CENTRAL OFFICE CODE EXHAUST ANALYSIS METHODOLOGY

Maintenance History		
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Table of Contents

1 Introduction

The numbering resources are a vital part in the service provisioning of public telecommunications services to end users. There is a general format for numbers used in the provision of public telecommunications network services as prescribed by the ITU-T Rec. E164. Further refinement to this general format occurs at the level of national number administration, which takes into consideration the capabilities of the public telecommunications networks. Numbers are used by concessionaires for their internal network arrangements as well as for identifying users of a public telecommunications network . It is therefore necessary for the usage of numbers be monitored to ensure that there is an adequate supply of numbers for the provisioning of services to users.

Trinidad and Tobago is a participating country in the North American Numbering Plan (NANP), which includes other participating countries such as Canada and the English speaking Caribbean. As a NANP participating country, Trinidad & Tobago shares country code 1 with the other participating countries and its area code (868) is allocated by the NANP Administration (NANPA), in the USA. The assignment of numbers within the area code to public telecommunications network concessionaires is done locally by the Regulator. The guidelines developed by the NANPA to plan and administer these numbers are adhered to by Trinidad and Tobago, to the extent possible, as described in the *National Numbering Plan for Central Office (CO) C*odes and *Home Network Identity (HNI) Administration.*

Trinidad and Tobago has been assigned a Numbering Plan Area (NPA) code by NANPA, which follows to format 868 NXX XXXX (where N = 1 to 9 and X = 0 to 9). As identified in the National Numbering Plan, this NPA code is further divided and allocated to various service categories, such as fixed line services, mobile services, premium services, etc. Currently, the number allocation to the each service category is determined by the estimated demand for numbers by that category. Utilization thresholds must be

established to alert number administrators that the allocations to these service categories are in jeopardy of being exhausted and to deploy conservation methods which will delay the exhaust or to make further number allocations to the exhausted service category. There are 792 CO codes, with each CO code providing for 10,000 numbers, available in the 868 NPA and while this may seem to be a large quantity for a small island nation, there is a requirement for careful management of this resource. Therefore, a method needs to be employed to monitor the usage and potential exhaust of the number allocations to different service categories in the National Number Plan developed for Trinidad and Tobago.

The methodology used in this document is based on the NANPA practices as Trinidad & Tobago is a participating country of the NANP. While there are methodologies used by other nations to manage their numbering resources, it is prudent to conform to the NANPA practices suitably modified, where necessary, to the Trinidad & Tobago environment.

1.1 Regulatory Framework

Sections 18(j) of The Telecommunications Act No 4 of 2001, gives the Telecommunications Authority of Trinidad & Tobago, hereafter called 'the Authority', the mandate to plan, administer, manage and assign telecommunications numbering for telecommunications services. Implicit therein is the duty of the Authority to effectively and efficiently manage the number resources and to thereby request the relevant information from concessionaires.

1.2 Purpose

This document provides guidelines and procedures for the determination of the utilization of numbering resources and, in particular, the exhaust projection for the number allocations to the service categories defined in the National Numbering Plan developed for Trinidad & Tobago.

Trinidad & Tobago, as a participating country in the North American Numbering Plan (NANP), has an obligation to report number utilization in the 868 NPA to the NANPA so that an accurate exhaust projection can be obtained for the entire NANP and if necessary, preparation be made for NPA relief should the 868 NPA assignment be in jeopardy of exhaust . This document enables this obligation to be fulfilled.

1.3 Review cycle

As the telecommunications sector grows and develops into more efficient and competitive markets, the need may arise to revise and update the CO Code Exhaust Methodology that is employed by the Authority. As such, this document will be modified in consultation with concessionaires, stakeholders, interested parties and the public, as the Authority deems appropriate. The maintenance history will be modified accordingly.

1.4 Consultation Process

The Authority is seeking the views and opinions of the general public and other stakeholders regarding the proposals made in this document in accordance with the Authority's *Procedures for Consultations in the Telecommunications Sector of Trinidad and Tobago.*

The Authority's consultation procedures and comment submission form are available on the Authority's website, http://www.tatt.org.tt/newdoc.htm. Comments should be submitted on or before **November 30, 2007** or mailed to:

Telecommunications Authority of Trinidad and Tobago
BEN Court, 76 Boundary Road
San Juan

2 Definitions

In order to determine the quantity of available numbers in a CO code, the various categories to which numbers can be designated must be defined.
The following gives the definitions used by NANPA[1] for the various categories to which numbers can be designated. These definitions are the industry standard for the NANP.

Administrative Numbers	Administrative numbers are numbers used by telecommunications carriers to perform internal administrative or operational functions. Examples of administrative numbers are: Test numbers, employee/official numbers, Location Routing Numbers, Temporary Local Directory Numbers
Aging Numbers	Aging numbers are disconnected numbers[2] that are not available for assignment to another end user or customer for a specified period of time. Numbers previously assigned to residential customers may be aged for no more than 90

[1] *NANP Numbering Resource Utilization /Forecast (NRUF) reporting guidelines. ATIS -0300068.*
[2] *Disconnected numbers are numbers that are no longer used to route calls to equipment owned or leased by subscriber of record.*

	calendar days. Numbers previously assigned to business customers may be aged for no more than 365 calendar days.
Assigned Numbers	Assigned numbers are numbers working in the PSTN providing services to customers for their use, or numbers not yet working but having a customer service order pending. Numbers that are not yet working and have a service order pending for more than ten working days shall not be classified as assigned numbers.
Reserved Numbers	Reserved numbers are numbers that are held by concessionaires at the request of specific end users or customers for their future use. Numbers held for more than 60 working days shall not be classified as reserved numbers
Available Numbers	Available numbers are numbers that are available for assignment to subscribers to enable them to access telecommunications services. The quantity of Available numbers can be determined by the formula: Total quantity of numbers in the CO code or block inventory minus the sum of Assigned, Reserved, Aging and Administrative numbers.
Service Categories	The categories identify the various services which use Numbering resources e.g. Premium services, Operator and Plant test codes, short codes, subscriber codes fall into this category. These have been defined in the CO code assignment guidelines.

The Concessionaires who utilize number resources are required to submit utilization and forecast data by CO code for the numbers assigned to them by the Authority. These definitions will guide them in reporting in what categories the numbers have been used.

3 Responsibilities of the Concessionaire

Concessionaires are responsible for activities which support the Authority's mandate to efficiently manage the numbering resource as follows:.

