

HKTA 2108
Issue 2.2

Functional Specification
For NP Administration Database
(Non-CRD Approach)



May 2010
Telecommunications Authority

Revision History

| Issue No. | Date of Issue | Remarks |
|-----------|---------------|--|
| 1 | July 2003 | Issued by the Telecommunications Authority (TA) for operator's implementation of Operator Number Portability (ONP). |
| 2 | October 2004 | The administration databases of new operators are included. The new Attachment 6-2 for reporting number porting statistics is included. |
| 2.1 | June 2006 | The new Annex 6 is included. |
| 2.2 | May 2010 | The Annex 6 is updated. |

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0. Introduction

Apart from the real-time routing database in supporting Operator Number Portability, a decentralized Administration Database is found essential to maintain the data integrity of individual's number porting record by means of periodic updating and auditing. In addition, the decentralized Administration Database can be served as a backup image to speed up the disaster recovery of individual operators' database if required.

This functional specification sets out the requirement for implementing the decentralized Administration Database in FTNS for the support on Operator Number Portability. The information exchange among operators, such as NPR, APN, etc., is standardized so that information/orders can be sent via the communication network.

1. Communication Interface and Protocol Standard

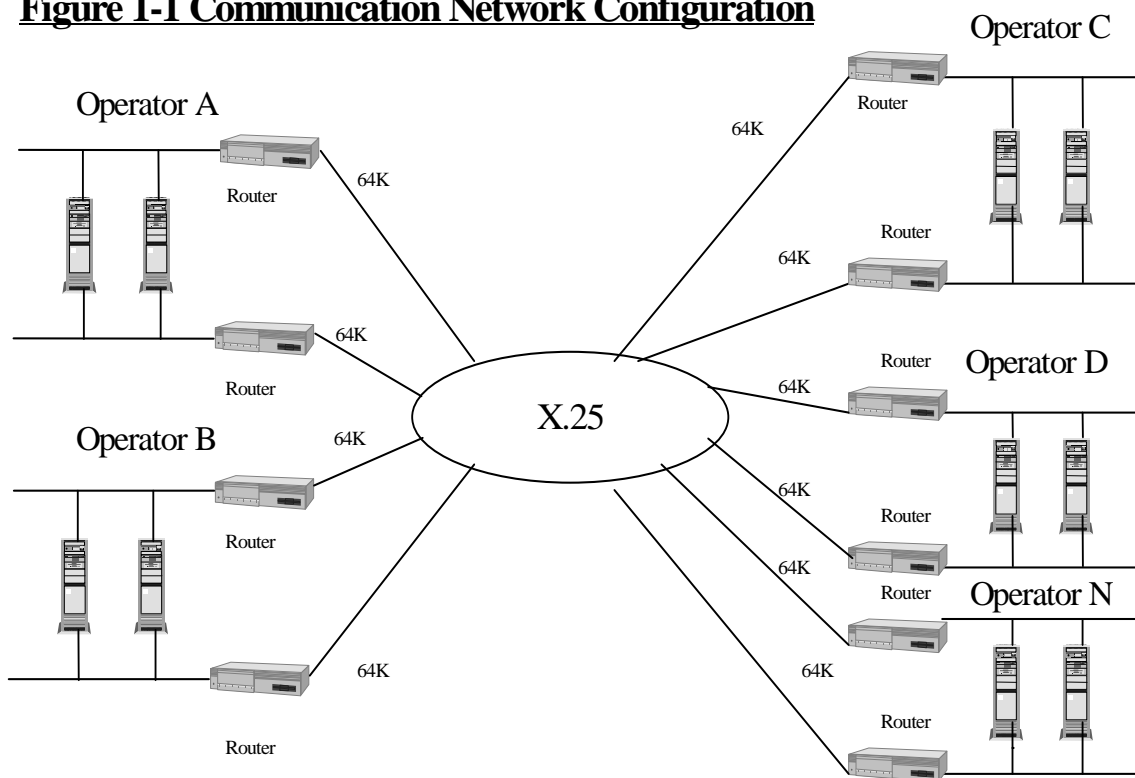
1.1 Objective

To establish a common communication interface and protocol standard on a reliable, high performance and resilient network between FTNS operators for the support of the activities in NP Administration Database.

1.2 Network Topology

The backbone network chosen is a X.25 network. The details of the network topology are as shown in the Figure 1-1.

Figure 1-1 Communication Network Configuration



- 1.2.1 Two X.25 64K lines are connected to two routers for connecting the individual Administration Database server.
- 1.2.2 The two routers should allow FTP in/out from involved servers
- 1.2.3 The Administration Database servers should also be FTP servers and allow FTP in/from pre-defined clients.

- 1.2.4 The benefits of the configuration are summarized below:
- a) high availability and reliability
 - b) easy to administrate
 - c) easy to expand
 - d) secured network

1.3 Communication Network Establishment

- 1.3.1 When there is a request for number porting service, the communication network between network operators is established and is used to support information exchange between FTNS operators for Number Portability orders.
- 1.3.2 The sending network operators start the information exchange commands and have their router made a X.25 call to the receiving network operator.
- 1.3.3 When the primary X.25 line of the receiving network operator becomes unavailable, the sending network operator should try to connect to the secondary X.25 line of the receiving network operator.

1.4 Information Exchange

- 1.4.1 The sending network operator uses FTP to send the information exchange files over the communication network.
- 1.4.2 Secured user ID and password for FTP accessing the administration database server should be used for further validation.
- 1.4.3 The sending network operator should be allowed to read and write only in the specific directory on the administration database server of the receiving network operator.

1.5 Communication Network Termination

The communication network would be terminated when:

- a) The sending network operator terminates the X.25 call after the information exchange, and/or
- b) Expiration of inactivity timers (e.g. 30 second) implemented in both routers of the sending and receiving network operators.

1.6 Network Operator Responsibilities

- 1.6.1 Network operators or their MAs should setup and administrate their own administration database servers, LANs, routers and X.25 lines, including maintenance, operations and security.
- 1.6.2 The router should be compatible with the routers of other network operators.
- 1.6.3 IP addresses and mask of their own administration database servers and routers, X.25 directory numbers, user ID and password of the administration database server should be given to all other network operators or their MAs and kept confidentially.
- 1.6.4 IP addresses and mask chosen should be compromised between network operators.
- 1.6.5 Each network operator should proceed their own fault handling within their own operations. In case of joint investigation is required, the network operators or their MAs should coordinate themselves.

1.7 Network Security

[3<]

2. Database Fields and Database Record Format

2.1 Objectives of establishing a decentralized Administration Database

- To maintain data integrity between the administrative/operational database of individual FTNS operator for implementing number portability through periodic updating and auditing.
- To act as backup reference for disaster recovery in case of breakdown of the administrative/operational database of any operator.

2.2 Database Content & Database Format

Regarding to the objective of the Administration Database, it mainly performs the *Backup and Auditing* role for all ported-out and ported-in numbers, therefore the database is required to store ***all FTNS operators' working ported-out and ported-in numbers and its corresponding information only***, the number owned by individual operator will be stored under individual FTNS operator's database.

