Papua New Guinea Telecommunication Authority

Technical Interconnection Code of Practice

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FOREWORD

In a multi-operator, multi-technology, multi-service, competitive environment, interconnection of networks is essential for providing access to subscribers of one network to the subscribers and services of another network. In order to provide this end-to-end seamless interoperability of services for all users, a Technical Interconnection Code of Practice comprising general framework and principles for interconnection to public telecommunications networks and publicly available telecommunications services, irrespective of the supporting technologies employed, is needed. Establishment of fair interconnection regime is the most critical step. Nowadays, interconnection is not only considered to be essential for network development but also regarded as a cornerstone of competition.

Fair, proportionate and non-discriminatory conditions for interconnection and interoperability are key factors in fostering the development of open and competitive markets. A new entrant needs interconnection to the already existing networks of incumbent and other service providers to allow its customers to communicate with their customers and access any services provided by them for which specific commitment is undertaken. Competing in this scenario for a new entrant with the established service providers is dependent on the terms and conditions of interconnection. Interconnection is thus critical for the success of a competitive environment and the key to effective competition.

Section 66B of the *Telecommunications Act 1996 (as amended)* ("*the Act*") mandates PANGTEL to determine, by writing, the Interconnection Codes of Practice for carriers dealing principally with engineering and related technical aspects of telecommunication networks, equipment and services including a code of practice for inter-carrier network connections and points of interconnect, connection of customer equipment, technical arrangements, standards, etc., in consultation with all licensed carriers, the Independent Consumer and Competition Commission ("the Commission"), and other interested parties.

This Code is written under this mandate and delineates the general framework, technical rules, guidelines and principles that shall be followed by carriers in negotiating technical aspects of interconnection agreements. Carriers shall maintain the specified Quality standards and no carrier shall provide lower interconnection standards to marginalise another carrier to gain unfair economic advantage.

This Code covers the technical aspects and lays down the principles, technical standards, network arrangements, etc., for efficient interconnection that fall under the purview of technical regulation for which PANGTEL has been designated by section 19C of *the Act* to be the principal regulatory agency, in accordance with which the carriers may enter into Interconnection agreements. All other aspects of interconnection shall be governed by the Telecommunications Interconnection Code of Practice issued by the Independent Consumer and Competition Commission.

Sharing of facilities and other infrastructure *including but not limited* to ducts, manholes, towers, land, buildings, exchange space and ancillary installations such as Main Distribution Frame (MDF) rooms, cable risers and cable entry points shall also be implemented in conformance to PANGTEL recognized and or approved operational, regulations and specifications standards.

Telecommunications is a dynamic and rapidly developing sector. In order to keep pace with the emerging technological scenarios, changing needs of the industry, migration to Next Generation Networks, etc., the Code of Practice presented herein may be reviewed/amended as and when considered necessary by PANGTEL, in consultation with ICCC and other stakeholders.

Whereas in preparing the Technical Interconnection Code of Practice as it relates to technical regulation, the PANGTEL has made every effort to maintain consistency and harmony with the ICCC Interconnection code of Practice, in case of any inadvertent overlap, the provisions of the Code prescribed by ICCC shall apply.

Thank you

CHARLES S PUNAHA
Director General

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Contents

1. INTRODUCTION

1.1 Name of Code

This Code is called the Technical Interconnection Code of Practice (*"the Code"*).

1.2 Index

This Code is divided in Chapters, Sections and Clauses.

1.3 Contents of this Code

The Chapters and Annexes of this Code deal with the issues as indicated:

Chapter 1 : Introduction

Chapter 2 : Definitions

Chapter 3 : Interconnection Framework - Technical

Chapter 4 : Technical Requirements

Chapter 5 : Confidentiality

Chapter 6 : Liaison and Coordination amongst Carriers

Chapter 7 : Agreement Structure

Chapter 8: Administration of the Code

Annex : Schedule 1 – POI and Performance Standards

Schedule 2 – Standards & Specifications

1.4 Making of Code

This Code has been made by PANGTEL pursuant to section 66B of *the Telecommunication Act 1996 (as amended) ('the Act')*. Section 82 of *the Act* confers the right to a Carrier to access any other Carrier's Network to interconnect its facilities. This Code provides guidelines and a general interconnection framework, principally in regard to engineering and related technical aspects of telecommunication network and services. For all other aspects, the Telecommunications Interconnection Code of Practice shall apply, as per *the Act*.

1.4.1 Consultation

PANGTEL has held due consultations with all parties in accordance with Section 66B(4) of *the Act*.

1.5 Application of this Code

This Code shall apply to all Carriers and shall be used as a guide in formulating the access agreements. This Code will take effect from the date on which it is published in the National Gazette or a later date as specified by PANGTEL and shall apply until duly amended by PANGTEL.

1.6 Review of the Code

This Code shall be reviewed every three (3) years from the date on which the Code is first published or earlier in consultation with stakeholders when necessary.

1.7 Legislative Background

This Code forms an integral part of the telecommunications regulatory regime in Papua New Guinea, the legislative framework for which is set out under *the Act.* This Code is made as a code relating to the technical conduct or operations of a participating carrier in a regulated industry, and therefore developed as a technical Code of Practice under section 66B of *the Act.*

1.8 Technical Interconnection Code of Practice

Part VIA of *the Act* relating to Codes of Practice requires the licensees (Carriers) to comply with the code in the course of their operations. Section 66B of *the Act* enables PANGTEL to determine Codes of Practice to be followed by carriers in the course of their operations, and specifically includes a Technical Interconnection Code of Practice.

Accordingly, this Code has been determined by PANGTEL under section 66B of *the Act* to be the Technical Interconnection Code of Practice.

1.9 Statutory Right to Access

Part XI of *the Act* grants the rights of carriers to access other carriers' networks. This Code lays the principles and general framework and processes which are to be followed by carriers, in giving effect to those access rights.

1.10 Scope of the Code

This Code aims to encourage a cooperative relationship between Access Providers and Access Seekers on technical matters in the conduct of their operations within the telecommunications industry. The objective of this Code is to provide guidance to Access Providers when drafting Access Agreements and to Access Seekers when assessing the technical terms and conditions of an Access Agreement or a bilateral agreement proposed by an Access Provider. The Code may also be taken into account by the ICCC to the extent it considers it appropriate to do so, including in relation to Access Agreements or bilateral agreements in any arbitration determinations pursuant to Part XI of *the Act.* This Code applies to all different types of Access and Interconnection Services, as defined in Chapter 4.

The Code includes matters associated with the requesting of and agreeing to the supply of Physical Access to Telecommunications Transmission Towers, Buildings, Masts, Ducts, Manholes, Sites of Towers or Masts and Underground Facilities; in matters relating to technical standards and operational procedures.

Note: *This Code should be read together with the Telecommunications Interconnection Code of Practice developed by ICCC.*

2. DEFINITIONS

Definitions included in *the Act*, and Regulations, Directions and Orders published under *the Act*, and license shall apply wherever available and shall take precedence. In addition, as used in this Code, the following terms shall have the meanings indicated hereunder:

Access Agreement has same meaning as in *the Act.*

Access Provider means a licensed carrier who provides access of its telecommunications facility for usage by an Access Seeker.

Access Seeker means a licensed carrier who applies for or intends to gain access of another licensed carrier's telecommunications facility for usage or carriage services and includes, where appropriate, a Nominated Access Seeker.

Act means the *Telecommunications Act 1996 (as amended).*

Apparatus means Telecommunication Apparatus.

