

**The Hashemite Kingdom of Jordan**  
**TELECOMMUNICATIONS REGULATORY COMMISSION**



**EXPLANATORY MEMORANDUM  
FOR CHARGES FOR  
MOBILE INTERCONNECTION SERVICES  
BASED ON TSLRIC+ MODELS**

# Implementation of TSLRIC+ for mobile services

## Summary

This document sets out details of TRC’s pricing decision in relation to the implementation of TSLRIC+ pricing for the relevant regulated services of mobile operators in Jordan. The purpose of this document is to give the operators an understanding of how TRC has implemented TSLRIC+ pricing in conjunction with the release of the efficient operator models.

Accompanying this Explanatory Note is a redacted version of the efficient operator model.

## Mobile termination rates 2024-2027

The table below sets out the termination rates that will be applied in the period 2024-2027 for Zain, Orange Mobile and Umniah.

<b>Rate per minute (fils)</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>
Blended	1.55	1.11	0.66	0.21

## Timing of the implementation

The Interconnection charges set out in the Pricing Decision shall apply from 1<sup>st</sup> January 2024 till 31 December 2027. After 3 years, if necessary, TRC intends to undertake a review of the TSLRIC+ models and, if deemed convenient, will work with the industry to update the TSLRIC+ models. In general, TRC will monitor market conditions and, if justified, may update the forecasts and key assumptions in the TSLRIC+ models.

## Implementation of LRIC-based Interconnection Charges

The approach adopted by TRC when setting the new regulated charges is described below:

1. When the new charges were considered to be close to the previous ones and/or the regulated services under consideration were not material under the current market situation, a fixed charge has been set for the 2024-2027 period, which is extracted as the average of the efficient operator model’s results for the relevant period.
2. When the new charges were considered not to be close to the previous ones and the regulated services under consideration were material under the current market situation, a glide path has been defined so as to smooth the impact on the market of the Decision.

## Symmetrical rates

The TRC Decision 17-5/2009 stated that symmetrical prices for all operators are preferred unless there are exogenous cost differences that justify asymmetrical prices. Having reviewed all the available evidences in relation to the cost structures of the different mobile operators, TRC has concluded that there are no exogenous cost differences that justify asymmetrical rates. TRC has determined that the final mobile interconnection costs

calculated by the models for the 2024-2027 period are sufficiently close together, and given the uncertainty about future market growth, cost changes and other factors, one set of charges can be implemented. This set of charges is based on the outcomes of the efficient operator model. That is, TRC has determined to set symmetric charges on all operators for the 2024-2027 period.

# Annex 1- Efficient Operator Model

## Introduction

Since 2005, the Telecommunications Regulatory Commission (hereinafter, 'TRC') has shown its motivations to adopt a "*Total Service Long-Run Incremental Cost Plus*" (hereinafter, 'TSLRIC+') as the preferred mechanism for wholesale price setting in the Kingdom.

In September 2009, TRC published its "*Regulatory decision on the principles to be used in the construction of TSLRIC+ models for the costs of interconnection Services*", which was later followed by the submission of the Hybrid TSLRIC+ models and the publication by TRC in 2011 of the regulatory decisions including its regulated wholesale charges for fixed and mobile interconnections services.

TRC has updated the Hybrid TSLRIC+ models and the applicable charges with new wholesale prices in 2017 and published the regulated wholesale charges in the two decisions presented below:

- Regulatory decision on charges for fixed interconnection services based on TSLRIC+ models
- Regulatory decision on charges for mobile interconnection services based on TSLRIC+ models

Having reached the end of the period reflected in the previous regulatory decisions (2021), TRC decided in 2022 to start a new wholesale price process to update the applicable charges. The industry was informed in late 2022 of the initiation of this process and was welcomed to participate throughout the process at different stages such as:

- Data gathering process
- Review and disclose Hybrid TSLRIC+ Models with relevant operators

As part of this process, TRC has updated its Hybrid TSLRIC+ models on the grounds of the methodology that was established in September 2009 to recognise the latest technological developments that have taken place in the market, which are detailed in the following sections.

