19 September 2022

Shri Akhilesh Kumar Trivedi
Advisor (Network, Spectrum and Licensing),
Telecom Regulatory Authority of India
Mahanagar Doorsanchar Bhawan
Jawahar Lal Nehru Marg
New Delhi – 110 002

Subject: Tata Communications Ltd. response to TRAI Consultation Paper on 'Embedded SIM for M2M Communications'

Dear Sir,

This is with reference to the TRAI Consultation Paper dated 25.07.2022 on 'Embedded SIM for M2M Communications.'

In this regard, please find enclosed herewith Tata Communications Limited's response to the Consultation Paper for your kind perusal.

We request you to kindly take on record our response and consider the same while finalizing the recommendations.

Thanking You,
Yours Sincerely,

For Tata Communications Limited,

Praveen Sharma
Authorized Signatory

Enclosure: As mentioned above

Annexure

Tata Communications Limited's response to TRAI Consultation paper on 'Embedded SIM for M2M Communications'

Preamble:

At the outset, we thank TRAI for providing us an opportunity to share our comments/inputs on this important paper considering critical role of M2M /IoT Services in enhancing the performance of various verticals of different sectors, businesses, and services, by providing automation and intelligence to the end devices. As highlighted by TRAI in its paper, this technology permits billions of devices to connect over the internet giving rise to an unprecedented number of new applications, services, and business opportunities in various verticals. The issues identified for consultation in this paper are of paramount importance especially for the M2M Service Providers using foreign e-SIMs on international roaming and using ITU allocated global IMSI series of 901.xx.

Going forward, e-UICC / e-SIM will play a very critical role in overall growth of IoT / M2M Services in India. The foreign eUICC fitted devices will be roaming with Indian TSP's networks under mutually agreed international roaming arrangements entered between the foreign carrier (whose eUICC is fitted in the device) and the Indian TSP/TSPs with whom that foreign carrier has the roaming arrangement. It is our submission that roaming of eUICC fitted devices in India should be left to the market forces and the roaming arrangement foreign carrier has with Indian TSPs and should not be restricted by a time limit for M2M services.

The SMDP-SR architecture is certified by GSMA and is secure such that tampering with the profiles is difficult as they are securely encrypted and routed from the SM-DP to the SIM Cards, through the SM-SR. Given the intent of use of foreign SIMs embedded on the device imported in India for cross-border M2M use-cases, it is imperative that the SM-SR be allowed to be outside of India, especially for the non-India business entities. Foreign SM-SR should be allowed to download the local profiles on eSIM's located in India instead of SM-SR swap with local India SM-SR considering the fact that all critical profile data is stored on SM-DP located in India in encrypted manner and shared via SM-SR located outside India onto eSIM located in India. SM-SR swaps from the foreign agent (TSP/non-TSP) to Indian TSP for foreign eUICC fitted devices operating in India, are too complex and time-consuming activity and may also affects business viability thereby leading to loss of the business and opportunities.

We would like to submit that 901.xx is a global IMSI series, not tied to any country, and have the capability to provide network-agnostic, cross-border connectivity seamlessly. This will help manufacturers to build equipment in any part of the globe and deploy anywhere. The ITU has reserved the 901 IMSI series specifically for cross-border M2M use-cases and directly allocates the same to service providers, i.e. typically to non-telecom companies. 901 IMSIs series is recognized IMSI series by telecom standardization and many of the operators and IoT service providers around the world have been allotted this series by ITU for global IoT deployments.

Hence, it is our recommendation that 901 IMSI series needs to be recognized by TRAI/DoT for use for IoT/M2M usage by the M2MSPs. The 901.XX Global IMSI may be configured and permitted in the TSP network and may be considered as local for all technical and regulation purpose. It is recommended that 901.XX (Global IMSI) should continue to be allowed to be used in India. This will provide greater flexibility to end-users and will help in meeting global requirements. In the Global scenario, where the devices and users would be moving across countries, this feature will be contributing a lot in this mobility of users.

Our issue wise comments / inputs are as follows:

Q1. Whether the TRAI recommended timeline, about the foreign eUICC fitted devices to be on roaming with Indian TSP's network for a maximum period of three years only, needs a review? If yes, what should be the timeline after which the eUICC should mandatorily be configured with Indian TSP's profile?

