**Telecom Regulatory Authority of India**

Recommendations

on

Ensuring Adequate Numbering Resources for Fixed Line
and Mobile Services

New Delhi, India

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Mahanagar Doorsanchar Bhawan
Jawahar Lal Nehru Marg
New Delhi – 110002

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# CHAPTER 1

# INTRODUCTION

1.1 The telecommunications sector has been undergoing a transformation triggered by the emergence of new network architectures and services. The advancement in telecommunications technology has brought about possibilities of new revenue streams for operators and better, faster, and cheaper services for the consumer. It is becoming increasingly possible to deliver any service on any device, anytime, anywhere. To achieve this ubiquity, an often-overlooked resource, the number resource is used to uniquely identify and differentiate among the end users.

1.2 The Department of Telecommunications administers the numbers for fixed and the mobile networks based on the ITU's Telecommunication Standardization Sector (ITU-T) Recommendations. The ITU-T develops international standards known as the ITU-T Recommendations, which act as the defining element in the global infrastructure of Information and Communication Technologies (ICTs). The Series 'E' of ITU-T Recommendations deals with the "Overall network operation, telephone service, service operation and human factors". Specifically, the Recommendation E.164 describes "The international public telecommunication numbering plan". This Recommendation provides the number structure and functionality of numbers used for international public telecommunication. It details the components of the numbering structure and the digit analysis required to successfully route the calls.

1.3 Management of numbering resources is governed by the National Numbering Plan. The numbering plan is one of the important 'fundamental plans' along with Switching, Routing, Transmission, Charging, and Synchronization plans that govern the functioning of telecommunications' networks. Though these plans are designed for the long term, they may require careful and judicious reviews to constantly

meet the country's requirements, as the telecommunication networks grow and technological developments take place. Availability of numbering resources for telecommunication services, akin to spectrum for wireless services, is finite and scarce and depends on the way the numbering plan is constructed. A plan may require revision due to an unprecedented growth in the number of subscribers or by the introduction of new services. Substantial revision of the numbering plan is a complex, time-consuming and expensive exercise. It, therefore, makes sense to use the resources sensibly in a managed and controlled manner.

1.4    Numbers have always played a pivotal role in telecommunications, and their importance is well recognized. A well-designed numbering plan would ensure a structured approach in allocation and assignment of numbers that is consistent with the best international practices. The plan must ensure that the defined range of numbers allow for the expansion of the existing services and the introduction of a wide range of new services without getting prematurely exhausted during the planned period.

1.5    In India, a major review of the numbering plan was carried out in 1993. With the introduction of a large number of new telecommunication services and the opening up of the entire telecom sector for private participation, it was considered necessary to rationalize and review this plan to make it flexible so that it could cater to the numbering needs for the next 30 years in respect of the existing and likely new services.

1.6    Subsequently, due to a rapid growth in the number of subscribers, a major review of the numbering plan was again carried out by the Government in 2003, with the formulation of the National Numbering Plan, 2003 (NNP 2003). This plan created a numbering space for 750 million telephone connections – 450 million cellular mobile and 300 million basic phones. The NNP 2003 was formulated for a projected forecast of 50% tele-density by the year 2030.

1.7 TRAI issued recommendations on "Efficient Utilization of Numbering Resources" on 20th August 2010, in which TRAI had proposed that the existing 10-digit numbering scheme should be continued to avoid inconvenience to the customers that would accompany any move to shift to an 11-digit numbering scheme.

1.8 After 17 years into the National Numbering Plan, adequate availability of numbering resources is threatened because of an increase in the range of services and massive growth in the number of connections, especially in the mobile segment. The total number of telephone subscribers in India stands at 1177.02 million with a tele-density of 87.45% at the end of January 2020. Resultantly, we find ourselves in a situation where we need to review the utilization of the numbering resources and make some policy decisions to ensure that adequate resources are available for sustainable growth of the telecommunication services.

1.9 TRAI received a reference dated 8th May 2019 from DoT **(Annexure A)** seeking recommendations on the strategies of the National Digital Communications Policy, 2018 (NDCP 2018), which, inter alia, includes "Ensuring adequate numbering resources, by developing a unified numbering plan for fixed line and mobile services".

1.10 As a result, TRAI issued a consultation paper on "Developing a Unified Numbering Plan for Fixed Line and Mobile Services". The purpose of this consultation paper was to analyze whether unified numbering scheme can be used to augment the numbering resources. The alternative methods were also explored to identify the ways in which the numbering arrangement and allocation policy might be managed for ensuring adequate numbering resources. Written comments and counter-comments were invited from the stakeholders by 21st October 2019 and 4th November 2019, respectively. On the request of some of the stakeholders the last date for receiving the comments and counter-

comments was extended to 13th November 2019 and 27th November 2019, respectively. The consultation paper elicited many responses. Comments were received from 14 stakeholders and counter-comments were received from 5 stakeholders. An Open House Discussion (OHD) was also conducted on 16th January 2020, in New Delhi.

1.11 Based on the inputs received from the stakeholders and its own internal analysis, the Authority has finalized these recommendations. The recommendations comprise of four chapters. Chapter 1 provides a background to the subject. Chapter 2 deals with the measures which can be taken for generating adequate numbering resources. Chapter 3 deals with the present allocation criteria of numbers and associated issues. Chapter 4 provides the summary of the recommendations.

# CHAPTER 2

# MEASURES FOR ENSURING ADEQUATE NUMBERING RESOURCES

**Importance of the numbering plan**

2.1 Telephone numbers are necessary to identify and use basic and value-added services through switched telephone networks. The purpose of the numbering plan is to ensure a structured approach to the allocation of numbers, which is in accordance with the best international practices. Its primary function is to define the numbering space and its evolution for various existing and prospective services. It must ensure that the range of numbers, so defined, allows for the introduction of a wide range of services and caters to the expansion efficiently, during the planned period, and that premature exhaust is avoided. The plan, therefore, defines the general principles to be applied in the management of the numbering resources, and the processes and procedures to be applied. It should contain the guidelines for the allocation, assignment and management of numbers. It must ensure that the available resources are efficiently managed; their allocation among the service providers is need-based, fair and equitable, and promotes competition and innovation. Any modification should allow for minimal disruption to the existing numbers and longer-term stability that minimizes the need for further changes.

2.2 A numbering plan must consider the genuine needs of various stakeholders. Modification in a numbering plan could mean substantial changes in the network and significant network costs, and for this reason, the service providers want the numbering resources to be carefully managed. If changes are done often, then the subscribers have to change their dialing habits and also reprogram their mobile phones and phone books. The planners must remember that wrong or incomplete dialing hold

up network resources, building up congestion and loss of paying traffic. Uniform dialing pattern across the country, across service providers, and meaningful numbers that give some information about the location of a called party and the likely cost of a call, are subscriber friendly. Business subscribers do not like changes in the numbers as telephone numbers are advertised and printed on stationery and forms, which makes changes expensive for them.

2.3 The numbering plan provides a set of rules and guidelines for the use and assignment of numbers to telephone services delivered over the public networks. The plan also describes the allocation of numbers to international services, trunk service, emergency services, and special services such as toll free and Intelligent Network (IN) services. The structure of the national number generally conforms to the relevant ITU-T Recommendations. The primary concern of the numbering plan is to give a uniquely identifiable number to every subscriber irrespective of the network he/she is connected to.

2.4 The numbering plan could follow a closed numbering system, where the number of digits to be dialed remains the same, or it could be an open numbering system, where the number of digits to be dialed for local and national calls is different. The numbering plan refers to NSNs, where the first N is the national code and SN is the subscriber number. Where local dialing is permitted then just the SN is dialed for connection to another user in the same local area. A single SN, say 2345678, may be assigned to a different customer in each different local area. This kind of a plan is known as an open numbering plan. The alternative, a closed numbering plan, exists where there is only a single dialing procedure for all national calls, for example, in Denmark and Norway, where all 8 digits are dialed for all calls, and no trunk prefix is needed. The national numbering plan could have a geographical numbering scheme, or a non-geographical

scheme, or a mix of the two depending upon the services. The numbering plan should have service access codes for services like Intelligent Network services, Toll Free services, or any other service that may be started in the future. Provision has to be made for separate codes for Home Country Direct, International Toll Free, premium rate, mobile satellite services, etc., which are required to be mentioned in the National Numbering Plan. It is an important function of the numbering plan to mandate common numbers for emergency services like fire brigade, police, etc. for all the telecom service providers.

### ITU-T E.164 number structure

2.5 The ITU-T Recommendation E.164 describes "The international public telecommunication numbering plan". This Recommendation provides the number structure and functionality of numbers used for international public telecommunication. The international ITU-T E.164-number is composed of a variable number of decimal digits arranged in specific code fields. The international ITU-T E.164-number for geographic areas is composed of decimal digits arranged in two code fields: the country code (CC) and the national (significant) number N(S)N. The national (significant) number may be further subdivided into national destination code and subscriber number fields, according to the national requirements.

2.6 ITU-T recommends that the maximum number of digits of the national (significant) number, N(S)N, should be equal to 15 – n, where n is the number of digits of the country code. The N(S)N is used to select the destination subscriber (the term "subscriber" means a human subscriber or a point where a service is provided). In selecting the destination subscriber, however, it may be necessary to select a destination network. To accomplish this selection, the N(S)N code field comprises a national destination code (NDC) followed by the subscriber's number (SN). The NDC and SN may be inseparably connected in some national applications to form

a single composite dialling sequence. The NDC field, if used, will be variable in length depending upon the requirements of the destination country. Each NDC may have one of the following structures:

a) a destination network (DN) code, which can be used to select a destination network serving the destination subscribers;

b) a trunk code (TC);

c) any combination of destination network (DN) code and trunk code (TC).

The NDCs of a geographic country code may consist of one of the above structures or others as defined by the national numbering plan administrators.

2.7 The national telecom network in India has been divided as under:

- SDCA: Short Distance Charging Area also called local area
- LDCA: Long Distance Charging Area comprising of one or several SDCAs

In India for PSTN, NDC is the trunk (Area) code assigned to each SDCA. Each SDCA is allotted a unique trunk code. There are at present 2645 SDCAs distributed in 322 LDCAs. Accordingly, 2645 codes are required to identify the complete country based on the SDCA linked numbering scheme. The length of the Trunk Code (TC) shall vary from 2 to 4 digits depending upon the size and telephone density requirement of the SDCA. The cellular mobile network has been divided into 22 service areas for which licences are issued.

2.8 The Unified Licence defines 'Local Calls' and 'Long Distance Calls'.[1] 'Local Calls' mean calls originating and terminating within the same local area, which are charged at local call rates. For Basic Service, the SDCA is local area and for cellular mobile network, the 'Licenced Service Area' is local area. 'Long Distance Call' is defined as a call terminating in a local area

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[1] https://dot.gov.in/sites/default/files/Unified%20Licence_0.pdf

other than that in which it is originated. Long distance calls in India are also termed as STD (Subscriber Trunk Dialing) calls. International calls are termed as ISD (International Subscriber Dialing) calls.

