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12th January 2017

Shri Sanjeev Banzal
Advisor (Network, Spectrum & Licensing)
Telecom Regulatory Authority of India
Mahanagar Door Sanchar Bhawan,
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New Delhi-110002

Subject: Verizon response to TRAI Consultation Paper (No. 21/2016) dated 18th October 2016 on Spectrum, Roaming & QoS requirements in Machine-to-Machine (M2M) Communications

Dear Sir,

We are pleased to submit our response to TRAI Consultation Paper **(No. 21/2016)** on Spectrum, Roaming & QoS requirements in Machine-to-Machine (M2M) Communications. Verizon is a global player. Outside of the US, Verizon provides a broad spectrum of global communication products and enterprise solutions, predominantly to large business and government customers. We have been active in the M2M space globally. We are continuously working side-by-side with developers in our innovation labs to create connected apps and devices. We've also launched our own utility, transportation and healthcare solutions with products like Networkfleet, GridWide, Verizon Share, hum, and one of our newest products, Intelligent Track and Trace. A recent example is the launch of Intelligent Track and Trace to help an oyster farmer in Cape Cod (US) to monitor the quality of his oysters on the way to the consumer and uses the data generated by the Verizon platform to serve the end-customer with an improved quality .[1]

Verizon Communications India Private Limited (VCIPL) has been active on the Indian market since 2007. Our main focus is on serving Indian and other multinational Enterprises with bespoke telecommunications solutions as well as IT and consulting services. Being active across the globe, Verizon generally welcomes any initiative that aims at bringing further harmonization and legal certainty and reducing administrative burden at national levels.

We welcome TRAI's initiative by way of issuing the consultation paper on Spectrum, Roaming & QoS requirements in Machine-to-Machine (M2M) Communications for a fast developing market like India and reviewing the current situation of all market players including technology and service

[1] http://www.verizon.com/about/news/making-food-safer-one-oyster-time

providers as well as network operators. We hope that our comments (enclosed as Annexure – I) will merit consideration of the Hon'ble Authority.

Thanking you,

Yours sincerely,

Priya Mahajan
AP Regional Regulatory Counsel
Verizon Communications India Private Limited

Encl: As above

Annexure-I

Verizon response to TRAI CP on Spectrum, Roaming & QoS related requirements in M2M communications

M2M technologies and the IoT represent the next leap forward in the evolution of Internet-based services by connecting machines, devices, and industries to improve delivery of services and process management to increase efficiencies. Machine-to-Machine (M2M), a distinct segment of the IoT, is revolutionizing business processes. By being able to deliver actionable data fast, it can help enterprises speed decision-making, streamline supply chains, understand customer demands, and bring new products to market quickly.

According to industry estimates by 2017, there will be nearly three networked devices for every person on earth. It is forcasted that IoT Spending is likely to Reach $1.3 Trillion by 2019 with APAC contributing 40% to worldwide spend in last year.Connected Devices- By 2020, more than 33 billion connected devices will be installed, globally, up from 10.4 billion devices installed in 2015.

Specific to issue raised in the TRAI consultation we would like to underscore that the IoT & M2M ecosystem involves a large number of players; a range of platforms, device formats, and services; and data of varied sensitivity. The policy framework including any competition or consumer protection aspects should reflect this diversity and should not vary depending on the type of device or technology used to collect or transmit data. Instead, a framework should be technology & location neutral and apply in a way that is proportional to the nature, sensitivity, and amount of data collected. In addition, any framework should be flexible that promotes technological innovation , principle of opening up the sector, aligning with global best practices, embracing technological changes and promote light touch regulation.

It is important to note that the Investors will only view the M2M market as an attractive investment opportunity if it is incentivized by a flexible light touch regulatory framework. Restrictive requirements, including data and content localization will discourage investment and deprive consumers of innovative products.

