

# RESPONSES TO CONSULTATION

## National Numbering Plan

### National Numbering Plan

Responses to a Consultation Issued by the  
Telecommunications Regulatory Authority

28 August 2007

**Purpose:** Report responses to a consultation on the further development of the National Numbering Plan in relation to allocation and categorization of numbering resources in the Kingdom of Bahrain



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Telecommunications  
Regulatory  
Authority

# RESPONSES TO CONSULTATION

## National Numbering Plan

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### 1 Introduction

This report follows the Consultation Paper and presents the responses of service providers in Bahrain to the *Review of National Numbering Plan (NNP) Issues*, released October 20, 2005 and provides the TRA's position on each of the consultation questions. The Consultation Paper explained issues related to the current numbering plan and presented potential alternatives. It listed 39 consultation questions, dealing with the NNP to which this report provides an overview of responses of the service providers and a summary of the TRA's position after taking into account the answers to each question. This report with its responses to the consultations is referenced as the *report*.

Since the consultation was taken on, other international influences have significantly changed the landscape of numbering issues, and another short consultation will follow the publication of this report.

#### 1.1 Overview of Numbering Issues

Revising national numbering policies and numbering plans is a formidable challenge. If it is not carried out in a systematic way with the right information, changes can be disruptive and costly to users, network operators, and service providers. It is imperative that the numbering plan support the evolution of telecommunications and the competitive criteria envisaged by the TRA.

As well as reviewing the responses of interested parties to this consultation, the TRA has reviewed many other reports and reviews available in the public domain, to enhance the base of information and trends with regard to numbering, which have naturally contributed to the reasoning, where relevant to the market of Bahrain, and subsequent decision making information included in this document.

The technological changes that are taking place within the world of communications has initiated the need to review how numbering is used. The historic methods of identifying users of network services via fixed geographic numbers and their mobile counterparts have been enhanced with the introduction of the new naming and addressing conventions of alternative network architectures. Users of services may now be identified for example by IP network addresses or proprietary network names, and nomadic numbers as well as the traditional numbers.

As a result, the allocation of the National Numbering resource to operators appears to require a review of the criteria defining the eligibility of applicants requesting a number allocation, and the use of

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those numbers. Number ranges being made available for allocation should be defined for a service or range of services, as opposed to being defined for the customer type.

With the break up of the monopoly held by Batelco in the field of telecommunications, the Kingdom of Bahrain now has numerous licensed operators capable of providing established services as well as the potential for a new range of services using the capability of new network technology. These new operators can have their own number ranges for their own customers, but there is no guarantee that customers of one operator can call customers of another operator. The development of effective competition in the telecommunications market depends to a great extent on the capability of the customers to make calls. Hence the defined use of number ranges available from the National Numbering resource could be used to ensure connectivity and thus the effective development of competition.

A comprehensive review of numbering cannot be performed without considering number portability as a future requirement in Bahrain. The current situation around the telecommunications world is that most regulators agree that traditional services which use geographic and mobile numbers are subject to portability. On the other hand, differences of opinion have been introduced concerning new IP based services, which may have access to geographic numbers. Ultimately this means that regulators differ when defining the requirement for a given geographic number to be exported from one operator to another depending on whether the number is associated with a particular service or not. Non-geographic numbers however, are generally translated into a geographic number and are not themselves used for outgoing calls. However, most regulators require non-geographic numbers to be portable as well. The International Telecommunications Union (ITU) suggests it to be advisable to associate a requirement for number portability with a specific number range.

More interestingly, the original justifications for number portability have changed over the last few years in a contradictory manner. Number portability requirements have become much more common and for example are regarded in the European Framework as a user right irrespective of the cost, yet the set-up cost in some smaller countries (e.g. of less than 1 million subscribers) may be as high as 15BD per subscriber (that is all subscribers, not just per porting subscriber), and this cost would have to be contributed to by all operators with allocated number ranges. Also, the problems of changing number have reduced because subscribers can easily inform their correspondents of a change in number via a broadcast email at zero marginal cost.

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This consultancy report examines the existing allocations and assignments and recommends a forward looking plan specifically for the following number resources:

- Corporate Numbering (5X)
- Special Services (8X)
- Premium Rate Services (9X)
- Broadband Services (9X)
- Access Codes and Short Codes
- Carrier Selection Codes
- Resources that the TRA need to Administer

### 1.2 Comments Received

The consultation invited comments on specific issues relating to the National Numbering Plan and the comments received represented a range of opinions. Section 2 concisely summarizes responses to all the consultations and attempts to capture important nuances and provides the TRA's position on each consultation.

The TRA received only two responses in total to the Consultation Paper, and feels that some subjects were not fully considered when the initial consultation was published. As a result, further consultation must take place as quickly as possible.

Responses were received from:

- Batelco
- MTC Vodafone

### 1.3 Major Findings

The TRA presented 39 consultations for comment. The respondents were in general agreement in their responses for consultations 1, 2, 6, 8, 13, 14, 15, 22, 27, 29, 34 and 35. The following describes the basic responses:

#### 1. **Availability of Geographic Resources:**

##### a. **Numbering Format**

Respondents generally supported the TRA proposals. Both respondents noted that when the TRA introduces Number Portability, in accordance with section 40 of the Telecommunications Law, such a Service Provider identifier will become meaningless.

##### b. **Digit Analysis**

Changes would be required in the routing tables and switching systems.

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2. **Carrier Selection:** Each respondent offered different solutions for identifying the carrier.
3. **Migration of Short Codes from 3 to 5 Digits and Categorization of Short Codes:** The respondents offered different solutions. However, they agreed that they could incur significant expenses for particular implementations. One respondent strongly urged that the most established three digit codes should be left unchanged; that others be used on a common basis, and that only then should changes be introduced which require migration to 5 digit codes. That same respondent anticipates that a plan to move to 5 digit codes for all operators would be an unsatisfactory regulatory outcome. In addition, they also asked that the TRA should consider a 4 digit code allocation to other operators if appropriate.
4. **8 Series Special Service Range:** While one respondent usually agreed with the consultation statements, the other respondent had specific suggestions for change. One respondent strongly urged the TRA to further clarify and highlight the right of all licensed operators to apply for and be allocated 800 numbers and other number ranges beginning with 8 and 9. They offered specific suggestions described in this document.
5. **9 Series Premium Service Range:** The responses tracked the replies to the 8 Series described above. One respondent believes that there will be continuing problems with the definition of low, medium and high. They suggested two specific price bands as an alternative.
6. **5 Series Corporate Numbering:** Responses usually varied widely between the two respondents.
7. **SMS Numbering:** In general, the responses suggested that current practices for SMS should be retained. There is no need to introduce specific numbering for SMS services.
8. **Use of Numbering for Activation of Prepaid Cards:** While both respondents generally favoured current practices for prepaid cards, they offered preferences for proposed changes.
9. **Separate Numbering Range of IP Telephony:** Both respondents agreed that the numbering should not be tied to any technology, such as IP.
10. **National Number to Identify ISPs:** Both respondents agreed that there is no need for a unified access method for Internet Service Providers (ISPs).

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One of the respondents prefaced its responses with cautions against making unnecessary changes to the National Numbering Plan. They believe that the costs associated with changes can be significant. They cited these costs as:

- Network changes to allow the implementation of the new NNP, which may often include a long period of parallel running of numbers
- Costs imposed on operators to support the changes including internal training, revision of all internal and external documentation (application forms, customer guides, publicity materials, websites, etc)
- Costs of communicating with and educating the public about the changes and dealing with complaints and enquiries
- Costs of communicating with and educating operators overseas about the changes and following up
- Management of problems, such as electronic point of sale equipment which arose from the previous numbering changes
- The cost imposed on consumers and operators, including direct costs and the inefficiencies driven from mistakes in usage of a new NNP

## 2 SUMMARY of CONSULATATION RESPONSES and TRA's POSITION

### 2.1 Availability of Geographic Resources

#### 2.1.1 *Numbering Format, Consultation 1*

*Should the entire 13 range be protected for further geographic growth? Should the same allocation format adopted by the TRA in allocating blocks in the 16 range be adopted by operators?*

Both respondents support the TRA proposal to protect all the 13 range. A respondent suggested that TRA should seek to optimize the utilisation of the geographic numbers by allocating the numbers from the 13 range in blocks on a 'first come first served' basis to the fixed line Service Providers as they need additional numbers to satisfy their customers demands for service.

#### **TRA's Position – Consultation 1**

Since this consultation started, the 16X number range of geographic numbers have been consumed, therefore the TRA will make the 13X number range available immediately and the resources should be allocated in the same manner as stated in the NNP; first come, first served.

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Presently in the NNP, the national numbers with the leading digits of 1, 2 and 7 are designated for geographic services. Two years ago, Bahrain had undergone substantial numbering changes while it was revising its NNP and it is the intent of the TRA to minimize the impact to end users with any future changes to the NNP.