2.9 In India, both fixed line numbers and mobile numbers consist of 10 digits, excluding the country code. The telephone number for basic/fixed services has three components:

- CC: country code
- NDC (National Destination code): SDCA code
- SN: Subscriber Number

The SDCA codes consist of 2/3/4 digits while the subscriber number is of 8/7/6 digits, respectively. Calls within the local area (SDCA) are defined as local calls. In this open numbering system, 6 to 8 digits are required to be dialed for a local call from a fixed line to another fixed line, but 10 digits (SDCA code+ Subscriber number) need to be dialed for national long distance calls with a dialing prefix '0'.

2.10 The MSISDN (Mobile Station International Subscriber Directory Number) for cellular mobile services in India, has three components:

- CC: Country code
- NDC (National destination code) which identifies the PLMN
- SN: Subscriber number

It is a closed numbering system for cellular mobile services and all the 10 digits (NDC+SN) should be dialed for calls within India. However, the dialing prefix '0' is not mandatory for inter-circle calls from mobile networks. The 5-digit NDC is referred to as the MSC code. The allocation of 5-digit MSC codes is made to the TSPs, which caters to 1 lakh customers. The allocation is done in batches of 10 MSC codes, which caters to 1 million subscribers.

**National Numbering Plan (2003)**

2.11 With the introduction of a large number of new telecommunication services and opening up of the entire telecom sector for private participation; in 2003, it was considered necessary to rationalize and review the existing National Numbering Plan to make it flexible so that it could cater to the numbering needs for the next 30 years in respect of the existing and likely new services. Keeping this in view, National Numbering Plan 2003 (NNP 2003) was formulated for a projected forecast of 50% tele-density by 2030. This structure made numbering space available for 750 million telephone connections in the country comprising of the anticipated number of 300 million basic and 450 million cellular mobile connections. It was hoped that NNP 2003 will be able to meet the challenges of multi-operator, multi-service environment and will be flexible enough to allow scalability for the next 30 years without any change in its basic structure. It was designed to meet the challenges of the changing telecom environment by reserving numbering capacity to meet the undefined future needs.

2.12 As mentioned above, the National Numbering Plan (2003) was designed to take care of the numbering requirements for about 30 years' timeframe. However, the situation has changed rapidly since 2003. While the fixed line connections have shown a declining trend, the mobile segment exhibited unprecedented growth. The anticipated 450 million cellular mobile connections by 2030 had already been achieved in 2009. The growth of telephone connections in the last ten years is shown in Table 2.1.

**Table 2.1: Subscriber Base-10 Years**

| MONTH/YEAR | WIRELESS (million) | WIRELINE (million) | TOTAL (million) | GROWTH RATE (%) |
|---|---|---|---|---|
| March/2011 | 811.59 | 34.73 | 846.32 | 36.22 |
| March/2012 | 919.17 | 32.17 | 951.34 | 12.41 |
| March/2013 | 867.8 | 30.21 | 898.02 | −5.61 |
| March/2014 | 904.51 | 28.49 | 933 | 3.90 |
| March/2015 | 969.89 | 26.59 | 966.49 | 6.81 |
| March/2016 | 1033.63 | 25.22 | 1058.86 | 6.26 |
| March/2017 | 1170.18 | 24.40 | 1194.58 | 12.82 |
| March/2018 | 1183.41 | 22.81 | 1206.22 | 0.97 |
| March/2019 | 1161.81 | 21.70 | 1183.51 | −1.88 |
| January/2020 | 1156.44 | 20.58 | 1177.02 | −0.55 |

2.13 There has been a consistent decline in the wireline connections. The number of wireless subscribers, after a decline in the year 2012–13 due to cancellation of licences and closure of inactive subscribers, has increased steadily thereafter till 2017–18. The growth in the year 2016–17 has been somewhat sporadic due to the entry of a new operator with very attractive tariffs. However, after closures, mergers and consolidations in the telecom sector, a slight decline in the wireless connections is also observed in the last two years. The overall subscriber base is 1177.02 million as on 31st January 2020. Since, some of the assumptions made in drawing up the NNP 2003 are no longer applicable, the plan falls short of meeting the requirements and needs to be reviewed.

2.14 The NNP 2003 gives the complete list of SDCA codes (Annex-II of NNP 2003) and also a complete list of the spare codes (Annex-III of NNP 2003). The spare codes were provided for future requirement of SDCA codes. It was envisaged that due to an increase in the number of fixed line

subscribers, some of the SDCAs with a 3-digit trunk code and a 7-digit subscriber number will have to be changed to a 2-digit SDCA code with a 8-digit subscriber number. Similarly, N(S)N with a 4-digit SDCA code with a 6-digit subscriber number will have to be changed to a 3-digit SDCA code with a 7-digit subscriber number. However, the wireline numbers have not increased as envisaged while formulating the NNP 2003, rather a consistent decline has taken place. Hence, these spare codes were never used as SDCA codes. On the other hand, only level '9' was earmarked for cellular mobile services. After exhausting level '9' for mobile services, the spare codes of level '7' and '8' were used for generating additional mobile numbering resources.

**Capacity in the existing numbering scheme**

2.15 For a 10-digit numbering scheme leaving out levels '0' and '1', which are used for special purposes, a theoretical numbering capacity of 8 billion numbers exists. With only level '9' for mobile and a 10-digit numbering system, a maximum capacity of 1000 million numbers are available for mobile services. Some sub-levels of levels '7' and '8' have also been used for mobile services. The sub-levels of '7' and '8' have been used for generating mobile numbering resources using two methods:

- Suffixing working SDCA codes of level '7' and '8' with '0', '1', '8', and '9',
- Using spare codes of level '7' and '8' (listed in NNP 2003).

A capacity of approximately 1150 million is available in these two levels. However, local fixed line numbers for fixed network begin with '2', '3', '4', '5', '6', and few sub-levels of '7'. This renders these levels unusable for mobile numbers, because local intra-SDCA dialing between fixed numbers is allowed without SDCA code (open numbering plan). In a way, we can say that these levels are used for just about 20.58 million fixed line connections (as on 30th January 2020). Keeping in view the declining fixed line connections and adequate availability of numbering resources for

fixed line, our main focus should be on the numbering resources for mobile services.

2.16 The present allocation and utilization of SDCA linked fixed line numbers is represented in Table 2.2.

**Table 2.2: Allocation and Utilization of Fixed Line Numbers**

| Sr. No. | Levels | TSP | Working Connections as on 31st Jan 2020 |
|---|---|---|---|
| 1. | Level '2' | BSNL/MTNL | 12.260 million |
| 2. | Level '4' | Bharti Airtel | 4.315 million |
| 3. | Level '30', '33', '34', '37', '38', & '39' | Reliance Comm. Ltd. | 0.536 million (after merger) |
| | Level '793' | Sistema Shyam | |
| 4. | Level '37','50', & '71' | Vodafone Idea | 0.438 million |
| 5. | Level '50' to '54' | Quadrant (QTL) | 0.192 million |
| 6. | Level '50' to '59' | APFSL Andhra Pradesh | Not Available |
| 7. | Level '6' | Tata Teleservices | 1.788 million |
| 8. | Level '795' | M/s Idea Cellular (Vodafone Idea) | Not available |
| 9. | Level '35' & '796' | Reliance Jio | 1.055 million |
| 10. | Level '797' | Vmobi Solutions Pvt. Ltd. | Not Available |
| **Total** | | | **20.584 million** |

2.17 The sub-levels of level '5' has been allocated for basic fixed line services in some LSAs. DoT through its OM dated 30th November 2006 **(Annexure B)**, has also decided that all access service providers should use the level '5' for allocation of short codes to the content providers including SMS-based services within their own networks.

2.18 A total capacity of approximately 2150 million numbers exist in levels '9', '8' and '7'. Though there is no technical reason why all the 2150 million

numbers cannot be used for working connections. Yet, because of the reasons of granularity of allocation for each Mobile Switching Center (MSC), numbers blocked in the distribution chain, administrative processing time for allocation of new blocks of numbers, and other inefficiencies of the system, utilization cannot reach 100%. For these reasons, DOT allocates new blocks of number to service providers after the service providers demonstrate a specified percentage utilization of the already allocated numbers.

**TRAI Recommendations on "Efficient Utilization of Numbering Resources" (20th August 2010)**

2.19 TRAI issued recommendations on "Efficient Utilization of Numbering Resources" on 20th August 2010. In these recommendations, TRAI has proposed that the existing 10-digit numbering scheme should be continued to avoid inconvenience to the customers that would accompany any move to shift to an 11-digit numbering scheme. TRAI has recommended that India should migrate to an integrated numbering scheme for fixed and mobile services. In other words, both fixed line and mobile phones will have a 10-digit number. TRAI also recommended that till the integrated scheme is implemented, the dialing of intra-circle calls from the fixed line to mobile should be prefixed with '0' to enable the exploitation of spare capacity available in the sub-levels of existing SDCA codes. For making allocation of numbers more efficient, TRAI has recommended for the automation of the allocation process.

2.20 In response to the recommendations given by TRAI, a reference back dated 21st March 2012 was received with the comments of DoT on the recommendations. Some additional observations of DoT were also enclosed for reconsideration of TRAI. In the reference back, DoT in principle agreed to continue with the 10-digit numbering scheme. However, DoT asked TRAI to reconsider its recommendation for prefixing

'0' in all fixed to mobile intra-service area calls. Instead, DoT suggested that the basic service providers may be asked to vacate some of the levels ('5', '6' & '3') earmarked for basic services which are grossly unutilized. DoT also asked TRAI to reconsider its recommendation on integrated numbering scheme citing issues in carrying out changes in rural exchanges for a 10-digit dialing pattern for fixed line numbers. DoT also emphasized that barring the USA, no other major country is following integrated numbering scheme.

2.21 TRAI gave a careful consideration to the various comments as well as the additional observations of DoT, and gave its response vide letter dated 11th May 2012. TRAI was of the view that creating numbering resources through vacation of levels, as suggested by DoT, would be disruptive to the already struggling fixed line segment. It would create changes in large number of working telephone numbers, and create discontent among subscribers. The scheme suggested by DoT would only affect some of the service providers, and would, therefore, be discriminatory.

2.22 Despite the reconsidered view of TRAI, the prefixing of '0' for fixed to mobile intra-circle calls was not implemented. DoT started allocating numbering resources for mobile services in levels '7' and '8'. This was done by suffixing '0', '1', '8', & '9' to working SDCA codes in levels '7' and '8', and using spare codes in levels '7' and '8' (which are not allocated to any SDCA).

2.23 In the meantime, full mobile number portability was implemented w.e.f. 3rd July 2015. With this, it is possible to port mobile numbers from one licensed service area to another licensed service area. With the implementation of full mobile number portability, DoT has made it mandatory to allow dialing of intra-service area calls (basic to mobile, and mobile to mobile) without any prefix **(Annexure C)**.

2.24 After exhausting all the spare codes of levels '7'and '8', DoT has also started to withdraw the scarcely utilized MSC code numbering series allocated to the TSPs in different LSAs. These withdrawn levels are being re-allocated to other TSPs who have exhausted their earlier allocations. In the recent past, DoT has also allocated few sub-levels of '6' for mobile services. These sub-levels have been vacated by a wireline service provider.