Regarding to the content of the database, if the Changeover Date greater than zero and Termination Date is equal zero (Note 1), the current service number status should be **working** under the RNO network. On the other hand, if the Termination Date is greater than zero, the record is a **history** record and it should be retained at least **6 months** for reference purpose.

The format of the directory number for DDI is ABCD YYYYX, where X indicates the DDI range and Y indicates the prefix or DDI range. Hence, DDI number with range 10,100,1000,10000 could easily be stored in the database, an example is shown in Note 2.

The record will be created or updated after the changeover is successfully implemented. Following are possible scenarios :

- **Normal Ported-out/Ported-in** - A new record will be created and all corresponding information will be *based on the SCAPN*.
- **Successive Port** - Terminate the original ported-out record by updating the termination date and then create a new record for the new successive port.
- **Gateway Number Change** - Update the existing record with the new gateway number.
- **Relinquish Line** - Terminate the ported-out record by updating the termination date.
- **Port back to Original DNO** - Terminate the working record by updating the termination date.

Common Database Content:

- Directory Number [3<]
- Gateway Number [3<]
- RNO (Recipient Network Operator) [3<]
- DNO (Donor Network Operator) [3<]
- Original DNO [3<]
- Original Type of Service [3<]
- Existing Type of Service [3<]
- Changeover Date [3<]
- Termination Date [3<]
- RNO/DNO Reference Serial No. [3<]

3. Order Processing Function & Information Message Flow

3.1 Introduction

When there is a request for number porting service, the communications network between network operators is used for information exchange between FTNS operators for the Number Portability (NP) order. The information received by the network operator can be used to update the administration database automatically.

3.2 Information Exchange Document (IED)

The information exchange between network operators include the following documents.

- i) NPR (Number Portability Request)
- ii) NTNPR (Negotiation of NPR)
- iii) AKNPR (Acknowledgment to NPR)
- iv) CLNPR (Cancellation of NPR)
- v) ACNPR (Acknowledgment to CLNPR)
- vi) APN (Advice of Porting Number)
- vii) AKAPN (Acknowledgment to APN)
- viii) CLAPN (Cancellation of APN)
- ix) ACAPN (Acknowledgment to CLAPN)
- x) SCAPN (Successful Completion of APN)
- xi) ARP (Advice of Relinquished Porting Number)

Negotiation Phase

| IED | Description | Sender | Receiver |
|-------|----------------------------|-------------------------------------|-------------------------------------|
| NPR | Number Portability Request | Refer to Annex C of HKTA 2102 | Refer to Annex C of HKTA 2102 |
| CLNPR | Cancellation of NPR | | |
| AKNPR | Acknowledgment to NPR | | |
| ACNPR | Acknowledgment to CLNPR | | |
| NTNPR | Negotiation of NPR | | |

Provisioning and Completion Phase

| IED | Description | Sender | Receiver |
|-------|------------------------------|-------------------------------------|-------------------------------------|
| APN | Advice of Porting Number | Refer to Annex C of HKTA 2102 | Refer to Annex C of HKTA 2102 |
| SCAPN | Successful Completion of APN | | |
| CLAPN | Cancellation of APN | | |
| AKAPN | Acknowledgment to APN | | |
| ACAPN | Acknowledgment to CLAPN | | |

Termination Phase

| IED | Description | Sender | Receiver |
|-----|-----------------------------------|-------------------------------------|-------------------------------------|
| ARP | Advice of Relinquished Ported No. | Refer to Annex C of HKTA 2102 | Refer to Annex C of HKTA 2102 |

3.3 Information Exchange Files

3.3.1 File Name

Information exchange among the Network Operators or their MAs is achieved by means of Information Exchange Files sent through the communication network. Inside each Information Exchange File there is a series of Information Exchange Document (IED). The IED received are used to update the AD.

INFs are sent and received for the purposes of exchange of information during the negotiation phase, the provisioning phase, and the termination phase.

NP documents are contained in files which are sent to relevant network operators. In order to recognize the received files, the following naming convention for information exchange files is adopted.

[3<]

3.3.2 File Format

An information exchange file contains multiple NP documents (see Section 3.2). The file format is as follows.

[3<]

3.3.3 Document Contents

NPR Document

Each NPR document consists of the following fields. All fields are mandatory except the field "Comments" (i.e. it is to be included when required)

| Document Field | Content |
|----------------------------------|---------|
| Type of document | [3<] |
| Directory number (DN) | [3<] |
| Gateway number (GN) | [3<] |
| Recipient network operator (RNO) | [3<] |
| Donor network operator (DNO) | [3<] |
| Original DNO | [3<] |
| Original type of service | [3<] |
| Existing type of service | [3<] |
| Changeover start date | [3<] |

| | |
|--|-------|
| Changeover start time | [3<] |
| Changeover end time | [3<] |
| RNO/DNO reference serial number | [3<] |
| Comments | [3<] |
| Customer Name | [3<] |
| Identity Number | [3<] |
| LAL/BW order number | [3<] |
| Count of associated number | [3<] |
| 1 st associated no. to be terminated | [3<] |
| 2 nd associated no. to be terminated | [3<] |
| | [3<] |
| 99 th associated no. to be terminated | [3<] |

Documents other than NPR

Documents other than NPR will have the same fields and field sequence as that of the NPR except the removal of the following fields from the NPR.

- Customer Name
- Identity Number
- LAL/BW order number
- Count of associated number
- 1st associated no. to be terminated .. 99th associated no. to be terminated

[3<]

For cases where the same set of associated nos. is applicable to more than one NPR, these associated nos. will only appear in the NPR/supplementary form for the prime no. or the first NPR if the prime no. is not to be ported. The first NPR is defined as the smallest RNO/DNO Serial No that is used among these NPR.

The format for a document is shown as follows:

[3<]

3.3.4 Header Contents

Each information exchange file contains a header with the following fields.

| Header Field | Content |
|---------------|---------|
| File type | [3<] |
| Creation date | [3<] |

| | |
|---------------------------------------|-----|
| Sender Network Operator | [] |
| Receiving Network Operator | [] |
| Total number of documents transferred | [] |

[]

3.4 Read/Write Process for Information Exchange Files

- 3.4.1 Information exchange files should be retrieved twice a day. The reading cycles would start at [] and []. To allow the Receiving Network Operator to retrieve the information in a reading cycle, the Sending Network Operator should complete the writing operation for those information 5 minutes before the start of the corresponding reading cycle. The operators should arrange to match the clock of its AD with the time of the Hong Kong Observatory.
- 3.4.2 During a write cycle, the Sending Network Operator should write the document files on to its directory for a Receiving Network Operator. The Sending Network Operator should write document files in sequence together with a control file for that Receiving Network Operator.
- 3.4.3 The Sending Network Operator should write document files in sequence together with a control file for that Receiving Network Operator. While a document file or a control file is being updated or created, reading of the file by the Receiving Network Operator should be blocked or disabled so that the Receiving Network Operator will receive no partial or incomplete file.

