ANNEXURE A

Response to TRAI Consultation Paper No. 8/2014

on

"Migration to IP Based Networks"

Response to TRAI ConsultationPaper "Migration to IP Based Networks"

Introduction:

1. IDEA Cellular Limited (Idea) is pleased to provide its comments and submissions on the TRAI consultation paper on "MIGRATION to IP Based Networks".

2. At Idea, we agree with the Regulator that worldwide, operators are strategizing for migration towards an Internet Protocol (IP)-based telecommunications systems and convergence is going to take place on Global Scale.

3. The TRAI Consultation states that traditional telecommunications systems are nearing the end of their product lifecycles, however, it is our humble submission **that Telecom Service Providers (TSPs) have committed huge investments in GSM technology, based on the initial license mandate and these investments have been made for larger time horizon specifically since the product life cycles and monetization of equipment requires larger time intervals.**

4. Based on technology advancements, the networks have migrated from R99 to R4/R5 Architecture for 2G/3G based GSM networks in the year 2007, 2008 and 2009. **Most of the investments to augment/ make fresh rollout in new service areas are as recent as 3 – 4 years old and includes the Licenses for New Service areas.**

5. The standard lifespanfor the telecom equipment as committed by Telecom Equipment providers such as NSN, Ericsson, Huawei, ZTE and others is about 10 – 15 years. The Return on Investment and Project viability are evaluated in these Telecom networks based on the assumption that Telecom gear procured for GSM services will last for a minimum of ten years. **It needs to be noted that these networks which are rolled out in recent past have capability and capacity for minimum projected Voice traffic growth over next 3 to 5 years.**

6. **Thus we submit that it would be incorrect to state that telecom equipment is nearing the end of its lifecycle.**

7. As already acknowledged in the TRAI consultation paper, TSPs will face considerable risk in committing significant investment in upgrading infrastructure for migration towards IP networks in the current environment.

8. **In view of the above, TSPs have generally strategized their networks to run on IP networks in Transport layer and have decided to continue in R4 & R99 GSM architecture which *operates* the Voice on Circuit Switching only. With this hybrid approach TSPs are able to ensure the Return on Investments are realized in traditional / legacy Network and at the same cater to the need for providing new emerging services.**

9. It is further submitted that the license mandates that TSPs should follow TEC specified Network Equipment's which are compliant to ITU-T / TEC regulated standards. And for the purpose of Interconnection between two service providers it is mandated in

License Conditions and Reference Interconnect Offer (RIO) - July 2002 that Interconnection between the networks of different service providers shall be as per national standards of CCS No.7 issued from time to time by Telecom Engineering Centre (TEC), and also subject to technical feasibility and technical integrity of the Networks and shall be within the overall framework of interconnection regulations issued by the TRAI from time to time.

10. As per directions issued in License given by DoT, TSPs deployed and upgraded their Telecom Networks based on 2G & 3G technologies and used the signalling system of CCS no.7 only. Thus the current legacy status of network is borne out of licensing & Regulatory mandates.

11. It is further submitted that before providing VoIP based telephony solution, there is a need to determine whether the data network is capable of processing voice traffic. Equally important is an assessment of any costs that would be incurred if the data network has to be updated in order to guarantee what is known as "VoIP readiness".

12. **It is our belief that the introduction/use of VoIP does not automatically result in cost savings in the telecommunications budget. In terms of total costs, the expenditure could be equal to or even higher than the costs involved in operating a conventional telephone system.**

13. As per statement in Chapter-2 of Consultation paper, "Type of Interconnection", TDM and legacy TSP may have to introduce NGN & MGW to convert TDM Voice to VoIP and Signalling Gateway for conversion of SS7 signalling into SIP or H.323. **In this case, the**

potential security risks need to be understood and addressed at an early stage.

14. The interconnectivity between two IP based Voice Networks (VoIP) require Session Border Controller (SBC). Comparatively, the SBC is more costly compared with similar capacity TDM interface.

15. The SBC requires other network elements like routers and switches to function optimally. Additionally for SBC and its components the Operation & Maintenance part is much more complex and requires special engineering skill set that is scarce. This SBC based Interconnectivity between two different Service Providers is done using SIGTRAN and SIP Protocols for signalling between two networks.