However, with the introduction of competition in the telecommunications sector and the entrance of new operators and service providers, there was a need to identify and allocate geographic national numbers for the new operators and service providers. With the awarding of additional fixed line licenses, each of the new operators required blocks of numbers to offer services to their customer and each of these operators needed to have access to comparable level of national numbering resources as the incumbent.

There are two reasons for considering the 1X number range for geographic numbers. The first is simply to comply with the requirement to exhaust the use of a logical range, before allocating any numbers from a new range. The second is the potential competitive disadvantage if new service providers were allocated geographic numbers with the leading digit of 2 or 7 while other operators continue to use the 1X numbering range for services to their customers, although it is acknowledged that some operators may prefer to be identified by a new range.

Therefore, to allow for access to a comparable level of national numbering resources for the new licensees, it has become important to identify numbering resources in the leading digit "1" series to allocate to new operators and service providers.

The TRA had reclaimed the 13X and 16X number ranges for Geographic Numbering allocations on the 7th, August 2005 and have already allocated all blocks of the 16X number range for geographic purposes. The TRA will also reclaim one more 1X number range because the 13X range will be open for allocations.

The numbers in the 13X number range would follow the same format; 13XXXXXX as the 17X and 16X number ranges. This would provide for additional growth and provide each operator a block of 100,000 numbers. The use of the 13X number range for geographic purposes allows for up to ten (10) blocks of 100,000 numbers. This provides sufficient capacity for future needs and maintains the dialling in the "1" series for all geographic numbers in Bahrain.

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#### 2.1.2 **Digit Analysis, Consultation 2**

*Comment on the possible impact of the additional analysis associated with the introduction of new geographic number ranges. Comments should be supported by appropriate details.*

Both respondents stated that changes would be required in the routing tables and switching systems.

#### **TRA's Position – Consultation 2**

The TRA recognizes that additional routing requirements will be placed on the network due to the changes required but it is felt that the work involved on the network analysis would not increase in any complexity or be prohibitive burden and that the associated expense would be minimal and thus not deter the TRA from modifying the NNP where necessary with respect to geographic numbers.

It should be pointed out that the operators and service providers already need to implement this additional network routing and analysis capability for when the 16X geographic range is introduced and therefore to implement the 13X geographic number range would be a matter of opening up the appropriate numbers in the network. This additional change would not place an undue burden or incur restrictive cost to each of the operators.

### **2.2 Carrier Selection**

#### 2.2.1 **Carrier Selection, Consultation 3**

*Comment on the three options for Carrier Selection codes in Bahrain and indicate the most suitable option for implementation.*

One respondent preferred Option 1 while the other respondent preferred Option 2. Both respondents found issues associated with Option 3. In addition, one of the respondents suggested an alternative 4-digit Carrier Selection code, 0Z XX.

#### **TRA's Position – Consultation 3**

The TRA will adopt Option 1 as the preferred format for Type B short codes in relation to Access Services.

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#### **Option 1 – 0Z XXX**

For the specific case of Carrier Selection and Carrier Pre-Selection,

Where Z = 2

XXX is the Allocated Carrier Identifier

Where X = any number in the range 0 - 9

The selection of this option will allow for the assignment of 1,000 carrier identifiers, and was made because the 02 range has no existing allocation, would therefore not conflict with any other range, and uniquely reflects an access service. In addition the selection of 02 instead of the first block in the 0 range is to indicate to the CS customers that they are selecting a “second” operator.

One respondent did point out, that numbers starting with “0” are not used in some PBX’s and therefore a call would be blocked if a “0” was dialled. This would therefore require that operators work with the PBX providers to “unblock” the digit “0” when dialled. This change would need to be implemented coincident with the introduction of the Carrier Selection Codes. PBX providers are requested to change digit analysis and call processing whenever there is a numbering change and the TRA realizes that there are costs associated with such changes but the TRA also recognizes that this is not a significant change and the unblocking of the digit “0” by PBX providers is a practical request and can be implemented prior to the introduction of Carrier Selection Codes

As an ongoing assignment principle, the TRA will assign the same XXX code to be used for both Carrier Pre Selection and Carrier Selection. It is recognized that this will facilitate and make the assignment of codes both more efficient and allow the codes to be implemented consistently across the networks. By assigning the same code for both Carrier Selection and Carrier Pre Selection, each of the operators can implement in their switches one set of codes for both purposes. For Carrier Pre Selection the subscriber need only notify the operator of their preferred carrier without knowing what code needs to be implemented in the switches for network routing, while for Carrier Selection that subscriber needs to dial the prefix; 02, then the 3-digit code; XXX, on a call by call basis. The network will recognize the 02 code as the prefix and then utilize the XXX code for routing. That XXX code will be the same whether on a call-by call basis or whether a customer is pre-subscribed. By assigning the number for both purposes it will efficiently utilize the administrative practices and will be easier to implement

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from a network perspective since the operators do not need to administer two different set of codes; one for Carrier Selection and one for Carrier Pre Selection.

Option 2, 1Z XXX was not selected because the TRA require Type B short codes to be designated a unique number range.

Option 3, 11 ZXX was not selected since the additional routing analysis complexities that would be required due to the 112 short code already in service for emergency services makes this option unsuitable for Carrier Selection codes.

#### 2.2.2 **Carrier Selection, Consultation 4**

*Suggest any alternative options for Carrier Selection codes in accordance with NP rules for short codes.*

A respondent recommend that the TRA introduces a four digit code 01XX.

#### **TRA's Position – Consultation 4**

The reason that this alternative option was not selected is the number of potential new operators would be restricted potentially requiring a further review of the NNP, therefore as stated and discussed in Consultation 3, the TRA's position is that Option 1; 0Z XXX, will be the format for Carrier Selection. .

### 2.3 Migration of Short Codes from 3 to 5 Digits and Categorization of Short Codes

#### 2.3.1 **Short Codes, Consultation 5**

*Propose the preferred option for the allocation and migration of short codes, citing reasons as well as details of the preferred block of allocation or the digits to be added.*

There is no agreement among the respondents.

A respondent considered that option 3 - the placement of all codes behind one of the existing unallocated 2 digit ranges in the "1" code series – presents the most viable from a theoretical point of view. However, in order to change voice short codes, roaming issues should be taken into consideration. All operators with roaming agreements would need to be informed (approximately 266 operators). The operators will have to redefine the numbers in all their switches and will have to test

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with that operator again. The testing will not only be a cost but it will also be time consuming. In addition, it was stated that some operators' systems do not support 5 digit short codes.

Of the first 2 options, the other respondent favoured Option 1 provided that existing codes are allocated the additional digits 00. They do not support option 3 or option 4.

#### **TRA's Position – Consultation 5**

The TRA acknowledges that one of the significant impacts associated with the migration of short codes are the network modifications required to accommodate longer length short codes and the associated impact of the change of known numbers on consumers. In addition, the TRA acknowledges that the roaming issues associated with longer short codes mentioned by one of the respondents are noteworthy.

The primary concern of the TRA is that if migration is deemed necessary, whatever option was ultimately selected is that it is easy for the subscribers to understand and that the competition has justified the migration to the benefit of the general public.

It is clear that the incumbent operator benefits from the fact that the short codes it has allocated to services have for some time been the only short codes for those services, and as such the general public will only remember those codes. This is the competitive advantage that the incumbent holds with respect to the currently allocated short codes.

If a migration from 3 to 5 digits was made without any competitive services available, the general public will simply remember the new incumbent codes, and the competitive advantage would be maintained by the incumbent.

Therefore the TRA believes that to simply migrate from 3 to 5 digits without competition in the services offered by the incumbent may be detrimental to the original requirement.

If any service provider wanted to compete in any of the services currently offered by the incumbent, then a migration process for that individual service may be the more favourable approach.

However, other factors must also be considered when defining the difference between a common service and what a competitive service is.

Existing operators may assign Type C short codes as required to provide an equivalent service as the incumbent, but available

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only to its own subscribers. This would not be a competitive service, because the service is not common to customers of all operators.

For example, to provide a common service such as the speaking clock, any operator may individually offer the service and assign their own Type C code. It is therefore a competing service, but individual to each networks customers. There is no necessity for one operator's customers to call another operators speaking clock, so no common code is required.

Under certain circumstances a common service may require all operators actually contributing to the service. The obvious example is a service such as Directory Enquiries. As a common service it would justify a common short code, but all the operators would need to supply their customer database for the common service to be effective.

This would only work if the existing operators wanted to outsource the service provision of directory enquiries. The service if outsourced would then not be in competition unless the databases were supplied to more than one service provider.

If one operator provides a service for its customers, for example speaking clock, another operator may buy access to that service via an interconnect agreement. The purchasing operator can then offer that service to its customers, and may even use the same short code for its customers to call that service. This however, is still not a justification to migrate the short code to 5 digits. The service is being provided only by the original operator, and hence is not in competition, and would maintain a competitive advantage even if the short code were migrated to 5 digits.

After due consideration of available number resources, and taking into account the updated designation of Type A and Type C short codes stated in Consultation 9, TRA has decided that full migration to 5 digit short codes will not be a requirement until competition is introduced in the services using those short codes. The potential for disruption of a migration among both operators and the general public, as well as the cost aspects to operators would serve no useful purpose at this stage.