1. Concessionaires are required to provide Number utilization and forecasting data on a semi-annual basis by the following due dates[3]

a) March 31st for the six month period commencing July and ending December 31st of the previous year
b) September 30th for the six month period commencing January and ending June 30 of the current year.

2. Concessionaires are required to submit the Months to Exhaust Worksheet for growth codes as required.

3. The number utilization and forecast data is to be presented on a per exchange (NXX) basis for fixed lines only.

4. Concessionaires are also required to provide validation data to the Authority, as requested, for the processing of the *Request for Growth CO Codes* and semi-annual *Number Utilization Reports*.

The data must be accurate and factual as possible as it will guide the Authority in determining the exhaust date of the quantity of numbers allocated per service category in the National Numbering Plan and enable it to take the necessary steps, in a timely manner, to mitigate the premature exhaust of the allocations.

[3] *These responsibilities are adapted from the NANPA guidelines*

4 Responsibilities of the Authority

The Authority is responsible for the following[4]:

- The effective and efficient management of the numbering resources in the allocated NPA.
- Compilation of submitted utilization and forecast data and the preparation of the CO code exhaust report
- Issuance of the exhaust report sixty working days after the receipt of verifiable data
- Initiating mitigation techniques to prevent premature exhaust of the allocations in the National Numbering Plan and NPA
- To make rules for the issuance of numbers allocated to end users so that the numbering resource is efficiently utilized
- Initiating the process for having another NPA allocated to Trinidad & Tobago should the current NPA be near exhaust
- Safeguarding the confidentiality of the data provided by the concessionaires
- Penalties being levied on concessionaires who are non compliant and who do not respond to queries on the submitted data by the stipulated due dates.
- Providing the NANPA with a utilization and forecast report on an annual basis for the NPA assigned to Trinidad & Tobago

[4] *These responsibilities are adapted from the NANPA guidelines*

5 Methodology

The methodology uses an average rate of assignment of numbers, also called growth of assigned numbers, to determine an expected exhaust date of the currently allocated numbers to concessionaires. The average rate of assignment is derived by using the historical rate of assignment of numbers over a minimum of six months and the forecasted rate of assignment of numbers over the immediate three (3) year period. This average rate of assignment of numbers, so derived, is used to project an exhaust date for the quantity of numbers currently allocated to concessionaires as well as the NPA for Trinidad and Tobago.

In addition to the assignment rate of numbers (historical and forecasted), the Authority will take into consideration such factors as

1. The current occupancy of the individual CO Codes used for any public telecommunications service
2. Demographic changes
3. PESTEL analysis
4. Competitive changes

Since competition is relatively recent in Trinidad and Tobago, a profile of the assignment rate for numbers for each concessionaire needs to be established to assist the Authority in planning for an adequate supply of numbers to each concessionaire.

It was decided that the year 2004 will be used as the starting point as it was the year of the establishment of the Authority. There are no historical rates of assignment prior to the year 2004 or profiles of the concessionaires' number assignments. Upon implementation of the methodology, historical data on number assignments from 2004 for both fixed lines and mobile will be requested from the concessionaires on a quarterly basis up to the current year when the number assignments will be requested on a monthly basis. See forms in Appendix 2, 4. The forecasted number assignment will be required for the next three years on a quarterly basis as this will provide the Authority with data to determine the quantity of numbers to have available for concessionaires as well as to project an exhaust date for the currently allocated numbers in the Trinidad and Tobago Numbering Plan.

5.1 CO code occupancy

The current occupancy of the individual CO codes will guide the Authority as to what quantity of numbers in the CO code has been used. Occupancy thresholds for both fixed line and mobile services have been established so that new CO codes can be assigned to the concessionaires in a timely manner so as not to put the concessionaires at a disadvantage by not having enough numbering resources to provide service to their customers.

5.2 Concessionaire projected usage

Concessionaire usage forecasts will be used to guide the Authority in determining the quantity of numbers that the concessionaire expects to be in service per CO code over the next three years. While it is expected that there will be growth in the networks, it is normal that customer churn will be experienced as competition increases. Entrance of new concessionaires will also affect the forecasts of the existing concessionaires and should be taken into account by the Authority in determining the forecasted quantity of numbers required.

5.3 Historical assignment rate

The historical assignment rate per CO code will provide a guide as to the rate at which assignments are being made by the concessionaires. This will guide the Authority in determining the reasonableness of the forecast provided by concessionaires and the need to assign new CO codes to the rate centre (refers to fixed line only) which may be in jeopardy of exhaust.

It is recognized that there is a different assignment rate for fixed line services as opposed to mobile services and these services are treated separately.

5.4 Demographic changes

This takes into account any demographic changes which will likely affect the demand for numbers.

5.5 PESTEL analysis

The state of the country as regards its political, economic, social, technical, environmental and legislative climate needs to be factored into the considerations to determine the reasonableness of the forecasts provided by the concessionaires.

5.6 Competitive changes

The Authority will also take into account the effects of any competitive changes which can impact the forecasts provided by the concessionaires to maintain reasonableness in the data used to calculate the CO code exhaust for the different service categories.

6 Application of Growth Rate[5]

6.1 The NANPA model

The NANPA model[6] provides three options to determine Central Office growth based on the data provided by the concessionaires. Their model does not distinguish between fixed line and mobile services. Due to the infancy of competition in Trinidad & Tobago, the Authority has decided to treat the fixed line services as distinct from the mobile services in determining the growth rates. The options used by NANPA are as follows:

1. Fixed line:
    a. *Uniform application of the Number Utilization forecast across all exchange areas.*

       It assumes that there will be uniform growth across all exchange areas in the NPA. The growth is spread across existing exchange areas at a rate proportional to the percentage of existing codes in that exchange area. For example, the model will allocate twice as many growth codes to an

[5] *Growth rate is used interchangeably with rate of assignment*
[6] *www.nanpa.com/relief_planning/model_description.html*

exchange area with twelve codes than it would to an exchange area with six codes. The growth may be distributed among the exchange areas in anticipation of events that will occur during the planning period.

b. *Individual exchange area historical growth rate*

In this option, the forecasted growth is distributed in proportion to the previous year's observed growth in each exchange area e.g. an exchange area that grew by nine central office codes in the preceding year will be allocated three times the number of growth codes as will an exchange that had growth of only three codes in the previous year. The growth may be redistributed among the exchange areas in anticipation of known events that will occur during the planning period.

c. *Manual input*

The historical growth rate for each exchange area, knowledge of events and the concessionaires' forecast in each exchange area are used for determining the expected growth.

