

Tender Document

for

**Supply, Installation, Testing and  
Commissioning of a Central Billing Centre  
on turn-key basis**

**Book-2**

**TECHNICAL CONDITION AND SPECIFICATION OF  
TENDER & CONTRACT**

**Bangladesh Telecommunications Company Ltd**

TENDER DOCUMENT FOR BILLING CENTRE OF BTCL

BOOK TWO

TECHNICAL CONDITION AND SPECIFICATION OF TENDER & CONTRACT

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## Book Two

### Chapter 1

#### SCOPE OF WORKS OF THE BID

- 1.1 In order to setup its own Centralized Billing Centre, BTCL intends to procure all the required products and services for the work as mentioned subsequently in this Bidding Document in the name of "**Supply, Installation, Testing and Commissioning of a Central Billing Centre on turn-key basis**".
- 1.2 Unless otherwise described in the tender document, the scope of works and provision shall cover survey, designing & drawing, manufacturing, supplying, installing, testing, commissioning of equipment, **software and materials and their related facilities and services on "Full Turn-Key" basis**. In order to setup its own Centralized Billing Centre, BTCL intends to procure all the required products and services for the work as mentioned subsequently in this Bidding Document in the name of "**Supply, Installation, Testing and Commissioning of a Central Billing Centre on turn-key basis**".
- 1.3 For this purpose, this Tender proposes to procure equipment, materials, software and services for the following systems :
  - a) **Core Equipment for a Central Billing System** having the general Network Configuration as shown in *Annex 1* and having Present Capacity requirements as described in this document
  - b) Data Equipment and ancillary items for Billing System
  - c) **AC/ DC Power Systems** for all network element
- 1.4 Detail Technical Specifications of various components of the required system/service are given in subsequent chapters of this document.

#### 1.5 **Spare parts and consumables to be used before end of Guarantee Period**

All necessary spare parts and consumables, to be used during installation, testing & commissioning and operation of the systems, *up to the end of Performance Guarantee Period*, shall be supplied by the Bidder at his own cost.

#### 1.6 **Training**

The Bidder shall provide the training to BTCL Engineering personnel. The curriculum shall be enough to facilitate transfer of technology for planning, designing, expanding, provisioning and proper operation & maintenance of all the systems covered by this purchases and general concepts on theoretical aspects of relevant technologies.. The bidder shall quote for the relevant costs (*per person basis*). Failure to quote shall be treated as "non compliance" and it shall be considered that the bidder proposes to provide this service totally "free of charge" to BTCL. If

the bidder does not agree to this basic minimum format, its disagreement shall be considered as a “**major deviation**”.

### 1.6.1 Factory Training

The bidder shall provide high-level training in their factory/ lab premises. The details are as follows :

- a) Number of BTCL personnel : 5 (five)
- b) Number of minimum working days : 20 (twenty)
- c) Per diem charge to BTCL Trainee : US\$ 60 (Six) per day (*including all holidays in between*) per person
- d) Other facilities : Local Transportation  
Standard Accommodation  
Medical Services (*if required*)  
Both way Air Ticket

### 1.6.2 Local Training

The Bidder shall provide practical Equipment based training in Bangladesh at BTCL premises. BTCL shall provide the hosting site including furniture, but the bidder has to arrange all logistic supports. The details of the local training shall be as follows:

i) High-level Training for all equipment & modules :

Shall include courses in planning, designing, expansion techniques, transfer of technology and basic aspects of operation of maintenance of all equipment and modules of the billing system.

- a) Number of BTCL Engineer : 5 (five)
- b) Number of minimum working days : 20 (twenty)
- c) Per diem charge to BTCL Executives : BD Taka 500(five hundred)  
*per day per person for working days*

ii) Mid-level Training for each module :

Shall include courses in transfer of technology, provisioning and detail aspects of operation of maintenance and system administration of all equipment and modules of the billing system. The requirement for each module and its related equipment shall be :

- a) Number of BTCL Engineer : 5 (five)
- b) Number of minimum working days : 15 (fifteen)
- c) Per diem charge : BD Taka 500(five hundred)  
*per day per person for working days*

iii) Beginners'-level Training for each module :

Shall include courses in detail aspects of operation of maintenance and data entry operations of all equipment and modules of the billing system. The requirement for each module and its related equipment shall be :

- a) Number of BTCL Engineer : 10 (ten)
- b) Number of minimum working days : 10 (ten)
- c) Per diem charge : BD Taka 500(five hundred)  
*per day per person for working days*

iv) Training for Database Management/ Administration

Shall include courses in detail aspects of management and administration of the Oracle database system. On completion of training, each of the trainee will be given a authorized certificate for completion of such course. The requirement of such program shall be :

- a) Number of BTCL Engineer : 05 (five)
- b) Number of minimum working days : 20 (twenty)
- c) Per diem charge : BD Taka 500(five hundred)  
*per day per person for working days*

v) Payment of per-diem charges for each trainee :

The bidder has to pay the per diem charges to each of the trainee before completion of the relevant training course and take signature of receipts and submit the receipts to the relevant office of BTCL with its request for issuance of completion certificate.

## 1.7 Inter-connections

- i) The Bidder shall be responsible for making inter-connection facility (including supply of all required equipment & material, inter-connecting cables, cable-trays, connectors at both ends of inter-connecting cable and related service) between its own system and BTCL's existing System. The Bidder shall also be responsible for connecting all the concerned equipment with relevant IP backbones. BTCL shall provide only the capacity in the transmission systems. All costs for materials and service shall be quoted by the bidder in his offer. Failure to quote shall be treated as "non compliance" and it shall be considered that the bidder proposes to provide this "**free of charge**" to BTCL.
- ii) Probable requirements of the equipment & materials, connectors, inter-connecting cables, cable tray etc. should be checked by the bidder, before the submission of the bid.
- iii) The bidder shall also be responsible to ensure that the NGN-based exchanges already installed in BTCL's network and/ or under installation during installation of the Billing System can be inter-connected live/ on-line to the supplied billing system. Bidder will be responsible to ascertain the necessity of additional hardware/ software/ modules at its own end and quote for such items in unit cost basis. Under no pretext, later requirement of any new and/ or undefined shall be entertained by BTCL.

- iv) Bidder shall also suggest and quote, as optional offer, for systems to allow processing of subscriber billing now prevalent in BTCL's local switches. The bidder is required to make initial/ prior survey at its own costs.

## 1.8 Inter-working with the Existing Systems

The Bidder shall be responsible to ensure that all the system covered by this purchase shall be able to inter-work with all the existing systems of BTCL. The bidder shall make necessary survey before submission of the bid. The bidder shall also be entirely responsible to solve any mismatch, if encountered. The Bidder shall quote any extra cost, if necessary. If the bidder fails to quote for this work, he shall have to complete this work *at his own cost*. No subsequent additional request for costs for required interfaces, if any, shall be entertained. Moreover, the failure to quote shall also be treated as a **"non compliance"** during evaluation of the bid.

## 1.9 Earth Connection of all equipment

- i) BTCL shall provide "Earth Bus-bar", one each for AC & DC loops, in the main equipment room at each site.
- ii) The bidder will be responsible to connect all its equipment in the relevant bus-bar with standard earth cables of proper (minimum 25mm) size.
- iii) Before connecting to the earth bus-bar, the bidder will take care to ensure that BTCL's earth connection satisfies its standard technical and other requirements.
- iv) All costs for materials and service shall be quoted by the bidder in his offer. Failure to quote shall be treated as "non compliance" and it shall be considered that the bidder proposes to provide this *"free of charge"* to BTCL.

## 1.10 Installation Material

- i) The Bidder shall quote for all installation material for all of the equipment covered by this purchase. The Bidder, in his offer shall show, details of required installation material, for each equipment, per site separately, to come to a total price for "Installation Material". The material shall include all type local material like fuel, power etc necessary to be used during installation and testing functions.
- ii) These price breakdowns will be used for calculating revised total price if there is any subsequent change in number of sites/amount of equipment.
- iii) If the bidder fails to give detail breakdown, BTCL shall reserve the right to draw its own conclusions, as and where necessary.
- iv) Failure to give detail breakdown shall also be treated as **"Minor deviation"**.

- v) All costs for materials shall be quoted and failure to quote shall be treated as “non compliance” and it shall be considered that the bidder proposes to provide these material totally "free of charge" to BTCL.

### 1.11 Installation and Commissioning Services

- i) The Bidder shall be responsible to provide all services related to installation, testing, **initial provisioning, initial data entry, initial rating data entry & programming**, commissioning and cut-over services for all equipment covered by this purchase. The Bidder, in his offer, shall show details of required installation and commissioning services, for each equipment separately, per site to come to a total price for “Installation and Commissioning Services”.
- ii) These price breakdowns will be used for calculating revised total price, if there is any subsequent change in number of sites and/or amount of equipment.
- iii) If the bidder fails to give detail breakdown, BTCL shall reserve the right to draw its own conclusions, as and where necessary.
- iv) Failure to give detail breakdown shall be treated as “**Minor deviation**”.
- v) All costs for service shall be quoted and failure to quote shall be treated as “non compliance” and it shall be considered that the bidder proposes to provide this service totally "free of charge" to BTCL.

### 1.12 Survey, Network Planning & Design Services

- i) As part of its turn-key responsibility, the successful bidder shall be responsible to provide all services related to detail installation survey, planning & design for all equipment/ system covered by this purchase.
- ii) A report shall be submitted to BTCL's relevant office after completion of that work.
- iii) All costs for materials and service shall be quoted and failure to quote shall be treated as “non compliance” and it shall be considered that the bidder proposes to provide this service totally "free of charge" to BTCL.

### 1.13 Maintenance Spares Price List

1.13.1 BTCL reserves the option to buy maintenance spares at any time in any quantity it deems fit and necessary.

1.13.2 The bidder shall quote for such list (in Form D.1 of Book 2). Such quotation is mandatory and failure to quote shall be regarded as “Non compliance” and it shall be concluded that the bidder intends to give any number of all spares to BTCL at totally “free of cost” to BTCL.

1.13.3 The list shall include FoB unit prices for at least 2 (two) units of all possible replaceable items/cards/ modules (as the case may be) for all equipment and systems covered by this purchase.

1.13.4 Though contracting for such spares will be optional/ discretionary choice for BTCL, the total price of the list will be added in its quoted price during comparative evaluation of the financial bid.

1.13.5 If the bidder fails to include any item/ card/ module in the supplied list, but during the life-time of the equipment requirement of such an item/ card/ module becomes imperative, the bidder shall have to supply any required number of such item/ card/ module totally “free of charge” to BTCL.

#### 1.14 **Documentation**

- i) The Bidder shall supply at least (but not limited to) the following documents before PAT of each site/ system/ equipment.
  - a) Technical Documentation for all relevant equipment/ system - 1 set of hard copy and 1 set in CD.
  - b) As-built installation drawings for all relevant equipment/ system : 1 set in CD and 1 set in hard copy.
  - c) Station AC & DC power wiring diagrams : 1 set in CD and 1 set in hard copy per site.
- ii) Detail technical document for all systems set in CD and 1 set in hard copy.
- iii) Bidder shall include in his offer prices for these Documentation. Failure to quote shall be treated as “non compliance” and it shall be considered that the bidder proposes to provide this "*free of charge*" to BTCL.

#### 1.15 **Quotation for additional equipment**

If the bidder thinks that any additional equipment, not listed in this document, is needed for proper implementation and subsequent O&M of the proposed equipment, and also finds any equipment mentioned in this document but not listed in the BoQ form, he shall quote for such equipment. If any such additional equipment are not quoted, it shall be deemed that no additional equipment are necessary for proper implementation and subsequent O&M of the proposed system. If during implementation and subsequent O&M up to performance guarantee period, either the bidder or the purchaser finds that any additional equipment are obligatory for proper implementation and subsequent O&M of the network, the bidder shall be liable to supply such systems or equipment, whatever be the required quantity, “free of charge” to BTCL.

#### 1.16 **Unit Price for Future Orders**

- i) The unit prices for all future orders for all equipment and services covered by this purchase shall be equal to or below the prices quoted in the original contracted offer.
- ii) The Bidder shall quote, with his offer, a detailed ‘**Future Order Formula**’ separately for equipment and services in Form E and submit in the Financial Documents.

- iii) The new prices as per quoted future order formula shall become effective only for orders placed after Guarantee Period and up to the life time of all equipments, optical fibers and services as per BOQ under this purchase.
- iv) All parameters of the quoted formulae must be described clearly.
- v) Any disagreement/deviation/non-quotation will be treated as “**Change of substance**”.

#### **1.17 Possibility of change in Scope of Work and BoQ**

The Bidder shall consider that during negotiation of the contract, the size, number, location of nodes and other equipment and subsequently the total BoQ may change, depending upon the actual requirement during BoQ preparation.

#### **1.18 Omission of any Mandatory Items in the Contracted BoQ**

The bidder shall note that, even if any or many work(s), equipment or service(s) mentioned in this document as mandatory, is not mentioned in the contract BoQ for any reason, the bidder shall not be automatically relieved of his responsibility for those items. But if such omission(s) has (have) previously been agreed, in writing, by BTCL’s BoQ team, the bidder shall not be made liable for such omitted items. Such approved omissions, if any, shall have to be put either into the contract document or into any other document which subsequently is declared as part of the contract.

#### **1.19 Prevalence of different clauses, chapters and books**

If, for any item, the contents of a Clause of any Book contradict with the contents of any other Clause of the same or other Book of the Tender Document, the prevalence of the Clause shall be as follows :

- a) In all cases, regulations of Procurement Policy of BTCL (PPB) shall prevail over this Tender Document
- b) In case of different Books, Book Two shall supersede Book 1;
- c) In case of same Book, later page shall supersede previous page
- d) In case of same page, later line will supersede previous age
- e) In case of same Chapter, later Clause shall supersede previous Clause.
- f) In case of later corrections by BTCL, corrections will prevail with its due position.

#### **1.20 Deviations from BTCL's requirements**

The bidder shall note that, during submission of the bid, if he does not comply and/or disagree to any or many specification, terms and/or conditions set forth in this document and/or proposes any alternate specification, terms and/or conditions; such non-compliance and/or disagreement and/or alternate specification, terms and/or conditions shall not be binding upon BTCL until and unless such non-compliance and/or specification and/or terms and/or conditions have been accepted by BTCL and has been incorporated in writing in the Purchase Contract and/or any other document which has been declared as part of the contract.

