استاندارد

MCCI - 4027 - Ver 1.0

مشخصات فنی رادیو های 8 x 2 Mb/s

باند فرکانسی 15 GHz

همکارانی که درتهیه و تدوین این سند مشارکت موثرداشته اند عبارتند از :

آقایان	خانم ها
1 – ابوالفضل سلمانی نژاد	
2 - پرویز عبدا...پور	
3- سیامک مویدی	
4 - اسدا... آقاخانی	
5 - امیر همایون علیجانی	
6- کاظم زارعیان	
7- رضا طالبی	
8- رزاق سلمانی	

خرداد 1385

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1-Scope of work

1-1-Mobile Communication Company of IRAN (MCCI), intends to purchase digital radios in 15 GHz bands to be used for nation-wide cellular telephone network between BSCs –Macro BTSs.

1-2-The bidder shall provide the complete suggestion of fully outdoor or split (Indoor+Outdoor) equipment.

1-3-The proposed systems are going to be used between BTS and BSC in dense and urban area.

1-4-The bidder shall propose radio links including all accessories: supervisory, antenna, cable & feeder, connectors, maintenance tools, installation materials and tools, spare units, test equipment, and required documents.

1-5-The bidder should submit the technical specifications regarding the installation of the radio equipments in the cabinet of the Outdoor BTS equipments.

2-GENERAL CONDITIONS

2-1-The bidder shall make a point –by – point compliance statement to all items of the present specification. All figures shall be stated explicitly; reference to catalogs and/or supporting data will not be acceptable.

2-2-Incompliant with any item or part shall be indicated in the relevant item number. The bidder shall state the technical reasons for not complying with MCCI requirement of his proposal.

2-3-The bidder shall provide a complete “LIST OF MATERIAL (LOM)” necessary to meet all requirements mentioned in this specification.

2-4-The bidder shall submit detailed list for rack mount digital radio, antenna, feeder cable, jumper cable. Connectors and all necessary accessories, spare units, consumable parts, Installation Tools and Materials, maintenance tools, and also test equipments required for installation and commissioning, operation and maintenance.

2-5-The technical proposal of the bidder shall include a complete and detailed “LIST OF MATERIALS” without prices.(including training)

2-6-Beside the main proposal, other proposals, containing alternative plans having technical and economical advantages and satisfying all MCCI’s requirement will be considered. The differences shall be specified clearly with a comparison table.

2-7-The bidder shall supply rack mount radio equipment and accessories, maintenance tools and accessories, spare unites, spare panels, spare components and documents required.

2-8-The equipment characteristics and performance shall be based on the latest ITU publication of ITU-R recommendations.

2-9-A schedule of delivery shall be included in the tender.

2-10-The equipment shall be packed to resist fungous or mold during transportation and storage.

2-11-Equipments shall be packed to withstand sever vibration as may be encountered during transportation.

2-12-The bidder shall provide the total and detailed break down prices of all equipments.

2-13-The bidders are obliged to provide complete statement of compliance (S.O.C) TO THE WHOLE Items of specification.

(Fully comply, partially comply or not comply)

3-GENERAL EQUIPMENT REQUIRMENTS

3-1- The equipment must have the capability to be used as (1+0) or (1+1). The capacity should be 4E1 extendable to 8E1.

3-2-The proposed equipments, antenna and feeder and connectors shall operate without loss of system performance in the following environmental conditions:

a) For in door equipment

Temperature range : 0 ^{o}C to +50 ^{o}C

Relative humidity : 10% to 95%

b) For feeder and antenna, outdoor cables:

Temperature range : - 30 ^{o}C to +60 ^{o}C

Relative humidity : 10% to 100%

c) for outdoor equipment

Temperature range : - 30 ^{o}C to +55 ^{o}C

Relative humidity : 10% to 95%

3-3-The power consumption shall be minimum and shall be stated exactly for full load.

3-4-The system shall be able to operate with (-48±20%) VDC power supply

3-5-Copper wires, cables and terminal plugs shall be provided. Aluminum wire will not be allowed.

3-6-All equipments shall be sourced from a particular OEM (Original Equipment Manufactures).

3-7-Extension cords, cables for servicing, and any special tools necessary for maintenance and operation shall be included in the proposal (standard hand tools is not required to be proposed).

3-8-All equipment shall conform to international standard or any recognized national standards (approved MCCI) unless otherwise specified. The bidder shall state the standards, recommendations and codes on which the tender is based.

3-9-All terminals and terminal blocks shall be clearly identified.

3-10-All Indoor equipment shall be connected to a rack ground bar.