The control file should be a text file in ASCII codes (the same as other document files) with the format specified as follows:

- One single control file per directory for all files (document file, audit file, rectification file, disaster recovery file etc.) to be read by the Receiving Network Operator
- Name of control file []
- Maximum number of entries per control file should be 10
- The control file contains entries with the following layout except for audit files:
[]
- The control file contains audit file (AUD) entries has the following layout:
[]

3.5 Information Exchange Procedures

- a) Information exchange files should be sent twice a day [3<].
- b) The detailed procedures for ONP porting are described in Annex 1.
- c) [3<]

3.6 Change of Gateway Number Request by Recipient Network Operator

It has been identified that there may be a need for the Recipient Network Operator (RNO) to request the change of gateway number (GN) for one or more customers. For instance, a ported subscriber moves location (i.e. geographical portability). This change of gateway number request is similar to the Number Portability (NP) service request except that the Donor Network Operator (DNO) and the RNO are the same Network Operator.

3.6.1 Notification Procedure for Change of Gateway Number Request

The procedure for change of GN request is based on the number porting service request and activation process and no new document types are required.

The procedure for change of GN request is as follows:-

- a) The RNO (which is also the DNO) sends an APN to all concerned Network Operators at least [4 working days] in advance of the expected cutover date. The RNO and DNO fields contain the same Network Operator code.
- b) On receipt of the APN, all concerned Network Operators will, within [2 working days], reply to the RNO with an AKAPN.
- c) If any difficulties are encountered by the RNO, that would mean the cutover date could not be achieved, the RNO must inform all concerned Network Operators at least 1 working day before the expected cutover date, by issuing of a CLAPN. All concerned Network Operators shall acknowledge the CLAPN by issuing an ACAPN. Once the difficulties have been overcome, the RNO will issue a revised APN to all concerned Network Operators.
- d) If the cutover is successful, the RNO shall send a SCAPN to all concerned Network Operators to confirm the successful completion of the cutover for record purpose.

The detailed procedures for gateway number change are described in Annex 2.

3.6.2 Information Message Flow

3.6.2.1 Normal

[3<]

3.6.2.2 Negotiation of APN

[3<]

3.6.2.3 Cancellation of APN

[3<]

3.7 Relinquishment of Ported Number

When a ported number ceases to be used in the Recipient Network, the ported number shall be relinquished and returned to the original Donor Network three calendar months after the customer ceased to use the number(s). Within these three months, RNO could re-assign the same number(s) to the original customer upon request by this customer but is not allowed to assign the number to any other customer.

The detailed procedures for relinquishment of ported number are described in Annex 3

3.8 Port-back Request

When a number is requested to be ported from a RNO back to the ODNO, it is regarded as a port-back request and the porting procedure is the same as that of a new number porting except that the gateway number used in the APN should be all “9”s.

The detailed procedures for port-back are described in Annex 4

4. Cross-Auditing Between FTNS

4.1 Objective

Regarding to the setup of NP Administration Database, each NP Administration database will be stored & updated by individual FTNS. In order to eliminate data discrepancies, a cross reference mechanism has to be setup for auditing between the NP Administration Database of individual operator to achieve data integrity.

4.2. Cross Auditing

| |
|--------------------------|
| Database Exchange |
|--------------------------|

- 4.2.1 A cross-auditing exercise is carried out at the 7th working day of each month.
- 4.2.2 Every Network Operator or its MA(s) should sort its AD using RNO as the key and generate different Audit Files. A record would be regarded as a working record only after SCAPN was received and only working records should be put in the audit file. Network Operators or its MA should first compress the audit file using “gzip” format before making it accessible by other operators, and then combine current file and historical records of the last month into a single audit file.
- 4.2.3 The Auditing file should contain :
- The Header record for verification purpose.
 - All Ported numbers (including working and last month historical record) for the Recipient Network under the NP Administration database records up to the end of last month (23:59). A ported number is regarded as working number only when the associated “SCAPN” is sent by the RNO and received by all ONOs.
- Note: No port back entry will be placed in the monthly ONP audit file. Only the termination date of the last porting record is updated by the port back date.
- 4.2.4 The Audit Files should then be sent via the communication network to the corresponding RNOs for auditing. [3<]
- 4.2.5 After receiving the Audit File, the corresponding RNO should compare all records inside the file with the records of its own AD and return the result of checking to operator concerned. When operators need to verify the ported number, they will investigate the number based on the original exchange document.
- 4.2.6 For those unsettled cases that were outstanding for more than 6 months, they would be separately settled among relevant Network Operators by means such as telephone, fax and etc.

4.3 Cross-auditing - Discrepancies Found

- 4.3.1 If discrepancies are found, the RNO should take responsibility to investigate and rectify the mismatch records in its own AD, or if it is the other operator's error, the RNO should send the rectified records to the operator concerned by a Rectification File [3<].
- 4.3.2 The following are the possible scenarios of mismatch between records received from other operators and the records in the AD of RNO:

| Scenario | Action |
|---|--|
| Operator's record has no corresponding record in the AD of RNO. | Delete record from the AD of the operator concerned. |
| RNO's AD record not in audit file. | Add record to the AD of the operator concerned. |
| Content mismatch between RNO record and the record of other operator. | Update record in the AD of the operator concerned. |

4.4 Cross-auditing - No Discrepancies Found

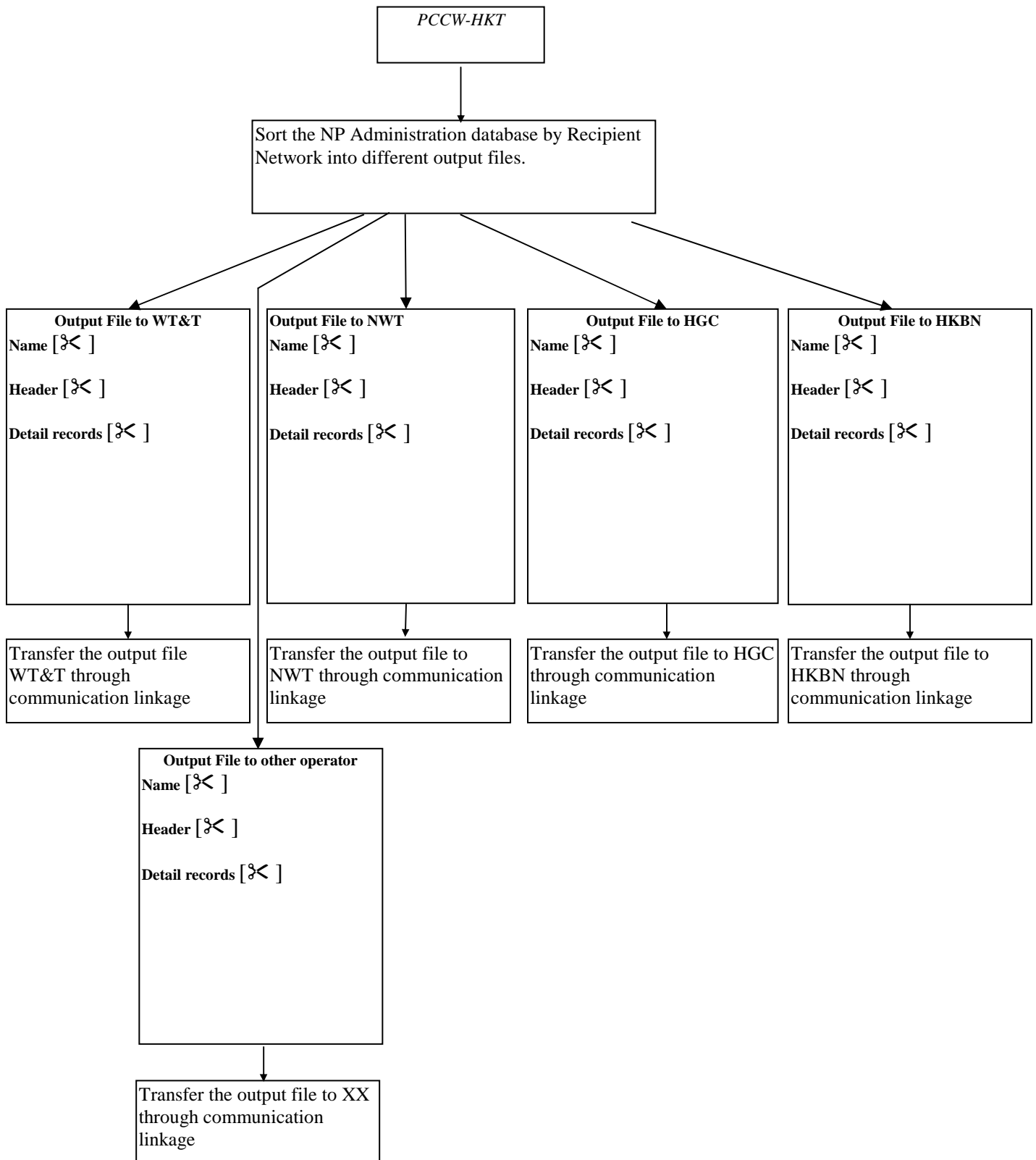
- 4.4.1 If no discrepancy is found, a rectification file should still be sent to the operator concerned, but with the 'Total No. of Records Enclosed' field marked as zero and [3<].