Based on the modelling methodology that was laid out in the Decision, TRC received data from the three Jordanian mobile network operators. TRC carried out an extensive engagement with the operators, each being given the opportunity to comment on its own cost model and on the efficient operator. These models were accompanied by manuals that described their technical algorithms as well as their overall rationale. In finalising the models and using them to establish interconnection charges, TRC has carefully considered all the submissions and notes received from the operators in the construction of the TSLRIC+ models during the above-mentioned stages. All these comments and the related actions taken by TRC are reflected in Annex 2.

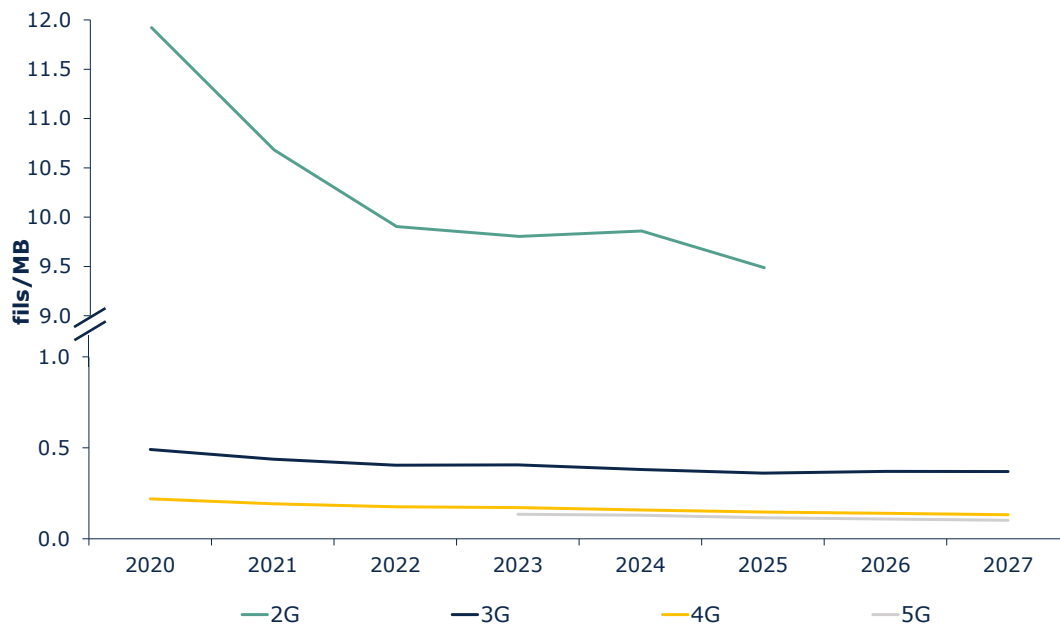
Since the last update of TRC's Hybrid TSLRIC+ models in 2016/2017, the Jordanian telecom markets have undergone significant changes which need to be recognised to correctly assess the results of the updated TSLRIC+ models. The following sections describe the main evolutions of the telecom sector since then and which have been implemented in the updated models, as well as some specific considerations which are of particular importance for the TSLRIC+ pricing.

## Technological advancements in mobile networks

The most relevant technological advancements that have taken place in the mobile telecoms market are listed below:

1. **Introduction of 5G technology.** It must be indicated that the calculation algorithms needed for this technology have been incorporated in the updated TSLRIC+ models.
2. **Gradual phasing out of 2G networks.** Operators have started switching off their 2G networks, prioritising the use of more efficient access technologies such as 3G, 4G and 5G while allowing significant cost reductions.
3. **Relevance of voice traffic over LTE (VoLTE).** The progressive dismantling of 2G networks has led to a higher proportion of voice traffic being carried over 4G (LTE) technology, resulting in higher efficiency in the transport of this traffic across the network and, consequently, lower costs associated with the provision of these services.
4. **Increasing capacity transmission links.** More intensive use of networks due to growing demand, especially for data traffic, has also been accompanied by an increase in the capacity of transmission links.