Authority means the Commission or PANGTEL as appropriate.

BHCA means Busy Hour Call Attempt

Busy Hour means the continuous one-hour period lying wholly in a given time interval for which the traffic is highest.

Carrier(s) has the same meaning as in *the Act.*

CCS means Common Channel Signalling

CDMA means Code Division Multiplex System

CDR means Call Data Records

CLI means the process that identifies and transfers the identity (number) of the calling party from one network to the other.

Commission means the Independent Consumer and Competition Commission or ICCC as the case may be.

Condition means, in relation to a license, a condition or restriction to which the license is subject to, or will be subject to, as the case requires.

Customer equipment means equipment that is or is intended to be connected to a telecommunications PTN operated by a carrier other than equipment that is used or intended for use within the boundaries of such a PTN.

Customer means any person who is, or wishes to be, provided with any relevant Telecommunications Service by a **Party** for which the party is licensed.

Directions means directions issued by the competent Authority under the *Act*

E1 Level means a primary PCM with bandwidth of 2.048 Mb/s.

Effective Date means the commencement date of the Agreement

Equipment means, any apparatus or equipment hardware or software used or intended for use in or in connection with a telecommunications network but does not include a line.

Erlang means the unit of telephone traffic intensity defined by the International Telecommunication Union.

Facility has the same meaning as in the *Act*

Gateway means, the provision of an interface between two (2) networks.

GMPCS means Global Mobile Personal Communication System

GOS means Grade of Service

GSM means Global Mobile System

Incumbent means a licensed carrier with established telecommunication infrastructure which shall be able to interconnect with new entrants carriers or interconnection seeking carriers or parties

International means, making reference to places outside PNG or an entity outside of PNG as the case may be.

International Subscriber Dialling (ISD) means facility for direct connectivity between an end user in the country with another end user in another country by means of direct dialling through licensed networks.

ITU-T (formerly CCITT) means, the Standardisation Sector of the International Telecommunications Union, the international telecommunications standards-setting body.

ISUP means Integrated Service Digital Network (ISDN) User Part.

ISP means an Internet Service Provider.

License has the same meaning as in the *Act*

Licensee has the same meaning as in the *Act.*

Line has the same meaning as in the *Act.*

Market has the same meaning as in the *Act*

MSC means the switching centre that performs all switching functions needed for cellular mobile systems located in an associated geographical area.

National Standards means the technical standards set by PANGTEL.

Network has the same meaning as in the *Act.*

Nominated Access Seeker means a person who has applied for a carrier licence and whom the Commission has declared is likely to be awarded a Carrier licence and is thereby declared to be a Nominated Access Seeker for the purpose of conducting negotiations with an Access Provider in accordance with the Telecommunications Interconnection Code of Practice developed by the Commission.

Non-discrimination in interconnection charge means that service providers shall not, in the matter of interconnection discriminate between the similarly situated and similar class of service providers.

Order means the order(s) issued by the court of law of competent jurisdiction under the Constitution of the Independent State Papua New Guinea.

PANGTEL means, the PNG Radiocommunications and Telecommunications Technical Authority, established under the *Act.*

PCM means Pulse Code Modulation system to CEPT standard (ITU-T G.703).

PNG means, the Independent State of Papua New Guinea.

Point of Interconnection (POI) means a mutually agreed upon point of demarcation where the parties networks interconnect and where the exchange of traffic between the two **Parties** takes place.

Point of Presence (POP)) means setting up of switching centre or/and transmission centre of appropriate capacity by Service Provider to provide, on demand, service of prescribed quality and grade of service in a non-discriminatory manner.

Port means an access point in equipment e.g. Exchange, that allows connection with other equipment or network with defined characteristics (impedance and bandwidth).

PSTN means the Public Switched Telephone Network.

PTN means, Public Telecommunications Network.

QOS means Quality of Service

Regulations mean the regulations issued from time to time by the PANGTEL in exercise of its powers under the Telecommunications Act.

RIO means Reference Interconnection Offer: It is an offer used internationally by Service Providers or Access Providers to other Service Providers including Access Seekers on its own network and the facilities in which interconnection can place. RIO is the document published by the Access Provider setting out the interconnection services to be offered and terms and conditions under which they will be offered. The RIO provides the basis in concluding an Access Agreement.

Roaming means extension of cellular service when the user goes to another licensed area of the same licensee or to the area of operation of another licensee.

SDH means Synchronous Digital Hierarchy

Service Area means the geographical area specified under the license throughout which the services are provided.

Signalling System 7 means, international common-channel signalling (CCS7) system based on ITU-T Recommendation number Q7. An addressing protocol that speeds up call processing by operating out of band and includes fraud detection, caller ID, store and forward, ring back, etc.

SMS means Short Message Service
SMSC means Short Message Service Centre
Subscriber includes any subscriber or any person or legal entity, which subscribes to/ avails of the service from a licensee.
Supplier or Service Provider means, carrier which may also include both Access Seeker and Access Provider for the situation where appropriately applicable in text provided.

Switch means an automatic telephone exchange.

System means a telecommunication network consisting of access network, switching nodes and transmission links, together with the operation and maintenance systems and network management systems.

Telecommunication Apparatus means a piece of equipment which is used in a system or series of systems, for carrying communications by means of guided or unguided electromagnetic energy or both.

Telikom means, Telikom PNG Ltd, a company duly incorporated under the Companies Act in Papua New Guinea.

Value-Added Services has the same meaning as in the *Act*.

Working Day means any day from Monday to Friday, excluding holidays.

WTO means the World Trade Organization

3. INTERCONNECTION FRAMEWORK - TECHNICAL

3.1 General

Interconnection is the physical and logical linking of public telecommunication networks used by the same or different Carriers in order to allow the users of one Carrier to communicate with users of same or another Carrier, or to access services provided by another Carrier. Services may be provided by the Carriers or other Service Providers too, who have access to the network.

Interconnection between Carriers refers to linking their networks in order to establish effective, efficient and any-to-any connectivity and allow users of one to access the users or services of the other.

Fair, transparent and consistent interconnection arrangements implemented in accordance with the PANGTEL operational, technical specifications and standards are essential for ensuring interoperability of networks and rolling out telecommunication services even to some of the remotest areas of PNG. This potential is in harmony with general government policies and the industry together with all stakeholders including the regulators have an obligation to fulfil its realisation in providing efficient communication services to the end users.

Interconnection arrangements in a multi-carrier environment are also vital for service expansion, improving the efficiency of the network, and enhancing the co-carrier relationship.

The network interconnection between the access provider and the access seeker shall have a definite liability boundary, and equipment or adequate measures for demarcation shall be set up to separate the telecommunications equipment of the parties. The liability boundary, and equipment and adequate measures for demarcation alluded to shall be handled according to the agreement between both parties of the network interconnection.

Network operators need to agree on the technical and commercial arrangements under which they decide to interconnect their networks. On technical side, among other things, such an agreement specifies the location where the two networks will be interconnected, how they will be connected, how calls will be handed-over from one network to the other, and how the quality of service will be maintained.

PANGTEL is responsible for formulating technical rules, specify standards, provide guidelines and codes of practice for all suppliers and consumers of telecommunications goods and services. In this code the principle aim is to outline the main technical aspects that are necessary in maintaining message and signal quality on end-to-end basis over the entire route traversed via interconnected carriers.