The Type of short code allocated to access various services will be defined by what kind of service is provided, and by whom. For example, access to a third party service provider for national fixed directory enquiries would justify a 0ZXXX Type B Short Code.

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It would seem logical to allocate access codes based on a service type, e.g. Operator Assistance might be one category for a type B short code, and at this point in time is the only potential competitive service in the current market that would demand a Type B Code.

#### 2.3.2 **Short Codes, Consultation 6**

*Comment on whether the “0” code series should be opened for short code allocation or should remain in the “1” series.*

Both respondents agreed that the “0” code series should not be opened for short code allocation.

#### **TRA’s Position – Consultation 6**

The TRA’s position is that the leading digit 0 number series is defined as a prefix reserved for Access to International and Carrier Selection services. Hence access to direct international dialling (00), or access to other national operators (02XXX for CPS). The TRA does not therefore wish to move access to non network level services currently accessed via 1XX short codes into this range, thus maintaining a unique identifier for higher network level services. The TRA will allocate other 0ZXXX numbers for access to appropriately licensed service providers who can offer competitive network level services.

#### 2.3.3 **Short Codes, Consultation 7**

*Comment on whether there is a need for the parallel running period upon migration from three to five digits; and if so, what is the proposed period. Is this period needed for all three-digit short codes?*

A respondent believed there is definitely a need for parallel running periods if there is to be any migration from three to five digits. The respondent urged the TRA to consider proposals that limit the announcements required for changed numbers should be limited; otherwise they will need to upgrade their existing announcement resources in the network switches. They strongly urge that the most established three digit codes should be left unchanged; that others be used on a common basis, and that only then should changes be introduced which require migration to 5 digit codes. That respondent also proposed that the TRA should consider 4 digit code allocations to other operators if appropriate.

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Based on discussions with other carriers, another respondent suggested that the majority of customers do not take advantage of parallel running.

#### **TRA's Position – Consultation 7**

The TRA position is that short code migration to 5 digits is not deemed immediately necessary unless competition is introduced in the services provided using short codes, as detailed in the response to Consultation 5. However, if migration does take place the case for parallel running will be reviewed. In general, the TRA believes if a service provider offers a truly competitive service, parallel running would maintain the advantage currently held by the incumbent, and would be detrimental to the process of introducing effective competition.

It would therefore be the decision of the TRA not to have parallel running, but to mandate a specific date for the service and its associated code to start. However, the TRA will remain flexible in its approach, and each case of future migration may be reviewed to ensure a fair approach to all operators concerned.

#### **2.3.4 Short Codes, Consultation 8**

*Propose other possible options for smoother migration, as well as alternative allocation formats.*

Neither respondent had further suggestions.

#### **TRA's Position – Consultation 8**

Since no other view was proposed, the TRA evaluated each of the proposed Options as defined in the Consultancy and its position is stated in Consultation 5 that migration to five digits is not an immediate requirement until competition is introduced. However, when a competitive service does emerge, the TRA will allocate a range as a Type B short code i.e. 0ZXXX, from which appropriately licensed operators may request an allocation. A date will be specified for the implementation of those codes, based on the launch date of the new competitive services. Any operator already offering an equivalent service will be mandated to discontinue offering the service on any pre-existing short code and apply for a new Access Code, and move access to the service on the new code starting at the date specified. This process will not require parallel running, but will require advertising to the general public.

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#### 2.3.5 **Short Code Type A, Consultation 9**

*Which short codes or services should be considered as Type A.*

A respondent proposed the following short codes or services should be considered as Type A:

- 140 – Speaking Clock – English
- 141 – Speaking Clock – Arabic
- 151 – International Operator Booking
- 181 – National Directory Enquiries
- 188 – Mobile Directory Enquiries - SMS
- 191 – International Enquiries (Operator Services)
- 199 – Traffic Emergency Number
- 999 – Emergency Number

Another respondent asked that the number of Type A codes should be kept to a minimum, typically public services that are free to the caller. They support the TRA in their proposal that Type A codes should be classified as 'off-net', and all operators should have a responsibility to connect the calls.

#### **TRA's Position – Consultation 9**

The TRA will define Type A public interest codes in the NNP as only those codes used for emergency services. These codes are identified as 112, 199, and the range 99X.

These Type A short codes, will remain 3-digits and all other codes will be designated Type B or Type C.

Type B – Carrier Selection Codes will be reclassified as Access Codes and will have the five digit format 0ZXXX;

Type C – Are all other short codes accessible only to the customers of the individual network operator, i.e. "On Net", where there are no restrictions on the number length provided that no conflict exists with any other number plan allocation.

All short codes must be applied for through the numbering unit of TRA for the purpose of recording and managing the number ranges.

#### 2.3.6 **Short Code Type A, Consultation 10**

*Should the entire 19X range be protected for Government and Emergency/Highway Services?*

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Save for maintaining the 196 mobile helpdesk number already in use, one respondent agrees that the entire 19X range be protected for Government and Emergency/Highway Services.

The other respondent also supported all 19X codes be maintained with consistent length.

#### **TRA's Position – Consultation 10**

The current use of 19X numbers includes Batelco's International Enquiries, and helpdesks, as well as the 199 traffic emergency number. There is insufficient reason to force the change of these allocations at present, as a result the position of the TRA is to maintain the designation of Type A codes as public interest service numbers. Therefore the codes 112, 199, and the 99X number range will be protected for Government and Emergency/Highway Services and will remain 3-digits in length and the 19X range except 199 falls into the type C "On Net" category.

#### **2.3.7 Short Code Type A, Consultation 11**

*Is there a need to identify a common set of services in the Kingdom of Bahrain?*

One of the respondents was in agreement with the consultation that there is a need to identify a common set or classification of services in Bahrain.

The other respondent believed that the common set of services should be limited to Type A codes and Type B codes for those individual operators required to provide the Carrier Selection facility.

#### **TRA's Position – Consultation 11**

Based on the results of the consultation, the Type A codes; 199, 112 and the number range 99X, will be protected for Government and Emergency/Highway Services and will remain 3-digits in length.

The Type B codes will be the codes allocated for Access, and will be 5-digits in length.

All other short codes will be considered Type C, "On Net" codes.

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#### 2.3.8 **Short Code Type A, Consultation 12**

*Suggest which services could be included in this common set, and propose a block that could be designated for the common set.*

A respondent proposes that a specific numbering block should be designated for the common set and it further suggests the following services be included in this common set as three digit codes:

- Emergency services
- Speaking clock

The other respondent said that Type A and Type B codes should be defined as the common set. As such, no single block should be designated for them.

#### **TRA's Position – Consultation 12**

Based on the previous decision, the common set of codes will be Type A; 112, 199, and 99X number range. A range of numbers will be designated for services that become common to all consumers. That means a service that is only available to the consumers of one service provider where access to that service for other consumers is via an interconnect will not be considered a common service.

A range of numbers for common services may be identified by the TRA that will be defined by the service type. Service types may be for example, Operator Assistance Services. In the case of an independent service provider, the use of an Access Code is warranted in the 0ZXXX range.

#### 2.3.9 **Short Code Type C, Consultation 13**

*Comment on the need to identify a special range for the use of Type C codes.*

Neither respondent supported the proposal of a special range for use of Type C codes.

One respondent did not agree with the consultation that there is a need to identify a special range for the use of Type C codes, and proposes that they should be permitted to keep the short codes 107 and 196 for the services to which they are assigned.

Given that the individual short codes and ranges are defined for both Type A and Type B codes, the other respondent believed

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that the TRA should not constrain the market and should designate all the remaining 10 XXX short codes for allocation of Type C services.

#### **TRA's Position – Consultation 13**

As previously stated and discussed, all codes that are not defined as Type A or Type B are considered Type C. As type C codes are used for the sole purpose of the licensed operators' subscribers, and do not conflict with any other numbering resource, the TRA do not consider that these numbers need be restricted in the numbering plan in terms of number length or of number range.

#### **2.3.10 Short Code Type C, Consultation 14**

*If respondents are of the view that there is such a need, propose a range for Type C codes and explain their proposal; if not, propose possible solutions to avoid the conflict of codes.*

Both respondents are in general agreement.

A respondent considered that the TRA proposal is not applicable.

Another respondent can facilitate customer awareness by making informal suggestions to the operator, but to encourage competition, the TRA should not be prescriptive in these circumstances.

#### **TRA's Position – Consultation 14**

As previously discussed, there is no specified range for Type C codes and any short codes that are not Type A or Type B will be considered Type C for "On Net" use only.

#### **2.3.11 Short Code Type C, Consultation 15**

*Raise any issues (if applicable) that should be considered by the Authority and the operators when introducing new Type C codes to the market.*

Responses indicated that there are no immediate issues.

#### **TRA's Position – Consultation 15**

No additional issues were raised by the respondents, however, the TRA wishes to raise a point made in response to information received about the possibility for operators to mislead

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consumers with regard to services offered on one network, which may be duplicated on another network, but with different terms applied.