2. Mobile services

The NANPA will issue growth CO codes to mobile operators when the utilization of assigned CO codes is 75% or greater. NANPA's *Months to Exhaust Certification Worksheet* [7]which is required to justify the request, provides the NANPA with the historical growth of assignment data for six (6) months and the forecast growth data for twelve (12) months.

6.2 The Authority's application of growth rate

The Authority will use the manual input method for the growth of fixed line and mobile services due to the recent introduction of competition in the mobile market and the soon

[7] ATIS- 0300051 COCAG Appendix B

to be launched competition in the fixed line market. There are no established patterns in the market in either of the services at this time and the following guidelines will be used

.:

a) Fixed line

The Authority will use the manual input method to determine future growth for fixed lines. This is due to insufficient historical growth records on which to base future growth for fixed lines. In addition to the concessionaires attaining a utilization of 80%, the following factors will be used in developing the future growth rate and hence the exhaust of the assigned CO codes:

- Occupancy of currently assigned CO codes
- Pent up demand
- Concessionaire's forecast
- Competitive climate
- Economic factors
- Demographic changes

A regression analysis will be used to determine the growth rate and the 'best fit' line is used to forecast exhaust. The main assumption of this methodology is that the historical growth data is accurate and the forecast growth data is reasonable.

b) Mobile services

Mobile numbers are not tied to an exchange area. Insufficient historical growth records due to the infancy of competition in this market means that a manual method of determining the future growth and the exhaust of CO codes for Mobile concessionaires will be used. Other considerations on which the future growth and exhaust of CO codes for mobile services will be based on are as follows:

a. the occupancy of the current CO codes assigned to mobile concessionaires
b. the historical growth rate of assignment of numbers to end users
c. three year forecast of demand
d. economic factors

e. competitive climate

Regression analysis is used to obtain the 'best fit' curve to determine the exhaust for mobile CO codes. The main assumption of this methodology is that the historical data is accurate and forecast data is reasonable.

7 Determination of CO code Exhaust

While a Numbering Plan has been established for Trinidad & Tobago, there has been an absence of any telephone number management. The Authority is proposing to adopt the following process for determining the CO Code Exhaust.

1. Request the concessionaires to supply historical data for their CO code utilization on the prescribed forms along with marketing plans and schedules for the stipulated periods.
2. Use the historical information to build a profile of Number usage by concessionaire, by service category and by CO code
3. Request forecast information on the demand for numbers for the next 3 year period and construct a profile of number usage by concessionaire and service category.
4. Use the historical and forecast data to determine the growth rate in the issuance of CO codes
5. Based on the growth rate in the issuance of CO codes, determine the timeframe for the exhaust for fixed line and mobile services
5. Request historical and forecasted usage information on a semi annual basis to refine process
6. Implement measures to promote efficient utilization of numbers and so mitigate the premature exhaust of the allocated numbers as per the Numbering Plan

7.1 Collection of data to determine CO Code Utilization

A template has been created in Microsoft Excel to record the assignment of Numbers, by CO code that has been issued to the concessionaires. This will serve the following purposes:

1. To confirm which CO codes are currently issued to the concessionaires
2. To identify any errors in the records of the Authority regarding CO codes issued by the Authority
3. To provide the number fill in each CO code used by the concessionaire
4. To show the practice of concessionaires regarding number assignment

7.1.1 Assignment rate trend

The historical assignment rate or growth data requested is from 2004 to the current year. This is to enable a benchmark to be established for assignment rates for fixed line and mobile services separately. The data is required on a quarterly basis and will assist the Authority in understanding the rate of utilization for that period as well as the assignment trend by service category. The data for the twelve month period prior to the current date is requested on a monthly basis as this will give the Authority a better understanding of the demand for numbers and the trend of the assignment rate.

Information on marketing and promotional programmes should also be supplied with the data as this will assist the Authority in assessing the reason for changes in the assignment rate. This information should be restricted to the prior twelve month period.

The forecast of number assignment on an annual basis for three years after the current period will be requested. This will be used in determining the exhaust date of the CO codes assigned for fixed line and mobile as per the National Numbering Plan.

7.2 The Template

Concessionaires will be supplied with the template for their input of the quantity of assigned numbers for each of the CO codes issued to them. The template records data for fixed line concessionaires on Form COCUR 01 and mobile concessionaires on Form

COCUR 02 separately due to the different rates of utilization between the services and to enable the Authority to make judicious comparisons. See Appendix 2 and 4.

Using the different Templates

The data being requested will be on a concessionaire basis by type of service and processed as such by the Authority. The reasons for that are:

1. Data collected in this format will permit the assignment rates for each service to be determined individually. The historical and forecasted quantities of numbers for the various categories of services supplied by a concessionaire are essential for validating a request growth CO code. The forms used for this exercise are as follows and are described in 9.2.1.
   COCUR 01- historical fixed line data
   COCUR 01-01 forecast fixed line data
   COCUR 02 – historical mobile data
   COCUR 02-01 forecast mobile data

2. To determine whether the forecast data supplied by the concessionaire is reasonable. The Authority will do so on the following forms
   TATT HF – 0X - Historical fixed data
   TATT FF – 0X - Forecast fixed line data
   TATT HM – 0X –Historical Mobile data
   TATT FM – 0X – Forecast Mobile data
   Where 0X = concessionaire code

3. To determine whether the rate of assignment projected in a previous period of study was achieved or not by comparing the forecast for the immediate past period and the actual. This will guide the Authority as to whether the assignment rate should be adjusted and a new CO code exhaust date determined for the service category.

4. The collation of data on the historical and forecasted growth of numbers assigned for each CO code (obtained from items 1-3 above) for all categories of services on a concessionaire basis will provide a profile of the assignment rate of numbers for the concessionaire. The forms used for this are as follows (see Appendix 10 and 11):

   COCUR 03 F – 0X Summary of Fixed line data for concessionaire 0X

   COCUR 03 M – 0X Summary Mobile data for Concessionaire 0X

   Developing a profile of the assignment rate of numbers for the concessionaires gives the Authority a method by which to monitor their compliance to number assignment procedures and the efficiency of their processes. Forms can be devised for other services using Number resources.

5. The totals of all the numbers assigned by CO code as historical data and forecasted demand for numbers by all the concessionaires are transferred to *The Summary of Number Utilization Sheet COCUR O4* (Appendix 12). Using this summary and a regression analysis, the CO code exhaust for fixed lines and Mobile can be determined as per the Trinidad & Tobago Numbering Plan.