In order to promote global innovation and investment throughout the digital economy, Regulators/ Government should adopt light-touch and flexible regulatory frameworks to facilitate faster and efficient deployment and adoption of M2M in the country. These include, but are not limited to:

- ✓ Avoiding unnecessary regulations that could impede the pace of innovation and find mechanisms to address divergent national standards

- ✓ Support seamless cross-border data flows for all types of services, and avoid data localization and infrastructure localization requirements

The National Telecom M2M Roadmap released by Department of Telecommunications in May 2015, has opened up tremendous opportunities to make enormous positive impact for consumers, Indian manufacturers, and Government by adopting policies that encourage competition and innovation in the machine-to-machine market in India. TRAI could facilitate new business models for machine-to-machine services by permitting the use of "Global SIMs" for the delivery of M2M services in India to industries relying upon on a single global platform and service delivery model. Global SIMs are the SIMs of one MNO used globally, on a single platform.

Global SIMs allow a manufacturer, for example, to contract with only one operator for all its global needs, and to use one platform for global ordering, service provisioning, rather than having to acquire services from different operators in each country into which they distribute their products, each of whom has different platforms that may record information in different ways, preventing the consistent collection of information across countries. International roaming is the vehicle for data transport for the Global SIM.

In each country, an underlying MNO that is subject to local regulation provides the wireless service, but the service is sold to operators in other countries who can then offer roaming on their Global SIM, using a single platform worldwide, to their customers on a seamless basis to address their global distribution needs. The efficiency of such an arrangement is imperative to the success of M2M services in a very low margin business (relative to cell phones and tablets). The business models that apply to M2M services are significantly different from the business models that apply to standard handsets and, therefore, require much more flexible solutions.

In the M2M environment, economies of scale are essential:

Compared to mobile phones and tablets, M2M devices typically have low data consumption and very low average revenue per user ("ARPU") (e.g., a smart meter sending a few hundred bytes of data per day vs. a smartphone or tablet consuming tens of gigabytes.

Manufacturers typically do not sell, or charge end users separately, for wireless connectivity. Instead, wireless connectivity is a cost of doing business that may be included in the overall price of the M2M product.

Because their products usually have very low ARPU, manufacturers are extremely sensitive to development and deployment of input costs.

To efficiently amortize their costs, manufacturers tend to develop standardized products with long useful lives that can be sold in significant volumes across many countries.

In sum, to be economically viable, M2M device manufacturers must be able to "build it once, sell it everywhere."

The emergence of new M2M and IoT business models pose unique challenges that require fresh thinking and innovative solutions, such as a light-touch regulatory approach for the introduction of a M2M Service Provider ("MSP") (which has been the draft registration based framework led by DoT with industry consultation)., liberalized policies for the allocation and use of numbering resources, and industry-driven security and privacy practices. Given that M2M communications, and the IoT, are evolving at a dynamic pace, government and industry must work together to create flexible, global, interoperable and future-focused policies to ensure the IoT and M2M communications deliver their potential for economic and social development in and across all sectors, private and public.

Responses to the specific questions in the consultation:

The following questions have been posed to the public by TRAI in its consultation paper. Please find our responses in order below:

Question 1. What should be the framework for introduction of M2M Service providers in the sector? Should it be through amendment in the existing licenses of access service/ISP license and/or licensing authorization in the existing Unified License and UL (VNO) license or it should be kept under OSP Category registration? Please provide rationale to your response.

VERIZON Response:
M2M is inherently a global business which requires regulatory policies to reflect the global essence and recognize as well as facilitate cross border data flow amongst many other requirements. There are inherent restrictions in voice related licensing framework, which do not always permit free flow of cross border data.

Apart from the uniform underlying connectivity piece there will be multiple M2M based applications. The telecom license can only regulate the underlying connectivity which is already part of the license provided to mobile operators. Consequently, no license should be prescribed for the M2M /application part.

TRAI has in the current consultation under clause 1.2 stated that "M2M communication has potential to bring substantial social and economic benefits to governments, citizens, end-users and businesses". TRAI has further stated under clause 1.3 that "Although forecasts indicate a significant opportunity in this field, this industry is still in a nascent stage. The M2M ecosystem is composed of a large number of diverse players, deploying innovative services across different networks, technologies and devices. Providing clarity and consistency of regulation for equivalent services, as well as policies that enable growth will play a significant role in fully capturing its opportunity to stimulate this market". Therefore it is imperative that such a nascent and emerging technology service format should not be placed under licensing or regulatory barrier which impedes its growth.
On MSP registration, the National Telecom M2M roadmap dated May 12, 2015 states: "To have lightweight regulation towards M2M services and addressing concerns like interface issues with Telecom service provider, KYC, security and encryption (for the purpose of lawful interception at TSP level), all M2M service providers utilizing telecom facilities from authorized TSPs should have MSP

(M2M service Provider) registration as in case of OSP registration. The terms, conditions and related guidelines of MSP registration will be released in due course."

