

Petra Jordanian Mobile Telecommunications Company (Orange Mobile) comments to the Draft Regulatory Decision for Establishing an Internet Exchange Point (IXP)

Orange Mobile welcomes the opportunity to participate in this consultation and shares its views and comments on this matter with the TRC, and hope that our comments are taken into consideration.

Orange Mobile comments are structures into two parts; (A) General comments, and (B) Specific comments.

A) General Comments

1. Orange Mobile strongly believes that the establishment of an IXP in Jordan shall be subject to prior assessment to weigh its cost, benefits and risks, taking into consideration the market situation, legal and regulatory environment, and most importantly; the optimal IXP business model, governance structure and operational model, which are detrimental for the success of an IXP.
2. Orange Mobile has always been a key player in supporting initiatives and launching new products for the purpose of developing the ICT sector in Jordan. However, the scope of the initial discussion on the establishing of an IXP was mainly focused on establishing an IXP for the purpose of national traffic peering (Jordan Internet Exchange – JIEX) based on non-for-profit model. The TRC draft decision expanded the original scope to include cross-country, CDN based and for profit models. Moreover, the draft decision also introduces operating mandates, technical and financial consideration that were not previously discussed or assessed by operators. Orange Mobile believes that it is necessary to clearly understand and thoroughly discuss different IXP business models, governance structure and all relevant details by all stakeholders prior to proposing any regulations. The establishment of an IXP in Jordan should be addressed similar to any other investment assessment. Therefore, Orange Mobile proposes to thoroughly discuss these issues with all stakeholders through a special dedicated committee prior to introducing any relevant regulations (if proves to be necessary) into the market.
3. Orange Mobile would like to highlight the following areas of no clarity, uncertainty and inconsistency noticed in the draft decision and its appendix:

- a. Business model is not clear. The business model is one of the key success factors for an IXP. The draft decision does not clearly specify the IXP (or the Host) business model, operating model, governance structure/organization, ownership and shareholding, etc.
- b. Licensing; it is not clear from the draft decision if the licensing is required for the IXP, the Host, the Members, and CDNs joining the IXP. There is also a mention of a 'special license holders' in Article (3.1) of the Appendix, which is not in line with the licensing regime in Jordan (class or individual licenses). Moreover, there is no clear distinction between a licensee and network operator in some articles, which shall cause complications in implementation as this implies exclusion from licensing requirements.
- c. Contradiction between the Host definitions (as an authority) as mentioned in Article (2.20), and the content of Article (2.38) where the Host is being specified as a Neutral entity/non-Governmental. It is also not clear how and who is going to assign the function of the Host, and if it is going to be a licensee or not.
- d. Also there are uncertainties as door open for any entity to establish additional redundant IXP physical location(s) and control governance/setup of the new site(s) are not clear.
- e. Neutral entity provisions are not specified, and it is being defined in terms of independence from Government, Licensee or company. It is not clear if this meant to address governance structure and ownership model of the Host and the IXP, or it is intended to address operational aspects as carrier-neutral IXP/Host. Therefore, clarification is necessary.
- f. No clear distinction between the Interconnection agreement and the bilateral agreement as both agreements are set to exchange traffic between two Licensees. Interconnection Agreements are mandatory by the telecom law, regulated by interconnection instructions and signed between any interconnected licensees. However, bilateral agreement scope, services to be covered, parties involved in this agreements, or its legal mandate are not clearly defined and have not been specified.
- g. Peering definition is also not clear, it is being defined in Article (2.34) as an agreement between two ISPs.
- h. Some of the legal terms introduced are neither specific nor abstract, and on some incidents are not necessary. Examples include Articles (2.6), (2.7), (2.16), (2.17), (2.19), (2.20), (2.21), (2.23), (2.30), (2.31), (2.32), (2.33), (2.34) and (2.38). This may create difficulties in implementation in future and would be

subject to challenge and legal disputes in the future. More detailed comments are provided in the Specific Comments section below.

- i. Sharing of CAPEX and OPEX as per Article (4.1.6) is not clear, taking into consideration that every member will provide its own equipment and devices as per Article (4.1.2).
- j. It is not clear why TRC have introduced requisites for interconnection with IXP in Article (2) of the Appendix given that Interconnection is already a regulated topic detailed and extensively specified in the telecom law and Interconnection Instructions. As a matter of fact, Interconnection Instructions mandated the establishment of Joint Technical Committee between licensees to discuss and agree on all interconnection related aspects with minimum supervision of TRC. Given the fact that TRC considered the IXP members as Licensee (please refer to Article 2.6 of the draft decision) renders the requisites for interconnection unnecessary. On the other hand, it is not clear why TRC mentioned content providers in Article (2.12) of the appendix as they are not licensees and outside the scope of interconnection.
- k. Moreover, TRC introduced new terms and conditions to interconnection without review of Interconnection Instructions. Interconnection framework is a vital topic in the regulation of telecom sector in Jordan that is mandated by the telecom law which Orange Mobile believes should not be reviewed, amended, updated in isolation from the Interconnection Instructions.
- l. The scope of QoS Instructions issued by the TRC that are applied or extended to the IXP and the members is not clear, and therefore must be detailed and specified.
- m. According to Article (3.4), the TRC mandated all ISP connection to the IXP. It is not clear on what basis TRC mandated ISP interconnection to the IXP. Orange Mobile believes that mandating membership without member buy-in and that does not correspond to a member's own interests and strategy may not achieve meaningful results. Moreover, any regulation to mandate connection to the IXP shall be based on prior extensive market assessment and in response to market failure. Orange Mobile also believes, that the reasoning introduced by TRC, which is to local internet traffic, is not justified and considered a direct intervention in competitive dynamics of the market which shall cause distortion to the market.
- n. Some terms are repeated in the body of the draft decision and the appendix. Example; Article (9) of the draft decision repeated as Article (6) in the Appendix.