Point of Interconnection is where the networks of multiple competing telecommunication carriers interface, so that each carrier can provide telecommunications service to any part of the Public Telecommunication Network, irrespective of which carrier owns that particular network. This imposes the requirement of technical compatibility, necessitating compliance to national. ITU or other International/Global (e.g. ETSI, GSM, CDMA, IETF, etc.) technical standards that have the approval of PANGTEL and avoidance of proprietary standards. To the customer the demarcation lines are invisible and the Public Telecommunication

Network is seen as a single entity. A call may pass from one telecommunication network to another and the customer will receive one charge for that call.

When two networks interconnect, each operator seeks to charge the other for resources provided. The most basic interconnection service provided is that of call termination, i.e. delivering a call which originates on one network to its destination on another network.

Interconnection of networks allows the use of different network resources for call origination, carriage over transport network i.e., national or international long distance networks, transit through switches and finally termination. For this purpose, the technical compatibility has to be ensured by adoption of appropriate standards.

As per Section 82 of the Act "right to access", any carrier has the right to interconnect its facilities to a network of any other carrier on agreed terms and conditions, failing which the ICCC may determine such terms and conditions under section 84.

All carriers have an obligation to maintain and adhere to recommended technical specifications, network and end-user quality of performance standards.

Subsequently and conditionally, on approval of PANGTEL any access provider 'may' disconnect any access seeker's facilities and infrastructure from its own network if the access provider believes and provides proven evidence and/or information to PANGTEL on the poor performance standards of the access seeker's network or facility or for violation of network integrity/ security considerations. However, disconnection or blocking of traffic at the point of interconnection cannot be done unilaterally by a carrier without giving sufficient notice and regulatory sanction. Access Agreements entered into by the interconnecting carriers should contain the provision for termination with conditions warranting such action.

In order to fully realize the multi-dimensional benefits of multi-carrier interconnection, the co-operation of all parties is very important in ensuring that internationally accepted and ITU-T recommended technical standards as adopted by PANGTEL are followed. In the absence of appropriate standards, such standards as may be agreed by the interconnecting Carriers through negotiations and ratification by PANGTEL may be adhered to.

3.2 Objectives

The objective of interconnection is to enable a customer to access customers, services and networks of other service providers (carriers) in the most efficient manner. The major and somewhat interrelated objectives of interconnection from policy angle are:

- To ensure fair competition among Access Providers and Access Seekers;
- To ensure full network connectivity so that all customers may communicate with each other in a seamless manner;
- To meet the needs of customers by availability of a wide range of innovative services through interconnected competing networks;
- To ensure network efficiency by optimum utilization of network infrastructure resources of all competing carriers;
- To create an investor friendly business environment;

- To encourage provision of modern network and services;
- To make the overall telecommunication service sector customer friendly, and
- Technical and commercial[1] terms of Interconnections, to be non-discriminatory, proportional and transparent, and based on objective criteria.

3.3 Principles

In line with the principles enunciated in the WTO reference paper[2], Interconnection with a major supplier will be ensured at any technically feasible point in the network. Such interconnection is provided:

(a) under non-discriminatory terms, conditions (including technical standards and specifications) and rates and of a quality no less favourable than that provided for its own like services or for like services of non-affiliated service suppliers or for its subsidiaries or other affiliates;

(b) in a timely fashion, on terms, conditions (including technical standards and specifications) and cost-oriented rates that are transparent, reasonable, having regard to economic feasibility, and sufficiently unbundled so that the supplier need not pay for network components or facilities that it does not require for the service to be provided; and

(c) upon request, at points in addition to the network termination points offered to the majority of users, subject to charges that reflect the cost of construction of necessary additional facilities.

The procedures applicable for interconnection to a major supplier will be transparent and made publicly available. A major supplier will make publicly available, the terms and conditions for interconnection in the form of a model agreement or a Reference Interconnection Offer (RIO), duly approved by PANGTEL and ICCC.

All carriers shall use ITU/ other National and International technical standards specified/approved by PANGTEL. Some of the relevant ITU standards are indicated in the Annex. As a rule, to ensure full network connectivity and interoperability so that all customers may communicate with each other irrespective of the carrier and/or network they are subscribed to, non-proprietary, open standards shall be adopted.

All carriers shall provide information about network planning programs and changes to network architecture or configuration, to PANGTEL and amongst the interconnecting parties to ensure uninterrupted interoperability of networks.

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[1] For economic and commercial aspects of Interconnection, reference may be made to Telecommunications Interconnection Code of Practice develop by ICCC.

[2] Telecommunications services: WTO Reference paper; 24 April 1996; Negotiating group on basic telecommunications.

In principle, bottlenecks in the access provider's network and/or any other carrier's network are not desirable. If, however, there are unavoidable bottlenecks in the network, appropriate and/or adequate redundancy and/or contingency plans shall be put in place to cater for internationally acceptable quality telecommunications services.

Interconnection principles are summarized as follows:

i. Interconnection should be permitted at any technically feasible point.
ii. Interconnection should be non-discriminatory i.e. there should be no discrimination between carriers or between a carrier's own operations and those of interconnecting competitors. The access provider shall be required to provide access seekers or new carriers the same range of interconnection services on terms and conditions no less favourable as it would apply to itself or its own subsidiaries.
iii. Interconnection provided by the access provider to access seekers shall be of the same quality that the access provider provides for its own network.
iv. As practicality and efficiency allows, interconnection arrangements and procedures should be transparent.
v. Network elements should be sufficiently unbundled.
vi. Network integrity of each interconnecting network should be maintained under all circumstances meaning that any fault or network management action in one network should not in any way affect the functioning of other network(s).
vii. Access agreement shall:
    - be technically and administratively sound and efficient;
    - promote greater efficiency in a competitive telecommunications environment;
    - be transparent to users and independent from internal network characteristics;
    - where practical, efficient and commercially agreed, provide for customer choice and access to whichever carriers services regardless of the network or system to which the customer is directly connected; and
    - be non-discriminatory in terms of overall functionality, quality and performance.

All licensees are required to establish a Point of Presence (POP) at an interconnection gateway switch (POI), which is normally a transit switch of the Access Provider and mutually negotiated, unless specified otherwise by PANGTEL, on the technical and commercial arrangements for delivery of traffic to its destination.

The general principles of interconnection as contained in ITU-T Recommendation shall be the guiding principles when such access agreement is negotiated between carriers.

3.4 Safeguards against Unfair Engineering Practices

All carriers have the right to equal access to other carriers. Interconnected carriers shall be treated fairly in terms of engineering practices.

Within the normal commercial operating environment, Carriers shall not engage in any unfair practice or conduct that has the effect of discriminating, eliminating, deterring, reducing or inhibiting access to their network, or in any way prevent or hinder the entry of a new service provider or carrier.

Where quality of service may be impacted upon by the high take up of a promotion offered by a licensee, adequate safeguards must be implemented and PANGTEL can make directions on this aspect of quality of service.

A telecommunication carrier shall not technically discriminate against other carriers and/or service providers.

Except as otherwise provided hereunder, the equipment configuration and maintenance, location and associated costs of the network interconnection between the interconnecting carriers shall be decided through negotiation, and where an agreement is reached, a copy should be forwarded to PANGTEL. Further to the above aforementioned prohibition of discrimination, a carrier shall not:-

a) engage in unfair discrimination in relation to numbering, interconnection and sharing of facilities;

b) technically bundle or require an interconnection access seeker to acquire other services or equipment of the licensee as a condition of acquisition of the desired service, capacity or equipment;

c) tamper with the services or equipment of other licensees;

d) disclose confidential information of other licensees; and

e) intentionally lower the quality of their service, by providing low quality or unreliable interconnection.

