



Date	Our reference	Page
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Your date	Your reference	
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Subject

Case SE/2018/2086: Wholesale call termination on individual public telephone networks provided at a fixed location - Remedies

Case SE/2018/2087: Wholesale local access provided at a fixed location - Remedies

Request for information pursuant to Article 5(2) of Directive 2002/21/EC1

PTS response to the request for information regarding the two cases

1. Please indicate the dates of the public consultation.

There have been three public consultations in regards of the new fixed cost model:

#	Date	Content	URL	PTS Comments
1	2016-06-22	Model reference Document (MRD)	PTS webpage	PTS webpage PTS webpage (ad)
2	2017-09-07	Complete model and documentation	PTS webpage	PTS webpage
3	2018-02-22	Complete model and documentation	PTS webpage	PTS webpage

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2. Please briefly summarise the changes in the cost model and the rationale of such changes.

Principle/specification	New model	Current model
<i>Model principles</i>		
Modelled operator	Hypothetical operator that is vertically integrated	The SMP-operator (although it is a hypothetical operator that is based on the SMP-operator's traffic volume and number of lines)
Approach	Bottom-up model	Hybrid (based on a reconciliation of a top-down model (with data provided by the SMP-operator) and a bottom-up model)
Type of network	Modern network with fibre, FTTH, no fixed wireless (radio)	Fibre as the modern equivalent asset (MEA), with wireless access in rural areas if it is cost efficient
Number of subscribers, market shares	An aggregated market share of 70% of the national active demand, based on an aggregation of the current traffic on all platforms on the Swedish market	The model is based on the actual number of subscribers that use the SMP-operator's network, demand is adjusted to the expected growth
<i>Model specifications</i>		
Footprint for the access network	Complete Geo-modelling of a national access network, based on databases for all roads and dwellings and information of the access nodes. Then the shortest distance from the access node and to the dwellings is calculated through the	In depth calculation of various parameters, such as distances, in 50 samples of access nodes which were extrapolated to a national network

	shortest path-algorithm.	
Re-use of civil engineering assets	18 percent of the civil engineering assets (trenches, ducts and manholes) are considered to be re-used and are valued differently compared to newly deployed assets.	Not taken into consideration.
Micro trenching	25% of the trenches considered to be deployed through micro trenching.	Microtrenching is not considered.
Poles	No poles are deployed in the network.	Poles are deployed in some of the rural areas
Uplift for wholesale costs	No differentiation between regulated and unregulated services regarding wholesale. Cost per line are treated equally.	Differentiation between regulated and unregulated services.
Common cost uplift in the FTR calculation (see below for detailed description of FTR calculation)	The wholesale costs for FTR is calculated based on a billing system (CAPEX) used for FTR and corresponding OPEX. No mark-up for loss on debtors is applied (in line with the MTR-model in Sweden)	The uplift for wholesale costs consisted of a mark-up for commercial non-network costs such as customer wholesale, billing and debtor handling, wholesale other based on common costs and then distributed through an allocation key on regulated access, regulated core services, co-location and non-regulated wholesale. A mark-up for loss on debtors is applied.