- a. Uncertainty regarding the current transit and peering arrangements between operators. Telecom operators in Jordan are already having bilateral national peering arrangements for national traffic.
4. In order to address the above areas of no clarity, uncertainty and inconsistency, and in order to respond properly to the consultation, Orange Mobile have requested meeting with TRC to go through these areas but TRC has not responded to our request of the meeting.
5. TRC has not conducted an impact assessment to evaluate if the establishment of an IXP is necessary or beneficial to the telecom market in Jordan that consider the following aspects:
 - The share of domestic traffic out of total internet traffic.
 - The presence of major international content providers caching services in Jordan.
 - The existence of international capacity routes, which are basic enabler for the effective operation of any IXP.
 - Estimation of cost and benefits for the introduction of an IXP in Jordan.
 - The cost of regulatory intervention, and its effect of the facilitation of IXP establishment in Jordan.
 - Technical and security risks on each operator network.
 - The availability of an alternative international transmission routes.
 - Amount of investment needed for a business model proposed by TRC, taking into consideration the level of regulatory intervention proposed, including mandatory connection and approval of bilateral agreements by TRC.
 - Evaluating the pros and cons of different business models. Orange Mobile believes that a non-mandatory approach with starting small and growing as the business grows is a success factor for IXP in Jordan.
 - TRC did not specify the reasoning behind its conclusions, not reference to papers, reports, or international practice.
6. TRC intervention:
 - a. Orange Mobile believes that TRC intervention with reference to the establishment of an IXP should be limited to promote the introduction of IXP, by a regulatory statement that set basic principles and minimum requirements for the structure and operation of an IXP, and provides guidance for applicants interested in providing IXP services in Jordan. Therefore, Orange Mobile believes that any regulations imposed in this stage

of IXP development in the market would be prohibitive, and TRC should aspire for a market-driven approach and to introduce light IXP regulation which might involves regulating minimal areas of IXP activities, and leaving outcomes to market forces and for IXP to develop organically.

- b. Orange Mobile believes that bilateral agreements can offer the optimum solution for the relationships between ISPs and IXP, and gives the ISPs the flexibility to manage bilateral business and ensure that both are comfortable with the conditions that the will govern their mutual business. However, Orange Mobile believes that TRC intervention by approving such agreements is not necessary and no legal basis of such approval to the bilateral agreement. Orange Mobile also believes that peering should be voluntarily and should not be an obligation. Members should be allowed to choose their peering partners.
- c. As mentioned above, Orange Mobile believes that the IXP should start small and then expand with the business growth and needs. Thus, we see that the IXP can be run by each ISP representatives under the guidance and governance agreed between the ISPs. This can be the most effective and cost optimized mechanism at the start. While the project grows, a well-defined management system can be studied, discussed and agreed between the participating ISPs.
- d. It is not clear why TRC choose to define the following operating policies of the IXP, namely; control over the traffic, transit traffic, capturing the content of a member's data traffic, confidentiality rules, collect and report technical information, technical information collected by the IXP, traffic filtering, access roles, etc. Orange Mobile believes that it is the IXP role to set those policies, in addition to other policies such as IXP role is in the event of security problems, additional security response services, limitations of liability for IXP operations.
- e. It is also not clear why TRC choose to define the technical consideration, e.g. protocols to be used, how ISP connect to the internet, content of Internet Routing Registry IRR, optimal means of establishing connectivity with IXP, minimum bandwidth, elements of physical security, etc.
- f. In general, Orange Mobile believes that IXPs should have the freedom to choose their respective operating models, strategic and commercial objectives; this is in line with mandates on the Government Policy and can enable growth and investment in the IXP ecosystem in Jordan. Moreover, Regulation of IXP operations is typically not encountered in other markets.

