Review of Railway Rehabilitation in Central Asia

for Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan

Tender Documents

for the rehabilitation measures of the Kungrad - Kazakh border railway section (Uzbekistan)

Lot 1.3 - Telecommunications

This project is funded by the European Union

ITALFERR

A project implemented by Italferr S.p.A.

Uzbekistan

INVITATION FOR PREQUALIFICATION

[date]
[name of the Employer]
[ADB Loan number]

Rehabilitation measures for the Kungrad – Kazakh Border railway section

Lot 1.3 Telecommunications

This Invitation for Prequalification follows the General Procurement Notice for this project that appeared in the "ADB Business Opportunities", issue of [*issue date*].

[*name of Borrower*] has received a loan from the Asian Development Bank (the Bank) towards the cost of Rehabilitation measures for the Kungrad – Kazakh Border railway section and intends to apply part of the proceeds of the Loan to payments under the contract for the Lot 1.3 Telecommunications.

[*name of Employer]* (the Employer) intends prequalifying firms and joint ventures to tender for the following contract to be funded from part of the proceeds of the loan:

Implementation of a new telecommunication system using a STM1 (155 Mbps) + E1 (2 Mbps) - using a SDH (Synchronous Digital Hierarchy) based system for the primary backbone complemented by PDH (Plesyocronous Digital Hierarchy) based system for the secondary backbone. The contract includes the supply and installation of 3 ADM 1, 18 MUX D/I, 15 UPS, 3 PABX, about 350 km of Fiber Optical Cable and Copper Cable.

The contract implementation period will be 22 months.

Prequalification and tendering for contracts to be financed with the proceeds of a loan from the Bank is open to firms and joint ventures of firms from eligible countries.

Interested eligible firms may obtain further information from [*insert name of Employer*] and inspect Prequalification Documents at the address given below, [*insert address at end of document*] from [*insert office hours*].

Prequalification documents in English language may be obtained from the address below upon payment of a non-refundable fee of [*state currency and value*] or equivalent in a convertible currency. [*Give instructions for payment by bank transfer or the like*].

If requested, the documents will be promptly despatched by courier, but no liability can be accepted for loss or late delivery.

The prequalification documents must be duly completed and delivered to the address below, on or before [*specify time and date of deadline for submission].*

Documents which are received late may be rejected and returned unopened.

Interested firms may obtain further information from, and inspect and acquire the prequalification documents at the following office:

[*Contact name*]

[*Executing agency*]

[*Address*]

[*Tel:*]

[*Fax:*]

Date: _____

STANDARD PROCUREMENT DOCUMENT

Prequalification of Bidders

Asian Development Bank
November 2004

Foreword

This Standard Procurement Document for the Prequalification of Bidders (SPQD) has been prepared by the Asian Development Bank (ADB) and is based on the Master Procurement Document entitled "Prequalification Documents for Procurement of Works", prepared by multilateral development banks and other public international financial institutions which reflects the majority view of these institutions. This document has the structure and the provisions of the Master Procurement Document, except where ADB-specific considerations have required a change.

This SPQD facilitates prequalification of bidders for large and complex civil works contracts, turnkey contracts, and contracts for the fabrication of expensive and technically complex plant and equipment. This is to ensure that only firms with appropriate experience, a proven track record, and necessary annual turnover, which are free of any major pending litigation, will be invited to submit bids.

This SPQD is to be used for the prequalification process for contracts financed in whole or in part by ADB and to be procured through International Competitive Bidding.

An important feature of this SPQD is that it can be used with minimum changes, as it does not contain explanations, footnotes or examples. The SPQD is only available in electronic format.

This SPQD is supported by a User's Guide. The User's Guide contains detailed explanations and recommendations to Employers on how to prepare specific Prequalification Documents and how to evaluate applications. The User's Guide is not a part of the Prequalification Document.

To obtain further information on procurement under ADB-assisted projects, contact

Project Coordination and Procurement Division
Central Operations Services Office
Asian Development Bank
P.O. Box 789, 0980 Manila, Philippines
Email: procurement@adb.org
Fax: (63-2) 636 2475

PROCUREMENT DOCUMENT

Prequalification of Bidders for the Procurement of

_____

_____

_____

_____

Issued on:

Invitation for Prequalification No.:

ICB No.:

Employer:

Country:

Preface

This Prequalification Document (PQD) has been prepared by . . . . . and is based on the Standard Procurement Document for the Prequalification of Bidders (SPQD) issued by the Asian Development Bank dated . . . . . .

ADB's SPQD has the structure and the provisions of the Master Procurement Document entitled "Prequalification Documents for Procurement of Works", prepared by multilateral development banks and other public international financial institutions except where ADB-specific considerations have required a change.

Summary Description

Page No.

PART 1. APPLICATION PROCEDURES

PART 2. REQUIREMENTS

PART 1 – Prequalification Procedures

Section I. Instructions to Applicants

Table of Clauses

A. General

1. Scope of Application

1.1 In connection with the Invitation for Prequalification indicated in Section II, Application Data Sheet (ADS), the Employer, as defined in the ADS, issues this Prequalification Document to applicants interested in bidding for the works described in Section VI, Scope of Contract. The number of contracts and the name and identification of each contract as well as the International Competitive Bidding (ICB) number corresponding to this prequalification, are provided in the ADS.

2. Source of Funds

2.1 The Borrower or Recipient (hereinafter called "Borrower") indicated in the ADS has applied for or received financing (hereinafter called "funds") from the Asian Development Bank (hereinafter called "the ADB") towards the cost of the project named in the ADS. The Borrower intends to apply a portion of the funds to eligible payments under the contract resulting from the bidding for which this prequalification is conducted (hereinafter called "the Contract").

2.2 Payments by the ADB will be made only at the request of the Borrower and upon approval by the ADB in accordance with the terms and conditions of the financing agreement between the Borrower and the ADB (hereinafter called the Loan Agreement), and will be subject in all respects to the terms and conditions of that Loan Agreement. No party other than the Borrower shall derive any rights from the Loan Agreement or have any claim to the funds.

3. Corrupt Practices

3.1 ADB's Anticorruption Policy requires borrowers (including beneficiaries of ADB-financed activity), as well as bidders, suppliers, and contractors under ADB-financed contracts, observe the highest standard of ethics during the procurement and execution of such contracts. In pursuance of this policy, the ADB:

(a) defines, for the purposes of this provision, the terms set forth below as follows:

(i) "corrupt practice" means the offering, giving receiving, or soliciting, directly or indirectly, of any thing of value to influence the action of any party in the procurement process or the execution of a contract;

(ii) "fraudulent practice" means a misrepresentation or omission of facts in order to influence a procurement process or the execution of a contract;

(iii) "collusive practices" means a scheme or arrangement between two or more bidders, with or without the knowledge of the Borrower, designed to influence the action of any party in a procurement process or the execution of a contract;

(iv) "coercive practices" means harming or threatening to harm, directly or indirectly, persons, or their property to influence their participation in a procurement process, or affect the execution of a contract;

(b) will reject a proposal for award if it determines that the bidder recommended for award has, directly or through an agent, engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract; and

(c) will sanction a party or its successor, including declaring ineligible, either indefinitely or for a stated period of time, to participate in ADB-financed activities if it at any time determines that the firm has, directly or through an agent, engaged in corrupt, fraudulent, collusive, or coercive practices in competing for, or in executing, an ADB-financed contract.

4. Eligible Applicants

4.1 An Applicant shall be a private or government-owned legal entity, subject to ITA Sub-Clause 4.6, or any combination of them with a formal intent to enter into an agreement or under an existing agreement in the form of a Joint Venture (JV). In the case of a JV,

(a) all partners to the JV shall be jointly and severally liable; and

(b) a JV shall nominate a representative who shall have the authority to conduct all business for and on behalf of any and all the partners of the JV during the prequalification process and, in the event the JV is prequalified, during the bidding process, and in the event the JV is awarded the Contract, during contract execution.

4.2 An Applicant, and all partners constituting the Applicant, shall have the nationality of an eligible country, in accordance with Section V, Eligible Countries. An Applicant shall be deemed to have the nationality of a country if the Applicant is a national of that country; or is constituted, incorporated, or registered and operates in conformity with the provisions of the laws of that country.

4.3 The above requirement shall also apply to the determination of the nationality of proposed subcontractors or suppliers for any part of the Contract including related services.

4.4 Applicants shall not have a conflict of interest. All Applicants found to have a conflict of interest with one or more parties in this prequalification process shall be disqualified. Applicants shall be considered to have a conflict of interest, if they

(a) have controlling shareholders in common; or

(b) receive or have received any direct or indirect subsidy from any of them; or

(c) have the same legal representative for purposes of their Application; or

(d) have a relationship with each other, directly or through common third parties, that puts them in a position to have access to information about or to influence the application of another Applicant in the subsequent bidding process or influence the decisions of the Employer regarding this prequalification process; or

(e) participated as a consultant in the preparation of the design or technical specifications of the works that are the subject of this prequalification. Where a firm, or a firm from the same economic or financial group, in addition to consulting, also has the capability to manufacture or supply goods or to construct works, that firm, or a firm from the same economic or financial group, may not normally be a supplier of goods or works, if it provided consulting services for the contract corresponding to this prequalification, unless it can be demonstrated that there is no significant degree of common ownership, influence or control.

4.5 A firm that is under a declaration of ineligibility by the ADB in accordance with ITA Clause 3, at the date of submission of the application or thereafter, shall not be considered.

4.6 Government-owned enterprises in the Employer's country shall be eligible only if they can establish that they are legally and financially autonomous, and operate under commercial law, and that they are not in any way dependent agencies of the Employer.

4.7 Applicants shall provide such evidence of their continued eligibility satisfactory to the Employer, as the Employer shall reasonably request.

5. Eligible Materials, Equipment and Services

5.1 The materials, equipment and services to be supplied under the Contract and financed by ADB shall have as their country of origin an eligible country of ADB (see Section V, Eligible Countries).

B. Contents of Prequalification Document

6. Sections of the Prequalification Document

6.1 The Prequalification Document consists of Parts 1 and 2 which include all the sections indicated below, and should be read in conjunction with any Addenda issued in accordance with ITA Clause 8.

PART 1 Prequalification Procedures

- Section I. Instructions to Applicants (ITA)
- Section II. Application Data Sheet (ADS)
- Section III. Qualification Criteria
- Section IV. Application Forms
- Section V. Eligible Countries

PART 2 Requirements

- Section VI. Scope of Contract

6.2 The "Invitation for Prequalification" issued by the Employer is not part of the Prequalification Document.

6.3 The Employer accepts no responsibility for the completeness of the Prequalification Document and its addenda unless they were obtained directly from the Employer.

6.4 The Applicant is expected to examine all instructions, forms, and terms in the Prequalification Document and to furnish all information or documentation required by the Prequalification Document.

7. Clarification of Prequalification Document

7.1 A prospective Applicant requiring any clarification of the Prequalification Document shall contact the Employer in writing at the Employer's address indicated in the ADS. The Employer will respond in writing to any request for clarification provided that such request is received no later than fourteen (14) days prior to the deadline for submission of Applications. The Employer shall forward copies of its response to all Applicants who have acquired the Prequalification Document directly from the Employer including a description of the inquiry but without identifying its source. Should the Employer deem it necessary to amend the Prequalification Document as a result of a request for clarification, it shall do so following the procedure under ITA Clause 8 and in accordance with the provisions of Sub-Clause 17.2.

8. Amendment of Prequalification Document

8.1 At any time prior to the deadline for submission of Applications, the Employer may amend the Prequalification Document by issuing addenda.

8.2 Any addendum issued shall be part of the Prequalification Document and shall be communicated in writing to all who have obtained the Prequalification Document directly from the Employer.

8.3 To give prospective Applicants reasonable time in which to take an addendum into account in preparing their Applications, the Employer may, at its discretion, extend the deadline for the submission of applications.

C. Preparation of Applications

9. Cost of Applications

9.1 The Applicant shall bear all costs associated with the preparation and submission of its application, and the Employer shall in no case be responsible or liable for those costs, regardless of the conduct or outcome of the prequalification process.

10. Language of Application

10.1 The application, as well as all correspondence and documents relating to the prequalification exchanged by the Applicant and the Employer, shall be written in the English language. Supporting documents and printed literature that are part of the application may be in another language, provided they are accompanied by an accurate translation of the relevant passages into the English language, in which case, for purposes of interpretation of the application, the translation shall govern.

11. Documents Comprising the Application

11.1 The Application shall comprise the following:

(a) Application Submission Sheet, in accordance with ITA Clause 12;

(b) written confirmation authorizing the signatory of the application to commit the Applicant, in accordance with ITA Sub-Clause 15.3;

(c) documentary evidence establishing the Applicant's eligibility to prequalify, in accordance with ITA Clause 13;

(d) documentary evidence establishing the Applicant's qualifications, in accordance with ITA Clause 14; and

(e) any other document required as specified in the ADS.

12. Application Submission Sheet

12.1 The Applicant shall prepare an Application Submission Sheet using the form furnished in Section IV, Application Forms. This form must be completed without any alteration to its format.

13. Documents Establishing the Eligibility of the Applicant

13.1 To establish its eligibility in accordance with ITA Clause 4, the Applicant shall complete the eligibility declarations in the Application Submission Sheet and Forms ELI 1.1 and 1.2, included in Section IV, Application Forms.

14. Documents Establishing the Qualifications of the Applicant

14.1 To establish its qualifications to perform the contract in accordance with Section III, Qualification Criteria, the Applicant shall provide the information requested in the corresponding Information Sheets included in Section IV, Application Forms.

15. Signing of the Application and Number of Copies

15.1 The Applicant shall prepare one original of the documents comprising the application as described in ITA Clause 11 and clearly mark it "ORIGINAL". The original of the application shall be typed or written in indelible ink and shall be signed by a person duly authorized to sign on behalf of the Applicant.

15.2 The Applicant shall submit copies of the signed original application, in the number specified in the ADS, and clearly mark them "COPY". In the event of any discrepancy between the original and the copies, the original shall prevail.

15.3 The requirements regarding the legal instrument evidencing the authorization to represent and sign on behalf of the Applicant shall be as specified in the ADS. Applications submitted by an existing or intended JV shall include an undertaking signed by all partners

(a) stating that all partners shall be jointly and severally liable, and

(b) nominating a Representative who shall have the authority to conduct all business for and on behalf of any and all the partners of the JV during the prequalification process and, in the event the JV is prequalified, during the bidding process, and in the event the JV is awarded the Contract, during contract execution.

D. Submission of Applications

16. Sealing and Marking of Applications

16.1 The Applicant shall enclose the original and the copies of the application in a sealed envelope which shall

(a) bear the name and address of the Applicant;

(b) be addressed to the Employer, in accordance with ITA 17.1; and

(c) bear the specific identification of this prequalification process indicated in the ADS 1.1.

16.2 If the envelope is not sealed and marked as required, the Employer will assume no responsibility for the misplacement of the application.

17. Deadline for Submission of Applications

17.1 Applications shall be received by the Employer at the address and no later than the deadline indicated in the ADS.

17.2 The Employer may, at its discretion, extend the deadline for the submission of Applications by amending the Prequalification Document in accordance with ITA Clause 8, in which case all rights and obligations of the Employer and the Applicants subject to the previous deadline shall thereafter be subject to the deadline as extended.

18. Late Applications

18.1 The Employer reserves the right to accept or reject late Applications.

19. Opening of Applications

19.1 The Employer shall prepare a record of the opening of Applications that shall include, as a minimum, the name of the Applicant. A copy of the record shall be distributed to all Applicants.

E. Evaluation of Applications

20. Confidentiality

20.1 Information relating to the evaluation of Applications, and recommendation for prequalification, shall not be disclosed to Applicants or any other persons not officially concerned with such process until the notification of prequalification is made to all Applicants.

20.2 From the deadline for submission of Applications to the time of notification of the results of the prequalification in accordance with ITA Clause 28, if any Applicant wishes to contact the Employer on any matter related to the prequalification process, it may do so in writing.

21. Clarification of Applications

21.1 To assist in the evaluation of Applications, the Employer may, at its discretion, ask any Applicant for a clarification of its application which shall be submitted within a stated reasonable period of time. Any request for clarification and all clarifications shall be in writing.

21.2 If an Applicant does not provide clarifications of the information requested by the date and time set in the Employer's request for clarification, its Application may be rejected.

22. Responsiveness of Applications

22.1 The Employer may reject any Application which is not responsive to the requirements of the Prequalification Document.

23. Margin of Preference

23.1 If so indicated in the ADS, a margin of preference shall apply in the bidding process resulting from this prequalification.

24. Subcontractors

24.1 Applicants shall state in the Application Submission Sheet whether they intend to subcontract parts or elements of the Works.

24.2 If an Applicant intends to subcontract any of the key activities listed in Section III, Qualification Criteria, Criteria 4.2(b), then such key activities and the proposed subcontractors (Specialist Subcontractors) shall be clearly identified in Section IV, Application Forms, Forms ELI-1.2 and EXP-4.2(b). Such Specialist Subcontractor(s) shall meet the corresponding qualification requirements specified in Section III, Qualification Criteria. At the time of bidding, the Bidder shall use in its bid only Specialist Subcontractor(s) prequalified during the prequalification exercise.

24.3 Unless otherwise specified in the ADS, the Employer does not intend to execute certain specific parts of the Works by subcontractors selected in advance by the Employer (Nominated Subcontractors).

F. Prequalification of Applicants

25. Evaluation of Applications

25.1 The Employer shall use the criteria and methods defined in Section III, Qualification Criteria to evaluate the qualifications of the Applicants and proposed subcontractors.

25.2 Only the qualifications of proposed subcontractors that have been identified in the Application pursuant to ITA 24.2 will be considered in the evaluation of an Applicant. However, the general experience and financial resources of subcontractors may not be added to those of the Applicant for purposes of prequalification of the Applicant.

25.3 Unless otherwise indicated in the ADS, this prequalification shall be for a single contract.

26. Employer's Right to Accept or Reject Applications

26.1 The Employer reserves the right to accept or reject any Application, and to annul the prequalification process and reject all applications at any time, without thereby incurring any liability to Applicants

27. Prequalification of Applicants

27.1 All Applicants, including their proposed subcontractors, whose applications have been determined to be substantially responsive to the requirements of the Prequalification Document and who have met or exceeded the specified criteria shall be prequalified by the Employer.

28. Notification of Prequalification

28.1 Once the Employer has completed the evaluation of the Applications it shall notify all Applicants in writing of the names of those applicants who have been prequalified.

29. Invitation to Bid

29.1 Promptly after the notification of the results of the prequalification, the Employer shall invite bids from all the Applicants that have been prequalified.

29.2 Bidders may be required to provide bid security in the form of a demand guarantee or other security acceptable to the Employer for an amount as specified in the bidding document.

29.3 A qualified firm or a member of a qualified joint venture may participate in only one bid for the contract. If a firm submits more than one bid, singly or in joint venture, all bids including that firmrequest will be rejected. This rule will not apply in respect of bids that include specialist subcontractors that are used by more than one bidder.

30. Changes in Qualifications of Applicants

30.1 Any change in the qualification status of an Applicant after being prequalified in accordance with ITA Clause 27 shall be subject to the written approval of the Employer. Any such change shall be submitted to the Employer not later than fourteen (14) days after the date of the Invitation to Bid. Such approval shall be denied if as a consequence of any change,

(a) the prequalified Applicant, after the change, no longer substantially meets the qualification criteria set forth in Section III, Qualification Criteria; or

(b) a new partner that had not been prequalified as an Applicant or a Specialist Subcontractor as per ITA 24.2 is added to a prequalified Applicant.

Section II. Application Data Sheet

A. General

ITA 1.1	The identification of the Invitation for Prequalification is:
ITA 1.1	The name of the Employer is:
ITA 1.1	The names, identification and number of the contracts are:
ITA 1.1	The name and identification number of the ICB are:
ITA 2.1	The name of the Borrower is:
ITA 2.1	The name of the Project is: ***Rehabilitation measures for the Kungrad – Kazakh border railways section – Lot 1.3 Telecommunications***

B. Contents of the Prequalification Document

ITA 7.1	For **clarification purposes** only, the Employer's address is: Attention: Number and Street: Floor/Room Number: City: . ZIP Code: Country Telephone: Facsimile number: Electronic mail address:

C. Preparation of Applications

ITA 11.1 (e)	The Applicant shall submit with its application the following additional documents:
ITA 15.2	In addition to the original, the number of copies to be submitted with the application is:
ITA 15.3	The requirements regarding the legal instrument evidencing the authorization to represent and sign on behalf of the Applicant shall be:

D. Submission of Applications

ITA 17.1	For **application submission purposes** only, the Employer's address is: Attention: Number and Street: Floor/Room Number: City: ZIP Code: Country: Telephone: Facsimile number: Electronic mail address: **The deadline for application submission is:** Date: Time:

E. Evaluation of Applications

ITA 23.1	A margin of preference . . . . . apply in the bidding process corresponding to this prequalification. If a Margin of Preference applies, the procedure for evaluation will be specified in bidding document.
ITA 24.3	The Employer . . . . . to execute certain specific parts of the Works by subcontractors selected in advance (Nominated Subcontractors). The specific parts of the works and the respective subcontractors are:

F. Prequalification of Applicants

ITA 25.3	As stipulated in ITA 1.1, this prequalification exercise shall be for: . . . . .

Section III. Qualification Criteria

Table of Contents

1. Eligibility

Criteria	Compliance Requirements				Documents
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Each Partner	One Partner	

1.1 Nationality

Nationality in accordance with ITA Sub-Clause 4.2.	must meet requirement	existing or intended JV must meet requirement	must meet requirement	not applicable	Forms ELI –1.1; ELI –1.2 with attachments

1.2 Conflict of Interest

No conflicts of interest in accordance with ITA Sub-Clause 4.4.	must meet requirement	existing or intended JV must meet requirement	must meet requirement	not applicable	Application Submission Sheet

1.3 ADB Eligibility

Not having been declared ineligible by ADB, as described in ITA Sub-Clause 4.5.	must meet requirement	existing or intended JV must meet requirement	must meet requirement	not applicable	Application Submission Sheet

1.4 Government-owned Entity

Applicant required to meet conditions of ITA Sub-Clause 4.6.	must meet requirement	must meet requirement	must meet requirement	not applicable	Forms ELI -1.1, ELI -1.2 with attachments

2. Pending Litigation

Criteria	Compliance Requirements				Documents
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Each Partner	One Partner	

2.1 Pending Litigation

All pending litigation shall be treated as resolved against the Applicant and so shall in total not represent more than . . . . . percent of the Applicant's net worth.	must meet requirement by itself or as partner to past or existing JV	not applicable	must meet requirement by itself or as partner to past or existing JV	not applicable	Form LIT - 2

3. Financial Situation

Criteria	Compliance Requirements				Documents
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Each Partner	One Partner	
3.1 Historical Financial Performance					
Submission of audited balance sheets or, if not required by the law of the applicant's country, other financial statements acceptable to the Employer, for the last . . . . . years to demonstrate the current soundness of the applicants financial position and its prospective long-term profitability.	must meet requirement	not applicable	must meet requirement	not applicable	Form FIN - 3.1 with attachments

Criteria	Compliance Requirements				Documents
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Each Partner	One Partner	

3.2 Average Annual Construction Turnover

Minimum average annual construction turnover of US$ . . . . . calculated as total certified payments received for contracts in progress or completed, within the last . . . . . years.	must meet requirement	must meet requirement	must meet . . . . . of the requirement	must meet . . . . . of the requirement	Form FIN - 3.2

4. Experience

Criteria	Compliance Requirements				Documents
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Each Partner	One Partner	

4.1 General Construction Experience

Experience under construction contracts in the role of contractor, subcontractor, or management contractor for at least the last . . . . . years prior to the applications submission deadline.	must meet requirement	not applicable	must meet requirement	not applicable	Form EXP-4.1

Criteria	Compliance Requirements				Documents
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Each Partner	One Partner	

4.2 Specific Construction Experience

(a) Contracts of Similar Size and Nature

Participation as contractor, management contractor, or subcontractor, in at least . . . . . contracts within the last . . . . . years, each with a value of at least US$ . . . . . that have been successfully or are substantially completed and that are similar to the proposed works. The similarity shall be based on the physical size, complexity, methods, technology or other characteristics as described in Section VI, Scope of Contract.	must meet requirement	must meet requirement	not applicable	not applicable	Form EXP 4.2(a)

Criteria	Compliance Requirements				Documents
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Each Partner	One Partner	

4.2 Specific Construction Experience

(b) Construction Experience in Key Activities

For the above or other contracts executed during the period stipulated in 4.2(a) above, a minimum construction experience in the following key activities:	must meet all requirements	must meet all requirements	not applicable	not applicable	Form EXP-4.2(b)

Section IV. Application Forms

Table of Forms

Application Submission Sheet

Date: .....
IFP No.: .....
ICB No.: .....

To: .....

We, the undersigned, apply to be prequalified for the referenced ICB and declare the following.

(a) We have examined and have no reservations to the Prequalification Document, including Addenda No(s)....., issued in accordance with ITA Clause 8.

(b) We, including all subcontractors or suppliers for any part of the contract(s) resulting from this prequalification process, if any, have nationalities of eligible countries, in accordance with ITA Sub-Clause 4.2.

(c) We, including any subcontractors or suppliers for any part of the contract(s) resulting from this prequalification, do not have any conflict of interest in accordance with ITA Sub-Clause 4.4.

(d) We, including any subcontractors or suppliers for any part of the contract(s) resulting from this prequalification, have not been declared ineligible by the ADB.

(e) We are a not government-owned entity. (1)

(f) We, in accordance with ITA Sub-clause 24.1, plan to subcontract the following key activities or parts of the works: .....

(g) We declare that the following commissions, gratuities, or fees have been paid or are to be paid with respect to the prequalification process:

Name of Recipient	Address	Reason	Amount
.....	.....	.....	.....
.....	.....	.....	.....

(If none has been paid or is to be paid, indicate "none.")

(h) We understand that you may cancel the prequalification process at any time and that you are not bound either to accept any application that you may receive or to invite the prequalified applicants to bid for the contract(s) subject of this prequalification, without incurring any liability to the Applicants, in accordance with ITA Clause 26.

Name .....

In the capacity of .....

Signed .....
.....
.....

Duly authorized to sign the Application for and on behalf of .....

Date .....
.....

(1) Government-owned entites must replace para (e) with the following statement: "We are a government-owned entity but meet the requirements of ITA Sub-Clause 4.6."

Form ELI – 1.1

Applicant Information Sheet

Date: .....
IFP No.: .....
.....
.....
ICB No.: .....
.....
Page ..... of ..... pages

Applicant Information	
Applicant's legal name	
In case of JV, legal name of each partner	
Applicant's actual or intended country of constitution	
Applicant's actual or Intended year of constitution	
Applicant's legal address in country of constitution	
Applicant's authorized representative (name, address, telephone numbers, fax numbers, e-mail address)	

Attached are copies of the following original documents.

- ☐ 1. In case of single entity, articles of incorporation or constitution of the legal entity named above, in accordance with ITA Sub-Clauses 4.1 and 4.2.
- ☐ 2. Authorization to represent the firm or JV named in above, in accordance with ITA Sub-Clause 15.3.
- ☐ 3. In case of JV, letter of intent to form JV or JV agreement, in accordance with ITA Sub-Clause 4.1.
- ☐ 4. In case of a government-owned entity, any additional documents not covered under 1 above required to comply with ITA Sub-Clause 4.6.

Form ELI – 1.2

JV Information Sheet

for JV Partners and Specialist Subcontractors as per ITA 24.2

Date: .....
IFP No.: .....
.....
.....
ICB No.: .....
.....
Page .....of ..... pages

Each member of a JV and Specialist Subcontractors as per ITA 24.2 must fill in this form

JV / Specialist Subcontractor Information	
Applicant's legal name	
JV Partner's or Subcontractor's legal name	
JV Partner's or Subcontractor's country of constitution	
JV Partner's or Subcontractor's year of constitution	
JV Partner's or Subcontractor's legal address in country of constitution	
JV Partner's or Subcontractor's authorized representative information (name, address, telephone numbers, fax numbers, e-mail address)	

Attached are copies of the following original documents.

- ❑ 1. Articles of incorporation or constitution of the legal entity named above, in accordance with ITA Sub-Clauses 4.1 and 4.2.
- ❑ 2. Authorization to represent the firm named above, in accordance with ITA Sub-Clause 15.3.
- ❑ 3. In the case of government-owned entity, documents establishing legal and financial autonomy and compliance with commercial law, in accordance with ITA Sub-Clause 4.6.
- ❑ 4. In case of Specialist Subcontractors as per ITA 24.2 a formal intent to enter into an agreement.

Form LIT – 1

Pending Litigation

Applicant's Legal Name: .....
.....
JV Partner Legal Name: .....
.....

Date: .....
IFP No.: .....
ICB No.: .....
.....
Page ..... of .....pages

Each Applicant or member of a JV must fill in this form

Pending Litigation			
☐ **No pending litigation in accordance with Criteria 2.1 of Section III, Qualification Criteria**			
☐ **Pending litigation in accordance with Criteria 2.1 of Section III, Qualification Criteria, as indicated below**			
Year	**Matter in Dispute**	**Value of Pending Claim in US$ Equivalent**	**Value of Pending Claim as a Percentage of Net Worth**

Form FIN – 3.1

Financial Situation

Applicant's Legal Name: .....
.....
JV Partner's Legal Name:.....
.....

Date: .....

IFP No.: .....

ICB No.: .....
.....

Page .....of ..... pages

Each Applicant or member of a JV must fill in this form

	Financial Data for Previous 3 Years [US$ Equivalent]		
	Year 1:	**Year 2:**	**Year 3:**
1. Total Assets			
2. Current Assets			
3. Total Liabilities			
4. Current Liabilities			
5. Profits Before Taxes			
6. Profits After Taxes			

7. Net Worth [= 1 – 3]			
8. Working Capital [= 2 – 4]			
9. Return on Equity [= 5 / 7 of prior year]			

❑ Attached are copies of the audited balance sheets, including all related notes, and income statements for the last three years, as indicated above, complying with the following conditions.

- All such documents reflect the financial situation of the Applicant or partner to a JV, and not sister or parent companies.
- Historic financial statements must be audited by a certified accountant.
- Historic financial statements must be complete, including all notes to the financial statements.
- Historic financial statements must correspond to accounting periods already completed and audited (no statements for partial periods shall be requested or accepted).

Form FIN – 3.2

Average Annual Construction Turnover

Applicant's Legal Name: .....
.....
JV Partner's Legal Name: .....
.....

Date: .....

IFP No.: .....

ICB No.: .....
.....

Page ..... of ..... pages

Each Applicant or member of a JV must fill in this form

Annual Turnover Data for the Last 3 Years (Construction only)			
Year	**Amount Currency**	**Exchange Rate**	**US$ Equivalent**
	Average Annual Construction Turnover		

The information supplied should be the Annual Turnover of the Applicant or each member of a JV in terms of the amounts billed to clients for each year for work in progress or completed, converted to US Dollars at the rate of exchange at the end of the period reported.

Form EXP – 4.1

General Construction Experience

Applicant's Legal Name: .....
.....
JV Partner's Legal Name:.....
.....

Date: .....
IFP No.: .....
ICB No.: .....
.....
Page .....of ..... pages

Each Applicant or member of a JV must fill in this form

General Construction Experience				
Starting Month Year	Ending Month Year	Years	Contract Identification and Name Name and Address of Employer Brief Description of the Works Executed by the Applicant	Role of Applicant

Form EXP – 4.2 (a)

Specific Construction Experience

Applicant's Legal Name: .....
.....
JV Partner's Legal Name: .....
.....

Date: .....
IFP No.: .....
ICB No.: .....
.....
Page ..... of ..... pages

Fill up one (1) form per contract.

Contract of Similar Size and Nature		
Contract No . . . . . of	**Contract Identification**	
Award Date		**Completion Date**
Role in Contract	❑ **Contractor** ❑ **Management Contractor** ❑ **Subcontractor**	
Total Contract Amount		**US$**
If partner in a JV or subcontractor, specify participation of total contract amount	**Percent of Total**	**Amount**
Employer's Name **Address** **Telephone/Fax Number** **E-mail**		
Description of the similarity in accordance with Criteria 4.2(a) of Section III		

Form EXP – 4.2(b)

Specific Construction Experience in Key Activities

Applicant's Legal Name: ..... Date: .....

