Advisory Services

GNCC Spectrum Pricing Model project
Final report

Strictly private and confidential
Final version

10 October 2014

pwc

Important message to any person not authorised to have access to this report

Any person who is not an addressee of this report or who has not signed and returned to PricewaterhouseCoopers Central Asia and Caucasus B.V. Georgia Branch a Release Letter, is not authorised to have access to this report.

Should any unauthorised person obtain access to and read this report, by reading this report such person accepts and agrees to the following terms:

1. The reader of this report understands that the work performed by PricewaterhouseCoopers Central Asia and Caucasus B.V. Georgia Branch was performed in accordance with instructions provided by our addressee client and was performed exclusively for our addressee client's sole benefit and use.
2. The reader of this report acknowledges that this report was prepared at the direction of our addressee client and may not include all procedures deemed necessary for the purposes of the reader.
3. The reader agrees that PricewaterhouseCoopers Central Asia and Caucasus B.V. Georgia Branch its partners, directors, employees and agents neither owe nor accept any duty or responsibility to it, whether in contract or in tort (including without limitation, negligence and breach of statutory duty), and shall not be liable in respect of any loss, damage or expense of whatsoever nature which is caused by any use the reader may choose to make of this report, or which is otherwise consequent upon gaining of access of the report by the reader. Further, the reader agrees that this report is not to be referred to or quoted and not to distribute the report without prior written consent of PricewaterhouseCoopers Central Asia and Caucasus B.V. Georgia Branch.

This report has been prepared solely for the use by Georgian National Communication Commission ("GNCC") for the purpose set out in the contract with PricewaterhouseCoopers Central Asia and Caucasus B.V. Georgia Branch, under the terms and conditions stipulated under this Contract, and is not to be used for any other purpose. We do not accept any responsibility for losses occasioned to GNCC or to any other party as a result of the circulation, reproduction or use of this cost model methodology contrary to the provisions of this paragraph.

The report is based on the research and analysis performed by PricewaterhouseCoopers Central Asia and Caucasus B.V. Georgia Branch. The data and information used in this report were provided by GNCC as part of the data collection for this project and were not independently verified unless specifically stated otherwise in the report. This report has not been independently verified and we therefore do not provide any assurance as to its completeness or accuracy.

Georgian National Communications
Commission
Ketevan Tsamebuli Ave/ Bochorma St 50/18
0144 Tbilisi, Georgia

Dear Sir/Madam,

Subject: GNCC Spectrum Pricing Model project for GNCC

This report has been prepared by PricewaterhouseCoopers Central Asia and Caucasus B.V. Georgia Branch ("PwC") for Georgian National Communications Commission ("GNCC", the "Client") under the terms of the Contract with PwC (the "Contract") and its contents are strictly confidential.

This report has been prepared for the purposes of consulting services related to developing the benchmarking and business case models for pricing of the spectrum frequency bands as an input into the setting of the reserve price/administrative incentive prices for inidvidual spectrum bands in 800, 900, 1800, 2100 and 2600 MHz.

This is a draft report. The comments in this draft report are subject to amendment or withdrawal. Our definitive findings and conclusions will be those set out in the final report.

We draw your attention to important comments regarding the scope of our work, the purpose for which the report is to be used, our assumptions and limitations in the information on which the report is based on. Accordingly, this report may not have identified all matters that might be of concern to you.

Save as described in the contract or as expressly agreed by us in writing, we accept no liability (including for negligence) to anyone else or for any other purpose in connection with this report and it may not be provided to anyone else.

Yours faithfully

Altaf Tapia, Country Managing Partner

PricewaterhouseCoopers Central Asia and Caucasus B.V. Georgia Branch

Altaf Tapia
Country Managing Partner
T: +995 322 508 061
altaf.tapia@ge.pwc.com

PricewaterhouseCoopers Central Asia and Caucasus B.V. Georgia Branch,
#7 Bambis Rigi St, Business Center Mantashevi, Tbilisi, Georgia
Tel.: +995 32 250 80 50
Fax: +995 32 250 80 60,
www.pwc.com/ge

Contents

Executive summary

Executive summary

- As part of the Spectrum Pricing Model project we have **developed pricing model** based on benchmarking approach and business modelling
- Benchmarking model is **based on the auction results** collected for auctions from public sources where full range of data for modelling was available
- **Benchmark prices were set as** average and weighted average (adjusted for the differences in the size of the market and its maturity) and split by prices with and without coverage obligation
- Business modelling approach is **based on the discounted cash flow modelling** and allocation of present value of spectrums to individual spectrum bands using **spectrum-specific coefficients**
- The calculated spectrum prices expressed in GEL/MHz/capita using the abovementioned approaches **are as follows**:

***Additional findings and considerations**:*

- *Price with coverage for spectrum bands is estimated using benchmarking approach but was not modelled using business modelling due to unknown coverage obligation. See "Further considerations" section on suggestions to determining price with coverage obligation.*

in GEL/MHz/capita	Benchmark Average	Benchmark Weighted Average	Benchmark Average - with cover. obligation	Benchmark Average - without cover. obligation	Business case - hypothetical operator
800 MHz	0,7213	0,6525	0,7140	0,7849	0,5669
900 MHz	0,3086	0,3154	0,0087	0,3943	0,5499
1800 MHz	0,2880	0,2606	0,2288	0,3154	0,3171
2100 MHz	0,2830	0,2830	N/A	0,2830	0,1922
2600 MHz	0,0525	0,0541	N/A	0,0525	N/A

Source: PwC calculations

Chapter 1: Project overview

Overview of the project

Context of the project

GNCC as a national regulatory authority ("NRA") of communication market in Georgia is undergoing a major project of consolidation and re-farming of mobile spectrum. As part of this project GNCC plans to terminate all the existing licenses currently awarded to mobile operators in Georgia and re-issue new licenses to them in the same frequency spectrums and the same volume of bandwidth with standardized 15-year license duration and for the standardized price per MHz within each spectrum.

The spectrums being considered are:

- 800 MHz
- 900 MHz
- 1800 MHz
- 2100 MHz
- 2600 MHz

For the issuance of these new licenses GNCC will need to estimate the fair price for each of the spectrums that will reflect the market value of each spectrum.

Additionally, as part of the project GNCC also intends to organize an auction to offer available bandwidth within 800 MHz spectrum for which it will need to set reserve price for the auction.

Objectives of the project

Objective of the spectrum pricing model project is to develop 2 models for the estimation of the market price of the spectrums:

1. Benchmarking model
2. Business case model

The models will serve to estimate:

- Reserve price for the 800 MHz auction
- Administrative price based on estimated market price to set the license fees for the newly issued licenses in 800, 900, 1800, 2100 and 2600 MHz spectrums

Role of PwC

PwC provided consulting services in relation to the setting of the reserved price for the spectrum tender and the administrative fee for the renewal of the existing licenses.

This included the development of the benchmarking and business case models, data collection and population of the models with the data from publicly available data sources, assumptions and data provided by GNCC.

Project approach

For the estimation of the value of spectrum and the estimation of reserved price we used **the 2-module approach**, where in the 1st module we used the **benchmarking approach** and for the 2nd module we used the **bottom-up financial modelling**:

1 Module 1 – calculation using the international benchmarking

- In the first module we calculated an estimate for the value of spectrum and reserved price based on the international benchmarking from the recent auctions in the European countries:
  - We collected the data from the results of the radio spectrum auctions from European countries from recent years
  - We performed the sizing calculations to adjust the auction values of the benchmarked countries to the Georgian market situation using the comparative parameters such as:
    - Population
    - GDP
    - Size of the spectrum
    - F/X rates
    - License duration
    - Year of the auction

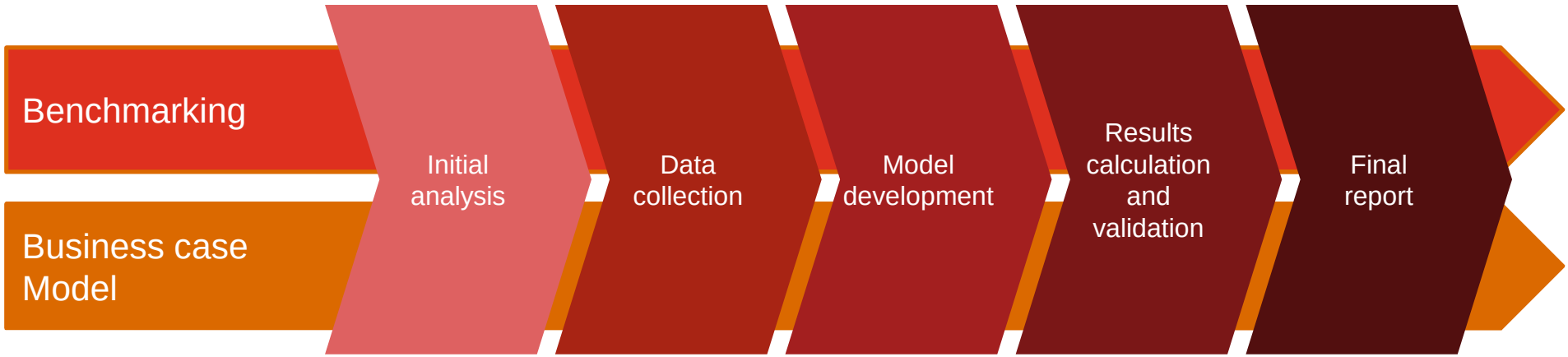
2 Module 2 – development of the business case model

- In the second module we developed a business case model for the purpose of the bottom-up calculation of the price of spectrum and reserve price, that is used for validation of the benchmark model:
  - We modelled the costs and revenues of the potential operator on the market
  - For the revenue modelling we used the demographic data, penetration and average revenue per user
  - For the cost modelling we used international cost benchmarks

The work for both modules will be performed simultaneously in several steps

Our work was performed **in several steps**. We worked on the modules **simultaneously**, that means we were working on benchmarking and business case module at the same time. The steps that were followed were based on our experience from previous projects and included:

- Initial analysis
- Data collection
- Model development
- Results calculation and validation
- Final report



The steps of the project are described in detail below

In the first step of the project we performed the initial analysis of the Georgian telecommunication market.

We prepared the data requirements that need to be collected in the next steps.

We also performed the initial analysis of other countries that we involved in the benchmarking.

In the next step we performed the data collection of the data needed for the benchmarking modelling as well as the data needed for the business case model development.

This included data such as auction prices from other countries, demographic data, macroeconomic data, cost and price benchmarks, etc.

Following the data collection we developed the models:

- **Benchmarking model** – for the adjustment of the international benchmarks to calculate the expected benchmark for Georgian market
- **Business case model** – for the bottom-up calculation of the price of spectrum and the reserved price

We calculated 2 sets of results – one using the benchmarking model and one using the business case model.

Both results were validated with the regulator against the expectations and sense-checked against the market situation.

We prepared the final report summarising the approach to the modelling, the data and assumptions used in the modelling and the results of the modelling.

Chapter 2: Benchmarking

Benchmarking model approach

- **Benchmarking model** is a comparative model that compares the final prices for the spectrum bands based on the auctions organized in selected European union and other countries.
- The purpose of the benchmarking model is to provide **additional price information** that can be used in the process of setting reserve or administrative prices for spectrum bands in Georgia. However, since the benchmarking compares auction results from different economies, different auctions set ups, different market situations or different market potential, the resulting prices may differ significantly, therefore the results of benchmarking and their application should be considered with special care
- Benchmarks are collected for auctions organized **in last 10 years**
- Since the auctions were organized in different years, the resulting price of each auction has to be **adjusted for inflation**
- The auctioned licenses were issued for **different durations** therefore the resulting price for each auction has to be adjusted to the same duration of the license
- The auctioned licenses were issued in different countries with different economic environments and priced in local currencies, therefore the resulting price for each auction has to be adjusted for **purchasing power parity** and converted using **historical FX rates**
- The final adjusted prices in GEL per MHz per capita are calculated for each auction
- The data is **further cleansed** to exclude statistical extreme values and adjusted for country specifics, such as population density or maturity of the market

Key parameters of the benchmarking model

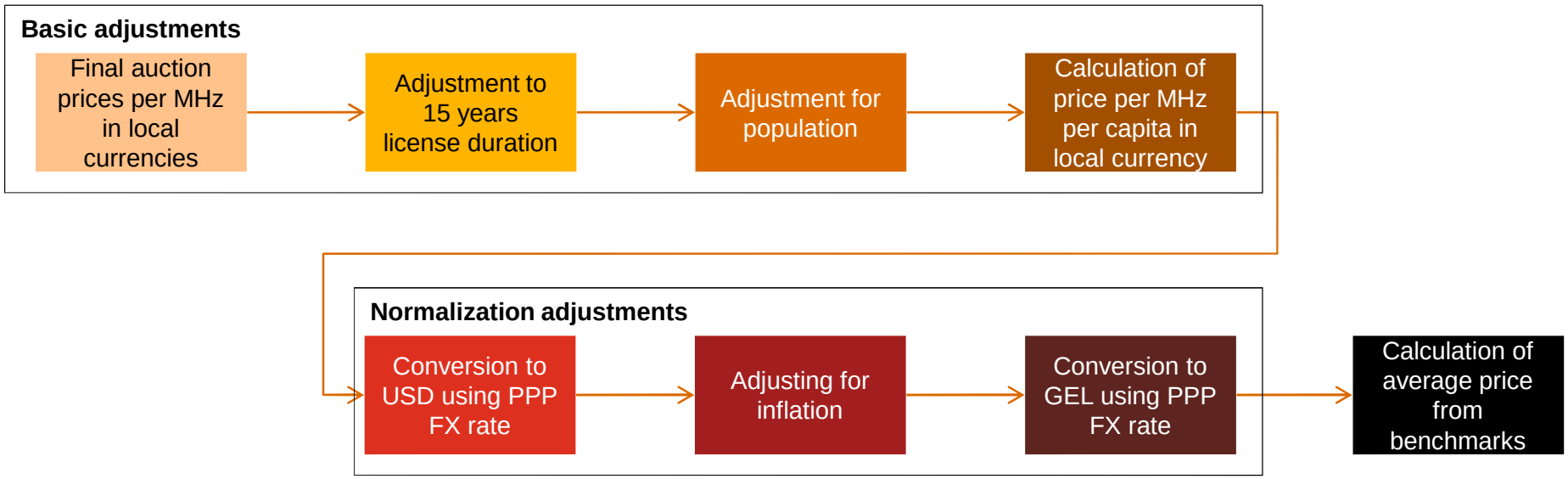
1. **Period of auctions** – last 10 years
2. **Countries included** – EU, non-EU in Europe, CIS
3. **Spectrum bands** – 800 MHz, 900 MHz, 1800 MHz, 2100 MHz, 2600 MHz (where spectrums were auctioned in packages, such data is not included)
4. **License duration to which the price is adjusted** – 15 years
5. **Conversion currency** – USD (common currency to which the original currencies are converted to using PPP FX rates)
6. **Final currency** – GEL (currency in which the final prices are presented)
7. **Inflation rates** – US CPI (inflation used to adjust prices to 2014 price level, consumer price index of conversion currency is used)
8. **Discounting interest rate** –actual average WACC of Georgian mobile operators provided by GNCC

Process of benchmark calculation

Benchmark calculation process consists of collection of data from auctions (such as auctioned spectrums, prices, license durations) and subsequent conversions of the auction price to adjust them for different duration, year of the auction, currency of the auction, purchasing power parity of the country and re-calculating it to price per MHz and per capita.

Once all individual auction prices are adjusted and converted to GEL per MHz per capita, the price benchmarks for all considered spectrum bands are calculated as average price calculated within the spectrum band. In addition, minimum, maximum and median price for each spectrum band is presented as well as number of auctions included in the benchmark.

Process of benchmark calculation



Data collection and auction prices

Data collection

In the first step of benchmarking process that data are collected based on the defined parameters of benchmarking.

The following data categories are collected for individual auctions:

- **Country** – e.g. Austria, Germany, Moldova,…
- **Spectrum band** – e.g. 800 MHz, 900 MHz,…
- **Spectrum width** – e.g. 2x10 MHz, 2x5 MHz, 1x5 MHz,…
- **License duration** – e.g. 10 years, 15 years,…
- **Year of auction** – e.g. 2004, 2005, 2006,…
- **Currency** – e.g. EUR, GBP, SEK,…
- **Value in local currency** – e.g. total final auction fee
- **Coverage obligation** – obligation to cover certain % of population or area

Additional information collected for individual auctions is the coverage obligation (if it was part of the license terms).