   In addition, the projected exhaust of CO codes in the 868 NPA can be determined from this.

7.2.1 Use of Template reporting worksheet

7.2.1.1 Historical Fixed line Worksheet- Form COCUR 01

The Form COCUR 01 is used for reporting historical Central Office code assignment data for fixed line services.

This form for historic fixed line number information will be used initially to establish a benchmark to determine the historical assignment rate of fixed lines in the individual exchange areas

The reporting officer will complete the required administrative information fields. The name of the exchange being reported on and the date of the report will be entered in the appropriate field.

Description of Form (Appendix 2)

All exchanges will be listed in Column 1 and the associated Central Office Codes assigned to the particular exchanges will be listed in column 2. The quantities of numbers assigned in each Central Office Code in each column will be the quantity of numbers assigned as at the time period being reported on. The report is **NOT** asking for the incremental figures but the total quantity assigned as of that date and is the cumulative total i.e. the assigned lines for the current period includes the assigned lines for the previous period.

7.2.1.2 Forecast Fixed line Worksheet COCUR 01-01

Form COCUR 01-01 is used for reporting forecast Central Office Code assignment data for the next three (3) years on a quarterly basis for fixed line services.

The reporting officer will complete the required administrative information fields. The name of the exchange being reported on and the date of the report will be entered in the appropriate field.

Description of Form (Appendix 3)

All exchanges will be listed in Column 1 and the associated Central Office Codes assigned to the particular exchanges will be listed in column 2. The forecasted quantities of numbers assigned in each Central Office code in each column will be the quantity of numbers assigned as at the time period being reported on. The report is **NOT** asking for the incremental figures but the total quantity assigned as of that date and is the cumulative total i.e. the assigned lines for the current period includes the assigned lines for the previous period.

7.2.1.3 Historical Mobile Worksheet COCUR 02

The Form COCUR 02 is used for reporting historical mobile Central Office code number assignment data.

This form for historical mobile number information will be used initially to establish a benchmark to determine the assignment rate for numbers used for mobile services.

The reporting officer will complete the required administrative information fields. The CO code and the date of the report will be entered in the appropriate field.

Description of Form (Appendix 4)

The Central Office codes issued to the concessionaire for the provision of mobile services will be listed in Column 1. The quantities of numbers assigned in each Central Office code in each column will be the quantity of numbers assigned as at the time period being reported on. The report is **NOT** asking for the incremental figures but the total quantity assigned as of that date and is the cumulative total i.e. the assigned lines for the current period includes the assigned lines for the previous period.

7.2.1.4 Forecast Mobile Worksheet COCUR 02-01

The Form COCUR 02-01 is used for reporting forecast mobile Central Office code number assignment data.

The reporting officer will complete the required administrative information fields. The CO code and the date of the report will be entered in the appropriate field.

Description of Form (Appendix 5)

The quantities of numbers expected to be in service at the particular quarters for the forecasted years will be entered in row 20. The quantities of numbers forecasted to be assigned in each quarter for the three years under consideration will be the quantity of numbers assigned as at the time period being reported on. The report is **NOT** asking for the incremental figures but the total quantity assigned as of that date and is the cumulative total i.e. the assigned lines for the current period includes the assigned lines for the previous period.

7.2.2 Form COCUR 05

The form COCUR 05 (see appendix 1) must be completed for each CO code being reported on, whether they are being used for fixed line or mobile services. The form COCUR 05-F must be used for fixed lines and COCUR 05-M must be used for mobile services. The quantities of numbers used must be reported on a semi annual basis by Service category (defined in Section 4.0) and in the following number states (at a minimum) as follows:

- Assigned
- Reserved
- Aging
- Administration

The Authority will calculate the quantity of available numbers by the formula

Available numbers = 10,000 – (assigned + reserved + aging + Administration)

And the occupancy of each CO code is calculated by the formula

$$\textbf{Occupancy (\%)} = \left(1 - \frac{\text{available numbers}}{10000}\right) \times 100$$

$$= \frac{\text{Total quantity numbers assigned}}{\text{Total quantity of numbers issued}} \times 100$$

These formulae will guide the Authority in determining whether a CO code is in jeopardy of exhaust.

The Form COCUR 05 will provide the Authority with details on the quantity of numbers assigned in the various categories so that all numbers in a CO code will be accounted for. This will reveal areas where numbers are underutilized or wasted.

7.3 Collation of Data supplied by Concessionaires

1. The data supplied by the concessionaires on numbers assigned for fixed line and mobile CO codes will be imported into the Authority's concessionaire summary sheets as follows:
    - Form TATT COCUR HF-0X* for historical fixed line data by concessionaire- Appendix 6
    - Form TATT COCUR FF-0X* for forecast fixed line data by concessionaire- Appendix 7
    - Form TATT COCUR HM-0X* for historical mobile data by concessionaire – Appendix 8
    - Form TATT COCUR FM-0X* for forecast mobile data by concessionaire- Appendix 9

HF = Historical Fixed lines	*0X = ID code assigned to Concessionaire
FF= Forecast Fixed lines	01= TSTT
HM= Historical Mobile Lines	02= Digicel
FM= Forecast Mobile lines	03= Laqtel

The data on these forms will be the source information for the Authority to determine usage and exhaust of CO codes.

2. The Data supplied by the concessionaires on the Form COCUR 05 (Appendix 1), the CO code number assignment by category, will be imported to the TATT summary sheets as follows
    - Form TATT COCUR 05 F – 0X for fixed line providers - F = Fixed
    - Form TATT COCUR 05 M – 0X for mobile concessionaires – M = Mobile

The data on these forms will provide the Authority with information on exactly how the numbers have been assigned.

7.4 Validation of data

Validation of the information supplied by concessionaires will be done from time to time and as required using Form COCUR 05 in Appendix 1. The Authority will conduct the validation exercise in the following manner:

a) Request that the concessionaires provide data on COCUR 05-Fixed and COCUR 05-Mobile with respect to the CO codes that have been issued to them in the following format:

1. Quantity of numbers in each number state as obtained from the billing/administration systems for each CO code
2. Definitions of each number state used
3. The date the report was generated

These reports will be required to show the information on a monthly[8] basis as this granularity will assist the Authority in doing its analysis and must be available in ten (10) working days from the date of request from the Authority.

b) Inspection of the records at the concessionaires' premises in accordance with the Telecommunications Act of 2001.