JV Partner's Legal Name:..... IFP No.: .....

Subcontractor's Legal Name (as per ITA 24.2): ..... ICB No.: .....

..... Page : ..... of ..... pages

Fill up one (1) form per contract

Contract with Similar Key Activities		
Contract No . . . . . of	**Contract Identification**	
Award Date		**Completion Date**
Role in Contract	❑ **Contractor** ❑ **Management Contractor** ❑ **Subcontractor**	
Total Contract Amount		**US$**
If partner in a JV or subcontractor, specify participation of total contract amount	**Percent of Total**	**Amount**
Employer's Name **Address** **Telephone Number** **Fax Number** **E-mail**		
Description of the key activities in accordance with Criteria 4.2(b) of Section III		

Section V. Eligible Countries

PART 2 – Requirements

Section VI. Scope of Contract

Table of Contents

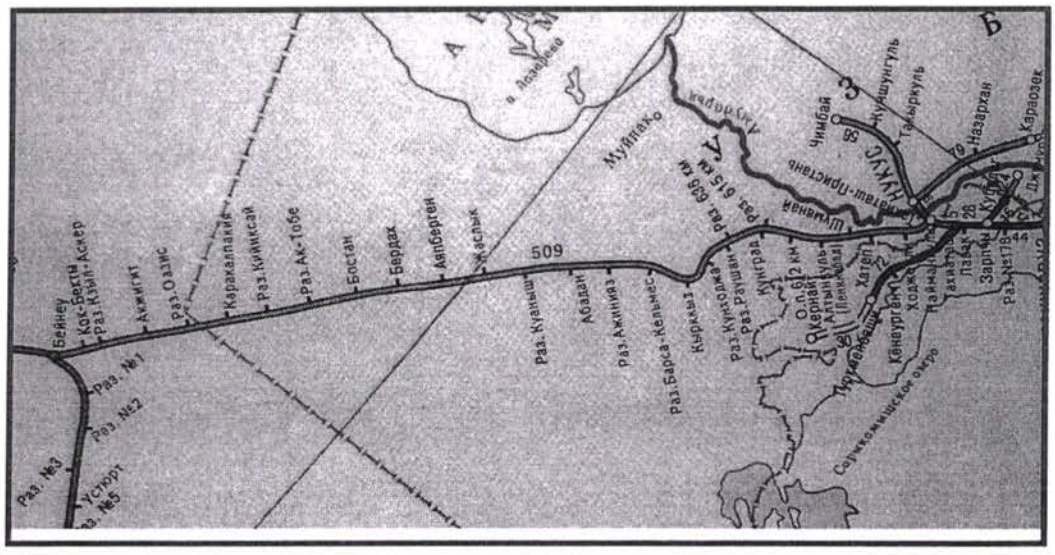
A. Requirements

1. Brief Description of the Scope

The Scope of works refers to the conclusions of the feasibility study of the rehabilitation measures for the Kungrad – Kazakh border railway section in Uzbekistan.
Historically the section under study belongs to the line Kungrad - Beyneu (407 km) as it is shown in the following Figures A and B.

Figure A - The Kungrad – Beyneu railway line

Figure B - Details of Kungrad-Beyneu railway line



After the end of the former Soviet Union, the line has been split into two sections because of the introduction of the national border between Uzbekistan and Kazakhstan: the Kungrad – Border (327 km) and the Beyneu – Border (80 km).
Improvements along the main line have to be financed and managed by two different Railway Administrations. Consequently the study has to consider two different Feasibility Studies for rehabilitation measures concerning sections of the same line.
The Feasibility Study carried out for the Uzbek side of the line (from Kungrad to the Border) has outlined the need of rehabilitation of the line for the following issues:

a. permanent way;
b. main structures (bridges);
c. power supply system for signalling and stations;
d. telecommunications.

Aspects related to uses a. and b. have been considered within Lot 1 while Lot 2 is for issue indicated under c. Aspects related to telecommunication (d. in the list) are managed separately within the present Lot 3.

The following Figure C presents the actual situation for the railway telecommunication system along the Kungrad – Border section while the Figure D presents the new system to be implemented.

Figure C – Description of the existing telecommunications system

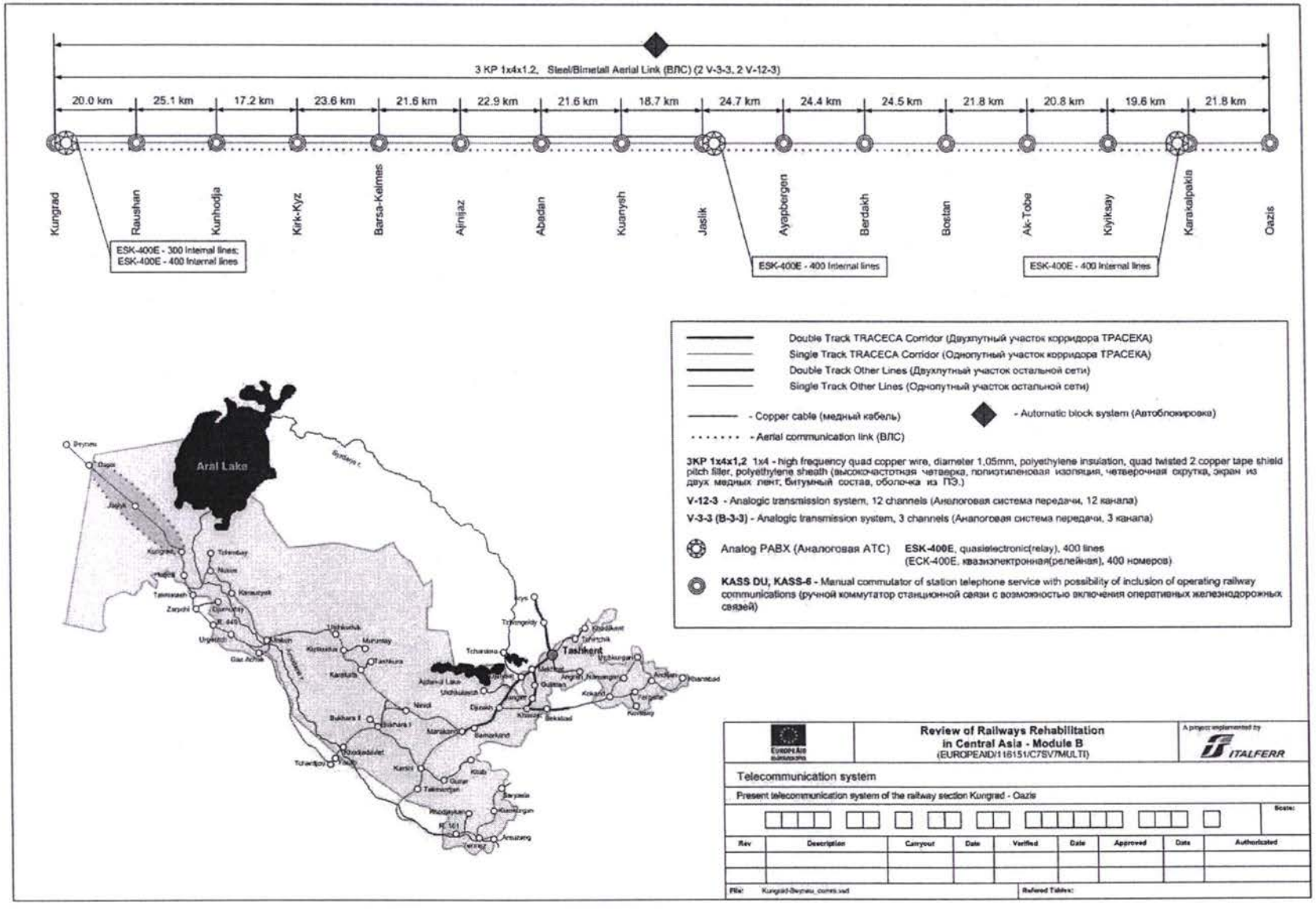
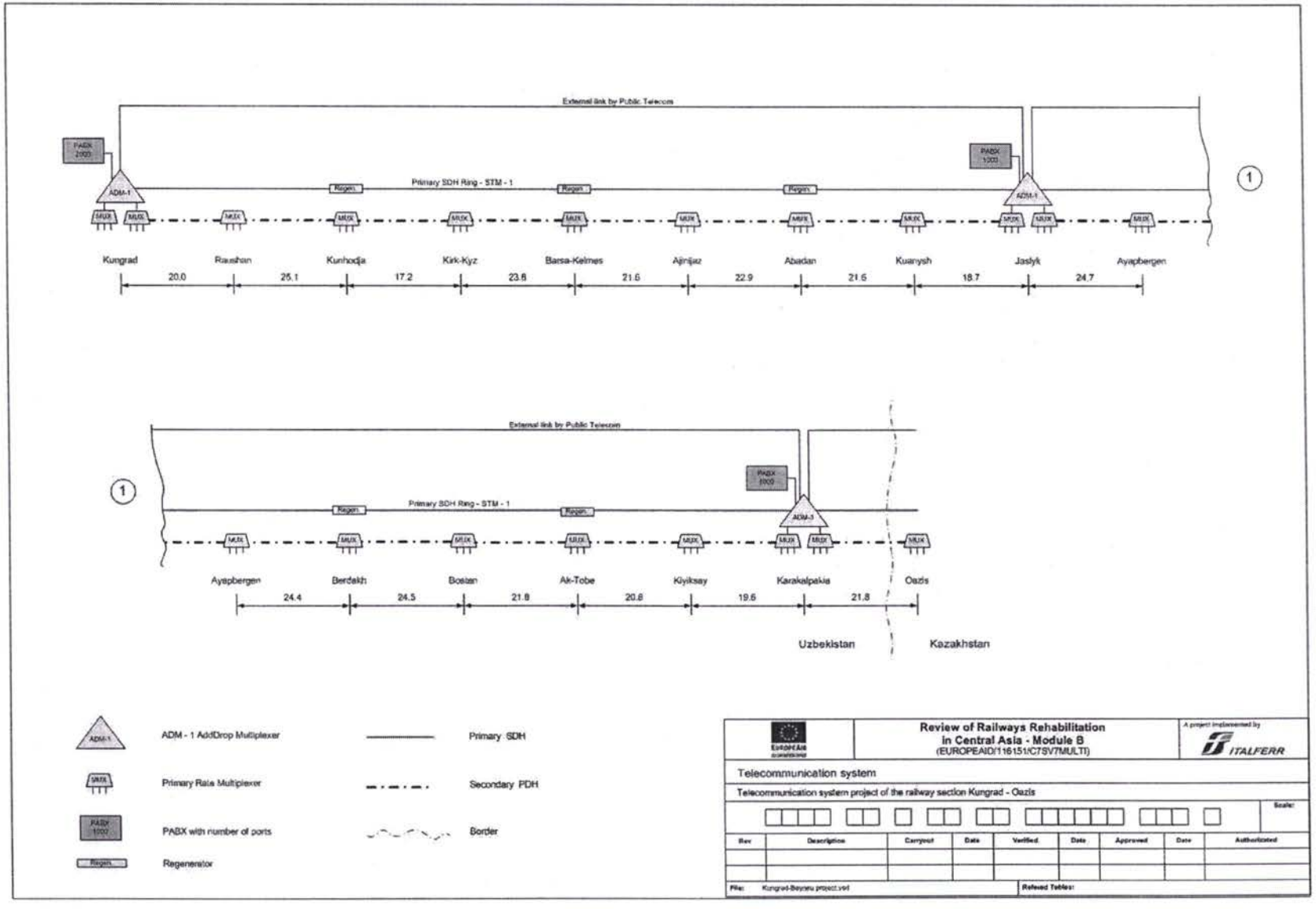


Figure D – Description of the new telecommunications system



The existing system uses both buried copper cable and aerial links. The copper cable is installed only on the section Kungrad-Jaslyk (and it has the following technical specification: 3KP 1x4x1,2 1x4 - High frequency quad copper wire, diameter 1,05mm, polyethylene insulation, quad twisted 2 copper tape shield pitch filler, polyethylene sheath). The steel/bimetal aerial link is present on the entire section Kungrad-Beyneu and it is of the following technical type: V-12-3 and V-3-3.
All the stations are equipped with manual commutator of stations and line sections telephone service, for operation and maintenance activities. The following types of commutatores are installed: KASS – 6 and KASS – DU.
Telecom switches (analogue PABX) are installed on the following stations:

- Kungrad – ESK-400E - 300 Internal lines; ESK-400E - 400 Internal lines
- Jaslyk – ESK-400E - 400 Internal lines
- Karakalpakia – ESK-400E - 400 Internal lines

The following equipment for loud speaking communication is present: TU – 50, TU – 100, TU – 600, RUS.

The equipment for train to station radio communication presently installed is IZ RTS, 71 RTS.

Most of the equipment is very old, aged about 30 years, since it dates from the first years of 70s when the line was built.

The new configuration considers (Figure D) the implementation of a new telecommunication system using a STM1 (155 Mbps) + E1 (2 Mbps) - using a SDH (Synchronous Digital Hierarchy) based system for the primary backbone complemented by PDH (Plesyocronous Digital Hierarchy) based system for the secondary backbone.

2. Major Contract Components

Item Description	Code	Q-ty	Unit	Note
ADM 1 with installation	25-A1	3	unit	
MUX D/I with installation	25-A2	18	unit	
Regenerators	25-A3	5	unit	
UPS with installation	25-A4	15	unit	
PABX 1000 with installation	25-A5	2	unit	
PABX 2000 with installation	25-A6	1	unit	
Various item for equipment (frames, cards, etc.)	25-A7	10%	percentage	percentage of the equipment costs
Stock	25-A8	10%	percentage	percentage of the equipment costs
PCM management system	25-A9	1	unit	
PABX management system	25-A10	1	unit	

Item Description	Code	Q-ty	Unit	Note
Syncronisation system	25-A11	2	unit	
Fiber Optical Cable	25-A12	361,13	km	
Other costs for OF cable (junctions, cable ends, tubes, shafts, etc.)	25-A13	15%	percentage	percentage of the OF Cable costs
Laying of the OF cable	25-A14	328,3	km	
Copper Cable	25-A15	361,13	km	
Other costs for Copper cable (junctions, cable ends, tubes, shafts, etc.)	25-A16	15%	percentage	percentage of Copper Cable costs
Laying of the Copper cable	25-A17	328,3	km	
Preparation of rooms, big stations	25-A18	1	unit	
Preparation of rooms, medium stations	25-A19	2	unit	
Preparation of rooms, small stations	25-A20	12	unit	

3. Estimated Quantities of Major Components

See section 2.

4. Methods Required

No specific methods are required.

5. Contract Implementation Period

The contract implementation period will be of 22 months. The time schedule for implementation should avoid the interferences with the implementation of other Lots.

B. Supplementary Information

1. Project Country

The project country is Uzbekistan.

2. Contract Site

The contract site is along the railway line between Kungrad (Uzbekistan) and the border with Kazakhstan.

C. Facilities to be Provided by the Employer

[...]

STANDARD BIDDING DOCUMENT

Procurement of Goods

Single-Stage: One-Envelope Bidding Procedure

Asian Development Bank

November 2004

Preface

This document has been based on the Master Bidding Document for Procurement of Goods, prepared by Multilateral Development Banks and International Financial Institutions, and reflects what they consider best practices in regard to Bidding Documents and contracting for the procurement of goods.

This document reflects the structure and the provisions of the Master Bidding Document for the Procurement of Goods, except where specific considerations within the respective multilateral development bank or international financial institution have required a change.

This document has been prepared by the Asian Development Bank (ADB) to facilitate a Single-Stage:One-Envelope bidding procedure. The Single-Stage:One-Envelope bidding procedure is the main bidding procedure used for most of the procurement financed by the ADB. In the Single-Stage:One-Envelope bidding procedure, Bidders submit Bids in one envelope containing both the Price Proposal and the Technical Proposal. The envelopes are opened in public at the date and time advised in the Bidding Document. The Bids are evaluated and the Contract is awarded to the Bidder whose Bid has been determined to be the lowest evaluated substantially responsive Bid.

To obtain further information on procurement under ADB assisted projects, contact:

Project Coordination and Procurement Division
Central Operations Services Office
Asian Development Bank
P.O.Box 789, 0980 Manila, Philippines
Fax: (63-2) 636 2475
Email: procurement@adb.org

Standard Bidding Document

Table of Contents

PART 1 – Bidding Procedures

Section I. Instructions to Bidders

Table of Clauses

A. General

1. Scope of Bid

1.1 In support of the Invitation for Bids indicated in the Bid Data Sheet (BDS), the Purchaser, as indicated in the BDS, issues this Bidding Document for the supply of Goods and Related Services incidental thereto as specified in Section VI, Schedule of Supply (SS). The name, identification, and number of lots of the International Competitive Bidding (ICB) are provided in the BDS.

1.2 Throughout this Bidding Document :

(a) the term "in writing" means communicated in written form with proof of receipt;

(b) if the context so requires, singular means plural and vice versa; and

(c) "day" means calendar day.

2. Source of Funds

2.1 The Borrower or Recipient (hereinafter called "Borrower") indicated in the BDS has applied for or received financing (hereinafter called "funds") from the Asian Development Bank (hereinafter called "the ADB") toward the cost of the project named in the BDS. The Borrower intends to apply a portion of the funds to eligible payments under the contract for which this Bidding Document is issued.

2.2 Payments by the ADB will be made only at the request of the Borrower and upon approval by the ADB in accordance with the terms and conditions of the financing agreement between the Borrower and the ADB (hereinafter called the Loan Agreement), and will be subject in all respects to the terms and conditions of that Loan Agreement. No party other than the Borrower shall derive any rights from the Loan Agreement or have any claim to the funds.

3. Corrupt Practices

3.1 ADB's Anticorruption Policy requires borrowers (including beneficiaries of ADB-financed activity), as well as bidders, suppliers, and contractors under ADB-financed contracts, observe the highest standard of ethics during the procurement and execution of such contracts. In pursuance of this policy, the ADB:

(a) defines, for the purposes of this provision, the terms

set forth below as follows:

(i) "corrupt practice" means the offering, giving receiving, or soliciting, directly or indirectly, of any thing of value to influence the action of any party in the procurement process or the execution of a contract;

(ii) "fraudulent practice" means a misrepresentation or omission of facts in order to influence a procurement process or the execution of a contract;

(iii) "collusive practices" means a scheme or arrangement between two or more bidders, with or without the knowledge of the Borrower, designed to influence the action of any party in a procurement process or the execution of a contract;

(iv) "coercive practices" means harming or threatening to harm, directly or indirectly, persons, or their property to influence their participation in a procurement process, or affect the execution of a contract;

(b) will reject a proposal for award if it determines that the bidder recommended for award has, directly or through an agent, engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract; and

(c) will sanction a party or its successor, including declaring ineligible, either indefinitely or for a stated period of time, to participate in ADB-financed activities if it at any time determines that the firm has, directly or through an agent, engaged in corrupt, fraudulent, collusive, or coercive practices in competing for, or in executing, an ADB-financed contract.

3.2 Furthermore, Bidders shall be aware of the provision stated in Sub-Clause 3.2 and Sub-Clause 35.1 (c) of the General Conditions of Contract.

4. Eligible Bidders

4.1 A Bidder may be a natural person, private entity, government-owned entity (subject to ITB Sub-Clause 4.5) or any combination of them with a formal intent to enter into an agreement or under an existing agreement in the

form of a Joint Venture (JV). In the case of a JV:

(a) all parties to the JV shall be jointly and severally liable; and

(b) a JV shall nominate a Representative who shall have the authority to conduct all businesses for and on behalf of any and all the parties of the JV during the bidding process and, in the event the JV is awarded the Contract, during contract execution.

4.2 A Bidder, and all parties constituting the Bidder, shall have the nationality of an eligible country, in accordance with Section V, Eligible Countries. A Bidder shall be deemed to have the nationality of a country if the Bidder is a citizen or is constituted, or incorporated, and operates in conformity with the provisions of the laws of that country. This criterion shall also apply to the determination of the nationality of proposed subcontractors or suppliers for any part of the Contract including related services.

4.3 A Bidder shall not have a conflict of interest. All Bidders found to be in conflict of interest shall be disqualified. A Bidder may be considered to have a conflict of interest with one or more parties in this bidding process, if they:

(a) have controlling shareholders in common; or

(b) receive or have received any direct or indirect subsidy from any of them; or

(c) have the same legal representative for purposes of this Bid; or

(d) have a relationship with each other, directly or through common third parties, that puts them in a position to have access to information about or influence on the Bid of another Bidder, or influence the decisions of the Purchaser regarding this bidding process; or

(e) submit more than one bid in this bidding process, except for alternative offers permitted under ITB Clause 13. However, this does not limit the participation of subcontractors in more than one bid, or as Bidders and subcontractors simultaneously; or

(f) participated as a consultant in the preparation of the design or technical specifications of the goods and

related services that are the subject of the Bid.

4.4 A firm that is under a declaration of ineligibility by the ADB in accordance with ITB Clause 3, at the date of the deadline for bid submission or thereafter, shall be disqualified.

4.5 Government-owned enterprises in the Purchaser's country shall be eligible only if they can establish that they are legally and financially autonomous and operate under commercial law, and that they are not a dependent agency of the Purchaser.

4.6 Bidders shall provide such evidence of their continued eligibility satisfactory to the Purchaser, as the Purchaser shall reasonably request.

5. Eligible Goods and Related Services

5.1 All goods and related services to be supplied under the Contract and financed by the ADB, shall have as their country of origin an eligible country of the ADB (see Section V, Eligible Countries).

5.2 For purposes of this Clause, the term "goods" includes commodities, raw material, machinery, equipment, and industrial plants; and "related services" includes services such as insurance, installation, training, and initial maintenance.

5.3 The term "country of origin" means the country where the goods have been mined, grown, cultivated, produced, manufactured, or processed; or through manufacture, processing, or assembly, another commercially recognized article results that differs substantially in its basic characteristics from its imported components.

5.4 The nationality of the firm that produces, assembles, distributes, or sells the goods shall not determine their origin.

5.5 If so required in the BDS, a Bidder that does not manufacture or produce the Goods it offers to supply shall submit the Manufacturer's Authorization using the form included in Section V, Bidding Forms to demonstrate that it has been duly authorized by the manufacturer or producer of the Goods to supply these Goods in the

Purchaser's country.

B. Contents of Bidding Document

6. Sections of the Bidding Document

6.1 The Bidding Document consist of Parts 1, 2, and 3, which include all the Sections indicated below, and should be read in conjunction with any Addenda issued in accordance with ITB Clause 8.

PART 1 Bidding Procedures

- Section I. Instructions to Bidders (ITB)
- Section II. Bid Data Sheet (BDS)
- Section III. Evaluation and Qualification Criteria
- Section IV. Bidding Forms
- Section V. Eligible Countries

PART 2 Supply Requirements

- Section VI. Schedule of Supply

PART 3 Contract

- Section VII. General Conditions of Contract (GCC)
- Section VIII. Special Conditions of Contract (SCC)
- Section IX. Contract Forms

6.2 The Invitation for Bids issued by the Purchaser is not part of the Bidding Document.

6.3 The Purchaser is not responsible for the completeness of the Bidding Document and its addenda, if they were not obtained directly from the Purchaser.

6.4 The Bidder is expected to examine all instructions, forms, terms, and specifications in the Bidding Document. Failure to furnish all information or documentation required by the Bidding Document, may result in the rejection of the Bid.

7. Clarification of Bidding Document

7.1 A prospective Bidder requiring any clarification of the Bidding Document shall contact the Purchaser in writing at the Purchaser's address indicated in the BDS. The Purchaser will respond in writing to any request for clarification, provided that such request is received no later than twenty-one (21) days prior to the deadline for submission of Bids. The Purchaser shall forward copies of its response to all Bidders who have acquired the

Bidding Document directly from it, including a description of the inquiry but without identifying its source. Should the Purchaser deem it necessary to amend the Bidding Document as a result of a clarification, it shall do so following the procedure under ITB Clause 8 and Sub-Clause 24.2.

8. Amendment of Bidding Document

8.1 At any time prior to the deadline for submission of the Bids, the Purchaser may amend the Bidding Document by issuing addenda.

8.2 Any addendum issued shall be part of the Bidding Document and shall be communicated in writing to all who have obtained the Bidding Document directly from the Purchaser.

8.3 To give prospective Bidders reasonable time in which to take an addendum into account in preparing their Bids, the Purchaser may, at its discretion, extend the deadline for the submission of the Bids, pursuant to ITB Sub-Clause 24.2

C. Preparation of Bids

9. Cost of Bidding

9.1 The Bidder shall bear all costs associated with the preparation and submission of its Bid, and the Purchaser shall not be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.

10. Language of Bid

10.1 The Bid, as well as all correspondence and documents relating to the Bid exchanged by the Bidder and the Purchaser, shall be written in the language specified in the BDS. Supporting documents and printed literature that are part of the Bid may be in another language provided they are accompanied by an accurate translation of the relevant passages in the language specified in the BDS, in which case, for purposes of interpretation of the Bid, such translation shall govern.

11. Documents Comprising the Bid

11.1 The Bid shall comprise the following:

(a) Bid Submission Sheet and the applicable Price Schedules, in accordance with ITB Clauses 12, 14, and 15;

(b) Bid Security, in accordance with ITB Clause 21;

(c) alternative bids, if permissible, in accordance with ITB Clause 13;

(d) written confirmation authorizing the signatory of the Bid to commit the Bidder, in accordance with ITB Clause 22;

(e) documentary evidence in accordance with ITB Clause 16 establishing the Bidder's eligibility to bid;

(f) documentary evidence in accordance with ITB Clause 17, that the Goods and Related Services to be supplied by the Bidder are of eligible origin;

(g) documentary evidence in accordance with ITB Clauses 18 and 30, that the Goods and Related Services conform to the Bidding Document;

(h) documentary evidence in accordance with ITB Clause 19 establishing the Bidder's qualifications to perform the contract if its Bid is accepted; and

(i) any other document required in the BDS.

12. Bid Submission Sheet and Price Schedules

12.1 The Bidder shall submit the Bid Submission Sheet using the form furnished in Section IV, Bidding Forms. This form must be completed without any alterations to its format, and no substitutes shall be accepted. All blank spaces shall be filled in with the information requested.

12.2 The Bidder shall submit the Price Schedules for Goods and Related Services, according to their origin as appropriate, using the forms furnished in Section IV, Bidding Forms.

13. Alternative Bids

13.1 Unless otherwise indicated in the BDS, alternative bids shall not be considered.

14. Bid Prices and Discounts

14.1 The prices and discounts quoted by the Bidder in the Bid Submission Sheet and in the Price Schedules shall conform to the requirements specified below.

14.2 All items in the Schedule of Supply must be listed and priced separately in the Price Schedules. If a Price Schedule shows items listed but not priced, their prices shall be assumed to be included in the prices of other items. Items not listed in the Price Schedule shall be assumed not to be included in the Bid, and provided that the Bid is substantially responsive, the corresponding adjustment shall be applied in accordance with ITB Sub-

Clause 31.3

14.3 The price to be quoted in the Bid Submission Sheet shall be the total price of the Bid excluding any discounts offered.

14.4 The Bidder shall quote any unconditional discounts and the methodology for their application in the Bid Submission Sheet.

14.5 The terms EXW, CIF, CIP, and other similar terms shall be governed by the rules prescribed in the current edition of Incoterms, published by The International Chamber of Commerce, at the date of the Invitation for Bids or as specified in the BDS.

14.6 Prices proposed in the Price Schedule Forms for Goods and Related Services, shall be disaggregated, when appropriate as indicated in this sub-clause. This disaggregation shall be solely for the purpose of facilitating the comparison of Bids by the Purchaser. This shall not in any way limit the Purchaser's right to contract on any of the terms offered:

(a) For Goods offered from within the Purchaser's country :

(i) the price of the goods quoted EXW (ex works, ex factory, ex warehouse, ex showroom, or off-the-shelf, as applicable), including all customs duties and sales and other taxes already paid or payable on the components and raw material used in the manufacture or assembly of goods quoted ex works or ex factory, or on the previously imported goods of foreign origin quoted ex warehouse, ex showroom, or off-the-shelf;

(ii) sales tax and all other taxes applicable in the Purchaser's country and payable on the Goods if the Contrac1t is awarded to the Bidder; and

(iii) the total price for the item.

(b) For Goods offered from outside the Purchaser's country :

(i) the price of the goods quoted CIF(named port of destination), or CIP (border point), or CIP

(named place of destination), in the Purchaser's country, as specified in the BDS;

(ii) the price of the goods quoted FOB port of shipment (or FCA, as the case may be), if specified in the BDS.

(iii) the total price for the item.

(c) For Related Services whenever such Related Services are specified in the Schedule of Requirements:

(i) the local currency cost component of each item comprising the Related Services; and

(ii) the foreign currency cost component of each item comprising the Related Services,

inclusive of all custom duties, sales and other similar taxes applicable in the Purchaser's country, payable on the Related Services, if the Contract is awarded to the Bidder

14.7 Prices quoted by the Bidder shall be fixed during the Bidder's performance of the Contract and not subject to variation on any account, unless otherwise specified in the BDS. A Bid submitted with an adjustable price quotation shall be treated as nonresponsive and shall be rejected, pursuant to ITB Clause 30. However, if in accordance with the BDS, prices quoted by the Bidder shall be subject to adjustment during the performance of the Contract, a Bid submitted with a fixed price quotation shall not be rejected, but the price adjustment shall be treated as zero.

14.8 If so indicated in ITB Sub-Clause 1.1, Bids are being invited for individual contracts (lots) or for any combination of contracts (packages), Bidders wishing to offer any price reduction for the award of more than one Contract shall specify in their Bid the price reductions applicable to each package, or alternatively, to individual Contracts within the package. Price reductions or discounts shall be submitted in accordance with ITB Sub-Clause 14.4, provided the Bids for all lots are submitted and opened at the same time.

15. Currencies of Bid

15.1 Bid prices shall be quoted in the following currencies:

(a) the currencies specified in the BDS;

(b) a Bidder expecting to incur a portion of its expen-

ditures in the performance of the Contract in more than one currency, and wishing to be paid accordingly, shall so indicate in its Bid; and

(c) if some of the expenditures for the Related Services are to be incurred in the borrowing country, such expenditures should be expressed in the Bid and will be payable in the borrower's currency.

16. Documents Establishing the Eligibility of the Bidder

16.1 To establish their eligibility in accordance with ITB Clause 4, Bidders shall:

(a) complete the eligibility declarations in the Bid Submission Sheet, included in Section IV, Bidding Forms; and

(b) if the Bidder is an existing or intended JV in accordance with ITB Sub-Clause 4.1, submit a copy of the JV Agreement, or a letter of intent to enter into such an Agreement. The respective document shall be signed by all legally authorized signatories of all the parties to the existing or intended JV, as appropriate.

17. Documents Establishing the Eligibility of the Goods and Related Services

17.1 To establish the eligibility of the Goods and Related Services, in accordance with ITB Clause 5, Bidders shall complete the country of origin declarations in the Price Schedule Forms, included in Section IV, Bidding Forms.

18. Documents Establishing the Conformity of the Goods and Related Services to the Bidding Document

18.1 To establish the conformity of the Goods and Related Services to the Bidding Document, the Bidder shall furnish as part of its Bid the documentary evidence specified in Section VI, Schedule of Supply.

18.2 The documentary evidence may be in the form of literature, drawings or data, and shall consist of a detailed description of the essential technical and performance characteristics of the Goods and Related Services, demonstrating substantial responsiveness of the Goods

and Related Services to those requirements, and if applicable, a statement of deviations and exceptions to the provisions of Section VI, Schedule of Supply.

18.3 Standards for workmanship, process, material, and equipment, as well as references to brand names or catalogue numbers specified by the Purchaser in the Schedule of Supply, are intended to be descriptive only and not restrictive. The Bidder may offer other standards of quality, brand names, and/or catalogue numbers, provided that it demonstrates, to the Purchaser's satisfaction, that the substitutions ensure substantial equivalence or are superior to those specified in the Schedule of Supply.

19. Documents Establishing the Qualifications of the Bidder

19.1 To establish its qualifications to perform the Contract, the Bidder shall submit the evidence indicated for each qualification criteria specified in Section III, Evaluation and Qualification Criteria.

