



# FICORA ASSESSMENT PRINCIPLES FOR THE PRICING OF MOBILE TERMINATION

**CONTENTS**

<b>1. INTRODUCTION.....</b>	<b>3</b>
<b>2. SCOPE OF APPLICATION AND GENERAL PRINCIPLES FOR MOBILE TERMINATION PRICING.....</b>	<b>3</b>
<b>3. DESCRIPTION OF FICORA'S ASSESSMENT METHOD .....</b>	<b>4</b>
<b>4. MOBILE TERMINATION RATES.....</b>	<b>5</b>
<b>5. MOBILE NETWORK STRUCTURE AND NETWORK SERVICES.....</b>	<b>6</b>
<b>6. COST ITEMS TO BE INCLUDED IN THE CALCULATIONS.....</b>	<b>7</b>
<b>6.1 Operating and overhead costs.....</b>	<b>8</b>
<b>6.2 Replacement price of the mobile network .....</b>	<b>9</b>
<b>6.3 Depreciation.....</b>	<b>9</b>
<b>6.4 Return on capital employed.....</b>	<b>10</b>
<b>6.4.1 Definition of capital employed.....</b>	<b>10</b>
<b>6.4.2 Reasonable return .....</b>	<b>11</b>
<b>6.4.2.1 Estimation of cost of debt .....</b>	<b>11</b>
<b>6.4.2.2 Estimation of cost of equity .....</b>	<b>12</b>
<b>6.4.2.3 Total Average Cost of Capital .....</b>	<b>13</b>
<b>6.4.2.4 Reasonable return on capital in mobile telecommunications.....</b>	<b>13</b>
<b>7. ALLOCATION OF COSTS TO SERVICES .....</b>	<b>14</b>
<b>8. EFFICIENCY.....</b>	<b>14</b>
<b>9. ASSESSMENT OF FLAT RATES FOR MOBILE TERMINATION .....</b>	<b>14</b>
<b>10. FICORA'S ASSESSMENT OF REASONABLE RATES FOR MOBILE TERMINATION .....</b>	<b>15</b>

## 1. INTRODUCTION

In December 2006, FICORA published principles for assessing the pricing of mobile termination<sup>1</sup>. In the published memorandum, FICORA presented central principles of assessing the pricing of mobile termination. FICORA has developed its assessment methods further and presents in this memorandum the updated principles it shall use to assess whether the charges for call termination in mobile networks are cost-oriented.

During 2007 and 2008, FICORA continued developing the assessment principles in co-operation with, for example, external experts. In 2007, FICORA commissioned an external expert report on replacement prices and current replacement costs of mobile networks. The report was used in developing the assessment of mobile termination and as support in supervising that pricing complies with regulations. The report was conducted by Deloitte Corporate Finance Oy (Deloitte). As a part of the commissioned report, Deloitte evaluated also how well the FIFAC model used by FICORA suits the assessment of flat rates for mobile termination. The public version of the report is available in Finnish on the FICORA website at [www.ficora.fi](http://www.ficora.fi). [www.ficora.fi](http://www.ficora.fi)

In developing the assessment principles, FICORA has taken into account the consensus on mobile termination rates for 2007-2009 that mobile network operators reached in their commercial negotiations in 2007 and 2008. Special attention has also been given to the mobile operators' joint goal of introducing flat rates in December 2009. FICORA has also re-examined the suitability of some individual assessment principles and specified the principles regarding, for example, capital costs.

In addition, FICORA presents its estimate of a reasonable price level of mobile termination in 2010 and 2011 in the opinion appended to the present memorandum.

This memorandum replaces the FICORA memorandum on assessment of mobile termination pricing published in December 2006.

## 2. SCOPE OF APPLICATION AND GENERAL PRINCIPLES FOR MOBILE TERMINATION PRICING

In its operator-specific SMP decisions<sup>2</sup> that are based on market analysis, FICORA has imposed obligations (non-discrimination and cost-orientation) on national mobile network operators operating in Finland (DNA Finland Oy, Elisa Corporation and TeliaSonera Finland Oy) concerning pricing in the market for voice call termination on individual mobile networks (Market 7 of the European Commission Recommendation, i.e. Market 16 of the previous Recommendation). FICORA gave the first SMP decisions in compliance with the new Communications Market Act (393/2003) on 6 February 2004 and the second on 22 June 2006.

These assessment principles concern FICORA's methods for assessing the pricing of voice call termination on individual mobile networks and the calculations on which the assessment is based.

According to section 43(3) of the Communications Market Act, call termination, or incoming traffic, means the use of the telephone network by a telecommunications operator to form a connection, where this connection is from the telephone network of another telecommunications operator to the telecommunications operator's own telephone network. Call termination is traffic from the interconnection point to the recipient of a call.

Call termination on mobile networks means traffic from all other telecommunication networks to mobile networks. For instance, traffic may terminate on an individual network from other national or foreign mobile networks and national or foreign fixed networks. Voice call termination service is a homogeneous product which involves transmission of voice calls in the destination network. At wholesale level, mobile network operators collect minute-based charges from other network operators for the voice call traffic terminating on their own network. Table 1 on page 5 presents the termination rates for 2007-2009 of national mobile network operators operating in Finland.

<sup>1</sup> <http://www.ficora.fi/attachments/englanti/5n14UxXtj/Files/CurrentFile/Arviointiperiaatemuistio061207MobiiIiEN.pdf>

<sup>2</sup> <http://www.ficora.fi/en/index/saadokset/tulkinnat/hmvpaatokset/hmv16.html>

Traffic between mobile network operators is reciprocal, and the charges for call termination are indirectly channelled into the end customer prices for calls between mobile networks. Traffic between fixed networks and mobile networks is not equally reciprocal. The prices for call termination on fixed networks and mobile networks differ from each other significantly. The charge a mobile operator collects for call termination is, in practice, directly channelled into the end customer price for a call made from a fixed network to a mobile network.

