
Benchmarking Methodology

for the

2020 Telecoms Price Benchmarking Study

for Arab Countries



Produced for
TRA Bahrain and AREGNET

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A. Introduction

Teligen has produced a Price Benchmarking study commissioned by TRA Bahrain on behalf of AREGNET, with 11 past updates from 2007 to 2019. A new study update started in July 2020, with broadly the same scope as before.

This study covers five different types of telecoms services: Fixed Voice, Mobile Voice and Data, Fixed Broadband, Mobile Broadband, and Leased Lines. For each of these services a basket methodology is used for a comprehensive price comparison across countries. Note, the Leased Line basket analysis has been reintroduced for this study, after being temporarily removed in the 2019 report.

The basket methodologies are identical to those used by the OECD (Organisation of Economic Co-operation and Development) for their ongoing price benchmarking. Teligen maintains and develops these methodologies on behalf of the OECD, and produces the official quarterly results for the OECD countries.

All basket systems are available as products and/or services from Teligen on a general basis covering European and OECD countries.

This document describes the methodologies and structures for the five service baskets.

A.1. Background data

For this study the exchange rate data will be taken from the OANDA web service on www.oanda.com. OANDA is a service that offers a comprehensive set of Internet-based currency tools, including an online currency converter - this enables easy conversion of currencies between most countries for specific dates, based on interbank market rates.

Exchange rates are based on the rates of the 1 July 2020.

The Purchasing Power Parity (PPP) exchange rates are taken from the latest available World Bank database of Comparative Price Levels (CPL). This data covers the majority of the countries in this study. However, some countries may not be covered up to 2020, and where this is the case the latest available data is used. The CPL is a correction factor for the market exchange rate to calculate current PPP rates.

In previous updates to this study, the OECD CPLs have been used for the OECD countries, however, for this update, results for OECD countries have been calculated using World Bank CPLs, to ensure greater consistency across all results.

The VAT information is taken from a variety of sources on the Internet as there is no single consistent source for tax information. Some information can be found on the Deloitte website www.deloitte.com.

A.2. Tariff data

The tariff data used in this study is researched by Teligen from Internet sources, mainly operator websites. As some of the services are only presented with a minimum of price information on the internet, Teligen will seek further clarifications from the operators and the regulators. In some cases it is not possible to establish enough price information to conclude the benchmarking for a service, and this will give a gap in the benchmarking results.

The tariff data is current as of July/August 2020

B. Basket methodologies

The so called “Basket” approach relates to the concept of a theoretical shopping basket where one can assume that a shopping basket is filled with the same amounts of equivalent goods in different shops, and then the cost of the basket content is compared.

The objective of the basket approach is to create a like-for-like comparison between different providers of a service. However, for the results to be comparable the services included in the basket must also be reasonably comparable.

For example, a telephony service is more or less the same thing in different countries and from different providers. However, if one provider offers a service that has specific limitations, for example no provision of mobile data, this service will not be comparable with other services that allow for mobile data use.

Great efforts are made to make sure that all the elements required by the basket definition are incorporated in each tariff entry. It is equally important that the calculations of the individual costs are true to the price structure of each tariff.

The “Basket Results” are created by applying the basket definition of individual calls and service parameters to the prices of each tariff. Fixed cost elements are simply calculated to the period of, for example one year, while call and message elements may be significantly more complicated to calculate in a consistent manner across all tariffs. The number of calls of a given type (e.g. Local) is combined with the average duration of calls at different times of day and the distribution of the calls across the day and week to calculate the overall cost of such calls as defined by the basket.

These calculations produce an annual or monthly cost for each tariff element, and these costs are comparable across all tariffs. In the end, the sum of the element costs for one tariff will produce the total cost of using the tariff. As all tariffs are calculated with the same set of rules, the results are also comparable.

The structure and metrics of the basket definition is critical to any comparison. If the traffic volumes and structure are too different from the real world situation the results may not be relevant for a meaningful comparison. The OECD has developed a comprehensive set of basket definitions for different types of services, with the most recent update of these baskets taking place at the end of 2017. These definitions are based on real traffic information from the majority of the OECD Member Countries around the world, and have produced a stable set of international benchmarking results for over two decades. Teligen has been working closely with the OECD through the development and implementation of these basket definitions, and is providing on-going updates to the OECD basket results.

The OECD baskets are produced specifically to facilitate meaningful international comparisons of prices. These baskets may not be directly comparable with the usage profiles experienced in any one country, and that is not the intention. More specific national usage profiles can be used for comparisons of prices seen from a national point of view, and may give different results.