The introduction of 5G access technologies has led to decreases in services' unit costs due to the higher efficiencies reached under each new release (5G being cheaper than 4G, and 4G being cheaper than 3G, with all of the previous ones being much cheaper than 2G by several orders of magnitude). The exhibit below provides a graphical overview of the data service unit costs under each different access technology:



**Exhibit 1: Costs of providing a MB of traffic under each access technology [Source: TRC]**

The exhibit above illustrates that the cost of 3G, 4G and 5G data traffic is much lower than the 2G data traffic. In addition, it is observed that the cost of 4G and 5G data traffic becomes lower than 3G, something that would be expected to be replicated in the 4G-5G

comparison on the medium term, when 5G networks are massively utilized. Also, the increased use of 4G technology for the provision of voice services, mainly caused by the gradual phasing out of the 2G network, has led to a reduction in unit costs through the increase of 4G traffic.

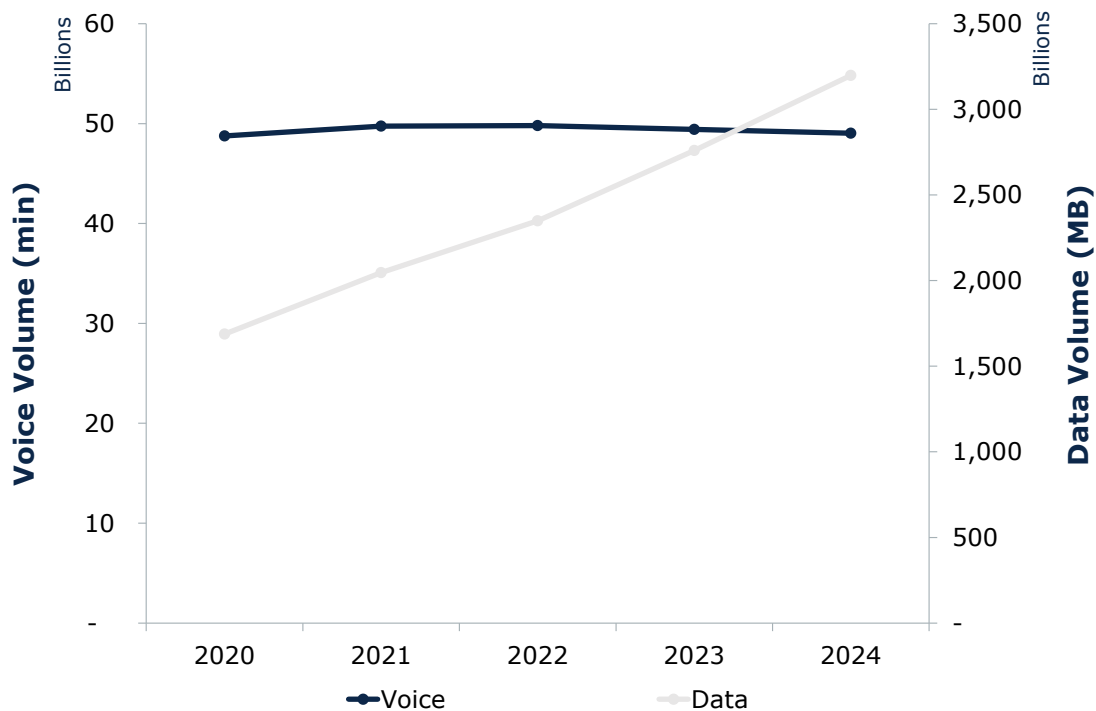
At the same time, the mobile telecoms market has also benefited from new spectrum bands made available, in particular:

- 1800 MHz
- 2600 MHz
- 3500 MHz

The availability of these bands will contribute to both (i) reduced coverage costs and (ii) better capabilities to provide the capacity requirements demanded by the users.