The mobile termination service cannot be bought unless the communication network is interconnected to the mobile network. Interconnection and buying of call termination services requires the introduction and maintenance of interconnection circuit link and the connection, modification and maintenance of common channel signalling interface. Operators often collect one-off charges for interconnection that is necessary for implementing voice call termination. In determining prices also for these regulated products, operators must fulfil the pricing obligations imposed on them.

According to section 84 of the Communications Market Act, a cost-oriented price means a price that is reasonable taking into account the costs incurred and the efficiency of the operation. A reasonable return on capital employed is also taken into account. Call termination must be cost-oriented regardless of the pricing structure. The costs for interconnection traffic in call termination are the same regardless of the origin of the incoming call. Bulk discounts on interconnection charges are prohibited, since according to section 44 of the Communications Market Act, the charge collected for the interconnection of telephone networks shall not be dependent on the amount of telecommunications transmitted.

According to section 86 of the Communications Market Act, a telecommunications operator has an obligation to prove that the price charged for its product is cost-oriented and non-discriminatory when a pricing matter is being handled by FICORA. On request, a telecommunications operator must submit to FICORA up-to-date and sufficiently detailed pricing calculations on which the prices charged for call termination are based. FICORA assesses the legality of the charges collected by the telecommunications operator primarily on the basis of these calculations but is not bound to the cost-accounting and pricing principles used by the telecommunications operator.

FICORA assesses the legality of the pricing of call termination in compliance with the principles referred to in this memorandum. FICORA continues to develop further the principles used in assessing mobile termination pricing, and works in co-operation with, for example, mobile operators. FICORA shall update the principles presented in the memorandum when necessary.

### **3. DESCRIPTION OF FICORA'S ASSESSMENT METHOD**

For assessing the pricing of mobile termination, FICORA uses the FAC model (Fully Allocated Costs) that is based on the operator's actual costs. Thus, the model used by FICORA in assessing pricing is a so-called top-down model. The Communications Market Act provides that the costs incurred must be taken into account; therefore, it is justified to use the FAC model in Finland. The FAC model is generally applied in other EU countries as well, especially in the mobile market.

In 2005, FICORA commissioned an external expert report on mobile termination pricing and its assessment. The survey was conducted by Frontier Economics Ltd<sup>3</sup>. The report included suggestions and recommendations for developing the assessment principles. The report also included a tool (Excel model) created for FICORA for allocating costs and assessing charges for call termination.

FICORA has developed its own version of the model developed by Frontier Economics Ltd for allocating costs, the FIFAC model (Ficora Fully Allocated Costs), which it uses for assessing the pricing of call termination on mobile networks. FICORA uses the FIFAC model also to gather cost and volume data necessary for assessing the pricing of call termination on mobile networks and the allocation keys used in the calculations.

<sup>3</sup> Frontier Economics Ltd: Developing the evaluation process for determining the cost oriented mobile termination prices in Finland, available at <http://www.ficora.fi/index/saadokset/ohjeet/taloudellinenvallvonta/matkaviestinverkkoihinlaskevanliikenteenhinnoitteluakoskevatutkimus.html>

The FIFAC model involves measuring the actual operating and overhead costs incurred to an operator, as well as depreciations and return on capital. The operating and overhead costs are measured on the basis of historical cost accounting, and capital costs on the basis of current cost accounting. The model also involves allocating the mobile network operator's costs first to mobile network components in accordance with the matching principle and then to mobile network services in accordance with the use of and load on the network. The result of the model is an estimate of the unit costs for services, such as the unit cost for call termination on mobile networks. The FIFAC model is available on the FICORA website at <http://www.ficora.fi/en/index/saadokset/ohjeet/talousvalvontateleyrityksille.html>.

FICORA's assessment of mobile termination pricing includes taking into account the actual costs incurred as well as the characteristics of the mobile communications market, such as the reciprocity of call termination and the general price level of mobile termination in Europe.

#### 4. MOBILE TERMINATION RATES

In their commercial negotiations, national mobile operators agreed on mobile termination rates for the years from 2007 to 2009. In addition, the operators have agreed that flat rates will be applied in mobile termination pricing from December 2009 onwards. However, the level of the flat rate introduced in December 2009 has not been decided yet.

Following the negotiation result, Table 1 presents the termination rates for 2007-2009 of national mobile network operators operating in Finland.

Mobile operator	Mobile termination rate (cents/minute)		
	2007	2008	1/2009- 11/2009
DNA Finland Oy	8.2	6.0	5.4
Elisa Corporation	7.0	5.1	4.9
TeliaSonera Finland Oyj	6.6	5.1	4.9

Table 1. Mobile termination rates in 2007-2009.

Compared to the European level, mobile termination charges collected by Finnish mobile operators are quite low. According to a price comparison<sup>4</sup> published by the European Regulators Group (ERG), the EU average charge for mobile termination transmission was 8.47 cents/min in January 2008. At the time, the Finnish average price was approximately 5 cents/min. Figure 1 presents mobile termination rates in the EU Member States in January 2008.