20. Period of Validity of Bids

20.1 Bids shall remain valid for the period specified in the BDS after the bid submission deadline date prescribed by the Purchaser. A Bid valid for a shorter period shall be rejected by the Purchaser as nonresponsive.

20.2 In exceptional circumstances, prior to the expiration of the bid validity period, the Purchaser may request Bidders to extend the period of validity of their Bids. The request and the responses shall be made in writing. If a Bid Security is requested in accordance with ITB Clause 21, it shall also be extended for a corresponding period. A Bidder may refuse the request without forfeiting its Bid Security. A Bidder granting the request shall not be required or permitted to modify its Bid.

21. Bid Security

21.1 Unless otherwise specified in the BDS, the Bidder shall furnish as part of its Bid, a Bid Security in original form and in the amount and currency specified in the BDS.

21.2 The Bid Security shall be, at the Bidder's option, in any of the following forms:

(a) a bank guarantee;

(b) an irrevocable letter of credit; or

(c) a cashier's or certified check;

all from a reputable bank from an eligible country. In case of a a bank guarantee, the Bid Security shall be submitted using the Bid Security Form included in Section IV, Bidding Forms, or another form acceptable to the Purchaser. The form must include the complete name of the Bidder. The Bid Security shall be valid for twenty-eight days (28) beyond the end of the validity period of the bid. This shall also apply if the period for bid validity is extended.

21.3 If a bid Security is required in accordance with ITB Sub-Clause 21.1, any Bid not accompanied by a substantially responsive Bid Security in accordance with ITB Sub-Clause 21.2, shall be rejected by the Purchaser as nonresponsive.

21.4 The Bid Security of unsuccessful Bidders shall be returned as promptly as possible upon the successful Bidder furnishing the Performance Security pursuant to ITB Clause 44.

21.5 The Bid Security of the successful Bidder shall be returned as promptly as possible once the successful Bidder has signed the Contract and furnished the required Performance Security.

21.6 The Bid Security may be forfeited :

(a) if a Bidder withdraws its Bid during the period of bid validity specified by the Bidder on the Bid Submission Sheet, except as provided in ITB Sub-Clause 20.2; or

(b) if the successful Bidder fails to:

(i) sign the Contract in accordance with ITB Clause 43;

(ii) furnish a Performance Security in accordance with ITB Clause 44; or

(iii) accept the correction of its Bid Price pursuant to ITB Sub-Clause 31.5.

21.7 The Bid Security of a JV must be in the name of the JV that submits the bid. If the JV has not been legally constituted at the time of bidding, the Bid Security shall be in the names of all future partners as named in the letter of intent mentioned in ITB Sub-Clause 16.1.

22. Format and Signing of Bid

22.1 The Bidder shall prepare one original of the documents comprising the Bid as described in ITB Clause 11 and clearly mark it "ORIGINAL." In addition, the Bidder shall submit copies of the Bid, in the number specified in the BDS and clearly mark them "COPY." In the event of any discrepancy between the original and the copies, the original shall prevail.

22.2 The original and all copies of the Bid shall be typed or written in indelible ink and shall be signed by a person duly authorized to sign on behalf of the Bidder. This authorization shall consist of a written confirmation as specified in the BDS and shall be attached to the Bid. The name and position held by each person signing the authorization must be typed or printed below the signature. All pages of the Bid, except for unamended printed literature, shall be signed or initialed by the person signing the Bid.

22.3 Any interlineation, erasures, or overwriting shall be valid only if they are signed or initialed by the person signing the Bid.

D. Submission and Opening of Bids

23. Sealing and Marking of Bids

23.1 The Bidder shall enclose the original and each copy of the Bid, including alternative bids, if permitted in accordance with ITB Clause 13, in separate sealed envelopes, duly marking the envelopes as "ORIGINAL" and "COPY." These envelopes containing the original and the copies shall then be enclosed in one single envelope.

23.2 The inner and outer envelopes shall:

(a) bear the name and address of the Bidder;

(b) be addressed to the Purchaser in accordance with ITB Sub-Clause 24.1;

(c) bear the specific identification of this bidding process indicated in the BDS; and

(d) bear a warning not to open before the time and date for bid opening, in accordance with ITB Sub-Clause 27.1.

23.3 If all envelopes are not sealed and marked as required, the Purchaser will assume no responsibility for the misplacement or premature opening of the bid.

24. Deadline for Submission of Bids

24.1 Bids must be received by the Purchaser at the address and no later than the date and time indicated in the BDS.

24.2 The Purchaser may, at its discretion, extend the deadline for the submission of Bids by amending the Bidding Document in accordance with ITB Clause 8, in which case all rights and obligations of the Purchaser and Bidders previously subject to the deadline shall thereafter be subject to the deadline as extended.

25. Late Bids

25.1 The Purchaser shall not consider any Bid that arrives after the deadline for submission of Bids, in accordance with ITB Clause 24. Any Bid received by the Purchaser after the deadline for submission of Bids shall be declared late, rejected, and returned unopened to the Bidder.

26. Withdrawal, Substitution, and Modification of Bids

26.1 A Bidder may withdraw, substitute, or modify its Bid after it has been submitted by sending a written Notice, duly signed by an authorized representative, and shall include a copy of the authorization in accordance with ITB Sub-Clause 22.2 (except that Withdrawal Notices do not require copies). The corresponding substitution or modification of the Bid must accompany the respective written Notice. All Notices must be:

(a) submitted in accordance with ITB Clauses 22 and 23 (except that Withdrawal Notices do not require copies), and in addition, the respective envelopes shall be clearly marked "Withdrawal," "Substitution," "Modification"; and

(b) received by the Purchaser prior to the deadline prescribed for submission of bids, in accordance with ITB Clause 24.

26.2 Bids requested to be withdrawn in accordance with ITB Sub-Clause 26.1 shall be returned unopened to the Bidders.

26.3 No Bid shall be withdrawn, substituted, or modified in the

interval between the deadline for submission of bids and the expiration of the period of bid validity specified by the Bidder on the Bid Submission Sheet or any extension thereof.

27. Bid Opening

27.1 The Purchaser shall conduct the bid opening in the presence of Bidders` designated representatives who choose to attend, and at the address, date and time specified in the BDS.

27.2 First, envelopes marked "WITHDRAWAL" shall be opened, read out, and recorded, and the envelope containing the corresponding Bid shall not be opened, but returned to the Bidder. No Bid shall be withdrawn unless the corresponding Withdrawal Notice contains a valid authorization to request the withdrawal and is read out and recorded at bid opening. Next, envelopes marked "SUBSTITUTION" shall be opened, read out, recorded, and exchanged for the corresponding Bid being substituted, and the substituted Bid shall not be opened, but returned to the Bidder. No Bid shall be substituted unless the corresponding Substitution Notice contains a valid authorization to request the substitution and is read out and recorded at bid opening. Envelopes marked "MODIFICATION" shall be opened, read out, and recorded with the corresponding Bid. No Bid shall be modified unless the corresponding Modification Notice contains a valid authorization to request the modification and is read out and recorded at bid opening. Only envelopes that are opened, read out, and recorded at bid opening shall be considered further.

27.3 All other envelopes shall be opened one at a time, and the following read out and recorded: the name of the Bidder and whether there is a modification; the Bid Prices (per lot if applicable), any discounts and alternative offers; the presence of a Bid Security, if required; and any other details as the Purchaser may consider appropriate. Only discounts and alternative offers read out and recorded at bid opening shall be considered for evaluation. No Bid shall be rejected at bid opening except for late bids, in accordance with ITB Sub-Clause 25.1.

27.4 The Purchaser shall prepare a record of the bid opening that shall include, as a minimum: the name of the Bidder and whether there is a withdrawal, substitution, or modification; the Bid Price, per lot if applicable, any

discounts and alternative offers; and the presence or absence of a Bid Security, if one was required. The Bidders' representatives who are present shall be requested to sign the record. The omission of a Bidder's signature on the record shall not invalidate the contents and effect of the record. A copy of the record shall be distributed to all Bidders.

E. Evaluation and Comparison of Bids

28. Confidentiality

28.1 Information relating to the examination, evaluation, comparison, and postqualification of Bids, and recommendation of contract award, shall not be disclosed to Bidders or any other persons not officially concerned with such process until information on Contract award is communicated to all Bidders.

28.2 Any attempt by a Bidder to influence the Purchaser in the examination, evaluation, comparison, and postqualification of the Bids or Contract award decisions may result in the rejection of its Bid.

28.3 Notwithstanding ITB Sub-Clause 28.2, from the time of bid opening to the time of Contract award, if any Bidder wishes to contact the Purchaser on any matter related to the bidding process, it should do so in writing.

29. Clarification of Bids

29.1 To assist in the examination, evaluation, comparison and post-qualification of the Bids, the Purchaser may, at its discretion, ask any Bidder for a clarification of its Bid. Any clarification submitted by a Bidder that is not in response to a request by the Purchaser shall not be considered. The Purchaser's request for clarification and the response shall be in writing. No change in the prices or substance of the Bid shall be sought, offered, or permitted, except to confirm the correction of arithmetic errors discovered by the Purchaser in the evaluation of the Bids, in accordance with ITB Clause 31.

30. Responsiveness of Bids

30.1 The Purchaser's determination of the responsiveness of a Bid is to be based on the contents of the Bid itself.

30.2 A substantially responsive Bid is one that conforms to all the terms, conditions, and specifications of the Bidding Document without material deviation, reservation, or omission. A material deviation, reservation, or omission is

one that:

(a) affects in any substantial way the scope, quality, or performance of the Goods and Related Services specified in the Contract; or

(b) limits in any substantial way, inconsistent with the Bidding Document, the Purchaser's rights or the Bidder's obligations under the Contract; or

(c) if rectified would unfairly affect the competitive position of other Bidders presenting substantially responsive Bids.

30.3 If a Bid is not substantially responsive to the Bidding Document, it shall be rejected by the Purchaser and may not subsequently be made responsive by the Bidder by correction of the material deviation, reservation, or omission.

31. Nonconformi-ties, Errors, and Omissions

31.1 Provided that a Bid is substantially responsive, the Purchaser may waive any non-conformity or omission in the Bid that does not constitute a material deviation.

31.2 Provided that a Bid is substantially responsive, the Purchaser may request that the Bidder submit the necessary information or documentation, within a reasonable period of time, to rectify nonmaterial nonconformities or omissions in the Bid related to documentation requirements. Such omission shall not be related to any aspect of the price of the Bid. Failure of the Bidder to comply with the request may result in the rejection of its Bid.

31.3 Provided that a Bid is substantially responsive, the Purchaser shall rectify nonmaterial nonconformities or omissions. To this effect, the Bid Price shall be adjusted, for comparison purposes only, to reflect the price of the missing or non-conforming item or component. The adjustment shall be made using the method indicated in Section III, Evaluation and Qualification Criteria.

31.4 Provided that the Bid is substantially responsive, the Purchaser shall correct arithmetical errors on the following basis:

(a) if there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit

price and quantity, the unit price shall prevail and the total price shall be corrected, unless in the opinion of the Purchaser there is an obvious misplacement of the decimal point in the unit price, in which case the total price as quoted shall govern and the unit price shall be corrected;

(b) if there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected; and

(c) if there is a discrepancy between words and figures, the amount in words shall prevail, unless the amount expressed in words is related to an arithmetic error, in which case the amount in figures shall prevail subject to (a) and (b) above.

31.5 If the Bidder that submitted the lowest evaluated Bid does not accept the correction of errors, its Bid shall be disqualified and its Bid Security may be forfeited.

32. Preliminary Examination of Bids

32.1 The Purchaser shall examine the Bids to confirm that all documents and technical documentation requested in ITB Clause 11 have been provided, and to determine the completeness of each document submitted.

32.2 The Purchaser shall confirm that the following documents and information have been provided in the Bid:

(a) Bid Submission Sheet, in accordance with ITB Sub-Clause 12.1;

(b) Price Schedules, in accordance with ITB Sub-Clause 12.2;

(c) Written confirmation of authorization to commit the Bidder, in accordance with ITB Sub-Clause 22.2; and

(d) Bid Security, in accordance with ITB Clause 21, if applicable.

If any of these documents or information is missing, the offer shall be rejected.

33. Examination of Terms and Conditions; Technical

33.1 The Purchaser shall examine the Bid to confirm that all terms and conditions specified in the GCC and the SCC have been accepted by the Bidder without any material deviation or reservation.

Evaluation

33.2 The Purchaser shall evaluate the technical aspects of the Bid submitted in accordance with ITB Clause 18, to confirm that all requirements specified in Section VI, Schedule of Supply of the Bidding Document have been met without any material deviation or reservation.

33.3 If, after the examination of the terms and conditions and the technical evaluation, the Purchaser determines that the Bid is not substantially responsive in accordance with ITB Clause 30, it shall reject the Bid.

34. Conversion to Single Currency

34.1 For evaluation and comparison purposes, the Purchaser shall convert all bid prices expressed in the amounts in various currencies into a single currency, using the selling exchange rates established by the source and on the date specified in the BDS.

35. Margin of Preference

35.1 Unless otherwise specified in the BDS, a margin of preference shall not apply.

36. Evaluation of Bids

36.1 The Purchaser shall evaluate each Bid that has been determined, up to this stage of the evaluation, to be substantially responsive.

36.2 To evaluate a Bid, the Purchaser shall only use all the criteria and methodologies defined in this Clause and in Section III, Evaluation and Qualification Criteria. No other criteria or methodology shall be permitted.

36.3 To evaluate a Bid, the Purchaser shall consider the following:

(a) the Bid Price;

(b) price adjustment for correction of arithmetic errors in accordance with ITB Sub-Clause 31.4;

(c) price adjustment due to discounts offered in accordance with ITB Sub-Clause 14.4;

(d) application of all the evaluation factors indicated in Section III, Evaluation and Qualification Criteria.

36.4 In the calculation of the evaluated cost of the Bids, the Purchaser shall exclude and not take into account:

(a) in the case of Goods offered from within the Purchaser's country, all sales tax and all other

taxes, applicable in the Purchaser's country and payable on the Goods if the Contract is awarded to the Bidder;

(b) in the case of Goods offered from outside the Purchaser's country, all customs duties, sales tax, and other taxes, applicable in the Purchaser's country and payable on the Goods if the Contract is awarded to the Bidder; and

(c) any allowance for price adjustment during the period of performance of the Contract, if provided in the Bid.

36.5 The Purchaser's cost evaluation of a Bid may require the consideration of other factors, in addition to the Bid Price quoted in accordance with ITB Clause 14. These factors may be related to the characteristics, performance, and terms and conditions of purchase of the Goods and Related Services. The factors selected, if any, shall be expressed in monetary terms to facilitate comparison of the Bids, unless otherwise specified in Section III, Evaluation and Qualification Criteria. The factors to be used and the methodology of application shall be as indicated in Section III, Evaluation and Qualification Criteria.

36.6 If this Bidding Document allows Bidders to quote separate prices for different lots, and the award to a single Bidder of multiple lots, the methodology of evaluation to determine the lowest evaluated lot combinations, including any discounts offered in the Bid Submission Sheet, is as specified in Section III, Evaluation and Qualification Criteria.

37. Comparison of Bids

37.1 The Purchaser shall compare all substantially responsive bids to determine the lowest-evaluated bid, in accordance with ITB Clause 36.

38. Postqualification of the Bidder

38.1 The Purchaser shall determine to its satisfaction whether the Bidder that is selected as having submitted the lowest evaluated and substantially responsive Bid is qualified to perform the Contract satisfactorily.

38.2 The determination shall be based upon an examination of the documentary evidence of the Bidder's qualifications submitted by the Bidder, pursuant to ITB Clause 19, to clarifications in accordance with ITB Clause 29 and the

qualification criteria indicated in Section III, Evaluation and Qualification Criteria. Factors not included in Section III, Evaluation and Qualification Criteria shall not be used in the evaluation of the Bidder's qualification.

38.3 An affirmative determination shall be a prerequisite for award of the Contract to the Bidder. A negative determination shall result in disqualification of the Bid, in which event the Purchaser shall proceed to the next lowest evaluated bid to make a similar determination of that Bidder's capabilities to perform satisfactorily.

39. Purchaser's Right to Accept Any Bid, and to Reject Any or All Bids

39.1 The Purchaser reserves the right to accept or reject any Bid, and to annul the bidding process and reject all Bids at any time prior to Contract award, without thereby incurring any liability to the Bidders.

F. Award of Contract

40. Award Criteria

40.1 The Purchaser shall award the Contract to the Bidder whose offer has been determined to be the lowest evaluated Bid and is substantially responsive to the Bidding Document, provided further that the Bidder is determined to be qualified to perform the Contract satisfactorily.

41. Purchaser's Right to Vary Quantities at Time of Award

41.1 At the time the Contract is awarded, the Purchaser reserves the right to increase or decrease the quantity of Goods and Related Services originally specified in Section VI, Schedule of Supply, provided this does not exceed the percentages indicated in the BDS, and without any change in the unit prices or other terms and conditions of the Bid and the Bidding Document.

42. Notification of Award

42.1 Prior to the expiration of the period of bid validity, the Purchaser shall notify the successful Bidder, in writing, that its Bid has been accepted. At the same time, the Purchaser shall also notify all other Bidders of the results of the bidding.

42.2 Until a formal Contract is prepared and executed, the notification of award shall constitute a binding Contract.

43. Signing of Contract

43.1 Promptly after notification, the Purchaser shall send to the successful Bidder the Agreement and the Special Conditions of Contract.

43.2 Within twenty-eight (28) days of receipt of the Agreement, the successful Bidder shall sign, date, and return it to the Purchaser.

44. Performance Security

44.1 Within twenty-eight (28) days of the receipt of notification of award from the Purchaser, the successful Bidder shall furnish the Performance Security in accordance with the GCC, using for that purpose the Performance Security Form included in Section IX, Contract Forms, or another form acceptable to the Purchaser.

44.2 Failure of the successful Bidder to submit the above-mentioned Performance Security or sign the Contract shall constitute sufficient grounds for the annulment of the award and forfeiture of the Bid Security. In that event the Purchaser may award the Contract to the next lowest evaluated Bidder whose offer is substantially responsive and is determined by the Purchaser to be qualified to perform the Contract satisfactorily.

Section II. Bid Data Sheet

A. Introduction	
ITB 1.1	The number of the Invitation for Bids is : _____
ITB 1.1	The Purchaser is: _____
ITB 1.1	The name of the ICB is:_____ The identification number of the ICB is: _____ The number and identification of lots comprising this ICB is: _____
ITB 2.1	The Borrower is: _____
ITB 2.1	The name of the Project is: ***Rehabilitation measures for the Kungrad – Kazakh Border railway section - Lot 1.3 Telecommunications***
ITB 5.5	The Bidder _____ required to include with its Bid, documentation from the Manufacturer of the Goods, that it has been duly authorized to supply, in the Purchaser's country, the Goods indicated in its Bid.

B. Bidding Document	
ITB 7.1	For **clarification purposes** only, the Purchaser's address is: Attention: _____ Street Address: _____ Floor/Room number: _____ City: _____ ZIP Code: _____ Country: _____ Telephone: _____ Facsimile number: _____ Electronic mail address: _____
C. Preparation of Bids	
ITB 10.1	The language of the Bid is: _____ _____
ITB 11.1 (i)	The Bidder shall submit with its Bid the following additional documents: _____ _____
ITB 13.1	Alternative Bids _____ permitted
ITB 14.5	The Incoterms edition is: _____
ITB 14.6 (b) (i)	For Goods offered from outside the Purchaser's country, the Bidder shall quote prices using the following Incoterms:_____ _____
ITB 14.6 (b) (ii)	In addition to the above, the Bidder shall quote prices for Goods offered from outside the Purchaser's country using the following Incoterms: _____ _____

ITB 14.7	The prices quoted by the Bidder shall be: _____
ITB 15.1 (a)	The currency of the Bid shall be: _____
ITB 20.1	The bid validity period shall be _____ days.
ITB 21.1	A Bid Security _____ required. If a Bid Security shall be required, the amount and currency of the Bid Security shall be _____ _____
D. Submission and Opening of Bids	
ITB 22.1	In addition to the original of the Bid, the number of copies is: _____ _____
ITB 22.2	The written confirmation of Authorization to sign on behalf of the Bidder shall consist of: _____ _____
ITB 23.2 (c)	The identification of this bidding process is: _____ _____
ITB 24.1	For **bid submission purposes** only, the Purchaser's address is : Attention: _____ Street Address: _____ Floor/Room number: _____ City: _____ ZIP Code: _____ Country: _____

ITB 24.1	**The deadline for bid submission is:** Date: _____ Time: _____
ITB 27.1	**The bid opening shall take place at:** Street Address: _____ Floor/Room number: _____ City : _____ Country:_____ Date: _____ Time: _____
E. Evaluation, and Comparison of Bids	
ITB 34.1	The currency that shall be used for bid evaluation and comparison purposes to convert all bid prices expressed in various currencies into a single currency is: _____ The source of exchange rate shall be: _____ The date for the exchange rate shall be: _____
ITB 35.1	A margin of preference _____ apply. If a margin of preference applies, the application methodology shall be as stipulated in Section III, Evaluation and Qualification Criteria.
F. Award of Contract	
ITB 41.1	The percentage by which quantities may be increased is: _____ _____ The percentage by which quantities may be decreased is: _____ _____

Section III. Evaluation and Qualification Criteria

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Section IV. Bidding Forms

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Bid Submission Sheet

Date: _____
ICB No.: _____
Invitation for Bid No.: _____
Alternative No.: _____

To:

_____

We, the undersigned, declare that:

(a) We have examined and have no reservations to the Bidding Document, including Addenda No.: _____;

(b) We offer to supply in conformity with the Bidding Document and in accordance with the delivery schedule specified in the Schedule of Supply, the following Goods and Related Services: _____
_____;

(c) The total price of our Bid, excluding any discounts offered in item (d) below is: _____
_____;

(d) The discounts offered and the methodology for their application are: _____
_____
_____
_____
_____;

(e) Our Bid shall be valid for a period of _____ days from the date fixed for the bid submission deadline in accordance with the Bidding Document, and it shall remain binding upon us and may be accepted at any time before the expiration of that period;

(f) If our Bid is accepted, we commit to obtain a Performance Security in the amount of _____percent of the Contract Price for the due performance of the Contract;

(g) Our firm, including any subcontractors or suppliers for any part of the Contract, have nationalities from the following eligible countries _____;

(h) We are not participating, as Bidders, in more than one Bid in this bidding process, other than alternative offers in accordance with the Bidding Document;

(i) Our firm, its affiliates or subsidiaries, including any subcontractors or suppliers for any part of the Contract, has not been declared ineligible by the ADB;

(j) The following commissions, gratuities, or fees have been paid or are to be paid with respect to the bidding process or execution of the Contract:

Name of Recipient	Address	Reason	Amount
_____	_____	_____	_____
_____	_____	_____	_____

(If none has been paid or is to be paid, indicate "none.")

(k) We understand that this Bid, together with your written acceptance thereof included in your notification of award, shall constitute a binding contract between us, until a formal Contract is prepared and executed.

(l) We understand that you are not bound to accept the lowest evaluated bid or any other bid that you may receive.

Name _____

In the capacity of _____

Signed _____

Duly authorized to sign the Bid for and on behalf of _____

Date _____

Price Schedule For Goods
To Be Offered From Within The Purchaser's Country

Name of Bidder _____ IFB Number _____ Page ___ of ___

1	2	3	4	5	6	7	8	9
Item	Description	Country of Origin	Domestic Value Added in Percent	Quantity and Unit of Measurement	Unit Price EXW	Total EXW Price per item	Sales and Other Taxes Per Item	Total Price per Item including Taxes
						5 x 6		7 + 8
					Total Amount			

Notes:

Column 4: In accordance with margin of preference ITB Clause 35, if applicable.
Domestic Value Added comprises domestic labor, the domestic content of materials, domestic overheads and profits from the stage of mining the raw material until final assembly.

Column 6: Incoterm in accordance with ITB Clause 14
Currency in accordance with ITB Clause 15
Price shall include all customs duties and sales and other taxes already paid or payable on the components and raw materials used in the manufacture or assembly of the item or the custom duties and sales and other taxes already paid on previously imported items.

Column 8: Payable in the Purchaser's country if Contract is awarded

Name _____

In the capacity of _____

Signed _____

Duly authorized to sign the Bid for and on behalf of _____

Date _____

Price Schedule For Goods
To Be Offered From Outside The Purchaser's Country

Name of Bidder _____ IFB Number _____ Page ___ of ___

1	2	3	4	5	6	7	8
Item	Description	Country of Origin	Quantity and Unit of Measurement	Unit Price CIF (...) or CIP (...)	Unit Price FOB (...) or FCA (...)	Total Price CIF or CIP per Item	Total Price FOB or FCA per Item
						4 x 5	4 x 6
					Total Amount		

Notes:

Column 5 and 6 : Incoterm in accordance with ITB Clause 14
Currency in accordance with ITB Clause 15

Column 6: Only to be used if the Purchaser wishes to reserve transportation and insurance to domestic companies or other designated sources. Identification of the lowest evaluated bid must be on the basis of the CIF or CIP price, but the Purchaser may sign the contract on FOB or FCA terms and make its own arrangement for transportation and/or insurance.

Name _____

In the capacity of _____

Signed _____

Duly authorized to sign the Bid for and on behalf of _____

Date _____

Price Schedule For Related Services To Be Offered From Outside And Within The Purchaser's Country

Name of Bidder _____ IFB Number _____ Page ___ of ___

1	2	3	4	5		6	
				Unit Price		Total Price per Item	
Item No.	Description	Country of Origin	Quantity and Unit of Measure-ment	(a) Foreign Currency	(b) Local Currency	(a) Foreign Currency	(b) Local Currency
						4 x 5(a)	4 x 5(b)
					Total Amount		

Notes :

Column 5 and 6: Currencies in accordance with ITB Clause 15

Prices are to be quoted inclusive of all custom duties, sales and other similar taxes applicable in the Purchaser's country and payable on the Related Services, if the Contract is awarded to the Bidder

Name _____

In the capacity of _____

Signed _____

Duly authorized to sign the Bid for and on behalf of _____

Date _____

Bid Security

Date: _____
ICB No.: _____
Invitation for Bid No.: _____

To: _____

Whereas

_____

_____

(hereinafter "the Bidder") has submitted its Bid dated _____ for ICB No. _____ for the supply of _____

_____hereinafter called "the Bid."

KNOW ALL PEOPLE by these presents that WE _____ of _____ having our registered office at _____ (hereinafter "the Guarantor"), are bound unto

_____

_____

(hereinafter "the Purchaser") in the sum of _____ for which payment well and truly to be made to the aforementioned Purchaser, the Guarantor binds itself, its successors, or assignees by these presents. Sealed with the Common Seal of this Guarantor this _____day of _____, _____.

THE CONDITIONS of this obligation are the following:

1. If the Bidder withdraws its Bid during the period of bid validity specified by the Bidder in the Bid Submission Sheet, except as provided in ITB Sub-Clause 20.2; or

2. If the Bidder, having been notified of the acceptance of its Bid by the Purchaser, during the period of bid validity, fails or refuses to:
   (a) execute the Contract; or
   (b) furnish the Performance Security, in accordance with the ITB Clause 44; or
   (c) accept the correction of its Bid by the Purchaser, pursuant to ITB Clause 31.

We undertake to pay the Purchaser up to the above amount upon receipt of its first written demand, without the Purchaser having to substantiate its demand, provided that in its demand the Purchaser states that the amount claimed by it is due to it, owing to the occurrence of one or more of the above conditions, specifying the occurred conditions.

This security shall remain in force up to and including twenty-eight (28) days after the period of bid validity, and any demand in respect thereof should be received by the Guarantor no later than the above date.

Name _____

In the capacity of _____

Signed _____

Duly authorized to sign the Bid Security for and on behalf of _____

Date _____

Manufacturer's Authorization

Date: _____

ICB No.: _____

Invitation for Bid No.: _____

Alternative No.: _____

To: _____

WHEREAS _____ who are official manufacturers of _____ having factories at _____ do hereby authorize _____ to submit a Bid in relation to the Invitation for Bids indicated above, the purpose of which is to provide the following Goods, manufactured by us _____ and to subsequently negotiate and sign the Contract.

We hereby extend our full guarantee and warranty in accordance with Clause 28 of the General Conditions of Contract, with respect to the Goods offered by the above firm in reply to this Invitation for Bids.

Name _____

In the capacity of: _____

Signed _____

Duly authorized to sign the Authorization for and on behalf of _____

Date _____

Section V. Eligible Countries

List of Eligible Countries of the Asian Development Bank

PART 2 – Supply Requirements

Section VI. Schedule of Supply

Contents

1 List of Goods and Related Services

Lot No. : 3				
Lot Name : Telecommunications				
Item No.	**Name of Goods or Related Services**	**Description**	**Unit of Measurement**	**Quantity**
25-A1	ADM 1 with installation		unit	3
25-A2	MUX D/I with installation		unit	18
25-A3	Regenerators		unit	5
25-A4	UPS with installation		unit	15
25-A5	PABX 1000 with installation		unit	2
25-A6	PABX 2000 with installation		unit	1
25-A7	Various item for equipment (frames, cards, etc.)	percentage of the equipment costs	percentage	10%
25-A8	Stock	percentage of the equipment costs	percentage	10%
25-A9	PCM management system		unit	1
25-A10	PABX management system		unit	1
25-A11	Syncronisation system		unit	2
25-A12	Fiber Optical Cable		km	361,13
25-A13	Other costs for OF cable (junctions, cable ends, tubes, shafts, etc.)	percentage of the OF Cable costs	percentage	15%
25-A14	Laying of the OF cable		km	328,3
25-A15	Copper Cable		km	361,13
25-A16	Other costs for Copper cable (junctions, cable ends, tubes, shafts, etc.)	percentage of Copper Cable costs	percentage	15%
25-A17	Laying of the Copper cable		km	328,3
25-A18	Preparation of rooms, big stations		unit	1
25-A19	Preparation of rooms, medium stations		unit	2
25-A20	Preparation of rooms, small stations		unit	12

2 Delivery and Completion Schedule

The delivery period shall start as of _____.

Item No.	Description of Goods or Related Services	Delivery Schedule (Duration)	Location	Required Arrival Date of Goods or Completion Date for Related Services

3 Technical Specifications

3.1 Acronyms list

ACD	Automatic Call Distribution
ADM-n	Add-Drop Multiplexer – level n
AT	Asynchronous Transfer Mode
CCITT	Comité Consultatif International Telegraphique Telephonique
CDU	Clock Distribution Unit
CPU	Central Processor Unit
CTA	Automatic Telephone Station
DECT	Digital European Cordless Telecommunications
DMS	Domain Management System
DXC	Digital Cross-Connect
EN	European Norm
ETS	European Telecommunications Standard
ETSI	European Telecommunication Standard Institute
FLL	Frequency-Locked Loop
GPS	Global Positioning System
HMS	Hierarchical Master Slave
ISDN	Integrated Services Digital Network
ISO	International Standard Organization
ISO-OSI	International Standard Organization-Open System Interconnection
ITU-T	International Telecommunication Union – Telecommunication

MDS	Main Distribution Frame
OCXO	Oven Controlled Crystal Oscillator
PABX	Private Automatic Branch Exchange
PC	Personal Computer
PCM	Pulse Code Modulation
PDH	Plesiochronous Digital Hierarchy
PLL	Phase-Locked Loop
POTS	Plain Old Telephone Service
PRC	Primary Reference Clock
SASE	Stand-Alone Synchronization Equipment
SDH	Synchronous Digital Hierarchy
SEC	Synchronous Equipment Clock
SMNP	Simple Network Management Protocol
SONET	Synchronous Optical NETwork
SSM	Synchronization Status Message
SSU	Synchronization Supply Unit
STM-N	Synchronous Transport Module di livello N
STS-N	Synchronous Transport Signal di livello N

3.2 Item 25-A1
SDH 155 (Add/Drop Multiplexer - ADM 1)

3.2.1 Reference Standards

All SDH equipment should be compliant with the following Standards:

- ITU-T G.707: (Nov. 2001), Network node interface for the synchronous digital hierarchy (SDH);
- ITU-T G.708: (June 1999), Sub STM-0 network node interface for the syncronous digital hierarchy (SDH);
- ITU-T G.709: (Nov. 2001), Network node interface for the Optical Transport Network (OTN);
- ITU-T G.770-779 Terminal Equipments - OA&M:
- ITU-T G.774: (Feb. 2001), SDH Management information model for network element view;
- ITU-T G.774.01: (Feb. 2001), SDH - Bidirectional performance monitoring for the network element view;
- ITU-T G.774.02: (Feb. 2001), SDH - Configuration of the payload structure for the network element view;
- ITU-T G.774.03: (Feb. 2001), SDH - Management of multiplex-section protection for the network element view;
- ITU-T G.774.04: (Feb. 2001), SDH - Management of the subnetwork connection protection for the network element view;
- ITU-T G.774.05: (Feb. 2001), SDH - Management of connection supervision functionality (HCS/LCS) for the network element view;
- ITU-T G.774.06: (Feb. 2001), SDH - Unidirectional performance monitoring for the network element view;
- ITU-T G.774.07: (Feb. 2001), SDH - Management of lower order path trace and interface labelling for the network element view;
- ITU-T G.774.08: (Feb. 2001), SDH - Management of radio-relay systems for the network element view;
- ITU-T G.774.09: (Feb. 2001), SDH - Configuration of linear multiplex section protection for the network element view;
- ITU-T G.774.10: (Feb. 2001), SDH - Multiplex Section (MS) shared protection ring management for the network element view;
- ITU-T G.775: (Nov. 1998), Loss Of Signal (LOS), Alarm Indication Signal (AIS) and Remote Defect Indication (RDI) defect detection and clearance criteria for PDH signals;
- ITU-T G.780-789 Terminal Equipments - Multiplex equipment for SDH:

- ITU-T G.780: (Jul. 1999), Vocabulary of terms for synchronous digital hierarchy (SDH) networks and equipment;
- ITU-T G.781: (July 1999), Synchronization layer functions;
- ITU-T G.782: (July 1999), Types and general characteristics of synchronous digital hierarchy (SDH) equipment(Apr 1997);
- ITU-T G.783: (July 1999), Characteristics of Synchronous Digital Hierarchy (SDH) equipment functional blocks(Oct 2000);
- ITU-T G.784: (July 1999), Synchronous Digital Hierarchy (SDH) management(July 1999);
- ITU-T G.785: (July 1999), Characteristics of a flexible multiplexer in a synchronous digital environment (Nov 1996);
- ITU-T G.803: (Mar. 2000), Architecture of transport networks based on the synchronous digital hierarchy (SDH).