7.5 Analysis

7.5.1 CO code Exhaust determination

Form COCUR 03 is used to collate all the CO codes historical and forecast data supplied by the concessionaire on a single sheet as follows:

[8] *The reports should show the states of numbers as at the end of the month being reported on.*

- TATT COCUR 03 F -0X Fixed line - F= Fixed 0X = ID code for concessionaire – Appendix 10
- TATT COCUR 03 M-0X - M= Mobile 0X = ID for concessionaire- Appendix 11

The Authority will be able to review the information displayed on these forms for trends and anomalies in the numbers assigned per CO code.
The information also provides the Authority with the exhaust potential of CO codes for fixed lines and mobile numbers independently as assignment rate and the reasonableness of the forecast usage for each sector can be judged. Actions to mitigate the lack of numbers due to exhaust of CO codes can be initiated in a timely manner.

7.5.2 NPA Exhaust Determination

The total of number usage in all CO codes issued to the concessionaires and the forecast for a three year period will be transferred to TATT COCUR 04 – Summary of Number Utilization (Appendix 12) irrespective of the types of concessionaires. This summary of usage of all the issued CO Codes in the 868 NPA will guide the Authority as to the rate of consumption in the CO code in the NPA and so determine exhaust of the NPA.

7.6 Trending analysis

The trending analysis tool in Microsoft Excel will be used to determine the future exhaust of the following number allocations as per the Numbering Plan:

- Fixed line
- Mobile
- The NPA

assuming the rate of assignment is the same as that determined from the current analysis. Various “what if” scenarios can be modeled using this tool.

See appendix 13 for an example using Mobile number assignment.

8 Number Conservation

Effective management of the numbering resources necessitates that some number conservation methods be implemented as early as possible to ensure that there is an orderly and managed usage of numbers which are a finite resource. Number conservation methods are used for the following purposes:

- to avoid premature exhaust of the number supply
- to maintain availability of numbers to all concessionaires to sustain competitiveness
- to minimize incentives for concessionaires to store excessively large inventories for numbers
- to permit the allocation of numbers to more closely match the requested quantity of numbers

8.1 Number Conservation methods employed

The Authority proposes to adopt the following number conservation methods:

1. Mandate that concessionaires produce accurate and timely number utilization and forecasts on a semi annual basis
2. Define the categories of numbers for which reporting must be done
3. Define the utilization threshold to increase concessionaire accountability
4. Incentives to use numbers efficiently
5. Reclaim numbers/CO codes not in use
6. Reduce aging period of disconnected telephone numbers
7. Reduce the issuance of numbers from 10,000 blocks to 1000 blocks which will necessitate number pooling to be introduced
8. Mandate that numbers be assigned from the current “open” thousands blocks to reduce contamination of unused thousands blocks
9. Introduce number portability so that customers of both mobile and fixed services can

change their concessionaire without having to change their telephone numbers

8.2 Reports

Effective monitoring of the CO code utilization and forecasts of the concessionaires will enable the Authority to maintain sufficient quantities of numbers for concessionaires to provide service to their customers.

The reports presented in this document for acquiring data from concessionaires:

- COCUR 01- Historical Fixed line data
- COCUR 01-01 Forecast Fixed line data
- COCUR 02 Historical Mobile data
- COCUR 02 -01 Forecast Mobile data

are required for determining a baseline for CO code usage in the years 2004 to the present. After the baseline has been established, the COCUR reports will require data for both fixed line and mobile to be submitted as follows:

- Historical information on numbers assigned on a monthly basis for the past six months
- Forecast information for the next three (3) years shown in the following detail
    - Monthly assignments for the first year
    - Quarterly assignments for the second year
    - Annual assignment for the third year

The COCUR is required semi-annually and will be due on March 31 for period June1 to December 31 for the previous year and September 30 for the current year

8.3 Definition of numbers

The numbers to be reported on have been defined in section 4.0 above.

8.4 Number Utilization Threshold

If the numbering resources are to be effectively managed, there must be a number utilization threshold that will initiate the issuance of a growth CO code. In Trinidad & Tobago, it is estimated that the growth of fixed line is slowing as the demand for fixed telephone service is being satisfied by mobile telephone service. The growth of mobile telephone services has been exponential and the rate of assignment exceeds that of fixed line. With this in mind, it is recommended that the following thresholds be used for the triggering of growth CO codes:

- fixed line – 80 %
- mobile – 75 %

NANPA CO code utilization requirement before a new CO code could be assigned is currently 75% [9] for both fixed line and mobile services**.**

The increase of thresholds which trigger the issuance of new CO codes for fixed line and mobile services is another method of conserving numbers**.**

8.5 Incentives for Efficient Use of Numbers

The Authority has taken measures early in its tenure as Administrator of the numbering resource to create an orderly and efficient use of this finite resource. The following incentives are currently used to encourage efficiency.

1. Charging a number fee for numbers issued to the concessionaires whether they have been assigned or not will provide inducement for them to use them efficiently. It should be noted that many European countries also charge for numbers as an incentive for improved efficiency in number utilization.[10]
2. Withholding of additional numbers should there be non compliance by concessionaires in respect of efficient utilization of numbers

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[9] *Federal Communications Commission telephone number utilization requirement before a new CO code is issued is 75%.*

[10] *http://www.ofcom.org.uk/static/archive/oftel/publications/1995_98/numbering/dna798.htm*

Adherence to number utilization criteria such as:

- use of numbers in sequential order in the "open" thousands block
- assignment of numbers up to a 90% occupancy level of the currently open thousands block before a new thousands block is opened up.
- adequate justification for growth CO Codes requests

will redound to the benefit of the concessionaire in the expediting of requests for CO codes.

.

8.6 Reclamation of Codes not in use

The Authority will move speedily to recover unused codes so that they may be reissued in an agreed to timeframe.

8.7 Reduction of Aging period

The concessionaires are encouraged to recycle disconnected numbers back into service at the earliest opportunity. This will improve the utilization of numbers and delay the need for new numbers.

8.8 Reduction in Block Size

Should this measure become necessary, the telephone numbers will be issued in block sizes of one thousand rather than ten thousand as is the normal practice. The numbers will be held by a pooling administrator who would then issue numbers in a range of one thousand blocks within the same rate area to the concessionaires. The routing of calls would be done on the fourth digit of the telephone e.g. NXX-X as the NXX is now being used on multiple switching entities.

This method seeks to promote a higher efficiency of usage of numbers within the same rate area (refers to fixed line) among the various concessionaires.