<sup>4</sup> [http://www.erg.eu.int/doc/publications/erg\\_08\\_17\\_mtr\\_upd\\_snap\\_final\\_080604.pdf](http://www.erg.eu.int/doc/publications/erg_08_17_mtr_upd_snap_final_080604.pdf)

### Average MT Tariff per country Jan 2008

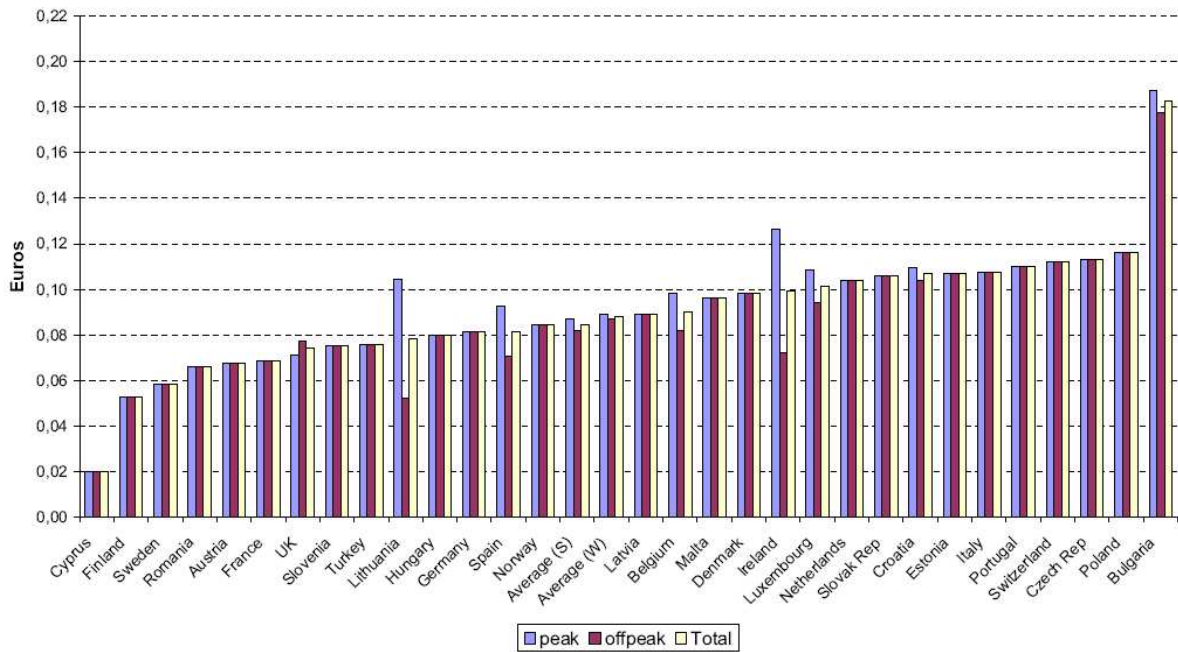


Figure 1. Mobile termination rates in EU Member States, January 2008.

Source: ERG

## 5. MOBILE NETWORK STRUCTURE AND NETWORK SERVICES

Mobile networks can be divided into a network switching subsystem (NSS), a base station subsystem (BSS) and an operations subsystem (OSS) which administers the previous two subsystems. The network switching subsystem consists of mobile services switching centres (MSC) and registers connected with them (for example, home location, visitor location, and equipment identity registers). The base station subsystem consists of, for instance, base stations (BTS) and base station controllers (BSC). The network also comprises transmission connections between different network elements. The connection between a subscriber's terminal and a base station is wireless. Therefore, radio frequencies are needed in the operations of a mobile operator. Figure 2 gives a basic example of the structure and components of a mobile network.

A mobile network is used, for instance, for

- 1) traffic from an interconnection point between other telecommunications networks and the mobile network to the recipient of a call (call termination),
- 2) traffic from a mobile network subscriber to an interconnection point between the mobile network and other telecommunications networks (call origination),
- 3) traffic between mobile network subscribers (on-net traffic) and
- 4) other services, such as SMS and data services.