2.25 As per the information received by TRAI from DoT through its communication dated 4th November 2019, a total of 1917.3 million numbering resources for mobile services has been allocated by DoT as per the following breakup:

| Sr. no. | Level | Numbering resources |
|---------|-------|---------------------|
| 1 | Level '9' | 834.5 million |
| 2 | Level '8' | 507.7 million |
| 3 | Level '7' | 470.4 million |
| 4 | Level '6' | 104.7 million |
| | **Total** | **1917.3 million** |

However, this excludes around 241.6 million numbers worth MSC codes, which have been surrendered and are lying spare with DoT as per the following details:

| Sr. no. | TSP | Numbering resources |
|---------|-----|---------------------|
| 1 | RCOM/RTL/SSTL(CDMA/GSM) | 83.6 million |
| 2 | BSNL (CDMA & GSM) | 16.6 million |
| 3 | TTSL(GSM & CDMA) | 141.4 million |
| | **Total** | **241.6 million** |

DoT has also informed that at present it is allocating MSC codes to TSPs who fulfill the VLR-based criterion of utilization; from these surrendered MSC codes.

2.26 DoT has also allocated a 13-digit numbering series for M2M services, which consists of 3-digit M2M identifier, 4-digit licensee identifier, and 6-digit device number. So, gradually all the M2M devices which were using the 10-digit numbering series are getting migrated to the new 13-digit

series. In July 2016, the DoT issued the 3-digit M2M identifier codes: 559, 575, 576, 579 and 597.

**Estimated requirement of Numbering Resources: Possible Solutions**

2.27 As per the UN's "World Population Prospects, 2019"[2] report, India is projected to become the most populous country by 2027 surpassing China, and will host 1.639 billion people by 2050. The population is supposed to peak at 1.6518 billion in the year 2059, and will gradually start declining thereafter.

2.28 Currently, we have about 1.2 billion telephone subscribers. These subscribers are with multiple telephone connections. The quality and reach of the networks are expected to improve due to technological developments, mergers, acquisitions and other type of consolidations. Due to the technological developments and other means of communication like the OTT, the multiplicity of telephone connections is also expected to decrease. We can observe a slight decline in the wireless connections in the last two years **(Table 2.1)**. However, it is likely that a large-scale increase in the requirement of numbers will be there for mobile network based devices catering to M2M and IoT applications. A 13-digit numbering series has already been earmarked for these applications.

2.29 As per the ITU Key ICT indicators report, 2019,[3] the mobile cellular subscription density per hundred inhabitants for developed countries is 128.9, and fixed telephone subscription density per hundred inhabitants is 35.6. In India the numbering resources allocated for fixed line are underutilized, but the main challenge is to ensure adequate resources for mobile services. Even if we assume a highly optimistic 200% mobile tele-

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[2] https://population.un.org/wpp/Download/Standard/Population/ and
https://www.un.org/development/desa/publications/world-population-prospects-2019-highlights.html
[3] https://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx

density in India; by 2050 the total number of mobile telephones working in this country is likely to be nearly [1.639*(200/100)] = 3.278 billion. Assuming 70% utilization of the numbering resources, (3.278/0.7) = 4.683 billion numbers will be enough to cater to the requirement of mobile telephones working in the country by 2050.

2.30 The Numbering Plan Administrator has allocated numbers from level '9' and free sub-levels of levels '7' and '8'. These three levels together would give around 2150 million numbers. The following options were explored during the consultation process to generate more numbering resources:

**(i)  Unified Numbering Plan**

2.31 The NDCP, 2018, refers to the unified numbering plan for fixed line and mobile services. Presently, India follows an SDCA-linked numbering scheme for fixed telephones in which the country is divided into 2645 SDCAs with unique SDCA codes. On the other hand, the mobile numbering series is not geographical. The Indian Telecom Network is divided into 22 Service Areas for the purpose of Licence. Although, the MSC code allocations are made LSA (Licensed Service Area) wise to the cellular mobile service providers there is no geographical link. Further, all India mobile number portability has also been introduced in the country.

2.32 The North American Numbering Plan (NANP) is an integrated telephone numbering plan serving 20 North American countries, including the USA, that share its resources. The International Telecommunications Union (ITU) assigned country code "1" to the NANP area. The NANP conforms with ITU Recommendation E.164, the international standard for telephone numbering plans. NANP numbers are 10-digit numbers consisting of a 3-digit Numbering Plan Area (NPA) code, commonly called an area code, followed by a 7-digit local number. The format is usually represented as:
   NXX-NXX-XXXX, where N is any digit from 2 through 9, and X is any digit from 0 through 9.

2.33 In order to implement a unified numbering plan in India, it will be necessary to have a re-look at the SDCA-based numbering. There are broadly two ways to migrate to an integrated numbering scheme, one would be to merge the SDCA code with the subscriber number and form a 10-digit number for fixed line, and the second would be to identify one or more unique codes for each service area and fill up the remaining digits to make a 10-digit number.

**(ii) Creating numbering resources by vacating fixed line levels**

2.34 The fixed line levels '3', '5', and '6', are grossly underutilized. The total number of basic telephone connections in level '2' is 12.260 million and that in level '4' is 4.315 million (as on 31th January 2020). By sparing the underutilized levels '3', '5', and '6', and moving them to a sub-level of '2' or '4', several million numbers can be used for mobile numbers.

**(iii) Mandating dialing prefix '0' for calling mobile numbers from fixed line**

2.35 Presently, inter-service area mobile calls from basic/fixed phone can be accessed with a dialing prefix '0'. However, mobile phones are accessed from a fixed line phone, within a service area, without dialing prefix '0'. This puts the limitation that any digit which has been used as a first digit for fixed network (for local calls) cannot be used for mobile numbers. By making it mandatory to access mobile numbers in a service area from fixed network by dialing prefix '0', all the free sub-levels in levels '2','3','4', and '6', can also be used for mobile numbers.

**(iv) Shifting Data only mobile numbers from 10-digit to 13-digit numbering**

2.36 Nowadays, some mobile connections are used purely for the Internet or mobile data (dongles) but 10-digit mobile numbers are allocated from the same series which is used for voice communication. DoT has already allocated 13-digit numbers for M2M communication. It is also possible to

shift these data only connections (SIMs[4] used for data cards, dongles and other devices used only for the Internet access) to 13-digit numbering series, since these devices are not used for making PSTN voice calls. It is also possible to provide private-numbering series for these numbers by the cellular mobile operators (which is internal to their network). This will release some of the numbering resources blocked by the operators.

**(v) Switching over from 10-digit to 11-digit scheme for mobile numbers**

2.37 Switching from 10 to 11 digits with first digit for mobile number as '9' would give a total capacity of 10 billion numbers. With the current policy of allotment after 70% utilization, this would suffice till India has 7 billion connections. This could mean liberal allocation to service providers and administrative ease.

**Introduction of the unified numbering scheme**

2.38 In the consultation paper dated 20th September 2019, the stakeholders were requested to provide their comments on the following issue with justification:

> *"Q1. Whether, the unified numbering scheme should be introduced in India? If yes, please provide the possible ways of implementing it with justification.*

2.39 Most of the TSPs were against the introduction of unified numbering scheme in India. As per their submissions, it requires enormous changes in the architecture and databases of fixed network, rearrangement of POI (Point of Interconnection) and changes in routing and billing systems. The large-scale changes in fixed line numbering scheme will have an adverse effect on the customers also, and will lead to widespread customer dissatisfaction. Some of the stakeholders have submitted that unified

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[4] Subscriber Identity Module or Subscriber Identification Module: an integrated circuit that securely stores the international mobile subscriber identity (IMSI)

numbering scheme should only be introduced if there is no alternative method to meet the future ascertained requirement of 4.68 billion numbers by 2050.

2.40 One of the stakeholders has commented that there is still a lot of scope for making more numbering resources available for mobile services, even within the existing 10-digit numbering framework. Hence, the proposal for implementation of unified numbering plan should be weighed against other available alternatives, in order to arrive at the best alternative that effectively and efficiently results in freeing up large and contiguous block of numbers for allocation to mobile services.

2.41 One of the stakeholders has submitted that the fixed line customers will be the worst sufferers of unified numbering scheme. As per the present numbering scheme, the wireline numbering has geographical significance. When a customer dials a distinctive landline number of any office or home, it is known that it will be answered from a particular geographical location. The fixed line telephone bill is an authentic document for address verification, and even for providing many government services to citizens. The existing facility of local dialing from fixed line to fixed line numbers within SDCA using 6 to 8 digits is comfortable to dial and easy to remember. So, any scheme which needs change in dialing habits of the customers and reconfiguration in fixed line switches is not desirable. Hence, TSPs may be asked to optimally utilize the existing numbering resources.

**Analysis**

2.42 The primary challenge here is the need to generate adequate numbering resources to cater to the emerging demand in the next 30 years. The Authority feels that opting for unified numbering scheme at this stage will be detrimental to the health of the struggling fixed line segment. Fixed line numbers are extensively used by enterprise customers, which includes

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major corporate houses, Government agencies, banks, financial institutions, etc. If unified numbering is implemented, it is going to adversely affect both the fixed line TSPs as well as the fixed line customers. The leading fixed line operators will have to make many configuration changes in their network architecture and switches involving a huge cost. Large-scale change in the fixed line numbers will also create widespread discontent among the subscribers.

2.43 Therefore, **the Authority is of the view that the migration to unified numbering scheme, which involves large-scale changes in the existing network, is not recommended at this stage. However, sufficient numbering resources can be made available for fixed line/ mobile services through alternative methods as recommended in the subsequent paras.**

2.44 During the consultation process, the stakeholders were requested to give their views on alternative options (other than the unified numbering scheme) for generating numbering resources. The following question was raised for consultation:

> *"Q2. If the answer to the preceding question is in the negative, which of the following options can be tried out? Please provide details and justification considering the advantages and disadvantages.*
>
> *(i)   Vacating the sparingly used fixed line levels '3','5', and '6', for allocation for mobile services*
>
> *(ii)  Accessing intra-service area as well as inter-service area mobile from fixed line by dialing prefix '0'; for generating more numbering resources for mobile services*
>
> *(iii) Shifting Data only mobile numbers from 10 digit to 13 digit numbering*

*(iv) Moving on to 11 digit numbering scheme for mobile and continuing with 10 digit numbering for fixed line services*

*(v) A combination of some of the above*

*(vi) Any other option"*

2.45 Some of the stakeholders have suggested dialing all fixed line numbers (local as well as national) with the prefix '0'+SDCA code from fixed line as well as the mobile numbers. They have also suggested dialing of all mobile numbers (intra-LSA as well as inter-LSA) without the prefix '0' from fixed line as well as mobile numbers. The stakeholders have also suggested that for incoming international calls terminating in fixed line, the SDCA code should be prefixed with '0'. For example, this means that the international format of a Delhi fixed line number +91 11 XXXXXXXX will become +91 011 XXXXXXXX. This in turn implies that the number of digits for fixed line is increased to 11 by increasing a digit '0' in the NDC. One of the stakeholders has also submitted that if the aforesaid option is not found feasible by the Authority, they would like to suggest the option of accessing intra-service area as well as inter-service area mobile numbers from fixed line numbers by dialing the prefix '0' (with no changes in the existing dialing pattern from fixed to fixed , mobile to fixed, and mobile to mobile).

