



## **Implementing the new 10-digit numbering plan in Sri Lanka**

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## 1 Introduction

This paper reviews the implementation of Sri Lanka's new 10-digit numbering plan during 2003. A companion report covers related aspects of the implementation of call-by-call carrier selection codes for international carriers in the new competitive regime.

The consultant's terms of reference focused on implementation but also extended to the quality of the numbering plan itself, especially where competition is concerned.

The assignment was carried out through two visits to Colombo in January to March 2003. A draft report was circulated between the two visits for written comment. Details of those contributing are at Annex D; all contributions are gratefully acknowledged. This final report aims to document TRC's relevant decisions during March 2003.

### 1.1 Context

The backdrop to this assignment has been a complex set of interrelated changes in Sri Lanka's telecoms industry, including:

- Issuing External Gateway Operator (EGO) licences following the formal end of SLT's international monopoly in August 2002, together with the specific rules that are to govern retail international carrier selection and interconnection;
- Moving mobile phones from Mobile Party Pays to Calling Party Pays (CPP) tariffing.

Implementing the new numbering plan has become a central issue for the industry. Naturally, any changes tend to be judged in terms of perceived advantage or disadvantage to individual industry participants. However, this review was designed with the aims of:

- **competition-friendliness** – with an eye on fairness to unknown future competitors as much as to current participants;
- **customer-friendliness** – trying to minimise the inconvenience and difficulty that numbering changes cause for customers;
- **practicability** – trying to avoid implementation problems, and especially those which could lead to network instability as well as bad publicity for all concerned.

These aims are all intended to be in the national interest, rather than in any sectional interest. The consequences for existing industry participants are incidental.

### 1.2 The proposals

Main features of the plan originally put to the consultant (as agreed between the industry and TRC) summarised in Table 1 as Plan A. The consultant's proposed modifications are summarised as Plan A1. TRC's decisions are given in the final column.



	<b>Plan A</b>	<b>Plan A1</b>	<b>TRC decision</b>
Mobile trunk codes	No change	Same as Plan A	Plan A
Mobile subscriber numbers (SNs)	One digit added to existing SNs, details left to operator's discretion	Same as Plan A	Plan A
Wireless local loop trunk codes (074, 075)	Withdrawn	May stay in use at operator's discretion	Plan A
Wireless local loop subscriber numbers (Suntel, Lanka Bell (LB))	Integrated into appropriate geographic areas, prefixed by 4 (Suntel) or 5 (LB)	Same as Plan A	Plan A
SLT local subscriber numbers	7 digits starting with 2	7 digits starting with 2 or 9	Plan A
Geographic trunk codes			
Colombo (now 01)	011	030	Plan A
Kandy (now 08)	081	058	Plan A1
Galle (now 09)	091	049	Plan A1
All others	No change	Same as Plan A	Plan A
Non-geographic numbering ranges	8xx xxx xxxx	08xx xxx xxx, 09xx xxx xxx	Plan A1
Short codes starting 11	Common services – same for all operators eg emergency 112	Same as Plan A	Plan A
Short codes starting 18, 19	Reserved for carrier selection codes	Same as Plan A	Plan A
Short codes starting 10, 13, 15, 16	Reserved for future use	Same as Plan A	Plan A
Short codes starting 12, 14, 15, 17	Allocated to current access networks (17 – part)	12 operator-dependent, 14, 15, 17 reserved for future use	Plan A1

**Table 1 Summary of implementation proposals**

Table 1 shows that A and A1 are identical in many respects, and that TRC has supported only a few deviations from Plan A. The thinking behind the differences between A and A1 is summarised in Table 2 below, where known, together with an outline of TRC's reasons for its decisions. The main body of this report is a full discussion of the differences between Plans A and A1.

In the course of the assignment, SLT mentioned several features of its network and current situation which it feels severely limit its scope for adopting any change from Plan A. These are summarised in Annex F.



	<b>Plan A</b>	<b>Plan A1</b>	<b>TRC decision / rationale</b>
WLL trunk codes	Uniformity required for both WLL operators	Slight deviations from uniformity permissible where justified	A: A1 rejected by WLLs
Colombo trunk code	Uniform migration method with minimal change from status quo, to aid recognition	Free 01 range to make it easy to close the plan one day; use spare code in same region	A: A1 raises long-term issue, can wait
Kandy and Galle trunk codes	Uniform migration method with minimal change from status quo, to aid recognition	Free 08 and 09 ranges for non-geographic numbering; use similar code in same region	A1: Change from A to A1 is feasible as extra time allowed (and see next)
Non-geographic numbering ranges	Greater capacity, easier customer recognition.	Follows general usage elsewhere, internationally accessible, uniform with rest of plan.	A1: Internationally accessible, uniform non-geographic numbering important for e-Sri Lanka
SLT local subscriber numbers	Migration simple to describe (“add 2 or 22”)	Migration simple to implement (using spare number blocks)	A: SLT unable to take advantage of A1 without delay; transitional issue only.
Short codes starting 12, 14, 15, 17	Easy to access existing access networks’ common services from other access networks, in uniform way	Allow for fair treatment of future access networks while conserving scarce short code space	A1: Fair competition given priority, change from A to A1 feasible

**Table 2 Thinking behind different implementation approaches**

The implementation timetables are summarised in Table 3.

	<b>Plan A</b>	<b>TRC plan</b>
Start of publicity	1 February	March
First number changes	14 February	May
First Colombo changes	14 February	June
WLL changes possible	31 July	September
Calling Party Pays starts	1 July	October
Short code changes	25 April	Last quarter

**Table 3 Outline timetables**



## **2 Trunk codes**

### **2.1 WLL codes**

The original timetable for the numbering change was determined by a desire to introduce Calling Party Pays charging for mobiles by 1 July 2003. The connection with the numbering plan is a human rather than a technical one: it is the need to avoid any misconception by the public that the higher charges that will apply for calling mobiles on 071, 072, 077 and 078 will also apply to calling WLL customers (currently on 074 and 075). (See the fuller discussion of this point in section 6). This means providing the WLL operators with the opportunity to move their customers to local numbering ranges.

This review pointed out that there could be an advantage to a WLL operator in leaving some customers on the 07 codes, rather than moving them to SSC numbering (and providing local calls at local rates) where there are no local points of interconnection. However, the WLLs were not interested in this option, so the suggestion that it be offered to them has been withdrawn.

### **2.2 Geographic codes**

The different codes suggested for Colombo, Kandy and Galle may appear to be the major difference between Plans A and A1. However, the difference is more presentational than substantial.

Technical implementation of the codes is straightforward in either case. Only vacant codes are proposed, so systems can immediately recognise whether old or new numbers are being dialled and can route misdialled calls to announcements. There is of course some cost in changing any preparations that have already been made for Plan A. Normally, however, adding codes to exchange routing tables is a routine matter, so this cost is not expected to be large.

The message given to the public at the time of the change is simpler and more memorable for Plan A: “add a 1 after the codes for Colombo, Kandy and Galle”. However, Plan A1 has desirable long-term features which are discussed below.

#### **2.2.1 Colombo code**

The reason for suggesting that if Colombo’s code is to change, it should change to a vacant code in the 03 range rather than to 011, is that this keeps open the option of closing the plan easily (by avoiding a conflict between Colombo’s numbers and short codes on the 1 range). At the same time this would integrate Colombo into its hinterland, the Western Province, where all codes start with 03.

Annex A explains the features of open and closed numbering plans and why there is a global trend towards closed plans, which Sri Lanka may wish to join at some point. The point here is not that it is recommended that Sri Lanka should close its plan in the near future, or indeed ever. Before closing the plan, it is very desirable that tariffs for national calls should not differ significantly from those for local calls. It is simply a matter of not unnecessarily closing off an option which may be seen as desirable in future. In particular, if and when Colombo exhausts the capacity provided by 7-digit local numbers, the closure option may be reconsidered, as it provides an easy way to enhance capacity.



Another point raised in discussion is that Colombo, as the capital, deserves a distinctive and special code, and that 11 would serve this purpose well. This view is understandable, but a quick glance at area codes for some capitals and major cities (see Table 4 below) shows that there is no clear pattern of code used.

<b>City</b>	<b>Code</b>
Ottawa	613
Santiago	2
Sao Paolo	11
Washington DC	202
Amsterdam	20
Athens	Changed from 1 to 10
Berlin	30
Brussels	2
Helsinki	9
London	Changed from 1 to 20
Madrid	Changed from 1 to 91
Milan	2
Paris	1
Rome	6
Stockholm	8
The Hague	70
Zurich	To change from 1 to 44
Bangkok	2
Beijing	10
Canberra	6
Delhi	To change from 11 to 211
Dhaka	2
Islamabad	51
Karachi	21
Kuala Lumpur	3
Melbourne	3
Mumbai	To change from 22 to 222
Osaka	6
Shanghai	21
Sydney	2
Taipei	2
Tokyo	3
Johannesburg	11 to be extended by 10
Cairo	2

**Table 4 Area codes of some major cities**

The only vacant code in the 03 range is 039. (The code 030 was thought to be vacant, but appears to have been brought into use recently by SLT for voicemail services).



TRC considered the following relevant factors:

- the long-term advantages of moving Colombo from the 01 range, which could be achieved at a later date;
- the lack of “specialness” of the only vacant 03 code, 039, and its lack of any digit in common with the existing 01 code;
- the short-term difficulty to SLT in changing its implementation plans;
- the deviation from uniformity that would occur if the Colombo code did not change at all for the time being;

and decided to support the implementation of the Plan A code change for Colombo (to 011). It requested that if possible this code change should be on the same day as the majority of local number changes (that is, the second stage), which would be easier for customers.

Having drawn attention to the closure option, the review recommends that other 01x codes should not be used for the time being (other than for temporary applications) until the longer-term direction of the plan is clear. A likely spur to the next numbering plan review will be a need for yet more numbers for Colombo.

## **2.2.2 Kandy and Galle codes**

The reason for suggesting the alternative codes 058 and 049 for Kandy and Galle (rather than 081 and 091) is that this allows the whole of the 08 and 09 ranges to be dedicated to non-geographic numbering. The review recommends, and TRC has accepted, that in any case the 08 and 09 ranges should be used for non-geographic numbering. Removing Kandy and Galle from the ranges provides 10% additional capacity. But this is less significant than the opportunity to assign clear new meanings to the ranges, unmixed with geographic codes.

TRC considered the following relevant factors:

- the importance in the near future of internationally accessible non-geographic services in building up Sri Lanka’s IT industry (for example, through the provision of call centres);
- the feasibility of changing SLT’s plans, given the extra time allowed for the numbering implementation and the postponement of the short code changes;
- the fact that the 058 and 049 codes both retain the original 08 and 09 codes, while in each case adding an appropriate regional digit;
- the unnecessary burden on customers of changing the codes twice in a short time;

and decided to adopt Plan A1. As for Colombo, TRC requested that the new codes 058 and 049 be implemented for Kandy and Galle at the same time that most local numbers in those cities are changed (that is, at the second stage) in order to minimise inconvenience for customers.





## **2.3 Non-geographic numbering ranges**

The provision in Plan A for non-geographic numbering, using the subscriber number range starting with 8, plus a further 9 digits, is surprising:

- The major driver for this entire new 10-digit plan is achieving uniformity, but the Plan A provision is non-uniform (without any need for non-uniformity).
- Numbering non-geographic services using the subscriber number (SN) range is an unusual approach. Most countries use trunk codes, and a few (eg Australia) use short codes.
- One reason for using SNs might be a shortage of alternative options, but this is not the case in Sri Lanka – both trunk codes and short codes are available.
- Another reason to use SNs might be a desire to provide non-geographic services at local level, using facilities in the local exchange and maybe varying the actual services from place to place. But this seems unlikely to make sense in Sri Lanka – non-geographic services are more likely to be provided by any operator using a single national platform.

Two arguments have been put forward in favour of the Plan A proposal:

- It provides greater capacity for non-geographic services than the Plan A1 proposal - 100 distinct services each of 10m gross capacity, rather than 20 distinct services each of 10m gross capacity.
- It allows a clearer distinction in the public mind between non-geographic services (which start with 8) and geographic services (which start with 0).

It is of course true that the gross capacity of Plan A is higher than that of Plan A1. However, no forecasts have been made of required capacity. Just as important as the quantity of numbers available are the quality of the codes and flexibility of use and expansion, both of which are superior in Plan A1. Availability of two first digits (08 and 09) permits a broad distinction, if desired, which could for example correspond to service cost (08 being free or less costly calls, 09 being premium rate or more costly calls). There is no reason to insist on giving every service the same length of code and 10m capacity. In fact many new services will need much less capacity than this, and a more flexible approach would be to tailor the code to foreseen requirements.