The data are collected from publically available sources, for example the websites of the national regulatory authorities in individual countries or industry studies or reports summarizing recent auctions.

Auction prices

In the next step the basic price per MHz in local currency is calculated by dividing the value of the spectrum in local currency by the spectrum width that was auctioned:

$$Price\ per\ MHz\ in\ local\ currency = \frac{Total\ value\ in\ local\ currency}{Auction\ spectrum\ width}$$

Adjustment for license duration and population

License duration

Adjustment for different license duration is done by calculating ”annual profit stream”, i.e. annualizing the auction fee using the net present value (NPV) calculation, and then re-calculating the annual profit stream to 15-year license duration. The discounting factor used in the NPV calculation is average WACC of the Georgian mobile operators.

The calculation formulae is as follows:

$$Discounted\ price\ per\ MHz\ in\ local\ currency = \frac{Price\ per\ MHz\ in\ local\ currency}{(1-(1+WACC)(-^{License\ duration)}/WACC)} *(1-(1+WACC)^{(-15)})/WACC)$$

Where:

- License duration – original duration of the auctioned license
- 15 – duration of the license to which the price is converted
- WACC – weighted average cost of capital

Population

In the next step the discounted price per MHz in local currency is divided by the population of the country of the auction in the year of the auction:

$$Discounted\ price\ per\ MHz\ per\ cap\ in\ local\ currency = \frac{Discounted\ price\ per\ MHz\ in\ local\ currency}{Population\ of\ the\ country\ of\ auction}$$

The source for population statistics is Eurostat and the population statistics data is collected by country and by year.

Adjustment for purchasing power parity, FX conversion and inflation

Adjusting for purchasing power parity and FX conversion

In this step the discounted auction prices per MHz per capita in local currencies are converted to a common currency and adjusted for purchasing power parity to normalized them to comparable level from the perspective of price and economic differences between countries.

The calculation formulae is as follows:

$$Discounted\ price\ per\ MHz\ per\ cap\ in\ USD\ in\ PPP =$$

$$Discounted\ price\ per\ MHz\ per\ cap\ in\ local\ currency\ /\ PPP\ LCU/USD\ FX\ rate$$

Where:

- PPP LCU/USD FX rate – FX rate expressed as units of local currency for 1 USD in PPP in the year of auction

The source data for PPP FX rates is the World Development Indicators database of the World Bank.

Adjusting for inflation

Since the auctions in the benchmark were held in different years, their results have to be adjusted for the inflation between the auction year and the current year. US consumer price index is used for the inflation adjustment:

$$Inflation-adjusted\ discounted\ price\ per\ MHz\ per\ cap\ in\ USD\ (PPP) =$$

$$Discounted\ price\ per\ MHz\ per\ cap\ in\ USD\ (PPP) * Cumulative\ US\ CPI$$

Where:

- Cumulative US CPI – cumulative US inflation between the year of auction and current year

The source for inflation data is Bureau of Labour Statistics of United States.

Final price calculation in GEL/MHz/cap

Final price calculation

In the final step the inflation-adjusted price in USD is converted to GEL using PPP FX rate:

$$Inflation-adjusted\ discounted\ price\ per\ MHz\ per\ cap\ in\ GEL = Inflation-adjusted\ discounted\ price\ per\ MHz\ per\ cap\ in\ USD\ (PPP) * PPP\ GEL/USD\ FX\ rate$$

Where:

- PPP GEL/USD FX rate – actual FX rate expressed as units of GEL for 1 USD in PPP

The source data for PPP FX rates is the World Development Indicators database of the World Bank.

Subsequent adjustments to calculated weighted average price

The final prices calculated from the benchmarked auctions represent the estimation of the market value of the spectrums bands in different countries and are used to calculated average price by spectrum band and/or by country.

However, as the prices are results of local auctions that reflect local country specifics, additional adjustments are introduced into the benchmarking model in order to calculate weighted average prices that uses weights to reflect the differences between the countries for the following indicators:

- **Area** – as an indicator of the relative physical size of the network
- **Density** – as an indicator of the relative population density of the market
- **Mobile penetration** – as an indicator of the relative potential of the market
- **Mobile broadband penetration** – as an indicator of the relative maturity of the market represented by the development of data services
- **Economic power** – as an indicator of the relative overall economic development of the market

Data and weights used for weighted average price calculation

- **Area** – total area of the country in km2. Source: Eurostat, World Development Indicators, The World Bank, 2014
- **Density** – average density in population per km2. Source: Eurostat, World Development Indicators, The World Bank, 2014
- **Mobile penetration** – mobile subscriptions per 100 inhabitants. Source: World Development Indicators, The World Bank, 2014
- **Mobile broadband penetration** – mobile broadband subscriptions per 100 inhabitants. Source: International Telecommunication Union, 2013
- **Economic power** – Gross domestic product per capita in PPP (in current international USD). Source: World Development Indicators, The World Bank, 2014

For each country, the relative weights are set based on the relative difference between the abovementioned indicators of the considered country and of Georgia. The weights used in the model gives higher weight to countries with lower relative difference of each indicator. The weights for ranges of relative differences used in the model are as follows:

- More than 100% or less than -100%: 1
- 70% to 100% or -70% to -100%: 2
- 30% to 70% or -30% to -70%: 3
- 10% to 30% or -10% to -30%: 4
- Between 10% and -10%: 5

Statistical cleaning of the input data and final presentation of the results

In the last step the input data of the auctions are cleaned to **exclude auctions with extreme prices**.

Extremely low or high prices of auctions can distort the calculation of the average prices for each spectrum band. Therefore these extremes were excluded from the calculation.

For the purpose of the statistical cleaning the auctions with final prices in GEL/MHz/capita **below the 5th percentile** and **above 95th percentile** for each of the spectrum bands were excluded from the benchmark.

Presentation of final results

Benchmarking results are summarized by spectrum band and by spectrum band by country. The benchmarked prices are **shown in 3 tables**:

- Benchmark prices for all auctions, split by paired and unpaired spectrums
- Benchmark prices for auctions without coverage obligation, split by paired and unpaired spectrums
- Benchmark prices for auctions with coverage obligation, split by paired and unpaired spectrums

The benchmark prices **are provided as**:

- Minimum price
- Maximum price
- Average price
- Weighted average price
- Median price

		Prices per MHz per capita in GEL				
Spectrum (MHz)	No. of samples	Min.	Max.	Average	Weighted Average	Median
800	35	0,0123	2,4156	0,8162	0,7505	0,7950
900	11	0,0076	0,7720	0,3234	0,3317	0,1414
1800	18	0,0052	2,1146	0,3515	0,3213	0,1899
2100	2	0,1888	0,3773	0,2830	0,2830	0,2830
2600	6	0,0000	0,4221	0,0581	0,0608	0,0112

Chapter 3: Business Case

Price estimation methodology

Description of price estimation methods used

- For the purposes of estimating the market value of the spectrum, three basic approaches have been considered: (i) income approach (ii) market approach and (iii) net asset approach. The basic premise of the approaches are as follows:

1. **Income approach** – The income approach indicates the market value of an asset (e.g. business enterprise) based on the present value of the cash flows that the asset can be expected to generate in the future. Such cash flows are discounted at a rate (the cost of capital) that reflects the time value of money and the risks associated with the cash flows. There are several methodologies for the application of the income approach such as DCF (discounted cash flow) to entity, DCF to equity or APV (adjusted present value).
2. **Market approach** – The market approach indicates the market value of equity or a business enterprise based on a comparison of the subject company to comparable publicly traded companies, or an analysis of statistics derived from transactions in the relevant industry as well as prior transactions involving the subject of the valuation.
3. **Net assets approach** – This approach indicates the market value of the equity or business enterprise by adjusting the assets and liabilities to their market value equivalents. This approach is based on the summation of the individual piecemeal values of the underlying assets and liabilities.

- We will apply the **income approach** using the discounted cash-flow (DCF to entity) methodology as our primary method as it enables the appropriate reflection of future earnings potential and its specific aspects in relation to the Operator. Please note that the term 'Operator' refers to the hypothetical mobile network operator active in Georgian market which holds 33% market share.
- We will apply the **market approach** using a transactions based market comparison method as our supporting method. We will identify a sample of transactions with companies in the industry completed in recent years, which form the basis for the application of this method.
- We will not use the **net assets approach** as we consider the aforementioned two approaches more appropriate for a value indication of an operational company that is able to generate stable positive cash flows in the foreseeable future.

1. Income approach

Methodology

- The income approach represented by the DCF to entity method expresses the market value of an enterprise based on the current value of expected cash flows to be generated in the future. These cash flows are discounted using the discount rate (cost of capital) that reflects the time value of money and the risks associated with generating this cash flow.
- The DCF method approach used in this business case comprised the following key steps:
  - Estimating the future cash flows of the Operator for the projected period (2015-2029);
  - Discounting of such cash flows to present value using a specific rate which takes into account the risks of achieving them and the time value of money;
  - When valuing the Operator, only a 15-year (i.e. finite period) forecast was used, as this is the period for which the GNCC will be allocating spectrum usage licenses. Thus, the terminal value from the expected cash flows after the explicitly projected period (i.e.15 years) has not been taken into account;
- The result of the DCF to entity method is an enterprise value i.e. the fair value of the Operator.
- For the value allocation to respective technologies (2G, 3G, 4G) and subsequent split into spectrum bands (800MHz,900MHz, 1800 MHz, 2100 MHz, 2600MHz) please refer to the following page.

Peer group

- Some of the parameters used in the model refer to the benchmark value of a peer group. Peer group consists of a selection of comparable companies which meet all of the following criteria:

  1. listed company

  2. company located in the CEE region, CIS country (including Russia) or Turkey

  3. revenues from mobile services (voice and data) comprise at least 40% of total operating revenues of the company
- In addition, the peer group (i.e. all operators together) should have a combined revenue share from mobile services of more than 50%.
- Selected financial ratios of the peer group (e.g. depreciation/revenue, net working capital /revenue, CAPEX/revenue) were then used as benchmark values in the DCF model (see further in this report).
- For the details of the operators included in the peer group see Appendix 5

2. Market approach

- The market approach to valuation leads to an estimate of the market value of the business based on comparison with publicly traded companies active in the same or similar industry or with companies that were subject to public or private transactions.
- It is typically not possible to find a comparable company that is identical. The comparability of companies is often limited due to the fact that they are highly diversified, publicly traded companies doing business in other geographic and economic environments.
- The initial step in the application of this method is the identification of the recent transactions with comparable companies in the same or in a similar industry.
- The resulting list of comparable transactions includes information from 12 completed deals from the CEE and CIS countries, whose principal activities include provision of mobile telecommunication services. The transactions were completed in the last three years.
- We have collected and analysed data on the comparable transactions and we established relevant valuation multiples. We have considered three valuation multiples: (i) enterprise value ("EV") to Revenues and (ii) EV to EBITDA and (iii) EV to EBIT. The observed valuation multiples have been then applied to the results of the Company with the aim of estimating its enterprise value. Generally, while using the market approach, the valuation multiples are applied to the business results prior to the Valuation date (last fiscal year or the last twelve months), or to the values planned for the very next period. We believe that using the FY13 year end results is the appropriate assumption to make.
- After eliminating the extreme values in market multiples sample, we have multiplied the relevant performance indicator of the Company (revenue, EBITDA, EBIT) by a corresponding median value from the transaction multiples sample in order to arrive at the indicative valuation range. We used the results of the market approach valuation to cross-check the spectrum valuation through DCF model i.e. income approach. The estimated value of the Company should not be significantly different.

Comparable transactions – selection criteria

Company subject to transaction ("Target")	Mobile network operator
Countries	CEE, CIS (including Russia)
Period reviewed	Last three years
Transaction multiples analysed	EV/ Revenue, EV/EBITDA, EV/EBIT
Number of comparable transactions identified	12
Source of information	Mergermarket.com

Overall modelling overview – income approach

Approach to modelling

The model calculates the present value of the licenses for hypothetical Georgian operator for each spectrum band and based on that the market price for each spectrum .

The model starts with the modelling of revenues of hypothetical operator which are calculated using the modelled number of subscribers and ARPU.

The revenues are then used to calculated the operator's EBITDA and further adjusted to exclude the cash outflows represented by CAPEX, Income tax and net working capital to get the value of free cash flows in each of the modelled years.

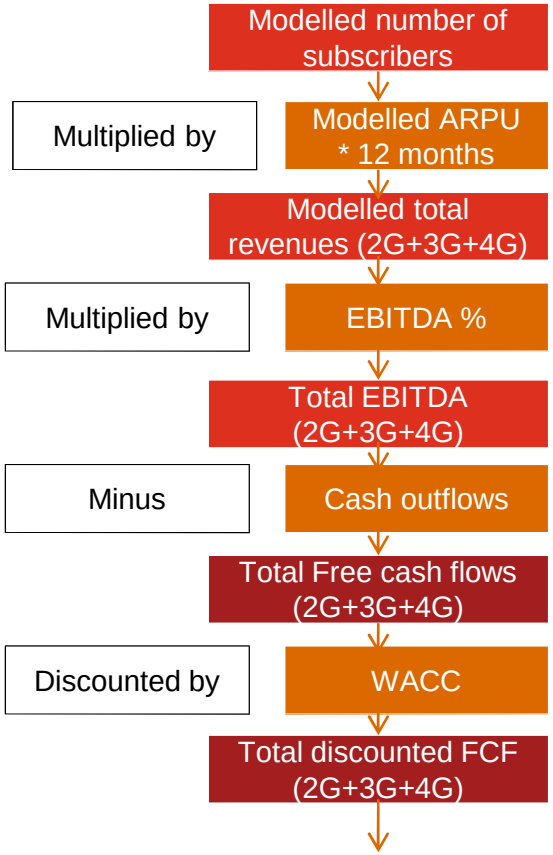
The free cash flows are subsequently discounted to get the present values in each of the modelled years. The present values are then split by technology (2G, 3G and 4G) and within these technologies allocated to spectrum bands.

Present values for each spectrum bands for each modelled year are then summed up to get the present value of each spectrum band at the valuation date.

These present values are then further adjusted for the contributory asset charges (CaC), i.e. the charges for other assets used in the generation of the cash flow to get the present value of the licenses for hypothetical Georgian operator.

In the last step the total present value of the licenses is allocated to individual spectrum bands using commercial, technical and strategic coefficient and price in GEL/MHz/capita is calculated.