2.46 One of the stakeholders suggested a unique way of implementing a numbering scheme for generating maximum numbers. They have suggested the following:

a) all the mobile numbers should remain unchanged.

b) Private operators offering fixed line services should be required to subsume their fixed line numbers under allocated mobile levels.

c) Strip off the number '2' which is currently the prefix for all BSNL fixed line numbers. Use this digit to prefix the current STD code. This will convert all 2,645 SDCAs into a single level 10-digit numbering plan.

d) Level '0', '1', and '5', will be kept reserved and continue to be allocated for long distance, special services and short codes, respectively.

e) No more separate level allocation for fixed numbers, and these need to be allocated from the allocated set of numbers to service providers. The operators may be permitted to keep a sub-level reserved for fixed line numbers.

f) Theoretically, 6 billion 10-digit number will be available (levels '3', '4', '6', '7', '8' and '9')

The most significant impact of this scheme will be a change of all the fixed line numbers in the country while keeping the mobile numbers unchanged.

2.47 While responding to the proposal in the previous paragraph, one of the stakeholders in its counter-comments has submitted that the aforesaid proposal will have an adverse impact on the customer bases of all the existing fixed line TSPs. The stakeholder has strongly opposed the proposal and requested the Authority to continue with the existing SDCA-based numbering scheme for fixed line.

2.48 A few stakeholders have suggested 11-digit numbers both for fixed line and mobile numbers. However, most of the TSPs have opposed 11-digit numbering for mobile numbers. One of them has submitted that 11-digit numbering scheme would incur massive configuration modifications across all telephony domains inclusive of software and hardware, storage, etc. involving additional cost for the TSPs. This will also entail confusion and inconvenience to the customers and will also impact routing by international operators.

2.49 A few stakeholders have suggested vacating the sparingly used fixed line levels ('3', '5', & '6') and allocating them for mobile numbers. However, some other stakeholders have submitted that selectively vacating a few

fixed line levels will be discriminatory and will also be against the interest of fixed line customers. They have submitted that fixed line numbers are extensively used by major corporate houses, banks, financial institutions, etc. and change in numbers will disturb their national and international reachability creating a widespread discontent.

2.50 Most of the stakeholders have not recommended for the shifting of 'data only' mobile numbers from 10 to 13 digits. However, one of the stakeholders has pointed out that one of the wireless operators has closed down its mobile voice service but it continues to provide data services and SMS. Such numbers can easily be shifted to 13-digit numbering while freeing up the numbering resources. Some of the stakeholders have submitted that shifting of 'data only' numbers will not release any significant amount of numbers. Moreover, customers normally try to retain the same MSISDN numbers while switching from 'data only' usage to 'voice plus data' usage. One of the stakeholders has also suggested that the 13-digit numbering should be kept exclusively for M2M communications.

**Analysis**

2.51 The Authority is of the view that vacating sparingly used fixed line levels ('3', '5' & '6'), and allocating them for mobile numbers will lead to a large-scale change of fixed line numbers, and will be disruptive for the fixed line segment. This type of arrangement will be discriminatory for some fixed line operators. This will also create large-scale customer dissatisfaction. Moreover, this arrangement will be able to generate numbering resources for a few years only. However, some sparingly used fixed line sub-levels in level '3' and level '6' have been withdrawn by DoT in the recent past. This exercise may be continued further. The Authority is of the view that sparingly used sub-levels in levels '2', '3', '4', '5', and '6', may be withdrawn after seeking sub-level wise utilization from the TSPs providing fixed line services. Some levels/sub-levels allocated for fixed line service may not be

in use. Levels/sub-levels allocated to some fixed line TSPs who have not launched services even after one year of allocation, may also be withdrawn after seeking justification. These withdrawn levels should be reserved for future allocations for fixed line service providers.

2.52 The Authority is also of the view that it may not be feasible to shift 'data only' connections (SIMs used for data cards, dongles and other devices used only for Internet access) to 13-digit numbering series. Some of these subscribers may like to retain the same MSISDN number while switching frequently from 'data only' usage to 'data plus voice' usage and vice-versa. Moreover, the number of such SIMs which are used only for Internet access may be insignificant to generate additional numbering resources. However, the Authority is of the view that all the SIM-based M2M connections using 10-digit mobile numbering series should be shifted to the 13-digit numbering series allocated by DoT for M2M communication.

2.53 The Authority is of the opinion that some serious problems are anticipated with change in the mobile number from 10 digits to 11 digits. This would require widespread modifications in the configuration of switches involving cost. This would also cause inconvenience to the customers in the form of dialing extra digit and updating phone memory. This could lead to more dialing errors, infructuous traffic, and loss of revenue to the TSPs. Telephone numbers are also associated with the digital identity of individuals, and, hence, changes will be required in the databases of all services requiring telephone numbers for identity like financial banking services, e-commerce, and government welfare schemes. So, lot of software changes and upgradations will have to be resorted to in different sectors of the economy and may have widespread economic and security implications. There will be a disruptive impact on the digital economy in which telephone number plays a very important role. Hence, the Authority is of the view that migration from 10 digits to 11 digits may be resorted to,

only if all the efforts to continue with the 10-digit numbering are exhausted.

2.54 One of the stakeholders has suggested a unique way of implementing a scheme which entails change in all fixed line numbers in the country (Para 2.46). The idea suggested is not tenable as it is too disruptive and detrimental to the fixed line TSPs as well as fixed line customers. Some stakeholders have also tried to link SDCA-based numbering with SDCA-based POI for fixed line networks. Although the level of Point of Interconnection (POI) is not the subject under consideration in this consultation process, the Authority is of the view that it is always possible to change the level of interconnection while keeping SDCA-based fixed line numbering scheme intact.

2.55 As per the information received from DoT on 4th November 2019, around 241.6 million numbers worth MSC codes which have been surrendered by TSPs are lying spare with DoT. The Authority is of the view that, initially, the mobile numbering resources surrendered by TSPs who have closed down their wireless operations, may be reallocated to those TSPs who need more numbering resources.

2.56 The Authority is of the view that the emerging requirements of the mobile segment can be met by some small changes in the dialing pattern. Considering the fact, that there has been a slightly negative growth of subscribers in the wireless segment in the last two years, it can be inferred that the requirement of numbering resources may not be very high. We have already assumed a very optimistic scenario of 200% mobile tele-density leading to a requirement of a total of 4.683 billion by 2050. It is also worthwhile to mention here that most of the growth is expected to be in the M2M segment for which a 13-digit numbering series has already been allocated by DoT.

2.57 The Authority is of the view that for generating additional numbering resources without opting for unified numbering scheme; the following options involving changes in dialing plan are worth consideration and comparison:

(i) Dialing all fixed line numbers (local as well as national) with prefix '0'+SDCA code from fixed line as well as mobile numbers. Dialing of all mobile numbers (intra-LSA as well as inter-LSA) without the prefix '0' from fixed line as well as mobile numbers.

(ii) Dialing intra-service area as well as inter-service area mobile numbers from fixed line with the prefix '0'

2.58 Most of the stakeholders who have suggested the first scheme have also suggested that for incoming international calls to fixed line numbers, the SDCA code should be prefixed with '0'. This scheme will generate 7 billion numbers for mobile services. However, this scheme leads to the increase in the number of digits for fixed line to 11 by increasing a digit '0' in the NDC, while keeping the 10-digit mobile numbers intact. (For example, the international format of a Delhi fixed line number +91 11 XXXXXXXX will become +91 011 XXXXXXXX). This also implies that 11 digits (prefix '0' plus present SDCA code) are to be dialed for local (intra SDCA) fixed to fixed calls. This will also entail routing changes to be done by international operators for international incoming calls terminating in fixed line numbers.

2.59 However, in the second scheme prefix '0' will be added only for intra circle as well as inter-circle, fixed to mobile calls. There will be no change in dialing pattern for incoming international calls. There will be no change in dialing pattern of local fixed to fixed calls, which can be dialed without SDCA prefix (only subscriber number of 6, 7, or 8, digits for SDCA code of 4,3, and 2 digits, respectively). By simply changing the dialing pattern for mobile numbers from fixed phones, we will be able to utilize the levels '2',

'3', '4', and '6', excluding the SDCA codes for mobile numbers. Even in case of SDCA codes starting with '2', '3', '4', and '6', the SDCA code with suffix '0', '1', '8', and '9', can be used for allocation of MSC codes for mobile services. This scheme will generate nearly 2.544 billion numbering resources for mobile services as per the following details. The detailed calculations with explanation are given in **Annexure D**.

**Table 2.3: Mobile Number Resources Using Levels '2', '3', '4', and '6'**

| Level | From Spare codes | From SDCA codes | Total |
|-------|------------------|-----------------|--------|
| Level 2 | 157 M | 337.2 M | 494.2 M |
| Level 3 | 513 M | 194.8 M | 707.8 M |
| Level 4 | 317 M | 273.2 M | 590.2 M |
| Level 6 | 593 M | 158.8 M | 751.8 M |
| **Total** | **1580 M** | **964 M** | **2544 M** |

where M=million

2.60 The Authority is of the view that the second scheme is less disruptive for the fixed line segment. If all the fixed to mobile calls (intra-circle as well as inter-circle) are dialed with the prefix '0', then levels '2', '3', '4', and '6', can be used for mobile numbers also. It would require all fixed line customers to have '0' dialing facility. No subscriber numbers are affected nor are any SDCA codes changed. Implementing this scheme should not be a difficult proposition as the subscribers already need to use '0' for calling adjacent SDCAs. The fact that no subscriber numbers or SDCA codes are changed is quite appealing. The minimal nature of the impact of this scheme can be seen in Table 2.4:

<p style="text-align:center"><strong>Table 2.4: Recommended Dialing Scheme</strong></p>

| From | To | Existing dialing | Recommended |
|---|---|---|---|
| **Fixed Line** | Intra-SDCA Fixed | Subscriber Number | No Change |
| | Intra-Service Area Mobile | NSN (10 digit mobile number) | **Prefix '0' i.e. '0'+NSN** |
| | Inter-SDCA Fixed | '0'+Area Code+ SN | No Change |
| | Inter-Service Area Mobile | '0'+NSN or NSN | **'0'+NSN** |
| **Mobile** | Intra-Service Area Fixed | '0'+Area Code+ SN | No Change |
| | Intra-Service Area Mobile | NSN or '0'+NSN | No Change |
| | Inter-Service Area Fixed | '0'+Area Code+ SN | No Change |
| | Inter-Service Area Mobile | '0'+NSN or NSN | No Change |

Note: For calls originating from Mobile prefix '0' can be replaced with '+91' also

2.61 TRAI has earlier also recommended for prefixing '0' for dialing all mobile numbers from fixed line vide its recommendation dated 20th August 2010. However, in its reference backdated 21st March 2012, DoT has said that rural subscribers will have to be provided with a dynamic lock facility in order to access intra-service area mobile calls, and, hence, this could not be implemented. DoT has also said that all the subscribers are not aware enough to use dynamic STD locks and will face problems in dialing fixed to mobile intra-service area calls with the mandatory prefixing of '0'.