For the 2020 AREGNET update, the OECD 2017 baskets have been applied. The baskets were declassified at the end of 2017, and the first set of OECD results for these new baskets was produced in quarter 1 of 2018. The 2017 baskets were used for the first time in the AREGNET study in 2019. In order to ensure consistency across the time series prior to 2019, the OECD 2017 baskets have been applied retrospectively to previous years' data. The baskets for each service are shown below, and described in detail in sections C to F

B.1. Basket summaries

Below is a summary of the baskets for each service. Full basket definitions are given in sections C to F.

B.1.1. OECD Fixed Voice baskets

The OECD 2017 Fixed Voice baskets consist of 6 baskets in total, as shown below.

Calls per month	Total calls	Call distribution		
		Fixed to fixed Local	Fixed to fixed National	Fixed to mobile
20 calls basket	20	61%	20%	19%
60 calls basket	60	60%	15%	25%
140 calls basket	140	58%	15%	27%
420 calls basket	420	73%	17%	10%
100 calls business basket	100	48%	19%	33%
260 calls business basket	260	43%	23%	34%

B.1.2. OECD Mobile Voice and Data baskets

The OECD 2017 Mobile Voice and Data baskets consist of 12 baskets in total, as shown below.

Basket	Voice calls	SMS	Data (GB)
30 calls, no data	30	10	0
100 calls, no data	100	20	0
30 calls, 0.1 GB	30	20	0.1
100 calls, 0.5 GB	100	40	0.5
300 calls, 1 GB	300	80	1
900 calls, 2 GB	900	160	2
Unlimited voice, 5 GB	Unlimited	Unlimited	5
30 calls, 0.5 GB	30	10	0.5
100 calls, 2 GB	100	20	2
300 calls, 5 GB	300	40	5
900 calls, 10 GB	900	80	10
Unlimited voice, 20 GB	Unlimited	Unlimited	20

B.1.3. OECD Fixed Broadband baskets

The OECD 2017 Fixed Broadband baskets consist of 15 baskets in total (5 each for low, medium and high data use), as shown below. Note, as most fixed broadband tariffs include unlimited or very high data allowances, the OECD reports on the medium data volumes only.

Minimum Download Speed (Mb/s)	Low alternative data volume (GB/month)	Medium data volume (GB/month)	High alternative data volume (GB/month)
0.256	5	15	45
10	10	30	90
25	20	60	180
100	40	120	360
1000	100	300	900

B.1.4. OECD Mobile Broadband baskets

The OECD 2017 Mobile Broadband baskets consist of 7 baskets in total, as shown below

	Usage volume (GB / month)
0.5 GB basket	0.5
1 GB basket	1
2 GB basket	2
5 GB basket	5
10 GB basket	10
20 GB basket	20
50 GB basket	50

B.1.5. OECD Leased Line baskets

The OECD 2017 Leased Line baskets comprise two speed categories only:

- 2 Mbit/s
- 34 Mbit/s

The basket weights of the 2017 OECD basket methodology are:

	2 km	20 km	50 km	100 km	200 km	500 km
<=2 Mbit/s	50%	18%	6%	8%	10%	8%
=>34 Mbit/s	42%	18%	15%	9%	8%	8%

In the Price Benchmarking Study for Arab Countries a minor modification has been made to the leased line basket:

- Where tariffs are available the additional bitrates of 64 kb/s, 256 kb/s and 155 Mb/s will be included in the results.

Note: Where 34 Mb/s is not offered, and 45 Mb/s is used instead, a conversion factor of $34 / 45 = 0.75$ will be used on the price

B.2. Time series

With this update being the 12th in the series of benchmarking studies, the potential range of time series results makes visual presentation across all AREGNET countries more difficult. It has been decided to only include the last 5 years in the main report time series data.

The full time series data will still be available in the basket spreadsheets, and the Bahrain-specific report will still be showing the full range of time series data.

The time series results are based on two key assumptions:

- The latest baskets are used for all years in the time series. Where baskets have changed in a way that does not allow inclusion of services from past years, e.g. with introduction of new services or service parameters, only the relevant years covering the full scope of the basket will be included in the time series¹.
- The latest exchange rate and PPP rate information available is used for all years. This will exclude any exchange rate variations from the results, only leaving the price changes seen in each market. However, it may also mean that the results for the early years of the time series can have a different price balance between countries than seen in previous studies.

¹ For example, very high speed fixed broadband services, which were much less prevalent in many AREGNET countries in previous years.