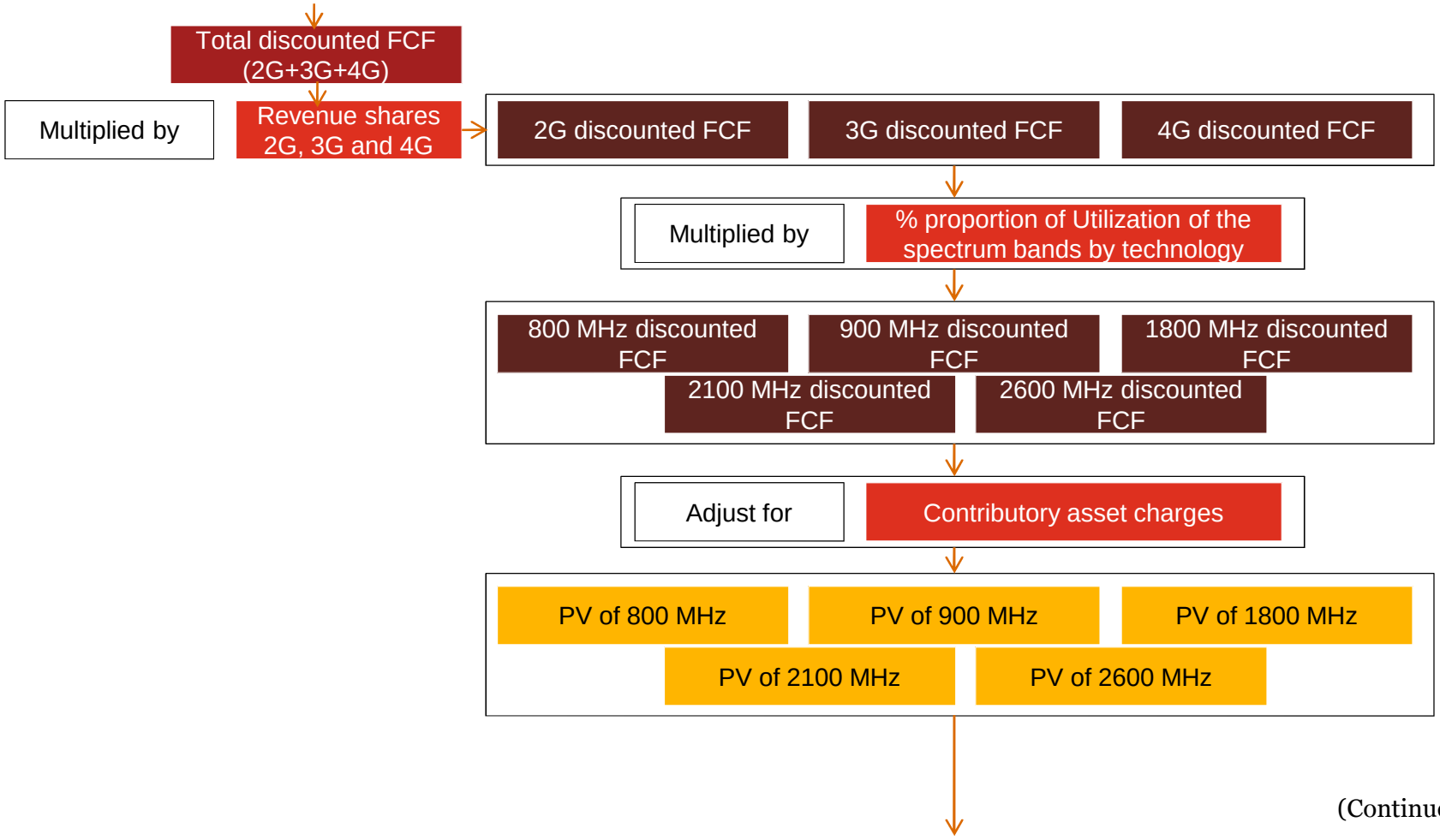
Illustration of the overall modelling approach



(Continues on the next page)

Overall modelling overview – income approach (2)

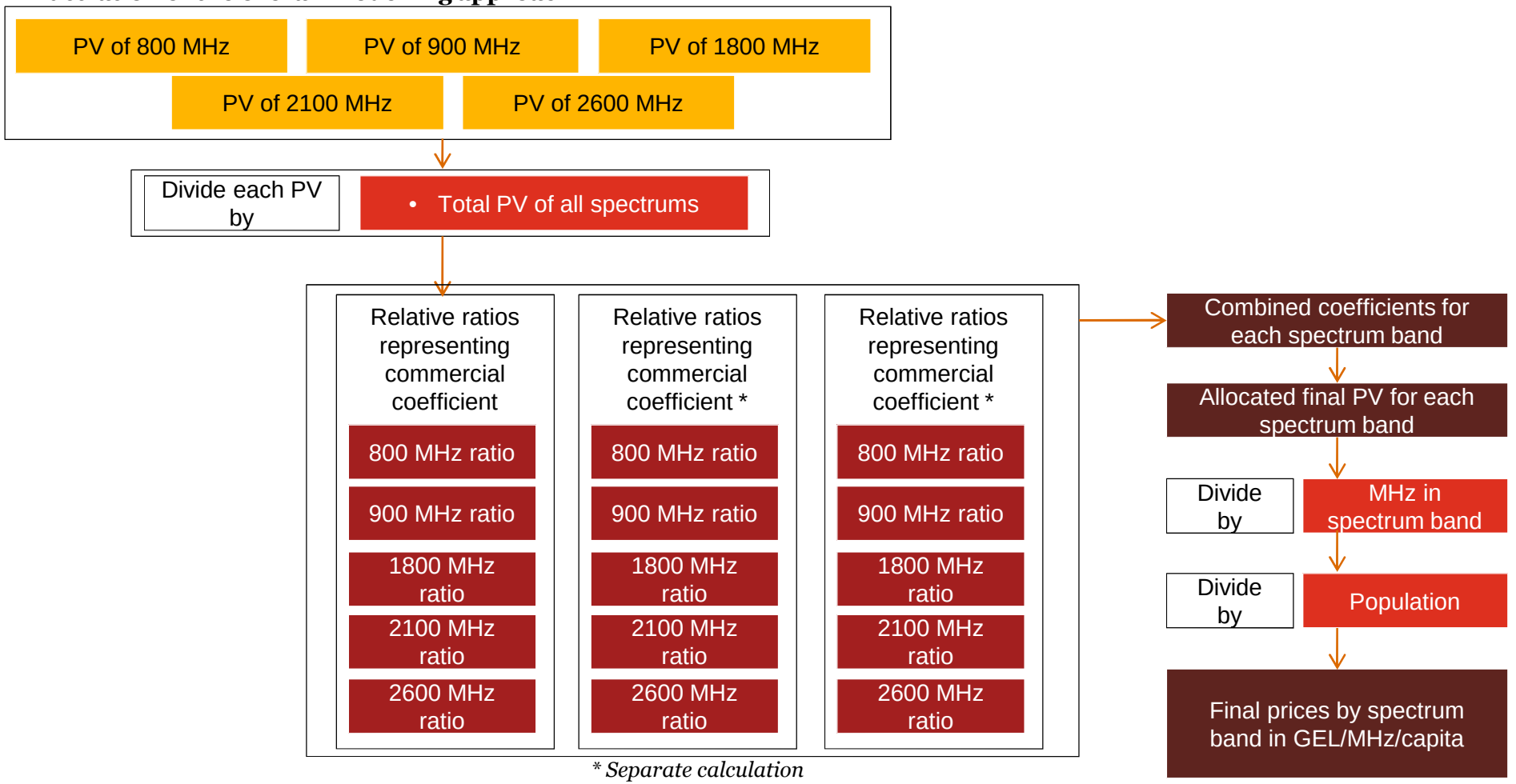
Illustration of the overall modelling approach



(Continues on the next page)

Overall modelling overview – income approach (3)

Illustration of the overall modelling approach



** Separate calculation*

Modelling of revenues

Approach to modelling

1. **Population**
   Data on population is standard demographic indicator which is in used as a base for the calculation of total number of subscribers for each modelled year.
2. **Total penetration**
   Total penetration rate enters the aforementioned calculation as a multiplier of the total population. The result of this multiplication represents the modelled number of subscribers.
3. **ARPU**
   Average revenue per user (ARPU) is a standard indicator used in the telecommunications sector . This indicator represents one of the key variables present in the total revenue calculation. ARPU in the model is presented in the structure, which allows its split into ARPU from voice and data services and subsequently into ARPU from 2G, 3G and 4G respectively.
4. **Voice split: 2G:3G**
   ARPU generated by the voice services is calculated as a multiplication of the market average monthly ARPU and the share of revenues generated by the voice services. ARPU generated by the voice services is split into ARPU generated in 2G and 3G. This split is calculated as a multiplication of ARPU generated by voice services and the respective share of voice services provided via 2G and 3G respectively (relative 2G:3G voice penetration). Calculated values are subsequently used in the calculation of revenues generated by 2G and 3G voice.

Key assumptions

1. **Population**
   Historical data on Georgian population development and forecast are acquired from the GeoStat. The population forecast is based on the modelling of compound annual growth rate between years 2011 and 2014.
2. **Total penetration**
   Expert estimate based on the mature market development. This estimate is subsequently applied on the Georgian market.
3. **ARPU**
   Initial value is based on the average ARPU of the mobile operators in Georgia based on the information from the financial statements. Market average monthly ARPU development is based on the ARPU development in mature and emerging markets. The main source of historical data and forecasts used are based on industry forecast reports.
4. **Voice split 2G:3G**
   Development of the Market average monthly ARPU from voice services for the projected period is based on the development of ARPUs from voice services in mature and emerging markets.

Modelling of revenues (2)

5. Data split: 2G:3G:4G

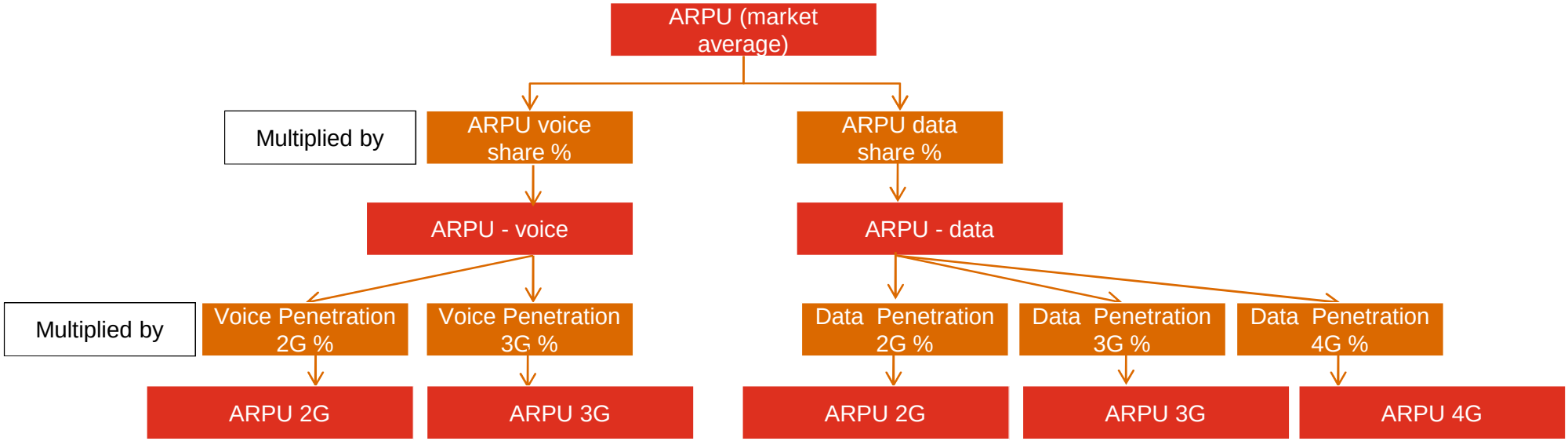
ARPU generated by data services is calculated as a multiplication of the market average monthly ARPU and the share of revenues generated by data services. ARPU generated by data services is split into ARPU generated in 2G, 3G and 4G. This split is calculated as a multiplication of ARPU generated by data services and the respective share of data services provided via 2G , 3G and 4G (relative 2G:3G:4G penetration). Calculated values are subsequently used in the calculation of revenues generated by the 2G, 3G and 4G data services.

5. Data split 2G:3G:4G

Development of the Market average monthly ARPU from data services for the projected period is based on the development of ARPUs from data services in mature and emerging markets.

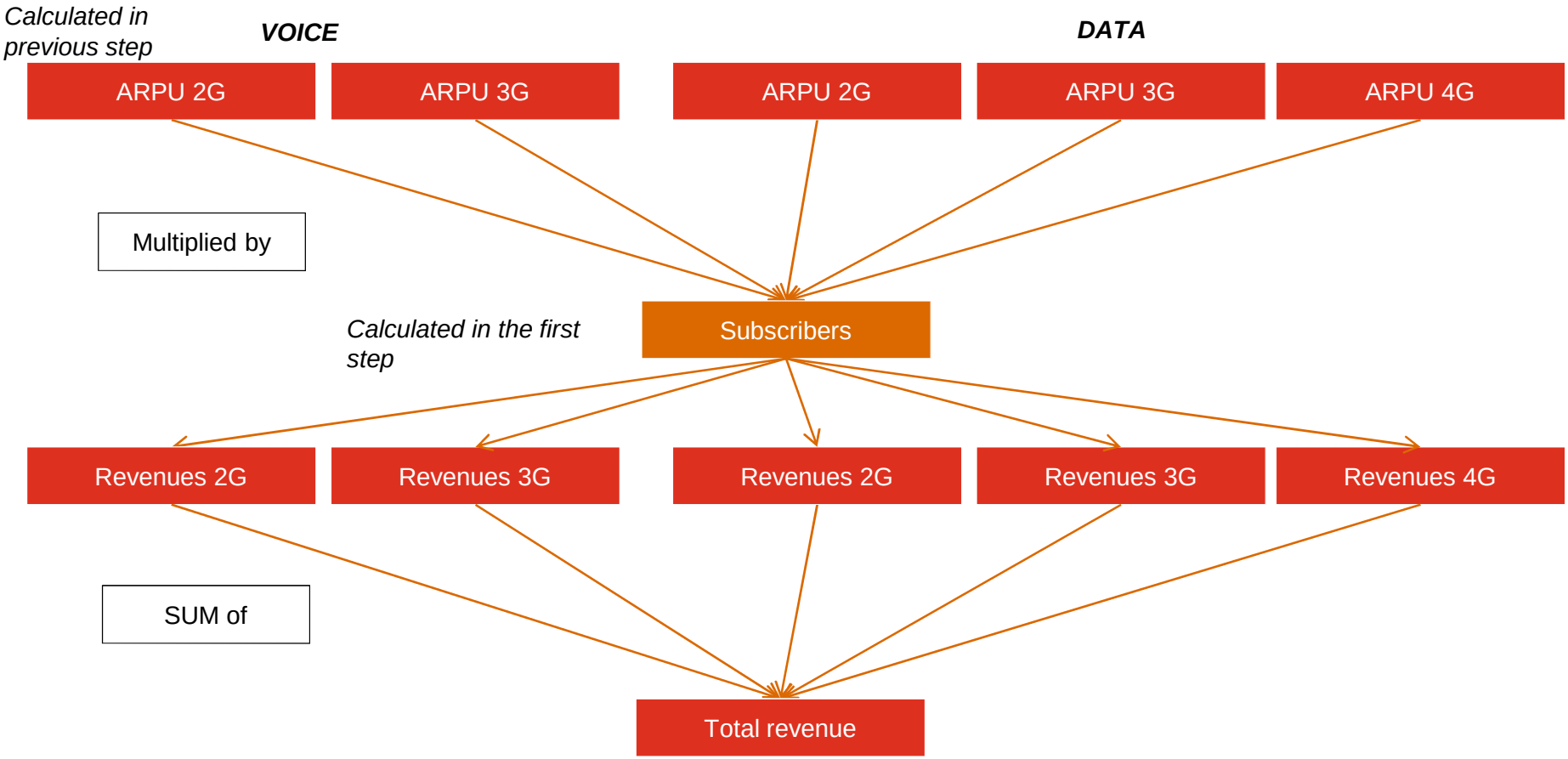
Modelling of revenues (3)

Illustration of the calculation of ARPU



Modelling of revenues (4)

Illustration of calculation of modelled revenues



Modelling of revenues (5)

Further assumptions used for the revenues modelling

Total penetration

It is assumed that the total mobile penetration in Georgia will continue to grow. This assumptions is supported by experience from EU markets and by various market studies, that show that the mobile market penetration rate is generally expected to grow in the future. For instance, based on the GSMA and A.T.Kearney report on the Mobile Economy 2013, SIM penetration in CIS countries will reach 186% in 2017. Ericsson in its Mobility Report from June 2014 forecasts European mobile subscriptions to grow with a CAGR of 2 percent between 2013 and 2019. It can therefore be assumed that the penetration rate will grow in Georgia and CIS countries as well and will copy the penetration growth of the mature markets.

Expected worldwide growth in mobile market penetration is in line with the ever increasing demand for mobile broadband services and more intensive usage of smart devices. Cisco, a global leader in networking equipment, envisages a 63% growth in mobile data traffic in the smartphone category (see table below):

Device type	Growth in Devices, 2013–2018 CAGR	Growth in Mobile Data Traffic, 2013–2018 CAGR
Smartphone	18%	63%
Tablet	41%	87%
Laptop	13%	30%
M2M Module	43%	113%

Source: Cisco VNI Mobile, 2014. Retrieved from http://www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni/white_paper_c11-520862.html

The general growth trend of penetrations in Georgia will be therefore modelled based on the growth rates seen in the mature markets in past years and will be applied to current Georgian penetration as it is assumed that the trend in Georgia will follow the trends in mature market with some delay.