Given M2M/IoT are still in a nascent stage, we recommend that TRAI should promote a light touch regulatory environment . There should not be a license based approach for M2M services. The framework should foster innovation and encourage growth of M2M services .There are several precedents for permitting providers of M2M services in a national context (such as a US or UK SIM in India) without a notification/registration.

To that effect we would like to highlight the Belgian Telecom Regulator's (Belgian Institute for Postal services and Telecommunications' BIPT) decision not to impose notification requirements for such services. The decision is based on the view that there is market demand for the extraterritorial use of numbering resources and, importantly, that the proposition does not pose any significant issues for telecommunications in Belgium.

There should not be any requirement to register SIM to facilitate deployment. This would also mean less administrative burden on the DoT/TRAI and facilitate the current motto of the Government of "ease of doing business". It is important to note that the majority of M2M devices will be sending data to specific destinations and that voice capabilities will be limited to the capability to call specifically designated call centers associated with the service.

Furthermore, the M2M device makers or the M2M service providers typically contract with an MNO; the MNO does not typically contract with the consumer/end-user. Thus with M2M services, the threshold policy question of actual consumer harm must be evaluated and the technological advancements and innovations that continue to define the M2M marketplace considered before imposing over prescriptive requirements.

Also, the terms and conditions should enable the MSP to obtain numbering resources directly, without any infrastructure requirements or other obligations such as QoS, etc.

Licensing authorization in the existing Unified License and UL (VNO) license:

We do not support the idea of a licensing authorization in the existing Unified License and UL (VNO) license for M2M services for the following reasons as also mentioned in the response filed by our industry association ACTO.

M2M services experience very low ARPU.

M2M involves many sectors/ verticals and only a miniscule part of the service uses data communications already under license and regulation.

Licensing arrangements are only applicable in telecom sector unlike in other sectors like agriculture, health etc.

UL/VNO model will undermine the M2M business model because, as currently formulated, licensing fees are assessed without the ability of a license holder to deduct the cost of inputs that already

include licensing fees. This creates results in an unequal assessment of licensing fees, where some license holders pay licensing fees for their own license and on the licensing fees assessed on the services they may purchase from another licensed provider in India. Requiring MSPs to obtain a Unified License or VNO license would result in a regulatory imbalance and a disincentive to deployment of M2M services.

Regulations are different in different sectors. Licensing/regulation will be viewed as an infringement upon the jurisdiction of any authorized telecom licensee / OSPs.

Licensing requirements will prevent the entry of new service providers in the M2M space due to inherent advantages of incumbent providers, thus lead to less competition for existing operators.

This lack of competition will not only impede the rapid proliferation of M2M services but will also impact end users / consumer choice and cost of service..

Thus there should be no additional regulation of any kind for M2M services. If any regulation is required it should be light touch, in line with global practices, and horizontal in nature.

To summarise below are the specific reasons why M2MSP should not be linked to a UL or UL-VNO.

1. VNO is essentially a licensing requirement. It comes with a cost of US$1.1 million and multiple compliances. Making VNO a precondition to M2M SP Registration is an attempt to reduce competition and erect an entry barrier where non-exist and do not need to.

2. The reason why VNO option was perhaps not considered by DoT during the formulation of the draft M2M SP Guidelines was they do not wanted to restrict innovation, growth and competition by burdening M2M ecosystem with legacy traditional voice linked license regime.

3. M2M is at very early stages of development. It requires very light touch regulation akin to notification or a registration at most. Any regulation beyond that would be considered heavy handed, and dampen the ecosystem for investments due to costs, compliance and other related issues, included in the UL VNO licensing specifications.