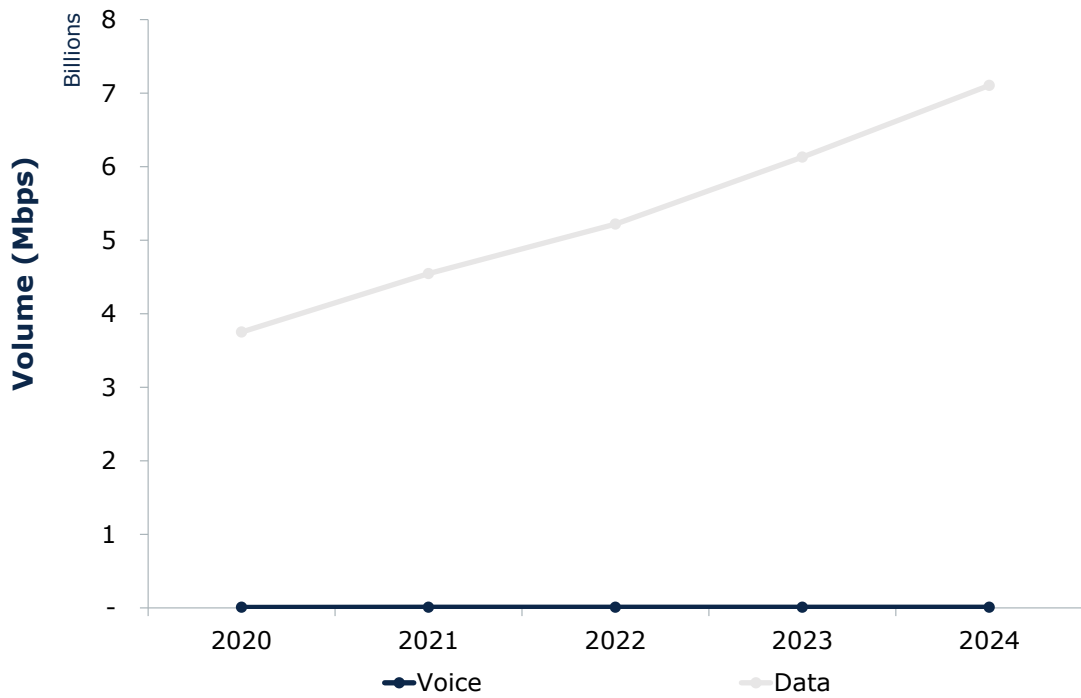
### Traffic Evolution

All the above technological changes were accompanied by an increase in the traffic which was particularly relevant for data services, which experienced a yearly growth of 15% between 2020 and 2024, as illustrated below:



**Exhibit 2: Evolution of the voice and data traffic in the mobile sector in the period 2020-2024 [Source: TRC]**

The exhibit below shows that same comparison as above, expressing both voice and data volumes (minutes and MB, respectively) in the same unit, i.e. Mbps:



**Exhibit 3: Evolution of the voice and data traffic (in Mbps) in the mobile sector in the period 2020-2024 [Source: TRC]**

All the above factors (more efficient networks and equipment, higher economies of scale) have contributed to a general decrease in the unit costs of mobile telecoms services which are reflected in the wholesale prices presented in the Annex 3.

## Annex 2 - Overview of the comments received from operators

The table below summarizes the main comments received from operators and the related actions taken by TRC. It must be noted that comments are presented confidentially.

#	I/E <sup>1</sup>	Comment received from the operator	Action taken by TRC
1	I/E	An operator claims that the evolution of the subscriber base predicted in the model is not in line with its predictions provided during the data collection process.	There is no evidence that the forecasts provided by the operator will actually become true, and that this will actually be the situation in Jordan. In fact, these projections had to be put together to ensure that all forecasts introduced into the models were consistent and representative of the overall market evolution in Jordan, considering also other operators' forecasts.  Nevertheless, the subscribers' forecasts considered in the model have been revisited so that they come closer to operators' own projections.
2	I/E	An operator claims that the evolution of the data traffic predicted in the model is not in line with its predictions provided during the data collection process.	Similar to the point above, in what relates to forecasts, there is no evidence that the operator's contributions will actually become true, and that this will actually be the situation in Jordan.  Despite that, as for the case of the number of subscribers, the trends for the data traffic consumption have been revisited accordingly.
3	I/E	An operator claims that the evolution of the incoming voice traffic predicted in the model is not in line with its predictions provided during the data collection process.	TRC indicates that an inconsistency in the data reported by the operator was identified. Therefore, the initial modifications to these inputs have been preserved.
4	I	An operator claims that while TRC kept the same overall volume of outgoing SMSs it submitted, TRC changed its distribution between SMSs 'On-Net' and 'A2P'.	TRC has reassessed the data provided by the operator and adjusted the SMS demand keeping its original split.
5	I/E	An operator claims that voice and SMS traffic included in the model are not aligned with the operator's predictions provided during the data collection process.	TRC outlines that some modifications were introduced in services for which the operator did not provide any information, given that these services are indeed provided by the operator.
6	I/E	An operator claims that the percentages of busy hour and average busy messages do not match the data provided by the operator.	TRC clarifies that network statistics reflected in the model represent a market average, and not necessarily they should match the specific data provided by one operator.