2.62 Normally, landline phones are provided with dynamic locks for preventing unauthorized usage. One can lock his/her telephone electronically by using a secret code. It is possible to lock/allow Local, STD or ISD calls in many ways viz. all calls allowed, only local calls allowed, only STD & Local calls allowed, all outgoing calls barred, etc. Earlier, it was not possible to provide these dynamic locks in small exchanges in rural areas due to capacity constraints, but now there is no such constraint since all the operators have upgraded their networks. The general awareness of both rural and urban subscribers about the use of dynamic lock facility has

increased over the years. Further, the dynamic locks were crucial when the price difference between a local and STD call was significant, and, hence, the potential chances of unauthorized use was high. But, presently, when the price difference between the STD and the local call is either nil or negligible, the same code may be used together for locking/allowing local as well as STD calls. The separate code for allowing/blocking ISD calls may continue as earlier. It is also technically possible in the new fixed line switches to program the STD dynamic lock for STD/ISD barring, in such a way that the inter-SDCA fixed line calls may be barred and all the mobile calls (intra-circle as well as inter-circle) with the access code '0' may be allowed.

2.63 The Authority is also of the view that in order to change the customer behavior, it is important to give some time to the fixed line TSPs for implementing the change in the dialing pattern. A total time of one month may be given to all the TSPs to implement this scheme. Suitable announcement may be fed in the fixed line switches to apprise the subscribers about the requirement of dialing prefix '0' for all fixed to mobile calls. This announcement should be played whenever a fixed line subscriber dials a mobile number without prefixing '0'. All the fixed line subscribers should be provided with '0' dialing facility.

2.64 The Authority is of the view that after exhausting all the surrendered numbering resources, the existing SDCA codes starting with '6', '3', '4', and '2', may be used for mobile services by suffixing with '0', '1', '8', and '9'. Initially, existing SDCA code of level '6' may be used followed by levels '3','4', and '2', successively. After exhausting all the numbering resources using the existing SDCA codes, the spare codes listed in the NNP 2003 may be used for mobile services. Initially, spare code of level '6' may be used followed by levels '3','4', and '2', successively.

2.65 In view of the above, **the Authority recommends that:**

    a. **Sparingly used sub-levels in levels '2', '3', '4', '5', and '6', may be withdrawn after seeking sub-level wise utilization from the TSPs providing fixed line services.**

    b. **Levels/sub-levels allocated to some fixed line TSPs who have not launched their services even after one year of allocation, may also be withdrawn after seeking justification.**

    c. **These withdrawn levels should be reserved for future allocations for fixed line service providers.**

2.66 **The Authority recommends that, all the SIM-based M2M connections using 10-digit mobile numbering series should be shifted to the 13-digit numbering series allocated by DoT for M2M communication; at the earliest.**

2.67 **The Authority recommends that the mobile numbering resources surrendered by TSPs who have closed down their wireless operations, may be re-allocated to those TSPs who need more numbering resources.**

2.68 **The Authority recommends that the following scheme should be adapted for creation of sufficient numbering space:**

    a. **Dial all fixed to mobile calls with the prefix '0'**

    b. **No change in dialing plan for fixed to fixed, mobile to fixed, and mobile to mobile calls.**

    c. **A total time of one month may be given to all the TSPs to implement this scheme.**

    d. **Suitable announcement may be fed in the fixed line switches to apprise the fixed line subscribers about the requirement of dialing the prefix '0' for all fixed to mobile calls. This announcement should be played whenever, a subscriber dials a fixed to mobile call without prefixing '0'.**

**e. All the fixed line subscribers should be provided with '0' dialing facility.**

2.69 **The Authority recommends that:**

a. **after exhausting all the surrendered numbering resources, the existing SDCA codes starting with '6', '3', '4', and '2', may be used for mobile services by suffixing with '0', '1', '8', and '9'. Initially, existing SDCA codes of level '6' may be used followed by levels '3', '4', and '2', successively.**

b. **after exhausting all the numbering resources using the earlier steps, the spare codes listed in the NNP 2003 may be used for mobile services. Initially, spare codes of level '6' may be used followed by levels '3', '4', and '2', successively.**

# CHAPTER 3
# ALLOCATION OF NUMBERS

**Present Allocation criteria for numbers**

3.1 The numbering system for basic services is linked with SDCA. The service providers have been given pre-defined levels that decide the amount of numbering resources they have. The levels '2' and '4' and various sub-levels of '3', '5','6', and '7', are being used for fixed line numbers. The present distribution of different fixed line levels and working connections in each level is given in the previous chapter. The service providers are also allowed to use these allocated numbers in more than one LSA (licensed service area). Additional numbers are allocated to requesting service providers after they demonstrate 80% utilization of already allocated numbers. Recently, two-/three-digit sub-levels have been allocated to the latest entrants in the basic wireline services.

3.2 Level '9' and some sub-levels of '7'and '8' have been allocated for mobile services. Few sub-levels of '6' which have been vacated by the fixed line service providers have also been allocated for mobile services. As per the existing criteria followed by the Numbering Plan Administrator, mobile service providers are initially allocated 1 million numbers in a service area and additional numbers are allocated as and when requested by the service providers, after demonstrating some specified level of utilization.

3.3 Earlier, DoT used to allocate numbering resources for mobile services as per the HLR (Home location register) subscriber figures. It was observed that there is a significant difference between the HLR figures and VLR (Visitor Location Register) figures of the mobile subscriber base. It is because the TSPs normally keep permanently inactive customers in HLR for a long time, and effective re-cycling of these numbers is not being done. Hence, DoT felt that in order to exercise better control of the scarce numbering resource, the allocation of MSC codes based on VLR figures is

better than the practice of allocation of new MSC codes based on HLR figures.

3.4   At present the allocation of MSC codes numbering series to TSPs is done following a VLR-based criterion defined vide DoT Letter dated 8th November 2017 **(Annexure E)**.  The salient features are reproduced below:

(a) Both attached and detached VLR figures are to be considered (added) to calculate the total VLR figure.

(b) In case of intra-circle roaming agreements, intra-circle in-roamers should be deducted whereas the intra-circle out-roamers shall be added to arrive at net VLR figures.

(c) Inter-circle in-roamers (of any operator) will be deducted and inter-circle out-roamers will be added.

(d) The VLR figures may be taken as average of 7 days VLR count.

(e) Inclusion of Port-In numbers and exclusion of Port-Out numbers from the total MSC code series allotted till date to the respective TSP.

(f) MSC codes are issued if the VLR figure reached the count taking para (a) to (e) into account as detailed below:

| S. No. | Numbers Allocated (N) | VLR Figure (V) as %age of Number Allocated (V/N) |
|---|---|---|
| 1. | Less than 3 Million | Subject to minimum of 40% |
| 2. | 3 Million to less than 6 Million | Subject to minimum of 45% |
| 3 | 6 Million to less than 8 Million | Subject to minimum of 50% |
| 4 | 8 Million | Subject to minimum of 55% |
| 5 | 9 Million | Subject to minimum of 60% |
| 6. | 10 Million to less than 15 Million | Subject to minimum of 63% |
| 7. | 15 Million to less than 20 Million | Subject to minimum of 66% |
| 8. | 20 Million to less than 25 Million | Subject to minimum of 68% |
| 9. | 25 Million and above | Subject to minimum of 70% |
| N= Number allocated V= VLR figure | | |

3.5   Recently, DoT has also started withdrawing scarcely utilized/unutilized MSC code numbering series allocated to the TSPs in different LSAs. These withdrawn MSC codes are being re-allocated to the TSPs whose subscriber base is increasing. TSPs are instructed to use the newly allocated series,

however, with the exception for the numbers already assigned to active subscribers and ported out subscribers out of that series.

3.6 During the consultation process the stakeholders were asked to provide their views on the following issues with justification:

*"Q3. Do the present criteria of utilization for allocation of numbers ensure efficient utilization of the numbering resources or would you suggest some other criteria?*

*Q4. Do you feel that sparingly used MSC codes may be withdrawn and reallocated to another TSP whose subscriber base is growing?"*

3.7 Most of the stakeholders were of the view that the present allocation criterion is efficient and stringent. They have suggested that this may be continued without any change. However, one of the stakeholders has submitted that the current VLR-based criteria for allocation of mobile numbering resources is not optimum. This criterion is heavily loaded against the fast-growing providers and should be revised with immediate effect. They have also submitted that the process for applying for new MSC code is very lengthy, and the DoT field units do not follow a uniform procedure for verification. Besides, the allocation of one million numbers in a service area is too small. Hence, the current number allocation process is not consummate with requirements of a healthy proliferation rate of services and needs to be revised. The current recycling period for 90 days impose a further load on the operator's numbering resources. The allocation should be based on the active users only and there should be flexibility in use of the numbering series.

3.8 Some of the stakeholders have suggested that the previous allocations of mobile numbering resources which are not in use should be taken back and can be re-allocated to another TSP. The existing customers residing in these numbering series can be ported before such re-allocation. However, some of the stakeholders have suggested that MSC codes with

utilization less than 10% may be considered for withdrawal subject to condition that sufficient numbering series is available to the operator for its future expansion needs. However, some of the stakeholders have opposed the withdrawal of MSC codes. They have submitted that keeping in mind the business requirements of corporate customers, series might be underutilized but needs to be reserved. One of the stakeholders has submitted that the current subscriber growth rate of TSP whose MSC codes are being withdrawn needed to be taken into account before deciding the withdrawal and reallocation.

**Analysis**

3.9 The Authority is of the view that the present allocation criteria is fair, stringent and justified. However, in the recent past; as some mergers and acquisitions have taken place in the telecom sector, it is possible that some of these merged entities might be having an excess of numbering resources. In such a case, it is also possible to take back some of the numbering resources if it is not getting used. The Authority is of the view that if some of the MSC codes allocated are being used with less than 10 percent utilization even after 2 years of allocation, the same may be re-allocated to another TSP who needs it. The existing working connections in the re-allocated MSC code may be ported out.

3.10 In view of the above, **the Authority recommends that the present criterion of utilization for allocation of the numbering resources should be continued.**

3.11 **The Authority recommends that sparingly used MSC codes (less than 10 percent utilization after 2 years of allocation) may be withdrawn and reallocated to another TSP whose subscriber base is growing. The working connections may be ported out.**

**Annual Numbering Return**

3.12   It is important to devise mechanisms to have a good monitoring system for the effective utilization of numbering resources. One possibility is that all service providers making use of the numbering resources may be required to submit a detailed "Annual Return on Numbering Resource Utilization" to the Numbering Plan Administrator every year. The Numbering Plan Administrator may carry out the numbering audit of usage of numbers by service providers based on these returns.

3.13   During the consultation process the stakeholders were asked to give their views on the requirement to file an "Annual Return on Numbering Resource Utilization" to the numbering plan administrator for monitoring and ensuring efficient utilization of numbers.

3.14   Some of the stakeholders have submitted that there is no need to file annual returns because the information is already sought while applying for additional numbering resources. One of the stakeholders has submitted that operators are aware of the value of numbering resources and, hence, should be left to operators to use the resource wisely. However, some of the stakeholders have submitted that annual filing is necessary to gauge the utilization of numbering resources.

