Consultation Paper

on

National Numbering Plan

Pakistan Telecommunication Authority

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Executive Summary

1. Section 5(2)(k) of Pakistan Telecommunications (Reorganization) Act, 1996 mandates Pakistan Telecommunications Authority (PTA) to develop and manage national numbering plan for the provision of a wide range of efficient telecommunications services in Pakistan.

2. Liberalization of Telecommunication Sector in Pakistan has resulted in rapid growth of conventional services besides induction of new services. Where the explosive growth in the mobile sector has fuelled the demand for more numbering resource it has exposed the limitation of the existing National Numbering Plan (NNP). To meet the growing numbering needs of the telecom sector in the country and create additional resource for the emerging services in the sector, Pakistan Telecommunication Authority decided to revisit the National Numbering Plan.

3. Number Ranges for PSTN and Cellular Mobile services make major part of any national numbering plan; process as such was initiated through consultation for the enhancement of numbering capacity for fixed line and mobile sectors from current 7 digits to 8 digits.

4. Public consultation was started through release of initial version of public consultation paper on mobile number migration on 8th August 2006 for comments and suggestions from the stakeholders. The stakeholders participated enthusiastically in the process through all possible communication channels leading to release of four versions of the consultation paper. Final version for the mobile number migration was issued on 28th February 2007 after inclusion of suggestions from the stakeholders and addressing the reservations expressed by them and 2 digit network access code with 8 digit subscriber number adopted. Mobile number migration is already under way.

5. Consultation on fixed line number migration from 7 to 8 digits for numbering capacity enhancement was kicked off through release of initial version of public consultation paper on 31st August 2006 for comments from the stakeholders. Final version was issued on 28th February 2007 after due consultation with the stakeholders and 8 digit scheme adopted. The concept was also presented in the Telecom Industry Forum and agreed by CEOs of all major telecom operators, representing their respective companies. Implementation plan is being finalized at PTA.

6. Proposed National Numbering Plan takes into account the previous NNP and growing demand for numbers and aims to meet the objective of creating a numbering framework which acts as a growth engine for the telecom sector in the country through unhindered availability of numbering resource for expansion of existing services and creation of additional resource for new services to be introduced in future. The Plan is intended to fuel the growth of competitive telecommunications services in Pakistan and prepare ground for the introduction of IP based services in the sector.

7. This is a long-term Plan, intended to meet short-term and medium-term objectives while creating adequate reserve capacity for the future services, not yet discovered. To preserve the objective the Plan will be reviewed at least every three years and adjustments made to address fresh demand for numbering resource allocation from the reserve numbering ranges against new services appearing on the telecommunication horizon.

8. Numbering is a finite national resource and therefore must be managed prudently to ensure that numbering resource is adequate to support existing telecommunications services and has enough capacity for the introduction of new networks and services as these become available.

9. Under the plan, leading digit defines the service/network for the use of a particular numbering range. The structure of the national numbering plan complies, as far as possible, with ITU-T Recommendations E.164.

10. The Plan defines number ranges and their assignment to various telecommunication services including PSTN and Wireless Networks, international direct dialing, emergency and special services such as voice mail, carrier identification/ selection codes and Intelligent Network (IN) based services.

11. Numbers beginning with the digit '0' are reserved for national and international services. Level "0" is used as escape code for long distance (national) dialing and for access to other networks i.e. mobile, IP based services while "00" is assigned to international direct dialing for all telecommunication users in the country irrespective of their service provider and as such shared by all the service providers.

12. Numbers starting with leading digit "1"are reserved for short codes and access to intelligent network based services. Short codes for emergency services, customer services and carrier selection also start with digit "1". Some short codes are 3-digit long while others are 4-digit long depending on their use. Detailed allocation is laid out in annexure included in this document.

13. Country is divided in two geographic areas and leading digits "02" and "04" are assigned to these geographic areas where second/third or fourth digit leads to complete national destination code. Subscriber number consists of eight/seven/six digits. National Significant Number is ten digits long in all cases.

14. Leading digit "01" and "03" is assigned to cellular mobile operations with 2-digit network access code and 8-digit subscriber number. Twenty mobile operators can launch their services while each operator can hold a theoretical base of 100 million customers.

15. Leading digits "05" and "06" are reserved for future services,

16. Leading digit "07" is reserved for IP based services while leading digit "08" is assigned to Freephone and new non geographic services.

17 Leading digit "09" is assigned to Premium Rate Services and new non geographic services.

Following table presents an overview of the proposed National Numbering Plan. The table displays only leading digit, however, network access codes and national destination codes are 2/3/4-digit long while subscriber number is 8/7/6-digit long. Overall length of national significant number is ten digits.

National Numbering Plan Structure

Leading Digit	Number of digits for subscriber number	Geographic Area/ Services
NDC	**SN**	**Area/Service**
0	1 digit	**National/International Direct Dialling**
01	8 digits	**Mobile Services**
02	8 digits	**Geographic Numbers (Sind & Baluchistan Provinces)**
03	8 digits	**Mobile Services**
04	8 digits	**Geographic Numbers (Punjab & NWFP provinces)**
05	8 digits	Reserved for future services
06	8 digits	Reserved for future services
07	8 digits	**IP Based Services**
08	7/8 digits	**Freephone and New Non Geographic Services**
09	7/8 digits	**PRS and New Non Geographic Services**

The plan in its proposed form has a theoretical capacity of 800 million PSTN customers in one geographic area while the country is divided into two geographic regions and host of fixed line operators can share an overall resource of 1600 million numbers in the foreseeable future.

With proposed number of network access codes the plan can support twenty mobile networks. Two digit NAC with 8 digit subscriber number, each mobile network can support 100 million customers while room has been created for one hundred IP based networks each capable of supporting 10 million customers.

Besides above capabilities the Plan has two national levels in reserve for future services and networks not yet discovered.

Scheme of NDC assignment at district level has been retained, however, with the reduction of national levels allocated to geographic numbers from the current 7 to 2 has led to change of area code for some districts. The change has been contained to minimal level i.e. the one absolutely necessary to spare five national levels for more productive use.

NDC Assignment

S.No	NPA Name	Existing NDC	Proposed NDC		S.No	NPA Name	Existing NDC	Proposed NDC
1	Sahiwal	40	400		51	Kurram Agency	926	477
2	Okara	44	440		52	Karak	927	474
3	Kasur	49	449		53	Bannu / North Waziristan Agency	928	478
4	Sheikhupura	56	456		54	Tank	963	473
5	Pakpattan	457	457		55	South Waziristan	965	475
6	Faisalabad	41	441		56	D.I.Khan	966	476
7	Toba Tek Singh	46	446		57	Lakki Marwat	969	479
8	Jhang	47	447		58	Rawalpindi / Islamabad	51	451
9	Sargodha	48	448		59	Attock	57	450
10	Bhakkar	453	453		60	Chakwal	543	443
11	Khushab	454	454		61	Jhelum	544	444
12	Mianwali	459	459		62	Hyderabad	22	222
13	Sialkot	52	452		63	Dadu	25	225
14	Gujrat	53	445		64	Tharparkar	232	232
15	Gujranwala	55	455		65	Mirpur Khas	233	233
16	Narowal	542	442		66	Sanghar	235	235
17	Mandi Bahauddin	546	458		67	Umerkot	238	238
18	Hafizabad	547	469		68	Badin	297	297
19	Abbottabad	992	492		69	Thatta	298	298
20	Haripur	995	495		70	Sukkur	71	271
21	Shangla	996	496		71	Larkana	74	274
22	Mansehra /	997	497		72	Naushahro Feroze	242	242

	Batagram							
23	Kohistan	998	498		73	Khairpur	243	243
24	Karachi	21	21		74	Nawabshah	244	244
25	Lahore	42	42		75	Jacobabad	722	221
26	Multan	61	461		76	Ghotki	723	223
27	Bahawalpur	62	462		77	Shikarpur	726	226
28	Bahawalnagar	63	463		78	Quetta	81	281
29	Dera Ghazi Khan	64	464		79	Gawadar	86	286
30	Khanewal	65	465		80	Zhob	822	272
31	Muzaffargarh	66	466		81	Killa Saifullah	823	273
32	Vehari	67	467		82	Loralai	824	224
33	Rahim Yar Khan	68	468		83	Chagai	825	275
34	Rajanpur	604	404		84	Killa Abdullah / Pishin	826	276
35	Layyah	606	406		85	Musakhel	828	228
36	Lodhran	608	408		86	Barkhan / Kohlu	829	229
37	Peshawar / Charsadda	91	491		87	Bolan	832	282
38	Nowshera	923	493		88	Sibi / Ziarat	833	283
39	Khyber / Mohmand Agency	924	494		89	Dera Bugti	835	285
40	Malakand	932	432		90	Jhal Magsi	837	237
41	Mardan	937	437		91	Jaffarabad / Nasirabad	838	288
42	Swabi	938	438		92	Mastung	843	284
43	Buner	939	439		93	Kalat	844	254
44	Bajaur Agency	942	431		94	Kharan	847	247

45	Chitral	943	433	95	Khuzdar	848	248
46	Upper Dir	944	434	96	Kech	852	252
47	Lower Dir	945	435	97	Lasbela	853	253
48	Swat	946	436	98	Panjgur	855	255
49	Kohat	922	472	99	Awaran	856	256
50	Hangu / Orakzai Agency	925	471	100	AJK & NA	58	48

AJK & NA

S.No	NPA Name	Existing NDC	Proposed NDC
1	Muzzafarabad	58	480
2	Neelam	58	480
3	Rawalakot	58	481
4	Plandri	58	481
5	Bagh	58	482
6	Kotli	58	483
7	Mirpur	58	484

AJK & NA

S.No	NPA Name	Existing NDC	Proposed NDC
8	Bhimber	58	485
9	Gilgit	58	486
10	Chilas	58	487
11	Astore	58	487
12	Gakuch	58	488
13	Skardu	58	489
14	Khaploo	58	489

Short codes allocated to emergency services have been retained and space created for more short codes for future use through shifting of two digit codes for Speaking Clock, Directory Enquiry and Telephone Complaint etc. to four digit codes. Space for five hundred short codes has thus been created.

Short Codes -Summary

Name of Service	Short Code	Number of Digits
Customer Services (Calling Card, Customer Services)	10XX	3/4 digits
UAN, Emergency Services (Fire, Ambulance, Various Enquiries)	11X	3 digits

Access Code for various customer services (VMS, Calling Cards)	12XX	3/4 digits
Internet Access & Various helplines	13X	3 digits
Reserved for Future Use	14XX	4 digits
Emergency Police	15	2 digits
Reserved for Future Use	16XX	4 digits
Reserved for Future Use	17XX	4 digit
Reserved for Future Use	18XX	4 digits
Carrier Selection	19XX	3/4 digits

Separate paper on ENUM has been included in this document with a concrete proposal for preliminary steps to be taken to prepare the grounds for the implementation of ENUM in the country when market is ready to deploy the technology gainfully.

Another paper benchmarking golden numbers and short codes has also been included in this document. The paper includes benchmarks for golden number declaration and the procedure for charging of ordinary number, the short codes and the golden numbers.

This document lays down the rules and procedures governing assignment of numbering resources to various service providers in a fair and transparent manner.

1. INTRODUCTION

1. For the proliferation of telecommunication services and development of a wide range of modern telecommunications, multimedia services and business applications need to be supported by a range of operational frameworks. One of these frameworks, which operate as an enabler for the information age, relates to numbering and electronic addressing.

2. Numbers and electronic addresses are necessary resources to facilitate the development of new products and services and to provide means of accessing them. As necessary resources, they must be made available in a fair, transparent and efficient manner within an acceptable time frame to the relevant users. Plans for the designation, reservation and assignment of numbers and electronic addresses need to be forward looking and to reflect not only current requirements but also to anticipate future requirements brought about by next generation networks and services.

3. Plans that reflect outdated technologies and market structures, and attempt to solve problems using old methods and assuming old compromises, cannot facilitate transition to an information based society. At best, outdated plans miss the potential opportunity to contribute to national goals; at worst they inhibit that development.

4. PTA takes the view that the National Numbering Plan (NNP) should provide telecom market in the country with a competitive advantage in the development of communications and multimedia services through clear, transparent and forward looking numbering and electronic addressing policies.

5. National Numbering Plan has been aligned with various ITU-T Recommendations and international best practices in the sector. The changes are planned in such a way that the customers suffer minimum disruptions/ number changes while the numbering capacity is enhanced to take care of the sector for more than a decade. Room has also been created for the introduction of non geographic services.

National levels are vacated and reserved for the new services not yet introduced in the telecom market. All these measures make the National Numbering Plan forward looking and futuristic in nature.

1.1 Objectives of the Plan

Main objectives of the proposed national numbering plan are to;

1. Create enough numbering capacity to meet the needs of telecommunication sector to brave multi operator environment without numbering constraints and enough capacity to spare for future needs for the induction of new networks and services for a decade and more.

2. Provide a framework for the allocation of numbering resource to various telecommunications service providers and ensure availability of numbers to facilitate introduction and supply of new services

3. To minimize disruption and inconvenience to customers when numbers assigned are recovered or replaced and enable them to understand the level of charges for calls to a number; and understand which numbers can be used in connection with the supply of a particular service

4. Set procedures to maximize the efficiency in assignment and use of numbers

5. Promote competition and innovation in telecommunications services

1.1.1 Scope

a. National Numbering Plan provides a set of guidelines and procedures for the assignment of number ranges to Public Switched Telephone Network and Wireless Network. The Plan also describes the assignment of numbers for access to emergency services, customer services and Intelligent Network based special services such as Free-phone, Premier Rate Services. The Plan generally follows ITU-T Recommendations E.164

b. Application procedure, eligibility requirements, assessment procedure, number assignment or refusal thereof, fee charged and application forms for number assignment are also included in this paper.

1.1.2 Role of the PTA

1) PTA as telecommunication regulator is mandated to evolve and manage the National Numbering Plan under the Telecommunication Act 1996. PTA is further mandated to ensure that the number allocation process is equitable, fair and transparent so as to provide a level playing field to all the competitors in the sector.

2) PTA, in consultation with all the stake holders, will review the national numbering plan, from time to time, to ensure its continued relevance.

3) PTA, in consultation with stakeholders, will allocate national levels reserved for future use to new services and networks as these services become available.

2. NUMBERING PLAN OVERVIEW

2.1.1 Number Categorization

Numbers assigned to various services are categorized according to the leading digit. The designation of numbers is such that the first digit of the number indicates type of service offered while the second digit leads to the network or the area concerned.

Following table displays assignment of leading digit for various services and networks

National Level	Number of digits in NDC	Number of digits for subscriber number	Geographic Area/Services
0	1/2 digits		International Direct Dialing (00), Escape Code (0)
(0)1	2 digits	2 digits	Radio Networks (Cellular Mobile Service)
(0)2	2 digits	8 digits	Geographic Numbers (Sind & Baluchistan)
(0)3	2 digits	8 digits	Radio Networks (Cellular Mobile Service)
(0)4	2 digits	8 digits	Geographic Numbers (Punjab & NWFP)
(0)5	2 digits	8 digits	Reserved for future national use
(0)6	2 digits	8 digits	Reserved for future national use
(0)7	2 digits	8 digits	IP based Services and Networks
(0)8	2 digits	8 digits	Free-phone and New Non Geographic Services
(0)9	2 digits	8 digits	PRS and New Non Geographic Services

2.1.2 Number Structure

National Numbering Plan is purely numeric. The national numbers both for PSTN and Wireless Network have a total length of 10 digits where 2-digit codes are used for access to geographic areas and cellular mobile networks as National Destination Code and Network Access Code respectively while subscriber number consists of 8 digits.

1) Each such 2-digit national destination code or network access code with 8-digit subscriber number can hold a theoretical maximum of 800 million customers

2) Leading digit "(0)2 & (0)4" signify geographic numbers where the country is divided into two broad geographic areas; each area is represented by a separate leading digit while national destination code consists of two, three or four digits.

3) Each geographic area can hold a theoretical maximum of 800 million customers, with two such geographic areas the Plan can hold a maximum of 1600 million fixed line customers creating sufficient capacity for geographic number ranges for seeable future.

4) No separate range is assigned to ISDN, normal 8-digit PSTN number will be assigned to ISDN subscriber

5) Leading digits "01 and 03" are assigned to Radio Networks which includes Public Mobile Telephone Networks, Public Trunk Radio Services and Public Radio Paging Networks with PSTN interconnection rights. With 2-digit network access code and two national levels the plan creates possibility of assigning twenty separate codes to radio networks.

