Govt. of NCT of Delhi
Department of Information Technology
Delhi Secretariat, New Delhi – 110 113

DELHI 2010
XIX COMMONWEALTH GAMES
COME OUT AND PLAY

RFP DOCUMENT
for
Secured Communications Network (TETRA) for Common Wealth Games (CWG) 2010

RFP No.: 6431

Date of Issue	April 2, 2009
Issued By	Secretary (IT) For **Govt. of NCT of Delhi**, New Delhi

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NOTICE INVITING BIDS

(NIB)

GLOBAL RFP NOTICE (PRESS)

Govt. of N.C.T of Delhi
Department of Information Technology
9th Floor, B-wing
Delhi Secretariat, India, 110 113

GLOBAL NOTICE INVITING BIDS

Online Global bids are invited through e-Procurement portal https://delhi.govtprocurement.com by the Secretary (IT) on behalf of Govt. of NCT of Delhi, from Original Equipment Manufacturers/ Service Providers/ System Integrators or their authorized representatives for establishment of **"Secured Communications Network (TETRA) for Common Wealth Games (CWG) 2010"** on WET LEASE basis. The detailed RFP document (RFP No.6431) can be downloaded from the e-Procurement portal from 2nd April 2009 from 12.00 noon onwards.

The interested bidders are requested to register themselves by paying Rs 6,000/- + applicable service tax through Demand Draft in favour of C1 India Pvt. Ltd payable at Delhi (C1 India is a service provider of Directorate General of Supplies & Disposals (DGS&D), Govt. of India, for implementing e-Procurement in Govt. of N.C.T of Delhi). However, in case any bidder who is already registered with e-procurement platform for DGS&D empanelment, then that bidder will be treated as deemed registered, provided the bidder's user id and Digital Certificates are the same and its registration is valid. The bidder is required to have Class-II or Class – III Digital Certificate from one of the authorized agencies of the Controller of Certifying Authorities (CCA), Government of India. The list of certifying authorities is available at http://cca.gov.in.

The Pre-Bid meeting will be held on 17th April 2009 at 11.00 AM at Conference Hall No.3, Level-2, Delhi Secretariat, IP Estate, New Delhi-110 113. The bidders may send their queries to **bidqit.delhi@nic.in**.

A help desk has been setup at the Delhi Secretariat at Room No 129, Phone Number: +91-011–23392722 / 23392723 which is operational from 10 A.M to 6 P.M during working days for registration on e-Procurement platform or any other queries related to use of e-procurement platform.

Secretary (Information Technology)

GLOBAL RFP NOTICE (On Govt. of NCT of Delhi Website)

RFP No.: 6431

Global Notice Inviting RFP (Website)

Bids against RFP are invited by Secretary (IT), on behalf of Govt. of NCT of Delhi (GNCTD), from the eligible Bidders, through e-procurement portal, for the works as detailed below.

Name of Work: Secured Communications Network (TETRA) for Common Wealth Games (CWG) 2010 for Delhi.

The work shall be carried out on **WET LEASE** basis.

1. Earnest Money Deposit (EMD)/Bid Security: Rs. 2,20,00,000/- (Rs. Two Crores and Twenty Lakhs only)

2. **Eligibility Criteria**: (to be read in conjunction with detailed criteria specified in Special Conditions of Contract (SCC) :

2.1 Eligible Bidder shall be a firm , i.e. Original Equipment Manufacturer (OEM)/System Integrator/Service Provider/ or its Authorized Representative who has downloaded the RFP document from specified website in response to the NIB for Project of "Secured Communications Network (TETRA) for Common Wealth Games (CWG) 2010" and meets eligibility criteria as mentioned below. In case the Bid is being submitted by an Authorized Representative, the credentials of the OEM/Authorized Representative shall be taken into account for determining Eligibility. However, the Authorized Representative should meet the financial parameters as defined in Cl. No. 2.2.2.

2.2 Bidder shall have experience of having successfully completed similar contracts during last 5 years ending last day of the month before the one in which applications are invited. The Bidders' experience shall be either of the following: -

2.2.1 Bidder shall have one similar completed contract costing not less than the amount equal to Rs. 88,00,00,000/- (Rs. Eighty Eight Crores only).

Or

Bidder shall have two similar completed contracts costing not less than the amount equal to Rs. 55,00,00,000/- (Rs. Fifty Five Crores only) each.

Or

Bidder shall have completed three similar contracts costing not less than the amount equal to Rs. 44,00,00,000/- (Rs. Forty Four Crores only) each.