C. Fixed Voice Benchmarking methodology

C.1. OECD Fixed Voice Baskets, 2017 version

C.1.1. Overview

The OECD 2017 basket methodology for fixed voice services is based on landline or wireless connection and is built up by the following tariff elements:

Installation	Assuming that the average life of a fixed voice connection is 5 years the installation elements consists of 1/5 of any one-off charges related to the connection of the service.
Rental	As the OECD basket results are calculated for one month the rental element is made up of any line rental charges and other recurring charges, calculated to a period of one year.
Fixed line calls	The fixed line call element covers all local and national fixed line calls. Calls are divided into Local and National calls, describing the shortest and longest call distances within the country. The local calling area is specified for each operator/country as covering all distances up to a certain radius. Regional calls, if defined in the price list, are not considered.
Calls to mobiles	Calls to mobiles are included for all major national networks. The call charges are weighted according to the best possible market share information available

For fixed line calls and calls to mobiles a time of day-weighting dividing the week into Daytime, Evening and Weekend times is applied. Call charges for all of these three times are calculated separately and weighted. Weekend is defined as the “end-of-working-week” period in any country.

The calculation of national calls is done as close to actual billing principles as possible, applying units, minimum charges, maximum charges and call set up charges as specified by the tariff.

The Fixed Voice basket parameters have not changed in the 2017 basket revision International calls are no longer included in the baskets. [This is a change in 2017 basket definitions]

C.1.2. Fixed voice call distribution

Overall basket volumes and destination distribution

Calls per month	Total calls	Call distribution		
		Fixed to fixed Local	Fixed to fixed National	Fixed to mobile
20 calls basket	20	61%	20%	19%
60 calls basket	60	60%	15%	25%
140 calls basket	140	58%	15%	27%
420 calls basket	420	73%	17%	10%
100 calls business basket	100	48%	19%	33%
260 calls business basket	260	43%	23%	34%

Time of day distribution: Fixed to fixed

	Fixed to Fixed		
	Day	Evening	Weekend
20 calls basket	53%	25%	22%
60 calls basket	60%	22%	18%
140 calls basket	52%	26%	22%
420 calls basket	52%	26%	22%
100 calls business basket	69%	17%	14%
260 calls business basket	75%	15%	10%

Time of day distribution: Fixed to mobile

	Fixed to Mobile		
	Day	Evening	Weekend
20 calls basket	45%	28%	27%
60 calls basket	57%	22%	21%
140 calls basket	46%	27%	27%
420 calls basket	46%	27%	27%
100 calls business basket	69%	18%	13%
260 calls business basket	77%	14%	9%

C.1.3. Fixed Voice call durations

Fixed to fixed local, minutes per call

	Fixed to fixed local		
	Day	Evening	Weekend
20 calls basket	2.6	4.0	2.6
60 calls basket	2.6	3.8	2.9
140 calls basket	3.1	4.8	3.7
420 calls basket	3.6	5.4	5.4
100 calls business basket	1.9	2.3	2.1
260 calls business basket	2.0	2.8	3.1

Fixed to fixed national, minutes per call

	Fixed to fixed national		
	Day	Evening	Weekend
20 calls basket	4.0	6.3	5.4
60 calls basket	4.1	6.4	6.4
140 calls basket	4.7	7.6	7.1
420 calls basket	5.3	8.1	8.1
100 calls business basket	2.3	3.3	3.3
260 calls business basket	2.4	2.7	3.4

Fixed to mobile, minutes per call

	Fixed to mobile		
	Day	Evening	Weekend
20 calls basket	1.5	2.1	1.3
60 calls basket	1.9	2.4	1.9
140 calls basket	1.7	2.3	2.1
420 calls basket	1.8	2.3	2.3
100 calls business basket	1.6	1.9	1.5
260 calls business basket	1.7	2.2	1.9

Note: Day and Evening applies to weekdays, while Weekend applies to the entire “end-of-working-week” period. Call durations are given in fractions of minutes, i.e. 4.6 minutes mean 4 minutes and 36 seconds.

C.1.4. Other OECD 2017 basket rules

- Only incumbent² operators are covered.
- Nonrecurring charges are covered using the charge for a new installation of a service.
- Nonrecurring charges are distributed over 5 years, except where the installation is a tradable asset (Japan) where the charge is distributed over 20 years.
- Call costs are calculated using the duration of $D + (\text{Unit}(\text{seconds})-1)/2$, based on basket call duration D converted to seconds and average per second charges. Unit is the billing unit in seconds. This method ensures a reasonable approximation of the distribution of call durations.
- National call charges to fixed networks are based on a local / national split. While this is adequate for most prices, some operators may split their prices into local / regional / national. In such cases only the prices for local and national areas will be considered.
- When call charges to mobile networks differ by network, the weighted average charge for calls to all national mobile networks shall be used, based on available subscriber numbers.
- Selective discounts mean discounts to a chosen set of numbers or destinations. The effect of such discounts is calculated using the approach taken in the OECD baskets, see C.1.6 below.
- Results are presented in US\$ / PPP per month, excluding VAT for Business baskets and including VAT for Residential baskets.