8.9 Assignment from "Open" Thousand Blocks

The practice of assigning numbers from "open" thousand blocks only , except for special applications such as golden numbers, should be mandated as it will prevent the contamination of thousand blocks which are not immediately required for providing services to end users. This practice, while not needed to be implemented when the NPA is not in jeopardy , ensures that the numbers are efficiently used.

8.10 Number Portability

The Authority plans to consult stakeholders on Number Portability shortly. Number portability is a method of number conservation which has the added benefit of allowing end users to keep their telephone number when they change concessionaire or location. This method of conservation can be used in conjunction with number pooling to extend the life of the NPA. This option has some significant costs associated with it.

Appendix 1- CO Code Utilization Worksheet

CO Code Utilization Worksheet- COCUR 05- F (Fixed line)

The purpose of this Worksheet is to determine the utilization and occupancy of the CO code based on the historical data provided below.

Name of Concessionaire……

Registered Address of Concessionaire….....

Type of service provided …….

Name of Authorised contact……

Position of Authorised contact……

Tel……. Cell…… Fax……. e mail……...

Switch ID (fixed line only)…… CO Codes issued……..

Year:

CO Code NXX	Service Categories	Assigned Numbers (A)	Administrative Numbers (B)	Reserved Numbers (C)	Non Recycle Numbers (D)	Total Quantity of Numbers Assigned (E)

Total Quantity of numbers assigned (E) = A+B+C+D

Occupancy[11] (%) = Sum of Total Quantity of numbers assigned (∑ E) x 100

Total Quantity of numbers issued

[11] *The threshold of NXX occupancy before a new CO code is issued is 80% for wire line services and 75 % for mobile services. This may be varied in light of the historical /current rate of assignment.*

CO Code Utilization Worksheet- COCUR 05- M (Mobile)

The purpose of this Worksheet is to determine the utilization and occupancy of the CO code based on the historical data provided below...

Name of Concessionaire……

Registered Address of Concessionaire….....

Type of service provided …….

Name of Authorised contact……

Position of Authorised contact……

Tel……. Cell…… Fax……. e mail……...

Year: CO Codes issued …….

CO Code NXX	Assigned Numbers (A)	Admin Numbers (B)	Non Recycle Numbers (C)	Roam/ test (D)	Defined by Concessionaire* (E)…….	Total Assigned Numbers (G)

* Any other defined categories that the billing system puts numbers into.

Total Quantity of numbers assigned (G) = A+B+C+D+E

Occupancy[12] (%) = Sum of Total Quantity of numbers assigned (∑ G) x 100

Total Quantity of numbers issued

[12] *The threshold of NXX occupancy before a new CO code is issued is 80% for wire line services and 75 % for mobile services. This may be varied in light of the historical /current rate of assignment.*

Appendix 2 - Concessionaire Form COCUR 01

Concessionaire Form COCUR 01- Fixed line Historical data

FORM COCUR 01

Historical Fixed line data

Central Office Code Utilisation Report

Name of Concessionaire

Registered address of Authorized Provider

Name of Reporting Officer

Address of Reporting Officer

Tel. no fax no. e mail

Exchange Location Date

CO Code - Fixed line

NXX		2004	2004	2004	2004	2005	2005	2005	2005	2006											
Exchange	CO Code	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	January	February	March	April	May	June	July	August	September	October	November	December
	621																				
Nelson	623																				
	624																				
	625																				
	626																				
	627																				
	821																				
West	615																				
	622																				

Appendix 3- Concessionaire Form COCUR 01-01

Concessionaire Form COCUR 01-01 – Fixed line Forecast data

Trinidad & Tobago Telecommunications Authority FORM COCUR 01-01

Central Office Code Utilisation Report Forecast Fixed line Report

Name of Concessionaire
Registered address of Authorized Provider
Name of Reporting Officer
Address of Reporting Officer

	Fax	
Tel. no	no.	e mail

Exchange Location Date

CO Code - Fixed line

Exchange	CO Code	2007 Qtr 1	Qtr 2	Qtr 3	Qtr 4	2008 Qtr 1	Qtr 2	Qtr 3	Qtr 4	2009 Qtr 1	Qtr 2	Qtr 3	Qtr 4
Nelson													
West													
St													
Augustine													
Arima													
Piarco													

Appendix 4- Concessionaire Form COCUR 02

Concessionaire Form COCUR 02- Mobile Historical data

Trinidad & Tobago Telecommunications Authority

FORM COCUR 02
Historical Mobile Report

Central Office Code Utilisation Report

Name of Service Provider
Registered address of Authorised Provider
Name of Reporting Officer
Address of Reporting Officer

Tel. no fax no. e mail

Date

CO Code - Mobile

NXX	2004 Qtr 1	2004 Qtr 2	2004 Qtr 3	2004 Qtr 4	2005 Qtr 1	2005 Qtr 2	2005 Qtr 3	2005 Qtr 4	2006 January	February	March	April	May	June	July	August	September	October	November	December

Appendix 5- Concessionaire Form COCUR 02-01

Concessionaire Form COCUR 02-01 Mobile Forecast data

Trinidad & Tobago Telecommunications Authority

FORM COCUR 02-01

Forecast Mobile Report

Central Office Code Utilisation Report

Name of Concessionaire

Registered address of Authorized Provider

Name of Reporting Officer

Address of Reporting Officer

Tel. no fax no. e mail

Date

CO Code -

Mobile

NXX	2007				2008				2009			
	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4

Appendix 6- TATT Form COCUR HF -0X

TATT Form COCUR HF -0X Historical Fixed line data for Concessionaire

Trinidad & Tobago Telecommunications Authority TATT FORM COCUR HF -0X

Central Office Code Utilisation Report Concessionaire Historical Fixed line Report

Name of Concessionaire
Registered address of Authorized Provider
Name of Reporting Officer
Address of Reporting Officer

Tel. no Fax no. e mail

Exchange Location Date

CO Code - Fixed line

Exchange	CO Code	2004 Qtr 1	2004 Qtr 2	2004 Qtr 3	2004 Qtr 4	2005 Qtr 1	2005 Qtr 2	2005 Qtr 3	2005 Qtr 4	2006 January	February	March	April	May	June	July	August	September	October	November	December
Nelson	621																				