6) With the 2-digit network access code and 8-digit subscriber number one cellular mobile network can hold a theoretical maximum of 100 million customers, being a closed scheme with the implementation of Mobile Number Portability.

7) All numbers starting with leading digits **(0)5 and (0)6** are reserved for future networks and services.

8) All numbers starting with leading digits (0)7 are assigned to IP based services. There is a possibility of defining one hundred IP based networks recognized by subsequent two leading digits. Seven-digit subscriber number provides possibility of 10 million customers under one service provider.

9) Level (0)8 is assigned to Free-phone service and New Non Geographic (NNG) Services and level (0)9 is assigned to Premier Rate Services and NNG Services.

2.1.3 NDC Assignment

Leading digits for geographic numbers have been reduced from current 7 national levels (2, 4, 5, 6, 7, 8, & 9) to only two to create room for assignment of one national level to IP Telephony and spare two levels for future use while level (0)8 is assigned to toll free service and (0)9 to premium rate services. These two levels are further earmarked for new non geographic services.

The process necessitates change of NDC for the existing national destinations. Effort has been made to retain the codes where ever possible. Two and three digit national destination codes have been assigned on district level according to the current assignment. Subscriber number length varies according to the destination code i.e. 8-digit subscriber number where NDC is two digit long while 7-digit number where NDC is three digit long. Four digit area codes are assigned to smaller towns and cities within the districts for efficient use of numbering resource.

First 6 digits of the subscriber number will be assigned by PTA for the destinations where NDC consists of two digits, while first 5 digits will be assigned by PTA for the destinations where NDC consists of 3 digits. List of NDC is included in the annexure to this document.

2.1.4 NAC Assignment

Leading digits "01 and 03" are assigned to Radio Networks. Assignment of Network Access Codes to the existing cellular mobile network operators are presented in the table below. Level "01" is reserved for future wireless networks.

Cellular Mobile Network	NAC*	Length of SN
For Future Use	10	8 Digits
For Future Use	11	8 Digits
For Future Use	12	8 Digits
For Future Use	13	8 Digits
For Future Use	14	8 Digits
For Future Use	15	8 Digits
For Future Use	16	8 Digits
For Future Use	17	8 Digits
For Future Use	18	8 Digits
For Future Use	19	8 Digits
Mobilink	30	8 Digits
Paktel GSM	31	8 Digits
Warid	32	8 Digits
Ufone	33	8 Digits
Telenor	34	8 Digits
SCO	35	8 Digits
Instaphone	36	8 Digits
For future use	37	8 Digits
For future use	38	8 Digits
For future use	39	8 Digits

- Network Access Code

The scheme provides space for twenty cellular mobile operators with 100 million customer capacity each.

In addition, the plan has a capacity to hold one hundred IP based service providers each with a capacity of ten million customers. The plan renders two national levels spare for future new non geographic services.

Do you agree that:

a) Numbering categorization according to leading digit will help create customer awareness of service charges

b) Two leading digits are enough for geographic numbering

c) Proposed NDC will take care of geographic numbering for a decade and more without further subscriber number change

3. MANAGEMENT AND IMPLEMENTATION OF NNP

3.1 Number Allocation Procedures

3.1.1 General Procedures

The following allocation conditions shall apply to all number types:

1 Only operators licensed to provide telecommunication services in Pakistan may apply for allocation of numbers as authorized in the license. When number utilization targets set out by the PTA, as shown in this document, are met, the licensed operator may apply for further allocation of numbering resource; otherwise the licensee shall provide justifications to substantiate the timing of the application.

2 Normally the allocation is a subsequent step to the reservation. The application for allocation shall be submitted to the PTA at least three months prior to the estimated date for number activation. The application shall be in accordance with the provisions of national numbering plan including these guidelines and using the forms shown in various annexes.

3 In exceptional cases, PTA may accept a request for allocation without a prior reservation. In these cases the licensee shall provide PTA supporting evidence to justify the request.

4 PTA within 45 calendar days will inform the licensee in writing whether the application is accepted and whether the allocation has been granted or not. The specified period (45 calendar days) will be counted from the date PTA receives the application with the required complete information.

5 Numbers for all services are generally allocated in blocks as shown in this document sequentially from the pool of available number ranges. The total quantity allocated will depend on the requirements and will be at the discretion of PTA.

6 Normally sufficient numbers will be allocated to meet 12 months requirements as indicated in the five year rolling forecast. Subsequent allocation of numbers to individual subscribers is considered as secondary allocation and is under the responsibility and control of the licensee who submits the application.

7 The allocation shall be used for the purpose specified in the application.

8 Licensees shall not use number allocations in an anti-competitive way.

9 Licensees shall maintain an up to date record of the percentages of number blocks in use and reserved.

10 The licensees shall maintain a record of numbers that have been ported out to other networks.

11 Allocated numbers shall not be traded.

12 Allocated numbers shall not be directly transferred between licensees.

13 PTA may, at its discretion, apply additional specific conditions of use to an allocation if PTA considers that it is in the national interest to impose such conditions.

14 The licensees who have been allocated number blocks are required to apply to PTA for approval if they require any changes to the use of the number allocated or to any conditions placed on the allocation.

15 When applying for an allocation of number block, the licensee shall provide the following information to PTA:

(a) Name and contact details of the licensee. Where a person submits an application form on behalf of the licensee, a signed and dated letter of authorization shall accompany it from that licensee.

(b) Details of the relevant telecommunications license or authorization under which the licensee intends to operate the number blocks sought and the system being operated.

(c) Details of any existing ranges held by the licensee that are relevant to that application.

(d) A five year rolling forecast is provided to the PTA.

(e) Details of the utilization of existing number allocations and a forecast of expected utilisation of the requested numbers.

(f) A description, nature and function of the service for which numbers are reserved.

(g) Target service date.

(h) Authorized signature of the licensee.

(i) Any other information that the licensee considers necessary or appropriate to justify the application.

16 In addition, licensees shall provide to PTA any other information required. This may include a description of the licensee's technical and operational system configuration.

17 PTA may make an alternative allocation that has the potential to satisfy the licensee's requirements.

18 Applications must be in writing on the designated application forms. Specimen copies of these forms are attached to this document.

19 If PTA cannot make the allocation based on the information supplied in the application form and accompanying documentation, then it will request additional details. These must be submitted in writing.

20 The licensees who have been allocated number blocks are required to apply to PTA to make any changes:

(a) For the purpose or use of the number allocation, or

(b) Related conditions of use placed on the allocation

3.1.2 Additional Information

In addition to the above, following information must be attached with the application for reservation or allocation of special services numbers or codes:

1 Whether the number requested for assignment is an access code or a special service number.

2 The length of the number or code.

3 The amount of requested numbers or codes for use in connection with the same service.

3.1.3 Numbers Eligibility Criteria

1 All licensees providing telecommunications services in Pakistan are eligible to apply to PTA for reservation and allocation of relevant number blocks.

2 Licensees shall use the numbers allocated to them, in accordance with directions, guidelines and principles set by the PTA in this document.

3 No licensee shall be entitled to ownership of any number or numbers allocated to that licensee or to any customer thereof.

3.1.4 Number Block for Reservation/Allocation

1 The number block sizes for reservation or allocation to a licensee are laid out in relevant section.

2 If a number block size has not been mentioned for reservation/allocation of a type of number, PTA may determine, in writing, a number block size that is appropriate for the type of number.

Do you agree with the

Proposed number allocation procedures/guidelines

4. ASSESSMENT OF APPLICATIONS

4.1.1 Assessment Criteria

PTA will take into account the following criteria when assessing an application.

1 The principles and guidelines within this National Numbering Plan.

2 Any relevant licence conditions.

3 Whether PTA considers that the proposed use of the numbering range is appropriate.

4 The views of the licensee and other interested parties.

5 The rules, regulations, guidelines and eligibility criteria set out in this document.

6 Any other matter that PTA deems relevant (e.g. any requirement to open a new range or make changes to the National Numbering Plan in order to allocate the required numbers or codes).

4.1.2 Timing and Assessment of Application

1 Applications for numbering allocation should be submitted after utilization of existing capacity has reached 50% for geographic numbers and 80% for non geographic services including cellular mobile service.

2 PTA will make the reservation or allocation within a period of 45 calendar days following receipt of a complete application that contains all of the relevant information. The period referred to above may be exceeded where:

a) Additional information is required from the licensee.

b) A period of consultation is necessary, as initiated by the PTA.

c) There are significant issues relating to the application that cannot be reasonably handled within that period.

d) PTA considers that an alternative period of time is justified.

3 Where PTA considers that an increase to the specified 45 day period after receipt of a complete application is required, then PTA will inform the licensee in writing of the revised period.

4.1.3 Denial of applications

PTA may deny an application for reservation or allocation of number blocks for reasons which include but are not limited to:

a) The requested number blocks are not available for allocation or reservation.

b) The applicant is not a holder of an appropriate licence for such a reservation or allocation.

c) The applicant is not meeting the numbering eligibility criteria.

d) The planned activation date is beyond the allowed period.

e) The planned services are considered by PTA, not to be appropriate for implementation on the requested number blocks.

f) A previous related allocation remains significantly under utilized vis-à-vis the licensee's stated plans.

g) A previous related reservation has not yet been used in accordance with the licensee's stated plans.

h) A previous related allocation has been used for services or purposes other than those specified or permitted in the terms of reservation or allocation.

i) PTA considers that reservation or allocation would not be in the national interest.

j) It is considered that the reservation or allocation would unfairly impede competition.

2 In the event of a refusal, whether in part or in full, PTA will inform the licensee, in writing.

4.1.4 Confidentiality of Application

1 A licensee may request PTA to treat its application for reservation or allocation in confidence

2 PTA will consider the request in accordance with the relevant statute.

4.1.5 Number Activation Procedures

When activating allocated numbers:

1 It shall be the responsibility of the holder of the allocation to negotiate with and to notify relevant operators and, where appropriate, overseas authorities on the implementation of allocations within the timescales agreed between the organization and the operators concerned, under intimation to the Authority.

2 Operators and others to whom allocations of numbering capacity have been made are required to advise the Authority of the contact in their organizations who is to receive notifications of the dates for activation of the allocated codes and number blocks.

3 The Authority shall maintain a list of such contacts and shall make it available on request.

4 The Authority shall, in collaboration with operators and service providers, review the process for the notification of the bringing into service of new numbering ranges, in particular taking into account the impact of direct allocations to service providers.

4.1.6 Renumbering and Notice of Number Changes

1 At least 3 months before the date of activation of the new number, the licensee must take reasonable steps to inform the customers assigned with a number affected by the change that the change will happen.

2 Calls to the old numbers must be directed for a period of three months by the licensee to an explanatory message, containing information that a change of number has happened. The explanatory message may be a recorded message.

3 The licensee must ensure that the new number will have, at least, the same services and features as the old number.

4.1.7 Reporting process

1 All licensees who hold an allocation of numbers shall submit an annual report to PTA an 'Annual Numbering Return' within 30 calendar days after the end of each year. The following information shall be provided in the annual numbering return for each allocation:

(a) The current use of the allocation.

(b) Numbers in service assigned to customers

(c) Details of numbers reserved for planned growth, customer orders or other usage, with explanations and justifications.

(d) The proportion of numbers ported, at the request of customers to another Service Provider.

(e) A five year forecast of demand.

(f) The justification for continued reservation of number blocks, and

(g) Any other information requested by the PTA.

2 At any time, PTA may request, the status of their numbering resource. Information submitted should include all number ranges allocated, level of utilisation and projected number usage within their networks.

Do you agree with the:

a) Proposed application assessment criteria

b) Proposed number allocation/denial criteria

c) Proposed reporting process

5. NUMBER RESERVATION/CANCELLATION

5.1 Number Reservation

Procedures governing reservation and allocation of numbers for various telecommunication services are laid out in this document. If number ranges created from the numbering space reserved for future use are not covered in this document, PTA may issue additional procedures in writing.

5.2 Number Reservation/Assignment Cancellation

1 PTA may cancel number reservations or allocations for reasons which include following but are not limited to:

(a) Failure to comply with allocation and reservation guidelines.

(b) Insufficient usage of allocated number blocks as determined by PTA.

(c) All numbers of an allocated range have become deactivated.

(d) The fees have not been paid for at least 3 months after their due date.

(e) The need for additional number blocks elsewhere mandates such cancellation.

(f) Cancellation is necessary to ensure that fair and open competition is maintained.

(g) International harmonisation mandates such cancellation.

(h) Cancellation is deemed to be in the overall national interest.

(i) It is necessary as part of a change to the National Numbering Plan.

2 Cancellation of an in-service numbering range, which has been allocated by PTA, can be made only after PTA has issued a notice with a period of not less than three months.

3 PTA will not have any liability in the event of cancellation.

4 If a licensee no longer requires the use of a reservation or allocation that has been made, then the reservation or allocation should be returned to PTA at the earliest opportunity.

5 PTA will not accept partial return of any blocks.

5.2.1 Number Publication

PTA will be responsible for the publication (on official website) of all information concerning the blocks of numbers allocated to particular operators and service providers, the list of reserved numbers, as well as the lists of all free number ranges.

5.2.2 NNP Review

This numbering plan shall be reviewed not later than five years.

5.2.3 Distribution

This National Numbering Plan shall be made available to all stakeholders

Do you agree with the:

a) Proposed number reservation/cancellation procedures

b) Proposed NNP review period

6. ASSIGNMENT OF GEOGRAPHIC NUMBERS

Geographic Numbers are assigned to local loop operators (including WLL operators) for subsequent allocation to their customers for providing PSTN services. A separate consultation process was initiated by PTA and it was concluded, with consensus, that fixed number migration from 7-digits to 8-digits is required to meet the growing numbering resource requirements of the telecommunication industry in Pakistan. PTA will announce migration schedule in consultation with the stakeholders, shortly.

6.1.1 Eligibility Criteria

All operators granted rights to operate local loop services (including WLL operations) are eligible for assignment of geographic numbers in blocks of 10,000 for subsequent allocation to their customers.

6.1.2 Application Procedure

Authorized licensee will submit application for reservation/ assignment of PSTN number blocks to PTA on prescribed form. In addition to observing the general rules for number allocation the licensee will attach following information to facilitate reservation or allocation of geographic numbers:

a Numbers reserved for actual customer orders and a forecast of expected utilization for the reserved numbers

b the exchange service area for which the numbers are requested;

c the region for which the numbers are requested;

d the detail of requested numbers for use in the service area; and

e the detail of other numbers allocated to the applicant for use in that exchange service area.

To facilitate the PTA assess the application for reservation/assignment of PSTN number blocks, licensees are required to submit to the PTA, annual status report on the numbering resource assigned. Information submitted should include number assignment, level of utilisation and projected number usage within their networks.

6.1.3 Geographic Number Structure

Following table depicts PSTN number structure.

Geographic Number Structure	
10 digits	
2/3/4 digits	8/7/6 digits
National Destination Code (NDC)	Subscriber Number
AX	BXXX XXXX

Where A= 2 or 4, B=2-9 and X= 0-9

7. ASSIGNMENT OF MOBILE NUMBERS

Cellular Mobile Numbers are assigned to cellular mobile operators for subsequent allocation to their customers for the provision of radio services. A separate consultation process was initiated by PTA and it was concluded, with consensus, that mobile number migration from 7-digits to 8-digits is required to meet the growing numbering resource requirements of the telecommunication industry in Pakistan. The migration process for enhancement of numbering resource for mobile sector is already underway.

7.1.1 Eligibility Criteria

All operators granted rights to provide cellular mobile services are eligible for assignment of mobile numbers in blocks of 10,000 for subsequent allocation to their customers; in addition numbers will be assigned for radio paging services.

7.1.2 Application Procedure

Authorized licensee will submit application for reservation/ assignment of Cellular Mobile number block to PTA on prescribed form. In addition to observing the general rules for number allocation the licensee will attach following information to facilitate reservation or allocation of cellular mobile numbers:

1 Numbers reserved for actual customer orders and a forecast of expected utilization for the reserved numbers.

2 The Network Access Code.

3 The service area (Province/District) for which the numbers are requested.

4 The city/town for which the numbers are requested.

To facilitate PTA assess the application for reservation/assignment of mobile number blocks, licensees are required to submit to the PTA, annual status report on the numbering resource assigned. Information submitted should include number assignment, level of utilisation and projected number usage within their networks.

7.1.3 Mobile Number Structure

Following table depicts mobile number structure.

Mobile Number Structure

10 digits	
2 digits	8 digits
Network Access Code (NAC)	Mobile Subscriber Number
BX	XXXX XXXX

Where B= 1 or 3 and X= 0-9

7.1.4 International Mobile Subscriber Identity (IMSI) Structure

Following table depicts structure of international mobile subscriber identity.