The TRA in its review would simply point out that various Articles of the Civil Code promulgated under Legislative Decree No. 19 of 2001 dealing with contracts and fraudulent behaviour may be breached, and further that such complaints brought to the attention of the TRA could be defined as being within its jurisdiction under Section 56 of the Telecommunications Law.

## 2.4 8 Series Special Service Range

### 2.4.1 **Digit Analysis and Routing, Consultation 16**

*Comment on whether to implement the proposed allocation format in the Review of Network Numbering Plan (NNP) Issues, Section 5.1 for the "8" series in Bahrain, noting any significant difficulties in digit analysis and routing that might prevent this format from being applied.*

One of the respondents agreed with implementation of the consultation's proposed number format for the "8" series in Bahrain, 80[XX] YYYY, where 80 identifies the service, [XX] the service provider and YYYY the subscriber.

The other respondent strongly urged the TRA to further clarify and highlight the right of all licensed operators to apply for and be allocated 8X numbers and other number ranges beginning with 8 and 9 and supports the implementation of number portability in order to remove the necessity for service provider identification within the dialled digits.

#### **TRA's Position – Consultation 16**

The fact that numbers are allocated in sequential blocks effectively predefines a routing scenario for that block of numbers, and negates the requirement for the TRA to mandate and manage service provider identifiers in the number format. In fact, by defining service provider identities with the number allocation and recording them in the number plan may even conflict with the number analysis of an individual operator where internal node numbering or location numbering might be applied.

In this consultation, the TRA did not raise the issue of the implementation of number portability but must consider these types of future requirements in the NNP, and the need to reduce reviews of the NNP.

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A major problem with including service provider identification in allocated number ranges will occur when number portability is implemented in the Kingdom of Bahrain. Should a subscriber or service provider wish to transfer to another provider or carrier, the portability of the number is impossible, because the move would demand the change of the number to include the new provider identity.

The TRA considers that it should not need to manage the routing processes of operators where simple number analysis resolves the routing requirements. However, in the case of Number Portability, the TRA may be required to lay down the requirements for location or node numbering, routing and transfers, and is a case against predefining service provider identities.

In addition to the numbering returns required by operators, where sub-allocations of numbers would be reported, the TRA must consider other methods of informing the public for the purpose of consumer protection, and as a consequence will mandate the publication of sub-allocations of 8X numbers to service providers on the operator's web site.

Therefore, the identification of the carrier/service provider will not be presented as a requirement for Special Service numbers in the revised NNP.

A further point highlighted by one of the respondents is the "right" of all licensed operators to apply for and have allocated their own 8 and 9 series numbers. This subject is covered in the Conventions of the NNP, and specifically Convention 2 that details the eligibility of operators as follows:

#### ***Criteria for the eligibility of applicants for number allocations and reservations***

*11. All operators providing publicly available telecommunications services and running a telecommunication system under a licence granted under section 3.C.12 of the Telecommunications Law, whether that is an individual or a class licence, containing a Numbering section, are eligible to apply for allocations and reservations of numbering capacity.*

*12. Other persons who may require an allocation of numbering capacity, but who are not eligible under clause 11, should seek a sub-allocation from an eligible operator. Sub-allocations should be fairly and reasonably available from such operators. However, the Authority is prepared, at its discretion, to consider reserving or allocating numbers or codes to virtual service providers in demonstrably exceptional*

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circumstances (e.g. where a virtual service provider is in the process of setting up a system).

#### **Information to be supplied by an applicant for a numbering allocation and/ or reservation**

13. When applying for an allocation or reservation of numbering capacity, the applicant shall provide the following information to the Authority's Numbering Unit on an appropriate application form (see **Error! Reference source not found.**):

- a) Name and contact details of the applicant.
- b) Where a person submits an application form on behalf of the applicant, a signed and dated letter of authorisation shall accompany it from that applicant.
- c) Details of the licence granted under the Telecommunications Law under which the applicant intends to operate the numbering capacity sought and of the system being operated.
- d) Details of any existing ranges held that are relevant to that application.
- e) Details of the operator's interconnection and number portability arrangements.
- f) A preferred numbering code and/ or block and, where appropriate, second and third preferences should be indicated.
- g) Where relevant, details of the type of telecommunications service intended on the range and the proposed tariff rate of the service.
- h) Details of the applicant's utilisation of existing number allocations. For example:
  - Numbers in service allocated to end users;
  - Capacity not in use but contracted for (geographic numbering only);
  - Numbers set aside for geographic growth or customer orders; and
  - A forecast of expected utilisation over a specified period.
- i) Any other information that the applicant considers necessary or appropriate to justify the application.

14. In addition, applicants shall provide to the Authority any other information, judged by the Authority to be relevant to the application. This may include a brief description of the applicant's technical and operational system configuration.

#### **Timing of applications**

15. Applications for numbering allocations should not, in general, be made more than six months prior to the planned in-service date.

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The TRA considers that this Convention adequately explains the eligibility criteria, and that operators are not restricted from being allocated their own number ranges.

The issue of connectivity does have an influence on the scope specified for each different number range. If there is any risk that operators will fail to offer connectivity to number ranges then the TRA will either consider enforcement to mandate connectivity or adopt a policy of widening the scope of existing ranges where there is established connectivity.

Connectivity problems also occur where operators in foreign countries analyse the called number beyond the country code and may not connect calls to allocated number ranges.

The TRA will consider the connectivity issue as a serious matter, should there be unjustifiable refusals to connect.

With due regard to all the issues the TRA is selecting the following number format for the 8 series Special Service range:

8X YYYYYY

Where

X identifies the charging method, where X=0-9

YYYYYY identifies the subscriber, where Y=0-9

The TRA will allocate these numbers in blocks, and will mandate the publication of sub-allocations on operator web sites.

#### 2.4.2 **Format Change, Consultation 17**

*Comment on whether the format change suggested in Review of Network Numbering Plan (NNP) Issues, table in Section 5.3, should be implemented.*

Except as discussed in relation to the 801 range, one of the respondents agrees that the TRA's proposed format changes should be implemented as summarised in table 4 of the TRA's consultation.

Another respondent noted that there is a discrepancy between the format shown in section 5.1 and Table 4. The latter closely aligns with the preferred approach. The TRA should recognise that many of the services accessed by these numbers are likely to be provided by third parties. Therefore the designation of 84 should be called Cost Shared with the Service Provider and not the operator as shown in the table. They also support the

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introduction of format change to that in the table noting that the third digit should not identify the Service Provider.

#### **TRA's Position – Consultation 17**

Table 4 should be modified as follows;

<b>Table 4: 8 Series Number</b>			
<b>From:</b>		<b>To:</b>	
<b>Number</b>	<b>Service</b>	<b>Number</b>	<b>Service</b>
8X0	No Charge to caller	80	No Charge to caller
8X1	Protected	81	Protected
8X2	Internet for Schools	82	Protected
8X3	Protected	83	Protected
8X4	Cost Shared with operator	84	Cost Shared with service provider
8X5	Protected	85	Protected
8X6	Protected	86	Protected
8X7	Cost borne by caller	87	Cost borne by caller
8X8	Reserved	88	Reserved
8X9	Protected	89*	Protected

The three changes to the table are to delete the X-digit; third digit, from the original table on the right hand side, secondly to change the word operator to service provider for the 84 series, and thirdly the need for a separate identification for Internet for schools; 82, is no longer required because operators may use any range to provide access to internet. The number block with leading digits 82 will therefore be protected for future purposes.

#### **2.4.3 Format Change, Consultation 18**

*Indicate preferred format (the old or the one currently proposed), taking into account the reasons given by the TRA for the change.*

One of the respondents preferred format is the new one currently proposed.

The other respondent is in agreement provided that the format in Table 4 is amended by their comments under Consultation 17, referring to the cost sharing with service providers and not operators.

#### **TRA's Position – Consultation 18**

The TRA's decision reflects the requirements of all concerned, and will implement the new table as detailed in Consultation 17.

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## 2.5 9 Series Premium Service Range

### 2.5.1 *Digit Analysis and Routing, Consultation 19*

*Comment on whether the proposed allocation format in Section 6.1 should be implemented, noting any significant difficulties in digit analysis and routing that would prevent this format from being applied*

A respondent noted that the proposed allocation format can be implemented such that the format for the 9 series is 90 XX YYYY, where 90 identifies the service, XX the service provider and YYYY the subscriber.

The other respondent referred to their response to Consultation 16 (8X series), as the issues are the same.

### **TRA's Position – Consultation 19**

Premium Rate Services generally offer some form of content, product or service via fixed or mobile lines. These may be accessed as conventional voice services or using SMS text, fixed line telephones, PC (email, internet), and mobile phones. Services include voting lines, competitions, chat lines, business information services, technical help lines, mobile phone ring tones, game downloads, and horoscopes etc.

These services vary in cost, but are generally more expensive than Special Service calls, and in most cases the bulk of the revenue goes to the service providers who are responsible for the content, product or service, or who are aggregators on behalf of a number of such providers. The remainder of the revenue is shared by the consumer's originating operator which receives a fee for originating the call, and the operator which terminates the call on behalf of the service provider through the provision of network facilities.