2.2.2 Bidder/Lead Partner (In case of a consortium) shall have an average annual financial turnover for works in field of Information & Communication Technology (ICT) for last 3 completed financial years, not less than Rs. 300,00,00,000/- (Rs. Three Hundred Crores only). Bidder shall submit its financial standing through Annual Report (Balance sheet, Profit & Loss account and other documentary proofs) of last 3 years certified by the Bidder as well as Chartered Accountant. These documents shall be able to demonstrate the value of turnover in the field of ICT as mentioned above. The

above figures shall be submitted for the financial year 2007-2008, 2006-2007 & 2005-2006. The Net-worth and Net Profit shall be positive during this period and shall be indicated as per Form 6/F1 of Section -5.

2.2.3 For Bidder's, whose Financial Annual Reports/ Experience Certificates are in currency other than Indian Rupee (INR), the employer shall do conversion to INR. For this, the conversion rate (Selling Rate) prevailing at the last day of the financial year of the Financial Report/Experience Certificate shall be considered. Conversion rates applicable at that time, issued by Reserve Bank of India/ State Bank of India shall be used.

2.2.4 In the Bidder's company (Lead Partner in case of consortium), total foreign holding, including Foreign Direct Investment (FDI) by Overseas Corporate Bodies/ NRIs/People of Indian Origin(PIO), etc., portfolio investments by FIIs, investment by foreign nationals, within the limits prescribed by RBI and borrowings, if these carry conversion options, shall not exceed 49 % of the paid equity in the entity. The Bidder shall submit the balance sheet/certificate from Director or Company Secretary/DMAT account details indicating the share details.

2.3 Bidder can also participate as a consortium. Maximum three firms are permitted to form a consortium and such consortium shall be formed under an Agreement on a non-judicial stamp paper of Rupees one hundred, duly signed by all the firms. In case of Bidder, being a consortium, at least one consortium member/ subcontractor of consortium member should meet the required eligibility criteria as mentioned above in clause no. 2.2.1. The lead partner shall at least meet the financial criteria of clause no. 2.2.2.

2.4 A Bidder shall not be allowed to submit more than one Bid either individually or in a consortium. If so found, its bid is liable to be rejected.

3. The Bidder/Partners in Consortium should have valid VAT/Sales Tax and Service tax registrations and meet other Obligatory Requirements.

4. The bid for same equipment cannot be submitted both by the OEM and by its Authorized Representative. In such case, the bid of OEM alone shall be accepted and the bids of the Authorized Representative will be rejected. An OEM shall not be allowed to be part of more than one consortium. An OEM, however, shall be allowed to authorize more than one Bidder.

5. Agents of foreign firms can purchase bid document on behalf of their Principal/OEMs, on submission of authorization certificate. However, bid documents shall be signed only by the Principal/OEM & not by the agent.

6. The RFP document fee shall be NIL.

7. RFP documents can be downloaded from https://delhi.govtprocurement.com from 2nd April 2009 upto 1400 Hours of 18th May 2009.

8. Last date for the receipt of queries from bidders is 13th April 2009 upto 1700 hours. The complete queries shall be sent at bidqit.delhi@nic.in with full details of authorized representative. No communication other than email shall be entertained.

9. Pre-bid meeting for this RFP will be held on 17th April 2009 at 1100 hrs at following

address: - Conference Hall no. 3, Level 2, B-Wing, Delhi Secretariat, IP Estate, New Delhi-110 113. Training to bidders in respect of use of e-procurement portal shall be organized after the pre-bid meeting on the same day.

10. Any amendment/corrigendum/clarification to the RFP document will be posted on https://delhi.govtprocurement.com. Those Bidders, who have registered on GNCTD's e-procurement portal by paying the requisite registration charges, will be intimated of any amendment/corrigendum by email.

11. Purchase preference for products and services of CPSU (Central Public Sector Unit) registered under single point registration scheme will be provided as per Govt. of India Policy prevalent on the date of acceptance of RFP.

12. RFP Bid document complete in all respects should be submitted online latest by 1500 Hours of 18th May 2009.

13. RFP Technical bid documents and EMD will be opened at 1600 Hours of 18th May 2009 by duly a constituted committee. Bidders' representatives (maximum 2) may attend the opening through e-procurement portal or in person at the above- mentioned office address.

14. GNCTD reserves the right to reject any or all the bids or part thereof without assigning any reason thereof, and to call for any other details or information from any of the Bidder.

15. GNCTD shall not be responsible for non-receipt of any bid offer.

16. No manual bids shall be accepted. Only those Bids submitted through e-procurement portal, shall be considered. The Bidder is advised to fully acquaint himself with the procedure of e-Procurement Portal of GNCTD on its website (https://delhi.govtprocurement.com)

Secretary (IT)

Deptt. of Information Technology

Govt. of NCT of Delhi

DEFINITIONS

Definitions

The following terms shall have meanings, in this document, as indicated:

1. "**Acceptance**" means the GNCTD's written certification following installation and commissioning; the System(s) (or specific part thereof) has been tested and verified as complete and/or fully operational, in accordance with the acceptance test defined in the Acceptance Test Documents.