<sup>1</sup> Comment related to Individual operator-specific model (I) and/or Efficient operator model (E).



#	I/E <sup>1</sup>	Comment received from the operator	Action taken by TRC
7	I	An operator, after further analysis, has provided inputs on the proportion of voice and data traffic during weekdays.	TRC has considered new figures provided by the operator.
8	I/E	An operator indicates that the total populated area to be covered by mobile networks included in the model is not aligned with its own estimation.	After analyzing the estimate provided by the operator, TRC concludes that this estimate is not realistic and, although it could be further fine-tuned, it would not differ significantly from that reflected in the model.  Therefore, no adjustments on the inputs have been introduced by TRC as a result of this comment.
9	I	An operator claims to update the model with the values originally provided by the operator in terms of voice traffic carried over 4G and data traffic carried over 3G.	TRC has considered figures originally provided by the operator.
10	I/E	An operator claims that maximum cell radius included in the model are incorrect and not aligned with the values provided during the data collection process.	TRC indicates that the values provided by the operator are completely out of range.
11	I/E	An operator argues that the CapEx obtained in the model for the RAN is not aligned with its financial statements, mainly due to differences between i) the number of network elements obtained from the model and the actual figures provided by the operator; and ii) the unit costs included in the model and the actual figures provided by the operator.	TRC indicates that no relevant differences exist as regards the RAN equipment. In fact, the Capex produced by the model to this end is aligned with the one reported by the operator itself.  On the other hand, the figures provided by the operator in terms of unit costs are far from the national average and from most international references. Therefore, no adjustments on these inputs have been introduced by TRC.
12	I/E	An operator claims that the CapEx obtained in the model for the backhaul network is not aligned with its financial statements, mainly due to differences between the unit cost of the 1Gbps and 10Gbps optical fibre equipment.	TRC indicates that the operator did not even provide any input for these assets in the data collection process. In these cases, TRC reassessed these inputs and adjusted them so that the results are more aligned with operator's reality.
13	I/E	An operator claims that the CapEx obtained in the model for the core network is not aligned with its financial statements, mainly due to differences between the unit cost of the core elements included in the model and the actual figures provided by the operator.	TRC indicates the figures provided by the operator in terms of unit costs are far from the national average and from most international references. Therefore, no adjustments on these inputs have been introduced by the TRC.

#	I/E <sup>1</sup>	Comment received from the operator	Action taken by TRC
14	I/E	An operator claims that the useful lives included in the model were not the ones provided by the operator during the data collection process.	TRC indicates that as no relevant differences shall be expected in terms of the useful lives of the assets by the operators in the country, and in order to ensure the representativeness of the information included in the models, these inputs were averaged across the main mobile operators, considering also as an additional source international benchmark.
15	I	An operator claims that the model should include the electricity prices provided during the data collection process.	TRC indicates that given that the operator has not provided evidence against the official electricity prices reported by the electricity distributors in Jordan, TRC finds no reason to deviate from the original electricity prices reflected in the model.
16	I	An operator claims that the values used for the calculation of the actual OPEX and depreciation of the operator to conciliate model's results are not derived from the FAR and P&L submitted by the operator.	TRC clarifies that in terms of OpEx and depreciation, while the references considered for the reconciliation exercise have naturally been extracted from operators' P&L and FAR, these cannot be expected to match. This is because not all cost elements included in these statements are accounted for in the Hybrid TSLRIC+ model and thus, cannot be included in the comparison. Some examples of such cost elements include marketing expenses, shops, revenue share, etc.
17	I/E	An operator argues that different levels of redundancy and spare capacity should be used depending on the level of the network, and not just a single load/utilisation factor as of now, suggesting using a different value for the RAN, and another for the core network.	TRC indicates that these values included in the model must be assessed altogether and have to reflect efficiency in the operator's network with other factors included in the model and not individually, as otherwise the conclusions reached may be misleading. However, the operator is not considering them in its analysis. In fact, the results of the model show that there is a good balance among all these parameters that leads to a representative set of results that is well aligned with the operator's market realities.  Therefore, no adjustments on the inputs have been introduced by TRC as a result of this comment.
18	I	An operator claims that the model should consider the forward provisioning period provided by the operator during the data collection process.	The forward provisioning periods applied in the model have been revisited accordingly.
19	I/E	An operator claims that the model should consider additional spectrum that could potentially be awarded in the period up to 2030.	TRC clarifies that the uncertainty on future spectrum holdings is not reflected in the model.