16. SIP Protocol has many versions used by different OEMs as there is Lack of clarity on SIP standardization. SIP Protocol is designed based on RFC 3260 and few other released by IETF. These RFCs are yet to be adopted as Telecom Standards, hence various OEMs follow few common handshaking messages but many features are built with proprietary software. Therefore, all IP POIs require extended planning and testing. Most GSM network MSC/GMSC support BICC IP POI protocol and these will have to be upgraded so as to support SIP based signalling to be able to interact with SIGTRAN based Connectivity. This Session Border Controller equipment is not manufactured by traditional Telecom Vendors as Nokia, Ericsson or Huawei, hence it needs introduction of VoIP Equipment manufacturers who make SBC, Application Servers etc.

17. Additionally, the introduction of NGN, MGW, SIGTRAN Signalling Gateway, SBC, Routers and IP Switches requires huge additional capital to be infused in operational networks. Considering the impact on Legacy GSM and TDM Service providers, the consultation mentions in Chapter 2, paragraph 2.5A that "*Conversion functions from IPto TDM protocols and vice versa are being carried out by IPbased operator at its own cost*".

18. **VoIP migration also requires Organization overhauling due to convergence of technologies used in Data and VoIP Networks. Companies that continue to run separate divisions for voice and data services cannot gain optimum advantage from VoIP. VoIP requires the organizational integration of all tasks affecting the convergent infrastructure.**

19. As mentioned in Consultation Paper, Chapter 2 – 2.5 for "*Type of Interconnection" that: "C.* ***Between two IP based network operators:*** *The interconnection between the networks is IP based. There will be no conversion required in this case. This arrangement is gradually becoming popular among network operators.*" **This statement is not factually correct for present state of Telecom Operations in India as none of the domestic Telecom Service Provider has IP based interconnection for Voice Termination in CMTS / UASL / NLD services.**

20. Currently, all Telecom Service Providers in India are providing Voice Services on Circuit Switching techniques. Legacy 2G networks or the recently deployed 3G networks both have Voice on Circuit Switching only, 4G networks which are yet to be commercially launched for

Voice or VoLTE will require Packet Switched Voice with end application on VoIP in coming future as and when these 4G networks are ready for service.

21. **Hence, considering the present scenario the Interconnect should be left to bilateral agreement between TSPs based on the technology used in their respective networks.**

22. One of the major challenge of IP based Voice Network will be providing Emergency services in VoIP networks. The call flow required for Emergency Services and Priority Call Routing (PCR), would require definite process for Identification of Emergency calls, determining Callers' Locations, routing of emergency calls to appropriate public safety access points. This would need further studies with reference from International Operators where ever VoIP or VoLTE services are rolled out and ENUM or alternate solution is deployed.

In view of the above, Idea submits that that IP Based Voice Networks should not be mandated and the TSPs be provided withtime frame of atleast 3 – 4 years to achieve economic efficiency of equipment currently in use, attain maturity in handling IP/MPLS Networks, understanding and mitigating security issues of VoIP Networks etc. . Thus Voice should remain on 2G/3G based Circuit switched Networks and Data Transport Layer should run on IP/PMPLS based networks. The Migration of TDM based Voice Networks to IP based Voice (VoIP) should be delayed for time being for creating the models of regulation and preparation for Challenges as enumerated above.

Issues for consultation:

Q1. Is there a need to mandate IP interconnection? If so, what should be the time frame for implementation of the same? Please comment with justifications.

Answer: -Please refer to the Introduction summary given with our response. We reiterate the following:

IP interconnection should not be mandated, as it will be a major shift from the current mode of GSM Core Network. Also in India, Service Providers (TSPs) have huge investments sunk in domestic TDM based GSM Networks. Also currently Idea doesnot have a single IP interconnection with any other UASL operator to exchange Voice Traffic. All current interconnections are based on circuit switched / TDM technology. The existing deployed Networks will require new investments to build IP interconnection capabilities, features and security measures and also loss of existing investments in TDM interconnection technology

1. In today's scenario, IP based Network has high risk of security breach such as Network hacking, Data theft & revenue leakage as compare to TDM Network.

2. Current deployed GSM Core Switchesrequire additional IP features such as SIP, BICC protocol for IP signalling. Traditionally VoIP signalling works on SIP Protocol with external networks. SIP Protocol has many versions which are still in RFCs and Not a standard, and different OEMs have their proprietary versions of SIP whereas in TDM we have SS7 signalling - ISUP protocol which is an ITU standard.

3. Operators will have to deploy multiple SBC's and IP devices to secure the Network.

4. Skilled IP/MPLS resources are limited in industry and today also many configuration and fault escalations are handled only by highly skilled Vendor Engineers from their respective Global Service Centres.