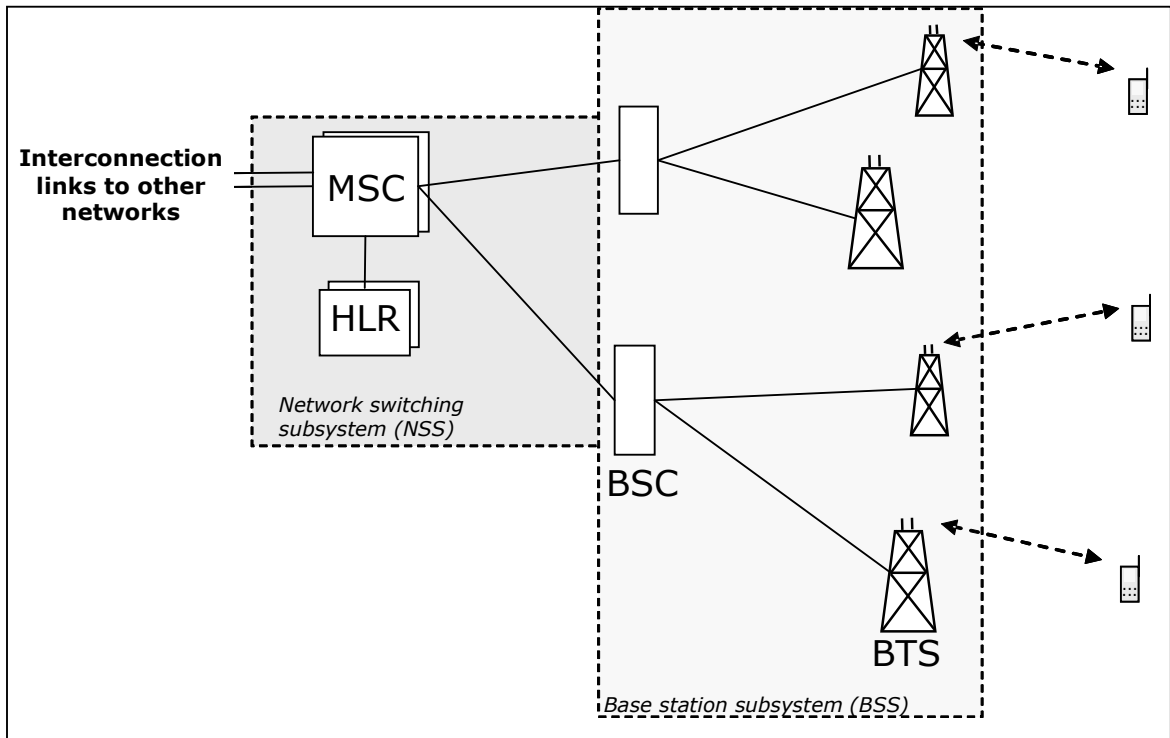


Figure 2. Mobile network structure

## 6. COST ITEMS TO BE INCLUDED IN THE CALCULATIONS

FICORA's assessment of whether the charges are cost-oriented is primarily based on the cost and volume data provided by telecommunications operators. The examination of the cost and volume data covers primarily the previous closed accounting period. Significant changes in, for example, cost data or traffic volumes may be taken into account in assessing the cost-oriented charges. The cost calculations for call termination on mobile networks are based on the replacement price of the mobile network which is used for determining depreciation. The replacement price is also used to define the capital employed in the network, i.e. the current replacement cost on which a return is calculated. In addition to the cost of capital, the estimate also takes account of the operating and overhead costs of the network. Figure 3 illustrates how the costs of interconnection traffic products are made up.

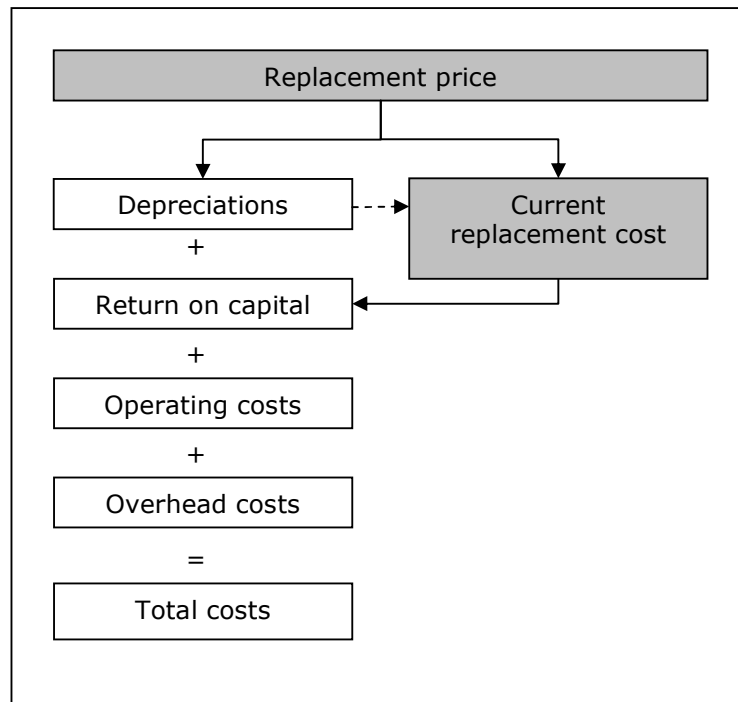


Figure 3. Cost structure

At this stage, FICORA considers it impractical to separate the costs of second and third generation networks from each other. FICORA recommends that the costs of third generation networks, like the costs of second generation networks, are included in the costs and that these combined costs are allocated to the entire traffic. This results in a common price for call termination on mobile networks.

### 6.1 Operating and overhead costs

Operating costs of a mobile network are comprised of the costs incurred by the use and maintenance of the network. These costs may include annual frequency and licence fees, rents on premises and mast sites, leased lines, material costs, labour and indirect employee costs, costs of network operations and maintenance, costs of network power, testing and development costs and other operating costs incurred by the use and maintenance of a mobile network. If a telecommunications operator does not have its own network but, for instance, leases network from other telecommunications operators, the costs incurred by this will be included in the operating costs. Intra-group charges for the use of a network must also be taken into account in accordance with the actual costs (only in operating costs). The operating costs must be based on the actual costs given in the operator's bookkeeping and cost-accounting.

It should be observed that operating costs do not include, for instance, termination charges payable to other operators, roaming costs or billing fees that belong to the service operator of a mobile network. The operating costs of a mobile network include only the operating costs incurred by mobile telecommunications (by a network operator).

It is also possible to allocate overhead costs for the entire company in mobile telecommunications to interconnection traffic products. The overhead costs are comprised of, for instance, costs incurred by the telecommunications operator's support activities, such as financial, personnel, data and materials administration. The telecommunications operator must also ensure that each cost item of a product is allocated only once in order to prevent manifold allocations at company level. In addition, the cost volume must be taken into account in allocating the overhead costs. The share of the overhead costs from the interconnection traffic costs should not be significant but most of the costs should be allocated directly.