**Analysis**

3.15   The Authority is aware of the fact that the utilization details of all the allocated numbering resources is submitted every time a new demand is raised. However, the customer base of some of the TSPs may be declining, and they may not be submitting any details since they do not need additional numbering resources. However, it is necessary for the Numbering Plan Administrator to know about the numbering resource utilization of all the TSPs. Hence, the Authority is of the view that Annual Return on utilization of numbering resources should be submitted to the Numbering Plan Administrator by all the TSPs, both for mobile  as well as

fixed line numbering series. The format used for filing this return may be similar to the details presently given by the service providers for allocation of fresh block of numbers. In addition to annual submission, this return should be submitted every time the service providers make a request for fresh block of numbers.

3.16 In view of the above, **the Authority recommends that the Annual Return on utilization of the numbering resources should be submitted to the Numbering Plan Administrator by all the TSPs, both for mobile as well as fixed line numbering series. The format used for filing this return may be similar to the details presently given by the service providers for allocation of fresh block of numbers. In addition to annual submission, this return should be submitted every time the service providers make a request for fresh block of numbers.**

**Pricing of numbers:**

3.17 At present, the service providers do not pay for the numbering resources allocated to them. It has been observed from some websites and newspaper reports that most of the service providers charge their subscribers for allocating preferred numbers or 'vanity numbers'. Some service providers even resort to auction the numbers for a higher revenue.

3.18 It has been observed that most regulators in Europe put a modest charge on the numbers. It is often felt that charging for the numbers allocated to operators may be used as a tool to encourage efficient use of numbering resources and would also be in line with the practices followed internationally for charging of the numbers.

3.19 The stakeholders were asked to give their views on pricing of the numbering resources. Most of the stakeholders, which include all the major TSPs did not agree with the proposal of pricing of numbering resources. However, a few stakeholders have suggested that a modest

charge may be levied on the TSPs for allocation of numbering resources.

3.20 Some of the stakeholders have submitted that the Indian TSPs are already offering the lowest tariffs to the subscribers, and their ARPU (Average Revenue Per Unit) is also among the lowest in the world. The service providers are already burdened with high levels of levies and duties. In this scenario, any additional charge on TSPs for allocating numbers would act as an additional burden on the operators. This would act as an impediment to the growth and spread of telecom services in the country.

**Analysis**

3.21 The Authority is of the view that after following a stringent criterion for allocation of numbering resources, introducing pricing of numbers at this stage is not advisable.

**Automated Allocation of numbering resources**

3.22 TRAI in its recommendations on "Efficient Utilization of Numbering Resources", 2010, has recommended for automated allocation of numbering resources. This recommendation was accepted by DoT but still the entire process of allocation of numbers is manual and no automation has been done.

*3.23* During the consultation process the stakeholders were asked to give their views on the following issue related to automated allocation of numbering resources:

> *"Q7    Do you feel that an automated allocation of numbering resources using number management system software is necessary to speed up the process of allocation and collecting returns in an efficient and transparent manner? Do you feel that this work may be assigned to an independent body by the licensor? Please provide details."*

3.24 Most of the stakeholders have suggested that automated allocation of

numbering resources is necessary to speed up the process. They have submitted that it will improve the timelines in allocating the numbers; thereby, improving the ease of doing business. Some of them have suggested that the work may be assigned to an independent body. On the other hand, some other stakeholders have suggested that the same may be done by the Numbering Plan Administrator i.e. DoT. These stakeholders have submitted that an additional independent body will be a burden to the exchequer and should be avoided. One of the stakeholders has suggested that the present system is robust and effective and there is no need for automation.

**Analysis**

3.25 The Authority is of the view that the information on availability of resources, data from the returns filed, and the rules for allocation, could be built into an application, which could dispense free block of numbers according to the present rules. This application software can be integrated with the MNP database and also with the numbering allocation database of the telecom service providers.

3.26 Presently, number management systems are being used in most of the developed countries by the numbering plan administrators. The number management system acts as a bridge between the numbering plan administrators and the telecom service providers, and increases the overall transparency and efficiency of the number allocation process as well as its utilization. The number management system is also able to give details of the utilization of the allocated numbering resources. Some of the TSPs complain that there is a significant delay in opening new routes for the allocated numbering resources in all the networks. This issue can also be solved if a consolidated dynamic database is maintained by the Numbering Resource Administrator in the number management system, which is open and accessible to all the stakeholders. The Authority is of the view that an automated allocation of numbering resources using

number management system software may be introduced to speed up the process of allocation in an efficient and transparent manner. If needed, this work may be outsourced with overall control and supervision of the DoT.

3.27 In view of the above, **the Authority recommends that an automated allocation of numbering resources using number management system software may be introduced to speed up the process of allocation in an efficient and transparent manner. If needed, this work may be outsourced with overall control and supervision of the DoT.**

**Revision of numbering plan and consolidation of short codes**

3.28 The National Numbering Plan, 2003, has been amended several times since its inception and some major changes have also been made. It is difficult to formulate a single document, which incorporates all the changes. In some cases, the basic structure has also been altered.

3.29 The allocation of short codes for emergency services, travel-related information and for other non-commercial use for general public is done by DoT. The charging for these numbers is either toll free or metered. The allocation letters are issued by DoT for each short code, but no consolidated list is available on the DoT website.

3.30 During the consultation, the stakeholders were requested to give their views on the revision of National Numbering Plan and consolidated list of short codes. They were asked comments on the following issue:

*"Q8. Do you agree that a revised and new National Numbering Plan and a consolidated list of short code allocations should be issued? If so, what should be the periodicity?"*

3.31 Most of the stakeholders have submitted that many amendments have been made in the NNP since its inception, and, hence, a revised and new National Numbering Plan may be issued. Some stakeholders have

suggested that new and revised NNP should be enacted with the periodicity of two years. One of the stakeholders suggested that a consolidated addendum to the NNP may be issued every three years, and NNP may be revised every ten years. Another stakeholder has suggested a consolidated addendum to the NNP in every five years after issuing a revised NNP. However, one of the stakeholders suggested that unless and until any drastic change in existing NNP has been proposed, there is no requirement for a revised and new NNP.

3.32 Some of the stakeholders have suggested that a consolidated list of short codes should be issued on a yearly basis. Since short code allocation and configuration in the network is a continuous process, there is a need for a corrected and validated list of all short codes issued by the numbering plan administrator at periodic intervals. One of the stakeholders also suggested that the codes which have already been allocated but are not being used, should be withdrawn, and allocated to other organizations.

**Analysis**

3.33 The Authority is aware of the fact, that the NNP 2003 has undergone too many changes and amendments in the last 17 years. It is needless to say that it is an important national policy document, which should be regularly updated to keep up with the changes. In such a situation it is desirable to have a revised and new National Numbering Plan. The Authority is also of the view that regular consolidated addendum should also be issued every year, which should include all newly allocated numbering resources for fixed line as well as mobile services.

3.34 Several organizations who have been allocated short codes, struggle to get it opened in all the TSPs networks. Sometimes, the organizations/entities who have been allocated these short codes do not use it afterwards. These codes should be vacated and reallocated to another organization. A dynamic database of all the short codes should be maintained by the

number administrator and monitored for implementation. The Authority is of the view that a consolidated list of short codes should be issued at the earliest. This list should be updated on a yearly basis after incorporating all the withdrawals and new allocations.

3.35 In view of the above, **the Authority recommends that:**

   a. **a revised and new National Numbering Plan (NNP) should be issued at the earliest.**

   b. **a consolidated addendum to the NNP should be issued every year, which should include all newly allocated numbering resources for fixed line as well as mobile services.**

   c. **a consolidated list of short codes should be issued at the earliest. The short code allocations which are not in use should be withdrawn.**

   d. **the consolidated list of short codes should be updated every year incorporating all withdrawals and new allocations.**

3.36 The stakeholders were also asked to comment on any other related issue. One of the stakeholders has suggested that the SDCA-based point of interconnection for fixed line may be dismantled, and fixed number portability should be unleased after implementing unified numbering. One of the stakeholders has suggested that the process of phone number re-cycling should be clearly re-defined to overcome issues raised due to allotment of used numbers for new connections. They have raised an issue that new customers (who had new connections with re-cycled numbers) are suffering from un-wanted communication of previous users of that mobile number.

3.1 The Authority is of the view that these issues are not directly related to the issues which have been raised in this consultation process and will be taken up at an appropriate time in the future.

# CHAPTER 4

## SUMMARY OF RECOMMENDATIONS

1.  **The Authority is of the view that the migration to unified numbering scheme, which involves large-scale changes in the existing network, is not recommended at this stage. However, sufficient numbering resources can be made available for fixed line/ mobile services through alternative methods as recommended in the subsequent paras.**

2.  **The Authority recommends that:**
    a. **Sparingly used sub-levels in level '2', '3', '4', '5', and '6', may be withdrawn after seeking sub-level wise utilization from the TSPs providing fixed line services.**
    b. **Levels/ sub-levels allocated to some fixed line TSPs who have not launched their services even after one year of allocation, may also be withdrawn after seeking justification.**
    c. **These withdrawn levels should be reserved for future allocations for fixed line service providers.**

3.  **The Authority recommends that all the SIM-based M2M connections using 10-digit mobile numbering series should be shifted to the 13-digit numbering series allocated by DoT for M2M communication; at the earliest.**

4.  **The Authority recommends that the mobile numbering resources surrendered by TSPs who have closed down their wireless operations, may be re-allocated to those TSPs who need more numbering resources.**

5.  **The Authority recommends that the following scheme should be adapted for creation of sufficient numbering space:**
    a. **Dial all fixed to mobile calls with the prefix '0'.**
    b. **No change in dialing plan for fixed to fixed, mobile to fixed, and mobile to mobile calls.**

c. A total time of one month may be given to all the TSPs to implement this scheme.

d. Suitable announcement may be fed in the fixed line switches to apprise the fixed line subscribers about the requirement of dialing the prefix '0' for all fixed to mobile calls. This announcement should be played whenever a subscriber dials a fixed to mobile call without prefixing '0'.

e. All the fixed line subscribers should be provided with '0' dialing facility.

6. The Authority recommends that:

   a. after exhausting all the surrendered numbering resources, the existing SDCA codes starting with '6', '3', '4', and '2', may be used for mobile services by suffixing with '0', '1', '8', and '9'. Initially, existing SDCA codes of level '6' may be used followed by levels '3', '4', and '2', successively.

   b. after exhausting all the numbering resources using the earlier steps, the spare codes listed in the NNP 2003 may be used for mobile services. Initially, spare codes of level '6' may be used followed by levels '3', '4', and '2', successively.

7. The Authority recommends that the present criterion of utilization for allocation of the numbering resources should be continued.

8. The Authority recommends that sparingly used MSC codes (less than 10 percent utilization after 2 years of allocation) may be withdrawn and reallocated to another TSP whose subscriber base is growing. The working connections may be ported out.

9. The Authority recommends that the Annual Return on utilization of the numbering resources should be submitted to the Numbering Plan Administrator by all the TSPs, both for mobile as well as fixed line numbering series. The format used for filing this return may be similar to the details presently given by the service providers for allocation of

fresh block of numbers. In addition to annual submission, this return should be submitted every time the service providers make a request for fresh block of numbers.