Thus IP interconnection should not be mandated at present.

Q2. Whether both TDM and IP interconnection should be allowed to coexist? If so, whether the existing regulation i.e. 'Reference Interconnection Offer dated 12th July 2002' addresses the requirements of IP interconnection also? Please comment with justifications.

Answer: -The existing interconnect networks between TSP's have evolved over last 18 years or so and hence any sudden shift to a new regime of only IP interconnection will totally disrupt the interconnect regime. If IP Interconnection is required to be mandated sooner rather than waiting for the natural technological evolution to take place due to competitive forces, then the existing TDM & New IP Interconnection system should definitely be allowed to coexist, as TSPs have already invested huge amounts for many years in TDM Network only and for other reasons given above.

Q3. In case IP interconnection is mandated in India, whether the enforcement of interconnection agreements should rely on

(i) Bilateral agreements and dispute resolution or

(ii) Mandatory reference offer

Answer: -We would like to again put our view that IP interconnection should not be mandated as per reasons given above and also would like to point out that the current Regulations regarding charging & dispute are based on TDM only.

If IP Interconnection is mandated then IC agreements should rely on bilateral agreements and dispute resolution as this practice has served the industry well.

Q4. In an IP based network scenario, which mode of interconnection is preferable to carry traffic:- peer-to-peer, Interconnect Exchange or Combination of both? Please comment with justifications.

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Q5. In case an Interconnect Exchange is required, should such exchange be placed within each licensed service area or a single Interconnect Exchange will be adequate for the entire country? Please comment with justifications.

Answer: -During so many years of growth in telecom the interconnection has been based on peer to peer and it is already serving the industry well and has large investments on ground. Hence interconnect exchange idea has been left far behind due to need of the operators & prevailing regulatory guidelines.

Since majority of the operators have already established their interconnection bilateral interconnects with large investments and therefore interconnect exchange will be an additional/unproductive cost burden. Therefore at this stage, because of well matured networks in India we do not consider it technically and particularly in commercial terms a viable option to have an interconnect exchange.

Q6. Whether any regulatory intervention is required to mandate the locations and structure of points of interconnection (POI) for IP based network architecture? Please comment with justifications.

Answer: -

Based on detailed facts given above, we would again like to reiterate that IP interconnection should not be mandated and are best left to mutual agreements between operators. Current interconnection provides flexibility to the operators to interconnect in a service area and the same may be continued with, as all of the operators are already interconnected.

Hence we do not feel any need to mandate locations and structure of point of interconnection for IP based network architecture.

Q.7 what are your views on the migration from the existing interconnection regime-measured in terms of minutes of traffic to an IP interconnection regime replaced by measures of communication capacity? Please comment with justifications.

Answer: - The Charging for IUC (termination and carriage) should be retained as per existing process of CDR and Minutes of Usage.

Interconnect costs and charges include many elements and costs, of which IP based interconnection is only a very small part.

In IP interconnection regime,the challenge is to correlate Minutes of voice delivered by a particular unit of Bandwidth. The traffic throughput depends on various network parameters. Hence capacity based interconnection can not work currently asa majority of the mobile and fixed line network that are TDM based, where all costing etc is done on the basis of Minutes and cannot be done in terms of bandwidth/capacity.

Q.8 in an IP interconnection between networks, comment on the type of charging principles that should be in place

(a) Capacity based in terms of Mbps.

(b) Volume based in terms of Mbps.

(c) QoS based.

(d) A combination of the above three.

Answer: -

i) Charging Principle for interconnect between networks should be generally in line with the principle of charging subscribers for voice calls. At the moment all calls are TDM based and charged for minutes of usage. Accordingly the charging principle for IUC should continue to be on actual minutes exchanged between networks.

ii) POI establishment charges and Passive Infra charges should be retained as in current Interconnect agreements.

iii) IUC charging: Existing logic of MoUs for billing should be retained. In case of IP Interconnection also the CDRs from NGN Soft-switch

/ IP TAX would be available and same will be used for billing and charging of terminating traffic.

Q9. What should be the criteria to estimate the traffic minutes in environment if interconnection charges continue to be minute based? Please provide justification in support of your answer.

Answer: - To estimate the traffic minutes, CDRs of Soft Switch and/or SBC, which carry the minutes of use information, should be used to charge IP POIs on the charging principle of MoUs.

Existing logic of MoUs should be retained for interconnect settlement between operators.

Q10.In addition to the above, any other modifications or components of IUC which are required to be reviewed in the IP based network scenario? Please provide all relevant details?