## 6.2 Replacement price of the mobile network

The value of a mobile network shall be estimated on the basis of the replacement price to calculate the depreciation and the capital employed. The replacement price shall be a sum of the replacement prices of different asset items of the network. Significant asset items in the network for assessing the mobile network include, for instance, base stations, centres, transmission connections between base stations and centres, and transmission connections between centres. In FICORA's FIFAC model, the fixed assets are assessed at replacement price for the following asset items:

Asset item	Description
Base station subsystem	Base stations and radio repeaters; antenna systems and RF equipment; Base station controllers (BSC and RNC), software related to the controllers, measuring devices and the rest of the radio network
Transmission between base station controllers and mobile services switching centres	Transmission from BSC/RNC to MSC; Transcoder (TRAU)
Mobile services switching centres	Mobile services switching centres (MSC)
Transmission between MSCs	Transmission between MSCs
Interconnection links	Interconnection links to other networks
Voicemail systems	
Data service systems	SMSC; MMSC; Packet data systems (SGSN/GGSN and related transmission)
Other fixed assets in the network	AuC; EIR; network management systems; HLR; vehicles; all other fixed assets in the mobile network that cannot be allocated to other network elements
Intangible assets	

FICORA recommends that in assessing the network, the operator should primarily use the delivery prices the telecommunications operator would actually pay the equipment supplier (e.g. purchase agreements in force, offer requests). Thus, discounts on purchases should also be taken into account when the network is being reassessed. It should also be observed that asset items that have already been written off but are still in use must not be included in the replacement price. The assessment of the assets at replacement price must therefore be based on the operator's balance sheet, so the assets in the balance sheet shall be valued to replacement price.

If a telecommunications operator draws up the financial statement in accordance with the IFRS financial reporting standards and uses market values to assess property, the operator should report on the principles applied in the financial statement for assessing property and used in the pricing calculation. The share of labour costs can also be taken into account when estimating the replacement price of the network if the telecommunications operator has capitalised the share in the balance sheet in its accounts when making the investment. Otherwise, the share of costs has been taken into account in the calculations as operating costs.

The pricing calculation of the telecommunications operator shall include a calculation showing how the reassessment that is based on a replacement price has been done in practice and, if possible, provide the historical delivery prices of the asset items used in determining the replacement price. In other words, the pricing calculation shall explicitly indicate how the replacement prices have been determined.

## 6.3 Depreciation

Depreciation is calculated on the basis of the replacement value of the network by using planned depreciation periods and methods in the statutory accounts. In the FIFAC model, depreciation is defined for the asset items mentioned in section 6.2.

## 6.4 Return on capital employed

The method FICORA has used to estimate the reasonable return is the WACC method (Weighted Average Cost of Capital), and the principles used for estimating the capital employed have mainly remained the same.

In 2005, FICORA commissioned Frontier Economics Ltd to prepare an expert report on the reasonable return on a mobile network (*Cost of capital for mobile telecommunications networks in Finland*). To estimate the reasonable return, FICORA has also used the reports prepared by LTT Research Ltd (*Arvio kohtuullisesta pääoman tuotosta kiinteässä televerkkotoiminnassa*) and Europe Economics Ltd (*Cost accounting and Pricing Principles in Finnish Digital TV Transmission*). Both reports have been published on the FICORA website. Decisions made by other telecommunications authorities in EU countries have also been taken into account in the estimation of reasonable return in business operations related to mobile networks.

### 6.4.1 Definition of capital employed

The capital employed in mobile networks, on which the return is calculated, is comprised of the fixed assets in the network and other assets and debts related to the activities. Thus, capital employed may only include asset items employed in a mobile network. For instance, a company's losses from previous years or goodwill are not regarded as asset items necessary for producing call termination. They cannot, therefore, be included in the capital employed referred to in pricing calculations.

FICORA estimates the capital employed by using primarily the current replacement cost as the capital employed in fixed assets. The Supreme Administrative Court has confirmed the legality of the estimation method<sup>5</sup>. If reasonable, it is also possible to use some other method for defining the capital employed in fixed assets. The current replacement cost shall be determined by deducting from the replacement price the depreciation made on the basis of the replacement price and lifetime of the assets. The asset lifetimes are those used in the operators' statutory accounts.

The current replacement cost of the whole network can be calculated by summing the current replacement costs of the network elements. A reasonable estimate of the current replacement cost of a network can be calculated with the formula  $NKA$  (current replacement cost) =  $JHH * (n-1)/(2*n)$  used by many telecommunication operators, where  $JHH$  is the replacement price and  $n$  is the average lifetime in years.

The current replacement cost of a network can be defined also by taking into account the actual age of the network when calculating the current replacement cost and by making the estimations separately for each component. The current replacement cost can then be defined, for instance, so that the current replacement cost of a component  $i$  in the year  $t$  after purchasing is calculated using the formula  $NKA_{it} = JHH_{it} * [1 - (t/T)]$  where  $T$  is the depreciation period set for the component. The current replacement cost must be calculated with the above formulas, unless the telecommunication operator shows justifiably that a different calculation method serves the purpose better.

For justifiable reasons, it is also possible to announce the capital employed of a mobile network in terms of balance sheet values stated in the financial statements instead of the current replacement cost derived from replacement prices. The use of balance sheet values is justifiable if market prices have remained stable and the balance sheet value reflects the actual value of the assets, or in other words, if the depreciations made in bookkeeping correspond to the actual decrease in the value of the assets. However, FICORA recommends that the value of a mobile network is determined primarily on the basis of replacement prices and current replacement costs.

In addition to fixed assets, it is also possible to take such short-term assets and debts that have resulted from producing mobile telecommunications and call termination into account in determining the capital employed. The proportion of short-term assets and debts from the capital employed should not be significant, and should in practice offset each other. Short-term assets and debts that belong to a mobile network are valued at balance sheet values.

<sup>5</sup> Decision of the Supreme Administrative Court on 16 Sept 2004, Diary no. 3225/2/02, Record no. 2323

Short-term assets and debts should be allocated to the mobile network and call termination in accordance with the matching principle. Thus, the basis of division used should reflect the short-term assets and debts employed in mobile network operations as well as possible. In addition, the time of examination should be taken into account; because, in FICORA's opinion, using one specific point in time, e.g. the last day of an accounting period, does not necessarily reflect correctly the amount of short-term assets and debts in a longer-term examination. Thus, for instance, an accounting period average value should be used when examining short-term assets and debts.