- g. Orange Mobile therefore prefers to leave the right to determine operations with the IXPs themselves. TRC should only set the minimum basic commercial parameters required for peering arrangements and the actual operation is left to negotiations. Nevertheless, IXPs shall define and communicate their policies, products and pricing to all members and prospective members.
- 7. Dispute resolution; it is not clear why TRC included a dispute resolution terms in the draft decision, given that fact that dispute resolution process is detailed in Interconnection Instructions, and dispute resolution Instructions issued by the TRC.

B) Specific comments:

Without prejudice to our comments above, Orange Mobile would like to provide below detailed comments to the articles of:

- 1) Draft regulatory decision, and
- 2) Appendix I.

TELECOMMUNICATIONS REGULATORY COMMISSION (TRC) REGULATORY DECISION FOR ESTABLISHMENT OF INTERNET EXCHANGE POINT (IXP) IN JORDAN	
Issued Pursuant to Articles 6(a), 6(b), 6(c) of the Telecommunications Law No. (13) For the Year 1995 and its amendments, and Article (56) of the General Policy for the Information and Communications Technology and Postal Sectors, 2018	
1 CITATION	
1. The following terms constitute the TRC's Regulatory Decision on the Provisioning of a National Internet Exchange Point (IXP) to facilitate network interconnection through a centralized physical network access point, which is expected to minimize the upstream traffic connected to international Gateways of Internet service provider's (ISP) members in the IXP, thus avoiding additional costs, moreover exchanging and caching local Internet traffic, improving the bandwidth and the quality of Internet ecosystem traffic in Jordan.	
This Regulatory Decision shall come into effect as of the date of their approval by the Board of Commissioners.	
2 DEFINITIONS	
The following words and phrases shall have the meanings assigned thereto hereunder, unless the context indicates otherwise. Any words and phrases not defined hereunder shall have the meanings ascribed thereto in the Telecommunication Law and the Regulations issued pursuant thereto:	
2.1 "Policy": Government of Jordan's GENERAL POLICY FOR THE	

ICT AND POSTAL SECTORS issued on 2018.	
2.2 "Telecommunications Law": means the Telecommunications Law (Law No. 13 of 1995 of Jordan, and its amendments.	
2.3 "TRC": The Telecommunication Regulatory Commission of Jordan.	
2.4 "License" means the authorization granted by the TRC, or the contract or license agreement signed between the TRC and a Person (including all appendices and schedules attached thereto), to allow a Person to establish, operate, and manage a Public Telecommunications Network, or provide Public Telecommunications Services, or use Radio Frequencies pursuant to the provisions of the Telecommunications Law and the by-laws and instructions issued pursuant thereto.	
2.5 "IXP": Internet Exchange Point established in Jordan, also called IX, or peering point. Both a physical networking location and a logical networking strategy, which facilitates interconnection between Internet-based networks, through which ISP (ISPs) and Content Delivery Networks (CDNs) exchange Internet traffic between their networks.)	Stating that "through which ISP (ISPs) and Content Delivery Networks (CDNs) exchange Internet traffic between their networks" interpreted that the IXP is limited to exchanging traffic between the ISPs and CDNs, which means that the CDN will be a member to interconnect with ISPs. This contradicts to the definition of the Member that is limited to the Licensee.
2.6 "Member": The Licensee who connects or participates in the IXP.	It is not clear the difference between connection and participation in the IXP.
2.7 "CDN": Content Delivery Network or Content Distribution who owns a geographically distributed Network of servers which work together to provide fast delivery of Internet content and delivering high availability and high performance by distributing the service spatially relative to end-users, with quick transfer of assets needed for loading Internet content including HTML pages, javascript files, stylesheets, images, and videos, including traffic from major sites like Facebook, Netflix, Amazon..Etc, once a CDN connects to an	This definition is not clear and not abstract.

IXP in a country, the web traffic from the country to the CDN becomes local and provides upstream saving and increases performance for IXP members and help protect websites against some common malicious attacks.	
2.8 'Interconnection': means the physical and logical linking of the Telecommunications Systems in order to allow the Users of one Telecommunications Systems to communicate with Users of the same or another Telecommunications Systems or to access services provided by another Licensee. And it is subject to Interconnection's Instructions issued by TRC.	
2.9 'Person': means any individual, company, corporation, partnership, joint venture, consortium, government or governmental entity.	
2.10 'Point of Interconnection' (or POI) refers to any technically feasible point where the Networks of Licensees are interconnected.	The POI is not mentioned in the terms of the draft regulatory decision.
2.11 'Private Telecommunications Network' means the Telecommunications System operated for the benefit of a single Person or a single group of Persons under common ownership to serve their own needs.	
2.12. 'Public Network Operator' means a Licensee that is an operator of a Public Telecommunications Network.	
2.13 'Public Telecommunications Network' or 'Network' means a Telecommunications System or a group of Telecommunications Systems for the offering of Public	