### 1.21 The Proposed Network Architecture

- i) The proposed network architecture is shown in *Annex 1* of this document.
- ii) However, the bidder will note that, they are open to propose any alternate architecture which fully fulfils the requirement of the proposed system.
- iii) The bidder, in its technical proposal, shall provide details of its proposed architecture.
- iv) The proposed architecture must allow deployment of hardware and support modules from any vendor/ manufacturer. If the proposed architecture does not allow usage of third party hardware and support modules during subsequent expansion/modification, such proposal will be regarded as having reasons to declare the proposal to have “Change of Substance”
- v) The proposed architecture must be user friendly.

### 1.22 Physical Requirement for all equipment

All components of all of the equipment shall be of highest possible quality design and fully tropicalized to be used for continuous operation. The metal surface shall either be galvanized or painted by spray or plated with surface treatment. There shall be no sharp edges or projections. All power equipment and cables shall be protected with fuses of proper ratings. All equipment racks, sub-racks and slots shall be clearly marked in English letters for proper recognition. All equipment racks, sub-racks and slots shall also be provided with proper earthing and shall be protected against any surge. Bidder will be responsible of connecting of all supplied equipment with existing Earth-bus of the building.

### 1.23 Operating Voltages

The nominal operating voltages of all of the equipment shall be as follows :

- i) For equipment operating in DC : (-) 43 to (-) 55 Volts DC with (-) 48V DC being typical voltage.
- ii) For equipment operating in AC : 230 Volts AC  $\pm$  15%, 50 Hz, Single Phase and/ or 415 Volts AC  $\pm$  15%, 50 Hz, Three Phase.
- iii) All AC powered equipment shall be connected through Inverter(s); the inverters being fed in turn by the DC power system.
- iv) Any deviation shall be regarded as “**Critical Deviation**”.

### 1.24 Climatic Condition for operation

- i) Bidder shall bear the full responsibility to ensure that all of the supplied equipment are capable of operating in Bangladesh environment without degradation.

- ii) All of the supplied equipment must work satisfactorily under the following environmental conditions :
  - a) Normal Operation
    - Temperature Range : 15°C to 35°C
    - Relative Humidity : maximum 90 %
  - b) Short-time Operation (maximum of 06 hrs at a stretch)
    - Temperature Range : 5°C to 45°C
    - Relative Humidity : maximum 95 %
- iii) Deviation from these values shall be considered as **“Major”**.

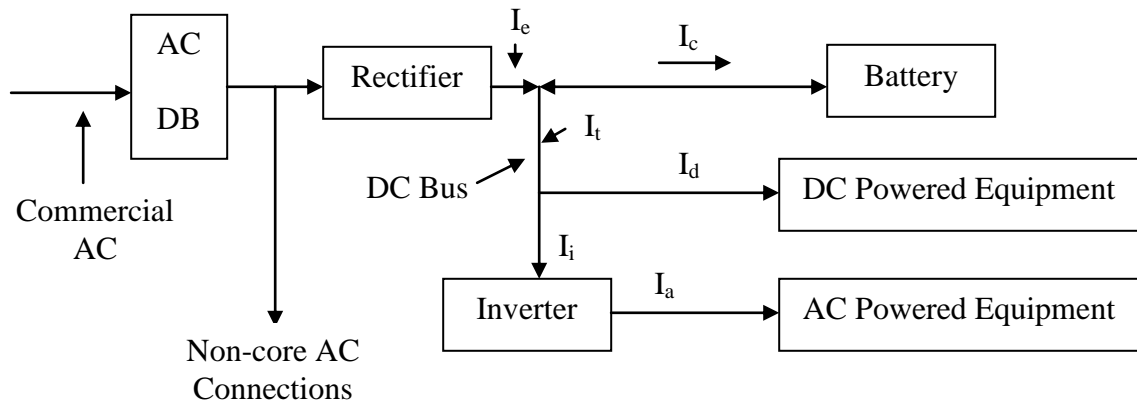
== End of Chapter One ==

## Chapter 2

### POWER SYSTEMS AND RELEVANT REQUIREMENTS

2.1 The Scope of Work of this purchase shall include necessary AC and DC Power Systems and Relevant Ancillary Equipment for operation of the main equipment. The details of power system facilities are listed below. The bidder shall quote for these items. Each of the negative deviations, if any, of the described specification and requirement shall be treated as **“major”**.

2.2 The typical power connectivity diagram of the supplied system shall be as follows :



### 2.3 Battery

i) The offer shall include necessary battery sets to provide back-up DC power source to run the system during commercial AC mains failure. The Bidder in his offer shall use the detail breakdown of its DC power requirement, as given by him in the bid offer. The required back-up time shall be 6 (six) Hrs. The number of battery sets shall be 2(two). The calculation for minimum capacity requirement of the battery shall be as follows :

- a) Total DC Amps requirement of the system load =  $I_t$  Amp
- b) Total reserve DC Amps requirement = 20 Amp
- c) Total Design DC Load =  $(I_t + 20) = I_{td}$  in Amp
- d) Allowable maximum discharge = 80 %
- e) Total required back-up capacity =  $6 \text{ hrs} \times I_{td} = C_{bt}$  in AH
- f) Total Required battery capacity =  $C_{bt}/0.8 = C_{ct}$  in AH
- g) Minimum Capacity of each Set of Battery =  $m_{ct} = C_{ct}/2$  in AH

ii) The Bidder shall give the above details of battery dimensioning at the designated sites. Failure to give detail breakdown shall be treated as non-compliance and in such case BTCL shall draw its own conclusion.

- iii) The nominal specifications of the Batteries shall be as follows :
1. Type : Sealed, Maintenance – Free Valve-regulated

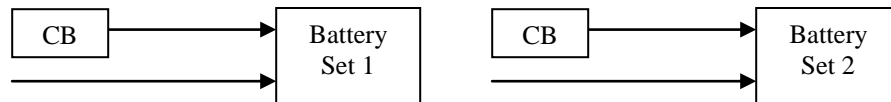
2. Nominal Rated Voltage : 48 V DC for each set
3. Rated Output : Required as per above calculation
4. Number of Cells : 24 per set
5. Nominal Voltage per Cell : 2.0 V DC
6. Life Cycle : 1200 full charge – discharge
7. Nominal Charging Voltage : 2.2 V per Cell
8. Connectors : Flat-bar

iv) The minimum guaranteed life-cycle of the batteries must be at least 5(five) years.

v) The abnormal fall in terminal voltage shall generate visual and audible alarm facilities and required alarm loops to the OMM shall be connected.

vi) **Installation Principle**

1. The Battery Sets shall be mounted in Steel Racks and the Racks fixed firmly on the floor.
3. The contractor shall supply the DC Circuit Breakers of adequate capacities, Electrical Wires, Connectors, Channels and other required accessories.
4. Electrical Wires shall be by solid copper DC cables capable to carry at least 110% of the designed load.
5. The Battery Steel-racks shall be connected to station earth-bar with 25mm green cables.
2. The contractor shall connect the Battery to Rectifier as per following diagram :



vii) The circuit-breakers (*one at the rectifier-end and the other at the battery-end*) must allow complete disconnection of the battery set during all any required O&M function.

viii) Both of the battery sets shall be connected to the rectifier through a common circuit-breaker of adequate capacity which will allow complete disconnection of both of the battery sets during any required O&M function.

ix) In order to protect the equipment as well as the battery in case of dropping of the DC voltage below a certain level, the rectifier connection to the battery sets must be provided with a device for disconnecting the battery sets as soon as such levels arrive.

x) Provisions must be available to detect the battery-voltage and other parameters.

xi) All of the exposed parts of the terminals in each cell of the battery-sets will be provided with adequate oxidation-proof covers.

x) The charging-current at 10hrs charging rate for the battery sets, as supplied, shall be carried-over to calculation for rectifier requirement.

## 2.4 Rectifier

i) The offer shall include necessary rectifier system to provide DC power source to run the DC powered equipment, to charge the back-up batteries and to provide power to the inverter system. The Bidder in his offer shall give a detail breakdown of its power requirements and the charging current for the back-up batteries at 10 hrs charging rate. The calculation for capacity requirement of the rectifier set shall be as follows:

- a) Total DC Amps requirement of the system load =  $I_d$  Amp
- b) Total Charging Amps for the quoted batteries at 10 hrs charging rate =  $I_c$  Amp
- c) Total DC load for Inverter System =  $I_i$  Amp
- d) Total Equipment load =  $I_d + I_c + I_i = I_e$
- e) Reserve = 25 %
- f) Required Rectifier Capacity =  $1.25 \times I_e = I_r$
- g) Reserved Capacity for other systems = 20 amps
- h) Total Required capacity =  $I_r + 20 = I_{tr}$  Amp
- i) Capacity of each Rectifier Module =  $m_c$
- j) Number of required modules =  $I_{tr}/m_c = N_r$  (*rounded up to the next integer value*)
- k) Number of modules to be supplied =  $N_r + 1$
- l) Minimum Installable Module Numbers in the Rectifier System =  $N_r + 4$

ii) The Bidder shall give the above details of rectifier dimensioning at the designated sites. Failure to give detail breakdown shall be treated as **non-compliance** and in such case BTCL shall draw its own conclusion.

iii) Rectifier System Specification

1.	Type	:	Switch Mode Electronic Three Phase
2.	Nominal Input Voltage	:	230 V AC, 50 Hz $\pm$ 2%, Phase to neutral
3.	Input Voltage Range	:	80 V ~ 300 V AC, Phase to neutral
4.	Nominal Output Voltage	:	53.50 V DC positive earth
5.	Output Voltage	:	40 V ~ 58 V DC
6.	Battery Disconnect Voltage	:	42 V DC
7.	Controller Configuration	:	N + 1 unit Redundancy Control Load Sharing among the units Hot Plug-in of units Output Current Limit 30% ~ 100% of rated LCD Display Menu Programmed Ability to control up to unit level
8.	Load Efficiency	:	At 80V AC input > 80% At 230V AC input > 90%
9.	Power Factor	:	> 0.98 at 50% to 100% load
10.	Voltage Regulation	:	Static $\pm$ 5% for 100% to 0% load
11.	Structure of Rack	:	ETSI, Modular Multi-unit with controller
12.	Protection Devices	:	Circuit Breaker (Line & Neutral) in Input side Auto Shutdown on Over & under Voltage input and auto restart on voltages within range Over-voltage & Surge Protection

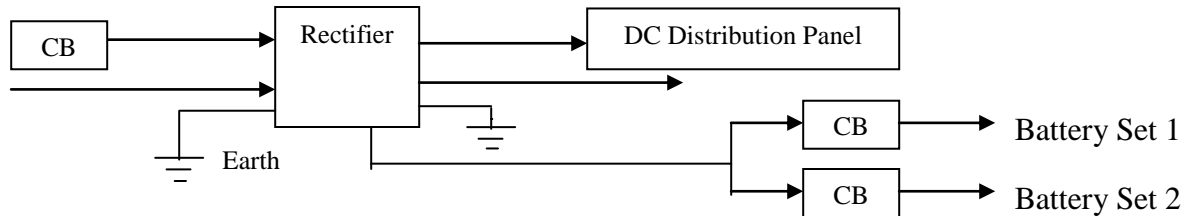
			Low Voltage Protection
			Neutral Loss Protection
			Transients
13.	Battery Charging Control	:	40% ~ 100% of 10 Hour Charging rate Boost Charging @ around 120% Manual Boost Charge Capability
14.	Alarm Loops	:	Individual Circuit Breaker for 2 sets of Battery DC loops to be extended to station alarm panel i) Mains Failure Alarm ii) Rectifier Fault Alarm iii) Incoming Circuit Breaker Trip Alarm iv) Low Battery Voltage Alarm v) High Battery Voltage Alarm vi) Battery Disconnect Alarm vii) Load Disconnect Alarm viii) Low Output Voltage Alarm ix) Low Input Voltage Alarm x) High Temperature Alarm
15.	Operating Temperature	:	0° C ~ 55° C
16.	Operating Humidity	:	10% ~ 99% non-condensing
17.	Cooling	:	natural / forced by fan units
19.	LED Indicators	:	On System i) Mains On Indicator : Green ii) Mains Failure Indicator : Red iii) Rectifier Fault Indicator : Red On Individual Unit iii) Unit Ready Indicator : Green iv) Unit Fault Indicator : Red
20.	Display Panel	:	LCD Display Panel for all control menu and system outputs (e.g., Output Voltage, Total Output Current, Load Current, Battery Discharge Current, Battery Charging Current, Battery Temperature, all types of faults etc.)
21.	DC Distribution Panel	:	Miniature DC Circuit Breakers

iv) The Rectifier Rack (*or Frame*) shall be provided with circuit-breakers (*both in AC & DC side*) of adequate capacity and shall allow full isolation from the source and the load. If the all of the rectifiers are taken-out of service, provisions shall be there for automatic diversion of the load to battery.

v) The rectifier rack shall contain one or more DC distribution panel consisting of circuit-breakers of different capacity. The number of such breakers shall be such that it will be at least 100% redundant from the quantity destined to be used for the present capacity of the equipment in site.

vi) **Installation Principle**

1. The Rectifier Rack shall be mounted firmly on the floor.
2. The contactor shall connect the Rectifier to the Station MDB as per following diagram.



3. The Rectifier will be connected to the Station Earth-bar with Copper Cable (Green – 25mm size for AC & DC sides) to carry short-circuit, surge and transient fault currents.
4. BTCL shall supply the MDB, AC Circuit Breakers and Earth bar, but the contractor shall supply all of the DC Circuit Breakers, Electrical Wires, Connectors, Channels and other required accessories.
5. Electrical Wires shall be of brands Eastern Cable/ Paradise Cable/ BRB Cable. The size of the Cables shall be 7/ .064 and the Color will be Red for Phase, Black for Neutral and Green (25mm) for Earth.
6. The contractor will also connect all of the alarm loops to station alarm gathering strip by VF cable pairs. The Strip will also be provided and installed by the contractor.

vii) The contractor must quote the prices for individual rectifier units in such a way that, BTCL can choose the required number of units.

viii) The prices for DC Breakers must also be quoted separately.