International Mobile Subscriber Identity Structure

IMSI (Max of 15 digits)		
3 digits	2	Max of 10 digits
MCC	MNC	MSIN
410	01	000 6765432

MCC : Mobile Country Code
MNC : Mobile Network Code
MSIN : Mobile Subscriber Identification Number
IMSI : International Mobile Subscriber Identity
MCC codes are assigned for each country by the Telecommunications Standardization Bureau within ITU-T (TSB). For Pakistan, the assigned MCC is (410). The MNC is assigned by the PTA (01) for Mobilink GSM. MSIN is assigned by the network operator.

7.1.5 Global Services

International Public Telecommunications Number for Global Services as shown below is composed of a variable number of decimal digits arranged in specified code fields. The code fields are the Country Code (CC) and the Global Service Number (GSN) with a total of 15 digits. National and International prefixes are not part of International Public Telecommunications Number for Global service. Global numbers may be used for mobile services and radio paging services.

Global Service Number Structure

Max. 15 digits	
3 digits (max)	12 digits (max)
CC	GSN

Where CC: the country code, GSN: Global Service Number

7.1.6 International Public Number for Networks

International Public Telecommunications Number for Networks is composed of a variable number of decimal digits arranged in specified code fields. The code fields are the Country Code (CC), the Identification Code (IC) and the Subscriber Number (SN) with a maximum of 15 digits. National and International prefixes are not part of International Public Telecommunications Number for Networks.

Examples of international number for networks are international freephone service, international premium rate services and international shared cost services.

8. ASSIGNMENT OF TOLL FREE NUMBERS

8.1 National Toll Free (Freephone) Service

1) '0800' numbers are toll free service numbers, these 9-digit numbers are used to offer national toll free service.

2) The numbers take the form of '0800' access code +6-digit virtual number. The full number string (e.g. 0800 544321) is not a physical number used to identify a particular subscriber line. Rather, the number is mapped to a real PSTN number at the Intelligent Network platform, so that calls may be routed to the subscriber using the PSTN number.

3) PTA treats the numbering plan for '0800' numbers as a separate numbering plan from the PSTN. This means that the '0800' numbers (e.g. 0800-544321) and the equivalent PSTN numbers (e.g. 544321) can be assigned to different licensees and used by different entities.

8.1.1 Eligibility Criteria

All operators granted rights to provide licensed service are eligible for assignment of toll free numbers on per number basis for subsequent allocation to their customers.

8.1.2 Application Procedure

PTA licensee will submit application for reservation/assignment of Toll Free number block on prescribed form. In addition to the general rules for number allocation the licensee will attach following information to facilitate reservation or allocation of Toll Free Numbers:

Numbers reserved for actual customer orders and a forecast of expected utilization for the reserved numbers.

To facilitate PTA assess the application for reservation/assignment of Toll Free number blocks, licensees are required to submit to PTA, an annual status report on the numbering resource assigned. Information submitted should include number assignment, level of utilisation and projected number usage within their networks.

The licensee may, however, submit application for allocation of additional toll free numbers within one year if 80% of the previously allocated resource has been utilized.

8.1.3 National Toll Free Number Assignment Procedure

1) PTA manages '0800' numbers range on per block basis through an online registration system over the Internet. A licensee may apply 0800 numbers assignment on behalf of its customers through the system.

2 Generally, the numbers (exclude those starting with '0800-8) are individually allocated to a licensee through the 0800 online registration system. PTA would issue User IDs and Passwords, on online request, to according licensee for access

to the online system to register for the number assignment on behalf of their customers.

3 The online system allows the registration, extension, activation and termination of '0800' numbers from within the block allocated. Authorized licensees are free to register any available '0800' numbers on a first-come-first-served basis.

8.1.4 National Toll Free Number Structure

Following table depicts structure of toll free number

National Toll Free Number Structure

9 digits	
3 digits	6 digits
Access Code	Assigned Number
(0)800	XXXXXX

Where X= 0-9

8.2 International Toll Free (Freephone) Service (IFS/ITFS)

1) International Freephone Service (IFS) enables an IFS customer in one country (host Country) to be assigned one or more special telephone numbers which allow IFS callers in another country to call the IFS customer free of charge. All service and call-related charges are paid by the IFS customer.

2 An IFS access provider is a recognized operating company in the country of origin of the call which is responsible to ensure the establishment of access to the international freephone number in the host country.

3 An IFS provider is a recognized operating company in the host country which provides the International Freephone Service to the IFS customer and is responsible for all relations with the IFS customer concerning the service.

4 An IFS customer is the individual or entity in the host country that obtains an International Freephone Service from an IFS service provider, and is responsible for payment of all charges due to that IFN service provider.

5 The International Freephone Service is provided through bilateral agreement between IFS providers and IFS access providers

8.3 International Toll Free Numbers

8.3.1 General

1) International Toll Free Numbers are 12-digit numbers, used for International Toll Free Services (ITFS) and Home Country Direct Service (HCDS). These numbers take the form: 00800 access code, country code and 5-digit number.

2 ITFS numbers are subscribed by overseas-based companies offering toll-free service for Pakistan originated calls.

3 HCDS numbers, similar to ITFS numbers, are toll free numbers subscribed by foreign public telecom operators offering visitors in Pakistan to reach their home operator or to self-dial and charge the call to their called party or to their International Calling Card (ICC).

8.3.2 Eligibility Criteria

Long Distance and International licensees are eligible for IFS/ITFS numbers.

8.3.3 Numbers Allocation Criteria and Procedure

PTA allocates IFS/ITFS on per number basis to licensees authorized to offer international toll free and home country direct services for sub-allocation to overseas subscribers in another country on a foreign network. Another IFS number is also allocated if the licensee is also working with another foreign operator within the same country.

1 PTA allocates ITFS numbers on per number basis to licensees for the provision of IN based international toll free service. The first 6 digits of the '0800' number (i.e. (00)800 ABCXX) are collectively referred to as a block.

2 Licensees may apply for a block of '0800' numbers for a new category of Audio-line service.

3 PTA reserves the right to determine if the new category of Audioline service should be entitled to a block of '0800' numbers or subsumed under an existing category.

8.3.4 ITFS Number Structure

Service providers in Pakistan route international incoming Home Country Direct (HCD) calls where 00800 is preceded by CC from where the call was originated followed by the operator identity.

International Toll Free Service

12 digits			
3 digits	1 digit	1 to 3 digits	5 to 7 digits
Access Code	International Identifier(ID)	Country Code	Subscriber Number
(00)800	8	C or CC or CCC	SXXXX or SXXXXX

Where CC = country code (1-3 digit)
S = Foreign network identifier digit (X)

8.3.5 Home Country Direct (HCD)

Home Country Direct (HCD) is a feature of international telephone service which enables a caller in one country to access the international operator of his home country using a non-chargeable number for the purpose of placing an international call to his home country. HCD involves a two-stage international call and will require the HCD service provider to have a bilateral agreement in place with the access service provider.

1) The access number is a non-chargeable number.

Presently PTCL, the incumbent, has implemented Home Country Direct with a few countries of the world where the call from abroad is directed to Intelligent Network by PTCL international Gateway Exchange and the customer is guided through IVR to dial the actual number to be accessed and thus connected within Pakistan while the amount is charged to the customer account in Pakistan.

Incumbent has currently implemented HCD in more than one ways for visiting foreign nationals. Following are a few examples

Current Home Country Direct Number Structure

	3 digits	2 digits	3 digits
Country Name	**Access Code**	**Network Identifier**	**Country Code**
UAE	800	11	971
UK	800	11	044
Malaysia	800	11	060

Alternately HCD for foreign nationals accessing their home country from Pakistan is currently implemented as presented below

Current Home Country Direct Number Alternate Structure

	3 digits	2 digits	3 digits	3 digits
Country Name	**Access Code**	**International Identifier**	**Country Code**	**Network Identifier**
UAE	800	90	971	002
UK	800	90	044	001
Malaysia	800	90	060	001

HCD as implemented at Intelligent Network by PTCL for HCD Calls initiated from abroad is presented below

Home Country Direct Number Structure (From abroad)

Telecom Operator	**Access Code (to be dialed by the Card user)**	**Routing Code(created in IGE Pakistan)**
Saudi Telecom Company (STC)	1800-92	10001966
ICT, Iran	0900-9211	10001018
MCI, USA	1-888-725-7826	10002001
AT&T, USA	1-800-899-3646	10001001
British Telecom, UK	0800-7839202	10001044

It is proposed to standardize HCD according to ITU-T Recommendations E.164 as follows:

ITU-T HCD Number Structure

12 digits			
3 digits	1 digit	1 to 3 digits	5 to 7 digits
Access Code	International Identifier(ID)	Country Code	Subscriber Number
(00)800	8	C or CC or CCC	SXXXX or SXXXXX

Where CC = country code (1-3 digit)
S = Foreign network identifier digit (X)

Do you agree with the:

a) Proposed number eligibility criteria

b) Proposed block size

c) Proposed structure of International Toll Free Service Number

d) Proposal to implement HCD Number structure as per ITU-T recommendations

9. ASSIGNMENT OF PREMIUM RATE NUMBERS

9.1.1 General

Premium Rate Service Numbers are used for a service in which the calling party gains access to voice content at a pre-determined rate and includes audio-text hosting services. The voice content includes specialist information provided by an appropriately qualified person or entertainment services.

1 Numbers starting with 0900 are premium rate service numbers and tele-voting service numbers the numbers are 9-digits long.

2 The numbers take the form of '0900' access code + 6-digit virtual number. Similar to '0800', the full number string for '0900' numbers (e.g. 0900 765 432) is not a physical number used to identify a particular subscriber line but is mapped to a real PSTN number at the IN, so that calls may be routed to the subscriber using the PSTN number.

9.1.2 Eligibility Criteria

CVALS licensee is eligible for premium rate service numbers in blocks of 100 numbers on production of a valid commercial contract with mobile/fixed line operator for access to its services. In addition to standard conditions for number assignment the assignee shall comply with any guidelines issued by PTA for premium service numbers and per minute charge approved by PTA.

9.1.3 Application Procedure

Authorized licensee will submit application for reservation/ assignment of Premier Rate Service number block to the PTA on prescribed form. In addition to the general rules for number allocation the licensee will attach following information to facilitate reservation or allocation of premier rate services:

Numbers reserved for actual customer orders and a forecast of expected utilization for the reserved numbers.

To facilitate the PTA assess the application for reservation/assignment of Premium Rate Service number blocks, licensees are required to submit to the PTA, an annual status report on the numbering resource assigned. Information submitted should include number assignment, level of utilisation and projected number usage within their networks.

9.1.4 PRS Number Structure

Following table depicts current structure of Premium Rate Number Structure

Current PRS Number Structure	
9 digits	
3 digits	5 digits
Access Code	Assigned Number
0900	XXXXX

Where X=0-9

Following number structure is recommended.

Recommended PRS Number Structure			
9 digits			
Access Code	Charge Band	Operator Identity	Assigned Number
3 digits	1 digit	3 digits	2 digits
0900	X	XXX	XX

Where X= 0-9

Do you agree with the:

a) Proposed structure of Premium Rate Service Number

b) Proposal to include charge information in the number itself

c) Proposal to include Service Provider information in the number itself

10. ASSIGNMENT OF UNIVERSAL ACCESS NUMBERS

10.1.1 General

Numbers starting with 111 are assigned to universal access service. These 10-digit long numbers are categorized as universal access numbers.

The numbers take the form of '111' access code + 7-digit virtual number. The full number string (e.g. 111 7654321) is not a physical number to identify a particular subscriber line, rather, the number is mapped to a real PSTN number at the IN, so that calls may be routed to the subscriber using the PSTN number.

10.1.2 Eligibility Criteria

Local Loop licensees are eligible for assignment of UAN in a block of 100 numbers for subsequent allocation to its customers.

10.1.3 Application procedure

Fixed line licensee will submit application for reservation/ assignment of universal access number block to the PTA on prescribed form. In addition to the general rules for number allocation the licensee will attach following information to facilitate reservation or allocation of universal access numbers:

Numbers reserved for actual customer orders and a forecast of expected utilization for the reserved numbers.

10.1.4 UAN Number Assignment Procedure

1) PTA manages '111' numbers range on per block basis through an online registration system over the Internet. The block consists of 100 numbers. A licensee may apply 111 numbers assignment on behalf of its customers through the system.

2 Generally, the numbers are individually allocated to a licensee through the UAN online registration system. PTA would issue User IDs and Passwords, on online request, to according licensee for access to the online system to register for the number assignment on behalf of their customers.

3 The online system allows the registration, extension, activation and termination of '111' numbers from within the block allocated. Authorized licensees are free to register any available '111' numbers on a first-come-first-served basis.

10.1.5 UAN Number Structure

Following table depicts structure of Universal Access Number Structure

Universal Access Number Structure	
10 digits	
3 digits	7 digits
Access Code	Assigned Number
111	XXXXXXX

Where X= 0-9

Comments are invited on

a) Proposed increase of assigned number from 6 to 7 digits.
b) Fixing the block size at 100 numbers

11. UNIVERSAL PERSONAL NUMBER

11.1.1 Basic Principles and Guidelines

1 Universal Personal Telecommunications (UPT) enables access to telecommunications services while allowing Personal Mobility. It enables each UPT user to participate in a User-defined set of subscribed services and to initiate and receive calls across multiple networks from any terminal, fixed or mobile, irrespective of geographic location through one access number, limited only by terminal and network capabilities and restrictions imposed by the service provider.

2 UPT is a number linked to a person rather than to a particular location or terminal.

3 UPT service allows subscribers to be reached through just one number for office, mobile or home.

4 The service provider shall provide security and privacy to UPT users including authentication (a process by which the verification of the UPT user identity is accomplished) and protection from third parties.

5 The UPT user may request various subscription options, such as basic telecommunications services and supplementary services

6 The UPT user shall have control of his services and calls.

11.1.2 Eligibility Criteria

All operators granted rights to provide Local Loop services are eligible for assignment of UPT numbers in blocks of 10 for subsequent allocation to their customers.

11.1.3 UPT Number Structure

In this scheme leading digits of the national (significant) number do not permit identification of the number as being a UPT number. Information relating to the UPT service is held in the associated UPT service profile in the subscriber's home domain. The mobility of the UPT user is then limited by the capability of the home domain and restricted only by routing and performance considerations. Following is the number structure for home related numbering scheme.

Universal Personal Number Structure (National Dialing)

2 digits	Maximum 15 digits		
Escape Code	**National Destination Code**		**Subscriber Number**
EC	UPT	SP	
0	81	X	XXXXX

The national destination code will allow at least national calling parties and national networks to identify a UPT number.

From international networks the complete UPT number must be dialed. A national short dialing format may exist but must include both the NDC and SN. Following table presents proposed structure of universal personal number.

Universal Personal Number Structure (Int'l Dialing)

1 digits	Maximum 15 digits		
Country Code	**National Destination Code**		**Subscriber Number**
CC	UPT	SP	
92	81	X	XXXXX

Where CC: the country code,
UPT: UPT Indicator
NDC: National Destination Code
SN: Subscriber number indicates UPT customer
SP: Service provider indicator

UPT identification and authentication requirements

In the UPT service it is necessary for UPT service providers to identify the UPT user service profiles, the UPT user service provider and to authenticate the UPT user. The following numbers and identities are used within the UPT service to identify UPT users' service profiles and/or provider.

i) **UPT number**

A UPT number, normally used by the caller to reach a UPT user, unambiguously identifies the UPT user. The UPT number can be used by the UPT user in a procedure to unambiguously identify his UPT service profile.

ii) **UPT user-specific UPTAN**

One UPTAN is assigned to each UPT user. The UPT user-specific UPTAN is an E.164 number to ensure dialling from international networks, and comply with other requirements of Recommendation E.164 (e.g. the 7-digit maximum length of number analysis for routing and charging).

iii) **Personal user identity (PUI)**

A PUI is an identity which unambiguously identifies the UPT user but is different from the UPT number although there is a one-to-one mapping between them. The PUI is an identity by which the UPT user is known to his UPT service provider, and by which the UPT user's service provider is known to other service providers and networks supporting UPT. As a UPT service provider option, the UPT PUI may also be used for authentication.

There are two possible authentication functions associated with a UPT user accessing their UPT service profile:

i) UPT user authentication at the user-network interface;

ii) UPT user authentication at the network-network interface(s).

UPT user-network authentication with a UPT number and PIN

This method uses UPTAN to reach the user-network interface at which time the UPT user identifies his UPT service profile to the network by inputting his UPT number, followed by a personal identification number (PIN) for authentication.