Telecommunications Services to Users pursuant to the provision of the Law.		
2.14 'Public Telecommunications Services' means a telecommunications service provided for compensation to the general public or any category thereof, in accordance with the Law.		
2.15 'Telecommunications System' means any transmission or switching device or other device or Computer system or instrument used to convey, receive or transmit Telecommunications signals for the purpose of providing Public or Private Telecommunications Services as the case may be.		
2.16 "Traffic " means any computer data relating to a communication by means of a computer system, generated by a computer system that forms part in the chain of communication, indicating its origin, destination, path or route, time, date, size, duration or type of underlying network service;	This definition is not specific. In addition Traffic has been defined in the Interconnection Instructions.	
2.17 "Bilateral agreement (BA)": an agreement (one-to-one agreement) between two networks to exchange traffic.	Not clear the difference between bilateral agreement and the Interconnection agreement. For more details, please refer to our General Comments.	
2.18 'Interconnection Agreement' means an agreement made between two interconnected Licensees in accordance with the requirements of these Instructions.	The definition of the IXP refers to "which facilitates interconnection between Internet-based networks", it does not refer to the interconnection between Licensees.	
2.19 "Transit": An arrangement in which a network provides access to another network through to enable its connection to a third party network.	No need to introduce new definition for transit; it is already defined in the Interconnection Instructions.	

Transit arrangements typically provide access to an array of networks not limited to one country. In many cases one Internet transit arrangement with a large network can provide a small, remote network with access to the rest of the world	
2.20 "Host": the authority or organization which will be responsible for providing the IXP's physical location.	This definition is not clear and contradicts with the definition of Neutral Entity in (2.38), where the Host might be established jointly of the members under an entity or under existing association that the licensees are members of such association. In addition, the definition of the Host is limited to providing the IXP's physical location, where article (4.1.1) extended the scope of the Host to full operational and management of the IXP.
2.21 "Internet Service Provider" (ISP) : means any telecommunications licensee who holds a license to provide access to Internet and other data networks services under the telecom law in Jordan.	
2.21 "Class License" means a License to provide Public Telecommunications Services and/or operate Public Telecommunications Networks (i) not requiring the use of Scarce Resources, or (ii) requiring the use of Scarce Resources that have been specifically exempted by the TRC from an Individual License requirement.	
2.22 "Individual License" means a License to provide Public Telecommunications Services and/or operate Public Telecommunications Networks that use in the provision of some or all services or operation of networks Scarce Resources that have not been specifically exempted by the TRC from an Individual License requirement.	
2.23 Local internet traffic means traffic generated when local users access to the digital contents	Definition not clear, and does not indicate of such digital content is hosted locally or outside Jordan.

2.24 Border Gateway Protocol (BGP) is a standardized exterior gateway protocol designed to exchange routing and reachability information among autonomous systems (AS) on the Internet.	
2.25 Autonomous system (AS) is a collection of connected Internet Protocol (IP) routing prefixes under the control of one or more network operators on behalf of a single administrative entity or domain that presents a common, clearly defined routing policy to the Internet.	
2.26 "eBGP" is the protocol used to transport information to other BGP enabled systems in different autonomous systems (AS).	
2.27 "Routing Information Base RIB" : is a routing table which is a data table stored in a router or a networked computer that lists the routes to particular network destinations, and in some cases, metrics (distances) associated with those routes.	
2.28 NITC : means National Information Technology Center is Jordan.	
2.29 RIPE NCC (is an open and voluntary organization of European ISP, the Regional Internet Registry for Europe, the Middle East and parts of Asia.	
2.30 "Computer data" means any representation of facts, information or concepts in a form suitable for processing in a computer system, including a program suitable to cause a computer system to perform a function;	This definition is not necessary; it is not related to the scope of the regulatory decision.
2.31 "Computer system" means any device or a group of interconnected or related devices, one or more of which, pursuant to a program performs automatic processing on computer data;	This definition is not necessary; not related to the scope of the regulatory decision.
2.32 "Internet protocol" (IP) is the method or protocol by which data is sent from one terminal to another on the Internet. Each terminal (known	This definition is not necessary.

as a host) on the Internet has at least one IP address that uniquely identifies it from all other terminals on the Internet.	
2.33 "Internet" is a global information system that is: logically linked together by a globally unique address, based on internet protocol (IP) or its subsequent enhancements/up gradations; able to support communications using Transmission Control Protocol (TCP/IP) suite or its subsequent enhancements/up gradations, and all IP compatible protocols.	This definition is not necessary.
2.34 "Peering" the term used for exchanging traffic on the IXP. Peering is a bilateral agreement between two ISPs. There is no rule that governing how to peer with all other ISPs on the IXP. It is up to the individual ISP who they want to peer with.	This definition is not clear; it defined Peering as an agreement to exchange traffic, and later contradicts with mandating connection to IXP and regulation of IXP operation since it does not mandate any rule that governing how to peer with all other ISPs on the IXP.
2.36 "User" means any person using the services of an a telecommunications licensee.	"User" means any person using the services of an a telecommunications licensee"
2.37 <u>Interconnection Instructions</u> : Instructions Issued by TRC Board Decision No.(2- 1/2005) Dated (5/1/2005) And amended by TRC Board Decision No.(18-11/2010) Dated(15/6/2010).	
2.38 "Neutral Entity": an entity which does not favor any Licensee, company or Government.	Need more details on this definition; does this mean only non-licensed entities can be the host? And it contradicts with definition of Host on (2.20) as indicated above. Please refer to our General Comments.
3 GENERAL PRINCIPLES	
The actions taken by the TRC pursuant to this regulatory decision shall take the following into consideration:	
3.1 Implemented in an objective and impartial manner.	

