IRAQ TELECOMMUNICATIONS & POSTS CO.

THE REPUBLIC OF IRAQ

OUTLINE DESIGN STUDY REPORT

ON

THE PROJECT

FOR IMPROVEMENT OF TRUNK COMMUNICATIONS NETWORK

IN

THE REPUBLIC OF IRAQ

OCTOBER 2004

JAPAN INTERNATIONAL COOPERATION AGENCY

NIPPON KOEI CO., LTD., TOKYO, JAPAN

PREFACE

In response to a request from the Government of the Republic of Iraq, the Government of Japan decided to conduct an outline design study on the Project for Improvement of Trunk Communications Network and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Amman in Jordan a study team from July 31 to August 27, 2004.

The team held discussions with the officials concerned of the Government of the Republic of Iraq, and conducted a study in Jordan. After the team returned to Japan, further studies were made. Then, the present report was finalized.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of the Republic of Iraq for their close cooperation extended to the teams.

October 2004

Seiji Kojima

Vice President

Japan International Cooperation Agency

October, 2004

Letter of Transmittal

We are pleased to submit to you the outline design study report on the Project for Improvement of Trunk Communications Network in the Republic of Iraq.

This study was conducted by Nippon Koei Co., Ltd., under a contract to JICA, during the period from July, 2004 to October, 2004. In conducting the study, we have examined the feasibility and rationale of the project with due consideration to the present situation of Iraq and formulated the most appropriate basic design for the project under Japan's grant aid scheme.

We hope that this report will contribute to further promotion of the project.

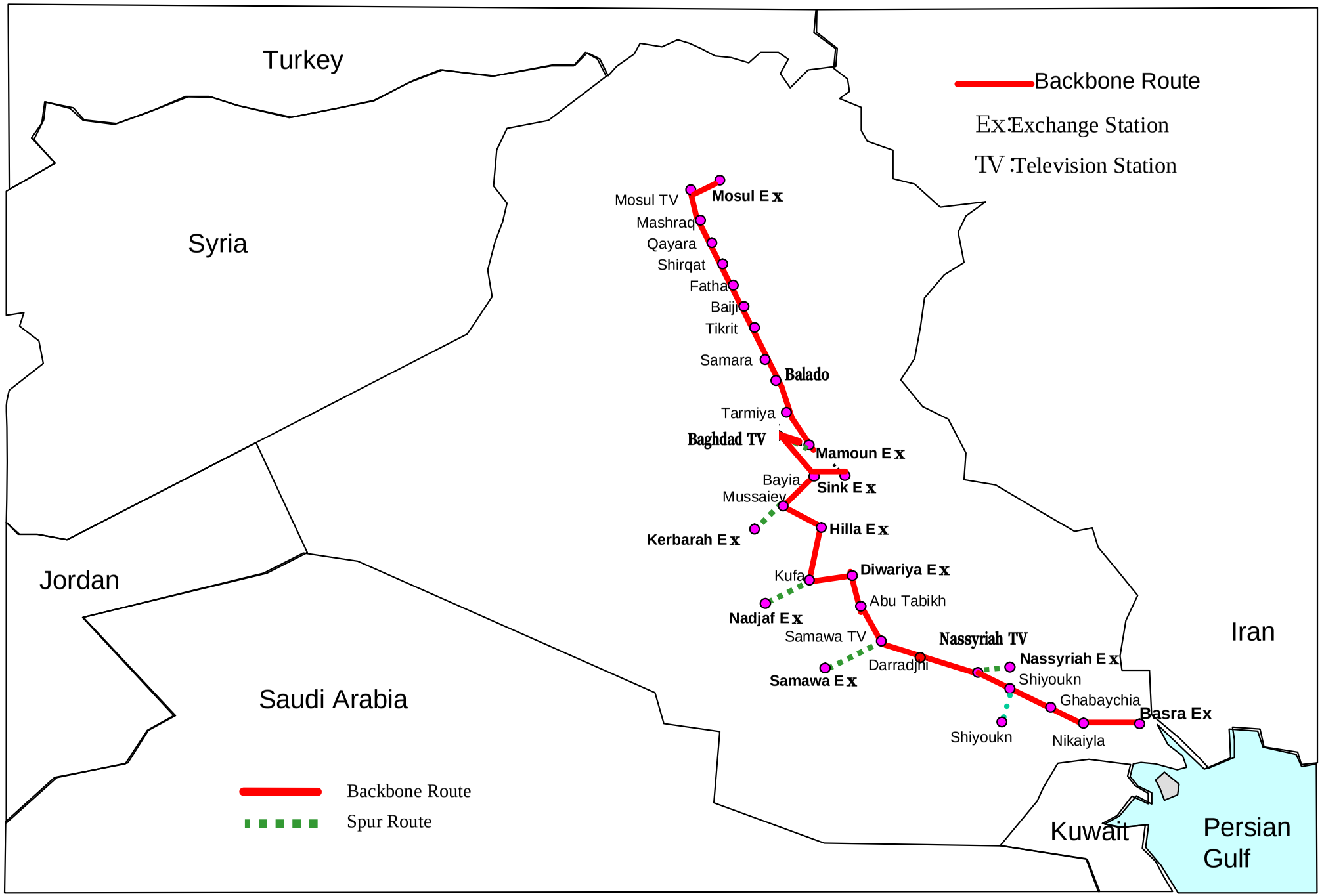
Very truly yours,

Tomotaka Taniguchi

Project manager,

Outline design study team on
the Project for Improvement of
Trunk Communications Network
in the Republic of Iraq

Nippon Koei Co., Ltd.



Location Map

TABLES

FIGURES

ABBREVIATIONS

AC	:	Alternate Current
CHILL	:	CCITT HIGH LEVEL LANGUAGE
CODEC	:	Coder Decoder
DC	:	Direct Current
DDF	:	Digital Distribution Frame
DEG	:	Diesel Engine Generator
E1	:	European Standard 1
EX	:	Exchange
FD	:	Frequency Diversity
G.O.S.	:	Grade of Service
G/T	:	Gain-to-Noise Temperature Ratio
INTS	:	International Transit Switch
IP	:	Internet Protocol
ITPC	:	Iraq Telecommunications and Posts Company
ITU	:	International Telecommunications Union
ITU-R	:	Radio-Communication Sector of ITU
ITU-T		Telecommunication Sector of ITU
LS	:	Local Switch
MDF	:	Main Distribution Frame
MFC	:	Milti-Frequency Code
MPEG	:	Moving Picture Experts Group
MW	:	Microwave Transmission
NFB	:	Non-Fuse-Breaker
NMS	:	Network Management System
O&M	:	Operation and Maintenance
PCM	:	Pulse Code Modulation
PDH	:	Plesiochronous Digital Hierarchy
PMU	:	Project Management Unit
PSTN	:	Public switched Telephone Network
QAM	:	Quadrature Amplitude Modulation
RECT	:	Rectifier
RX	:	Receive
SD	:	Space Diversity
SDH	:	Synchronous Digital Hierarchy
SPC	:	Stored Program Control
STM	:	Synchronous Transport Module
TMN	:	Telecommunication Management Network
TS	:	Transit Switch
TX	:	Transmit
UPS	:	Uninterruptible Power Supply
VSAT	:	Very Small Aperture Terminal

SUMMARY

Communications Network in Iraq consisted of 316 points of Telephone Switching Station, Analog Microwave backbone located in Baghdad, which is as the boundary between North and South and 6,000 km of Fiber Optic Cables, and the Communications Network provided 675,000 Channels of Telephone Communications Service. However, public telephone communications was badly damaged due to the war in 2003, the present situation prevails that available services are limited to some amounts.

To put it concretely, the present Microwave backbone does not function, the condition of the communication has deteriorated by the lack of Transit lines. It limits the available service to the limited area, and it prevents the recovery work from proceeding smoothly.

In addition to it, Transit Switching Stations are also partially damaged, Transit lines which are connected to them are not available, and also a part of the Local switches to accommodate the subscriber lines is damaged, therefore fixed telephone users who are connected to the damaged Switches has not received the service at present.

Moreover, the two earth stations for International Communications in Baghdad and the International Transit Station, which are connected to them are totally destroyed by the war, the quality of International Communications Service has remarkably deteriorated. The nation, at the moment, deals with the international communications by utilizing very small aperture terminal (VSAT) as the emergency measure; it is far from the necessary international communications service since the amount that VSAT can provide is very small.

Under such a situation, Minister of Communications in the Republic of Iraq visited Japan in March 2004, and directly requested Grant Aid from the Government of Japan regarding the problems of telecommunication sector that they are faced and have to be solved. The requests are as follows;

(1) Rehabilitation of Southern to Northern Microwave Backbone Network

Rehabilitation of the Main Route (539 km to South, 377 km to North from Baghdad) and spur routs which are relayed from Trunk Communications Network (Objected radio stations: 36 in total.) and Rehabilitation of Television Transmit equipment.

This transmission link covers the most populated areas in the country and consists of 2 grids of Southern Backbone (Baghdad – Hilla – Nadjaf – Samawa – Nassyriah – Basra: 22hops) and Northern Backbone (Baghdad – Samara – Tikrit – Mosul: 13 hops).

(2) Rehabilitation of Telephone Network (Transit and Local Switch)

This equipment consists of 2 national and 8 Regional Transit Switches, 7 Local Switches and 100 small capacity digital radio links (inter connecting transit, local and cellular exchanges) in order to accommodate prioritized (fixed and cellular) users in the most populated cities/areas and provide local and national interconnection.

(3) Installation of Standard A Earth Station in Baghdad

Two new Standard A Earth Stations (for Indian Ocean Region and Atlantic Ocean Region) will be installed near Baghdad (new site), for the urgent rescue work, as a replacement of old ones near Baghdad which were completely damaged during the war. Digital microwave Approach Link between 2 E/S locations and the station of International Transit Switching will also be installed.

(4) Installation of International Transit Telephone Switching

New International Transit Telephone Switching system, as a replacement of old damaged system, will be installed in the Central Switching Station in Baghdad in order to handle all the international and national telephone calls.

The Government of Japan received such requests and concluded that the study for judging the possibility of the assistance has to be conducted and entrusted the duty to the Preliminary Study Team initiated by JICA, by sending the team to Amman in Jordan from April 26 to May 3. During the study session, the team collected basic information regarding the present telecommunications conditions, priority, suitability and possibility of the implementation by discussing with Ministry of Communications in Iraq and Iraq Telecommunications and Posts Company (ITPC). Based on the result of the study, the Government of Japan examined and concluded the Basic Policy, as to the formation of the concrete agenda is proceeded, and it is to be Grant Aid, JICA formed the Outline Design Study Team and sent it to Amman from July 31 to August 28, 2004.

The Study Team examined the contents of the requests, chiefly verified the suitability of the requests as Grant Aid, especially the benefit, concluded as the plan of (1) and (2) shown below. Through the process of the examination, Television Transmit equipment in the relay point of Trunk Communications Network, Local Transit Switches, small capacity digital radio links and equipment for the earth stations which were included in the requests, however, they were decided to be excluded as the reasons below.

- Television Transmit equipment (a part of radio stations included): The broadcast equipment of the station relayed from the Trunk and Microwave Radio Transmit Equipment which connect to it seem to be less emergency. However, Television Station Equipment in the Trunk is included in Aid since it is to be practical use for distributing news which is beneficial to Iraqi nation.
- Local Transit Switches: The maintenance for the subscriber system is not included in the original requests from Iraqi side. Therefore it is appropriate for Iraqi side to execute the rehabilitation of Local Switches which are used to connect the subscriber system to the upper transit network.
- Small capacity digital radio link: It is the equipment, chiefly used to connect Local Station and Transit Station with radio, therefore it is appropriate to be executed by Iraqi Side.

- The Earth Stations: It is important for International Communications, however considering the situation that VSAT earth station manages for International Communications, it is judged as a less emergency item.

As for International Transit Switch, the Iraqi side withdrew it from the requested items, since they have already executed the procurement and the installation works.

(1) The Project for Improvement of Trunk Communications Network

Receiving the request of Rehabilitation of Southern to Northern Microwave Backbone Network, the Project aims to reconstruct the existing communication network by digital microwave transmission system as to 25 microwave stations which comprise Main Route in South to North Trunk Route.

This backbone is for data transmission among its connected areas. This transmission link covers the most populated areas in the country, and consists of two grids of Southern Backbone (Baghdad – Hilla – Nadjaf – Samawa – Nassyriah – Basra: 19 hops) and Northern Backbone (Baghdad – Samara – Tikrit – Mosul: 12 hops). The existing damaged analog backbone has been malfunctioning due to the war and the deterioration of the equipment and it has to be replaced by this new backbone. Following will be a major performance specification for microwave radios.

Items	Main Route	SPUR Route 1	SPUR Route 2
Frequency Band	U6GHz Band (6430-7110MHZ)	L6GHz Band (5925-6425 MHz)	11 GHz Band (10700-11700MHz)
Transmission Capacity	155 Mbps/SYS(STM-1)	155 Mbps/SYS(STM-1)	155 Mbps/SYS(STM-1)
Modulation System	64 QAM	128 QAM	64 QAM
RF Channel Allocation and Spacing	ITU-R F384-6 (40 MHz Spacing)	ITU-R F383-5 (29.65MHz Spacing)	ITU-R F387-7 (40 MHz Spacing)
Standard Path Length	50 km	20-30 km	20-30 km
Transmit Output Power	33 dBm/RF carrier	32 dBm/RF carrier	30 dBm/RF carrier
Diversity Arrangement for Fading	FD+SD System	FD System	FD System
System Configuration (No. of Operation System ＋ No. of Standby System)	4+1(Maximum 11+1)	2+1(Maximum 11+1)	1＋1, 2＋1, 4＋1(Maximum 11+1)

(2) The Project for Improvement of Transit Switches

Receiving the request of Rehabilitation of Domestic Telephone Transit network, the project aims to install the Transit Switches which will be placed in the existing stations, at the 10 points of 9 major cities/areas, considered to be the most populated areas in the capital, Baghdad and 8 others along 1,000 km of the Southern and Northern Routes Digital Microwave Backbone.

Transit switch has a routing and a switching function between subscribers and backbone, and also works for switching of incoming and outgoing calls. This equipment consists of ten sets of Transit Switches in order to accommodate prioritized users in the most populated cities/areas and provide a local and a national interconnection. The existing transit switches located in these switching stations have been out of order due to the war and the deterioration of equipment. 10 points where the switches will be each installed are follows; Baghdad I and II areas, Mosul, Kerbarah, Hilla, Nadjaf, Diwayiya, Samawa, Nassyriah and Basra. The following will be a major performance specification for switches.

Items	Technical Specification
Total Switching Capacity	- Transit Switch:10,000 - 20,000 trunks (Bothway circuits are 80%)
Traffic (Erl)	- 0.8 Erlangs/trunk
Traffic Distribution	- Intra office: 30% - Local (Own Area): 40% - National and International call: 30%
Interface Signaling System	- 90% : ITU-T CCS No.7 - 10% : R2 MFC
Number of CCS No.7 Links	TS: 32x2 (duplication)
Batteries	- Sealed maintenance free type (holding time :8 hours)
Rectifier	- AC 1f 220V(3f 380V)DC 48 V - Redundancy Configuration: N + 1

Above two Projects are scheduled for the implementations as 22 months for Improvement of Trunk Communications Network, and 24 months for Improvement of Transit Switches from the start of the detailed design. The rough provisional costs for these Projects are estimated as 7,154 million and 3,598 million Japanese Yen respectively which would be further examined by the Government of Japan for the approval of the Grant.

ITPC, the organization responsible for the work in Iraqi side, has the actual result to manage and maintain the existing communication facilities. Therefore it is considered to be possible to perform the management and maintenance the newly equipment for this project which has similarities to the existing facilities, technically and financially for itself. Based on it, the implementation of the project as Grant Aid is judged to be appropriate and the following effects shall be seen.

(a) Direct Effect

By the implementation of the Project, it is expected to improve telecommunications services such as transit telephone service and the transmission of television programs as the development of backbone digital microwave transmission route from south to north with transit switches installed in switching stations in major cities. Converting to the telephone circuit, 145,000 traffic will be recovered and it will be beneficial to 12,000,000 people living in Baghdad and 8 major cities/areas along 1,000 km of the Southern and Northern Routes Digital Microwave Backbone.

(b) Indirect Effect

This telecommunications development could contribute not only to promote various restoration projects, but also to improve of social services like a medical care and education by utilizing the public telephone service network. This newly installed microwave backbone can be utilized for fixed telephone network as well as for the mobile telephone network.

Following are the notes should be born in mind in order to carry out the project effectively and efficiently.

(1) Security issue

It is an indispensable to transport the equipment to each site without any damages and to secure the safety of the staffs and the workers engaged in the projects under the tense situation. Therefore, considerable guards during the local transportation and the process of the installation work are highly recommended. Also the design of the trunk communications network should be as simple as possible by such as maximum utilization of the existing facilities.

(2) Process issue

This Grant Aid Project is requested as equipment supply basis by Iraqi Government. The outline design however was made under turnkey base by the contractor because of the technical difficulties of the system integration. The problem arises that the contractor and the consultant can not enter Iraq due to the security reasons. In order to solve this problem, it is recommended that the contractor should open a project management office in Japan and in the third country, for instance in Amman, which enable to provide Iraqi sites with any kind of supports during the installation period. The consultant should apply the same manner as the contractor.

(3) Preparation issue by Iraqi side

Prior to this installation project, it is necessary to make preliminary arrangement for the site by the Iraqi side so that the installation of the new equipment to be conducted smoothly. This arrangement includes the repair or replacement of damaged buildings, rooms and antenna towers for the newly installation of the equipment, clearing the equipment sites, the maintenance of access roads to the site, and the security facilities. In addition to these Iraqi undertakings, the commercial power supply to the newly equipment is also subject to the Iraqi side. Since these undertakings require long period of months to prepare, a project implementation organization by Iraqi side is recommended to be established in order to monitor and to keep the project implementation schedule.

(4) Cooperation of Iraqi side

In detailed design stage for the implementation, further data and information for the design should be provided from Iraqi side to the consultant. Entry Permission to the sites to Iraqi local consultants shall be also required for obtaining further information for detailed design. In order to avoid any delay of issuance of permissions for the site survey and to help disclosure of relevant information from Iraqi side, Iraqi organization for the implementation of the project should be activated with clear rights and responsibilities.

(End)

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APPENDICES

CHAPTER 1

BACKGROUND OF THE PROJECT

CHAPTER 1 BACKGROUND OF THE PROJECT

After the Iraq War in 2003, the Government of Japan expressed the official assistance and announced Grant Aid Cooperation of total one billion and five hundred million US Dollars as urgent supports. In response to the announcement, the Government of Japan decided to focus on the several sectors which would contribute to the rehabilitation of basic infrastructures for Iraqi nation, and to the improvement of social security, and asked JICA to urgently formulate a necessary project on these sectors.

In respond to the Government's resolution, JICA dispatched the Preliminary Study Team to Jordan from January to March in 2004 to investigate some sectors of electric power, water supply and sanitation, health care, education and vocational training. Based on the investigation, the team selected the priority projects with preliminary design and cost estimation by verifying their necessity and urgency through hearing and collecting the data from relevant organizations and local consultants in Iraq.

Based on the above study result by Preliminary Study Team, the Government of Japan set some higher priority projects in March 2004. Regarding the other fields that Preliminary Study Team did not cover, only when the priority projects are found on the process of the research, the projects are to be considered to be implemented including telecommunications sector.

Under such circumstances, Minister of Communications in the Republic of Iraq visited Japan in March 2004, and directly requested emergency assistance from the Government of Japan regarding the problems of telecommunication sector that they are faced and have to be solved, it is on the grounds that Communication Network in Iraq has been badly damaged due to the war began in 2003. Consequently the Government of Japan concluded that the study for judging the possibility of the assistance has to be conducted and entrusted the duty to the Second Preliminary Study Team initiated by JICA, sent it to Amman in Jordan from April 26 to May 3. During the study session, the team collected basic information regarding the present telecommunications conditions, priority, suitability and possibility of the implementation by discussing with Ministry of Communications in Iraq and Iraq Telecommunications and Posts Company (ITPC).

Afterwards, the Government of Japan discussed referring to the result of the study, and concluded that they would proceed the assistance by formulating the concrete Grant Aid Project of telecommunications. As a result of the Government's resolution, JICA formed the Outline Design Study Team and sent it to Amman from July 31 to August 28, 2004 to conduct the further study.

This Outline Design Study was conducted aiming at the investigation into the contents of these 4 requests mentioned below, the necessity and emergency of each request, concluding a rough estimate for the cost of the project. During the several discussions in Amman, the Iraqi Team decided to delete the request of International Transit Telephone Switching since this equipment could be installed by Iraqi side.

(1) Digital Microwave Backbone (Southern and Northern Routes)

This transmission link covers the most populated areas in the country and consists of 2 grids of Southern Backbone (Baghdad – Hilla – Nadjaf – Samawa – Nassyriah – Basra: 22hops) and Northern Backbone (Baghdad – Samara – Tikrit – Mosul: 13 hops).

(2) Standard A Earth Station in Baghdad

Two new Standard A Earth Stations (for Indian Ocean Region and Atlantic Ocean Region) will be installed near Baghdad (new site), for the urgent rescue work, as a replacement of old ones near Baghdad which were completely damaged during the war. Digital microwave Approach Link between 2 Earth Stations locations and the station of International Transit Switching will also be installed.

(3) International Transit Telephone Switching

New International Transit Telephone Switching system, as a replacement of old damaged system, will be installed in the Central Switching Station in Baghdad in order to handle all the international and national telephone calls.

(4) Rehabilitation of Telephone Network (Transit and Local Switch)

This equipment consists of 2 national and 8 Regional Transit Switches, 7 Local Switches and small capacity digital radio links (inter connecting transit, local and cellular exchanges) in order to accommodate prioritized (fixed and cellular) users in most populated cities/areas and provide local and national interconnection.

As a result of the field survey at Jordan, and the several discussions with Japan's relevant organizations based the survey, the team concluded that the following measures should be taken immediately.

- Southern and Northern Digital Microwave Backbone (some spur TV stations are not included because of less urgency and priority), and
- Rehabilitation of transit switches (local switches and small capacity digital radio links are not included because of less urgency and priority).

Standard A Earth Stations were not employed as Japan's Grant Aid Project because there exist very small aperture terminals for international communications which barely allow presently international communications. It is considered that urgency and priority do not reach the necessary level.

Local switches were also not included to Japan's Grant Aid Scheme since their urgency and priority were not considered as higher than transit switches. The direct effects by introducing new local switches were less considered than transit switches.

CHAPTER 2

CONTENTS OF THE PROJECT

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2-1 Basic Concept of the Project

Telecommunications services in Iraq has limited due to damages of relevant facilities during the War. Existing analog microwave transmission have not been functioned, and the switching equipment connected to the transmission lines have also had limited capacity of lines by damages. In order to improve the present situation, the Iraqi Government planned urgent development for telecommunications to secure the public communications' means.

This Grant Aid project aims at the improvement of public telecommunications services of telephone, data, Internet by replacing the present damaged equipment with new ones and by providing necessary trainings to the engineers in Iraqi side to maintain the newly installed equipment. This Grant Aid project therefore includes procurement and the installation of the relevant equipment for rehabilitation of Northern to Southern trunk communications network in Iraq.

2-2 Outline Design of the Requested Japanese Assistance

The Study Team confirmed that the requested items with priority by the Iraqi Team are as follows. The International Transit Telephone Switching Equipment initially requested has been withdrawn by the Iraqi Team because this equipment has already been procured and installed by the Iraqi side.

(First priority): Rehabilitation of Southern to Northern Microwave Backbone Network

Rehabilitation of the Main Route (539 km to South, 377 km to North from Baghdad) and spur routs which are relayed from Trunk Communications Network (Objected radio stations: 36 in total.) and Rehabilitation of Television Transmit equipment.

(Second priority): Rehabilitation of Telephone Network (Transit and Local Switch)

This equipment consists of 10 Transit Switches, 7 Local Switches and 100 small capacity digital radio links.

(Third priority): Installation of Standard A Earth Station in Baghdad

Two new Standard A Earth Stations for Indian Ocean Region and Atlantic Ocean Region.

The Study Team examined the above requested items and verified the appropriateness as urgent Grant Aid Project from the viewpoint of the effects. Through these processes, the Study Team concluded that the two projects of "The Project for Improvement of Trunk Communications Network" and "The Project for Improvement of Transit Switches" should be appropriate projects as Japan's Grant Aid Project. Through the consideration for the appropriate projects, Television Transmit equipment in the spur routes, Local Transit Switches, Small capacity digital radio links and equipment for the Earth Stations were decided to be excluded from Grant Aid project as the reasons below.

- Television Transmit equipment (a part of radio stations included): the broadcast equipment of the station relayed from the Trunk and Microwave Radio Transmit Equipment which connect to it seem to be less emergency. However, Television Station Equipment in the Trunk is included in Grant Aid since it is to be practical use for distributing news which is beneficial to Iraqi nation.
- Local Transit Switches: the maintenance for the subscriber system is not included in the original requests from Iraqi side. Therefore it is appropriate for Iraqi side to execute the rehabilitation of Local Switches which are used to connect the subscriber system to the upper transit network.
- Small capacity digital radio links: It is the equipment, chiefly used to connect Local Station and Transit Station with radio, therefore it is appropriate to be executed by Iraqi Side.
- The Earth Stations: It is important for International Communications, however considering the situation that VSAT earth station manages for International Communications, it is judged as a less emergency item.

2-2-1 Design Policy

The design policies of the two projects of "The Project for Improvement of Trunk Communications Network" and "The Project for Improvement of Transit Switches" are described below.

The Project for Improvement of Trunk Communications Network

(1) Design Policy

North to South microwave transmission system consists of the following three components:

(a) North trunk lines from Baghdad (13 Radio Relay Stations, 539 km)

(b) South trunk lines from Baghdad (11 Radio Relay Stations, 377.4km)

(c) SPUR lines branched from trunk lines (8 Terminal Stations)

The route map is shown in Figure 2.2.1.