3.5 Scope of the Code

The Code covers primarily the technical aspects pertaining to provision, operation and maintenance of interconnection that facilitates passage of traffic and signalling information between networks. The technical standards and specifications stipulated in the relevant ITU-T Recommendations and other international/national standards specified by PANGTEL shall be reflected in the implementation of such arrangements.

The technical parameters, standards and arrangements covered in the Code to facilitate (i) physical interconnection between the two networks for telecommunications and other services as applicable; (ii) Sharing of infrastructure elements; and (iii) network elements for origination, termination and transit traffic; inter alia, shall relate to the following:

(a) Point of Interconnection

- Traffic routing arrangements at POI;
- Interconnection Gateway Switch;
- Co-location of Apparatus and Plant.

(b) Provisioning Procedures

- Initial demand and forecasts procedures;

- Provisioning, testing and commissioning of circuits.

(c) Network and Transmission requirements

(d) Signalling architecture

(e) Service Quality and Fault Repairs

(f) Technical Specifications and Standards

(g) Network Management, Maintenance and Measurements

(h) Network Integrity and Safety

(i) Operator-assisted-services (manual and special services)

(j) Access to International Gateway

(k) Technical requirements for Data transfers (Inter-carrier and customer)

(l) Fundamental Technical Plans

(m) Short Message Service

(n) Confidentiality

(o) Coordination mechanism

(p) Agreement Structure

(r) Administration of the Code

4.0 TECHNICAL REQUIREMENTS

4.1 Public Telecommunication Services covered

The Code shall apply to the technical aspects of interconnection of networks for the purposes of provision of telecommunications services. Such service may include:-

- Public Mobile Telephone Services
- Public Data Telecommunications Services
- Fixed Public Voice Telephone Services (local and long distance)
- International Communication Services
- Satellite Communications Services such as GMPCS and VSAT
- Public Paging Services
- Public Pay Telephone Services
- Trunking Services
- Short Messages Services (SMS)
- Directory, Emergency and Operator Services
- Internet Services, and
- Value Added Services

4.2 Provision of Information

Carriers are required to provide to each other information relevant to working out the technical arrangements and engineering of the networks to meet the demands of interconnection services.

Pursuant to section 195 of the *Telecommunications Act 1996* as amended, and where there is reason to believe that a carrier has information that is relevant to interconnection, PANGTEL may in writing request the carrier to make available that information which shall be supplied by it within the specified period of such request.

4.3 Access to Directory and Emergency Services

The Carriers shall ensure that the Directory Enquiry Service is accessible on a commercial basis by all customers irrespective of which carrier provides that customer with telecommunications service, (Note: Directory services are an integral part of the numbering plan. (See 4.11.2)

All carriers will provide access to Emergency Services and any other public Utility and Information services.

4.4 Provisioning Procedure

4.4.1 Request for Access to Interconnect

The interconnection access seeker shall explicitly state the type of interconnection that is requested to be negotiated and implemented including the preferred physical locations.

The access seeker shall also provide documents outlining the architecture and/or the detailed configurations for traffic and signalling simultaneously to the access provider and PANGTEL.

Details submitted on these documents shall be used to assess the technical compatibility and/or feasibility of the requested interconnection. Information derived from such documents shall form a major part of the access agreement between the access provider and the access seeker.

4.4.2 Initial Demand

Part XI of the *Act* provides for antecedent negotiations between the Access Provider and the Access Seeker(s) to determine the terms and conditions on which access will be provided. To conclude Technical and commercial arrangements for access and interconnection with the Access Provider in advance of the commencement of operations by the Access Seeker, prior to the commencement of the Access Seeker's carrier licence is considered prudent to ensure readiness. The ICCC Interconnection Code provides for this purpose, the term "Nominated Access Seeker", which means a person who has applied for a carrier licence and whom the Commission has declared is likely to be awarded a carrier licence and is thereby declared to be a Nominated Access Seeker for the purpose of conducting negotiations with an Access Provider in accordance with this Code.

To enable such negotiations to occur within a commercially sensible timeframe, an Access Provider must, if requested to do so by a Nominated Access Seeker, enter into negotiations in good faith with that Nominated Access Seeker with a view to concluding technical and commercial arrangements for access and interconnection, to take effect as and when the Nominated Access Seeker becomes a licensed carrier.

4.4.3 Planning Action

The Access Seeker shall provide relevant information normally 6 months in advance except in case of regulatory exigency (as stated in Clause 4.4.2.) where such period may be reduced on the location of POI, estimated traffic in Erlangs, BHCA, type of signalling, and any other technical information required to facilitate planning.

A formal demand in writing indicating the number of ports and other facilities required, and the time schedule, shall be separately placed on the Access Provider at six-monthly interval. Demand for interconnection circuits should be based on actual traffic flow during the busy-hour and growth pattern for maintaining a grade of service (GOS) of 0.5% (loss probability: 1 in 200 calls). However, during the initial launching of the network, the GOS may be mutually agreed among the interconnecting parties at not more than 1% GOS. For capacity of ports not likely to be met within 6 months, planning action shall be immediately started by the Access provider.

4.4.4 Provisioning, Testing and Commissioning of Interconnect Circuits

4.4.4.1 The capacity made available within 90 days shall be taken up immediately for testing. The full capacity required shall be provided and made available for testing in accordance with the time schedule indicated in the acceptance of demand or demand note, but within 6 months of the firm demand.

4.4.4.2 If the demand is not met within the scheduled periods, the matter will be considered by the Joint Technical and Operations Committee for further necessary action under the access agreement. Refer to Section 6.2 of this Code.

4.4.4.3 Number of Ports indicated in the firm demand for each POI will be the deciding factor for determining the port charges in terms of the Regulations.

4.4.4.4 The party installing the equipment and requiring inter-connectivity tests shall, notify the other party indicating that such capacity is ready for testing as per the applicable Standards. Both Parties shall ensure that the testing is completed within 30 days of provisioning.

4.4.5 Augmentation

4.4.5.1 Traffic measurements shall be taken by both the Parties during agreed route busy hours for seven days, six months after commencement of service and every six months thereafter with a view to determine further capacity requirements.

4.4.5.2 Augmentation for additional capacity for the next 12 months shall also be initiated by either **Party** on the basis of such traffic observation.

4.4.6 Capacity Utilization

The Access Seeker shall undertake to use the capacity so made available for a minimum period of 3 years.

4.5 Point of Interconnection

4.5.1 General

i. The Point of Interconnection (POI) is the physical point where the networks interconnect and where carriers terminate their facilities.

ii. Interconnection shall be made at a technically feasible point in the network as mutually agreed between the Carriers and so specified in the access agreement.

iii. The equipment capacity and interconnected transmission circuits of the points of interconnection shall be adequate to achieve standard telecommunications quality and traffic flow.

iv Unless agreed otherwise, the carriers that are interconnected shall be responsible for maintaining their own linkage from each network terminal to the point of interconnection.

4.5.2 Location of POI

The location of the POI shall be any point that is technically and economically feasible and capable of accommodating the particular type of interconnection requested by a carrier and maintaining the quality of the traffic and handling any unexpected short term, medium term and long term increase in traffic.

The location of the POI shall be at a technically feasible point and the POI shall be capable of accommodating the particular type of interconnection requested by a carrier.