The second argument in favour of Plan A overlooks the non-geographic services which are already numbered using 0x codes – including the mobile services, SLT's own WLL service and the recently introduced voicemail on 030.

The A1 alternative is both internationally standard and easy to implement. In fact, in principle 0800 services could be implemented immediately, independently of all these other developments (while the A proposal might best be left until all local number changes are complete). The ability to offer access using 0800 freephone numbers could significantly help new international calling card providers, so should be given priority.



In this connection we note a paper on numbering put to the December 2002 Dhaka SATRC meeting, at which Sri Lanka does not appear to have been represented. The most relevant parts of this paper are reproduced at Annex D. There is an emphasis on numbering non-geographic services within the 1xxx range, although little rationale is given for this choice. An important argument in favour of using 0800 (etc) rather than 1800 (etc) is the ability to make the services internationally accessible, and the paper does not comment on this point. However the main relevant recommendation in the paper is to use the 800 “flag” for freephone. It also recommends 0900 for premium rate services.

The A1 proposal for non-geographic numbering could be implemented together with the A proposal for geographic codes (ie Kandy on 081 and Galle on 091). However, it would give best value taken together with the A1 proposal for geographic codes, as then the whole of the 08 and 09 ranges could be imprinted on the public mind as non-geographic.

The review recommends:

- the ranges 08 and 09 should be used for non-geographic numbering (even if they have to be shared with Kandy on 081 and Galle on 091), rather than the local number range starting with 8 as currently proposed.
- Priority should be given to setting up 0800 freephone service at the earliest opportunity.
- The X0 series of NDCs (020, 030, 040, 050, 060, 070) should also be reserved for non-geographic services. TRC should consider and confirm (or otherwise) SLT’s current use of 030 for voicemail and 070/060 for WLL service.
- The numbering capacity made available for each non-geographic service should depend on the nature of the service concerned (eg the whole of 080, with 10m numbers, should be reserved for freephone, while 100,000 numbers may be ample for some services).
- A first digit should be reserved within each service code in case of eventual need to expand number length (eg 0800 numbers might not start with 0 for the time being, so that they could ultimately become 08000 numbers should the need arise for more capacity).
- Contact should be re-established urgently with the SATRC numbering group, in an attempt to support South Asian numbering harmonisation as far as is practicable without sacrificing good outcomes for Sri Lanka.

## **2.4 Other codes**

TRC’s attention is drawn to the following miscellaneous code issues.

- SLT’s own WLL service on 070 is scheduled to change to 060. This covers around 3,000 lines in various locations including Kalutara, Hambantota and Nuwara Eliya, all served by a single switch in Colombo. The rationale for permitting this non-standard form of numbering, and the particular choice of 060 as code, is not clear.



- The use of the 030 code for SLT's voicemail service has only recently been mentioned; TRC needs to clarify whether this allocation is correct and in order.
- Confusion has emerged in relation to the 079 code range, parts of which (0791 and 0792) are claimed by more than one licensee. A resolution may be found by ascertaining what types of service these licensees plan to offer in future, and providing them with appropriate new numbering space.
- The position of SriLankan Airlines is anomalous, as for historic reasons it occupies the 073 code with 4 digit numbers. This is non-uniform with the rest of the new plan; also, to be fair to everyone, similar numbering facilities should be available other large companies. This is an example of corporate numbering, which is being offered in other countries as a type of non-geographic numbering on various codes. The natural approach here would be to offer SriLankan (who have asked for a 100,000 number block) a change to OXY 73 XXXXX, where XY denote corporate numbering. XY could be any current or future available code, for example:
  - 73 (providing an attractive digit string for SriLankan, who have no concern about the "expensive call" association of 07);
  - 50 (which in other countries may have a "non-geographic" association and/or a "corporate numbering" association).
- In future, new rural access operators may require numbering which clearly signals premium charging (corresponding to asymmetric interconnection terms). Here options include:
  - a distinctive first digit of local numbers (say, 9 or 8, both of which will be available) within the appropriate SSC area code, to indicate higher charges
  - a special non-geographic or regional code. This could possibly be shared with SLT's WLL service on 060, or if calls are very expensive the new 09 range might prove suitable.

The second option may provide better short-term tariff differentiation, while the former allows for easier eventual integration with the rest of the area.

### **3 SLT local subscriber numbers**

#### **3.1 Difficulties with implementing Plan A**

The simple message of Plan A "put 2 or 22 before the number to make 7 digits" is attractive. However, this implementation approach has serious drawbacks.

In most SSC areas, numbers starting 2 or 22 are already in use. As discussed in Annex B, this greatly complicates the provision of parallel running and changed number announcements (CNA). It has already been decided to do without parallel running (although, as explained in Annex B, this makes providing a simple national message less straightforward and makes the changeover more difficult for customers). However, for good reasons (again see Annex B) TRC is insisting that changed number announcements be provided. A significant amount of effort has



already been expended on the necessary complex analyses and software reprogramming. Unfortunately, exchanges with the timeout facility (see Annex B) account for only a minority of those in SLT's network, so CNA simply cannot be provided for some numbers. Currently it is intended to return engaged tone to calls to these numbers, which is likely to encourage repeated calling and thereby aggravate congestion.

Where it is necessary or desired to implement a numbering change re-using an existing number range, the change may more easily be carried out in two (or more) stages. Typically, at the first stage the target range of numbers is cleared, so that the second stage can have CNA without difficulties. To work as intended, a reasonable gap ("sterilisation period") must be left between the stages to ensure that people have stopped dialling old numbers in the target range. Unfortunately, therefore, staged changes inevitably take longer than single-stage changes.

SLT has already put a great deal of effort into planning this implementation. On the basis that the only permitted new number range is that starting with 2 (in Colombo and Kandy, where local numbers already have 6 digits) and 22 elsewhere, SLT engineers have gone for two-stage changes in 10 SSC areas, including Colombo. Table 5 reproduces the original implementation schedule for Plan A.

Table 6 matches names to SSC codes and also identifies the main switch manufacturers with equipment in each area. Nokia and Samsung are the two manufacturers whose equipment is a problem to modify because of obsolescence, hence the special treatment for the three SSC areas containing these switches (026 - Trincomalee, 041 – Matara, and 034 – Kalutara). Colombo area manufacturers are NEC, Ericsson, Alcatel, Lucent and Fujitsu.

Phase no	Date	Affected SSC areas	Notes
1	07/09/02	021	Already complete
2	14/02/03	01, 023, 038	Colombo first stage (clearing level 2)
3	28/02/03	01, 08, 09	Code change to 011, 081, 091
4	14/03/03	025, 033, 034, 035, 037, 045, 047, 08, 09	First stage (clearing level 2)
5	25/04/03	All 1xx short codes	
6	23/05/03	026	
7	31/05/03	034, 01	Second stage
8	06/06/03	024, 027, 031, 032, 036, 051, 052, 054, 055, 057, 063, 065, 066, 067	
9	13/06/03	025, 033, 035, 037, 045, 047, 08, 09	Second stage
10	18/07/03	041, 070	

**Table 5 Original timetable for changing SLT numbers**



Code	Name	Main manufacturers	Code	Name	Main manufacturers
01	Colombo	Various	041	Matara	Nokia
021	Jaffna	NEC	045	Ratnapura	NEC
023	Mannar	NEC	047	Hambantota	Alcatel
024	Vavuniya	Ericsson	051	Hatton	Ericsson
025	Anuradhapura	NEC	052	Nuwara Eliya	NEC
026	Trincomalee	Samsung	054	Nawalapitiya	Ericsson
027	Polonnaruwa	NEC	055	Badulla	NEC
031	Negombo	NEC	057	Bandarawela	NEC
032	Chilaw	NEC	063	Ampara	Ericsson
033	Gampaha	Ericsson	065	Batticaloa	Ericsson
034	Kalutara	NEC/Ericsson/Samsung	066	Matale	NEC/Ericsson
035	Kegalle	NEC	067	Kalmune	Ericsson
036	Awissawella	NEC	08	Kandy	NEC/Ericsson
037	Kurunegala	NEC/Ericsson	09	Galle	NEC/Ericsson
038	Panadura	Ericsson			

**Table 6 Key to SSC codes and switch manufacturers**

Even with two-stage changes, it has been found impossible to supply CNA to all customers. The current plan is that all those customers who cannot get CNA on their “old” number will be offered a complete number change instead. This means writing letters to some customers in each of the following sixteen areas: 024, 025, 026, 027, 031, 036, 041, 051, 052, 054, 055, 057, 063, 065, 066, 067.

In view of:

- the extreme time pressure to complete this numbering change, and
- the fact that staggering the change (ie changing different SSC areas on different dates) reduces the attractiveness of publicising nationally the digits 22 as number prefixes

this review recommended that the requirement for SLT to use 22 be relaxed. TRC accepted this recommendation. For the record, Annex E provides some alternative prefixes that SLT could have considered using outside Colombo to improve the quality of the change. Unfortunately, however, SLT found that time and cost constraints (elaborated upon in Annex F) prevented them from taking advantage of the extra freedom offered. An amended version of the original plan and timetable will therefore be followed, and the difficulties outlined in this section are likely to be encountered.

### **3.2 Colombo**

Colombo presents a big problem for the number change because all 8 first digits, 2 to 9, are in use and most of them are heavily occupied. Table 7 shows how many 1000-number blocks are in use for each first two digits, based on information supplied by SLT. (For example, the bold number 7 tells us that 7 of the 10 possible 1000-number blocks following the first digits 31 are in use). In fact there are exactly 8 vacant 2-digit blocks – 20, 21, 22, 26, 27, 28, 98 and 99 – which could in principle be used for extending the existing numbers without problems in providing changed number announcements.



	0	1	2	3	4	5	6	7	8	9	total
2	-	-	-	10	6	10	-	-	-	8	34
3	10	7	10	10	10	7	5	3	10	1	73
4	8	9	8	10	8	10	7	10	10	3	83
5	10	6	10	10	5	9	10	10	10	10	90
6	6	10	5	2	10	10	5	10	10	10	68
7	10	10	10	10	3	2	10	10	9	6	80
8	10	10	10	8	10	10	10	10	10	9	97
9	8	10	10	10	8	9	3	8	-	-	66
total	62	62	63	70	60	67	50	61	59	47	

**Table 7 Used 1000-number blocks in Colombo**

A major part of this assignment was devoted to exploring alternative approaches to handling the Colombo problem which could satisfy the timing and other constraints. The findings of this exercise were:

- A single-stage change to 7 digits for Colombo would be possible (using the 8 vacant number blocks mentioned) but would entail much more complicated messages to callers, and in some cases replacement of first digits rather than simple prefixes.
- A two-stage change to 7 digits which cleared the 4 and 5 ranges for the WLLs at the first stage was also possible. This would be a little simpler to present to the public, but would still entail some replacement of first digits rather than simple prefixes.
- More radical solutions to Colombo’s number shortage (eg a move direct to 8 digits) were ruled out as being inconsistent with the uniform 10-digit plan.
- The original proposal for a two-stage change prefixing all numbers by the digit 2 (changing only numbers starting with 2 at the first stage, and all other numbers at the second stage) still appeared the best plan, provided that enough time could be allowed for it to be implemented with appropriate notice and sterilisation periods.

TRC therefore decided to allow extra time for the original proposal to be implemented. A draft new implementation timetable for SLT’s changes is provided in Section 3.3, and an outline overall timetable for the entire numbering change in Section 0.

TRC also accepted the following additional recommendations of the review:

- The Colombo code change should take place at the same time as most local numbers change (that is, at the second stage), to minimise inconvenience to residents.
- SLT should make every effort to avoid misdialled calls receiving the engaged tone; if no announcement can be provided then number unobtainable tone will be preferable to engaged tone.



- Throughout the number change period and during its aftermath, all operators should trap misdialled interconnection traffic with an announcement at source, wherever this is possible without complex analysis.

### 3.3 Revised SLT local number change timetable

The details of the revised local number change timetable will be for SLT, within TRC’s decisions. Table 8 below shows one new timetable which is believed to be feasible, on the basis of information currently available to this review.