2. **"Acceptance Test Documents"** means a mutually agreed document, which defines procedures for carrying out complete test on the "**Systems"** against specifications. It should define tests to be carried out, test equipment and expected test results.

3. **"Availability"** is the probability that an item will be in a state to perform a required function under given conditions, at a given instant of time or over a time interval, assuming that the given external resources are provided.

4. **"Bid"** means the offer submitted by the Bidder in response to this RFP.

5. **"Contract"** shall mean the Contract to be entered into between the GNCTD and successful Bidder and all attached exhibits and documents referred to therein and all terms and conditions thereof together with any subsequent modifications thereto.

6. **"Contract Value"** shall mean the overall Rentals over the specified period.

7. **"Contractor"** shall mean the successful Bidder entering into contract with GNCTD.

8. **"Corrective Maintenance"** is the Maintenance performed to correct the occurrence of an equipment or system fault.

9. **Department's** means various Departments of GNCTD and Govt. of India who are the stakeholders in this Project, as named in Annexure 8.3 of RFP.

10. **"Down Time"** means the time period when specified services with specified technical and operational requirements as mentioned in this document are not available to GNCTD and its users. The network shall be operational on all days of a year and 24-hours/ day with in the uptime specified in the Service Level Agreement (SLA).

11. **"% Downtime"** means the ratio of Downtime (in minutes) in a quarter to total minutes in a quarter (in minutes) multiplied by 100.

12. **"Employer"** means Govt. of NCT of Delhi and its authorized representative.

13. **"Eligible Countries"** shall mean those countries as qualified by Govt. of India/ World Bank/ IDA

14. **"Employer's Representative"** shall mean any person/agency authorized by GNCTD. This includes M/s Telecommunications Consultants India Limited (TCIL), New Delhi, who is Project Management Consultants (PMC) for this Project.

15. **"e-Procurement Portal"** shall mean the portal of Govt. of NCT of Delhi for procuring the RFP Documents and submission of Bids Online.

16. **"GCC"** mean the General Conditions of Contract for Bidding**.**

17. **"Installation"** means the Bidder's written notification that the system(s) (or specific part thereof) have been installed by the Bidder in accordance with GNCTD's requirements and the project plan, and is ready for the acceptance testing.

18. **"Intellectual Property Right"**, also called "IPR", means any and all copyrights, moral rights, trade marks, patent, and other intellectual proprieties.

19. **"Integrated Training Facility (ITF)"** is an additional training system integrating separate functional training simulators to provide a "realistic" training environment in the area of incident training.

20. **"ITB"** shall mean Instructions to Bidders.

21. **"Law" or "Legislation"** - shall mean any Act, notification, bye law, rules and regulations, directive, ordinance, order or instruction having the force of law enacted or issued by the Government of India or State Government or regulatory authority or political subdivision of government agency.

22. **"Mean Time to Restore (MTTR)"** is the average time to restore equipment, subsystems and systems to full functionality.

23. **"Mimic"** is a graphical representation of the system and its global operating status.

24. **"Man Machine Interface (MMI)"** is the visual interface between the Controller and the control system. The MMI consists of the computer screens, displayed objects, icons, and equipment as well as the facilities by which the Controller executes control.

25. **"Network"** means the proposed new "Secured Communications Network (TETRA) for Common Wealth Games (CWG) 2010".

26. **"NIB"** means Notice Inviting Bids, the detailed notification seeking a set of solution(s), services, materials, or any combination of them as laid down in this document.

27. **"Project"** means the work of providing the Service on the Network as per provisions of this RFP Document.

28. **"Party"** shall mean GNCTD or Bidder individually and **"Parties"** shall mean GNCTD and Bidder collectively.

29. **"Products" or "Goods"** means all of the equipment, hardware, software, supplies and consumable items along with associated documentation that the Bidder is required to install or provide.

30. **"Preventive Maintenance"** is a Periodic or regular maintenance performed in order to pre-empt the occurrences of equipment faults in the future. This shall include First, Second and Third Line Maintenance.

31. **"Reliability"** is the measure of ability to rely upon equipment and systems to perform their intended function. The measure of reliability is MTBF.

32. **"SCC"** means the Special Conditions of Contract.

33. **"Service"** means services associated with the supply, installation, integration, commissioning and O & M of the "**System**".

34. **"Service Provider"** means the successful Bidder (Contractor) who has been awarded the Project to provide the Service.