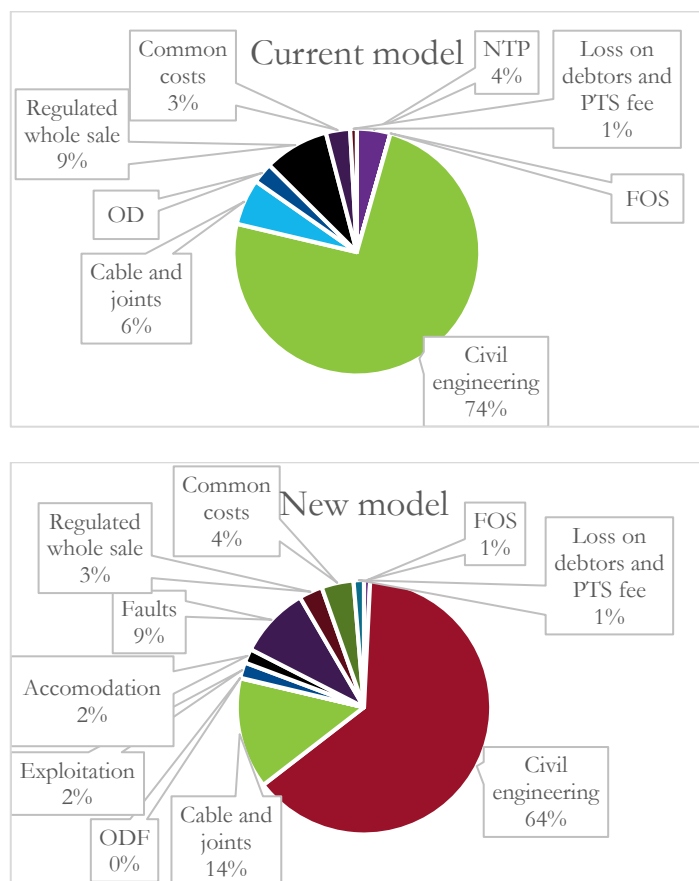
OPEX for access services	Incremental OPEX is calculated separately for Access infrastructure maintenance, Exploitation and planning and IT supervision systems of the access network.	Incremental OPEX is calculated as a percentage of the CAPEX equipment.
WACC (nominal pre-tax)	6.3% (approach unchanged, but lower risk free rate)	7.5%
Copper-adjustment	A fibre network is deployed. But certain network elements are replaced in order to calculate the copper investment, i.e. cables, joints, distribution points and MDF (change if relevant unit costs, lifetimes, price trends and OPEX).	No differentiation between copper and fibre access services

Fixed Termination Rate

The calculation of FTR in the new cost model has some differences compared to the hybrid model. First, the traffic cost is calculated on the cost for 1) TDM Gateway, Media Gateway Module, 2) Core IMS, Session Boarder Controller and 3) Core IMS Core CSFC, which is fewer items compared to the hybrid model which also include costs for Core TDM Gateway: Media Gateway Controller, Core TDM Gateway: Media Gateway Main, Core TDM Gateway Media Gateway, Pure term, Opex, and Core IMS, Pure term Opex. The appendix A exhibits the details of the calculation for FTR. The total costs for single respectively double segments are divided with the number of minutes for the two categories. This generates a cost per minute before uplift of wholesale cost of 0.12 öre for single segments and 0.26 öre for double segment, representing a reduction of 73% respectively 65% compared to the hybrid model. The explanation is that fewer cost items are included as well as that the cost levels are lower.

The calculation of uplift of wholesale costs has also been altered. Based on a lower cost base as the total cost in the hybrid model was SEK 38.8 million in relation to an allocation base of SEK 86.3 million resulted in an up lift for commercial non-network costs of 45%. The uplift in the new cost model is based on a wholesale cost of SEK 7.4 million, consisting of SEK 3.6 million in annualized capex on billing and SEK 3.8 million on opex for the wholesale activity. This is divided with the total voice costs together with a mark-up for common cost which is SEK 5.6 million given an uplift for wholesale cost of 132%. In combination with the registration and contingency fee the cost result are 0.29 öre and 0.60 öre for single segment respectively double segment.

Comparison of cost result per month, LLU raw copper, between the new and current cost model



Altogether, the changes that are listed above demonstrate that the rationale for the cost model has been to make the approach more modern and accurate. The move to geomodelling gives a robust foundation for the calculation of the network distances and inventory. Based on an extensive data collection process

the ambition has been to make the model more transparent and future proof. Moreover, given the extensive fibre deployment in Sweden an economic adjustment of copper calculation has been implemented. The aspect of re-use was not part of the current model enabling us to incorporate that in a new model.

3. We noted that some principles / key assumptions used in the new model are mentioned in the notification on market 3a but not in the notification on market 1 (ex. the valuation of reusable infrastructure or the geographic distribution of the HEO's network). Could you please explain why it is so? Could you please confirm our understanding that all the principles for the cost model apply to both notified markets (as the cost model itself is used to calculate prices for both markets)?

The principles of the model applies to both the regulated market, M1 and M3. However, since the calculation of the increment for FTR is only affected by the core network, hence the investments in the access network and valuation of reusable assets are not applicable for the FTR calculation. For the same reason is the geographical footprint not relevant for the FTR calculation, since pure LRIC is based on traffic related costs which are derived from the IMS¹ and TDM² equipment rather than the investment of the deployment of the core network.