Answer: -

There are many possible methods evolved in Data Market to sell IP Bandwidth based on Usage, Usage + Quality and Usage + Quality + Committed Transfer rate. But in Voice segment we have VoIP based Interconnections in International Long distance and there also the standard mode of IUC settlement is MOU (Minutes of Usage) transited through ILD Carrier Network.

Hence, as suggested earlier in document we should retain MOU based Billing logic which is pre-existing in present Billing systems.

Q11. Do you envisage any interconnection requirement for application & content service providers? If so, what should be the

charging mechanism? Please provide all relevant details justifying your comments

Answer:- Interconnection is a requirement between telecom licensees and hence we do not see need for including application and content service providers.

The agreement between TSP's and these service providers is according to well established industry practices and depends on a lot of factors including quality of products/competition in the market etc. Hence there is no need to prescribe any requirements for this category and current practise should continue.

Q12. Whether the existing regulatory framework for measuring and reporting quality of service parameters as defined for PSTN/PLMN/Internet may continue to apply for IP based network services? Please comment with justifications.

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Q13. In the context of IP based network Migration, if the parameters in the existing QoS regulation are required to be reviewed immediately then please provide specific inputs as to what changes, if any, are required in the existing QoS regulations issued by the Authority. Please comment with justification.

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Q14. In case new QoS framework is desirable for IP based network, do you believe that the QoS be mandatory for all IP based network

services. If yes, what should be QoS parameter and their Benchmarks?

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Q15. What should be the mechanism for monitoring the parameters? For end to end QoS in IP based network environment? What should be the reporting requirement in this regard? Please comment with justification.

Answer:-

Indian telecom has seen market forces driving QoS as we have had hyper competition due to 8 ~ 10 operators. Hence we feel that Regulator should keep QoS responsibility with the operators.

Also the existing regulatory frame work as per RIO - 12th July 2002, does not provide any detailed method to measure and maintain the QoS parameters in IP based Inter connection.

Regarding changes in directions required in RIO if the IP based Networks are mandated. This RIO may need updation as the current RIO does not provide any guideline on IP Interconnect Protocols, Standards, TEC specifications and QOS measurement and assurance techniques.

For new proposed IP network where SIP or H.323 protocols of SIGTRAN based signalling are used, there is no framework available on how to measure and report the parameters for Voice Quality and end to end Customer experience of Voice Services.

Hence, overall we strongly feel that this area needs no detailed intervention of the regulator.

Q16. Should sharing of the IP based core and Access network element by different telecom service providers be allowed in IP based network scenario? What are the challenges, opportunities and problems of such sharing? Please comment with justifications.

Answer:-

Network Sharing is welcome step and Authority should recommend changes in the 2008 guideline of DoT, which has been pending for implementation / necessary licensing amendments for last few years.

Q17. Do you see any issues concerning the national numbering plan with regard to the migration towards IP based networks?

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Q18. Do you believe that ENUM has to be considered when devising the regulatory policy for IP based networks as it will provide essential translation between legacy E.164 numbers and IP/SIP (Session Initiation Protocol) addresses.

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Q19. Which type of the ENUM concept should be implemented in India? What should be the mechanism for inter-relationship between number and IP addressing, and how it will be managed?

Answer:-

E.164 should continue as it is meeting all requirement.

Additionally, as per consultation paper some of the countries has implemented Public ENUM, but in India we should take time and also

prepare comprehensive regulations and framework of implementation of Public ENUM.

This will require scalable, robust and secure DNS infrastructure to be provided at all hierarchical levels. Hierarchical registry operations and name servers that coordinate delegations of E.164 numbering resources will need to be deployed at the international, national and sub-national levels. This is important for geopolitical, sovereignty, security and other pragmatic reasons.

Q20. Is there a need to mandate Emergency number dialling facilities to access emergency numbers using telephone over IP based networks platform? Please give your suggestions with justifications.

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Q21. How will the issues, of Caller location delivery and priority routing of calls to the emergency centre in IP based networks environment, be handled? Please comment with justifications.

Answer: - Providing Emergency services in VoIP networks is vital to the success of IP based Networks. The call flow required for Emergency Services and Priority Call Routing (PCR), we should define process for Identification of Emergency calls, determining Callers' Locations, routing of emergency calls to appropriate public safety access points. **Further studies are needed** with reference from International Operators where ever VoIP or VoLTE services are rolled out and ENUM or alternate solution is deployed.