## 2.5 Inverter

i) The offer shall include necessary inverter system to provide AC power source to run all AC powered equipment. The Bidder in his offer shall give a detail breakdown of its AC power requirements. The calculation for capacity requirement of the inverter set shall be as follows:

- a) Total AC Amps requirement of the system load =  $I_a$  Amp
- b) Reserve = 25 %
- c) Required Inverter Capacity =  $1.25 \times I_a = I_i$
- d) Reserved Capacity for other systems = 40 amps
- e) Total Required capacity =  $I_i + 40 = I_{ti}$  Amp
- f) Capacity of each Inverter Module =  $m_c$
- g) Number of required modules =  $I_{ti}/m_c = N_r$  (rounded up to the next integer value)
- h) Number of modules to be supplied =  $N_r + 1$
- i) Minimum Installable Module Numbers in the Inverter System =  $N_r + 4$

ii) The Bidder shall give the above details of inverter dimensioning at the designated sites. Failure to give detail breakdown shall be treated as **non-compliance** and in such case BTCL shall draw its own conclusion.

iii) Inverter System Specification

1. Type : Switch Mode Electronic

			Single Phase
2.	Nominal Input Voltage	:	53.50 V DC positive earth
3.	Input Voltage Range	:	40 V ~ 58 V DC
4.	Nominal Output Voltage	:	230 V AC $\pm$ 10%, 50 Hz $\pm$ 2%
5.	Battery Disconnect Voltage	:	42 V DC
6.	Controller Configuration	:	N + 1 unit Redundancy Control Load Sharing among the units Hot Plug-in of units Output Current Limit 30% ~ 100% of rated LCD Display Menu Programmed Ability to control up to unit level
7.	Load Efficiency	:	At 40V DC input > 80% At 58V DC input > 90%
8.	Power Factor	:	> 0.98 at 50% to 100% load
9.	Voltage Regulation	:	Static $\pm$ 5% for 100% to 0% load
10.	Structure of Rack	:	ETSI, Modular Multi-unit with controller
11.	Protection Devices	:	Circuit Breaker in Input side Multiple circuit breakers at output side Auto Shutdown on Over & under Voltage input and auto restart on voltages within range Over-voltage & Surge Protection Low Voltage Protection Transients
12.	Alarm Loops	:	DC loops to be extended to station alarm panel i) Input Failure Alarm ii) Inverter Fault Alarm iii) Incoming Circuit Breaker Trip Alarm iv) Low Battery Voltage Alarm v) High Battery Voltage Alarm vi) Load Disconnect Alarm vii) Low Output Voltage Alarm viii) Low Input Voltage Alarm ix) High Temperature Alarm
13.	Operating Temperature	:	0° C ~ 55° C
14.	Operating Humidity	:	10% ~ 99% non-condensing
15.	Cooling	:	natural / forced by fan units
17.	LED Indicators	:	On System i) DC On Indicator : Green ii) DC Failure Indicator : Red iii) Inverter Fault Indicator : Red On Individual Unit iv) Unit Ready Indicator : Green v) Unit Fault Indicator : Red
18.	Display Panel	:	LCD Display Panel for all control menu and system outputs (e.g., Output Voltage, Total Output Current, Load Current, all types of faults etc.)
19.	AC Distribution Panel	:	Miniature AC Circuit Breakers

iv) The Inverter Rack (*or Frame*) shall be provided with circuit-breakers (*both in AC & DC side*) of adequate capacity and shall allow full isolation from the AC main source and the load.

v) The rectifier rack shall contain one or more AC distribution panel consisting of circuit-breakers of different capacity. The number of such breakers shall be such that it will be at least 100% redundant from the quantity destined to be used for the present capacity of the equipment in site.

vi) **Installation Principle**

1. The Inverter Rack shall be mounted firmly on the floor.  
2. The contactor shall connect the Inverter to an AC distribution panel for its own equipment (including supply of AC distribution panel).

3. The Inverter will be connected to the Station Earth-bar with Copper Cable (Green – 25mm size for AC & DC sides) to carry short-circuit, surge and transient fault currents.

4. BTCL shall supply the Earth bar, but the contractor shall supply all of the Circuit Breakers, Electrical Wires, Connectors, Channels and other required accessories.

5. Electrical Wires shall be of brands Eastern Cable/ Paradise Cable/ BRB Cable. The size of the Cables shall be 7/ .064 and the Color will be Red for Phase, Black for Neutral and Green (25mm) for Earth.

6. The contractor will also connect all of the alarm loops to station alarm gathering strip by VF cable pairs. The Strip will also be provided and installed by the contractor.

v) The contractor must quote the prices for individual rectifier units in such a way that, BTCL can choose the required number of units.

vi) The prices for AC Breakers must also be quoted separately.

== End of Chapter Two ==

## Chapter 3

### REQUIREMENTS OF THE DATA EQUIPMENT AND ANCILLARY FACILITIES

As shown in network diagram of Annex-1, there shall be two Routers to connect with BTCL's internal network, to connect with internet for O&M support to collect CDR of IGW (ITXs), ICX, ANS gateway and BTCL's existing Ledger Management and Accounting System. There shall have also two Firwalls and at least two LAN switches. Technical specification of these data equipment enclosed below.

#### 3.1 Router

The Router shall have the following general characteristics Each of the negative deviations, if any, of the described specification and requirement shall be treated as **“major”**..

##### 3.1.1 Connectivity

- a) The Router shall support Packet over Synchronous Optical Network (POS), ATM, Gigabit/Fast Ethernet, and Channelized STM-1 interface types.
- b) All the interface mentioned above shall be supported in the same chassis offered in the bid.

##### 3.1.2 Management

The management of the Router shall support the following:

- i) Command Line Interface (CLI)
- ii) Extensive Simple Network Management Protocol (SNMP) support including the Service Assurance Agent

##### 3.1.3 General IP Features

The Router shall be able to support the following general IP features.

- a. Internet Protocol- RFC 791
- b. Internet Control Message Protocol (ICMP) – RFC 792
- c. IP Multicast
  - i) Internet Group Management Protocol (IGMP) – RFC 1112
  - ii) PIM dense mode, PIM sparse mode
  - iii) Multicasting BGP (MBGP)
- d. User Datagram Protocol (UDP) – RFC 768
- e. Transmission Control Protocol (TCP) – RFC 793
- f. Requirements for IPv4 Routers – RFC 1812
- g. Telnet Protocol Specification – RFC 854
- h. Network Timing Protocol (NTP) – RFC 1305
- i. DHCP

##### 3.1.4 The Router shall support the following protocols from the day one.

- a. PPP
- b. HDLC

- c. Frame Relay
- d. Multi-link PPP
- e. Link Bundling for high speed links
- f. Equal load sharing on all high speed links
- g. Network Address Translation
- h. IP header Compression
- i. Compressed RTP (cRTP)
- j. GRE VPN

### 3.1.5 Routing

The routing features shall include the following.

- a. Static Routing
- b. BGP Features support - Route Target, Site of Origin, Route Refresh, ASN Override, Outbound Route Filters (ORF), VPNv4 routes filtering based on route target, Inter-AS MPLS VPN model, and BGP route reflector functionality.

The other BGP Features to be supported are:

- i. RFC1771 & 1772, BGPv4
  - ii. RFC1997, BGP Communities Attribute
  - iii. RFC 2270: Using a Dedicated AS for Sites Homed to a Single Provider.
  - iv. RFC 2385: Protection of BGP Session via the TCP MD5 Signature Option.
  - v. RFC 2439, BGP Route Flap Damping
  - vi. RFC 2796, BGP Route Reflection – An Alternative to Full Mesh IBGP
  - vii. RFC 2918, Route Refresh Capability for BGP-4
  - viii. RFC 3065, Autonomous System Confederations for BGP
  - ix. RFC 3107, Carrying Label Information in BGP-4
  - x. BGP Extended Communities Attribute
  - xi. BGP4 Multi path support to enable load balancing between multiple exterior BGP peers from the same downstream router.
  - xii. Exterior BGP multi-hop support-to-support load balancing between two EBGPeers connected by two or more links.
  - xiii. Prefix List tracking & Control to enable network administrators to control peering requirements with exterior BGP peers.
  - xiv. Policy Routing to enable flexibility in making changes to the normal routing process based on the characteristics of the traffic.
  - xv. The router shall support minimum of 50 BGP peering and 100,000 IP routes
- c. The router shall support following OSPF protocol features:
    - i. OSPF V2 as per RFC 2328
    - ii. RFC1403, BGP-OSPF interaction
    - iii. OSPF Not So Stubby Area (NSSA) RFC 3101
    - iv. RFC1850, OSPFv2 MIB
    - v. RFC2370, Opaque LSA option
    - vi. RFC 2740, OSPF for IPv6
    - vii. OSPF Stub Area
    - viii. Traffic Engineering (TE) extensions to OSPF v2 (OSPF-TE) as per RFC 3630.
    - ix. OSPF graceful restart

- d.     RIPv1 and RIPv2
- e.     IS-IS
- f.     MPLS

3.1.6 The router shall support the following MPLS/VPN features.

- i.     MPLS RFC 2547bis MPLS L3 VPN
- ii.    MPLS E-LSP and MPLS Fast Re-Route
- iii.   MPLS L2 VPN (Ethernet, VLAN, FR, PPP, HDLC, ATM over MPLS)
- iv.    The router shall support 1000 VRF
- v.     Scheduling/ queuing for 8 classes that provide configurable minimum bandwidth allocation to each class, based on 802.1p and IP TOS bits.
- vi.    Mapping of 802.1p and IP TOS bits into MPLS EXP bits.
- vii.   The router shall support mapping of 802.1q VLAN tags into MPLS labels.
- viii.   RFC 3031, Multi-protocol Label Switching Architecture
- ix.     RFC 3032, MPLS Label Stack Encoding
- x.     LDP specification as per RFC 3036.
- xi.    RFC 3270, Multi-Protocol Label Switching (MPLS) Support of Differentiated Services
- xii.   RFC 3443, Time To Live (TTL) Processing in Multi-Protocol Label Switching (MPLS) Networks
- xiii.   RFC 3469, Framework for Multi-Protocol Label Switching (MPLS)-based Recovery
- xiv.   ICMP Extensions for Multi-protocol Label Switching
- xv.    Dynamic MPLS LSP setup with signaling protocol shall be supported on all the router interfaces.
- xvi.   Shall support LSP path optimization. When new LSPs are added, LSP re-optimization allows rerouting LSPs to follow a lower cost path with no data loss to existing traffic.
- xvii.  The router shall support LSP Ping, LSP Trace route and L2VPN OAM functionalities.

3.1.7 An essential feature for Router is to support differentiated Quality of Service (QoS) for IP packets. The router must be able to deliver the following IP QoS to allow service providers to offer differentiated IP service plans to their subscribers.

- i.     Simple traffic classification (DSCP or TOS bits). The router shall support Low latency-Low Jitter for VOIP Class of service in addition to Assured Services and Best effort services.
- ii.    Traffic Control
- iii.   Traffic shaping
- iv.    Congestion control based on Weighted Fair Queuing
- v.     Congestion avoidance based on RED and Weighted RED
- vi.    Support of DiffServ
- vii.   The router shall support SLA probes to monitor the packet loss, Jitter, latency parameter with Tier-1 Peering ISPs and also the downstream service providers and corporate customers. The frequency of checking and number of packets are configurable. The SLA parameter is able to collect by SNMP MIBs by the central performance Management software.

3.1.8 Other High Availability Feature Support required from day one

- a) Virtual Router Redundancy Protocol (VRRP)

- b) Bi directional Failure Detection (BFD)
- c) Graceful Restart and Non Stop forwarding for BGP, OSPF, ISIS
- d)
- e) 50ms switchover in case of node failure on an IP forwarding network

3.1.9 The Router shall provide the following security features.

#### 3.1.9.1 Equipment Security

- a) Ensuring hierarchical user authorities, preventing unauthorized configuration of equipment
- b) Providing SSH, ensuring security for administrator accounts
- c) Supporting the application of complex ACL policies on host ports, preventing illegal access to the equipment
- d) Supporting firewall, preventing various attacks originated by users

#### 3.1.9.2 Protocol Security

- a) Supporting plain text authentication and MD5 authentication for common routing protocols, avoiding importing invalid routing information
- b) Supporting SNMP V3

#### 3.1.9.3 Security Auditing

- a) Providing various security-related statistic information and system logs

#### 3.1.9.4 Hardware configuration and Performance Requirement

The Router shall have the following capabilities.

- a) The backplane capacity shall be not less than 1.8 Gbps
- b) The Router shall support the forwarding rate of minimum of 2 million packet per second.
- c) The router shall forward the packet on Line-rate on all the interfaces.
- d) The router shall have at least 2 redundant DC power supply (-48V).
- e) All interface modules shall support hot swapping.
- f) Loss of the management link to the Network Management System must not affect the normal operation of the Router.
- g) Must support IPv6
- h) The Router Processor shall be supplied with minimum of 1 GB DRAM and 32 MB Flash memory expandable to 2 GB DRAM and 256 MB Flash memory.

#### 3.1.10 Present and Final interface capacities

The present equipped interface capacity of each of the router shall be at least 8 Gigabit Ethernet ports and 4E1. Out of 8 GE ports 3 will be SX and 5 will be optical with LX (10 km) SFP module. There shall be at least one free slot for future expansion.

## 3.2 LAN Switch

LAN switch shall be Metro Ethernet Forum (MEF) certified and shall have the following general characteristics. Any deviation shall be treated as “**Major Deviation**”.

### 3.2.1 General Features.

- a. Broadcast Storm Suppression: The broadcast storm suppression is to suppress the flooding of the unknown unicast, multicast, and broadcast packets on the network, thereby bating the affect of packet upon the network efficiency.
- b. Virtual Local Area Network (VLAN). The system shall support 4096VLAN transport.
- c. Multiple Spanning Tree Protocol (MSTP) as per 802.1S
- d. IEEE 802.1W Rapid Spanning Tree (RSTP)
- e. The system shall support IP version 6 in addition to IP Version 4
- f. The system shall support Policing and shaping the traffic with 32Kbps granularity.
- g. The system shall support minimum of 128MB RAM and 32MB Flash
- h. The switch shall support different type of optical modules which shall include 2KM, 10KM and 40KM distance support. Also it shall support 10/100/1000TX.
- i. Support of 802.1q Trunking
- j. The system shall support User configurable Management VLAN.
- k. The System shall support Port mirroring for Traffic analysis or Security Monitoring.