4.5 Cross-auditing File Format

- 4.5.1 The Auditing File, the Rectification File, the Verification File, and their corresponding Header Document have the following format:

[3<]

Following is the example of the database exchange that is manipulated by *PCCW-HKT* as at 07/03/04:

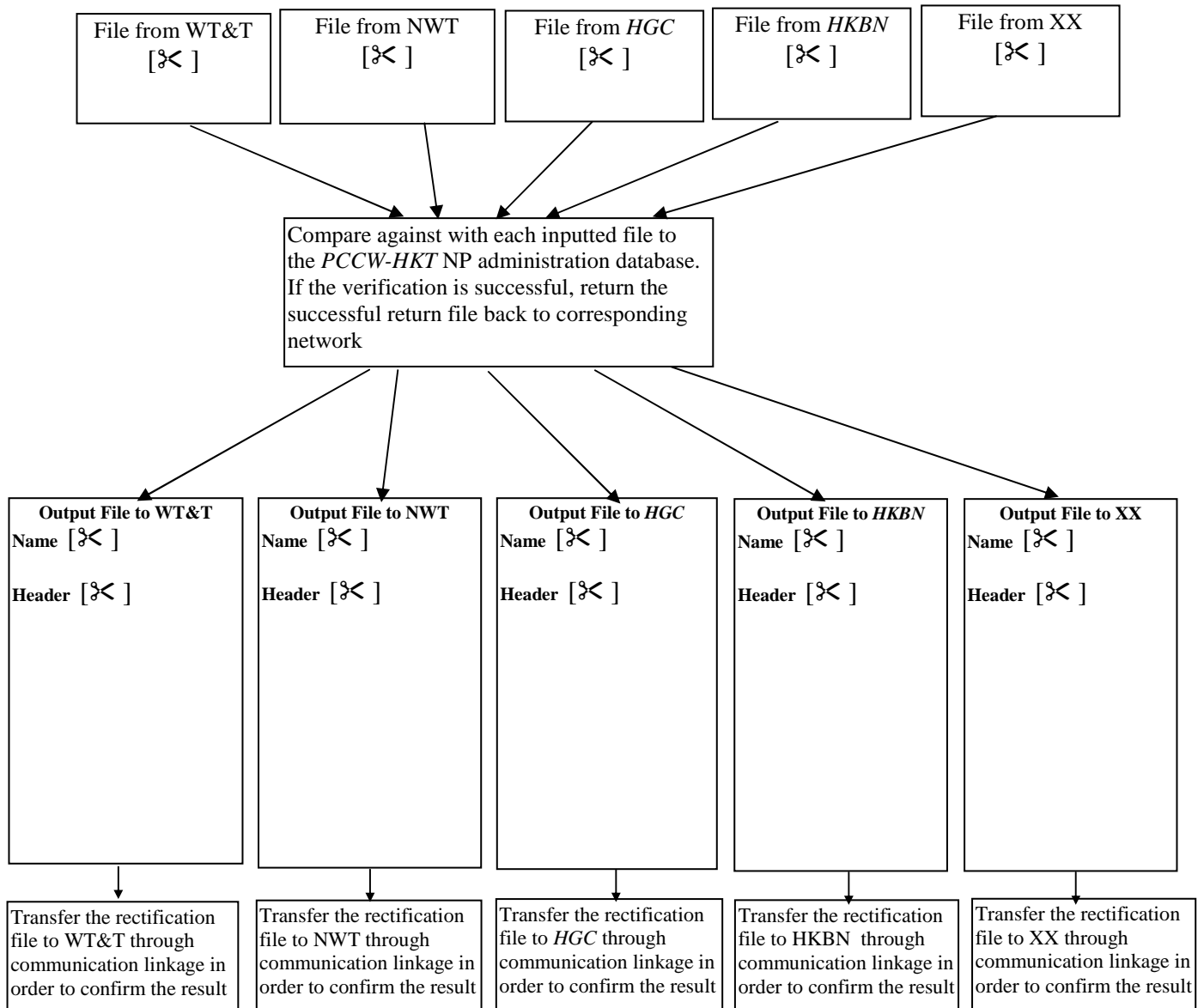


Cross Auditing & Rectification

Each operator, after receiving files sent to it from operators, will compare all the files against to its own NP Administration. In case discrepancies arise, the Recipient Network Operator should take responsibility to investigate and rectify the mismatch records and then send back the corrected files to the concerned operators for updating their own database. The file should contain all corrected/amended entries and the corresponding header record. On the other hand, if no mismatch record, Recipient Network Operator has to sent back the header record with mismatch counter of zero for notification purpose.