35. **"Service Period"** means the Contract Period as defined in Section –3.

36. **"Site"** means the location(s) for which the work has been allotted or identified by the Bidder, and where the delivery and installation of the equipment/system(s) are to be made.

37. **"Specifications"** shall mean and include schedules, details, description, statement of technical data, performance characteristics, standards (Indian as well as International) as applicable and specified in the RFP documents.

38. **"System"** means all or any of the products to be installed, integrated and made operational, together with the services to be delivered by the Bidder.

39. **"Safety-Critical"**. Failure of the system, sub-system or equipment which directly lead to a situation with the potential to cause harm, injury, damage to property, plant or equipment, damage to the environment, or economic loss.

40. **"Similar contract"** means Bidder has successfully completed a contract involving supply, installation, testing, integration and commissioning of Digital Radio Trunking (TETRA) System.

41. **"Sub-system"** is any one of the systems comprising the System, i.e., Radio system, CDRS, lease line & Microwave system.

42. **"Bidder"** means the firm or group of firms (consortium with one firm acting as lead firm) offering the solution(s), services and / or materials required in the RFP.

43. **"Technical Specifications (TS)"** means the detailed Technical Specifications contained in Chapter 7.1 to 7.3 of TS.

44. "**Uptime**" means the time period when specified services with specified technical and service standards as mentioned in this RFP document are available to GNCTD and its user organizations. The uptime will be calculated as total time in a quarter (in minutes) less total Service Down time (in minutes) in the quarter.

45. "**%Uptime**" means ratio of 'up time' (in minutes) in a quarter to total time in the quarter (in minutes) multiplied by 100.

46. **"Wet Lease"** means the arrangement in which equipment or System is taken on lease along with Operation & Maintenance for a defined period of time.

47. **"Workstation"** is the collection of processors, screens and input devices necessary to provide one Controller with the necessary System displays and Commands.

LIST OF ABBREVIATIONS

LIST OF ABBREVIATIONS

ABBREVIATION	MEANING
ADPCM	Adaptive Pulse Code Modulated
BCC	Backup Operation Control Centre
BER	Bit Error Rate
BS	British Standard
BSHR	Bidirectional Self Healing Ring
CBR	Constant Bit Rate
CCD	Charge Coupled Device
CCITT	International Telegraph and Telephone Consultative
CCIR	International Radio Consultancy Committee
CCTV	Closed Circuit Television
CD	Compact (Optical) Disk
CDRS	Centralized Digital Recording System
CENELEC	European Committee for Electrotechnical Standardization
CER	Central Equipment Room
CODEC	Coder/Decoder
DCE	Data Communication Equipment
DDF	Digital Distribution Frame
DDP	Digital Distribution Panel
DID	Direct Inward Dialing
DOT	Department of Telecommunication
DTC	Delhi Transport Corporation
EIA	Electrical Industries Association
EMC	Electromagnetic Compatibility
EMI	Electromagnetic Interference

EPABX	Electronic Private Automatic Branch Exchange
FSD	Fire Services Department
GPS	Global Positioning System
GUI	Graphic User Interface
HQ	Headquarters
ICAO	International Civil Aviation Organization
IEC	International Electro-technical Commission
IEE	Institute of Electrical Engineers
IEEE	Institute of Electrical and Electronic Engineers
ISDN	Integrated Services Digital Network
ISO	International Organization for Standardization
IT	Information Technology
ITU-R	International Telecommunications Union – Radio
ITU-T	International Telecommunications Union
JPEG	Joint Photographic Expert Group
IVRS	Interactive Voice Response System
ITB	Instructions to Bidders
LAN	Local Area Network
LCD	Liquid Crystal Display
LCR	Local Control Room
LCX	Leaky Coaxial Cable
LED	Light Emitting Diode
MDF	Main Distribution Frame
MMI	Man-Machine Interface
MTBF	Mean Time Between Failures
MTTR	Mean Time To Repair
NMS	Network Management System

NTSC	National Television Standards Committee
O&M	Operations and Management
OCC	Operations Control Centre
ODF	Optical Distribution Frame
OLTE	Optical Line Terminating Equipment
PAS	Public Address System
PCM	Pulse Code Modulated
PSE	Power Supply Equipment
PSTN	Public Services Telephone Network
PTT	Press To Talk
QA	Quality Assurance
RAMS	Reliability, Availability, Maintainability and Safety
RIN	Radio Identity Number
STM	Synchronous Transport Module
TER	Telecommunications Equipment Room
TETRA	Terrestrial Trunked Radio
UHF	Ultra High Frequency
UPS	Uninterruptible Power Supply
VHF	Very High Frequency
VoIP	Voice over Internet Protocol

SECTION – 1

INSTRUCTIONS TO BIDDERS

(ITB)

Section – 1

Instructions To Bidders (ITB)

RFP No.: 6431

Dated : April 2, 2009

1 Invitation:-

The Bids will be received on the prescribed portal up to schedule as specified in the NIB of this RFP for the Secured Communications Network (TETRA) for Common Wealth Games (CWG) 2010 in the manner prescribed in the RFP. The Bids submitted Online shall bear Digital Signature of the Bidder/Lead Partner in case of Consortium.