The following standards are also applicable as appropriate to the equipment considered:

- ITU-T G.800-899 Digital Networks:
- ITU-T G.804: (Nov. 1993), ATM Cell mapping into plesiochronous digital hierarchy (PDH);
- ITU-T G.805: (Mar. 2000), Generic functional architecture of transport networks;
- ITU-T G.807: (July 2001), Requirements for the automatic switched transport network (ASTN);
- ITU-T G.810: (Aug. 1996), Definitions and terminolgy for synchronization networks;
- ITU-T G.811: (Sept. 1997), Timing requirements at the outputs of primary reference clocks suitable for plesiochronous operation of international digital links;
- ITU-T G.823: (Mar. 2000), Control of jitter and wander within digital networks which are based on the 2048 kbit/s hierarchy;
- ITU-T G.824: (Mar. 2000), Control of jitter and wander within digital networks which are based on the 1544 kbit/s hierarchy;
- ITU-T G.826: (July 2001), Error performance parameters and objectives for international, constant bit-rate digital paths at or above the primary rate;
- ITU-T G.827: (Mar. 2000), Availability performance and objectives for path elements of international constant bit rate digital paths at or above the primary rate;
- ITU-T G.827.1: (Nov. 2000), Availability performance and objectives for end-to-end international constant bit rate digital paths at or above the primary rate;
- ITU-T G.828: (July 2001), Error performance parameters and objectives for international, constant bit rate synchronous digital paths;

- ITU-T G.832: (Oct. 1998), Transport of SDH elements on PDH networks - Frame and multiplexing structures;
- ITU-T G.852: (Nov. 1996), Management of the transport network;
- ITU-T G.852.2: (Mar. 1999), Enterprise Viewpoint Description of Transport Network Resource Model;
- ITU-T G.852.3: (Mar. 1999), Enterprise Viewpoint for Topology Management ;
- ITU-T G.852.6: (Mar. 1999), Enterprise Viewpoint for Trail Management;
- ITU-T G.852.8: (Mar. 1999), Enterprise Viewpoint for Pre-provisioned Adaptation Management;
- ITU-T G.852.10: (Mar. 1999), Enterprise Viewpoint for Pre-provisioned Link Connection Management;
- ITU-T G.852.12: (Mar. 1999), Enterprise Viewpoint for Pre-provisioned Link Management;
- ITU-T G.852.16: (Jan. 2001), Enterprise Viewpoint for Pre-provisioned Route Discovery;
- ITU-T G.853: (Jan. 2001), Information Viewpoint for management of transport networks;
- ITU-T G.853.1:(Mar. 1999), Common elements of the information viewpoint for the management of a transport network;
- ITU-T G.853.2: (Nov. 1996), Information Viewpoint for Subnetwork Connection Management;
- ITU-T G.853.3:(Mar. 1999), Information Viewpoint for Topology Management;
- ITU-T G.853.6:(Mar. 1999), Information Viewpoint for Trail Management;
- ITU-T G.853.8:(Mar. 1999), Information Viewpoint for Pre-provisioned Adaptation Management;
- ITU-T G.853.10:(Mar. 1999), Information Viewpoint for Pre-provisioned Link Connection Management;
- ITU-T G.853.12: (Mar. 1999), Information Viewpoint for Pre-provisioned Link Management;
- ITU-T G.853.16: (Jan. 2001), Information Viewpoint for Pre-provisioned Route Discovery.
- ITU-T G.854: Management of the transport network - Computational Viewpoint;
- ITU-T G.854.1:(Nov .1996), Computational interfaces for basic transport network model;
- ITU-T G.854.3: (Mar. 1999), Computational Viewpoint for Topology Management;
- ITU-T G.854.6: (Mar. 1999), Computational Viewpoint for Trail Management;
- ITU-T G.854.8: (Mar. 1999), Computational Viewpoint for Pre-provisioned Adaptation Management;

- ITU-T G.854.10: (Mar. 1999), Computational Viewpoint for Pre-provisioned Link Connection Management;
- ITU-T G.854.12: (Mar. 1999), Computational Viewpoint for Pre-provisioned Link Management;
- ITU-T G.854.16: (Jan. 2001), Enterprise Viewpoint for Pre-provisioned Route Discovery.
- ITU-T G.871: (Oct. 2000), Framework of Optical Transport Netwrk Recommendations;
- ITU-T G.872: (Nov. 2001), Architecture of Optical Transport Network.
- ITU-T G.900-999: Digital Sections and Line Systems:
- ITU-T G.957: (July 1999), Optical interfaces for equipments and systems relating to the synchronous digital hierarchy;
- ITU-T G.959.1:(Feb. 2001), Optical transport network physical layer interfaces;
- ITU-T G.960: (Mar. 1993), Access digital section for ISDN basic rate access;
- ITU-T G.961: (Mar 1993), Digital transmission system on metallic local lines for ISDN basic rate access;
- ITU-T G.962: (June 1997), Access digital section for ISDN primary rate at 2048 kbit/s;
- ITU-T G.964: (Feb. 2001), V5.1 interface (based on 2048 kbit/s) for support of Access Network;
- ITU-T G.965, (Feb. 2001), V5.2 interface (based on 2048 kbit/s) for support of Access Network;
- ITU-T G.966: (Feb. 1999), Access digital section for B-ISDN;
- ITU-T G.991.1: (Oct .1998), High bit rate digital subscriber line (HDSL)transmission system on metallic local lines;
- ITU-T G.991.2: (Nov. 2001), Single-pair High-speed Digital Subscriber Line (SHDSL) transceivers;
- ITU-T G.992.1: (Nov. 2001), Asymmetrical Digital Subscriber Line (ADSL) Transceivers;
- ITU-T G.992.2: (July 1999), Splitterless Asymmetrical Digital Subscriber Line (ADSL) Transceivers;
- ITU-T G.993.1: (Nov. 2001), Very-high speed Digital Subscriber Line Foundation;
- ITU-T G.994.1: (Feb. 2001), Handshake procedures for Digital Subscriber Line (DSL) Transceivers;
- ITU-T G.995.1: (Nov. 2001), Overview of Digital Subscriber Line (DSL) Recommendations;
- ITU-T G.996.1: (Feb. 2001), Test procedures for Digital Subscriber Line (DSL) Transceivers;
- ITU-T G.997.1: (July 1999), Physical layer management for Digital Subscriber Line (DSL) Transceivers.

3.2.2 Basic Specifications

SDH multiplexers perform optical-to-electric signal transduction at a gross frequency of 155.52 Mps and 622.08 Mps for SDH-STM-1 and SDH-STM-4 devices, respectively.

This bandwidth will have to be made available on access by 2 Mbps flows with G703 interfaces.

The system will also have to meet the following MTBF requirements:

SDH	
Description	MTBF (hours)
Matrix Block	190.000
Power Unit Block	400.000
Synchronisation Block	360.000
Line Interface	180.000
Tributary Cards	250.000

3.2.3 Configuration

The device, equipped with common parts and duplicated critical parts, should be equipped as follows:

- (Redundant) Power Unit
- Optical Line Interface (single or duplicated, depending on equipment configuration - i.e. terminal or drop-insert, respectively)
- (Redundant) Central Unit
- (Redundant) Matrix Unit
- 32 2-Mbps Flows
- Local interface for remote terminal
- At least 4 earthing points for external alarm detection.

Cards may be integrated.

3.2.4 Operating Conditions and Electromagnetic Compatibility

Primary SDH multiplexers will have to ensure the expected performance also under environmental conditions that are typical for the premises housing PABX and will not have to require specific maintenance/replacement activities for at least 5 years following installation. In this regard, the Contractor is required to list all the ordinary maintenance activities to be performed on the equipment to be installed as well as their frequency.

All the equipment supplied will have to ensure performance within the range specified for the environmental conditions that usually apply to PABX premises.

Again with regard to environmental conditions (temperature, humidity, vibrations), compliance with European EN 300 019 standard (1.1, 2.2 and 3.2 classes) will have to be ensured in terms of appropriate operation of the equipment within the specified performance range.

As for electromagnetic compatibility (emission and immunity), each equipment will have to be compliant with the specifications made in European ETSI EN 300 386 and CENELEC (EN 50081-1 and EN 50082-1) standards.

3.2.5 Power Supply

Network equipment will have to be powered at a voltage of either 48-60 V DC or, alternatively, 220 V. Power supply will be available either at the technological premises or at the PABX where PCM system equipment is to be deployed.

The equipment will have to be powered by two different power units, of which at least one should be protected (e.g. by means of UPS).

3.2.6 System Diagnostics and Control

The primary routers management and control system will have to supervise operational status of each card and interface making up the equipment.

The management system architecture will be configured as follows:

- A national management and control station (main server of the management system or network manager)
- Peripheral management and control stations located at the most strategically important nodes

The following tasks will have to be discharged by both national and peripheral control stations:

- Network events detection and reporting
- Interface management
- Real-time, continuous-mode acquisition and management of alarm information
- Network configuration management
- Network performance monitoring
- Location of failure-originating equipment
- Information presentation to operators in graphic format
- Integrability of all network monitoring and supervision functions, including the relevant

network components, in a higher-hierarchy network according to standard interfacing methods and protocols (Q3, or preferably SNMP), without any dedicated development being necessary and with easily configurable parameters and software enable functions

- The hardware and software platform will have to be compliant with the most commonly used market standards for TLC networks management.

3.2.7 Testing

It will be possible to perform such tests as may be necessary to verify compliance of equipment with the aforementioned international standards.

Furthermore, the Employer will be able to perform such tests as he may have developed to verify system operation if one or more redundant parts are put out of order (e.g. power port, etc.).

The Employer will be able to perform such tests as he considers appropriate in order to verify system operation.

A list of the tests and checks to be at least envisaged by the Contractor in his own operation tests is reported below; these tests should be performed at both minimum and maximum supply voltage:

a routing verification

b service tests

c system services

d proper operation of at least 25% of 2-Mbps ports

e alarm verification and management.

3.2.8 Technical Documentation

Contractor will have to make available to the Employer, at least 30 days before start of tests, 2 complete, updated copies of the documentation concerning the system to be installed - both hardware and software - including user and maintenance manuals on paper and magnetic media.

Additionally, Contractor will have to equip each system with a copy (on a magnetic medium) of the aforementioned documentation upon installation.

The technical documentation made available as above will have to be in English and Russian language; the licence to reproduce a sufficient number of copies for use by the Employer will also have to be granted.

3.2.9 Training

In order to allow full management of facilities by the Employer prior to activation,

Contractor is required to organise 1 training course for maximum 10 persons, for a total duration of 20 working days, to be held on location, with a view to training the Employer staff in charge of maintenance and management of the equipment supplied.

During installation and testing, Contractor is required to explain operational arrangements of the equipment supplied as well as use of the main PABX functions and services to the Employer staff in charge of maintenance and use.

The documentation in Russian required for training the Employer staff will have to be made available 30 days prior to start of the relevant courses.

The costs related to organisation and performance of the above courses as well as to supply of the necessary teaching materials and those incurred on account of the operating mode of the equipment(s) will be borne and paid via the equipment supply prices.

3.2.10 Installation

3.2.10.1 General Structural Specifications

Racks: equipment should be assembled on ETSI ETS 119-3 racks with the following dimensions: 600x2600x300 mm.

Thermal Dissipation: peak thermal dissipation of fully equipped racks should not be in excess of 500 W for ADM-1 and 800 W for ADM-4, respectively, under standard operating conditions.

Power Supply: Power units should be compliant with ETSI ETS 300 132-2 standard.

3.2.10.2 Environmental Conditions

The equipment referred to in these specifications should comply with the standards reported below, the relevant definitions being laid down in ETSI ETS 300 019-1-0 standard.

Standard operating conditions: the climatogram is laid down in ETSI ETS 300 019-1-3 class 3.1 standard.

Extraordinary operating conditions: the climatogram is laid down in ETSI ETS 300 019-1-3 class 3.1E standard.

Storage conditions: the climatogram is laid down in ETSI ETS 300 019-1-1 class 1.2 standard.

Transport conditions: the climatogram is laid down in ETSI ETS 300 019-1-1 class 2.3 standard.

Vibrations: equipment subjected to mechanical stress should be compliant with ETSI ETS 300 019-1-1 class 3.1 standard under operating conditions, and with ETSI ETS 300 019-1-2

class 2.3 standard under transport conditions.

3.2.11 Payment

The supply and installation of the SDH 155 apparatus shall be paid with the following unit prices, which shall be deemed to include for the full scope as aforesaid, including, but not limited, insurance cost, performance security cost, training, testing and commissioning cost, overheads and profit.

Apparatus SDH 155 Mb/sb

Item 25-A1

1.01	Supply of Add/Drop Multiplexer (ADM 1) from outside the Employer's country.	
	Each	
1.02	Supply of Add/Drop Multiplexer (ADM 1) from within the Employer's country.	
	Each	
1.03	Local Transportation of Add/Drop Multiplexer (ADM 1).	
	Each	
1.04	Installation of Add/Drop Multiplexer (ADM 1)	
	Each	

3.3 Item 25-A2
PDH 2Mb/s Multiplexers
(Primary Rate Multiplexer - MUX)

3.3.1 Reference Standards

All PDH multiplexers should be compliant with the standards reported below:

- ITU-T G.703: (Nov. 2001), Physical/electrical characteristics of hierarchical digital interfaces;
- ITU-T G.704: (July 1999), Synchronous Digital Hierarchy (SDH) management (July 1999);
- ITU-T G.730-769 Terminal Equipments - Multiplex Equipment for PDH;
- ITU-T G.751: (Oct. 1998), Digital multiplex equipments operating at the third order bit rate of 34 368 kbit/s and the fourth order bit rate of 139 264 kbit/s and using positive justification;
- ITU-T G.753: (Oct. 1998), Third order digital multiplex equipment operating at 34 368 kbit/s and using positive/zero/negative justification;
- ITU-T G.763: (Oct. 1998), Digital circuit multiplication equipment using 32 kbit/s ADPCM (Recommendation G.726) and digital speech interpolation;
- ITU-T G.767: (Oct. 1998), 16 kbit/digital circuit multiplication element using 16 kbit/s LD-CELP, digital speech interpolation and facsimile demodulation/remodulation;
- ITU-T G.803: (Mar. 2000), Architecture of transport networks based on the synchronous digital hierarchy (SDH).

The following standards will also be applicable as appropriate to the equipment in question:

- ITU-T G.800-899 Digital Networks:
- ITU-T G.804: (Nov. 1993), ATM Cell mapping into plesiochronous digital hierarchy (PDH);
- ITU-T G.805: (Mar. 2000), Generic functional architecture of transport networks;
- ITU-T G.807: (July 2001), Requirements for the automatic switched transport network (ASTN);
- ITU-T G.810: (Aug. 1996), Definitions and terminolgy for synchronization networks;
- ITU-T G.811: (Sept. 1997), Timing requirements at the outputs of primary reference clocks suitable for plesiochronous operation of international digital links;
- ITU-T G.823: (Mar. 2000), Control of jitter and wander within digital networks which are based on the 2048 kbit/s hierarchy;

- ITU-T G.824: (Mar. 2000), Control of jitter and wander within digital networks which are based on the 1544 kbit/s hierarchy;
- ITU-T G.826: (July 2001), Error performance parameters and objectives for international, constant bit-rate digital paths at or above the primary rate;
- ITU-T G.827: (Mar. 2000), Availability performance and objectives for path elements of international constant bit rate digital paths at or above the primary rate;
- ITU-T G.827.1: (Nov. 2000), Availability performance and objectives for end-to-end international constant bit rate digital paths at or above the primary rate;
- ITU-T G.828: (July 2001), Error performance parameters and objectives for international, constant bit rate synchronous digital paths;
- ITU-T G.832: (Oct. 1998), Transport of SDH elements on PDH networks - Frame and multiplexing structures;
- ITU-T G.852: (Nov. 1996), Management of the transport network;
- ITU-T G.852.2: (Mar. 1999), Enterprise Viewpoint Description of Transport Network Resource Model;
- ITU-T G.852.3: (Mar. 1999), Enterprise Viewpoint for Topology Management ;
- ITU-T G.852.6: (Mar. 1999), Enterprise Viewpoint for Trail Management;
- ITU-T G.852.8: (Mar. 1999), Enterprise Viewpoint for Pre-provisioned Adaptation Management;
- ITU-T G.852.10: (Mar. 1999), Enterprise Viewpoint for Pre-provisioned Link Connection Management;
- ITU-T G.852.12: (Mar. 1999), Enterprise Viewpoint for Pre-provisioned Link Management;
- ITU-T G.852.16: (Jan. 2001), Enterprise Viewpoint for Pre-provisioned Route Discovery;
- ITU-T G.853: (Jan. 2001), Information Viewpoint for management of transport networks;
- ITU-T G.853.1:(Mar. 1999), Common elements of the information viewpoint for the management of a transport network;
- ITU-T G.853.2: (Nov. 1996), Information Viewpoint for Subnetwork Connection Management;
- ITU-T G.853.3:(Mar. 1999), Information Viewpoint for Topology Management;
- ITU-T G.853.6:(Mar. 1999), Information Viewpoint for Trail Management;
- ITU-T G.853.8:(Mar. 1999), Information Viewpoint for Pre-provisioned Adaptation Management;
- ITU-T G.853.10:(Mar. 1999), Information Viewpoint for Pre-provisioned Link Connection Management;
- ITU-T G.853.12: (Mar. 1999), Information Viewpoint for Pre-provisioned Link

Management;

- ITU-T G.853.16: (Jan. 2001), Information Viewpoint for Pre-provisioned Route Discovery;
- ITU-T G.854: Management of the transport network - Computational Viewpoint;
- ITU-T G.854.1:(Nov .1996), Computational interfaces for basic transport network model;
- ITU-T G.854.3: (Mar. 1999), Computational Viewpoint for Topology Management;
- ITU-T G.854.6: (Mar. 1999), Computational Viewpoint for Trail Management;
- ITU-T G.854.8: (Mar. 1999), Computational Viewpoint for Pre-provisioned Adaptation Management;
- ITU-T G.854.10: (Mar. 1999), Computational Viewpoint for Pre-provisioned Link Connection Management;
- ITU-T G.854.12: (Mar. 1999), Computational Viewpoint for Pre-provisioned Link Management;
- ITU-T G.854.16: (Jan. 2001), Enterprise Viewpoint for Pre-provisioned Route Discovery;
- ITU-T G.871: (Oct. 2000), Framework of Optical Transport Netwrk Recommendations;
- ITU-T G.872: (Nov. 2001), Architecture of Optical Transport Network;
- ITU-T G.900-999: Digital Sections and Line Systems:
- ITU-T G.957: (July 1999), Optical interfaces for equipments and systems relating to the synchronous digital hierarchy;
- ITU-T G.959.1:(Feb. 2001), Optical transport network physical layer interfaces;
- ITU-T G.960: (Mar. 1993), Access digital section for ISDN basic rate access;
- ITU-T G.961: (Mar 1993), Digital transmission system on metallic local lines for ISDN basic rate access;
- ITU-T G.962: (June 1997), Access digital section for ISDN primary rate at 2048 kbit/s;
- ITU-T G.964: (Feb. 2001), V5.1 interface (based on 2048 kbit/s) for support of Access Network;
- ITU-T G.965, (Feb. 2001), V5.2 interface (based on 2048 kbit/s) for support of Access Network;
- ITU-T G.966: (Feb. 1999), Access digital section for B-ISDN;
- ITU-T G.991.1: (Oct .1998), High bit rate digital subscriber line (HDSL)transmission system on metallic local lines;
- ITU-T G.991.2: (Nov. 2001), Single-pair High-speed Digital Subscriber Line (SHDSL) transceivers;
- ITU-T G.992.1: (Nov. 2001), Asymmetrical Digital Subscriber Line (ADSL) Transceivers;

- ITU-T G.992.2: (July 1999), Splitterless Asymmetrical Digital Subscriber Line (ADSL) Transceivers;
- ITU-T G.993.1: (Nov. 2001), Very-high speed Digital Subscriber Line Foundation;
- ITU-T G.994.1: (Feb. 2001), Handshake procedures for Digital Subscriber Line (DSL) Transceivers;
- ITU-T G.995.1: (Nov. 2001), Overview of Digital Subscriber Line (DSL) Recommendations;
- ITU-T G.996.1: (Feb. 2001), Test procedures for Digital Subscriber Line (DSL) Transceivers;
- ITU-T G.997.1: (July 1999), Physical layer management for Digital Subscriber Line (DSL) Transceivers.

3.3.2 Basic Specifications

PDH multiplexers should:

- adapt inbound and outbound signals on the G.703 interface side;
- generate the AIS signal on both the line and the G.703 interface side;
- transcode the G703 interface line signal into the G.703 line/interface signal.

The system will also have to meet the following MTBF requirements:

PDH	
Description	MTBF (hours)
Matrix Block	540,000
Power Unit Block	400,000
Synchronisation Block	360,000
Line Interface	300,000
Tributary Cards	400,000

3.3.3 Configuration

The device should allow being equipped with the following units:

- (Redundant) power unit
- Line interface (electrical or optical depending on the specific cases, and single or duplicated depending on equipment configuration, i.e. terminal or drop-insert, respectively)
- (Redundant) central unit

- (Redundant) matrix unit
- Local interface for remote terminal
- At least 4 earthing points to detect external alarms
- Tributary card with at least 4 65 Kbsec voice channels with EM signalling
- Tributary card with at least 8 64 Kbsec channels with G.703 interface
- Tributary card with at least 2 X.21bis/V.35 interface channels with 14.5 to 64 Kbsec programmable speed
- Tributary card with at least 2 V.36 interface channels with 14.5 to 64 Kbsec programmable speed
- Tributary card with at least 2 X.20bis and/or V.24 and/or V.28 36 channels with 1,200 to 19,200 bsec programmable speed
- Tributary card with at least 4 X.21 and/or V.11 channels with 2,400 bsec to 64 Kbsec programmable speed
- Tributary card with at least 8 Nx64 data channels
- Tributary card with at least 5 omnibus telephone channels
- Tributary card with at least 5 omnibus data channels
- Tributary card with at least 3 remote user voice channels on user side (if the multiplexer is not located at CTA premises), or with at least 20 remote user voice channels on branch exchange side (if the multiplexer is located at CTA premises)
- Call generator (only if the multiplexer is not located at CTA premises)
- Channel card with at least 2 ISDN ports and S0 interface
- Channel card with at least 2 ports with 10baseT interfaces compliant with IEEE802.3 standard.

Cards may be integrated.

All the abovementioned cards should be supplied for each piece of the equipment.

3.3.4 Operating Conditions and Electromagnetic Compatibility

Primary SDH multiplexers will have to ensure the expected performance also under environmental conditions that are typical for the premises housing PABX and will not have to require specific maintenance/replacement activities for at least 5 years following installation. In this regard, the Contractor is required to list all the ordinary maintenance activities to be performed on the equipment to be installed as well as their frequency.

All the equipment supplied will have to ensure performance within the range specified for the environmental conditions that usually apply to PABX premises.

Again with regard to environmental conditions (temperature, humidity, vibrations),

compliance with European EN 300 019 standard (1.1, 2.2 and 3.2 classes) will have to be ensured in terms of appropriate operation of the equipment within the specified performance range.

As for electromagnetic compatibility (emission and immunity), each equipment will have to be compliant with the specifications made in European ETSI EN 300 386 and CENELEC (EN 50081-1 and EN 50082-1) standards.

3.3.5 Power Supply

Network equipment will have to be powered at a voltage of either 48-60 V DC or, alternatively, 220 V. Power supply will be available either at the technological premises or at the PABX where PCM system equipment is to be deployed.

The equipment will have to be powered by two different power units, of which at least one should be protected (e.g. by means of UPS).

3.3.6 System Diagnostics and Control

The primary routers management and control system will have to supervise operational status of each card and interface making up the equipment.

The management system architecture will be configured as follows:

- A national management and control station (main server of the management system or network manager)
- Peripheral management and control stations located at the most strategically important nodes.

The following tasks will have to be discharged by both national and peripheral control stations:

- Network events detection and reporting
- Interface management
- Real-time, continuous-mode acquisition and management of alarm information
- Network configuration management
- Network performance monitoring
- Location of failure-originating equipment
- Information presentation to operators in graphic format
- Integrability of all network monitoring and supervision functions, including the relevant network components, in a higher-hierarchy network according to standard interfacing methods and protocols (Q3, or preferably SNMP), without any dedicated development being necessary and with easily configurable parameters and software enable functions

- The hardware and software platform will have to be compliant with the most commonly used market standards for TLC networks management.

3.3.7 Testing

It will be possible to perform such tests as may be necessary to verify compliance of equipment with the aforementioned international standards .

Furthermore, the Employer will be able to perform such tests as he may have developed to verify system operation if one or more redundant parts are put out of order (e.g. power port, etc.).

The Employer will be able to perform such tests as he considers appropriate in order to verify system operation.

A list of the tests and checks to be at least envisaged by the Contractor in his own operation tests is reported below; these tests should be performed at both minimum and maximum supply voltage:

a routing verification

b service tests

c system services

d proper operation of at least 25% of 2-Mbps ports

e alarm verification and management

3.3.8 Technical Documentation

Contractor will have to make available to the Employer, at least 30 days before start of tests, 2 complete, updated copies of the documentation concerning the system to be installed - both hardware and software - including user and maintenance manuals on paper and magnetic media.

Additionally, Contractor will have to equip each system with a copy (on a magnetic medium) of the aforementioned documentation upon installation.

The technical documentation made available as above will have to be in English and Russian language; the licence to reproduce a sufficient number of copies for use by the Employer will also have to be granted.

3.3.9 Training

In order to allow full management of facilities by the Employer prior to activation, Contractor is required to organise 1 training course for maximum 10 persons, for a total duration of 20 working days, to be held on location, with a view to training the Employer staff in charge of maintenance and management of the equipment supplied.

During installation and testing, Contractor is required to explain operational arrangements of the equipment supplied as well as use of the main PABX functions and services to the Employer staff in charge of maintenance and use.

The documentation in Russian required for training the Employer staff will have to be made available 30 days prior to start of the relevant courses.

The costs related to organisation and performance of the above courses as well as to supply of the necessary teaching materials and those incurred on account of the operating mode of the equipment(s) will be borne and paid via the equipment supply prices.

3.3.10 Installation

3.3.10.1 General Structural Specifications

Racks: equipment should be assembled on ETSI ETS 119-3 racks with the following dimensions: 600x2600x300 mm.

Thermal Dissipation: peak thermal dissipation of fully equipped racks should not be in excess of 300 W under standard operating conditions.

Power Supply: Power units should be compliant with ETSI ETS 300 132-2 standard.

3.3.10.2 Environmental Conditions

The equipment referred to in these specifications should comply with the standards reported below, the relevant definitions being laid down in ETSI ETS 300 019-1-0 standard.

Standard operating conditions: the climatogram is laid down in ETSI ETS 300 019-1-3 class 3.1 standard.

Extraordinary operating conditions: the climatogram is laid down in ETSI ETS 300 019-1-3 class 3.1E standard.

Storage conditions: the climatogram is laid down in ETSI ETS 300 019-1-1 class 1.2 standard.

Transport conditions: the climatogram is laid down in ETSI ETS 300 019-1-1 class 2.3 standard.

Vibrations: equipment subjected to mechanical stress should be compliant with ETSI ETS 300 019-1-1 class 3.1 standard under operating conditions, and with ETSI ETS 300 019-1-2 class 2.3 standard under transport conditions.

3.3.11 Payment

The supply and installation of the Multiplexer PHD 2 Mb/s shall be paid with the following

unit prices, which shall be deemed to include for the full scope as aforesaid, including, but not limited, insurance cost, performance security cost, testing and commissioning cost, overheads and profit.

Item 25-A2

2.01	Supply of Primary Rate Multiplexer (MUX) from outside the Employer's country.	
	Each	
2.02	Supply of Primary Rate Multiplexer (MUX) from within the Employer's country.	
	Each	
2.03	Local Transportation of Primary Rate Multiplexer (MUX)	
	Each	
2.04	Installation of Primary Rate Multiplexer (MUX)	
	Each	

3.4 Item 25-A3
Regenerators (SDH 155 Mb/s)

3.4.1 Reference Standards

Reference standards are the same mentioned for SDH/PDH equipment.

3.4.2 Basic Specifications

The regenerators have the duty of transforming the optical signal into an electrical one and then again into optical with the aim regenerate the quality of the optical signal. In order to perform this task, the same SDH equipment (see the previous chapter) will be used with drop/insert operation. As consequence, all the characteristics already mentioned for SDH equipment will be valid for the regenerators with the only exception of the trunks – 2 Mbps which are optional for regenerators.

3.4.3 Configuration

The device, equipped with common parts and duplicated critical parts, should be equipped with the same SDH parts which the only exception of tributary trunks which are optionals.

3.4.4 Operating Conditions and Electromagnetic Compatibility

Primary SDH multiplexers will have to ensure the expected performance also under environmental conditions that are typical for the premises housing PABX and will not have to require specific maintenance/replacement activities for at least 5 years following installation. In this regard, the Contractor is required to list all the ordinary maintenance activities to be performed on the equipment to be installed as well as their frequency.

All the equipment supplied will have to ensure performance within the range specified for the environmental conditions that usually apply to PABX premises.

Again with regard to environmental conditions (temperature, humidity, vibrations), compliance with European EN 300 019 standard (1.1, 2.2 and 3.2 classes) will have to be ensured in terms of appropriate operation of the equipment within the specified performance range.

As for electromagnetic compatibility (emission and immunity), each equipment will have to be compliant with the specifications made in European ETSI EN 300 386 and CENELEC (EN 50081-1 and EN 50082-1) standards.

3.4.5 Power Supply

Network equipment will have to be powered at a voltage of either 48-60 V DC or, alternatively, 220 V. Power supply will be available either at the technological premises or at

the PABX where PCM system equipment is to be deployed.

The equipment will have to be powered by two different power units, of which at least one should be protected (e.g. by means of UPS).

3.4.6 System Diagnostics and Control

The regenerators will be supervised and controlled by the SDH equipment management system.

3.4.7 Testing

It will be possible to perform such tests as may be necessary to verify compliance of equipment with the aforementioned international standards.