With specific regard to digit analysis, the issues are indeed the same as for the 8 series numbering, and consequently the allocation of service provider identity by the TRA will not be a requirement. The numbers will be allocated by the TRA in blocks, and it will be the responsibility of the operators to manage the routing. Publication of allocations and sub allocations will be mandatory.

The major issue with Premium Rate numbers is the method of allowing consumers to easily identify the probable costs of

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calling such numbers, and this issue is discussed in Consultation 20.

The TRA is adopting the following number structure for the Premium Rate Service number range;

9X YYYYYY

Where

X identifies the charge band, where X=0-2

YYYYYY identifies the subscriber, where Y = 0-9

#### 2.5.2 **Format Change, Consultation 20**

*Comment on whether the format change suggested in the table of Section 6.3 should be implemented.*

A respondent believed that there will be continuing problems with the definition of low, medium and high. Therefore they suggested two price bands:

Calls charged on the basis of the duration of the call

Calls charged on a flat rate basis

They also believe that the TRA should retain flexibility to react to future innovation in call pricing by designation of some of the range with the protected for future use status.

The other respondent, on the other hand, did not support the allocation based on the low, medium, high principle but offered an alternative suggestion of simply defining the whole range as shared cost, and relying on advertising to impart cost details.

#### **TRA's Position – Consultation 20**

In its review of Premium Rate Numbering, the TRA has taken into account the main requirement of the format of the numbering is to inform consumers of the potential costs of calling or connecting to such a number and its associated service.

The methods currently available to identify these Premium Rate charges are threefold:

- advertising
- banding of the numbers for specific levels of charging
- voice or text messaging.

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The TRA finds in its analysis that most administrations apply a charge band method, and regulate the actual costs of calls within those bands. The merits of this are that the common methodology is known by consumers, and they have the satisfaction of knowing that costs have finite limits set by an independent authority. To rely on advertising alone would be impossible to supervise, and too easily subject to exploitation.

Another method may be considered, considering that in almost every case, the Premium Rate service provider answers a call with an automatic messaging system. For the Bahrain market, it may be appropriate to have an Arabic message followed immediately by an English message stating the costs that will be applied to the call if continued. However, as this was not a stated option in the consultation document, the TRA may initiate a further short consultation as to the viability of this option. The benefit of this proposal is that it is certain that callers will be informed of the tariff being applied, and negates the need to regulate the tariffs as a whole, although monitoring would ensure that excessive charging is not implemented, and the TRA will cap charges if necessary.

The current requirement is based on the need for consumer protection. At the time of writing this response, Batelco is regulated for tariffs based on their dominance in certain markets. Other operators however are not, and hence the TRA is concerned for the consumers and the potential for excessive charging. Historically, the case exists for banding of numbers and regulating the charges applied to those bands.

For the moment, the TRA is implementing the 9 Series numbers as follows;

Number Range:	Charge Band	Status
90	Band A	Free
91	Band A	Protected for future use
92	Band A	Protected for future use
93	Band B	Protected for future use
94	Band B	Protected for future use
95	Band B	Free
96	Band C	Protected for future use
97	Band C	Free
98	Band C	Protected for future use
99	Protected	Protected for 999 emergency number

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The identified bands of A, B and C should be considered as A = High, B = Medium and C = Low charging bands. Initially Premium numbers may be allocated freely. However, the TRA will review tariffs being applied to premium rate calls, and will cap tariffs if exorbitant charges are applied. Operators will be required to publish allocations and sub-allocations in the interests of consumer protection. A further consultation may take place with regard to tariff information applied as mandatory voice messaging.

#### 2.5.3 **Format Change, Consultation 21**

*Indicate their preferred format (the old or the one currently proposed), taking into account the reasons given by the TRA for the change.*

One respondent has a preference for the new format currently proposed, taking into account the reasons given by the TRA for the change.

The other respondent's preference is described in response to Consultation 20.

#### **TRA's Position – Consultation 21**

The TRA's decision is described in Consultations 19 and 20.

#### 2.5.4 **Format Change, Consultation 22**

*Comment on whether the 9X2-9X8 range for Broadband Services should be reclaimed by TRA.*

Both respondents were in general agreement and support the proposal.

#### **TRA's Position – Consultation 22**

The 9X2-9X8 range for Broadband Services is being reclaimed and the 9 series numbers are being allocated in accordance with the table in Consultations 19 and 20.

No applications have been made for the allocation in this number series, and the consolidation of the 9 series number block simplifies The Plan at this stage. However, the requirement for allocating a range for geographically associated numbers and non geographic numbers based on access and new technology will be reviewed under IP telephony detailed in Consultation 35.

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#### 2.5.5 **Format Change, Consultation 23**

*Comment on whether they recommend the categorization of 9X numbers on the basis of cost, as well as on what rates (per minute) should be considered Low (90-93), Medium (94-96) and High (97-98).*

One respondent agreed with the TRA's proposed categorisation of 9X numbers on the basis of cost, but say this should be established by each operator.

The other respondent does not believe that this is the appropriate approach for these numbers and services, and believed that there will be continuing problems with the definition of low, medium and high. Therefore they suggested two price bands:

Calls charged on the basis of the duration of the call  
Calls charged on a flat rate basis

They also believe that the TRA should retain flexibility to react to future innovation in call pricing by designation of some of the range with the protected for future use status.

#### **TRA's Position – Consultation 23**

The TRA's position and rationale is stated in Consultation 20, and has protected some 9X ranges to retain future flexibility.

#### 2.5.6 **Format Change, Consultation 24**

*If it was decided to categorize 9X numbers on the basis of cost, comment on whether it would be beneficial if the TRA introduced a separate regulation on the minimum and maximum rates for these ranges, as well as other guidelines for consumer protection when calling premium numbers.*

If it was decided to categorize 9X numbers on the basis of cost, one respondent believed it would be beneficial if the TRA introduced a separate regulation on the minimum and maximum rates for these ranges.

The other respondent already expressed concerns about including specific call price values within the National Number Plan. Given that series 8 numbers will be designated *no charge to caller; cost shared by provider; and cost borne by caller* they believe that consumer protection would be enhanced by referring to these numbers as '*Revenue Share*'. This will clearly state to consumers that the third party Service Provider is

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receiving part of the cost of the call. The necessary consumer protection can be further enhanced if the TRA adopts the practice of requiring advertisements for the services accessed by these numbers to include call cost information.

#### **TRA's Position – Consultation 24**

Tariff transparency is probably the most important aspect of numbering plans for the general public. Tariffs in Bahrain are set for Batelco by regulation at the time of this review, rather than the TRA's target of effective competition.

Tariffs are linked to a large extent to termination rates, because operators have to take into account the interconnection terminating rate of the terminating operator. Subsequently non regulated operators may set tariffs accordingly, and in fact are unrestricted at this time.

The TRA may achieve tariff transparency typically by categorising similar services for which the terminating rates would tend to be similar, or regulating all termination rates on the grounds that call termination is a monopoly. Other methods may include setting an upper limit on termination rates or requiring operators of similar services to charge the same termination rate or even setting a maximum price limit for calls to a number range.

The current level of tariff transparency in Bahrain may be improved to the benefit of consumers for calls to special tariff services, where at present only Batelco's tariffs are regulated. Other areas of concern for the future, as highlighted in the media recently are mobile calls, and specifically calls made from roaming mobiles and calls received by roaming mobiles.

The TRA will, as explained in Consultation 20, band the 9 series numbers, and will monitor the situation with regard to setting limits for the charge bands.

#### **2.5.7 Format Change, Consultation 25**

*Comment on any effects (where applicable), as a result of applying the new structure to the currently allocated numbers and the operators using these numbers.*

One respondent believed that there would be a negative effect if it results in any existing Audiotex or Inet prepaid services numbering changes.

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The other respondent has commented in responses to earlier consultations (e.g. Consultation 24) on the problems for the TRA and operators associated with the price information in the number format.

#### **TRA's Position – Consultation 25**

The TRA's position on these issues is discussed in Consultations 20 to 24, and concludes that no number changes will be required, because no tariffs will be regulated at this stage. However, the TRA will consider setting tariffs for the charge bands if complaints of excessive charging are received. This may mean that existing numbers could be forced to change.

## **2.6 5 Series Corporate Numbering**

### **2.6.1 Number Structure and Format, Consultation 26**

*Indicate preferred allocation format from the options in Section 7.1. Also indicate preference whether to allocate blocks in 100,000 and 10,000 numbers.*

Of the two options proposed by the TRA for corporate numbering assignments, one respondent is in favour of option 1: 5 [XX] YYYYY, where 5 identifies the number as a corporate entity, [XX] the service provider and YYYYY the subscriber. In addition, allocation in blocks of 100,000 numbers is preferred.

Given that there are no significant capacity pressures within the National Number Plan, the other respondent supported the TRA in continuing to designate range 5 for possible future use as Corporate Numbering. They do not believe that a format should be defined.