Modelling of revenues (6)

Further assumptions used for the revenues modelling

Total ARPU

Total ARPU is decreasing in both mature markets in Western Europe as well as markets in Central and Eastern Europe. This downwards trend is caused by overall changes in telecommunications industry, emergence of new internet based services that are competing with traditional telecommunications services such as voice and SMS, and mobile data services are yet not able to compensate the decline in voice revenues. A decline in SMS and voice communication revenue is, amongst other possible reasons, attributable to ever increasing usage of social mobile applications based on instant messaging principle, such as Whatsapp, Telegram or Hangouts. These communication channels, which are virtually costless from customers' perspective, have been replacing SMS services and to certain extent also mobile network voice communication.

For the model purposes it is assumed that the ARPU will continue to decrease to a level expected for developing markets. The overall decrease between current levels and level in the last modelled year will be approx. 12% and modelled using linear trend. Despite sharper ARPU decreases seen in many markets it is assumed that ARPU gets stabilized with the increasing share of mobile data services and new non-voice services as the operators are substituting the services with declining ARPU with new services.

Split of ARPU between voice and data

Majority of current ARPU in Georgia is generated from voice services. However, this should change dramatically over the next decade and the majority of revenues should be generated from data services. This trend can already be observed in mature markets. For example, as Bloomberg reported, Japan was the first country where mobile data fees exceeded voice charges (2011). USA reached 50% data vs voice ratio in 2013 and this trend is expected to continue across the globe. According to the study of PwC he mobile operator data revenues will overtake voice revenues globally by 2018.

According to GSMA the mobile data explosion is being driven by a surge in demand for connected devices and machine-to-machine (M2M) communications. In the long-term the ARPU generated from voice services should converge towards 0 and the revenue should be generated by data and new services while traditional voice services will be provided free of charge. This can already be observed in some of the mature markets where operators started to offer free voice services to selected data packages.

Based on these trends the model will assume that voice ARPU in the last modelled year will be 0 and all revenues will be generated from data. The voice:data ratio in individual modelled years will be calculated using linear trends between current ratio and last modelled year.

Modelling of revenues (7)

Further assumptions used for the revenues modelling

Voice 2G:3G split

Voice split between 2G and 3G technology will be based on the split at the comparable market.

Data 2G:3G:4G split

Data split between 2G, 3G and 4G technology will be based on the initial split in Georgia and will develop in the next modelled years assuming the introduction of 4G and gradual decline of 2G data to 0. The split of 4G will be increasing while 3G will continue to grow in the first years after the introduction of 4G at the expense of declining 2G. However, 3G will see similar decline as was seen in 2G after the introduction of new technology that gradually replaced the older one. Therefore the model will assume that in the 10th year of the modelling period the 4G will reach 80% of all data while 3G will keep the remaining share. 2G in this modelled year will be 0. In the last year of the modelling period the share of 4G will be 100%. This is based on the experience with the introduction of 4G at the mature markets and subsequent decline of 2G and 3G share on the data services.

Modelling of other items of DCF calculation

Approach to modelling

Other items of DCF calculation are:

1. **Depreciation –** Depreciation is calculated as a total revenue multiplied by Depreciation/Revenues benchmark. The benchmark is based on the data for the peer group of companies.
2. **EBITDA –** EBITDA is measured as a total revenue multiplied by EBITDA margin benchmark of the peer group of companies
3. **CAPEX –** To estimate CAPEX, total revenue is multiplied by CAPEX /Revenues benchmark . The benchmark is based on the data for the peer group of companies.
4. **Income tax –** Income tax is determined as EBIT (EBITDA minus depreciation) multiplied by Corporate Income tax rate in Georgia which is currently 15%.
5. **Net Working Capital (NWC)** – In order to obtain **Net Working Capital (NWC)** the total modelled revenue is multiplied by NWC/Revenues benchmark. The benchmark is based on the data for the peer group of companies.
6. **Discount factor –** We use WACC (weighted average cost of capital) as the Discounting interest rate to calculate discounted free cash flows

Key assumptions

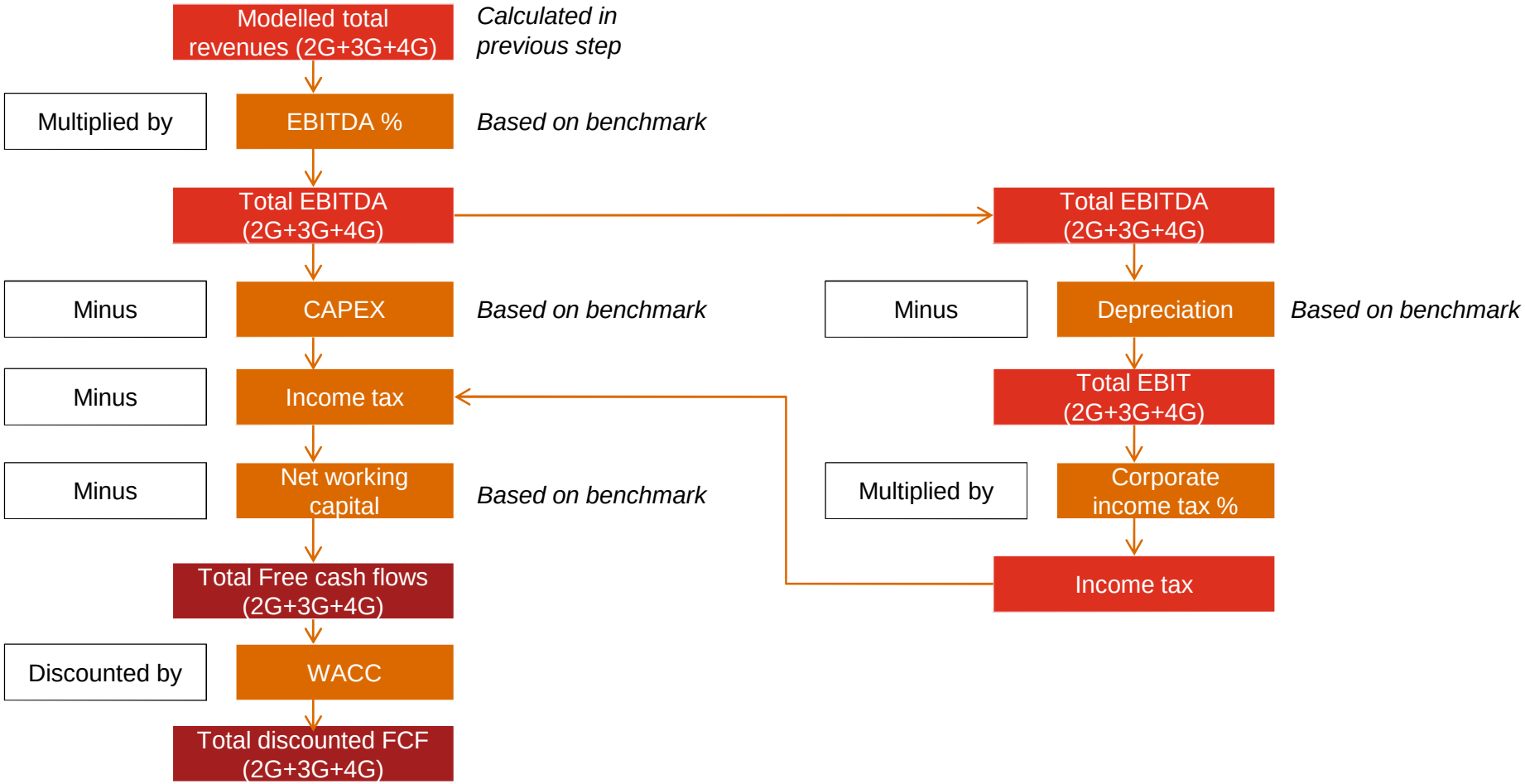
It is expected that the EBITDA for the first year of the model (2015) is based on the average EBITDA margin of the mobile operators in Georgia for the period 2011-2013. The development of EBITDA margin for the next modelled years is based on the assumptions that it should converge towards the EBITDA margin of the peer group of companies which is considered to be market average. The EBITDA margin will converge to EBITDA margin of the peer group in 8th year of the model. From 2020 onwards the EBITDA margin is fixed at the same level for the remaining years of the model based on the assumptions that the objective of the operator should be to keep the long-term profitability targets for its stakeholders.

CAPEX represents the combination of expenditures to new roll-outs and maintenance of the network.

The interest rate for the discounting of the free cash flows is based on the actual WACC (weighted average cost of capital) of the mobile operators in Georgia. WACC should represent the WACC of the operator that uses both equity and debt financing as that would be considered as common financing structure in the industry.

Modelling of other items of DCF calculation (2)

Illustration of the calculation of free cash flows from modelled revenues:

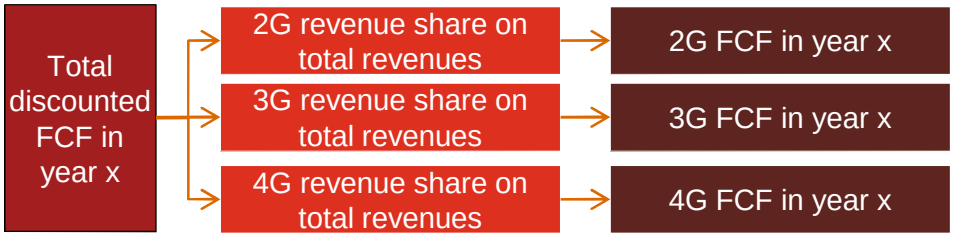


Allocation of free cash flow by technology and spectrum band

Approach to modelling

Once the total discounted free cash flows (FCFs) of the hypothetical operator are calculated, they have to be allocated to technologies (2G, 3G and 4G) and then further to spectrum bands:

1. **Allocation to technologies** – Total discounted FCFs are allocated to technologies using the relative proportions of calculated modelled revenues by technology on total modelled revenues in each modelled year



2. **Allocation of spectrum band utilization by technologies** – in this step it is modelled for each year what % proportion of each considered spectrum band will be used by each technology. The allocation is changing in time based on the expert estimates.

Key assumptions

Allocation of spectrum utilization by technologies

Key step in the calculation of the market value of spectrum in each spectrum band is to allocate the proportion of the 2G, 3G and 4G FCFs respectively to individual spectrum bands.

For the hypothetical operator we assume that the following spectrum bands will be used for coverage and for capacity for each technology (based on the current spectrum usage in Georgia and based on the expected utilisation of spectrum by 4G technology):

	2G	3G	4G
800 MHz			Coverage
900 MHz	Coverage	Capacity	
1800 MHz	Capacity		Capacity (future)
2100 MHz		Coverage	
2600 MHz			Capacity (future)

(Continues on the next page)

Allocation of free cash flow by technology and spectrum band (2)

Key assumptions

Allocation of spectrum utilization by technologies

The utilisation of the spectrum bands by different technologies is based on the current situation that can be find also in European countries. The 800 MHz spectrum band is used for LTE or is reserved for LTE networks, 900 and 1800 MHz spectrum is used for GSM and LTE , 2100 MHz spectrum is used for UMTS and 2600 MHZ spectrum will be used for LTE.

The share of each technology in each spectrum will be set by the expert estimate based on the expected utilization of the band by the technology, where the major proportion of the technology will be allocated in the spectrum band dedicated for coverage for each technology while the remaining proportion will be allocated to the spectrum band dedicated for capacity for each technology.

The allocation percentages will develop in time, i.e. they will be changing towards the target values (the values set for the last year of the model). This is specifically relevant to 4G technology, where it is expected that in the first year of the model only the 800 MHz and 1800 MHz will be used as a primary spectrum band for 4G technology and later additional spectrum bands (2600 MHz) will be used for capacity purposes as the 4G traffic will increase in time.

Example of the allocation of spectrum utilization by technologies for the initial and last year of the model:

Initial year	2G	3G	4G
800 MHz			50% (Cover.)
900 MHz	60% (Cover.)		
1800 MHz	40% (Cap.)		50% (Cap.)
2100 MHz		100%	
2600 MHz			

Last year	2G	3G	4G
800 MHz			60% (Cover.)
900 MHz	70% (Cover.)	10% (Cap.)	
1800 MHz	30% (Cap.)		40% (Cap.)
2100 MHz		90% (Cover.)	
2600 MHz			

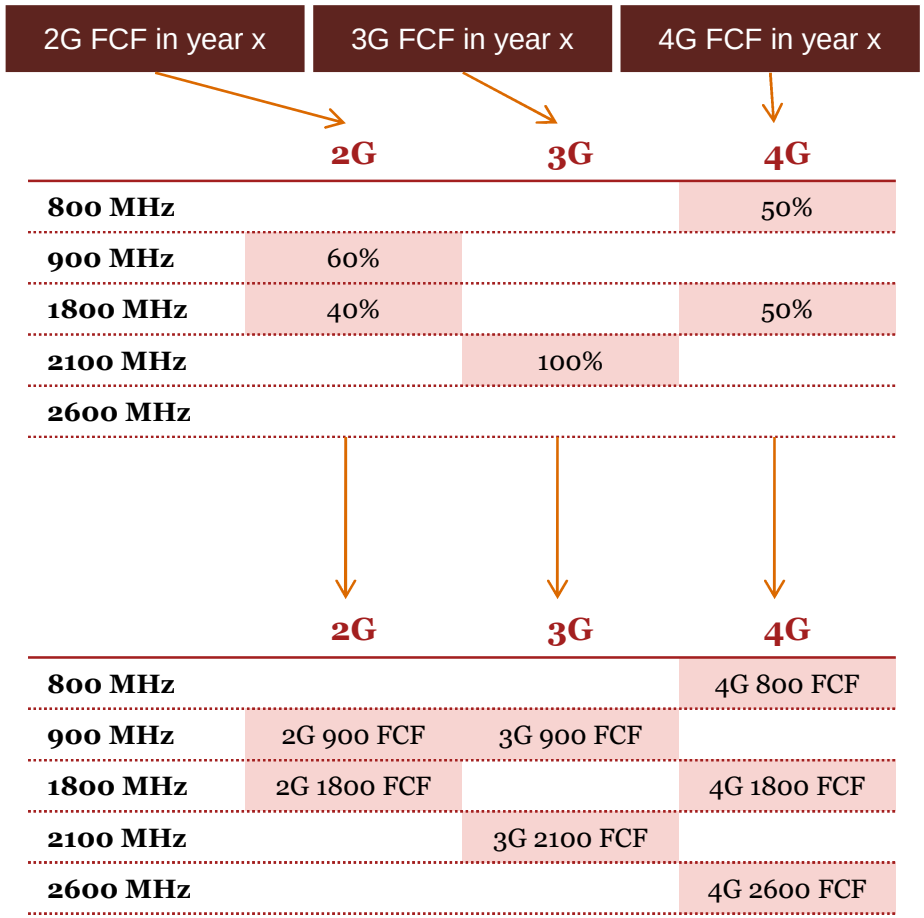
Allocation of free cash flow by technology and spectrum band (3)

Key assumptions

The allocation of spectrum utilization by technologies should follow the effective utilization principles. Effective utilization of spectrum bands should be based on these principles:

1. **Technical** – transmission characteristics of the network in terms of transmission capacity per unit of frequency spectrum or territory, re-use frequency, network resilience rate , the possibility of assigning frequencies in a harmonized and standardized channel arrangements, etc.
2. **Functional** – includes qualitative parameters of the service provided for example access to electronic communications services, speed and mobility, integrity or degree of coverage, substitutability transmission service by other medium or platform.
3. **Economic** – takes into account the contribution to the promotion of competition and growth of the national economy and is usually evaluated by the consumer (willingness to pay for the service), service provider or network operator (costs, profit) and external benefits (positive impact on GDP, revenues of the state budget - tax revenue income from fees for use of the spectrum, revenues from auctions, etc.).
4. **Social** – inseparable, although difficult to quantify factor that takes into account the broader issue of the meaning and range of services provided in the context of social, cultural, scientific research, safety, or general concepts of national and European policy

Illustration of the allocation of spectrum utilization by technologies:



Modelling of contributory asset charges

Approach to modelling

Contributory asset charges represent charges for other assets (besides the frequency licence) used in the generation of cash flow of the Operator. This represents the concept that Operator value is generated by a set of different assets, each of which contributes to its value generation. In order to obtain the FV of Licence, FVs of other contributing assets need first to be deducted from the overall Operator value (which is represented by 15-year FCF).