Tata Communications' Response:

Roaming is a feature of cellular networks that allows a customer or SIM module of one mobile operator to use the network of another mobile operator to continue with voice/SMS/data services. Such inter-operator arrangements are wholesale-based agreement (Roaming Agreement) between two mobile operators which facilitates one operator's SIM to latch on other operator's network for consumption of various telecom services.

Mobile operators enter in a National Roaming arrangement to facilitate market entry and extend their coverage to serve their customers through other mobile operators' network (e.g., in rural areas). Similarly, International Roaming arrangement provides incentives to mobile operators to adopt a common technology for extending the cellular network services to their customers in other countries by entering into an International Roaming Agreement with various mobile operators globally on mutually agreed terms and conditions. Most of these agreements are bilateral so that operator supports each other's customers for roaming on their networks. Neither the license, nor any TRAI Regulations has prescribed any duration for which an international customer can roam within India as the same is left to the market forces and mutual agreement between Indian and International mobile operators.

Foreign eUICC fitted devices roaming with Indian TSP's networks is a scenario of international roaming which works as per the mutual agreement entered between the foreign carrier (whose eUICC is fitted in the device) and the Indian TSP/TSPs with whom that foreign carrier has the roaming arrangement. Hence, roaming of an eUICC fitted devices in India should be left to the market forces and the roaming arrangement a foreign carrier has with Indian TSPs. We are of the view that there should not be any restriction or timeline for which international roaming of an eUICC fitted device should be allowed and any such roaming should be on permanent basis as per the terms of the roaming arrangement with Indian TSPs. Global models for M2M have evolved for unrestricted access across the borders due to the nature of services as use of device is not necessarily same as the country (or place) of manufacturing and any roaming restriction would

significantly hamper the growth of M2M/IoT services. The M2M Service Provider (M2MSP) can support the customer information related activities for such devices as it is being done for the devices with local SIMs/profiles.

However in case a timeline is being prescribed for roaming of foreign eUICC fitted devices in India, then the TRAI recommended period of three years should be continued and same need not be reduced. This will enable sufficient time to end user and M2MSP to get the services transferred, without any service disruption thereby impacting end customers. There may be critical emergency devices which needs connectivity without any break in service. This period can be used by M2MSP in validating correct Profile set, features, timers and switching logics etc. as the technology and standards are still evolving and will take some more time to mature. The change requires several activities like switching of SM-SR, agreements for new India based profiles, testing and validation and then actual migration as per GSMA guidelines. Hence, three years period should be permitted to continue for an eUICC migration to India local profile.

It is to be noted that roaming eUICC/eSIMs are registered with foreign SM-SRs and for local profile migration it needs SM-SR to SM-SR swap as eUICC are embedded with the device which cannot be changed/replaced with local eUICC/eSIMs. SM-SR swapping is quite complex and time consuming as well as tedious activity in addition to other logistical challenges along with compliance with the local agreements / guidelines. Hence roaming eSIMs may be allowed to continue for at least 3 years as it gives enough time for migration and to take care of all the needed logistics or complexities without disrupting the services.

Further it is recommended that the timeline of three years should apply only for the new device and not on existing devices. Existing devices may be permitted to continue with roaming profile, as the migrations will be a complex task for all the operators, End user and M2MSPs.

Hence, we request the following for your kind consideration that:

- Permanent roaming of foreign eUICC fitted devices in India should not be restricted for a time limit for M2M services and same should be left to the market forces and mutual roaming agreements between foreign TSPs and Indian TSPs. Global models for M2M have evolved for unrestricted access across the borders due to the nature of services as use of device is not necessarily same as the country (or place) of manufacturing.

- If at all, TRAI recommends any timeline, then same should be three years as per earlier recommendations of TRAI.

- Any such timelines should be applicable only on the new devices imported with fitted foreign eUICC.

Q2. Whether there is a need to change the controlling SM-SR from the foreign agent (TSP/non-TSP) to Indian TSP in case of foreign eUICC fitted devices operating in India? If yes, what should be the methodology and time period within which it should be done?