#### **TRA's Position – Consultation 26**

The TRA has reviewed the respondent's comments and reviewed the technical and commercial aspects of the introduction of a non geographical number range in Bahrain.

A major requirement for corporate numbers is the need for continuation of the number even in the event of other major changes. The effect on a corporation when forced to change its contact details is a major disruption requiring changes to stationary, business cards, advertising and web sites, as well as informing all existing customers. A number change may also result in loss of business during any change process.

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The TRA must also consider the effects on operators of routing of calls to non geographic numbers where the analysis may be down to the last one or two digits before a connection can be made. Although the 8 digit numbering scheme should not impose any problems for existing technology with respect to the capability of the systems to analyse down to that level, it is understood that some legacy technology may be restricted in capability. It is also considered that the additional computing load associated with more detailed analysis for called number routing would not be a restriction considering the limited application in Bahrain.

The TRA will therefore implement the following number format:

5 XXXXXXX

Where:

5 identifies the call as a corporate number

XXXXXXX identifies the subscriber

The table below shows that the TRA will start allocating corporate numbers in the 55 range and that other number blocks will be protected for future use.

Number Range:	Status
50X – 54X	Protected for future use
55X	Available as 100 blocks of 10,000 numbers
56X – 59X	Protected for future use

A Corporate Number is typically defined as a telephone number allocated to a service provider where the number is to be assigned by that service provider to a specific corporate customer. It is believed that corporate customers wish to obtain and to operate telephone numbers which facilitate contact with customers, dealers and members of the public.

The use of these corporate numbers is considered non-geographic in nature because it is not possible to determine the location of the called party based on the dialled digits.

The above assignment would provide enough resources to offer 100 operators a block of 10,000 numbers to assign to its corporate customers or variations thereof. The assignment guidelines for these resources would be consistent with the existing NNP resources, i.e. first come, first served.

#### 2.6.2 **Digit Analysis and Routing, Consultation 27**

*Comment on any significant difficulties (if applicable) in implementing and using corporate numbers, as well as on how operators could overcome such problems.*

Both respondents are in general agreement that further study is required.

#### **TRA's Position – Consultation 27**

For Non-Geographic (i.e. 5X, 8X and 9X series numbers), assessing the feasibility of digit analysis to a finer level requires analysis of the specific networks involved. However, as a guide, ITU Recommendation E.162 calls for international traffic to be subject to analysis down to the 7<sup>th</sup> digit, which for Bahrain corresponds to a block of 10 numbers. The decode tables used for this type of function are probably not excessively utilised in Bahrain and this suggests that technically, there is unlikely to be a problem with the depth of decode for 8 digit analysis.

The analysis and routing needs for non geographic numbers consists of two scenarios. The first is for those numbers that are on net, and the second for numbers allocated to other operators. However a full analysis would show that it will never be any more complicated than current 8X or 9X number analysis and hence no greater burden on the operators.

#### 2.6.3 **Other Issues, Consultation 28**

*Comment on the issues under Section 7.3 and mention their preferred options.*

One respondent would support an allocation of these numbers either based upon pre-existing usage and allocation or allocation by lottery.

Another respondent believed that comments in advance are highly speculative and unlikely to be helpful when they occur.

#### **TRA's Position – Consultation 28**

The TRA will allocate these corporate numbers according to the conventions of the NNP; on a first come, first served basis and will review each application accordingly.

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## 2.7 SMS Numbering

### 2.7.1 **SMS Numbering, Consultation 29**

*Comment on whether there is a need to introduce a specific numbering for SMS services.*

Both respondents are in general agreement that there is no need to introduce a specific numbering for SMS services.

#### **TRA's Position – Consultation 29**

The exchange of short messages between subscribers using the E.164 telephone number or for SMS value added services are currently not separated as a service grouping that may justify a separate number range. In fact the number allocated to identify a subscriber in a mobile network for the voice service is the same number used for identifying the subscriber for messaging. There may be a case in the future for a numbering allocation if messaging is separated as a service environment.

Based on the responses, and available data, the TRA does not see any justification at present to allocate a specific numbering range for SMS.

### 2.7.2 **SMS Numbering, Consultation 30**

*Comment on whether there should be a categorization of numbers into ranges based on cost or content.*

One respondent believed there should not be any further categorization of numbers into ranges based on cost or content since this is something that operators can manage for themselves if of value to consumers.

The other respondent believed that the services should use the existing cost basis and Short Code numbers available within the plan. There is no further need to differentiate these services.

#### **TRA's Position – Consultation 30**

Consistent with the decision to Consultation 29, the TRA will not introduce a specific numbering range for SMS and will therefore, not categorize numbers into ranges based on cost or content at this time.

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#### 2.7.3 **SMS Numbering, Consultation 31**

*Mention other issues to be considered by the Authority or the operators regarding the use of SMS numbering.*

One respondent suggested that the TRA should not make any special arrangements for these services. TRA should apply the existing allocation criteria when allocating the short Codes, shared cost and shared revenue number blocks. It will then be for operators to assign individual codes and numbers to third parties, as with the codes and numbers for any other service type.

#### **TRA's Position – Consultation 31**

The TRA will make no special arrangement for SMS numbering. See Consultations 29 and 30.

### **2.8 Use of Numbering for Activation of Prepaid Cards**

#### 2.8.1 **Prepaid Cards, Consultation 32**

*Comment on whether the method of accessing prepaid services in Bahrain should be unified, or should be open to both short codes and 800 numbers.*

One respondent considered that pre-paid services should be accessible by both methods. In particular, it is preferable to keep the short code access for a remote pre-paid account. If this cannot be retained and short codes are expanded to 5 digits, then it would be preferable to replace all other 8XX numbers with 5 digit short codes.

Another respondent did not see any significant reason for changing existing numbers.

#### **TRA's Position – Consultation 32**

The TRA supports the rationale that access to prepaid platforms be the responsibility of the operator, and that no regulation of the process is necessary.

The TRA examined the situation with regard to access to prepaid platforms in several countries. Although there are different access mechanisms in place throughout the world there is usually an agreed common practice within a country on the choice of either a short code or the use of a national number.

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Throughout the world the most common methods of access are either toll free (8X) numbers or short codes. In all instances examined, no charges were incurred by subscribers when the numbers or short codes were dialled to access the prepaid platform.

The TRA maintains the position that the operators are free to choose the access method, and that the market will decide on whether any system is more acceptable than any other.

#### 2.8.2 **Prepaid Cards, Consultation 33**

*Propose the most convenient type of number (short code or 8X to be used for accessing the prepaid card platform in Bahrain, and support answers with reasons.*

One respondent stated that the most convenient option would be to change the 8X numbers to short codes as this would reduce an already long dialling procedure utilising 80008888, 80005555 & 80005050.

Another respondent said that if the TRA decides to encourage Service Providers to adopt a unified scheme for new cards, the issues to be balanced are the customer convenience of dialling short codes against the consumer clarity of no charge calls using 8X numbers.

#### **TRA's Position – Consultation 33**

The TRA maintains the position that the operators are free to choose the access method, and that the market will decide on whether any system is more acceptable than any other as identified in Consultation 32.

#### 2.8.3 **Prepaid Cards, Consultation 34**

*Propose other options of numbers to be used for accessing prepaid cards, and support answers with reasons.*

No other options were proposed.

#### **TRA's Position – Consultation 34**

The TRA maintains the position that the operators are free to choose the access method, and that the market will decide on whether any system is more acceptable than any other. See rationale and discussion in Consultation 32.

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## 2.9 Separate Numbering Range for IP Telephony

### 2.9.1 *IP Telephony, Consultation 35*

*Comment on the need for a numbering range for IP telephony services in the Kingdom of Bahrain. Elucidate the answers by citing possible advantages and disadvantages. If recommending a separate range for IP telephony, propose the numbering range to be used for IP telephony services.*

Both respondents are in general agreement.

One respondent said that the TRA have correctly indicated the trend of migrating voice traffic to IP, as such and at this time a dedicated IP numbering range is not considered as necessary.

The other respondent believed that a National Numbering Plan should be 'technology neutral'.

#### **The TRA's Investigation**

The TRA wishes to facilitate the entry of new services and those service providers and operators into the Bahrain telecommunications market to encourage marketplace competition thus benefiting the consumer, while at the same time introducing certain technological enhancements and greater network efficiencies. Some of these new technologies also suffer from certain limitations, at least for the present, so the TRA wishes to ensure the avoidance of any harmful effects for consumers, or long-term damage to the wider communications infrastructure.

Whilst taking into account the stated position of the TRA in respect of remaining technology neutral, the subject of IP telephony numbering has been under consultation in virtually all numbering administrations around the world. The TRA in the absence of detailed input to the consultancy has investigated the situation in other parts of the world to provide the information necessary to make an informed decision.

In 2005, the United States Federal Communication Commission granted a waiver to a VoIP operator allowing access to the North American Numbering Pool. The FCC also requested that the North American Numbering Administration "review whether and how our numbering rules should be modified to allow IP-enabled service provider's access to numbering resources in a manner consistent with our numbering optimization policies."