### 3.2.2 Network Protocol Feature

- a. Address Resolution Protocol (ARP)
- b. Dynamic Host Configuration Protocol (DHCP) Relay
- c. The switch shall support minimum of 8000 Mac address
- d. The system shall learn the MAC address using static commands or dynamic
- e. All ports shall work on either Half or Full duplex. The System shall support manual or auto negotiation feature for defining the Half or Full Duplex mode of operation.
- f. Should generate Syslog and SNMP trap for all the events

### 3.2.3 Routing Feature

- a. Static Route and Default Route
- b. Open Shortest Path First (OSPF)
- c. RIP version-1 and 2
- d.. Border Gateway Protocol (BGP)
- e. Multicast Features
- f. Internet Group Management Protocol (IGMP) Snooping Version-1, Version-2 and Version-3 shall be supported.
- g. IGMP Filtering shall be supported on both Access and trunk ports
- h. Shall Support transport of Jumbo frames ( 9K Bytes packet)
- i. Protocol Independent Multicast-Dense Mode (PIM-DM)
- j. Protocol Independent Multicast-Sparse Mode (PIM-SM)

### 3.2.4 Quality of Service (QoS)

- a. QoS is to provide different network services upon different demands.
- b. Traffic Classification and marking based on DSCP or TOS bits
- c. Traffic Policing and Bandwidth Assurance

- d. Traffic Shaping
- e. Port Flow Control
- f. Queue Scheduling
- g. Priority Tag

### 3.2.5 Security Features

- a. Hierarchical management over the users and password protection
- b. Support the supplicant authentication compliant with IEEE 802.1x protocol.
- c. Support local and Remote Authentication Dial-in User Service (RADIUS) Authentication, Authorization and Accounting (AAA) schemes.
- d. Support ACL (Access Control List), Layer 2, 3, and 4 information filter (such as packet filter based on port, source/destination MAC addresses, and packet filter based on source/destination IP addresses and upper layer protocol type).
- e. Support the simple text authentication and MD5 encrypted text authentication for the Routing protocols
- f. Support SNMP V3 encrypted authentication.
- g. Terminal Access User Security Mechanism
- h. Packet Filter
- i. 802.1X Authentication or Port Based Network Access Control Protocol
- j. The Ethernet switch should supports identification authentication over the supplicants with standard Radius Server or that extended according to the 802.1 x protocols, and local identification authentication.
- k. Secured Shell (SSH)

### 3.2.6 Switch Capacity and Configuration

Each Switch shall be supplied with the following configuration.

- i) The switch shall be supplied with dual (1+1) DC supply module for redundancy.
- ii) The Switch shall support minimum of 120Gbps of switch capacity and 100 million packets per second forwarding performance.
- iii) The switch shall be supplied with 132 MB RAM and 32 MB flash memory
- iv) The switch shall be supplied with following interface
- v Four (4) 10/100/1000-TX ports
- vi 12 (Twelve) optical GE with SFP (SX)

## 3.3 Firewall

- 3.3.1** The Bidder has to supply firewall to protect the billing system Network and should also provide secure access/ connectivity for the remote users. The firewall shall be supplied with 1+1 redundancy to avoid single point of failure. Absence of such redundancy shall be treated as “**Critical Deviation**”.

The firewall shall support the following features. Any deviation shall be treated as “**Major**”.

- a. The firewall shall support IPSEC.
- b. The firewall shall support SSL in addition to IPSEC based VPN.

- c. The system shall provide Failover Port connectivity between Primary and Secondary Firewall
- d. The system shall support DC Power Supply
- e. The firewall shall support robust stateful inspection firewall services
- f. The firewall shall support 802.1q-based VLAN support on the LAN Ports.
- g. The system shall provide flexible access-control capabilities for more applications, services, and protocols, with the ability to define custom applications and services.
- h. The firewall shall Support inbound/outbound ACLs for interfaces, time-based ACLs, and per-user/per-group policies.
- i. The firewall Appliance shall support in a secure Layer 2 bridging mode, providing rich Layer 2-7 firewall security
- j. The system should support AAA services via RADIUS, with support for redundant servers for increased AAA services resiliency
- k. The vendor shall provide unlimited license for the VPN Client over Windows 98, ME, NT, 2000, XP, Sun Solaris; Intel-based Linux distributions for remote management and access requirement.
- l. Should Support OSPF dynamic routing
- m. The Firewall shall supports load balancing across equal-cost multipath routes
- n. The firewall shall also support native IPv6 network environments and applications.
- o. The firewall shall support SSHv2, telnet, HTTP/HTTPS, and ICMP-based management.
- p. The system support dynamic, static, and policy-based NAT, and PAT services
- q. The system shall support SNMP MIB for VPN flow statistics including tunnel uptime, bytes/packets transferred, etc.
- r. The system shall support H.323 NAT Traversal

**3.3.2** The present capabilities are mentioned below. Shortage of quantities offered only for the present capabilities of each item shall be treated as “**Major Deviation**”.

Sl.	Items	Unit	Required	Bidder's Offer
<b>A</b>	<b>Firewall Present Capacity</b>			
<b>A.1</b>	<b>Processing Capabilities</b>			
1	<i>Minimum Cleartext throughput</i>	Gbps	1.5	
2	<i>Minimum Concurrent connections/Sessions</i>	Nos	500,000	
3	<i>Minimum system performance with 128 / 256 -bit IPSec encryption</i>	Mbps	400	
4	Minimum Tunnels	Nos	2000	

5	Minimum Redundant FE port	Nos	2	
6	Minimum Redundant GE port	Nos	3	

### 3.4 Network Printer

Bidder has to include one network printer to print invoices, call summary etc. The printer shall support following features. Each of the negative deviations, if any, of the described specification and requirement shall be treated as “**major**”.

- 3.4.1 Should have built-in Ethernet port
- 3.4.2 Embedded Jetdirect (Gigabit Ethernet) print server, 1 Hi-Speed USB 2.0, 1 EIO slot, 1 external and 2 internal Host USB 2.0-like ports for 3rd party connection
- 3.4.3 Paper trays – two
- 3.4.4 Input capacity Up to 600 sheets (Multipurpose Tray: up to 100 sheets; Tray 2: up to 500 sheets)
- 3.4.5 Print capacity – 50 ppm
- 3.4.6 Automatic duplex printing
- 3.4.7 128 MB memory

### 3.5 Optical Distribution Frame (ODF)

The Bidder shall provide necessary Optical fiber termination facility (*Optical Distribution Frame*) for terminating optical fibers to connect different LAN ports and other inter-connectivity.

- i) Each of the ODF shall have the following criteria and any deviation shall be treated as “**Minor**”.
  - 1) Adopting the 19” ETSI rack
  - 2) having splicing and distribution module
  - 3) Stable equipments for fixing, stripping and grounding of the optical fibers
  - 4) Suitable for ribbon and non-ribbon optical fibers
  - 5) Suitable for installation of FC, SC and ST adaptors
  - 6) Optical fibers, fiber optic pigtailed and jumpers are separate, without disturbing each other
  - 7) Fiber optic cable management
- ii) Each of the ODF shall be properly grounded as per standard specification.
- iii) The ODF shall generally be located in the same room where equipment will be installed, but it can also be shifted to any other suitable room on mutual agreement. Efforts shall be taken to keep the maximum distance between the equipment position and the ODF at 30 meters.

== End of Chapter Three ==

**Requirements of the Core Equipment for Billing Centre**

**Chapter 4**

**Part 1 : Requirements of System Infrastructure**

**4.1 Scope of the System Architecture**

The Scope of System Architecture shall compose (but not limited to) of the following functional systems :

4.1.1 CDR Collection & Mediation System

4.1.2 Rating & Charging System

4.1.3 Bill Processing System

4.1.4 Accounting and Settlement Management System

4.1.5 Partner/ Carrier/ Interconnect Management System

4.1.6 Prepaid Partner Management System

4.1.7 Database Management System

4.1.8 Data Storage System

4.1.9 Product and Service Management System

4.1.10 Web Management System

4.1.11 System Management

4.1.12 Inventory Management

4.1.13 Bidder shall note that the above names of the functional systems are indicative only. The bidders can propose any name for any of such system provided that they fulfill the necessary functional requirements of the relevant system.

4.1.14 The bidder may also quote for a functional system which combines and/ or fulfills the requirements of multiple of the above functional systems in a single of its own functional system.

4.1.15 The bidder shall have to quote for a turn-key solution which shall include network connectivity elements, application platforms and system equipment providing all required service.

**4.2 Elements of System Design**

The following will be mandatory requirements for all of the offered systems. Each of the negative deviations, if any, of the described specification and requirement shall be treated as **“critical deviation”**.

- 4.2.1 The system design will be based on multi-layered, multi-tiered, distributed and component based open system client-server architecture.
- 4.2.2 All equipment and software modules shall be of carrier class.
- 4.2.3 The system architecture must facilitate reusability, scalability, clustering, redundancy, fail-over and load balancing.
- 4.2.4 The system must have the capability and flexibility to support expansions in transaction volume, data volume, application functions, business applications and business models.
- 4.2.5 The system components (e.g. Billing, Rating, Mediation and PRM) shall be modular in order to allow future expansions and replacements.
- 4.2.6 The system must have the possibility to deploy parts of the application independently of other parts so that new components can be introduced without the need to change the application program code
- 4.2.7 The system infrastructure and configuration must ensure, for each individual service component, high security, high availability, adequate backup and adequate recovery components.
- 4.2.8 The system shall have a Data Security Policy focusing on the mechanisms to achieve confidentiality, integrity and availability, which shall act as the prevention of unauthorized disclosure, modification, and withholding of information.
- 4.2.9 The system must have the ability to maintain single data model that enables complete and consistent functionality throughout all integrated products.
- 4.2.10 The system must support and contain state-of-the art fraud control mechanisms.
- 4.2.11 The system configuration must contain adequate resiliency and provide high availability through active redundancy, guaranteed message delivery, server clustering, parallel deployment and other alternatives.
- 4.2.12 The system must support multiple levels of redundancy in order to ensure 99.999% availability, real time rating and active load balancing.
- 4.2.13 The system must have clear separation of Infrastructure Layer from the Application Layer and the Core Layer from the Customization Layer.
- 4.2.14 The system must support on-site application development works.

- 4.2.15 The system must allow flexible bundling of products and services.
- 4.2.16 The system must support real-time and/ or near real-time credit-limit monitoring and balance deduction of pre-paid carrier/ trunk partners.
- 4.2.17 The system must support real-time and/ or near real-time and/ or batch processing.
- 4.2.18 The Key Technology elements of the system must be based on open industry standards supported by major vendors or consortium of vendors.
- 4.2.19 All core components must be able to provide all functionalities & services irrespective of the type of equipment used for building the network.
- 4.2.20 The operating systems and the application modules must be based on any commercially available version of UNIX or LINUX software.
- 4.2.21 Unified principles must be used to provide data collection, data processing, system operation, system management, operation log, statistics collection and other functionalities.
- 4.2.22 The system configuration must allow introduction of new application components and addition of new hardware without any halt to or degradation of service of any in-service elements.
- 4.2.23 The system shall allow backward compatibility to future versions and upgrades to applications and hardware.
- 4.2.24 The system shall allow multiple types of billing options CDR based, per unit of time based, part of time-unit based, usage type based, flat rate based, location based, calling number based, called number based, time of the day based, day of the week based, date based, discount module based, protocol based etc.
- 4.2.25 The system must allow promotion of new services, cross-service discounting, bonuses and loyalty enhancement models.
- 4.2.26 The system must enable real-time rating for any type of communications.
- 4.2.27 The system shall allow billing of :
- i) Carrier/ Partners of national and international interconnection;
  - ii) Clearing house for international calls;
  - iii) Obligatory payments to BTRC; and
  - iv) Other relevant components.
- 4.2.28 The system shall allow future introduction of
- i) individual PSTN subscribers for their Telephone, Internet and Data usages;
  - ii) individual PSTN subscribers for their SMS and/ or MMS usages;
- 4.2.29 The user interfaces (for administration, configuration and management) must be built on user-friendly GUI menus prepared on commercially available industry-standard software.

4.2.30 The system must support different business rules as discrete field-executable service(s) as and when required by BTCL. The system must allow seamless integration of business function components without changing of the application program code.

4.2.31 The system shall support storage, search, access and retrieval of data by automated applications.

4.2.32 The system must contain product development & management tools to facilitate modification, extension and customization of existing applications and integration of new applications.

### 4.3 System Dimensioning

4.3.1 The system dimensioning will be based on following elements :

- a) National Inter-connect voice calls for BTCL's network (in paid minute per day) : Present Capacity – 100 million, Final Capacity – 250 million
- b) International voice calls for BTCL's network (in paid minute per day) : Present Capacity – 15million, Final Capacity – 40 million
- c) Number of Billing Cycles per month : Normal – 2, On emergency – 4
- d) Number of Remote user terminals : Present – 15, Final – 50
- e) The system must process CDRs for both successful/ completed and unsuccessful/ uncompleted calls. Call completion rate to be considered : 33%.

4.3.2 The bidder shall also consider the following aspects during dimensioning of its proposed hardware :

- a) For Processors :  
The minimum expandable and equipped capacities for the processors will be :
  - i) Equipped : Application Server System : 120,000 tpmC  
Database Server System : 180,000 tpmC
  - ii) Expandable up to : Application Server System : 200,000 tpmC  
Database Server System : 300,000 tpmC
- b) For Memory Elements :  
The minimum expandable and equipped capacities for the memory systems will be :
  - i) Equipped : Application Server System : 16 GB  
Database Server System : 10 GB
  - ii) Expandable up to : Application Server System : 24 GB  
Database Server System : 16 GB
- c) For Primary Storage of Data :  
The minimum expandable and equipped capacities for the primary storage systems will be :

- i) Equipped : 10 TB
- ii) Expandable up to : 20 TB
- iii) Raw CDR Storage : 6 (six) months
- iv) Bill Data Storage : 6 (six) months
- v) Provisioning Data : 6 (six) months
- vi) O & M Data : 6 (six) months

d) For Secondary Storage of Data :

The minimum expandable and equipped capacities for the secondary storage systems will be :

- i) Equipped : 20 Tb
- ii) Expandable up to : 40 Tb
- iii) Raw CDR Storage : 24 (twenty four) months
- iv) Bill Data Storage : 24 (twenty four) months
- v) Customer Data Storage : 24 (twenty four) months
- vi) Provisioning Data : 24 (twenty four) months
- vii) O & M Data : 24 (twenty four) months

e) For Archive Data :

- i) Bill Data Storage : 5 (five) years
- ii) Customer Data Storage : 5 (five) years

4.3.3 The bidder shall note that, for dimensioning of its offered system, the parameters given in clause 4.3.1 and other relevant clauses will be used for all purposes. The parameters shown in clause 4.3.2 are indicative but mandatory minimum values only.