Furthermore, the Employer will be able to perform such tests as he may have developed to verify system operation if one or more redundant parts are put out of order (e.g. power port, etc.).

The Employer will be able to perform such tests as he considers appropriate in order to verify system operation.

3.4.8 Technical Documentation

The technical documentation for regenerators will be integrated in that for SDH equipment.

3.4.9 Training

The training courses will be included in those for SDH equipment.

3.4.10 Installation

The installation of the regenerators will be following the specifications provided for SDH equipment.

3.4.11 Payment

The supply and installation of the Regenerator shall be paid with the following unit prices, which shall be deemed to include for the full scope as aforesaid, including, but not limited, insurance cost, performance security cost, testing and commissioning cost, overheads and profit.

Item 25-A3

3.01	Supply of Regenerator from outside the Employer's country.
	Each
3.02	Supply of Regenerator from within the Employer's country.
	Each
3.03	Local Transportation of Regenerator
	Each
3.04	Installation of Regenerator
	Each

3.5 Item 25-A4
Power Supply of Transmission Systems (UPS)

3.5.1 Specifications

SDH transmission systems including the relevant accessory equipment (SASE, routers, switches) will be powered at 48-60 V DC with grounded positive pole, the voltage being supplied by a 200 V monophasic AC source with 50 Hz frequency, which the Employer will make available in the premises where the equipment is installed.

The Contractor will be responsible for supplying power as appropriate to the abovementioned racks by means of AC/DC converters capable to supply the power required by the rack equipment; the converters will be hosted in a standard N3 sub-rack, which may also be located on the powered rack if this is allowed by the available room and the relevant thermal dissipation. Alternatively, a separate standard N3 rack will be used, which may also host transmission system equipment.

Said converters will have to be powered, in turn, by static continuity groups with 220 V, 50 Hz monophasic output voltage (UPS) equipped with a reserve power unit (batteries plus the relevant recharge system), which will have to allow supplying stable 200 V - 50 Hz power also in the absence of the primary upstream source for at least 8 hours - the power supplied being twice as much as that required by the equipment.

The aforementioned power will not have to be lower than the values reported below if the specifications made in the preceding paragraphs are met:

- In stations with only MUX – 500 W;
- In stations with ADM1 and MUX equipment – 1,000 W;

Each static continuity group will be powered by two separate lines coming from the 200V - 50Hz power sources as available in the premises, and each of said lines will have to be protected on the start side by a suitably calibrated automatic switch.

Each rack will have to be protected in turn by a similar automatic switch, which will also be used to terminate power supply for maintenance purposes.

Each power station will have to be equipped with a suitable number of earthing points monitored by the management and control system of the whole Sub-network, in order to monitor functional status of the station centrally.

3.5.2 Payment

The supply and installation of the UPS shall be paid with the following unit prices, which shall be deemed to include for the full scope as aforesaid, including, but not limited, insurance cost, performance security cost, testing and commissioning cost, overheads and profit.

Item 25-A4

4.01	Supply of UPS from outside the Employer's country.
	Each
4.02	Supply of UPS from within the Employer's country.
	Each
4.03	Local Transportation of UPS
	Each
4.04	Installation of UPS
	Each

3.6 Items 25-A5, 25-A6 and 25-A10 PABX 1000,PABX 2000 and PABX Management System

3.6.1 Reference Standards

3.6.1.1 General Features

All PABX included in the interventions must be based on a modular and scalable increased capacity able to generate both nodes and network with a capacity ranging from 30 to 20.000 subscribers. Components of the system will have the same HW and SW characteristics (services, maintenance, management, etc.).

Consequently they will share the same software, the same man-machine interface and, in general, the same hardware components.

PABX modules will be connected both locally and as networking according to various technologies (PCM, fibre, Back-Bone-PCM, IP) and architectures (star, tree, mesh, ring).

The management of such networks and systems will have the possibility of being centralised or spread. Alternatively it could be foreseen the use of a single Data Base.

At the start up or during the reactivation of the system, the management, monitoring and self diagnostic software must be loaded on RAM from hard disk.

Modules must be endowed with HD and it must be possible to maintain backup copies of the whole configuration on MO-Drive disk (magneto- optic).

3.6.1.2 Modularity, Flexibility/Reliability and Availability

Apparatus must have:

- same Hw and Sw modules on every systems
- complete configuration flexibility
- availability of fixed different parts, expansible to the maximum system capacity without the necessity of hardware and software substitution installed
- modularity of principal peripheral schedule and insertion possibility in any peripheral slot
- Connection network, with numeric technique
- advanced construction technique (VLSI, SMT) and production control according to quality control regulations EN29001 - ISO9001
- easy repairing with substitution and insertion of plates in use
- diagnostic automatic tests included by the standard programme for the hardware and software periodical control

- remote management and diagnosis

3.6.1.3 Traffic Capacity

The system architecture must guarantee high traffic capacity and the possibility of equipping PABX with decimal users, multi frequency, cordless DECT, and voice data (2B+D).

As far as "dynamic" traffic is concerned, system capacity is hereby described:

SUBSCRIBERS	BHCA
< 500	> 40.000
> 500	> 80.000

In respect of dealing with static traffic, the maximum capacity for each user must be over 0,90 Erlang.

3.6.1.4 Redundancy

PABX must be on duty uninterruptedly 24 hours a day without any deterioration in their performance. To guarantee the maximum availability every PABX critical organ (of commutation in particular) must be redundant in hot stand-by. Duplication in hot stand-by involves the common controlling systems (CPU and memory), commutation networks, tone emitters and receivers, central and stack power supply.

The duplicated components work in hot reserve so that the cases of active common control loss do not cause communication failures or interruptions, remaining working all services.

In case of mis-functioning of not duplicable PABX components, the impact on the whole system working conditions will be minimised by way of an appropriate distribution of the schedules on various tracks.

3.6.1.5 Operational Instruments (Management and Maintenance)

PABX must contain operational instruments for the management and maintenance both at local and remote level. Management and maintenance tasks are:

- Operating conditions and off-duty controls over modules, users, lines
- Management (up dating and interrogation)
- Maintenance (localisation and mistakes correction)

The operator has at his disposal a Personal Computer (local and remote) and, for each country, a management DMS centre (Domain Management System), which permits the centralised PABX administration.

The system, to be supported by Personal Computer within the most significant places, will be

able to interface also with managing global net systems (telecom+ data), according with the standard SMNP (Simple Network Management Protocol).

All the functionalities will be realised on the same HW and SW PABX platform and will use the same database, so as to realise a managing global system with a unique entry point.

The managing and maintenance principles of PABX and of the related net must obey the following standards: TMN (serie M30), Q.903, CMIP, TCP/IP.

The control introduction will occur in a direct and guided manner. Each control (MML), and the corespondent executing programme, is protected by a password to prevent abuses. In addition, MML commands can be virtualized through a specific MS-Windows software for standard PCs.

Operational instruments of auto diagnosis, allowing mistakes recognition and managing, must be provided. In cases of duplicated system, redundancy in hot stand-by will permit the prosecution of conversation started in cases of switch of the systems. In case of failure, the system swap permits to isolate ruined parts and to switch automatically to the functioning ones. On top of that, within the reserve system, configuration commands can be applied during normal telephonic traffic.

The PABX should be provided with specific procedures allowing self-management and self-monitoring in the different operating conditions.

PABX full-fledged configuration should be possible via PC; the latter should operate in both remote and local mode.

Access to the individual procedures should be regulated by multi-level passwords. The PC should allow changing, adding and deleting any internal number, changing service classes, modifying coverage sequences, composition of automatic search groups, and so on.

PABX should be equipped with a workstation to allow processing, storing on magnetic/optic media and printing system tables concerning PABX maintenance and management.

PABX should autonomously perform such hardware and software checks with regard to their centralised and peripheral boards as may allow detecting failures.

At least three types of alarm should be managed by the system:

- low: failure causing no service disruption;
- medium: failure causing slight service disruption requiring non-immediate intervention;
- high: failure causing severe disruption requiring immediate intervention.

Two types of maintenance test will have to be carried out:

- regular;
- on request.

Regular tests will have to be programmable so as to be performed at regular intervals.

On-request tests will concern either automatic requests (made by the system in case of malfunctioning) or requests made by operators; they should be repeatable upon warning. Said tests should result into detecting and repairing the relevant failure(s).

This function should be included in the system Software as a maintenance sub-routine. It should allow:

- checking system;
- storing errors and alarms.

3.6.1.6 Energy Supply

System feeding is supplied by the 220 V alternating current (or 380V). Each PABX must be equipped of a specific station of external alimentation (UPS) (batteries alimentation), designed to cope with the effective necessities of the system, expansible in a modular way and able to feed the nominal tension of (buffered) 48 Volt direct current.

A battery of accumulators must guarantee, for the cases of lack of energy in the net, the correct PABX functioning for at least 8 hours; such functioning must be assured also for accessory parts, such as service terminals, if the system is not able to record failures or anomalies during the black outs.

3.6.1.7 Environmental Conditions

PABX must function without necessity of forced ventilation. Nevertheless rooms dedicated to machinery must be able to get off the possible excess warming produced. The foreseen environmental conditions are summarised in the following table:

Environmental conditions:	
Ambient temperature	from 0 to +40 °C
Absolute humidity	from 2 to 25 g H_2O/m^3
Relative humidity	from 20 to 80 %

3.6.1.8 Systems Networking

PABX have to enable the creation of various types of net:

- Real networks through connection point to point
- Virtual networks (RPV), through public sector or third operators
- Network packages through Frame Relay, ATM and IP.

The following type of protocols must be provided:

- Q-SIG/PSS1 on 2 Mb/s PCM (only real networks) trunk
- E&M on analogic and digital trunk (only real networking)
- Proprietary for corporate homogeneous network with 2 Mb/s, 2B+D and analogue.

In this way PABX must be equipped with interfaces for the Basic Access (2B+D) and the Primary Access (30B+D) to the ISDN network, both public and private, in accordance with the standards of ETS 300 series ETSI (European Telecommunications Standards Institute) listed below:

3.6.1.8.1 Euro ISDN Basic Calls and Supplementary Services

ETS 300 012 (2B+D) (S/T)	Level 1 of ISO-OSI model
ETS 300 011 (30B+D) (T)	Level 1 of ISO-OSI model
ETS 300 125 (S/T o T)	Level 2 of ISO-OSI model
ETS 300 047-1-2-3-4-5	Security and protection
ETS 300 102	BASIC CALL for level 3 of ISO-OSI model
ETS 300 064	DDI
ETS 300 052	MSN
ETS 300 092	CLIP
ETS 300 093	CLIR
ETS 300 097	COLP
ETS 300 130	MCID
ETS 300 061	SUB
ETS 300 182	AOC-D
ETS 300 182	AOC-E
T/S 46 -33T	UUS1

3.6.1.8.2 Private ISDN Network (QSIG)

ETS 300 012(2B+D)	Level 1 of ISO-OSI model
ETS 300 011(30B+D)	Level 1 of ISO-OSI model
ETS 300 170	Level 2 of ISO-OSI model
ETS 300 172	Level 3 of ISO-OSI model
ETS 300 239	Generic Functional Protocol for The Support of Supplementary Services

3.6.1.8.3 Interconnections between PABX of the Railway Network

The new digital PABX should be included into the existing Railway telephone network and interface with the existing PABX.

Interfacing of new and existing PABX should be ensured for all types of system and transmission support and allow telephone connection between any two users of the Railway network. As a function of availability and capability of the transmission supports and systems made available by the Employer, interconnections between new and existing PABX will have to be implemented by using:

- analog 2-wire connections on twisted copper pair;
- 6-wire telephone channels (4 voice + 2 E&M signalling) belonging to either analog FDM or digital PCM transmission systems;
- numeric 64 Kbsec channels (single B channel), or with S0-type interface (2B + D).

The new PABX to be supplied will be connected via 2 Mbsec flows from the new transmission systems, without using channel multiplexing

3.6.1.8.4 Interconnections with Public PABX

As for interconnection with PABX of the public Telecom network via DC and/or digital signalling systems, it should be implemented by using - as already mentioned concerning the Railway network - twisted copper pairs, analog telephone channels with E&M signalling, 64 Kbsec numeric channels or 2 Mbsec PCM flows, depending on local availability.

PABX should be compliant with the ETSI recommendations referred to above as regards connection with the public ISDN network.

3.6.1.9 Homogeneous and Heterogeneous Networks - Numbering

3.6.1.9.1 Homogeneous and Heterogeneous Networks

PABX must solve communication problems between separate units of the same company, permitting the creation of a "Corporate Network" able to managing the integration of different communication modes: voice, data, texts and images.

The communication protocol to be used will assure the complete potentialities of different links between networks nodes (30B+D o 2B+D numeric, Frame Relay/ATM, IP).

This protocol, based on CCITT Q.93x recommendations for public networks ISDN e QSIG, must assure:

- a signalling procedure uniform on the whole network,
- the detailed service distribution

- the centralisation, transparent for the users, of numerous services and added value - resources (such as vocal mail and office automation services)

permitting, lastly, the realisation of a unique virtual ISPBX.

PABX, beyond what is foreseen for the homogeneous network must also incorporate the Q-SIG/PSS1 standard. This is the standard adopted by "Forum IPNS" and ETSI/ECMA for future links between ISPBX of different suppliers.

PSS1 protocol is a standard protocol, based on QSIG and defined by ISO/IEC rules.

3.6.1.9.2 Numbering

Traffic on the railway telephone network will take place automatically in all directions; any user will be able to reach any other user by selecting the corresponding call number.

The PABX will allow internal Railway communications as well as international communications on the Railway telecommunications network, if the PABX of neighbouring Railway networks are interconnected; conversely, they will allow urban, national trunk, international and intercontinental calls by interconnection and transit on the public Telecom operator's network.

Inbound traffic from the public Telecom network will reach users either directly via automatic switch or in operator-assisted mode.

The PABX will have to allow for a flexible numbering plan such as to permit user numbers to be assigned without constraints throughout the network.

The PABX should allow setting up complex networks by making it possible to assign multi-level node numbers; at least the following numbering plans should be supported:

- Numbering plan for ISDN trunk in accordance with ETSI-E.164
- Private numbering plan in accordance with ETSI-E.189.

Contractor will have to consider the Numbering Plan to be adopted (e.g. separate area code system), by taking into account that the PABX ID is omitted if communication takes place within the framework either of the PABX serving both caller and calling party or of the same local network.

3.6.1.10 Integration between Data Voice (ISDN, LAN, ATM)

The PABX has to allow ISDN communication on digital apparatus that allow to establish telephone and data connections from the same work placing at the same time.

This will allow a distribution of entry data points coinciding with telephone points distribution.

They will be supplied at least:

- asynchronous terminals up to to19.2 Kbit/s
- synchronous terminals up to to 64 Kbit/s
- multimedial terminals n*64 Kbit/s
- IP terminals.
- entrance and at the exit modem pool management at the entrance and at the exit.

They will be supplied at least the following ISDN services:

- transparent stand of the ISDN interfaces on a level of standard terminal;
- interconnection towards ISDN net by basic access (BRA) and by primary access (PRI);
- multiprotocol bus (with connection of ISDN terminals and digital terminals);
- transparency to Gr.4 - alike services;
- access to ISDN additional services;
- identification of the various terminals with the same number (subaddress and/or multinumber);
- verification of the terminals compatibility;
- possibility of contemporary communication of voice and data.

The system architecture has to provide an internal BUS of LAN type (Ethernet) used for the high speed connection of System Server. This BUS/LAN can be connected directly with an external LAN network. The protocol used by LAN network is the TCP/IP, ad the access will be at high speed:

- 10 Mbps towards LAN
- from 64 Kbps to 30 x 64 Kbps towards WAN.

The PABX has to allow the management of the connectivity with the ATM world at integrated level too.

3.6.1.11 Telephonical Terminals

Besides the traditional analogical terminals (with decadical and multi-frequence signalling), it has to be possible to realise voice and voice-data solutions thanks to the connection of digital telephones remotely feeded thanks to ISDN standard interfaces.

A display, present in some models, has to supply also indications for the use of system advanced functions (for example the functions linked to the vocal-message system, the programming of the terminal keys, and so on), besides to allow to associate useful information to communications, such as the name, the surname, and the number of the caller and of the called people.

3.6.1.12 Operator Work Station

The terminal for the operator work station has to be provided of all the technical and ergonomic instruments necessary to manage the telephone calls in a fast, reliable and functional way.

The operator site has to be in the possibility of adapting itself to the necessities of the ipo-seeing and of the blinds(by a additional model with Braille bar of at least 40 characters).

Besides the operator work station on traditional videoterminal, it is requested the availability of a placing on a PC with user interface within MS-Windows environment.

3.6.1.13 Basic System Services

In relation to the system level, the PABX has to own all the following basic services besides the fundamental ones provided by the ETSI standards:

1. Automatic call
2. Direct entering call
3. Classification of the subscribers
4. Control of the selection on private net
5. Control of the direct dialling system
6. Disconnection for call reception in post dial selection
7. Accounting on call basis
8. Accounting on request
9. Encapsulation
10. Alternative routing
11. Flexible numbering
12. Uniform numbering
13. Personal number on S0 (common for different terminals of the same user)
14. Modem pool
15. Remotely Alarms
16. People search
17. Night notice service
18. Selezione Passante
19. Night general service
20. Night singular service
21. Tele-supervision

22. Selection in DTMF towards the public plant.

3.6.1.14 User Services

Within the PABX environment, each user has to enjoy at least of one of the following services:

1. Access to the operator
2. Functional key call
3. Direct call (DSS)
4. Individual disconnection (classes of service)
5. Identification of the caller (only with digital telephones)
6. Mono and bi-directional interphone (only with digital telephones)
7. Awaiting messages
8. External automatic booking
9. Redialling
10. Call parking (parking)
11. Transfer with consent
12. Transfer on call control and on engaged line
13. Visualisation of the debt (only with digital telephones)
14. Visualisation of time and date (only with digital telephones)
15. Visualisation on display of the selected digits (only with digital telephones)
16. Padlock software.

3.6.1.15 Net Services

On system level, the PABX has to include at least the net services based on the protocol Q-SIG/PSS1, on the base access (2B+D) and/or primary access (30B+D):

1. Basic call
2. Consultation with call holding, consultation with alternated return, conference by 3
3. Booking services
   - booking on engaged line
   - booking on free user who doesn't answer
4. Display services
   - display of the number and the name on digital telephone
   - display of the number and of the name on the operator working station

- display of the number of units on digital telephone
- suppression of the information on display (permanent or on the basis of call)

5. Debts documentation
   - Sending identity of the caller towards the PBX where it is engaged the external line
6. Inclusion
   - in both directions
   - both from user and from operator station
   - with possibility of prevention (by operator and/or user)
   - not disturbing service with possibility of overcoming
7. Deviation
   - fixed deviation for all conditions
   - deviation for missed answer
8. Centralising service of the operator stations freely remotized
9. Use of server (VMS) intranet and in centralised way
10. Hot-line call
11. Re-call service (flash-hook) in connection with VMS and possibility of selection
12. Access to particular services of other PBX
    - dictation installation
    - people-search
    - shortened selection
13. Optimisation of the routings
14. PIN services (Personal Identification Number) networking, pick-up.

3.6.1.16 Courtesy Services and Awaiting messages Services

Courtesy service will be obtained by combining functions of the PABX system with the server producing vocal messages. It will have to guarantee a full and flexible range of services; the possibilities offered by the system will be at least:

- Courtesy answer towards calls to operator stations
- Courtesy message for non-answer and/or for engaged state to calls addressed to internal users in passing selection, directed to operator stations
- Music on hold message (for transfer, parking, wait for P.O., etc.) customizable such as the text of the messages
- Special messages for communications (summer closes announcements, transfers, ecc.)

- Message on research groups with automatic wait (booking offices, ecc.)
- Message on night user (answer on call current).

The performance of the message on wait answers to the need of having the possibility of sending a music and/or a message alternatively to normal tones in the states of internal wait (such as forwarding from PO, re-call, transfer, parking, etc).

In this case the user who waits for speaking with an internal number, listens to the programmed courtesy music, in place of the normal tones foreseen in the various telephonic conditions.

3.6.1.17 Integrated Solutions (Voice Mail, Fax Mail, ecc.)

The PABX has to foresee the vocal mail service that foresees reception, storage and re-transmission vocal messages functions.

The management of messages within opportune vocal boxes must be possible both for internal and external users. Voice mail application must be completely integrated within the PABX and will be expansible in a modular way.

PABX will provide an integrated fax-managing and vocal-mail system. As in the case of the vocal mail, also for electronic mail it must be foreseen the possibility to centralize the service for local networks.

Electronic mail must foresee recording functions, document conversion and distribution in text and fax format.

3.6.1.18 Integrated Solutions PABX_Host

PABX must foresee the link with Host – Computer in order to assure the monitoring and control of user telephonic functions and the realisation of added value solutions based on integrated solutions Host – PABX. The service shall be integrated with device and text to speech.

3.6.1.19 Direct GSM Access

Through dual-band fixed GSM mobile phones, it shall be possible the routing of calls addressed to public Telecom network mobile phones generated by fixed telephones, directly on GSM network and without any transit through the Public Operator fixed network.

3.6.1.20 Wireless Use

The implementation of wireless uses with integrated PABX functionalities will be required in the central.

In other words, PABX utilities are still requested with the addition of mobile phones with

multi-function characteristics.

Such system must be available, accordingly with DECT standards foreseen by ETSI, both for mono and multi-cell configurations.

Radio covering will be assured through a number of Basis Stations, enabling the users to call and to be called as well. Each Base Station will offer from 4 up to 12 simultaneous radio channels.

Cells must have a minimum radius of 250 metres (external) and 50 metres (internal).

The apparatus will be realised based on digital pico-cellular cordless telephone, based on DECT European Standard, including GAP-CAP profile foreseen by ETSI standard. Radio transmission between Base Radio Stations and mobile phones will be digital.

The telephone to be provided shall be of small dimensions (pocket size) and of small weight (max. 240 gr). In addition it must be equipped with batteries with this autonomy:

- 3 hours call;
- 16 hours stand-by.

Optic and acoustic alarms will be prompted by the mobile phone accordingly to batteries running down.

It must be possible to deactivate acoustic.

3.6.1.21 Automatic Call Distribution (ACD)

The telephonic centre has to provide the calls automatic distribution service to groups of users with at least the following features:

- Calls distribution to operators made in a linear or cyclical way;
- Attribution of priority levels to the calls;
- Dynamic queueing of the calls;
- Awaiting courtesy/telephony service;
- Group overflowing according to load and time, with the possibility of transfers;
- Night service;
- Remote management of ACD service;
- Two different types of working stations.

3.6.1.22 Main Distribution Frame (MDS)

Each PABX has to be provided with a MDS. It has to be dimensioned for the maximum number of couples foreseen in the system and it has to be equipped with apparatus for the

connection of the telephone lines, both local and network connection.

Essential requirements are:

- maximum miniaturisation of the components;
- high modularity of the components of the stripe and possibility of the same components to be provided with protections against over-voltage, over-currents and thermal overloading;
- rapid connection technique so as to eliminate weldings, screw mounting and cables sheaths removal.

Good view and proper numeration of wiring points must facilitate wiring operations.

Stripe assembling must be realised easily. Stripes supporting urban lines and junctions coming from other centres must be protected according to European rules.

3.6.1.23 Synchronization System

Upon installation of digital PABX, Contractor will have to perform such operations and activities as are necessary to ensure appropriate synchronisation of all systems.

PABX synchronisation - as for the network portion that is the subject of this tender - will be derived directly from either the network clock or the synchronisation equipment, if available locally.

3.6.2 Configuration of the PABX Equipment and PABX Management System to Be Supplied

The PABX to be supplied will have to be equipped with the units reported below.

Cards/Modules may be integrated.

All the cards referred to below will have to be supplied for each system regardless of their being actually activated and/or installed.

3.6.2.1 1000-Port PABX (Subscribers and Trunk)

3.6.2.1.1 Hardware Equipment

Central Unit

1	Basic System, expandable to up to 5,768 ports by addition of stack modules, and up to 12,000 ports by addition of IP-network remote modules. Hot-standby redundant control with duplicated power supply including integrated battery manager. Full CPU system, RAM memory, switch matrix, HW and SW interfaces for operation and maintenance tasks, HardDisk for mass memory, magneto-optic

	disk for backup software and MF receivers for all analog derivatives.

Expansions

3	Peripheral expansion box with duplicated power supply .

Power Stations

2	30 A / 100 Ah power stations

Courtesy Service and On-Hold Messages

3	Card and integrated courtesy module
3	Board for on-hold music

Common Components

1	Desktop PC for system management
1	Printer
1	Printer Cable (10 m)
1	Test panel
1	Permutator tool

Permutation

1	External permutator with 3 100-cp. stripes including protections and 7 100-cp stripes without protection
41	Cable for connecting 16/24-circuit modules with the permutator, max. 20 m in length, headed on PABX side
2	Balanced 120 Ohm cable
4	Balanced 75 Ohm cable
2	Connector for balanced 120 Ohm cable

Derivatives

648 analog derivatives (of which one for the remote diagnosis modem) by means of:

27	Module for connecting 24 analog derivatives (a/b)

120 digital derivatives, by means of:

5	Module for connecting 24 digital derivatives

External Lines

2 EURO ISDN 2 Mb primary accesses towards public network

4 2 Mb junction flows for connection with Railway network:

by means of

3	Module with 2 digital interfaces for EURO ISDN primary access (30B + D)

24 analogue lines

set up by means of:

3	Module for connecting 8 urban lines including 12 Khz counter
6	Emergency devices for 4 lines

24 6-wire junction lines

set up by means of:

6	Module for 4 4+2-wire E&M junctions (universal protocol)

Lines for IP Network Connection

4 junction interfaces for connection with I/P Railway network

set up by means of:

4	Module with 10/100 Base T interface for I/P Network Access (TCP/IP Protocol) with RJ45 connectors and connecting cable

Operator Workstation

3	Normal-eyesight operator workstation on desktop PC in Windows environment (including cabling and connectors)
3	Electronic telephone directory in Windows environment for 1 workstation (including cabling and connectors)
3	Software application for reduced-eyesight operator

Analogue Telephone Equipment

150	Basic analogue telephones with display and viva-voice
350	Standard analogue telephones with last number redial

Digital Telephone Equipment

70	Standard telephone equipment with 8 function keys, associated LEDs and hand-free selection
30	Basic telephone equipment with 12 function keys, associated LEDs, 3 dialogue keys (Confirm, Back, Forward for the interactive guide), hand-free selection, alphanumeric display with 2 24-character lines, one slot for additional adapters and

	possibility to connect up to two additional key modules
10	Advance telephone equipment with 19 function keys, associated LEDs, 3 dialogue keys (Confirm, Back, Forward for the interactive guide), viva-voice full duplex with echo suppression and environmental sound adjustment, alphanumeric display with 2 24-character lines, one slot for additional adapters and possibility to connect up to two additional key modules.

Fax

70	Group 3 fax including telephone with keyboard and photocopying functions, compliant with the following minimum features: 750 Kb memory, 30-page memory, 14,400 bps modem, direct 5-number dialling, shortened 50-number dialling, post-transmission, automatic and manual reception, Rx/Tx polling.

3.6.2.1.2 Software Services and Performance

The PABX will have to be equipped with all SW applications required for its operation as well as with all network applications required for managing devices and numbering plan.

The following services and licences will also have to be available:

a)	Operating system licence
b)	Telephone services licence
c)	Director/Secretary configuration
d)	External lines licence
e)	Network configuration
f)	Software disk

3.6.2.2 2000-Port PABX (Subscribers and Trunk)

3.6.2.2.1 Hardware Equipment

Central Unit

1	Basic System, expandable to up to 5,768 ports by addition of stack modules, and up to 12,000 ports by addition of IP-network remote modules. Hot-standby redundant control with duplicated power supply including integrated battery manager. Full CPU system, RAM memory, switch matrix, HW and SW interfaces for operation and maintenance tasks, HardDisk for mass memory, magneto-optic disk for backup software and MF receivers for all analog derivatives.

Expansions

6	Peripheral expansion box with duplicated power supply .

Power Stations

2	30 A / 100 Ah power stations

Courtesy Service and On-Hold Messages

4	Card and integrated courtesy module
4	Board for on-hold music

Common Components

1	Desktop PC for system management
1	Printer
1	Printer Cable (10 m)
1	Test panel
1	Permutator tool

Permutation

1	External permutator with 4 protected 100-cp. stripes and 14 non-protected 100-cp. stripes
87	Cable for connecting 16/24-circuit modules with the permutator, max. 20 m in length, attested on PABX side
2	Balanced 120 Ohm cable
6	Balanced 75 Ohm cable
2	Connector for balanced 120 Ohm cable

Derivatives

1488 analogue derivatives (of which one for the remote diagnosis modem) by means of:

62	Module for connecting 24 analogue derivatives (a/b)

168 digital derivatives, by means of:

7	Module for connecting 24 digital derivatives

External Lines

2 EURO ISDN 2 Mb primary accesses towards public network

6 2 Mb junction flows for connection with Railway network:

by means of

4	Module with 2 digital interfaces for EURO ISDN primary access (30B + D)

48 analogue lines

set up by means of:

6	Module for connecting 8 urban lines including 12 Khz counter
12	Emergency devices for 4 lines

48 6-wire junction lines

set up by means of:

12	Module for 4 4+2-wire E&M junctions (universal protocol)

Lines for IP Network Connection

4 junction interfaces for connection with I/P Railway network

set up by means of:

4	Module with 10/100 Base T interface for I/P Network Access (TCP/IP Protocol) with RJ45 connectors and connecting cable

Operator Workstation

4	Normal-eyesight operator workstation on desktop PC in Windows environment (including cabling and connectors)
4	Electronic telephone directory in Windows environment for 1 workstation (including cabling and connectors)
4	Software application for reduced-eyesight operator

Analogue Telephone Equipment

500	Basic analogue telephones with display and viva-voice
800	Standard analogue telephones with last number redial

Digital Telephone Equipment

100	Standard telephone equipment with 8 function keys, associated LEDs and hand-free selection
40	Basic telephone equipment with 12 function keys, associated LEDs, 3 dialogue keys (Confirm, Back, Forward for the interactive guide), hand-free selection, alphanumeric display with 2 24-character lines, one slot for additional adapters and

	possibility to connect up to two additional key modules
15	Advance telephone equipment with 19 function keys, associated LEDs, 3 dialogue keys (Confirm, Back, Forward for the interactive guide), viva-voice full duplex with echo suppression and environmental sound adjustment, alphanumeric display with 2 24-character lines, one slot for additional adapters and possibility to connect up to two additional key modules.

Fax

150	Group 3 fax including telephone with keyboard and photocopying functions, compliant with the following minimum features: 750 Kb memory, 30-page memory, 14,400 bps modem, direct 5-number dialling, shortened 50-number dialling, post-transmission, automatic and manual reception, Rx/Tx polling.

3.6.2.2.2 Software Services and Performance

The PABX will have to be equipped with all SW applications required for its operation as well as with all network applications required for managing devices and numbering plan.

The following services and licences will also have to be available:

a)	Operating system licence
b)	Telephone services licence
c)	Director/Secretary configuration
d)	External lines licence
e)	Network configuration
f)	Software disk

3.6.2.3 PABX Management System

The PABX management system will have to supervise operational status of each card and interface making up the equipment as described more precisely under 4.2.5 above.

The information will have to be conveyed to the centralised maintenance point of the relevant line by means of the transmission links related to the junctions between PABX, or else via ad-hoc dedicated links with the relevant PABX based on interfaces.

The management system architecture will be configured as follows:

- A national management and control station (main server of the management system, or network manager consisting of several PCs).
- A PC for peripheral management and control at each PABX (as envisaged in the PABX specifications).

The following minimum functions and activities will have to be available in any case at both centralised and peripheral control station level:

- Individual node configuration;
- Detection and signalling of events on the PABX network, including alarms and errors
- Individual node management and maintenance
- Interface management
- Real-time, continuous mode acquisition and management of alarm information
- Network management configuration
- Monitoring of PABX network performance
- Performance of maintenance tests
- Viewing error and alarm log
- Location of failure-originating equipment/card
- Performance of changes to eliminate failures
- Presentation of information to operators in graphic format.