C.1.5. Local calling areas for the Fixed Voice baskets

Most tariffs today have one call charge for all fixed line calls within a country. In some countries there may still be a distinction between local area calls and calls beyond the local area. The local area may in principle be seen as a circular area around the calling party.

To account for the differences that may appear as a result of different sizes of local calling areas, where such differences in price is specified in the tariffs, an added adjustment of the proportion of calls within the local calling area will be incorporated. The adjustment will increase the proportion of local calls, and correspondingly reduce the proportion of national calls, with increasing size of local calling area. The adjustment is based on assumed average radius of the local calling areas.

² Monopoly or former monopoly operator that still has dominant market share

The following adjustment of the Local and National call proportions will be used, based on the closest size of local calling area:

Local and national call proportions

Average local call radius	Local adjustment	National adjustment
10 km	-8.9%	+8.9%
15 km	-4.2%	+4.2%
20 km	-1.4%	+1.4%
25 km	0.0%	0.0%
30 km	3.2%	-3.2%
50 km	6.4%	-6.4%
100 km	9.6%	-9.6%

In addition the percentages above must be adjusted with the proportion of fixed line calls in each basket, as given below.

Basket adjustment

	Basket adjustment
20 calls basket	81%
60 calls basket	75%
140 calls basket	73%
420 calls basket	90%
100 calls business basket	67%
260 calls business basket	66%

An example: The 60 calls basket will have the following adjustment factors:

Example – 60 call basket

Average Local call area radius	Local adjustment	National adjustment
10 km	-6.7%	6.7%
15 km	-3.2%	3.2%
20 km	-1.1%	1.1%
25 km	0.0%	0.0%
30 km	2.4%	-2.4%
50 km	4.8%	-4.8%
100 km	7.2%	-7.2%

If the operator, for example, uses an average local calling radius of 15 km, the fixed-to-fixed local proportion will be 60% - 3.2% = 56.8%, and the fixed-to-fixed national portion will be 15% + 3.2% = 18.2%

C.1.6. Selective discounts

Selective discounts are discounts which are limited to calls to a set of nominated numbers. Users can typically specify 1, 2, 3, or up to 10 or more numbers (depending on tariff) to which calls and/or messages will be free or discounted. Such plans are also known under brand names like “Friends and Family”, “Bestmates”, “Preferred numbers”, “Calling circle” etc.

The handling of the selective discount is based on the following elements and assumptions:

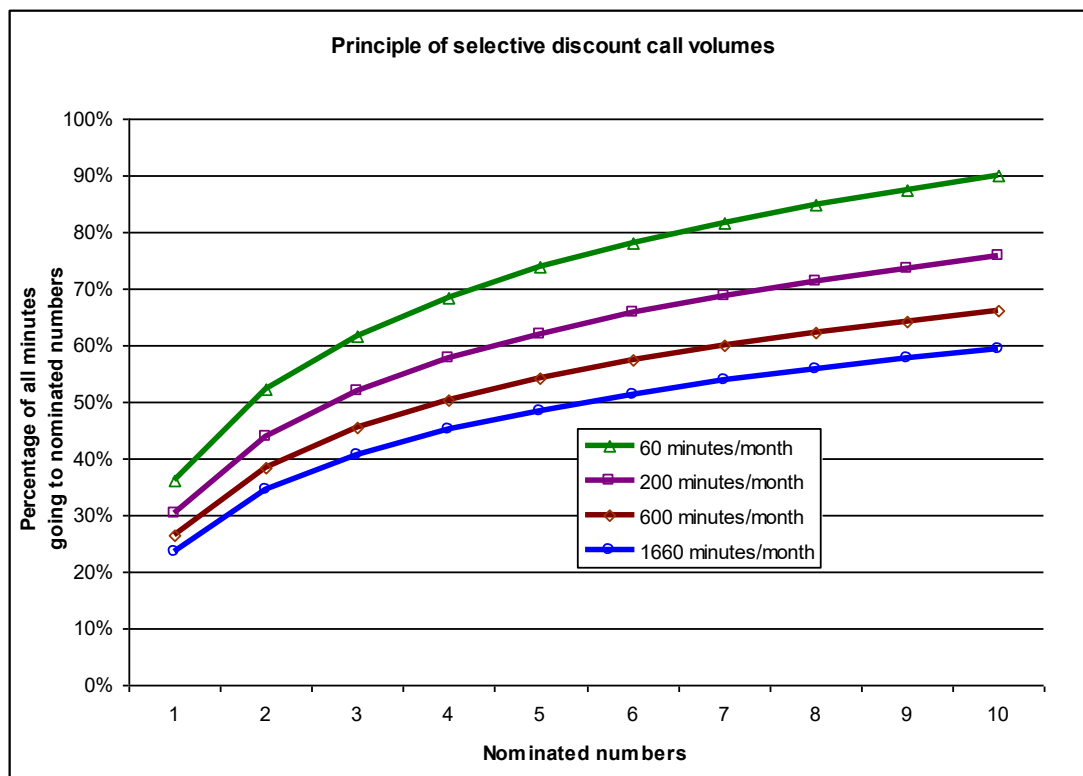
- The total number of minutes for all calls in the basket is V.
- The discount applies to N nominated numbers
- The discount D (%) applies to each of these calls
 - (D=100% is a free call)
- The proportion of minutes A (%) receiving the discount is calculated based on the formula below, using V and N as input data. The proportion A is adjusted according to the discount D
- ($A_2 = A \times D$)
- Mapping information will indicate which call types are affected by the discount.
- The remaining proportion A_2 is used to calculate the number of minutes to be deducted from the basket minutes according to the call type mapping.
- Cost of remaining minutes is calculated as usual.