A variation of this method is to use a national prefix (P) to access the user-network interface, in this case the UPT user's UPT service provider, followed by input of the national UPT number (i.e. excluding CC) to identify the UPT service profile. The UPT user then authenticates himself to the network by inputting his personal identification number (PIN).

This method uses the UPTAN to reach the user-network interface. The user identifies him self to the network by inputting a PUI and a PIN.

The PUI is known to the UPT service provider and is not available to the public. Along with PINs and dedicated security algorithms, PUIs can assist in providing a more secure way of activating UPT procedures than through use of a UPT number.

Incumbent operator has implemented the scheme; however it is not launched, commercially.

UPT user authentication at the network-network interface

Authentication at the network-network interface is required when the UPT user is roaming between different UPT service provider networks nationally or internationally, and is using an UPTAC to access his UPT service profile. In this case, identification of his UPT service provider and the location of his UPT service profile must be available to the serving network.

If a personal identity module (PIM) containing the PUI is not used, a PUI may need to be known by the user as well as by his service provider.

A. Tele-voting

PTA allocates Service Access Code for running surveys etc through televoting. The access code leads to the IN platform of the service provider who can distinguish various surveys through allocation of additional digits to be dialed by the customer to participate in tele-voting. For example 1240 is allocated to PTCL for tele-voting. The operator assigns further four digits to be dialed by the user i.e 1240 1111. The additional digits dialed lead the participant to an announcement which directs the user to dial appropriate digit to express his opinion. For example digit 1 in favour and digit 2 against the opinion sought through tele-voting.

Another Access Code is allocated to the service provider to facilitate the company conducting the voting to get the result of the survey direct from the system. For example 1241 is assigned to PTCL for this purpose. PTCL-client (company) can fetch the result of the voting through dialing the access code and additional digits assigned by PTCL for the purpose.

11 DATA NETWORK IDENTIFICATION CODE (DNIC)

11.1 Data Network Numbering

11.1.5 Basic Principles and Guidelines

1) Data numbering plan applies only on the Public Switched Data Network (PSPDN)

2) Numbering plan for data shall be consistent with the international numbering plan described in International Telecommunications Union Recommendation X.121 and X. 122.

3 Data numbering structure allows the destination number to be transmitted by a terminal, for addressing purposes, to the data network to which the destination terminal is connected.

4 The international data number is used to identify a country, a particular network, if several data networks exist in the same country, and specific data terminal equipment/data circuit-terminating equipment (DTE/DCE) interface on that network.

5 A national data number assigned to a DTE/DCE interface is unique within a particular national network. This national data number forms part of the international data number which is also unique on a worldwide basis.

6 The Data Numbering should make provision for the inter-working of data terminals on public data networks with data terminals on public telephone, mobile, telex networks and on Integrated Services Digital Networks (ISDN).

7 The numbering plan for inter-working between PSTN and PSPDN shall be in accordance with ITU-T recommendation E.166/X.122

8 The 10-digit numeric character set 0-9 is used for numbers (or addresses) assigned to DTE/DCE interfaces on public data networks. This principle applies to both national and international data numbers.

11.1.6 Data Network Identification Code (DNIC) Structure

The DNIC consists of 4 digits as follows:

Data Network Identification Code Structure

4 digits	
3 digits	1 digit
Data Country Code(DCC)	Network Code(NC)
Z X X	X

Where Z = 4 for Pakistan (for country or geographic DNIC), and X= 0 to 9 (if Z =1 , the DNIC identifies a public mobile satellite system or global public data network)

1) The First three digits (ZXX) identify the country and the fourth digit (X) identify a specific data network in the country.

2) The DCC assignment is made by ITU-T and the network code assignment will be made by PTA and will be notified to the ITU-T.

3) Data Network Identification Code for Pakistan is 410

11.1.7 Data Number Structure

Following table depicts Data Number Structure

Data Number Structure

International Data Number (Maximum of 14 digits)		
Data Network Identification Code		Network Terminal Number
DCC	NC	NTN
3 digits	Max of 11 digits	

Where Prefix is "0",DCC for Pakistan is "410"

1 The Network Terminal Number (NTN) consists of the full address that is used when calling the data terminal from within its serving public data network.

2 The data numbers has a maximum of 14 digits according to ITU-T recommendation X.121 and X.122.

4 The limit of 14 digits length applies exclusively to the international data number information. Adequate register capacity should be made available at data switching exchanges to accommodate the above digits as well as any additional digits that might be introduced for signalling, or other purposes.

11.2 Dial up Internet Access

12.2.1 Purpose

Dial-up Internet Access Service Number is the short code used to access service offered by various internet service providers. The use of a special number range for Dial-up Internet Access Services is to allow calls intended for Internet Access Services to be easily distinguished from voice calls within the network and to be routed for optimal network efficiency and thereby reducing the potential for network congestion.

12.2.2 Dial-up Internet Access Service Number Structure

The number structure for Dial-up Internet Access Service Numbers is as follows:

Dial-up Internet Access Number Structure

AccesCode	Service Number
3 digits	**5 digits**
131	XXXXX

13 OTHER NUMBERING ISSUES

13.1 Signalling Point Code

13.1.1 National Signaling Point Code

The format of the code used to identify NSPC in the national SS7 network is identified within the signaling system by the Network Indicator (NI) as follows:

a) **NI = 10** is national network (currently used)

b) **NI = 11** is national network (reserved for other national networks)

1 The NSPC is the number that uniquely identifies a network (Network Element – NE) in a SS7 network.

2 The format of the 14-bit binary code is used for the identification of national signaling point. The 14 bits of the NSPC are first converted to a five-digit decimal number denoted **ABCDE** which is in a range from **00000 to 16383.** The NSPC (ABCDE) decimal number is divided into two fields:

a) The first field consists of three decimal digits (ABC) representing the Network Identity. The Network Identity has 164 blocks of which have the capacity of 100 codes and one (No. 164) has a capacity of 83 codes.

b) The second field will be consisting of two decimal digits (DE) representing the signaling point code. Each block of (DE) has a capacity of 100 signaling point codes.

The code used in public telephone networks using the ITU-T Recommendation on Signalling System Number 7 (known as CCS 7).

National Signaling Point Code Format

National Signaling Point Code Format
NML : KJIHGFED : CBA
3 bits : (8 bits) ; (3 bits)

13.1.2 International Signaling Point Code

The format of the code used to identify the international signaling points in the SS7 network is identified by the Network Indicator **"NI = 00"**. It is composed of 14 bit binary code which is represented by 3 decimal numbers as follows:

1 The first indicating the three most significant bits (NML), with a range of **0 to 7.**

2 The second indicating the following eight bits (K-D), with a range of **000 to 255.**

3 The third consisting of the three least significant bits (CBA), with a range of **0 to 7.**

The combination of the fields containing bits NML and bits K-D is regarded as the Signaling Area Network Code (SANC). The three bits (CBA) identify a specific signaling point which when combined with the SANC forms the 14-bit ISPC.

The code used in international telephone networks using the ITU-T Recommendation on

Signalling System Number 7 (known as CCS 7). International Signalling point codes are allocated by ITU-T. (4-074 for Pakistan)

International Signalling Point Code Format

International Signaling Point Code Format

NML	**K J I H G F E D**	**C B A**
1 digit (Z)	3 digits (UUU)	1 digit (V)
3 bits	8 bits	3 bits
Zone Identification	Area/Network identification	Signaling Point identification
Signaling Area/Network Code (SANC)		
International Signaling Point Code (ISPC)		

Where NML = World geographic zone identification
K to D = Geographic area or network identification in a specific zone
CBA = Signaling point identification in a specific geographic area or network

SPC Charge

PTA levies a one time charge of Rs:5000 as processing fees for allocation of SPC, to ensure efficient use of SPC PTA will charge Rs:10,000 for assignment of national SPC.

13.2USE OF '*' AND '#' KEYS

1) Apart from the digits '0' to '9' on the keypads of the current multi frequency tone dialing telephones, there are two remaining dial buttons '*' and '#'. These keys are presently widely used in paging services and the activation and deactivation of various value-added services such as call transfer, call waiting etc.

2) The use of these codes for value added services should be switch-based.

3) These codes should terminate at the local switch (or nearest switch in the case of Radio Network) connected to the subscriber unit and should not be passed from one switch to another.

4) The use of such codes should not cause conflict to the national numbering plan including the PSTN/Mobile/Paging number ranges.

13.3Use of Alphanumeric Characters

Alphanumeric characters are not used in the National Numbering Plan keypads. PTA may, when the market is ready, issue separate rules for the standardization of alphanumeric keypad as recommended by the ITU.

13.3.1 Number Charge

Telecommunication Regulator is responsible for the preparation and management of National Numbering Plan to ensure fair and equitable supply of numbering resource to all the players in the telecommunication market. At the same time regulator ensures the sanctity of the national numbering plan against misuse. Normally following principles are followed.

a) Fair and non-discriminatory access to numbers is important for fair competition. While a number of countries set the level of charges for numbers based on a cost recovery basis, an important consideration in charging numbers is that it promotes efficient use of numbers by service providers in a fair and equitable manner.

b) If no cost is imposed on holding assigned numbers without actually using them there is no economic incentive for operators to be more efficient in the use of assigned numbers. Number charge provides economic cause for service providers to use finite national resource efficiently.

c) Efficient use of numbers carries long term benefit for the society in minimising numbering plan changes which result in disruption, additional cost and inconvenience to customers and the industry.

d) Numbers hold a value to industry above the level of administrative costs being a finite national resource. A reasonable portion of this national value is normally collected by the regulator on behalf of the Government. This has the economic effect on industry of setting an appropriate cost level for the numbering resource in business decisions, such as the evaluation of new products and services.

e) Short codes have a special significance and carry a special price

f) Golden numbers are preferred for the ease to remember and carry special appeal for some customers who are willing to pay premier on such numbers, regulators around the world place premier on such numbers.

PTA incurs an expense in development of a National Numbering Plan and manages it in a fair and transparent manner. PTA allocates numbers to telecom operators for launch of

their services as also for the expansion of their networks and services. This section examines various possibilities to recover the expense in a fair, equitable and transparent manner.

13.3.2 Categories of Numbers

Numbers are normally categorized under three heads.

1) Ordinary numbers

2) Short codes or special numbers, and

3) Golden numbers

Ordinary Numbers

The numbers which are normally assigned to fixed line and mobile customers for provision of according service are called normal numbers.

Short Codes

Short codes are further divided into three categories according to the way these are used.

1) Type A codes

Codes having such widely understood significance that they may be used by all operators offering equivalent services (whether directly or through the agency of another operator), and will not be used by any other operator for any other service.

2) Type B codes

Type B access codes have network-wide significance: they are used by the end users of one public telecommunications operator to have selected calls connected by an operator other than the one from whom they rent their telephone line (known as 'Carrier Selection'). Operators may be required to choose the same code where the service is identical to conserve the supply of Access codes. It should not be assumed that the operators concerned would make all services available to all callers.

3) Type C codes

Codes that are used for network operators' in-house and on-net services, such as for testing and customer services.

Use of all types of access codes will be subject to approval by the PTA and will be confirmed, or issued through the allocation procedure.

- Type A access codes will be common to all operators e.g. Emergency Services.
- Type B access codes will be used to develop competition. Carrier Selection, etc.
- Type C access codes will be curtailed to on-net free or low cost services and testing.

Golden Numbers

1. PTA may reserve Non-Geographic numbers which it considers to be cherished by the customers in order to protect and realize its value.

2. The following principles are adopted when deciding whether a number is a cherished or golden number

   i. Repeated digits - numbers containing the same digit repeated four (4) or more times consecutively

   ii. Increasing or decreasing sequences - numbers containing an increasing or decreasing sequence of four (4) or more consecutive digits

   iii. Alternating sequences - numbers containing consecutive alternating digits with a length of six (6) or more alternating digits

   iv. Repeated pairs - numbers containing consecutive pairs of repeated digits of a total length of six (6) or more repeated digits; and

   v. Other patterns regarded as valuable by the Authority

If PTA decides to assign cherished numbers by way of auction, tender or any other means, the Authority may issue and publish any of the following matters at the appropriate time:

(a). Eligibility criteria for cherished numbers assignment

(b). Applicable conditions attached to any assignment

(c). Necessary application forms

(d). Type of process by which cherished numbers are to be assigned and the rules thereof

(e). Entry fees for prospective applicants

(f). Reserve price and deposits required (if any)

(g). Basis on how the Authority would handle two or more equal applicants

(h). Methods of payment of the charges for the assignment

(i). Cherished numbers which are on offer

(j). Extent, if any, to which the transfer or dealing with the assignment will be permitted

(k). Type of services which the assignment shall be used for

(l). Time period which the assignment shall be utilized

(m). Such other matter as may be necessary in the opinion of the Authority.

Assignment of geographic numbers to end-users, shall not be subject to any charge by the assignment holder, merely because the number is in a form or structure which falls within the designation of a cherished number as set out in paragraph above.

Charging Numbers

Following options are normally exercised while charging numbers.

1) Ordinary numbers are charged on "Cost Basis". The cost of managing the numbering plan and allocation of numbers is divided by the numbers allocated to various service providers giving the cost of managing the Numbers.

2) PTA is spending around one hundred million rupees per year on the management of numbering resource against an equal number of numbering under the use of various service providers, as such the cost of managing one ordinary number is rupee one per number allocated and reserved annually.

3) Each operator is charged the cost as "Number Fee" at the time of allocation of number block and subsequently charged on annual basis. The number charge normally is included in the License as license condition.

3) Incumbent is charged for all the numbers previously under use and subsequently for all new allocations as applicable to other operators to provide level playing field to all the players in the telecommunication market.

Managing one ordinary number costs PTA approximately one rupee whereas PTA charges rupee 0.5 per number per annum.

13.3.3 Short Codes

Short Codes and Special Numbers carry a premium because such numbers consume a larger capacity possible for ordinary numbers in national numbering plan.

Benchmarking-Short Code Charge

Country	GDP in Local Currency*	GDP in USD	Population*	Per Capita Imcome (USD)	Short Codes Charge	Procedure**
Australia	778762	423,240	19.64	21,549		Auction
UK	1043940	1,558,119	59.09	26,369		
Singapore	155727	86,998	4.16	20,893	11173	Auction
Malaysia	360658	94,910	24.53	3,870		Auction
Bahrain	2889	7,603	0.67	11,313		

Source: *ITU-Year book of Statistics (2002) & **NRA websites

Benchmark Analysis- Short Code Charge

Since most of the countries fix the cost through auction there is not enough data available on short codes to work out a parallel with other countries.

PTA charges a one time fee of rupees 5,000 at the time of allocation of short codes specific to the service provider. It is proposed that PTA auctions short codes to ensure efficient use of short codes and to collect the market price of the codes. The process will ensure transparent and equitable allocation of the short codes where service providers attach a special significance to short codes which are easy to remember and contribute towards their business model.

13.3.4 Golden Numbers

1) Golden Numbers do not consume capacity more than an ordinary number as part of national numbering plan, however these numbers generate demand and interest from the customers. The network operators use these numbers to generate revenues by selling such numbers on premium.

2) Irrespective of the fact whether PTA allocates golden numbers on premium or not, the operators make money from such numbers all the same. This is especially true for mobile numbers. When the customer is ready to pay the premium it is prudent for the PTA also to reinforce its finances to ensure its independence through generation of resources for regulation of the sector.

   There are various methods to charge the numbers in an equitable and fair manner

   i) Open Bidding

   ii) At administratively fixed prices

iii) Sale through tender

iv) Any combination of above three.

Determining Golden Numbers

Different countries determine golden numbers against different criteria, following are a few examples how golden number is determined in these countries

Benchmarking-Golden Number

S.No	Country	Golden Number
1	Australia	Numbers with last digit repeated at least three times and with repeated pairs.
2	UK	Numbers with last digit repeated at least three times and with repeated pairs.
3	Singapore	Numbers with a digit repeated at least 4 times, repeated pairs and increasing, decreasing & alternating sequences.
4	Malaysia	Numbers with last digit repeated at least three times and with repeated pairs, increasing, decreasing and alternating sequences.
5	Bahrain	Numbers with a digit repeated at least three times

Source: Websites of National PTAy Authorities

Benchmark Analysis-Golden Number

A number with following attributes is normally declared a Golden Number

1) A number which holds a digit consecutively repeated at least three times

2) A number which holds consecutive repeated pairs

3) A number which has an increasing or decreasing sequence

4) A number which has an alternating sequence

It is evident from above that most of the countries declare a number as golden number which has the last digit repeated three times and more and also the number having consecutively repeated pairs. It is recommended that numbers with a digit repeated at least three times (& more) and the ones with consecutive repeated pairs are treated Golden Numbers

Golden Number Charge

Various countries put a price tag on a golden number differently. Following table lays down the maximum cost charged on assignment of a golden number.