4.3.4 The bidder shall note that it can propose any industry standard hardware for the system, provided that such hardware fulfills the relevant specifications and experience requirements. However, BTCL prefers to SUN/HP/IBM-based solutions.

4.3.5 The bidder shall note that it may incorporate one or more functional system and/ or application platform in a single element of its proposed hardware platform. However, the Storage System (SAN) will be a complete, self-sufficient and independent platform.

4.3.6 Each of the negative deviations, if any, of the described specification and requirements above shall be treated as **“major”**.

== End of Chapter Four ==

**REQUIREMENTS OF THE BILLING CENTRE**

**Chapter 5**

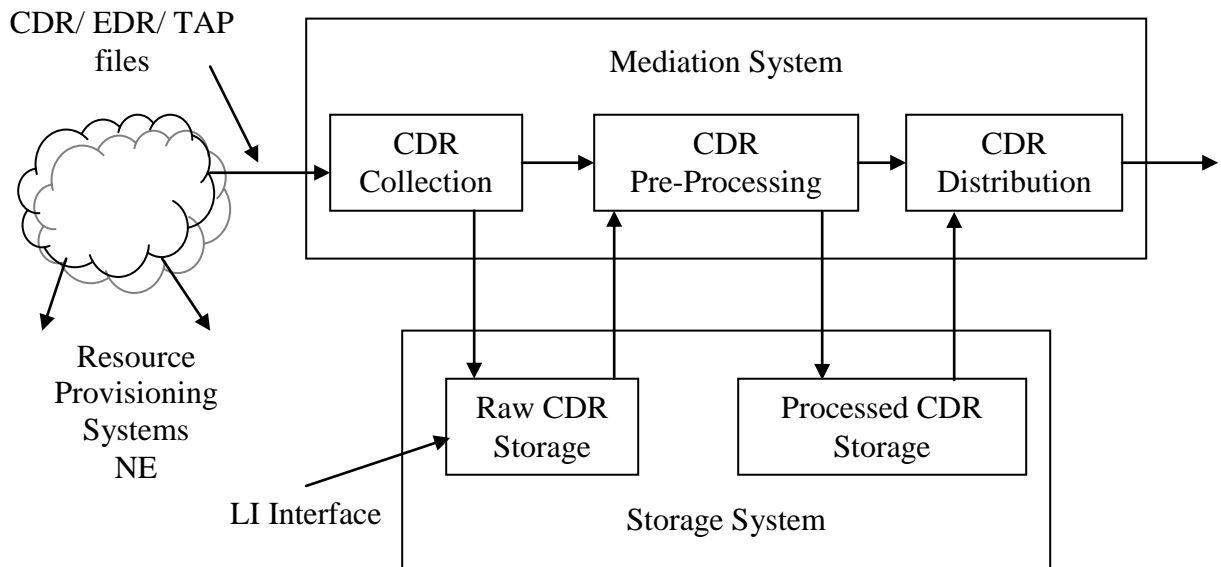
**Part 2 : Requirements of CDR Collection & Mediation System**

**5.1 System Overview**

5.1.1 The CDR Collection & Mediation System (*hereinafter referred to as CCMS*) is intended for use in automatic/manual collection of Call Data Record (CDR) files from different Resource Provisioning Systems of BTCL, applying different business logics to these raw CDRs and forwarding these processed CDR files to the Bill Processing System of BTCL.

5.1.2 System Network

The general overview of the proposed system network shall be as follows :



The bidder can offer any suitable network that suits requirement of this tender.

5.1.3 The Resource Provisioning System includes (*but not limited to*) connectivity supports for BTCL’s Switches ( *ITX, ANS Gateway, ICX and IGW*), , Intelligent Network (IN) Platforms, other Pre-paid Platforms, Post-paid Platforms, etc.

5.1.4 The bidder shall also shall make its own survey to gather information about different other resource provisioning platforms available/ working in BTCL’s network. The bidder will also gather relevant information about requirements of BTRC.

- 5.1.5 Under no pretext, the successful bidder can later, during negotiation and/ or implementation of the contract, claim to have missed out any requirement.
- 5.1.6 The offered system must allow connectivity towards third party billing system using industry standard protocols.
- 5.1.7 Each of the negative deviations of the offered systems, if any, from the specification and requirement described above shall be treated as **“major”**.
- 5.1.8 The CCMS must allow mediation/ collection of CDRs by the following (*but not limited to*) methods :
- a) from NGN based Exchanges by push/ pull method;
  - b) from Magnetic Tape;
  - c) from Optical/ Opto-magnetic Drives;
  - d) from Compact Disk;
  - e) from USB devices; etc.

## 5.2 Data Exchange Formats

- 5.2.1 The CCMS must be able to support the following (*but not limited to*) Data Exchange Formats :
- a) Transmission Control Protocol/ Internet Protocol (TCP/ IP)
  - b) ITU-T X.25
  - c) File Transfer Protocol (FTP)
  - d) File Transfer, Access and Management (FTAM) Protocol
  - e) Message Transfer Protocol (MTP)
- 5.2.2 The bidder’s quotation shall include support for all of such protocols in such a way that, BTCL must be able to decide inclusion of individual protocols during negotiation of contract. If the bidder fails to give proper breakdown in quotation, BTCL reserves the authority to take any discretionary decision in this aspect.
- 5.2.3 Each of the negative deviations, if any, of the described specification and requirements shall be treated as **“major”**.

## 5.3 Functional Requirements

The CCMS must support the following (*but not limited to*) functions :

- 5.3.1 CDR collection – Automatic and Manual
- a) The system shall have to support CDR Collection from various types of network elements like TDM switch, Softswitch etc
  - b) The system shall be a unified Mediation Platform for collecting and processing all CDR/ EDR/ TAP files.
  - c) The system shall have to support automatic (online) and manual (offline) collection.

- d) The system shall have to support real-time collection and scheduled collection depending upon the network element.
- e) The system shall have to support breakpoint continuous transmission.
- f) The system shall have to support collection recovery automatically when there is abnormality.
- g) The Collection Module shall have to support deletion of files once the files are collected after a pre-defined programmable time but after maintaining proper log.
- h) The Collection Module shall have to support new network element interface protocols (i.e. the application & lower level protocols) for collection when introduced in the network.
- i) The sequence number validation shall have to be supported during collection so that no files are lost or duplicated.
- j) The Collection Module shall have to support feature of duplicate file detection to ensure that a specific file name has not been previously collected.
- k) The Collection Module shall have to ensure data integrity & reliability of data being transferred.
- l) The Collection system shall have to raise an alarm and request for retransmission if an input file is deemed incomplete or corrupted.
- m) The Mediation shall have to support both sender and receiver initiated session.

### 5.3.2 CDR Pre-processing

- a) The CDR Processing shall involve Validation, Correlation, Aggregation, Enrichment, Sorting, Filtering and Distribution of CDRs.
- b) The system must have a flexible format translator to translate any usage data input formats into a format like ASN.1, XML, AMA, CSV, Binary, ASCII, BCD, or any other required by downstream applications & vice-versa.
- c) The system shall have to be flexible enough to manage the changes due to introduction of new network element of any type and/ or downstream application.
- d) The system must support format builder to enable the user to create customized mapping definitions for conversion of CDRs external format to internal format and vice-versa.
- e) The system must have the capability to perform format validation and/ or pre-defined validation criteria.
- f) The system must be capable to process the CDR according to any rule that is possible to define. An easily used configuration interface shall be provided.
- g) The system shall have to filter the CDR for further distribution, the filter configuration shall need to be configured through GUI interface.
- h) The system must be capable to distribute the CDR to an external, internal or post processing system.
- i) The system must be capable to merge a number of CDRs files from a single source or multiple sources into a larger output file. The criteria for merging the files either from a single source or many sources shall be defined by the user.
- j) The system must be capable to check duplicate CDRs within the file and between multiple files. In addition, in the mediation system, it shall be possible to define the age of call for duplicate detection.
- k) The duplicate CDRs shall have to be logged and stored.

- l) The system must be capable to handle partial CDRs generated by the Network Element for consolidation of CDRs.
- m) The system must be capable to merge the CDRs that belong to the same chargeable call into one CDR.
- n) The system must be capable for the user to define criteria to match together and combine related records into a single billable event.
- o) The system must be capable to correlate data generated from various types and various sources of CDRs.
- p) The system must be capable to correlate records from different network elements so that several CDRs from the same event may be combined into a single billable event. If an event is routed through several network elements it may be necessary to correlate the data from each network element.
- q) The system must be capable for the user to define the rules for determining the correlation key (a field or combination of fields that can be used to match it to other related records) for the incomplete record.
- r) The system must be capable to generate alarm when Number of duplicate CDRs found in a CDR stream exceeds user specified value.
- s) The system must be capable to support time gap detection functionality to ensure that there is acceptable time gap between two CDRs.
- t) Time Gap detection functionality shall be able to check the minimum as well as maximum acceptable time gap between consequent CDRs.
- u) The system must also be capable to check Time gap between the last CDR of one file and the first CDR of the next file.

### 5.3.3 CDR Distribution

- a) The system shall support storing of Raw CDRs in pre-designated areas of the Storage Area Network (SAN).
- b) The system shall support storing of pre-processed CDRs in pre-designated areas of the Storage Area Network (SAN).
- c) The system shall support sorting of pre-processed CDRs in order to send them to various downstream systems.
- d) The system shall support data output, data movement, data storing, data sorting and data re-collection sequences.
- e) Industry standard protocols like FTP, SFTP etc shall be supported.

### 5.3.4 System Reporting

The system must be capable of producing reports including (*but not limited to*):

- f) Number of CDR files collected per day from each network element.
- g) Number of CDR records delivered to downstream systems.
- h) Number of service orders per network element including an indication of their progress.
- i) Number of total CDR, erroneous CDR, duplicate CDR, correct CDR.

### 5.3.5 The Mediation system shall be able to operate in centralized or de-centralized mode.

5.3.6 The system must have the capability for generating alarm notifications. The alarms shall be collected in a central system, which can be easily interfaced to other systems.

5.3.7 Each of the negative deviations, if any, of the described specification and requirements shall be treated as “**major**”.

#### 5.4 Off Line CDR Collection

5.4.1 In addition to the automated CDR Collection/ Mediation System for on-line collection of CDRs from different resource elements, the CCMS will also have to be equipped with facilities for off-line collection of CDRs from different resource elements.

5.4.2 Such CDRs may be in the form of CDR files and/ or Incremental Meter Reading files.

5.4.3 Such CDRs/ Meter Reading files may be transported by (*but not limited to*) :

- i) Magnetic Tape; or
- ii) Magnetic Cartridge/ Cassette; or
- iii) Magneto-Optical Disk; or
- iv) Optical Disk; or
- v) Compact Disk (CD); or
- vi) USB Drive.

5.4.4 The CCMS will facilitate reading of the transported file(s) from the relevant devices and storing them in the Billing Centre SAN for further processing.

5.4.5 The bidder will be required to provide all necessary hardware and software at the Billing Centre end for enabling this functionality. The bidder will make its own survey to ascertain BTCL’s requirement in this aspect.

5.4.6 Each of the negative deviations, if any, of the described specification and requirements shall be treated as “**major**”.

#### 5.5 Service Assumptions

5.5.1 Following are typical (*but not restrictive*) Service parameters to be followed for proposing the design of the CCMS :

<b>Service Parameter</b>	<b>Typical Value</b>
<i>Size of Raw CDR</i>	450 bytes
Number of Raw CDRs per day	500 Million
Busy Hour per day for Mediation	12 hours
Size of Pre-processed CDR	500 bytes
Number of Pre-processed CDR	100% of input
Retail Billing CDR	56% of input
Inter-connect Billing CDR	44% of input
tpmC consumed for mediation & processing of each CDR	0.85
Peak co-efficient of Mediation	3.5

Server Redundancy co-efficient	30%
Storage Redundancy co-efficient	40%
RAID Protection Redundancy co-efficient	60%
Storage Period of Raw CDR	180 days

5.5.2 Calculation method for Server tpmC :

Server tpmC = [number of CDR per day x tpmC consumed per CDR processing x peak co-efficient for mediation] / [busy time in minute x (1- server redundancy co-efficient)]

5.5.3 Calculation method for Mediation Storage :

Storage Capacity = [CDR Size x number of CDR per day x storage period] / [(1 – storage redundancy co-efficient) x RAID protection redundancy co-efficient]

5.5.4 All system power modules must be 1 + 1 hot redundant. Failure to provide 1+1 redundancy shall be treated as “Critical deviation”

== End of Chapter Five ==

**REQUIREMENTS OF THE BILLING CENTRE**

**Chapter 6**

**Part 3 : Requirements of Rating & Charging System**

**6.1 Rating System Overview**

- 6.1.1 The Rater should be able to rate calls for both voice (local, national and IDD) and data (local, point-to-point, national, international, internet) services.
- 6.1.2 The Rater must support following functionality:
- a) Rating of traffic on a single call basis with and/ or without rounding applied;
  - b) Rating of traffic based on aggregated data (sum of seconds or sum of bytes during a month);
  - c) Retail and/ or Inter-connect Rating;
  - d) Rating and issuance of reports for a specific directions/ premium rate numbers (for example directory enquiry number '123'), route, exchange code/identifier
  - e) It should be possible to specify free interconnect time per calls to a special directions (for example, calls to a directory service 17 will have first 4 seconds of non-charged interconnect time, which is time of IVR greeting message from partner);
  - f) Different rates to national interconnect; international partner per country or group of countries; content-providers interconnect.
  - g) Count transit traffic.
- 6.1.3 The Rater should be able to support charging categories of recurring charge (e.g. monthly and annual subscription), non-recurring charge (e.g. Activation / Connection fee), usage charge, special charge scheme, incentive charge scheme etc.
- 6.1.4 The Rater must support **rounding rules**: up to 1 second; up to N seconds to the nearest, up to N seconds to higher/lower value.
- 6.1.5 The System must support multiple overseas/interconnect partners for voice/ data/ fax calls, SMS, and data services.
- 6.1.6 The system must allow addition of new overseas/ interconnect partner at any time.
- 6.1.7 Data aggregation module must be available to calculate interconnect based on the aggregated data (e.g. sum of seconds of all calls during a month coming from/going to a specific partner).