The critical element is the calculation of A. This proportion is based on N (number of nominated numbers) and V (total minutes in basket), and an empirically developed function can be used to calculate the proportions as shown on the graph below. The function is:

$$A (\%) = \text{Log}(10 \times N^{1.5}) / \text{Log}(10 \times V)$$

This function provides a proportion that resembles the amount of calls going to nominated numbers in the data received from operators in this basket review.

Selective call discount volumes



The selective discount will be taken before any minute, message and value allowances included in the tariff. The amount of minutes that will be deducted because of the selective discount is calculated as

- $V_{(2)} = V_{(1)} \times (\text{Log}(10 \times N^{1.5}) / \text{Log}(10 \times V)) \times D$

where $V_{(1)}$ is the total number of minutes defined by the basket, and $V_{(2)}$ is the number of minutes going to the nominated numbers.

- $V_{(2)}$ is then distributed to the specific call types according to the selective discount mapping. Each call type will have between zero and $V_{(2)}$ minutes to be deducted. The remaining minutes for each call type is used for the following distribution of allowances and calculation of call costs.

C.2. Modifications for Arab baskets

In the Price Benchmarking Study for Arab Countries the following minor modification has been made to the OECD Fixed Voice baskets:

- As a complete list of subscriber numbers for mobile operators in the Arab countries is not available, the prices for calls to each network are evenly distributed. The effect is minimal as the prices are normally quite close, and the distribution is still within reason.

D. Mobile Voice and Data Benchmarking Methodology

D.1. OECD Mobile Voice and Data Baskets 2017

D.1.1. Overview

The Mobile Voice and Data basket shall cover mobile voice, message and data services based on 3G, 4G and 5G mobile networks.

Operators	<p>At least the two largest network operators are covered for each country, based on subscriber numbers. The operators covered should have at least 50% of the market share between them.</p> <p>Discount brands offered by the covered network operators can be included when clearly linked from the discount brand's website to the network operator's website and brand. The discount brand is covered under the parent company.</p>
Service specification	<p>Offers shall include 3G, 4G and 5G mobile phone services, covering Post-paid, Pre-paid and SIM-only tariffs. Handsets are not included.</p>
Depreciation	<p>Service lifetime is 3 years. Nonrecurring charges and promotional discounts are distributed over 3 years.</p>
Type of offer	<p>Tariffs shall describe a new connection of a single mobile phone service, for a new customer.</p>
Number of baskets	<p>There are 12 baskets split into 3 groups:</p> <ul style="list-style-type: none"> • No data use (2 baskets) • Low data and message use (5 baskets) • High data and message use (5 baskets) <p>Each group includes different levels of voice calls, messages (SMS) and data use (GB). The fifth level in each group covers unlimited voice and SMS.</p>

<p>Usage price information</p>	<p>Voice calls to:</p> <ul style="list-style-type: none"> • Local fixed lines • National fixed lines • On-net mobile network • Off-net mobile networks, weighted by market share • Voicemail retrieval <p>SMS messages</p> <ul style="list-style-type: none"> • On-net message • Off-net messages <p>Mobile data used on handset</p>
<p>Allowances</p>	<p>Voice and message allowances are deducted in the following order: Selective discounts, most restricted minute allowance, least restricted minute allowance, message allowance, value allowance. Specific volume discounts will be deducted from the total cost at the end.</p> <p>Add-on packages for SMS and data can be included.</p>
<p>Results presentation</p>	<p>Results are presented in USD / PPP per month, including VAT. Nominal exchange rates can be used.</p>