Concerning the implementation of the Project, it is conclude that the traffic improvement on the fixed public switch telephone services and development of transit transmission lines on the North and North to South microwave transmission system should be prioritized. This design is to be the reconstruction of the existing North to South Analogue microwave transmission route by digital transmission system which consists of 25 microwave radio relay stations on the Main route and 7 terminal stations connected by Transit Switch on the SPUR route. The digital microwave transmission route configuration under the Japan's Grant Aid is shown in Figure 2.2.2.

The transmission lines was established by the analogue microwave communications equipment before the war and used to operate as a public switched telephone network (PSTN), and also, as a relay transmission lines of the television programs. The facilities, however, has been damaged by the war and it is now impossible to provide the telecommunications services.

In order to rehabilitate the existing analogue microwave communications as the digital trunk communication network, urgently the new SDH digital microwave transmission equipment should be installed.

The digital trunk transmission lines shall be established by using the existing building and the microwave bands shall be used as the same frequency band as previously used, therefore, it is not required to make radio frequency coordination and to make path clearance tests.

The digital microwave backbone transmission link covers the most populated areas in the country as follows:

Southern Backbone ：Baghdad～Samawa～Nasiriyah～Basrah

Northern Backbone ：Baghdad～Samara～Tikrit～Mosul

The system design (path length, tower height and use of frequency bands) is shown in Figure 2.2.3.

(2) Microwave Radio System Configuration

The systems are composed of SDH microwave radio systems for long-haul. They have a transmission capacity of STM-1 per radio frequency (RF) channel. The system configuration is (4+1), STM-1, 155 Mbps, operating in the upper 6 GHz band (6.4-7.2)GHz between mainline stations using ITU-Rec.384-2. Lower 6GHz band is used for the spur links based on ITU-Rec.383-1. 11GHz band is used for the spur links.

The major performance specifications are shown in Table 2.2.1.

Table 2.2.1 Major Performance Specifications for Microwave Radio

Items	Main Route	SPUR Route 1	SPUR Route 2
Frequency Band	U6GHz Band (6430-7110MHZ)	L6GHz Band (5925-6425 MHz)	11 GHz Band (10700-11700MHz)
Transmission Capacity	155 Mbps/SYS(STM-1)	155 Mbps/SYS(STM-1)	155 Mbps/SYS(STM-1)
Modulation System	64 QAM	128 QAM	64 QAM
RF Channel Allocation and Spacing	ITU-R F384-6 (40 MHz Spacing)	ITU-R F383-5 (29.65MHz Spacing)	ITU-R F387-7 (40 MHz Spacing)
Standard Path Length	50 km	20-30 km	20-30 km
Transmit Output Power	33 dBm/RF carrier	32 dBm/RF carrier	30 dBm/RF carrier
Diversity Arrangement for Fading	FD+SD System	FD System	FD System
System Configuration(No. of Operation System＋No. of Standby System)	4+1(Maximum 11+1)	2+1(Maximum 11+1)	1＋1, 2＋1, 4＋1(Maximum 11+1)

(3) Procurement of Facilities

Newly required equipment for development of North and South microwave radio systems shall be as follows; Antenna (with 3.6 m diameters) and Feeder system, SDH Radio systems, SDH MUX equipment, PDH MUX equipment, DC Power Supply Equipment and Network Management System.

As for the followings , the existing buildings or facilities provided by the ITPC shall be used; Towers, Building, Diesel Engine Generators, Air Conditioning Equipment and AC Power Supply with main PDB and NFB.

The seven following microwave radio stations, where the destroyed towers or the damaged buildings are found, are required to repair or rebuilt by Iraqi side before the installation works of new equipment start; Mashraq, Baiji, Mamoun, Baghdad TV, Sink, Ghabaychia and Nikaiyia.

(4) Operation and Maintenance

Network Management System (NMS) for both microwave and SDH transmission equipment shall be installed and the operation and the maintenance of the system will be centered at Baghdad, Mosul and Basra maintenance center.

Local management craft terminal shall be installed at each radio station. Centralized management operation terminal shall be installed at Baghdad Maintenance Center.

The spare units and PCB’s for SDH transmission equipment shall be centralized at maintenance center. Remote control centralized management from Baghdad Maintenance Center shall be established.

In case of equipment failure at the remote microwave radio station, the maintenance engineers from maintenance center shall be dispatched to deal with the failure.

Basically the remote microwave radio station has to be designed considering the unmanned operation by the centralized monitoring system and the remote controlling equipment.

(5) Major undertakings to be taken by the ITPC

(a) Restoration of damaged buildings and towers (total 7 places)

(b) Installation, test and commissioning for the equipment to be procured by Iraqi side

(c) AC electricity distributing line to the site (with main PDB and NFB)

(d) Standby Diesel Engine Generators (DEG)

(e) Air-conditioner of the equipment room

(f) To secure floor space, power supplies, grounding, space for equipment in the equipment room

(g) Tower and associated facilities (Vertical/Horizontal feeder rack, Lighting rod, Tower lights, etc)

(h) Antenna mounting pipe and structure to tower

The Project for Improvement of Transit Switches

(1) Design Policy

The Digital Switching System with function of transit toll switch shall be installed at 9 major cities of Baghdad, Mosul, Kerbarah, Hilla, Nadjaf, Diwariya, Samawa, Nassyriar and Basra, which are the most populated areas of the Republic of Iraq.

The system shall equip the transit switch function to establish the national connectivity in the populated areas from north to south via Baghdad by routing north to south backbone digital microwave transmission lines over the distance of about 1,000 km. New digital switching system shall be installed in the existing transit exchange office. The existing analogue switch facilities were damaged during the war and they are now disconnected from the PSTN (Public Switched Telephone Network). The equipment consists of 2 national Transit Switch and 8 regional Transit Switch.

It is planned to implement the rehabilitation of 10 national transit toll switches damaged during the war in case Japan's Grant Aid is executed.

As a result, total 145,000 trunk lines will be restored and national transit telephone services will be remarkably improved. The scope of work in the rehabilitation project by the Japan's Grant Aid is shown in Figure 2.2.4.

(2) Technical Parameters of Digital Switch System

Rehabilitation of switch system consists of Transit Switching Equipment, Local Switching Equipment, Software, Office Data, DC Power Equipment (Rectifier and Battery with 8 hours Holding Time), Digital Distribution Frame(DDF), Terminal Block, Protection Device, Spares for two years amount and etc.

Major performance specification of switching equipment is shown in Table 2.2.2.

Table 2.2.2 Major Performance Specifications for Switch

Items	Technical Specification
Total Switching Capacity	-Transit Switch:10,000 - 20,000 trunks (Bothway circuits are 80%)
Traffic(Erl)	- 0.8 Erlangs/trunk
Traffic Distribution	-Intra office: 30% - Local (Own Area): 40% -National and International call: 30%
Interface Signaling System	- 90% : ITU-T CCS No.7 - 10% : R2 MFC
Number of CCS No.7 Links	TS: 32x2 (duplication)
Batteries	-Sealed maintenance free type (holding time :8 hours)
Rectifier	- AC 1φ220V (3φ380V) DC 48 V -Redundancy Configuration: N + 1

(3) Procurement of Facilities

Newly required equipment for rehabilitation of Transit Switch for Public Switched Telephone Network shall be as follows; Transit Switching Equipment, Software, Office Data, DC Power Equipment (Rectifier and Battery with 8 hours Holding Time), Digital Distribution Frame (DDF), Terminal Blocks, Protection Device, and Spares for two years and etc.

The existing buildings shall be used to accommodate the Digital Switching System. The following facilities shall be provided by the ITPC: Diesel Engine Generators, Air Conditioning Equipment and AC Power Supply with main PDB and NFB.

Mamoun Transit Toll Exchange Office building and Sink Transit Toll Exchange Office building were damaged during the war. Rehabilitation of building for those two Transit Toll Exchange offices shall be made by the ITPC before the start of installation works of new Digital Switching System.

(4) Operation and Maintenance

Each maintenance center can independently monitor the operations of switching and transmission facilities as well as transmission quality. In order to systemically manage national switching maintenance centers it is required to have control center that can centrally manage

and unify network operations. In case Japanese Grant Aid is executed for development of trunk communications network ITPC Operation and Maintenance Centers shall be established and located at Baghdad National Switching Center Building. Spares units and PCB for Digital Switching Equipment are centralized at Baghdad Operation and Maintenance Center. Operation and Maintenance (O&M) center maintains 24 hour real-time monitoring and controls the network to provide a telecommunication network of the highest reliability.

(5) Major undertakings to be taken by the ITPC

(a) Restoration of damaged buildings and towers :Mamoun Exchange Office (Baghdad NTS1) and Sink Exchange Office (Baghdad NTS2)
(b) Installation, test and commissioning for the equipment to be procured by Iraqi side
(c) AC electricity distributing line to the site (with main PDB and NFB)
(d) Standby Diesel Engine Generators (DEG)
(e) Air-conditioner of the equipment room
(f) To secure floor space, power supplies, grounding, space for equipment in the equipment room

2-2-2 Basic Plan

This Grant Aid Projects are expected to contribute to the telecommunications development in Iraq by restoration of trunk communications back bone and rehabilitation of transit switches. These Projects include procurement of the relevant equipment and the installation. The Iraqi side undertakes to prepare spaces for newly installed equipment, also to prepare antenna towers and commercial power supply equipment including emergency diesel engine generators and other necessary items to carry out the Projects.

(1) Overall plan

New equipment will be installed in the same places as existing equipment installed. Damaged sites by the War will be repaired or newly built. Since the number of damaged building is minor, it will be proper to utilize existing buildings for newly installed equipment. Existing power supply system will be able to be maximum used by proper rehabilitations.

(2) Equipment plan

Expected equipment lists for the Projects are attached in Appendix 5.

2-2-3 Outline Design Drawings

Outline design drawings are shown in Figure 2.2.1 to 2.2.4

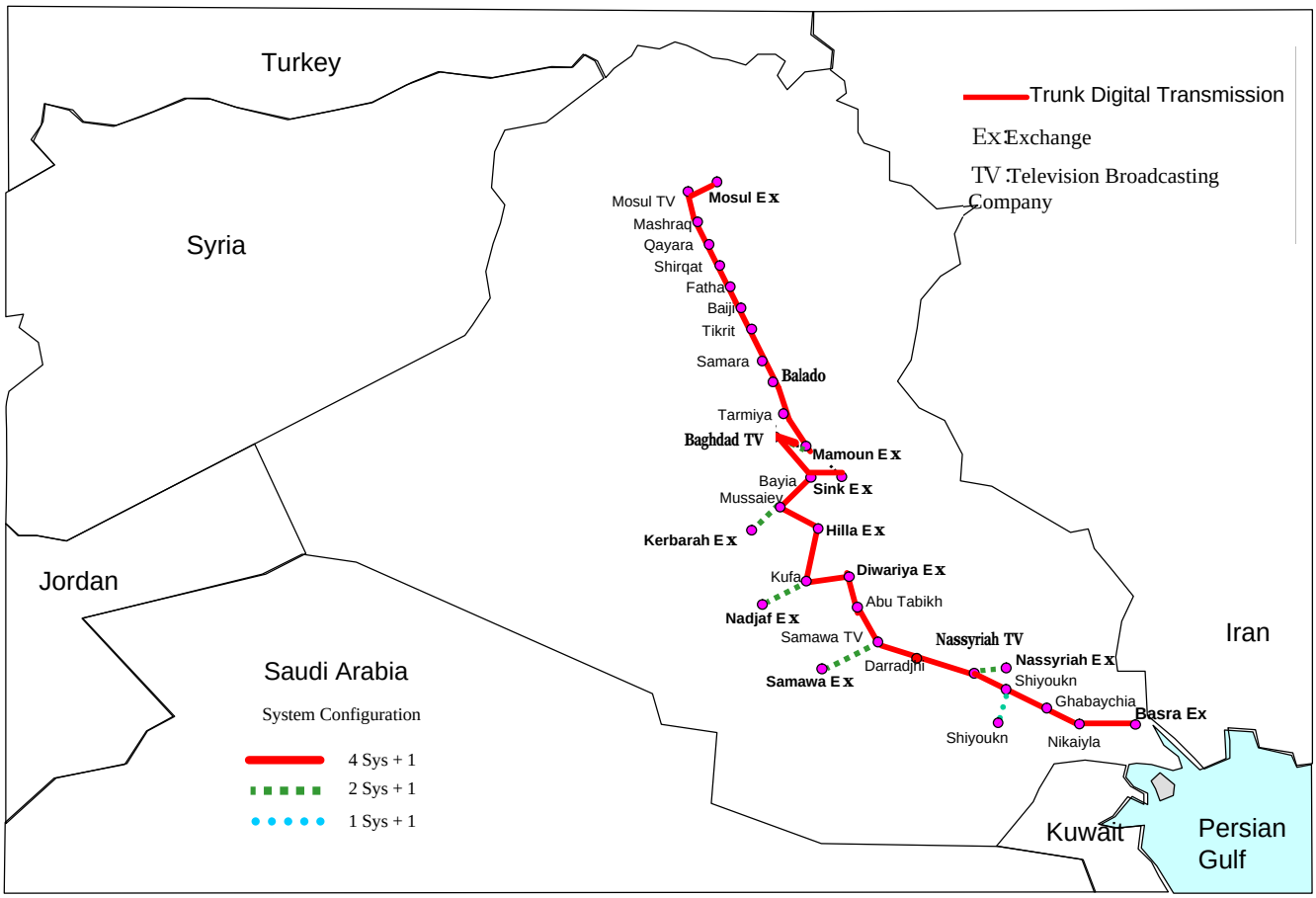


Figure 2.2.1 North to South Trunk Microwave Transmission Route

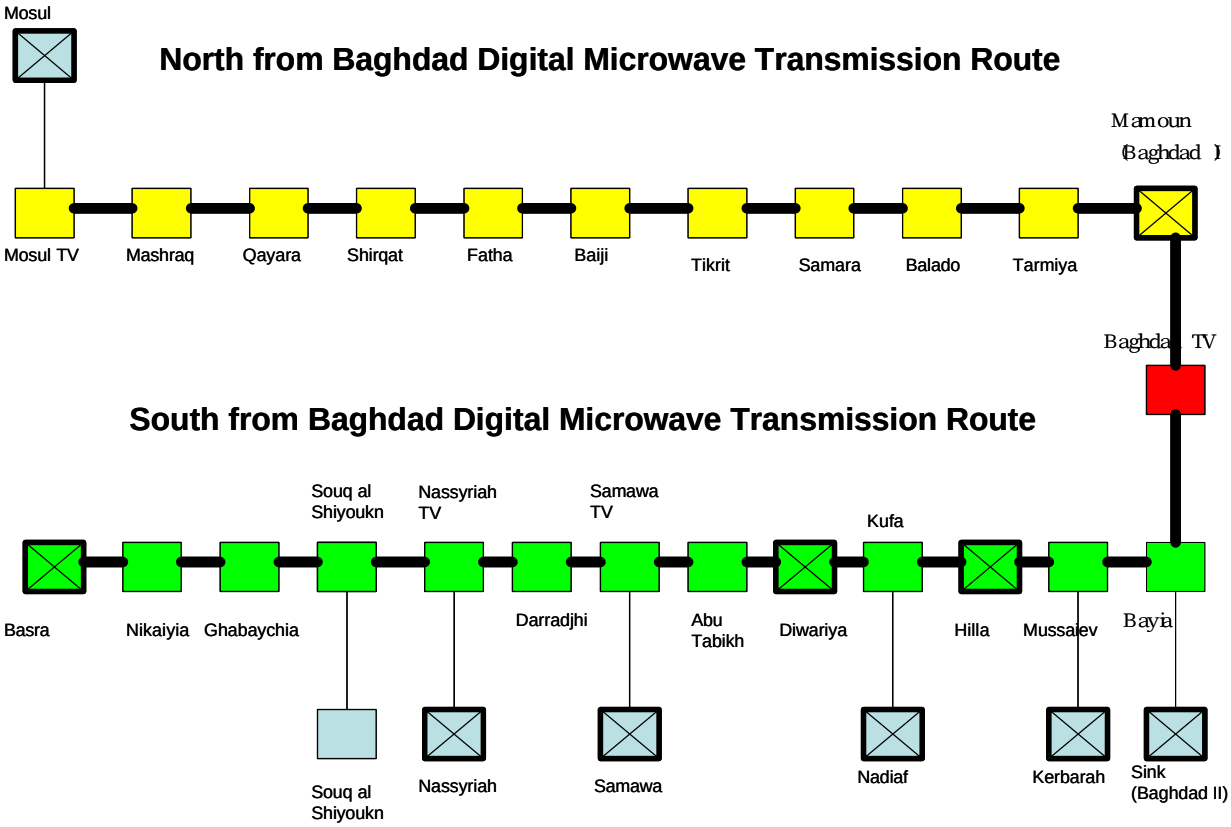


Figure 2.2.2 Digital Microwave Transmission Route Configuration under the Japan's Grant Aid

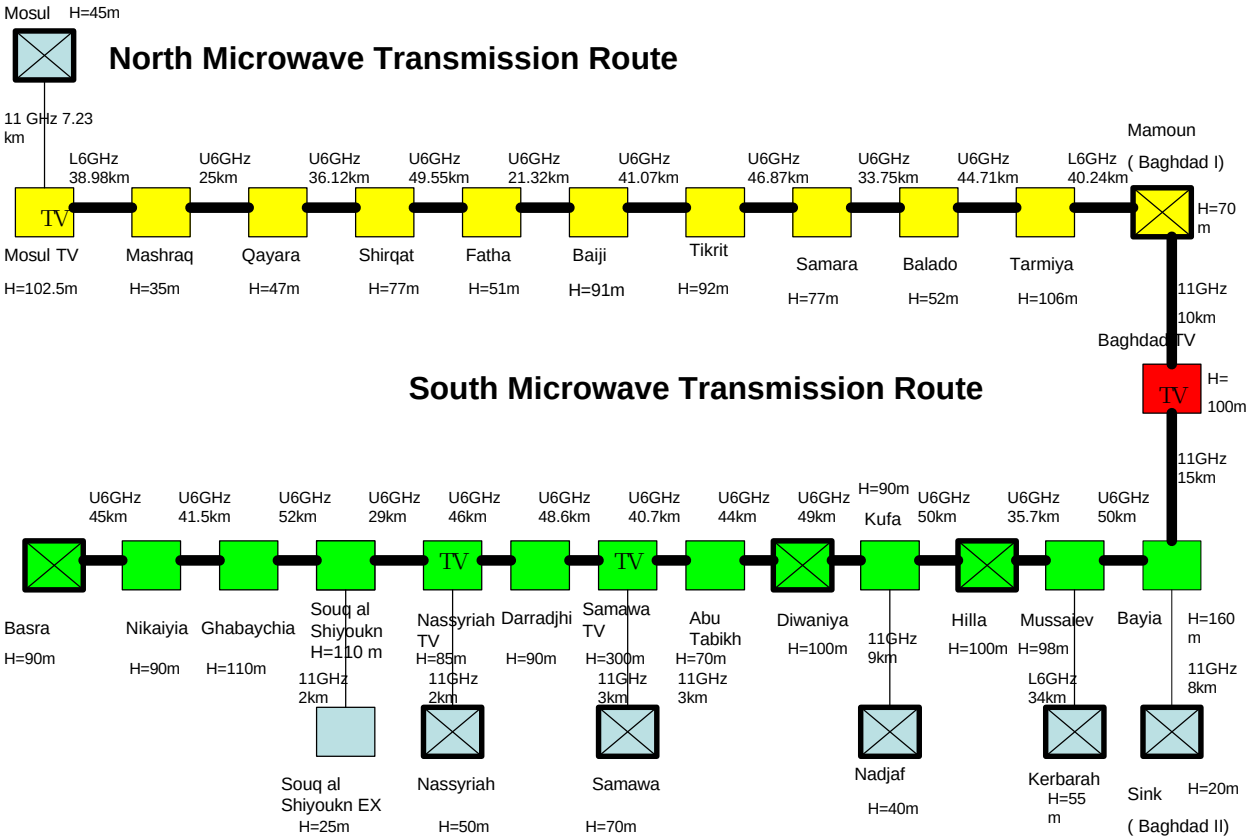


Figure 2.2.3 Design of Microwave Transmission Backbone Route

Transit Switch under the Japan's Grant Aid

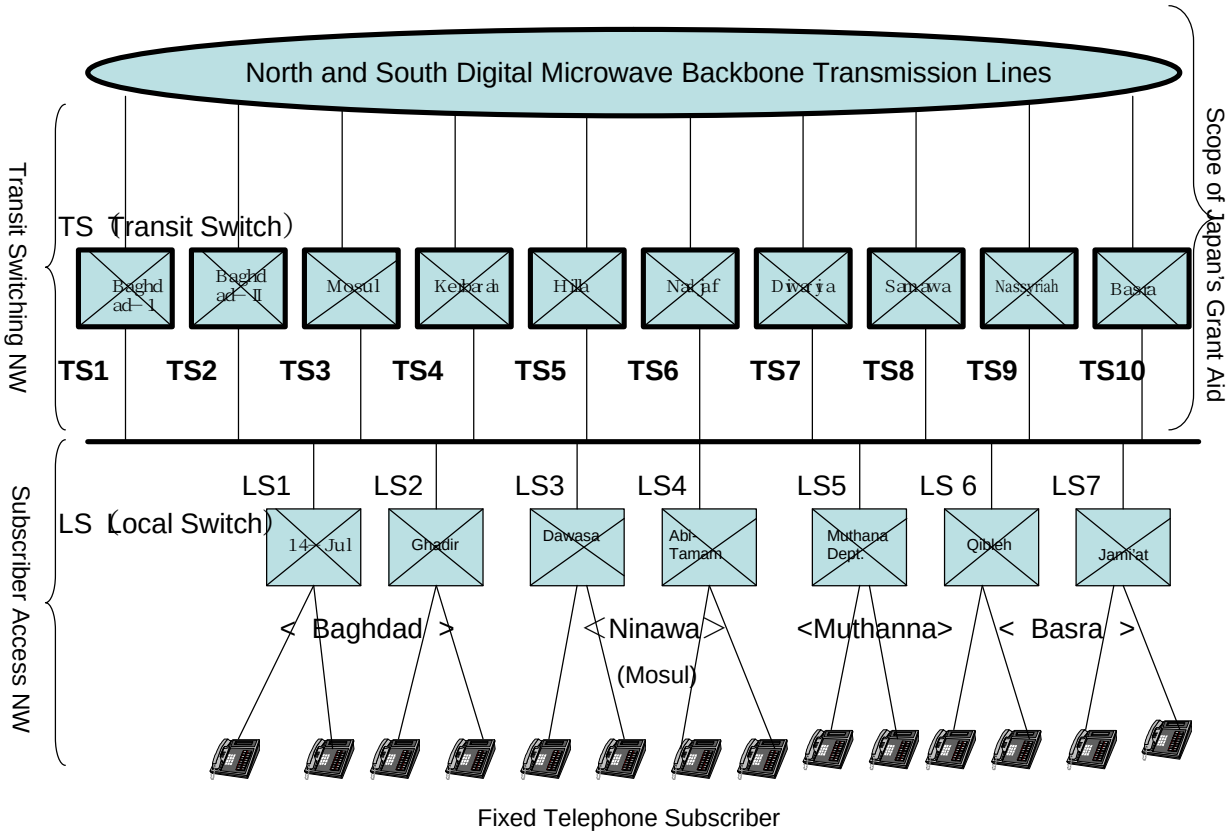


Figure 2.2.4 Trunk Communications System Configuration

2-2-4 Implementation Plan

This Grant Aid Project (hereinafter called “Project”) aims to replace the existing radio system and transit/toll switching system, which were destroyed or damaged during the war, with the new facilities of radio stations/telephone exchanges along 1,000 km from the north to the south in Iraq, and to recover the key telecommunications network infrastructure, connecting and interfacing with the existing many other telephone exchanges by utilizing many existing transmission facilities not damaged. In order to complete the Project within the target date, ITPC is requested to establish the Project Management Unit (PMU), for instance, to monitor, control and manage both the ITPC obligation works and the Contractor’s installation works. This Unit will be worked for project implementation with the Consultants.

Prior to the commencement of the detailed design work by the Consultant who assist the overall project, ITPC is also requested to organize the Project Team, which is consist of the ITPC Project Manager, counterpart engineers, and the Consultant. The Project Team intends to communicate closely with the Contractor and Government authority officers and to corporate each other for the respective implementation schedules, the review and evaluation of technical specifications and installation manners. The Team also manages the process of the overall project by adjusting and controlling overall project implementation schedule, which includes the respective installation schedules of the Contractor and the ITPC obligation so that the project is proceeded smoothly without any delay.

2-2-4-1 Implementation Policy

(1) Employment of Local Consultant

The Consultant performs the consulting services of the detailed design work, the site survey and supervision works for the Project in Jordan until the security situation in Iraq is improved, since Japanese are not officially allowed to enter Iraq due to the present security situation. The Consultant employs the Iraqi local consultant to perform some parts of the site survey, the supervision and the communication with ITPC on behalf of the Consultant.

(2) Experience and Capability of Local Contractor

As for the rehabilitation and the installation works of the telecommunications facilities damaged or destroyed by the last two wars, ITPC executed directly by procuring the

telecommunications equipment from the manufacturers from overseas, by receiving the instruction by manufactures to make use of the limited budget under the economic sanction. The ITPC entrusts civil works only to the private companies. The private companies therefore have less experience for installation work of the telecommunication facilities.

(3) ITPC Obligation and Technical Coordination

There are several ITPC obligations under the Project such as the repair and installation of the existing exchange and station buildings, antenna towers, transmission systems, commercial power facilities, AC power facilities, stand-by diesel engine generators (DEG), air-conditioning facilities, including the removal of the unnecessary damaged or destroyed existing equipment and facilities. The frequent technical coordination for the capacity design of the new equipment and facilities mentioned above is required between ITPC and the Consultant at the detailed design stage, including the stage of the contractor selection and tender evaluation.

(4) Mobilization of Local Contractor

The local contractors of the telecommunications facilities installation in Iraq are short of their experience, because ITPC is the monopoly telecommunications operator in Iraq and install the telecommunications facilities by themselves, except for the civil works concerned. The Contractor is requested to giving the proper technical training for the installation work to the local contractors so that the mobilization of the local contractor is effective.