New phase	Date	Affected SSC areas	Notes
1	07/09/02	021	Already complete
2	17/03/03	National publicity campaign – all areas	Critical date for whole timetable
3	16/05/03	023, 038	Single-stage changes
4	23/05/03	025, 033, 034, 035, 037, 045, 047, 08, 09	First stage (level 2 only)
5	30/05/03	026	Single-stage change
6	06/06/03	024, 027, 031, 032, 036, 051, 052, 054, 055, 057, 063, 065, 066, 067	Single-stage changes
7	13/06/03	01 first stage	Ja-ela and Katunayake (level 2)
8	1/08/03	041, 070	
9	8/08/03	025, 033, 034, 035, 037, 045, 047, 08, 09 second stage	08, 09 code changes on same date as 08, 09 local number changes
10	30/08/03	01 local number change second stage	01 code change on same date

**Table 8 An alternative timetable for SLT’s number changes**

## 4 Short codes

Plan A includes wholesale changes (see Table 9 and Table 10) to all current short codes starting with 1. This plan, agreed by the industry and approved by TRC, is effectively to share out a large proportion of short code space (the four ranges shown above) among the existing access networks. This may have been appropriate in the circumstances of the time, but it is not in keeping with GOSL’s latest policy of open competition. While new access networks are not being licensed at present, these remain an open option in the longer term. Plainly it will not be possible to give every new access network an entire range of short codes on an equitable basis.



Company	Code	Purpose
All	112	Emergency – fire
SLT	100	Operator assistance – international
	101	Operator assistance – national
	102/3/4	Time Sinhala/Tamil/English
	120	Priority trunk booking
	121	Fault reporting
	122	Billing complaints
	123	Internet help desk
	131/2/3	Phonograms Sinhala/Tamil/English
	14x, 152/3, 16x	Subscriber facilities
	150/1/4	Internet access
	155	Emergency - police
	161/0	Directory enquiries (white/rainbow pages)
	170/1/2	Calling Card Sinhala/Tamil/English
	178	Prepaid phone card
	19x, 129	Internal operational codes
Lanka Bell	188	Internet access
Mobitel	111	Voicemail
	12x	Various information/entertainment services
	141/181/171	Prepaid service Sinhala/Tamil/English
	174	SMS operator pagenet
Celltel	111	Customer care hotline
	9xx	Various information/entertainment services
	914	Cellwallet
Dialog	111	WAP access
	115	E-channelling
	119	Emergency - fire
	123	Prepaid account recharge
	159	Administration menus
	456	Account balance
	505	Directory
	380, 777, 2428	Various information/entertainment services

**Table 9 Current short codes**

	SLT	Suntel	Lanka Bell	Mobile
Emergency, fire etc	111, 112 etc	111, 112 etc	111, 112 etc	111, 112 etc
Call booking - international	1200	1400	1500	
Call booking - national	1201	1401	1501	
Fault reporting	1211	1411	1511	17Y11
Billing complaints	1212	1412	1512	17Y12
Home page	1213	1413	1513	
Time Sinhala/Tamil/English	1222/3/4	1422/3/4	1522/3/4	17Y22/3/4
Directory enquiries national	1231	1431	1531	17Y31
Directory enquiries international	1232	1432	1532	

**Table 10 Proposed short codes**

The justification given for the Plan A approach is to enable people to call services associated with any access network from any other access network. For example, it





is important in case of a faulty line to be able to report the fault from a different line, which may be on a different access network. However:

- This cross-network access requirement does not hold for the entire range of services for which individual codes have been allocated (for example, all networks' versions of the time in Sinhala should be very similar!)
- Short codes are in limited supply and need to be reserved for special purposes. The cross-network access requirement is likely to be the exception rather than the rule, and it is not clear that it warrants short code treatment.
- The code system would not be as simple and uniform as it may appear in Table 10, since each operators would develop later codes in its own space as it saw fit. (So, for example, the codes 1461 and 1261 would probably not lead to the same services on Suntel's and SLT's networks).
- There are alternative approaches to providing cross-network special service access, for example:
  - dialling the carrier selection code followed by a generic special service short code (as is done in Chile),
  - providing freephone numbers (as is done in the UK),
  - dedicating a short code range to a particular service (followed by a uniform system of carrier identification digits), as is done in Portugal,
  - allowing each carrier one or two 3-digit codes to use as they prefer, expanded to 4 or 5 digits if they wish (as is done in Hong Kong).

Annex G goes into more detail on options for cross-network access. Annex H outlines approaches to planning 1xx short code space adopted in 12 selected countries.

Special considerations relate to mobile networks. Where "local dialling" among their subscribers is not implemented, mobile networks are not limited to the 1xx range for short codes – they have at their disposal the entire range of subscriber numbers. Short codes are especially important for mobile users, who may want to access services from memory in a hurry – and of course there is an increasing range of special services available to them (for example using SMS). It would be convenient for customers (who may switch mobile networks) if there were at least a degree of consistency in how mobile operators use short codes and charge for the services concerned. Mobile operators in some countries are currently working together to achieve common practice in numbering for SMS and/or other short codes.

Following a special industry meeting and TRC's approval of the broad approach, this review recommends that:

- The Plan A short code proposal should not be implemented.
- An alternative proposal for short code space should be formulated and implemented within 2003.
- All access networks should implement a standard set of 1XX short codes for commonly called services. These could be based on SLT's current set, or modified by agreement. For example, 121, if called from an SLT line, could give



access to SLT's fault reporting service, while if called from a Suntel line, could give access to Suntel's fault reporting service.

- Certain short code ranges should be designated for network operators to use as they prefer. The idea here is to encourage shared use of some ranges, enabling other space to be kept clear for the longer term, rather than letting all ranges be used randomly as at present. A single code would have different meanings when dialled from different networks (123 is a good example of this at present).
- TRC should reserve some free short code ranges for the longer term.
- For the time being, the 11X range should be reserved for South Asian harmonisation.
- Cross-network special service access should be provided by alternative means.
- Mobile operators and TRC should consider introducing good practice guidance for the use of short codes from mobiles.

Table 11 provides an illustration of how 1xx short code space might be planned in future.

Range	Application
10x	Common services – operator-independent
11x	South Asian harmonised codes – operator-independent
12x	Common services – operator-independent
13x	Operator-dependent services
14x	Operator-dependent services
15x	Reserve
16x	Reserve
17x	Reserve
18x	Carrier selection codes (immediate)
19x	Carrier selection codes (reserve)

**Table 11 Illustrative plan for 1xx short code space**

## **5 Timing of changes**

A major factor in the timing of any numbering change must be the need to give adequate public notice of the change. This is not only a courtesy to customers, but (as explained in Annex B) it is the network's first line of defence against misdialling. Customers need time to pass on information about the forthcoming change to people who call them. It is of particular value to ensure that international gateway operators in other countries are aware of the changes, as they can then bar much misdialled international inbound traffic at source, and avoid tying up international capacity unproductively.

A critical question for this review is: how much public notice is adequate? Following discussions with Sri Lankan operators and one major business customer, the proposal put forward by this review is:

- Changes outside Colombo: two months



- Changes inside Colombo: three months

The reason for the difference is the greater size and complexity of business installations in Colombo, and also the larger number of such installations, which have to be supported by a single limited set of PBX suppliers.

The main problem with the original Plan A implementation timetable was that it allowed for only two weeks' notice for the Ja-ela and Katunayake areas of Colombo – part of the Free Trade Zone which includes many business customers. Everybody concerned agreed that this was inadequate.

A major outcome of this assignment has been TRC's agreement to allow a little longer for the change, so that all customers can be given notice as above and three months' sterilisation periods are available between first and second stage number changes.

It is important to understand that the new timetable is still very compressed and far from ideal for a major numbering change. Only the pressure to introduce CPP quickly, which now assumes such importance for the industry, leads the consultant to offer this approach. Good numbering practice would suggest allowing at least a further six months.

It must also be stressed that the new timetable includes no contingency for slippage. Already, at the date of writing this report, the start of publicity had been delayed by two weeks. These two weeks cannot be recovered later in the change programme - they are already lost.

In this connection it is worth recalling the relevant passage from the statement of 7 February 2000 of the Committee of Inquiry into the Calling Party Pays System:

“3.4 The identifying digits (code) for the cellular networks are similar to those of the fixed wireless networks. Hence even at present most subscribers are confused. This is likely to have a further negative effect if the fixed wireline subscribers are confused through mistaken identity into believing that calls to fixed wireline networks will also cost significantly more in a CPP regime. In view of such circumstances it is imperative that the new 8-digit closed numbering plan be implemented prior to considering the move to CPP. This numbering plan clearly identifies the cellular networks from the fixed wireline and wireless networks.”

Since February 2000, the 8-digit closed numbering plan referred to has been abandoned in favour of a 10-digit open numbering plan. Plainly, therefore, ensuing decisions have to be understood according to the intention rather than the letter of this passage. The intention is that WLL numbering should be clearly distinguishable from cellular numbering before CPP is introduced – not that all other numbering changes (whether necessary or desirable for other reasons) should have taken place.

It is worth noting that any disadvantage to the WLL operators or their customers, from mistaken association with higher charges for calling mobiles, is of limited duration. It will start when CPP publicity starts, and end when WLL customers are known to have moved from 07x numbers to ordinary geographic numbers. This means that:



- on any scenario now being considered, the problem will last at most a month or two;
- careful management of the CPP publicity (specifying the mobile codes and WLL codes) could minimise mistaken associations.

It is also worth noting that simple code changes for either the WLL operators or the cellular operators would have fulfilled the numbering preconditions for CPP. For example, moving cellular services from the 07 to the 09 code range (which will be largely free as soon as the Galle code has been changed) would have achieved all that that is required at the moment, quickly and cheaply. At the same time this would have enhanced the CPP publicity campaign.

<b>Activity</b>	<b>Date</b>
Start of TRC publicity campaign	Mid-March 2003
SLT first-stage local number changes (level 2) outside Colombo	mid-May 2003
SLT first-stage local number changes in Colombo (level 2)	mid-June 2003
SLT single-stage local number changes	May-June 2003
International call-by-call carrier selection	July 2003
SLT second-stage local number changes and Colombo, Kandy, Galle code change	August 2003
WLL number changes	September 2003
CPP	October 2003
Short code changes	Last quarter 2003
0800 service	October 2003

**Table 12 Outline master schedule for numbering plan implementation**

## **6 Management and practical issues**

This section touches briefly on some points about the practical management of the change, and also continuing management of the numbering plan.

### **6.1 Practical management of change**

All parties have underlined the great importance of good publicity and customer information in implementing the new plan successfully. This review entirely agrees with this view, and suggests some supporting actions.

A few points worth noting in relation to the publicity campaign are:

- The importance of co-ordination among all operators and TRC (all of whom are planning their own publicity).
- The need to avoid customers trying out the new numbers before the date when they come into service (as there will be no parallel running, this would generally lead to wrong or uncompleted connections and confusion).



- The need to stir business customers into rapidly taking appropriate action to prepare their businesses for the change (rather than simply creating awareness, which will be adequate for most residential customers and casual users).
- The fact that even once a firm timetable of changes has been agreed, unforeseen circumstances may lead to deviations from timetable. Therefore it may be preferable for publicity to start with broad indications of timing which only become more precise as the time approaches, for example first “June”, followed by “mid-June”, “the weekend of 14-15 June”, and finally “midnight on 13 June”.

It is recognised that **notice of the number change** needs to be sent to all correspondent administrations (normally most easily reached via ITU’s central service – recently enhanced by an “instant” email list as well as the fortnightly Operational Bulletin). This should be done without delay as soon as details of the changes are firm. Other overseas contacts should also be informed.

As soon as the national publicity campaign goes live, one or more backup **telephone helplines** should be provided to answer customers’ further questions. These should be mentioned as appropriate in the publicity. Typical services might include:

- Full information on how and when any given number will change (or, later, how it has changed)
- Support for business customers (possibly by sending an informative leaflet)

Backup **leaflets** covering similar ground should be available on request, and of course on the internet.

The natural place for customers to look for number information is the **telephone directory**. It would be very helpful if new directories could be made available by April, containing existing and new numbers in parallel columns.

A **checklist** should be produced for business customers (in consultation with some volunteers) covering among other topics:

- changing stored numbers in PBXs, fax machines, mobile phones
- reprogramming of private payphones, alarm systems, point-of-sale terminals
- reprinting stationery, changing signage on shopfronts, vehicles etc
- changing phone numbers in paper and computer-held records
- updating websites to hold correct numbers
- amending any systems that rely on CLI

Customers who currently have **golden numbers** (typically using patterns such as 699699 or 484848) may be especially upset by the imposed number change, as it will often spoil their number. They may be consoled by being offered the opportunity to choose a new golden number, free of charge, within a specified range.



The uniformity which is the major feature of the new plan could be enhanced by promoting **standard ways of writing numbers**. For example, geographic numbers might normally be written 0xx xxx xxxx; non-geographic numbers might normally be written 0xxx xxx xxx (a precedent is already being set here by Dialog).