3-11-The equipment shall be so designed and installed that all maintenance adjustments, measurements and repairs, as well as frequency and power adjustments can be performed from the front or face of the equipment.

3-12-The modular and plug-in design concept shall be utilized.

3-13-Structure of the mechanical construction shall be in such a way that accumulation of dust and weather effects will be minimized specially the outdoor equipments shall be sealed such that they will be water-proof, dust-proof and also resistance to vandalism.

3-14-The bidder shall state related standard use for outdoor equipment.

3-15-The equipment shall not be sensitive to electromagnetic energy, normally encountered in telephone central offices, or to impulse energy from VF switching equipment. It should be noted that this equipment maybe located next to electromagnetic and solid state switching systems.

3-16-The radio equipment shall be designed and installed so that a recorder can be readily connected to record received signal strength without causing any circuit interruptions or bits.

4-EQUIPMENT SPECIFICATION

4-1-RF Section

4-1-1-RF frequency band for the operation of the proposed equipment shall be 14.5 ~ 15.35 GHz.

4-1-2-RF channel spacing and channel arrangement shall be according to ITU-R Latest recommendations. How ever the proposed frequency plan shall be submitted.

4-1-3-RF impedance shall be 50Ω unbalanced.

4-1-4-RF return loss of the Transmitter-Receiver shall be better than 20 dB (including the TX-RX branching filters).

4-1-5-Direct RF modulation method shall be adopted.

4-1-6-Modulation methods shall be stated in order to fulfill RF channel spacing required.

4-1-7-The bidder shall state the method used to distinguish between desired and undesired radio channels (e.g. RF channel authentication).

4-1-8-The bidder shall state the maximum hop attenuation of BER=10^{-4}

4-1-9-The bidder shall state the duplexer loss in both directions (Transmit and Receive).

4-1-10-RF input should be protected against high voltages and lightening.

4-1-11-RF output should be protected against short circuit

4-1-12-Bidder should specify the following characteristics for ATPC: Range - Dynamic range - Control step - Tracking speed. It shall be possible to disable the ATPC function manually for test and performance.

4-2-Transmitter

4-2-1-The transmitter frequency stability shall be at least ±7PPM in the temperature range mentioned in 3-2(c).

4-2-2-The radio equipment shall be provided with a method of sensing transmitter power output and providing a low power output alarm. The low power alarm shall be adjustable with a 2 dB below normal transmitter power output.

4-2-3-The bidder shall state minimum and maximum transmitter output power and the steps at least can be adjusted.

4-2-4-Bidder shall submit following curves:

a) Net filter discrimination for 1+0 configuration.

b) Transmitter branching filter selectivity.

4-3-Receiver

4-3-1-The radio receiver shall have a maximum noise figure of 5dB. The measuring point shall be so that branching filter loss will be included.

4-3-2-The receiver frequency stability shall be at least ±7 PPM in the temperature rang mentioned in 3-2(c).

4-3-3-The image frequency attenuation of the proposed receivers shall be greater than 100 dB.

4-3-4-Coherent demodulation shall be adopted.

4-3-5-The bidder shall submit the following curves:

a) Receiver branching filter selectivity.

b) Filter characteristics for IF B.P.F. (For 2x2 Mb/s in band 14.5 ~ 15.35 GHz)

4-3-6-Minimum RF input power level should be stated at BER of 10^{-6}, the guaranteed value also should be stated at BER of 10^{-6}, and the bidder shall state the receiver threshold at BER of 10^{-3} for different modulation and capacities.

4-4-Base band and sub-base band

4-4-1-The proposed radio equipment shall be employed for transmission Between Macro BTS-BSC.

a) Time division multiplex voice Circuit, which shall carry speech and high - speed data.

4-4-2-The base – band unit shall be an integrated type and software driven using FPGA and DSP techniques.

4-4-3-The base band signal characteristics are as the following:

a) ITU-T Recommendation : G.703

b) Code : HDB-3.

c) Bit rate : 2048 Kb/s, ±50 PPM.

d) Impedance : 75 Ω unbalanced.

e) Connection cable : 75 Ω coaxial cable for out door shall be employed.

4-4-4-The sub-base band shall have the capability of carrying one service channels. One digital channel for supervisory base band.

4-5-Network Management System

4.5.1 : The Offered System Shall include Complete Network .

Management system for operating and maintenance the whole network.

4.5.2 : Local and remote management system shall be provided and the needed HW & SW must be provided together with list of materials and equipments .