4. Please indicate the impact of the changes in the cost model on prices of fixed termination services and wholesale local access service.
 - a. How do the new prices of FTRs compare to the current prices?

Product	New Price (öre per minute)	Current Price (öre per minute)
Termination, Single Segment	0,29	0,66
Termination, Double segment	0,60	1,07

- b. How do the new prices of wholesale local access services compare to the current prices?

¹ IMS: Session Border Controller: All and IMS: IMS Core: CSFC.

² TDM Gateway: Media Gateway: Module

Product	New Price (SEK per quarter)	Current Price (SEK per quarter)
Raw copper	289	287
Shared copper	106	112
Raw sub-loop	253	233
Shared sub-loop	94	93
PTP raw copper	578	573

WACC

- Regarding the WACC, please explain the calculations leading to a WACC of 6.3% (please provide an excel sheet with the calculations, if possible).

Please see appendix B for detailed calculations of WACC.

WACC	PTS		Explanation
Risk free rate	1,39%	Rf	10-year Swedish Government bonds, calculated as a 7-year average with data retrieved from Bloomberg GSGB10YR Index
Credit risk premium	1,90%	Crp	Spread on corporate bonds with at least five year until maturity, average for the peer group altogether comprising 40 corporate bonds
Tax	22,0%	T	Swedish corporate tax
Cost for debt	2,57%		$(Rf + Crp) * (1-T)$
Risk free rate	1,39%	Rf	
Market risk premium	5,54%	Mrp	Weighted average of three different methods and based on nine data sources
Beta	0,89	B	Calculated as a 5 year average with one observation per week, STOXX Europe 600 Index

Cost for equity	6,32%		$R_f + M_{rp} * B$
Gearing	38%	G	Based on the peer group, 12 major European operators, five year average
WACC post tax	4,90%		Cost for equity * (1-G) + G * Cost for debt
WACC pre tax	6,30%		WACC post tax/ (1-T)

The method used to calculate the WACC consists of the following six factors:

- 1) PTS use the yield on Swedish 10-year government bonds in order to determine the risk-free rate, which is calculated on a 7-year average with one observation per month. The data is retrieved from Bloomberg and is labeled GSGB10YR. The calculation is done for the period 2011-2017 and result in a risk free rate of 1.39 percent.
- 2) The gearing for the peer group, which consists of 12 major European operators, is 38 percent and based on an average during five years, using full year figures. Gearing is defined as net debt, which is interest bearing debt less cash and cash equivalent, in relation to enterprise value, which is net debt plus market capitalization.
- 3) Credit risk premium is the difference between the risk-free rate and the return on corporate bonds (bond yield). The calculation is based on yields on 40 corporate bonds issued by companies in the peer group, and is done in two steps. First, an average is calculated per company and based on up to four bonds per company in the peer group. The criteria to identify the relevant bonds has been that they should have at least five year to maturity. The average yield on the bonds is 175 basis point to which is added 15 basis points for transaction cost and thereby reflect the cost of capital on the debt market. Altogether this gives a credit risk premium of 190 basis point (1.90%)
- 4) Tax: The current corporate tax in Sweden is 22% which is used in the WACC-calculation.
- 5) For the equity risk premium PTS combines three methods: 1) implicit pricing, which is based on market prices, 2) historical development, which is calculated as the return on equity over the long term risk free rate, and 3) survey, investors and management expectations on future return on equity.

Based on nine data points a weighted average is calculated which gives an equity risk premium of 5.54%.

6) Beta measures the correlation between returns on shares in a specific company and returns on the entire market in the form of an index, which in this case is the STOXX Europe 600 Index. The calculation is done in several steps and based on an average for each company with one observation per week over five years, and then calculated as an average for the peer group. This result in an asset beta of 0.55, and with a debt ratio of 38 percent gives an equity beta of 0.89.

6. Given the values of the risk free rate (1.39%) and the debt risk premium (1.9%), please explain the calculations that led you to a cost of debt of 2.57%.