4. M2M business is very different from traditional voice. M2M is a high volume and low ARPU business. UL-VNO license has huge financial entry cost (Entry Fee of INR 7.5 crores (USD 1.2 Million), Recurring license fee and spectrum charges totaling to 13% approximately, coupled with bank guarantee cost will make the M2M business financially unviable.

5. A UL-VNO in India for M2M services may also entail that the M2M devices will work solely on the underlying cellular connectivity. Machina Research 2016 projects that by 2021 there will be merely 8.4% connected devices on cellular connectivity. This implies that vast majority of the potential M2M service providers neither come from the traditional telephony business nor wish to offer voice services as a part of their portfolio.

6. Other connectivity options (sensors, RFID, blue tooth, zig bee protocol etc.) are expected to proliferate the M2M connectivity in a significant manner. Provisions for these connectivity options does not requires any telecom license or authorization.

Any telecom license carries a host of associated compliance requirements spreading from technical, financial, commercial, etc. The current licensing framework is not aligned to the requirements of M2M business which requires a light touch regulatory approach for which licensing is not the right option.

Question 2. In case a licensing framework for MSP is proposed, what should be the Entry Fee, Performance Bank Guarantee (if any) or Financial Bank Guarantee etc? Please provide detailed justification.

VERIZON Response:
Since we do not recommend any type of licensing framework for MSP, there should be no entry fee, PBG or FBG.

Question 3. Do you propose any other regulatory framework for M2M other than the options mentioned above? If yes, provide detailed input on your proposal.

VERIZON Response:
Please refer to our response in Question No 1.

Question 4. In your opinion what should be the quantum of spectrum required to meet the M2M communications requirement, keeping a horizon of 10-15 years? Please justify your answer.

VERIZON Response:
Spectrum is an essential building block for M2M device connectivity. Ubiquitous, affordable, high-speed broadband connections over licensed and unlicensed airwaves is crucial to enable consumers and the public and private sectors to benefit from this emerging technology format throughout the IoT ecosystem. Thus, effective and technologically neutral management of this increasingly scarce resource must be a priority for policymakers.
On the issue about spectrum and its requirements under M2M/IOT, it is to be noted that the projected number of IoT devices will place additional demands on spectrum resources, requiring a continued growth in spectrum available for general commercial use, both licensed and unlicensed.

However, there is no need for governments to allocate dedicated spectrum specifically for IoT or IoT segments. Government should continue efforts to find and reallocate spectrum for commercial mobile broadband use. It should be left to spectrum licensees to manage and employ their spectrum in an optimized fashion for the mix of traffic types that may be simultaneously using licensed bands. Government should continue to support the progress being made by industry standards bodies in the development of new standards, and work toward international harmonization of spectrum allocations where appropriate.

The pricing and release of spectrum should follow a transparent process with no arbitrage advantage vis-à-vis access spectrum. Also, the M2M service provider, in case they wish to build networks by acquiring the M2M spectrum, would need to take a UL.
M2M can also operate over wired networks, private wireless (Wi-Fi) or public mobile networks, the latter two of which already have allocated spectrum. As traffic grows on mobile networks, additional spectrum may be required to accommodate the increase in the data volumes, some of which may be M2M, including some applications that would be made possible through expected high-speed 5G technologies. Any spectrum allocated would best be used by expanding public mobile networks which provide new capacity across all applications and users, and not dedicated to particular use such as M2M.

Thus, there is no need to allocate dedicated spectrum for M2M services or industry verticals. However, there is great benefit for the adoption of all services, including M2M services, if spectrum bands are harmonized across multiple countries, but this is a matter of regional/global planning, rather than of solely domestic spectrum allocation. India should continue to engage at the ITU and monitor global developments for future spectrum use with respect to 5G in order to benefit from global harmonization through the ITU and as a result of market forces.

Other connectivity options (sensors, RFID, blue tooth, zig bee protocol etc.) are expected to proliferate the M2M connectivity in a significant manner. Provisions for these connectivity options does not requires any telecom license or authorization. Therefore any policy should account for such options.

Question 5. Which spectrum bands are more suitable for M2M communication in India including those from the table 2.3 above? Which of these bands can be made delicensed?