(5) Mobilization of Foreign Engineers and Contractors (Hardware)

The telecommunications facilities of the radio and switching equipment will have to be installed, tested and adjusted under the instructions by the experienced professional engineers or supervisors with the possible care, since such complicated equipment installation works are not like the ordinary and simple works. Therefore, essentially the local professionals should conduct the installment. However in this case, due to the less availability of such engineers and technicians in Iraq, except for ITPC, the Contractor is requested to hire such experienced professional engineers and supervisors from Japan or overseas.

(6) Mobilization of Foreign Engineers and Contractors (Software)

The mobilization of the professional software engineers is essential for the installation of the switching equipment, since the switching equipment is a kind of real time computer operated by the massive software. Because of the lack of the experienced software engineers in the private companies in Iraq, except for ITPC, the Contractor is requested to hire the experienced professional software engineers and technicians from Japan of overseas and to locate in the local areas.

2-2-4-2 Implementation Conditions

(1) Adherence of Completion Target

The Contractor can start the installation works at site only after the completion of the various ITPC obligation works on the site. In addition to the close communications and coordination between the Contractor and ITPC, as of the ongoing schedule or the process in each site both parties are strictly requested to adhere to the completion target of the respective obligations in each site, including the internal works of the Contractor such as DC power facilities, radio system and switching system.

(2) Necessity of heavy machines

The vehicle with crane or the winch is required since the installation works of the new antenna and related facilities, and the removal of the existing unnecessary antenna are conducted on the very high tower. All other installation works except for the antenna are conducted inside the building. The proper lifting devices to lift up the new equipment into the second or upward floors are not provided in some buildings, judging from the pictures at the site survey. It is necessary for the Consultant to check the availability of such lifting facilities through the site survey at the detailed design stage. In case that there is no availability in Iraq, the Contractor is requested to deliver such vehicles or machines from Japan or overseas.

(3) Major Equipment and Installation Materials

All the equipment and installation materials will be imported from Japan or overseas, except for the scaffolding materials such as timbers, ropes, etc., which are available in Iraq.

2-2-4-3 Scope of Works

The obligations to be undertaken both by the Iraq and Japanese sides under the Project are classified below:

(1) Obligation to be undertaken by the Japanese Side

(a) Detailed design of the new radio and switching systems
(b) Supply and delivery of the new equipment
(c) Supply and delivery of the installation materials
(d) Installation, testing, adjustment and commissioning of the new equipment
(e) Technical training in Japan (hardware installation, testing, adjusting, commissioning)
(f) Technical training in Japan (software)
(g) Technical assistance for solution of various problems arose during installation work (in Jordan)
(h) Technical assistance for solution of various problems arose during installation work (in Japan)

(2) Obligation to be undertaken by the Iraqi Side (Common Items)

(a) Land preparation for repair and construction of damaged/destroyed buildings and other facilities
(b) Provision of commercial power supply, water supply, drainage, telephone line and scaffolding materials site
(c) Establishment of Project Management Unit (PMU)
(d) Organization of Project Team and counterpart staff under PMU
(e) Custom clearance assistance for exemption of taxes and duties
(f) Provision of store houses for equipment and materials imported
(g) Organization of operation and maintenance and staffing for new systems
(h) Security provision of building and new facilities during installation period
(i) Budget provision for Project

(3) Obligation to be undertaken by the Iraqi Side (Technical Items)

(a) Provision of information and data required for detailed design (to the Consultant)
(b) Repair and construction of damaged or destroyed buildings for new systems
(c) Repair and construction of damage or destroyed antenna tower
(d) Repair and construction of damaged or destroyed fence
(e) Removal of existing unnecessary facilities for the new equipment

(f) Repair and painting of equipment room for the new equipment
(g) Installation of partition, door, window and glass required for air-conditioning
(h) Provision of commercial power lead-in and required facilities
(i) Repair or installation of destroyed or damaged stand-by DEG and associated facilities
(j) Repair or installation of destroyed or damaged air-conditioning equipment
(k) Repair or installation of destroyed or damaged optical fiber transmission equipment

2-2-4-4 Consultant Supervision

(1) Employment of Consultant

In order to implement the Project smoothly, the Project Team is organized under the PMU which is established by ITPC to monitor, control, manage and coordinate with the ITPC departments and the Contractor. The Team has to be consists of the ITPC staff and the Consultant engineers (local consultant on behalf of the foreign consultant in Iraq). The Project implementation is divided into two stages, (a) the detailed design and selection of the Contractor, and (b) the installation and construction. At the detailed design stage, On-site survey, detailed design, Preparation of tender documents, Tender evaluations, Preparation of supply and installation contract, etc are included. At the installation stage, Check of detailed installation drawings, Monitor of the factory inspection test, Supervision of installation work, the acceptance test and commissioning, and the hand-over of the completed systems to ITPC. For the smooth implementation of the various complicated works, it is essential for ITPC to employ the Consultant to assist them at all the implementation stages. The local consultants have to be hired to assist them in various works such as the site survey, supervision, progress monitor at the site on behalf of the Consultant, because the Japanese Consultant is officially not allowed to enter Iraq under the present security situations.

(2) Scope of Consulting Services

(a) Selection of Contractor

At the detailed design stage, the Consultant assists ITPC in the site survey, Detailed design, Preparation of tender documents (general conditions and technical specifications), Pre-qualification of the tenders, Tender evaluation, Selection of the successful tenders, Preparation of draft supply and installation contract, etc.

(b) Supervision Work

At the installation stage, the Consultant assists ITPC in the Examination of the detailed installation drawings (prepared by the contractor), Supervision the inspection test, the installation work, the installation progress, the completion test at site, the commissioning, the hand-over of completed systems to ITPC. The Consultant assists ITPC in the Inspection and Monitor of the installation progress and works to examine whether the installation is conducted in accordance with the installation manners approved by ITPC or the process of the installment is adequate by sending the local consultant the local consultant to the installation sites periodically.

(c) Examination and Approval of Contractor's Documents

At the manufacturing and installation stages, the Consultant assists ITPC in the approval of the detailed installation drawings, equipment drawings and samples, standard installation methods, installation schedules to be submitted by the Contractor, after the examination of such technical documents.

(d) Observation the Factory Test

The Consultant assists ITPC in the Observation the factory inspection test of the equipment and materials in the manufacturer's factory to confirm that they meet the technical specifications of the contract, prior to the shipment of such equipment and materials. The Contractor can ship such equipment and materials only after the approval of quality and quantity by the Consultant.

(e) Examination of Contractor's Invoices

The Consultant assists ITPC in the check of the content, quantities and costs of the Contractor's invoices for the payments at the installation stage and after the completion of the project ,including the payment arrangement.

(f) Hand-over of Completed Facilities

The Consultant assists ITPC in the supervision the acceptance test of the completed facilities and the check of the installation drawings of the completed facilities.

(g) Reports and Recommendations

Through all the consulting services stages the Consultant assists ITPC in solution of various technical problems arise during the installation work, by submitting reports and recommendations for the solution in order to complete the Project by the target date.

(3) Consultant Mobilization Plan

(a) Overall Project Control

Through all the installation stages the Consultant is requested to assist ITPC in the monitor and control both the ITPC obligation works and the Contractor's installation works in order to complete the entire Project by the target date. The major responsibility by the Consultant's supervision is the overall project monitor and control, the advice and instructions to both ITPC and the Contractor, and the adherence to the completion target date, through the continuous acquisition of the overall project progress and the assurance of the quality of the installed equipment manners.

(b) Engineers Mobilization Plan

In order to implement the project smoothly and to complete the project by the target date, the Consultant plans to perform the consulting services such as the overall progress monitor and control, technical assistance and quality assurance at the installation stage, combining both Japanese engineers to be mobilized in Jordan and Iraqi engineers to be employed and dispatched to sites in Iraq on behalf of Japanese engineers to assist them. The continuous supervision work at each site by the local consultant is practically difficult during all the installation works by the Contractor, because the objective work sites are located along the radio transmission routes of about 1,000km from the north to the south. The Consultant plans to mobilize the engineers at site on the spot supervision basis.

2-2-4-5 Procurement Plan

(1) Procurement Plan

The major equipment and materials such as radio equipment, switching equipment, transmission equipment, DC power equipment, including the major installation materials, are imported from Japan and overseas due to no availability in Iraq. The installation materials such as cement, reinforcement iron bar, sand, stone, scaffolding timbers, etc., are able to be procured locally, which is available in Iraq.

(2) Spare Parts for Operation and Maintenance

The spare parts and consumables for the operation and maintenance of the new systems under the Project are supplied for 2 years amount to ensure the reliability of the equipments. There is no agent of the manufacturer in Iraq to supply the spare parts and consumables, except

for a manufacturer overseas . However the supply is possible even after the 2 years stock are out through the several branch offices of Japanese trading companies in the neighboring countries, which are the agents of manufacturer and supply the spare parts and consumables,

(3) Factory Observation Test

After the completion of manufacturing, the Consultant and/or ITPC's engineers observe the factory inspection test in the manufactures factory to check the quality and quantity of the new equipments and materials, before the shipment.

(4) Technical Coordination of Commercial Power Supply

As a result of the site survey by the local engineers, the commercial power supply was available just about half day (50%) per day through the all objective sites. The continuous power supply is essential for the stable and continuous operation and maintenance of the telecommunications facilities. In general the hybrid combination of the commercial power supply, stand-by DEG and batteries is adopted by the telecommunications operators for the stable power supply to the telecommunications facilities. The technical coordination for the stand-by DEG will be done at the detailed design stage between the ITPC engineers and the Consultant.

(5) Transportation Route to the Project Sites

There are various transportation routes across neighboring countries from Japan to the project sites in Iraq. Route via air or ocean is usually taken into account in most cases for transportation to the cities of Iraq. In this project, air transportation route by way of Baghdad Airport has been studied by local consultants hired by the Consultant, in terms of minimizing the risk against inland transportation to the project sites, and the period for transportation. However, the local consultants have reported that no air transportation routes are available through any Iraqi airport with cargo facilities. Therefore, ocean transportation is carefully studied in this project.

Generally, transportation routes to the Iraqi sites are listed below.

(via)

1. Turkey (Mersin, Iskenderun)
2. Syria (Latakia)

3. Lebanon/Syria (Tarutus, Tripoli, Beirut)
4. Israel/Jordan (Haifa)
5. Jordan (Aqaba)
6. Kuwait (Shuwaikh, Shuaiba)
7. Dubai (Umm Qasr, Jebel Ali Rashid)

This project is to provide communication equipment. Generally, it is so sensitive and fragile that it can not be easily transferred to another container through the transportation to the project sites. So it has to be transported there directly after it leaves Japan. Weight of the communication equipment is expected to become high. Therefore, port facilities to handle the equipment require sufficient capabilities enough to transfer heavy and many cargoes at one time. Consequently, transportation routes to the project sites are limited to via 3 ports (above No.5, 6 or7).

For the implementation of this project, it is essential to have an armed security guard protect a transportation convoy to the Iraqi sites. However, a security company in Jordan has revealed that the conflicts occurred in southern parts of Iraq such as in Nadjaf prevent even security companies from recruiting security guards and performing the security service on the southern route. They also said that it could have difficulty undertaking the mission itself.

In Kuwait, there is a restriction on immigration against Iraqi people. Therefore, trucks from Iraq are hardly allowed to enter Kuwait. In that case, the trucks have to be procured in Kuwait or Saudi Arabia. And it means that the drivers who will work spontaneously can not be easily collected, and it also means that large amount of equipment can not actually be transported form Kuwaiti ports.

This may conclude that the transportation via Aqaba port in Jordan to the Iraqi sites is the most realistic route at present.

It is suggested at present that the equipment and materials should be unloaded in Aqaba port in Jordan, and transported through Jordan to the western border to Iraq. If any congestion such as traffic jam in the border of Iraq is expected, the convoy of trailers could change the route toward a route via Syria, and it can enter Iraq from the northern border. The equipment and materials to the project sites are suggested to be delivered in the daytime only for security reasons. Unless appropriate camps for the convoy are prepared for the delivery to a project site, it is suggested that the convoy should stay at a Baghdad security camp, which is protected by armed security guards. The study estimates the transportation would take approximately two months from Japan to the remotest site.

(6) Security guard during transportation and installation

It is important to locate the armed security guards to the trailers loaded with the equipment to protect them during the transportation. At present plan, it is suggested that the armed security guard should comprise 3 vehicles of each 3 armed guards for each convoy, consists of 4 trailers. Generally, it is one of the essential requirements to reduce insurance fee to place security guard designated by the coalition forces of the United Nations for the transportation for the contract with insurance companies. This project puts much consideration on the selection of a security company.

During the installation of the equipment, armed security guards will be placed in and around a project site, and to perform the duty toward building and people concerned. Actually, this group of the security guards will consist of people from a third country such as Australia and Britain, and Iraqi people.

2-2-4-6 Quality Control Plan

(1) Training of ITPC Engineers

The technical training of the hardware and software installation to the ITPC engineers in the factory is planned by the Contractor, concerning the installation, operation and maintenance of the new systems to be supplied under the Project. The quality policy and control procedures are one of the important curriculums of the training.

(2) Training of Contractor's Staff

Prior to the commencement of the installation work, the Contractor provides the training with the Contractor's foreign and/or local engineers and technicians, who engage in the actual installation work for the good installation manners based on the quality control policy.

2-2-4-7 Implementation Schedule

The implementation of the Project is describer below. The detailed project implementation time schedule is shown in Table 2.2.3.

(1) Project Preparation

As the first step of the commencement of the Project, the Government of Iraq and the Consultant in Japan conclude the consulting services agreement for the Project, after the conclusion of the Exchange of Note between the Government of Japan and the Government of Iraq.

(2) Selection of Contractor

As the second step, the Consultant starts the detailed design work in Jordan, employing the local consultant in Iraq, together with the ITPC Project Manager and counterpart staffs in order to prepare the tender documents for the selection of the Contractor. The competitive tender is invited, and ITPC and Consultant select the successful tenderer after evaluation of the tender proposals. The supply and installation contract is concluded between the Government of Iraq and the Contractor.

(3) Production of Equipment and Materials

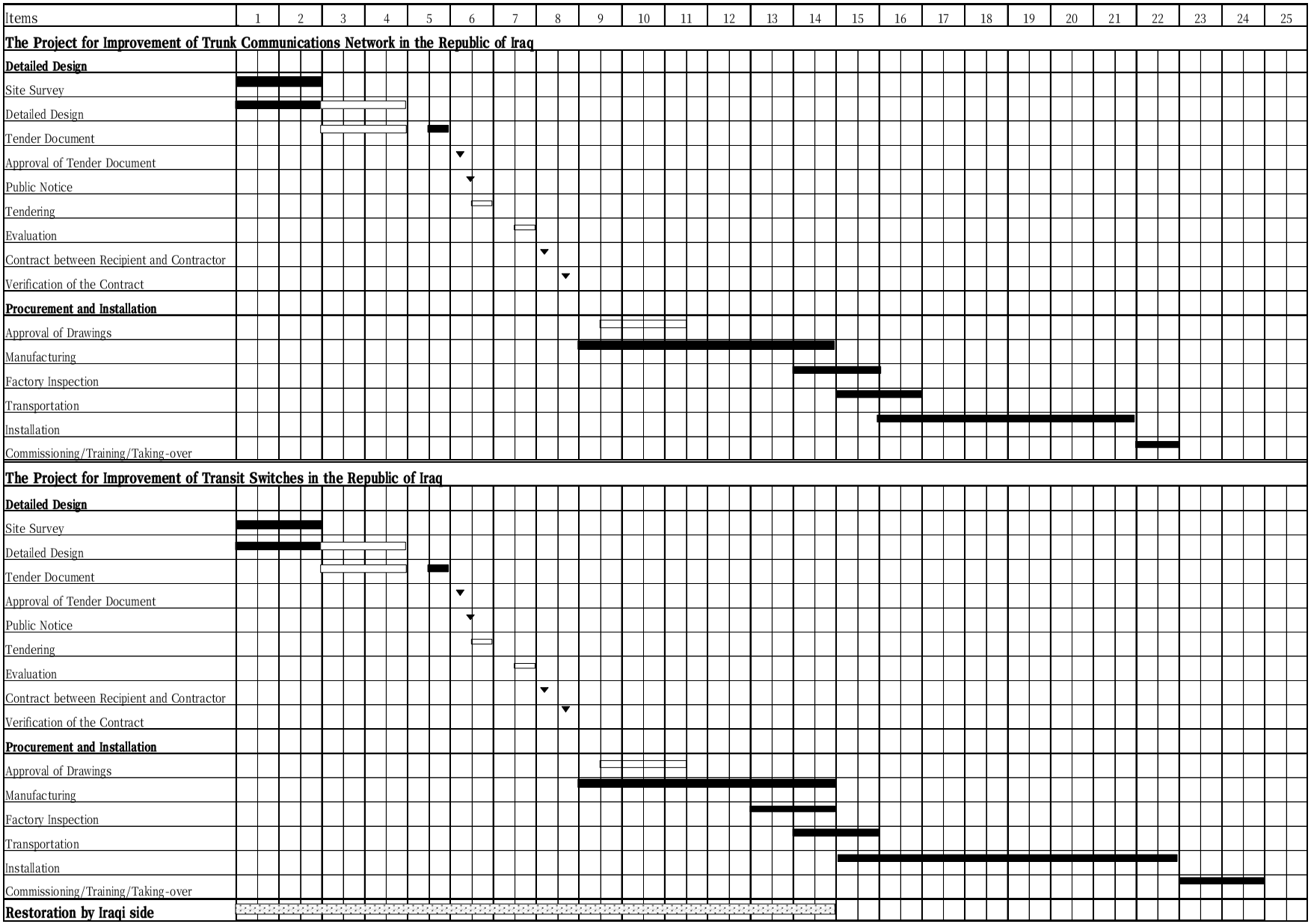
As the third step, the Contractor starts the production of the equipment and materials in the factory after the detailed site survey and preparation of the installation drawings. The produced equipment and materials are shipped to Iraq, after the successful factory inspection.

(4) Installation, Testing and Commissioning

As the fourth step, the Contractor starts the installation of the equipment and materials at site. The installed equipment will be tested and adjusted. The completed systems are tested under the witness of ITPC and the Consultant. Finally the completed systems are commissioned and hand-over to ITPC

Table 2.2.3 Project Implementation Time Schedule

THE PROJECT FOR IMPROVEMENT OF TRUNK COMMUNICATIONS NETWORK IN THE REPUBLIC OF IRAQ



2-3 Obligations of Recipient Country

Details of the obligations of the Iraqi side are described in the previous Chapter 2-2-4-3 and the outline is mentioned below:

(1) Land preparation for repair and construction of damaged/destroyed buildings and other facilities

(2) Repair and construction of the damaged or destroyed buildings, antenna towers, fences

(3) Removal of existing unnecessary facilities, installation of partition, door, window, glass, and required painting of room

(4) Provision of commercial power lead-in and facilities required, repair or installation of damaged or destroyed stand-by DEG and associated facilities and air-conditioning equipment and optical fiber transmission equipment

(5) Provision of commercial power supply, water supply, drainage, telephone line and scaffolding materials site

(6) Establishment of Project Management Unit (PMU)

(7) Organization of Project Team and counterpart under PMU

(8) Custom clearance assistance for exemption of taxes and duties

(9) Provision of store houses for equipment and materials imported

(10) Organization of operation and maintenance and staffing for new systems

(11) Security provision of buildings and new facilities during installation period

(12) Budget provision for Project

(13) Provision of information and data required for detailed design (to Consultant)

2-4 Project Operation Plan

(1) Radio System

The new radio transmission systems installed under the Project are monitored and controlled remotely through the Network Management System (NMS) to be installed in Baghdad. The new radio systems are principally designed without any operation and maintenance staff at each site. Therefore it is possible for ITPC to reduce the number of operation and maintenance staff at each site, in which 5 staffs are stationed now, through increase of the efficiency of the operation and maintenance procedure. The periodical maintenance, however, is required for the stand-by DEG, air-conditioning facilities and related facilities, through the new radio systems are designed free of operation and maintenance, in consideration of the present situations that the commercial power is of 50% supply per day in all objective sites now. The spare parts for the operation and maintenance for the radio transmission systems is kept in the regional operation and maintenance centers. The operation and maintenance staff in the regional centers is dispatched to repairs any troubles in the remote radio stations, bringing the spare parts required, as soon as any trouble is found through the NMS. The operation and maintenance of the new radio systems in the remote station is not required, because such systems are monitored and supervised by the NMS mentioned above.

(2) Switching System

The present operation and maintenance staff are 18 persons (4 engineers and 14 technicians) in average for the objective 10 transit/toll exchanges. All the switches in Iraq are of digital type as the site survey results show. Accordingly there is no problem for the operation and maintenance of the new switching systems in view point of the technical capability and numerical staff, through the proposed technical trainings to the present staff in short period in Japan for 20 engineers (1 hardware engineer and 1 software engineer for each exchange) in total by the Contractor. The revision of the operation and maintenance organization is not necessary, because the operation and maintenance is done by such key staff trained in Japan.

2-5 Cost Estimate for the Project

(1) The project for Southern and Northern Routes Digital Microwave Backbone.

In case that Grant Aid is implemented, Japan's share of the expenses is as below (shown in table 2.5.1). Iraq's share of the expense has not been clear, therefore, only the expenses as Japan's Grant are described. This cost estimate is provisional and would be further examined by the Government of Japan for the approval of the Grant.

Table 2.5.1 Cost Estimate for the project for Southern and Northern Routes Digital Microwave Backbone

Item		Cost Estimate (Unit: thousand yen)
Equipment Procurement		6,662,320
	1 Equipment	3,335,192
	Southern Backbone Digital Microwave Radio Stations	1,524,168
	Northern Backbone Digital Microwave Radio Stations	1,171,884
	Southern SPUR Digital Microwave Radio Stations	524,897
	Northern SPUR Digital Microwave Radio Stations	84,979
	Others	29,264
	2 Transportation/Packing	1,119,140
	3 Installation	870,385
	4 Procurement Control	1,337,603
General Management		199,870
Consulting Service		228,609
Procurement Management		63,411
Total		7,154,209

Period of cost estimate; September, 2004
Exchange Rate; 1US$=109.425YEN
(Average Rate from March, 2004 to August, 2004)

(2) The project for Transit Switches

In case that Grant Aid is implemented, Japan's share of the expenses is as below (shown in table 2.5.2). Iraq's share of the expense has not been clear, therefore, only the expenses as Japan's Grant are described. This cost estimate is provisional and would be further examined by the Government of Japan for the approval of the Grant.

Table 2.5.2 Cost Estimate for the project for Transit Switches

Item			Cost Estimate (Unit: thousand yen)
Equipment Procurement			3,169,113
	1 Equipment		1,417,000
	Transit Switches	Baghdad I Station	167,000
		Baghdad II Station	167,000
		Mosul Station	167,000
		Kerbarah Station	121,000
		Hilla Station	144,000
		Nadjaf Station	121,000
		Diwariya Station	121,000
		Samawa Station	121,000
		Nassyriah Station	121,000
		Basra Station	167,000
	2 Transportation/Packing		433,452
	3 Installation		735,335
	4 Procurement Control		583,326
General Management			95,073
Consulting Service			265,036
Design Management			69,246
Total			3,598,467

Period of cost estimate; September, 2004
Exchange Rate; 1US$=109.425YEN
(Average Rate from March, 2004 to August, 2004)

CHAPTER 3

PROJECT EVALUATION AND RECOMMENDATIONS

CHAPTER 3 PROJECT EVALUATION AND RECOMMENDATIONS

3-1 Project Effect

It is expected to improve telecommunications services such as transit telephone service and the transmission of television programs by the development of backbone digital microwave transmission route from south to north with transit switches installed in switching stations in major cities. This telecommunications development can contribute to promote various restoration projects, to secure public peace. In addition to these effects, it also contributes to improve social services like medical care and education which are related to the utilization of public telephone service network. This newly installed microwave backbone can be utilized by not only for fixed telephone network but for the mobile telephone network.

3-2 Recommendations

(1) Under the tense security situation in Iraq, it will be the most crucial issue to transport equipment to each site without any damages, and to secure the safety of staffs and workers engaged in installation works for the project in Iraq. Therefore, considerable guards during inland transportation in Iraq and during installations are highly recommended for protection of all concerned. Also the design of the trunk communications network should be simple as possible by such as maximum utilization of the existing facilities.

(2) This grant aid project is requested as equipment supply basis by Iraqi Government. The outline design however was made under turnkey base by the contractor because of the technical difficulties of system integration. The problem arises that the contractor and the consultant can not enter Iraq due to the security reason. In order to solve this problem, it is recommended that the contractor should open a project management office in Japan and for instance in Amman which is able to provide Iraqi sites with any kind of supports during installation period. The consultant should apply the same manner as the contractor.

(3) As the responsible undertakings by the Iraqi side, preparation of the site for the installation of new equipment is essential. This includes repairs or installations of

damaged buildings, rooms and antenna towers for newly installation of the equipment, clearing the equipment sites, preparation of access roads for installation work and other necessary matters before the installation starts. In addition to these Iraqi undertakings, commercial power supply to the newly equipment is also subject to the Iraqi side. Since these undertakings require long period of months to prepare, project implementation organization by Iraqi side is recommended to be established in order to monitor and be in line with project implementation schedule.

(4) At the detailed design stage for the implementation, providing further data and information for designing by Iraqi side for the consultant is necessary. Giving Entry Permission to sites to Iraqi local consultants shall be also required for obtaining further information for detailed design. In order to avoid any delay of issuance of permissions for the site survey and to help disclosure of relevant information from Iraqi side, Iraqi organization for the implementation of the project should be activated with clear rights and responsibilities.