Benchmarking-Golden Number Charge

Country	GDP in Local Currency*	GDP in USD	Population*	Per Capita USD	Golden Number Charge**	Assignment Procedure**
Australia	778762	423,240	19.64	21,549	436	Auction
UK	1043940	1,558,119	59.09	26,369	877	Fixed
Singapore	155727	86,998	4.16	20,893	30	Fixed
Malaysia	360658	94,910	24.53	3,870	N/A	Auction
Bahrain	2889	7,603	0.67	11,313	265	Fixed

Source: *ITU-Year book of Statistics (2002) & **NRA websites

Benchmark Analysis-Golden Number Charge

There is no direct link between per capita income and the maximum cost realized from the sale of a golden number from the analysis of the benchmarked countries. Bahrain with half the per capita income as compared to Singapore charges almost nine times for assignment of a golden number. It is reasonable to assume that the cost depends on the socio-economic conditions of the country and the importance attached by the people to the number they hold and the way it is seen in the society—a status symbol.

Since different societies value Golden Number differently it is prudent that Golden numbers are auctioned by PTA to fetch the market price. All the golden numbers are separated from the normal numbers while allocating a number block and auctioned separately by PTA for direct assignment to the service user. This includes toll free numbers, universal access numbers and premium rate numbers.

13.4 ENUM

Telephone Number Mapping (**ENUM** from T**E**lephone **NU**mber **M**apping) is a suite of protocols to unify the telephone numbering system E.164 with the Internet addressing system DNS by using an indirect lookup method, to obtain NAPTR records. The records are stored at a DNS database.

Although it facilitates calling VOIP users from IP and PSTN networks, ENUM is not a VOIP function and should not be confused with common VOIP routing based on SIP, H.323 or IAX protocols with a Uniform Resource Identifier (URI).

Being able to dial telephone calls the way customers have come to expect is considered crucial for the convergence of classic telephone service (PSTN) and Internet telephony (VOIP), and for the development of new IP multimedia services. The problem of a single universal personal identifier for multiple communication services can be solved with different approaches. One simple approach is the Electronic Number Mapping System ENUM (also known as Telephone Number Mapping), developed by the IETF, using existing E.164 telephone numbers, protocols and infrastructure to indirectly access different services available under a single personal identifier. ENUM also permits connecting the IP world to the telephone system in a seamless manner

For an ENUM subscriber to be able to activate and use the ENUM service it needs to obtain three elements from a Registrar. A personal Uniform Resource Identifier (URI) to be used on the IP part of the network and one E.164 regular personal telephone number associated with the personal URI, to be used on the PSTN part of the network.

ENUM customer needs authority to write his/her call forwarding/termination preferences in the NAPTR record accessible via the personal URI

ENUM Registrar provides the Subscriber (or Registrant) a domain name, the URI, that will be used to access a DNS server to fetch a NAPTR record, (2) a personal E.164 telephone number (the ENUM number). The URI domain name of the registrant is associated to the subscriber E.164 ENUM number to the according NAPTR record. Finally the NAPTR record corresponding to the subscriber URI contains the subscriber call forwarding/termination preferences.

When PSTN customer dials a contact who has subscribed to ENUM, the number is translated at the ENUM gateway into the corresponding URI. This URI is used to look-up and fetch the NAPTR record obtaining the called party wishes about how the call is to be terminated (either on IP or on PSTN), the so-called access information, which the registrant (the called party) has specified by writing his/her choice at the 'NAPTR record', "Naming Authority Pointer Resource Records" as defined in RFC 2915, such as e-mail addresses, a fax number, a personal website, a VOIP number, mobile telephone numbers, voice mail systems, IP-telephony addresses, web pages, GPS coordinates, call diversions or instant messaging. Alternately, when the calling party is at the IP side, the User Agent (UA) piece of software of the dialer will allow to dial a E.164 number, but the dialer UA will convert it into a URI, to be used to look-up at the ENUM gateway DNS and fetch the NAPTR record obtaining the called party wishes about how the call should be terminated (again, either on IP or on PSTN terminations).

Calling by using a new personal E.164 number (the ENUM number) to look-up at a database is therefore an indirect calling support service.

The ITU ENUM allocates a specific zone, namely "e164.arpa" for use with ENUM E.164 numbers on the IP side of the network. RFC 3761 define how any ENUM number, such as +92 51 5671234 can be transformed into a URI, by reversing the numbers, separating them with dots and adding the e164.arpa suffix thus: 4.3.2.1.7.6.5.1.5.2.9.e164.arpa

The URI can then be used to look up at the DNS the Internet addresses for services such as SIP VOIP telephony. NAPTR records are used to set the subscriber call forwarding/termination preferences. Therefore the whole system can 'translate' E.164 addresses to SIP addresses.

A detailed paper on the working of ENUM is placed in Annexure as part of this document.

13.5NDC Assignment

S.No	NPA Name	Existing NDC	Proposed NDC		S.No	NPA Name	Existing NDC	Proposed NDC
1	Sahiwal	40	400		51	Kurram Agency	926	477
2	Okara	44	440		52	Karak	927	474
3	Kasur	49	449		53	Bannu / North Waziristan Agency	928	478
4	Sheikhupura	56	456		54	Tank	963	473
5	Pakpattan	457	457		55	South Waziristan	965	475
6	Faisalabad	41	441		56	D.I.Khan	966	476
7	Toba Tek Singh	46	446		57	Lakki Marwat	969	479
8	Jhang	47	447		58	Rawalpindi / Islamabad	51	451
9	Sargodha	48	448		59	Attock	57	450
10	Bhakkar	453	453		60	Chakwal	543	443
11	Khushab	454	454		61	Jhelum	544	444
12	Mianwali	459	459		62	Hyderabad	22	222
13	Sialkot	52	452		63	Dadu	25	225
14	Gujrat	53	445		64	Tharparkar	232	232
15	Gujranwala	55	455		65	Mirpur Khas	233	233
16	Narowal	542	442		66	Sanghar	235	235
17	Mandi Bahauddin	546	458		67	Umerkot	238	238
18	Hafizabad	547	469		68	Badin	297	297
19	Abbottabad	992	492		69	Thatta	298	298
20	Haripur	995	495		70	Sukkur	71	271
21	Shangla	996	496		71	Larkana	74	274
22	Mansehra / Batagram	997	497		72	Naushahro Feroze	242	242

23	Kohistan	998	498		73	Khairpur	243	243
24	Karachi	21	21		74	Nawabshah	244	244
25	Lahore	42	42		75	Jacobabad	722	221
26	Multan	61	461		76	Ghotki	723	223
27	Bahawalpur	62	462		77	Shikarpur	726	226
28	Bahawalnagar	63	463		78	Quetta	81	281
29	Dera Ghazi Khan	64	464		79	Gawadar	86	286
30	Khanewal	65	465		80	Zhob	822	272
31	Muzaffargarh	66	466		81	Killa Saifullah	823	273
32	Vehari	67	467		82	Loralai	824	224
33	Rahim Yar Khan	68	468		83	Chagai	825	275
34	Rajanpur	604	404		84	Killa Abdullah / Pishin	826	276
35	Layyah	606	406		85	Musakhel	828	228
36	Lodhran	608	408		86	Barkhan / Kohlu	829	229
37	Peshawar / Charsadda	91	491		87	Bolan	832	282
38	Nowshera	923	493		88	Sibi / Ziarat	833	283
39	Khyber / Mohmand Agency	924	494		89	Dera Bugti	835	285
40	Malakand	932	432		90	Jhal Magsi	837	237
41	Mardan	937	437		91	Jaffarabad / Nasirabad	838	288
42	Swabi	938	438		92	Mastung	843	284
43	Buner	939	439		93	Kalat	844	254
44	Bajaur Agency	942	431		94	Kharan	847	247
45	Chitral	943	433		95	Khuzdar	848	248
46	Upper Dir	944	434		96	Kech	852	252

47	Lower Dir	945	435		97	Lasbela	853	253
48	Swat	946	436		98	Panjgur	855	255
49	Kohat	922	472		99	Awaran	856	256
50	Hangu / Orakzai Agency	925	471		100	AJK & NA	58	48

AJK & NA

S.No	NPA Name	Existing NDC	Proposed NDC
1	Muzzafarabad	58	480
2	Neelam	58	480
3	Rawalakot	58	481
4	Plandri	58	481
5	Bagh	58	482
6	Kotli	58	483
7	Mirpur	58	484

AJK & NA

S.No	NPA Name	Existing NDC	Proposed NDC
8	Bhimber	58	485
9	Gilgit	58	486
10	Chilas	58	487
11	Astore	58	487
12	Gakuch	58	488
13	Skardu	58	489
14	Khaploo	58	489

13.6 Short Codes- Summary

Short codes are numbers starting with leading digit "1". These codes are allocated for providing special services to customers. These services include calls for operator assistance, service enquiry, voice information and IN services. Number assignments in the level '1' range are rationalised such that similar ranges of numbers are used for similar services.

Following short codes have been retained in the public interest since well remembered and under use for a long time now.

Police	15	UAN	111	Flight Enquiry	114
Edhi Ambulance	115	Fire Brigade	116	Railway Enquiry	117
Electricity Complaint	118	Gas Complaint	119.	Motorway Police	130
Internet Access	131	CM Emergency Cell	134		

Summary of Proposed Short Code Assignment

Name of Service	Short Code	Number of Digits
Customer Services (Calling Card, Customer Services)	10XX	3/4 digits
UAN, Emergency Services (Fire, Ambulance, Various Enquiries)	11X	3 digits
Access Code for various customer services (VMS, Calling Cards)	12XX	3/4 digits
Internet Access & Various helplines	13X	3 digits
Reserved for Future Use	14XX	4 digits
Emergency Police	15	2 digits
Reserved for Future Use	16XX	4 digits
Reserved for Future Use	17XX	4 digit
Reserved for Future Use	18XX	4 digits
Carrier Selection	19XX	3/4 digits

14 QUERRIES AND COMMENTS

All queries and or comments regarding this Code should be directed to the following address;

The Director General
Industry Development
Pakistan Telecommunication Authority
F /6-1 Islamabad

11.2 References

ITU-T Recommendation E.152 (1996), *International freephone service*

– ITU-T Recommendation E.161 (1995), *Arrangements of digits, letters and symbols on telephones and other devices that can be used for gaining access to a telephone network.*

– ITU-T Recommendation E.164 (1997), *The international public telecommunication numbering plan.*

– ITU-T Recommendation E.164.1 (1998), *Criteria and procedures for the reservation, assignment and reclamation of E.164 country codes and associated Identification Codes (ICs).*

– ITU-T Recommendation E.166 (1998), *Numbering plan interworking for the E.164 and X.121 numbering plans.*

– ITU-T Recommendation E.169 (1998), *Application of Recommendation E.164 numbering plan for universal international freephone numbers for the international freephone service.*

– ITU-T Recommendation E.174 (1995), *Routing principles and guidance for Universal Personal Telecommunications (UPT).*

– ITU-T Recommendation E.190 (1997), *Principles and responsibilities for the management, assignment and reclamation of E-series international numbering resources.*

– ITU-T Recommendation E.212 (1998), *The international identification plan for mobile terminals and mobile users.*

– CCITT Recommendation E.214 (1988), *Structure of the land mobile global title for the signalling connection control part (SCCP).*

– ITU-T Recommendation F.850 (1993), *Principles of universal personal telecommunication (UPT).*

– ITU-T Recommendation F.851 (1995), Universal Personal Telecommunication (UPT) – Service descripion (service set 1).

11.3 Abbreviations

CC	Country Code
CC (UPT)	E.164 country code "878" which has been reserved as a UPT indicator
CCITT	International Telegraph and Telephone Consultative Committee
CDLI	Called Line Identity
CI	Charging/Accounting Indicator
CLI	Calling Line Identity
COLI	Connected Line Identity
DN	Destination Network
FSN	Freephone Subscriber Number
GSN	Global Subscriber Number
IC	Identification Code
IFS	International freephone service
IMSI	An E.212 international mobile subscriber identity
IN	Intelligent Network
ISDN	Integrated Services Digital Network
ITU	International Telecommunication Union
ITU-T	International Telecommunication Union – Telecommunication Standardization Sector
IPRS	International Premium Rate Service
MCC	An E.212 mobile country code

MNC	An E.212 mobile network code
NDC	National Destination Code
NDC(CC)	An E.164 country code assigned to a country or other purpose that would allow it to be used for UPT
NPI	Numbering Plan Identifier
PRSN	Premium Rate Subscriber Number
N(S)N	National (Significant) Number
PIM	Personal identity module
PIN	Personal identification number
PUI	Personal user identity
PSTN	Public Switched Telephone Network
ROA	Recognized Operating Agency
SA	Sub-Address
SP	Service provider
SN	Subscriber Number
SN	Subscriber Number
TC	Trunk Code
TON	Type of Number
TSB	Telecommunication Standardization Bureau

UIFN	Universal International Freephone Number
UIFN	Universal International Freephone Number
UC	UPT user code
UIFN	Universal international freephone number
UPT	Universal personal telecommunication
UPTAC	Universal personal telecommunication access code
UPTAN	Universal personal telecommunication access number
UPTGT	UPT global title
UIPRN	Universal International Premium Rate Number

A6	DNS Resource Record used to look up 128-bit IPv6 Address
AAAA	DNS Resource Record to help transition and coexistence between IPv4 and IPv6 networks
ACE	ASCII Compatible Encoding
APNG	Asia Pacific Networking Group
ARIN	American Registry for Internet Numbers
BIND	Berkeley Internet Name Domain
ccTLD	Country Code Top Level Domain
DES	Data Encryption Standard, widely-used method of data encryption
DIG	Domain Internet Groper
DIN	Deutsches Institut für Normung
DNAME	DNS Resource Record providing capability to map entire subtree of a DNS name space to another domain (RFC 2672)
DNS	Domain Name System

DNSSEC	Domain Name System Security
DOC	US Department of Commerce
E2U	E.164 to URI resolution (specific type of NAPTR service)
ENUM	IETF Telephone Number Mapping Working Group and resultant protocol
GATS	General Agreement on Trade in Services
GIC	Group Identification Code
GOC	Groups of Countries
GPS	Global Positioning System
GTLD	Generic Top Level Domain
GTLD-MOU	Generic Top Level Domain Memorandum of Understanding
HTTP	Hypertext Text Transfer Protocol
IAB	Internet Architecture Board
IAHC	International Ad Hoc Committee
IANA	Internet Assigned Numbers Authority, now part of ICANN
IC	Identification Code
ICANN	Internet Corporation for Assigned Names and Numbers
IDNS	International Domain Names
iDNS	Internationalized Multilingual Multiscript Domain Names Service
IETF	Internet Engineering Task Force
INTUG	International Telecommunications User Group
IP	Internet Protocol
ISOC	Internet Society
ISP	Internet Service Provider
ITU	International Telecommunication Union

ITU-T	ITU Telecommunication Standardization Sector
JIS	Japanese Industrial Standard
KEY	DNS Resource Record type used in DNSEC
LDAP	Lightweight Directory Access Protocol
MIB	Management Information Base
MINC	Multilingual Internet Names Consortium
MRTG	Multi Router Traffic Grapher
NAPTR	Naming Authority Pointer (RFC 2915)
NIST	US National Institute of Standards and Technology
NOTIFY	Extension to DNS protocol defined in RFC 1996
NP	Number Portability
NSF	US National Science Foundation
NSI	Network Solutions Incorporated
NTPD	Network Time Protocol Daemon
NXT	DNS Resource Record type used in DNSEC
PSTN	The Public Switched Telephone Network
QoS	Quality of Service
RBL	Realtime Blackhole List
RFC	Request for Comments, an IETF-related document
RFP	Request for Proposals
RIPE	Réseaux IP Européen
RIPE-NCC	RIPE Network Coordination Center
RLOGIN	UNIX Remote Logon command
RR	DNS Resource Record
RRDtool	Round Robin Database Tool

RSH	UNIX Remote Shell command
RTT	Round Trip Time
SG2	ITU-T Study Group 2
SIG	DNS Resource Record type used in DNSEC
SIP	Session Initiation Protocol
SLA	Service Level Agreement
SNMP	Simple Network Management Protocol
SOA	Start of Authority
SOA	Start of Authority DNS Resource Record
SPAM	Unsolicited Commercial Email
SSHD	Secure Shell Daemon
TLD	Top Level Domain
TSB	Telecommunication Standardization Bureau
TSIG	Transaction Signatures
TSON	TSB Telecommunication, Operation and Numbering Services Unit
TSP	Telephone Service Provider
UCE	Unsolicited Commercial Email
UIFN	Universal International Freephone Numbers
URI	Uniform Resource Identifier
URL	Uniform Resource Locator
VGRS	Verisign Global Registry Services
VoIP	Voice over IP
VPN	Virtual Private Network
WG	Working Group
WIPO	World Intellectual Property Organization

WP1/2	Working Party 1 of SG 2
WTO	World Trade Organization
WTSA	World Telecommunication Standardization Assembly

11.4 Definitions

Address: A string or combination of decimal digits, symbols, and additional information which identifies the specific termination point(s) of a connection in a public network(s) or, where applicable, in interconnected private network(s).