VERIZON's Response
Please see response to Question 4. Since, M2M services will in part rely on existing commercial wireless networks, discussions on spectrum should be reserved to those types of services, which will be designed to meet multiple needs, not just M2M. We point to the recent Spectrum Frontiers Order by the FCC in the U.S. as an indicator of what other countries are considering with respect to licensed, unlicensed and shared spectrum for 5G. See:
https://www.fcc.gov/document/spectrum-frontiers-ro-and-fnprm

Question 6. Can a portion of 10 MHz centre gap between uplink and down link of the 700 MHz band (FDD) be used for M2M communications as delicensed band for short range applications with some defined parameters? If so, what quantum? Justify your answer with technical feasibility, keeping in mind the interference issues.

VERIZON Response:
No response is provided.

Question 7. In your opinion should national roaming for M2M/IoT devices be free?
(a) If yes, what could be its possible implications?

(b) If no, what should be the ceiling tariffs for national roaming for M2M communication?

VERIZON Response:
The M2M devices typically use much less data as compared to traditional consumer facing voice/data services. The TRAI tariff order should not be applicable to M2M devices. Commercial negotiations among operators will be the best option for roaming on M2M communication.

Question 8. In case of M2M devices, should;

(a) roaming on permanent basis be allowed for foreign SIM/eUICC; or
(b) Only domestic manufactured SIM/eUICC be allowed? and/or
(c) there be a timeline/lifecycle of foreign SIMs to be converted into Indian SIMs/eUICC?
(d) any other option is available?
Please explain implications and issues involved in all the above scenarios.

VERIZON Response:
Roaming on a permanent basis is simply roaming which is permitted under existing license terms and conditions. Prohibiting the use of foreign SIMs / numbers for roaming will impede the growth of M2M applications / services. Requiring the use of a local number will not enhance the availability of data significantly. We understand that the language in the draft policy does mention providing a reasonable time-frame for transition to local SIMs in consultation with stakeholders, but we strongly believe that there should not be any requirement to replace foreign SIMs in cases where a device is already fitted with hard or soft / embedded SIMs.
Vehicles and Devices with embedded SIMs from other countries would come into India and roam on the network of India telecom operators in exactly the same way as any individual with a mobile phone would roam with an international SIM with the number from the country of origin.
There are also technical challenges with respect to the technical feasibility of SIM replacement/ integration /refitting etc. and there is possibility that the M2M device could be compromised and potentially render the service inoperable.

Question 9. In case permanent roaming of M2M devices having inbuilt foreign SIM is allowed, should the international roaming charges be defined by the Regulator or it should be left to the mutual agreement between the roaming partners?

VERIZON Response:
VERIZON believes that the roaming charges should be market driven rather than prescriptive in nature. Given the availability of commercial roaming agreements in India, there is no need for any regulatory intervention on this matter.

Question 10. What should be the International roaming policy for machines which can communicate in the M2M ecosystem? Provide detailed answer giving justifications.

VERIZON Response:

The MSP shall utilize Telecom Resources operated by an Authorized Telecom Licensee having valid license under Indian Telegraph Act, 1885, which may include international roaming under the international roaming arrangement / agreement with telecom carriers / operators worldwide. The telecom resources should be technology neutral, as the provision of M2M services can be on any technology or standard. Nothing should prohibit M2M devices from being able to roam on an Indian TSP's network under a legitimate international roaming arrangement.

We further note that the M2M roadmap released by DoT recognized the global nature of M2M services and underscore that a locally registered MSP in India may have commercial arrangements with MSPs in foreign markets. Therefore it is important that resources being used to provide service be able transit countries throughout a product's lifetime. Additionally "international roaming" is an accepted concept, and is specifically mentioned under clause 4.3.4 of the National Telecom M2M Roadmap as well. The TRAI should follow the same recommendations in order to be consistent with the roadmap.

As an example as international practice, the U.S. Government places no conditions on the use in the United States of M2M devices containing SIM cards/IMSIs from other countries, and such devices are not subject to roaming requirements or regulations any different from other types of mobile devices.

Question 11. In order to provide operational and roaming flexibility to MSPs, would it be feasible to allocate separate MNCs to MSPs? What could be the pros and cons of such arrangement?

VERIZON Response:

No comments provided.