APPENDICES

Appendix 1　Member List of the Survey Team

No.	In Charge	Name	Organization
1.	Leader	Mr. Kazuhisa ARAI	Chief, Living Conditions Improvement Team, Project Management Group II, Grant Aid Management Department, JICA
2.	Technical Advisor	Mr. Masayuki AKIBAYASHI	Managing Director, Department of Wireless Communications, Tohoku Regional Bureau of Telecommunications, Ministry of Public Management, Home Affairs, Posts and Telecommunications
3.	Chief Consultant / Telecommunications Planner / Operation and Maintenance Planner	Dr. Tomotaka TANIGUCHI	Nippon Koei Co., Ltd.
4.	Transmission Facilities Planner	Mr. Hideaki ISHIGAKI	Nippon Koei Co., Ltd.
5.	Equipment Planning	Mr. Hideo MITSUHASHI	Nippon Koei Co., Ltd.
6.	Procurement Planner / Cost Estimate	Mr. Hitoshi EGAWA	Nippon Koei Co., Ltd.

Appendix 2 Study Schedule

No. of Days	Date	Day	Schedule					Place
			Officials	Consultant Team				
			Leader (Arai), Technical Advisor (Akibayashi)	Chief Consultant (Taniguchi)	Transmission Planner (Ishigaki)	Switching Planner (Mitsuhashi)	Procurement Planner/ Cost Estimator (Egawa)	
1	7/30	Fri		20:40 Leave Narita (JL1319)→via Kansai & Dubai				
2	7/31	Sat	9:50 Leave Narita (LH711)→via Frankfurt 21:50 Arrived at Amman (RJ126)	15:55 Arrived at Amman (EK903)				Amman
3	8/1	Sun	(am) Courtesy Call to EOJ. Meeting with JICA Amman Office. (pm) Explanation and discussion on the Inception Report.					Amman
4	8/2	Mon	Discussion with Iraq side.					Amman
5	8/3	Tue	Discussion with Iraq side.					Amman
6	8/4	Wed	Discussion on the Deaft Minutes					Amman
7	8/5	Thu	(am) Visit to UNDP, Signing on Minutes, Report to EOJ & JICA, 17:15 Leave Amman (EK904)→via Dubai & Kansai	Visit to UNDP, Signing on Minutes Report to EOJ & JICA	Technical Discussion with Iraqi Team			Amman
8	8/6	Fri	19:45 Arrived at Haneda (JL1316)	Data arrangement				Amman
9	8/7	Sat		Data collection about other donor	Collection of the site conditions for transmission facilities	Collection of the site conditions for switching facilities	Data collection for cost estimate	Amman
10	8/8	Sun		Confirmation of basic component	Collection of the site conditions for transmission facilities	Collection of the site conditions for switching facilities	Data collection for cost estimate	Amman
11	8/9	Mon		Consideration of the alternatives	Collection of the site conditions for transmission facilities	Collection of the site conditions for switching facilities	Data collection for cost estimate	Amman
12	8/10	Tue		Consideration of the alternatives	Collection of the site conditions for transmission facilities	Collection of the site conditions for switching facilities	Data collection for cost estimate	Amman
13	8/11	Wed		Confirmation of necessity & urgency of requested equipment	Rough design of digital microwave	Rough design of local switch	Data collection for cost estimate	Amman
14	8/12	Thu		Video Conference Report to EOJ & JICA	Video Conference	Video Conference	Video Conference	Amman
15	8/13	Fri		Data arrangement	Data arrangement	Data arrangement	Data arrangement	Amman
16	8/14	Sat		Consideration of priority plan	Rough design of digital microwave	Rough design of transit switch	Cost estimate & Procurement planning	Amman
17	8/15	Sun		Selection of priority plan	Rough design of digital microwave	Rough design of transit switch	Cost estimate & Procurement planning	Amman
18	8/16	Mon		Consideration of project implementation organization	Consideration of project implementation organization	Consideration of project implementation organization	Cost estimate & Procurement planning	Amman
19	8/17	Tue		Operation & maintenance planning	Rough design of earth station	Rough design of internat'l telephone switch	Cost estimate & Procurement planning	Amman
20	8/18	Wed		Operation & maintenance planning	Rough design of earth station	Rough design of internat'l telephone switch	Cost estimate & Procurement planning	Amman
21	8/19	Thu		Video Conference Report to EOJ & JICA	Video Conference	Video Conference	Video Conference	Amman
22	8/20	Fri		Data arrangement	Data arrangement	Data arrangement	Data arrangement	Amman
23	8/21	Sat		Consideration for the project implementation plan	Rough design of earth station	Rough design of internat'l telephone switch	Rough estimation for project implementation	Amman
24	8/22	Sun		Consideration for the project implementation plan	Rough design of trunk networks	Rough design of trunk networks	Rough estimation for project implementation	Amman
25	8/23	Mon		Consideration for the project implementation plan	Rough design of trunk networks	Rough design of trunk networks	Rough estimation for project implementation	Amman
26	8/24	Tue		Consideration for the project implementation plan	Rough design of trunk networks	Rough design of trunk networks	Rough estimation for project implementation	Amman
27	8/25	Wed		Determination of the project implementation plan	Rough design of trunk networks	Rough design of trunk networks	Rough estimation for project implementation	Amman
28	8/26	Thu		Video Conference, Report to EOJ & JICA Amman Office.				Amman
29	8/27	Fri		17:15 Leave Amman (EK904)→to Dubai, to Haneda via Kansai				
30	8/28	Sat		22:15 Arrived Haneda (JL1320)				

(Note) Iraqi Officials arrived at Amman in July 31 (Sat) and left Amman in August 6 (Fri).

Appendix 3 List of Parties Concerned in the Recipient Country

Iraqi Delegation Member

	Name	Title	Note
1.	Ahmad Al Zubaidy	Director General Planning and Follow-up Bureau Ministry of Communications Republic of Iraq	
2.	Walid Jallo	Director, Technical Affairs Iraq Telecommunications and Post Company, Republic of Iraq	
3.	Malik Jawad Abdulkarim	Director, Microwave Section Iraq Telecommunications and Post Company, Republic of Iraq	

Appendix 4 Minutes of Discussions

4-1 Minutes signed on August 5, 2004

4-2 Technical Note signed on August 5, 2004

4-3 Technical Note asked signature to Iraqi side on August 26, 2004

4-4 Technical Note dated September 9, 2004 asked signature, and a cover letter dated September 30, 2004 for finalizing

4-1 Minutes signed on August 5, 2004

Minutes of Discussions
on the Outline Design Study
on the Project for Improvement of Trunk Communications Network
in the Republic of Iraq

In response to the request from the Government of Iraq, the Government of Japan decided to conduct an Outline Design Study on "The Project for Improvement of Trunk Communications Network" (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA sent to Jordan the Outline Design Study Team (hereinafter referred to as "the JICA Team"), headed by Mr. Kazuhisa Arai, Chief, Living Conditions Improvement Team, Grant Aid Management Dept., JICA, and is scheduled to stay in the country from July 31 to August 27, 2004. JICA also invited three officials concerned of the Government of Iraq (hereinafter referred to as "the Iraqi Team") to Jordan for the study.

The JICA Team held discussions with the Iraqi Team. Main points of the discussions are as in the attached sheets. The Study Team will proceed to further works and examine the items requested.

Amman, August 5, 2004

新井和久

Kazuhisa Arai
Leader
Outline Design Study Team
Japan International Cooperation Agency

5/8/2004

Ahmad Al Zubaidy
Director General
Planning and Follow-up Bureau
Ministry of Communications
Republic of Iraq

5-8-2004

Walid Jallo
Director,
Technical Affairs
Iraq Telecommunications and Post Company

Malik Jawad Abdulkarim
Director,
Microwave Section
Iraq Telecommunications and Post Company

ATTACHMENT

Date:	August 1, 2004 - August 5, 2004	
Place:	Royal Club, Radisson SAS-Amman	
Participants:		
The JICA Team	ARAI, Kazuhisa,	Japan International Cooperation Agency
	AKIBAYASHI, Masayuki	Ministry of Public Management, Home Affairs, Post and Telecommunications
	TANIGUCHI, Tomotaka	Nippon Koei Co., Ltd.
	EGAWA, Hitoshi	Nippon Koei Co., Ltd
	ISHIGAKI, Hideaki	Nippon Koei Co,. Ltd.
	MITSUHASHI, Hideo	Nippon Koei Co,. Ltd.
The Iraqi Team	Ahmad Al Zubaidy	Ministry of Communications
	Walid D Jallo	Iraq Telecommunications and Post Company
	Malik A. K. Jawad	Iraq Telecommunications and Post Company

1. Objectives and priority of the four components

The Iraqi team explained that the objectives of the Project consisting four components were to improve the damaged Iraqi telecommunication network indispensable to meet basic needs of Iraqi people including ensuring security in Iraq. The priority of the four components is as following order. They also explained the reason as below.

(1) Nationwide Microwave Backbone (Southern & Northern Routes)

This route is a main trunk telephone line of Iraq. There is an optical fiber cable system there, but it faces frequent cuts caused by sabotage and accidents. This component will be used to increase capacity because there is shortage of transmission lines and as a reliable backup line for the optical fiber cable system to ensure the communication in Iraq. Considering forecasted demand and coverage expansion plan of the ITPC, this microwave will be fully utilized in future too. This line is so important that the Iraqi team hopes to install Japanese equipment because of its good quality.

(2) Rehabilitation of Telephone Network (Transit and Local Switches)

The requested transit switches shall be used to improve telephone traffic flow and makes it easier for people to use telephone and make use of the increased capacity provided by the Microwave Backbone.

(3) Standard A Earth Stations

It is very difficult to make international calls to or from Iraq. Because international gateways were destroyed during the war and most of the international traffic is passing via a small

earth station funded by USAID and many VSATs which are providing bad quality and not reliable communications. Also small international traffic is passed through Jordan because of limited capacity.

(4) International Telephone Switching System

The Iraqi team withdrew this component. Because there is urgent need for this Project, ITPC had to procure it from its own resources. It is now under installation.

The JICA team commented that this team would examine necessity, urgency, appropriateness and priority of the three components and make options for possible projects. The team will report the findings to the Ministry of Foreign Affairs of Japan by the end of September 2004. Then the Government of Japan will decide whether or not any of the projects can be funded by Japan's Grant Aid.

2. Responsible organizations and necessary procedure

The Responsible organization is the Iraq Telecommunications and Post Company (ITPC). The ITPC is the government own company monopolize telecommunication in Iraq except mobile and internet (3 private mobile providers and 1 government own internet provider named SCIS). The ITPC has been already authorized to handle the Project by the Ministry of Communications. The Ministry of Planning and the Iraq Strategic Review Board (ISRB) have already approved the Project.

The Iraqi team will directly report these discussions to the Minister of Communications. He will make coordination with the Minister of Planning, if necessary.

The JICA team explained the procedure of Japan's Grant Aid for the Reconstruction of Iraq and the Iraqi team understood it. The Iraqi team accepted it as a given factor because the Government of Japan made it.

The Iraqi team mentioned that no special or additional procedure of the Government of Iraq would be necessary to implement the Project, because ISRB had already approved it.

3. Funding

The Iraqi team explained their Government had not asked the four components to any donor but Japan and would wait for the answer by Japan. If that answer is negative, then the Government of Iraq will contact other donors.

4. Major undertakings

The JICA team explained major undertakings of Japanese and Iraqi sides under the procedure of Japan's Grant Aid for the Reconstruction of Iraq. Some of these undertakings may be changed, e.g. transportation in Iraq and installation of equipment, because they depend on the project

scope which is one of the subjects of this study. The Iraqi team commented that they can carry the equipment from port of entry in Iraq to the site, in case the port of entry will be Umm Qasr port or Baghdad airport. They also mentioned that they can install, test, operate and maintain all of the equipment they requested. The JICA team will examine the Iraqi proposals through this study. Through the discussion, the Iraqi team agrees to do the following:

1) To allocate sufficient budget and qualified staff to promptly and effectively install, operate and maintain the equipment;
2) To ensure prompt tax exemption and customs clearance of the equipment at the port of entry in Iraq;
3) To exempt from any kind of tax and all duties concerning local procurement of goods and services under the project to a Japanese supplier; and
4) To prepare the site for the installation of new equipment.

5. Decision

The JICA team explained that the Government of Japan would make the decision for the Project and would inform the Government of Iraq of it through diplomatic channel.

6. Schedule of the study

The JICA team can not enter Iraq. Both side agreed the following to make further study effective.

(1) The JICA team will hire some Iraqi engineers in Iraq. The ITPC will cooperate with them in Iraq.
(2) Video Conference (3 times)

Tentative date and time

1.August 12, Thu. 10:00am Iraqi local time
2.August 19. Thu. 10:00am Iraqi local time
3. August 26 Thu. 10:00am Iraqi local time

Participants

At least three of the Iraqi team members will attend these meetings. Other relevant officials may attend the meetings.

Main Agenda

Further technical details necessary for the study

4-2 Technical Note signed on August 5, 2004

Memo of Discussions
on the Outline Design Study
On the Project for Improvement of Trunk Communications Network
in the Republic of Iraq

Through the series of discussions, the Iraqi Team and the JICA Study Team have mutually understood on the attached Technical Note. The Note will be further thrashed out during period of the Study.

Amman, August 5, 2004

Tomotaka Taniguchi
Chief Consultant, Nippon Koei,
Outline Design Study Team

5/8/2004

Ahmad Al Zubaidy
Director General
Planning and Follow-up Bureau
Ministry of Communications
Republic of Iraq

5-8-2004

Walid Jallo
Director,
Technical Affairs
Iraq Telecommunications and Post Company

5-8-2004

Malik Jawad Abdulkarim
Director,
Microwave Section
Iraq Telecommunications and Post Company

Technical Note on Outline Design Study
(Memorandum of Discussions on Questionnaire)
Version 1(2004/08/05)

1. Objectives and priority of the four components

The Iraqi team explained that the objectives of the Project consisting four components were to improve the damaged Iraqi telecommunication network indispensable to meet basic needs of Iraqi people including ensuring security in Iraq. The priority of the four components is as following order. They also explained the reason as below.

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This route is a main trunk telephone line of Iraq. There is an optical fiber cable system there, but it faces frequent cuts caused by sabotage and accidents. This component will be used to increase capacity because there is shortage of transmission lines and as a reliable backup line for the optical fiber cable system to ensure the communication in Iraq. Considering forecasted demand and coverage expansion plan of the ITPC, this microwave will be fully utilized in future too. This line is so important that the Iraqi team hopes to install Japanese equipment because of its good quality.

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The requested transit switches shall be used to improve telephone traffic flow and makes it easier for people to use telephone and make use of the increased capacity provided by the Microwave Backbone.

(3) Standard A Earth Stations

It is very difficult to make international calls to or from Iraq. Because international gateways were destroyed during the war and most of the international traffic is passing via a small earth station funded by USAID and many VSATs which are providing bad quality and not reliable communications. Also small international traffic is passed through Jordan because of limited capacity.

(4) International Telephone Switching System

The Iraqi team withdrew this component. Because there is urgent need for this Project, ITPC had to procure it from its own resources. It is now under installation.

The JICA team commented that this team would examine necessity, urgency, appropriateness and priority of the three components and make options for possible projects. The team will report the findings to the Ministry of Foreign Affairs of Japan by the end of September 2004. Then the Government of Japan will decide whether or not any of the projects can be funded by Japan's Grant Aid.

2. Components of Digital Microwave Backbone

(1) Digital Microwave Transmission System (Bill of Quantity)

Route configuration was confirmed as follows:

(a) South Microwave Main Route
12 hops, 13 Repeater/Terminal Stations, 6 GHz Band SDH (STM-1) Microwave System, 4+1System

(b) South Microwave Spur Route
10 hops, 10 Terminal Stations (Exchange Office, TV Stations), 11GHz Band SDH (STM-1) Microwave System except for Kerbalah, 6GHz Band SDH(STM-1) Microwave System between Kerbalah and Mussaieb

(c) North Microwave Main Route
10 hops, 11 Repeater/Terminal Stations, 6 GHz Band SDH (STM-1) Microwave System, 4+1 System

(d) North Microwave Spur Route
3 hops, 3 Terminal Stations (Exchange Office, TV Stations), 11 GHz Band SDH(STM-1) Microwave System

(2) SDH Transmission Equipment and TV/Audio CODEC Equipment

SDH Transmission equipment (Multiplex/Demultiplex equipment) is requested to provide at the entire microwave relay stations on the North and the South Main Routes. In addition, terminal transmission equipment is required to interface with switches and TV transmitting equipment. Technical specification of TV and Audio CODEC shall be provided by ITPC.

(3) Project Stations Data and Route Maps

In order to provide basic design and equipment plan it is requested for you to provide the detailed route maps and detailed station data about all of the project stations (Station Name, Location, Hop Distances in km, Tower height (existing and newly required) in meters and site elevation (A.S.L) in meters, Floor Plan and Site layout)

(4) Network Synchronization Plan

The details of current network synchronization plan, especially the accuracy, performance and capability about the master clock supplied for the digital network in Iraq shall be informed JICA mission.
Master clock supply for the digital microwave backbone and supply for the Standard-A Earth Stations are responsible for ITPC.

(5) Scope of Works between ITPC and Contractor

It is confirmed that antenna mounting pipe and structure to tower is available by ITPC and not necessary to supply by the contractor.
Test equipment, installation materials and tools for installation of antenna and factory training shall be provided by the contractor.
Shelter (building and associated facilities) at Gabaychia microwave relay station and Mamount Exchange Office shall be repaired by ITPC.

3. Components of INTELSAT Standard-A Earth Station

(1) Priority of two (2) Standard-A Earth Stations

There is no priority between AOR Earth station and IOR Earth station. It is envisaged that major international traffic will be carried by AOR Earth station.

(2) Current Situations of International Telephone Service

Most of the international telephone traffic is now handled through USAID Earth station (Transmission capacity is 24 E1) and VSAT Earth Stations. VSAT

Earth Stations connect with local switch. Those Earth Stations are now operational via satellites. The services quality on the VSATs is not reliable.
An optical fiber cable transmission system between Jordan and Iraq is not operational. Only 2 E1 transmission systems between Jordan and Iraq are available to carry the international telephone traffic.

(3) Site Selection of New Standard-A Earth Station

The INTELSAT Earth stations at Dujail were completely destroyed during the war. New INTELSAT Standard Earth stations will be installed at the same site as before (at Dujail).

(4) IDR MODEM System and INTELSAT Satellite Circuit Plan

IDR MODEM shall be in 8+1 redundancy configuration and three clusters of 8+1 redundant IDR MODEM shall be provided in one Standard-A station. We would like to know the IDR satellite circuit plan and IDR utilization plan. Direct destinations with IDR digital satellite circuits via AOR Standard-A Earth station and via IOR Standard-A Earth station shall be informed to JICA mission.
How many international telephone channels via satellite will be established using new AOR Station and IOR station? INTELSAT satellite circuit plan via two (2) Standards-A Earth station shall be clarified. The data are requested for the project justification, checking the necessity of Standard-A Earth stations in Iraq.

(5) Equipment Building for Standard-A Earth Station

Equipment building to accommodate Ground Communication Equipment and Antenna foundations shall be prepared by ITPC side. We would like to have the detailed site layout (the location of Antenna, equipment building and administration building, etc.) and the detailed floor plan for making the basic design of Earth station.

(6) Test Equipment

Test equipment including for the purpose of Standard-A Earth Station Antenna Verification Test shall be provided by the contractor.

(7) Microwave Approach Link between Dujail Earth Station and International Gateway Switch through Tarmiya Microwave Station on the North Digital Microwave Backbone

Microwave Approach Link consists of 2 hops, Dujail Earth Station – Tarmiya Microwave Relay Station – Mamoun Exchange Office.
Two (2), 8 GHz Band, SDH (STM1:1+1) Digital Microwave Links are requested, one link for connection between Dujail Earth station and Tarmiya station, one link for connection between Tarmiya station and Mamoun Exchange Office (Microwave Terminal Station).
Towers and buildings on the microwave approach link shall be provided by ITPC.

4. Components of Transit/Local Switching System and Small Capacity Digital Radio Links

4.1 Information and Data

ITPC agreed to provide the following information, in accordance with the sample tables of 1.1, 1.2, 2.1 and 2.2 attached. To cancel Table 2.3

(1) Telephone exchange profile (before and after war)
(2) Junction/trunk circuits among exchanges in Iraq (before and after war)
(3) Terrestrial international circuits between Iraq and Kuwait/Jordan (before and after war)
(4) Direct international telephone circuits via satellite (before and after war)
(5) Total telephone lines being used or having been used or to be used by the Government offices and ITPC
(6) National/local numbering plan
(7) Charging and tariff rate
(8) Type of special services (e.g. time, weather, fire, emergency);

4.2 Switch and Capacity

(1) Objective Switch and Capacity

The objective switches are 10 transit switches (2 national and 8 regional transit/toll, 4,833 E1 in total) and 7 local switches (170,000 line units in total) stipulated in the application letter from Iraq.
Those objective switches are not overlapped with other donor's assistance schemes, including USAID. The above exchange capacity will be reviewed, based on the exchange data to be provided by ITPC.

(2) Combined Switching system

Combined regional transit and local switch will be reviewed in case of low per line traffic (0.2 Erlangs or less for local switch, 0.8 Erlangs or less for transit/regional transit switch), based on the exchange data to be provided by ITPC.

(3) MDF and Protector

MDF and protector shall be supplied by the contractor. The installation, required cabling and jumpering works will be done by ITPC.

(4) Subscriber Connection

Cables and accessories for the rehabilitation of the subscriber cable network is not included in this project, because ITPC will procure the cables and accessories and implement the required rehabilitation in the objective exchanges.

(5) Installation of New Equipment

It is necessary for the contractor to provide the detailed installation drawings, including the exact floor layout plan, floor making, iron works, cabling (earth, communication, power), jumper list, detailed trunking diagrams, etc.

(6) Testing, Commissioning, Operation and Maintenance

It is necessary for the contractor to provide the detailed manual and required software for the testing, commissioning, operation and maintenance to assist ITPC in smooth implementation of testing, commissioning, operation and maintenance of the new equipment.

(7) Network Management System

ITPC has proposed to provide the network management system of the new equipment, which was not included in the specifications of the application letter from Iraq.
JICA mission will study the system, if ITPC provides the outline of the specification of the network management system of the existing equipment in Iraq.

(8) Training

It is necessary for the contractor to provide the engineers and technicians with the technical training in overseas country sufficient for the installation, testing and commissioning of the new equipment by ITPC.

(9) DDF and MUX Terminal

Multiplex terminal equipment will be installed in the radio equipment room, in case the radio and switch equipment is accommodated in the same building. DDF will be installed in both radio and switch rooms. Two DDFs will be connected by electrical (balanced 120ohms) cable or optical fiber cable.

(10) Optical Fiber Cable Transmission System

ITPC will provide Multiplex equipment of the optical fiber cable transmission system for the objective exchange in which the optical fiber cable transmission system is terminated and working.

4.3 Technical Specifications

ITPC will provide the answers on the following items:

(1) Traffic Distribution (Paragraph 3.2)
(2) Number trunk channels of E1 trunk interface will be 30% of number of subscribers of each LS (Local Switch) (Paragraph 3.4)
(3) Subscriber to Exchange (Paragraph 5.1.8.2)
(4) MDF and Test Equipment (Paragraph 5.1.10)
(5) Holding Time of Calls (Paragraph 5.2.2)
(6) Charging in Local Exchanges (Paragraph 5.5)
(7) Charge Data Transfer (Paragraph 5.5.3)
(8) Batteries (Paragraph 5.8.2.2)
(9) Training (Paragraph 6.2)
(10) Environmental Conditions (Paragraph 6.3)
(11) Others

4.4 Small Capacity Digital Radio Links for Local Switch

Regarding rehabilitation of telephone network the JICA Study Team would like to know the detailed requirements for trunk circuits between local Switch exchanges and other exchanges. As small capacity digital radio links for local switched, a total of 100 links (4x2 MB : 50 and 8x2 MB :50) are requested, where are they installed ? ITPC is requested to clarify the reason why 100 links are necessary.

4.5 International Telephone Switching System (INTS)

To delete this paragraph, because ITPC cancelled INTS.

5. General Information

5.1 General Site Information

ITPC agreed to provide the following information:

(1) Guide map of each site

(2) Site layout (approx. measurements), including the antenna tower
(3) Building/floor layout (approx. measurements), including the following rooms:
(4) Detailed room layout, including the measurements and the proposed installation location of new equipment:

6. Information for Outline Design

6.1 General Information

ITPC agreed to provide the following information:

(1) General guide map for multi-exchange areas (Baghdad and other areas)
(2) General junction network configuration map for multi-exchange areas
(3) National trunk transmission network configuration map in Iraq
(4) Terrestrial international link configuration map between Iraq and Kuwait/ Jordan;
(5) Network hierarchy diagram which covers local, toll and international switches.
(6) Mobile telephone network (for three operators)
(7) Fixed wireless access network
(8) Internet: One company of SCI provides services.
(9) Television

6.2 Power Plant

(1) Voltage and frequency of the commercial power is 220 – 240v and 50Hz for single phase and 380v for 3 phases. ITPC provides power supply to the new equipment by engine generator, in case no availability of the commercial power.
(2) ITPC will provide engine generator.
(3) Storage batteries and rectifying equipment will be supplied by the contractor.
(4) Air conditioning equipment, lighting facilities and emergency lighting will be provided by ITPC.
(5) Fire detector (smoke sensor) will be provided by the contractor.
(6) ITPC proposed to apply the temperature sensor to protect the telecom equipment, which will suspend DC supply to the telecom equipment in proper

shut-down, in case equipment temperature shows beyond certain degrees in centigrade for more than ten (10) minutes (recommended by the contractor) due to any trouble. JICA mission will study to apply the temperature sensor.

7. Organization of MOC and ITPC

ITPC will provide the following information:

(1) Organization chart (General and detailed organization structure chart)
(2) Function, responsibility and role
(3) Personnel (construction, operation, maintenance, etc.)

8. Human Resource Development

ITPC will provide the information for the training course and training facilities.