#	I/E <sup>1</sup>	Comment received from the operator	Action taken by TRC
20	I	An operator claims that the model ignores the 3500 MHz spectrum for fixed LTE, as well as the additional spectrum bands in 1800 MHz, 2100 MHz and 2600 MHz, which are planned to be awarded in 2023.	TRC has considered these spectrum holdings in the model, excluding the new awarded spectrum associated with the 2100 MHz band, as it is only being made available on a temporary basis for one year, which is not sufficiently representative in a network modelling exercise.
21	I/E	An operator claims that the model considers government-imposed costs when setting wholesale rates.	TRC indicates that the methodological approach on the treatment of government-imposed costs was clearly defined in the development of the models. Therefore, TRC does not identify a particular need to change the way these factors are considered in the model.
22	I	An operator claims that mobile termination rates should be higher than the prices produced by the model, pointing out that not a single EU country would produce a price lower than TRC's model produces for Jordan.	TRC indicates that TRC model's results are roughly around the average of EC cost model's results. Therefore, TRC concludes that the results from the model are not only aligned with what could be expected from the natural evolution of the telecoms sector in Jordan, but also within the expectable range if compared with the outcomes from the EC's cost model.
23	I	An operator claims that SMS termination rates should be higher than the prices produced by TRC's model, mainly due to the merging of Voice and Data increments and the implementation of EPMU for common costs.	TRC indicates that defining a separate increment for voice traffic no longer represents a sensible approach to cost modelling given its lack of relevance when compared to data and, on the other hand, the implementation of EPMU for common costs is aligned with Section 3.7 of the 2009 TSLRIC+ Methodological Principles.

## Annex 3- Pricing of mobile services:

The tables below set out the pricing of all mobile services based on the efficient-operator model. Board of Commissioners Decision No.19-13/2023 issued on 27/12/2023

### National Call Termination

Rate per minute (fils)	2024	2025	2026	2027
Blended	1.55	1.11	0.66	0.21

### Directory Enquiries

Rate per minute (fils)	2024	2025	2026	2027
Blended	54.8	54.8	54.8	54.8

### Emergency calls

Rate per minute (fils)	2024	2025	2026	2027
Blended	1.2	1.2	1.2	1.2

### Operator Assistance (including Call Connection Services)

Rate per minute (fils)	2024	2025	2026	2027
Blended	54.8	54.8	54.8	54.8

### Customer sited interconnect link port – Microwave

JD per E1 per hop	2024	2025	2026	2027
Port installation	8.1	8.1	8.1	8.1
Monthly rental (port)	2.7	2.7	2.7	2.7

JD per 16E1 per hop	2024	2025	2026	2027
Port installation	8.1	8.1	8.1	8.1
Monthly rental (port)	4.5	4.5	4.5	4.5

JD per 48E1 per hop	2024	2025	2026	2027
Port installation	8.1	8.1	8.1	8.1
Monthly rental (port)	19.3	19.3	19.3	19.3

JD per STM-1 per hop	2024	2025	2026	2027
Port installation	8.1	8.1	8.1	8.1
Monthly rental (port)	32.6	32.6	32.6	32.6