2 Inspection:-

2 (i) Place of the inspection of material and services shall be Delhi. Bidder shall bear all expenditure of inspection carried out by GNCTD and/or its authorized representative.

2 (ii) The stores shall be offered for inspection in one or more lots.

2 (iii) The entire materials ordered as per lot shall have to be offered for inspection in open condition, if required and the same shall have to be repacked in such manner so as to be suitable for transport.

3. Origin of Stores:-

The origin of stores offered, whether Indian or foreign and in case of former, the State in which manufactured, shall be indicated.

4 Guarantees:-

4 (a) Bids accompanied by Earnest Money by way of Bank Guarantee will be accepted, provided the Guarantee is valid for at least 45 days beyond the validity of Bid. The Earnest Money will be liable to forfeiture if Bidder fails to complete the Project in the event of order being placed on Bidder. Bid without Earnest Money shall not be considered.

4 (b) In case Bidder is successful in getting the order, Bidder shall be required to pay a sum of 10% of Contract Value as Performance Security during contract period. This Deposit can be paid in Bank Guarantee. Within 15 days of the receipt of the LOI from the GNCTD, the Supplier shall furnish an irrevocable and unconditional performance security for an amount mentioned in the SCC, using the specified performance security format at Section 5 of this RFP. The Performance Security shall remain valid for a period of 60 days beyond the date of completion of all contractual obligations. If the Bidder fails to furnish the required performance security within the specified period, its EMD (Bid Security) shall be forfeited.

4 (c) The proceeds of the performance security shall be payable to GNCTD as compensation for any loss resulting from the Supplier's failure to complete its obligations under this RFP. GNCTD shall notify the Supplier in writing of its invocation of its right to receive such compensation within 15 days, indicating the reasons for which the Supplier is in default.

4 (d) The Supplier shall furnish amendment to the Performance Security, if required, within 15 days.

5 (a) **Certified copy of the receipt of latest Income** - Tax filed with Income Tax Department, as applicable, and copy of PAN number should be enclosed with the bid. Bids received without the above certificate are liable to be rejected.

5 (b) **Business name and constitution of Bidding firm**: - Bidders must give following details in bid quotation regarding registration of Bidders' firm.

(1) The Companies Act, 1956.

(2) Proprietary concern.

Bidder must also show the full name(s) of Proprietor / Partners.

6 Conviction:-

In case Bidder is convicted of an offence under the Indian Law, Bidder will be considered ineligible for being given contracts.

Any involvement of the Service Provider/Contractor or his employees in Anti-National Activities during the Contract Period shall be governed under Laws of the Republic of India including the Information Technology Act 2000, including its amendments, if any.

7 Release of Controlled Materials:-

Bidders who do not stipulate conditions regarding release of controlled materials shall be given preference.

8 (a) Ex-stock offers or those on Bidders' own import license will be preferred. It will be Bidders' responsibility to inform this office within the validity period of the quotation in the event of the stores offered ex-stock being sold elsewhere. Failure to comply with this instruction shall be construed to mean that the stores are available ex-stock during the validity period. No cognizance shall be taken of the intimation that the stores have been sold out prior to receipt of order if such intimation is received after receipt of intimation of Acceptance of order by the Bidder.

8 (b) The exact, earliest and clear delivery period should be quoted. Time is the essence of this RFP and preference will be given for compliance to specified time schedules.

8 (c) The rates quoted in the Bid will be construed as inclusive of all taxes, duties, cess, levies, transportation charges and license fees except Service Tax.

9 Units and Measures:

9 (a) Bidder should indicate the rates in metric system of weights and measures or in

any equivalent weights and measures thereof showing conversion rates. Non-compliance in this respect will render the bid liable for rejection.

9 (b) Rates should be quoted per "unit" as specified in the Schedule. Non - compliance will render the bid liable for rejection.

10 The GNCTD reserves the right to accept either the bid in full or part or divide the quantity amongst one or more Bidders without assigning any reasons.

11 The GNCTD does not pledge himself to accept the lowest or any bid and also reserves the right of accepting the whole or any part of the bid or portion of the quantity offered against any item and Bidders shall supply the same at the rate quoted. The bids shall be unconditional, failing which the bid is liable to be rejected.