Successful Verification

Following is the example of the general flow for *PCCW-HKT* file rectification action. The result is successful verification (all record matched) for the file as at 07/03/04:

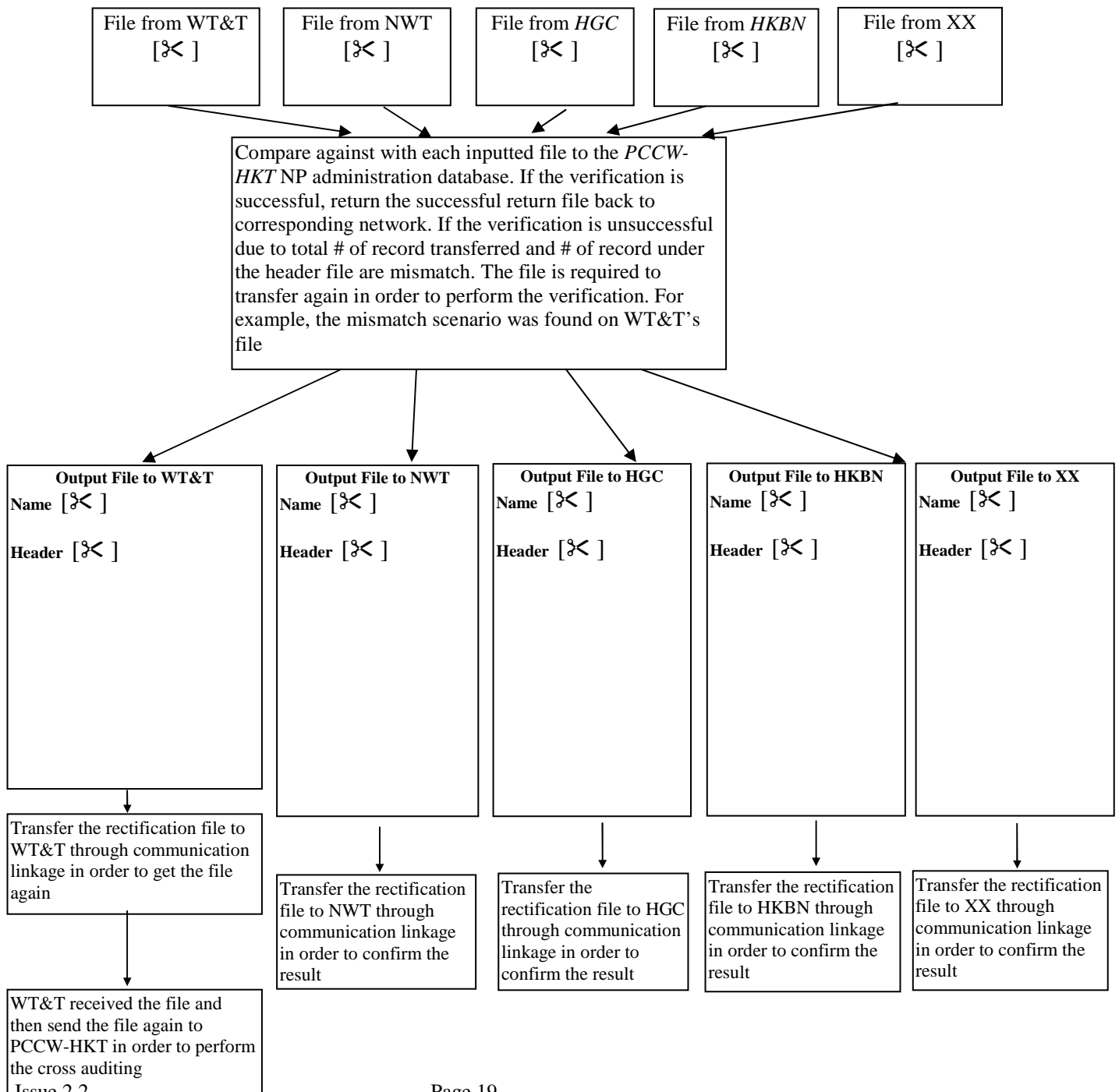


Unsuccessful Verification

• **Header total & total # of record transferred mismatch**

In case the total transferred count on the header record is mismatch with records transferred, recipient has to send a Verification type file in order to get the file again through the communication linkage for cross auditing.

Following is the example of the general flow for *PCCW-HKT* file rectification action as at 07/03/04 with unsuccessful verification due to header total & total # of record transferred mismatch, the file is required to transfer again in order to perform the verification :

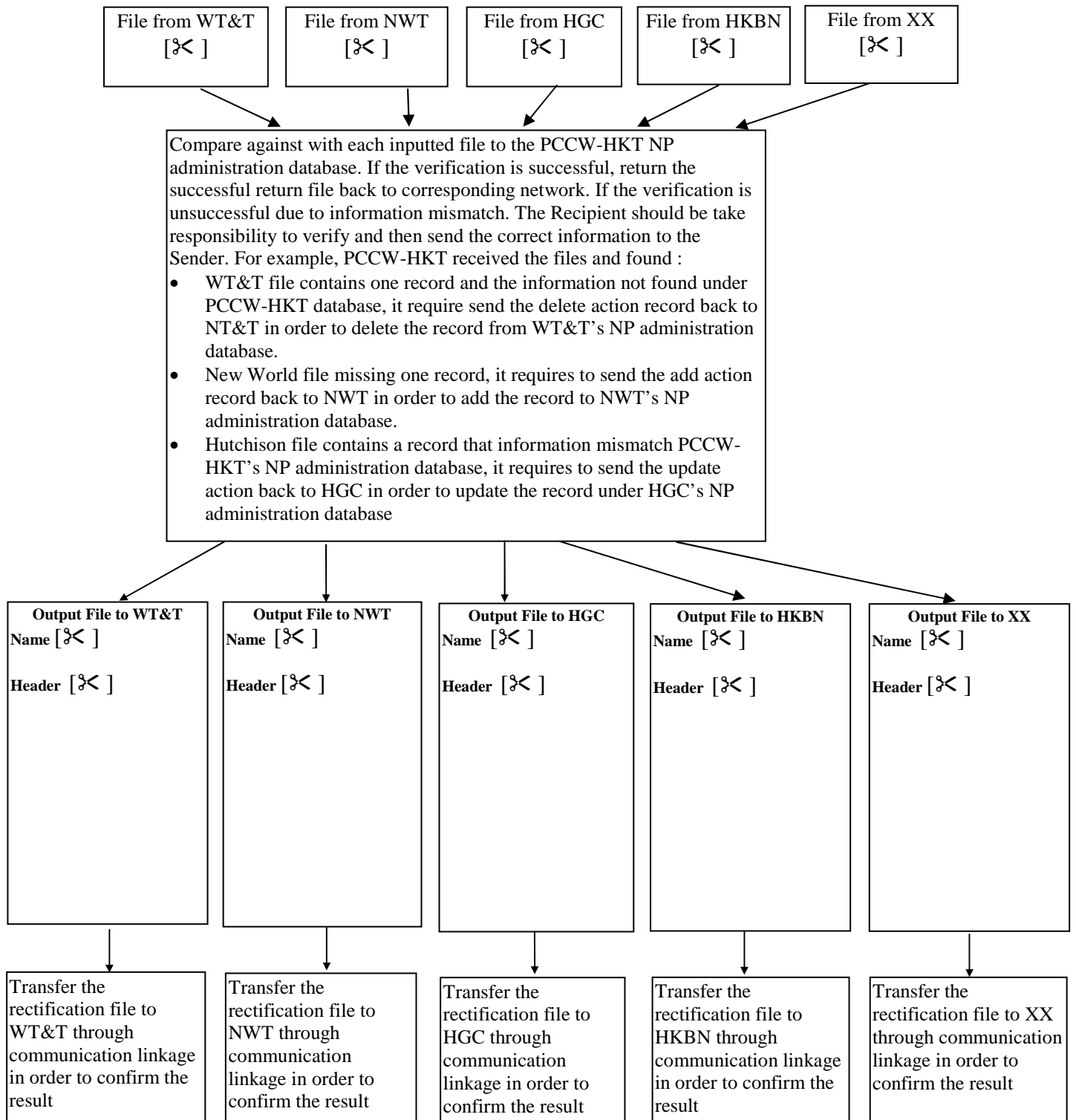


- ***NP administration database information mismatch***

In case record mismatch arises, the Recipient Network Operator should take full responsibility to investigate and rectify the mismatch records and then send the corrected files to the concerned operators for updating their own database. Following are the possible scenarios of record mismatch between the inputted file and the NP administration database :

- ⇒ Record not found under the NP administration database record, the record is required to delete from the Sender NP administration database (Action : **Delete**).
- ⇒ Record missing on the input file, the record is required to add from the Sender NP administration database (Action : **Add**)
- ⇒ Record information mismatch, the record is required to update from the Sender NP administration database (Action : **Update**)

Following is the example of the general flow for PCCW-HKT file rectification action as at 07/0304 with unsuccessful verification due to the file content & database mismatch.