JD per STM-4 per hop	2024	2025	2026	2027
Port installation	8.1	8.1	8.1	8.1
Monthly rental (port)	43.4	43.4	43.4	43.4

JD per STM-16 per hop	2024	2025	2026	2027
Port installation	8.1	8.1	8.1	8.1
Monthly rental (port)	57.9	57.9	57.9	57.9

JD per STM-64 per hop	2024	2025	2026	2027
Port installation	8.1	8.1	8.1	8.1
Monthly rental (port)	94.9	94.9	94.9	94.9

JD per Fast Ethernet link per hop	2024	2025	2026	2027
Port installation	8.1	8.1	8.1	8.1

Monthly rental (port)	7.5	7.5	7.5	7.5
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<b>JD per Gigabit Ethernet link per hop</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>
Port installation	8.1	8.1	8.1	8.1
Monthly rental (port)	8.8	8.8	8.8	8.8

<b>JD per 10 Giga Ethernet link per hop</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>
Port installation	8.1	8.1	8.1	8.1
Monthly rental (port)	15.3	15.3	15.3	15.3

**Customer sited interconnect link port – Fibre**

<b>JD per E1</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>
Port installation	8.1	8.1	8.1	8.1
Monthly rental (port)	2.7	2.7	2.7	2.7

<b>JD per E3</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>
Port installation	8.1	8.1	8.1	8.1
Monthly rental (port)	4.5	4.5	4.5	4.5

<b>JD per DS3</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>
Port installation	8.1	8.1	8.1	8.1
Monthly rental (port)	6.9	6.9	6.9	6.9

<b>JD per STM-1</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>
Port installation	8.1	8.1	8.1	8.1
Monthly rental (port)	32.6	32.6	32.6	32.6

<b>JD per STM-4</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>
Port installation	8.1	8.1	8.1	8.1
Monthly rental (port)	43.4	43.4	43.4	43.4

<b>JD per STM-16</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>
Port installation	8.1	8.1	8.1	8.1
Monthly rental (port)	57.9	57.9	57.9	57.9

<b>JD per STM-64</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>
Port installation	8.1	8.1	8.1	8.1
Monthly rental (port)	94.9	94.9	94.9	94.9

<b>JD per Fast Ethernet link</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>
Port installation	8.1	8.1	8.1	8.1
Monthly rental (port)	7.5	7.5	7.5	7.5

<b>JD per Gigabit Ethernet link</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>
Port installation	8.1	8.1	8.1	8.1
Monthly rental (port)	8.8	8.8	8.8	8.8

<b>JD per 10 Giga Ethernet link</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>
Port installation	8.1	8.1	8.1	8.1
Monthly rental (port)	15.3	15.3	15.3	15.3

**Interconnect link extension port**

The charges for Customer sited interconnect link port services listed above shall apply here to the installation and rental port charges.

**Operator sited interconnect link port**

The charges for Customer sited interconnect link port services listed above shall apply here to the installation and rental port charges.

**Collocation and Infrastructure Sharing (for base station)**

JD per month	2024	2025	2026	2027
Outdoor space (Average space of 5 m <sup>2</sup> ) / Rental per 3 antennas of the tower per m2	374.3	374.3	374.3	374.3
Power supply / minimum cost [<2000 Kwh/month]	41.9	41.9	41.9	41.9
Power supply / minimum cost [>2000 Kwh/month]	9.1	9.1	9.1	9.1
Indoor space (Average space of 3 m <sup>2</sup> ) / Rental per m2	303.9	303.9	303.9	303.9
Sharing of space in towers	118.0	118.0	118.0	118.0

**Duct and Dark Fibre sharing**

JD/metre	2024	2025	2026	2027
Installation	0.72	0.72	0.72	0.72
1 pair of dark fibre monthly rental / 1 metre	0.39	0.39	0.39	0.39
Duct monthly rental / 1 metre	0.25	0.25	0.25	0.25

**Billing and Collection Service**

Billing (JD/bill)	2024	2025	2026	2027
Billing and collection	1.0	1.0	1.0	1.0

**SMS National Termination Service**

(Fils/SMS)	2024	2025	2026	2027
SMS	0.22	0.22	0.22	0.22