Tata Communications' Response:

We support the fact that SM-SR, deployed outside India, is required to be used in case of devices assembled/manufactured outside India, wherein at the place of manufacturing e-SIM is required to be integrated with the device and accordingly, bootstrap profile corresponding to the SM-SR deployed outside India is burnt on the e-SIM. The SMDP-SR architecture is certified by GSMA and is secure such that tampering with the profiles is difficult as they are securely encrypted and routed from the SM-DP to the SIM Cards, through the SM-SR. Given the intent of use of foreign SIMs embedded on the device imported in India for cross-border M2M use-cases, it is imperative that the SM-SR be allowed to be outside of India, especially for the non-India business entities. It would not be possible for say a Europe based business entity to deploy their SM-SR in India, just for the SIMs that roam into India. Making this mandatory will also defeat the purpose of promoting cross-border M2M use cases where devices are manufactured outside India with eUICC fitted within the device at the manufacturing stage itself before imported to India.

Foreign SM-SR should be allowed to download the local profiles on eSIM's located in India instead of SM-SR swap with local India SM-SR. As critical profile data (Ki, Opc etc) is stored on SM-DP located in India and shared via SM-SR located outside India onto eSIM located in India. Profile data is fully encrypted as well as integrity protected in SM-DP before getting downloaded to eSIM in India via SM-SR outside India. It is only decrypted at eSIM end which is anyways located in India. SM-SR does not decrypt the profile data being downloaded by SM-DP. Instead, it provides secure environment to download the profile. Not only that, SM-SRs are also GSMA SAS security certified. Thus, eSIM profile download should not be allowed through non-GSMA security certified SM-SR's. It is worthwhile to mention that cross-border and cross-vendor SM-SR swaps are too complex and time-consuming activity and can sometimes affects business viability thereby leading to loss of the business and opportunities.

However, if the Government mandates the change of SM-SR from Foreign to Indian for foreign eUICC fitted devices, then SM-SR held by the M2MSPs must be allowed to do such SM-SR swap as long as M2MSP's SM-SR is as per GSMA guidelines. M2MSPs, providing services using foreign eUICC based devices, which are initially shipped with an International Bootstrap profile can operate on International Roaming and any swap to the local profiles should be allowed to the M2MSP having their SM-SR in India within 3 years.

Q3. Whether there is a need for the SM-SR of each TSP to be integrated with the SM-DP of other TSPs? If yes, what should be the methodology for integration? Please specify the timelines also.

Tata Communications' Response:

We are of the view that instead of mandating the integration of the SM-SR of each TSP with the SM-DP of other TSPs, the TSPs should be mandated to provide their profiles to all other SM-DP where their profiles can be hosted. This would allow TSP and M2M SP to provide ability to serve

the customer with minimum disruption and will save high cost of carrying out SM-SR Swap/ SM-SR-SM-DP integration.

It will also help the eUICC working under the control of a specific SM-SR to download the profile of another TSP on these eUICC. We recommend that GSMA prescribed OTA profile subscription mechanism should be used for this purpose which will also be in compliance to DoT instructions dated 30.05.2018.

Q4. Whether there is a need to prescribe SM-SR swapping among the Indian TSPs? If yes, what should be the modalities and procedure for such a swap?

Tata Communications' Response:

We are of the view that this option of SM-SR swapping amongst Indian TSPs must be available with the customer. In view of fair-trade practices and ensuing the availability of options to the OEM and Enterprises, the TSPs should facilitate other TSPs and M2MSPs to migrate from their profile to other TSP's profile through its' own SM-SR. Switching of TSP is required to provide necessary flexibility to the end users which will be like the MNP options available to the mobile users in India. Hence, the end user may be allowed to switch SM-SR from existing TSP to another TSP or M2MSP provided SM-SR as per its choice and all these options should be facilitated by the existing TSP via SM-SR swap.

For this purpose, necessary guidelines for SM-SR swapping among Indian TSPs may be published by TRAI post consultation with all stakeholders.

Q5. Whether the profile switchover, from one TSP to another, is driven by the user or OEM? If yes, what methods can be deployed to execute such switchover?