10. The Authority recommends that an automated allocation of numbering resources using number management system software may be introduced to speed up the process of allocation in an efficient and transparent manner. If needed, this work may be outsourced with overall control and supervision of the DoT.

11. The Authority recommends that:

    a. a revised and new National Numbering Plan (NNP) should be issued at the earliest.

    b. a consolidated addendum to the NNP should be issued every year, which should include all newly allocated numbering resources for fixed line as well as mobile services.

    c. a consolidated list of short codes should be issued at the earliest. The short code allocations which are not in use should be withdrawn.

    d. the consolidated list of short codes should be updated every year incorporating all withdrawals and new allocations.

**DoT Reference Dated 8th May 2019**

Government of India

Ministry of Communications

Department of Telecommunications

Access Services Wing

Sanchar Bhavan, 20, Ashoka Road, New Delhi-110001

No: 20-281/2010-AS-I Vol. XII (pt.)                     Date:08.05.2019

To,

The Secretary,

Telecom Regulatory Authority of India,

Mahanagar Doorsanchar Bhawan,

Jawaharlal Nehru Marg, Old Minto Road,

New Delhi-110002

**Subject: Seeking recommendations of TRAI on strategies of National Digital Communications Policy, 2018 - reg.**

The National Digital Communications Policy, 2018 (hereinafter, referred to as, the NDCP, 2018) of the Government of India envisages, *inter-alia*, the following strategies under its 'Connect India' and 'Propel India' missions:

"

*1. Connect India: Creating a Robust Digital Communications Infrastructure*

...

*Strategies:*

*1.1    Establishing a 'National Broadband Mission — Rashtriya Broadband Abhiyan' to secure universal broadband access*

...

*(j)     By Encouraging innovative approaches to infrastructure creation and access including through resale and Virtual Network Operators (VNO)*

*2. Propel India: Enabling Next Generation Technologies and Services through Investments, Innovation, Indigenous Manufacturing and IPR Generation*

*...*

*Strategies:*

*...*

*2.1    Catalysing Investments for Digital Communications sector:*

*...*

*(b)    Reforming the licensing and regulatory regime to catalyse Investments and Innovation, and promote Ease of Doing Business by:*

    *...*

    *v.      Enabling unbundling of different layers (e.g. infrastructure, network, services and application layer) through differential licensing*

    *...*

*(c)    Simplifying and facilitating Compliance Obligations by:*

    *...*

    *v.      Reforming the Guidelines for Mergers & Acquisitions, 2014 to enable simplification and fast tracking of approvals*

    *...*

    *viii.    Creating a regime for fixed number portability to facilitate one nation – one number including portability of toll free number, Universal Access Numbers and DID numbers*

*...*

*2.2    Ensuring a holistic and harmonized approach for harnessing Emerging Technologies*

*...*

*(e)    Ensuring adequate numbering resources, by:*

    *...*

    *ii.     Developing a unified numbering plan for fixed line and mobile services*

*... "*

2. Telecom Regulatory Authority of India is, hereby, requested to furnish recommendations, under the terms of the clause (a) of sub-section (1) of Section 11 of the Telecom Regulatory Authority of India Act, 1997 (as amended), in respect of the afore-mentioned items of the NDCP, 2018.

3. For sake of convenience, the strategies/ items under strategies of the NDCP, 2018, on which recommendation of TRAI are being sought, are summarized below:

   (a) Strategy 1.1 (j) of 'Connect India' mission,

   (b) Item (v) under Strategy 2.1 (b) of 'Propel India' mission,

   (c) Items (v) & (viii) under Strategy 2.1 (c) of 'Propel India' mission, and,

   (d) Item (ii) under Strategy 2.2 (e) of 'Propel India' mission.

4. This issues with the approval of the Secretary, Department of Telecommunications, Government of India.
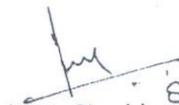
(S.B. Singh)

Deputy Director General (AS)

Tel: 011-23036918

**DoT OM Regarding Allocation of Short Codes to Content Providers**

**GOVERNMENT OF INDIA**
**MINISTRY OF COMMUNICATIONS & INFORMATION TECHNOLOGY**
**DEPARTMENT OF TELECOMMUNICATIONS**
*714, SANCHAR BHAVAN, 20, ASHOK ROAD, NEW DELHI-110001*

**No. 16-3/2003-BSII/Vol.VI**        **Dated: 30th November, 2006**

**OFFICE MEMORANDUM**

**SUBJECT:**    **ADDENDUM TO THE NATIONAL NUMBERING PLAN- 2003 (NNP-2003) – ALLOCATION OF SHORT CODES TO THE CONTENT PROVIDERS INCLUDING SMS BASED SERVICES.**

In supersession of this office O.M. of even No. dated 29th November, 2004 on the subject mentioned above, the undersigned is directed to state that for the proper conduct of telegraph, the Competent Authority has decided that all the Unified Access / Basic / Cellular Mobile Service providers must use the level '5' for allocation of short codes to the Content Providers including SMS based services within their network.

All other terms and conditions will be as per the guidelines issued in this regard.

-Sd/-      .
(Raj.K.Kataria)
**Under secretary to the Govt. of India**

**Copy to:**
1.    **Secretary, Telecom regulatory authority of India.**
2.    **Sr.DDG(TEC), Khurshid Lal Bhavan, Janpath, New Delhi.**
3.    **DDG(DS) / (AS) / (CS)**
4.    **All Unified Access / Basic / Cellular Mobile service Operators.**

**Annexure C (Chapter No. 2 Para no. 2.23)**

**Amendment to NNP 2003 for Implementation of Full Number Portability**

<center>

**Government of India**
**Ministry of Communications & IT**
**Department of Telecommunications**
**(Access Services Cell)**
**Sanchar Bhawan, 20 Ashoka Road New Delhi**

</center>

File No: 800-22/2013-AS.II                              Dated: 13.04.2015

To

    All Access Service providers
    (Including BSNL & MTNL)
    COAI/ AUSPI

**Subject:**    Amendment to National Numbering Plan 2003 for implementation of Full Mobile Number Portability.

Undersigned has been directed to communicate following amendments to the National Numbering Plan 2003 for the smooth implementation of Full Mobile Number Portability:

**Dialling procedure for intra as well as inter service area Basic to Mobile calls and Mobile to Mobile calls**– The telecom service providers may allow dialling of intra service area as well as inter service area calls to their subscribers without any prefix and/or by prefixing '0' and/or by prefixing '+91'. However, intra service area calls shall mandatorily be allowed without any prefix, as at present.

<div align="right">

(P C Sharma)
Director (AS-II)

</div>

Copy to:
1. Secretary, TRAI
2. Sr. DDG (TERM), DoT
3. DDG(CS)/DDG(DS)/DDG(LF-P)/DDG(LF-A)/DDG(A/C).
4. All DDsG TERM.
5. Director (AS-I)/ Director (AS-III)/ Director (AS-IV), Dir(AS-V), DoT
6. MNP Service Providers
7. DDG(IT) for uploading it on DoT website.

**Sample Calculations to Estimate the Availability of Mobile Number Resources After Using Levels '2', '3', '4', and '6'**

The National numbering Plan 2003 gives the complete list of SDCA codes (Annex-II of NNP 2003) and also a complete list of the spare codes which are not used as SDCA codes (Annex-III of NNP 2003). It is possible to generate numbering resources using the spare codes of levels '2', '3', '4', and '6'. It is also possible to generating numbering resources by suffixing '0', '1', '8', and '9', to the working SDCA codes (since fixed line subscriber numbers start with the digits '2', '3', '4', '5', '6' or '7')

**Case 1: Spare Codes:**

In a 10-digit number any digit can take any value between 0 to 9

Now assume, the following is the generalized representation of any mobile number: <u>**P Q R S T U V W X Y**</u>

Since, every alphabet can take maximum up to 10 possible values (0 to 9).

Hence,

Using 2-digit spare code **PQ** gives: 100 million numbers
Using 3-digit spare code **PQR** gives: 10 million numbers
Using 4-digit spare code **PQRS** gives: 1 million numbers

**Case 2: SDCA Codes:**

It is possible to generate mobile numbering space if we use the SDCA Code with the suffix '0', '1', '8' and '9'. The calculation is as follows:

For **'m'** digit SDCA code, the maximum numbers possible are
$$4*10^{(10-m-1)}$$
Which can be explained with the help of the following example:
For 2-digit SDCA code: 20 where **m** = 2, **P** = 2, **Q** = 0, **R** can take either of 0, 1, 8 or 9, while other remaining alphabets **S, T, U, V, W, X** and **Y,** can take 10 possible values (0 to 9).

The total maximum possible spare numbers are: $4*10^{(10-2-1)}$ which is equivalent to 40 million numbers.

Similarly, a 3-digit SDCA code will give 4 million numbers and a 4-digit SDCA code will give 0.4 million numbers.

# Level 2:

## Case 1: Spare Codes

For Level '2' we have:

| From code: | To code: | Spare codes in the given range: | Numbering resources available |
|---|---|---|---|
| 2000 | 2099 | 0 | 0 |
| 2100 | 2199 | 23 | 23M* |
| 2200 | 2299 | 0 | 0 |
| 2300 | 2399 | 27 | 27M |
| 2400 | 2499 | 35 | 35M |
| 2500 | 2599 | 13 | 13M |
| 2600 | 2699 | 12 | 12M* |
| 2700 | 2799 | 38 | 38M |
| 2800 | 2899 | 9 | 9M |
| 2900 | 2999 | 0 | 0 |
| **Total** | | | **157M** |

Where M = million or $10^6$

\* Considering the fact that 2150 to 2159 and 2600 to 2609 are repeated in both Spare Code and SDCA Code & 2638 do not find place in spare code or SDCA code.

## Case 2: SDCA Codes:

| 'm' (Number of digits in a SDCA Code) | Total 'm' digit SDCA Codes | Max. spare numbers per 'm' digit SDCA code | Total |
|---|---|---|---|
| 2 | 2 | 40M | 80M |
| 3 | 22 | 4M | 88M |
| 4 | 423 | 0.4M | 169.2M |
| **Net Total** | | | **337.2M** |

Where M = million or $10^6$

| Maximum possible numbers from Spare Codes | 157M |
|---|---|
| Maximum possible numbers from SDCA Codes using suffix '0', '1', '8' & '9' | 337.2M |
| **Net Total** | **494.2M** |

Where M = million or $10^6$

# Level 3:

## Case 1: Spare Codes

For level '3' we have:

| From code: | To code: | Spare codes in the given range: | Numbering resources available |
|---|---|---|---|
| 3000 | 3099 | 90 | 90M |
| 3100 | 3199 | 97 | 97M |
| 3200 | 3299 | 64 | 64M* |
| 3300 | 3399 | 0 | 0 |
| 3400 | 3499 | 53 | 53M |
| 3500 | 3599 | 58 | 58M |
| 3600 | 3699 | 16 | 16M |
| 3700 | 3799 | 12 | 12M |
| 3800 | 3899 | 23 | 23M* |
| 3900 | 3999 | 100 | 100M |
| Total | | | 513M |

Where M = million or $10^6$

\* Considering the fact that 3230 to 3239 do not find place in spare code or SDCA code. 3878 and 3880 are repeated in both Spare and SDCA Code.