9. Operation and Maintenance

ITPC will provide the following information:

(1) Present organization in charge of operations and maintenance
(2) Operation and maintenance profiles (before and after war)
(3) Performance indicator and achievement indicator (before and after war)
(4) Number of operation and maintenance staff
(5) Resource management
(6) Present problems for operation and maintenance
(7) Annual budget of ITPC for the last five (5) years.
(8) Actual revenue and expenditure of ITPC during the last 5 years.
(9) Actual revenue and expenditure especially for the maintenance section with break down during the last 5 years.
(10) Fiscal year: January to December

10. Construction and Installation of New Equipment

10.1 ITPC

ITPC will report JICA mission the proposed construction groups and members (engineers, skilled technicians, etc.) for the followings:

(1) Local and transit switching system
(2) Digital microwave radio transmission system
(3) Earth station
(4) Power plant

10.2 Local Contractor

ITPC will manage all the installation and construction work for the new equipment and system, and will employ the local contractor by ITPC's own budget, if necessary.

4-3 Technical Note asked signature to Iraqi side on August 26, 2004

THE OUTLINE DESIGN STUDY
ON
THE PROJECT FOR IMPROVEMENT OF TRUNK COMMUNICATIONS NETWORK
IN
THE REPUBLIC OF IRAQ

TECHNICAL NOTE

August 26, 2004

Dr. Tomotaka Taniguchi
Chief Consultant,
Outline Design Study Team,
Japan International Cooperation Agency

Mr. Ahmad Al Zubaidy
Director General,
Planning and Follow-up Bureau,
Ministry of Communications,
Republic of Iraq

Dr. Walid Jallo
Director, Technical Affairs,
Iraq Telecommunications and Post Company

Mr. Malik Jawad Abdulkarim
Director, Microwave Section,
Iraq Telecommunications and Post Company

Japan International Cooperation Agency (JICA)
Outline Design Study Team

TECHNICAL NOTE
FOR
THE OUTLINE DESIGN STUDY
ON
THE PROJECT FOR IMPROVEMENT OF TRUNK COMMUNICATIONS NETWORK
IN
THE REPUBLIC OF IRAQ

August 26, 2004

Outline Design Study Team (the JICA Team) and the Officials from the Government of Iraq (the Iraqi Team) have started discussions related the Study in Amman from August 1 to August 5 in 2004. After the Iraqi Team went back to Iraq, video conferences have been held to confirm items which could not be clarified during the meeting in Amman.

This Technical Note is for confirmation of remaining items which the JICA Team and the Iraqi Team are necessary to follow up continuously in order to completely carry out this Outline Design Study. The completion date of the Study is October 2 in 2004.

1. World Bank Administered Trust Fund

The possibility of duplication with the World Bank Administered Trust Fund was found in August 18 in 2004 by the information from a Secretary of Embassy of Japan in Jordan through a staff of JICA Jordan Office. The confirmation was made by the video conference in next day of August 19, which was explained by the Iraqi Team that the Japan's Grant Aid Project and the planning of the World Band are the same project in terms of microwave backbone for Southern and Northern Routes. And the Iraqi Team considered it would not be a problem since the Government of Japan (GOJ) has not committed yet the project officially, and the World Bank's fund derives from the GOJ too. The Iraqi Team expected the GOJ manages demarcations with the World Bank. If GOJ commits officially, the Ministry of Communications (MOC) would change the request to the World Bank to another East-West route.

Further confirmation was made by JICA Team in August 22 for asking to Dr.

Mohammad Mustafa, Lead Private Sector Development Specialist, MNS Region, World Bank. The receiving mail from him mentioned that the World Bank has been working on this telecommunications project with ITPC since March, and the Bank has shared the plan with communication planner of JICA Study Team last June. And also mentioned that the World Bank has been coordinating this telecommunications work with Japan Embassy in the US and Japan's Executive Director to the World Bank and Japan's Ministry of Finance. According to a short description of the telecommunication project plan attached to the e-mail, the proposed digital microwave backbone network (US$40 million) by the World Bank was completely duplicated with the network requested to Japan.

For further confirmations, the JICA Team tried to find a person in charge working for Trust Fund Office in Amman. Although the JICA Team asked the present progress status of World Bank Funding to Dr. Mohammad Mustafa, such information could not be obtained from him. Further relevant information will try to be collected by the JICA Team after leaving Amman.

The above story is contradictory to the record in the Minutes of Discussions in August 5 saying that "The Iraqi Team explained that their Government had not asked the four components to any donor but Japan and would wait for the answer by Japan. If that answer is negative, then the Government of Iraq will contact other donors."

2. Responsible organizations and necessary procedure

The Iraqi Team said, "The Ministry of Planning (MOP) and the Iraq Strategic Review Board (ISRB) have already approved the Project". This is recorded in the Minutes of Discussions signed in August 5 in Amman. The JICA Team confirmed this word provided by Iraqi Team during 2nd video conference in August 19 that MOC and ISRB have only ranked the Project as having a priority. This interpretation differs from the understanding by JICA Team.

In addition, the Minutes also say "The Iraqi team mentioned that no special procedure of the Government of Iraq would be necessary to implement the project, because ISRB had already approved it."

3. Response by the Iraqi side

The cooperation with Iraqi local consultants was stated in the Minutes of Discussions on August 5 in 2004. The JICA Team however have been waited for getting approval from the Minister of Communications for Iraqi local consultants enter into local sites of microwave transmission routes during the JICA Team staying in Amman. This brought to the JICA Team the lacking of information about inside conditions of each project site except Baghdad area. Under such conditions the JICA Team has continuously asked the Iraqi Team to get permission from the Minister and has tried to find an another direct access to the Minister. Through the effort, limited permission was given to the local consultant in the date of August 21, but the constraints which were not allowed to go into communications facilities and to take photos had still remained except the facilities in Baghdad area. The same day, considering such condition, the JICA Team instructed the Iraqi local consultants to immediately start to go to each local site to observe the objective building facilities from outside without photo taking, which could be done without permission by the Minister. The JICA Team heard the reason from the Iraqi Team that the security (secret) reason to the Iraqi local consultants.

4. US Advisors working for MOC and MOP

In order to confirm the relation to the US advisors to the Ministry of Communications, The JICA Team asked to Iraqi Team to be named the persons during the 2nd Video Conference held in August 19. According to the explanation by Iraqi Team, there are no American Advisor and no US intervention structure in the MOC since the termination of CPA.

The JICA Team, however, has tried to originally find the US persons and specified two people named below.

- Mr. Arno Kosko, Senior Consultant, IRMO, Office of Communications, US Embassy in Iraq
- Mr. Mel Painter, USAID Power & Energy Sector Advisor, Southern Area Power Projects, Basra, Iraq

The JICA Team has asked them and is waiting for their answers by e-mail from Mr. Kosko and Mr. Painter regarding their relations to MOC.

5. Technical items

The followings have not been provided to the JICA Team, which stated in Technical Note mutually singed as Memo of Discussions in August 5.

(1) Project Stations Data for Northern Route
(2) Network Synchronization Plan
(3) IDR MODEM System and INTELSAT Satellite Circuit Plan
(4) Information about Components of Transit/Local Switching System and Small Capacity Digital Radio Links
(5) Site Information including guide maps, site layout, building/floor layout.
(6) General Information including general junction network configuration map, national trunk transmission network configuration map, terrestrial international link configuration map, network hierarchy diagram, mobile telephone network and fixed wireless access network.
(7) Information about ITPC's present training program for human resource development.
(8) Information of operation and maintenance including actual revenue and expenditure, and also futures budget.
(9) ITPC's proposed construction groups and members.

Above remaining information shall be provided to the JICA Team by September 5, 2004.

6. Further Expecting Items to Iraq

(1) Providing further information about the progress status by the World Bank Plan.
(2) Providing further information about the progress status of this Outline Study in Iraqi side.
(3) Getting approval from the Minister of Communications for Iraqi local consultants to go into relevant sites and to take pictures.
(4) Continuous collection of data mentioned in above item 5, and providing them to the JICA Team by specified date.
(5) Continuous correspondence with JICA Team by e-mail.

7. Other Contacting Persons

As the preparation in case that the necessity to be confirmed the collected information through the Study was happen, the JICA Team has found following contacted person in both MOC and Ministry of Planning.

- Dr. Qasim Mhawi, Deputy Minister of MOC and General Manager of ITPC
- Dr. Faiq, Deputy Minister of Ministry of Planning

(End)

4-4 Technical Note dated September 9, 2004 asked signature, and a cover letter dated September 30, 2004 for finalizing

Attention : Mr. Ahmad Al Zubaidy, Dr. Walid Jallo, Mr. Malik Jawad Abdulkarim

Our ref. LNPM 053/04 Date: September. 30, 2004

The Outline Design Study on the Project for Improvement of Trunk Communications Network in the Republic of Iraq

Subject: **Finalization of the Dealing for the Technical Note**

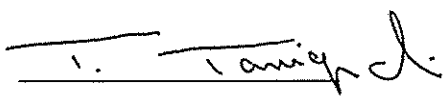
Gentlemen,

We would like to finalize the Outline Design Study Report as completion of the Study. In order to finalize, we confirm the dealing of Technical Note dated September 9 which has not been signed yet.

We attach this letter as a cover of unsigned Technical Note.

Your understanding would be highly appreciated.

Sincerely yours,



Tomotaka Taniguchi
Chief Consultant, Nippon Koei
Outline Design Study Team,
Japan International Cooperation Agency

Copy to : 1) Mr. Kazuhisa Arai, JICA Tokyo HQ
2) Mr. Nobutaka Kondo, JICA Tokyo HQ

THE OUTLINE DESIGN STUDY
ON
THE PROJECT FOR IMPROVEMENT OF TRUNK COMMUNICATIONS NETWORK
IN
THE REPUBLIC OF IRAQ

TECHNICAL NOTE

September 9, 2004

Dr. Tomotaka Taniguchi
Chief Consultant,
Outline Design Study Team,
Japan International Cooperation Agency

Mr. Ahmad Al Zubaidy
Director General,
Planning and Follow-up Bureau,
Ministry of Communications,
Republic of Iraq

Dr. Walid Jallo
Director, Technical Affairs,
Iraq Telecommunications and Post Company

Mr. Malik Jawad Abdulkarim
Director, Microwave Section,
Iraq Telecommunications and Post Company

Japan International Cooperation Agency (JICA)
Outline Design Study Team

This Technical Note is a record of past three times video conferences held in August 12, 19 and 26 in 2004 during field survey period. Since the JICA Team has not received any comments from Iraqi Team on the previous Technical Note dated August 26, the JICA team therefore will finalize the Note. Following points are noted as progresses from the August 26th Technical Note.

1. World Bank matter

The JICA Team knew the World Bank announcement, notice number WB1851-636/04 for consulting services of preliminary design on digital microwave backbone announced on July 28 in 2004. The JICA Team would like to ask Iraqi Team the progress of the World Bank Study.

2. Field survey by Iraqi local consultants

The site survey data by Iraqi local consultants have been collected after getting permission by the Minister of Communications on August 26. These data can be reflected to the outline design study.

3. Technical Items

Following data have been received by JICA Team from ITPC after August 26.

1) Profile maps on Southern route
2) Route map for microwave
3) Frequency plan
4) Drawing of antennas and feeders arrangement for microwave
5) Traffic matrix
6) Distribution of 100 microwave links

TECHNICAL NOTE
FOR
THE OUTLINE DESIGN STUDY
ON
THE PROJECT FOR IMPROVEMENT OF TRUNK COMMUNICATIONS NETWORK
IN
THE REPUBLIC OF IRAQ

August 26, 2004

Outline Design Study Team (the JICA Team) and the Officials from the Government of Iraq (the Iraqi Team) have started discussions related the Study in Amman from August 1 to August 5 in 2004. After the Iraqi Team went back to Iraq, video conferences have been held to confirm items which could not be clarified during the meeting in Amman.

This Technical Note is for confirmation of remaining items which the JICA Team and the Iraqi Team are necessary to follow up continuously in order to completely carry out this Outline Design Study. The completion date of the Study is October 2 in 2004.

1. World Bank Administered Trust Fund

The possibility of duplication with the World Bank Administered Trust Fund was found in August 18 in 2004 by the information from a Secretary of Embassy of Japan in Jordan through a staff of JICA Jordan Office. The confirmation was made by the video conference in next day of August 19, which was explained by the Iraqi Team that the Japan's Grant Aid Project and the planning of the World Band are the same project in terms of microwave backbone for Southern and Northern Routes. And the Iraqi Team considered it would not be a problem since the Government of Japan (GOJ) has not committed yet the project officially, and the World Bank's fund derives from the GOJ too. The Iraqi Team expected the GOJ manages demarcations with the World Bank. If GOJ commits officially, the Ministry of Communications (MOC) would change the request to the World Bank to another East-West route.

Further confirmation was made by JICA Team in August 22 for asking to Dr. Mohammad Mustafa, Lead Private Sector Development Specialist, MNS Region, World Bank. The receiving mail from him mentioned that the World Bank has been working on this telecommunications project with ITPC since March, and the Bank has shared the plan with communication planner of JICA Study Team last June. And also mentioned that the World Bank has been coordinating this telecommunications work with Japan Embassy in the US and Japan's Executive Director to the World Bank and Japan's Ministry of Finance. According to a short description of the telecommunication project plan attached to the e-mail, the proposed digital microwave backbone network (US$40 million) by the World Bank was completely duplicated with the network requested to Japan.

For further confirmations, the JICA Team tried to find a person in charge working for Trust Fund Office in Amman. Although the JICA Team asked the present progress status of World Bank Funding to Dr. Mohammad Mustafa, such information could not be obtained from him. Further relevant information will try to be collected by the JICA Team after leaving Amman.

The above story is contradictory to the record in the Minutes of Discussions in August 5 saying that "The Iraqi Team explained that their Government had not asked the four components to any donor but Japan and would wait for the answer by Japan. If that answer is negative, then the Government of Iraq will contact other donors."

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The Iraqi Team said, "The Ministry of Planning (MOP) and the Iraq Strategic Review Board (ISRB) have already approved the Project". This is recorded in the Minutes of Discussions signed in August 5 in Amman. The JICA Team confirmed this word provided by Iraqi Team during 2nd video conference in August 19 that MOC and ISRB have only ranked the Project as having a priority. This interpretation differs from the understanding by JICA Team.

In addition, the Minutes also say "The Iraqi team mentioned that no special procedure of the Government of Iraq would be necessary to implement the project, because ISRB had already approved it."

3. Response by the Iraqi side

The cooperation with Iraqi local consultants was stated in the Minutes of Discussions on August 5 in 2004. The JICA Team however have been waited for getting approval from the Minister of Communications for Iraqi local consultants enter into local sites of microwave transmission routes during the JICA Team staying in Amman. This brought to the JICA Team the lacking of information about inside conditions of each project site except Baghdad area. Under such conditions the JICA Team has continuously asked the Iraqi Team to get permission from the Minister and has tried to find an another direct access to the Minister. Through the effort, limited permission was given to the local consultant in the date of August 21, but the constraints which were not allowed to go into communications facilities and to take photos had still remained except the facilities in Baghdad area. The same day, considering such condition, the JICA Team instructed the Iraqi local consultants to immediately start to go to each local site to observe the objective building facilities from outside without photo taking, which could be done without permission by the Minister. The JICA Team heard the reason from the Iraqi Team that the security (secret) reason to the Iraqi local consultants.

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The JICA Team has asked them and is waiting for their answers by e-mail from Mr.

Kosko and Mr. Painter regarding their relations to MOC.

5. Technical items

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Above remaining information shall be provided to the JICA Team by September 5, 2004.

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7. Other Contacting Persons

As the preparation in case that the necessity to be confirmed the collected information through the Study was happen, the JICA Team has found following contacted person in both MOC and Ministry of Planning.

- Dr. Qasim Mhawi, Deputy Minister of MOC and General Manager of ITPC
- Dr. Faiq, Deputy Minister of Ministry of Planning

(Attachments)

1) Minutes of Discussions of the 1st Video Conference
2) Minutes of Discussions of the 2nd Video Conference
3) Minutes of Discussions of the 3rd Video Conference

Minutes of Discussions of the 1st Video Conference

Date: August 12, 2004

Place: Video Conference Room in the World Bank Office, Amman
Video Conference Room of the World Bank in the Ministry of Planning and Development Coordination of the Republic of Iraq, Baghdad

Time: 09:00 – 09:40 (Amman time)
10:00 – 10:40 (Baghdad time)

Participants:

The Iraqi Side	Mr. Ahmad Al Zubaidy	Ministry of Communications
	Dr. Walid D Jallo	Iraq Telecommunications and Post Company
	Mr. Malik A. K. Jawad	Iraq Telecommunications and Post Company
The Japan Side	Dr. TANIGUCHI, Tomotaka	Nippon Koei Co., Ltd.
	Mr. EGAWA Hitoshi	Nippon Koei Co., Ltd.
	Mr. ISHIGAKI Hideaki	Nippon Koei Co,. Ltd.
	Mr. MITSUHASHI Hideo	Nippon Koei Co,. Ltd.
Observer	Ms. OISHI Masami	Embassy of Japan in Jordan
	Mr. OKUBO Hisatoshi	JICA Jordan Office
	Mr. SUGIMURA Yoshinobu	JICA Jordan Office

1. Points Discussed
   1) The JICA Study Team (hereinafter referred as "the JICA Team"): We have hired seven Iraqi local consultants as study assistance inside Iraq, for investigation of present condition of telecommunication facilities on sites, since we have not been allowed to enter Iraq. The site investigation on the contract between the JICA Team and Iraqi engineers is scheduled to commence on August 5th for three weeks. Coordination with the Ministry of Communications (hereinafter referred as "MOC") and ITPC is highly requested as well as support to the Iraqi engineers.
      Iraqi Team: We will arrange meeting with Iraqi local consultants on August 14th.
   2) JICA Team: How about progress of answers to the questionnaire?
      Iraqi Team: We will provide them next week.
   3) JICA Team: We are preparing a B/Q list of facilities and materials requested by

MOC to estimate rough total cost of the Project. Please explain the system structure of Digital Microwave Backbone Network. Also, are there any sites which require PCM equipment other than SDH equipment?
Iraqi Team: The number of the PCM equipment can be confirmed based on route channel plan on the Request for Project. TV broadcast stations locate in the Microwave Backbone Network as terminal stations.

4) JICA Team: For TV program relay, is it technically acceptable to procure American TV CODEC equipment, not the Japanese one (PAL →MPEG)?
Iraqi Team: We will provide the CODEC specification at the next video conference.

5) JICA Team: Is the site for the new Earth station the same as the old one in Dujail? We estimate the land requirements for the new Earth station as follows:
1,500 ㎡(approx) for construction of A-Standard Earth station and two (2) antennas
6.7m x 6.7m for the foundation of one (1) antenna
building capacity of 500 ㎡ to install telecommunication facilities inside
INTELSAT position: 335.5 degree East, Atlantic Ocean Satellite
62 degree East, Indian Ocean Satellite
Iraqi Team: Location is same as old one in Dujail

6) JICA Team: What is the transmission line from town exchange station to upper station?
Iraqi Team: optic fiber cables

7) JICA Team: Please explain the relation between the new radio main route to North and two stations planned for local switch: Dewasa, Abi-Tammaan
Iraqi Team: Dewasa Station is in the same building as Mosul Station located at the terminal of the new radio main route to North. Abi-Tammaan is located in another site and connected with existing optic fiber transmission facilities.

8) JICA Team: Conflicts in Najaf are getting more violent. Are the transportation conditions OK for the portion of Iraqi undertakings?
Iraqi Team: Goods are delivered as usual. We insure for goods and materials with British Loyd Co. and delivery is in charge by governmental logistics companies.

Next video conference shall be held on August 19th in the morning.

Minutes of Discussions of the 2nd Video Conference

Date: August 19, 2004

Place: Video Conference Room in the World Bank Office, Amman
Video Conference Room of the World Bank in the Ministry of Planning and Development Coordination of the Republic of Iraq, Baghdad

Time: 09:00 – 10:10 (Amman time)
10:00 – 11:10 (Baghdad time)

Participants:

The Iraqi Side	Mr. Ahmad Al Zubaidy	Ministry of Communications
	Ms. El Halim	Ministry of Communications
	Dr. Walid D Jallo	Iraq Telecommunications and Post Company
	Mr. Malik A. K. Jawad	Iraq Telecommunications and Post Company
The Japan Side	Dr. TANIGUCHI, Tomotaka	Nippon Koei Co., Ltd.
	Mr. EGAWA, Hitoshi	Nippon Koei Co., Ltd.
	Mr. ISHIGAKI, Hideaki	Nippon Koei Co,. Ltd.
	Mr. MITSUHASHI, Hideo	Nippon Koei Co,. Ltd.
	Mr. NAGATA, Kazuhiro	Nippon Koei Co,. Ltd.
	Mr. SUGIMURA, Yoshinobu	JICA Jordan Office

1. Progress report: the JICA Study Team
   1) The JICA Study Team (hereinafter referred as "the JICA Team") requested Mr. Putters, Ministry of Planning (hereinafter referred as "MOP"), to observe the conference. He told to attend short time during the conference, but was unable to attend due to no permission from the Minister.
   2) Local consultants of the JICA Team have not yet commenced their local site investigations, waiting the entry permission issued by the Minister of Communications (hereinafter referred as "MOC"), which is expected to issue in the afternoon of August 19th according to Dr. Walid. The local consultants shall commence their works immediately upon issuance of the permission.
   3) The JICA Team has commenced collection and evaluation of quotations for the equipment and materials for the project component requested, and expect to complete by the end of next week.

2. Progress report: the Iraqi Team

1) The written report of the discussion held on August 1st to August 5th was submitted to the Minister of Communications directly from Iraqi Team, while it would not be transmitted to the MOP nor the ISRB before an official commitment of the Japanese Government.

2) The Iraqi Team shall provide some answer of the questionnaire and data such as profiles of the digital microwave transmission line of Northern main route from Baghdad, height of steel towers, coordination data of transmission distance coordination data, time schedule, etc, through email on the day.

3) The Iraqi Team shall, collaborated with the local consultants of the JICA Team, complete drawings and plan view of the sites and buildings.

3. Questions and Answers

1) Q (Taniguchi): Another Microwave Transmission Project financed by the World Bank is reported. Is it not a duplication with the project requested to the Government of Japan (hereinafter referred as "GOJ")?
A (Walid): It is the same project. We think it would not be a problem since GOJ has not committed yet the project officially, and the World Bank's fund derives from the GOJ. We expect the GOJ manages demarcations with the World Bank. If GOJ commits officially, MOC would change the request to the World Bank to another East-West route.

2) Q (Taniguchi): Other information reports that Iraqi Ministry of Transportation, Electricity and/or Oil establishes some microwave backbone routes. Is it not a duplication with the project requested to the GOJ?
A (Walid): The said ministries have their own facility outside towns and cities. The pointed microwave backbones are for their facilities and its transmission lines runs another route. It's quite another project and completely different purpose from ours.

3) Q (Taniguchi): How is the reporting system among the MOC, MOP and ISRB?
A (Walid): The Iraqi Team (Dr. Walid) reports directly to the Minister of Communications, and doesn't report to the MOP. Once the GOJ commits the project, the Minister of Communications reports to the Minister of Planning, then MOP transfers to ISRB for final approval.

4) Q (Taniguchi): At the last meeting in Amman, the both sides have signed on the Minutes of Discussion expressing that "MOP and the ISRB have already approved

the Project". It does not coincide with the above explanation?
A (Walid): ISRB has two functions: announcement of potential Reconstruction projects and its needs & priority to donors, and final decision of accepting donations. The meaning of "approved" on the Minutes of Discussion was the first function of ISRB.

5) Q (Taniguchi): Is there any US Adviser to the MOC?
A (Walid): No US Adviser, no US intervention structure in the MOC since the termination of CPA

4. Undertakings to be taken by the ITPC confirmed in case Japan's Grant is executed

1) secure a land of the site for the Earth station antenna erection in Dujail: approximately1500 ㎡ land which is NOT damaged by bombing
2) undertake incidental outdoor works such as fencing, gates, and exterior lighting in and around the site
3) provide self support steel towers with 30 meters high for Dujail station, tower and associated facilities such as vertical/horizontal feeder racks, lighting rods, tower lights, etc.
4) provide microwave antenna mounting pipe and structure to tower
5) rehabilitate buildings for Gabachiya Microwave Station, Mamoun Exchange Office, Dujail Earth Station equipment room
6) provide following facilities for implementing the Project
   A) electricity distributing line to the site
   B) air-conditioner of the equipment room
   C) dual diesel engine generators (50kVA) for each station all complete with control cubicle and switch over facility from/to the mains
   note: AC-UPS and battery for earth station shall be provided by Japanese contractors.
   (duplex 50 kVA per station with 15 minutes battery)
7) secure floor space, power supplies, grounding, space for equipment in the equipment room and a route for wave guides between antenna and equipment room
8) construct the earth station antenna foundation
   note: antenna foundation design shall be provided by Japanese contractors
9) erect the earth station antenna, install, test and commission equipments
10) take necessary measures for radio coordination procedures depicted in ITU Radio Regulations, for an application for use of INTELSAT space segment and for frequency registration for ITU Radio Bureau

5. Confirmation regarding Exchange System
   1) The JICA Team proposed to use "O&M Center" instead of "Network Management System" in the exchange system of this project.
   2) In response to the above proposal by the JICA Team, the ITPC shall timely provide basic specification to present to the JICA Team. Based on it, the JICA Team will design the O&M center, if the reception by the JICA Team is in time for this outline design.
   3) The JICA Team explained the idea and scheme of training for exchange and transmission system. The Iraqi Team shall consider the necessary training in order to request to the JICA Team. If the reception by the JICA Team is in time for this outline design, the JICA Team will consider their request.

Note: The above two clauses, 4 and 5, are confirmations in case that the GOJ adopts the project as Japanese Grant Aid. These confirmations were made by the consideration that the Iraqi side shall bear these expenses. These confirmations do not assure the implementation of Bilateral Grant Aid of GOJ.

6. Confirmation regarding Transportation
   1) Custom clearance Procedure in Umm-Qasr Port: MOC dispatches officer(s) to the port immediately after receiving notification from contractors.
   2) Information that the British forces have been controlling the port shall be investigated further.