File Name

In order to recognize and verify the received file, the following naming convention for cross auditing & rectification file.

- 1st-2nd byte : Sender Network Operator
[3<]
- 3rd-4th byte : Receiving Network Operator
[3<]
- 5th-8th byte : Verification month & date
[3<]
- File extension : File Type
[3<]

Header Record

- File Type : [3<]
- Verification Date : [3<]
- Sender Network Operator : [3<]
- Receiving Network Operator : [3<]
- Total # of Record Transferred : [3<]

Detail Records for Rectification

- Directory Number [3<]
- Gateway Number [3<]
- RNO (Recipient Network Operator) [3<]
- DNO (Donor Network Operator) [3<]
- Original DNO [3<]
- Original Type of Service [3<]
- Existing Type of Service [3<]
- Changeover Date [3<]
- Termination Date [3<]
- RNO/DNO Reference Serial No. [3<]
- Action Code [3<]
- [3<]

Note : Please refer the NP administration database document for the detail description

Field Delimiter

The Delimiter chosen is [⌘].

Record Separator

The Separator chosen is [⌘].

File Format

[⌘]

4.6 Dispute Resolution

In case mismatch record arises in FTNS's NP Administration Database, the Recipient Network Operator should take full responsibility to investigate and rectify the mismatch record and then inform concerned operators for updating their own database. If more than one operator claimed that she is the RNO, then the actual RNO (the operator to which the working line is connected) should clarify the situation, rectify the mismatch record, and then keep the others operators informed of the findings.

5. Administration Database Disaster Recovery & Backup

5.1 Introduction

An objective of setting up an Administration Database at each FTNS network is to use it as backup reference for disaster recovery in case of breakdown of both operational and administration databases of any FTNS network operator.

In case of disaster, a request can be made to one of the other FTNS network operators for:

- a) sending full information of all working records
- b) sending full information of all working and last six month historical records (i.e. a database image).

(Note: A working record contains a ported number service in active state.)

5.2 Information for Disaster Recovery

5.2.1 File Name

In order to recognize the received files, the following naming convention is used for the disaster recovery files.

| | |
|------------------|--|
| 1st - 2nd byte : | Sending Network Operator [3<] |
| 3rd - 4th byte : | Receiving Network Operator |
| 5th - 6th byte: | Month [3<] |
| 7th - 8th byte: | Date [3<] |
| file extension: | WKG for all working record information files FUL for full working & historical record information files |

For instance, [3<].

5.2.2 File Format

The files contain multiple records and the format for these files is as follows:

[3<]

5.2.3 File Contents

This file contains the information of all working records/last six month historical records. Each file contains a series of records and each record contains the following fields.

| Record Field | Content |
|----------------------------------|---------|
| Directory number (DN) | [<] |
| Gateway number (GN) | [<] |
| Recipient network operator (RNO) | [<] |
| Donor network operator (DNO) | [<] |
| Original DNO | [<] |
| Original type of service | [<] |
| Existing type of service | [<] |
| Changeover start date | [<] |
| Termination date | [<] |
| RNO/DNO reference serial number | [<] |

Note: Field delimiter = [<]
End of record = [<]

The format for the record is shown as follows:

[<]

5.2.4 Header Content

The file contains a header with the following fields.

| Header Field | Content |
|-------------------------------------|---------|
| File type | [<] |
| Creation date | [<] |
| Sender Network Operator | [<] |
| Receiving Network Operator | [<] |
| Total number of records transferred | [<] |

Note: Field delimiter = [<]
End of header = [<]

The format for the header is shown as follows:

[<]

5.3 Disaster Recovery Procedures

- a) In case of breakdown, the operator facing disaster should contact one of the other FTNS network operators by phone requesting for the file, later supplemented by a formal letter.
- b) The operator being contacted should send out the required information (see Section 5.2 for information details) within one working day. For special case such as corruption of the online and NP Administration database, the response time in sending the database image to the requesting operator should be mutually agreed among FTNS network operators.
- c) The operator facing disaster should make sure the network (including the administration database) is back to normal before any cross-auditing function can be performed.
- d) The operator facing disaster should make the request to other operators in an alternative manner.

6. Statistics

6.1 Introduction

A number of statistical reports should be generated by the system on both periodical and on-demand basis to serve the following purposes:-

- satisfy OFTA's requirement of statistics submission
- monitor the efficiency and effectiveness of number porting activities
- provide information for capacity planning
- provide information to support related operational requirements e.g. charging, billing, etc.

6.2 Statistics Reports

6.2.1 Periodic Statistics Report to OFTA

Number porting statistics in the format as in Attachment 6-1 and 6-2 should be output on a monthly basis for submission to OFTA. For Attachment 6-1, category of ported lines (e.g. DEL, DDI, etc.) should be referred to the pre-porting situation or referred to the original service type in successive porting cases. That is DDI lines before porting should be recorded as DDI even in the case that the DDI group was broken up into individual DELs after porting. For Attachment 6-2, only statistics as RNO are required to be reported.

The report should also be produced on a per network operator basis to facilitate submission to OFTA.

6.2.2 On-demand Statistics Reports

The system should be able to produce the porting history, at least in the past six months, of a particular telephone number on demand to facilitate various charging or billing operations.

6.3 Examples on Number Porting Statistics

6.3.1 Relinquish of Ported-Out Numbers

Suppose 100 DEL numbers in PCCW-HKT were ported to HGC in August 1995, and 20 of these numbers were relinquished in September 1995 due to the termination of the services by some customers. It was assumed that there were no more porting events among the FTNS operators in August and September 1995.

The porting statistics in August and September in PCCW-HKT and HGC should be as shown in Figure 6-1.

| | PCCW-HKT | HGC |
|----------------|----------------------|---------------------|
| August 1995 | Ported-out DEL = 100 | Ported-In DEL = 100 |
| September 1995 | Ported-out DEL = 80 | Ported-In DEL = 80 |

Figure 6-1

6.3.2 Successive Ported-Out Case

Suppose 1000 DDI numbers (original service type) in PCCW-HKT (original donor network) were ported to NWT in November 1995. The configuration after the porting in NWT: 800 numbers in a DDI group and 200 numbers as DELs. In December, 200 out of 800 DDI numbers and 100 out of 200 DEL numbers were ported to WT&T. The configuration after the successive porting in WNT&T: 200 numbers in a DDI group and 100 numbers in a hunting line group. It was assumed that there were no more porting events among FTNS operators in November and December 1995.