Tata Communications' Response:

M2M ecosystem is mainly driven by the application service providers/OEMs who have taken the M2M services from the M2MSP who in turn use foreign SIMs or local SIMs from the TSPs. While, the end user of an eUICC fitted device or M2M SIMs will be the customer/user of services/devices sold to them by such OEMs, however, there are variety of functions which are controlled and/or consumed by these OEMs, for ex: in case of connected cars, while the end users are the respective owners of those cars however various data, particularly related to telematics, vehicle's performance etc. are consumed by the vehicle manufacturer/OEMs. Thus, it would be very difficult to establish who is the end user of an M2M SIM hence the profile switchover cannot be driven by the user/end consumer of the SIM. Also, leaving the decision of profile switchover at individual user would not be feasible as the choice of TSP will vary from individual to individual and in such case, it will become extremely challenging for the M2MSP or the application provider/OEM to deliver the M2M use cases on different TSP's network for different individual users.

Also, in case of M2M, the Enterprise or OEM owns the subscription of the M2M SIMs/eUICC and in most of the cases these SIMs are bundled as part of an overall service being provided by these OEMs e.g. Smart meter or Connected Vehicle. Hence, we are of the view that the profile switchover should be driven by the application provider/OEMs who have taken the subscription from the M2MSPs.

Q6. Whether non-TSP entities, such as OEMs and M2M Service Providers, should be permitted to own SM-SR and manage the subscribed profiles for their devices? If yes, what should be the methodology and procedure?

Tata Communications' Response:

In India, many M2MSP have established their own SM-SR which are certified by GSMA. Also, as per global practices, SM-SR are not only owned and managed by a TSP, but various application providers/OEMs and entities providing M2M services, have their own SM-SR to cater the requirement of their M2M connectivity, SIM profiling and SIM profile swapping. These entities are neither TSPs nor e-SIM manufacturers. Pls refer the link having list of GSMA SAS-Approved sites[1]. As you can see, MNOs and 3rd party non-MNO entities are both present here. This makes it easier for the customers to select appropriate solution provider.

We suggest that similar standards should be followed in India and M2M-SPs should be allowed to have their own SM-SR. This will provide great flexibility to OEMs/ M2M users on their choices. It should be mandated that any entity (e.g. M2M-SP) must operate a GSMA certified SM-SR and TSPs must support provisioning of their profiles to such M2M-SP through a profile donation.

Q7. Whether the use of ITU allocated shared Mobile Country Code 901.XX (Global IMSI) be permitted in India for M2M Communication? If yes, what should be the methodology and procedure? If not, what are the reasons and challenges in implementation of Global IMSI? Please elaborate.

Tata Communications' Response:

901.xx is a global IMSI series, not tied to any country, and have the capability to provide network-agnostic, cross-border connectivity seamlessly. This will help manufacturers to build equipment in any part of the globe and deploy anywhere. The 901.xx codes allow a simpler method by which various use cases, can be utilized and deployed. In general, we believe that any provider wishing to use 901.xx can register as an M2M Service Provider (M2MSP) and consequently be bound by the regulatory requirements. The ITU has reserved the 901 IMSI series specifically for cross-border M2M use-cases and directly allocates the same to service providers, i.e. typically to non-telecom companies. Following methods can mitigate security, privacy and identity concerns regarding the use of 901.xx codes within Indian borders:

[1] https://www.gsma.com/security/sas-accredited-sites/

- Regulating M2MSP – M2MSPs are regulated by DoT under its M2MSP registration requirements. M2MSP Registration Guidelines imposes requirements, such as inspections, security conditions etc. on M2MSPs, which will make them highly regulated entities, in line with National Security Interests.
- Know Your Customer (KYC): As per DoT's instructions dated 16-05-2018 and M2MSP Registration Guidelines, M2MSPs are required to ensure maintenance of records of end users of devices.
- Application Server Location: It has already been specified in the M2MSP Guidelines to inform DoT about the location of IT and Network systems, which will ensure that DoT is informed about the application server location of M2MSPs.
- Lawful Intercept: The 901.xx IMSI owner can provide a mirror of the traffic when requested to the Indian regulatory authorities. This can even be managed through the local TSPs, on whose networks, connectivity will be provided. Security Obligations have already been placed by DoT on M2MSPs in the registration guidelines.
- Mobile Numbering Series: All M2MSPs registered with DoT should also be allowed to apply for M2M Mobile Numbers which can be applied to 901 IMSIs. Mobile Operators would then be able to differentiate between traffic being routed on these specific 13-digit numbers and regular international or domestic MSISDNs. In addition to this, as per the ITU directives, the 901.XX IMSI will be allocated directly by the ITU to respective entities, along with a numbering series.