Contractor will have to ensure integrability of all network monitoring and supervision functions, including the relevant network components, into a higher-hierarchy network according to standard interfacing methods and protocols (Q3, or preferably SNMP), without any dedicated development being necessary and with easily configurable parameters and software enable functions

The hardware and software platform will have to be compliant with the most commonly used market standards for TLC networks management.

3.6.3 Environmental Conditions - Electromagnetic Compatibility

The PABX equipment will have to ensure the expected performance also under environmental conditions that are typical for the premises housing PABX and will not have to require specific maintenance/replacement activities for at least 5 years following installation.

In this regard, the Contractor is required to list all the ordinary maintenance activities to be performed on the equipment to be installed as well as their frequency.

3.6.3.1 Environmental Conditions

All the equipment supplied will have to ensure performance within the range specified for the environmental conditions that usually apply to PABX premises.

Again with regard to environmental conditions (temperature, humidity, vibrations), compliance with European EN 300 019 standard (1.1, 2.2 and 3.2 classes) will have to be

ensured in terms of appropriate operation of the equipment within the specified performance range.

The equipment referred to in these specifications should comply with the standards reported below:

Standard operating conditions: the climatogram is laid down in ETSI ETS 300 019-1-3 class 3.1 standard.

Extraordinary operating conditions: the climatogram is laid down in ETSI ETS 300 019-1-3 class 3.1E standard.

Storage conditions: the climatogram is laid down in ETSI ETS 300 019-1-1 class 1.2 standard.

Transport conditions: the climatogram is laid down in ETSI ETS 300 019-1-1 class 2.3 standard.

Vibrations: equipment subjected to mechanical stress should be compliant with ETSI ETS 300 019-1-1 class 3.1 standard under operating conditions, and with ETSI ETS 300 019-1-2 class 2.3 standard under transport conditions.

3.6.3.2 5.3.2 Electromagnetic Compatibility

As for electromagnetic compatibility (emission and immunity), each equipment will have to be compliant with the specifications made in European ETSI EN 300 386 and CENELEC (EN 50081-1 and EN 50082-1) standards.

3.6.4 Installation of PABX and PABX Management System

The new PABX will have to be installed in the premises made available by the Employer.

As far as the adjustments as may be necessary in accordance with the required environmental conditions, see paragraph 14.

3.6.4.1 1.000-Port PABX (Subscribers and Trunk)

Installation of the equipment described under point 9.2.3 above including all Hardware and Software components required for operation of PABX and network; performance of additional work; activation, tests, configuration and specification of users and services, testing and start of service.

3.6.4.2 2,000-Port PABX (Subscribers and Trunk)

Installation of the equipment described under point 9.2.4 above including all Hardware and Software components required for operation of PABX and network; performance of additional work; activation, tests, configuration and specification of users and services,

testing and start of service.

3.6.4.3 PABX Management System

Installation of the equipment described under point 9.2.6 above including all Hardware and Software components required for operation of both Management System and the relevant control network; performance of additional work; activation, tests, configuration and specification of management PCs and specific applications for network supervision of PABX, testing and start of service.

3.6.4.4 Supplementary Work and Cabling

Equipment installation will also include the following activities:

1. supply of electric cables for connection with the mains network, of the copper cable/cord and terminal for earthing - except for the creation of an earthing system (on condition that both access to mains network and access to the earthing system are available within the premises where the System is located) - plus supply of consumption materials such as grafts, nails, dowels, cement, chalk, bundling wire, adhesive tape, tin, standard raceways for permutator-to-PABX cables, etc;
2. Performance of telephone wire terminations, combs, connection with stripes and/or terminal boards, connection with cable terminations of the internal telephone network, connection with SDH and I/P transmission systems, holes in partition walls;
3. Connection of protection devices (whether installed on the power supply line or on external telephone lines) with the earthing system - on condition that access to said system is available within the premises where the PABX is located.

3.6.4.5 Activation and Tests

Contractor will be responsible for activation and performance of the tests required to ensure appropriate operation of the equipment in accordance with the testing procedure released by the Manufacturer.

3.6.5 Tests

It will be possible to perform such tests as may be necessary to verify compliance of equipment with the aforementioned international standards.

Furthermore, the Employer will be able to perform such tests as he may have developed to verify system operation if one or more redundant parts are put out of order (e.g. power port, etc.).

The Employer will be able to perform such tests as he considers appropriate in order to verify system operation.

A list of the tests and checks to be at least envisaged by the Contractor in his own operation tests is reported below; these tests should be performed at both minimum and maximum supply voltage:

a routing verification

b service monitoring

c system services

d user services

e operator services

f network-expanded user services

g alarm signalling verification and management

h traffic measurement

i network bundles workload measurement;

l PABX workload and service level measurement;

m dialling tone delay measurement;

n power station adequacy assessment.

3.6.6 Technical Documentation

Contractor will have to make available to the Employer, at least 30 days before start of tests, 2 complete, updated copies of the documentation concerning the system to be installed - both hardware and software - including user and maintenance manuals on paper and magnetic media.

Additionally, Contractor will have to equip each system with a copy (on a magnetic medium) of the aforementioned documentation upon installation of the PABX.

The technical documentation made available as above will have to be in English and Russian language; the licence to reproduce a sufficient number of copies for use by the Employer will also have to be granted.

3.6.7 Training

In order to allow full management of facilities by the Employer prior to activation, Contractor is required to organise 1 training course for maximum 10 persons, for a total duration of 20 working days, to be held on location, with a view to training the Employer staff in charge of maintenance and management of the equipment supplied.

During installation and testing, Contractor is required to explain operational arrangements of the equipment supplied as well as use of the main PABX functions and services to the Employer staff in charge of maintenance and use.

The documentation in Russian required for training the Employer staff will have to be made available 30 days prior to start of the relevant courses.

The costs related to organisation and performance of the above courses as well as to supply of the necessary teaching materials and those incurred on account of the operating mode of the equipment(s) will be borne and paid via the equipment supply prices.

3.6.8 Payment

The supply and installation of the PABX shall be paid with the following unit prices, which shall be deemed to include for the full scope as aforesaid, including, but not limited, insurance cost, performance security cost, testing and commissioning cost, overheads and profit.

PABX 1000

Item 25-A5

5.01	Supply of PABX 1000 from outside the Employer's country. Each
5.02	Supply of PABX 1000 from within the Employer's country. Each
5.03	Local Transportation of PABX 1000 Each
5.04	Installation of PABX 1000 Each

PABX 2000

Item 25-A6

6.01	Supply of PABX 2000 from outside the Employer's country. Each
6.02	Supply of PABX 2000 from within the Employer's country. Each
6.03	Local Transportation of PABX 2000 Each
6.04	Installation of PABX 2000 Each

PABX Management System

Item 25-A10

10.01	Supply of PABX Management System from outside the Employer's country. Each
10.02	Supply of PABX Management System from within the Employer's country. Each
10.03	Local Transportation of PABX Management System Each
10.04	Installation of PABX Management System Each

3.7 Item 25-A9
PCM Equipment Monitoring and Management System

3.7.1 In General

Management, monitoring and maintenance systems of PCM transmission equipment to be implemented will have to be compliant with ITU-T M.3010 Recommendation, which sets out the general architecture of a telecommunications network (TMN - Telecommunications Management Network).

The minimum applications to be implemented by the system are as follows:

- Configuration management
- Performance management
- Alarm management
- Security management.

In functional terms, the systems will have to be made up of either two basic modules or a single module (in case of smaller networks). The reference modules are as follows:

- the Element Manager (EM), which monitors the individual network elements (NE) by also managing the information on installation, activation, monitoring and diagnostics of physical resources for each network element and providing it to the higher network component (Network Manager),
- the Network Manager (NM), monitoring connections at the different network levels.

3.7.2 Architecture

The architecture of a monitoring system should be of a modular nature so as to allow expansion and flexibility as related to future developments of the TLC network.

For each system, or for the systems related to the individual countries, the Operator Workstation has been envisaged as located at NM and/or EM level depending on extension of the network to be monitored as well as on maintenance requirements.

Hardware and software architecture of the system as envisaged for each transmission system, has to assure the following:

- positioning of OS (Operating System) and WS (WorkStation)
- arrangements for connecting OS and WS in terms of architecture of the implemented DCN, protocols, routing methods, and physical communication resources;
- forwarding of the individual DCCs (Data Communication Channels) to the OS;
- arrangements for connecting EM and NM in terms of interfaces, protocols, information

models and procedures;

- arrangements for assigning geographical and functional tasks to management centres.

Exchange of information between ADM-1/4 (NE) equipment and the Management Centre should be performed via the Q3 communication interface as integrated into the equipment at OS level and configured with gateway functions (GNE Gateway Network Element).

Management of ADM 1/4 equipment in the relevant section should take place via the Qeec high-speed integrated communication channel (Embedded Communication Channel) included into the STM 1/4 meshwork, whereas data exchange should be activated and managed in accordance with ITU-T G.784 Recommendation.

As for 2 Mbsec PDH transmission equipment, if any, data exchange with OS should be performed via monitoring channels integrated into the 2 Mbsec flow so as to prevent use of traffic channels.

Features of the PDH transmission systems for remote equipment management has, in any case, to take into consideration the following basic functionalities:

- information flow allocation
- flow protocols
- management/concentration of flows from the individual devices
- forwarding of flows to OS
- forwarding of flows to the SDH network, if any.

3.7.2.1 Management System Potential

Each Management System will have to manage at least

- 30 1st-level devices,
- 80 2nd-level devices,
- 2000 earthing points,
- two OS at the Management Centre.

3.7.2.2 Hardware and Software

The hardware and software platform will have to be compliant with the most commonly implemented market standards and support the minimum features reported in the above paragraph.

Each management centre at NM level will have to be equipped with two Operator Workstations, each including a graphic 21" high-resolution colour terminal, keyboard, mouse, graphic colour printer and laser printer. The latter will have to be configured so as to be simultaneously used by two operators.

The key parts/functions of the server will have to be redundant, separate and hosted in the same cabinet; key parts also include power supply components.

The graphic environment will have to be implemented in such a way as to allow operators to immediately view system functions by selecting menus and/or icons, to display TLC network maps, detailed equipment configuration, etc.

Access to management tasks for both 1st-level (ADM 1/4) and 2nd-level (ADM1 or MUX) equipment will be possible via the same terminal by a single integrated application, including access to the same equipment from the two workstations in exclusive mutual mode.

3.7.2.3 Management and Monitoring Tasks

3.7.2.3.1 Element Manager

Each operator workstation at Element Manager level will have to allow performing at least the following tasks:

- configuration management (pursuant to ITU-T M.1400 Recommandation)
- physical links configuration, including creation and elimination of physical links between the ports of two devices
- management of permutations within a device
- management of synchronisation and the relevant priority table, including automatic changes to the active source
- protection management
- equipment software management
- database re-adjustment
- alarm management
- alarm detection
- alarm acquisition
- alarm presentation
- management of alarms coming from earthing points.

3.7.2.3.2 Network Manager

Each operator workstation at Network Manager level will have to allow performing at least the following tasks:

- network configuration management (physical layer, sections, paths, circuits)
- alarm management
- performance management.

Additionally, it should be possible to configure the system according to different hierarchical levels; management tasks and access priority parameters will have to be set for each of said levels.

Access to the individual levels will have to be protected via passwords and user-IDs, to be set by a single category of user (super-user).

The system will have to allow setting functional and geographic domains.

The aforementioned tasks will be the subject of the testing procedure, to be carried out in respect of the management and monitoring systems following their implementation.

The location of the NM and EM for the management and monitoring of the portion of the railways network interested by the package are indicated in the and in the previous chapters.

3.7.3 Payment

The supply and installation of the PCM Management System shall be paid with the following unit prices, which shall be deemed to include for the full scope as aforesaid, including, but not limited, insurance cost, performance security cost, testing and commissioning cost, overheads and profit.

Item 25-A9

9.01	Supply of PCM Management System from outside the Employer's country.	
	Each	
9.02	Supply of PCM Management System from within the Employer's country.	
	Each	
9.03	Local Transportation of PCM Management System	
	Each	
9.04	Installation of PCM Management System	
	Each	

3.8 Item 25-A11
Synchronisation System

3.8.1 Reference standards

The equipment will have to be compliant with the standards reported below.

3.8.1.1 ITU-T RECOMMENDATIONS

Features of the clocks suitable for synchronisation of digital networks:

- ITU-T Draft Rec. G.810 "Definitions and Terminology for Synchronisation Networks";
- ITU-T Draft Rec. G.811 "Timing Characteristics of Primary Reference Clocks", 1997;
- ITU-T Draft Rec. G.812 "Timing Requirements of Slave Clocks Suitable for Use as Node Clocks in Synchronization Networks", 1998.

Features of SDH equipment clocks:

- ITU-T Draft Rec. G.813 "Timing Characteristics of SDH Equipment Slave Clocks (SEC)".

Architecture of synchronisation networks:

- ITU-T Rec. G.803 "Architectures of Transport Networks Based on the Synchronous Digital Hierarchy", Section 8.

Slip rate objectives for international 64-kbsec circuits, also with temporary malfunctioning of synchronisation mechanisms:

- ITU-T Rec. G.822 "Controlled Slip Rate Objectives on an International Digital Connection".

Jitter and wander control at network equipment interfaces:

- ITU-T Rec. G.823 "The Control of Jitter and Wander within Digital Networks which are Based on the 2048 kbit/s Hierarchy".
- ITU-T Rec. G.824 "The Control of Jitter and Wander within Digital Networks which are Based on the 1544 kbit/s Hierarchy".
- ITU-T Rec. G.825 "The Control of Jitter and Wander within Digital Networks which are Based on the Synchronous Digital Hierarchy".

Other features:

- ITU-T Rec. G.703 "Phisical/Electrical characteristic of hierarchical digital interface".
- ITU-T Rec. G.771 "Q-interfaces and associated protocols for transmission equipment in the TMN".

- ITU-T Rec G.773 "Protocol suites for Q-interfaces for management of transmission systems".
- ITU-T Rec. G.784 "Synchronous digital hiuerarchy management".
- ITU-T Rec. G.81S "Timing charactheristics of SDH Equipment slave Clock (SEC)".
- ITU-T Rec. G.821"Error performances of an international digital connection forming part of an integrated services digital network".

3.8.1.2 ETSI STANDARDS

Network synchronisation is addressed in ETSI EN 300 462 standard (1999).

- EN 300 462-1-1 "Transmission and Multiplexing (TM); Generic Requirements for Synchronization Networks; Part 1-1: Definitions and Terminology for Synchronization Networks".
- EN 300 462-2-1 "Transmission and Multiplexing (TM); Generic Requirements for Synchronization Networks; Part 2-1: Synchronization Network Architecture".
- EN 300 462-3-1 "Transmission and Multiplexing (TM); Generic Requirements for Synchronization Networks; Part 3-1: The Control of Jitter and Wander within Synchronization Networks".
- EN 300 462-4-1 "Transmission and Multiplexing (TM); Generic Requirements for Synchronization Networks; Part 4-1: Timing Characteristics of Slave Clocks Suitable for Synchronization Supply to Synchronous Digital Hierarchy (SDH) and Plesiochronous Digital Hierarchy (PDH) Equipment".
- EN 300 462-4-2 "Transmission and Multiplexing (TM); Generic Requirements for Synchronization Networks; Part 4-2: Timing Characteristics of Slave Clocks Suitable for Synchronization Supply to Synchronous Digital Hierarchy (SDH) and Plesiochronous Digital Hierarchy (PDH) Equipment; Implementation Conformance (ICS) Statement".
- EN 300 462-5-1 "Transmission and Multiplexing (TM); Generic Requirements for Synchronization Networks; Part 5-1: Timing Characteristics of Slave Clocks Suitable for Operation in Synchronous Digital Hierarchy (SDH) Equipment".
- EN 300 462-6-1 "Transmission and Multiplexing (TM); Generic Requirements for Synchronization Networks; Part 6-1: Timing Characteristics of Primary Reference Clocks".
- EN 300 462-6-2 "Transmission and Multiplexing (TM); Generic Requirements for Synchronization Networks; Part 6-2: Timing Characteristics of Primary Reference Clocks; Implementation Conformance (ICS) Statement".

Parts 1 to 6 as listed correspond to ITU-T G.810, G.803 Section 8, G.823/825, G.812, G.813 and G.811 Recommendations, respectively.

Other features:

- ETS 300 019-1 "Environmental conditions and environmental tests for telecom.

Equipment: classification of environmental conditions".

- ETS 300 019-2 "Environmental conditions and environmental tests for telecom. Equipment:specification of environmental tests".
- ETS 300 119-3 "Enginnering requirements for miscelaneous racks and cabinets".
- ETS 300 132-2 "power supply interface at the input to telecommunication equipment: part2: operated by direct current".
- ETS 300 462-1: "Definition of synchronization terminology".
- ETS 300 462-2:"Synchronization network architecture".
- ETS 300 462-3:"The control of jitter and wander within synchronization networks".
- ETS 300 462-4:"Timing characteristics of slave clocks suitable for operation in SDH equipment".

3.8.1.3 Basic Specifications

The following specifications apply to all kinds of equipment:

1. Being equipped with internal high-quality quartz oscillator;
2. Diagnostics capabilities with regard to GPS (or similar) signals to detect bad reception and/or signal loss conditions;
3. Capability to manage at least 3 external synchronisation inputs (GPS signal plus at least 2 2.048 KHz or 2.048 Mb/s signals);
4. Holdover function in case of absence of external synchronisation signals;
5. Possibility to select input timing signal manually, automatically (in accordance with configuration priorities) or via the monitoring system ;
6. 1x10^-12 frequency accuracy (long-term slip rate compared with sample frequency) of the signal supplied by the internal oscillator in the presence of the input GPS signal;
7. 1x10^-10/day internal oscillator stability during holdover;
8. Availability of at least 8 outputs for distributing the synchronisation signal to the relevant node equipment;
9. Possibility of redundant configuration;
10. Alarm and status information displayed on the equipment front panel;
11. Performance diagnostics, configurability and management via local and remote workstation as purposely interfaced with the synchronisation equipment;
12. All kinds of equipment will have to be compliant with the following international standards: ITU-T G.811 Recommendation (1997) (with regard to PRC), ITU-T G.812 (1998) (with regard to SASE), ETSI EN 300 462 (1999);
13. For all nodes on the synchronisation network, regardless of their hierarchical levels, quartz clocks will have to be used - as their quality features are currently comparable

with those of rubidium secondary atomic standards;

14. Monitoring will have to be possible for all input synchronisation signals of each node, including measurement of MTIE and TDEV standard values;
15. No less than 64 redundant outputs will have to be available on clocks;
16. Maintenance-free operationality of clocks will not have to be shorter than 15 years; the relevant internal oscillators will have to require no calibration for at least 20 years;
17. At least the following key parts will have to be redundant: I/O interfaces, oscillators, controller;
18. The management system will have to be equipped with Q3 and/or SMNP interface for alarm export;
19. Equipment will have to be hosted on ETSI ETS 119-3 racks with the following dimensions: 600 x 2600 x 300 mm.

3.8.2 Configuration

The PRC should be equipped with the units reported in Table 1

Clock Type	PRC
Reference Standards	ITU-T G.811 Recomm. / ETSI EN 300 462-6-1
Frequency Source	Cesium primary frequency standard with OCXO quartz oscillator
External References	2 GPS Receivers Predisposition for 1 2048 Kbit/s flow or 2048 KHz signal from National Reference System (ITU-T - G.703 Recommendation)

The SASE should be equipped with the units listed in Table 2

Clock Type	SASE
Reference Standards	ITU-T G.812 (type I) / ETSI EN 300 462-4-1
Frequency Source	OCXO quartz secondary frequency standard
External References	1 GPS receiver 2 2048 KHz signals (ITU-T - G.703 Recommendation) from SDH terminals synchronisation output

3.8.3 Operating Conditions and Electromagnetic Compatibility

The Cesium Primary Reference Clock (PRC) will have to ensure the expected performance also under environmental conditions that are typical for the premises housing PABX and will not have to require specific maintenance/replacement activities for at least 8 years following

installation. In this regard, the Contractor is required to list all the ordinary maintenance activities to be performed on the equipment to be installed as well as their frequency.

All the equipment supplied will have to ensure performance within the range specified for the environmental conditions that usually apply to PABX premises.

Again with regard to environmental conditions (temperature, humidity, vibrations), compliance with European EN 300 019 standard (1.1, 2.2 and 3.2 classes) will have to be ensured in terms of appropriate operation of the equipment within the specified performance range.

As for electromagnetic compatibility (emission and immunity), each equipment will have to be compliant with the specifications made in European ETSI EN 300 386 and CENELEC (EN 50081-1 and EN 50082-1) standards.

3.8.4 Power Supply

Network equipment will have to be powered at a voltage of 48-60 V DC. Power supply will be available either at the technological premises or at the PABX where PCM system equipment is to be deployed.

The equipment will have to be powered by two different power units, of which at least one should be protected (e.g. by means of UPS).

3.8.5 Diagnostics and Supervision System

The system will have to be capable to manage a six-level synchronisation network with master-slave architecture based on SASE-type clocks.

Management system architecture will be organised as follows:

- A national management and control station (main server of the management system or network manager)
- Peripheral management and control stations located at the most strategically important nodes.

Peripheral management stations will have to allow managing the synchronisation network sub-systems as required.

The following tasks will have to be discharged by both national and peripheral control stations:

- Synchronisation network events detection and reporting
- Management of SASE clocks interface
- Real-time, continuous-mode acquisition and management of the alarm information concerning SASE, including integrated management of clock-related alarms

- Management of network configuration and clock performance
- Synchronisation network performance monitoring with regard to all input synchronisation signals including measurement of at least MTIE (*Maximun Time Interval Error*) and TDEV (*Time Deviation*)
- Management of alarms on input flows as used for transport of SASE-related synchronisation signals
- Location of failure-originating equipment
- Information presentation to operators in graphic format
- Integrability of all synchronisation network monitoring and supervision functions, including the relevant network components, into a higher-hierarchy network according to standard interfacing methods and protocols (Q3, or preferably SNMP), without any dedicated development being necessary and with easily configurable parameters and software enable functions
- The hardware and software platform will have to be compliant with the most commonly used market standards for TLC networks management.

3.8.6 Testing

The Employer will be enabled to perform such tests as may be necessary to verify compliance of equipment with the aforementioned international standards.

Furthermore, the Employer will be able to perform such tests as he may have developed to verify system operation if one or more redundant parts are put out of order (e.g. power port, etc.).

The Employer will be able to perform such tests as he considers appropriate in order to verify system operation.

A list of the tests and checks to be at least envisaged by the Contractor in his own operation tests is reported below; these tests should be performed at both minimum and maximum supply voltage:

a clock quality assessment

b clock priorities management

c configuration change following local or remote re-configuration

d alarm signalling and management.

3.8.7 Technical Documentation

Contractor will have to make available to the Employer, at least 30 days before start of tests, 2 complete, updated copies of the documentation concerning the system to be installed - both hardware and software - including user and maintenance manuals on paper and magnetic media.

Additionally, Contractor will have to equip each system with a copy (on a magnetic medium) of the aforementioned documentation upon installation.

The technical documentation made available as above will have to be in English and Russian language; the licence to reproduce a sufficient number of copies for use by the Employer will also have to be granted.

3.8.8 Training

In order to allow full management of facilities by the Employer prior to activation, Contractor is required to organise 1 training course for maximum 10 persons, for a total duration of 20 working days, to be held on location, with a view to training the Employer staff in charge of maintenance and management of the equipment supplied.

During installation and testing, Contractor is required to explain operational arrangements of the equipment supplied as well as use of the main PABX functions and services to the Employer staff in charge of maintenance and use.

The documentation in Russian required for training the Employer staff will have to be made available 30 days prior to start of the relevant courses.

The costs related to organisation and performance of the above courses as well as to supply of the necessary teaching materials and those incurred on account of the operating mode of the equipment(s) will be borne and paid via the equipment supply prices.

3.8.9 Installation

3.8.9.1 General Structural Specifications

Racks: the devices should be hosted on ETSI ETS 119-3 racks with the following dimensions: 600x2600x300 mm.

Sub-racks: the node synchronisation equipment should be hosted on a single sub-rack partitioned into two areas - one for hosting the units, the other one for cable termination. This sub-rack should fit into the N3 racks described above and should not be higher than 475 mm.

Thermal Dissipation: peak thermal dissipation of fully equipped racks should not be in excess of 400 W under standard operating conditions.

Power Supply: Power units should be compliant with ETSI ETS 300 132-2 standard.

3.8.9.2 Environmental Conditions

The equipment referred to in these specifications should comply with the standards reported below, the relevant definitions being laid down in ETSI ETS 300 019-1-0 standard.

Standard operating conditions: the climatogram is laid down in ETSI ETS 300 019-1-3 class 3.1 standard.

Extraordinary operating conditions: the climatogram is laid down in ETSI ETS 300 019-1-3 class 3.1E standard.

Storage conditions: the climatogram is laid down in ETSI ETS 300 019-1-1 class 1.2 standard.

Transport conditions: the climatogram is laid down in ETSI ETS 300 019-1-1 class 2.3 standard.

Vibrations: equipment subjected to mechanical stress should be compliant with ETSI ETS 300 019-1-1 class 3.1 standard under operating conditions, and with ETSI ETS 300 019-1-2 class 2.3 standard under transport conditions.

3.8.10 Payment

The supply and installation of the Synchronisation System shall be paid with the following unit prices, which shall be deemed to include for the full scope as aforesaid, including, but not limited, insurance cost, performance security cost, testing and commissioning cost, overheads and profit.

Item 25-A11

11.01	Supply of Synchronisation System from outside the Employer's country.	
	Each	
11.02	Supply of Synchronisation System from within the Employer's country.	
	Each	
11.03	Local Transportation of Synchronisation System	
	Each	
11.04	Installation of Synchronisation System	
	Each	

3.9 Item 25-A12, 25-A13, 25-A14
Optical fibre cable, additonals, laying of the cable

3.9.1 Main references

[1] ITU-T G.650 Definition and test methods for the relevant parameters of single-mode fibres

[2] ITU-T G.652 Characteristics of a single-mode optical fibre cable

[3] IEC 60793-1 Optical fibres – Part 1: Generic specification - General

[4] IEC 60793-1-xOptical fibres – Part 1-x: Measurement methods and test procedures

[5] IEC 60793-2 Optical fibres – Part 2: Product specifications

[6] IEC 60793-2-50 Optical fibres – Part 2-50: Product specifications – Sectional specification for class B single-mode fibres

[7] IEC 60794-1-1Optical fibre cables - Part 1-1: Generic specification – General

[8] IEC 60794-1-2Optical fibre cables - Part 1-2: Generic specification - Basic optical cable test procedures

[9] IEC 60794-3 Optical fibre cables - Part 3: Sectional specification - Outdoor cables

[10] IEC 60794-3-10 Optical fibre cables - Part 3-10: Outdoor cables - Family specification for duct and directly buried optical telecommunication cables

[11] IEC 60794-3-20 Optical fibre cables - Part 3-20: Outdoor cables - Family specification for optical self-supporting aerial telecommunication cables

3.9.2 Cable typology

3.9.2.1 Cable structure general description

The main structure of the proposed optical fibres cable is compose by two main parts: the optical core and the external protection. Both the parts consist of several further components.

The optical core of the cable has to consist of dielectric material with fibre confined in plugged loose tubes, stranded with SZ technique round a central support consisting in fibreglass. The tubes containing the optical fibres as a whole must be plugged in order to exclude the introduction and the propagation of the water in the optical core. The number of the tubes and the number of fibres in each tube depend on the cable potentiality.

A multi-layer protection around the optical core has to be considered. The protection is for supporting different cable stresses during the getting under way and during the operation. The structure/composition of the protection is different for each cable typology and depends on the use of the cable itself.

The following paragraphs are detailing the parts of the cable for every typology of cable.

The acronym LSZH (Low Smoke Zero Halogen) makes reference to anti-fire propagation cable, with low emission of opaque smokes and corrosive and toxic gasses.

3.9.2.2 Optical fiber cable with metallic armour

This paragraph describes the prescriptions for optical cable with metallic sheath for rail use both for open line and tunnel, for service tunnel, for piping or rope coupled.

The following table resumes the characteristics of different cable typology.

Cable with metallic armour									
Construction features									
Specific features		-				LSZH			
N° of fibres in the cable		8	16	24	32	8	16	24	32
Central strength member		Dielectric (fiberglass)							
Nominal diameter	mm	3							
Fibres secondary coating		Tubes in PBTF or equivalent material, plugged with synthetic fat							
N° tubes / tubes wth fill-in and without fibres		8/0	8/0	8/2	8/0	8/0	8/0	8/2	8/0
N° fibres in each tube		1	2	4	4	1	2	4	4
Tubes stranding		Around the central strength member using SZ technique							
Outer plugging		By synthetic fat hydrogen absorber							
Wrapping		By synthetic bands							
Internal sheath		Black polyethylene | Black polyethylene							
Average and nominal thickness	mm	≥ 0,9							
Minimum thickness	mm	≥ 0,8							
Dielectric armour		Double layer of aramide yanrs							
Total minimum count	dTex	> 140.000							
Wrapping		One or more synthetic bands							
Mechanical protection		Sheath in welded corrugated steel							
Nominal thickness	mm	0,4							
Outer nominal diameter	mm	14							
Inner nominal diameter	mm	10,7							
Anti-corrosion protection		Bitumen mixture | note (1)							
Outer sheath		Black polyethylene | note (2)							
Average and nominal thickness	mm	2,9							
Minimum thickness	mm	2,5							
note (1) synthetic, anti-fire propagation, low emission of opaque smokes, low emission of corrosive and toxic gasses; note (2) thermoplastic compound; type M and green coloured, anti-fire propagation, low emission of opaque smokes, low emission of corrosive and toxic gasses.									
Dimensions and mechanical characteristics									
Outer diameter:	mm	21,5±2							
Nominal weight (approx.)	kg/km	450 | 550							
Nominal size length	Km	2.100							
Total weight (approx.) (reel + nominal size cable):	Kg	1.320 | 1.520							
Maximum traction stress (extensions : cable ≤ 0.3 % and fo ≤ 0.1 %)	N	3.000							
Minimum curvature radius									
-dynamic (under stress)	mm	420							
-static (permanent)	mm	350							
Crush Resistance		up to 1.000 daN/10cm without residual increase of attenuation; up to 2.500 daN/10cm without fibres break (attenuation ≤ 10 dB)							
Impact strength		up to 15 N*m without residual increase of attenuation; fino a 30 N*m without fibres break (attenuation ≤ 10 dB)							

Temperature variation:		
-operation	° C	-25/+65 (variation of the attenuation ≤ 0,05 dB/km)
-laying	° C	-10/+50
-transport & storage	° C	-40/+70

3.9.2.3 Fire-proof optical fibre cable

This paragraph describes the prescriptions for fire-proof optical cable use in tunnel and emergency systems.

As far as the fire-proof optical fibres cables are concerned the characteristics are listed in the following table. The mentioned table gives requirements for mechanical and fire resistance together with the main standard of characteristics for the construction; nevertheless other schemes are allowed providing that they will be satisfying the mentioned requirements.

In details the following it is not binding:

- the tubes material
- the wrapping of the tubes and the related material
- the fill-in and the related material
- the size and the presence of the wrapping of the central support.

Fire-proof cables with metallic armour			
Construction features			
Specific features	Fireproof		
N° of fibres in the cable	8	16	24
Central strength member Nominal diameter VTR/coating mm	Dieletric (fiberglass) with anti-fire protecion (note 1)		
Fibres secondary coating	Tubes (note 2)		
N° tubes / tubes wth fill-in and without fibres	8/0	8/0	8/2
N° fibres in each tube	1	2	4
Tubes stranding	Around the central strength member using SZ technique		
Outer plugging	By synthetic fat hydrogen absorber		
Fire-proof dielettric wrapping	Mica-glass bands or other fire-proof material		
Inner sheath Average and nominal thickness mm Minimum thickness mm	Black polyethylene ≥ 0,9 ≥ 0,8		
Dielectric armour Total minimum count dTex	Double layer of aramide yanrs > 140.000		
Wrapping	By one or more synthetic bands		
Mechanical protection Nominal thickness mm Outer nominal diameter mm Inner nominal diameter mm	Sheath in welded corrugated steel 0,4 14 10,7		
Anti-corrosion protection	Synthetic (note 3)		
Outer sheath Average and nominal thickness mm Minimum thickness mm	Thermoplastic compound; type M and green coloured (3) 2,9 2,5		
note (1): diameter, thickness and material of the central strength member have to satisfy the requested tests; note (2): Material and thickness of the tubes coating have to satisfy the requested tests; note (3): anti-fire propagation; low emission of opaque smokes, low emission of corrosive and toxic gasses.			