All POIs which have been agreed to, shall be upgraded if necessary to the level technically capable of providing any of the aforementioned interconnection types as provided in the agreement.

4.5.3 Mandatory and Possible Points of Interconnection (POI)

The locations and/or places indicated below are mandatory and possible points of interconnection listed in order of priority and carriers have an obligation to ensure that those locations that are agreed as POI are technically upgraded and capable of providing quality interconnection to other carriers.

- All major centres in PNG, where the carriers or carrier maintains trunk/transit/tandem exchanges, Mobile Switching Centres and/or international gateway switches are deemed possible POI. The negotiation of these interconnection points shall be the responsibility of the interconnecting carriers.
- Initially two(2) POIs shall be implemented as this is the minimum technical requirement.
- In the medium term the number of POI shall be no less than five(5) nationwide including NCD, Lae, Mt Hagen, Rabaul and Wewak exchanges as mandatory POIs, where certain minimum number of E1s shall be made available by the Access Provider to interconnect within 90 days of their initial demand. Other POIs may be negotiated by the access seeker and access provider.

4.5.4 Interconnection Rules

The interconnecting carriers (parties) shall agree:

a) to connect and keep connected their Systems at mutually agreed feasible Points of Interconnection- a voice and data gateway switch that would serve as the Interconnection Gateway Switch.

b) to connect the MSC as far as possible to the nearest Transit Exchange in accordance with the Provisioning procedure detailed in Section 4.4. ,

c) Cellular Mobile Service Operators 'may' interconnect directly with each other at MSC level.

d) to record the agreed POIs for each class of service as per Schedule 1 (see Annex), which shall form part of the Access agreement.

e) to supply the requested telecommunication services, facilities and information, relating to interconnection, to the other Party as may be mutually agreed.

4.5.5 Arrangements at the POI

Interconnection shall be based on ITU standards such as CCS System No. 7 etc. The facilities such as CLI are required to be provided and shall be indicated in Schedule 2. The transmission and electric conditions at the POI shall conform to the Standards recommended by the ITU and/or other standards as may be adopted by PANGTEL. The types of traffic to be carried across the POI shall be indicated in Schedule 1.

4.5.6 Traffic Routing Principles

Each Party shall carry the traffic offered at the POI by the other Party through its network for delivery to the designated subscribers. In case a call cannot be so

carried due to temporary network conditions, suitable tones or announcements shall be provided as agreed to between the two Parties.

The Interconnection agreement shall specify the levels and points at which interconnections may be provided for various classes of traffic and details on various interconnection and delivery of inter operator traffic/services.

4.5.7 Co-location of Apparatus and Plant

Wherever it is possible, physical co-location should be considered.

Wherever such co-location has been mutually agreed, essential accommodation and auxiliary infrastructure for the Transmission Links, and Terminal equipment (E1/SDH) shall be made available for this purpose within the time schedules for interconnection.

4.5.8 Port Identification

All ports should be clearly marked according to identification labels agreed by the carriers.

4.6 Network Switching & Transmission Requirements

The access seeker shall make available technical specifications including clearly drawn, marked and labelled engineering interconnection diagrams for all concerned parties. These diagrams shall include the Network diagram for interconnection of traffic; and the network configuration for the signalling scheme. The interconnecting parties shall share forecasted network development plans in a six-monthly intervals.

The access provider shall readily provide information regarding the readiness of its network for interconnection including the signalling scheme that is deployed in its network.

The access provider shall have the primary responsibility and opportunity of upgrading its network to a standard that is required for non-discriminatory access by interconnection access seekers.

4.6.1 Switching Network Interconnection

Optimum interconnection at the switching level is the most significant aspect of network interconnection. The Access Provider and Access Seeker shall:

- address the approach for meeting the switching capacity requirements for interconnection traffic;
- identify the rules governing the level at which switching interconnection will take place;
- identify interconnection measures to provide switching diversity, if feasible.

The Access Provider shall require other service providers including access seekers to interconnect at more than one location or to particular location or at particular switching network hierarchy level. Any such requirements must be based on reasonable engineering principles and a justified need to provide switching diversity for network resilience.

4.6.2 Network Interconnection Links and Routing

The Network Interconnection Links connect the networks of Access Provider & Access Seeker and facilitate the conveyance of traffic between them. Routing considerations for Network Interconnection Links should include route capacity, route direction, route diversity and segregation. The Access Agreement shall identify the rules for determining capacity requirements in terms of bandwidths in nx2.048 Mbps or higher and increments in which capacity may be provisioned. A Network Interconnection Link capacity should not be less than 1x E1. Internet Service Providers' demand for bandwidth may be in terms of leasing nx64 Kbps.

4.6.3 Transport Network Interconnection – leasing long distance circuits

An Access Seeker shall require interconnection links not only to the network of the Access Provider but also to the networks of other service providers or for interconnection of its own network equipment, e.g. mobile network base stations.

The Access Provider shall provide interconnection to its Access and/or Core Transport networks to meet the requirements of other appropriate carriers.

4.6.4 Transport Network Technologies

The Access Agreement shall specify the transmission technologies (of the Access and/or Core Transport networks to be used for interconnection.

4.6.5 Traffic Forecasts

Traffic forecasts are used for the planning of sufficient switching and transmission capacity. Traffic forecasts shall be prepared and supplied by one Party to the other **Party** on the following basis:

The Parties shall forecast all outgoing traffic of each type, to the other Party's System for a period of three years at intervals of six (6) months for each POI. The first forecast shall be supplied within ninety (90) days of the Effective Date and thereafter on the 1st January and 1st July every year.

All traffic forecasts shall be in terms of Busy Hour Call Attempts and Busy Hour Erlangs. For these forecasts, time consistent busy hour of the exchange and routes shall be determined.

4.6.6 Network Engineering

4.6.6.1 Diversity and Alternate Routing

Diversity shall be provided by either **Party** in accordance with standard network engineering practices. In the case of partial network/route failure, each party shall extend the same priority to the traffic of the other party as it gives to its own traffic.

4.6.6.2 Circuit Provision

Circuit provision shall be made on the basis of the specified GOS of 0.5% on the Network – Network Interface allowing for adequate overload safety protection. However, during the initial launching of the network, the GOS may be mutually agreed among the interconnecting parties to not more than 1% GOS. Bandwidth for interconnection may be provided in terms of nx2.048 Mbps (E1 level) or at SDH level, except for small ISPs.

4.6.6.3 Network Changes

The Parties shall inform each other, wherever possible, 6 months in advance of changes to network configuration and facilities relating to interconnection that may have significant impact on the engineering of the other's network.

4.6.6.4 Calling Line Identification

CLI of the caller shall be transmitted to the receiving (incoming) network whenever requested by that network in the course of the Signalling procedure and wherever technically possible.

4.6.6.5 Carrier Selection

Both Parties shall handle calls in accordance with the Regulations issued in this connection by PANGTEL and procedures and guidelines laid down by the Licensor (ICCC) in relation to Carrier Selection. Carrier selection establishes a level playing field to provide equal ease of access.

Call-by-call selection

To facilitate a subscriber to select the long distance/international carrier of his choice by dialling on call-by-call basis, the numbering plan provides for carrier identification codes allocated to the two Parties are:

a) Party A XX Party B XY

On request from any Party, the other shall supply information relating to its subscribers, who have opted for a service offered by the former, or have requested for termination of such service.