Question 12. Will the existing measures taken for security of networks and data be adequate for security in M2M context too? Please suggest additional measures, if any, for security of networks and data for M2M communication.

VERIZON Response:

Security must be a priority in the device design, network, and system integrator level. Security is a never-ending effort, and the focus by the private sector on security must always be a priority. With security, it is important for public policy to provide incentives to the private sector to develop secure systems, but not to establish "one size fits all" security prescriptions; because the latter approach can mandate rigid regulations that do not keep pace with the security risk environment. The private sector must be nimble and quick to innovate, to predict security risks and prevent loss. The Government on the other hand should recognize the innovations as acceptable and develop a policy model to complement the same. As part of its deliberations, India may find helpful the OECD recommendations on Digital Security Risk Management and Economic and Social Prosperity. See: http://www.oecd.org/sti/ieconomy/digital-security-risk-management.htm.

Additionally we would like to emphasize that while making the M2M guidelines we need to be cognizant of the pace at which technology is evolving and touching the lives of ordinary citizens.

Government/ Regulator should refrain from making prescriptive policy guidelines that restrict cross border data flows, mandate localization and international operability.

Governments need to work on a flexible, technology neutral, and market oriented policy frameworks. M2M policies that allow the Industry to continue to innovate foster technologies that leads to accelerate deployment and enablement.

This flexibility in turn will allow consumers to enjoy the benefits of expanded, new, and innovative services.

Moreover, privacy and security frameworks should reflect this diversity and should not vary depending on the type of device or technology used to collect or transmit data. Instead, a framework should be technology & location neutral and apply "in a way that is proportional to the nature, sensitivity, and amount of data collected. Furthermore, such frameworks should be horizontal in nature rather than sector-specific, especially when considering that M2M applications will be employed in a wide variety of economic sectors. Furthermore, certain consumer protection regulations may be inapplicable to B2B M2M applications.

Question 13. (a) How should the M2M Service providers ensure protection of consumer interest and data privacy of the consumer? Can the issue be dealt in the framework of existing laws?

(b) If not, what changes are proposed in Information Technology Act. 2000 and relevant license conditions to protect the security and privacy of an individual?

Please comment with justification.

VERIZON Response:

The issues of consumer interest and data privacy are adequately covered by the framework of existing laws and the IT Act of 2000. Security & privacy risks, however are not static, so as time goes by there may be a need to update them.

We believe there is no reason for prescriptive privacy regulations. Industry stakeholders—device makers, connectivity providers, application developers, and platform operators—are proactively engaged in voluntary and collaborative processes to provide appropriate privacy protections for M2M applications. Establishing this trusted environment for consumers will be crucial to commercial success, separate and apart from any policy frameworks for these issues. Indeed, with this broad variety of industry players, it will be impossible to regulate a path to effective privacy protection. Rather, those protections will depend on a robust multi-stakeholder process to define the practices that will engender consumer trust—and therefore adoption—across the system. Thus, for privacy concerns, as with security, government should opt for a common, M2M-wide framework that relies not on regulation, but rather on multi-stakeholder efforts that will facilitate development of effective privacy approaches.

Overemphasizing concerns over security & privacy at the initial stages of implementation of new services like M2M will deter investor sentiment and the future development of new technologies.

For example, in the IT/ITES/BPO sector, India is a net importer of data whereby India hosts a wide range of information belonging to customers located globally. Such geographical mandates may be construed as significant trade barriers and will have negative consequences as there will be possibilities of other countries also start imposing such restrictions. This will severely impact the export market (including the BPO/ITES sector). One of the key thrust under the prestigious "Make in India" programme is to make India an export hub for the world. This has the potential of being