3.2 Conducted in accordance with best standards of transparency taking into consideration the need to protect the national interest.		
3.3 Conducted in accordance with the approvals issued by TRC with the corporation of the IXP Host.		
3.4 IXP members to comply with any decision and directive given by TRC in respect of matters concerning the duty to interconnect to an IXP provided for in this Instructions and shall promptly take such measures as TRC may direct them to take for the purposes of implementing or of facilitating the implementation of this Instructions.	Need to undersand here if the interconnection to the IXP is mandatory or optional for ISPs. The definition states that the interconnection will be to IXP, does the IXP will be a licensee?	
4 PROVISIONING OF (IXP) IN JORDAN	IXP rules shall be agreed in advance and changes to the rules must be agreed with all the members.	
4.1 The IXP shall have, but are not limited to, the following characteristics:		
4.1.1 The Host should be a Neutral entity, and shall be responsible also for day-to-day operations, in addition to the ability to allow for-profit/Commercial and revenue to members by facilitating BA's and encouraging international CDN's to join.	The day to day operations can be a joint team from ISPs. Again, the definition of Neutral is not clear. Please refer to our above comments to the related definition, and our General comments.	
4.1.2 Each member shall provide required devices and equipment required to connect to the IXP, initial equipment will include all devices for functioning on Layer 2 only on the establishment phase, once a CDN wishes to connect, members who share services with the CDN should allow Layer 3 (IP traffic).	Not clear, what would be the setup and the business case for the IXP? Each member shall provide required devices and equipment required to connect to the IXP, while it shall be shared as stated in (4.1.6).	
4.1.4 There will be no limitation for the number of members allowed to join the IXP, taking into consideration any future issued decisions in this concern from TRC.	Change member to Member as the "Member" is defined in 2.6 and limited to the Licensees only.	
4.1.5 If any entity wishes to offer a new additional or redundant	Need to clarify who will provide the original physical routes. Also there are uncertainties as door open for	

physical location for the IXP, TRC will supervise the establishment until launch, considering any further regulatory decision that will be issued by TRC on this matter.	any entity to establish additional redundant IXP physical location(s) and control governance/setup of the new site(s) are not clear.
4.1.6 The Capital expenditures (CAPEX) and operating expenses (OPEX) cost of the IXP will be divided on all members in coordination with the Host.	Need to understand the scope and the size of the IXP at the initial phase to estimate the cost, or cost need to be provided. Please refer to our General Comments. Also contradict with (4.1.1).
4.1.7 Any future member shall endure the costs and expenses as decided by the Host, taking into consideration the expenses and cost endured by previous members.	Original members must be reimbursed for the original cost as the new members enter.
4.1.8 If a member wishes to withdraw from the IXP at any stage, a formal letter should be conveyed to TRC explaining the detailed reasons, TRC has the right to study the request and issue the required decision accordingly.	Withdrawal should be an option.
5 INTERCONNECTION	
5.1 By default, Transit traffic will be not open, unless two members sign an interconnection agreement approved from TRC and it shall be subject to Interconnection Instructions issued by TRC on this behalf, more details on Interconnection are available in APPENDIX I accompanying this document.	Please refer to our General Comments about Interconnection.
6 QUALITY OF SERVICE (QoS)	
6.1 The IXP shall be subject to the Quality of Service (QoS) obligations issued by TRC, more details on Quality of Service are available in (APPENDIX I) accompanying this document.	The scope of QoS Instructions issued by the TRC that are applied or extended to the IXP and the members is not clear, and therefore must be detailed and specified. The TRC has not defined the IXP as a licensee to enforce any regulation to the operation and management scope of the IXP i.e QoS,