Operators are already aware of the need to change sent **CLI** and to amend any systems that may depend on it (eg selective call routing). They are reminded that they will need to attend to all their **operational support systems** which use phone numbers. These may include, for example, customer care databases, directory records, and importantly billing. **Customer-controlled stored numbers** in switches will also need to be changed (for example, numbers for call diversion). This can be done either by the customers (if reminded) or by the operators on their behalf. The latter is probably preferable for the sake of accuracy.

## **6.2 Numbering plan management**

As was commented in section 3, the blocks of new local numbers which will be created by this number change (4 for Suntel, 5 for Lanka Bell and 2, in general, for SLT) should not be assumed to be allocated to these operators in their entirety. Instead, this review recommends that occupied blocks of 10,000 or at most 100,000 number should be allocated, and the rest reclaimed by TRC. This is for two important reasons:

- The demands of good husbandry (as mentioned in section 3) – although the number supply may seem (and indeed be) very plentiful after the change, handing out a million numbers at a time when many fewer are needed is the best way of running out of numbers again.
- Fairness to future access network operators requiring geographic numbering capacity. Plainly a maximum of 8 operators can receive a whole initial digit each. In an open market, numbers should be allocated only in justifiable quantities that are reasonably likely to be used.

A third point is that, while the access network operators may find it convenient for the time being to have all their numbers starting with a single digit, they cannot expect this state of affairs to last indefinitely. Operator number portability is likely to be required within at most the next decade (possibly much sooner), and this will destroy the connection between operators and “their” first digits.

To exercise its number management responsibilities properly, TRC will need to set up a number database showing ranges available and allocated. This information should be publicly accessible, as should the full rules of the new numbering plan.

At present, TRC is plainly lacking the resources needed to manage the numbering plan and enforce licence requirements relating to numbering on a continuing basis. It is recommended that TRC should urgently acquire and develop the necessary expertise for numbering plan management. This will include economic, legal and human factors skills as well as network and database expertise. Because of its significant policy implications, numbering needs to be managed overall at a senior level.

The industry numbering implementation taskforce convened by TRC will form a good basis for a future numbering advisory committee. It is recommended that public interest representatives (such as business users and academics) be invited to join



this committee, to ensure adequate coverage of all interests when numbering issues arise in future.

Good husbandry is fostered by a modest level of charging for numbers, and this review recommends that this be adopted. A charge based on 5 SLR per full-length number per year has been suggested. This would be levied on operators at the block level, so that a 10,000 number block would cost 50,000 SLR a year – and a 1m number block (or, equivalently, exclusive use of a 3-digit access code) 5,000,000 SLR. The details of the method and level of charging are for further consideration.

## **7 Summary of conclusions and recommendations**

### **7.1 Code changes**

It has been decided that the code change for Colombo, from 01 to 011, will go ahead as originally planned. The review draws attention to the fact that it may be found desirable to clear the 01 code range at some future time, to facilitate closure of the numbering plan. It is therefore recommended that the other 01x codes should not be used for the time being (other than for temporary applications) until the longer-term direction of the plan is clear. A likely spur to the next numbering plan review will be a need for yet more numbers for Colombo.

The codes 058 and 049 should be implemented for Kandy and Galle respectively, instead of the currently planned changes to 081 and 091, in order to clear the ranges 08 and 09 completely for non-geographic use.

The ranges 08 and 09 should be reserved for non-geographic numbering. In addition, the ranges 020, 030, 040, 050, 060 and 070 should be reserved for this purpose. Priority should be given to introducing 0800 freephone/tollfree service as soon as possible.

If possible SLT should change the codes for Colombo, Kandy and Galle on the same day that most local numbers are changed in each city (that is, on the second stage change day), instead of having all code changes together on a separate day as is currently planned. This would be easier for customers.

TRC should consider and resolve the miscellaneous issues relating to codes identified in Section 2.4.

Contact should be re-established urgently with the SATRC numbering group, in an attempt to support South Asian numbering harmonisation as far as is practicable without sacrificing good outcomes for Sri Lanka. In particular, the 11X short code range should be developed in a harmonised way with other South Asian countries.

### **7.2 Local number changes**

In the course of this review, alternative approaches to the planned local number changes were explored which could have avoided the need for two-stage changes outside Colombo and enabled changed number announcements to be provided for all customers. However time constraints have prevented the adoption of any alternatives.



It is therefore recommended that SLT publish a new schedule for the planned local number changes, to allow for the delayed start of publicity (now planned for 17 March 2003) and to ensure that:

- All customers in Colombo get at least three months' notice of impending number changes (two months may be adequate outside Colombo);
- As in the current plan, reasonable sterilisation periods (around 3 months) are allowed for between first and second stage changes in any given place;
- All area code and SLT local number changes are complete by 31 August 2003 (to allow a clear month in which the WLL number changes can take place before the current target date for CPP of 1 October 2003)

An indicative schedule which is believed to be achievable is shown below. The dates shown for single-stage changes are relatively flexible within the overall timeframe shown, and may be altered to suit SLT's convenience. The critical dates which determine the overall timeframe are those for the start of publicity and for the first and second stage changes in Colombo.

New phase	Date	Affected SSC areas	Notes
1	07/09/02	021	Already complete
2	17/03/03	National publicity campaign – all areas	
3	16/05/03	023, 038	Single-stage changes
4	23/05/03	025, 033, 034, 035, 037, 045, 047, 08, 09	First stage (level 2 only)
5	30/05/03	026	Single-stage change
6	06/06/03	024, 027, 031, 032, 036, 051, 052, 054, 055, 057, 063, 065, 066, 067	Single-stage changes
7	13/06/03	01 first stage	Ja-ela and Katunayake (level 2)
8	1/08/03	041, 070	
9	8/08/03	025, 033, 034, 035, 037, 045, 047, 08, 09 second stage	08, 09 code changes on same date as 08, 09 local number changes
10	30/08/03	01 local number change second stage	01 code change on same date

SLT should make every effort to avoid misdialled calls receiving the engaged tone; if no announcement can be provided then number unobtainable tone will be preferable to engaged tone.

Throughout the number change period and during its aftermath, wherever possible all operators should trap misdialled interconnection traffic with an announcement at source.

### **7.3 Short code changes**

This review recommends that:

- The Plan A short code proposal should not be implemented.





- An alternative proposal for short code space should be formulated and implemented within 2003.
- All access networks should implement a standard set of 1XX short codes for commonly called services.
- Certain short code ranges should be designated for network operators to use as they prefer.
- TRC should reserve some free short code ranges for the longer term.
- For the time being, the 11X range should be reserved for South Asian harmonisation.
- Cross-network special service access should be provided by alternative means.
- Mobile operators and TRC should consider introducing good practice guidance for the use of short codes from mobiles.

#### **7.4 Management and practical issues**

The suggestions in Section 6.1 for supporting the publicity campaign should be adopted without delay. These include providing a number change telephone helpline to be advertised as part of the publicity campaign, and a checklist for business customers.

This review recommends that:

- TRC should urgently acquire and develop the necessary expertise for numbering plan management. This will include economic, legal and human factors skills as well as network and database expertise. Because of its significant policy implications, numbering needs to be managed overall at a senior level.
- occupied blocks of 10,000 or at most 100,000 number should be allocated, and the rest reclaimed by TRC.
- information on available and allocated number blocks should be publicly accessible, as should the full rules of the new numbering plan.
- public interest representatives (such as business users and academics) should be invited to join a new numbering advisory committee, to ensure adequate coverage of all interests when numbering issues arise in future.
- a modest level of charging for numbers should be adopted, to be levied on operators at the block level, with the primary aim of providing incentives for efficient number use. Details of the charging approach and level are to be determined.



## **Annex A Open and closed numbering plans**

Here these terms are used as follows:

A *closed numbering plan* has a single dialling procedure for an entire country, and no trunk dialling prefix; it usually though not necessarily has a single uniform number length.

An *open numbering plan* has separate local and trunk dialling procedures, and has a trunk prefix to show when trunk dialling is being used; the lengths of codes and subscriber numbers may vary (though they do not always do so).

Table 13 summarises the incidence of open and closed numbering plans around the world at March 2002. Traditionally, closed plans have tended to prevail in countries with:

- a relatively small geographic area (eg Hong Kong) limiting the geographic structure needed;
- and/or a relatively small population/number of lines (eg Norway, Denmark);
- and a maximum NSN length of 8 or less, limiting the burden of dialling all digits for every call.

However in recent years many numbering plans have moved from open to closed, including several with NSN lengths of 9 or 10. To some extent closing a numbering plan has been used to create additional usable capacity, as a substitute for or at the same time as adding a digit (eg congested areas of the NANP, Switzerland). In other cases closing the plan has seemed the only practicable expansion option (eg Italy, Spain).

Maximum NSN length	4 or 5	6	7	8	9	10	11+	total
Open plans	-	1	16	32	30	17	8	104
Closed plans	15	30	25	14	10	1	4	99
% closed plans	100%	97%	61%	30%	25%	6%	33%	49%
Total	15	31	41	46	40	18	12	203

**Table 13 Open and closed numbering plans by plan size<sup>1</sup>**

<sup>1</sup> Source: ITU Operational Bulletin 759 Annex on Dialling Procedures, March 2002. This Annex relies on information supplied by countries which is not always in accordance with consistent definitions, so a few discrepancies are inevitable.



Feature	Closed plan	Open plan
Local dialling	Full national number eg 2345 6789	Local number only eg 345 6789
Long-distance dialling	Full national number eg 2345 6789	Trunk prefix + area code + local number eg 02 345 6789
Trunk prefix	Not needed	Needed
Tariff indicators	Early digits of national number	Trunk prefix + area code
Number length	Often one national number length	Can be uniform or variable
Number layouts	Fewer layouts, eg N1+L7 <sup>2</sup> and N2+L6 both written XXXX XXXX	Must reflect start of local number, eg 02 345 6789, 034 567 890
Geographic portability	Practicable anywhere	Practicable within code area
Geographic relief	Overlay straightforward	Area split or longer numbers
Long term	Offers great flexibility	Less flexible
Main advantage	Simple for users	Short local dialling
Next advantage	Growth and development easier	Avoids near-term change
Main disadvantage	Loss of short local dialling and local tariff indication	Geographic relief disruptive
Next disadvantage	Users must learn new dialling habits and ways to recognise tariffs	Multiple number formats

**Table 14 Features of open and closed numbering plans**

Table 14 summarises the main features and some advantages and disadvantages of closed and open numbering plans. The examples given are from an imaginary 8-digit plan, and the advantages and disadvantages assume that the plan starts as open.

The main advantages of an open scheme are that customers can dial shorter numbers for local calls, and that geographic area identities are maintained (together with the associated tariff indications). The main advantages of a closed scheme, on the other hand, are a uniform dialling procedure for all calls, and a higher possible capacity utilisation<sup>3</sup>. Also, as there is no need for a trunk prefix, one dialled digit can be saved on national calls<sup>4</sup>.

<sup>2</sup> N1+L7 means a one-digit NDC followed by a seven-digit subscriber number (and so on).

<sup>3</sup> Closure provides an immediate 25% local capacity gain as the ranges starting 0 and 1 can be used for local numbers within each former geographic area.

<sup>4</sup> Although many countries do not take advantage of this potential saving, thinking it simpler for users to dial all digits for all calls, at least for a transitional period.



In many larger countries with longer numbers, open schemes remain and may well do so indefinitely. But gradually, as time passes, the balance of advantage moves towards closure:

- a high proportion of calls is in any case dialled with a full national number (often in part because of a rise in calls to and from mobile phones);
- many people use dialling aids (eg memory phones) and so are little affected by the number of digits required for a call;
- there is little difference in cost between a local and a long-distance call, so no effort need be spent on finding out the exact tariffs.

The closure option is one that most countries will want to preserve for the future in case it looks desirable at some time. In practice, this may be most easily achieved by avoiding duplicate use of any first digit both for NDCs and for short codes (so that dropping the trunk prefix will not cause a clash between NDCs and short codes). This usually means avoiding use of 1 to start NDCs.

Longer term, with less differentiated tariff structures and/or alternative ways<sup>5</sup> for callers to find out how they will be charged for calls, a closed plan is conducive to both geographic and service number portability.

Widespread take-up of geographic or service portability will inevitably lead to a loss of meaning in the NDCs in the numbering plan. Ultimately one might see a single pool of numbers which can be used for any purpose in a country, with no meaning in the early digits. A person would be able to keep his number wherever he moved and whatever service he subscribed to. This would have obvious advantages for number "owners" and would also permit a very efficient use of the numbering resource.

Denmark is the country which is furthest down this road, with both full geographic portability and fixed/mobile portability. The only number ranges reserved with special meaning are the international prefix 00, short codes starting with 1, and freephone and premium rate ranges (80, 90)<sup>6</sup>. All other numbers are interchangeable. Before the regulator permitted these developments, market research was carried out to check that fixed and mobile call tariffs were so low, and so similar, that loss of tariff information in numbers was acceptable to callers.