Further, it may be noted that the 901 IMSIs series is recognized IMSI series by telecom standardization and many of the operators and IoT service providers around the world have been allotted this series by ITU for global IoT deployments. Hence, we recommend that 901 IMSI series should be recognized by TRAI/DoT for use for IoT/M2M usage by the M2MSPs.

It is also submitted that with the use 901 IMSI profiles, it will be easy to detect the M2M devices on the network of TSP as network optimization is an independent exercise carried out by TSPs irrespective of the fact that whether it is for P2P or M2M communication. Network optimization and- performance monitoring are activities which are even today performed by operators daily. Therefore, TSPs can easily detect the changes happening with regard to traffic/ signalling load and can optimize the resources over time and there is no threat of any sudden network/signalling surge are resources can be augmented over time. In so far as detecting the roaming devices is concerned, it may be noted that TSPs enter into roaming agreements for enabling the roaming of devices.

IMSI: In so far as usage of IMSI series not allotted by DoT is concerned, it may be kindly noted that even today TSPs/ISPs use resources such as IP addresses and Autonomous Numbers which are not allocated to them by DoT. The primary objective should be to meet relevant security requirements. Even if IMSI series is not allocated by DoT but these are used by the entities registered with DoT, relevant security requirements can be enforced by DoT to ensure compliance. Further, M2MSPs may be mandated to provide up to date information on the usage of IMSI series and moreover, if the traffic is being handled by the licensed telecom networks,

using the platform of M2MSPs registered with DoT, it will leave no scope for non-enforcement of security conditions.

Roaming: We request that 901.xx IMSI series should be allowed under International Roaming arrangements. With reference to TRAI Recommendations to convert the International Roaming connections to local connections, we would like to submit that if Regulators of every country makes it mandatory for the 901.xx IMSI to be converted to a local connection after a defined period, the whole basis of the ITU in setting up 901.xx exclusively for cross-border M2M use-cases will be defeated. Therefore, an exception should be made to the 901.xx IMSI series to ensure that the IMSI works in India in-line with the global practices adopted for M2M business. Further, it is technically feasible to provide services by using 901 series on inter-circle/intra-circle roaming through roaming arrangements, which can be negotiated between TSPs and M2MSPs. Since the entities being allocated the 901.xx series will work on international roaming contracts, even within the home country of business entity, there is no need for any regulatory interventions for inter-circle or intra-circle roaming contracts for 901.xx. However, keeping in mind that the 901.xx IMSIs are specifically being allocated for M2M usage only, restrictions such as roaming not allowed in specific circles (for example J&K circle in India) should not be apply to these connections. From a security perspective, the entities, who are providing service in India, under International roaming arrangements, could be asked to maintain a copy of their servers and data in India, so that the licensor and security agencies will be able to track the data as needed. Additionally, the business entity should be responsible for maintaining the KYC of the physical custodian of the device/ machine in which the e-SIM is being used. Since as per the ITU directives, the 901.XX IMSI is allocated only for cross-border M2M usage, and all such activities will be covered under the scope of M2MSP registration.

Further, these IMSI's are recognised by global telecom standardisation bodies; so the ITU allocated series should also be treated just like other global telecom standards accepted in India. With respect to the argument that the mobile operators/ M2MSPs will be using IMSI or the numbering series which have not been allotted to them by the DoT, it is submitted that these IMSI's will still a be valid numbering series allocated by ITU and recognised by all the telecom standardisation bodies globally. With respect to other concern i.e. there is no Inter-circle/Intra-circle roaming available to these connections, it is submitted that this issue does not actually poses much challenge especially considering the kind of innovation, flexibility, opportunities and advantages it brings.

In view of the above submissions, we humbly request that a suitable light touch regulatory framework may be adopted for a collaborative ecosystem in line with Global practices, while keeping in mind the consumer and national interests. There is no reason for any Regulatory inhibitions for 901 series, if all the concerns can be addressed through suitable technological, regulatory, and commercial framework. The 901.XX Global IMSI may be configured and permitted in the TSP network and may be considered as local for all technical and regulation purpose.