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Certain conditions were applied with the waiver which basically required the operator to show that they had an interconnect agreement in place, and were ready to offer services, meaning that VoIP carriers can only obtain numbering resources through the purchase of interconnect based services. The waiver rules were not final, and subject to further review.

A review later produced a report basing its analysis on the underlying principle that telephone numbers are assigned to all providers, including VoIP providers, and that calls to a telephone number from the PSTN are expected to be completed.

The report supported the waiver and made recommendations on the following principles:

1. The underlying principle that calls to telephone numbers from the PSTN are expected to be completed;
2. That telephone numbers should be assignable to all providers, including VoIP providers if their intent is to assign numbers in a manner that promotes communication with the PSTN;
3. That all providers should have access to numbering resources in a fair and equitable manner, irrespective of industry segment or group, or technology;
4. With respect to item 3 above: All providers should share and bear the same “numbering-related” responsibilities, including cost obligations.

For an IP Service Provider to obtain numbering resources directly from the administration for use in deploying IP-enabled services, including Voice over Internet Protocol (VoIP) services, the IP Service Provider must offer services on a “commercial basis” to residential and/or business customers. Upon application for number resources the VoIP provider must demonstrate facilities readiness and that calls from the PSTN will be able to complete to those numbers.

In addition to conforming to all the administrations rules for efficient use of numbering resources, and with the relevant registration processes, other obligations were included such as to:

1. Participate in Local Number Portability (LNP) FCC mandated port-in and port out requirements and be treated just as any other provider who is porting customers numbers.
2. Contribute to number administration, number pooling and local number portability industry cost obligations.

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One element of the review was the actual method of interconnect, where historically, VoIP service providers traditionally interface at a local exchange using a Primary Rate Interface (PRI), (that means the VoIP gateway looks like a PBX), and hence the charging mechanisms applied have been on a retail business customer basis, and the number blocks allocated would therefore be associated to the local exchange geographical numbers, in the same way a business customer would be allocated a telephone number.

If the numbers were to be allocated from the central pool, the VoIP operator could apply for a state wide number range, (equivalent to a national number range in Bahrain) but would then require an interconnect at the trunk or transit level, and hence require a Signalling System Number 7 interface (currently the most common technology). The operator would also qualify for and be allowed to charge for call termination for voice calls originating from the PSTN and terminating on their own numbers.

Just recently the administration in the USA has completed a legal process where VoIP providers are now subject to lawful interception. That means monitoring and recording of voice and data calls by the security services of the country.

Other obligations under the administration's registration processes invoke the requirement to include such information as:

- Registrants legal name
- Registrants principle business address and telephone number
- Contact information for the person responsible for Universal Service Fund
- Contact information for the person responsible for Telecommunications Relay Systems
- Contact information for the person responsible for numbering resources
- Contact information for the person responsible for E.911 (calls to emergency services)
- Contact information for the person for responsible Consumer issues

These requirements show that the VoIP operators in the USA are obliged, if they want to apply for number resources, to

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operate in the same way as existing telecommunication companies, and will have the same obligations for consumer issues, quality of service, provision of emergency call services (i.e. database of customers names and addresses, and location if applicable), and obligations to contribute to funds for Universal Service provision and Number Portability administration.

In October 2004 the Commission for Communications Regulation (ComReg) in Ireland published the response (ComReg 04/103) to a consultancy paper issued in June that year on the implications of Voice over Internet Protocol (VoIP) technology and on how to respond to its emergence. At the end of the process ComReg opened the national numbering scheme to ensure it met the needs of the new VoIP providers. It changed the eligibility criteria for geographic numbers to include some service providers where their VoIP service was equivalent to the Publicly Available Telephone Service, and introduced a new non-geographic number range for use with IP based services. In addition, it provided a set of guidelines (ComReg 05/50) for VoIP service providers aimed at helping them to ensure their services offer maximum benefit to consumers, while also ensuring that consumers are alerted to any limitations in service they can expect to encounter,

Further in 2005 ComReg initiated a review of the VoIP market resulting in a new consultation document (ComReg 06/13) dated 3<sup>rd</sup> March 2006, in which it reviews the status of the numbering and number portability, social obligations such as the provision of access to emergency services and other consumer issues such as port blocking.

With regard to geographic numbering, one issue was raised that geographic numbers could technically be utilised without regard to the physical geographic location of the end user and area for which the number is allocated. If this is allowed to happen, any user anywhere in the world could request an allocation of a geographic number, potentially even multiple numbers from many different geographic areas. This could lead to a situation where an excessive demand for national number resources from outside the country could trigger costly capacity based number changes, without clearly identified national based economic benefits in return.

The introduction of a new number range specifically for IP based services without the geographic restrictions came under early pressure in Ireland with the operators unable to agree a wholesale interconnection rate, resulting in ComReg stepping in

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to set a retail price point and requiring access to the number range to be opened based on it.

Other points made were the obligations put on some service providers, (where the service is equivalent to PATS), specifically the obligation to ensure uninterrupted access to emergency services and to ensure that end users are able to call the emergency services (112 and 999) free of charge. Another issue is the caller location information that is available with the fixed telephony and mobile services. Although VoIP service providers can configure their systems to prevent any nomadic operation, and also considering that international bodies are working on standards to support the provision of location information on IP networks, it is perceived that the nomadic element of VoIP is an attractive aspect of the service, and that location information may then be of concern for emergency service use, but at this stage cannot be guaranteed for use by emergency services.

It is clear that some VoIP providers around the world are achieving a similar status to the legacy network telecommunication type operators, and that obligations are being imposed on those operators that bring them directly into the legal framework of the legacy telecommunications business', and as such must consider responsibility for such things as consumer protection, quality of service, and emergency service calling, and many other obligations such as calling line identity, and providing directory listings etc.

Finally, the method of interconnection between legacy networks versus peering and transit arrangements must be resolved together with the relevant network cost aspects for termination rates, and methods used for settlement related to traffic handling either by means of per unit volume costing or agreed handling levels per unit cost.

### **TRA's Position – Consultation 35**

The TRA aims to make their numbering plans "technology neutral" and to treat different technical solutions for providing comparable services in a similar way. The reasoning for this is to enable operators to adopt newer and different technologies in their networks and for users to upgrade their terminals without disturbing the numbering arrangements. In reality various conditions and concepts have become rooted in numbering plans and relate to the characteristics of specific technologies. Therefore plans may only be "technology neutral" in terms of the technologies available when the plans were formulated and

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would need to be modified to remain neutral with the introduction of new technologies.

The classification of services that may use a specific number range is rarely addressed in any great detail, but as a result of the diversity that results from the use of IP technology and from the introduction of new access technologies this classification is now becoming more of an issue. For example, geographical numbers are universally allocated according to a geographic plan, with the first few digits of the number identifying a specific region historically within the incumbent's network. In the existing Numbering Plan this is a requirement. Based on Batelco's network, the geographic number block identifies a location for a number allocation, there may be a requirement to use the number only in the area for which it was allocated, particularly in the event of complete unbundling of the local loop. However, this may be seen as a restriction on the inherent nomadic nature of numbers allocated for a VoIP service.

The TRA recognizes that different countries are utilizing different approaches to resolve this issue but that the trend is to allocate a portion of their NPP for IP Telephony.

The TRA would like to follow the impetus introduced by other administrations, however, feels that the subject of IP telephony numbering has not been fully consulted on for the Bahrain market. The decision is to introduce a short consultation on the subject as soon as possible.

#### **2.9.2 IP Telephony, Consultation 36**

*Comment on the possible problems associated with specifying a range for IP telephony services.*

A respondent said that a range dedicated for IP Telephony would add unnecessary complexity to the NNP.

Another respondent referred to their detailed response in Consultation 35. In particular, there is a lack of a common approach even within the CEPT countries. Therefore, each regulatory body should reach their own conclusions.

#### **TRA's Position – Consultation 36**

The TRA has also considered other numbering issues which may in the future be raised, such as whether numbering should be:

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- linked to Quality of Service (QoS), especially voice quality during calls
- related to requirements to provide the capability to call emergency services and provide location information, or
- related to requirements for law enforcement

The idea of linking numbering to quality of service is not generally considered advisable simply because quality of service depends on both the technology used and the way in which networks are designed and operated. Being technology specific obviously conflicts with the regulatory requirement of being technology neutral. The network design and operation issue results in the QoS being a noticeable variable. For IP based networks it is variable with traffic loading and so is not a balanced approach, and anything associated with numbering needs to be as secure and future proof as possible. A link to levels of quality may mean that numbering should change when quality changes, which is neither reasonable nor practicable.

Connection of emergency calls from IP-based technologies is generating a good deal of attention. These issues are important, but do not generally affect the organisation of numbering, only the rules of allocation. For example; the capability of routing a call to an emergency response centre, together with the calling line identity and its associated location information.

Law enforcement has two areas of concern, that again do not affect the organisation of numbering, only the qualification for allocation. That is lawful interception, and data retention. A subscriber's usage history may be required to be held by service providers in case of future legal action. Both activities require the appropriate legal processes to be followed and are supported traditionally by service providers. However, the effects of introducing IP based technologies bring restrictions that may be a reason to refuse the allocation of numbers to service providers.