4.5.3 : Full description of the management System Shall be provided and the provided NMS shall include the following Services at Least :

- Performance Management (PM)

-Maintenance Loop back

-Performance monitoring and management

-Performance measurement based on G.821 , G.826 and ITU-R Rec : 697-1

-Fault Management (FM)

-Security Management(SM)

-Configuration Management (CM)

- Path Management.
- Inventory monitoring
- Remote and local software downloading

4.5.4 : Selection of RF channel through IDU and via NMS shall be provided.

4.5.5 : For remote and local operation and maintenance purpose the offered system shall include SW with RS232 interface to lap tap for measuring and adjusting the following items , at least :

- Transmitter output power (dBm)
- Receive signal (dBm)
- **IF** output level
- Power supply voltage

- **AGC** (Volt)
- **RF** loop , **RX** loop
- Frequency changing
- It will be advantage include **LCD** display for monitoring transmitter output power, Receive signal, **IF** output level and power supply voltage.

4.5.6 : The proposed system shall be able to handle the following major and minor alarms :

- Radio frame alarm
- **Tx** alarm
- **AIS** alarm
- **AGC** threshold alarm
- Temperature alarm
- Output and input traffic alarm (with path trace)
- RF input and output level alarm
- Radio identity (**ID**) alarm
- **BER** alarm
- **RX** frequency alarm
- Processor alarm
- **BUS** alarm
- DC voltage alarm

4.5.7 : The bidders are obliged to specify any additional alarm Indication in the system, if any.

4.5.8 : The system shall be able to display the performance log and AGC log and data collected from Terminals , store the related files for sort and printing purpose .

4.5.9 : The central management system shall include any peripheral equipment needed for printing and buffering data , the list and specification of these equipment shell be provided .

4.5.10: Any kind of transmission facility for connecting remote site to central management system shall be provided and the related list shall include in the offer.

5-SPARE UNITS AND SPARE PARTS

5-1-The bidder is obliged to provide spare parts(units) concerning the MTBF for whole units for a periods of 3 years after the guarantee considering (1+0) configuration.

5-2-The bidder shall propose a complete set of consumable parts.

6-INSTALLATION & MAINTENANCE

6-1-The bidder shall supply only the special installation materials on the basis of standard typical configuration which be explained and cleared with drawings in detail.

6-2-The bidder shall propose special maintenance tools and accessories For 10 maintenance groups.

6-3-The bidder shall propose special Installation tools for 10 Installation groups.

6-4-The detailed specification of installation and maintenance tools shall be submitted.

7-TEST EQUIPMENT AND FACTORY TEST

7-1-The bidder shall submit the lists of test equipments and accessories required for line up, acceptance test, routine maintenance and non – routine maintenance separately.

7-2-The instruction of the usage and test procedures for each equipment shall be supplied by the bidder.

7-3-The bidder shall propose special test equipments required for the following purposes as option:

a) Installation and commissioning.

b) Operation and maintenance.

c) Planning tools for at least calculation hops and interference (optional)

7-4-Factory test procedure shall be provided.

7-5-All equipments shall be tested in the factory by presence of MCCI personal.

8-TRAINING

8-1-The bidder shall submits training proposal and price quotation for, training program designed to train MCCI trainees .

8-2-The bidder shall provide a training schedule for all training sessions that are proposed.

8-3-Training shall be scheduled to complete a minimum of thirty (30) days prior to the first delivery of the equipment.

8-4-The proposed training schedules are subject to MCCI approval and MCCI reserves the right to change training schedule.

8-5-The bidder shall provide all training materials
(instructors guide, student work books and ……etc)

8-6-Training language shall be English or Persian.

9-DOCUMENTATION

9-1-The bidder shall provide documentations as below:

a) Instruction manual one set for each equipment.

b) Installation standard manuals : 60 hard copies & 60 soft copies

c) Typical installation drawing one set for each equipment

d) Factory test procedure : 10 hard copies & 30 soft copies

e) Test data sheets per link : 2 hard copies & 2 soft copies

f) Training manual for installation & commissioning:

10 hard copies & 30 soft copies

g) Training manual for operation & maintenance:

10 hard copies & 30 soft copies

h) Training manual for planning (Fundamental and Advanced) based on SW item 7-3(c) : 10 hard copies & 30 soft copies (optional)

9-2- Instruction manual shall contain all necessary information for the operation and maintenance of the equipment and shall include:

a) Description of system operation incorporating block diagrams of system with levels indicated.

b) Full circuit drawings and description of each unit.

c) Full equipment description.

d) Full description of test procedure, trouble – shooting and calibration of the Equipment.

e) A comprehensive part list comprising all parts used, with manufacturers name, stock number, original manufacture part number and any additional necessary data .