Therefore, it is recommended that ITU allocated shared Mobile Country Code 901.XX (Global IMSI) should continue to be allowed to be used in India. This will provide greater flexibility to end-

users and will help in meeting global requirements. In the Global scenario, where the devices and users would be moving across countries, this feature will be contributing a lot in this mobility of users.

Q8. Is there any issue, pertaining to the Consumer eSIM, that needs to be addressed? Please highlight the issue and suggest mechanism to address it with justification.

Tata Communications' Response:

It is submitted that eSIM/eUICC with OTA profile updation provides greater flexibility to the consumers wherein they can download TSP profiles easily on their devices. We are of the view that consumers should be allowed to have multiple TSP profiles simultaneously and switch the profiles as per their needs. This will allow the Consumers to have best services and rate contracts with flexibility to quickly switch the network. GSMA standards should be adopted for "pull" based profile downloads. The end-user should be given facility to download and switch using multiple channels, such as QR Code, pre-configured devices with bootstrap, SM-DS GSMA discovery systems technologies.

M2MSP plays a critical role in providing this "neutral" services to the users and are to be considered a critical player in the complete eco-system of eSIM based Consumer systems. SMDP+ technology recommended by GSMA should be adopted which will enhance the interoperability. Various SMDP+ providers (e.g. M2MSP) may be permitted to host the Profiles, without worrying about the owner TSP of the profile. This will provide greater flexibility to end user, M2MSP and TSP with competitive environment in this technology area for consumer eSIM.

Q9. Give your comments on any related matter that is not covered in this Consultation Paper.

Tata Communications' Response:

Our additional comments on this important issue for consideration of TRAI is given below:

On deployment and use of SM-SR:

- TRAI/DoT through their regulations/instructions should mandatorily allow all possible channels and their interoperability without any restrictions, for the end users to select any of the SM-SR as per their choice, commercial agreement, and service levels.
- SM-SR can be owned and managed by either a neutral M2M Service Provider, TSP or an OEM.
- These various SM-SR should be allowed to be connected and share the profiles.
- There should be a seamless donation of profiles, downloads, and configurations without any restriction, and must be driven by OEM/end-user choice. This would provide a competitive environment and will enhance innovation, R&D and investments by various players in eSIM area.

On Industry Readiness and Evolution:

We would like to highlight some challenges which need to be looked into on an urgent basis to help development of this M2M industry which is crucial to the overall evolution of connected eco-systems in India specially in context of the IoT use cases and M2M services offered by devices manufactured both in India and outside India:

- Supply Base Shrinkage:
  - The mandate of local manufacturing and/or personalization has resulted in number of suppliers reducing considerably for eSIM technology.
  - Large global suppliers who are at the leading edge of this technology are not currently ready to produce in India because of the current low penetration of eSIMs in India (less than 1% of the market).
  - This raises a strong ongoing supply risk to manufacturers who have already adopted the technology, leading to real and urgent risk of manufacturing disruption.
  - The shrinkage of supplier base also has a bearing on monopolistic pricing risks

- Time to transition to new suppliers:
  - Considering the intricacies of the technology, even with a shrunk supplier base the transition to a new supply takes several months of preparation, testing and qualification.
  - Some of these are linked to the procedural approvals for supporting a fully GSMA compliant eUICC platform based within in the geographical borders of India.

- Elative immaturity of existing suppliers in India:
  - While the few currently available suppliers have traditionally been large plastic SIM providers in the past, they are going through a cycle of learning and gaining maturity.
  - Considering that eSIM technology is a combination of hardware and remote SIM provisioning software which can operate in multiple different combinations, the existing and new suppliers will require time to mature and properly industrialize production to be able to achieve Business-as-Usual service capabilities.

The M2M service providers have also been impacted in terms of long-term support for existing eSIM vendors to its customer base as eSIMs in IoT device lifecycle can have a significant time between device manufacturing and rollout in the field. The current size of supplier base, supply capacity, maturity of supply base and the time required to switch from an existing supplier to a new supplier are very significant risks that manufacturers face today. Some of these manufacturers are the largest corporations in the country contributing significantly to the Indian economy. Hence, we request TRAI to kindly take cognizance of the state of readiness of the industry to serve the currently issued mandates in context of the M2M services offered through eSIM/eUICC and take urgent steps to issue directives to help ensure business continuity for all parties who have already adopted this technology and are faced with a less than optimally equipped eSIM manufacturing environment.

***