7 GENERAL PROVISIONS	
7.1 IXP is an interconnection point of ISP ISPs in Jordan. The main goal is to enable the traffic exchange locally without routing through international networks. However IXP can also be used for routing of internet traffic between the networks in Jordan and the peer or downstream networks of IXP participants in other countries. IXP serves and IXP members who holds licenses, and local and international Research and Education networks as well as international network services providers and Internet exchanges via licensed networks.	As a start, IXP should be limited to licenses in Jordan, as the business grows the model can be adapted to include other entities. This is an extension of the original scope discussed with all stakeholders. Please refer to our General Comments on this matter. "IXP serves and IXP members who holds licenses, and local and international Research and Education networks as well as international network services providers and Internet exchanges via licensed networks." is not cleared.
More details regarding General Provisions are available in APPENDIX I accompanying this document.	
8 FEES AND TARIFFS	
8.1 The IXP management (the Host) has the right to set up the tariff policy/ per unit according to agreed parameters (Data traffic, bandwidth, etc...).	Licenseses should be part of IXP management; a committee must be formed by participating licensees to manage commercial and technical issues.
8.2 Tariff policy shall be approved by the TRC.	The Government policy mandates a commercial IXP. Therefore, tariff policy should not be subject to TRC approval, and should be based on negotiation. The IXP may publish it prices. In addition to that there is no legal basis of TRC approval to such tariff policy. For more, please refer to our general comments.
9 MANAGEMENT OF OPERATIONS	Should be studied in details by the assigned committees, and should not be regulation by TRC. This article is repeated as is in Article (6) of the

9.1 IXP shall have a system to ensure reliable and continuous operation, and information security control and monitoring. System data shall be stored at least 6 months or as stipulated in the data retention instructions.	appendix. Data Collected by IXP host should be governed by legal obligations (to be clarified the governance entity that are able to audit this & put enough controls to insure application/maintenance of these rules). IXP host monitoring functions should imply full monitoring systems & notifications/escalations tools (be clarified requirement to have centralized logs).
9.2 The following principles shall be compiled to solve troubleshooting. Those are:	
9.3 When troubleshooting occurs, immediately inform related parties by using fully automated control system.	Should be 9.2.1
9.4 Involved IXP members shall quickly repair and troubleshoot.	Should be 9.2.2
9.5 Record troubleshooting type/classification, period and solutions, and analyze.	Should be 9.2.3
9.6 Host should agree with all ISP members to define proper down-time in the BA.	Should be 9.2.4
9.7 More details on operations which regard to system interference and reporting are specified in the APPENDIX I accompanying this document.	
10 Dispute resolution	Not clear why TRC have introduced dispute resolution terms in this decision. Please refer to our general comments.
10.1 Any unresolved dispute between IXP members or between them and the Company with a special license or between any of the previous parties and the IXP Host regarding the terms and conditions of	

interconnection to the IXP or relating to any matter concerning the implementation of these Instructions may be brought before TRC for resolution by any party to such dispute.	
10.2 In deciding upon any dispute referred to in these Instructions the TRC shall employ easily accessible and in principle, inexpensive procedures to resolve such dispute in a fair, transparent and timely manner.	
10.3 The existence of a dispute about the terms and conditions of interconnection to the IXP or with regard to any matter concerning the implementation of these Instructions shall not exempt, suspend or postpone the obligation of an ISP to interconnect to the IXP in terms of these Instructions.	The connection of members should not be an obligation. It is not clear on what basis TRC mandated ISP interconnection to the IXP. Please refer to the General comments.

TELECOMMUNICATIONS REGULATORY COMMISSION (TRC)	
INTERNET EXCHANGE POINT (IXP) INSTRUCTIONS	
Issued Pursuant to Articles 6(a), 6(b), 6(c) of the Telecommunications Law No. (13) for the Year 1995 and its amendments, and Article (56) of the General Policy for the Information and Communications Technology and Postal Sectors, 2018	
1 INTRODUCTION	
This document is supplementary to the Regulatory decision issued by TRC on (), the document will tend to illustrate more in depth look of main pillars of establishing an Internet Exchange point in Jordan, from a technical perspective.	
Note: any difficulties to explain any term, word or a definition please review section 2 "Definitions" of the Regulatory decision.	
Items which will be covered within this appendix are:	
i. Interconnection ii. Peering iii. Quality of Service (QoS) iv. General Provisions v. IXP Operations	

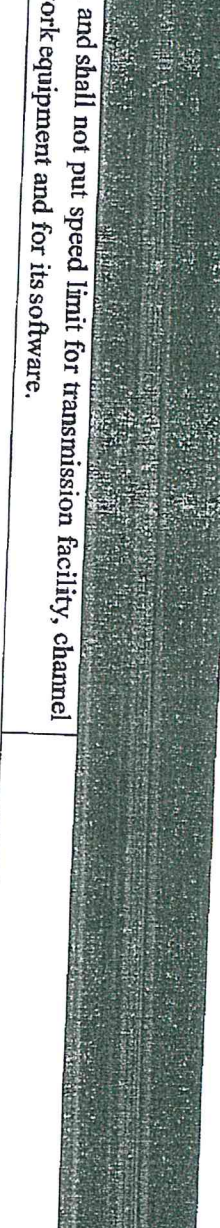
2 INTERCONNECTION	
	It is not clear if the IXP is a licensee. Providing interconnection services is required by licenses only as per the telecom law, interconnection instructions and license agreement In addition to that, it is not clear why TRC have introduced requisites for interconnection with IXP, and it is not required as interconnection is already regulated area as per the interconnection instructions issued by the TRC. Orange Fixed believes that this article should be reconsidered. Please refer to our General Comments.
<i>Requisites for the interconnection and peering with IXP.</i>	
2.1 In those instances where the intended members have reached agreement, the TRC will then have 30 days in which to approve the agreement or require changes by the parties in order to comply with the Interconnection Instructions.	
2.2 Interconnection Agreements shall be submitted to the TRC for approval and shall be considered if no comments are provided by the TRC within 30 days of submission	
2.3 IXP shall be versatile enough to accommodate all type of interconnect links as per Interconnection Instructions.	It is not clear if the IXP is a licensee. Providing interconnection services is required by licenses only as per the telecom law, interconnection instructions and license agreement. Please refer to our General Comments.