Mobile Voice and Data baskets³

Basket	Voice calls	SMS	Data (GB)
30 calls, no data	30	10	0
100 calls, no data	100	20	0
30 calls, 0.1 GB	30	20	0.1
100 calls, 0.5 GB	100	40	0.5
300 calls, 1 GB	300	80	1
900 calls, 2 GB	900	160	2
Unlimited voice, 5 GB	Unlimited	Unlimited	5
30 calls, 0.5 GB	30	10	0.5
100 calls, 2 GB	100	20	2
300 calls, 5 GB	300	40	5
900 calls, 10 GB	900	80	10
Unlimited voice, 20 GB	Unlimited	Unlimited	20

D.1.2. Mobile Voice basket parameters

Mobile: Overall destination and time distribution

	Voice call distribution				Voice call day/week distribution		
	M2F	On-net	Off-net	Voicemail	Day	Evening	Weekend
30 calls basket	15%	55%	28%	2%	46%	27%	27%
100 calls basket	15%	55%	28%	2%	46%	27%	27%
300 calls basket	15%	55%	28%	2%	46%	27%	27%
900 calls basket	15%	55%	28%	2%	46%	27%	27%

³ For baskets which include unlimited allowances, these cover tariffs where allowances are stated as unlimited, without throttling. Only these offers will be considered for basket calculation purposes.

Mobile voice call duration

	Call duration (minutes / call)			
	M2F	On-net	Off-net	Voicemail
30 calls basket	2.0	1.6	1.7	0.9
100 calls basket	2.1	1.9	1.8	1.0
300 calls basket	2.0	2.0	1.8	1.0
900 calls basket	1.9	2.1	1.9	1.1

SMS distribution

	Destination		Time of day	
	On-net	Off-net	Peak	Off-peak
30 calls basket	53%	47%	66%	34%
100 calls basket	53%	47%	66%	34%
300 calls basket	53%	47%	66%	34%
900 calls basket	53%	47%	66%	34%

D.1.3. Additional notes, Mobile Voice:

- **No distinction of 3G, 4G and 5G results**

Basket results will normally not distinguish between 3G, 4G and 5G offers.

- **Voice usage is defined in calls**

As several tariff elements are calculated based on number of calls rather than minutes it is more relevant to start the voice basket calculation with the number of calls, hence the definition of calls rather than minutes.

For reference, the four voice baskets cover the following number of minutes (total across all calls):

Calls	Minutes
30	50
100	188
300	577
900	1795

D.1.4. Other basket rules

- A range of relevant tariffs shall be covered, allowing the lowest cost tariff to be selected for each operator. Only tariffs presented clearly as current tariffs on the operator web pages will be considered.
- All baskets can be used for both pre-paid and post-paid services.
- Selective discounts are calculated with the algorithm described in the section on selective discounts under Fixed Voice above.
- The value of call and message allowances included in the tariff will be deducted from the usage element of the basket, up to the value of actual usage.
- Off-net mobile-to-mobile charges are weighted according to subscriber numbers for each country, where relevant for the pricing of calls.
- Call costs are calculated using the duration of $D + (\text{Unit}_{(\text{seconds})} - 1) / 2$, based on basket call duration D given below converted to seconds and average per second charges. The Unit is the billing unit in seconds.
- Results are presented in USD / PPP per month including VAT. Nominal exchange rates can be used.

Many tariffs will also apply limitations to the data usage, often with a “Fair Usage Policy” (FUP) that effectively limits the use of data by reducing speed or stopping the data service at the FUP limit. When the usage exceeds the FUP limit of such tariffs the tariff as a whole is deemed inappropriate for the usage level of the basket and is therefore removed from the analysis.

D.2. Modifications for Arab baskets

There are no modifications proposed.

E. Fixed Broadband benchmarking methodology

E.1. OECD Fixed Broadband Baskets

The Fixed Broadband basket shall cover fixed location broadband services based on landline or wireless connection. Minimum speed of broadband is 256 kb/s.

Operators	In the OECD baskets, the top three providers in each country shall be covered, ranked by market share. The combined market share shall be at least 70%. However, for this study of fixed broadband services in Arab countries it was decided to only cover the incumbent ⁴ provider in each country.
Service specification	Fixed broadband services for residential users, provided over: <ul style="list-style-type: none"> • ADSL • Cable and fibre networks • Wimax • Fixed location LTE
Depreciation	Service lifetime is 3 years. Nonrecurring charges and promotional discounts are distributed over 3 years.
Type of offer	Tariffs shall describe a new installation of fixed broadband service, for a new customer.