#### 6.4.2 Reasonable return

In calculating a reasonable return, FICORA uses a percentage that has been determined with the average cost of capital, i.e. by using the so-called WACC method (Weighted Average Cost of Capital). In this method, the cost of the entire capital is the weighted average of the return requirements for both equity and debt. The weighting coefficient is the gearing of the operator, i.e. the debt percentage of the entire capital.

Concerning the paid tax rate, the pre-tax WACC is determined as follows:

$$WACC_{pre-tax} = D/V \times R_d + E/V \times R_e \times \left( \frac{1}{1-T} \right),$$

where

- $D$  = amount of debt,
- $E$  = amount of equity,
- $V = E + D$  entire capital,
- $R_d$  = cost of debt,
- $R_e$  = cost of equity and
- $T$  = company tax base.

##### 6.4.2.1 Estimation of cost of debt

In practice, there are two ways to estimate the cost of debt using the WACC calculation: directly on the basis of the interests on the existing loans of the operator or by separately estimating the values for the risk free rate and the required debt premium. A common and more transparent alternative is to estimate the cost of debt on the basis of the separate components mentioned above. In addition, the cost of debt must be estimated uniformly for all the components included in the WACC calculation. Since the cost of equity of an operator is partly determined by the operator's indebtedness, estimating the cost of debt on the basis of the actual paid rates would be in conflict with the use of target capital structure (see Gearing below). FICORA uses risk free interest rate and debt premium to estimate the cost of debt.

#### Risk Free Interest Rate

The risk free interest rate indicates the return on a hypothetical risk free investment on the market.

FICORA considers it justified to use the yield of long-term bonds (maturity of 5 or 10 years) as the indicator of the risk free interest rate. The maturity should correspond to what an average investor can expect to obtain from an investment in shares. The risk free rate has usually been calculated by using bonds with a maturity of approximately 10 years. As the risk free interest rate, FICORA uses the interest rate of Finnish benchmark government bonds with a 10-year maturity. At the time of quotation, FICORA uses the average rate from February of the previous year. The pre-defined time of quotation is clear and brought to the knowledge of all parties in advance. Thus, the risk free interest rate remains the same regardless of the time of estimation. The risk free rate that has been defined this way is readily available, for example, on the website of the Bank of Finland at [www.bof.fi](http://www.bof.fi).

The average yield on 10-year Finnish government bonds was 4.06% in February 2008. FICORA will use this percentage as the risk free interest rate until the end of February 2009.

### **Debt Premium**

A reasonable debt premium can be determined by the market values of the bonds that belong to operators with a certain credit classification and are traded on the market.

Based on expert reports, FICORA uses 1.5% as the debt premium.

### **Cost of Debt**

The cost of debt is the sum of the risk free interest rate and debt premium. Thus, on the basis of what is stated above, FICORA uses the percentage 5.56% as the cost of debt.

### **6.4.2.2 Estimation of cost of equity**

In the WACC calculation, the cost of equity is estimated on the basis of risk free rate, market risk premium and beta coefficient.

### **Risk Free Interest Rate**

As stated above, the risk free rate used by FICORA is the average yield on the 10-year Finnish Government bonds in February 2008, i.e. 4.06%.

### **Market Risk Premium**

The general market risk premium indicates the average long-term excess return on risky investments in comparison with a risk-free investment. The market risk premium is not dependent on a certain branch of business but indicates the general cost of risk on the market.

On the basis of historical averages, enquiries to professional investors, decisions made by other supervising authorities and expert reports, FICORA uses the percentage 4–5% as the general market risk premium.

### **Asset Beta**

The beta coefficient indicates the market risk affecting a share. The market risk measures the sensitivity of a share to general changes on the market. Beta indicates the risk situation of an operator in relation to other investments. When the beta coefficient is 1, the risk of a share corresponds to the average market risk. The beta coefficient is the only risk indicator relevant to an investment decision.

When the WACC method is used, the operator's risks are taken into account in the beta coefficient.

FICORA has evaluated the beta for mobile telecommunications on the basis of, for example, expert reports and decisions made by authorities in other countries. The value of the asset beta used by FICORA in mobile telecommunications is 1.1-1.3.

### **Equity Beta**

FICORA determines the beta used to calculate the cost of equity on the basis of asset beta and gearing of 30% (see Gearing below). Thus, the equity beta is 1.6-1.9.

## Total Cost of Equity

The cost of equity can be calculated by adding the market risk premium multiplied by the equity beta to the risk free interest rate. On the basis of what is stated above, FICORA uses the percentage 10-13% as the cost of equity.

### 6.4.2.3 Total Average Cost of Capital

#### Gearing

The cost of an operator's total capital is calculated with the WACC method as a weighted average of the costs of equity and debt. The operator's gearing is used as the weighting coefficient which gives the debt percentage of the operator's entire capital.

In assessing the pricing of mobile operators' regulated products, FICORA uses the same return percentage or range of return for all operators. Therefore, the gearing applied in the WACC calculation should be the same ratio between debt and equity for all operators, and it is not possible, in practice, to use the actual capital structures in defining a reasonable return.

On the basis of expert reports, FICORA uses 30% as gearing in mobile telecommunications.

#### Tax Rate to Be Paid by Operators

FICORA takes the taxes paid into account in the cost of capital in accordance with the prevailing company tax base (currently 26%). In other words, FICORA uses the so-called pre-tax WACC for estimating the cost of capital. When taxes are taken into account, the cost of capital increases.

### 6.4.2.4 Reasonable return on capital in mobile telecommunications

Based on what is stated above in sections 6.4.2.1-6.4.2.3, FICORA considers the return of **11-14%** to be reasonable in the pricing of call termination on mobile networks. At present, the return requirements for mobile operators have not been otherwise restricted under the Communications Market Act.