7. Next video conference shall be held on August 26th afternoon.

Minutes of Discussions of the 3rd Video Conference

Date: August 26, 2004

Place: Video Conference Room in the World Bank Office, Amman
Video Conference Room of the World Bank in the Ministry of Planning and Development Coordination of the Republic of Iraq, Baghdad

Time: 14:30 – 15:40 (Amman time)
15:30 – 16:40 (Baghdad time)

Participants:

The Iraqi Side	Mr. Ahmad Al Zubaidy	Ministry of Communications
	Dr. Walid D Jallo	Iraq Telecommunications and Post Company
The Japan Side	Dr. TANIGUCHI, Tomotaka	Nippon Koei Co., Ltd.
	Mr. ISHIGAKI, Hideaki	Nippon Koei Co,. Ltd.
	Mr. MITSUHASHI, Hideo	Nippon Koei Co,. Ltd.
	Mr. NAGATA, Kazuhiro	Nippon Koei Co,. Ltd.
	Mr. SUGIMURA, Yoshinobu	JICA Jordan Office

Prior to the video conference, the JICA Team sent a draft of TECHNICAL NOTE through email to the Iraqi Team, which the Iraqi Team did not receive before the conference due to not enough time for the reception. Under the circumstances, the discussion was made verbally based on the draft of TECHNICAL NOTE.

1. World Bank issue

   Dr. Taniguchi read the TECHNICAL NOTE and confirmed unclear items again to the Iraqi Team. The Iraqi Team explained as follows:

   1) The MOC requested the projects to the GOJ only, with the detailed information and data.
   2) At the donor conference in Doha held on May 25, 26, the Iraqi Government announced the priority project list to all the donors participated. In the list, there were 5 projects in Telecom Sector. Out of them, the 4 projects had already been requested to the GOJ, while the GOJ had not committed yet the projects at that moment.
   3) Knowing the Telecom sector projects at the donor conference, the World Bank

contacted to the MOC and ITPC.

4) The MOC and ITPC did not neither request the projects, nor provide the World Bank with the detailed data. The World Bank involvement on the projects is beyond control of the Iraqi Team.
5) Compared two finance from the GOJ and the World Bank, the Iraqi Team prefers that of the GOJ since they can expect better quality as explained before.

2. Responsible organization and necessary procedure

Dr. Taniguchi read the TECHNICAL NOTE and requested the present understanding on it. Dr .Walid explained that the ISRB approved projects to be proposed to the donor conference in Doha (first approval), then, following to the ITPC selection of finance, ISRB shall approve to receive the finance (second approval).

3. Response by the Iraqi side

Dr. Taniguchi read the TECHNICAL NOTE and reported that the Iraqi local consultants completed the observation survey without entering into the buildings to take photos. The Iraqi Team apologized the delay of permission-issue, and added the Minister agreed today to issue a full-range permission including entering into building and taking photos. The JICA Team appreciated the effort and suggested to follow up the site investigation.

4. US Advisor working for MOC and MOP

Dr. Taniguchi read the TECHNICAL NOTE and asked the opinions of the Iraqi Team. Dr. Walid replied that the question was very political, and added that relation between MOC and US is such higher level that the question is beyond their duty and authority.

5. Technical items

The both side confirmed nine items remained being not provided to the JICA Team, and that they shall be provided by September 5.

Item (1) shall be corrected to "Southern" Route.

6. Further Expecting Items to Iraq

Four expecting items were requested to Iraqi Team by the JICA Team. All items were agreed by Iraqi Team. Item (3) regarding Minister's permission has been just

solved.

7. Other Contacting Persons

Two Iraqi persons except Iraqi Team were proposed by the JICA Team to be accessed from the JICA Team in order to have multi-confirmation routes for the JICA Team. The Iraqi Team understood this manner and no objection about these Iraqi names proposed.

(Others)

1. Regarding process of the Technical Note dated August 26 in 2004, both Iraqi Team and the JICA Team agreed for waiting comments from Iraqi Team on the Note, then for finalizing by both signatures as Technical Note with past Minutes of Discussions for Video Conferences.

2. Technical confirmation from Mr. Ishigaki, JICATeam

1) Information regarding damaged buildings to be rehabilitated is different between the Iraqi Team and Iraqi local consultants.

A: Mamoun Exchange shall be rehabilitated, while the Sink Exchange office not needed. This is because that equipment planned to be installed in the Sink Exchange shall be put in containers in Mamoun Exchange, and that Sink shall be connected to Mamoun with optical fiber cables.

Iraqi Team will provide answer regarding Babel BC and Gabachiya buildings since Mr. Malik, who is familiar with the situation, is absent in this video conference.

2) The JICA Team has found the unreliable commercial power supply in Iraq through the site survey, and it is quite essential to supply diesel-engine generators under the situation. Is it necessary to be supplied new generators?

A: It shall be prepared by Iraqi side.

3) The site of the Earth Station in Dujail was completely destroyed and is likely to take long time to rehabilitate as before. In addition, planned new earth station shall be kept in good conditions with reliable air-conditioning installed. Considered the long period for site rehabilitation and requirements of new equipment, is it necessary to provide shelter-typed equipment?

A: Not necessary, since it will be much time (nine months?) before installation of equipment. It will be enough to rehabilitate all by Iraqi side.

(End)

Appendix 5 Equipment Lists

5-1 List of Trunk Communications Network

5-2 List of Transit Switched

5-1 Equipment List of Trunk Communications Network

Equipment	Specifications	Unit	Qty	Purposes	Location
Digital Microwave Transmission Facilities on Back-bone Network					
South Backbone Digital Microwave Radio Stations					
1 S1 Station (Bayia)					
1.1 SDH 6GHz Digital Microwave Transmission Equipment	Frequency Diversity + Space Diversity, STM-1,U6GHz,Long-haul (50km) ,4sys+1	Set	1	For the supply of South Backbone Radio stations	Bayia
1.2 SDH 11GHz Digital Microwave Transmission Equipment	FD system、STM-1,11GHz,4sys+1	Set	2	Ditto	Ditto
1.3 6GHz Antenna System (Antenna, Feeder, DehydlatorEquipment)	FD+SD antenna,6GHz Band	Set	2	Ditto	Ditto
1.4 11GHz Antenna System (Antenna, Feeder, DehydlatorEquipment)	FD antenna, 11 GHz Band	Set	2	Ditto	Ditto
1.5 6GHz SDH Multiplexer (MUX)	155M/2M MUX DDF(2M Interface) 4sys +1	Set	4	Ditto	Ditto
1.6 DDF(Digital Distribution Frame)		Set	1	Ditto	Ditto
1.7 DC Power Supply	Rectifiers Equipment (n+1),Input AC220v,0ytoyt DC48V 48V/30A (2+1) configuration. Lead-Acid sealed batteries 200 AH/48V	Set	1	Ditto	Ditto
1.8 Installation Materials		Lot	1	Ditto	Ditto
1.9 Spares for Maintenance and Operation	PCB Spares、Consumption Parts (5% 2 Years)	Lot	1	Ditto	Ditto
1.10 Measuring Equipment for Maintenance	(1)RF Microwave Link Analyzer, (2) RF Spectrum Analyzer (6-13)GHz, (3) Scalar (0-20)GHz Network Analyzer, (4) RF power Meter with sensors (6L,&U, 11&13GHz)+RF attenuator set (5) STM-1 SDH/PDH Test set with printer, (6) Oscilloscope 500 MHz Dual Beam (7) Frequency Counter up to 20 GHz, (8) TV Composite signal test set (9) Digital Multimeter set (10) Clamp meter 500 Amp. Up to 500v set,(11) Specific Adapters & Tools for installation (For each station) 12.PCM-30 Test set	Lot	1	Ditto	Ditto
2 S2 Station (Mussaiev)					
2.1 SDH 6GHz Digital Microwave Transmission Equipment	Frequency Diversity + Space Diversity, STM-1,U6GHz,Long-haul (50km) ,4sys+1	Set	2	For the supply of South Backbone Radio stations	Mussaiev
2.2 SDH 6GHz Digital Microwave Transmission Equipment	Frequency Diversity + Space Diversity, STM-1,U6GHz,Long-haul (50km) 2sys+1	Set	1	Ditto	Ditto
2.3 6GHz Antenna System (Antenna, Feeder, DehydlatorEquipment)	FD+SD antenna,6GHz Band	Set	6	Ditto	Ditto
2.4 6GHz SDH Multiplexer (STM-1 MUX) Equipment	155M/2M MUX DDF (2M Interface),2M CH Drop x 10, PCM MUX x1 , Sound decoder x 4), 4sys+1	Set	2	Ditto	Ditto
2.5 6GHz SDH Multiplexer (STM-1 MUX) Equipment	155M/2M MUX DDF (2M Interface,2M CH Drop x 10, PCM MUX x1 , Sound decoder x 4) 2sys+1	Set	1	Ditto	Ditto
2.6 PCM Primary Multiplexer (MUX) Equipment	E1 (30 ch) FXS/FXD	Set	1	Ditto	Ditto
2.7 DDF(Digital Distribution Frame)		Set	1	Ditto	Ditto

Equipment	Specifications	Unit	Qty	Purposes	Location
2.8 DC Power Supply Equipment	Rectifiers Equipment (n+1), Input AC 220v, Output DC 48V/30A (2+1) configuration. Lead-Acid sealed batteries 200 AH/48V	Set	1	Ditto	Ditto
2.9 Installation Materials		Lot	1	Ditto	Ditto
2.10 Spares for Maintenance and Operation	PCB Spares、Consumption Parts (5% 2 Years)	Lot	1	Ditto	Ditto
2.11 Testing Measuring Equipment for Maintenance		Lot	1	Ditto	Ditto
3 S3 Station (Hilla)					
3.1 SDH 6GHz Digital Microwave Transmission Equipment	Frequency Diversity + Space Diversity, STM-1,U6GHz,Long-haul (50km) ,4sys+1	Set	2	For the supply of South Backbone Radio stations	Hilla Exchange
3.2 6GHz Antenna System (Antenna, Feeder, DehydlatorEquipment)	FD+SD,6GHz Band	Set	4	Ditto	Ditto
3.3 SDH Multiplexer Equipment (STM-1 MUX)	155M/2M MUX DDF (2M Interface),2M CH Drop x126, PCM MUX x2 , 4sys + 1	Set	4	Ditto	Ditto
3.4 PCM Primary Multiplexer Equipment (PCM MUX)	E1 30 CH FXS/FXD	Set	2	Ditto	Ditto
3.5 DDF(Digital Distribution Frame)		Set	1	Ditto	Ditto
3.6 DC Power Supply Equipment	Rectifiers Equipment (n+1), Input AC220v, Output DC 48V/30A (2+1) configuration. Lead-Acid sealed batteries 200 AH/48V	Set	1	Ditto	Ditto
3.7 Installation Materials		Lot	1	Ditto	Ditto
3.8 Spares for Maintenance and Operation	PCB Spares、Consumption Parts (5% 2 Years)	Lot	1	Ditto	Ditto
3.9 Test Measurement Equipment for Maintenance		Lot	1	Ditto	Ditto
4. S4 Station (Kufa)					
4.1 SDH 6GHz Digital Microwave transmission Equipment	Frequency Diversity + Space Diversity, STM-1,U6GHz,Long-haul (50km) ,4sys+1	Set	2	For the supply of South Backbone Radio stations	Kufa
4.2 SDH11GHz Digital Microwave Transmission Equipment	FD System、STM-1,11GHz,2 sys+1	Set	1	Ditto	Ditto
4.3 6GHz Antenna System (Antenna、Feeder、Dehydrator Equipment)	FD+SD,6GHz Band	Set	4	Ditto	Ditto
4.4 11GHz Antenna System (Antenna、Feeder、Dehydrator Equipment)	FD, 11 GHz Band	Set	1	Ditto	Ditto
4.5 6GHz SDH Multiplexer Equipment (STM-1 MUX)	155M/2M MUX DDF (2M Inteface),34 M CH Drop x 3, TV Decoder with 2 Sound RX CH x 3	Set	4	Ditto	Ditto
4.6 11GHz SDH Multiplexer Equipment (STM-1 MUX)	155M/2M MUX DDF (2M Interface,34 M CH Drop x 3, TV Decoder with 2 Sound RX CH x 3	Set	1	Ditto	Ditto
4.7 TV Decoder with 2ch Sound Equipment	MPEG-2/PAL and 2ch Sound Decoder	Set	3	Ditto	Ditto
4.8 DDF(Digital Distribution Frame)		Set	1	Ditto	Ditto
4.9 DC Power Supply Equipment	Rectifiers Equipment (n+1), Input AC220v, Output DC 48V/30A (2+1) configuration. Lead-Acid sealed batteries 200 AH/48V	Set	1	Ditto	Ditto
4.10 Installation Materials		Lot	1	Ditto	Ditto
4.11 Spares for Maintenance and Operation	PCB Spares、Consumption Parts (5% 2 Years)	Lot	1	Ditto	Ditto
4.12 Test Measurement Equipment for Maintenance		Lot	1	Ditto	Ditto

Equipment	Specifications	Unit	Qty	Purposes	Location
5. S5 Station (Diwariya MW and Exhchange)					
5.1 SDH 6GHz Digital Microwave Transmission Equipment	Frequency Diversity + Space Diversity, STM-1,U6GHz,Long-haul (50km) ,4sys+1	Set	2	For the supply of South Backbone Radio stations	Diwariya Excfhange
5.2 6GHz Antenna System (Antenna、Feeder、Dehydrator Equipment)	FD+SD,6GHz Band	Set	4	Ditto	Ditto
5.3 SDH Multiplexer Equipment (STM-1 MUX)	155M/2M MUX DDF (2M Interface),2M CH Drop x126, PCM MUX x2 , 34M CH Drop x 3, TV decoder with 2 Sound RX CH x 3 4sys + 1	Set	4	Ditto	Ditto
5.4 PCM Primary Multiplexer (PCM MUX) Equipment	E1 30 CH FXS/FXD	Set	2	Ditto	Ditto
5.5 TV Decoder with 2ch Sound Equipment	MPEG-2/PAL and 2 CH Sound Decoder	Set	2	Ditto	Ditto
5.6 DDF(Digital Distribution Frame)		Set	3	Ditto	Ditto
5.7 DC Power Supply Equipment	Rectifiers Equipment (n+1), Input AC220v, Output DC 48V/30A (2+1) configuration. Lead-Acid sealed batteries 200 AH/48V	Set	1	Ditto	Ditto
5.8 Installation Materials		Lot	1	Ditto	Ditto
5.9 Spares for Maintenance and Operation	PCB Spares、Consumption Parts (5% 2Years)	Lot	1	Ditto	Ditto
5.10 Test Measurement Equipment for Maintenance		Lot	1	Ditto	Ditto
6. S6 Station (Abu Tabikh)					
6.1 SDH 6GHz Digital Microwave Transmission Equipment	Frequency Diversity + Space Diversity, STM-1,U6GHz,Long-haul (50km) ,4sys+1	Set	2	For the supply of South Backbone Radio stations	Abu Tabikn
6.2 6GHz Antenna System (Antenna、Feeder、Dehydrator Equipment)	FD+SD,6GHz Band	Set	4	Ditto	Ditto
6.3 SDH Multiplexer Equipment (STM-1 MUX)	155M/2M MUX DDF(2M Interface) 4sys +1	Set	4	Ditto	Ditto
6.4 DDF(Digital Distribution Frame)		Set	1	Ditto	Ditto
6.5 DC Power Supply Equipment	Rectifiers Equipment (n+1), Input AC220v, Output DC 48V/30A (2+1) configuration. Lead-Acid sealed batteries 200 AH/48V	Set	1	Ditto	Ditto
6.6 Installation Materials		Lot	1	Ditto	Ditto
6.7 Spares for Maintenance and Operation	PCB Spares、Consumption Parts (5% 2Years)	Lot	1	Ditto	Ditto
6.8 Test Measurement Equipment for Maintenance		Lot	1	Ditto	Ditto
7. S7 Station (Samawa TV)					
7.1 SDH 6GHz Digital Microwave Transmission Equipment	Frequency Diversity + Space Diversity, STM-1,U6GHz,Long-haul (50km) ,4sys+1	Set	2	For the supply of South Backbone Radio stations	Samawa TV
7.2 SDH11GHz Digital Microwave Transmission Equipment	FD System、STM-1,11GHz,2 sys+1	Set	1	Ditto	Ditto
7.3 6GHz Antenna System (Antenna、Feeder、Dehydrator Equipment)	FD+SD,6GHz Band	Set	4	Ditto	Ditto
7.4 11GHz Antenna System (Antenna、Feeder、Dehydrator Equipment)	FD, 11 GHz Band	Set	1	Ditto	Ditto
7.5 6GHz SDH Multiplexer Equipment (STM-1 MUX)	155M/2M MUX DDF (2M Interface),34 M CH Drop x 3, TV Decoder with 2 Sound RX CH x 3	Set	4	Ditto	Ditto
7.6 11GHz SDH Multiplexer Equipment (STM-1 MUX)	155M/2M MUX DDF (2M Interface) 2M CH Drop x 63, PCM MUX x 2)	Set	1	Ditto	Ditto

Equipment	Specifications	Unit	Qty	Purposes	Location
7.7 TV Coder with 2ch Sound Equipment	MPEG-2/PAL with 2 CH Sound Decoder	Set	3	Ditto	Ditto
7.8 PCM Primary Multiplexer (PCM MUX) Equipment	E1 30 ch FXS/FXD	Set	1	Ditto	Ditto
7.9 DDF(Digital Distribution Frama)		Set	1	Ditto	Ditto
7.10 DC DC Power Supply Equipment	Rectifiers Equipment (n+1), Input AC220v, Output DC 48V/30A (2+1) configuration. Lead-Acid sealed batteries 200 AH/48V	Set	1	Ditto	Ditto
7.11 Installation Materials		Lot	1	Ditto	Ditto
7.12 Spares for Maintenance and Operation	PCB Spares、Consumption Parts (5% 2Years)	Lot	1	Ditto	Ditto
7.13 Test Measurement Equipment for Maintenance		Lot	1	Ditto	Ditto
8. S8 Station (Darradijhi)					
8.1 SDH 6GHz Digital Microwave Transmission Equipment	Frequency Diversity + Space Diversity, STM-1,U6GHz,Long-haul (50km) ,4sys+1	Set	2	For the supply of South Backbone Radio stations	Darradijhi
8.2 6GHz Antenna System (Antenna、Feeder、Dehydrator Equipment)	FD+SD,6GHz Band	Set	4	Ditto	Ditto
8.3 SDH Multiplexer Equipment (STM-1 MUX)	155M/2M MUX DDF(2M interface) 4sys +1	Set	4	Ditto	Ditto
8.4 DDF(Digital Distribution Frame)		Set	1	Ditto	Ditto
8.5 DC DC Power Supply Equipment	Rectifiers Equipment (n+1), Input AC220v, Output DC 48V/30A (2+1) configuration. Lead-Acid sealed batteries 200 AH/48V	Set	1	Ditto	Ditto
8.6 Installation Materials		Lot	1	Ditto	Ditto
8.7 Spares for Maintenance and Operation	PCB Spares、Consumption Parts (5% 2Years)	Lot	1	Ditto	Ditto
8.8 Test Measurement Equipment for Maintenance		Lot	1	Ditto	Ditto
9. S 9 Station (Nassyriah TV)					
9.1 SDH 6GHz Digital Microwave Transmission Equipment	Frequency Diversity + Space Diversity, STM-1,U6GHz,Long-haul (50km) ,4sys+1	Set	2	For the supply of South Backbone Radio stations	Nassyriah TV
9.2 SDH 11GHz Digital Microwave Transmission Equipment	FD System、STM-1,11GHz,1 sys+1	Set	1	Ditto	Ditto
9.3 6 GHz Antenna System (Antenna、Feeder、Dehydrator Equipment)	FD+SD,6GHz Band	Set	4	Ditto	Ditto
9.4 11GHz Antenna System (Antenna、Feeder、Dehydrator Equipment)	FD, 11 GHz Band	Set	1	Ditto	Ditto
9.5 6Ghz SDH Multiplexer Equipment (STM-1 MUX)	155M/2M MUX DDF(2M interface) 34M CH Drop x 3, TV Coder with 2 Sound TX CH x1 , TV decoder with 2 Sound RX CH x 3, Sound Coder x 1, Sound Decoder x 4, 4 sys + 1	Set	4	Ditto	Ditto
9.6 11GHz SDH Multiplexer Equipment (STM-1 MUX)	155M/2M MUX DDF (2M Interface) 2M CH Drop x 189, OCM MUX x 2 , 2sys + 1	Set	1	Ditto	Ditto
9.7 TV Video with 2CH Sound Codec Equipment6	PAL/MPEG-2 with 2 CH Sound(TX CH x 1)	Set	1	Ditto	Ditto
9.8 TV Video with 2 CH Sound Decoder Equipjment	MPEG-2/PAL With 2 CH Sound (RX CH x 2)	Set	3	Ditto	Ditto
9.9 Sound Coder Equipment	Sound Coder	Set	1	Ditto	Ditto
9.10 Sound Decoder Equipment	Sound Decoder	Set	4	Ditto	Ditto
9.11 DDF(Digital Distribution Frame)		Set	1	Ditto	Ditto

Equipment	Specifications	Unit	Qty	Purposes	Location
9.12 DC Power Supply Equipment	Rectifiers Equipment (n+1), Input AC220v, Output DC 48V/30A (2+1) configuration. Lead-Acid sealed batteries 200 AH/48V	set	1	Ditto	Ditto
9.13 Installation Materials		Lot	1	Ditto	Ditto
9.14 Spares for Maintenance and Operation	PCB Spares, Consumption Parts (5% 2Years)	Lot	1	Ditto	Ditto
9.15 Test Measurement Equipment for Maintenance		Lot	1	Ditto	Ditto
10 S 10 Station (Souk Al Shiyoukn)					
10.1 SDH 6GHz Digital Microwave Transmission Equipment	Frequency Diversity + Space Diversity, STM-1,U6GHz,Long-haul (50km) ,4sys+1	Set	2	For the supply of South Backbone Radio stations	Souk Al Shiyoukn
10.2 6GHz Antenna System (Antenna、Feeder、Dehydrator Equipment)	FD+SD,6GHz Band	Set	4	Ditto	Ditto
10.3 6GHz SDH Multiplexer Equipment (STM-1 MUX)	155M/2M MUX DDF (2M Interface) 2 M CH Drop x 10	Set	2	Ditto	Ditto
10.4 DDF(Digital Distribution Frame)		Set	1	Ditto	Ditto
10.9 DC Power Supply Equipment	Rectifiers Equipment (n+1), Input AC220v, Output DC 48V/30A (2+1) configuration. Lead-Acid sealed batteries 200 AH/48V	Set	1	Ditto	Ditto
10.5 Installation Materials		Lot	1	Ditto	Ditto
10.6 Spares for Maintenance and Operation	PCB Spares, Consumption Parts (5% 2Years)	Lot	1	Ditto	Ditto
10.7 Test Measurement Equipment for Maintenance		Lot	1	Ditto	Ditto
11 S 11 Station (Ghabaychia)					
11.1 SDH 6GHz Digital Microwave Transmission Equipment	Frequency Diversity + Space Diversity, STM-1,U6GHz,Long-haul (50km) ,4sys+1	Set	2	For the supply of South Backbone Radio stations	Ghabaychia
11.2 6GHz Antenna System (Antenna、Feeder、Dehydrator Equipment)	FD+SD,6GHz Band	Set	4	Ditto	Ditto
11.3 SDH Multiplexer Equipment (STM-1 MUX)	155M/2M MUX DDF(2M Interface) 4sys +1	Set	4	Ditto	Ditto
11.4 DDF(Digital Distribution Frame)		Set	1	Ditto	Ditto
11.5 DC Power Supply Equipment	Rectifiers Equipment (n+1), Input AC220v, Output DC 48V/30A (2+1) configuration. Lead-Acid sealed batteries 200 AH/48V	Set	1	Ditto	Ditto
11.6 Installation Materials		Lot	1	Ditto	Ditto
11.7 Spares for Maintenance and Operation	PCB Spares, Consumption Parts (5% 2Years)	Lot	1	Ditto	Ditto
11.8 Test Measurement Equipment for Maintenance		Lot	1	Ditto	Ditto
12 S 12 Station (Nikayia)					
12.1 SDH 6GHz Digital Microwave Transmission Equipment	Frequency Diversity + Space Diversity, STM-1,U6GHz,Long-haul (50km) ,4sys+1	Set	2	For the supply of South Backbone Radio stations	Nikayia
12.2 6GHz Antenna System (Antenna、Feeder、Dehydrator Equipment)	FD+SD,6GHz Band	Set	4	Ditto	Ditto
12.3 SDH Multiplexer Equipment (STM-1 MUX)	155M/2M MUX DDF(2M interface) 4sys +1	Set	4	Ditto	Ditto
12.4 DDF(Digital Distribution Frame)		Set	1	Ditto	Ditto

Equipment	Specifications	Unit	Qty	Purposes	Location
12.5 DC Power Supply Equipment	Rectifiers Equipment (n+1), Input AC220v, Output DC 48V/30A (2+1) configuration. Lead-Acid sealed batteries 200 AH/48V	Set	1	Ditto	Ditto
12.6 Installation Materials		Lot	1	Ditto	Ditto
12.7 Spares for Maintenance and Operation	PCB Spares、Consumption Parts (5% 2Years)	Lot	1	Ditto	Ditto
12.8 Test Measurement Equipment for Maintenance		Lot	1	Ditto	Ditto
13 S 13 Station (Basra MW and Exchange)					
13.1 SDH 6GHz Digital Microwave Transmission Equipment	Frequency Diversity + Space Diversity, STM-1,U6GHz,Long-haul (50km) ,4sys+1	Set	1	For the supply of South Backbone Radio stations	Basra Exchange
13.2 6GHz Antenna System (Antenna、Feeder、Dehydrator Equipment)	FD+SD,6GHz Band	Set	2	Ditto	Ditto
13.3 6GHz SDH Multiplexer Equipment (STM-1 MUX)	155M/2M MUX DDF (2M Interface),2M CH Drip x189, PCM MUX x9 , 4sys + 1	Set	4	Ditto	Ditto
13.4 PCM Primary Multiplexer Equipment (PCM MUX)	E1 (30 ch), FXS/FXD	Set	9	Ditto	Ditto
13.5 DDF(Digital Distribution Frame)		Set	1	Ditto	Ditto
13.6 DC Power Supply Equipment	Rectifiers Equipment (n+1), Input AC220v, Output DC 48V/30A (2+1) configuration. Lead-Acid sealed batteries 200 AH/48V	Set	1	Ditto	Ditto
13.7 Installation Materials		Lot	1	Ditto	Ditto
13.8 Spares for Maintenance and Operation	PCB Spares、Consumption Parts (5% 2Years)	Lot	1	Ditto	Ditto
13.9 Test Measurement Equipment for Maintenance		Lot	1	Ditto	Ditto