These contributory asset charges represent:

1. **Net book value (NBV) of network –** Value of equipment/assets which consist of two parts:
   - network itself covering transmission, access, signalling, switching, mobile
   - business and technical information system as operating and business support system
   - NBV of network is calculated as a sum of long-term assets of all Georgian operators with regard to their weights
2. **FV of NWC –** Fair value of Net Working Capital is based on peer group of companies

Key assumptions

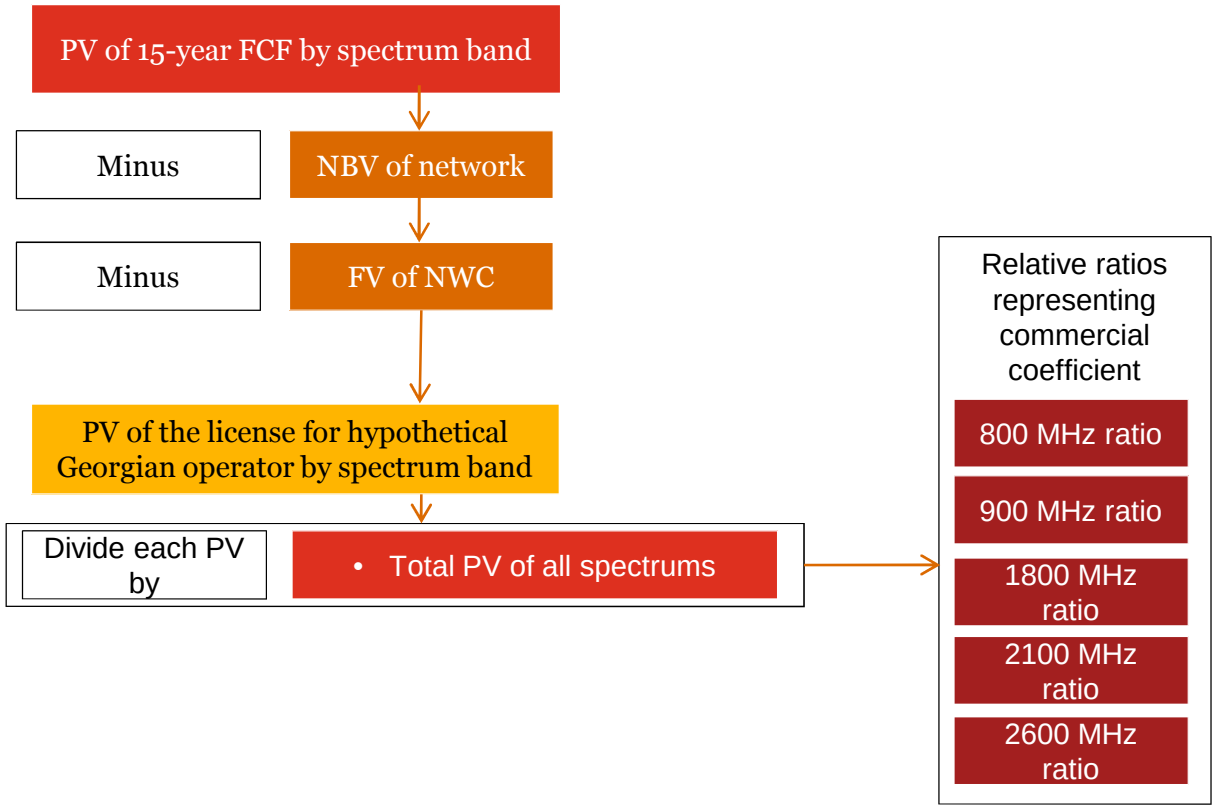
Long –term Assets calculation is based on IFRS Financial Statements of Georgian operators

Contributory assets are calculated as a percentage of revenues as follows:

- NBV of network – 3-year average of long-term assets of the operators from the financial statements
- Net Working Capital- 3 year average of market peer group

Modelling of contributory asset charges (2)

Illustration of the application of the contributory asset charges:



Key assumptions

By deducting the contributory asset charges the present value of the license for hypothetical operator for each spectrum band is calculated.

This represents the approximation of the amount that the spectrum band is worth.

In the next step relative ratios between the PVs of individual spectrum bands is calculated and the resulting figures represent "Commercial coefficient" that is used in setting the prices for spectrum bands (see next slides).

Calculation of the price per MHz per capita for each spectrum band using weighting coefficient

Approach to modelling

Once the total PV of the licenses for hypothetical Georgian operator is calculated it has to be allocated to individual spectrum bands to reflect their commercial, technical and strategic attractiveness. The allocation is done using 3 different coefficients:

- **Commercial coefficient** – this coefficient represents the commercial attractiveness of the spectrum band and is derived from the expected revenues to be produced from providing the services using each band. Commercial coefficient is directly calculated from the results if the DCF modelling by calculating the relative ratios of the individual PVs of the licenses for each spectrum band:

$$CC_{X\ MHz} = \frac{PV_{X\ MHz}}{PV_{All\ bands}}$$

Where:

- $CC_{X\ MHz}$ – Commercial coefficient of spectrum band X
- $PV_{X\ Mhz}$ – Present value of license for spectrum band X from DCF modelling
- $PV_{All\ bands}$ – Total present value of licenses from DCF modelling

- **Technical coefficient** – this coefficient represents the technical attractiveness of the spectrum that is based on the fact that sub-1 GHz spectrums have higher coverage range and hence are more cost effective in terms of covering the area. The assumptions on the coverage and resulting relative cost effectiveness of each spectrum band is based on the expert estimate. Technical coefficient is calculated as relative ratios between the cost effectiveness ratios of individual spectrum bands:

$$Cost\ coefficent_{X\ MHz} = \frac{Coverage\ coefficent_{X\ MHz}}{Cost\ coefficient_{2600\ MHz}} \longrightarrow TC_{X\ MHz} = \frac{Cost\ coefficient_{X\ MHz}}{Sum\ of\ cost\ coefficients\ of\ all\ bands}$$

Where:

- $TC_{X\ MHz}$ – Techincal coefficient of spectrum band X
- $Cost\ coefficient_{X\ Mhz}$ – Cost coefficient of spectrum band X

Calculation of the price per MHz per capita for each spectrum band using weighting coefficient (2)

Approach to modelling

Once the total PV of the licenses for hypothetical Georgian operator is calculated it has to be allocated to individual spectrum bands to reflect their commercial, technical and strategic attractiveness. The allocation is done using 3 different coefficients:

- **Strategic/competition coefficient** – this coefficient represents the strategic and competitive attractiveness of the spectrum. Strategic aspect of the value of the spectrum is based on the fact that operators value the spectrum not just from the perspective of the current revenue generation and cost effectiveness, but also from the perspective that spectrum is a strategic asset, which gives them a competitive advantage and hence they may want to obtain and hold the spectrum at the time of auction or assignment even if it does not generate commercial value immediately. Some spectrum bands provide multiple options for they current and potential future use and it can be observed that operators are willing to pay relatively more for securing their allocation. The approximation of the strategic coefficient is based on the relative scoring of different technologies that can be deployed within the spectrum band (LTE, UMTS, GSM). The final relative strategic/competition coefficient is calculated as a relative value to the sum of the strategic coefficients of individual spectrum bands:

$$Relative\ strategic\ coefficient_{X\ MHz} = \frac{Strategic\ coefficient_{X\ MHz}}{Sum\ of\ strategic\ coefficients\ of\ all\ bands}$$

- **Combined coefficient** – this coefficient is the combination of commercial, technical and strategic coefficient which is used for the final allocation of the total present value of licenses for all spectrum bands into individual spectrum bands. Combined coefficient is calculated average of commercial, technical and strategic coefficient for all spectrum bands.

Calculation of the price per MHz per capita for each spectrum band using weighting coefficient (3)

Final calculation of the price for each spectrum bands

Final calculation of the prices of the spectrum bands is done in 3 steps:

1. **Allocation of total PV of licenses into individual spectrum bands** – this is done by applying individual combined coefficients for each spectrum band to total PV of licenses:

$$Final\ PV_{X\ MHz} = \frac{PV_{All\ bandsz}}{Sum\ of\ combined\ coefficients\ for\ all\ bands}$$

2. **Calculation of price in GEL/MHz** – in the next steps the final PV for each spectrum band is divided by the number of MHz utilized by the hypothetical operator in each band:

$$Price\ per\ MHz_{X\ MHz} = \frac{Final\ PV_{X\ MHz}}{Number\ of\ MHz_{X\ Mhz}}$$

3. **Calculation of price in GEL/MHz/capita** – in the final step the price per MHz is divided by the population to derive final price in MHz per capita:

$$Price\ per\ MHz\ per\ capita_{X\ MHz} = \frac{Price\ per\ MHz_{X\ MHz}}{Population}$$

Chapter 4: Results

Results summary

*Based on the abovementioned approaches **we have calculated 5 sets of results**:*

1. *Benchmark average price*
2. *Benchmark weighted average price*
3. *Benchmark average price – with coverage obligation*
4. *Benchmark average price without coverage obligation*
5. *Price based on business modelling of hypothetical operator*

Results summary

Based on the benchmarking results the 800 MHz spectrum band is deemed to be the most valuable. This relates to the fact that the operators consider it as a strategic assets needed for the deployment of 4G networks.

The results of the benchmarking are relatively consistent with the results of the business modelling with the exception of the 900 MHz spectrum band which is priced higher in the business modelling compared to benchmarking. This is caused by lower number of 900 MHz spectrum auctions included in the benchmarking as well as lower willingness to pay for additional spectrum in this spectrum band compared to another bands.

In addition, in business modelling the 900 MHz spectrum is valued higher due to the commercial coefficient that indicates that services operated using 900 MHz spectrum will still produce substantial value to the operator due to the high initial share of 2G voice revenues operated on 900/1800 MHz bands in Georgia.

Results summary table:

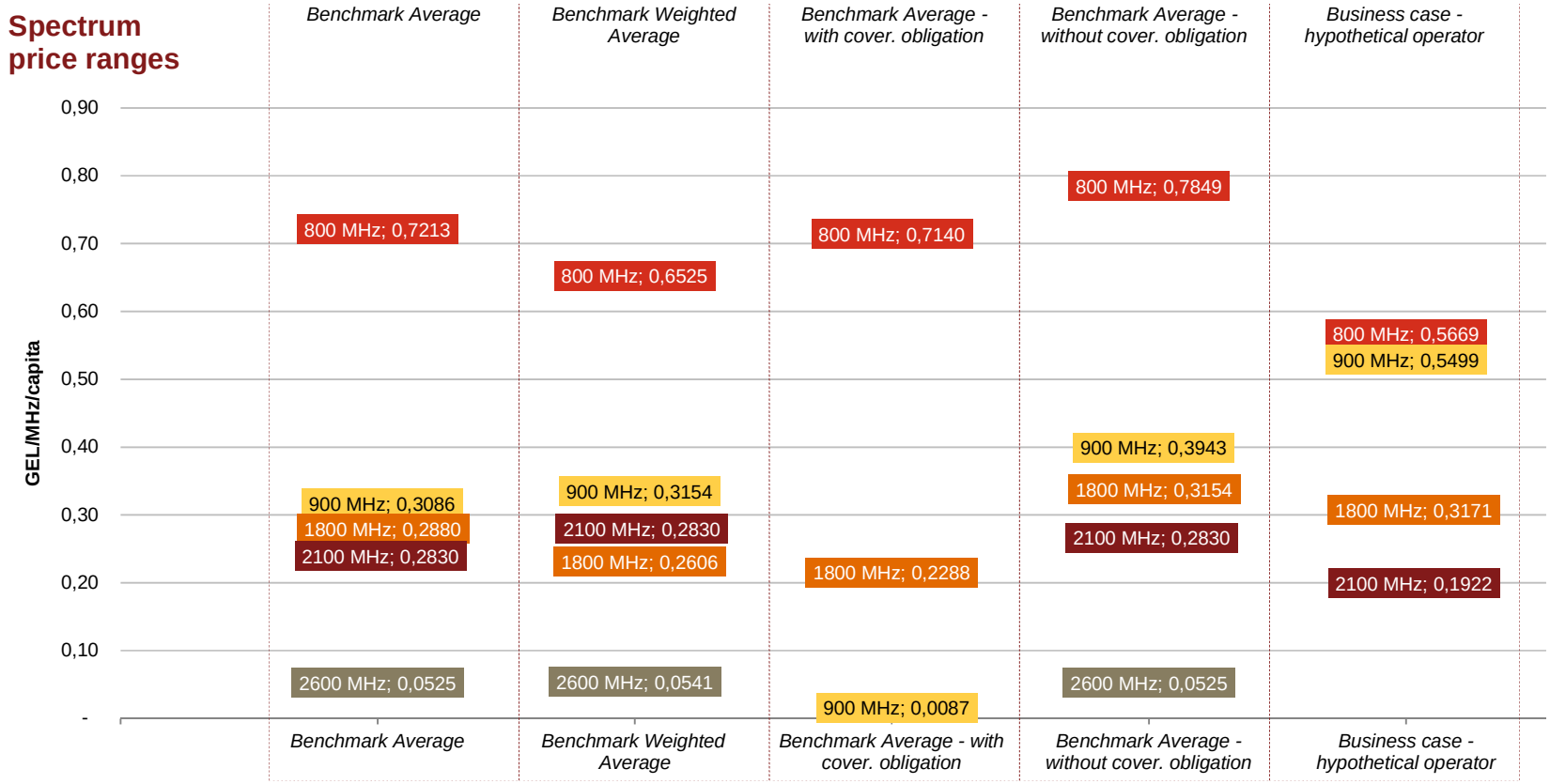
in GEL/MHz/capita	Benchmark Average	Benchmark Weighted Average	Benchmark Average - with cover. obligation	Benchmark Average - without cover. obligation	Business case - hypothetical operator
800 MHz	0,7213	0,6525	0,7140	0,7849	0,5669
900 MHz	0,3086	0,3154	0,0087	0,3943	0,5499
1800 MHz	0,2880	0,2606	0,2288	0,3154	0,3171
2100 MHz	0,2830	0,2830	N/A	0,2830	0,1922
2600 MHz	0,0525	0,0541	N/A	0,0525	N/A

Source: PwC calculations

Results summary – graphical interpretation

Benchmarking shows lower prices for 900 MHz spectrum band while other spectrum bands are relatively consistent with the business modelling results.

Some prices are not available in some of the results (for example price with cover obligation in 2100 and 2600 MHz bands due to unavailability of such auctions in benchmarking sample).



Source: PwC calculations

Benchmarking results

Benchmarking was performed using the **sample of the auction results from EU and non-EU European countries** from the years 2003-2014. Total sample size used was 139 auction results, but 14 auction results where excluded from the sample in the process of statistical cleansing where final prices above 95th percentile and below 5th percentile were excluded from the sample for each spectrum band. Final results presented here are therefore based on the **sample of 125 auction results**. The list of auctions excluded from the final sample is provided in Appendix 1.

Out of that 4 auction results were for unpaired spectrum in 2600 MHz spectrum band, but due to the insufficient sample size the results are not presented here. The summary of unpaired spectrum results is provided in Appendix 2.

The data for the benchmarking were sourced from **publicly available information** (websites or auction documentation of the regulatory authorities) and only auctions where all required information was available were included in the sample (required information is bandwidth auctioned, year of auction, price, license duration). Where multiband auctions were organized or lots of combination of paired and unpaired spectrum was auctioned, if the required data (such as price) was not split by individual bands, **such auction results were not included in the sample**.

The benchmark prices are also separately presented for auctions with and without coverage obligation. For the purpose of the split it was assumed that the auction has to include at least 50% coverage obligation (of the area or population) to be considered as auction with coverage obligation.