Dimensions and mechanical characteristics		
Outer diameter:	mm	22±2
Nominal weight (approx.)	kg/km	550
Nominal size length	Km	2.100
Total weight (approx.) (reel + nominal size cable):	Kg	1.520
Maximum traction stress (extentions: cabel ≤ 0.3 % and fo ≤ 0.1 %)	N	3.000
Minimum curvature radius -dynamic (under stress) -static (permanent)	 mm mm	 450 350
Crush Resistance		up to 1.000 daN/10cm without residual increase of attenuation up to 2.500 daN/10cm without fibres break (attenuation ≤ 10 dB)
Impact strength		up to 15 N*m without residual increase of attenuation up to a 30 N*m without fibres break (attenuation ≤ 10 dB)
Resistance to fire	 min	CEI EN 50200 ≥ 180' attenuation increase ≤ 1 dB CEI 20-36/5 ≥ 180'+ 15' attenuation increase ≤ 1 dB
Temperature variation: -operation -laying -transport/storing	 ° C ° C ° C	 -25/+65 (variation of the attenuation ≤ 0,05 dB/km) -10/+50 -40/+70

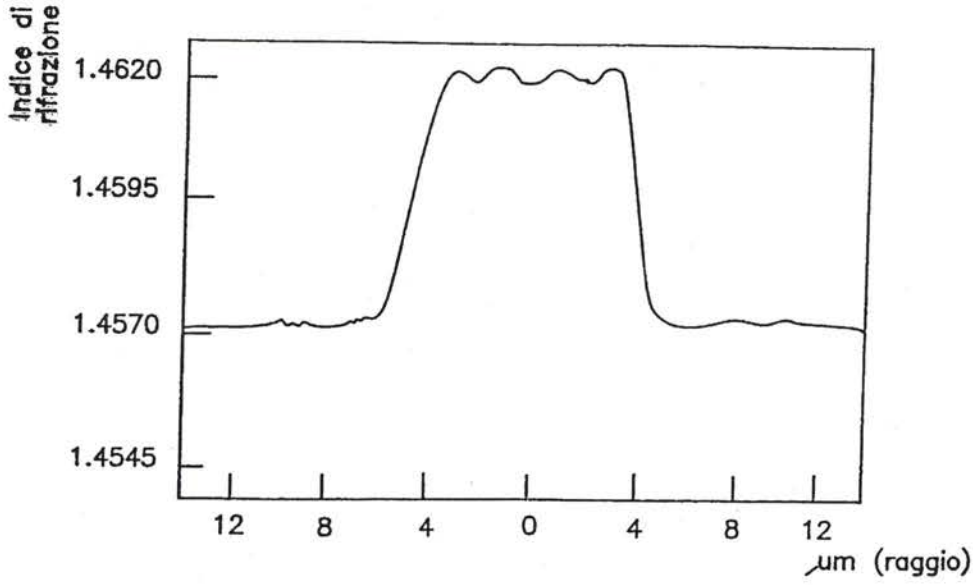
3.9.3 Technical characteristics of the optical fibres

3.9.3.1 Generality

The optical fibres have to be monomodal SMR (Single Mode Reduced) in conformity to ITU-T G.652 (1), IEC 60793-1, IEC 60793-2 and to the additional following requirements.

The material consisting the coating and the optical fibres core must be in respectively, silica and doped silica. The profile for the refraction index has to be a stepped profile as qualitatively in figure below.

(1) Reference in Table 1/G.652.



The uniformity of the characteristics of all the fibres glass must be ensured, with specific emphasis to the softening temperature which has to be constant in order to guarantee the quality of junctions adopting a fusion technique.

Junctions within the same optical cable size are not allowed.

3.9.3.2 Primary protection

The primary protection consists on a double layer of reticular (UV) acrylic resin.

Outer diameter:

- uncoloured fibre 245 ± 10 µm

- coloured fibre 250 ± 15 µm

Error for the concentricity of the primary protection: ≤ 12.5 µm

3.9.3.3 Thermic cycles

The variation of the attenuation for the thermic cycles from –25°C to +65°C, measured at 1310 nm, must be less then 0,05 db/Km.

3.9.3.4 Minimum curvature radius

The minimum curvature radius allowed by the fibre cable with the only primary protection is 40 mm.

3.9.3.5 Geometric characteristics

1. Modal field diameter	at 1310 nm	(ref. G.652-5.1)	9.2 ± 0.4 μm
2. Coating diameter		(ref. G.652-5.2)	125± 1.0 μm
3. Error of concentricity of the core		(ref. G.652-5.3)	≤0.8 μm
4. Error in the circularity of the coating		(ref. G.652-5.4)	≤ 2.0%

3.9.3.6 Fibre characteristics for transmission

3.9.3.6.1 Wavelength for cut (ref. G.652-5.5)

- Wavelength for cut : λcc ≤ 1.260 nm
- Wavelength for cut : λc 1.150÷1.330

3.9.3.6.2 Loss of curvature (ref.5.6)

- Loss of curvature at 1550 nm: ≤ 0.5 dB.

(100 fibre turns using a radius of 37.5 mm)

3.9.3.6.3 Chromatic dispersion (ref. G.652-5.10)

Chromatic dispersion:

- In the field 1285÷1330 nm
  - - average value ≤ 3.1 ps/nm•km
  - - maximum value ≤ 3.5ps/nm•km
- at 1550 nm: - maximum value ≤ 18 ps/nm•km
- Wavelength with none dispersion: 1312 ± 12 nm
- Slope at wavelength with none dispersion: ≤ 0.093 ps/nm2•km
- Polarization dispersion:
  - fibre alone ≤ 0.2 ps/$\sqrt{km}$
  - -wired fibre ≤ 0.5 ps/$\sqrt{km}$

3.9.3.6.4 Attenuation factor (ref. G.652-6.1)

	Average value (dB/km)	Maximum value (dB/km)
1310 nm	≤ 0.37 (nota a)	≤ 0.40
1550 nm	-	≤ 0.25
1285÷1330 nm	≤ 0.40 (nota b)	≤ 0.43
1525÷1575 nm	-	≤ 0.27
Peak at 1380 nm	-	≤ 1.5

a) for fibres in the same position in the same stock;

b) average attenuation for each fibre evaluated within the mentioned band

The attenuation must be uniformly distributed along the fibre. Diffusion points are not allowed. Possible attenuation points must not be higher than 0.05 dB.

3.9.4 Supply of Fiber-Optic Cables

The Fibre-Optic Cable to be supplied is described below.

3.9.4.1 Features of the FO Cable

Fibre-Optic, 32-fibre, metallic armour cable of monomodal SMR (Single Mode Reduced) type compliant with the above Main References.

Building, dimensional, mechanical and technical features are described above under "Cable Typology".

The FO cable will come in different sizes with the following nominal lengths - subject to different provisions made by the Employer -, i.e. 2,100 m or 4,000 m, with 2% tolerance on said length.

Each cable size will be wound on a reel bearing a specific plate.

The reel plate will have to include the following information:

- Contractor's name
- Cable type and total fibre number
- Cable acronym according to the relevant standards
- Length
- Specific reference Technique.

3.9.4.2 Tests and Measurements

Contractor will have to carry out cable manufacturing activities in accordance with ISO quality assurance standards and attach the relevant records to prove performance of tests and measurements in compliance with the specifications as well as with the Main References described above. Said records will have additionally to refer to the Typology Tests, Routine Tests and Acceptance Tests performed.

3.9.5 Cable Laying

The cable will be buried at a depth of 100 cm in a HDPE duct.

Cable positioning alongside the railway line will be determined on the basis of ground features and the presence of a power line; positioning will anyhow be such as to prevent the cables from being affected by subsequent electrification activities. Minimum excavation width will have to be 30 cm.

When passing the stations or some special areas, especially where the installation of buried cable is difficult (like as bridges, road crossing, difficult section areas, etc.), the cable will be also put in HDPE cable ducts of 100 mm diameter.

Two possible laying techniques are suitable for the HDPE duct. The solution to be adopted is dependant from the alignment characteristics and from the presence of the electrification.

- Laying of the HDPE duct from a machine running on the rail track along the verge of the railway track, inside the catenary poles;
- Laying of the HDPE duct using the laying equipment like trenching machine, drum puller and back filling machine on the verge of the railway track outside of the catenary poles.

Having dug a trench about 30 cm wide, its bottom will be covered by a 10-cm layer of sand, then the HDPE duct will be laid. After laying the cables in the respective HDPE ducts, the latter will be covered by a 15-cm layer of sand and the rest of the trench will be covered with the dug soil.

During laying and junctioning of the fibre optic cable as well as during laying, junctioning and splitting/sectioning of the copper cable, operating arrangements will be such as to ensure tight-seal closure of ducts by means of suitable anti-rodent foams.

3.9.6 Installing the Fiber Optic Cable

3.9.6.1 In General

Positioning fibre optic cables plays a key role in order to ensure utmost availability of facilities as well as of the relevant telecommunications network, which has been designed to include redundant components. Therefore, special care will have to be taken in diversifying the positioning of cables coming from different lines that all converge to the same

termination premises, by laying them along different routes.

The fibre optic cabling inside the TLC premises (fibre termination premises) should be as short as possible and include the smallest possible number of bends; such bends should not have a curvature radius below the threshold referred to in the above standards.

3.9.6.2 Laying of the Cable

A 32-fibre cable with the manufacturing and transmission features described under the above Technical Specifications will be laid on the relevant line.

The fibre optic cable serving the different transmission systems - as already described in the technical recommendations for the Feasibility Study (railway requirements and availability of dark fibres for TLC operators) - will be sectioned as follows:

- fully sectioned cable at the level of PABX;
- fully sectioned cable at ADM1 level (only with regard to lines to be equipped with ADM1 + PDH);
- partly sectioned cable (12 fibres) for all other nodes.

As for laying arrangements, laying of the cable and the relevant protections - including use of a specific HDPE duct - were described in the preceding paragraphs.

Laying also includes:

- supply and installation of the HDPE duct holding the cable,
- performance of excavations with the required depth and width both in the station yard and along the line;
- supply and laying of sand to protect the ducts;
- cabling inside buildings;
- restoration of flooring inside buildings and/or on platforms.

3.9.6.3 Junctioning and Termination – Supplementary Materials

Junctioning, termination and sectioning - whether partial or total - will have to be performed in compliance with the general standards as well as with the particular requirements laid down in these Technical Specifications..

The cable metallic sheath will have to be broken and connected with a water-tight outlet at the level of each size junction.

Installation also includes supply and deployment:

- of all the materials required for termination, sectioning and junctioning of the aforementioned 32-fibre cable;

- of cabinets to N3 ETS (ETS 300 119) standard, holding the sectioning/termination sub-racks of the fibre optic cable, as envisaged for telephone premises;
- of sub-racks holding sectionings/terminations;
- of the connectors used for monomodal optical fibres, of SC-PC type;
- of such materials as may be necessary for the earthing of all the equipment to be installed.

All external equipment will have to ensure at least IP 659 water resistance protection.

All cabinets will have to be equipped with ad-hoc locks and keys..

3.9.6.4 Tests and Measurements

3.9.6.4.1 Test Length

The transmission features specified below will have to be checked on regeneration sections. If intermediate sectionings are present, sectioned fibres will have to be connected by means of connecting straps.

3.9.6.4.2 Measurements

Contractor will be responsible for assessing the features of the installed cable as well as full operation of the latter by carrying out a set of measurements. Below a list is reported of the measurements to be at least envisaged:

- Total section attenuation (to be measured at 1310 nm with the insertion technique);
- Fibre optical length (to be measured with the back-diffusion technique by setting a refraction index of 1.4675 on the measurement tool and selecting 1,550 nm as the corresponding wavelength for SMR fibres);
- Measurements on fibres: junction loss, back-diffused power diagram, total section attenuation, junction optical length and total section optical length;
- Electric measurements and pneumatic tests: air tightness of junction box, metallic sheath insulation resistance.

Upon completion of the installation activities, the results of the measurements carried out with regard to the FO cable together with the relevant back-diffusion diagrams will have to be made available. Such results and the identification data of the facility will be presented not only on paper, but also on magnetic/optical media and analysed by means of software to be provided by the Contractor.

3.9.7 Payment

The supply and installation of the Optical Fibre Cable (32 fibres) shall be paid with the following unit prices, which shall be deemed to include for the full scope as aforesaid, including, but not limited, insurance cost, performance security cost, testing and

commissioning cost, overheads and profit.

Item 12-A12

12.01 Supply of Optical Fibre Cable (32 fibres) from outside the Employer's country.

Km.

12.01 Supply of Optical Fibre Cable (32 fibres) from within the Employer's country.

Km.

12.03 Local Transportation of Optical Fibre Cable (32 fibres)

Km.

12.04 Installation of Optical Fibre Cable (32 fibres)

Km.

3.10 Item 25-A15, 25-A16, 25-A17 Copper cable, additonals, laying of the cable

3.10.1 Copper cable typology

The main cable for telecommunications has to be with 4 shielded pairs, aluminium sheathed, external protection consisting in polyethylene and the following characteristics:

1. with 12 pairs armoured longitudinally by steel band (4 pairs, singularly shielded, in copper 9/10 isolated by foamed polyethylene; 4 quads in copper 9/10 paper insulated);
2. with 22 pairs armoured longitudinally by steel band (4 pairs, singularly shielded, in copper 9/10 isolated by foamed polyethylene; 1 security quad in copper 9/10 isolated by thermoplastic; 8 ring quads in copper 9/10 paper insulated);
3. with 34 pairs armoured longitudinally by steel band (4 pairs, singularly shielded, in copper 9/10 isolated by foamed polyethylene; 2 security pairs in copper 9/10 isolated by thermoplastic; 14 ring quads in copper 9/10 paper insulated).

3.10.2 General features

The above mentioned cables are for the installation along the railway line. They consist in layers of 0,9 mm symmetric pairs (quads), paper insulated and of:

- a core including, more than the shielded pairs, also (only for 22 and 34 pairs cables) pairs for safety and signalling circuits, and eventually also 0.9 mm thread quads paper insulated;
- one or more layers of the other 0.9 mm thread quads paper insulated;
- a paper wrapping among the different layers;
- stranding and and paper wrapping, by 1 mm minimum paper band around the whole consisting of pairs and quarts;
- an aluminium sheath for the whole cable;
- an inner polyethylene sheath;
- a protection sheath anti-rodents consisting of a steel band armour;
- a final external protection in polyethylene.

3.10.3 Conductors

All conductors must be of 0.9 mm cylindrical copper wire; the thread must characterised by smooth surface and complete lack of defects.

The wires junctions must be must be performed by autogenous welding, or electrical welding, or silver alloy welding.

3.10.4 Paper insulation

Every wire has to be helical wrapped by cellulose or other similar material with the same diameter. It has to be considered a continuous paper band on the wrapping. This last continuous band paper has to form a sealed tube.

The paper has to be >0.06 mm and uniform.

3.10.5 Polyethylene Insulation (PE)

A concentric layer of close polyethylene will be covering every single copper thread. The polyethylene must be > 0.4 mm, uniform and with smooth surface.

3.10.6 Pairs and quad formation

By the colour of the insulation or by the sealing elements, the following elements has to distinguishable:

- the pairs forming each quad;
- the pairs among themselves;
- the two wires forming each pair.

The pairs must be formed joining two wires of same diameter and insulation and forming an constant pitch helix.

The quads must be formed by four wires of the same diameter and insulation. The wires must be joined forming an helix with a single step, in such a way they will be arranging themselves in the four corner of a star quad.

After wrapping the strended wires with one of more synthetic bands, the shilded has to be by one of more aluminium band of nominal thickness of 0,1 mm, with continuity wire in tinned copper of 0,4 mm of diameter and wrapped externally with at least two helical bands of paper or other similar synthetic material.

3.10.7 Aluminum sheath

After a desiccation in the vacuum procedure (max 120° C), an aluminium sheath has to be applied on the stranding and wrapping.

The aluminium tube has to be of uniform diameter thickness along the cable and also exempt of discontinuities and surface defects.

The sheath can be by extrusion or by longitudinal welding of an aluminium rolled section specially modelled.

The sheath thickness must be >1.20 mm.

3.10.8 External protection of the aluminium sheath

A barrier anti-corrosion has to be applied on the aluminium sheath. The materials to be used for spreading the sheath should be bitumen based and must be thick and adhesive in order to form a protection for electrolytic corrosion and aggressive ground aggression.

An external sheath in black polyethylene (PE) (thickness >3 mm) has to cover the aluminium sheath and the anti-corrosion.

3.10.9 Armouring anti-rodents

A wrapping by at least 0.2 mm synthetic bands with overlap has to be superimposed on the internal polyethylene sheath.

On the above two additional bands will be applied. The two bands have to be in cold rolled previously galvanised steel tape. The two bands must be wrapped closely in the same direction in such a way that the second will be covering the interstice between turns of the first one with an overlap at least of one third of its width. The nominal thickness of the bands has to be of 0,5mm.

3.10.10External protection in Polyethylene

A protection has to be applied on the metallic protection above mentioned. The wrapping has to be realised with synthetic bands, wrapped in close turns with overlapping and has to have the minimum thickness of 0.2 mm.

A final black polyethylene sheath (PE) (thickness >4 mm) has to be covering all the other sheaths.

3.10.11Cable testing

The construction procedure has to be in compliance with European Standards for Quality Insurance. The Contractor has to verify and measure the mechanical and electrical characteristics of the product.

It has to guarantee at least the following parameters:

- 0.9 mm copper wires resistance <28,4 Ω/Km;
- wires insulation resistance >10.000 MΩ per Km;
- external protection insulation resistance >300 MΩ per Km;
- mutual capacitance at 800 Hz: max nF/km 38;
- external protection sheath dielectric rigidity and water penetration test in a cable shall be carried out in accordance with IEC 60794-1-2.

3.10.12Color code

The color code is not specified but shall be indicated in the relevant detail specification. The colors shall be readily identifiable and should correspond with the standard colors shown in IEC 60304.

3.10.13Packing

The Contractor has to adopt adequate procedures for the product transport, packing and delivering.

Every size has to be rolled up a spool and cable ends must be accessible for the electric tests as well as protected in order to avoid damages during the transport.

A label with the characteristics of the cable (cable typology, capacity, size length, Contractor name, etc.) must be put on the spool.

3.10.14Supply of the Copper Cable

The copper cable to be supplied is described below.

3.10.14.1 Features of the Copper Cable

The main cable for telecommunications has to be with 4 shielded pairs, aluminium sheathed, external protection consisting in polyethylene and the following characteristics:

- with 12 pairs armoured longitudinally by steel band (4 pairs, singularly shielded, in copper 9/10 isolated by foamed polyethylene; 4 quads in copper 9/10 paper insulated).

The copper cable will come in sizes with the following nominal lengths except as provided otherwise by the Employer: 500 m, with 5% tolerance.

Each size will be wound on a reel bearing a label with the relevant features.

The following data will have to be included in the reel label:

- Contractor's name
- Cable type and total number of pairs
- Metallic sheath type
- Conductor diametre
- Cable acronym as per the relevant standards
- Size length
- Reference technical specifications.

3.10.14.2 Tests and Measurements

Contractor will have to carry out cable manufacturing activities in accordance with ISO quality assurance standards and attach the relevant records to prove performance of tests and measurements in compliance with the above specifications. Said records will have additionally to refer to the Typology Tests, Routine Tests and Acceptance Tests performed.

3.10.15Cable Laying

The cable will be buried at a depth of 100 cm in a HDPE duct.

Cable positioning alongside the railway line will be determined on the basis of ground features and the presence of a power line; positioning will anyhow be such as to prevent the cables from being affected by subsequent electrification activities. Minimum excavation width will have to be 30 cm.

When passing the stations or some special areas, especially where the installation of buried cable is difficult (like as bridges, road crossing, difficult section areas, etc.), the cable will be also put in HDPE cable ducts of 100 mm diameter.

Two possible laying techniques are suitable for the HDPE duct. The solution to be adopted is dependant from the alignment caractheristics and from teh presence of the electrification.

- Laying of the HDPE duct from a machine running on the rail track along the verge of the railway track, inside the catenary poles;
- Laying of the HDPE duct using the laying equipment like trenching machine, drum puller and back filling machine on the verge of the railway track outside of the catenary poles.

Having dug a trench about 30 cm wide, its bottom will be covered by a 10-cm layer of sand, then the HDPE duct will be laid. After laying the cables in the respective HDPE ducts, the latter will be covered by a 15-cm layer of sand and the rest of the trench will be covered with the dug soil.

During laying and junctioning of the fibre optic cable as well as during laying, junctioning and splitting/sectioning of the copper cable, operating arrangements will be such as to ensure tight-seal closure of ducts by means of suitable anti-rodent foams.

3.10.16Installing the Copper Cable

3.10.16.1 In General

Positioning copper cables at the time of laying fibre optic cables plays a key role in order to ensure utmost availability of facilities as well as of the relevant telecommunications network, which has been designed to include redundant components. Therefore, special care will have to be taken in diversifying the positioning of cables coming from different lines that all converge to the same termination premises, by laying them along different routes.

3.10.16.2 Laying of the Cable

A 12-pair copper cable will be installed on the relevant line, with the manufacturing and transmission features described in the above Technical Specifications.

The copper cable serving the different railway systems will be fully sectioned at the level of all railway premises (PABX, ADM1) as already specified in the technical recommendations for the Feasibility Study.

The copper cable will be partly sectioned (max 8 pairs) along the line, by means of sectioning boxes, for telephone and signalling purposes.

No pupinization of cable pairs is envisaged, since this type of cable will be used for connecting yard/line telephone entities between two premises housing the new transmission equipment; given the short distance to be covered and the different features of the existing equipment, no cable additives are considered to be necessary.

As for laying arrangements, laying of the cable and the relevant protections - including use of a specific HDPE duct - were described in the preceding paragraphs.

Laying also includes:

- supply and installation of the HDPE duct holding the cable,
- performance of excavations with the required depth and width both in the station yard and along the line;
- supply and laying of sand to protect the ducts;
- cabling inside buildings
- restoration of flooring inside buildings and/or on platforms.

3.10.16.3 Junctioning and Termination – Supplementary Materials

Junctioning, termination and sectioning - whether partial or total - will have to be performed in compliance with the general standards as well as with the particular requirements laid down in these Technical Specifications.

The cable metallic sheath will have to be connected with a water-tight outlet at the level of each junction and line sectioning.

Installation also includes supply and deployment

- of all the materials required for termination, sectioning and junctioning of the aforementioned copper cable;
- of cabinets to N3 standard, holding the sectioning/termination sub-racks of the copper cable, as envisaged for telephone premises;
- of sub-racks holding sectionings/terminations of the copper cable;

- of the mounting brackets required to instal sectioning boxes for telephone and signalling purposes;
- of such materials as may be necessary for the earthing of all the equipment to be installed.

All external equipment will have to ensure at least IP 659 water resistance protection.

All cabinets will have to be equipped with ad-hoc locks and keys.

3.10.16.4 Tests and Measurements

3.10.16.4.1 Test Length

The electric and transmission features specified below will be tested on a cable run of less than 100 Km for temperature values ranging between +5C and +30C.

3.10.16.4.2 Measurements

Contractor will have to assess the features of the installed cables and test full operationality of the latter by carrying out a set of measurements; a list of the measurements to be at least included among those to be envisaged is reported below:

- conductor insulation (for voltage values ranging between 300 and 500 V, it must be > 8.000 MΩ/Km for air and paper conductors, whereas it must be 300 MΩ/Km for PVC and polyethylene conductors);
- resistance unbalance (not in excess of 3 Ω for paper and air, and of 5 Ω for polyethylene);
- impedance regularity;
- far-end cross-talk (FEXT).

Upon completion of the installation activities, the results of the measurements carried out with regard to the copper cable will have to be made available. Such results and the identification data of the facility will be presented not only on paper, but also on magnetic/optical media and analysed by means of software to be provided by the Contractor.

3.10.17Payment

The supply and installation of the Copper Cable (12 pairs) shall be paid with the following unit prices, which shall be deemed to include for the full scope as aforesaid, including, but not limited, insurance cost, performance security cost, testing and commissioning cost, overheads and profit.

Item 25-A15

15.01	Supply of Copper Cable (12 pairs) from outside the Employer's country.
	Km.
15.02	Supply of Copper Cable (12 pairs) from within the Employer's country.
	Km.
15.03	Local Transportation of Copper Cable (12 pairs)
	Km.
15.04	Installation of Copper Cable (12 pairs)
	Km.

3.11 Item 25-18, 25-A19, 25-A20 Civil, electrical and mechanical works for the renewal of technical rooms in the stations for the new telecom equipment

3.11.1 Introduction

The technical rooms for the new telecom equipment will be provided by the Employer at the station premises. The Contractor is bound to renew the technical rooms according with the present specifications.

3.11.2 Works to be performed

The works to be performed are related to maintain suitable environmental conditions for the proper functioning of the new telecom equipment.

The works will be determined stations by stations in order to guaranteeing to the equipment:

- a suitable condition of humidity;
- a suitable condition of temperature;
- a suitable condition of illumination;
- a suitable protection against animals (for instance rodents).

It is mandatory that environmental condition mentioned in the previous paragraphs for each apparatus has to be guaranteed.

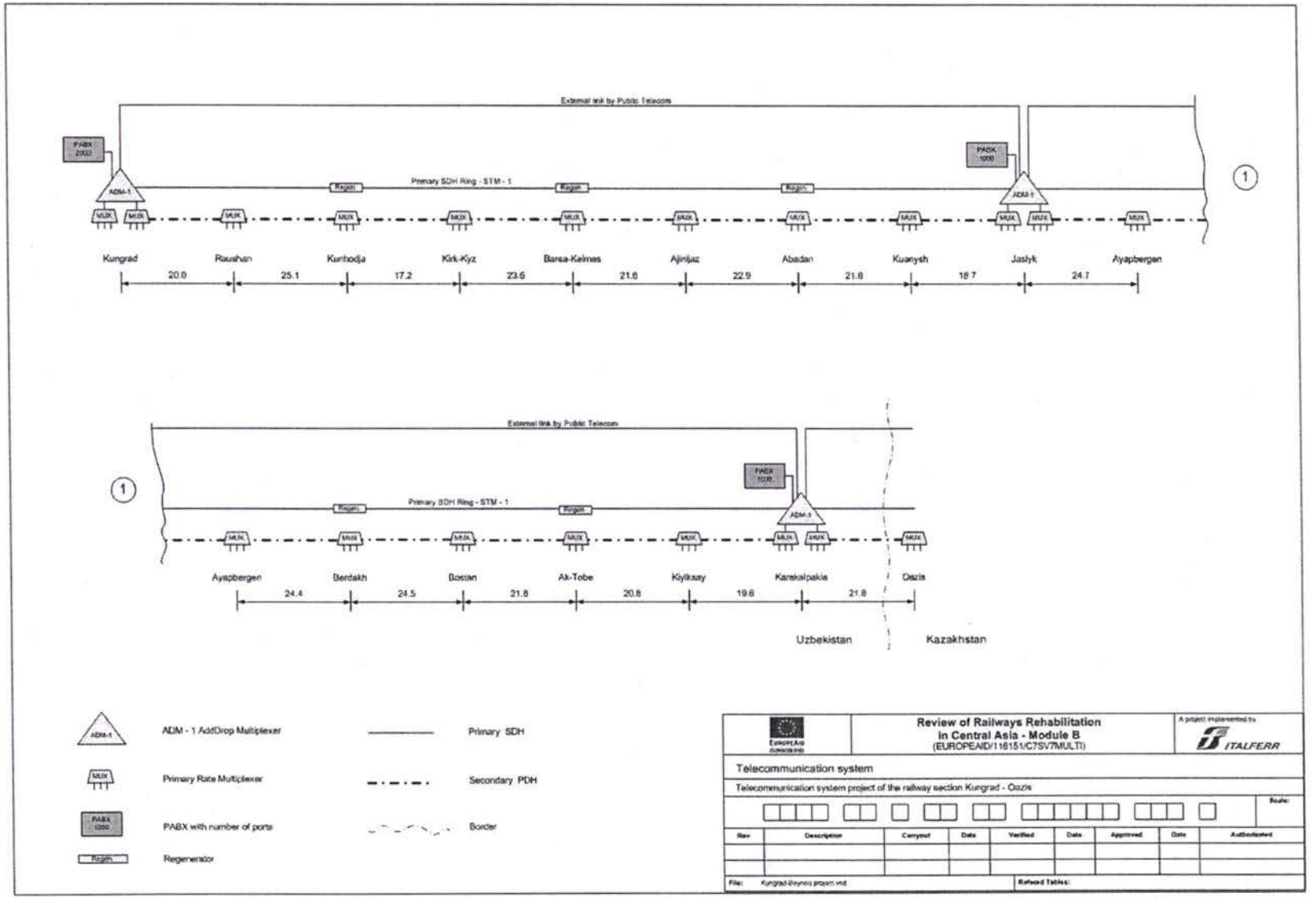
Also measure for guaranteeing safety works condition for operators has to be considered within the present item (for instance, presence of earthings, construction of floating floors, etc) as well as measure anti-intrusion.

Finally works should aim at maintaining proper condition of cleanliness of the rooms.

Works refer to:

- civil works (for instance construction of walls or minor structures within the room, painting of ceiling/walls, anchorage of equipment, renewing of windows and doors, construction of floating pavement, etc.)
- electrical works (for instance, cabling, earthing, plugging, etc)
- mechanical works (for instance conditioning, heating, etc.).

4 Drawings


External link by Public Telecom
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ADM-1
Regen
Primary SDH Ring - STM - 1
MUX
PABX 1000
Kungrad
Raushan
Kunhodja
Kirk-Kyz
Bansa-Kelmes
Ajinjaz
Abadan
Kuanysh
Jasiyk
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Bostan
Ak-Tobe
Kiyikusay
Karakalpakia
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Uzbekistan
Kazakhstan
ADM - 1 AddDrop Multiplexer
Primary Rate Multiplexer
PABX with number of ports
Regenerator
Primary SDH
Secondary PDH
Border
Review of Railways Rehabilitation in Central Asia - Module B
(EUROPEAID/116151/C/SV/MULTI)
A project implemented by
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Telecommunication system
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Refresh Tables:

PART 3 – Contract

Section VII. General Conditions of Contract

Table of Clauses

1. Definitions

1.1 The following words and expressions shall have the meanings hereby assigned to them:

(a) "Contract" means the Agreement entered into between the Purchaser and the Supplier, together with the Contract Documents referred to therein, including all attachments, appendices, and all documents incorporated by reference therein.

(b) "Contract Documents" means the documents listed in the Agreement, including any amendments thereto.

(c) "Contract Price" means the price payable to the Supplier as specified in the Agreement, subject to such additions and adjustments thereto or deductions therefrom, as may be made pursuant to the Contract.

(d) "Day" means calendar day.

(e) "Delivery" means the transfer of the Goods from the Supplier to the Purchaser in accordance with the terms and conditions set forth in the Contract.

(f) "Completion" means the fulfillment of the Related Services by the Supplier in accordance with the terms and conditions set forth in the Contract.

(g) "Eligible Countries" means the countries and territories eligible as listed in Section V.

(h) "GCC" means the General Conditions of Contract.

(i) "Goods" means all of the commodities, raw material, machinery and equipment, and/or other materials that the Supplier is required to supply to the Purchaser under the Contract.

(j) "Purchaser's Country" is the country specified in the Special Conditions of Contract (SCC).

(k) "Purchaser" means the entity purchasing the Goods and Related Services, as specified in the SCC.

(l) "Related Services" means the services incidental to the supply of the goods, such as insurance, installation, training and initial maintenance and other similar obligations of the Supplier under the

Contract.

(m) "SCC" means the Special Conditions of Contract.

(n) "Subcontractor" means any natural person, private or government entity, or a combination of the above, including its legal successors or permitted assigns, to whom any part of the Goods to be supplied or execution of any part of the Related Services is subcontracted by the Supplier.

(o) "Supplier" means the natural person, private or government entity, or a combination of the above, whose bid to perform the Contract has been accepted by the Purchaser and is named as such in the Agreement, and includes the legal successors or permitted assigns of the Supplier.