It should not be assumed, however, that this route will be generally followed. Another advanced country, Sweden<sup>7</sup>, has recently reviewed its long-term direction for numbering and concluded that it will retain an open plan for the time being. Users like to dial short local numbers and have little interest in geographic portability outside their local area. Fixed-mobile convergence is not foreseen for the time being. Compared with Denmark, the additional significant digit (9 instead of 8) means that there are no local number shortages.

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<sup>5</sup> Ways which are not dependent on human interpretation of the number. For example, voice announcements of charge rates during call set-up, a visual display of call cost so far during the call itself, or reference to on-line databases. The topic is covered in a 1999 Ovum report to the European Commission, *Tariff transparency in a multioperator environment*, available at <http://europa.eu.int/ISPO/infosoc/telecompolicy/en/tarifftran.pdf>

<sup>6</sup> <http://www.itst.dk/wimpblob.asp?objno=95024315>

<sup>7</sup> Several relevant reports are available in Swedish <http://www.pts.se/>; English summaries may soon appear.



## **Annex B Misdialed traffic, parallel running and changed number announcements**

### **The misdialling problem**

Misdialled traffic is the major problem besetting all numbering changes. Misdialling is obviously undesirable because it wastes both callers' time and network resources. It may also lead to wrong connections, thereby inconveniencing called parties as well as callers.

Of course, a certain level of misdialling happens the whole time as people accidentally swap digits, press the wrong button and so on. Switches are designed with capacity to handle these normal amounts of misdialling. But at a major numbering change, the level of misdialling can be greatly multiplied, as people continue to dial old numbers instead of new ones. Listening to an announcement holds exchange equipment for up to half a minute. If there is no announcement, repeated attempts may be made to dial the same wrong number.

These two effects can significantly increase the loading on an exchange processor. In a new switch with plenty of spare capacity, this may not be a problem; but in a switch already carrying its design traffic or more, this sort of overloading can lead to severe congestion and even to processor failure.

### **Minimising misdialling when numbers change**

Three main defences are used to guard against excessive misdialling when numbers change:

- Advance publicity, which both alerts callers to the need to dial differently from a given date, and enables called parties to inform their regular contacts about the number change.
- Changed number announcements (CNA), which provide call-by-call guidance on correct dialling. In most cases it is sufficient for a caller to hear the announcement once to achieve correct future dialling. Without an announcement, misdialling may continue for some time.
- Supplementary information about details of the change, which is widely available for reference. This may include, for example, telephone enquiry services, informative leaflets, and updated telephone directories.

### **Some terminology**

"Number change day" is the day when old numbers are switched off and calls can no longer be successfully completed by dialling these numbers.

In a "flash change", new numbers are switched on at the same time as old numbers are switched off. This means that the public's dialling patterns must change on that day for calls to succeed. Flash changes are plainly harder to manage than changes with parallel running. The current implementation plan (A) is for a staggered series of flash changes throughout Sri Lanka. A "staged change" within an area normally starts by clearing a number range (in this case, 2 or 22) so that the second stage need not be a flash change.



“Parallel running” means switching new numbers on before number change day, so that old and new numbers are available in parallel. During the period of parallel running, calls can be completed successfully whether old numbers or new numbers are dialled.

“Changed number announcements” (CNA) are normally provided on “old” numbers from number change day onwards. A typical announcement will inform the caller that the called number is no longer valid, and also explain how to transform the old number into the corresponding new number (eg “please redial placing digits 20 in front of the number”).

### **The advantages of parallel running**

Parallel running is of particular value to business customers with equipment that stores phone numbers, such as PBXs and fax machines. All stored old numbers must be reprogrammed with corresponding new numbers. For large businesses, this can be a sizeable operation which takes a few weeks. The need to involve equipment suppliers in the reprogramming also adds to the period required, especially for a major change when many customers will need help from the same suppliers (who obviously have limited resources). Without parallel running, stored number facilities must be made unavailable to staff for a period (or if used unawares, will produce wrong results).

Parallel running is also of value to those who are responsible for the publicity campaign and for managing the numbering change. This is because with parallel running, national media can be used to publicise a simple staggered change such as “put 2 or 22 before the number” (at different dates in different places), without risking premature dialling leading to uncompleted calls or wrong connections.

### **The advantages of changed number announcements**

Changed number announcements are perceived as helpful by callers and can greatly enhance the public acceptability of a change. As explained above, they are also a vital part of the network’s defences against overload.

### **Providing parallel running and changed number announcements**

The easy way to enable both these useful facilities to be provided is to plan the number change so that old and new numbers occupy different number blocks. For example, if no existing numbers in an area start with 2, and the change rule is “put 2 in front of the existing number”, then old and new numbers occupy different number blocks. It will be easy to tell simply by looking at the first dialled digit whether a new number or an old number is being dialled. Before number change day, calls to new numbers can already be completed, if desired (ie parallel running can be provided). After number change day, all calls to numbers not starting with 2 can be routed directly to a single changed number announcement.

Sometimes it is impossible to plan a numbering change in this way, and existing number ranges have to be re-used. Normally this means that parallel running cannot be provided, because the first digits of a new number may match an existing old number. For example, in Colombo, 234 567 and 345 678 could both be valid numbers at the moment. Suppose that they are. If the “2 in front” rule were applied, anyone trying before number change day to dial the new number corresponding to



345 678, that is 234 5678, would normally get connected to 234 567. Of course, if a little used existing numbering range is re-used, there is a good chance that matches of this kind will happen only for a few new numbers. However, the analysis required to provide as much parallel running as possible in such circumstances is complex.

There is a similar problem with providing changed number announcements for numbers in shared ranges. In some cases announcements may be provided after the first 2, 3, 4 or 5 dialled digits reveal that this is an old rather than a new number – however again the analysis required to achieve this is complex. Where old and new numbers match (as in the example above), it is only possible to tell whether an old or a new number has been dialled by counting the dialled digits. Not all exchange systems enable routing after a few seconds' pause to ensure that no more digits are on the way (known as a "timeout"). Even where this is possible, it takes longer than direct routing to an announcement on the first digit.



## **Annex C SATRC Number Plan Proposals**

**Extract from paper by R Bhatnagar put to Dhaka meeting, December 2002**

### **Internet Services**

This service is being used in almost all of the SATRC countries. Some of the countries are using PSTN Numbering and others have implemented short code dialing for this service.

It is proposed that a unique short code (3 to 4 digits) may be introduced for SATRC countries in the following format:

Prefix	Service Access Code	Operator code
(if any)	3-4 digit	4-3 digits

The countries may decide the number of digits for the operator code.

The service Access Code is proposed to be 3-4 digits so that similar services (preferably data services) may be allotted Access Code within same series. This may be from level '1' as is used in a few countries.

### **Intelligent Network**

#### **(i) Free Phone:**

Many of the SATRC countries are not having IN Networks. However, some are using the following format:

Access Code	Operator code including Subscriber number
2-4-digits	2-7digits

Some of the countries are using 180 or 1800 for accessing free phone service. Harmonization of free phone Numbering in the following format is being suggested.

Access Code	Operator/ SCP code	Subscriber number
2-4-digits ( <b>1800 preferred</b> )	2-3digits	1-5 digits

ITU also has allotted 800 as country code for International free phone service. A prefix '1' is proposed so as to utilize the level 8 for other services. '0' prefix is not proposed since it is used for National long distance calls.

#### **(ii) Virtual Private Network:**

Some of the SATRC countries having IN Services are using the following format:

Access Code    +    operator number  
 3-digits        +    2-digit

Harmonization of Numbering Scheme for VPN in the following format is suggested:





Access Code	Operator/ SCP code
2-4-digits (from level '1' preferred)	2-3digits

**(iii) Premium Rate Services:**

Some of the SATRC countries having IN Services are using the following format:

Access Code    +    Subscriber Number  
 2-4-digits    +    4-digits to 7-digit

However "900" is being used as Access Code by most of the countries. Some of the countries are using 190 or 1900 for accessing this service.

It is proposed that 900 with '0' as prefix may be used to access this service in line with the ITU-T allotted number. '0' prefix is proposed since the charging (Premium Rate) is similar to a Long distance call. The format suggested for Premium Rate service is the following:

Prefix	Access Code	Operator/ SCP code	Subscriber number
1 digit '0'	2-3-digits (Preferably 900)	2-3digits	1-5 digits

**(iv) Televoting:**

Some of the SATRC countries having IN Services are using premium rate numbers for accessing Televoting service where premium rate charging is required. This scheme could be adopted.

However where premium rate charging is not envisaged, the following format could be adopted:

Access Code	Operator/ SCP code	Subscriber number
2-4-digits (from level '1' preferred)	2-3digits	3-5 digits

**(v) Universal Number :**

This service is not available in most of the countries. Harmonization of Numbering Scheme for Universal Number in the following format is suggested:

Access Code    +    Subscriber number  
 2-4 digits    +    6-8 digits

Access Code	Operator/ SCP code	Subscriber number
2-4-digits (from level '1' preferred)	2-3digits	1-5 digits

**(vi) Virtual Card Calling :**

Harmonization of Numbering Scheme for VCC in the following format is suggested.



Access Code	Operator/ SCP code
2-4-digits (from level '1' preferred)	2-3digits

**Emergency services :**

Emergency services like Police, Fire and Medical assistance ( Ambulance) are very important for travelers and it would be preferable if it could be common at least in the SATRC countries though these need to be defined globally. Most of the SATRC countries are using range covered by level '1' in three digits format but are not common code. It is recommended that individual countries may decide to use one of the codes from the following:

Services	Access Codes
Police	100 or 110
Fire	101 or 111
Ambulance	102 or 112

**Level 1 Services**

Numbering Scheme for Level 1 Services for Multi-Operator Multi-Service scenario is in the process of being modified in India. Annex 2 document which is already on the Web Site of DOT, India for comments from stakeholders could be a useful document for other countries in the Region as and when they go for changes or revision in their Numbering Plan.



**Extract from paper by P K Roychowdhury put to Thimpu meeting, March 2001**

**Recommendation 1:** It is recommended that countries in the region adopt a 40 year development period for the Number Plan

**Recommendation 2:** It is recommended that ITU-T Recommendation E.164 § 7.4 be strictly followed and special access codes avoided

**Recommendation 3:** It is recommended that all countries in the region adopt a fixed number length for the National Number as well as the Numbers for the Geographical Numbering Areas. Where the Nationally Closed Numbering Scheme (or NLPN) is not adopted the geographical closed number schemes should be based on readily identified boundaries or areas.

**Suggested National Number Lengths (NAB...XXXX)**

Country	Suggested with DNC	Remarks
Bangladesh	9 digits	
Bhutan	7 digits	NLNPA
India	10 digits	
Maldives	7 digits	NLNPA
Nepal	8 digits	
Pakistan	9 digits	
Sri Lanka	8 digits	NLNPA

**Recommendation 4:** Sufficient spare capacity should be left in the numbering scheme for substantial expansion of the non-geographical services.

**Recommendation 5:** Wherever ITU Recommendation are available for the codes related to a service type, these should be followed

**Recommendation 6:** For new services where an ITU allocated code is not available, regional consultation should take place

**Recommendation 7:** It is recommended that common 3-digit codes on Level 1 be used for Enquiry, Emergency and Operator Services

110– Directory Enquiry

**112 – General Emergency**

115 – Medical Emergency Services

118 - Operators Assistance



## **Annex D Consultation history**

During the consultant's visits to Colombo from 23 to 31 January 2003 and from 26 February to 8 March 2003, individual meetings were held with representatives of the following organisations and companies.

\*†Public Interest Program Unit  
\*†Telecommunications Regulatory Commission

\*†Lanka Bell  
\*†Sri Lanka Telecom  
\*†Suntel

\*†Celltel  
\*†Dialog  
†Hutchison  
\*Mobitel

Electroteks  
Lanka Internet  
\*†GTV

SriLankan Airlines  
Hayleys Ltd

Those marked with a \* also attended one or both of two industry meetings held at TRC.

Written comments have been received from those marked †.



## **Annex E Alternative local number changes outside Colombo**

Vacant alternatives to the heavily used 2 or 22 blocks are available everywhere outside Colombo. Table 15 shows some available alternatives for the areas outside Colombo where two-stage changes are planned, and Table 16 shows some available alternatives in the other areas outside Colombo. The column headed “alternative” in each case chooses one set (which starts with 2 wherever possible and minimises variation between areas); many other sets could be devised with different advantages. The main point is to use vacant blocks rather than 2 or 22 wherever this improves or speeds up the implementation process.