The porting statistics in November and December in PCCW-HKT, NWT and WT&T should be as shown in Figure 6-2.

| | PCCW-HKT | NWT | WT&T |
|---------------|-----------------------|---|---------------------|
| November 1995 | Ported-Out DDI = 1000 | Ported-In DDI = 1000 | - |
| December 1995 | Ported-Out DDI = 1000 | Ported-In DDI = 700 Ported-Out DDI = 0 Ported-Out DEL = 0 | Ported-In DDI = 300 |

Figure 6-2

Note : The Ported-Out/Ported-In figures should be based on the original service type in the original donor network.

Number Portability Statistics for OFTA**Attachment 6-1**

FTNS Operator:

Month:

| | | |
|--|------------------|--|
| Number of Telephone Numbers "Ported-In" during the current month | DEL | |
| | DDI | |
| | Hunting Lines | |
| | Freephone | |
| | Infoline | |
| | Personal Numbers | |
| | Others | |
| | Total | |
| Net Total Number of "Ported-In" Telephone numbers at the end of the current month (see note 1) | DEL | |
| | DDI | |
| | Hunting Lines | |
| | Freephone | |
| | Infoline | |
| | Personal Numbers | |
| | Others | |
| | Total | |

| | | |
|---|------------------|--|
| Number of Telephone Numbers "Ported-Out" during the current month | DEL | |
| | DDI | |
| | Hunting Lines | |
| | Freephone | |
| | Infoline | |
| | Personal Numbers | |
| | Others | |
| | Total | |
| Net Total Number of "Ported-Out" Telephone numbers at the end of the current month (see note 2) | DEL | |
| | DDI | |
| | Hunting Lines | |
| | Freephone | |
| | Infoline | |
| | Personal Numbers | |
| | Others | |
| | Total | |

Note 1: Total number of telephone numbers ported in from other networks and remaining in the network of the operator submitting this report (i.e. those numbers in the network of the operator submitting this report but which do not fall within its originally allocated number blocks).

Note 2: Total number of telephone numbers ported out to other networks from the originally allocated number blocks of the operator submitting this report and which remain in the other networks.

Number Portability Statistics for OFTA

Attachment 6-2

FTNS Operator:

Month:

Statistics on Number Portings in the Fixed Telecommunications Network

| Month | Number of submitted applications (C1) | Number of confirmed number portings (C2) | Number of successful portings (C3) | Success rate A (C4) | Success rate B (C5) |
|-----------|---------------------------------------|--|------------------------------------|---------------------|---------------------|
| May 2004 | | | | | |
| Jun 2004 | | | | | |
| Jul 2004 | | | | | |
| Aug 2004 | | | | | |
| Sept 2004 | | | | | |
| Oct 2004 | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

This document is updated on monthly basis.

Remarks:

C1 is the number of NPRs (Number Portability Request) in the off-line electronic number porting platform.

C2 is the number of APNs (Advice of Porting Number) in the off-line electronic number porting platform.

C3 is the number of SCAPNs (Successful Completion of APN) in the off-line electronic number porting platform.

C4 is C3/C1 and it represents the success rate against all number porting requests.

C5 is C3/C2 and it represents the success rate against all number porting requests accepted by the DNO (Donor Network Operator).

ANNEX 1

Normal ONP Porting Procedure

Normal ONP Porting Process

Each Network Operator (NO) will be responsible for number portability internal to their own network and which does not affect other Network Operators. This document describes the inter-operator ONP procedures that require joint or coordinated activities. To achieve ONP, each Network Operator should nominate one or more ONP Provider and MA, which could be the Network Operator itself, to provide GN database look-up and other logistic services. The HKTA 2102 – Procedures for Handling Number Porting by Database Solution should be referred to for the allocation of responsibility for these procedures, which in all cases lie with the relevant Network Operator.

The internal procedures and agreement between a Network Operator and its ONP Provider(s) and MA(s) are outside the scope of this document.

The Normal ONP Porting Procedure is illustrated in Figures 1A, 1B, 1C, 1D and 1E.

Figure 1A

[3 <]

| | SCAPN for Number Porting |
|-------------------------|--------------------------|
| IED Type | [3 <] |
| LDN | [3 <] |
| GN | [3 <] |
| RNO | [3 <] |
| DNO | [3 <] |
| ODNO | [3 <] |
| OTS | [3 <] |
| ETS | [3 <] |
| change_over_start_date | [3 <] |
| change_over_start_time | [3 <] |
| change_over_end_time | [3 <] |
| rnodno_reference_serial | [3 <] |
| Comment | [3 <] |

AA. Record After Cutover

| | Working |
|-------------------------|---------|
| LDN | [3 <] |
| GN | [3 <] |
| RNO | [3 <] |
| DNO | [3 <] |
| ODNO | [3 <] |
| OTS | [3 <] |
| ETS | [3 <] |
| change_over_date | [3 <] |
| termin_date | [3 <] |
| rnodno_reference_serial | [3 <] |

Figure 1B

[<]

| | SCAPN for Number Porting |
|--------------------------------|---------------------------------|
| IED Type | [<] |
| LDN | [<] |
| GN | [<] |
| RNO | [<] |
| DNO | [<] |
| ODNO | [<] |
| OTS | [<] |
| ETS | [<] |
| change_over_start_date | [<] |
| change_over_start_time | [<] |
| change_over_end_time | [<] |
| rnodno_reference_serial | [<] |
| Comment | [<] |

BB. Record After Cutover

| | Working |
|--------------------------------|----------------|
| LDN | [<] |
| GN | [<] |
| RNO | [<] |
| DNO | [<] |
| ODNO | [<] |
| OTS | [<] |
| ETS | [<] |
| change_over_date | [<] |
| termin_date | [<] |
| rnodno_reference_serial | [<] |

Figure 1C

[✂]

Figure 1D

[✂]

Figure 1E

[✂]

ANNEX 2

Implementation of Gateway Number Change

1. Introduction

This paper documents all the agreed changes of AD records and protocol that are necessary for the unification of GN change to emerge among individual fixed networks.