Two other issues need to be considered that only apply to operators:

- The price for calling the numbers
- The connectivity to the numbers (the ability to call them)

For specially tariffed numbers regulators take different approaches between fixing the price for all calls to the numbers and fixing the price only for calls from operators with significant market power. For "normal" numbers there is the question about whether a price ceiling should be set as a consumer

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protection measure. Generally these aspects of price do not influence the basis planning of numbering and the allocation procedures.

Connectivity does have an influence on introduction of new number ranges and the scope specified for each different number range. If there is any risk that operators will fail to offer connectivity to new number ranges then unless regulators are willing to enforce connectivity it would be advisable to adopt an alternative policy of widening the scope of existing ranges where there is connectivity. In Europe, under the Universal Services Directive, Member States are required to ensure that at least one undertaking provides the ability to make local and national calls, but the application of this to new services such as nomadic services provided by VoIP is not totally clear. Furthermore, even if this requirement is met by the incumbent, if other operators decide not to connect calls to VoIP services in a new number range for nomadic services, then the VoIP operators are disadvantaged significantly. This situation could easily arise if, say, 6 operators have 60% of the market between them yet none qualifies for significant market power.

Connectivity problems also occur where operators in foreign countries analyse the called number beyond the country code and may not connect calls to new number ranges.

Future networks are expected to be all based on the Internet Protocol (IP). The Internet Protocol provides the foundation for the separation of services and connectivity. This separation is achieved in the Internet, and is one of the underlying principle characteristics of the Internet, but the telecom operators do not intend to allow this separation in New Generation Networks.

A consequence of the separation of services and connectivity is the characteristic of nomadism where a user may be located anywhere relative to their service provider and relative to a gateway to another network type such as the PSTN. With the Internet, nomadism is worldwide but with the NGN it is limited to the network that the user is subscribed to. Use of services beyond that network is treated as roaming and a much higher tariff is charged.

Nomadism means that, unless special measures are taken, there can be no control or effective restriction on the location where a number anywhere is within the nomadism area, and this is worldwide for the Internet.

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The Internet uses names instead of numbers and the Domain Name System converts names into IP addresses, which are used for the end-to-end routing of packets through the Internet. NGNs will also need their own DNS but it is not yet decided whether this will be:

- The same public DNS that is used by the Internet
- A common DNS available only to NGN operators
- Individual DNSs provided by each operator for their own use

DNS technologies may be used for handling numbers, which may be stored in number translation database. Storage in a different form does not necessarily affect how a number is used or how numbers should be arranged, but the methods of using numbers may affect how numbers should be arranged. For example, where networks analyse numbers partially in blocks, eg analyse the first X digits and later analyse deeper into the number, then all the numbers in a block may need to retain certain characteristics. In contrast if the analysis system always treats each number individually, as DNS does with names, then there is no requirement for all the numbers in a block to retain the same characteristics.

Voice over Internet services use various identification methods including E.164 numbers, SIP addresses and proprietary names such as Skype names. E.164 numbers are needed in particular for incoming calls from the PSTN.

Within a country there are normally up to four options for numbers for voice over Internet services:

- Geographic numbers under the existing geographic plan
- Numbers in a new non-geographic range created for nomadic services
- Existing special tariff numbers, such as relatively non-geographic/low price premium rate numbers
- Personal numbers.

The use of new number ranges can lead to the following problems:

- Existing operators refuse to open connectivity to the new ranges because they do not want to encourage competition from voice over Internet services
- Existing operators charge higher tariffs for calls

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- Calls to these numbers are not included in flat rate tariff arrangements and/or are not included in call package offers.

The TRA would like to follow the impetus introduced by other administrations, however, feels that the subject of IP telephony numbering has not been fully consulted on for the Bahrain market. The decision is to introduce a short consultation on the subject as soon as possible.

#### 2.9.3 **IP Telephony, Consultation 37**

*Comment on the possible problems with using geographic numbers for IP telephony services.*

A respondent stated that Geographic numbering is associated with the requirement to route calls to specific 'legacy' network nodes. IP Telephony services may reside on 'larger' nodes and there may not be the same need for geographic numbering.

Another respondent stated that the most significant numbering issue relating to using geographic numbers for IP voice services concerns the use of CLI for location purposes. Over the last 10 - 15 years emergency services have used the Calling Line Identity of fixed-line customers to provide location information. The ability to move location through 'nomadicity' removes this capability. However the TRA should note that adoption of a dedicated number range for such services does not resolve the problem, and that, as with mobile telephony, other solutions are required and that the technology for this is still being developed.

#### **TRA's Position – Consultation 37**

An option favoured by some providers of voice over Internet services is the use of sub-ranges within the main geographical range as a means of making it more difficult to discriminate against the new numbers. This would be like a virtual region for new services and this solution would work best if there is no distinction between local and long distance calls in the country concerned.

In practice many voice over Internet providers operate "behind" new entrant telecom operators and use the existing interconnection arrangements of these operators for their services. These arrangements may be used especially in countries where the regulatory framework makes the commercial operation of Voice over Internet services especially difficult as they may overcome some of the disadvantages such

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as the unavailability of geographic numbers and potentially the set-up costs of handling number portability processes.

Some service providers operate PSTN gateways in many different countries and offer their subscribers numbers in distant countries so that their correspondents may call them cheaply using a local or national number. This arrangement gives the benefit of VoIP such as avoiding higher tariffs to the less technically aware or poorer people and is the inverse of the normal arrangement for VoIP where the person with the PC and broadband access has the benefit. The arrangement is similar in some respects to the sale of mobile accounts to visitors to a country as a means of avoiding high roaming charges. If the call is routed through a service point in the country concerned then this is still in accordance with E.164 and this would normally be the case for calls from the PSTN. If, however, calls are routed wholly over the Internet using an E.164 number plus some translation capability then this is a situation that was not envisaged when the current version of E.164 was drafted.

The end result of these practices is increased demand for numbers for the purpose of avoiding high charges.

The TRA would like to follow the impetus introduced by other administrations, however, feels that the subject of IP telephony numbering has not been fully consulted on for the Bahrain market. The decision is to introduce a short consultation on the subject as soon as possible.

### **2.10 National Number to Identify ISPs**

#### **2.10.1 Identify ISPs, Consultation 38**

*Comment on whether there is a need for a unified access method for ISPs., i.e., whether ISP access should be limited to special numbers in the 9X range, or geographic numbers.*

Both respondents are in general agreement.

One respondent requested that unified ISP access is not considered as a requirement or advantage. The different ISP access methods can already be accommodated in the proposed 8X and 9X NNP rules without the need to introduce further complexity.

The other respondent said that this is a transitory issue and that the TRA should not be overly concerned with achieving a unified numbering range for ISP access.

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#### **TRA's Position – Consultation 38**

The TRA supports the respondents in deciding that there is no need for the TRA to determine a unified access method for ISPs.

Currently in Bahrain, there is no common numbering range for ISP access being utilized. In some cases geographic numbers are used and in other cases the 8 series special numbers are utilized. The TRA believes that customers generally understand the cost of the call depending on the numbering range allocated. Customers may not specially know the exact amount but they would be able to approximate the cost of access for any single event because in the event that geographic numbers are allocated customers would understand the cost of the call would be based on the national calling rates. In the case where the 8 special service number series were allocated the customer would understand if the cost was shared by the operator; 84X series, or if 87X was used the cost would be borne by the caller. (Please refer to Consultation 16 on 8 Series Special Service Numbers). In the last instance if the 9 series Premium service numbers were used the customer would know if the rate being applied was Low, Medium or High Cost, depending on the range allocated within the 9 series. (Please refer to Consultation 19 on the 9 series numbers).

An issue that has been raised recently in a number of administrations is where software diallers may be downloaded to PC's that will change the number dialled for a dial up service to the internet. These soft diallers will be configured to access a particular ISP or service provider for the service on offer. These types of diallers should return the dialling configuration on the PC to its original settings when the call or connection to the web site is disconnected. However, it is known that some diallers can be surreptitiously downloaded, and may change the dialling to an expensive destination without the knowledge of the user, or simply not return the dialling configuration to its original configuration. This subject will need to be reviewed by the TRA and will be the subject of further consultation.

#### **2.10.2 Identify ISPs, Consultation 39**

*Comment on whether there is a need categorizing the access numbers to reflect the cost of each call to customers.*

Both respondents are in general agreement.

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As ISP access is already categorized under the 8X or 9X NNP rules, one respondent believed that no further categorization is considered necessary.

Given their belief that the ISP access number issue is transitory, another respondent viewed that if any change is to be imposed then the call price should be the determining factor in the type of number to be used and that no dedicated range should be designated for ISP access.

#### **TRA's Position – Consultation 39**

The TRA's decision that no unified access method is required, is discussed in Consultation 38 above, and also takes into account that competitive market forces should always be allowed to prevail. However, further consultation may be required to consider the methodology for protecting consumers against the use of unwanted soft diallers.