2.4 Any IXP member must at a minimum announce all its regional routes to the IXP router at that IXP location.	This need to be clarified technically. Please refer to our General Comments.
2.5 All IXP members are entitled to receive these routes using a single BGP session with the IXP router. This will guarantee the exchange of regional traffic within IXP, referred to as forced regional multi-lateral peering	TRC stated that the IXP centralized router will be connected to each member's own router and capacity upgrade and running & maintenance of the member's equipment hosted in IXP host location is responsibility of member. This needs to be clarified Physical Security & access control responsibility. Please refer to our General Comments.
2.6 In the case where one IXP member is already providing transit to another IXP member, the exchange of regional routes mentioned in above, may also happen using a separate private connection between the members	This should be based on negotiations between members of the IXP. Please refer to our General Comments. Separate private connection is not cleared ?
2.7 IXP members shall announce only those routes that belong to their Autonomous System, Aggregating traffic from other members in the region and connect to the IXP through a single connection.	This should be based on negotiations between members of the IXP. Please refer to our General Comments.
2.8 The IXP router shall only exchange information but not carry any transit traffic unless indicated in the member's agreement	This should be based on negotiations between members of the IXP. Please refer to our General Comments.

2.9 All IXP members must ensure that they suitably and proactively upgrade capacity from time-to-time so that they do not end up dropping traffic that other peers are exchanging with them	This should be based on negotiations between members of the IXP. Please refer to our General Comments.
2.10 All IXP members shall not filter or block information but transmit traffic smoothly with no delay or jitter	This should be based on negotiations between members of the IXP. Please refer to our General Comments.
2.11 If data rate transmission and IP network's equipment usage is high, and the processing power for any device or channel, and/or transmission port load of IPXs or one of the service providers reaches over 80% continuously, the device or equipment should rapidly upgraded and an immediate increase of capacity is advised.	This should be based on negotiations between members of the IXP. Please refer to our General Comments.
2.12 The routing policy here also applies to "large" content providers to directly peer at any of the IXP nodes. They will be treated like stand-alone Data Centers. For this they need to adhere to the following criteria: a. they must have their own AS number b. The content hosted by them should be in accordance with Jordan laws (i.e they should not be hosting obscene content or promoting gambling or anti-national content, or any other content that violates either the ISP license condition or any other Jordanian Laws or regulations)	It is not clear the nature of CDN licensing and connection to the IXP with related obligations stated in this term. Please refer to our General comments for more.
2.13 A telecommunications Licensee leasing line bandwidth to other	It is not clear why TRC mandate licensed telecom operators to connect other licensees to the IXP.

Licensee shall ensure that they are connected to the IXP in terms of these Instructions	
3 Peering	
3.1 Non-governmental organization established by special license holders to establish information and communication network for cross-country and provide internet service shall establish IXP.	This different from original proposal discussed with all stakeholders. Cross-country have not been discussed before. It is not clear what the "special license" is.
3.2 IXPs shall be connected to each point. IXP connection topology shall be organized at Layer2	The term is not cleared. Please refer to the general comments.
3.3 Members who will exchange cross-country traffic should provide not less than 10Gbps uplink speed	Should not be mandated by the TRC, and should be left for commercial negotiations.
3.4 In order to increase local internet traffic and improve quality, ISP shall connect to one of the IXPs and if provide internet service for public organizations, shall connect to the IXP located at the National Datacenter	Connection to the IXP should not be mandated. This has been discussed thoroughly in the general comments.
3.5 Rights and obligations of parties connected to IXPs shall be regulated by the BA mentioned in section (2.17). BA draft between the Host and any ISP member specifying all technical conditions and all other details, and shall be reviewed and approved by TRC Jordan	As discussed in the general comments, bilateral agreements should not be approved by TRC; TRC has no legal basis of approving such type of agreements. Orange Fixed believes that TRC intervention by approving such agreements is not necessary. Orange Fixed also believes that peering should be voluntarily and should not be an obligation. Members should be