12 In the event of an order being placed with Bidders against this RFP and if Bidder fails to supply any stores in accordance with the terms and conditions of Acceptance of bid or fails to replace any stores rejected by the GNCTD or any person on his behalf within such time as may be stipulated, GNCTD shall be entitled to purchase elsewhere, without notice to Bidder on the account, such stores from any other source and at such price as the GNCTD shall in the sole discretion think fit and if such price shall exceed the rate set out in the schedule to Acceptance of Bid, Bidder shall be responsible to pay the difference between the price at which such stores have been purchased by the GNCTD and the price calculated at the rate set out in the Schedule.

If price difference amount is not paid due to any reason, it will be deducted from the Security Deposit/ Performance Deposit/ Pending Bills.

13 **Sample**: -

Bidder should submit one sample of each of the three TETRA subscriber radio set viz. Static, Mobile and Handheld as per the specifications mentioned in this document in physical form. The GNCTD may at its discretion provide a schedule for Bidder to arrange a demonstration of these during technical evaluation.

(a) Sample Label should bear following particulars:-
i) Name of the Bidder/signed by Bidder.
ii) Name of manufacturer.
iii) RFP No. and due date.
iv) Brand Name.

(b) Sample should be submitted in conformity to indent sample/RFP specification.

14 (a) Quotations without samples where samples are specifically called for will not be considered.

14 (b) Sealed samples should be submitted with a label showing (i) Name and address of the firm (ii) RFP No. (iii) Opening date of RFP.

14 (c) Samples for RFP should be submitted on or before the due date of RFP in respect of each item as mentioned in the RFP along with separate challans in triplicate for each schedule at the office of the GNCTD. In case of failure, the quotation will be rejected at the discretion of the above Officer.

14 (d) after the award of work for this RFP, the samples accompanying rejected bids, will be returned to the respective Bidders provided the samples are not destroyed or consumed during testing and examination. The Bidder will have to make their own arrangements to remove the samples before the expiry of the final date of removal of sample which will be intimated to them. If the samples are not removed by the date, they will be disposed of in a manner deemed fit.

14 (e) Bidders are advised that samples should not be submitted of a quality that they are not able to manufacture/ procure or maintain in ultimate supplies. The samples submitted shall be preserved for comparison with supplies and rejection will be made if supplies are not reasonably in accordance with the approved samples.

14 (f) Bidders are hereby advised that the quality will be main deciding factor both in the matter of deciding bids and in inspecting bulk supplies. If even a small percentage of samples drawn at random in bulk supplies fails to come up to the standard of the bidders' sample, the entire supply is liable to be rejected and no excuse whatsoever for deviation in quality will be entertained.

15 Bidder will be required to enter into Agreement for the due performance of the contract. It should be stamped with adhesive stamps and should be signed before any Gazetted Officer of this office or before a First Class Magistrate or a Justice of Peace or a Notary public.

16 (a) It shall be noted that if a contract is placed on a higher rate as result of this RFP in preference to lowest acceptable offer in consideration of Bidders' offer of earlier delivery, Bidder will be liable to pay to Government the difference between the contract rate and that of the lowest acceptable bid in case of failure to complete supplies in terms of such contract within the date of delivery specified in the RFP and incorporated in the Acceptance of Bid. This is without prejudice to other rights under the terms of contract.

16 (b) Bidder shall guarantee regular and timely supply of all the spare parts required for the normal working of the items bided for a period of ten years.

16 (c) Bidder shall further guarantee that "after-sale service" shall be available in Delhi for at least 10 years.

17 Special Conditions of Contract, if any specified in this RFP, shall also be applicable.

18 Non-compliance with any of the above conditions shall construe breach of the same and will render the offer liable to rejection.

19 Bidder is required to specify clearly in their Bid as to in which respect their quotations deviate from the RFP enquiry. Failure to do so may render the bid liable to rejection.

20 Bidder shall submit descriptive technical literature and all required details along with their Bids.

21 Bidder shall indicate the country of origin of each item in its Bid.

SECTION – 2

GENERAL CONDITIONS OF CONTRACT (GCC)

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General Conditions of Contract

SECTION – 2

General Conditions of Contract

Article –1: General

1.1 The Bidder shall submit only one option/alternative for any offered item, which is in accordance with the specifications and requirements. The bids shall be unconditional, failing which the bid is liable to be rejected.

Article – 2: Submission Instructions

2.1 The Bidder shall submit its Bid in three (3) parts, namely, **Part-I E.M.D, Part-II Technical Bid, Part-III Commercial Bid.** Details of Bid submission are given in Article 3, 4 & 5.