Equipment	Specifications	Unit	Qty	Purposes	Location
North Backbone Digital Microwave Radio Stations					
1. N1 Station (Mamoun MW and Exchange)					
1.1 SDH 6GHz Digital Microwave Transmission Equipment	Frequency Diversity + Space Diversity, STM-1,U6GHz,Long-haul (50km) ,4sys+1	Set	1	For the supply of North Backbone Radio stations	Mamoun Exchange
1.2 SDH11GHz Digital Microwave Transmission Equipment	FD System、STM-1,11GHz,2 sys+1	Set	1	Ditto	Ditto
1.3 6GHz Antenna System (Antenna、Feeder、Dehydrator Equipment)	FD+SD,6GHz Band	Set	2	Ditto	Ditto
1.4 11GHz Antenna System (Antenna、Feeder、Dehydrator Equipment)	FD, 11 GHz Band	Set	1	Ditto	Ditto
1.5 6GHz SDH Multiplexer Equipment (STM-1 MUX)	155M/2M MUX DDF (2M Interface),2M CH Drip x189, PCM MUX x9 , 4sys + 1	Set	4	Ditto	Ditto
1.6 11GHz SDH Multiplexer Equipment (STM-1 MUX)	155M/2M MUX DDF (2M Interface) 2M CH Drop x 189,PCM MUX x 9,1 Sys + 1	Set	1	Ditto	Ditto
1.7 PCM Primary Multiplexer Equipment (PCM MUX)	E1 (30 ch), FXS/FXD	Set	9	Ditto	Ditto
1.8 DDF(Digital Distribution Frame)		Set	1	Ditto	Ditto
1.9 DC Power Supply Equipment	Rectifiers Equipment (n+1), Input AC220v, Output DC 48V/30A (2+1) configuration. Lead-Acid sealed batteries 200 AH/48V	Set	1	Ditto	Ditto
1.10 Installation Materials		Lot	1	Ditto	Ditto
1.11 Spares for Maintenance and Operation	PCB Spares、Consumption Parts (5% 2Years)	Lot	1	Ditto	Ditto
1.12 Test Measurement Equipment for Maintenance		Lot	1	Ditto	Ditto
2. N2 Station (Tarmiya)					
2.1 SDH 6GHz Digital Microwave Transmission Equipment	Frequency Diversity + Space Diversity, STM-1,U6GHz,Long-haul (50km) ,4sys+1	Set	2	For the supply of North Backbone Radio stations	Tarmiya
2.2 6GHz Antenna System (Antenna、Feeder、Dehydrator Equipment)	FD+SD,6GHzBand	Set	4	Ditto	Ditto
2.3 SDH Multiplexer Equipment (STM-1 MUX)	155M/2M MUX DDF(2M Interface) 4sys +1	Set	4	Ditto	Ditto
2.4 PCM Primary Multiplexer Equipment (PCM MUX)	E1 (30 CH) FXS/FXO	Set	9	Ditto	Ditto
2.5 DDF(Digital Distribution Frame)		Set	1	Ditto	Ditto
2.6 DC Power Supply Equipment	Rectifiers Equipment (n+1), Input AC220v, Output DC 48V/30A (2+1) configuration. Lead-Acid sealed batteries 200 AH/48V	Set	1	Ditto	Ditto
2.7 Installation Materials		Lot	1	Ditto	Ditto
2.8 Spares for Maintenance and Operation	PCB Spares、Consumption Parts (5% 2Years)	Lot	1	Ditto	Ditto
2.9 Test Measurement Equipment for Maintenance		Lot	1	Ditto	Ditto
3. N3 Station (Balado)					
3.1 SDH 6GHz Digital Microwave Transmission Equipment	Frequency Diversity + Space Diversity, STM-1,U6GHz,Long-haul (50km) ,4sys+1	Set	2	For the supply of North Backbone Radio stations	Balado
3.2 6GHz Antenna System (Antenna、Feeder、Dehydrator Equipment)	FD+SD,6GHz Band	Set	4	Ditto	Ditto
3.3 SDH Multiplexer Equipment (STM-1 MUX)	155M/2M MUX DDF(2M Interface) 4sys +1	Set	4	Ditto	Ditto

Equipment	Specifications	Unit	Qty	Purposes	Location
3.4 PCM Primary Multiplexer Equipment (PCM MUX)	E1 (30 CH), FXS/FXO	Set	1	Ditto	Ditto
3.5 DDF(Digital Distribution Frame)		Set	1	Ditto	Ditto
3.6 DC Power Supply Equipment	Rectifiers Equipment (n+1), Input AC220v, Output DC 48V/30A (2+1) configuration. Lead-Acid sealed batteries 200 AH/48V	Set	1	Ditto	Ditto
3.7 installation Materials		Lot	1	Ditto	Ditto
3.8 Spares for Maintenance and Operation	PCB Spares、Consumption Parts (5% 2 Years)	Lot	1	Ditto	Ditto
3.9 Test Measurement Equipment for Maintenance		Lot	1	Ditto	Ditto
4. N4 Station (Samara)					
4.1 SDH 6GHz Digital Microwave Transmission Equipment	Frequency Diversity + Space Diversity, STM-1,U6GHz,Long-haul (50km) ,4sys+1	Set	2	For the supply of North Backbone Radio stations	Samara
4.2 6GHz Antenna System (Antenna、Feeder、Dehydrator Equipment)	FD+SD,6GHz Band	Set	4	Ditto	Ditto
4.3 SDH Multiplexer Equipment (STM-1 MUX)	155M/2M MUX DDF(2M Interface) 2M CH Drop x 126, PCM MUX x1,4sys +1	Set	4	Ditto	Ditto
4.4 PCM Primary Multiplexer Equipment (PCM MUX)	E1 (30 CH) FXS/FXO	Set	1	Ditto	Ditto
4.5 NMS(Network Management System)	LTC(Local Management Craft terminal)	Set	1	Ditto	Ditto
4.6 DC Power Supply Equipment	Rectifiers Equipment (n+1), Input AC220v, Output DC 48V/30A (2+1) configuration. Lead-Acid sealed batteries 200 AH/48V	Set	1	Ditto	Ditto
4.7 installation Materials		Lot	1	Ditto	Ditto
4.8 Spares for Maintenance and Operation	PCB Spares、Consumption Parts (5% 2 Years)	Lot	1	Ditto	Ditto
4.9 Test Measurement Equipment for Maintenance		Lot	1	Ditto	Ditto
5. N5 Station (Tikrit MW and Exchange)					
5.1 SDH 6GHz Digital Microwave Transmission Equipment	Frequency Diversity + Space Diversity, STM-1,U6GHz,Long-haul (50km) ,4sys+1	Set	2	For the supply of North Backbone Radio stations	Tikrit
5.2 6GHz Antenna System (Antenna、Feeder、Dehydrator Equipment)	FD+SD,6GHz Band	Set	4	Ditto	Ditto
5.3 6GHz SDH Multiplexer Equipment (STM-1 MUX)	155M/2M MUX DDF (2M Interface),2M CH Drip x126, PCM MUX x2 , 4sys + 1	Set	4	Ditto	Ditto
5.4 PCM Primary Multiplexer Equipment (PCM MUX)	E1 (30 ch) FXS/FXD	Set	2	Ditto	Ditto
5.5 DDF(Digital Distribution Frame)		Set	1	Ditto	Ditto
5.6 DC Power Supply Equipment	Rectifiers Equipment (n+1), Input AC220v, Output DC 48V/30A (2+1) configuration. Lead-Acid sealed batteries 200 AH/48V	Set	1	Ditto	Ditto
5.7 Installation Materials		Lot	1	Ditto	Ditto
5.8 Spares for Maintenance and Operation	PCB Spares、Consumption Parts (5% 2 Years))	Lot	1	Ditto	Ditto
5.9 Test Measurement Equipment for Maintenance		Lot	1	Ditto	Ditto
6. N6 Station (Baiji)					
6.1 SDH 6GHz Digital Microwave Transmission Equipment	Frequency Diversity + Space Diversity, STM-1,U6GHz,Long-haul (50km) ,4sys+1	Set	2	For the supply of North Backbone Radio stations	Baiji

Equipment	Specifications	Unit	Qty	Purposes	Location
6.2 6GHz Antenna System (Antenna、Feeder、Dehydrator Equipment)	FD+SD,6GHz Band	Set	4	Ditto	Ditto
6.3 SDH Multiplexer Equipment (STM-1 MUX)	155M/2M MUX DDF(2M Interface) 2M CH Drop x 63, PCM MUX x 1,4sys +1	Set	4	Ditto	Ditto
6.4 PCM Primary Multiplexer Equipment (PCM MUX)	E1 (30 CH) FXS/FXO	Set	1	Ditto	Ditto
6.5 DDF(Digital Distribution Frame)		Set	1	Ditto	Ditto
6.6 DC Power Supply Equipment	Rectifiers Equipment (n+1), Input AC220v, Output DC 48V/30A (2+1) configuration. Lead-Acid sealed batteries 200 AH/48V	Set	1	Ditto	Ditto
6.7 Installation Materials		Lot	1	Ditto	Ditto
6.8 Spares for Maintenance and Operation	PCB Spares、Consumption Parts (5% 2 Years)	Lot	1	Ditto	Ditto
6.9 Test Measurement Equipment for Maintenance		Lot	1	Ditto	Ditto
7. N7 Station (Fatha)					
7.1 SDH 6GHz Digital Microwave Transmission Equipment	Frequency Diversity + Space Diversity, STM-1,U6GHz,Long-haul (50km) ,4sys+1	Set	2	For the supply of North Backbone Radio stations	Fatha
7.2 6GHz Antenna System (Antenna、Feeder、Dehydrator Equipment)	FD+SD,6GHzBand	Set	4	Ditto	Ditto
7.3 SDH Multiplexer Equipment (STM-1 MUX)	155M/2M MUX DDF(2M Interface), 4sys +1	Set	4	Ditto	Ditto
7.4 DDF(Digital Distribution Frame)		Set	1	Ditto	Ditto
7.5 DC Power Supply Equipment	Rectifiers Equipment (n+1), Input AC220v, Output DC 48V/30A (2+1) configuration. Lead-Acid sealed batteries 200 AH/48V	Set	1	Ditto	Ditto
7.6 Installation Materials		Lot	1	Ditto	Ditto
7.7 Spares for Maintenance and Operation	PCB Spares、Consumption Parts (5% 2 Years)	Lot	1	Ditto	Ditto
7.8 Test Measurement Equipment for Maintenance		Lot	1	Ditto	Ditto
8. N8 Station (Shrqat)					
8.1 SDH 6GHz Digital Microwave Transmission Equipmen	Frequency Diversity + Space Diversity, STM-1,U6GHz,Long-haul (50km) ,4sys+1	Set	2	For the supply of North Backbone Radio stations	Shrqat
8.2 6GHz Antenna System (Antenna、Feeder、Dehydrator Equipment)	FD+SD,6GHz Band	Set	4	Ditto	Ditto
8.3 SDH Multiplexer Equipment (STM-1 MUX)	155M/2M MUX DDF(2M Interface) 2M CH Drop x 63, PCM MUX x 1,4sys +1	Set	4	Ditto	Ditto
8.4 PCM Primary Multiplexer Equipment (PCM MUX)	E1 (30 CH) FXS/FXO	Set	1	Ditto	Ditto
8.5 DDF(Digital Distribution Frame)		Set	1	Ditto	Ditto
8.6 DC Power Supply Equipment	Rectifiers Equipment (n+1), Input AC220v, Output DC 48V/30A (2+1) configuration. Lead-Acid sealed batteries 200 AH/48V	Set	1	Ditto	Ditto
8.7 Installation Materials		Lot	1	Ditto	Ditto
8.8 Spares for Maintenance and Operation	PCB Spares、Consumption Parts (5% 2 Years)	Lot	1	Ditto	Ditto
8.9 Test Measurement Equipment for Maintenance		Lot	1	Ditto	Ditto
9. N9 Station (Qayara)					
9.1 SDH 6GHz Digital Microwave Transmission Equipment	Frequency Diversity + Space Diversity, STM-1,U6GHz,Long-haul (50km) ,4sys+1	Set	2	For the supply of North Backbone Radio stations	Qayara

Equipment	Specifications	Unit	Qty	Purposes	Location
9.2 6GHz Antenna System (Antenna、Feeder、Dehydrator Equipment)	FD+SD,6GHz Band	Set	4	Ditto	Ditto
9.3 SDH Multiplexer Equipment (STM-1 MUX)	155M/2M MUX DDF(2M Interface) 2M CH Drop x 63, PCM MUX x 1,4sys +1	Set	4	Ditto	Ditto
9.4 PCM Primary Multiplexer Equipment (PCM MUX)	E1(30 CH),FXS/FXO	Set	1	Ditto	Ditto
9.5 DDF(Digital Distribution Frame)		Set	1	Ditto	Ditto
9.6 DC Power Supply Equipment	Rectifiers Equipment (n+1), Input AC220v, Output DC 48V/30A (2+1) configuration. Lead-Acid sealed batteries 200 AH/48V	Set	1	Ditto	Ditto
9.7 Installation Materials		Lot	1	Ditto	Ditto
9.8 Spares for Maintenance and Operation	PCB Spares、Consumption Parts (5% 2 Years)	Lot	1	Ditto	Ditto
9.9 Test Measurement Equipment for Maintenance		Lot	1	Ditto	Ditto

Equipment	Specifications	Unit	Qty	Purposes	Location
10. N10 Station (Mashraq)					
10.1 SDH 6GHz Digital Microwave Transmission Equipment	Frequency Diversity + Space Diversity, STM-1,U6GHz,Long-haul (50km) ,4sys+1	Set	2	For the supply of North Backbone Radio stations	Mashraq
10.2 6GHz Antenna System (Antenna、Feeder、Dehydrator Equipment)	FD+SD,6GHz Band	Set	4	Ditto	Ditto
10.3 SDH Multiplexer Equipment (STM-1 MUX)	155M/2M MUX DDF(2M Interface) 2M CH Drop x 63, PCM MUX x 1,4sys +1	Set	4	Ditto	Ditto
10.4 PCM Primary Multiplexer Equipment (PCM MUX)	E1 (30 CH) FXS/FXO	Set	1	Ditto	Ditto
10.5 DDF(Digital Distribution Frame)		Set	1	Ditto	Ditto
10.6 DC Power Supply Equipment	Rectifiers Equipment (n+1), Input AC220v, Output DC 48V/30A (2+1) configuration. Lead-Acid sealed batteries 200 AH/48V	Set	1	Ditto	Ditto
10.7 Installation Materials		Lot	1	Ditto	Ditto
10.8 Spares for Maintenance and Operation	PCB Spares、Consumption Parts (5% 2 Years)	Lot	1	Ditto	Ditto
10.9 Test Measurement Equipment for Maintenance		Lot	1	Ditto	Ditto
11. N11 Station (Mosul TV West Tigris)					
11.1 SDH 6GHz Digital Microwave Transmission Equipment	Frequency Diversity + Space Diversity, STM-1,U6GHz,Long-haul (50km) ,4sys+1	Set	1	For the supply of North Backbone Radio stations	Mosul TV
11.2 SDH 11GHz Digital Microwave Transmission Equipment	FD System、STM-1,11GHz,1 sys+1	Set	1	Ditto	Ditto
11.3 6GHz Antenna System (Antenna、Feeder、Dehydrator Equipment)	FD+SD,6GHz Band	Set	2	Ditto	Ditto
11.4 11GHz Antenna System (Antenna、Feeder、Dehydrator Equipment)	FD, 11 GHz Band	Set	1	Ditto	Ditto
11.5 6Ghz SDH Multiplexer Equipment (STM-1 MUX)	155M/2M MUX DDF(2M Interface) 2M CH Drop x 2,34M CH Drop x2, TV Coder with 2 Sound TX CH x1 , TV Decoder with 2 Sound RX CH x 3, Sound Coder x2, Sound Decoder x4, 4 sys + 1	Set	4	Ditto	Ditto
11.6 11GHz Multiplexer Equipment (STM-1 MUX)	155M/2M MUX DDF (2M Interface) 2M CH Drop x 189, PCM MUX x 8 ,4 sys + 1	Set	1	Ditto	Ditto
11.7 TV Video with 2 CH Sound Coder Equipment	PAL/MPEG-2 Encoder (TX CH x 1)	Set	1	Ditto	Ditto
11.8 TV Video with 2 CH Sound Decoder Equipment	MPEG-2/PAL Decoder (RX CH x 3)	Set	3	Ditto	Ditto
11.9 Sound Encoder Equipment	Analogue/MPEG-1 Coder	Set	2	Ditto	Ditto
11.10 Sound Decoder Equipment	MPEG-1/Analogue Decoder	Set	4	Ditto	Ditto
11.11 DDF(Digital Distribution Frame)		Set	1	Ditto	Ditto
11.12 DC Power Supply Equipment	Rectifiers Equipment (n+1), Input AC220v, Output DC 48V/30A (2+1) configuration. Lead-Acid sealed batteries 200 AH/48V	Set	1	Ditto	Ditto
11.13 Installation Materials		Lot	1	Ditto	Ditto
11.14 Spares for Maintenance and Operation	PCB Spares、Consumption Parts (5% 2 Years)	Lot	1	Ditto	Ditto
11.15 Test Measurement Equipment for Maintenance		Lot	1	Ditto	Ditto

Equipment	Specifications	Unit	Qty	Purposes	Location
South SPUR Digital Microwave Radio Stations					
1. 1-1 Station (Baghdad TV)					
1.1 SDH 11GHz Digital Microwave Transmission Equipment	FD System、STM-1,11GHz,4 sys+1	Set	1	For the supply of South SPUR Radio stations	Baghdad TV
1.2 SDH 11GHz Digital Microwave Transmission Equipment	FD System、STM-1,11GHz,2 sys+1	Set	1	Ditto	Ditto
1.3 11GHz Antenna System (Antenna、Feeder、Dehydrator Equipment)	FD, 11 GHz Band	Set	2	Ditto	Ditto
1.4 11 GHz SDH Multiplexer Equipment (STM-1 MUX)	155M/2M MUX DDF(2M Interface) 2M CH Drop x3,34M CH Drop x 3, TV Coder with 2 Sound TX CH x3, TV Decoder with 2 Sound RX CH x 3, Sound Coder x8, Sound Decoder x3, 2sys + 1	Set	2	Ditto	Ditto
1.5 11 GHz SDH Multiplexer Equipment (STM-1 MUX)	155M/2M MUX DDF(2M Interface) 2M CH Drop x4,34M CH Drop x 3, TV Coder with 2 Sound TX CH x3, TV Decoder with 2 Sound RX CH x 3, Sound Coder x8, Sound Decoder x3, 4sys + 1	Set	4	Ditto	Ditto
1.6 TV Video with Sound 2 CH Encoder Equipment	TX CH x 1 (PAL to MPEG-2)	Set	6	Ditto	Ditto
1.7 TV Video with Sound 2 CH Decoder Equipment	RX CH x 3 (MPEG-2 to PAL)	Set	6	Ditto	Ditto
1.8 Sound Encoder Equipment	Audiot to MPEG-1 Coder	Set	16	Ditto	Ditto
1.9 Sound Decoder Equipment	MPEG-1 to Audio Decoder	Set	6	Ditto	Ditto
1.10 DDF(Digital Distribution Frame)		Set	1	Ditto	Ditto
1.11 DC Power Supply Equipment	Rectifiers Equipment (n+1), Input AC220v, Output DC 48V/30A (2+1) configuration. Lead-Acid sealed batteries 200 AH/48V	Set	1	Ditto	Ditto
1.12 Installation Materials		Lot	1	Ditto	Ditto
1.13 Spares for Maintenance and Operation	PCB Spares、Consumption Parts (5% 2 Years)	Lot	1	Ditto	Ditto
1.14 Test Measurement Equipment for Maintenance		Lot	1	Ditto	Ditto

Equipment	Specifications	Unit	Qty	Purposes	Location
2. S1-2 Station (Sink Baghdad II Exchange)					
2.1 SDH 11GHz Digital Microwave Transmission Equipment	FD System、STM-1,11 GHz, 4sys+1	Set	1	For the supply of South SPUR Radio stations	Sink Exchange
2.2 11GHz Antenna System (Antenna、Feeder、Dehydrator Equipment)	FD,11 GHz Band	Set	1	Ditto	Ditto
2.3 SDH Multiplexer Equipment (STM-1 MUX)	155M/2M MUX DDF(2M Interface) 2M CH Drop x189, PCM MUX x12,4sys +1	Set	4	Ditto	Ditto
2.4 PCM Primary Multiplexer Equipment (PCM MUX)	E1 (30 CH) FXS/FXO	Set	12	Ditto	Ditto
2.5 DDF(Digital Distribution Frame)		Set	1	Ditto	Ditto
2.6 DC Power Supply Equipment	Rectifiers Equipment (n+1), Input AC220v, Output DC 48V/30A (2+1) configuration. Lead-Acid sealed batteries 200 AH/48V	Set	1	Ditto	Ditto
2.7 Installation Materials		Lot	1	Ditto	Ditto
2.8 Spares for Maintenance and Operation	PCB Spares、Consumption Parts (5% 2 Years)	Lot	1	Ditto	Ditto
2.9 Test Measurement Equipment for Maintenance		Lot	1	Ditto	Ditto
3. S2-2 Station (Kerbarah Exchange)					
3.1 SDH 6GHz Digital Microwave Transmission Equipment	Frequency Diversity + Space Diversity, STM-1,U6GHz,Long-haul (50km) ,4sys+1	Set	1	For the supply of South SPUR Radio stations	Kerbarah Exchange
3.2 6GHz Antenna System (Antenna、Feeder、Dehydrator Equipment)	FD+SD,6GHz Band	Set	2	Ditto	Ditto
3.3 SDH Multiplexer Equipment (STM-1 MUX)	155M/2M MUX DDF(2M Interface) 2M CH Drop x128, PCM MUX x 1,2 sys +1	Set	2	Ditto	Ditto
3.4 PCM Primary Multiplexer Equipment (PCM MUX)	E1(30 CH), FXS/FXO	Set	1	Ditto	Ditto
3..5 DDF(Digital Distribution Frame)		Set	1	Ditto	Ditto
3.6 DC Power Supply Equipment	Rectifiers Equipment (n+1), Input AC220v, Output DC 48V/30A (2+1) configuration. Lead-Acid sealed batteries 200 AH/48V	Set	1	Ditto	Ditto
3.7 Installation Materials		Lot	1	Ditto	Ditto
3.8 Spares for Maintenance and Operation	PCB Spares、Consumption Parts (5% 2 Years)	Lot	1	Ditto	Ditto
3.9 Test Measurement Equipment for Maintenance		Lot	1	Ditto	Ditto
4. S4-1 Station (Nadjaf Exchange)					
4.1 SDH 11GHz Digital Microwave Transmission Equipment	FD System、STM-1,11 GHz, 2sys+1	Set	1	For the supply of South SPUR Radio station	Nadjaf Exchange
4.2 11GHz Antenna System (Antenna、Feeder、Dehydrator Equipment)	FD,11 GHz Band	Set	1	Ditto	Ditto
4.3 SDH Multiplexer Equipment (STM-1 MUX)	155M/2M MUX DDF(2M Interface) 2M CH Drop x189, PCM MUX x2, 2 sys +1	Set	2	Ditto	Ditto
4.4 PCM Primary Multiplexer Equipment (PCM MUX)	E1(30 CH)FXS/FXO	Set	2	Ditto	Ditto
4.5 DDF(Digital Distribution Frame)		Set	1	Ditto	Ditto
4.6 DC Power Supply Equipment	Rectifiers Equipment (n+1), Input AC220v, Output DC 48V/30A (2+1) configuration. Lead-Acid sealed batteries 200 AH/48V	Set	1	Ditto	Ditto
4.7 Installation Materials		Lot	1	Ditto	Ditto