	623
	624
	625
	626
	627
	821
West	615
	622

Appendix 7- TATT Form COCUR FF -0X

TATT Form COCUR FF -0X Forecast Fixed line data for Concessionaire

Trinidad & Tobago Telecommunications Authority

TATT COCUR FF-0X

Central Office Code Utilisation Report

Concessionaire Fixed line Forecast Report

Name of Concessionaire

Registered address of Authorized Provider

Name of Reporting Officer

Address of Reporting Officer

Tel. no fax no. e mail

Date

CO Code -Fixed line

		2007				2008				2009			
Exchange	CO Code	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4
	621												

Nelson	623
	624
	625
	626
	627
	821
West	615
	622
	628

Appendix 8- TATT Form COCUR HM -0X

TATT Form COCUR HM -0X Historical Mobile data for Concessionaire

Trinidad & Tobago Telecommunications Authority

TATT COCUR HM-0X

Central Office Code Utilisation Report

Service Provider Historical Mobile Report

Name of Service Provider
Registered address of Authorised Provider
Name of Reporting Officer
Address of Reporting Officer

Tel. no fax no. e mail

Date

CO Code - Mobile

NXX-X	2004 Qtr 1	2004 Qtr 2	2004 Qtr 3	2004 Qtr 4	2005 Qtr 1	2005 Qtr 2	2005 Qtr 3	2005 Qtr 4	2006 January	February	March	April	May	June	July	August	September	October	November	December

Appendix 9- TATT Form COCUR FM -0X

TATT Form COCUR FM -0X Forecast Mobile data for Concessionaire

Trinidad & Tobago Telecommunications Authority

TATT COCUR FM-OX

Central Office Code Utilisation Report

Concessionaire Forecast Mobile Report

Name of Concessionaire

Registered address of Authorized Provider

Name of Reporting Officer

Address of Reporting Officer

Tel. no fax no. e mail

Date

CO Code - Mobile

NXX	2007				2008				2009			
	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4

Appendix 10- TATT Form COCUR 03 F -0X

TATT Form COCUR 03 F -0X Summary Fixed line data for Concessionaire

Trinidad & Tobago Telecommunications Authority

TATT COCUR 03 F-0X
Concessionaire Fixed line data

Central Office Code Utilisation Report

Name of Concessionaire
Registered address of Authorized Provider
Name of Reporting Officer
Address of Reporting Officer

Tel. no fax no. e mail

Exchange Location Date

CO Code - Fixed line

NXX		2004	2004	2004	2004	2005	2005	2005	2005	2006								
Exchange	CO Code	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	January	February	March	April	May	June	July	August	September

	621
Nelson	623
	624
	625
	626
	627
	821
West	615
	622
	628

Appendix 11- TATT Form COCUR 03 M -0X

TATT Form COCUR 03 M -0X Summary Mobile data for Concessionaire

Trinidad & Tobago Telecommunications Authority

TATT COCUR 03 M-0X

Concessionaire Mobile data

Central Office Code Utilisation Report

Name of Concessionaire

Registered address of Authorized Provider

Name of Reporting Officer

Address of Reporting Officer

Tel. no fax no. e mail

Date

CO Code -

NXX	2004 Qtr 1	2004 Qtr 2	2004 Qtr 3	2004 Qtr 4	2005 Qtr 1	2005 Qtr 2	2005 Qtr 3	2005 Qtr 4	2006 January	February	March	April	May	June	July	August	September

Appendix 12- TATT Form COCUR 04

TATT Form COCUR 04 – Summary of Number Utilization

Trinidad & Tobago Telecommunications Authority

TATT COCUR 04

Summary of Number Utilization

Central Office Code Utilisation Report

Name of Concessionaire ALL PROVIDERS

NXX	2004 Qtr 1	2004 Qtr 2	2004 Qtr 3	2004 Qtr 4	2005 Qtr 1	2005 Qtr 2	2005 Qtr 3	2005 Qtr 4	2006 January	February	March	April	May	June	July	August	September	October

2007 January	February	March	April	May	June	July	August	September	October	November	December

Appendix 13- Example of Mobile CO Code Exhaust

Example of Mobile CO Code exhaust

NXX	2006											
	January	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**
Total Mobile Digicel				27000	38000	32000	40000	50000	60000	70000	80000	90000
Total mobile TSTT	260000	300000	400000	500000	600000	700000	800000	900000	1000000	1100000	1200000	1300000
Total mobile Laqtel	0	0	0	0	0	0	0	0	0	0	0	0
Total Assigned Mobile	260000	300000	400000	527000	638000	732000	840000	950000	1060000	1170000	1280000	1390000

2007				2008				2009			
Qtr 1	Qtr 2	Qtr3	Qtr4	Qtr 1	Qtr 2	Qtr3	Qtr4	Qtr 1	Qtr 2	Qtr3	Qtr4
150000	230000	280000	350000	425000	505000	595000	695000	805000	925000	1050000	1200000
1310000	1320000	1330000	1340000	1350000	1360000	1370000	1380000	1390000	1400000	1410000	1420000
0	0	0	0	0	0	0	0	0	0	0	0
1460000	1550000	1610000	1690000	1775000	1865000	1965000	2075000	2195000	2325000	2460000	2620000

The figures used here are for illustration purposes only. The top table above shows the growth in number assignment from the year 2006 when competition began in Trinidad & Tobago. The Year 2006 was done on a monthly basis to show the pattern of assignments for the current year. This will enable the Number planner to determine whether forecasts for this year were met or not. The second table shows the forecast of number assignments from 2007 to 2009. These figures are plotted on the graphs below and the trendline shows the rate of assignment of mobile numbers in the nation (fig. 1) as well as the assignment rate of CO codes for mobile services for all mobile concessionaires in the nation. It can be calculated from the equation obtained that the CO code allocation for public mobile telephone service in Trinidad & Tobago of 300 will exhaust by third quarter of 2010 according to this example should the assignment rate remain constant. Fixed line CO codes exhaust is determined in a similar manner. NPA exhaust is done by combining the fixed and mobile number usage and using the same procedure.