	allowed to choose their peering partners. Please refer to the general comments.
3.6 Connection line connecting IXPs shall be not less than 10Gbps and connection lines connecting ISP shall be not less than 1Gbps in terms of capacity	Should not be mandated by the TRC, it should be left for commercial negotiations.
3.7 BGP, one of the dynamic connection types, shall be used for IXP	Should not be mandated by the TRC, it should be left for commercial negotiations.
3.8 IXPs shall offer the same service and technical conditions for ISP	Should not be mandated by the TRC, it should be left for commercial negotiations.
3.9 IXPs shall organize activities regarding creation and update of routing table which will be used in local internet traffic exchange	Should not be mandated by the TRC, it should be left for commercial negotiations.
3.10 Only own network information or IP address obtained from NITC and/or RIPE NCC shall be transmitted to IPXs	
3.11 Local traffic routing shall be done according to the routing table generated by the use of eBGP from routing table of special license holders registered at IPXs	
3.12 If transmission facility utilization reaches 80% in the IXP, either transmission facility channel or equipment shall be extended.	Should not be mandated by the TRC, it should be left for commercial negotiations.
3.13 ISP shall have transmission channel and connection completely separate from any other internet connection transmission channel and	This term is not clear.

	connection, and shall not put speed limit for transmission facility, channel and IP network equipment and for its software.

4 QUALITY OF SERVICE (QoS)

Below table 3.1, illustrates requisites for the Quality of Service:

1	All critical components of the IXP should be up for 99.00 % of time in a quarter These critical components are mainly IXP routers/Switches, interface module on which the links of the ISPs are terminated and any other equipment which affects the IXP traffic. Nor critical faults which do not affect IXP traffic like failure of one power supply module should be rectified by IXP within max of 12 hours	The scope of QoS Instructions issued by the TRC that are applied or extended to the IXP and the members is not clear, and therefore must be detailed and specified. This should be on an SLA based to commercial negotiations.
2	Switching architecture of IXP shall be non-blocking, so that it does not introduce any delay	
3	Uninterrupted power shall be ensured to the equipment of the ISP and IXP router itself in the IXP node. Power availability can be 99.00% in a quarter	
4	IXP shall ensure proper environment (Proper Air conditioning with Humidity control) for housing equipment's of IXP members	
5	Augmentation of IXP members' bandwidth to IXP: - IXP member shall augment its bandwidth to IXP, if the utilization of the existing link exceeds 80% of the capacity for 4 hrs. in a day and for 7 days. Such capacity management shall be through increase of capacity and not through reduction routes announced. The augmentation should normally be completed within a period of one month after IXP reported to the concerned IXP member. This time should be extendable by one more month in valid cases like IXP member having tangible problem and in case some additional equipment's are required to be procured	
6	Facility for ensuring security of IXP equipment like access control, monitoring and	

5 GENERAL PROVISIONS

Connection to the IXP should not be mandated.
Please refer to the general comments.

- It shall be the obligation of every Internet Service Provider to interconnect its computer system and to keep it interconnected at all times (24/7) to the IXP for the purpose of facilitating the efficient routing and interconnection of Internet Protocol transit networks within Jordan and of minimizing the use of international Gateways for Internet Protocol traffic between Internet users in Jordan.
- It shall be the obligation of every IXP member to distribute and receive routing information for local traffic data to or from all members of the IXP.

2	The IXP Host shall be entitled to demand such a reasonable extent of traffic data and engineering data from IXP members as is necessary and proportionate for it to be able to perform its functions efficiently.	
3	Any data collected by the IXP Host in terms of these Instructions shall be kept confidential subject to any obligation of disclosure in accordance with the applicable legislations.	This need to be clarified the governance entity that is able to audit this and put enough controls to insure application/maintenance of these rules.
4	The IXP members shall comply with the telecommunications law and regulations in respect of any data collected in pursuance of these Instructions	It is not clear if the IXP is a licensee?.

6 IXP OPERATIONS

Below table 3.1, illustrates requirements of day-to-day functional operations of IXP:

1	IPX shall have a system to ensure reliable and continuous operation, and information security control and monitoring. System data shall be stored at least 6 months or as stipulated in the data retention instructions	It is not clear how data retention instruction shall be applied, there will be a centralized logs. It is not a CDR or IP logs that need to be retained as per the telecom law, i.e., it is not in the scope of the data retention instructions.
2	The following principles shall be complied to solve troubleshooting. Those are: • When troubleshooting occurs, immediately inform related parties by using fully automated control system. • Involved IXP members shall quickly repair and troubleshoot. • Record troubleshooting type/classification, period and solutions, and analyze.	

	Host should agree with all ISP members to define proper down-time in the BA	
3	IXP Data center standard security operations should be according to ISO 27001	This implies high breach & confidential data breaches controls, Unauthorized Access & identity/data theft control, and off-course full physical/network security controls, and risk assessments. Also as discussed in several other points in Appendix 1 it is mandatory to protect IXP network infrastructure availability and thus implies protection from DDoS which is not mentioned clearly the responsibility of security protection services. Also as result of this, there are mandatory requirements to collect security logs on all events and user/admin activity & access events on all IXP infrastructure, network & systems and physical access controls in IXP physical site.