Equipment	Specifications	Unit	Qty	Purposes	Location
4.8 Spares for Maintenance and Operation	PCB Spares、Consumption Parts (5% 2 Years)	Lot	1	Ditto	Ditto
4.9 Test Measurement Equipment for Maintenance		Lot	1	Ditto	Ditto
5. S7-1 Station (Samawa Exchange)					
5.1 SDH 11GHz Digital Microwave Transmission Equipment	FD System、STM-1,11 GHz, 2sys+1	Set	1	For the supply of South SPUR Radio station	Samawa Exchange
5.2 11GHz Antenna System (Antenna、Feeder、Dehydrator Equipment)	FD,11 GHz Band	Set	1	Ditto	Ditto
5.3 SDH Multiplexer Equipment (STM-1 MUX)	155M/2M MUX DDF(2M Interface) 2M CH Drop x63, PCM MUX x2 2 sys +1	Set	2	Ditto	Ditto
5.4 PCM Primary Multiplexer Equipment (PCM MUX)	E1 (30 CH), FXS/FXO	Set	2	Ditto	Ditto
5.5 DDF(Digital Distribution Frame)		Set	1	Ditto	Ditto
5.6 DC Power Supply Equipment	Rectifiers Equipment (n+1), Input AC220v, Output DC 48V/30A (2+1) configuration. Lead-Acid sealed batteries 200 AH/48V	Set	1	Ditto	Ditto
5.7 Installation Materials		Lot	1	Ditto	Ditto
5.8 Spares for Maintenance and Operation	PCB Spares、Consumption Parts (5% 2 Years)	Lot	1	Ditto	Ditto
5.9 Test Measurement Equipment for Maintenance		Lot	1	Ditto	Ditto
6. S9-1 Station (Nassyriah Exchange)					
6.1 SDH 11GHz Digital Microwave Transmission Equipment	FD Sys、STM-1,11 GHz, 2sys+1	Set	1	For the supply of South SPUR Radio station	Nassyriah Exchange
6.2 11GHz Antenna System (Antenna、Feeder、Dehydrator Equipment)	FD,11 GHz Band	Set	1	Ditto	Ditto
6.3 SDH Multiplexer Equipment (STM-1 MUX)	155M/2M MUX DDF(2M Interface) 2M CH Drop x189, PCM MUX x2 2 sys +1	Set	2	Ditto	Ditto
6.4 PCM Primary Multiplexer Equipment (PCM MUX)	E1 (30 CH), FXS/FXO	Set	3	Ditto	Ditto
6.5 DDF(Digital Distribution Frame)		Set	1	Ditto	Ditto
6.6 DC Power Supply Equipment	Rectifiers Equipment (n+1), Input AC220v, Output DC 48V/30A (2+1) configuration. Lead-Acid sealed batteries 200 AH/48V	Set	1	Ditto	Ditto
6.7 Installation Materials		Lot	1	Ditto	Ditto
6.8 Spares for Maintenance and Operation	PCB Spares、Consumption Parts (5% 2 Years)	Lot	1	Ditto	Ditto
6.9 Test Measurement Equipment for Maintenance		Lot	1	Ditto	Ditto
7. S 10-2 Station (Souq Al Shiyoukn Exchange)					
9.1 SDH 11GHz Digital Microwave Transmission Equipment	FD System、STM-1,11 GHz, 1 sys+1	Set	1	For the supply of South SPUR Radio station	Souq Al Shiyoukn Exchange
9.2 11GHz Antenna System (Antenna、Feeder、Dehydrator Equipment)	FD,11 GHz Band	Set	1	Ditto	Ditto
9.3 SDH Multiplexer Equipment (STM-1 MUX)	155M/2M MUX DDF(2M Interface) 2M CH Drop x 10, 1sys +1	Set	1	Ditto	Ditto
9.4 DDF(Digital Distribution Frame)		Set	1	Ditto	Ditto

Equipment	Specifications	Unit	Qty	Purposes	Location
9.5 DC Power Supply Equipment	Rectifiers Equipment (n+1), Input AC220v, Output DC 48V/30A (2+1) configuration. Lead-Acid sealed batteries 200 AH/48V	Set	1	Ditto	Ditto
9.6 Installation Materials		Lot	1	Ditto	Ditto
9.7 Spares for Maintenance and Operation	PCB Spares、Consumption Parts (5% 2 Years)	Lot	1	Ditto	Ditto
9.8 Test Measurement Equipment for Maintenance		Lot	1	Ditto	Ditto

Equipment	Specifications	Unit	Qty	Purposes	Location
South SPUR Digital Microwave Radio Stations					
1. N11-1 Station (Mosul MW and Exchange)					
2.1 SDH 11GHz Digital Microwave Transmission Equipment	FD System、STM-1,11 GHz,4 sys+1	Set	1	For the supply of North SPUR Radio station	Mosul Exchange
2.2 11GHz Antenna System （Antenna、Feeder、Dehydrator Equipment）	FD,11 GHz Band	Set	1	Ditto	Ditto
2.3 SDH SDH Multiplexer Equipment (STM-1 MUX)	155M/2M MUX DDF(2Mインターフェイス) 2M CH Drop x189, PCM MUX x 8 4 sys +1	Set	4	Ditto	Ditto
2.4 PCM Primary Multiplexer Equipment (PCM MUX)	30 CH FXS/FXO	Set	8	Ditto	Ditto
2.5 DDF(Digital Distribution Frame)		Set	1	Ditto	Ditto
2.6 DC Power Supply Equipment	Rectifiers Equipment (n+1), Input AC220v, Output DC 48V/30A (2+1) configuration. Lead-Acid sealed batteries 200 AH/48V	Set	1	Ditto	Ditto
2.7 Installation Materials		Lot	1	Ditto	Ditto
2.8 Spares for Maintenance and Operation	PCB Spares、Consumption Parts (5% 2 Years)	Lot	1	Ditto	Ditto
2.9 Test Measurement Equipment for Maintenance		Lot	1	Ditto	Ditto
Others					
1. Antenna Mouting Insruments and Machinery	Hoist and Winch to mount Antenna to Tower	Lot	4		
2.Training （Japan）	Factory training fro installation、test and commissioning tests on-site ,Operation and Maintenace, 3 Engineers/Group, 1.5 Month, 13.5 M/M	Lot	1		
3. Operation and Maintenance Manuals, Equipment Description and System Manualas	Digital Microwave Transmission System Manuals in Engiish	Copies	36		

5-2 Equipment List of Transit Switches

Equipment	Specifications	Unit	Qty	Purposes	Location
1. Transit and Toll Switch					
1.1 Baghdad I Exchange					
1.1.1 Digital Transit/Toll Exchange	Total Capacity: 20,000 Channels (Bothway is 80%), Traffic Capacity: 0.8E/Channel, No. 7 Common Signalling System: 80%、R2 MFC Signalling: 20%、Stored Programme Control (SPC) System, Average Holding Time: 150 seconds, Overload Control under Proper G.O.S.	Set	1	Transit and Toll Switch	Baghdad I Exchange
1.1.2 Digital Distribution Frame	Patching Type, For Full Switch Capacity	Set	1	For Test of Digital Channels	ditto
1.1.3 Batteries	Sealed Type, 8-hour Uninterrupted Supply	Set	1	For Emergency DC Power Supply	ditto
1.1.4 Rectifiers	Floating Charge Type	Set	1	For Convertion from AC to DC	ditto
1.1.5 DC Distribution Board	DC 48 Supply	Set	1	For Distribution of DC Power	ditto
1.1.6 Operation and Mainteance Tools and Measuring Equipment	Wrapping Tools, Soldering Iron, Standard Tools (Drivers, Nippers, Pliers, etc.), Clamp Type AC/DC Meter, Synchroscope, Portable Tester	Set	1	For Operation and Mainteance	ditto
1.1.7 Installation Materials	Free Access Raised Floor, Cables and Racks	Lot	1	For Installation of Switching Equipment and Cabling	ditto
1.1.8 Maintenance Spares	2-year Spares for Power, Switch and Printer	Lot	1	For Maintenance	ditto
1.1.9 Exchange Data	Switch Operation Data for Respective Exchange (Trunk, Routing, etc.)	Lot	1	For Switch Operation	ditto
1.1.10 Software (for SPC)	Input, Internal and Output Process Main Programmes, Module Configuration written in CHILL or C Language, Easy Addition and Change in Programme	Lot	1	Switch Operation Software	ditto
1.1.11 Operation and Maintaince Manual	Comprehensive Documents written in English and Supply of CD-ROM	Set	1	For Operation and Mainteance	ditto
1.1.12 Installation Drawings	A4 or A3 in Size, Language in English	Set	5	For Installation and Wiring	ditto
1.2 Baghdad II Exchange					
1.2.1 Digital Transit/Toll Exchange	Total Capacity: 20,000 Channels (Bothway is 80%), Traffic Capacity: 0.8E/Channel, No. 7 Common Signalling System: 80%、R2 MFC Signalling: 20%、Stored Programme Control (SPC) System, Average Holding Time: 150 seconds, Overload Control under Proper G.O.S.	Set	1	Transit and Toll Switch	Baghdad II Exchage
1.2.2 Digital Distribution Frame	Patching Type, For Full Switch Capacity	Set	1	For Test of Digital Channels	ditto
1.2.3 Batteries	Sealed Type, 8-hour Uninterrupted Supply	Set	1	For Emergency DC Power Supply	ditto
1.2.4 Rectifiers	Floating Charge Type	Set	1	For Convertion from AC to DC	ditto
1.2.5 DC Distribution Board	DC 48 Supply	Set	1	For Distribution of DC Power	ditto
1.2.6 Operation and Mainteance Tools and Measuring Equipment	Wrapping Tools, Soldering Iron, Standard Tools (Drivers, Nippers, Pliers, etc.), Clamp Type AC/DC Meter, Synchroscope, Portable Tester	Lot	1	For Operation and Mainteance	ditto
1.2.7 Installation Materials	Free Access Raised Floor, Cables and Racks	Lot	1	For Installation of Switching Equipment and Cabling	ditto
1.2.8 Maintenance Spares	2-years Spares for Power, Switch and Printer	Set	1	For Maintenance	ditto
1.2.9 Exchange Data	Switch Operation Data for Respective Exchange (Trunk, Routing, etc.)	Set	1	For Switch Operation	ditto

Equipment	Specifications	Unit	Qty	Purposes	Location
1.2.10 Software (for SPC)	Input, Internal and Output Process Main Programmes, Module Configuration written in CHILL or C Language, Easy Addition and Change in Programme	Set	1	Switch Operation Software	ditto
1.2.11 Operation and Maintaince Manual	Comprehensive Documents written in English and Supply of CD-ROM	Set	1	For Operation and Mainteance	ditto
1.2.12 Installation Drawings	A4 or A3 in Size, Language in English	Set	5	For Installation and Wiring	ditto
1.3 Mosul Exchange					
1.3.1 Digital Transit/Toll Exchange	Total Capacity: 20,000 Channels (Bothway is 80%), Traffic Capacity: 0.8E/Channel, No. 7 Common Signalling System: 80%、R2 MFC Signalling: 20%、Stored Programme Control (SPC) System, Average Holding Time: 150 seconds, Overload Control under Proper G.O.S.	Set	1	Transit and Toll Switch	Mosul Exchange
1.3.2 Digital Distribution Frame	Patching Type, For Full Switch Capacity	Set	1	For Test of Digital Channels	ditto
1.3.3 Batteries	Sealed Type, 8-hours Uninterrupted Supply	Set	1	For Emergency DC Power Supply	ditto
1.3.4 Rectifiers	Floating Charge Type	Set	1	For Convertion from AC to DC	ditto
1.3.5 DC Distribution Board	DC 48 Supply	Set	1	For Distribution of DC Power	ditto
1.3.6 Operation and Mainteance Tools and Measuring Equipment	Wrapping Tools, Soldering Iron, Standard Tools (Drivers, Nippers, Pliers, etc.), Clamp Type AC/DC Meter, Synchroscope, Portable Tester	Lot	1	For Operation and Mainteance	ditto
1.3.7 Installation Materials	Free Access Raised Floor, Cables and Racks	Lot	1	For Installation of Switching Equipment and Cabling	ditto
1.3.8 Maintenance Spares	2-years Spares for Power, Switch and Printer	Lot	1	For Maintenance	ditto
1.3.9 Exchange Data	Switch Operation Data for Respective Exchange (Trunk, Routing, etc.)	Lot	1	For Switch Operation	ditto
1.3.10 Software (for SPC)	Input, Internal and Output Process Main Programmes, Module Configuration written in CHILL or C Language, Easy Addition and Change in Programme	Lot	1	Switch Operation Software	ditto
1.3.11 Operation and Maintaince Manual	Comprehensive Documents written in English and Supply of CD-ROM	Set	1	For Operation and Mainteance	ditto
1.3.12 Installation Drawings	A4 or A3 in Size, Language in English	Set	5	For Installation and Wiring	ditto
1.4 Kerbarah Exchange					
1.4.1 Digital Transit/Toll Exchange	Total Capacity: 10,000 Channels (Bothway is 80%), Traffic Capacity: 0.8E/Channel, No. 7 Common Signalling System: 80%、R2 MFC Signalling: 20%、Stored Programme Control (SPC) System, Average Holding Time: 150 seconds, Overload Control under Proper G.O.S.	Set	1	Transit and Toll Switch	Kerbarah Exchange
1.4.2 Digital Distribution Frame	Patching Type, For Full Switch Capacity	Set	1	For Test of Digital Channels	ditto
1.4.3 Batteries	Sealed Type, 8-hours Uninterrupted Supply	Set	1	For Emergency DC Power Supply	ditto
1.4.4 Rectifiers	Floating Charge Type	Set	1	For Convertion from AC to DC	ditto
1.4.5 DC Distribution Board	DC 48 Supply	Set	1	For Distribution of DC Power	ditto
1.4.6 Operation and Mainteance Tools and Measuring Equipment	Wrapping Tools, Soldering Iron, Standard Tools (Drivers, Nippers, Pliers, etc.), Clamp Type AC/DC Meter, Synchroscope, Portable Tester	Set	1	For Operation and Mainteance	ditto
1.4.7 Installation Materials	Free Access Raised Floor, Cables and Racks	Lot	1	For Installation of Switching Equipment and Cabling	ditto
1.4.8 Maintenance Spares	2-years Spares for Power, Switch and Printer	Lot	1	For Maintenance	ditto

Equipment	Specifications	Unit	Qty	Purposes	Location
1.4.9 Exchange Data	Switch Operation Data for Respective Exchange (Trunk, Routing, etc.)	Lot	1	For Switch Operation	ditto
1.4.10 Software (for SPC)	Input, Internal and Output Process Main Programmes, Module Configuration written in CHILL or C Language, Easy Addition and Change in Programme	Lot	1	Switch Operation Software	ditto
1.4.11 Operation and Maintaince Manual	Comprehensive Documents written in English and Supply of CD-ROM	Set	1	For Operation and Mainteance	ditto
1.4.12 Installation Drawings	A4 or A3 in Size, Language in English	Set	5	For Installation and Wiring	ditto
1.5 Hilla Exchange					
1.5.1 Digital Transit/Toll Exchange	Total Capacity: 15,000 Channels (Bothway is 80%), Traffic Capacity: 0.8E/Channel, No. 7 Common Signalling System: 80%, R2 MFC Signalling: 20%, Stored Programme Control (SPC) System, Average Holding Time: 150 seconds, Overload Control under Proper G.O.S.	Set	1	Transit and Toll Switch	Hilla Exchange
1.5.2 Digital Distribution Frame	Patching Type, For Full Switch Capacity	Set	1	For Test of Digital Channels	ditto
1.5.3 Batteries	Sealed Type, 8-hours Uninterrupted Supply	Set	1	For Emergency DC Power Supply	ditto
1.5.4 Rectifiers	Floating Charge Type	Set	1	For Convertion from AC to DC	ditto
1.5.5 DC Distribution Board	DC 48 Supply	Set	1	For Distribution of DC Power	ditto
1.5.6 Operation and Mainteance Tools and Measuring Equipment	Wrapping Tools, Soldering Iron, Standard Tools (Drivers, Nippers, Pliers, etc.), Clamp Type AC/DC Meter, Synchroscope, Portable Tester	Set	1	For Operation and Mainteance	ditto
1.5.7 Installation Materials	Free Access Raised Floor, Cables and Racks	Lot	1	For Installation of Switching Equipment and Cabling	ditto
1.5.8 Maintenance Spares	2-years Spares for Power, Switch and Printer	Lot	1	For Maintenance	ditto
1.5.9 Exchange Data	Switch Operation Data for Respective Exchange (Trunk, Routing, etc.)	Lot	1	For Switch Operation	ditto
1.5.10 Software (for SPC)	Input, Internal and Output Process Main Programmes, Module Configuration written in CHILL or C Language, Easy Addition and Change in Programme	Lot	1	Switch Operation Software	ditto
1.5.11 Operation and Maintaince Manual	Comprehensive Documents written in English and Supply of CD-ROM	Set	1	For Operation and Mainteance	ditto
1.5.12 Installation Drawings	A4 or A3 in Size, Language in English	Set	5	For Installation and Wiring	ditto
1.6 Nadjaf Exchange					
1.6.1 Digital Transit/Toll Exchange	Total Capacity: 10,000 Channels (Bothway is 80%), Traffic Capacity: 0.8E/Channel, No. 7 Common Signalling System: 80%, R2 MFC Signalling: 20%, Stored Programme Control (SPC) System, Average Holding Time: 150 seconds, Overload Control under Proper G.O.S.	Set	1	Transit and Toll Switch	Nadjaf Exchange
1.6.2 Digital Distribution Frame	Patching Type, For Full Switch Capacity	Set	1	For Test of Digital Channels	ditto
1.6.3 Batteries	Sealed Type, 8-hours Uninterrupted Supply	Set	1	For Emergency DC Power Supply	ditto
1.6.4 Rectifiers	Floating Charge Type	Set	1	For Convertion from AC to DC	ditto
1.6.5 DC Distribution Board	DC 48 Supply	Set	1	For Distribution of DC Power	ditto
1.6.6 Operation and Mainteance Tools and Measuring Equipment	Wrapping Tools, Soldering Iron, Standard Tools (Drivers, Nippers, Pliers, etc.), Clamp Type AC/DC Meter, Synchroscope, Portable Tester	Set	1	For Operation and Mainteance	ditto
1.6.7 Installation Materials	Free Access Raised Floor, Cables and Racks	Lot	1	For Installation of Switching Equipment and Cabling	ditto

Equipment	Specifications	Unit	Qty	Purposes	Location
1.6.8 Maintenance Spares	2-years Spares for Power, Switch and Printer	Lot	1	For Maintenance	ditto
1.6.9 Exchange Data	Switch Operation Data for Respective Exchange (Trunk, Routing, etc.)	Lot	1	For Switch Operation	ditto
1.6.10 Software (for SPC)	Input, Internal and Output Process Main Programmes, Module Configuration written in CHILL or C Language, Easy Addition and Change in Programme	Lot	1	Switch Operation Software	ditto
1.6.11 Operation and Maintaince Manual	Comprehensive Documents written in English and Supply of CD-ROM	Set	1	For Operation and Mainteance	ditto
1.6.12 Installation Drawings	A4 or A3 in Size, Language in English	Set	5	For Installation and Wiring	ditto
1.7 Diwariya Exchange					
1.7.1 Digital Transit/Toll Exchange	Total Capacity: 10,000 Channels (Bothway is 80%), Traffic Capacity: 0.8E/Channel, No. 7 Common Signalling System: 80%、R2 MFC Signalling: 20%、Stored Programme Control (SPC) System, Average Holding Time: 150 seconds, Overload Control under Proper G.O.S.	Set	1	Transit and Toll Switch	Diwariya Exchange
1.7.2 Digital Distribution Frame	Patching Type, For Full Switch Capacity	Set	1	For Test of Digital Channels	ditto
1.7.3 Batteries	Sealed Type, 8-hours Uninterrupted Supply	Set	1	For Emergency DC Power Supply	ditto
1.7.4 Rectifiers	Floating Charge Type	Set	1	For Convertion from AC to DC	ditto
1.7.5 DC Distribution Board	DC 48 Supply	Set	1	For Distribution of DC Power	ditto
1.7.6 Operation and Mainteance Tools and Measuring Equipment	Wrapping Tools, Soldering Iron, Standard Tools (Drivers, Nippers, Pliers, etc.), Clamp Type AC/DC Meter, Synchroscope, Portable Tester	Set	1	For Operation and Mainteance	ditto
1.7.7 Installation Materials	Free Access Raised Floor, Cables and Racks	Lot	1	For Installation of Switching Equipment and Cabling	ditto
1.7.8 Maintenance Spares	2-years Spares for Power, Switch and Printer	Lot	1	For Maintenance	ditto
1.7.9 Exchange Data	Switch Operation Data for Respective Exchange (Trunk, Routing, etc.)	Lot	1	For Switch Operation	ditto
1.7.10 Software (for SPC)	Input, Internal and Output Process Main Programmes, Module Configuration written in CHILL or C Language, Easy Addition and Change in Programme	Lot	1	Switch Operation Software	ditto
1.7.11 Operation and Maintaince Manual	Comprehensive Documents written in English and Supply of CD-ROM	Set	1	For Operation and Mainteance	ditto
1.7.12 Installation Drawings	A4 or A3 in Size, Language in English	Set	5	For Installation and Wiring	ditto
1.8 Samawa Exchange					
1.8.1 Digital Transit/Toll Exchange	Total Capacity: 10,000 Channels (Bothway is 80%), Traffic Capacity: 0.8E/Channel, No. 7 Common Signalling System: 80%、R2 MFC Signalling: 20%、Stored Programme Control (SPC) System, Average Holding Time: 150 seconds, Overload Control under Proper G.O.S.	Set	1	Transit and Toll Switch	Samawa Exchange
1.8.2 Digital Distribution Frame	Patching Type, For Full Switch Capacity	Set	1	For Test of Digital Channels	ditto
1.8.3 Batteries	Sealed Type, 8-hours Uninterrupted Supply	Set	1	For Emergency DC Power Supply	ditto
1.8.4 Rectifiers	Floating Charge Type	Set	1	For Convertion from AC to DC	ditto
1.8.5 DC Distribution Board	DC 48 Supply	Set	1	For Distribution of DC Power	ditto
1.8.6 Operation and Mainteance Tools and Measuring Equipment	Wrapping Tools, Soldering Iron, Standard Tools (Drivers, Nippers, Pliers, etc.), Clamp Type AC/DC Meter, Synchroscope, Portable Tester	Set	1	For Operation and Mainteance	ditto

Equipment	Specifications	Unit	Qty	Purposes	Location
1.8.7 Installation Materials	Free Access Raised Floor, Cables and Racks	Lot	1	For Installation of Switching Equipment and Cabling	ditto
1.8.8 Maintenance Spares	2-years Spares for Power, Switch and Printer	Lot	1	For Maintenance	ditto
1.8.9 Exchange Data	Switch Operation Data for Respective Exchange (Trunk, Routing, etc.)	Lot	1	For Switch Operation	ditto
1.8.10 Software (for SPC)	Input, Internal and Output Process Main Programmes, Module Configuration written in CHILL or C Language, Easy Addition and Change in Programme	Lot	1	Switch Operation Software	ditto
1.8.11 Operation and Maintaince Manual	Comprehensive Documents written in English and Supply of CD-ROM	Set	1	For Operation and Mainteance	ditto
1.8.12 Installation Drawings	A4 or A3 in Size, Language in English	Set	5	For Installation and Wiring	ditto
1.9 Nassyriah Exchange					
1.9.1 Digital Transit/Toll Exchange	Total Capacity: 10,000 Channels (Bothway is 80%), Traffic Capacity: 0.8E/Channel, No. 7 Common Signalling System: 80%, R2 MFC Signalling: 20%, Stored Programme Control (SPC) System, Average Holding Time: 150 seconds, Overload Control under Proper G.O.S.	Set	1	Transit and Toll Switch	Nassyriah Exchange
1.9.2 Digital Distribution Frame	Patching Type, For Full Switch Capacity	Set	1	For Test of Digital Channels	ditto
1.9.3 Batteries	Sealed Type, 8-hours Uninterrupted Supply	Set	1	For Emergency DC Power Supply	ditto
1.9.4 Rectifiers	Floating Charge Type	Set	1	For Convertion from AC to DC	ditto
1.9.5 DC Distribution Board	DC 48 Supply	Set	1	For Distribution of DC Power	ditto
1.9.6 Operation and Mainteance Tools and Measuring Equipment	Wrapping Tools, Soldering Iron, Standard Tools (Drivers, Nippers, Pliers, etc.), Clamp Type AC/DC Meter, Synchroscope, Portable Tester	Set	1	For Operation and Mainteance	ditto
1.9.7 Installation Materials	Free Access Raised Floor, Cables and Racks	Lot	1	For Installation of Switching Equipment and Cabling	ditto
1.9.8 Maintenance Spares	2-years Spares for Power, Switch and Printer	Lot	1	For Maintenance	ditto
1.9.9 Exchange Data	Switch Operation Data for Respective Exchange (Trunk, Routing, etc.)	Lot	1	For Switch Operation	ditto
1.9.10 Software (for SPC)	Input, Internal and Output Process Main Programmes, Module Configuration written in CHILL or C Language, Easy Addition and Change in Programme	Lot	1	Switch Operation Software	ditto
1.9.11 Operation and Maintaince Manual	Comprehensive Documents written in English and Supply of CD-ROM	Set	1	For Operation and Mainteance	ditto
1.9.12 Installation Drawings	A4 or A3 in Size, Language in English	Set	5	For Installation and Wiring	ditto
1.10 Basra Exchange					
1.10.1 Digital Transit/Toll Exchange	Total Capacity: 20,000 Channels (Bothway is 80%), Traffic Capacity: 0.8E/Channel, No. 7 Common Signalling System: 80%, R2 MFC Signalling: 20%, Stored Programme Control (SPC) System, Average Holding Time: 150 seconds, Overload Control under Proper G.O.S.	Set	1	Transit and Toll Switch	Basra Exchange
1.10.2 Digital Distribution Frame	Patching Type, For Full Switch Capacity	Set	1	For Test of Digital Channels	ditto
1.10.3 Batteries	Sealed Type, 8-hours Uninterrupted Supply	Set	1	For Emergency DC Power Supply	ditto
1.10.4 Rectifiers	Floating Charge Type	Set	1	For Convertion from AC to DC	ditto
1.10.5 DC Distribution Board	DC 48 Supply	Set	1	For Distribution of DC Power	ditto

Equipment	Specifications	Unit	Qty	Purposes	Location
1.10.6 Operation and Mainteance Tools and Measuring Equipment	Wrapping Tools, Soldering Iron, Standard Tools (Drivers, Nippers, Pliers, etc.), Clamp Type AC/DC Meter, Synchroscope, Portable Tester	Set	1	For Operation and Mainteance	ditto
1.10.7 Installation Materials	Free Access Raised Floor, Cables and Racks	Lot	1	For Installation of Switching Equipment and Cabling	ditto
1.10.8 Maintenance Spares	2-years Spares for Power, Switch and Printer	Lot	1	For Maintenance	ditto
1.10.9 Exchange Data	Switch Operation Data for Respective Exchange (Trunk, Routing, etc.)	Lot	1	For Switch Operation	ditto
1.10.10 Software (for SPC)	Input, Internal and Output Process Main Programmes, Module Configuration written in CHILL or C Language, Easy Addition and Change in Programme	Lot	1	Switch Operation Software	ditto
1.10.11 Operation and Maintaince Manual	Comprehensive Documents written in English and Supply of CD-ROM	Set	1	For Operation and Mainteance	ditto
1.10.12 Installation Drawings	A4 or A3 in Size, Language in English	Set	5	For Installation and Wiring	ditto