(p) "The ADB" is the Asian Development Bank.

(q) "The Site," where applicable, means the place named in the SCC.

2. Contract Documents

2.1 Subject to the order of precedence set forth in the Agreement, all documents forming the Contract (and all parts thereof) are intended to be correlative, complementary, and mutually explanatory.

3. Corrupt Practices

3.1 ADB's Anticorruption Policy requires borrowers (including beneficiaries of ADB-financed activity), as well as bidders, suppliers, and contractors under ADB-financed contracts, observe the highest standard of ethics during the procurement and execution of such contracts. In pursuance of this policy, the ADB:

(a) defines, for the purposes of this provision, the terms set forth below as follows:

(i) "corrupt practice" means the offering, giving receiving, or soliciting, directly or indirectly, of any thing of value to influence the action of any party in the procurement process or the execution of a contract;

(ii) "fraudulent practice" means a misrepresentation or omission of facts in order to influence a procurement process or the execution of a contract;

(iii) "collusive practices" means a scheme or arrangement between two or more bidders, with or without the knowledge of the Borrower, designed to influence the action of any party in a procurement process or the execution of a contract;

(iv) "coercive practices" means harming or threatening to harm, directly or indirectly, persons, or their property to influence their participation in a procurement process, or affect the execution of a contract;

(b) will reject a proposal for award if it determines that the bidder recommended for award has, directly or through an agent, engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract; and

(c) will sanction a party or its successor, including declaring ineligible, either indefinitely or for a stated period of time, to participate in ADB-financed activities if it at any time determines that the firm has, directly or through an agent, engaged in corrupt, fraudulent, collusive, or coercive practices in competing for, or in executing, an ADB-financed contract.

3.2 The Supplier shall permit the ADB to inspect the Supplier's accounts and records relating to the performance of the Supplier and to have them audited by auditors appointed by the ADB, if so required by the ADB.

4. Interpretation

4.1 If the context so requires it, singular means plural and vice versa.

4.2 Incoterms

(a) The meaning of any trade term and the rights and obligations of parties thereunder shall be as prescribed by Incoterms.

(b) EXW, CIF, CIP, and other similar terms, shall be governed by the rules prescribed in the current edition of Incoterms, published by the International Chamber of Commerce at the date of the Invitation

for Bids or as specified in the SCC.

4.3 Entire Agreement

The Contract constitutes the entire agreement between the Purchaser and the Supplier and supersedes all communications, negotiations and agreements (whether written or oral) of parties with respect thereto made prior to the date of Contract.

4.4 Amendment

No amendment or other variation of the Contract shall be valid unless it is in writing, is dated, expressly refers to the Contract, and is signed by a duly authorized representative of each party thereto.

4.5 Nonwaiver

(a) Subject to GCC Sub-Clause 4.5(b) below, no relaxation, forbearance, delay, or indulgence by either party in enforcing any of the terms and conditions of the Contract or the granting of time by either party to the other shall prejudice, affect, or restrict the rights of that party under the Contract, neither shall any waiver by either party of any breach of Contract operate as waiver of any subsequent or continuing breach of Contract.

(b) Any waiver of a party's rights, powers, or remedies under the Contract must be in writing, dated, and signed by an authorized representative of the party granting such waiver, and must specify the right and the extent to which it is being waived.

4.6 Severability

If any provision or condition of the Contract is prohibited or rendered invalid or unenforceable, such prohibition, invalidity or unenforceability shall not affect the validity or enforceability of any other provisions and conditions of the Contract.

5. Language

5.1 The Contract as well as all correspondence and documents relating to the Contract exchanged by the Supplier and the Purchaser, shall be written in the

language specified in the SCC. Supporting documents and printed literature that are part of the Contract may be in another language provided they are accompanied by an accurate translation of the relevant passages in the language specified in the SCC, in which case, for purposes of interpretation of the Contract, this translation shall govern.

5.2 The Supplier shall bear all costs of translation to the governing language and all risks of the accuracy of such translation.

6. Joint Venture, Consortium or Association

6.1 Unless otherwise specified in the SCC, if the Supplier is a joint venture, consortium, or association, all of the parties shall be jointly and severally liable to the Purchaser for the fulfillment of the provisions of the Contract and shall designate one party to act as a leader with authority to bind the joint venture, consortium, or association. The composition or the constitution of the joint venture, consortium, or association shall not be altered without the prior consent of the Purchaser.

7. Eligibility

7.1 The Supplier and its Subcontractors shall have the nationality of an eligible country. A Supplier or Subcontractor shall be deemed to have the nationality of a country if it is a citizen or constituted or incorporated, and operates in conformity with the provisions of the laws of that country.

7.2 All Goods and Related Services to be supplied under the Contract and financed by the ADB shall have their origin in Eligible Countries. For the purpose of this Clause, origin means the country where the goods have been grown, mined, cultivated, produced, manufactured, or processed; or through manufacture, processing, or assembly, another commercially recognized article results that differs substantially in its basic characteristics from its imported components.

8. Notices

8.1 Any Notice given by one party to the other pursuant to the Contract shall be in writing to the address specified in the SCC. The term "in writing" means communicated in written form with proof of receipt.

8.2 A Notice shall be effective when delivered or on the Notice's effective date, whichever is later.

9. Governing Law

9.1 The Contract shall be governed by and interpreted in accordance with the laws of the Purchaser's country, unless otherwise specified in the SCC.

10. Settlement of Disputes

10.1 The Purchaser and the Supplier shall make every effort to resolve amicably by direct informal negotiation any disagreement or dispute arising between them under or in connection with the Contract.

10.2 If the parties fail to resolve such a dispute or difference by mutual consultation within twenty-eight (28) days from the commencement of such consultation, either party may require that the dispute be referred for resolution to the formal mechanisms specified in the SCC.

11. Scope of Supply

11.1 Subject to the SCC, the Goods and Related Services to be supplied shall be as specified in Section VI, Schedule of Supply.

11.2 Unless otherwise stipulated in the Contract, the Scope of Supply shall include all such items not specifically mentioned in the Contract but that can be reasonably inferred from the Contract as being required for attaining Delivery and Completion of the Goods and Related Services as if such items were expressly mentioned in the Contract.

12. Delivery

12.1 Subject to GCC Sub-Clause 33.1, the Delivery of the Goods and Completion of the Related Services shall be in accordance with the Delivery and Completion Schedule specified in the Section VI, Schedule of Supply. The details of shipping and other documents to be furnished by the Supplier are specified in the SCC.

13. Supplier's Responsibilities

13.1 The Supplier shall supply all the Goods and Related Services included in the Scope of Supply in accordance with GCC Clause 11, and the Delivery and Completion Schedule, as per GCC Clause 12.

14. Purchaser's Responsibilities

14.1 Whenever the supply of Goods and Related Services requires that the Supplier obtain permits, approvals, and import and other licenses from local public authorities, the Purchaser shall, if so required by the Supplier, make its best effort to assist the Supplier in complying with such requirements in a timely and expeditious manner.

14.2 The Purchaser shall pay all costs involved in the performance of its responsibilities, in accordance with GCC Sub-Clause 14.1.

15. Contract Price

15.1 The Contract Price shall be as specified in the Agreement subject to any additions and adjustments thereto, or deductions therefrom, as may be made pursuant to the Contract.

15.2 Prices charged by the Supplier for the Goods delivered and the Related Services performed under the Contract shall not vary from the prices quoted by the Supplier in its bid, with the exception of any price adjustments authorized in the SCC.

16. Terms of Payment

16.1 The Contract Price shall be paid as specified in the SCC.

16.2 The Supplier's request for payment shall be made to the Purchaser in writing, accompanied by invoices describing, as appropriate, the Goods delivered and Related Services performed, and by the documents submitted pursuant to GCC Clause 12 and upon fulfillment of all the obligations stipulated in the Contract.

16.3 Payments shall be made promptly by the Purchaser, no later than sixty (60) days after submission of an invoice or request for payment by the Supplier, and the Purchaser has accepted it.

16.4 The currency or currencies in which payments shall be made to the Supplier under this Contract shall be specified in the SCC.

17. Taxes and Duties

17.1 For goods supplied from outside the Purchaser's country, the Supplier shall be entirely responsible for all taxes, stamp duties, license fees, and other such levies imposed outside the Purchaser's country.

17.2 For goods supplied from within the Purchaser's country, the Supplier shall be entirely responsible for all taxes, duties, license fees, etc., incurred until delivery of the contracted Goods to the Purchaser.

17.3 If any tax exemptions, reductions, allowances or privileges may be available to the Supplier in the Purchaser's Country, the Purchaser shall use its best efforts to enable the Supplier to benefit from any such tax

savings to the maximum allowable extent.

18. Performance Security

18.1 The Supplier shall, within twenty-eight (28) days of the notification of Contract award, provide a Performance Security for the due performance of the Contract in the amounts and currencies specified in the SCC.

18.2 The proceeds of the Performance Security shall be payable to the Purchaser as compensation for any loss resulting from the Supplier's failure to complete its obligations under the Contract.

18.3 The Performance Security shall be denominated in the currencies of the Contract, or in a freely convertible currency acceptable to the Purchaser, and shall be in one of the forms stipulated by the Purchaser in the SCC, or in another form acceptable to the Purchaser.

18.4 The Performance Security shall be discharged by the Purchaser and returned to the Supplier not later than twenty-eight (28) days following the date of completion of the Supplier's performance obligations under the Contract, including any warranty obligations, unless specified otherwise in the SCC.

19. Copyright

19.1 The copyright in all drawings, documents, and other materials containing data and information furnished to the Purchaser by the Supplier herein shall remain vested in the Supplier, or, if they are furnished to the Purchaser directly or through the Supplier by any third party, including suppliers of materials, the copyright in such materials shall remain vested in such third party.

20. Confidential Information

20.1 The Purchaser and the Supplier shall keep confidential and shall not, without the written consent of the other party hereto, divulge to any third party any documents, data, or other information furnished directly or indirectly by the other party hereto in connection with the Contract, whether such information has been furnished prior to, during or following completion or termination of the Contract. Notwithstanding the above, the Supplier may furnish to its Subcontractor such documents, data, and other information it receives from the Purchaser to the extent required for the Subcontractor to perform its work under the Contract, in which event the Supplier shall obtain from such Subcontractor an undertaking of confidentiality similar to that imposed on the Supplier under GCC Clause 20.

20.2 The Purchaser shall not use such documents, data, and other information received from the Supplier for any purposes unrelated to the Contract. Similarly, the Supplier shall not use such documents, data, and other information received from the Purchaser for any purpose other than the design, procurement, or other work and services required for the performance of the Contract.

20.3 The obligation of a party under GCC Sub-Clauses 20.1 and 20.2 above, however, shall not apply to information that:

(a) the Purchaser or Supplier need to share with the ADB or other institutions participating in the financing of the Contract;

(b) now or hereafter enters the public domain through no fault of that party;

(c) can be proven to have been possessed by that party at the time of disclosure and which was not previously obtained, directly or indirectly, from the other party; or

(d) otherwise lawfully becomes available to that party from a third party that has no obligation of confidentiality.

20.4 The above provisions of GCC Clause 20 shall not in any way modify any undertaking of confidentiality given by either of the parties hereto prior to the date of the Contract in respect of the Supply or any part thereof.

20.5 The provisions of GCC Clause 20 shall survive completion or termination, for whatever reason, of the Contract.

21. Subcontracting

21.1 The Supplier shall notify the Purchaser in writing of all subcontracts awarded under the Contract if not already specified in the Bid. Subcontracting shall in no event relieve the Supplier from any of its obligations, duties, responsibilities, or liability under the Contract.

21.2 Subcontracts shall comply with the provisions of GCC Clauses 3 and 7.

22. Specifications and Standards

22.1 Technical Specifications and Drawings

(a) The Supplier shall ensure that the Goods and Related Services comply with the technical specifications and other provisions of the Contract.

(b) The Supplier shall be entitled to disclaim responsibility for any design, data, drawing, specification or other document, or any modification thereof provided or designed by or on behalf of the Purchaser, by giving a notice of such disclaimer to the Purchaser.

(c) The Goods and Related Services supplied under this Contract shall conform to the standards mentioned in Section VI, Schedule of Supply and, when no applicable standard is mentioned, the standard shall be equivalent or superior to the official standards whose application is appropriate to the country of origin of the Goods.

22.2 Wherever references are made in the Contract to codes and standards in accordance with which it shall be executed, the edition or the revised version of such codes and standards shall be those specified in the Section VI, Schedule of Supply. During Contract execution, any changes in any such codes and standards shall be applied only after approval by the Purchaser and shall be treated in accordance with GCC Clause 33.

23. Packing and Documents

23.1 The Supplier shall provide such packing of the Goods as is required to prevent their damage or deterioration during transit to their final destination, as indicated in the Contract. During transit, the packing shall be sufficient to withstand, without limitation, rough handling and exposure to extreme temperatures, salt and precipitation, and open storage. Packing case size and weights shall take into consideration, where appropriate, the remoteness of the final destination of the Goods and the absence of heavy handling facilities at all points in transit.

23.2 The packing, marking, and documentation within and outside the packages shall comply strictly with such special requirements as shall be expressly provided for

in the Contract, including additional requirements, if any, specified in the SCC, and in any other instructions ordered by the Purchaser.

24. Insurance

24.1 Unless otherwise specified in the SCC, the Goods supplied under the Contract shall be fully insured, in a freely convertible currency from an eligible country, against loss or damage incidental to manufacture or acquisition, transportation, storage, and delivery, in accordance with the applicable Incoterms or in the manner specified in the SCC.

25. Transportation

25.1 Unless otherwise specified in the SCC, obligations for transportation of the Goods shall be in accordance with the Incoterms specified in Sections VI, Schedule of Supply.

26. Inspections and Tests

26.1 The Supplier shall at its own expense and at no cost to the Purchaser carry out all such tests and/or inspections of the Goods and Related Services as are specified in Sections VI, Schedule of Supply.

26.2 The inspections and tests may be conducted on the premises of the Supplier or its Subcontractor, at point of delivery, and/or at the final destination of the Goods, or in another place in the Purchaser's country as specified in the SCC. Subject to GCC Sub-Clause 26.3, if conducted on the premises of the Supplier or its Subcontractor, all reasonable facilities and assistance, including access to drawings and production data, shall be furnished to the inspectors at no charge to the Purchaser.

26.3 The Purchaser or its designated representative shall be entitled to attend the tests and/or inspections referred to in GCC Sub-Clause 26.2, provided that the Purchaser bear all of its own costs and expenses incurred in connection with such attendance including, but not limited to, all traveling and board and lodging expenses.

26.4 Whenever the Supplier is ready to carry out any such test and inspection, it shall give a reasonable advance notice, including the place and time, to the Purchaser. The Supplier shall obtain from any relevant third party or manufacturer any necessary permission or consent to enable the Purchaser or its designated representative to attend the test and/or inspection.

26.5 The Purchaser may require the Supplier to carry out any test and/or inspection not required by the Contract but

deemed necessary to verify that the characteristics and performance of the Goods comply with the technical specifications, codes and standards under the Contract, provided that the Supplier's reasonable costs and expenses incurred in the carrying out of such test and/or inspection shall be added to the Contract Price. Further, if such test and/or inspection impedes the progress of manufacturing and/or the Supplier's performance of its other obligations under the Contract, due allowance will be made in respect of the Delivery Dates and Completion Dates and the other obligations so affected.

26.6 The Supplier shall provide the Purchaser with a report of the results of any such test and/or inspection.

26.7 The Purchaser may reject any Goods or any part thereof that fail to pass any test and/or inspection or do not conform to the specifications. The Supplier shall either rectify or replace such rejected Goods or parts thereof or make alterations necessary to meet the specifications at no cost to the Purchaser, and shall repeat the test and/or inspection, at no cost to the Purchaser, upon giving a notice pursuant to GCC Sub-Clause 26.4.

26.8 The Supplier agrees that neither the execution of a test and/or inspection of the Goods or any part thereof, nor the attendance by the Purchaser or its representative, nor the issue of any report pursuant to GCC Sub-Clause 26.6, shall release the Supplier from any warranties or other obligations under the Contract.

27. Liquidated Damages

27.1 Except as provided under GCC Clause 32, if the Supplier fails to deliver any or all of the Goods or perform the Related Services within the period specified in the Contract, the Purchaser may without prejudice to all its other remedies under the Contract, deduct from the Contract Price, as liquidated damages, a sum equivalent to the percentage specified in the SCC of the Contract Price for each week or part thereof of delay until actual delivery or performance, up to a maximum deduction of the percentage specified in the SCC. Once the maximum is reached, the Purchaser may terminate the Contract pursuant to GCC Clause 35.

28. Warranty

28.1 The Supplier warrants that all the Goods are new, unused, and of the most recent or current models, and that they incorporate all recent improvements in design and materials, unless provided otherwise in the Contract.

28.2 Subject to GCC Sub-Clause 22.1, the Supplier further warrants that the Goods shall be free from defects arising from any act or omission of the Supplier or arising from design, materials, and workmanship, under normal use in the conditions prevailing in the country of final destination.

28.3 Unless otherwise specified in the SCC, the warranty shall remain valid for twelve (12) months after the Goods, or any portion thereof as the case may be, have been delivered to and accepted at the final destination indicated in the SCC, or for eighteen (18) months after the date of shipment or loading in the country of origin, whichever period concludes earlier.

28.4 The Purchaser shall give Notice to the Supplier stating the nature of any such defects together with all available evidence thereof, promptly following the discovery thereof. The Purchaser shall afford all reasonable opportunity for the Supplier to inspect such defects.

28.5 Upon receipt of such Notice, the Supplier shall, within the period specified in the SCC, expeditiously repair or replace the defective Goods or parts thereof, at no cost to the Purchaser.

28.6 If having been notified, the Supplier fails to remedy the defect within the period specified in the SCC, the Purchaser may proceed to take within a reasonable period such remedial action as may be necessary, at the Supplier's risk and expense and without prejudice to any other rights which the Purchaser may have against the Supplier under the Contract.

29. Patent Indemnity

29.1 The Supplier shall, subject to the Purchaser's compliance with GCC Sub-Clause 29.2, indemnify and hold harmless the Purchaser and its employees and officers from and against any and all suits, actions or administrative proceedings, claims, demands, losses, damages, costs, and expenses of any nature, including attorney's fees and expenses, which the Purchaser may suffer as a result of any infringement or alleged infringement of any patent, utility model, registered design, trademark, copyright, or other intellectual property right registered or otherwise existing at the date of the Contract by reason of:

(a) the installation of the Goods by the Supplier or the use of the Goods in the country where the Site is located; and

(b) the sale in any country of the products produced by the Goods.

Such indemnity shall not cover any use of the Goods or any part thereof other than for the purpose indicated by or to be reasonably inferred from the Contract, neither any infringement resulting from the use of the Goods or any part thereof, or any products produced thereby in association or combination with any other equipment, plant, or materials not supplied by the Supplier, pursuant to the Contract.

29.2 If any proceedings are brought or any claim is made against the Purchaser arising out of the matters referred to in GCC Sub-Clause 29.1, the Purchaser shall promptly give the Supplier a notice thereof, and the Supplier may at its own expense and in the Purchaser's name conduct such proceedings or claim and any negotiations for the settlement of any such proceedings or claim.

29.3 If the Supplier fails to notify the Purchaser within twenty-eight (28) days after receipt of such notice that it intends to conduct any such proceedings or claim, then the Purchaser shall be free to conduct the same on its own behalf.

29.4 The Purchaser shall, at the Supplier's request, afford all available assistance to the Supplier in conducting such proceedings or claim, and shall be reimbursed by the Supplier for all reasonable expenses incurred in so doing.

29.5 The Purchaser shall indemnify and hold harmless the Supplier and its employees, officers, and Subcontractors from and against any and all suits, actions or administrative proceedings, claims, demands, losses, damages, costs, and expenses of any nature, including attorney's fees and expenses, which the Supplier may suffer as a result of any infringement or alleged infringement of any patent, utility model, registered design, trademark, copyright, or other intellectual property right registered or otherwise existing at the date of the Contract arising out of or in connection with any

design, data, drawing, specification, or other documents or materials provided or designed by or on behalf of the Purchaser.

30. Limitation of Liability

30.1 Except in cases of gross negligence or willful misconduct :

(a) neither party shall be liable to the other party for any indirect or consequential loss or damage, loss of use, loss of production, or loss of profits or interest costs, provided that this exclusion shall not apply to any obligation of the Supplier to pay liquidated damages to the Purchaser; and

(b) the aggregate liability of the Supplier to the Purchaser, whether under the Contract, in tort, or otherwise, shall not exceed the amount specified in the SCC, provided that this limitation shall not apply to the cost of repairing or replacing defective equipment, or to any obligation of the Supplier to indemnify the Purchaser with respect to patent infringement.

31. Change in Laws and Regulations

31.1 Unless otherwise specified in the Contract, if after the date of the Invitation for Bids, any law, regulation, ordinance, order or bylaw having the force of law is enacted, promulgated, abrogated, or changed in the place of the Purchaser's country where the Site is located (which shall be deemed to include any change in interpretation or application by the competent authorities) that subsequently affects the Delivery Date and/or the Contract Price, then such Delivery Date and/or Contract Price shall be correspondingly increased or decreased, to the extent that the Supplier has thereby been affected in the performance of any of its obligations under the Contract. Notwithstanding the foregoing, such additional or reduced cost shall not be separately paid or credited if the same has already been accounted for in the price adjustment provisions where applicable, in accordance with GCC Clause 15.

32. Force Majeure

32.1 The Supplier shall not be liable for forfeiture of its Performance Security, liquidated damages, or termination for default if and to the extent that its delay in performance or other failure to perform its obligations under the Contract is the result of an event of Force

Majeure.

32.2 For purposes of this Clause, "Force Majeure" means an event or situation beyond the control of the Supplier that is not foreseeable, is unavoidable, and its origin is not due to negligence or lack of care on the part of the Supplier. Such events may include, but not be limited to, acts of the Purchaser in its sovereign capacity, wars or revolutions, fires, floods, epidemics, quarantine restrictions, and freight embargoes.

32.3 If a Force Majeure situation arises, the Supplier shall promptly notify the Purchaser in writing of such condition and the cause thereof. Unless otherwise directed by the Purchaser in writing, the Supplier shall continue to perform its obligations under the Contract as far as is reasonably practical, and shall seek all reasonable alternative means for performance not prevented by the Force Majeure event.

33. Change Orders and Contract Amend-ments

33.1 The Purchaser may at any time order the Supplier through Notice in accordance GCC Clause 8, to make changes within the general scope of the Contract in any one or more of the following:

(a) drawings, designs, or specifications, where Goods to be furnished under the Contract are to be specifically manufactured for the Purchaser;

(b) the method of shipment or packing;

(c) the place of delivery; and

(d) the Related Services to be provided by the Supplier.

33.2 If any such change causes an increase or decrease in the cost of, or the time required for, the Supplier's performance of any provisions under the Contract, an equitable adjustment shall be made in the Contract Price or in the Delivery and Completion Schedule, or both, and the Contract shall accordingly be amended. Any claims by the Supplier for adjustment under this Clause must be asserted within twenty-eight (28) days from the date of the Supplier's receipt of the Purchaser's change order.

33.3 Prices to be charged by the Supplier for any Related Services that might be needed but which were not included in the Contract shall be agreed upon in advance by the parties and shall not exceed the prevailing rates

charged to other parties by the Supplier for similar services.

34. Extensions of Time

34.1 If at any time during performance of the Contract, the Supplier or its Subcontractors should encounter conditions impeding timely delivery of the Goods or completion of Related Services pursuant to GCC Clause 12, the Supplier shall promptly notify the Purchaser in writing of the delay, its likely duration, and its cause. As soon as practicable after receipt of the Supplier's notice, the Purchaser shall evaluate the situation and may at its discretion extend the Supplier's time for performance, in which case the extension shall be ratified by the parties by amendment of the Contract.

34.2 Except in case of Force Majeure, as provided under GCC Clause 32, a delay by the Supplier in the performance of its Delivery and Completion obligations shall render the Supplier liable to the imposition of liquidated damages pursuant to GCC Clause 27, unless an extension of time is agreed upon, pursuant to GCC Sub-Clause 34.1.

35. Termination

35.1 Termination for Default

(a) The Purchaser, without prejudice to any other remedy for breach of Contract, by Notice of default sent to the Supplier, may terminate the Contract in whole or in part:

(i) if the Supplier fails to deliver any or all of the Goods within the period specified in the Contract, or within any extension thereof granted by the Purchaser pursuant to GCC Clause 34; or

(ii) if the Supplier fails to perform any other obligation under the Contract.

(b) In the event the Purchaser terminates the Contract in whole or in part, pursuant to GCC Clause 35.1(a), the Purchaser may procure, upon such terms and in such manner as it deems appropriate, Goods or Related Services similar to those undelivered or not performed, and the Supplier shall be liable to the Purchaser for any additional costs for such similar Goods or Related Services. However, the Supplier shall continue performance

of the Contract to the extent not terminated.

(c) if the Supplier, in the judgment of the Purchaser has engaged in corrupt, fraudulent, collusive, or coercive practices, as defined in GCC Clause 3, in competing for or in executing the Contract.

35.2 Termination for Insolvency

The Purchaser may at any time terminate the Contract by giving Notice to the Supplier if the Supplier becomes bankrupt or otherwise insolvent. In such event, termination will be without compensation to the Supplier, provided that such termination will not prejudice or affect any right of action or remedy that has accrued or will accrue thereafter to the Purchaser.

35.3 Termination for Convenience

(a) The Purchaser, by Notice sent to the Supplier, may terminate the Contract, in whole or in part, at any time for its convenience. The Notice of termination shall specify that termination is for the Purchaser's convenience, the extent to which performance of the Supplier under the Contract is terminated, and the date upon which such termination becomes effective.

(b) The Goods that are complete and ready for shipment within twenty-eight (28) days after the Supplier's receipt of the Notice of termination shall be accepted by the Purchaser at the Contract terms and prices. For the remaining Goods, the Purchaser may elect:

(i) To have any portion completed and delivered at the Contract terms and prices; and/or

(ii) to cancel the remainder and pay to the Supplier an agreed amount for partially completed Goods and Related Services and for materials and parts previously procured by the Supplier.

36. Assignment 36.1 Neither the Purchaser nor the Supplier shall assign, in whole or in part, their obligations under this Contract, except with prior written consent of the other party.

Section VIII. Special Conditions of Contract

The following Special Conditions of Contract (SCC) shall supplement the General Conditions of Contract (GCC). Whenever there is a conflict, the provisions herein shall prevail over those in the GCC.

GCC 1.1(j)	The Purchaser's country is: _____
GCC 1.1(k)	The Purchaser is: _____
GCC 1.1 (q)	The Site is: _____
GCC 4.2 (b)	The version of Incoterms shall be: _____
GCC 5.1	The language shall be: _____
GCC 6.1	The individuals or firms in a joint venture, consortium or association _____ jointly and severally liable.
GCC 8.1	For **notices**, the Purchaser's address shall be: Attention: _____ Street Address: _____ Floor/ Room number: _____ City: _____ ZIP Code: _____ Country: _____ Telephone: _____ Facsimile number: _____ Electronic mail address: _____
GCC 9.1	The governing law shall be: _____
GCC 10.2	The formal mechanism for the resolution of disputes shall be:_____ _____
GCC 11.1	The scope of supply shall be defined in :_____ _____
GCC 12.1	Details of shipping and documents to be furnished by the Supplier shall be::_____
GCC 15.2	The price adjustment shall be: _____
GCC 16.1	The terms of payment shall be: _____

GCC 16.4	The currencies for payments shall be: _____
GCC 18.1	The Supplier shall provide a Performance Security of _____ percent of the Contract Price. The Performance Security shall be denominated in the following amounts and currencies:_____ _____
GCC 18.3	The types of acceptable Performance Securities are: _____ _____
GCC 18.4	Discharge of Performance Security shall take place: _____ _____
GCC 23.2	The packing, marking and documentation within and outside the packages shall be: _____ _____
GCC 24.1	The insurance coverage shall be in accordance with:_____ _____
GCC 25.1	Obligations for transportation of the Goods shall be in accordance with: _____
GCC 26.2	Tests and Inspections specified in Section VI, Schedule of Supply, shall be carried out at the following times or milestones, and places : _____ _____
GCC 27.1	The liquidated damage shall be: _____ % per week or part thereof
GCC 27.1	The maximum amount of liquidated damages shall be: _____
GCC 28.3	The period of validity of the Warranty shall be: _____
GCC 28.5	The Supplier shall correct any defects covered by the Warranty within : _____ of being notified by the Purchaser of the occurrence of such defects
GCC 30.1	The amount of aggregate liability shall be: _____

Section IX. Contract Forms

Table of Forms

Agreement

THIS AGREEMENT made the _____ day of _____, _____, between _____ of _____ (hereinafter "the Purchaser"), of the one part, and _____ of _____ (hereinafter "the Supplier"), of the other part:

WHEREAS the Purchaser invited bids for certain Goods and Related Services, viz., _____ and has accepted a Bid by the Supplier for the supply of those Goods and Related Services in the sum of _____ (hereinafter "the Contract Price").

NOW THIS AGREEMENT WITNESSETH AS FOLLOWS:

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the Contract referred to.

2. The following documents shall be deemed to form and be read and construed as part of this Agreement, viz.:

(a) the Purchaser's Notification to the Supplier of Award of Contract;
(b) the Bid Submission Sheet and the Price Schedules submitted by the Supplier;
(c) the Special Conditions of Contract;
(d) the General Conditions of Contract;
(e) the Schedule of Supply; and
(f) _____.

This Contract shall prevail over all other Contract documents. In the event of any discrepancy or inconsistency within the Contract documents, then the documents shall prevail in the order listed above.

3. In consideration of the payments to be made by the Purchaser to the Supplier as indicated in this Agreement, the Supplier hereby covenants with the Purchaser to provide the Goods and Related Services and to remedy defects therein in conformity in all respects with the provisions of the Contract.

4. The Purchaser hereby covenants to pay the Supplier in consideration of the provision of the Goods and Related Services and the remedying of defects therein, the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

IN WITNESS whereof the parties hereto have caused this Agreement to be executed in accordance with the laws of _____ on the day, month and year indicated above.

Signed by _____ (for the Purchaser)

Signed by _____ (for the Supplier)

Performance Security

Date: _____

Contract Name and No. :_____

_____

To: _____

WHEREAS _____ (hereinafter "the Supplier") has undertaken, pursuant to Contract No. _____ dated _____, _____ to supply _____ (hereinafter "the Contract").

AND WHEREAS it has been stipulated by you in the aforementioned Contract that the Supplier shall furnish you with a security _____ issued by a reputable guarantor for the sum specified therein as security for compliance with the Supplier's performance obligations in accordance with the Contract.

AND WHEREAS the undersigned _____ _____, legally domiciled in _____ _____, (hereinafter "the Guarantor"), have agreed to give the Supplier a security:

THEREFORE WE hereby affirm that we are Guarantors and responsible to you, on behalf of the Supplier, up to a total of _____ and we undertake to pay you, upon your first written demand declaring the Supplier to be in default under the Contract, without cavil or argument, any sum or sums within the limits of _____ _____ as aforesaid, without your needing to prove or to show grounds or reasons for your demand or the sum specified therein.

This security is valid until the _____ day of _____, _____.

Name _____

In the capacity of _____

Signed _____

Duly authorized to sign the security for and on behalf of _____

Date _____

Advance Payment Security

Date: _____

Contract Name and No. :_____

_____

To: _____

In accordance with the payment provision included in the Contract, in relation to advance payments, _____ (hereinafter called "the Supplier") shall deposit with the Purchaser a security consisting of _____, to guarantee its proper and faithful performance of the obligations imposed by said Clause of the Contract, in the amount of _____.

We, the undersigned _____, legally domiciled in _____ (hereinafter "the Guarantor"), as instructed by the Supplier, agree unconditionally and irrevocably to guarantee as primary obligor and not as surety merely, the payment to the Purchaser on its first demand without whatsoever right of objection on our part and without its first claim to the Supplier, in the amount not exceeding _____ _____.

This security shall remain valid and in full effect from the date of the advance payment received by the Supplier under the Contract until _____, _____.

Name _____

In the capacity of _____

Signed _____

Duly authorized to sign the security for and on behalf of _____

Date _____