Appendix 14- Graphical Presentation

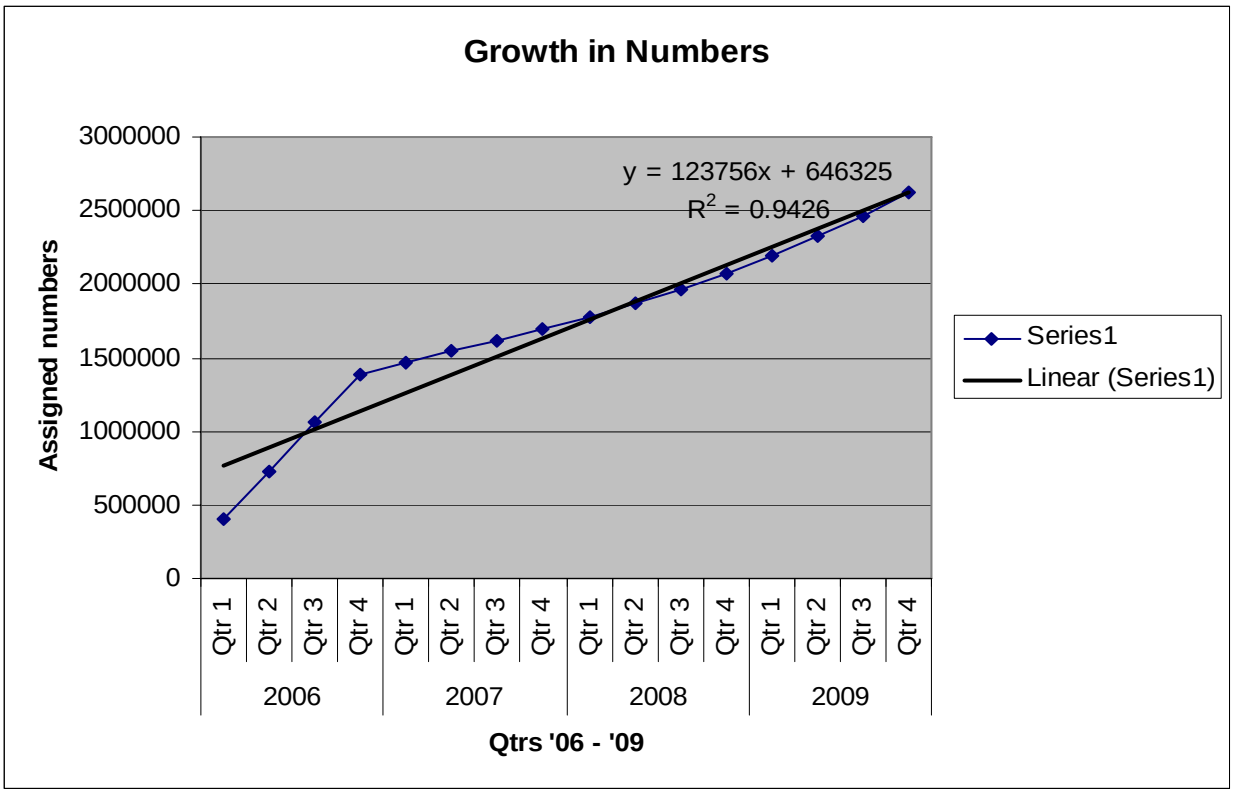
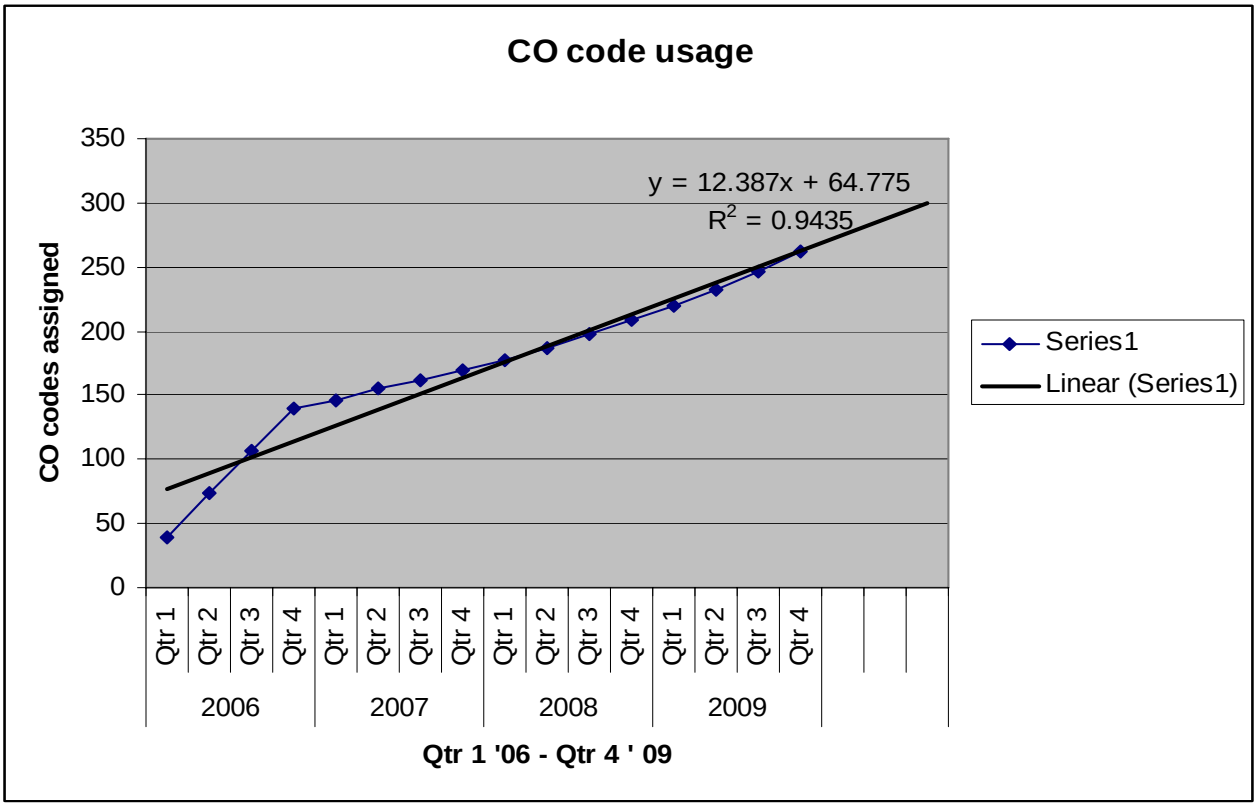


Fig.1

The graph also shows the growth in CO code usage as per the example..

Total number of CO codes issued to mobile concessionaires = 300 which equates to 3000000 numbers.


CO code usage
y = 12.387x + 64.775
R2 = 0.9435
CO codes assigned
350
300
250
200
150
100
50
0
Qtr 1
Qtr 2
Qtr 3
Qtr 4
2006
2007
2008
2009
Qtr 1 '06 - Qtr 4 ' 09
Series1
Linear (Series1)