RESULTS - ALL AUCTIONS

Paired frequencies

Spectrum (MHz)	No. of samples	Prices per MHz per capita in GEL				
		Min.	Max.	Average	Weighted Average	Median
800	29	0,0620	1,5021	0,7213	0,6525	0,7814
900	9	0,0083	0,7040	0,3086	0,3154	0,1414
1800	19	0,0589	1,0573	0,2880	0,2606	0,2616
2100	2	0,1888	0,3773	0,2830	0,2830	0,2830
2600	62	0,0004	0,2310	0,0525	0,0541	0,0210

RESULTS - WITHOUT COVERAGE OBLIGATION

Paired frequencies

Spectrum (MHz)	No. of samples	Prices per MHz per capita in GEL				
		Min.	Max.	Average	Weighted Average	Median
800	3	0,3023	1,5021	0,7849	0,7197	0,5504
900	7	0,0206	0,7040	0,3943	0,3981	0,5776
1800	13	0,0722	1,0573	0,3154	0,2876	0,2639
2100	2	0,1888	0,3773	0,2830	0,2830	0,2830
2600	62	0,0004	0,2310	0,0525	0,0541	0,0210

RESULTS - WITH COVERAGE OBLIGATION

Paired frequencies

Spectrum (MHz)	No. of samples	Prices per MHz per capita in GEL				
		Min.	Max.	Average	Weighted Average	Median
800	26	0,0620	1,3161	0,7140	0,6448	0,7882
900	2	0,0083	0,0090	0,0087	0,0087	0,0087
1800	6	0,0589	0,5356	0,2288	0,2099	0,1603
2100	0	N/A	N/A	N/A	N/A	N/A
2600	0	N/A	N/A	N/A	N/A	N/A

Source: PwC calculations

Benchmarking results (2)

In addition to the benchmarking results summary we also provide the split of the final prices by country. Please note that all of the spectrum bands were auctioned in all of the countries in the sample, so the summary only shows result for countries were auctions were held for individual spectrum bands.

The benchmarking results show significant distribution of prices between countries which reflects different level of maturity of the market, competition on the market, auction conditions, willingness to pay for the spectrum and format of auction.

RESULTS BY COUNTRY - ALL AUCTIONS - Average benchmark price

Paired frequencies

Country	800	900	1800	2100	2600
Austria	N/A	0,0321	N/A	N/A	0,0432
Belgium	0,6858	N/A	N/A	N/A	0,0666
Czech republic	1,0077	N/A	0,3986	N/A	0,0664
Denmark	0,2701	0,0206	N/A	N/A	0,2247
Finland	0,7715	N/A	N/A	N/A	N/A
France	1,0238	N/A	N/A	N/A	0,1377
Germany	N/A	N/A	N/A	0,2830	N/A
Greece	N/A	0,6734	0,3407	N/A	N/A
Italy	1,3096	N/A	0,4217	N/A	0,0956
Latvia	0,0856	N/A	N/A	N/A	N/A
Lithuania	0,0620	N/A	N/A	N/A	N/A
Portugal	N/A	0,5776	0,1213	N/A	0,2310
Romania	N/A	0,1414	N/A	N/A	N/A
Slovakia	0,0826	N/A	0,0590	N/A	0,0637
Spain	0,7582	0,5950	N/A	N/A	0,0104
Sweden	0,3768	N/A	0,2449	N/A	0,2254
UK	1,0583	N/A	N/A	N/A	N/A

Source: PwC calculations

Interpretation of benchmarking results:

The benchmarking results show **high differences in prices** in different jurisdictions. The differences in auction prices are caused by local conditions (market, competition), valuation of spectrum bands by operators (based on differences in their strategies, models, forecasts and resulting willingness to pay) or by the conditions of auctions and format of auctions.

Sealed bid auctions usually have **high value uncertainty** since the bidders don't know the bids of their competitors and the auction is organized only in 1 round. Simultaneous multi-round auction (SMRA) and Combinatorial clock auctions (CCA) can **reduce the uncertainty** since the bidders can observe the bidding behaviour of competitors and adjust their bids accordingly, which leads to decrease of the risk of bidding unreasonable prices for the spectrum.

Because of the abovementioned facts the results of the benchmarking **have to be considered with special care** and should be used alongside with additional checks or models. Simple benchmarking results without the detailed knowledge of the individual auctions included in the sample and the knowledge of the local markets and their competitive conditions **can lead to incorrect interpretation** of results.

Special care should be taken in cases where there is i**nsufficient size of the sample** for benchmarking. For example in 900 MHz there are 9 auction results included and for 2100 MHz there are only 2 auction results included in the benchmarking. For these spectrum bands the results should be taken as indicative only since due to the size of the sample they **may be distorted**.

Business modelling – assumptions

The results of the business modelling consist of 3 parts:

1. Result of DCF modelling to calculate PV of the licenses for all spectrum bands for hypothetical operator
2. Calculation of commercial, technical and strategic coefficient for the allocation of the PV of the licenses to individual spectrum bands
3. Calculation of final prices for each spectrum band

The **business modelling** is based on the projection of Revenues of the hypothetical operator. Subsequently the operator's EBITDA, CAPEX, income tax and change in the net working capital is modelled to derive the free cash flows of the operators which are then subsequently discounted using weighted average cost of capital. The resulting figure represents the **present value of the 15-year free cash flows** of the company. To derive the residual value of the free cash flows that **represents the theoretical market value** of the spectrums of the operator, the contributory asset charges have to be excluded. These are represented by net book value of long term assets of the operator and by the fair value of net working capital.

The resulting residual value represent the t**heoretical market value of the all spectrum bands** that the theoretical operator would use.

Assumptions used in the model

Parameter	Assumption
Market share of theoretical operator	33% based on the situation at the Georgian market where 3 relevant mobile operators are present
WACC	Regulatory approved WACC of the operator that uses both equity and debt financing
Modelling date	31.12.2014 – date to which the discounted free cash flows are calculated
Corporate income tax	15% - current corporate income tax in Georgia, it is not foreseen in the model that the tax will change over the modelling period
Population	Population modelling is based on the historical data from GeoStat for years 2011-2014 and future years are modelled based on the historical compound annual growth rate
Penetration	Penetration starts from expected 2014 penetration based on the data provided by GNCC and is expected to grow to 171% in last year of the modelling period. The penetration growth is estimated based on the growth curves from mature markets as the SIM cards per cap should grow with the increase of multi-device households and M2M communications.

(Continues on the next page)

Business modelling – assumptions (2)

Parameter	Assumption
Average ARPU	Initial ARPU value is derived as an average revenues per user from the financial statements of relevant Georgian mobile operators. The forecast of ARPU for future years is based on the assumption that it will follow the development on mature markets. The total decrease rate is modelled from year 2014 to 2019 at 6,7% and from year 2019 to 2029 12% (based on industry forecast of mature markets and CEE and assumption that Georgian market will follow similar ARPU decrease).
ARPU voice and data split	Initial % split between voice and data ARPU is calculated based in the actual data from GNCC: approx. 96% voice vs. 4% data. The modelled forecast is based on the expected monetization of data, i.e. it is expected that the revenue structure of mobile operators will shift to data revenues which will become main driver of company value while voice service will become complimentary to data service. The target data share for the last year of the modelling period is 100%.
Voice split into 2G and 3G	It is expected that the proportion between 2G and 3G voice is 80:20 based on the anticipation of current voice traffic distribution between 2G and 3G. No evidence suggests that this ratio will change in foreseeable future.

Parameter	Assumption
Data split 2G, 3G and 4G	The initial split is based on the current situation in Georgia based on the data provided by GNCC for operators that supplies relevant data. The initial split is expected to be 47% for 2G and 53% for 3G. The forecast development expects that 2G data will cease to operate in 10 years and that 4G will be increasing from the year 2015 and will gradually replace 3G technology by the end of the modelling period. 4G increase curve is based on the expert estimate in time based on the experience of mature markets.
EBITDA	Initial EBITDA % is calculated as weighted average of the Georgian operators providing both 2G and 3G services as it is assumed that hypothetical operator will provide both of these technologies. The development of EBITDA for the next modelled years is based on the assumptions that it should converge towards the EBITDA of the peer group of companies which is considered to be industry average. The EBITDA should converge to industry average in the middle of the modelling period (8th year). EBITDA benchmark is based on the peer group of comparable companies and is set at the level of 36%.

(Continues on the next page)

Business modelling – assumptions (3)

Parameter	Assumption
Depreciation	Depreciation of the hypothetical operator is calculated using the Depreciation to Revenues ratio of the peer group of comparable companies. Depreciation is the parameter that enters the calculation of EBIT from which the Income tax expense is calculated.
CAPEX	CAPEX of the hypothetical operator is calculated based on the 5-year average CAPEX to Revenues ratio of the peer group of comparable companies.
Net working capital	Net working capital of the hypothetical operator is calculated using the NWC to Revenues ratio of the peer group of comparable companies. The annual changes in the net working capital represents the increase or decrease of the free cash flows.

Parameter	Assumption
Allocation of discounted free cash flows by technology and spectrum bands	The percentage allocations of total discounted free cash flows to technologies and spectrum bands is based on the current expected utilization of technology within spectrum bandwidth based on traffic. The split and the future development after the introduction of 4G is based on the expert estimate. The percentage allocation is used to allocate discounted free cash flows to technologies and spectrum bands is used to calculate the present value of 15-year free cash flows by spectrum band. This figures are then decreased by the contributory asset charges in the relative proportions of their values on total present value of 15-year free cash flow to derive the present value of licenses for each spectrum band. These present values are then used to set the relative commercial coefficients that are used together with the technical and strategic coefficient for the final allocation of total present value of all spectrum bands into individual spectrum bands.

Business modelling – calculation of the total PV of all spectrums for hypothetical Georgian operator

Based on the abovementioned assumption the total present value of all spectrums for hypothetical Georgian operator is **183,1 mil. GEL**.

This amount represents the value of all the licenses that the hypothetical operator will required for conducting its business and have to be further allocated to individual spectrum bands.

Full calculation data table can be found **in Appendix 3**.

*Base on the assumptions of the business modelling **Enterprise value (EV)** of the hypothetical operator was calculated. EV is calculated as a sum of Discounted FCF and Terminal value of the company that values the discounted FCFs after the modelling period. EV represent FV of the operator.*

*Based on the modelling EV of the hypothetical operator is approx. **584 mil. GEL, or 6,6 multiple of EBITDA** which is within reasonable range of the peer group of comparable companies and confirms the correctness and validity of the business model.*

GEL in 000s	FY15	FY16	FY17	FY18	FY19	FY20 - FY29
Total revenue	233 934	237 456	240 984	244 518	248 053	2 818 232
EBITDA	**98 765**	**97 822**	**96 809**	**95 725**	**94 570**	**1 019 351**
Income tax	(9 182)	(8 956)	(8 719)	(8 471)	(8 213)	(85 044)
Capex	(31 581)	(32 057)	(32 533)	(33 010)	(33 487)	(380 461)
NWC change	52	52	52	53	53	943
Free CF	**58 054**	**56 862**	**55 609**	**54 297**	**52 923**	**554 788**

Discounted Free CF using WACC = 10,16%	**436 675**
Contributory asset charges	
less: NBV of network	(256 962)
less: FV of NWC	3 426
Subtotal of CaC	**(253 536)**
PV of the license for hypothetical Georgian operator	**183 139**

Source: PwC calculations

The amount of total PV of the hypothetical Georgian operator has to be allocated to individual spectrum bands in the next step using the **commercial, technical and strategic coefficient**.

Business modelling – calculation of commercial, technical and strategic coefficients

In order to allocate the total PV of the licenses of the hypothetical Georgian operator, the relative **commercial, technical and strategic coefficients** have to be calculated. (For definition of coefficients and their calculation see Chapter 3: Business Case model).

*Commercial, technical and strategic coefficients are averaged for each spectrum band to calculate final **combined coefficient** that is used for the final allocation of the total PV of the licenses of the hypothetical Georgian operator to individual spectrum bands.*

Commercial coefficient

Relative commercial coefficient is derived from the calculated PV of individual spectrum bands calculated based on the DCF model. The resulting PVs by spectrum bands are shown below in GEL (the full calculation table is provided in Appendix 4):

PV of the license for hypothetical Georgian operator by spectrum band	
800	29 769 558
900	52 791 351
1800	61 230 145
2100	39 348 179
2600	-
PV of the license for hypothetical Georgian operator	**183 139 233**

Source: PwC calculations

These PVs are translated into relative ratios as follows:

Spectrum band	Relative commercial coefficient
800	0,16
900	0,29
1800	0,33
2100	0,21
2600	

Source: PwC calculations

Note: The 2600 MHz spectrum band was excluded from the business case modelling due to uncertainty of its auctioning or assignment to the operators.

Business modelling – calculation of commercial, technical and strategic coefficients

Technical coefficient

Relative technical coefficient is based on the relative cost effectiveness of covering the area by different spectrum bands. It is based on the assumptions that it is less expensive to cover the area using sub-1 GHz spectrum bands and the cost effectiveness is derived from the relative coverage ranges of individual spectrum bands. The following table shows the ranges of the spectrum bands in km2:

Spectrum band	Rural coverage (km2)	Urban coverage (km2)	Rural/urban ratio	Weighted average coverage (km2)
800	35,0	5,5	50%	20,3
900	29,0	4,8	50%	16,9
1800	12,0	2,1	50%	7,1
2100	10,0	1,7	50%	5,9
2600	6,0	1,0	50%	3,5

Source: PwC analysis

Based on the coverage ranges the relative cost effectiveness coefficients and relative technical coefficients are derived. Relative technical coefficient is calculated as relative values of the relative cost effectiveness coefficients:

Spectrum band	Relative costs of coverage - rural	Relative costs of coverage - rural	Rural/urban ratio	Weighted relative costs of coverage	Relative cost effectiveness coefficient
800	1,0	1,0	50%	1,0	5,7
900	1,2	1,1	50%	1,2	4,8
1800	2,9	2,6	50%	2,8	2,0
2100	3,5	3,2	50%	3,4	1,7
2600	5,8	5,5	50%	5,7	1,0

Spectrum band	Relative technical coefficient
800	0,40
900	0,34
1800	0,14
2100	0,12
2600	

Source: PwC calculations

Note: Rural/urban ratio has minimal impact on the final technical coefficient due to the fact that the relative coverage ranges for rural and urban geotypes are similar.

Business modelling – calculation of commercial, technical and strategic coefficients

Strategic/competition coefficient

Relative strategic/competition coefficient is derived from the relative weights of the technologies and its use within different spectrum band. The technologies (LTE, UMTS,GSM) were given a weight based on their long-term attractiveness. It is expected that LTE has the highest weight due to its strategic value from the perspective of future data revenues. UMTS, on the other hand, is expected to have the lowest weight due to the fact that it will be continually replaced by LTE for data services. GSM is considered to be in the middle due to the voice services that are still being provided using this technology. The weights allocated to the technologies are as follows:

Strategic/competition coefficient of different technologies	
LTE	3,00
GSM	2,00
UMTS	1,00

Source: PwC analysis

In the next step the weights are allocated to individual spectrum bands according to its current and expected use within the spectrum bands. The scoring for each spectrum band represents the strategic/competition coefficient of each spectrum band from which the relative strategic/competition coefficient is calculated as a ratio of the individual score of specific spectrum band to the sum of the scores of all spectrum bands:

	800 Mhz band	900MHz band	1800Mhz band	2100 Mhz band
GSM		2,00	2,00	
UMTS		1,00		1,00
LTE	3,00		3,00	
Subtotal	**3,00**	**3,00**	**5,00**	**1,00**
Correction *		(1,00)		
TOTAL	**3,00**	**2,00**	**5,00**	**1,00**

Source: PwC calculations

Spectrum band	Relative strategic/ competition coefficient
800	0,27
900	0,18
1800	0,45
2100	0,09
2600	

*** Note**: The correction for 900 MHz band is based on the assumption that no operator has deployed UMTS900 technology yet and most probably 900 MHz band (in the longer term) will be re-farmed directly for LTE.