⁴ Incumbent here refers to operator that has dominant market share, typically the monopoly or former monopoly operator

<p>Number of baskets</p>	<p>There are 15 baskets, over 5 speed tiers, and 3 groups of usage:</p> <ul style="list-style-type: none"> • Low data volume • Medium data volume * • High data volume <p>The five speed tiers are defined by their minimum speed. Offers with a speed equal to or above the minimum may be considered for the basket results.</p> <p>* As most fixed broadband services offer unlimited data usage only the Medium usage volume will be included in published OECD results.</p>
<p>Usage price information</p>	<p>Overage data usage applied after any allowance is exhausted, per MB.</p>
<p>Allowances</p>	<p>Where an allowance or fair use limit is exceeded and the service is stopped or speed reduced until the end of the billing period, the package will not be included in the basket results.</p>
<p>Other fees</p>	<p>Where the provider, on their website, clearly identifies the existence of and need to pay an additional Access Fee to the network operator (“Incumbent Access Fee”), such fee shall also be included in the basket calculations.</p>
<p>Results presentation</p>	<p>Results are presented in USD / PPP per month, including VAT. Nominal exchange rates can be used.</p>

Fixed broadband baskets

Minimum Download Speed (Mb/s)	Low alternative data volume (GB/month)	Medium data volume (GB/month)	High alternative data volume (GB/month)
0.256	5	15	45
10	10	30	90
25	20	60	180
100	40	120	360
1000	100	300	900

Note: This is a new set of baskets in 2017, based on previous baskets

E.1.1. Additional notes, Fixed Broadband:

- Minimum download speed

The fixed broadband baskets are defined by “Minimum Download Speed”. This means that the basket results can include any offer with a download speed higher than the minimum. The “Data volume” applies to the basket regardless of offered speed.

Speeds are based on published speed.

- Upload speed

While the baskets are defined by the download speed only, the information about the corresponding upload speed of each offer shall be included/presented in basket results.

- Basket calculations

For installation. A 3 year lifetime of service is assumed, dividing all one off installation and modem costs⁵ by 36 months. Charges related to the provision of the physical line are not included.

Rental charges. Cover the sum of the monthly service cost and any option charges related to for example modem. Charges related to the provision of the physical line are not included

Usage costs. If usage beyond the volume limit results in further charges per minute, hour or MByte, such charges will be included in the overall cost calculation as “Usage”.

⁵ Modem cost may be included in the basic installation cost, or specified separately. If specified separately it is added to the installation cost.

Usage limitations. Indication of volume limit if applicable. There will also be a text description of what the consequence of breaking the limit will be. Tariffs with time limits are normally not considered.

Maximum usage cost. Some tariffs that apply usage charges may also have a maximum usage cost per billing period

- Additional information.

Additional information about the service may be included, although this will not be used in the calculation of the monthly cost. This includes information on email addresses and web space.

E.2. Modifications for Arab baskets

In the OECD baskets there is a pre-defined list of providers to be covered (three largest, with at least 70% market share). However, for this study of fixed broadband services in Arab countries it has been decided to only cover the incumbent provider in each country, as in previous years.

Following the data collection for this update the range of actual service offers will be reviewed, and where services for a particular speed range are available in less than 5 countries the speed range may be taken out of the presentation in the report. All speed and volume tiers will still be available in the benchmarking system.

In addition to the residential tariffs specified by the OECD basket definitions, Teligen will also analyse business offers, as in previous studies. Results for the AREGNET countries will be compared to residential and business results respectively in the OECD countries.

As in the OECD basket definitions time related parameters will not be included.

In line with the OECD approach, as most fixed broadband services offer unlimited data usage only the Medium usage volume will be included in published results.

F. Mobile Broadband Data Only benchmarking methodology

F.1. OECD Mobile Broadband Baskets

In previous AREGNET studies, a set of proprietary mobile broadband baskets has been used. For this update to the study, the mobile broadband baskets use the OECD 2017 definitions for mobile broadband.

The Mobile Broadband Data Only basket shall cover mobile data-only broadband services based on 3G, 4G and 5G mobile networks

Operators	<p>The top three mobile network providers in each country shall be covered, ranked by market share. The combined market share shall be at least 70%⁶.</p> <p>Discount brands offered by the covered network operators can be included when clearly linked from the discount brand’s website to the network operator’s website and brand. The discount brand is covered under the parent company.</p>
Service specification	Offers shall include data only 3G, 4G and 5G mobile broadband services for residential users, covering Post-paid, Pre-paid and SIM-only tariffs. Devices are not included.
Depreciation	Service lifetime is 3 years. Nonrecurring charges and promotional discounts are distributed over 3 years.
Type of offer	Tariffs shall describe a new connection to mobile broadband service, for a new customer.
Number of baskets	<p>There are 7 baskets, over 7 levels of usage.</p> <p>Speed is not a parameter used in the mobile broadband baskets.</p>

⁶ As market share for mobile broadband only is typically not available, market share for mobile voice and data subscriptions is considered.