Pre-selection

Carrier Pre-Selection; where the originating Access Provider shall be instructed by the calling subscriber, which Long Distance service provider should carry the call. In this case there shall be no requirement for the calling subscriber to enter a prefix.

4.6.7 Short Message Service, abbreviated as SMS, is the transmission of short text messages to and from a mobile phone, or any other device capable of generating the SMS. Once a message is sent, it is received by a Short Message Service Centre (SMSC) of the calling subscriber's network, which then delivers it to the appropriate destination device.

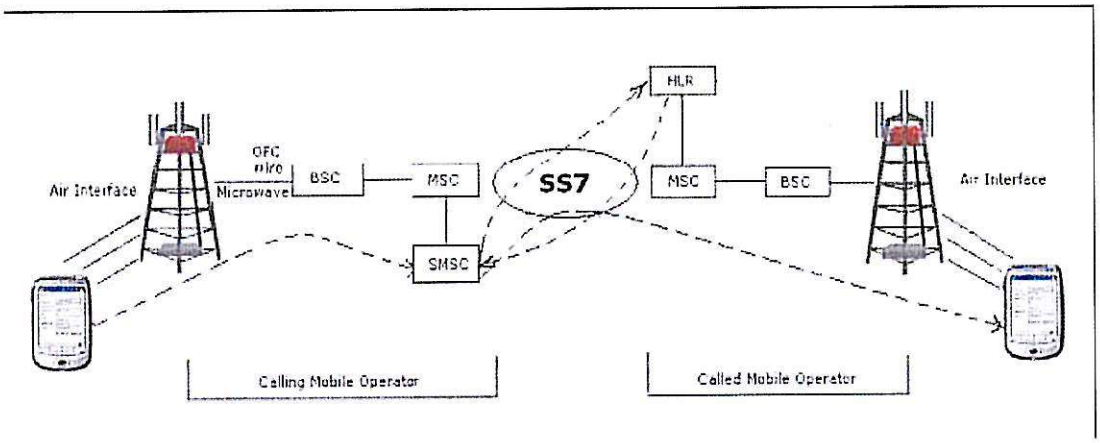
In Global System for Mobile (GSM), an SMS originated from the mobile subscriber of operator A is directly sent by the SMSC to the mobile subscriber of operator B. To determine the status of the customer, the SMSC sends a request to the home location register (HLR) of the network to which the recipient is a subscriber. Once the HLR receives the request, it will respond to the SMSC with the subscriber's status: 1) inactive or active 2) location where

subscriber is roaming. If the response is inactive, then the SMSC holds on to the message for a fixed period. When the subscriber accesses her or his device, the HLR sends a SMS Notification to the SMSC, and the SMSC attempts delivery.

There are three steps to routing an SMS from one operator to another. First, the SMS is stored in the SMSC of the calling party's operator. Then, the SMSC of the calling party' network queries the HLR of the called party's network, in order to locate the Mobile Switching Centre (MSC) to which SMS is to be delivered. Once the request has been made and authorisation received, the SMS is routed via the MSC of the called party's network.

The SMSC transfers the message in a Short message delivery Point to Point format to the serving system. The system pages the device, and if it responds, the message gets delivered. The SMSC receives verification that the end user received the SMS, then categorizes the message as sent and does not attempt to send it again. Thus, SMS uses a store and forward method of transmitting messages to and from mobiles.

Figure: SMS Travel Path



Normally in the GSM SMS delivery, SMS termination does not require the SMSC of the network of the recipient's operator. However, in some cases like Code Division Multiple Access (CDMA) network or GSM to CDMA SMS transfer, or in case of some services like Push SMS, the recipient SMSC is also used for terminating the SMS to the recipient. In all these types of SMS transfer, the air interface-signalling channel is extensively used for terminating the SMS traffic.

With the growing convergence of networks and services, a person can send an SMS from a mobile phone, fixed phone, or even via the Internet. Since SMS uses the signalling channel as opposed to a dedicated channel, these messages can be sent/received simultaneously with the voice/data/fax service over a network. SMS supports national and international roaming.

With the mobile networks based on all the technologies like GSM, CDMA etc. supporting SMS, SMS is more or less a universal mobile data service and can reach any other mobile user around the world.

Customers find it convenient but the resources used of the other mobile carrier gives rise to demands for revenue sharing of SMS Calls (Note: within the purview of ICCC). The interconnection networks of different carriers shall provide for SMSs between their customers.

4.7 Technical Service Commitments and Fault Repairs

4.7.1 General Commitments

Each Party shall:

4.7.1.1 Be responsible for operating its own system and ensuring its safety.

4.7.1.2 Ensure that the Services it provides to the other party are of the quality comparable to what it provides to itself and to its affiliates.

4.7.1.3 Maintain and repair faults on Interconnection Links in the same manner as it maintains plant and repairs faults within its own Network.

4.7.1.4 The performance standards that shall apply for the various types of interconnecting links between two Networks shall be as indicated in Schedule I.

4.7.2 Quality of Service

The Carriers shall ensure that the respective interconnect facilities delivered at each Point of Interconnection (POI) conform to the applicable Quality of Service (QOS) standards and Technical Specifications set out by PANGTEL. The agreed QOS (including GOS) shall be indicated in Schedule I.

4.7.3 Fault Reporting

4.7.3.1 Fault reporting mechanism for interconnect operational problems will be worked out jointly by both Parties and upgraded from time to time.

4.7.3.2 Each party shall advise its customers to report all faults to its own Fault Reporting Centre. If a fault report is received at an incorrect Centre, the complainant shall be directed to the correct Centre.

4.7.3.3 The party who first becomes aware of the fault shall promptly notify the fault to the other.

4.7.3.4 If one party identifies a fault occurring in its system or if a major fault occurs, that may have adverse effect on the other party's system; the first will promptly inform the other party of the actions being taken to resolve the problem.

4.7.4 Network Restoration:

The Parties will manage their Networks to minimise disruption to Services and, in the event of interruption or failure of any Services, will restore those Services as soon as is reasonably practicable in accordance with the schedule jointly set. Each Party shall manage, notify and rectify faults arising in its Network, which affect the

provision of any Services by the other party, as it would in the ordinary course for similar faults affecting the provision of Services by itself.

4.7.5 Operating Instructions:

The Parties will develop and record in the form of operating instructions, a series of agreed response times for different network fault conditions on the basis of following principles:

(a) Clearance of faults affecting the network will take priority over the clearance of individual faults.

(b) They will automatically bring in any standby capacity available and/or carry out network management actions to restore service.

(c) They will observe equipment alarms and carry out testing to identify the nature and location of the fault in co-operation, as deemed necessary, with the other party.

(d) They will keep each other continually informed of progress on restoration of faults during a breakdown.

(e) If temporary repairs are made by one, the other party must be informed of this fact. Other party shall also be informed of service impact of temporary repair and the estimated time of full restoration.

4.7.6 Planned Maintenance works:

4.7.6.1 Each party will give at least 7 days notice of any planned maintenance work that may affect the other's system.

4.7.6.2 Each party shall make its best efforts to minimise disruption and where possible alternative routing will be provided. Equipment design and link engineering should have such redundancy that for any planned work the prescribed quality of service is maintained.

4.8 Technical Specifications and Standards

4.8.1 National Standards

Interconnection of Networks and Systems shall conform to National Standards as set by the PANGTEL and Regulations applicable to Telecommunications Services. In the absence of National Standards, they shall conform to the relevant Recommendations of the ITU and other bodies, e.g., ETSI, ITEF, etc as approved by PANGTEL. References to typical standards have been indicated in Schedule 4 given in the Annex.