	Some vacant blocks	Alternative
025	26-29, 9	27
033	95-99	97
034	9	97
035	24-27, 9	27
037	90, 92, 94-97	97
045	21, 9	97 or 21
047	9	97
08	9	9
09	20, 21, 27, 28	27

**Table 15 Alternative prefixes for avoiding two-stage changes**

	Some vacant blocks	Alternative
024	25-29	27
026	9	97
027	20, 21, 26-29	27
031	20, 21, 25-29	27
032	9	97
036	20-21, 23-29	27
051	20, 21, 25-29	27
052	21, 25-28	27
054	20, 21, 25-29	27
055	20, 24, 26, 27	27
057	25-27	27
063	21, 21, 25-28	27
065	20, 21, 27-29	27
066	27-29	27
067	24-28	27

**Table 16 Alternative prefixes for facilitating provision of CNA**

The review recommended that:

- SLT avoids two-stage changes outside Colombo by using vacant number blocks such as those shown in Table 15 in place of the 2 or 22 prefix, wherever this can be achieved without overall delay
- SLT considers using vacant number blocks such as those shown in Table 16 in place of the 2 or 22 prefix, wherever this would achieve an overall benefit in



terms of greater ease of reprogramming, providing announcements and avoiding offering customers a complete number change, without overall delay

- SLT adjusts the timing of the planned changes for areas outside Colombo, so that they start no sooner than 1 May (assuming that publicity starts on 1 March) and are complete by 31 May.
- An exception may be made for the Nokia exchange in Matara (041), currently planned to change on 18 July, if it is impossible to advance its change; however every effort should be made to bring this forward. The simplified reprogramming made possible by relaxing the 22 rule should help here.
- If the codes for Kandy and Galle are to change during 2003 (see separate discussion above) then they should change at the same time as the local numbers in those areas change, to minimise inconvenience to their residents.



## **Annex F Constraints on SLT**

During this assignment, SLT mentioned the following constraints which limit its flexibility in relation to the numbering change.

1. The inability of the AT&T 5ESS switch (which serves 25,000 Colombo customers) to accept an additional code digit for its own identity without expensive software changes. This affects sent CLI. The switch will continue to send the code 01 instead of 011.
2. The limited announcement capacity of the network. This has two aspects:
  - Limits on the number of distinct announcements that can be offered. The exact number available varies from place to place. This constraint has been key to the planning of the change. For example, the new codes 011 for Colombo, 081 for Kandy and 091 for Galle were decided upon in significant part because they can be catered for by a single announcement “add 1 after the code”. Similarly, prefixing the same digits 22 to local numbers everywhere was supported by its needing only a single announcement.
  - Limits on the traffic that can be handled by any one announcement. Announcements in Sri Lanka are long because of the use of three languages. However, this is thought to be a less significant constraint than that on the number of announcements.
3. The fact that an extensive programme of network testing for the planned new numbers has already been carried out. Any changes would mean a repetition of testing, taking at least two months.
4. In the case of local number changes on most switch types, the need for the suppliers to provide and install new software releases. Particularly for obsolescent switches, this is expensive and any changes lead to additional expense and delay. The actual programme of local number changes is influenced by the need for engineering teams from suppliers and SLT to travel between switches of each type.
5. SLT is soon to install a new billing system. The specification for this system says that all numbers in future will have a uniform 10-digit format. Any change to this specification would entail unacceptable additional expense. The existing billing system cannot accept any new codes other than the ones proposed in Plan A, at least not without disproportionate trouble and expense.
6. There is a limitation on translator memory locations in many switches (variable from place to place). This affects the number of different number ranges that can be analysed at any one time. This constraint underlies the decision not to provide parallel running for any part of the number change. It also makes it much harder for SLT to implement any of the changes proposed in Plan A1.



## **Annex G Alternatives for cross-network access for common services**

Plan A for short codes devoted much short code space to cross-network access for all services provided on short codes. But for most services frequent use of cross-network access is not really necessary (eg the time should be the same on all networks), so using short code space for this service is not justified.

The only short code service that is likely to need a large proportion of cross-network access is fault repair (because if a line is completely out of order, it cannot be used to report a fault).

Several alternative approaches for cross-network access are explained below. This list is not comprehensive.

1. If desired, it would be possible to have a systematic set of short codes for cross-network access for fault reports, for example:

SLT fault reports (all networks)	12622
Suntel fault reports (all networks)	12644
Lanka Bell fault reports (all networks)	12655
Mobitel fault reports (all networks)	12671
Celltel fault reports (all networks)	12672
Dialog fault reports (all networks)	12677
Hutchison fault reports (all networks)	12678

This structure would allow equal treatment for 100 network operators. Other codes (eg 127, 128) could be used similarly for cross-network access for other selected services, eg billing complaints.

It would be possible to make the final two digits of these codes match the XY of the 18XY carrier selection codes – eg the carrier with carrier selection code 1811 could have fault reports on 12611, and so on. Another variation would be to allow shorter codes for fixed access network operators only – eg 1262 for SLT, 1264 for Suntel and 1265 for Lanka Bell.

2. Less systematically, special short codes (accessible from all networks) could be allocated just to those operators requiring them. For example, SLT and Suntel might use codes 126 and 127 respectively, and expand these to 4 digits if they wanted to offer more than one service.
3. An ordinary local number per service, located in one area (presumably Colombo) – incurring a local call charge when called from Colombo, or a long-distance charge when called from elsewhere. This is the approach used in Sri Lanka at present and also in some other countries.





4. A local number in each area where service is provided, so that the service can always be accessed for a local call charge. A refinement to this approach is to use the same local number in different areas or even on different networks (apparently something of this kind was offered by Dialog for a period using 678678).
5. Freephone numbers, when available – free of charge. This approach is normal, for example, in the UK. BT offers customer service and fault reporting on 150 and 151 when accessed from its own lines, and on 0800 800 150 and 0800 800 151 when accessed from any line.
6. Access via carrier selection codes, eg 1811 121 in place of (or as well as) 12611 to get fault repair for the carrier with access code 1811. This approach is used in Chile.
7. For operators with their own national codes (eg mobile operators), the standard short code could be used following this code. For example, a mobile operator with code 07x could provide fault reporting from any phone on 07x 121.

Any or all of these alternatives could be implemented in parallel.



## Annex H Survey of short code usage

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This quick overview brings together easily available material on short code practices and plans from a selection of countries, all either with or planning basic network competition. Focusing on 1xx space, for each country we look at:

- The classification of short codes into different types. Sri Lanka is proposing three main types: operator-independent, operator-dependent and carrier selection codes. The classification may include consideration of who is eligible for what type of code.
- Any overall structure for short code space, eg specific ranges dedicated to particular purposes.
- Any other points of note, including any available information on cross-network access.

The choice of countries for this exercise has been governed by what can be brought together rapidly, while aiming for a broad and varied coverage of maximum relevance to Sri Lanka. Much of the information is reproduced from regulatory documents, so there is no uniformity of terminology.

Finally the limited conclusions that may be drawn from this exercise are outlined.

### 1 Australia

#### 1.1 Classification of codes

**Access codes** are special services numbers used to prefix other numbers to select the carriage service or function to apply to the number.

**Carriage service provider identification codes** The four-digit numbers designated in part 3 of schedule 4 of the Numbering Plan as providing pre-selection over-ride service and are known as carriage service provider identification codes (CSPID). CSPID codes have two purposes:



- to be dialled by a customer or inserted into the network to indicate which CSP is responsible for carrying the call; or
- to identify a particular CSP in the carriage of a call to a point of interconnection

Every switch-based CSP interconnecting to another CSP requires a CSPID code, even if the CSP is not offering transit services. A CSP can also request additional CSPID codes to, for example, offer enhanced or distinctive over-ride services. Due to increased demand for CSPID codes, the ACA is considering supplementing the current range.

**Shared numbers** Shared numbers are not allocated to any one CSP, but can be used by all CSPs. The directory assistance number, 1223, is an example of a shared number. Some shared numbers are not accessible to the public. This includes several prefixes used on incoming-only international services.

Shared numbers can be used to supply a **selectable or non-selectable** carriage service. Shared selectable numbers are used for carriage services where the CSP providing the shared service can be selected (such as 1221, international faults and difficulties service). Where a shared service is non-selectable (such as calling number display over-ride services - 1831 blocks, 1832 unblocks), the customer cannot choose which CSP provides the shared service.

**Emergency service numbers** connect callers to an answering point for referral to the police, fire or ambulance in a time-critical or life threatening situation. The primary emergency service number is 000. There are also secondary emergency service numbers: 106 is used for text-based calls and 112 for calls from digital mobile phones. Only numbers specified in the Numbering Plan can be used as emergency service numbers. Emergency service numbers are shared numbers and are not allocated or issued to customers or CSPs.

## 1.2 Structure of short code space

Range	Use	Digits
10	Text-based emergency code 106	
11	Community services. Not shared.	4-8
12	Common telco services. Mainly shared.	4-10
13	Local rate services	6-10
14	Over-ride codes	4
15		
16		
17	National rate (1700)	10
18	Freephone (1800) plus mixed use.	4-10
19	Premium rate services (1900) plus mixed use. Not shared.	3-11

## 1.3 Points of note

The 1xx range is heavily used for special services with full length numbers (eg 1800 for freephone, 13x for local rate services) as well as for short codes. This has occurred for historical reasons – until the number changes in the 1990s, Australian NDCs were mainly occupied by geographic services.

Parts of the 01x code range are also in use (mainly 014 to 019, for longer established mobile services such as analogue mobile and paging). For every 1x code, the numbering plan specifies whether incoming international service is available to that code. There is little overlap between 1x and 01x ranges in use – 14, 1800 and 199



are the main ranges with duplicate use on 014, 01800 and 0199 (all for analogue AMPS service).

More detailed information is given below on how the 12 common telco services range is used. Further details are available at <http://www.aca.gov.au/number/index.htm>.

Code	Service	Charge limit	Digits	Status
1221	International fault reporting	Yes	4	Shared selectable
1222	Call costs and enquiries	Yes	4	Shared selectable
1223	National directory assistance	Yes	4	Shared non-selectable
1225	International directory assistance	Yes	4	Shared selectable
1234	Operator service		4	Shared selectable
1236	National directory assistance		4	Shared non-selectable
124	Operator service range		5, 6, 7	Not shared
125	Operator service range	Yes	5, 6, 7	Not shared
126	Internal network service range		4-10	Not shared
12711	Preselection verification service	yes	5	Shared selectable
1272-9	Testing service	yes	6-10	Not shared
128	Call information services		4, 5	Not shared

## 2 Chile

The information in this section dates from 1998.

### 2.1 Classification of codes

The basic structure for short code space shown in the table below was established in the early 1980s. Since then a growing demand for carrier selection codes (CSC) has led to mixed use of several of the ranges.

### 2.2 Structure of short code space

Range	Use	Digits
10	National customer services	3
11	Spare/CSC	
12	International customer services/CSC	3
13	Emergency services	3
14	General information services	3
15	Spare/CSC	
16	Spare	
17	Network interconnection/CSC	
18	Data and other network access/CSC	
19	Internal and test codes	3

### 2.3 Points of note

There is a systematic arrangement in Chile for cross-network access to special services. The table below shows designated codes for these services.

	National	International
Long distance calls	122	182
Information	123	183
Complaints	124	184



Sales

127

187

Customers with a preselection contract dial 0 before these codes to get their preselected operator service, while those preferring call-by-call selection dial a carrier selection code before the operator service code. For example 123 123 should connect to Entel's information service and 188 123 to CTC Mundo's information service.

Similar arrangements exist in some other Latin American countries, eg Bolivia.

### **3 Hong Kong**

#### **3.1 Classification of codes**

All the short codes will be classified into three categories:

1. Codes which are universally accessible by customers and universally allocated to all operators e.g. "99X" for emergency services;
2. Codes which are universally accessible by customers and allocated to a single operator e.g. "10X", "12X", "15XX", "16XX", and "17X" codes; and
3. Codes which in general will not be passed across networks and are universally allocated to all operators e.g. "108X" for the directory enquiry services, "109" for the fault reporting services and "1850X" for time and temperature services. (Here X is a language digit – 1 indicating English, 3 Cantonese and 8 Putonghua). However, operators are permitted to pass these codes across networks under bilateral or multilateral commercial arrangements.

In order to utilise the short codes more efficiently and effectively, the TA will assign to every FTNS operator a "10"-prefix or "12"-prefix code and every mobile network operator a "17"-prefix code for their various customer enquiry, hotlines requirements and operator-assisted services. Depending on their own operational requirements, the FTNS and mobile network operators can be flexible with the application and the digit length of the allocated short codes provided that they do not exceed 7 digits in length. Except for the "18" level, all short codes and their sub-levels should not be assigned to customers under any circumstances.