Address-of-Record (AoR): within SIP, an address-of-record represents an identity of the user, generally a long-term identity, and it does not have a dependency on any device; users can move between devices or even be associated with multiple devices at one time whilst retaining the same address-of-record

NOTE: A simple URI, generally of the form "sip:egdar@example.com", is used for an address-of-record.

Apex: name of a delegation point in the DNS. For example, the zone apex for the public ENUM name space is e164.arpa

Authorized subscriber: The person authorized to use a specific telephone number.

Authorized communications service provider: The communications service provider who is officially authorized to use the telephone number corresponding to an ENUM domain or to which this authorization is assigned by means of a number transfer

Border Element: generic term used for any device separating intranets, extranets and the public Internet

NOTE: It may consist of firewalls, session border controllers and may provide Network Address Translation (NAT) functions.

Communication Service Provider (CSP): any entity providing communications services using E.164 numbers to "End Users" and using an infrastructure to provide routeing capabilities

NOTE: The "End Users" may be on the Internet, within an IMS based NGN or even on the PSTN.

Caller: The person requesting the home country direct feature and providing information for the payment of telecommunication services.

Carrier Selection: The facility offered to end users which allow them to opt for a specific carrier. The term carrier selection is used when the decision is controlled by the calling party.

Country Code (CC): Country Code is a combination of one, two or three digits identifying a specific country or countries.

Country Code (CC) for Global Services: A 3-digit Country Code used to identify the global service.

Closed Numbering Plan: Closed numbering plan is a non-hierarchical numbering structure; for calls between subscribers within the same zone (local calls) or different

zones (national calls), it is always necessary to dial the full National Significant Number (NSN).

Delegation: Assignment of an ENUM domain to a registrar in the registry database.

Domain: set of names within the DNS consisting of a single domain name and all the domain names below it

E.164: International Public Telecommunications Numbering Plan

E164 number: number taken from the International Public Telecommunications Numbering Plan

ENUM: protocol developed by the IETF as RFC 3761 [16] to be used within e164.arpa

Global Subscriber: Global Subscriber number identifies a subscriber for a particular global service.

Home Country Direct[1)]: Home country direct is an optional feature of the international telephone service which enables a caller in one country to access directly the home country direct service provider in a second country for the purpose of placing a call terminating within the second country. This feature shall be provided on the basis of a bilateral agreement between the cooperating ROA.

Home country direct involves a two-stage international call and will require the home country direct service provider to have a bilateral agreement in place with the service access provider.

Home Country Direct Service Provider: The ROA accepting payment information, performing the verification process, recording the details of the call, and initiating call establishment.

Home Domain: Refers to a network, localized area or telephone exchange, within which a dialed UPT number is recognized as being UPT.

Incalls: Calls inbound to the UPT user.

International Premium Rate Number: A number dialed by a caller to obtain a connection to an IPRS customer for the IPRS.

International Premium Rate Service Customer: The information (content) provider.

IFS caller: The person who places a call to a UIFN.

IFS service provider: The ROA which provides the IFS.

IFS customer: The individual or entity that obtains a UIFN from an IFS service provider.

1) Also known as International Operator Direct Calling (IODC).

International Prefix: A digit or combination of digits used to indicate that the number following is an International Public Telecommunications Number.

Number (GSN): Home Country Direct: Home country direct is an optional feature of the international telephone service which enables a caller in one country to access directly the home country direct service provider in a second country for the purpose of placing a call terminating within the second country. This feature is provided on the basis of a bilateral agreement between the cooperating ROAs.

National (Significant) Number [N(S)N] NSN is the portion of the number which follows the country code, for geographic areas. The national (significant) number consists of the National Destination Code (NDC) followed by the Subscriber Number (SN).

National Destination Code (NDC): A nationally optional code field, within the ITU-T recommendation E.164 number plan, which combined with the Subscriber's Number (SN) will constitute the national (significant) number.

Network Access Code (NAC): A nationally optional code field, within the ITU-T recommendation E.164 number plan, which combined with the Mobile Subscriber Number will constitute the national (significant) number.

National (Trunk) Prefix: National Prefix is a digit or combination of digits used by a calling subscriber for making a call to another subscriber in his own country but outside his own numbering area. It provides access to the automatic outgoing trunk equipment.

NAPTR record: (Naming Authority Pointer Resource record): An entry in the Domain Name System (DNS) which contains rules for the conversion of queries. For ENUM resolution, this means that a request for an ENUM domain is answered with a URI (Uniform Resource Identifier) according to the specified rules. This URI supplies the source address and the protocol for further communication.

Number: A string of decimal digits,that uniquely indicates the public network termination point. The number contains the information necessary to route the call to this termination point.

The international format is known as the International Public Telecommunications Number which includes the country code and subsequent digits but not the international prefix.

Numbering Plan: A numbering plan specifies the format and structure of the numbers used within that plan. It typically consists of decimal digits segmented into groups in order to identify specific elements used for identification, routing and charging capabilities,

Number Block: Set of contiguous numbers of a specified or unspecified size.

Number Portability: This is a facility by which a user can retain an existing number without impairment of quality, reliability or convenience when switching from one service provider to another.

Number Embedding: Method by which an IFS customer's existing national FSN, is integrated as part of the GSN portion of the new UIFN.

Open Numbering Plan: This expression designates a hierarchical numbering structure containing a distribution of subscribers into zones identified by a NDC. For calls between subscribers within a zone, it is sufficient to dial the subscriber's number. For calls between subscribers in different zones, it is necessary to dial the NDC (including the prefix "0") and the subscriber's number.

O**utcalls**: Calls outbound from the UPT user.

Prefix: Prefix is an indicator consisting of one or more digits that allows the selection of different types of number formats, networks and/or service.

Premium Rate Services (PRS): Services that are paid for through the telephone bill of a subscriber. The revenue for a PRS call may be shared between the operator and the provider of the service.

Personal Mobility: The ability of a user to access telecommunications services at any terminal on the basis of a personal identifier (e.g. the UPT number), and the capability of the network to provide those services delineated in the user's service profile. Personal mobility involves the network capability to locate the terminal associated with the user for the purpose of addressing, routing and charging the UPT user's calls. (1.3.6/F.851)

Personal User Identity (PUI): A PUI is an identity which unambiguously identifies the UPT user but is different from the UPT number although there is a one-to-one mapping between them. The PUI is an identity by which the UPT user is known to his UPT service provider and by which the UPT user's service provider is known to other service providers and networks supporting UPT.

Personal Identity Module (PIM): A personal identity module is, for example, a microprocessor or magnetic strip equipped card or other device which contains procedures or data necessary for accessing the UPT service including a UPT user's personal user identity.

Prefix: A prefix is an indicator consisting of one or more digits that allows selection of different types of number formats, networks and/or service.

Registrar: The entity responsible for processing registration requests, and assignment of the GSN portion of the UIFN in accordance with this Recommendation and Recommendation E.152.

Routing Number: A number specified by and, identifying the home country direct service provider for routing purposes. The access number dialed by the caller is translated by the service access provider to this special routing number before the call is transferred to the home country direct service provider

Suspension of a delegation: The temporary deactivation of an existing ENUM domain delegation.

Service period: The service period for ENUM domains is defined as a specific period beginning on the date on which the ENUM domain is delegated. The service period shall then be extended for one additional period at a time

Signalling Point Code (SPC): The code used in public telephone networks using the ITU-T Recommendation on Signalling System Number 7 (known as CCS 7).

Subscriber Number (SN): Subscriber number identifies a subscriber in a telecommunication network or numbering area.

Service Access Provider: The Recognized Operating Agency (ROA) in the country of call origination providing access and telecommunication transport to the home country direct service provider on behalf of the caller.

Service Delivery Provider: The ROA providing telecommunication transport at the call destination.

UPT Service Profile: The UPT service profile is a record containing all the information related to a UPT user in order to provide that user with the UPT service. Each UPT service profile is associated with a single UPT number.

Universal International Freephone Number: The Universal International Freephone Number (UIFN) enables an IFS customer to be allocated a unique freephone number(s) that is the same throughout the world. A UIFN is composed of a 3-digit CC for a global service application, 800 and an 8-digit GSN.

Universal International Premium Rate Number (UIPRN): A unique number which is assigned to the IPRS customer on a global basis for the provision of the IPRS.

UIPRN registrar: The administrator responsible for processing registration requests and assigning the UIPRN resource.

Universal Personal Telecommunication (UPT): Universal personal telecommunication enables access to telecommunication services while allowing personal mobility. It enables each UPT user to participate in a user-defined set of subscribed services and to initiate and receive calls on the basis of a personal, network-transparent UPT number across multiple networks on any fixed terminal and or mobile terminal, irrespective of geographical location, limited only by network capabilities and restrictions imposed by the network operator.

Universal Personal Telecommunication Access Code (UPTAC): A code the UPT user may need to dial, when using certain terminals and networks, in order to enter the UPT environment before any UPT procedures can be carried out.

Universal Personal Telecommunication Access Number (UPTAN): A number the UPT user may need to dial, when using certain terminals and networks, in order to contact his UPT service profile (provider).

UPT environment: The environment within which the facilities of the UPT service are offered. It consists of combinations of networks and UPT service control facilities which,

when combined, enable the UPT user to make use of the telecommunication services offered by these networks.

UPT global title (UPTGT): An E.164 number derived from the PUI in accordance with Recommendation E.214, which is used for routing purposes.

UPT number: A number that uniquely identifiers the UPT user; it is also used by a calling party to reach the UPT user. A UPT user may have more than one UPT number (for example, a business UPT number for business calls and a private UPT number for private calls).

UPT service profile: The UPT service profile is a record containing all the information related to a UPT user in order to provide that user with the UPT service. Each UPT service profile is associated with a single UPT number.

UPT serving exchange: A UPT serving exchange is any exchange that has the technical capabilities necessary to access a UPT service profile.

UPT user code (UC): A UPT user code is that part of the PUI which identifies the UPT subscriber.

Registrant: A person who applies for the setup, update or deletion of an ENUM domain delegation (by a registrar)

Validation: The process of ensuring that the setup, change or deletion of an ENUM domain delegation corresponding to an ENUM-compliant national telephone number is only carried out or maintained (initial validation / revalidation) for a registrant in cases where that person has the authorization to use the respective national telephone number.

15 ANNEXURES

15.1 ENUM Introduction

a. How ENUM works

An average business card today lists a host of information on, as to how, an individual can be reached. At the least, it lists company, name, address, telephone number, cell-phone number, fax number, email address, and web site URL. It is a great deal of information for a person to remember. ENUM promises to provide access to such a person through single line information, be it telephone, fax, email or web site.

ENUM takes a complete, international telephone number and resolves it into a fully qualified domain name address using Domain Name System (DNS) based architecture.

DNS is a distributed hierarchical lookup service, it is primarily used on the internet to translate between domain names and IP addresses. Root node of internet name space consists of a single file called root zone file. This file contains pointers to primary and secondary servers for all internet Top Level Domains (gTLDs and ccTLDs). Similar arrangement is proposed for ENUM.

ENUM protocol, published in the IETF standards-track document RFC 2916, proposes mapping ITU-T Recommendation E.164 telephone numbers to Uniform Resource Identifiers (URI). URI is a string of characters that identify resources such as documents, files, images, email addresses, or other resources or services in a common structured format.

ENUM protocol uses Naming Authority Pointer (NAPTR) DNS resource records as defined in IETF RFC 2915 to find available methods or services for contacting a specific node identified through a standard telephone number.

ENUM provides a solution as to how network elements can find services on the internet using only a telephone number, and how telephones, which have an input mechanism limited to twelve keys on a keypad, can be used to access internet services. It will provide cost savings and revenue opportunities for both carriers and customers, and it will solve many of the interoperability problems faced by the Voice over IP industry. ENUM at its most basic is the convergence of the Public Switched Telephone Network and IP networks; **ENUM is the mapping of a telephone number from the PSTN to Internet functionalities.**

b. ENUM Evolution

ENUM was envisioned to facilitate people to communicate amongst themselves, over a mix of PSTN and IP networks, using only one piece of contact information. It was a good idea for business community to give out one small piece of information, comparatively

easy to remember, at the same time, providing access information to all the telecom services subscribed.

The concept attracted a lot of interest but not enough for the vendors and the service providers to invest money in a cause with a very limited use. Presumably, it did not promise decent return on investment to make it a sound business case, with a limited outreach at best.

However, prospect of a single Top Level Domain e164.arpa called ENUM Tier-0 TLD presented possibility of access to all telephone customers across the globe. It offered the opportunity to translate a standard telephone number into an IP address that could be used by a Domain Name System. Such a unique address for a telephone user over PSTN, across the globe, made access through internet possible, besides opening up the possibility of access to the other telecom services subscribed by the user.

The arrangement opened up a whole lot of business opportunities for a possible global clientele, generating new enthusiasm in the business community for ENUM deployment.

Besides mapping the telephone number onto DNS, ENUM opens up the possibility of delivering end- to-end IP call across all the service providers who, in the present arrangement, have to hop onto PSTN at one stage or the other for telephone call completion across various Service Providers.

Presently IP-to-IP call completion is possible within own customer base. Access to the customer base of another IP Service Provider is possible only through a third party.

The possibility of doing business with such a huge customer base, at comparatively lesser cost has generated a lot of interest in telecom service provider, carrier, and vendor communities who see a global business coming their way.

ENUM protocol, published in the standards-track document RFC 2916 (IETF), proposes mapping ITU-T Recommendation E.164 telephone numbers into the DNS. The last portion of a host name, such as .com is the generic top level domain to which a host belongs.

The ENUM protocol involves associating telephone numbers, Fax and Cellular Mobile numbers, Voice Mail Systems, an IP address, an E-Mail address, a Website or any other Resource or Services that can be identified through a widely used Internet Addressing Scheme called Uniform Resource Identifier (URI).

For a record in DNS, the NAPTR record is used for identifying available ways of contacting a specific node identified by that name. Specifically, it can be used for knowing what Services exist for a specific domain name, including phone numbers by the use of e164.arpa domain as described above. The identification is using the NAPTR resource record defined for use in the URN resolution process, but it can be generalized in a way, that suits the needs specific to ENUM.

c. What ENUM Does

Domain Name Server System consists of data, name servers and protocols to retrieve data from servers. Base records are called Resource Records which is simple text data. These records are placed into million of files called Zones and kept in Authoritative Name Servers distributed around the globe as part of internet. These servers answer queries according to the DNS network protocol.

Most servers are Authoritative for one or more zones and perform a caching function for all other DNS information. Caching Servers simply query the authoritative servers and cache the reply. Berkley Internet Name Domain (BIND) is the most commonly used DNS implementation software for domain name servers on the internet.

It is important to understand how Domain Name System (DNS) works. It has a hierarchical structure where TLD (Top Level Domain) is at the top as the name indicates; examples are .net, .com and .org. Then there are country code Top Level Domains called ccTLD example; .sa for Saudia Arabia, .pk for Pakistan. There are other top level domains which do not fit into, either of the classification and not discussed, since not relevant here.

An example can be given for a DNS lookup to find the IP address of the Yahoo web site: www.yahoo.com. When a server looks up www.yahoo.com, it will query the root name servers for a reference to the .com name servers. The local server then queries one of them for www.yahoo.com. A server for .com then returns a referral to the yahoo.com name servers. The server then repeats the query for www.yahoo.com a third time, this time to one of the yahoo.com name servers, which gives the final answer. This process is known as resolving.

The answers a name server gets when it is resolving queries are cached and used to speed up subsequent lookups. For example, if the name server that looked up www.yahoo.com was then asked to lookup up the mail server mail.yahoo.com, it would immediately query the yahoo.com name servers directly and not start resolving the query again from the root name servers.