- 6.1.8 The types of usage charge may be (*but not limited to*) :
- i) per an interval of seconds, e.g. Tk. x/y sec;
  - ii) by time, e.g. peak ,off-peak hours and Cheap;
  - iii) by day of week, e.g. local voice made on BTCL is free of charge;
  - iv) holiday rate;
  - v) by date
  - vi) charge by location;
  - vii) charge by called number (b-number);
  - viii) charge by calling number (a-number);
  - ix) charge by volume;
  - x) charge by tier (e.g. First 1 – 100 minutes is charged at Tk 0.5 per minute; 101 – 300 minutes is charged at Tk 0.3 per minute; > 300 minutes is charged at Tk. 0.2 per minute);
  - xi) flat rate;
  - xii) user segment (e.g. different rates to be applied to different user segment);
  - xiii) any logical combination of the above.

6.1.9 The types of special/ incentive charge may be (*but not limited to*) :

- i)
- i) offers based on set(s) of configurable business rule(s);
- ii) Free service for n months;
- iii) Rebate of service offer for n months;
- iv) Rebate for IDD usage for calls to specified regions;
- v) Rebate of service offer if usage exceeds certain volume and
- vi) Any logical combination of the above.

6.1.10 The Rater shall report ‘zero’ duration calls.

6.1.11 The rating system must support different tariffs for different customer segments.

6.1.12 Different prices should be applied by usage rating according to the predefined configurable period.

6.1.13 The rating system shall support an unlimited number of time bands.

6.1.14 The rating system shall support user configurable period sets.

6.1.15 Days of the year should be configured as special days, off-peak days and/or holidays for at least the next 12 months.

6.1.16 User-defined off-peak hours/days should be supported by the rating system.

6.1.17 Split rating of usage events should be supported by the rating system.

6.1.18 The system shall divide calls for services, like voice, that can be charged based on time of day, such as between peak and off-peak.

- 6.1.19 Peak or off-peak for voice and data services should be determined by either the start or end time.
- 6.1.20 The rating engine should be able to apply any one-time charge.
- 6.1.21 The rating engine should be able to apply a zero rate to usage events until a specified free minutes' limit is exceeded. For example, a product is sold with a number of free minutes, and charges are only applied after the free minutes have been consumed.
- 6.1.22 It should be possible to bundle one-time charges and usage charges.
- 6.1.23 It should be possible to exclude usage charges in special cases, for example zero-rated usage events with the service rental amount, or a specified number of free minutes of usage bundled with the rental charge.
- 6.1.24 The rating engine shall use the prices that were valid at the time of the call.
- 6.1.25 It should be possible to use different price plans/ rating schemes for every :
- i) Product;
  - ii) Service usage (such as local voice call, EISD, IDD, Internet and Intranet);
  - iii) Bundle (package/ service);
  - iv) Payment method.
- 6.1.26 It should be possible to base a rating scheme on multi-dimensional parameters that enable differentiation of the price, such as resolution, traffic type, time period, and content class.
- 6.1.27 The Rater shall allow a subscriber to carry over an allowance for any unused units from the current billing period to the next period. It will also be possible to set a time limit for such carried-over allowances.
- 6.1.28 System should support automated and efficient rate uploading facility.
- 6.1.29 System should allow registering changes to tariffs with the future start date. At that date the change should become active automatically.
- 6.1.30 The system shall support re-rating of previously rated events.
- 6.1.31 The Rater shall provide multiple attribute rating, that is, it should be able to use any event attribute and any customer attribute in the rating algorithm.
- 6.1.32 The Rater shall support distributing rated events to separate invoices on the basis of any event parameter or combination of parameters. Relevant event parameters may include the following:
- i) Service type (e.g., the employer may agree to pay for voice calls while an employee will be responsible for events of all other service types, including data calls);
  - ii) Route type (e. g – by destination, by carrier, by trunk, by application type)
  - iv) Connetivity type ( e,g – incoming, outgoing, local international)

6.1.33 The Rater shall have a configurable ability to accumulate rated events according to rules based on multiple criteria, such as :

- i) Accumulation by predefined attribute;
- ii) Accumulation by service filter;
- iii) Parallel accumulation in multiple counters.

6.1.34 The Rater shall support non-recurring charge association with services, such as service activation and registration. Whether the charge is created will be configurable.

6.1.35 The Rater need not to be restarted after changing the pricing catalog.

6.1.36 The Rater shall be able to pick up the latest pricing catalog for rating.

6.1.37 Multiple rating processes can be configured to speed up the rating process when needed.

6.1.38 Rating statistics per each call/ event file will be logged. Statistics should show how many records are processed, rejected and the rejection reason.

6.1.39 The Rater shall be able to support the following re-rating functions :

- i) Ability to rate specific records from X day as they are available without re-rating all other CDRs;
- ii) Ability to perform re-rating calls only for the error / rejected CDRs and can charge back the dispute amount to customers account;
- iii) Ability to handle rejected event;
- iv) Ability to perform late call processing;
- vi) Ability to perform end-to-end handling and tracking of usage, including re-rating and error usage utilities;
- vii) Rerating of data for a specific partner and/ or a specific period of time.

6.1.40 Each of the negative deviations of the offered systems, if any, from the specification and requirement described in this document shall be treated as **“major”**.

## 6.2 Charging System Overview

6.2.1 The Charging System must be able to support the following (*but not limited to*) Billing models :

- i) Circuit/ Trunk and/ or Circuit/ Trunk Group;
- ii) Individual Route;
- iii) Individual Carrier and/ or inter-connect Partner;
- iv) Originating/ Terminating inter-connect partner.

However, the system must also have the capability for later adoption of :

- v) Individual Subscriber billing;
- vi) Group of individual subscriber billing;

- vii) Group billing
- 6.2.2 The system shall support multiple billing cycles.
- 6.2.3 The system shall support the parallel execution of multiple billing cycles.
- 6.2.4 The system shall support running billing cycles on any day of the month.
- 6.2.5 The system's default billing cycle occurs on a monthly basis.
- 6.2.6 The system shall support the grouping of accounts to a bill cycle according to user-definable criteria.
- 6.2.7 Multiple accounts within an account hierarchy shall use the same billing cycle.
- 6.2.8 It will be possible to configure the date of closure of a billing cycle.
- 6.2.9 The system shall allow taxes to be applied on a configurable basis; different tax rates will be supported for tax qualifier service types.
- 6.2.10 The system shall provide the following prorating options :
- i) Relative period in cycle;
  - ii) Full rate regardless of the period;
  - iii) Full rate only if the service is effective on the bill day.
- 6.2.11 The system shall provide configurable recurring charge frequencies.
- 6.2.12 The system shall support a confirmation phase and be able to undo billing results with different configurable options, such as full or partial undo.
- 6.2.13 Access to rated events and accumulated charge totals over specified time periods will be made possible using the Customer Management GUI.
- 6.2.14 The system shall have the following (*but not limited to*) functionalities of employing discounts :
- i) ability to calculate a cross-product discount;
  - ii) ability to set up flat amount/ percentage discounts;
  - iii) ability to set up stepped amount/ percentage discounts;
  - iv) ability to set up tiered amount/ percentage discounts;
  - v) ability to copy an old discount plan and rename it in order to facilitate the creation of new discount plans;
  - vi) ability to define the time period for which the discount(s) are calculated, this period does not have to be the same as a billing period;
  - vii) ability to create discounts to apply on the total invoice amount for an account in the Customer Hierarchy;
  - viii) ability to create discounts to apply to all hierarchy nodes according to the hierarchy performance;

- ix) ability to create multiple discount plans at a single node, including prioritization, each discount calculation being performed on the net result of the previous calculation;
- x) ability to define discount plans at any level of the corporate structure, including support for discounts by aggregating the relevant performance at each level and by applying the correct credit to the billing arrangements and subscribers that are eligible for these discounts;
- xi) ability to allow discounts to be set up on entire invoice amounts, as well as on individual invoice items and their presentation on the invoice.
  - i. The system shall support the calculation and issue of final invoices (the last invoice in cases of abortive contract termination).
  - ii. The system shall have the ability to create test bill samples, which enable the verification of the results of the Billing process prior to actual Bill Production. In the event that a problem is detected during the test bill review, the system shall enable the reversing (“undo”) of the Billing process and the recalculation of the bill once the problem has been rectified. This reversal option can either be used for the whole cycle, selectively for specific accounts or selectively for accounts of specific rate plans.
  - iii. While aggregating individual CDRs to summarize the total volume, the system shall support rounding of each call by field definable values (such as one tenth of second etc).
  - iv. To significantly reduce bill production time, the system shall employ techniques such as parallel processing in order provide high-volume processing.

6.2.15 Each of the negative deviations of the offered systems, if any, from the specification and requirement described in this document shall be treated as **“major”**.

== End of Chapter Six ==

**REQUIREMENTS OF THE BILLING CENTRE**

**Chapter 7**

**Part 4 : Requirements of Bill Processing System**

**7.1 System Overview**

- 7.1.1 The turn-key contract obligations will include a complete solution of a Bill (Invoice) Processing System. The scope of this system shall include (*but not limited to*) :
- a) Invoice for local (ANS) partner(s);
  - b) Invoice for local inter-connect (ICX) partner(s);
  - c) Invoice for International Gateway (IGW) partner(s);
  - d) invoice for International Carrier partner(s).
- 7.1.2 The system shall support printing of invoices in pre-determined and pre-formatted forms as well as field-programmable forms and/ or formats.
- 7.1.3 Support of billing and invoice generation for post-paid and pre-paid services.
- 7.1.4 The period of each bill cycle can be configure as needed, such as calendar month, quarter, year, week, etc.
- 7.1.5 On demand billing
- 7.1.6 Support of multiple invoice formats(e.g. HTML, Text, TEX, etc)
- 7.1.7 Support flexible customized bill content configuration
- 7.1.8 Support of E-Bill (e.g. e-Mail)
- 7.1.9 Support bill and related information enquiry
- 7.1.10 Support to configure different tax rates for different products, different services and different customers group.
- 7.1.11 Shall support auditing system to compare bills and invoices to ensure that invoice has been issued for the full billing amount
- 7.2 Each of the negative deviations of the offered systems, if any, from the specification and requirement described in this document shall be treated as **“major”**.

== End of Chapter Seven ==

**REQUIREMENTS OF THE BILLING CENTRE**

**Chapter 8**

**Part 5 : Requirements of Accounting and Settlement Management System**

**8.1 System Overview**

The Scope of System Architecture shall compose (but not limited to) of the following :

- 8.1.1 Accept different methods of payment (cash, cheque, credit card, etc.)
- 8.1.2 Support of multi currency for payment
- 8.1.3 Accept payments of invoices, deposits, first time order payments, etc.
- 8.1.4 Accept advance payments
- 8.1.5 Accept over payments i.e. when the customer pays more than his/ her outstanding dues
- 8.1.6 Update outstanding balances and close paid invoices
- 8.1.7 Ability to manage disputes and interact with billing for adjustment purposes
- 8.1.8 Support Single and Batch Adjustment
- 8.1.9 Define International Operators and settlement rules
- 8.1.10 Define partners (content providers, network providers, etc)
- 8.1.11 Provides the function of maintaining various basic data to manage reference data involved in service processing in centralized mode
- 8.1.12 Support various methods of managing and displaying office data, such as query, clone, add, edit, delete, import, export, copy, etc
- 8.1.13 Provides logs of basic data maintenance, and records the detailed operation logs of basic data.
- 8.1.14 Generates settlement data based on the CDR files that contain bill items and fee information or daily statistics
- 8.1.15 Processing rules can be added or modified to meet different requirements for settlements
- 8.1.16 Provides Scene Matching module which is used to find out the settlement scenario of the standard event according to the pre-defined rule.
- 8.1.17 Calculate fees recorded in CDR files according to the preset tariff rules
- 8.1.18 The system should support calculating methods of VAT, such as flat tax, fixed value and percentage tax.

- 8.1.19 Support to get summary value, average value, MAX value and MIN value of the input standard events according to pre-defined rules
- 8.1.20 Shares the revenue according to preset rules - by percentage, by fixed rate
- 8.1.21 Support two-party and multi-party revenue sharing
- 8.1.22 Support audit to guarantee the reliability of system processing results. If the variation is beyond standard ITU values, provision shall be there to reprocess the total bills.
- 8.1.23 Generate settlement reports
- 8.1.24 Each of the negative deviations, if any, of the described specification and requirements shall be treated as **“major”**.