	Device is not included as a factor in the mobile broadband baskets.
Usage price information	Overage data usage applied after any allowance is exhausted, per MB.
Allowances	Where an allowance or fair use limit is exceeded and the service is stopped or speed reduced until the end of the billing period, the package will not be included in the basket results.
Results presentation	Results are presented in USD / PPP per month, including VAT. Nominal exchange rates can be used. Business offers shall not be included in OECD results.

Mobile broadband Data Only baskets

	Usage volume (GB / month)
0.5 GB basket	0.5
1 GB basket	1
2 GB basket	2
5 GB basket	5
10 GB basket	10
20 GB basket	20
50 GB basket	50

F.1.1. Additional notes, Mobile Broadband Data Only:

- Services based on “Days of use” or “Validity period”

The mobile broadband baskets are based on usage distributed across all days in a month, i.e. a 30 day period.

Mobile broadband offers that are defined with a price for a shorter usage period, e.g. 1 day or 10 days, can be included by multiplying the price per period with the number of periods in a 30 day month. Multiplication factor $P = 30 \text{ days} / (\text{Validity days})$.

E.g. a 10 day offer will have $P = 30 \text{ days} / 10 \text{ days} = 3$.

- Short period baskets

As an addition to the baskets above the following baskets can be used for analysis of the effect of short validity offers, i.e. offer with validity ≤ 30 days.

Short validity mobile broadband baskets

	Usage volume (GB / month)	Days of use per month
0.5 GB basket	0.5	15
1 GB basket	1	15

When using these baskets the monthly cost of offers with validity different from the defined number of days of use shall be adjusted by a pro-rata factor related to the number of days. E.g. a regular monthly offer will be multiplied by the factor $P = 15 \text{ days} / 30 \text{ days} = 0.5$, and a 10 day offer will have the multiplication factor of $P = 15 \text{ days} / 10 \text{ days} = 1.5$.

- Offers with “Validity period” > 30 days

As tariffs with long term prepayment of services are excluded in general (see General basket rules), tariffs with validity longer than 30 days will not be included. However, such tariffs may be included with a validity truncated at 30 days, i.e. without pro-rata adjustment to the price.

F.2. Modifications for Arab baskets

In addition to the residential tariffs specified by the OECD basket definitions, Teligen will also analyse business offers, as in previous studies. Results for the AREGNET countries will be compared to residential and business results respectively in the OECD countries.

G. Leased Line benchmarking methodology

The basket weights of the 2017 OECD basket methodology are:

	2 km	20 km	50 km	100 km	200 km	500 km
<=2 Mbit/s	50%	18%	6%	8%	10%	8%
=>34 Mbit/s	42%	18%	15%	9%	8%	8%

In the Price Benchmarking Study for Arab Countries a minor modification has been made to the leased line basket:

- Where tariffs are available the additional bitrates of 64 kb/s, 256 kb/s and 155 Mb/s will be included in the results.

Note: Where 34 Mb/s is not offered, and 45 Mb/s is used instead, a conversion factor of $34 / 45 = 0.75$ will be used on the price.

G.1. Other basket rules

- The basket shall include transparent end-to-end leased lines from the incumbent operators. Virtual circuits can be included in cases where traditional leased circuits do not exist anymore; xDSL services, however, fall outside the scope of the basket.
- Non-recurring charges (installation) are excluded from the basket⁷. Only monthly rental charges are included.

⁷ For leased lines the non-recurring charges are mostly related to the selection of physical interface at customer end, and this is considered outside the definition of the tariff. Such interfaces can vary considerably in price, and are largely dependent on customer technical requirements rather than location.

- Circuits above 2 km shall include two 2 km local tail circuits within the defined distance. This means that, for example, a 50 km circuit will have 2 local tail circuits of 2 km, and a main circuit of 46 km. Some operators include the local tail circuits in the total price, some do not.
- Circuits are assumed to be within or out of the major city in the country. This means that the 2 km circuit is a local circuit within the major city, and the rest of the distances will have one end in the major city, and the other end outside.
- Where the distance exceeds the possible distance for a country, the highest available price is used for that distance. This means that even when a circuit length would go beyond the borders of a country, this circuit is included in the basket, using the price of the longest possible circuit.⁸

Results are presented in US\$ per month, excluding VAT.

⁸ If a small country in principle only allows circuits up to for example 50 km within its borders, the weights and calculations for longer circuits will still be used as if circuits up to 500 km were possible. The price for the longest zone given in the tariff will be used for those excessive distances. In most cases this will not have an impact as the circuits in small countries do not normally have a distance element (i.e. per km charge) in the pricing.