A zone contains the domain names and data that a domain contains, except for the domain names and data that are delegated elsewhere. Delegation means making someone else responsible for the sub-domain. This delegation property is why DNS is often defined as a distributed database.

In order to take advantage of ENUM, the telephone number assigned to a user by a telephone company for normal PSTN services must be registered with an ENUM Service Provider for one or more ENUM services. A subscriber can register his telephone number to receive calls at a home phone, office or at mobile phone.

Additionally, he may register an email address, as well as a fax number. The user makes his decision what services he wants to avail as well as the order of priority to choose the services subscribed. He may also specify his priority according to the hour of the day he will be available and on what service i.e. phone, fax, email or whatever other services he has opted for. For example he may opt, “Contact me on office phone before contacting on mobile phone”.

ENUM service provider will map his telephone number on the DNS in the form of a URL. (ENUM service provider could be the local operator providing telephone service in this case). The Authoritative server will have the NAPTR records to locate the ENUM enabled customer through URI. The services subscribed will also be visible to the queries to this telephone number. All his resources i.e. telephone number, fax, email, web and whatever other service he has opted will be available to whosoever dials his PSTN number from a telephone or keys in his telephone number on a PC. All his enlisted telecommunication resources become public.

Once the phone number is translated into an Internet address, ENUM issues a DNS query on the domain, as previously described. One of two things can happen.

1. If an authoritative name server is found, ENUM will retrieve the relevant NAPTR Resource Records and the call will proceed according to the subscriber's registered services for that number. The telephone call that is connected will be conducted entirely over the Internet, without using the Public Switched Telephone Network. This call will be connected in as little time, or even in less time, as a circuit-switched call.

2. If an authoritative name server cannot be found, ENUM will return a 404 Not Found error to the telephone, a connection to the PSTN will be opened, and the call will be routed conventionally.

User ENUM relies on the technology defined in RFC 3761. It assumes a business model where the ENUM function is provided independently and optionally by ENUM Service Providers. The telephone number becomes a universal key that is, globally accessible by all correspondents of the user. The data of the User ENUM is public. Anyone knowing the universal key, meaning the phone number, can have access to the information which may have privacy implications. Even if the user subscribes to several services, he would remain the only party that has a complete control over the set of identifiers.

ENUM is optional not only for the called user, the calling user may use ENUM to establish a communication with a called user, but at the same time, he has the option to use the conventional method for establishing the call through PSTN.

This implies that ENUM domain names can only be allowed for existing telephone numbers and the domain name holder can be the only assignee of related E 164 number. Administrative control, meaning proper identification and validation is necessary to achieve this goal and keep the E 164 Numbering Plan intact.

In summary, user ENUM provides end user on the Internet and also, end user on PSTN a possibility, to find services of other users on the Public Internet.

d. Call Handling- ENUM

In order to place an ENUM call, the person initiating the call dials the telephone number as it would normally be dialed. For example, the caller dials the number 92-51-5671234. In cases where the caller dials less than a complete number (for example, a caller within Pakistan might leave off the "92" or a caller within a city might dial only "5671234"), network equipment will recreate the complete form of the number for use with ENUM.

Next, the phone number is translated into an address that can be used by the DNS. Because this address is based on a complete, international telephone number (+ 92 51 567 1234), a unique Internet address exists for every unique phone number. To determine if the number and address are registered in ENUM, the telephone number is translated in the following manner.

1. In this example, the telephone number we are using is (+92 51 567 1234). The number would first be stored as (+92-51-567-1234) "92" is the country code for Pakistan. The "+" indicates that the number is a complete, international telephone number, known as an E.164 number. E.164 is the name of the international telephone numbering plan administered by the International Telecommunication Union (ITU).

2. All characters are removed except for the digits. Example: 92515671234

3. The order of the digits is reversed. Example: 43217651529

4. Dots are placed between each digit. Example: 4.3.2.1.7.6.5.1.5.2.9

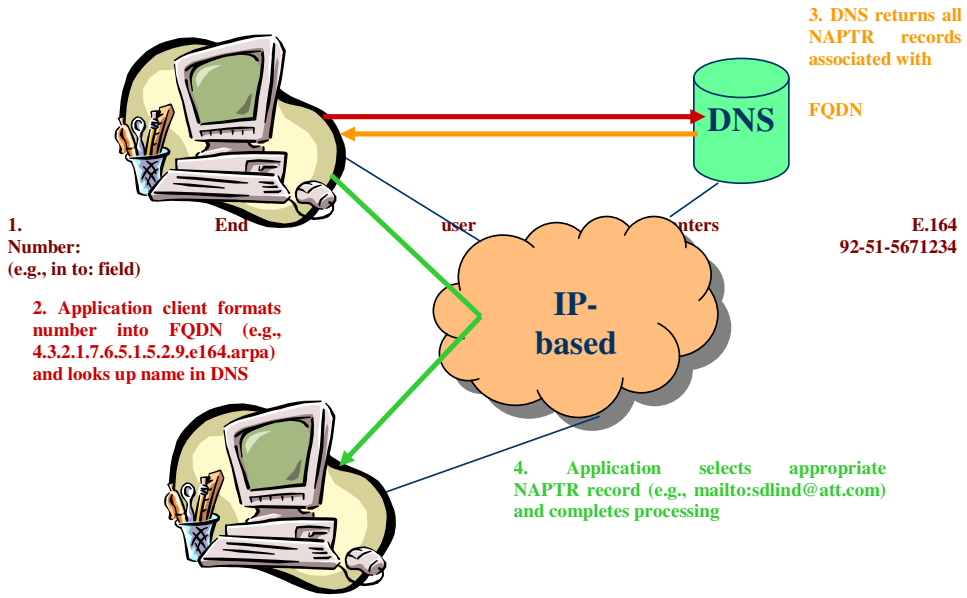
5. The domain "e164.arpa" is appended to the end. For example:
4.3.2.1.7.6.5.1.5.2.9.e164.arpa

E164.arpa has been proposed as the DNS domain for use with ENUM. It has been designated specifically for internet infrastructure purposes. ENUM is considered appropriate as an infrastructure application because it provides a set of DNS-based resource directories, referenced by phone number, for use by various ENUM enabled application clients. The telephone number is reversed because DNS reads addresses from right to left, from the highest level to the lowest level. In this case, a DNS lookup would start at the .arpa domain, and it would continue with .e164. Under e164 it would look for the "92" as the country code for Pakistan. It would then look up each succeeding digit in the telephone number until the address is fully resolved.

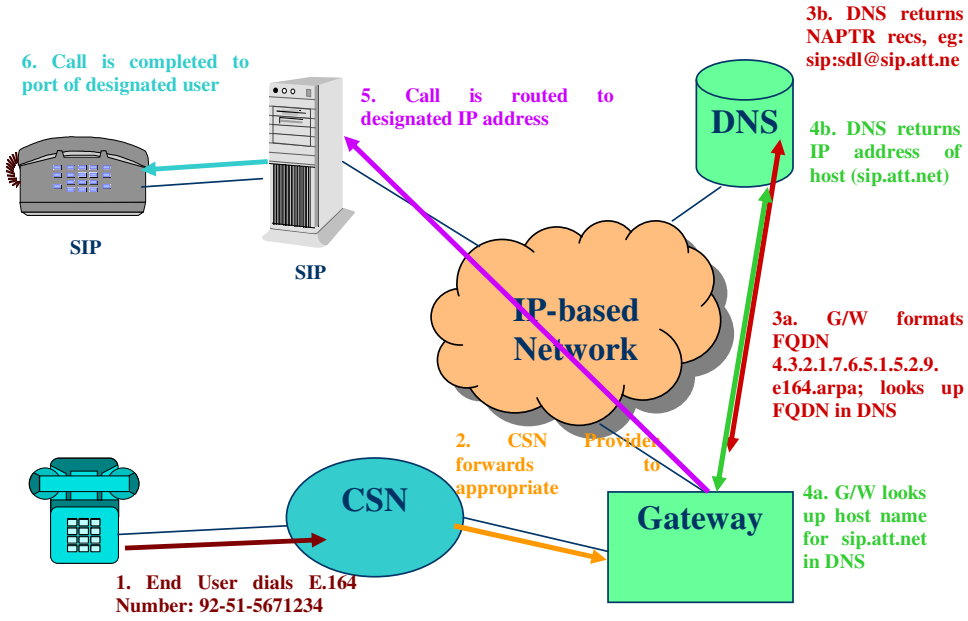
1. If an authoritative name server is found, ENUM will retrieve the relevant NAPTR Resource Records and the call will proceed according to the subscriber's registered services for that number. The telephone call that is connected will be conducted entirely over the Internet, without using the Public Switched Telephone Network. This call will be connected in as little time, or even in less time, as a circuit switched call.

2. If an authoritative name server cannot be found, ENUM will return a 404 Not Found error to the telephone, a connection to the PSTN will be opened, and the call will be routed conventionally.

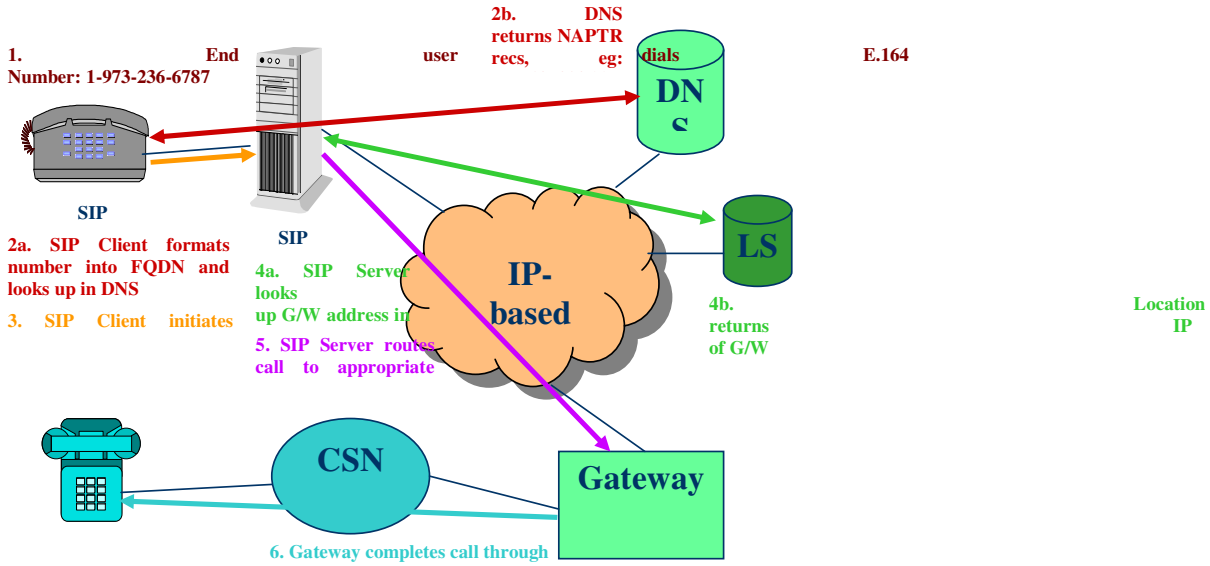
e. ENUM Call Scenarios



Call from PSTN to IP-based Networks



Call from IP-based to PSTN Networks



f. ENUM Applications

Apparently, it seems that ENUM will only facilitate translation of a standard telephone number into a web address, through a huge distributed database, which in turn will, provide the means to access through any of the resource subscribed by the person to be reached.

However, it opens a host of possibilities which become available, immediately, to build upon. These possibilities have attracted attention of the business community, the service providers and the vendors alike, now, although the concept was there from nineties.

A lot of traffic is being terminated on VOIP for the last many years not only for the reason that it is considered to be cheaper in terms of international bandwidth cost, but also because, there is no Access Charge for the voice traffic carried on internet in most of the countries.

A lot of carriers used innovative methods for voice termination abroad where a terminal device would convert packets into voice for termination on PSTN. The call, however, must hop off the IP network onto the PSTN and dial the PSTN number IP-to-PSTN instead of IP-to-IP, pay more money every time it has to use the PSTN to complete the call, as well as, use one of its own valuable port resources.

An ENUM enabled telephone number would be stored in the DNS, any device that has access to the Internet would be able to look up that telephone number as an Internet address. An IP service provider could stay on the IP world and offer a cheaper service, besides retaining a lot of features which do not work when the call hops back from IP to PSTN.

If the owner of a telephone has registered the number for fax services, another Internet-enabled fax machine will be able to reach it using an ENUM lookup. If not, that fax machine will still be reachable via the PSTN; if a 404 Not Found error is sent to the originating fax machine, that machine will be able to open a connection to the PSTN and dial the number traditionally.

Using email is just as easy. Rather than typing in an email address, the sender could type in the recipient's telephone number the mail would be sent, and the address lookup will be invisible to both sender and recipient.

ENUM enabled telephones present many more possibilities considering the number of Internet applications that can be used. Instant messaging could easily be modified for use with telephone numbers. A fax machine could send a document to an email address, or a computer could email a document to a fax machine. Voice Protocol for Internet Mail could potentially use ENUM as a method to retrieve voice mail from anywhere in the world.

Just as ENUM enables convergence, it will also help enable many of the functions of SIP including traditional call-forwarding, follow-me, and do-not-disturb functions along-with new features that merge Internet applications with video and voice communications.

Using applications requiring SIP resources, a person while surfing the internet on dial-up connection could be prompted on his computer that a call was waiting. He could make a selection on the computer either, to end the dialup session and answer the phone, forward the call to another number, or send the caller to voice mail.

An ENUM user could transfer a caller to a web page instead of another phone, in such a case the call would end, and the user's web browser would open the new page.

ENUM could enable Cable TV companies to terminate telephone calls on each other's network through a VOIP operator without going onto PSTN thus providing a very cheap service to ENUM enabled telephone users besides making a decent profit.

Every ITU member state has derived a National Numbering Plan (NNP), tailored to its own needs, from ITU-T Recommendations E. 164 for the implementation and operation of its telecommunication network. The NNP, so developed, is considered a national resource and administered by the country itself.

ENUM Deployment

It is important that sovereign role of each State with respect to the allocation and management of its E. 164 numbering resource is respected. Based on a principle of sovereignty, it is again very important that inclusion of E.164 numbering resource and the country code of a State in the DNS is authorized by the state concerned, through instructions from its Administration and further that each country keeps administering its portion of E.164 resource within its national numbering plan, mapped into the DNS.

To ensure the sanctity of National Numbering Plan it is important that PTA manages ccTLD (Country Code Top Level Domain) for country code 92 through its subsidiary, through delegation or appointing an administrator.

ENUM Infrastructure Requirement

Following minimum infrastructure is required for implementation of ENUM

The registrant or subscriber

The registrant is the person or subscriber that makes his access information available to others through ENUM. The registrant or subscriber is thus the person whose information has been included in ENUM and must not be confused with the person who uses the Internet to find an address through ENUM.

The registrar

The registrar is the party who manages the registrant's access information and ensures that it is publicly available on the Internet.

The registry

The registry is the manager of the National ENUM zone, or 2.9.e164.arpa (for country code 92 which is reversed as per relevant RFC). The registry forms the top of the National

ENUM pyramid and ensures that reference is made to the registrars' servers on which the access information is located.

Because of the hierarchical structure of the DNS, there can only be one registry for every National ENUM zone. To prevent abuse of this position, requirements are laid down regarding the impartiality of the registry and the costs and quality of its service. In addition every registrant must have equal and open access.

Regulation

Usually a governmental entity or a regulatory authority has control over the National zone of ENUM and plays a role in the appointment of the registry.

The number holder operator

Telecommunication service providers, the assignees of number blocks subsequently allocate these telephone numbers from these blocks. These E.164 numbers are used to initiate or terminate calls. In ENUM the number holder operator will typically be the gateway operator or, alternatively, will have an arrangement with a gateway operator, to whom he will transit the calls.

ENUM is a personal number, meant to be valid for the registrant life. Consequently in ENUM once the operator number holder assigns a number to a registrant, the number belongs to that registrant during his/her entire life. Proper regulatory provisions as such have to be made that once allocated number belongs to the customer and not the operator unless regulator determines otherwise.

Hence, if the registrant wishes to change his initial number holder operator, there have to be provisions for the ENUM number to be ported from the initial operator to other number holder operators.