## 8.2 **Generation of Reports**

The System shall generate soft and hard copies of the following (but not limited to) reports; the formats and contents of such reports to be discussed and agreed with the successful bidder during implementation :

- 8.2.1 Incoming Call summary for each ITX/ IGW/ Node
- 8.2.2 Incoming Call register for each ITX/ IGW/ Node
- 8.2.3 Outgoing Call summary for each ANS & ICX operator for each ITX/ IGW/ Node
- 8.2.4 Outgoing Call summary for each Carrier/ Partner for each ITX/ IGW/ Node
- 8.2.5 Outgoing Call register for each ANS & ICX operator for each ITX/ IGW/ Node
- 8.2.6 Outgoing Call register for each carrier/ partner for each ITX/ IGW/ Node
- 8.2.7 Transit Call summary for each ITX/ IGW/ Node
- 8.2.8 Transit Call register for each ITX/ IGW/ Node
- 8.2.9 Unclassified calls for each ITX/ IGW/ Node

== End of Chapter Eight ==

**REQUIREMENTS OF THE BILLING CENTRE**

**Chapter 9**

**Part 6 : Requirements of Partner/ Carrier/ Interconnect Management System**

**9.1 Scope of the System Architecture**

The Scope of System Architecture shall compose (but not limited to) of the following :

- 9.1.1 Support the function of managing interconnect partner information
  - 9.1.2 Support interconnect settlement in the telecom service scenario, such as voice, IDD service.
  - 9.1.3 Support the function of managing interconnect tariffs defined according to service scenarios
  - 9.1.4 Support mapping to carriers and country or region information
  - 9.1.5 Support the function of managing trunks which include the partner information
  - 9.1.6 Support the scenario that carrier transits for its partners
  - 9.1.7 Provide report for interconnect settlement
  - 9.1.8 The system should support different bill cycles for different partners.
  - 9.1.9 The system should provide GUI to do report or invoice generation easily.
  - 9.1.10 The system should support to do reconciliation to finish accounting quickly and exactly.
  - 9.1.11 The system should support easy management of agreements.
  - 9.1.12 The system should provide smart tariff model for rating, such as flat rate model, stepped rate model, tiered rate model, etc
  - 9.1.13 Archival database/ backup server may be layout in total solution
  - 9.1.14 Each of the negative deviations, if any, of the described specification and requirements shall be treated as **“major”**.
- 9.2 The system shall support pre-paid/ quasi pre-paid/ near real-time pre-paid system for partner/ carrier management. The detail requirements of such system has been given in Chapter 10 of this document. Absence of such a system will be treated as “Critical Deviation” of the bid.

== End of Chapter Nine ==

**REQUIREMENTS OF THE BILLING CENTRE**

**Chapter 10**

**Part 7 : Requirements of Prepaid Partner Management System**

**10.1 Scope of the System Architecture**

The Scope of System Architecture shall compose (but not limited to) of the following :

- 10.1.1 Record detailed information about product & services
- 10.1.2 Define packages, bundles of products and services with an option of period validity, and validity for specific region or specific groups of customers.
- 10.1.3 Define relationships between products
- 10.1.4 Define product/ service prices as one-time fee, rental charges, event-based, network service, etc.
- 10.1.5 Define variable prices driven by parameters such as time range, etc.
- 10.1.6 Define structured prices using logical rule to enable any future logic
- 10.1.7 Define bonus and discount based on number of parameters such as customer category, the extent of usage, time, duration of subscription, etc.
- 10.1.8 Define loyalty discounts
- 10.1.9 Define promotions for current and future periods
- 10.1.10 Restrict promotion to region, dates, customer category
- 10.1.11 Define default versions of rate plans

**10.2 Operation Procedure**

- 10.2.1 This will work as a near real time prepaid system for pre-paid partner.
- 10.2.2 The system shall allow declaring a partner to be treated as “Prepaid partner”.
- 10.2.3 The system shall allow putting field define limits (interms of used paid minute, period of activity etc) for each of such prepaid partner.
- 10.2.4 The system shall collect the required data relevant to predefined limit parameters from the CDR system at field defined time interval.
- 10.2.5 The system shall correlate and compare the limit parameters and collected data to calculate status of usage
- 10.2.6 The system shall generate an automatic visual and text alarms at field defined values of different usages
- 10.2.7 The system shall allow field defined classification of the alarm interms of their severity

- 10.2.8 The system shall have the capability to automatically re-define/reset the limit parameters with the change of the billing cycle
- 10.2.9 The system shall include a password protected web based interface for input of limit parameters
- 10.2.10 Each of the negative deviations, if any, of the described specification and requirements shall be treated as **“major”**.

== End of Chapter Ten ==

**REQUIREMENTS OF THE BILLING CENTRE**

**Chapter 11**

**Part 8 : Requirements of Database Storage Management System**

**11 Scope of the System Architecture**

The Scope of System Architecture shall compose (but not limited to) of the following :

- 11.1 All data backups are prepared for recovery in case of a disaster
- 11.2 Backup system shall have to meet high performance industry standard stability, comprehensiveness and automation principles
- 11.3 Backup system needs to meet operational simplicity
- 11.4 Backup system needs to meet real-time performance
- 11.5 Backup system needs to meet disaster tolerance consideration
- 11.6 Backup System should support virtual Tape Library/ Physical library /Disk array
- 11.7 Backup software shall have the , features of accelerated backup, auto-operation, and disaster recovery
- 11.8 backup network can be either a SAN, a LAN/MAN/WAN, or SAN + LAN/MAN/WAN combination. The system needs to have a good backup strategy and management plan to guarantee its backup and recovery performance
- 11.9 The System shall support full backup, incremental backup and differential backup
- 11.10 The System shall ensure data recoverability,
- 11.11 The System shall perform performance evaluation performed on the various parts of the data backup system to avoid any obvious bottleneck
- 11.12 the System should be so designed that it can safeguard against the network storm and the attack of hackers and viruses., and guarantee the network security of the service system through such means as network separation and layered protection.
- 11.13 The data backup system shall have centralized management to deliver such functions as performance monitoring and dynamic configuration change
- 11.14 the system shall have proper scalability & Dynamic scalability so that it can be easily expanded and upgraded to meet the increased demand

11.15 Bidder in its proposed offer shall provide –

11.15.1 backup system solution

11.15.2 description of Network Structure

11.15.3 description of its Features and Security Performanceiv. backup System Performance data

11.15.4 calculation of Data Storage Backup Capacity

11.15.5 backup System considerations of Host and Storage Array Performance

11.15.6 Process for reducing the influence to system when backing up data

11.15.7 backup strategy customization, such as: routine operation, during important operations, during Major festivals and holidays and so on.

11.16 Each of the negative deviations, if any, of the described specification and requirements shall be treated as “**major**”.

== End of Chapter Eleven ==

**REQUIREMENTS OF THE BILLING CENTRE**

**Chapter 12**

**Part 9 : Requirements of Database Management System**

**12.1 Scope of the System Architecture**

The Scope of System Architecture shall compose (but not limited to) of the following :

- 12.1.1. Operating system shall be Unix/Linux
- 12.1.2 RDBMS shall be Oracle. Version should be 10g or later.
- 12.1.3 Shall offer Application Specific Full User (ASFU) license
- 12.1.4. Shall offer 20 concurrent user license
- 12.1.5 Shall also offer licensing price for each additional user.
  
- 12.2 As an integral part of application and services management solution, bidder shall provide Oracle-specific capabilities for:
  - 12.2.1 database management
  - 12.2.2 performance and availability management
  - 12.2.3 business services management
  - 12.2.4 end user management, diagnostics
  - 12.2.5 change, configuration and release management
  
- 12.3 Offer shall include (but not limited to) following services:
  - 12.3.1 Development
    - Plan and develop applications that deliver both functionality and optimal performance
  
  - 12.3.2 Administration
    - Comprehensive object, space, security and change management
  
  - 12.3.3 Performance Management
    - Discover and resolve performance issues in production before they impact end users and service levels
  
  - 12.3.4 Backup and Recovery
    - Fast, flexible backup and recovery with industry-leading compression technology
  
  - 12.3.5 High Availability

Provide a fault-tolerant replica of Oracle databases to ensure high availability and disaster recovery, and eliminate risks associated with migrations

#### 12.3.6 Space Management

Reclaim space and monitor and report on growth trends

#### 12.3.7 Performance Management

Discover and resolve performance issues in production before they impact end users and service levels

12.4 Each of the negative deviations, if any, of the described specification and requirements shall be treated as **“major”**.

== End of Chapter Twelve ==

**REQUIREMENTS OF THE BILLING CENTRE**

**Chapter 13**

**Part 10 : Requirements of Product & Service Management System**

**13.1 Scope of the System Architecture**

The Scope of System Architecture shall compose (but not limited to) of the following :

- 13.1.1 Record detailed information about product & services
- 13.1.2 Define packages, bundles of products and services with an option of period validity, and validity for specific region or specific groups of customers.
- 13.1.3 Define relationships between products
- 13.1.4 Define product/ service prices as one-time fee, rental charges, event-based, network service, etc.
- 13.1.5 Define variable prices driven by parameters such as time range, etc.
- 13.1.6 Define structured prices using logical rule to enable any future logic
- 13.1.7 Define bonus and discount based on number of parameters such as customer category, the extent of usage, time, duration of subscription, etc.
- 13.1.8 Define loyalty discounts
- 13.1.9 Define promotions for current and future periods
- 13.1.10 Restrict promotion to region, dates, customer category
- 13.1.11 Define default versions of rate plans
- 13.1.12 Each of the negative deviations, if any, of the described specification and requirements shall be treated as **“major”**.

== End of Chapter Thirteen ==

**REQUIREMENTS OF THE BILLING CENTRE**

**Chapter 14**

**Part 11 : Requirements of System Management**

**14.1 Scope of the System Architecture**

The Scope of System Architecture shall compose (but not limited to) of the following :

14.1.1 System Setup Definition

14.1.2 Definition of System/Business Rules & Polices

14.1.3 Address Database Definition

14.1.4 Jobs Monitoring & Controls

14.1.5 Jobs Alarm Management Configuration

14.1.6 Audit Configuration

14.1.7 Definition of User Menus

14.1.8 Definition of online help/documentation

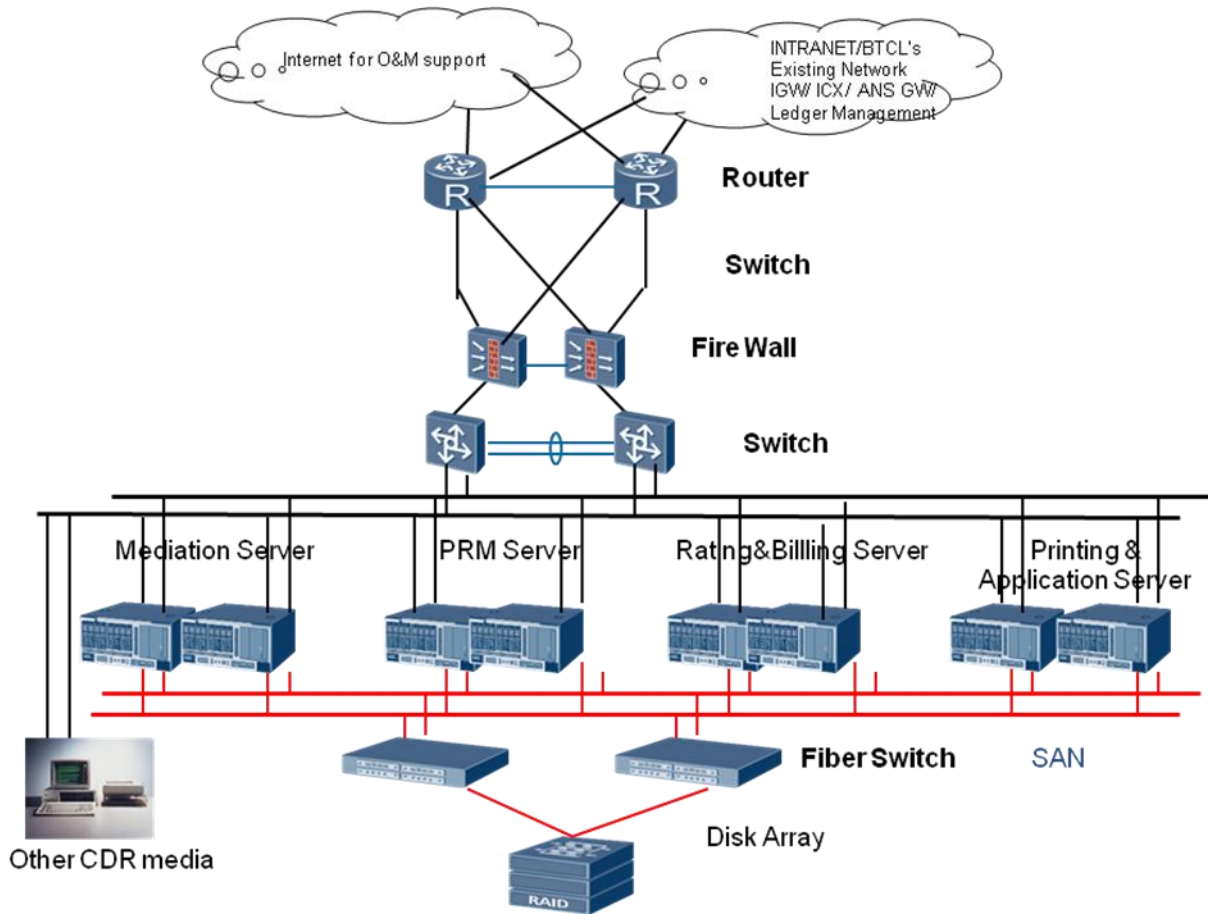
14.1.9 Each of the negative deviations, if any, of the described specification and requirements shall be treated as **“major”**.