4.8.2 Signaling and Synchronization

Inter-network Signalling shall be on the basis of CCS 7 (ISUP) in the format standardised for the country. The signal interchange points shall be those associated with the POIs.

The systems shall be synchronised in a manner required to meet National Standards. Signals, derived from the National Master Clock or GPS shall be used for synchronisation of the network of both the parties at the Network-Network interface.

4.8.3 Interface Approval

Neither Carrier shall connect or knowingly permit the connection to its System of any equipment that does not conform to ITU standards or not approved by PANGTEL for attachment to such Carrier's System. Both Carriers shall ensure that the equipment at the POI has been approved by the competent authority in accordance with the relevant Standards.

4.8.4 Transmission and Performance Standards

4.8.4.1 Transmission Interface

The normal interface for network interconnection shall be at the E1 level. However, higher order interfaces may also be used by mutual consent. In case of interconnections involving ISPs, nx64 kbit/s interfaces may also be used by mutual consent. National standards and ITU-T G. Series Recommendations shall apply.

4.8.4.2 Switching

Switches shall conform to the National performance standards and ITU-T Q. Series Recommendations.

4.8.4.3 Packet Network

Packet switches and interfaces shall conform to the National performance standards and to ITU-T H. Series Recommendations.

4.8.4.4 Speech Performance

Speech over the National network shall conform to the ITU-T P. Series Recommendations. Allocation of impairments shall be as prescribed in the National standards.

4.8.4.5 PSTN/ VOIP Interoperability Standards:

For Interoperability between Circuit switched and Packet switched IP based networks, the interface will conform to relevant national standards or guidelines of PANGTEL. Media gateway, Signalling Gateway and Gatekeeper shall conform to relevant ITU-T Recommendations and Internet Engineering Task Force (IETF) standards, as applicable.

4.9 Network Management, Maintenance & Measurement

4.9.1 The Parties shall provide, install, test, make operational and maintain all interconnection facilities on their side of Point of Interconnection (POI) unless otherwise mutually agreed. The parties shall take full precautions to keep operational the equipment of other party installed in their premises for interconnect purpose and shall also allow access to duly authorised representative of the other party to such equipment for provisioning, maintenance or monitoring purposes.

4.9.2 All measurements of calls and traffic shall be related to the POI. Where such measurements cannot be made at the POI, a mutually agreed procedure shall be followed.

4.9.3 Each **Party** shall employ its own network-specific, Network Management System, aimed at efficient traffic and facility management of its own network. In particular, each party shall make arrangements to prevent overload of other interconnecting systems.

4.9.4 The Network Management System employed shall be non-intrusive.

4.9.5 Each **Party** shall prevent any signal from its network or the Network Management system from interfering with the other Operator's network, so as to maintain network integrity.

4.9.6 Each **Party** shall make traffic and link measurements, and inform the other about any foreseen degradation in traffic performance, before it manifests through deterioration of QoS, to allow the other operator to initiate any viable action for diversion or rerouting of traffic through the network of a third operator.

4.9.7 At every Point of Interconnect between the two networks, congestion signal will be conveyed through CCS7, wherever available.

4.9.8 IP Platforms

Each **Party** using IP based networks shall have a Network Management System based on the Open System Protocol (OSP) for Interoperability of Multi-operator networks.

4.10 Network Integrity, Safety & Protection

4.10.1 General Principles:

4.10.1.1 The two Parties shall agree to maintain network integrity and to take measures for adequate protection and safety.

4.10.1.2 Integrity of a network refers to the ability of its systems to preserve and retain their original operational states and remain unaffected by interconnection with other networks.

4.10.1.3 All technical staff will need to be screened and accredited before entry into another carrier's site for both technical competence & safety, and security purposes. Such accreditation shall be carried out by a body duly determined by PANGTEL.

4.10.2 Maintenance of Network Integrity.

Each Party shall ensure:

- that adequate measures are taken to prevent the transmission of any Signalling message across the connecting network, which does not comply with interworking national specification;
- that efficient arrangement for screening functions and rejection of non-compliant messages are established to detect signals outside the Interworking national specification.

4.10.3 Safety and Protection.

4.10.3.1 Each Party is responsible for the safe operation on its side of the Network, and shall, so far as is reasonably practicable, take all necessary steps to ensure that its side of the Network and its Network operations:

- do not endanger the safety or health of any person, including the employees and contractors of the other Party; and
- do not cause physical or technical harm to the other party's Network, including but not limited to causing damage, interfering with or causing deterioration in the operation of the first mentioned Party's Network.

4.10.3.2 It shall be ensured that in case the transmission of traffic to either party's network requires power feeding, then not only the safety of the equipment shall be ensured but also that of the personnel maintaining it. In this regard, safety requirements of accidental human touch of feeding voltage as prescribed in ITU Directives.

4.11 Operator assisted, Directory Enquiry and other Services

4.11.1 Assisted Calls

When the services of a **Party** are used for completion of a special service call or for supply of information, the **Party** supplying the service shall be compensated as mutually agreed.

4.11.2 Directory Enquiry

Each **Party** shall provide access to its Public Directory Services for the other **Party's** subscribers on mutually agreed terms. Each **Party** shall include the other **Party**'s information on Directory Services access numbers in their respective telephone directories and Directory Inquiry Services.

4.11.3 Customer Services

Each **Party** shall be responsible for making arrangements to provide prescribed Customer Services to its Customers.

4.12. Access to Interconnection Gateway Facilities

4.12.1 Interconnection Gateways

Any switch that is used for transiting traffic, from one network to another network in a Multi-operator environment may be termed as an Interconnection Gateway. The functionality of such Switches should conform to the relevant national specification.

Operational and Planning requirements of the Interconnect Gateway shall be as laid down in the Regulations.

4.12.2 Access to International Gateway

The Cellular Mobile Operators shall interconnect their respective MSCs directly or indirectly through the Interconnection Gateway to the International Gateway of the International Service Provider (PNG Telikom) for handling the originating and terminating international traffic of their subscribers.

4.13 Inter-Carrier Data Transfer

4.13.1 Subscriber Data

Party A shall be responsible for the data of its subscribers and Party B shall be responsible for the data of its subscribers.

4.13.2 Inter-Carrier Data

All Carriers shall make arrangements for collection, storage and transfer of data relating to traffic passing through their network to facilitate inter-carrier charging and settlement.

Billing System may be based on Call Data Records (CDRs) on Call-by-call basis where not feasible on Bulk Billing basis. The transit switch generates CDRs, which is inputted to the Billing Systems.

For such CDR based systems, typically the following information is required:

a) Carrier Related Information

i) Identity of Originating Carrier
ii) Identity of Terminating Carrier
iii) Identity of Transit Carrier, if any.

b) Geographical Information

i) Originating Charging Area Code
ii) Terminating Charging Area Code.

Apart from transfer of information during the call, data may also be stored in appropriate CDRs.

4.14 Fundamental Technical Plans

4.14.1 General

All Carriers shall adhere to the National Fundamental Technical Plans to the extent applicable to their networks subject to conditions stipulated in the License Agreements. These plans for PTN comprise:

- Switching & Routing Plan;
- Numbering Plan;
- Transmission Plan;
- Signalling Plan; and
- Synchronization Plan.

