutes allocation for 1997/98**

Operator	Call minutes (bn)			per cent		
	Incoming	Outgoing	PRS	Incoming	Outgoing	PRS
Cellnet	1.399	2.300	N/A	37.8	62.2	0
Vodafone	1.831	3.157	0.07	36.2	62.4	1.4

Source: MMC and the companies.

8. The costs categories allocated in this way were:

- General depreciation
- Engineering
- Administration
- Operations
- Other assets return.

### ***Costs allocated in proportion to call minutes (excluding PRS)***

9. Vodafone's PRS calls were handled only by the transit layer of the network and by the MSCs. It would be inappropriate to use an allocation based on call minutes for elements of the network which did not handle PRS calls. The number of call minutes in 1997/98 excluding PRS calls and the resulting allocation percentages are shown in Table 2. Cellnet's network did not carry PRS, so there was no difference between the 'call minutes' allocation and the 'call minutes (excluding PRS)' allocation.

TABLE 2 **Call minutes (excluding PRS) allocation, 1997/98**

Operator	Call minutes (bn)			per cent		
	Incoming	Outgoing	PRS	Incoming	Outgoing	PRS
Cellnet	1.399	2.300	N/A	37.8	62.2	0
Vodafone	1.831	3.157	N/A	36.7	63.3	0

Source: MMC and the companies.

10. The costs categories allocated in this way were:

- Other leased lines
- Radio depreciation

- Cell site running
- Frequency licence
- Cell site assets return.

### ***Costs allocated in proportion to transit minutes***

11. The transit layer is used to carry calls round the mobile network (see paragraph 3.32 for details). In the case of Vodafone, each incoming and PRS call and 20 per cent of outgoing calls were carried by the transit layer. In the case of Cellnet, each incoming call was carried twice and each outgoing call once (see paragraph 3.56). The resulting number of transit minutes for 1997/98 was calculated by multiplying the number of call minutes by the appropriate factor. The result and the allocation percentages are shown in Table 3.

TABLE 3 **Transit minutes allocation, 1997/98**

<i>Operator</i>	<i>Transit minutes (bn)</i>			<i>per cent</i>		
	<i>Incoming</i>	<i>Outgoing</i>	<i>PRS</i>	<i>Incoming</i>	<i>Outgoing</i>	<i>PRS</i>
Cellnet	2.798	2.300	N/A	54.9	45.1	0
Vodafone	1.831	0.631	0.071	72.3	24.9	2.8

Source: MMC and the companies.

12. The costs categories allocated in this way were:

- Transit lines
- Transit depreciation
- Transit running
- Transit switch assets return.

### ***Costs allocated in proportion to processor time***

13. We accepted that the proportion of switch costs which should be allocated to incoming and outgoing calls should be determined by the processor time required for each. Accordingly, we apportioned 23 per cent of switch costs to call minutes and 77 per cent to call attempts and we weighted the latter in the proportion 19.0 to outgoing calls (and PRS for Vodafone) to 49.4 to incoming calls, to reflect the processor time required for each. We also added 11.97 to the latter (giving 61.37) to reflect the processor time required for location update.

14. The basis of the allocation is summarized in Table 4. This shows:

- the percentage of incoming, outgoing and (for Vodafone) PRS call minutes (line 2);
- the number of call attempts (line 3) multiplied by the processor time required for each type of call (line 4), to give the total processor time required for incoming, outgoing and PRS (for Vodafone) calls (line 5) and the percentage of the total (line 6); and
- 23 per cent of the call minutes percentage (line 7) plus 77 per cent of the processor time percentage (line 8), giving the allocation percentages we used (line 9).

TABLE 4 Processor time allocation, 1997/98

	Vodafone			Cellnet	
	Incoming	Outgoing	PRS	Incoming	Outgoing
1. Number of call minutes (bn)	[	<i>Figures omitted. See note on page iv.</i>			]
2. Percentage of total calls (%)	36.2	62.4	1.4	37.8	62.2
3. Number of call attempts (bn)	[	<i>Figures omitted. See note on page iv.</i>			]
4. Processor time per call type (milliseconds)	61.37	19.00	19.00	61.37	19.00
5. Total processor time (minutes/seconds) (3 x 4)	[	<i>Figures omitted. See note on page iv.</i>			]
6. Percentage of total processor time (%)	69.7	29.4	0.9	67.4	32.6
7. 23% of 2 (%)	8.3	14.4	0.3	8.7	14.3
8. 77% of 6 (%)	<u>53.7</u>	<u>22.7</u>	<u>0.7</u>	<u>51.9</u>	<u>25.1</u>
9. Allocation percentages (7 + 8) (%)	62.0	37.0	1.0	60.6	39.4

Source: MMC and the companies.

15. The costs categories allocated in this way were:

- MSC/BSC depreciation
- MSC/BSC running
- MSC/BSC assets return.

## Results

16. Applying our model to Cellnet's costs and traffic for 1997/98 gave a cost of an incoming call of 17.62 ppm, comprising 11.79 ppm network costs and overheads, 0.5 ppm marketing and service provider incentives, and 5.33 ppm return (see Appendix 5.5C).<sup>1</sup> Applying it to Vodafone's costs and traffic for 1997/98 gave a cost of an incoming call of 11.48 ppm, comprising 7.92 ppm network costs and overheads, 0.5 ppm marketing and service provider incentives, and 3.06 ppm return (see Appendix 5.5V).<sup>2</sup>

<sup>1</sup>Appendix 5.5C does not form part of the Vodafone report.

<sup>2</sup>Appendix 5.5V does not form part of the Cellnet report.