== End of Chapter Forteen ==

REQUIREMENTS OF THE BILLING CENTRE

Annex-1

Network Architecture



# Form A

## SUMMARY PRICE OF THE BID

SL	Name of Item (s)	Total Price		
		USD	+	BDT
<b>A Total Price for Equipment</b>				
A.1	Total Price for all Core equipment (from Form B.1)			
A.2	Total Price for Data and ancillary Equipment (from Form B.2)			
A.3	Total Price for Other Equipment(from Form B.3)			
A.4	Total Price for DC Power Equipment (from Form B.5)			
	<b>Total Price for Equipment (FoB/ FCA)</b>			
<b>B Total Freight (from Form B.1 to B.9)</b>				
	<b>Total Price for Equipment (C&amp;F)</b>			
<b>C Total Insurance (from Form B.1 to B.9)</b>				
<b>X</b>	<b>Total Price for Equipment (CIF) = A+B+C</b>			
<b>D Total Price for Services</b>				
D.1	Total Price for billing equipment (from Form B.1)			
D.2	Total Price for Data and ancillary Equipment (from Form B.2)			
D.3	Total Price for Other SErvice(from Form B.4)			
D.4	Total Price for DC/AC Power Equipment(from Form B.5)			
<b>Y</b>	<b>Total Price for Services</b>			
	<b>Total Price for The Bid (X + Y)</b>			

**In Words:** US Dollar ..... and BD Taka .....  
 ..... only

# Form B.1

## SUMMARY PRICE FOR CORE SYSTEM

SL	Name of Item (s)	Unit	Qty	FOB Price in USD/ BDT		
				Currency	Unit Price	Total Price
<b>A Total Price for Equipment</b>						
A.1	Total Price Equipment for CDR Collection & Mediation System					
A.2	Total Price for Equipment for Rating & Charging System					
A.3	Total Price for Equipment for Bill processing, invoice printing and accountant settlement System					
A.4	Total Price for SAN System					
A.5	Total Price for Equipment for all other core System mentioned in the tender document					
	Total Price for Equipment (FoB/ FCA)					
<b>B Total Freight</b>						
	Total Price for Equipment (C&F)					
<b>C Total Insurance</b>						
<b>X Total Price for Equipment (CIF)</b>						
<b>D Total Price for Services</b>						
D.1	Total Price for Equipment for CDR Collection & Mediation System Services					
D.2	Total Price for Equipment for Rating & Charging System service					
D.3	Total Price for Equipment for Bill processing, invoice printing and accountant settlement System service					
D.4	Total price for SAN system					
D.5	Total Price for Equipment for all other System mentioned in the tender document service					
D.5	Total Price for Installation, testing					

	and commissioning Services					
<b>Y</b>	<b>Total Price for Services</b>					
	<i>Total Price for SS and SG (X + Y)</i>					

**In Words:** US Dollar ..... and BD Taka .....  
..... only

## Form B.2

### SUMMARY PRICE FOR DATA EQUIPMENT AND ANCILIARY ITEMS

SITE NAME : .....

*(The Bidder shall fill up one form for each site)*

SL	Name of Item (s)	Unit	Qty	FOB Price in USD/ BDT		
				Currency	Unit Price	Total Price
<b>A Total Price for Equipment</b>						
A.1	Total Price for <b>Data Equipment Hardware and Software</b>					
A.2	Total Price for <b>Printer, ODF and other ancillary Equipment Hardware and Software</b>					
	<b>Total Price for Equipment (FoB/ FCA)</b>					
<b>B Total Freight</b>						
	Total Price for Equipment (C&F)					
<b>C Total Insurance</b>						
<b>X Total Price for Equipment (CIF)</b>						
<b>D Total Price for Services</b>						
D.1	Total Price for <b>Data Equipment service</b>					
D.2	Total Price for <b>Printer, ODF and other ancillary Equipment service</b>					
D.3	Total Price for Installation, testing and commissioning Services					
<b>Y Total Price for Services</b>						
	Total Price for the MGW (X + Y)					

**In Words:** US Dollar ..... and BD Taka .....  
 ..... only

## Form B.3

### SUMMARY PRICE FOR OTHER EQUIPMENT

SL	Name of Item (s)	Unit	Qty	FOB Price in USD/ BDT		
				Currency	Unit Price	Total Price
<b>A Total Price for Equipment</b>						
A.1	Total Price for other Equipment Hardware and Software					
	<b>Total Price for Equipment (FoB/ FCA)</b>					
<b>B Total Freight</b>						
	Total Price for Equipment (C&F)					
<b>C Total Insurance</b>						
<b>X</b>	<b>Total Price for Equipment (CIF)</b>					
<b>D Total Price for Services</b>						
D.1	Total Price for other Equipment Hardware and Software service					
D.2	Total Price for Installation, testing and commissioning Services					
<b>Y Total Price for Services</b>						
	Total Price for Router, Switch and Firewall (X + Y)					

**In Words:** US Dollar ..... and BD Taka .....  
 ..... only

## Form B.4

### SUMMARY PRICE FOR OTHER SERVICES

SL	Name of Item (s)	Unit	Qty	FOB Price in USD/ BDT		
				Currency	Unit Price	Total Price
<b>A Total Price for Other Services</b>						
A.1	Total Price for Maintenance assistance up to Guarantee Period					
A.2	Total Price for Post Guarantee Maintenance assistance Program					
A.3	Total Price for Customers Proof of Concept					
A.4	Total Price for Provisional Acceptance Test					
A.5	Total Price for Final Acceptance Test					
A.6	Total Price for Factory Training					
A.7	Total Price for Local Training					
	<b>Total Price for Other Services (FOB/FCA)</b>					
<b>B Total Price for Other Services related to Turn-Key completion of the Project</b>						
B.1	Total Price for Survey, Network Planning and Design Services					
B.2	Total Price for Project Implementation Services					
B.3	Total Price for Inter-working Services					
B.4	Total Price for Inter-connection Services					
	<b>Sub - Total for B</b>					
	<b>Total price for Other Services (A + B)</b>					

**In Words:** US Dollar ..... and BD Taka .....  
 ..... only

## Form B.5

### SUMMARY PRICE FOR DC POWER EQUIPMENT

SL	Name of Item (s)	Unit	Qty	FOB Price in USD/ BDT		
				Currency	Unit Price	Total Price
<b>A Total Price for Equipment</b>						
A.1	Total Price for Rectifier Equipment					
A.2	Total Price for Backup Battery Equipment					
A.3	Total Price for DC/ AC Inverter					
	<b>Total Price for Equipment (FOB/FCA)</b>					
<b>B Total Freight</b>						
	Total Price for Equipment (C&F)					
<b>C Total Insurance</b>						
<b>X Total Price for Equipment (CIF)</b>						
<b>D Total Price for Services</b>						
D.1	Total Price for Rectifier Equipment service					
D.2	Total Price for Backup Battery Equipment service					
D.3	Total Price for DC/ AC Inverter service					
D.4	Total Price for Installation, testing and commissioning Services					
<b>Y Total Price for Services</b>						
	<i>Total Price for DC Power and Air Conditioner Equipment (X + Y)</i>					

**In Words:** US Dollar ..... and BD Taka .....  
 ..... only

# Form C.1

## DETAIL LIST AND PRICE FOR CORE SYSTEM

SL	Name of Item (s)	Unit	Qty	FOB Price in USD/ BDT		
				Currency	Unit Price	Total Price
<b>A Equipment for CDR Collection &amp; Mediation System</b> <i>(The bidder shall fill up the list as per his/her system configuration and to fulfill the requirement of BTCL)</i>						
A.1						
A.2						
A.3						
A.4						
	<b>Sub Total for A</b>					
<b>B Equipment for Rating &amp; Charging System</b> <i>(The bidder shall fill up the list as per his/her system configuration and to fulfill the requirement of BTCL)</i>						
B.1						
B.2						
B.3						
B.4						
	<b>Sub Total for B</b>					
<b>C Equipment for Bill processing, invoice printing and accountant settlement System</b> <i>(The bidder shall fill up the list as per his/her system configuration and to fulfill the requirement of BTCL)</i>						
C.1						
C.2						
C.3						
C.4						
	<b>Sub Total for C</b>					
<b>D Equipment for SAN system</b> <i>(The bidder shall fill up the list as per his/her system configuration and to fulfill the requirement of BTCL)</i>						
D.1						
D.2						
D.3						
D.4						

	<b>Sub Total for D</b>					
E	<b>Equipment for all other Core System mentioned in the tender document</b> <i>(The bidder shall fill up the list as per his/her system configuration and to fulfill the requirement of BTCL)</i>					
E.1						
E.2						
E.3						
E.4						
	<b>Sub Total for E</b>					
	<b>Price for Core System Equipment</b>					
F	<b>Service for CDR Collection &amp; Mediation System</b> <i>(The bidder shall fill up the list as per his/her system configuration and to fulfill the requirement of BTCL)</i>					
F.1						
F.2						
F.3						
F.4						
	<b>Sub Total for G</b>					
G	<b>Service for Rating &amp; Charging System</b> <i>(The bidder shall fill up the list as per his/her system configuration and to fulfill the requirement of BTCL)</i>					
G.1						
G.2						
G.3						
G.4						
	<b>Sub Total for G</b>					
H	<b>Service for Bill processing, invoice printing and accountant settlement System</b> <i>(The bidder shall fill up the list as per his/her system configuration and to fulfill the requirement of BTCL)</i>					
H.1						
H.2						
H.3						
H.4						
	<b>Sub Total for H</b>					
I	<b>Service for SAN system</b> <i>(The bidder shall fill up the list as per his/her system configuration and to fulfill the requirement of BTCL)</i>					

I.1						
i.2						
I.3						
I.4						
	<b><i>Sub Total for I</i></b>					
J	<b>Equipment for all other Core System mentioned in the tender document</b> <i>(The bidder shall fill up the list as per his/her system configuration and to fulfill the requirement of BTCL)</i>					
J.1						
J.2						
J.3						
J.4						
	<b><i>Sub Total for J</i></b>					
	<b><i>Total price for service</i></b>					
	<b><i>Total price for Billing system Equipment and services</i></b>					

**In Words:** US Dollar ..... and BD Taka .....  
..... only

## Form C.2

### DETAIL LIST AND PRICE FOR DATA EQUIPMENT AND ANCILLARY EQUIPMENT

SITE NAME : .....

*(The Bidder shall fill up one form for each site)*

SL	Name of Item (s)	Unit	Qty	FOB Price in USD/ BDT		
				Currency	Unit Price	Total Price
<b>A Data Equipment</b> <i>(The bidder shall fill up the list as per his/her system configuration and to fulfill the requirement of BTCL)</i>						
A.1	Router					
A.2	LAN switch					
A.3	Firewall					
A.4	Other Material					
	<b>Sub Total for Data Equipment</b>					
<b>B Printer, ODF and other ancillary Equipment</b> <i>(The bidder shall fill up the list as per his/her system configuration and to fulfill the requirement of BTCL)</i>						
B.1	Printer					
B.2	ODF					
B.3	Other Material					
	<b>Sub Total for Printer, ODF and other ancillary Equipment</b>					
<b>C Service for Data Equipment</b> <i>(The bidder shall fill up the list as per his/her system configuration and to fulfill the requirement of BTCL)</i>						
C.1	Router					
C.2	LAN switch					
C.3	Firewall					
C.4	Other Material					
	<b>Sub Total for Data Equipment</b>					
<b>D</b>	<b>Service for Printer, ODF and other ancillary Equipment</b> <i>(The bidder shall fill up the list as per his/her system configuration and to</i>					

	<i>fulfill the requirement of BTCL)</i>					
D.1	Printer					
D.2	ODF					
D.3	Other Material					
<b>Sub Total for Printer, ODF and other ancillary Equipment</b>						
	Price for the Data and ancillary Equipment (A +B+C+D)					

**In Words:** US Dollar ..... and BD Taka .....  
..... only



## Form C.4

### DETAIL LIST AND PRICE FOR ALL INDIVIDUAL ITEMS/PARTS OF OTHER SERVICES

SL	Name of Item (s)	Unit	Qty	FOB Price in USD/ BDT		
				Currency	Unit Price	Total Price
<b>A</b>						
<b>Other Services</b> <i>(The bidder shall fill up the list as per his/her system configuration and to fulfill the requirement of BTCL)</i>						
A.1	Maintenance Support during Guarantee Period					
A.2	Post Guarantee Maintenance Support Program					
A.3	Customers Proof of Concept					
A.4	Provisional Acceptance Test					
A.5	Final Acceptance Test					
A.6	Factory Training					
A.7	Local Training					
	<b>Sub Total for A</b>					
<b>B</b>						
<b>Other Services related to Turn-Key completion of the Project</b> <i>(The bidder shall fill up the list as per his/her system configuration and to fulfill the requirement of BTCL)</i>						
B.1	Survey, Network Planning and Design Services					
B.2	Project Implementation Services					
B.3	Inter-working Services					
B.4	Inter-connection Services					
	<b>Sub Total for B</b>					
	<b>Price for Other Services (A + B)</b>					

**In Words:** US Dollar ..... and BD Taka .....  
 ..... only

## Form C.5

### DETAIL LIST AND PRICE FOR ALL INDIVIDUAL ITEMS/PARTS OF POWER

SL	Name of Item (s)	Unit	Qty	FOB Price in USD/ BDT		
				Currency	Unit Price	Total Price
<b>A</b> <b>Equipment</b> <i>(The bidder shall fill up the list as per his/her system configuration and to fulfill the requirement of BTCL)</i>						
A.1	Rectifier					
A.2	Backup Battery					
A.3	DC/ AC Inverter					
A.4	AC/ DC pwr wiring					
A.5						
	<b>Sub Total for A</b>					
<b>B</b> <b>Services</b> <i>(The bidder shall fill up the list as per his/her system configuration and to fulfill the requirement of BTCL)</i>						
B.1	Installation, testing and commissioning Services					
	<b>Price for DC Power and Air Conditioner Equipment (A + B)</b>					

**In Words:** US Dollar ..... and BD Taka .....  
 ..... only

## Form D.1

### DETAIL LIST AND PRICE FOR MAINTENANCE SPARES FOR 2 (TWO) YEARS

---

SL	Name of Item (s)	Unit	Qty	FOB Price in USD/ BDT		
				Currency	Unit Price	Total Price
	<i>(The bidder shall fill up the list as per relevant clause of Tender Document and to fulfill the requirement of BTCL)</i>					
	<b>Total For Maintenance Spares</b>					

**In Words:** US Dollar ..... and BD Taka .....  
 ..... only

## Form D.2

### DETAIL LIST AND PRICE FOR TOOLS AND TESTERS AND OTHER EQUIPMENT

---

SL	Name of Item (s)	Unit	Qty	FOB Price in USD/ BDT		
				Currency	Unit Price	Total Price
	<i>(The bidder shall fill up the list as per relevant clause of Tender document and to fulfill the requirement of BTCL)</i>					
	<b>Total For Tools and Testers</b>					

**In Words:** US Dollar ..... and BD Taka .....  
 ..... only



## Form D.4

### DETAIL LIST AND PRICE FOR INSTALLATION MATERIALS

---

SL	Name of Item (s)	Unit	Qty	FOB Price in USD/ BDT		
				Currency	Unit Price	Total Price
	<i>(The bidder shall fill up the list as per relevant clause of Tender document and to fulfill the requirement of BTCL)</i>					
	<b>Total For Installation Materials</b>					

**In Words:** US Dollar ..... and BD Taka .....  
 ..... only



**Form E.2**  
**QUOTATION FOR FUTURE ORDER**

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(a) Future Order Formula for Equipment: (*Bidder shall specify*)

(b) Future Order Formula for Service: (*Bidder shall specify*)