To enable customers to have an easy and convenient access to the services offered by external telecommunications services (ETS) operators, the TA will assign to every ETS operator a unique 4-digit "15XX" or "16XX" short code as service access code. The ETS operators may, at their discretion, extend the digit length of the assigned short codes from 4 digits to a maximum of 5 digits in length.

In assigning "18" short codes, the TA will have regard to the following criteria:

- There is a strong public demand and interest for the service in the community.
- The service provider must be a public organisation, utility company or non-profit-making entity.



- The service must be of a type that generates extremely high volume of traffic which involves mass calling.
- The service provider must be equipped with sufficient equipment and manpower resources to provide a satisfactory service.

### 3.2 Structure of short code space

Range	Use	Digits
10	short codes for various fixed telecommunications networks services	4-7
11	short codes, possibly harmonised in some cases with those in use elsewhere in the region	3
12	short codes for various fixed telecommunications network services	3-7
13	Calling number display control / reserved	3, 4
14	network identifiers (NI) used by fixed and mobile networks in number portability	3
15	service access codes for external telecommunications services	4, 5
16	service access codes for external telecommunications services	4, 5
17	short codes for various mobile services	4-7
18	special service codes, which involve high volume of traffic, shall be standardised and portable across various fixed telecommunications networks for commonly provided services. Examples are telemarketing and telebetting.	4-7
19	network test codes and routing codes for carriers/operators of external telecommunications services, fixed telecommunications network services and mobile services.	variable

### 3.3 Points of note

The following codes have been allocated to individual network operators for expansion (up to 7 digits) and use as they wish:

- fixed network operators 100, 101, 103, 106, 120, 121, 122, 123, 1281 (maximum 2 codes per operator)
- mobile network operators 170, 171, 173, 175, 176, 177, 178, 179 (one code per operator)

Further information on the numbering plan and allocations is available at <http://www.ofta.gov.hk>.

## 4 India

### 4.1 Classification of codes

Codes have a dual classification:

**Restricted/unrestricted:** Restricted services are accessible at least within local area, unrestricted are accessible from anywhere, national or international.

**Category-I:** These are the mandatory services to be provided by all the Access Providers.



**Category-II:** These services are not mandatory, but Access Providers shall use only these codes if such services are provided.

**Category-III:** These are the codes to be used by the Access Providers to provide the services under which these codes are listed. These services shall be provided in their own network.

**Category-IV:** These are the codes to be used by the Access Providers to provide any service of their choice in their own network.

## 4.2 Structure of short code space

Range	Use	Digits
10	Emergency services	3, 4
11	Access provider services (wakeup calls)	3
12	Access provider services (special services control)	3, 4, 5
13	Travel related enquiry services	3, 4, 5
14	Airline enquiry services	4, 5
15	Trunk booking, telegram services	4
16	Billing complaints	3, 4
17	New services – voicemail, data, internet	3 - 6
18	IN services	6 - 15
19	Directory enquiries, complaints, internal	3, 4

## 4.3 Points of note

This information is taken from a paper on TRAI's website. It appears to represent a proposal for India's short code space which is still subject to consultation, rather than a definite plan or even a full description of current practice.

## 5 Jamaica

Jamaica is part of the North American Numbering Plan, and as such shares the abbreviated dialling provisions outlined in section 8. In addition, the 11X range is already in use for common services.

A 2002 consultation document on Jamaica's numbering plan draws attention to the possibility of adding the full 1XX short code range, using one of the following techniques to avoid conflicting dialling patterns:

- Using the standard 00 international prefix plus the country code 1 instead of the trunk prefix 1 to dial the USA and Canada (thereby effectively losing one of the main advantages of belonging to the NANP)
- Using the "end of string" marker # to show when dialling a short code ends.

Early responses to the consultation appeared to favour introducing 1XX short codes, using the second option to avoid conflicts.



## 6 Malaysia

### 6.1 Classification of codes

Short Code Numbers can comprise of 3, 4 or 5 digits in length and fall into one of the following categories:

(a) **Common Intercarrier Short Code (CISC)** – consisting of 4 or 5 digits, allows a service offered by one service provider to be accessible by end-users on other networks.

(b) **Internationally Accessible Short Code (IASC)** – consisting of 5 digits, these codes are for services that are accessible from outside Malaysia.

(c) **Independent Short Code (ISC)** – consisting of 3, 4 or 5 digits and are assigned for services that are only available to end-users on the same network or for internal use. Different networks may use the same ISC for different purposes.

(d) **Commonly Known Short Code (CKSC)** – consisting of 3 digits, these codes are used mainly for public benefit services such as emergency services and service provider inquiries and are provided in the same manner across all networks.

(e) **Carrier Selection Code (CSC)** – consisting of 3 digits, these codes are used by end-users to select their preferred network for carrying long distance calls.

### 6.2 Structure of short code space

Range	Use
10	CKSC/CISC
11	ISC/CKSC
12	ISC
13	CISC/ISC
14	Spare
15	CISC
16	Spare
17	ISC
18	CSC
19	ISC

### 6.3 Points of note

The codes 1X0 are mainly used for full length special service numbers.

The information reproduced here is taken from a recent consultation document which includes the following relevant proposals:

- To expand the Carrier Selection Code ranges to become 5 digit, with the possibility of assignment to service providers outside of the original intention under the Equal Access arrangement, such as to providers of Internet Protocol-based telephony services.
- To migrate all existing Independent Short Codes ranges to the “13” Independent Short Code range, commencing with the 17x and 19x ranges; and





- To streamline and make consistent all Independent Short Codes so that the same code is applicable for similar services made available by each network.

No comment is made in the document on the arrangements for Common Inter-carrier Short Codes. The equivalent of 14 3-digit short codes is currently allocated for this purpose (to be used as 4 and 5 digit codes).

## **7 Netherlands**

### **7.1 Classification of codes**

The 10-series is proposed to be a possible extension of the 11-series, by the ETO, the research body of ECTRA and the European Commission. ETO leaves open which services should find a place here but a possible application is carrier selection for pan-European providers of telecoms. Therefore it was decided to assign the 10-series to Harmonised European Short Codes, but not to make the numbers available yet for allocation or reservation until the intention has been decided at a European level. The 19-series is similar to the 10-series.

The 11-series is intended for “harmonised European short codes”. The number 112 is, with the arrangement of the old number plan on 19 July 1996, already assigned as European alarm number. In the present agreement the number 118 is also allocated. 118 and not 118xy(z) was chosen specifically because of the importance of an easy to remember, recognisable number for the end user. Although every provider of telecoms services has in principle right to allocation of the number 118, actual use of the number depends on whether he has an access network, or whether he can obtain special access to such a network.

The 12-series is destined for Harmonised National Short Codes: short numbers which will not be harmonised in European context but only nationally. The services are restricted to “services with a special social importance, or for services which support fixed or mobile public telephone services.” By “services with a special social importance” is meant: disaster information, but also services such as police, fire brigade, or car recovery.

“Services which support fixed or mobile public telephone services” are services which are permanently connected to the public telephone services e.g. the operator service, a help desk, voice dialling, for as much as these won’t be harmonised on a European level. Because all numbers in the 12-series are harmonised numbers, they can be assigned to multiple providers simultaneously by the board. The number length of the 12 series has been laid down to be 4 digits, which offers room for 100 services.

The 12-series is destined for harmonised numbers for managing network local facilities. These are functionalities which the network offers itself to the users which are connected to the network, and which cannot be made available / accessible as a service from outside the network.

This is in contrast with services where the network is only used for carrying over or routing of the signals of the service. Network local facilities are management functions where no speech path needs to be installed: facilities which are connected to the exchange which has “control” over the connection. Examples are transfer instructions in case a call comes in (compare Follow-me); the submitting of routing



data directly preceding a conversation to be set up (compare CLIP and CLIR) and instructions for the benefit of a conversation to be set up at a later time. Because all the numbers in the 13-series are harmonised numbers, they can be assigned to multiple providers simultaneously.

The 13-series is primarily intended to make harmonised numbers available for network local facilities, which influence the costs and the privacy aspects of telecoms networks for the subscribers and which are of such public importance that they should be available from [old] “dial” phones. Examples are the numbers 131 and 132 which are destined for the (de) blocking of number identification (CLIP, CLIR). Numbers with a length of 4 digits are primarily meant to offer room for future other types of network local facilities.

The 14-series is destined for non-harmonised network local facilities for users of a network. Non harmonised means that the facilities with the use of the same number can differ from network provider to network provider. Network local facilities are functionalities which are offered by the network itself to the users which are connected to the network, and which cannot be made available as a service from outside the network. This in contrast with service where the network is only used for transfer or routing of signals of a service.

With the 14-series a desire has to be met of network providers to obtain space in a competitive market for innovations. To avoid the danger of unfair competition with providers of services, the allocation is limited to facilities which are network local and therefore per definition can only be offered by owners of networks.

The 16-series is already in use for the carrier selection. Since an important part of the 16-series has already been allocated, and as it is expected that the number of providers of the carrier selection service will continue to grow, expansion of the number capacity for this service is desired within the foreseeable future. Against this background, the 17 series will also be assigned to carrier selection service, albeit that the numbers will not be made available for allocation or reservation until it is necessary.

## 7.2 Structure of short code space

Range	Use	Digits
10	Harmonised European short numbers	
11	Harmonised European short numbers	
12	Harmonised short numbers for services with a particular social interest or for service which support the fixed or mobile telephone service.	4
13	Harmonised numbers for access to network-local facilities for users of a network	3, 4
14	Access to network-local facilities for the users of a network	
15		
16	Carrier selection codes	4
17	Carrier selection codes	4
18		
19	Harmonised European short numbers	



### **7.3 Points of note**

The information given in this section dates from 1999. The principles have not changed significantly since then, although more specific code allocations have been made.

The structure of Dutch short code space is particularly interesting because it was designed in the late 1990's with almost no constraints from existing services. Until the major change in the Dutch numbering plan in the mid-90's, the first digit 1 was used for local subscriber numbers like any digit 2 to 9. The decision was taken to clear the range entirely from local numbers and dedicate it to short codes. The principles outlined above were formulated following study and consultation on the best way to use this resource in future.

The Dutch have also led in many European harmonisation efforts and their dedication to this cause is evident in their plan.

## **8 North American Numbering Plan**

### **8.1 Classification of codes**

Abbreviated dialling resources, within the NANP, are generally defined as any set of numbers less than 7 digits in length, i.e., fewer digits than a local call, and that can be dialled and completed to a destination address. Abbreviated dialling resources are valuable both to the public and to telecommunications service providers. The public appreciates the ability to dial less than the normal number of digits for emergency services and for other services dialled on a frequent basis. Not only does it require less than the normal number of dialed digits, but the abbreviated set of numbers are easier to remember for frequent dialling situations. Service Providers see abbreviated resources as an advantageous method of providing easy subscriber access to popular network-based services.

There are three main groups of abbreviated dialling resources:

**Public Interest** – abbreviated sets of numbers for public access to health and safety related services, e.g., police, fire, ambulance. These numbers must be nationally uniform.

**Common** – abbreviated sets of numbers for public access to non-emergency services that should nonetheless be nationally uniform for ease and frequency of use, e.g., Directory Assistance, Time, and Weather.

**Service Provider-Specific** – a range of abbreviated sets of numbers, all of which are available to each service provider to use in the offering of unique network based subscriber services.

Four types of numbering resource might be regarded as short codes:

- N11 3-digit codes for commonly used services
- Carrier selection codes in the 10x xxxx and 950 xxxx ranges
- "Vertical service codes" for control of functions like call forwarding



- 555 xxxx line numbers for special information services. Allocations may be local or national in scope. The best-known use of this range is 555 1212 for directory assistance.

## 8.2 Structure of short code space

Code	Use
211	Community Information and Referral Services (US)
311	Non-Emergency Police and Other Governmental Services (US)
411	Local Directory Assistance
511	Traffic and Transportation Information (US); Reserved (Canada)
611	Repair Service
711	Telecommunications Relay Service (TRS)
811	Business Office
911	Emergency

Range	Use	Digits
10	Carrier selection codes	7
11	"Vertical service codes" (11 used on dial phones for *)	4, 5

All other 1x ranges are used for NDCs (mainly, geographic codes).

## 8.3 Points of note

Carrier selection codes for national carriers were originally of the form 10xxx. However, the lax definition of eligibility for these codes, and the very limited supply of alternative short numbers that could be used nationally, led to demand for these codes outstripping supply. (For example, carrier selection codes were being used as memorable short numbers by pizza delivery services). The codes have therefore been extended to 7 digits by duplicating the initial 10 to 1010.