2. Initial Record Details

a. Message Flow and INF content

[3<]

| | SCAPN (0) for Number Porting |
|-------------------------|---------------------------------|
| IED Type | [3<] |
| LDN | [3<] |
| GN | [3<] |
| RNO | [3<] |
| DNO | [3<] |
| ODNO | [3<] |
| OTS | [3<] |
| ETS | [3<] |
| change_over_start_date | [3<] |
| change_over_start_time | [3<] |
| change_over_end_time | [3<] |
| rnodno_reference_serial | [3<] |
| Comment | [3<] |

b. Record status after Cut-over of number porting

This initial record applies to all the subsequent Gateway number change scenarios.

| | Working |
|--------------------------------|----------------|
| LDN | [X] |
| GN | [X] |
| RNO | [X] |
| DNO | [X] |
| ODNO | [X] |
| OTS | [X] |
| ETS | [X] |
| change_over_date | [X] |
| termin_date | [X] |
| rnodno_reference_serial | [X] |

3. Normal

a. Message Flow and INF content

[3<]

| | APN (1) for Change of Gateway Number | AKAPN (1) for Change of Gateway Number | SCAPN (1) for Change of Gateway Number |
|-------------------------|--|--|--|
| IED Type | [3<] | | |
| LDN | [3<] | | |
| GN | [3<] | | |
| RNO | [3<] | | |
| DNO | [3<] | | |
| ODNO | [3<] | | |
| OTS | [3<] | | |
| ETS | [3<] | | |
| change_over_start_date | [3<] | | |
| change_over_start_time | [3<] | | |
| change_over_end_time | [3<] | | |
| rnodno_reference_serial | [3<] | | |
| Comment | [3<] | | |

b. Records Status before Cut-over of GN Change in AD

| Type of record | GN Change |
|--------------------------|-----------|
| Working (refer to 2b) | [<] |
| In-progress | [<] |

c. Records Status after Cut-over of GN Change in AD

| | Working |
|--------------------------------|---------|
| LDN | [<] |
| GN | [<] |
| RNO | [<] |
| DNO | [<] |
| ODNO | [<] |
| OTS | [<] |
| ETS | [<] |
| change_over_date | [<] |
| termin_date | [<] |
| rnodno_reference_serial | [<] |

4. Negotiation of APN

a. Message flow and INF content

[3<]

| | APN (1) for Change of Gateway Number | AKAPN (1) for Change of Gateway Number | CLAPN (1) for Change of Gateway Number | ACAPN (1) for Change of Gateway Number |
|-------------------------|--------------------------------------|--|--|--|
| IED Type | [3<] | | | |
| LDN | [3<] | | | |
| GN | [3<] | | | |
| RNO | [3<] | | | |
| DNO | [3<] | | | |
| ODNO | [3<] | | | |
| OTS | [3<] | | | |
| ETS | [3<] | | | |
| change_over_start_date | [3<] | | | |
| change_over_start_time | [3<] | | | |
| change_over_end_time | [3<] | | | |
| rnodno_reference_serial | [3<] | | | |
| Comment | [3<] | | | |

| | APN (2) for Change of Gateway Number | AKAPN (2) for Change of Gateway Number | SCAPN (2) for Change of Gateway Number |
|-------------------------|--------------------------------------|--|--|
| IED Type | [3<] | | |
| LDN | [3<] | | |
| GN | [3<] | | |
| RNO | [3<] | | |
| DNO | [3<] | | |
| ODNO | [3<] | | |
| OTS | [3<] | | |
| ETS | [3<] | | |
| change_over_start_date | [3<] | | |
| change_over_start_time | [3<] | | |
| change_over_end_time | [3<] | | |
| rnodno_reference_serial | [3<] | | |
| Comment | [3<] | | |

b. Records Status before Cut-over of GN Change in AD

| Type of record | GN Change |
|--------------------------|-----------|
| Working (refer to 2b) | [<] |
| In-progress | [<] |

c. Records Status after Cut-over of GN Change in AD

| | Working |
|--------------------------------|---------|
| LDN | [<] |
| GN | [<] |
| RNO | [<] |
| DNO | [<] |
| ODNO | [<] |
| OTS | [<] |
| ETS | [<] |
| change_over_date | [<] |
| termin_date | [<] |
| rnodno_reference_serial | [<] |

5. Cancellation of APN

a. Message flow and INF content

[3<]

| | APN (1) for Change of Gateway Number | AKAPN (1) for Change of Gateway Number | CLAPN (1) for Change of Gateway Number | ACAPN (1) for Change of Gateway Number |
|-------------------------|--------------------------------------|--|--|--|
| IED Type | [3<] | | | |
| LDN | [3<] | | | |
| GN | [3<] | | | |
| RNO | [3<] | | | |
| DNO | [3<] | | | |
| ODNO | [3<] | | | |
| OTS | [3<] | | | |
| ETS | [3<] | | | |
| change_over_start_date | [3<] | | | |
| change_over_start_time | [3<] | | | |
| change_over_end_time | [3<] | | | |
| rnodno_reference_serial | [3<] | | | |
| Comment | [3<] | | | |

b. Records Status before Cut-over of GN Change in AD

| Type of record | GN Change |
|--------------------------|-----------|
| Working (refer to 2b) | [3<] |
| In-progress | [3<] |

c. Records Status after ACAPN is received

| Type of record | GN Change |
|--------------------------|-----------|
| Working (refer to 2b) | [3<] |

6. Audit

All working and historical records of 1-month old including those change of gateway number records such as NTNTXXXXXXXXXX are to be collected by the audit file.

ANNEX 3

Procedures for Relinquishment of Ported Number

Figure 3

[<]

| | ARPN for Number Porting |
|-------------------------|-------------------------|
| IED Type | [<] |
| LDN | [<] |
| GN | [<] |
| RNO | [<] |
| DNO | [<] |
| ODNO | [<] |
| OTS | [<] |
| ETS | [<] |
| change_over_start_date | [<] |
| change_over_start_time | [<] |
| change_over_end_time | [<] |
| rnodno_reference_serial | [<] |
| comment | [<] |

Records Status before Cut-over of Relinquishment in AD

| Type of record | Relinquishment |
|--------------------------|----------------|
| Working (refer to AA) | [<] |

Records Status After Cut-over of Relinquishment in AD

The record for LDN = [<] should be terminated.

| | Historical |
|-------------------------|------------|
| LDN | [<] |
| GN | [<] |
| RNO | [<] |
| DNO | [<] |
| ODNO | [<] |
| OTS | [<] |
| ETS | [<] |
| change_over_date | [<] |
| termin_date | [<] |
| rnodno_reference_serial | [<] |

ANNEX 4

Procedure for Port-Back Request

Figure 4

[3<]

| | APN for Port-Back Number | AKAPN for Port-Back Number | SCAPN for Port-Back Number |
|-------------------------|--------------------------|----------------------------|----------------------------|
| IED Type | [3<] | | |
| LDN | [3<] | | |
| GN | [3<] | | |
| RNO | [3<] | | |
| DNO | [3<] | | |
| ODNO | [3<] | | |
| OTS | [3<] | | |
| ETS | [3<] | | |
| change_over_start_date | [3<] | | |
| change_over_start_time | [3<] | | |
| change_over_end_time | [3<] | | |
| rnodno_reference_serial | [3<] | | |
| comment | [3<] | | |

Records Status before Cut-over of Port-Back Request in AD

| Type of record | Port Back |
|--------------------------|-----------|
| Working (refer to BB) | [3<] |
| In-progress | [3<] |

Records Status after Cut-over of Port-Back Request in AD

| | Historical |
|-------------------------|------------|
| LDN | [3<] |
| GN | [3<] |
| RNO | [3<] |
| DNO | [3<] |
| ODNO | [3<] |
| OTS | [3<] |
| ETS | [3<] |
| change_over_date | [3<] |
| termin_date | [3<] |
| rnodno_reference_serial | [3<] |

Annex 5
Supplementary Form for NPR

Annex 6

Assignment of Two-byte Network Code

Assignment of Two-byte Network Code to Network Operators and Providers

[3<]