Way Forward

It is prudent that Pakistan follows the path most countries of the world have followed i.e. ENUM trial through the following process:

a) Start the process rolling through filing an application with RIPE NCC for the allocation of 2.9.e164.arpa to Pakistan with the rights to manage it

b) Start the process of public consultation to create awareness and to generate discussion on ENUM

c) Formulate a Task Force from eminent telecom professionals and the industry players to study ENUM and make recommendations

- **ENUM Task Force** with following Study Groups to explore ENUM for starting a trial bed if there is an evidence of a sound business model in local telecom market. Five study groups are proposed to explore various aspects of ENUM

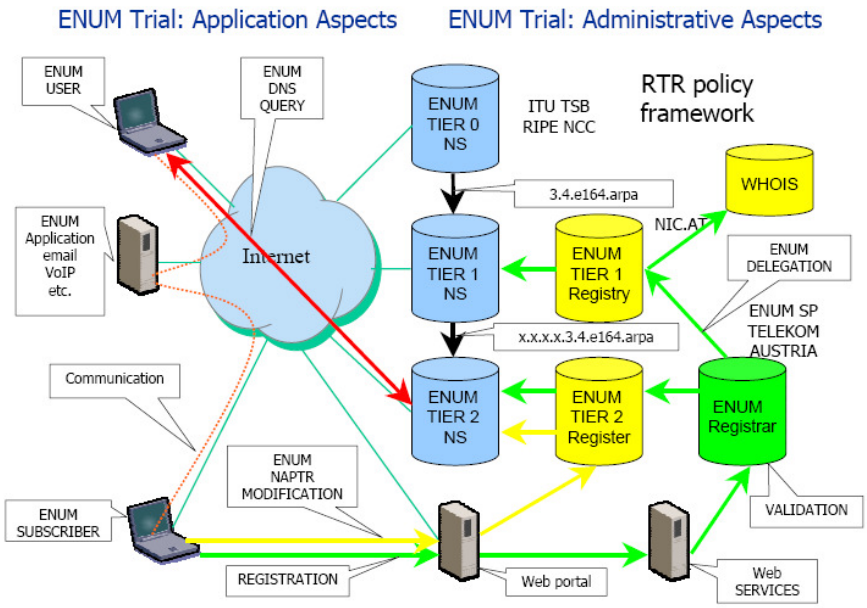
    - The task force to coordinate between teams and the government.

- ENUM **Application** Study Group
- ENUM **Provision** Study Group
- ENUM **Registration** Study Group
- ENUM **Regulation and Security** Study Group
- ENUM **International Coordination** Study Group

Further action plan should be hammered out on the recommendations of the Task Force.

ENUM was implemented in Germany and Austria after thorough verification of all procedure and processes over a test bed for more than a year. Most of the developed countries are still in the process of ENUM trials. A model from German test bed is presented below. It is evident that a huge number of processes have to be established before ENUM can be launched. However it is important that assignment of ccTLD 2.9.e164arpa to Pakistan is registered with RIPE NCC to secure National Numbering Plan.

German ENUM Trial Model



15.1.1 Short Code Assignment

Summary of Short Code Assignment

Name of Service	Short Code	Number of Digits
Customer Services (Calling Card, Customer Services)	10XX	3/4 digits
UAN, Emergency Services (Fire, Ambulance, Various Enquiries)	11X	3 digits
Access Code for various customer services (VMS, Calling Cards)	12XX	3/4 digits
Internet Access & Various helplines	13X	3 digits
Reserved for Future Use	14XX	4 digits
Emergency Police	15	2 digits
Reserved for Future Use	16XX	4 digits
Reserved for Future Use	17XX	4 digit
Reserved for Future Use	18XX	4 digits
Carrier Selection	19XX	3/4 digits

100X 10 Spare codes for future use

101X 4-digit across networks (spare codes to be withdrawn)

1010	PTCL Calling Card
1011	PTCL (O&M contract)
1012	PTCL (OM contract WorlCall)
1013	PTCL (OM contract WorlCall)
1014	PTCL (O&M contract Global Telecom)
1015	PTCL WIN Network
1016	PTCL (O&M contract M/s Dancom)
1017	PTCL (O&M contract Circleone for Fixed-line SMS)
1018	PTCL (O&M contract M/s Calmate Telips)
1019	PTCL (O&M contract VIVA Intl-new PCCS partner)

102X 10 Spare codes for future use

103X 10 Spare codes for future use

10 Spare codes for future use

105X 10 Spare codes for future use

106X 10 Spare codes for future use

Table : 107X 4-digit within networks (System Test)

1070	Dial Test (Within Net) All Operators
1071	Ring Test (Within Net) All Operators
1072	PPT Call Flow
1073	PPT Management Flow
1074	Vacant
1075	Vacant
1076	Vacant
1077	Vacant
1078	Vacant
1079	Vacant

108X 10 Spare codes for future use

109X 10 Spare codes for future use

Table : 110X 4-digit across networks (On Net Customer Services)

Code	Assignment
1100	Corporate Complaint (PRI Complaint)
1101	Intl Booking
1102	Trunk Enquiry
1103	Intl Enquiry
1104	VIP Booking
1105	Speaking Clock

1106	Helpline (Call Center)
1107	Tele directory Information
1108	Tele complaint
1109	Trunk Booking

Table : 11X 3/4-digit (countrywide across all networks) Utility Complaint/Enquiry

Code	**Assignment**
110	Customer Services (4 Digit)
111	UAN
112	Customer Services (4 digit)
113	Water Complaint
114	Flight Enquiry
115	Edhi Ambulance
116	Fire Brigade
117	Railway Enquiry
118	Electricity Complaint
119	Gas Complaint

Table : 112X 4-digit (across all networks) Customer Services

Code	**Assignment**
1120	
1121	Child Protection & Welfare Bureau (Countrywide)
1122	Emergency Ambulance (Countrywide)
1123	Intelligence Bureau*
1124	Police Petrol (Countrywide)

1125	Vacant
1126	Vacant
1127	Vacant
1128	Vacant
1129	Vacant

120X 10 Spare codes for future use

Table : 121X 4-digit (across all networks) Customer Services

Code	Assignment
1210	CMT Pre Paid Card Recharge & Balance Check
1211	Credit Card Calling Service
1212	Black Berry Service
1213	PTCL VPN Dialing Access from other operators
1214	Vacant
1215	Vacant
1216	Vacant
1217	Vacant
1218	NTC Pre Paid Calling Card
1219	NTC Pre Paid Calling Card

Table : 122X 4-digit (within network) Customer Services

Code	Assignment
1220	UPT Dialing (1220XXXXX) Number for incoming calls
1221	PTCL VPN Dialing Local Access
1222	PTCL VPN Dialing Remote Access

1223	LNP within PTCL
1224	LNP within PTCL
1225	Universal Personal Number
1226	Telephone Bill Payment (PTCL)
1227	UPN Dialing
1228	UPN Registration (to receive calls)
1229	UPT Registration

Table : 123X 10 Spare codes for future use

Table : 124X 4-digit (within network)

Code	Assignment
1240	Tele-voting (PTCL)
1241	Tele-voting (Survey Feedback) PTCL
1242	Opinion Poll
1243	PTCL Audio Conference
1244	PTCL Video Conference
1245	Vacant
1246	AFAC
1247	AFAC
1248	AFAC
1249	AFAC

Deleted: Tele-voting (Survey Feedback) PTCL

Table : 125X 10 Spare codes for future use

Table : 126X 4-digit (across all networks) Spare for future use

Code	Assignment

1260	Helpline Railway Police
1261	Helpline Crime Control
1262	Helpline Human Rights
1263	Vacant
1264	Vacant
1265	Vacant
1266	Vacant
1267	Vacant
1268	Vacant
1269	Vacant

127X 10 Spare codes for future use

128X 10 Spare Codes for future use

129X 10 Spare Codes for future use

13X 10 Spare Codes for future use

Code	**Assignment**
130	Motorway Police Helpline
131	Internet Access
132	4 Digit On Net Services
133	4 Digit On Net Services
134	CM Emergency Cell-All Provinces
135	Helpline Commanders Control Room
136	Helpline Governor House-All provinces
137	4 Digit 10 Spare codes
138	4 Digit Calling Card Service

139	4 Digit Calling Card Service

132X 10 Spare codes for future use

Table : 133X 4-digit (across all networks) Spare for future use

Code	Assignment
1330	Video Conference
1331	Maritime
1332	Audio Conference
1333	Vacant
1334	Vacant
1335	Vacant
1336	Vacant
1337	Vacant
1338	Vacant
1339	Vacant

Table : 138X 4-digit (across all networks) Pre Paid calling Card

Code	Assignment
1380	Callmate Telips LDI
1381	WISE comm LDI
1382	Warid LDI
1383	Burraq
1384	DV Com (proposed)
1385	DANCOM LDI
1386	WorldCall

1387	Redtone
1388	Link Direct Ltd
1389	Callmate Telips LDI

Table : 139X 4-digit (across all networks) Access Code for Intelligent Network

Code	**Assignment**
1390	Link Direct Ltd
1391	Telenor
1392	Circlenet
1393	TELECARD
1394	TELECARD
1395	Telenor
1396	Vacant
1397	Vacant
1398	GENTEL Intl
1399	GENTEL Intl

Table : 14XX 4-digits (100 codes) Reserved for future use

140X	Ten spare codes
141X	Ten spare codes
142X	Ten spare codes
143X	Ten spare codes
144X	Ten spare codes
145X	Ten spare codes
146X	Ten spare codes
147X	Ten spare codes

148X	Ten spare codes
149X	Ten spare codes

15 – Police Emergency

Table : 16XX 4-digits (100 codes) Reserved for future use

160X	Ten spare codes
161X	Ten spare codes
162X	Ten spare codes
163X	Ten spare codes
164X	Ten spare codes
165X	Ten spare codes
166X	Ten spare codes
167X	Ten spare codes
168X	Ten spare codes
169X	Ten spare codes

Table : 17XX 4-digits (100 codes) Reserved for future use

170	Ten spare codes
171	Ten spare codes
172	Ten spare codes
173	Ten spare codes
174	Ten spare codes
175	Ten spare codes
176	Ten spare codes
177	Ten spare codes

178	Ten spare codes
179	Ten spare codes

Table : 18XX 4-digits (100 codes) Reserved for future use

180	Ten spare codes
181	Ten spare codes
182	Ten spare codes
183	Ten spare codes
184	Ten spare codes
185	Ten spare codes
186	Ten spare codes
187	Ten spare codes
188	Ten spare codes
189	Ten spare codes

1900	Carrier Selection Code	WorldCall LDI
1901	Carrier Selection Code	WISECOM LDI
1902	Carrier Selection Code	Link Direct LDI
1903	Carrier Selection Code	TELECARD
1904	Carrier Selection Code	Telenor LDI
1905	Carrier Selection Code	WISECOM LDI
1906	Carrier Selection Code	Telenor
1907	Carrier Selection Code	DANCOM
1908	Carrier Selection Code	4B Gentel
1909	Carrier Selection Code	CircleNet
1910	Carrier Selection Code	4B Gentel
1911	Carrier Selection Code	WorldCall LDI
1912	Vaccant	
1913	Vaccant	
1914	Vaccant	
1915	Vaccant	
1916	Vaccant	

1917	Vaccant	
1918	Carrier Selection Code	DANCOM
1919	Carrier Selection Code	Warid LDI
1920	Carrier Selection Code	DV Com LDI
1921	Vaccant	
1922	Carrier Selection Code	Burraq LDI
1923	Vaccant	
1924	Vaccant	
1925	Vaccant	
1926	Vaccant	
1927	Vaccant	
1928	Carrier Selection Code	Callmate TELIPS
1929	Carrier Selection Code	DV Com LDI
1930	Carrier Selection Code	TELECARD
1931	Vaccant	
1932	Vaccant	
1933	Carrier Selection Code	Burraq LDI
1934	Vaccant	
1935	Vaccant	
1936	Vaccant	
1937	Vaccant	
1938	Carrier Selection Code	Callmate TELIPS
1939	Carrier Selection Code	Warid LDI
1940	Vaccant	
1941	Vaccant	
1942	Vaccant	
1943	Vaccant	
1944	Vaccant	
1945	Vaccant	
1946	Vaccant	
1947	Carrier Selection Code	RedTone LDI
1948	Vaccant	
1949	Vaccant	
1950	Carrier Selection Code	RedTone LDI
1951	Vaccant	
1952	Vaccant	
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1993	Vaccant	
1994	Vaccant	
1995	Vaccant	
1996	Vaccant	
1997	Vaccant	
1998	Carrier Selection Code	PTCL
1999	Carrier Selection Code	PTCL

15.2 Annex A PSTN

NAF-01

Application form for Local PSTN numbers reservation

Name of Licensee ……..

Registered business name (if different)

……..

Postal Address

……...

……..

…..

Registered office address (if different)

…….

……

Contact Person

Name

…….

Telephone number

……

Facsimile number

……..

E-mail address

…….……..

Description of the reservation requirement and intended use (including qualitative and quantitative characteristics of the service-zone code shall be identified).

……

……

……

Reason for requesting reservation

……

……

……

Estimated starting date

……..……..

……

Estimated quantity of numbers required (supported by 5 year forecasts)

(Note: More information shall be attached in a separate document)

……

……

……

For Licensee with existing allocations to be used in conjunction with the current application, details of the existing utilization of the current allocations and the anticipated exhaust dates (Note: More information can be attached in a separate document).……..……

…….

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……..……

Reservations will normally be published along with numbering allocations. If you wish that your name and / or the intended use of the reservation is not published, then please state your preference and the reasons.

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……..……

Declaration

I certify that the information provided in this application is true and correct

Signature of authorised person ……..

Name ……..

Position ……..

Date ……

15.3 Annex B short Codes

NAF-02

Application form for Special Numbers and Codes reservation

Name of Licensee ……..

Registered business name (if different)

……....

Postal Address

……..……...

……..

…..

Registered office address (if different)

……

……

Contact Person

Name

…….

Telephone number

…….…

Facsimile number

……..……..

E-mail address

……..……...

Description of the reservation requirement and intended use of number or codes

(including qualitative and quantitative characteristics of the service)

……

……..……

……

Reason for requesting reservation

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Estimated starting date

……..……..

……

Estimated quantity of numbers or codes required

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For Licensee with existing allocations to be used in conjunction with the current application, details of the existing utilization of the current allocations and the anticipated exhaust dates (Note: More information can be attached in a separate document).……..……

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……..……

Reservations will normally be published along with numbering allocations. If you wish that your name and / or the intended use of the reservation is not published, then

please state your preference and the reasons.

……

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……..……

Declaration

I certify that the information provided in this application is true and correct

Signature of authorised person ……..

Name ……..

Position ……..

Date ……

15.4 Annex C Non Telephone Numbers

NAF:03

Application form for Non Telephone Numbers Reservation

Name of Licensee ……..

Registered business name (if different)

……....

Postal Address

……..……...

……..

…..

Registered office address (if different)

……

……

Contact Person

Name

…….

Telephone number

……..…

Facsimile number

……..……..

E-mail address

……..……...

Description of the reservation requirement and intended use of numbers (including qualitative and quantitative characteristics of the service access code for the requested numbers shall identified)

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Reason for requesting reservation

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Estimated starting date

……..……..

……

Estimated quantity of numbers required (supported by 5 year forecasts)

(Note: More information shall be attached in a separate document)

……

……

……

For Licensee with existing allocations to be used in conjunction with the current application, details of the existing utilisation of the current allocations and the anticipated exhaust dates (Note: More information can be attached in a separate document).……..……

…….

……

……

……..……

Reservations will normally be published along with numbering allocations. If you wish that your name and / or the intended use of the reservation is not published, then

please state your preference and the reasons.

……

……

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……..……

Declaration

I certify that the information provided in this application is true and correct

Signature of authorised person ……..

Name ……..

Position ……..

Date ……

15.5 Annex D Mobile Numbers

NAF:04

Application form for Public Mobile Network numbers reservation

Name of Licensee ……..

Registered business name (if different)

……..

Postal Address

……...

……..

…..

Registered office address (if different)

…….

……

Contact Person

Name

…….

Telephone number

……

Facsimile number

……..

E-mail address

…….……..

Description of the reservation requirement (including qualitative and quantitative characteristics of the service)

……

……

……

Reason for requesting reservation

……

……

……

Estimated starting date

……..……..

……

Estimated quantity of numbers required (supported by 5 year forecasts)

(Note: More information shall be attached in a separate document)

……

……

……

For Licensee with existing allocations to be used in conjunction with the current application, details of the existing utilization of the current allocations and the anticipated exhaust dates (Note: More information can be attached in a separate document).……..……

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……..……

Reservations will normally be published along with numbering allocations. If you wish that your name and / or the intended use of the reservation is not published, then

please state your preference and the reasons.

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……

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……..……

Declaration

I certify that the information provided in this application is true and correct

Signature of authorised person ……..

Name ……..

Position ……..

Date ……