## Case 2: SDCA Codes:

| 'm' (Number of digits in a SDCA Code) | Total 'm' digit SDCA Codes | Max. spare numbers per 'm' digit SDCA code | Total |
|---|---|---|---|
| 2 | 1 | 40M | 40M |
| 3 | 19 | 4M | 76M |
| 4 | 197 | 0.4M | 78.8M |
| Net Total | | | 194.8M |

Where M = million or $10^6$

| | |
|---|---|
| Maximum possible numbers from Spare Codes | 513M |
| Maximum possible numbers from SDCA Codes using suffix '0', '1', '8' & '9' | 194.8M |
| Net Total | 707.8M |

Where M = million or $10^6$

# Level 4:

## Case 1: Spare Codes

For level '4' we have:

| From code: | To code: | Spare codes in the given range: | Numbering resources available |
|---|---|---|---|
| 4000 | 4099 | 0 | 0 |
| 4100 | 4199 | 63 | 63M |
| 4200 | 4299 | 24 | 24M |
| 4300 | 4399 | 50 | 50M* |
| 4400 | 4499 | 0 | 0 |
| 4500 | 4599 | 58 | 58M* |
| 4600 | 4699 | 59 | 59M |
| 4700 | 4799 | 16 | 16M |
| 4800 | 4899 | 20 | 20M |
| 4900 | 4999 | 27 | 27M |
| **Total** | | | **317M** |

Where M = million or $10^6$

\* Considering the fact that 4310 to 4319, 4540, 4541, 4547, 4548, 4550, 4555 to 4559 do not find place in spare code or SDCA Code.

## Case 2: SDCA Codes:

| 'm' (Number of digits in a SDCA Code) | Total 'm' digit SDCA Codes | Max. spare numbers per 'm' digit SDCA code | Total |
|---|---|---|---|
| 2 | 2 | 40M | 80M |
| 3 | 33 | 4M | 132M |
| 4 | 153 | 0.4M | 61.2M |
| **Net Total** | | | **273.2M** |

Where M = million or $10^6$

| Maximum possible numbers from Spare Codes | 317M |
|---|---|
| Maximum possible numbers from used SDCA Codes using suffix '0', '1', '8' & '9' | 273.2M |
| **Net Total** | **590.2M** |

Where M = million or $10^6$

# Level 6:

## Case 1: Spare Codes

For level '6' we have:

| From code: | To code: | Spare codes in the given range: | Numbering resources available |
|---|---|---|---|
| 6000 | 6099 | 100 | 100M |
| 6100 | 6199 | 64 | 64M |
| 6200 | 6299 | 58 | 58M |
| 6300 | 6399 | 71 | 71M |
| 6400 | 6499 | 54 | 54M |
| 6500 | 6599 | 21 | 21M |
| 6600 | 6699 | 45 | 45M |
| 6700 | 6799 | 39 | 39M |
| 6800 | 6899 | 41 | 41M* |
| 6900 | 6999 | 100 | 100M |
| Total | | | 593M |

Where M = million or $10^6$

\* Considering the fact that 6830 to 6839 do not find place in Spare code or SDCA code.

## Case 2: SDCA Codes:

| 'm' (Number of digits in a SDCA Code) | Total 'm' digit SDCA Codes | Max. spare numbers per 'm' digit SDCA code | Total |
|---|---|---|---|
| 2 | 0 | 40M | 0 |
| 3 | 11 | 4M | 44M |
| 4 | 287 | 0.4M | 114.8M |
| Net Total | | | 158.8M |

Where M = million or $10^6$

| Maximum possible numbers from Spare Codes | 593M |
|---|---|
| Maximum possible numbers from used SDCA Codes using suffix '0', '1', '8' & '9' | 158.8M |
| Net Total | 751.8M |

Where M = million or $10^6$

# Total numbering resources from levels '2', '3', '4' and '6'

| Level | From Spare codes | From SDCA codes | |
|---|---|---|---|
| Level 2 | 157M | 337.2M | 494.2M |
| Level 3 | 513M | 194.8M | 707.8M |
| Level 4 | 317M | 273.2M | 590.2M |
| Level 6 | 593M | 158.8M | 751.8M |
| **Net Total** | **1580M** | **964M** | **2.544B** |

Where B = Billion or 1000M or $10^9$

## VLR Criterion for Allocation of MSC Code Numbering Series

**Government of India**
**Ministry of Communications**
**Department of Telecommunications**
**Access Services Wing**
**20, Ashoka Road New Delhi-110001**

No. 16-03/2015-AS-III( Part-III)/MSC Codes/27/806/          Dated: 08 /11/2017

To,

    All Access Service Providers,

**Corrigendum**

**Subjecr: Change of VLR criterion for allocation of MSC code numbering series on the basis of VLR-regarding.**

In partial modification to DoT letter 16-03/2015-AS-III(Part-III)/MSC Codes/19/748 dated 11.08.2017, the undersigned is directed by competent authority to amend the VLR criterion to the earlier VLR criterion issued vide DoT letter No. 16-16/2009-AS-III/78 dated 27.09.2012 which is reproduced as follows:

| S. No. | Numbers Allocated (N) | VLR Figure (V) as %age of Number Allocated (V/N) |
|--------|----------------------|--------------------------------------------------|
| 1 | Less than 3 million | Subject to minimum of 40% |
| 2 | 3 Million to less than 6 Million | Subject to minimum of 45% |
| 3 | 6 Million to less than 8 Million | Subject to minimum of 50% |
| 4 | 8 Million | Subject to minimum of 55% |
| 5 | 9 Million | Subject to minimum of 60% |
| 6 | 10 Million to less than 15 Million | Subject to minimum of 63% |
| 7 | 15 Million to less than 20 Million | Subject to minimum of 66% |
| 8 | 20 Million to less than 25 Million | Subject to minimum of 68% |
| 9 | 25 Million and above | Subject to minimum of 70% |

N=Number allocated
V=VLR figure

2. Rest of the instructions contained in the letter dated 11.08.2017 as mentioned above will remain unchanged
3. It shall be applicable from immediate effect.

(Sanchit Kumar Garg)
ADG (AS-III)
Ph No. 23036444

Copy for kind information and necessary action, if any, to:

1. Secretary-TRAI, Mahanagar Doorsanchar Bhawan Jawaharlal Nehru Marg (Old Minto Road), New Delhi-110002
2. Sr. DDG, TEC, Gate No. 5, Khurshid Lal Bhawan, Janpath, New Delhi-110001.
3. Sr. DDG (TERM) with a requestto send the certified copies to all TERM Cells.
4. CMD MTNL/CMD BSNL
5. DG, COAI / SG, AUSPI
6. Director (TERM-I)/ Director (Security-II), DoT HQ, New Delhi.

No.16-03/2015-AS-III(Part-III)/MSC Codes/19/₇₄₈        Dated:11-08-2017

To,
    **All Accesss Service Providers.**

Subject:  **Change of VLR criterion for allocation of MSC code numbering series on the basis of VLR-regarding.**

In supersession to DoT letter dated 16-16/2009-AS-III/38 dated 26.07.2011, No. 16-16/2009-AS-III/78 dated 27.09.2012 and dated 03.08.2015 in which VLR criterion was defined for allocation of MSC Codes to Telecom Service Providers along with instructions. The undersigned has been directed to issue following revised consolidated instructions with immediate effect:

(I)     The new MSC codes will be issued on the basis of VLR figure.

(II)    The total VLR figure (to be enclosed with requisition for new MSC codes) should be certified by concerned TERM Cell(s).

(III)   The Access Service Provider(s) will first approach the respective LSA TERM Cell for certification of VLR figures and then submit their requisition for MSC codes to DoT HQ enclosing therewith the TERM Cells certified figures.

(IV)    The VLR database purging period should be fixed at 72 hours maximum.

(V)     The criteria for allocation of new MSC Codes is as below:

    (a)     Both attached and detached VLR figures are to be taken into account (added) to calculate the total VLR figure.

    (b)     In case of intra-circle roaming agreements. intra-circle in-roamers should be deducted whereas the intra-circle out-roamers shall be added to arrive at net VLR figures.

    (c)     Inter-circle in-roamers (of any opearator) will be deducted and inter-circle out- roamers will be added.

    (d)     The VLR figures may be taken as average of 7 days VLR count.

    (e)     Inclusion of Port-In number and exclusion of Port-Out number from the total MSC code series alloted till date to respective TSP.

(f) MSC codes will be issued if the VLR figure reached the count (taking para (a) to (e) into account as below:

| S. No. | Numbers Allocated (N) | VLR Figure (V) as %age of Number Allocated (V/N) |
|---|---|---|
| 1 | Less than 3 million | Subject to minimum of 45% |
| 2 | 3 Million to less than 6 Million | Subject to minimum of 50% |
| 3 | 6 Million to less than 9 Million | Subject to minimum of 60% |
| 4 | 9 Million to less than 15 Million | Subject to minimum of 65% |
| 5 | 15 Million to less than 25 Million | Subject to minimum of 70% |
| 6 | 25 Million and above | Subject to minimum of 75% |

N=Number allocated
V=VLR figure

(Sanchit Kumar Garg)
ADG (AS-III)
Ph No. 23036444

**Copy for kind information and necessary action, if any, to:**

1. Secretary-TRAI, Mahanagar Doorsanchar Bhawan Jawaharlal Nehru Marg (Old Minto Road), New Delhi-110002
2. Sr. DDG, TEC, Gate No. 5, Khurshid lal Bhawan, Janpath, New Delhi-110001
3. Sr. DDG (TERM) with a request to send to send the certified copies to all TERM Cells.
4. CMD MTNL/CMD BSNL
5. COAI/AUSPI
6. Director (TERM)/ Director (Security-II), DoT HQ, New Delhi

# LIST OF ACRONYMS

| Acronym | Description |
| --- | --- |
| CC | Country Code |
| DoT | Department of Telecommunications |
| DN | Directory Number |
| GSM | Global System for Mobile Communication |
| HLR | Home Location Register |
| ICT | Information and Communication Technology |
| ISD | International Subscriber Dialing |
| ITU-T | International Telecommunication Union- Telecommunication Standardization Sector |
| LDCA | Long Distance Charging Area |
| LSA | Licensed Service Area |
| MNP | Mobile Number Portability |
| M2M | Machine to Machine |
| MSC | Mobile Switching Center |
| MSISDN | Mobile Station International Subscriber Directory Number |
| NANP | North American Numbering Plan |
| NDC | National Destination Code |
| NDCP-2018 | National Digital Communication Policy-2018 |
| NNP | National Numbering Plan |
| NPA | Number Plan Area |
| N(S)N | National Significant Number |
| OTT | Over the Top |
| P2P | Person to Person |
| PLMN | Public Land Mobile Network |
| POI | Point of Interconnection |
| PSTN | Public Switched Telephone Network |
| SDCA | Short Distance Charging Area |
| SIM | Subscriber Identity Module |
| SMS | Short Message Service |
| SN | Subscriber Number |
| STD | Subscriber Trunk Dialing |
| TC | Trunk Code |
| TRAI | Telecom Regulatory Authority of India |
| TSP | Telecom Service Provider |
| VLR | Visitor Location Register |