impacted if such mandates continue and other countries reciprocate in the same manner. Rather, there should be a policy of attracting and incentivizing, investment.
Be it a government , enterprise, or individual user, it should be the user's prerogative/ choice where to keep their data, it is not the regulator's role to mandate how a user selects cloud services providers.
Government policy should offer complete flexibility to move the data as the ability for information to flow across borders will be increasingly important to economic growth as all businesses are dependent on the flow of digital, cloud-based information.
As recognized worldwide, the ICT services have important multiplier effects across other economic sectors and thus play an important role in stimulating broader economic activity. As digital services and global access to the Internet expand, there are enormous opportunities for economic growth. Thus regulatory provisions should not require ICT service suppliers to use local infrastructure, or establish a local presence, as a condition of supplying services. In addition, governments should not give priority or preferential treatment to national suppliers of ICT services in the use of local infrastructure, national spectrum, or orbital resources. The same should be based on user preference and choice depending the individual parameters and technical competence.
Given the rapid pace of innovation in digital technology and services, governments are urged to maintain a light touch regulatory approach to avoid stifling growth in the digital economy. It is important that governments find a balance that enables adequate protection for data without burdening industry with unworkable data privacy and protection obligations.

Question 14. Is there a need to define different types of SLAs at point of interconnects at various layers of Heterogeneous Networks (HetNets)? What parameters must be considered for defining such SLAs? Please give your comments with justifications.

VERIZON Response:
In a competitive market, market players should determine the terms of the SLAs. Since SLAs may require different measurements depending on the M2M service provided, any attempt by government to set those parameters could result in impeding the deployment of new and innovative services.

Question 15. What should be the distributed optimal duty cycle to optimise the energy efficiency, end-to-end delay and transmission reliability in a M2M network?

VERIZON Response:
No response is provided.

Question 16. Please give your comments on any related matter not covered in this consultation paper.

TRAI may consider following suggestion while framing bits recommendations on the matter-:

- ✓ Encourage and foster cross border data flows, develop standards that will not impede adoption of M2M technology and foster the development of technical standards that are easy to adopt cross-sector, (such as standards that may be needed so that any M2M device can connect to any network);

- ✓ Make sure the technology neutrality principle permits a broad range of complex integrated services and value chains to reap the benefits of favourable trade rules;

- ✓ Be wary of classifications – historic or new – that could freeze commitments and quickly make them obsolete;

- ✓ Both promote competition, and rely on it wherever possible, rather than on rigid regulatory rules;

- ✓ Avoid unnecessary regulations that could impede the pace of innovation and find mechanisms to address divergent national standards.

Summary-:

1. M2M/IoT is a key enabler for the economy as a whole , it is essential to focus on promoting investment and innovation ;
2. It is about emerging business models and technology evolution not revolution , therefore needs flexible, technology neutral and light touch approach;
3. There is no need for a M2M/IoT specific regulation;
4. M2M/IoT needs to be considered globally not at national and regional level;
5. International roaming, and extra-territorial use of IMSIs and numbering resources are essential to M2M;
6. The regulatory framework should work to remove barriers to cross border data flows and prohibit data localization requirements;
7. Security and technical standards: Should be Voluntary, industry-driven, and consensus-based standard-setting models engaging all relevant stakeholders
8. Registration of M2M/IoT services provider and classification of M2M/IoT services: careful consideration to foster and not crush it under regulatory weight

M2M communications are already demonstrating the potential to massively improve efficiency, productivity and social welfare in diverse fields. Indeed, the Government of India, recognizing the potential of M2M communications to advance all aspects of Indian society, enshrined M2M as early

as 2012 in its National Telecom Policy ("NTP-2012").2 DoT in May 2015, introduced the National Telecom M2M Roadmap3 to guide the development of M2M-related policies. Today India boasts one of the world's fastest growing economies—as well as telecommunications markets—and is looking to harness the power of telecommunications as a "key driver of economic and social development in an increasingly knowledge intensive global scenario."4 Therefore, as India develops a telecom platform to transform the country into " a digitally empowered and knowledge based society,"5 it must adopt flexible, global, industry-driven and technologically-neutral policies to create conditions for pioneering technologies, services, business models and investment to flourish.

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[2] "To facilitate the role of new technologies in furthering public welfare and enhanced customer choices through affordable access and efficient services delivery. The emergence of new service formats such as ***Machine-to-Machine communications***...represent tremendous opportunities, especially as their roll-out becomes more widespread" at 11.2 *See* http://www.trai.gov.in/WriteReadData/userfiles/file/NTP%202012.pdf

[3] *See* http://www.dot.gov.in/sites/default/files/National%20Telecom%20M2M%20Roadmap.pdf

[4] NTP-2012, at page1.

[5] Ibid.