2.2 Bid submitted shall have the documents as defined in Article-3, 4 & 5. Submission of illegible documents shall lead to disqualification of the Bidder.

Article – 3: Part-I: EMD (sealed single copy)

3.1 EMD Cover should contain EMD in form of Demand Draft/Bank Guarantee amount as mentioned in prescribed format in physical form. The name of the Bank must be mentioned on cover itself. In case of offer received without EMD, the technical Bid will not be opened.

3.2 EMD submitted in form of Bank Guarantee is acceptable subject to Bank Guarantee being from scheduled bank. Bank guarantee from non-scheduled private/public/co-operative bank will not be acceptable and bids filed with such Bank Guarantee will be ignored.

Article – 4: Part-II: TECHNICAL BID (Online Submission)

4.1 The Technical Bid shall contain essential prequalification documents as mentioned in Article 20.3 of this Section. In addition it should contain the following documents:

(a) Details on nature of constitution of their firm; names and addresses of the Partners/Proprietors/Directors; and also the details of sister / parent concerns
(b) RFP Letter Form as described in this RFP document duly filled in by the Bidder.
(c) ISO 27001 Certificate (for Lead Partner in case of Consortium).
(d) Confirmation that the Bidder has read and understood the complete documents/requirements.
(e) Confirmation that the goods and services are from eligible countries – the list indicating source of the same to be submitted
(f) Unpriced Price Schedule forms giving all details i.e. identical to Part-III with prices blanked out. **Filling up prices in Part-II will render the Bids disqualified.**
(g) P.F. Registration certificate (if applicable) (for all Partners in case of Consortium)

(h) Sales-Tax and Income-Tax return and Pan Number (as applicable) (for all Partner in case of Consortium)

(i) Proof of claiming Purchase Preference, if applicable

(j) Full description of design and layout of Systems with complete technical and engineering details and other technical information as required in Technical Specification.

(k) Any other additional information as required in this RFP.

Article – 5: Part-III: COMMERCIAL BID (Online Submission)

5.1 Commercial Bid cover should contain only rates/prices of items inclusive of all taxes, duties, cess, levies, transportation charges, license fees except service tax, in accordance with prescribed formats.

(a) Use Commercial Form 7 given in Section 5 of this document.

(b) Once quoted, the Bidder shall not make any subsequent price changes.

Article – 6: Payment

The payment to the Contractor shall be made as per the provisions of Article-9 of SCC.

Article – 7: Authorization

In case a Bidder is not Original Equipment Manufacturer (OEM), the Bidder should submit a letter from the manufacturer authorizing the Bidder to submit quotation on OEM's behalf. Authority letter should be in original letter head of the OEM with its seal and signature in prescribed form given in Sec.-5. In absence of this, bid is liable to be rejected.

Article – 8: Documents establishing Pre-Qualification, Products eligibility and Conformity to RFP Documents

8.1 Pursuant to "Eligible Bidder" the Bidder shall furnish, as part of its Bid, documents establishing the prequalification (Use Format T1 and Format F1 given at Section-5 of this document) and conformity to the RFP Documents of all products and services, which the Bidder proposes to supply.

8.2 The documentary evidence of the eligibility of the products and services shall consist of a statement in the Bid Form certifying that the proposed systems have their origin in eligible countries.

8.3 The documentary evidence of the Bidders' qualifications and ability to perform, if its Bid is accepted, shall establish to GNCTD's satisfaction

(a) that, in the case of a Bidder offering to supply products under this RFP that it did not produce, the Bidder has produced authorization letter, and

(b) That, if the Bidder takes eligibility on the basis of the experience of parent company, a letter from parent company, assuring technical support during the life cycle of this project, should be submitted.

Article – 9: RFP Forms

9.1 Wherever a specific form is prescribed in the RFP document, the Bidder shall use the form to provide relevant information.

9.2 For all other cases, the Bidder shall design a form to give the required information.

Article – 10: Cost of Bidding

10.1 Bidder shall bear all costs associated with the preparation and submission of the Bid including RF Network Surveys, other surveys (as required), and GNCTD will in no case be responsible or liable for those costs, regardless of the conduct or outcome of the Bidding process.

Article – 11: RFP Document

11.1 Bidder is expected to examine all instructions, forms, terms, specifications, and other information in the RFP document. Failure to furnish all information required in the RFP document or to submit a bid not substantially responsive to the RFP document will be at Bidders' risk and may result in the rejection of its Bid.

Article – 12: Clarification on RFP Document

12.1 Bidders requiring clarification of the RFP document may seek such clarification through email bidqit.delhi@nic.in. GNCTD will respond to any such clarification required, received not later than the date specified in this RFP. The response of GNCTD (with an explanation of the query but without identifying the source of the query) will be provided to all the eligible Bidders.