Business modelling – calculation of commercial, technical and strategic coefficients

Combined coefficient

Commercial, technical and strategic/competition coefficient is finally averaged to derive the combined coefficient that is used as the final coefficient to allocate the total PV of the licenses of the hypothetical Georgian operator to individual spectrum bands:

Spectrum band	Relative commercial coefficient	Relative technical coefficient	Relative strategic/ competition coefficient	Combined coefficient
800	0,16	0,40	0,27	0,28
900	0,29	0,34	0,18	0,27
1800	0,33	0,14	0,45	0,31
2100	0,21	0,12	0,09	0,14
2600				

Source: PwC analysis

Business modelling – final calculation of prices by spectrum bands

Calculation of final prices for each spectrum band

In the final step of the business modelling calculation the total PV of all spectrums of the hypothetical operator are allocated to individual spectrum bands using combined coefficients. The resulting values are then divided by the expected frequency bandwidth to be utilized by spectrum band to derive the price in GEL/MHz and subsequently divided by 2014 population to derive final price in GEL/MHz/capita:

Spectrum band	Spectrum bandwidth	Total MHz	Combined coefficient	Weighted price in GEL/MHz	Weighted price in GEL/MHz/cap
800	2 × 10	20	0,28	**2 545 494**	**0,567**
900	2 × 10	20	0,27	**2 469 267**	**0,550**
1800	2 × 20	40	0,31	**1 423 785**	**0,317**
2100	2 × 15	30	0,14	**863 088**	**0,192**
2600					

Source: PwC calculations

Note 1: The estimated spectrum bandwidths of the hypothetical operator are set not based on the current holdings of spectrum of existing operators, but are set based on the expert estimate reflecting what spectrum bandwidths the hypothetical operator may require to operate 2G, 3G and 4G networks.

Note 2: The 2600 MHz band was not modelled on the basis of business modelling approach, but only on the basis of benchmarking.

Further considerations

Calculation of the relative values of (liberalized) 800/900/1800/2100/2600 MHz bands

Spectrum band	Weighted price in GEL/MHz/cap	Weighted price in GEL/MHz	Relative coefficient of the price per MHz toward 800MHz	Relative coefficient of the price per MHz toward 900MHz	Relative coefficient of the price per MHz toward 1800MHz	Relative coefficient of the price per MHz toward 2100MHz	Relative coefficient of the price per MHz toward 2600MHz (paired)	Relative coefficient of the price per MHz toward 2600MHz (unpaired)
800 F	0,567	2 545 494	1,000	1,031	1,788	2,949	10,797	15,172
900 F	0,550	2 469 267	0,970	1,000	1,734	2,861	10,474	14,718
1 800 F	0,317	1 423 785	0,559	0,577	1,000	1,650	6,039	8,486
2 100 F	0,192	863 088	0,339	0,350	0,606	1,000	3,661	5,144
2600 (paired)	0,053	235 757	0,093	0,095	0,166	0,273	1,000	1,405
2600 (unpaired)	0,037	167 771	0,066	0,068	0,118	0,194	0,712	1,000

Based on the results of the business modelling for 800, 900, 1800 and 2100 MHz spectrum band and based on the benchmarking of 2600 MHz paired and unpaired spectrum band the relative coefficients for all spectrum bands were calculated.

Relative coefficients of the price per MHz towards particular frequency bands are calculated as a ratio of weighted price of each frequency band and the weighted prices of other frequency bands. For example, the calculation of relative coefficients to the price of 800 MHz spectrum band is as follows:

1. 800 MHz spectrum band price is assigned with **coefficient 1**
2. Relative coefficients for remaining spectrum bands are then calculated **according to this formula**:

$$Relative\ coefficient\ of\ spectrum\ band\ X\ to\ price\ of\ 800\ MHz\ spectrum = \frac{Price\ of\ spectrum\ band\ X}{Price\ of\ 800\ MHz\ spectrum\ band}$$

Estimation of the price with and without coverage obligation

Although the benchmarking results provide the estimate of the average price with and without coverage obligation by spectrum band, benchmarking **should always be considered** carefully due to its drawbacks and limitations.

For the business case model the price with coverage obligation cannot be set unless the coverage obligation is defined precisely.

In order to be able to quantify, for example, the price for 1 MHz of 800 MHz spectrum band with defined roll-out criteria, roll-out criteria themselves first **need to be defined**. This price may vary based on the philosophy of how these criteria are set in relation to current commercial expectations of LTE development in Georgia.

Setting out roll-out criteria for 800 MHz spectrum band should be a **balanced process** and should reflect the currently estimated commercial potential of LTE technology in Georgia. This commercial potential is closely linked to the expected development of penetration of 4G devices in future years.

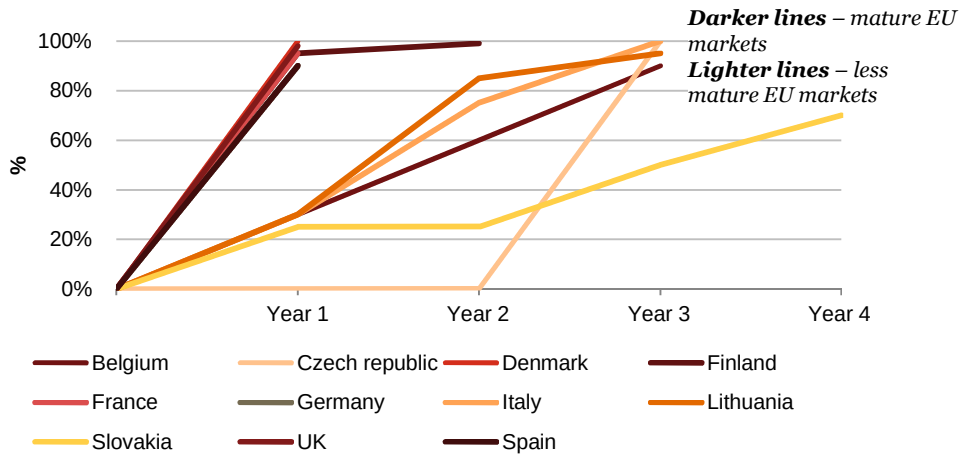
The approach of different regulators with respect to roll-out criteria of 800 MHz spectrum band can be seen in the **table and chart on the right side**.

From the above data it is obvious that regulators in more mature markets (Denmark, Finland, France, Germany, Spain, UK) chose more aggressive approach to roll-out obligations (i.e., 90%-100% coverage obligation with 1-2 years after obtaining the license). In other, less developed markets (Belgium, Czech republic, Italy, Lithuania, Slovakia), the approach is **to allow the operators** to roll out 4G sites gradually, which reflects the local commercial potential of LTE and does not impose too harsh economic burden on the operators.

Coverage obligation in 800 MHz auctions in selected countries:

Coverage obligation	Year of auction	Year 1	Year 2	Year 3	Year 4
Belgium	2013	30,0%	60,0%	90,0%	
Czech republic	2013	0,0%	0,0%	100,0%	
Denmark	2012	99,8%			
Finland	2013	95,0%	99,0%		
France	2011	95,0%			
Germany	2010	90,0%			
Italy	2011	30,0%	75,0%	100,0%	
Lithuania	2013	30,0%	85,0%	95,0%	
Slovakia	2013	25,0%	25,0%	50,0%	70,0%
UK	2013	98,0%			
Spain	2011	90,0%			

Coverage obligation in 800 MHz auctions by country



Source: PwC analysis

Estimation of the price with and without coverage obligation (2)

If the roll-out obligation is w**ell-balanced**, the price for 1 MHz of 800 MHz spectrum band should be the same irrespective of whether the roll-out obligation is set by the regulator or not. This means that the operator will roll-out the 4G network **based on commercial demand** which will ideally be similar or the same to the roll-out criteria. Rational decision making of the operator with respect to future CAPEX will therefore not be influenced by roll-out criteria.

If the roll-out criteria are set too strictly (i.e., high population coverage will be required by the operators in early years 1 and 2), the price of band spectrum will inevitably decrease. The amount of price decrease will be equal to the **"CAPEX penalty"** the operators will have to pay. The amount of this "penalty" can be quantified as opportunity costs resulting from capital investments into 800 MHz LTE network which is driven by regulation and not by commercial demand.

On the other hand, roll-out criteria can also be rather loose (or absent). In this case (i.e., when commercial demand for new technology is faster then roll-out criteria), the price for the spectrum will be the same for both cases (with or without coverage obligation).

In the instance of setting loose criteria for roll-out, regulator should be careful so as to set a reasonable spectrum cap (e.g., 2 x 10 MHz for 800 MHz spectrum). This should **prevent speculative spectrum hoarding**, which, in combination with absence of roll-out obligation (or its very loose form) can lead to attraction of speculative, as opposed to strategic, investors to participate on the spectrum auction.

Conclusion

The 800 MHz spectrum roll-out obligation may be set in such a way so as to reflect expected growth of commercial demand of LTE in Georgia. The roll-out criteria may be set as a gradual growth over a period of 3-4 years with target coverage which is deemed reasonable for Georgian market in the view of the coverage obligations set in the less develop EU markets.

Estimation of discounts to set the reserve price for the auction

We understand that the discount that can be used to set the reserve price from the estimates market value price of the spectrum band is **limited by Georgian legislation and regulation**.

However we suggest to consider the European experience in setting the reserve prices compared to the actual results of the auctions.

For the purpose of this analysis the 800 MHz spectrum band was selected due the large sample of auctions organized recently and the availability of the auctions details. However, the data on the reserve prices are **not always readily available** from reliable sources and therefore the analysis was limited to countries and auctions where the reserve price data was obtainable from reasonably reliable sources.

Based on the analysis it can be observed that there is very high disparity among the countries in terms of ratio of reserved price to final auction price. The range of the ratios is **between 0,6% in Italy to 100% in Belgium or Portugal** where the final auction price was at the level of reserve price. This is the evidence of various methods used by the regulators to set the reserve price. Incorrect reserve price setting may lead to low demand for the auction (if the reserve price is too high) and in turn to low competition during the auction.

The reserve price should therefore be set **with reasonable discount** from the estimated market value within the legislative range to attract sufficient competition for the auction.

Ratios of reserve price to auction price for selected auctions:

Country	Spectrum width description	Year	Currency	Value in local currency (mil.)	Reserve price (mil.)	Ratio of reserve price to auction price
Belgium	2*10	2013	EUR	120	120	100,0%
Czech republic	2*10	2013	CZK	2 664	1 010	37,9%
Czech republic	2*10	2013	CZK	2 231	1 110	49,8%
Czech republic	2*10	2013	CZK	2 386	2 220	93,0%
Denmark	2*20	2012	DKK	628	200	31,9%
Denmark	2*10	2012	DKK	111	50	44,9%
Finland	2*5	2013	EUR	34	17	49,7%
Finland	2*5	2013	EUR	33	17	50,0%
Finland	2*5	2013	EUR	41	17	40,6%
France	2*10	2011	EUR	683	400	58,6%
France	2*10	2011	EUR	1 065	600	56,3%
France	2*10	2011	EUR	891	800	89,8%
Germany	2*5	2010	EUR	1 212	3	0,2%
Italy	2*10	2011	EUR	978	6	0,6%
Italy	2*10	2011	EUR	992	6	0,6%
Italy	2*10	2011	EUR	992	6	0,6%
Portugal	2*10	2011	EUR	90	90	100,0%
Portugal	2*10	2011	EUR	90	90	100,0%
Portugal	2*10	2011	EUR	90	90	100,0%
Spain	2*5	2011	EUR	170	170	100,0%
Spain	2*5	2011	EUR	222	170	76,6%
Spain	2*5	2011	EUR	230	170	73,9%
Spain	2*5	2011	EUR	226	170	75,1%
Spain	2*5	2011	EUR	229	170	74,4%
Sweden	2*10	2010	SEK	431	250	58,0%
Sweden	2*10	2010	SEK	469	250	53,3%
Sweden	2*10	2010	SEK	854	250	29,3%
UK	2*5	2013	GBP	550	192	34,8%

Source: PwC analysis

Appendices

Appendix 1 – List of auctions excluded from the sample

The following auction results were excluded from the benchmarking sample in the process of statistical cleansing to exclude extreme values:

Country	Frequency band	Spectrum width description	License duration	Year	Currency	Value in local currency
[name]	[MHz]	[MHz]	[years]	[#]	[currency]	[#]
Austria	900	2*2,2	15	2004	EUR	157 000
Denmark	1800	2*10	23	2010	DKK	4 000 000
Germany	800	2*5	15	2010	EUR	1 212 000 000
Lithuania	800	2*10	17	2013	LTL	1 010 000
Lithuania	800	2*10	17	2013	LTL	2 000 000
Portugal	800	2*5	15	2011	EUR	90 000 000
Portugal	800	2*5	15	2011	EUR	90 000 000
Portugal	800	2*5	15	2011	EUR	90 000 000
Sweden	2600	2*10	15	2008	SEK	296 600 000
Sweden	2600	2*20	15	2008	SEK	562 450 000
Greece	900	2*10	15	2011	EUR	93 200 000
Spain	2600	2*10	19	2011	EUR	117 275
Spain	2600	2*10	19	2011	EUR	30 775
Spain	2600	2*10	19	2011	EUR	26 340

Appendix 2 – Summary of auction results for unpaired spectrums

Only 4 auctions results for auctions of unpaired spectrum were included in the sample. All of these auctions were in 2600 MHz spectrum bands. Although there were more auctions for unpaired spectrums organized, they were included in lots with paired frequencies and it was impossible to split the final price for the purpose of the benchmarking. The table below shows the benchmarking results for 2600 MHz spectrum band:

Unpaired frequencies

		Prices per MHz per capita in GEL				
Spectrum (MHz)	No. of samples	Min.	Max.	Average	Weighted average	Median
800	0	N/A	N/A	N/A	N/A	N/A
900	0	N/A	N/A	N/A	N/A	N/A
1800	0	N/A	N/A	N/A	N/A	N/A
2100	0	N/A	N/A	N/A	N/A	N/A
2600	4	0,0078	0,0655	0,0374	0,0320	0,0381

Appendix 3 – Calculation of total PV of all spectrums for hypothetical Georgian operator – PV of 15-years FCF