Based on the risk free rate on 1.39% and a credit risk premium of 1.90% combined with a corporate tax rate of 22% the calculation is done according to the following formula:

$$(1.39\% + 1.90\%) * (1-22\%) = 2.57\%$$

7. Please explain why you considered appropriate to use different averaging periods for the risk free rate (7 years), the gearing (5 years), the debt premium (4 years) and the beta (5 years).

PTS has historically calculated beta and gearing based on a five year average, which has been the established practice. The risk free rate was calculated as a 6 month average for the WACC up until 2010 and the plan was that PTS should have updated the WACC annually. But this did not happen and when the approach to the calculation of WACC was revised in 2010-2011 we wanted to set a WACC that could be relevant for the entire regulatory period of three years. We proposed initially to use a combination of historical data with a three year average in combination with two year forward looking numbers based on estimates from investment banks. But this meet criticism in the public consultation and the suggestion from the market was to use a longer historical period, like a business cycle, to calculate the risk free rate. Based on historical data for the length of business cycles we concluded that seven years is an appropriate period to reflect the length of a business cycle. We therefore modified the approach and established the seven year period to calculate the risk free rate which PTS has used since 2011. The calculation of the credit risk

premium is based on the spread of corporate bonds and as the duration period varies between corporate bonds we have strived to calculate the average spread over a couple years when it is possible. This has enable us to base the number of up to four years for calculating the bond spreads.

8. With respect to the beta and the gearing, please indicate/confirm whether you have calculated beta and gearing values for the incumbent and/or for a peer group of operators. If not, please explain why you have not calculated beta and gearing for Telia.

PTS have used a peer group to calculate beta, gearing and credit risk premium. The peer group consist of 12 major operators in Europe (incumbents) that are vertically integrated and publically listed, including Telia Company. The following companies are included in the peer group.

Company	Ticker
BT Group	BT/A LN
Deutsche Telekom	DTE GY
KPN	KPN NA
Orange	ORA FP
Proximus	PROX BB
Swisscom	SCMN VX
TDC	TDC DC
Telecom Italia	TTT IM
Telefonica	TEF SM
Telekom Austria	TKA AV
Telenor	TEL NO
Telia Company	TELIA SS

9. In its comments to the public consultation Telia notes that the calculation of the beta value is based on one observation per undertaking in the period 2013-2017, resulting in 12 observations. In relation to the beta, but also to the gearing value, could you please explain why PTS did not use weekly/monthly observations for the companies in the peer group?

The calculation of beta is done in several steps and based on an average for each company with one observation per week over five years. This means that

the average per company is calculated on 260 data points. This generates an average per company in the peer group, which is then used to calculate the average for the peer group. This means that the average is calculated on 12 data points (an equity beta per company) which gives the beta for the peer group. But the total number of data points used in the calculation is 3120.

- a. Could you please also indicate how the values of the beta and gearing would change if PTS used more frequent observations instead of a spot value per company?

As stated above the calculation of beta is based on 3120 data points, which means the frequency is one observation per week over five years. One alternative would have been to use daily observation over five years but we have not done that.

10. Please confirm our understanding that PTS is using the same level of WACC for calculating the costs of fibre and copper networks (i.e. there is no NGA risk premium).

Yes, that is correct. PTS does not apply any additional risk premium for NGA besides the ones that are included in the WACC formula as we regard the WACC as sufficient to compensate for the involved risk.

Economic Replicability Test (ERT)

11. We note that PTS proposes not to include the costs of fibre installation to the SDUs (road-to-home) for the purpose of ERT calculation. In that regard please explain:
 - whether and how such installation costs are regulated;
 - whether they are calculated by the same cost model;
 - what the level of such installation costs and price paid by retail customer is;
 - whether such exclusion from the ERT calculation concerns only the installation to SDUs, but not MDUs. If yes, why is the situation different with regard to MDUs?

The ERT Principles was originally notified in early 2015 and are currently in force. Please note that the complete ERT is not subject to this notification, but rather a small change in principle #21: Kalkylränta (cost of capital, WACC). The change is the reference to which WACC to be applied in the test. Currently the principle #21 refers to the current cost model for the fixed network (the Hybrid model), but according to the new wording the principle now refers to the WACC used in the cost model for the fixed network at any time in force.

Since the new cost model is not a hybrid model, but rather at BU-model, the old wording referring to at any time in force hybrid model is not applicable any longer.