	Minimum	Maximum
Risk Free Interest Rate	4.06%	4.06%
Debt Premium	1.50%	1.50%
Cost of Debt	5.56%	5.56%
Risk Free Interest Rate	4.06%	4.06%
Market Risk Premium	4.00%	5.00%
Asset Beta	1.1	1.3
Equity Beta	1.57	1.86
Cost of Equity	10.34%	13.36%
Gearing	30%	30%
Tax rate	26%	26%
WACC (pre-tax)	<b>11.45%</b>	<b>14.31%</b>

Table 2. FICORA's WACC calculation for mobile telecommunications in Finland

## **7. ALLOCATION OF COSTS TO SERVICES**

FICORA uses the FIFAC model to allocate the actual network costs to the services produced by operators. In accordance with the model, the operators' costs are first allocated to the main mobile network elements and then to each service in relation to the use of the network elements. The basic logic of the model corresponds to the network model FICORA has used before (at a more general level).

In the FIFAC model, the mobile network costs are allocated to different mobile network elements by means of allocation keys. The allocation keys are defined according to the nature of each cost item, and the costs are allocated according to the matching principle to different network elements. Examples of possible allocation keys are different network elements, number of personnel, floor area, vehicles, software and rents on connections. Mobile network costs are allocated according to allocation keys to different network elements which include base station subsystems, transmission between base station controllers and centres, mobile services switching centres, interconnection links, voicemail systems and common mobile network costs.

Costs are allocated to services on the basis of service volumes, and use and load. The services reviewed in the FIFAC model include: call origination, call termination, on-net traffic, SMS origination, SMS termination, SMS on-net and packet data traffic. The use of service (routing) is reviewed by using weighting coefficients to illustrate how services on average use the network. Conversion and load factors, on the other hand, convert voice and data to a commensurable unit by taking the network load caused by the services into account. FICORA uses same weighting coefficients and conversion and load factors for all mobile network operators. The result of the model is a calculation of the unit costs of services and costs of services for different network elements.

The FIFAC model is available in PDF format on the FICORA website at <http://www.ficora.fi/en/index/saadokset/ohjeet/talousvalvontateleyrityksille.html>.

## **8. EFFICIENCY**

According to section 84 of the Communications Market Act, the efficiency of the operation must be taken into account in estimating the cost-oriented price in addition to the costs incurred and a reasonable return on capital. According to the legislative history of the act, the efficiency is assessed by comparing the costs incurred by producing the service with the costs incurred to other telecommunications operators operating in similar circumstances by providing a similar service.

The efficiency shall be assessed if there is reason to doubt the efficiency of the operation of the telecommunications operator. The efficiency of the operation may be questioned if, for instance, the charges collected by the telecommunications operator substantially exceed the general price level or if the cost items presented in the pricing calculation substantially exceed the costs reported by other telecommunications operators operating in similar circumstances. The efficiency is assessed individually for each case. In assessing the efficiency, FICORA does not approve costs that significantly exceed the costs incurred by efficient operation, determined on the basis of reference data, as the base for the pricing of regulated products. If the efficiency is to be assessed, FICORA makes a reference calculation for the regulated wholesale product, using costs it has approved.

## **9. ASSESSMENT OF FLAT RATES FOR MOBILE TERMINATION**

As presented above, the national mobile operators operating in Finland have agreed that from December 2009 onwards flat rates are applied in the pricing of mobile termination. In practice, flat rates (symmetry) mean that operators charge each other equally large tariffs for transmission of call termination on their own network.

European Commission has stated in its opinions and views that call termination rates should be symmetrical, and can be asymmetrical only for justified reasons. The European Regulators Group published also, in March 2008, a joint opinion of the ERG on the symmetry of fixed and mobile

network termination rates<sup>6</sup>. According to the ERG view, mobile termination rates should normally be symmetrical. ERG states that possible asymmetrical rates, which have objective grounds, can be accepted only temporarily. After a transition period, however, the rates should be symmetrical.

In FICORA's opinion, applying flat rates in the pricing of mobile termination is justified due to, for instance, the reciprocity of call termination and for ensuring equal competitive conditions for operators. According to FICORA's opinion, asymmetrical rates can be accepted for a reasonable time period because of, for example, a late entry into the market. In FICORA's view, a new operator in the market may have higher unit costs in the beginning than operators that have been in the market longer, and therefore, asymmetrical rates can be allowed in the early stages of operation. Thus, the need to ensure competition in the long term can also be taken into account. According to FICORA, all operators providing call termination services (inc. MVNOs) should have symmetrical termination rates after a reasonable transition period.

#### FICORA's view on the assessment of flat rates

According to FICORA's SMP decisions, call termination rates charged by national mobile operators operating in Finland should be cost-oriented. According to the Communications Market Act, a cost-oriented price means a price that is reasonable taking into account the costs incurred and the efficiency of the operation. A reasonable return on capital employed is also taken into account. Cost-orientation must be fulfilled also when applying flat rates.

In a draft memorandum dated 6 June 2008<sup>7</sup>, FICORA has examined different alternatives and principles that can be used in assessing the flat rates of call termination. In the draft memorandum, FICORA reviewed both the positive aspects of different alternatives and possible problems related to e.g. reasonable return, efficiency of the operations and investment incentives. In evaluating the alternatives, FICORA used, for instance, Deloitte's evaluations of the suitability of FICORA's model for assessing flat rates, methods used by other national communications authorities in the EU countries, and European Commission opinions on the assessment of call termination.

FICORA's opinion is that flat rates in mobile call termination should be assessed primarily based on cost information in the FIFAC model. According to FICORA, by using the FIFAC model, it is possible to assess the pricing of call termination in compliance with the Communications Market Act.