GEL	2014F	2015F	2016F	2017F	2018F	2019F	2020F	2021F	2022F	2023F	2024F	2025F	2026F	2027F	2028F	2029F
Revenues																
Subscribers	1 709 976	1 759 615	1 810 695	1 863 257	1 917 346	1 973 004	2 030 279	2 089 216	2 149 864	2 212 272	2 276 492	2 342 576	2 410 579	2 480 556	2 552 564	2 626 662
Penetration	114%	117%	121%	124%	127%	131%	134%	138%	142%	146%	150%	154%	158%	162%	167%	171%
Population	4 490 500	4 497 623	4 504 756	4 511 902	4 519 058	4 526 226	4 533 405	4 540 596	4 547 798	4 555 011	4 562 236	4 569 472	4 576 720	4 583 979	4 591 250	4 598 532
ARPU (market average)	11,23	11,08	10,93	10,78	10,63	10,48	10,42	10,36	10,30	10,24	10,18	10,12	10,06	10,00	9,94	9,88
ARPU voice share	96%	90%	83%	77%	70%	64%	58%	51%	45%	38%	32%	26%	19%	13%	6%	0%
ARPU - voice	10,78	9,93	9,09	8,28	7,48	6,71	6,00	5,30	4,61	3,93	3,26	2,59	1,93	1,28	0,64	-
ARPU - voice - 2G	8,62	7,94	7,27	6,62	5,99	5,36	4,80	4,24	3,69	3,15	2,61	2,07	1,55	1,02	0,51	-
ARPU - voice - 3G	2,16	1,99	1,82	1,66	1,50	1,34	1,20	1,06	0,92	0,79	0,65	0,52	0,39	0,26	0,13	-
Voice Penetration 2G	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
Voice Penetration 3G	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
ARPU data share	4%	10%	17%	23%	30%	36%	42%	49%	55%	62%	68%	74%	81%	87%	94%	100%
ARPU - data	0,45	1,15	1,84	2,50	3,15	3,77	4,42	5,05	5,68	6,31	6,92	7,53	8,13	8,72	9,31	9,88
ARPU - 2G	0,21	0,40	0,54	0,60	0,62	0,58	0,49	0,40	0,32	0,15	-	-	-	-	-	-
ARPU - 3G	0,24	0,61	0,91	1,15	1,33	1,45	1,54	1,57	1,56	1,49	1,38	1,13	0,81	0,44	0,19	-
ARPU - 4G	0,00	0,14	0,39	0,75	1,20	1,73	2,39	3,08	3,81	4,67	5,54	6,40	7,32	8,28	9,12	9,88
Data Penetration 2G	47%	35%	29%	24%	20%	16%	11%	8%	6%	2%	0%	0%	0%	0%	0%	0%
Data Penetration 3G	53%	53%	50%	46%	42%	39%	35%	31%	27%	24%	20%	15%	10%	5%	2%	0%
Data Penetration 4G	0%	12%	21%	30%	38%	46%	54%	61%	67%	74%	80%	85%	90%	95%	98%	100%
Revenues - voice 2G	176 964 598	167 684 105	158 050 481	148 060 761	137 712 391	127 003 259	116 952 875	106 364 753	95 220 576	83 501 548	71 188 382	58 261 290	44 699 980	30 483 641	15 590 938	-
Revenues - voice 3G	44 241 149	41 921 026	39 512 620	37 015 190	34 428 098	31 750 815	29 238 219	26 591 188	23 805 144	20 875 387	17 797 095	14 565 323	11 174 995	7 620 910	3 897 734	-
Revenues - data - 2G	4 331 946	8 442 221	11 728 409	13 473 915	14 330 696	13 841 371	12 052 644	10 011 167	8 212 775	3 851 074	-	-	-	-	-	-
Revenues - data - 3G	4 884 960	12 967 446	19 786 704	25 661 937	30 543 200	34 380 179	37 449 285	39 411 049	40 183 933	39 682 806	37 818 828	31 747 852	23 514 052	12 979 363	5 700 437	-
Revenues - data - 4G	0	2 919 500	8 377 435	16 772 508	27 503 355	41 077 616	58 110 960	77 301 415	98 259 983	123 904 120	151 275 311	179 904 492	211 626 470	246 607 897	279 321 396	311 474 218
Total revenue	**230 422 653**	**233 934 299**	**237 455 650**	**240 984 312**	**244 517 740**	**248 053 239**	**253 803 983**	**259 679 573**	**265 682 412**	**271 814 936**	**278 079 616**	**284 478 957**	**291 015 498**	**297 691 811**	**304 510 505**	**311 474 218**
EBITDA margin	43%	42%	41%	40%	39%	38%	37%	36%	36%	36%	36%	36%	36%	36%	36%	36%
EBITDA	**99 641 512**	**98 765 492**	**97 821 580**	**96 808 515**	**95 725 077**	**94 570 092**	**94 164 612**	**93 686 445**	**95 852 132**	**98 064 606**	**100 324 759**	**102 633 495**	**104 991 730**	**107 400 391**	**109 860 419**	**112 372 768**
Depreciation (benchmark)	(36 987 902)	(37 551 598)	(38 116 852)	(38 683 280)	(39 250 473)	(39 817 998)	(40 741 119)	(41 684 281)	(42 647 868)	(43 632 273)	(44 637 892)	(45 665 127)	(46 714 385)	(47 786 081)	(48 880 631)	(49 998 460)
EBIT	**62 653 611**	**61 213 894**	**59 704 727**	**58 125 235**	**56 474 604**	**54 752 093**	**53 423 493**	**52 002 165**	**53 204 264**	**54 432 333**	**55 686 868**	**56 968 368**	**58 277 344**	**59 614 310**	**60 979 789**	**62 374 308**
Income tax rate	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
Income tax	**(9 398 042)**	**(9 182 084)**	**(8 955 709)**	**(8 718 785)**	**(8 471 191)**	**(8 212 814)**	**(8 013 524)**	**(7 800 325)**	**(7 980 640)**	**(8 164 850)**	**(8 353 030)**	**(8 545 255)**	**(8 741 602)**	**(8 942 147)**	**(9 146 968)**	**(9 356 146)**
Capex	(31 107 058)	(31 581 130)	(32 056 513)	(32 532 882)	(33 009 895)	(33 487 187)	(34 263 538)	(35 056 742)	(35 867 126)	(36 695 016)	(37 540 748)	(38 404 659)	(39 287 092)	(40 188 395)	(41 108 918)	(42 049 019)
NWC	(3 425 619)	(3 477 826)	(3 530 177)	(3 582 636)	(3 635 166)	(3 687 727)	(3 773 222)	(3 860 572)	(3 949 815)	(4 040 985)	(4 134 120)	(4 229 257)	(4 326 433)	(4 425 688)	(4 527 059)	(4 630 587)
Change of NWC		52 207	52 351	52 459	52 530	52 561	85 494	87 350	89 242	91 170	93 135	95 137	97 177	99 255	101 371	103 527
Free CF	**59 136 413**	**58 054 484**	**56 861 709**	**55 609 307**	**54 296 522**	**52 922 651**	**51 973 045**	**50 916 729**	**52 093 609**	**53 295 910**	**54 524 116**	**55 778 718**	**57 060 212**	**58 369 104**	**59 705 904**	**61 071 129**
Discount factor	-	0,953	0,865	0,785	0,713	0,647	0,587	0,533	0,484	0,439	0,399	0,362	0,329	0,298	0,271	0,246
Discounted FCF		**55 312 566**	**49 179 489**	**43 660 395**	**38 697 977**	**34 240 013**	**30 524 360**	**27 145 945**	**25 211 866**	**23 414 803**	**21 745 096**	**20 193 765**	**18 752 459**	**17 413 415**	**16 169 413**	**15 013 744**

PV of 15-year FCF	**436 675 306**

Source: PwC calculations

Appendix 3 – Calculation of total PV of all spectrums for hypothetical Georgian operator – PV after contributory asset charges

Discounted Free CF using WACC = 10,16%	**436 675**
Contributory asset charges	
less: NBV of network	(256 962)
less: FV of NWC	3 426
Subtotal of CaC	**(253 536)**
PV of the license for hypothetical Georgian operator	**183 139**

Source: PwC calculations

Appendix 4 – Calculation PV of individual spectrum bands

GEL	2015F	2016F	2017F	2018F	2019F	2020F	2021F	2022F	2023F	2024F	2025F	2026F	2027F	2028F	2029F
Split of Discounted FCF by technology															
2G	41 644 167	35 162 941	29 266 087	24 062 712	19 441 479	15 515 166	12 165 510	9 815 282	7 524 768	5 566 745	4 135 683	2 880 378	1 783 134	827 874	-
3G	12 978 098	12 281 496	11 355 545	10 282 517	9 128 387	8 020 337	6 899 631	6 072 228	5 216 631	4 349 019	3 287 545	2 235 293	1 205 008	509 660	-
4G	690 301	1 735 052	3 038 764	4 352 748	5 670 146	6 988 857	8 080 805	9 324 357	10 673 404	11 829 332	12 770 537	13 636 788	14 425 273	14 831 879	15 013 744
Total	**55 312 566**	**49 179 489**	**43 660 395**	**38 697 977**	**34 240 013**	**30 524 360**	**27 145 945**	**25 211 866**	**23 414 803**	**21 745 096**	**20 193 765**	**18 752 459**	**17 413 415**	**16 169 413**	**15 013 744**
Allocation % of Discounted FCF by technology and spectrum band															
2G 900	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%
2G1800	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%
3G 900	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
3G 2100	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
4G 800	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	52%	54%	56%	58%	60%
4G 1800	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	48%	46%	44%	42%	40%
4G 2600	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Allocation of Discounted FCF by technology and spectrum band															
2G 900	24 986 500	21 097 765	17 559 652	14 437 627	11 664 888	9 309 099	7 299 306	5 889 169	4 514 861	3 340 047	2 481 410	1 728 227	1 069 880	496 724	-
2G1800	16 657 667	14 065 177	11 706 435	9 625 085	7 776 592	6 206 066	4 866 204	3 926 113	3 009 907	2 226 698	1 654 273	1 152 151	713 253	331 150	-
3G 900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3G 2100	12 978 098	12 281 496	11 355 545	10 282 517	9 128 387	8 020 337	6 899 631	6 072 228	5 216 631	4 349 019	3 287 545	2 235 293	1 205 008	509 660	-
4G 800	345 150	867 526	1 519 382	2 176 374	2 835 073	3 494 429	4 040 402	4 662 178	5 336 702	5 914 666	6 677 166	7 393 087	8 098 760	8 613 084	9 008 246
4G 1800	345 150	867 526	1 519 382	2 176 374	2 835 073	3 494 429	4 040 402	4 662 178	5 336 702	5 914 666	6 093 370	6 243 701	6 326 512	6 218 795	6 005 498
4G 2600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	**55 312 566**	**49 179 489**	**43 660 395**	**38 697 977**	**34 240 013**	**30 524 360**	**27 145 945**	**25 211 866**	**23 414 803**	**21 745 096**	**20 193 765**	**18 752 459**	**17 413 415**	**16 169 413**	**15 013 744**

PV of 15-year FCF by technology and spectrum band	
2G 900	125 875 155
2G1800	83 916 770
3G 900	-
3G 2100	93 821 394
4G 800	70 982 227
4G 1800	62 079 759
4G 2600	-
PV of 15-year FCF	**436 675 306**

PV of 15-year FCF by spectrum band	
800	70 982 227
900	125 875 155
1800	145 996 530
2100	93 821 394
2600	-
PV of 15-year FCF	**436 675 306**

Contributory asset charges	
Subtotal of CaC	**(253 536 072)**
PV of the license for hypothetical Georgia	**183 139 233**

PV of the license for hypothetical Georgian operator by spectrum band	
800	29 769 558
900	52 791 351
1800	61 230 145
2100	39 348 179
2600	-
PV of the license for hypothetical Georgia	**183 139 233**

Source: PwC calculations

Appendix 5 - Description of selected transactions (1/3)

[1]

Target: O2 Czech Republic (Czech Republic)

Bidder: PPF Group N.V.

Seller: Telefonica SA

Description: PPF Group will acquire 86,646,414 shares representing 27.93% stake in O2 Czech Republic at an offer price of CZK 295.15 (EUR 10.75), thereby valuing the transaction at CZK 25.57bn (EUR 931.449m). Earlier in 2013, PPF Group had offered O2 EUR 2.063m in cash and a deferred payment of EUR 404m for a 65.9% stake. O2 had 5,428,035 treasury shares representing 1.72% stake prior to the offer. The transaction has been approved by Czech National Bank. PPF Group will own a 95.02% stake in O2 Czech Republic while the remaining stake of 4.98% will be owned by Telefonica, S.A.

Source: Mergermarket.com

[2]

Target: Polkomtel Sp. z o.o. (Poland)

Bidder: Cyfrowy Polsat SA

Seller: The European Bank for Reconstruction and Development

Description: Cyfrowy Polsat SA has signed a definitive agreement to acquire an 16.23% stake in Polkomtel Sp. z o.o., from The European Bank for Reconstruction and Development (EBRD). Polkomtel Sp. z o.o., the Poland based company headquartered in Warsaw, is engaged in providing wireline and wireless telecommunication services to business and residential customers.

Source: Mergermarket.com

[3]

Target: Tele2 Russia Telecom (Russia)

Bidder: Bank Rossiya; Alexey Mordashov (Private Investor)

Seller: VTB Bank OAO

Description: Several strategic investors, including Bank Rossiya have agreed to acquire a 50% stake in Tele2 Russia Telecom, the Russia based company operating as an alternative telecom operator, from VTB Bank OAO, the listed Russia based company providing retail and corporate banking services. The transaction is in line with VTB Bank strategy aimed to strengthen the market position of Tele2 Russia telecom via partnership with other strategic investors.

Source: Mergermarket.com

[4]

Target: MegaFon OAO (Russia)

Bidder: Russian Technologies State Corporation; USM Holdings Ltd

Seller: Telconet Capital Limited Partnership

Description: Russian Technologies State Corporation and USM Holdings Ltd have agreed to acquire 6.75% stake in MegaFon OAO from Telconet Capital Limited Partnership. MegaFon OAO, a listed Russia based company headquartered in Moscow, Moscow City, is a telecommunication service operator.

Source: Mergermarket.com

Appendix 5 - Description of selected transactions (2/3)

[5]

Target: Cosmo Bulgaria Mobile EAD (Bulgaria)

Bidder: Telenor ASA

Seller: Hellenic Telecommunications Organisation SA

Description: Telenor ASA has agreed to acquire Cosmo Bulgaria Mobile EAD from Cosmote-Mobile Telecommunications SA, a subsidiary of Hellenic Telecommunications Organisation SA. Cosmo Bulgaria Mobile EAD, the Bulgaria based company headquartered in Sofia is a provider of telecommunications services. The transaction includes the acquisition of Germanos Telecom Bulgaria EAD, the Bulgaria based company, engaged in providing mobile products and services, which is operationally integrated with Cosmo Bulgaria Mobile EAD.

Source: Mergermarket.com

[6]

Target: Tele2 Russia Telecom (Russia)

Bidder: VTB Bank OAO

Seller: Tele2 AB

Description: VTB Group has agreed to acquire Tele2 Russia from Tele2 AB. Tele2 Russia, the Russia based company, is the Russian operations of Tele2 AB, a telecommunications group that provides mobile services, fixed broadband and telephony, data network services, cable TV and content.

Source: Mergermarket.com

[7]

Target: VimpelCom Ltd (Russia)

Bidder: Altimo

Seller: Orascom TMT Investments S.a r.l.

Description: Altimo has acquired a 14.8% stake in VimpelCom Ltd from Weather Investments II S.a r.l. VimpelCom Ltd is a telecommunication operator engaged in providing voice and data services through a range of wireless, fixed and broadband technologies.

Source: Mergermarket.com

[8]

Target: Bulgarian Telecommunications Company (Vivacom) (Bulg.)

Bidder: VTB Capital ZAO; Corporate Commercial Bank AD

Seller: PineBridge Investments Asia Ltd

Description: VTB Capital ZAO and Corporate Commercial Bank AD have agreed to acquire 93.99% of Bulgarian Telecommunications Company (BTC), the listed Bulgarian telecommunications company.

Source: Mergermarket.com

Appendix 5 - Description of selected transactions (3/3)

[9]

Target: MegaFon OAO (Russia)

Bidder: AF Telecom Holding OOO

Seller: Altimo

Description: OOO AF Telecom Holding has agreed to acquire a 10.7% stake in OAO MegaFon from Altimo. MegaFon, the Russia based company headquartered in Moscow, is a mobile operator.

Source: Mergermarket.com

[10]

Target: VimpelCom Ltd (Russia)

Bidder: Telenor ASA

Seller: JPMorgan Chase & Co.

Description: Telenor ASA has acquired a 3.99% stake in VimpelCom Ltd from JPMorgan Chase & Co. Telenor ASA, the listed Norway based company headquartered in Fornebu, is a telecommunications group with a focus on mobile services. VimpelCom Ltd is telecommunication operator engaged in providing voice and data services through a range of wireless, fixed and broadband technologies.

Source: Mergermarket.com

[11]

Target: GSM Kazakhstan OJSC (Kazakhstan)

Bidder: TeliaSonera AB

Seller: JSC Kazakhtelecom

Description: TeliaSonera AB has agreed to acquire a 49% stake in GSM Kazakhstan OJSC from JSC Kazakhtelecom. GSM Kazakhstan OJSC, the Kazakhstan based company headquartered in Almaty, is providing mobile communication services under the brand Kcell.

Source: Mergermarket.com

[12]

Target: Volgograd-GSM ZAO (Russia)

Bidder: Rostelecom OAO

Seller: Smarts JSC

Description: OAO Rostelecom, the listed Russia based provider of national long-distance and international telecommunications service, has acquired a 50% stake in Volgograd-GSM ZAO, the Russia based mobile telephone operator, from JSC Smarts, the Russia based provider of cellular communications services. This acquisition will enable Rostelecom to enhance its footprint in the mobile industry and increase its service offerings.

Source: Mergermarket.com

Glossary

Term	Definition/Meaning
ARPU	Average revenue per user
CaC	Contributory asset charges
CAPEX	Capital expenditures
CEE	Central and Eastern Europe
CIS	Commonwealth of Independent States
CPI	Consumer price index
DCF	Discounted cash flows
EBIT	Earnings before interest and tax
EBITDA	Earnings before interest, tax, depreciation and amortization
EU	European union
EV	Enterprise value
FCF	Free cash flows
FV	Fair value
FX	Foreign exchange rate
FY	Financial year
GDP	Gross domestic product
GEL	Georgian Lari

Glossary

Term	Definition/Meaning
GNCC	Georgian National Communication Commission
GSM	Global System for Mobile Communications
LTE	Long-term evolution
MHz	Megahertz
NBV	Net book value
NPV	Net present value
NWC	Net working capital
PPP	Purchasing power parity
PV	Present value
PwC	PricewaterhouseCoopers
UMTS	Universal Mobile Telecommunications System
USD	US Dollar
WACC	Weighted average cost of capital