Tollfree service is very widely used in North America and substitutes for many potential applications of short codes.

Several years ago, there was a study by the Industry Numbering Committee (INC) to determine if there should be another format(s) for abbreviated dialling resources. This study resulted in a list of potential resource formats, but did not result in an implemented format. All the potential resource formats employed combinations of numerical digits and symbols, e.g., #XX, #XXX. This report is available from the INC secretariat.

# 9 Portugal

## 9.1 Classification of codes

The codes or numbers to be allocated at level "1" shall correspond either to services of a clear social or public interest, or to services with high frequency of calls, which, because of their characteristics, in particular pricing, cannot be configured or be similar to value added services.



The allocation of carrier codes is made on the applicant's free choice basis, of the codes available in the "10xy" series, in which x is different from 0. The applicant shall configure a provider of fixed telephone service.

The allocation of numbers for "Customer Care" services, which shall be characterised by the availability of information directly related to the provision of the telephone service, is carried out at the applicant's request, in the "16xy" series, in which xy has, in principle, the same value as in "10xy". The provider may sub-define 10 different access numbers, in the 16xy.z form, with a view to achieving market segmentation.

The allocation of numbers for the "Directory Enquiry Services" - other lists", which is characterised by the availability of information from telephone directories, is done at the applicant's request, in the "18xy" series, in which xy has, in principle, the same values as in "10xy". The provider shall configure a telephone service provider (fixed or mobile).

All the level "1" numbers are national access numbers, except those of "12" range. The ICP recommends to providers with access networks, the accommodation of their internal services in numbers in the "12r(s)(t)" form, with the aim of avoiding possible collision, should ICP intend to adopt other numbers or ranges in level "1", for national utilisation.

The utilisation of the carrier code shall be made in such a manner that, when dialling, there is only space for one single step, including the carrier code and the destination number.

## 9.2 Structure of short code space

Range	Use	Digits
10	Carrier access codes	4
11	Emergency and information services	3
12	Internal network services (use to be decided by each network)	5
13	Spare	
14	Services of social interest	3, 4
15	Telegrams etc	4
16	Customer support services (specific carriers)	4, 5
17	Spare	
18	Information services (specific carriers)	4
19	Spare	

## 9.3 Points of note

To date 28 of the possible 100 carrier identities have been allocated.

# 10 Singapore

## 10.1 Classification of codes

Level '1' short codes are allocated for providing special services and IDD type services to customers. The special services include calls for operator assistance, service enquiry, voice information and IN services.

Generally, only Facilities-based Operators are eligible for level '1' short codes. However, for Service-based Operator (Individual) licensees who propose to operate



an International Simple Resale (ISR) service (excluding solely wholesale service) where customers can have one stage IDD dialling through PSTN and where access is not via card mode nor Personal Computer-based, they will be also be allocated from '15XX' level with the following conditions:

One licensee is entitled to one 4-digit short code; and the licensee shall, with IDA's approval, extend the 4-digit code to 5-digit to provide additional access codes for their differentiated service.

Usage should meet the following conditions:

- The service nature is such that using short code is a necessity, an example being a restriction on the total number of digits that the service can accommodate for effective call routing; or
- The service reaches a significantly large user base and there are possibilities of high service usage, such that it would really benefit the users if a short code is used;

In considering applications short codes, IDA will ensure that there are sufficient short codes available for allocation for similar services provided by different licensees in the foreseeable future and that the allocation will not unintentionally create a situation whereby a licensees be given an unfair advantage over others offering similar services. generally, the process of allocating short codes is by bidding and/or balloting.

Short codes can be categorised into 2 groups:

Category I - codes which are universally accessible and allocated to a single Licensee. "Universally accessible" refers to the ability of any end-use to gain access to the respective services regardless of which licensee's network the end-user is using. The service may or may not be provided by this licensee by default. This will however be transparent to the end-user.

Category II - codes which are universally accessible and universally allocated to all Licensees. "Universally allocated" means that all licensees will use the same code for provision of certain specific services

All Licensees must share the following Category II access codes:

- '000' international dial direct (IDD) access code
- '1800' toll-free services access code
- '1900' premium rate services access code
- '100' directory enquiry services access code
- '19XX' internal network test / routing access code
- '1711' time announcement service

IDA reserves the right to review the current categorisation of short codes and classify more numbers under Categories I and II where necessary.

## **10.2 Structure of short code space**

Range	Use	Digits
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10	Operator assisted telephone services/ bookings	3
11	Operator to operator call	3
12	Reserved for future use	
13	Service Indicator/ Service access code (e.g. voice mail)	3-4
14	Reserved for future use	
15	International telecommunication services	4
16	Service Enquiry and Assistance	4
17	Voice Service/ Other services	4
18	IN services	4 (except 1800, 11 digits)
19	IN services/ network test codes	4 (except 1900, 11 digits)

### 10.3 Points of note

The ranges 13, 15, 16 and 18 have been opened for allocation by competitive bidding. The 0x range is also used for very short international prefixes, currently only taken up by two operators. Details of allocated codes are in the National Numbering Plan at <http://www.ida.gov.sg>.

## 11 Tanzania

### 11.1 Classification of codes

The short codes shall be common to all operators in Tanzania and will be assigned by TCC to the applicants.

### 11.2 Structure of short code space

Range	Use	Digits
10	Customer assistance (free of charge)	3
11	Life and safety (free of charge)	3
12	Voicemail/speaking clock (discounted charge)	3
13	Extras (standard tariff)	3
14	Test numbers (free of charge)	
15	Spare	
16	Spare	
17	Spare	
18	Spare	
19	Spare	

### 11.3 Points of note

The actual services provided on short codes are oriented towards mobile services, eg voicemail, account recharge and balance enquiry. Most services have dual language versions on separate codes (English and Swahili).

## 12 United Kingdom

### 12.1 Classification of codes

Access codes are short, generally memorable, three to six digit numbers, usually beginning with '1', which allow end users to access a wide range of telephony



services. Access codes are categorised by the type of service for which they are used. There are three types of access codes: Types A, B and C.

**Type A** access codes are used by callers to reach commonly used services, such as '100' (operator services) or '123' (speaking clock). These codes may be used throughout the United Kingdom by all operators offering equivalent services (and may not be used by any operator for any other service). More recently, the use of Type A codes has been refined for particular services where there is a social imperative, sometimes backed up by regulatory force, such as '141' (suppress calling line identification) and '1800X' (voice text services for the deaf). Type A codes will be designated individually by Oftel for such services, not allocated to a particular operator or a service provider.

**Type B** access codes have network-wide significance as they are used by the end users of one public telecommunications operator to have selected calls connected by an operator other than the one from whom they rent their telephone line (known as 'Indirect Access'). For example, callers might use Type B codes to select Indirect Access providers for long distance and/or international calls. Type B codes can also be used by callers to access services available from their own operator's system or another public operator's system. These codes are allocated by Oftel.

**Type C** access codes are set aside for independent use by public telecommunications operators, either to provide particular services exclusively to their directly connected end users or for internal network operations. The access code '150', which is used by British Telecommunications plc for residential sales and billing enquiries, and by Orange Personal Communications Limited for customer services, falls into this category. Operators of different systems have the opportunity to choose corresponding codes where it is convenient and potentially beneficial to adopt a common approach, but are not obliged to do so. While Oftel has designated a range, it does not allocate Type C codes but, based on information supplied by operators, their use is recorded in the Scheme.

Given the need to ensure reasonable numbering capacity, allocation of access codes will generally be on the basis of five-digit '1XXXX' codes. While three- and four-digit codes will no longer be issued, three- and four-digit codes already in use will remain in use.

Where appropriate, different access codes may be linked together such as, for example, to allow choice of operator followed by access to a second operator's service.

Type B access codes will be allocated on the basis of Company Groups, with the entitlement generally being restricted to one access code of each type set out below for each Company Group. Oftel will consider requests for additional access codes on a case by case basis. However, those who already have shorter-length access codes shall not generally be allocated new codes, and will be expected to extend their existing access codes.

There are generally three types of Type B Access Code:

- a) Access codes used for the purpose of a direct call set-up, where the dialled digits of the access code and the following number are treated as a single unit, or 'string', by the telephone networks in setting up the call;
- b) Access codes used as a prefix, where the second stage relies on the conveyance of a Personal Identification Number ('PIN'); and





c) Access codes that are used to access services, but which are not necessarily used in conjunction with a following number, or with a second stage which relies on conveyance of a PIN.

## 12.2 Structure of short code space

For historic reasons, UK short code space has no clear structure. Until liberalisation in 1984, only 3-digit codes were used, and the earliest carrier selection codes also had 3 digits. Following further market opening in 1991, most new codes were allocated with 4 digits. Further recent review has led to a policy of allocating only 5-digit codes for new uses, but previously allocated codes have not been withdrawn. The table below gives an overview of some of the predominant uses of ranges.

Range	Type	Use
10	A	Assistance
11	A	CEPT harmonisation
12	A, B, C	
13	B	Carrier selection codes
14	A, B, C	
15	A, C	Fault reports, customer service
16	B	Carrier selection codes
17	C	Special enquiries, internal, etc
18	B	Carrier selection codes
19	A, C	Directory enquiries, etc

## 12.3 Points of note

It is acknowledged that UK short code space is poorly organised. Following recent reviews, Ofcom has made a conscious decision not to pursue rationalisation, believing that the costs outweigh the benefits. Similarly, it has decided not to require “old” 3 and 4 digit carrier selection codes to be extended to 5 digits on grounds of competitive equity, even though “new” ones will all have 5 digits.

Competition has now been introduced into the directory enquiries (DQ) market. For this purpose, the 118 harmonised European DQ code has been opened up at 6 digits length. A selection of attractive 118xxx codes (eg 118500, 118118) has been allocated to market participants by lottery. The familiar old DQ code 192 is to be withdrawn.

The normal method of cross-network access for special services in the UK is freephone numbers, although alternatives using extended or linked access codes are provided for (see 12.1 above).

## 13 European Telecoms Office

As well as the country-specific information provided above, a good deal of relevant information and thinking is available in the 1998 European Telecommunications Office report on *Harmonisation of Short Codes in Europe*<sup>8</sup>. Chapter 4 of that report addresses the question of national uses of short code space. It concludes that the

<sup>8</sup> Available at <http://www.eto.dk/downloads/Numbering%20reports/short-codes.doc>



three main criteria for qualification of specific networks/services for access by a short code are:

- social importance of a short code (emergency services or help for travellers or disabled people would be examples of services of high social importance)
- call frequency for the networks/services
- network limitations (for example, where single-stage dialling of long digit strings is required and switches cannot handle many additional digits for carrier selection).

ETO further concludes that the need for short codes is affected by the following developments:

- development of intelligence in networks and terminal equipment
- development of non-geographic services
- development of feasible alternatives for telephony networks/services
- development of competition

and that therefore, overall, the use of short numbers seems to be decreasing and the use of prefixes and access codes seems to be increasing.

ETO's reports have been influential throughout Europe and especially in more recent numbering plan changes (mainly in Southern and Eastern European countries).

## **14 Conclusions**

From this quick survey of short code practice in selected countries the following limited conclusions may be drawn.

1. There is considerable variation in the availability of short codes and in how the supply is used. In some countries many 1xx codes can no longer be regarded as short.
2. Most regulators that have considered the use of short codes have decided that the supply needs to be managed with care. Strict criteria have been devised governing the issue of short codes and the length at which codes should be used. Increasingly, applications which could be accommodated on full-length national numbers are not being granted short codes.
3. Several different categorisations of the uses of short codes have been introduced. The main distinctions that appear in these categorisations are:
  - Whether the code is recognised with the same meaning on all access networks, or may have different meanings on different access networks.



- In the case of a code with the same meaning on all access networks, whether it “belongs” to a particular operator (eg a particular operator’s customer service) or whether it is available for all operators (eg emergency service).
  - In the case of a code “belonging” to a particular operator, whether it is an access code (intended to be followed immediately by more digits) or a short number giving direct access to a service, eg fault reporting.
  - In the case of codes available for all operators, whether the services in question must or simply may be provided using those codes, and the type and importance of the services.
4. Nearly all these countries have devoted at least one 1xx range to carrier selection codes of 3 or more digits.
  5. There is a tendency to reserve 112 for emergency services and the rest of 11x for international harmonisation.
  6. Several countries have set aside a range of short code space within which operators are free to provide whatever services they like to their own directly connected customers.
  7. No country has allowed more than two 3-digit short codes for an individual carrier’s use. Several countries meet the demand for carrier-specific codes for cross-network access by allocating only one or two 4-digit codes and permitting the carrier to use these as it chooses at 5- or 6-digit lengths.