In determining the flat rates with the FIFAC model, FICORA uses the average costs of mobile operators. FICORA assesses the flat rates of mobile termination based on the unit cost average weighted by traffic volumes that is used in the FIFAC model. FICORA considers that the average weighted by traffic volumes illustrates best the average unit costs of mobile termination.

The assessment of mobile termination pricing includes taking into account the actual costs incurred as well as, for instance, the characteristics of the mobile communications market, such as the reciprocity of call termination and the general price level of mobile termination in Europe.

## **10. FICORA'S ASSESSMENT OF REASONABLE RATES FOR MOBILE TERMINATION**

FICORA has assessed the mobile termination costs of the mobile operators operating nationally (DNA Finland Oy, Elisa Corporation and TeliaSonera Finland Oyj) based on the information provided by the operators. FICORA has evaluated the cost-orientation of the prices according to the assessment principles presented above and has used the FIFAC model in the assessment.

Based on the assessment, FICORA has formed an opinion on the desirable development of mobile termination rates in 2010 and 2011. FICORA's view is based on cost and volume data from 2007 that it has collected from mobile operators. Characteristics of the mobile market, such as the reciprocity of call termination and the general level of termination prices in Europe, have also been taken into account in the assessment. FICORA's view on the development of mobile termination is presented in Appendix 1.

<sup>6</sup> [http://www.erg.eu.int/doc/publications/erg\\_07\\_83\\_mtr\\_ftr\\_cp\\_12\\_03\\_08.pdf](http://www.erg.eu.int/doc/publications/erg_07_83_mtr_ftr_cp_12_03_08.pdf)

<sup>7</sup> Available in Finnish at [http://www.ficora.fi/index/saadokset/lausuntopyynnnot/taloudellinenvallvonta/P\\_21.html](http://www.ficora.fi/index/saadokset/lausuntopyynnnot/taloudellinenvallvonta/P_21.html)

The Communications Market Act limits also the possibilities of other telecommunications operators to price their call termination services. In accordance with section 40(3) of the Communications Market Act, a telecommunications operator with an obligation to establish interconnection shall not be unreasonably charged for the use of the telephone network of the telecommunications operator requesting interconnection. According to the legislative history of the Communications Market Act, a charge is deemed unreasonable if it clearly deviates from the general price level. In its SMP decisions<sup>8</sup>, FICORA has imposed interconnection obligations on all network operators operating in Finland. From this follows that no telecommunications operator is allowed to set unreasonably high call termination charges on other network operators. Thus, FICORA presents in the appended opinion its view on mobile termination rates of also other telecommunications operators operating in the market in addition to those operators that are obliged to price mobile termination in a cost-oriented way.

FICORA follows regularly the data of the mobile network operators' costs and traffic volume as well as the development in the market. According to section 126 of the Communications Market Act, FICORA shall promote cooperation among telecommunications operators and aim at resolving disputes between telecommunications operators primarily through mediation. Therefore, FICORA advises that mobile network operators agree on call termination prices primarily in their commercial negotiations with regard to FICORA's assessments and principles.

---

<sup>8</sup> FICORA's SMP decisions of 4 Jan 2008 on the markets of call origination on a fixed telephone network and call termination on individual fixed telephone networks, and SMP decisions of 6 Feb 2004 and 22 Jun 2006 on the market of voice call termination on individual mobile networks.

## APPENDIX 1: FICORA'S VIEW ON THE DEVELOPMENT OF MOBILE TERMINATION RATES

In December 2006, FICORA published its view on the development of mobile termination rates in 2007-2009. Since then, FICORA has monitored regularly the cost and volume data of the operators as well as the development of the market. Based on the information gathered, FICORA presents a view on the development of mobile termination rates in 2010 and 2011.

FICORA's opinion on reasonable mobile termination rates is based on cost and volume data from 2007 that FICORA has collected from mobile operators. According to the assessment principles that FICORA applies, flat rates for mobile termination are assessed on the basis of mobile operators' average costs weighted by traffic volumes. The FICORA view is based on assessments of cost-oriented prices made using the FIFAC model. In addition, characteristics of the mobile market, such as the reciprocity of the call termination and the general European price level of mobile termination, were taken into account.

According to FICORA, the maximum rates for mobile termination in 2010 and 2011 should be as follows:

Year	Mobile termination price (cents/minute)
2010	4.0
2011	3.5

The above estimates of reasonable mobile termination rates are directed at the termination rates of the operators which have, based on FICORA's SMP decisions, an obligation to set cost-oriented prices for mobile termination.

The Communications Market Act limits also the possibilities of other telecommunications operators to price their call termination services. In accordance with section 40(3) of the Communications Market Act, a telecommunications operator with an obligation to establish interconnection shall not be unreasonably charged for the use of the telephone network of the telecommunications operator requesting interconnection. According to the legislative history of the Communications Market Act, a charge is deemed unreasonable if it deviates significantly from the general price level.

Thus, telecommunications operators without the cost-orientation obligation in the mobile termination market cannot have significantly higher mobile termination rates than the average price level of other Finnish mobile operators. In addition, FICORA's view holds that mobile termination rates should be primarily symmetrical. Asymmetrical rates can be accepted for a reasonable period of time because of, for instance, a late entry into the market since unit costs may be higher in the early stages of operations. Thus, the need to ensure competition in the long term can also be taken into account. In FICORA's view, mobile termination rates of operators that have entered the market later than others and are not under the obligation of cost-orientation should develop so that they reach the symmetrical level. According to FICORA, all mobile operators in the market at present should have symmetrical rates by the year 2010.

FICORA continues to follow regularly both the mobile network operators' cost and volume data and the development of the market. FICORA will update its assessment of a reasonable price level when necessary.