Traditionally, in a government monopoly environment, the government operator formulated these plans based on ITU recommendations. This function now is that of PANGTEL.

5. CONFIDENTIALITY

5.1 Each **Party** may disclose to the other **Party** such proprietary and confidential technical information in written, oral, graphic or any other forms, as may be agreed to, for the purposes of this code only.

5.2 Each **Party** shall guarantee that the equipment / systems and other articles of the service commissioned / provided by it for the purpose of interconnection or usage by the other Party in this code, does not infringe any copy-right or trademark or on intellectual property rights of any third party.

5.12 Notwithstanding any provision in the access agreement and unless otherwise provided the **Parties** shall not reveal, make known or divulge to any third party in any manner howsoever the contents of those aspects of the access agreement (in full or in part) which the PANGTEL or ICCC has withheld from publication.

6.0 LIAISON AND COORDINATION

6.1 Services Management

Access Providers offering or providing interconnection services shall designate a Services Manager to deal with other Service Providers requiring interconnection and other services. The role of the Services Manager is to facilitate communication between Service Providers on commercial and technical aspects of interconnection and the provision of other services to Service Providers.

Access Providers should agree to meetings with other Access Seekers within five (5) working days of the meetings being formally requested.

6.2 Joint Technical and Operational Committee

Interconnected Service Providers should establish a joint technical and operational committee. The joint technical and operational committee should facilitate discussion to reach mutually acceptable agreements on technical, operational, planning, billing and other service aspects of interconnection.

The composition of the joint technical and operational committee should be agreed upon by the Carriers and could be reconstituted as and when required.

The joint technical and operational committee should meet at regular intervals with an agenda agreed in advance and may cover one or more of the following areas:

- New Points of Interconnection
- Analysis of traffic levels
- Service quality
- Capacity requirements
- Fault analysis
- Network and/or service changes
- Any other technical and operational issues associated with interconnection.

Service Providers should establish working groups of project managers, operational staff and technical personnel where required to coordinate all mutual activities relating to implementation of interconnection, amendment of schedules, reconciliation, etc., and lay down the detailed procedures required for smooth implementation of the agreements and address specific issues as they arise.

7. AGREEMENT STRUCTURE

7.1 General

i. The technical aspects of interconnection in conformity with those indicated in Chapter 4 must be explicitly stated in a comprehensive interconnection agreement.

ii. The type of equipment that will be interconnected, terminal point, and related technical arrangements, will be stated in the Schedules, including but not limited to:

- Switches (location, type and function);
- Interconnecting circuits (location, number, speed/capacity and type);
- Signalling routing and synchronisation; and
- Telecommunications services provided via the interconnected networks.

iii. The following will also be stated :-

- the agreed capacity of the interconnection and the obligation of the access provider to provide that capacity;
- dates, time periods and deadlines for establishing interconnection;
- testing arrangements and protocols;
- technical conditions, including interconnection parameters:
  - the procedure for settling interconnection;
  - a procedure for amending the interconnection agreement;
  - arrangements for common access to emergency calls;
  - engineering details of access to operator assistance; and
  - Call Line Identification data exchange.

7.2 Terminal Points at the POI

The interconnection agreement shall contain a specific description of the physical location and implementation of the POI and shall adhere to the parameters stipulated in the Fundamental Plans for:-

- Transmission Plan – Network Levels;
- Call Routing
- Synchronisation Plan; and
- Signalling Plan.

7.3 Physical Points of Interconnection

i When carriers are required to provide network interconnection service, the physical interconnection points shall be established as required through negotiations.

ii When a carrier offers network interconnection services, the interconnection points shall be set up at any points that are compatible in technology subject to clause 4.5.1 & 4.5.2. When a carrier is unable to set up interconnection points, it shall provide reasons therefore in writing to the party that demands network interconnection and copy to PANGTEL.

iii The physical interconnection points may take place at any of these points:

- Local switches
- Local tandem switches
- Toll switches
- International switches
- Dedicated tandem switches

It is reemphasized that the following principles shall be followed in evaluating the physical point of interconnection:

(a) whether the network interconnection affects the security and/or the reliability and technical performances of telecommunications networks, such as the ratio of trunks or number of exchange lines to the POI.

(b) Space and location shall not be allowed to be used as reasons for technical unfeasibility.

8. ADMINISTRATION OF THE CODE

8.1 Consistency of the Code

This Code is premised on the Act and should be read with the general carrier "Telecommunication Interconnection Code of Practice" which is developed by the ICCC.

All carriers and service providers shall comply with this Code and PANGTEL may penalize violators of this Code in accordance with the Act.

8.2 Change to the Code

PANGTEL may review the Code as stated in Section 1.6 and make changes it feels necessary and appropriate as and when required. All stakeholders including the Commission, all licensed carriers and other telecommunications industry players shall be consulted before any changes to the Code are proposed and confirmed.

8.3 Enforcement and Compliance of the Code

PANGTEL is responsible for administering this Code and shall consult the Commission as and where appropriate.

Any party that feels unfairly marginalised by the access provider vis-à-vis technical interconnection arrangements may notify PANGTEL at the earliest possible opportunity.

8.4 Availability of the Code

a) The updated versions of the Code can be accessed from the PANGTEL website: www.pangtel.gov.pg or enquiries may be send to the following :

The Director General,

PANGTEL,

P O BOX 8444,

BOROKO,

National Capital District(NCD),

PAPUA NEW GUINEA(PNG)

Telephone: + (675) 300 4009 or Fax: +(675) 325 6868

Email: cpunaha@pangtel.gov.pg

ANNEX

SCHEDULE 1

POINTS OF INTERCONNECT

List of POIs

Station/Area	Type of Traffic	POI	QOS

Note 1: Type of Traffic means local, domestic trunk, international trunk, special services etc.

Note 2: Outgoing, Incoming and Transit Traffic should be shown separately

Note 3: For each POI, a physical description should be prepared, separate from the main interconnect agreement

Each POI should be described in the following format:

Item	Description	Remarks
Location of the POI	Address:	
Party responsible for setting up and maintaining the POI	Name and address	
Physical description of POI	Ex: Physical cable (gauge) or channel interface (ITU-T specification	

Note: Both the parties will update Schedule I, at intervals of 6 months or when ever new POIs are added in a licensed service area.

Performance Standards

	Type of Network		
	Local	Trunk	International
1. System Availability a. Group Down Time b. MTTR 2. Answer/Seizure ratio			
2. Bit Error Rate			
3. Slip			
4. Others			

SCHEDULE 2

TYPICAL SCHEDULE OF STANDARDS AND SPECIFICATIONS

S. No.	Item	Specification	Remarks
1	Switching Interface	ITU-T E770	(PSTN and Mobile) (PSTN & Private basic operators)
2	Transmission Interfaces	ITU-T G.703/ G.707 3/96) G.782/ G.783 G/VAN-02/01 Sept, 96	2/8/34/140/ 155 Mbps For V 5.2 interface
3	Signalling CCS 7	ITU	CCS 7 Plan MTP & ISUP SCCP STP
4	Synchronization		As per National Synchronization Plan
5	Junction Traffic		Maximum loading = 0.7 Er
7	Junction Testing		
8	Higher Layer Protocols		
9	Interface with IP Network		Remote Access Server TCP/ IP Internet user devices
10	Electrical safety requirements		
11	Quality of telecom services	Regulations	ITU-T E 800
12	Terms and definitions	ITU-T B.13	All the definitions shall be considered as per B series of ITU-T Recommendations