12.2 GNCTD shall organize Pre-Bid meeting and Bidders may attend the same to clarify any queries.

12.3 Bidder is advised to inspect designated site(s) and/or carryout surveys to identify required sites as required to obtain all information necessary for preparing its Bid. Visiting the site(s) shall be entirely at the Bidders' own risk and expense. Bidder and any of its personnel or agents will be granted permission by GNCTD to visit its site(s) for the purpose of such inspection, but only upon the express condition that he releases and indemnifies GNCTD and its personnel and agents from all liabilities.

Article – 13: Amendment of RFP Document

13.1 At any time prior to the deadline (or as extended by GNCTD) for submission of Bids, GNCTD, for any reason, whether at its own initiative or in response to clarifications requested by prospective Bidders, may modify the RFP document by issuing amendment/corrigendum/clarification.

13.2 All Bidders will be notified of the amendment/corrigendum/clarification, and these will be binding on them. Any amendment/corrigendum/clarification to the RFP document will be posted on GNCTD's Website https://delhi.govtprocurement.com

13.3 In order to allow Bidders a reasonable time to take the amendment/corrigendum/ clarification into account in preparing their Bids, GNCTD, at its discretion, may extend the deadline for the submission of Bids.

Article – 14: Language of RFP

14.1 The Bid prepared by the Bidder, as well as all correspondence and documents relating to the RFP exchanged between the Bidder and GNCTD, shall be in English.

Article – 15: Format and Signing of Bid

15.1 The Bidder shall submit the Bid online at **https://delhi.govtprocurement.com** . The documents like EMD; and Samples accompanying Bids shall be submitted in physical form before the closing date and time of the Bid at the O/o Secretary (IT), Room no. B-902, Level 9, B-Wing, Delhi Secretariat, IP Estate, New Delhi-110 113. The on-line submission of Bid Documents shall be made in "PDF" file format carrying digital signatures of the Bidder. The sealed cover for Part-I of the Bid (EMD and Samples) shall be superscripted with the following information:

DO NOT OPEN – THIS IS A BID FOR
SECURED COMMUNICATIONS NETWORK (TETRA) FOR CWG 2010

Part-I: EMD
Purchaser : Secretary (IT), Department of Information Technology, Govt. of NCT of Delhi - 110 113
RFP No. : 6431
Due Date :
Time :
Name of the Bidder :
Address :

DO NOT OPEN – THIS IS A BID FOR
SECURED COMMUNICATIONS NETWORK (TETRA) FOR CWG 2010

Part-I: SAMPLE
Purchaser : Secretary (IT), Department of Information Technology, Govt. of NCT of Delhi - 110 113
RFP No. : 6431
Due Date :
Time :
Name of the Bidder :
Address :

15.2 The Bidder is to register with e-procurement portal of Delhi Govt. The requisite annual fee of Rs. 6000/= (Rupees Six Thousand only) plus applicable Service Tax is to be paid to C1 India Pvt. Ltd (Service Provider of DGS&D) for the registration. The Bid should be signed digitally. The Bidder should have digital signatures, which can be obtained from agencies authorized by the controller of certifying authority of Govt. of India.

Article – 16: RFP Due Date

16.1 Bids must be submitted on-line at https://delhi.govtprocurement.com not later than the time and date specified in the NIB.

16.2 The GNCTD may, at its discretion, on giving reasonable notice to all Bidders who have been issued the RFP documents, extend the RFP due date, in which case all rights and obligations of the GNCTD and the Bidder, previously subject to the RFP due date, shall thereafter be subject to the new RFP due date or deadline as extended.

Article – 17: Modification and Withdrawal of Bid

17.1 The Bidder shall not modify the Bid after submitting it through the e-procurement portal.

17.2 The bidder shall not be able to withdraw the bid, once submitted on the e-procurement portal.

Article – 18: Late Bid

18.1 No late bid would be received by the e-procurement portal. Server date and time will be applicable for receiving the bids.

Article – 19: Opening of Bids by GNCTD

19.1 GNCTD will open Bids at the place and time mentioned in the RFP. Bidders' representatives (maximum 2) may attend the opening in person or through e-procurement portal. Those who are present in person shall sign a register evidencing their attendance.

19.2 The Bidders' name and such other details as the GNCTD at its discretion, may consider appropriate, will be announced at the time of opening of bids.

Article – 20: Preliminary Examination, Short-listing of Bids and Evaluation of Technical Bids

20.1 GNCTD will examine all the Bids received to determine whether they are complete.

20.2 At the outset, Pre-Qualification (eligibility) documents of Bidders shall be examined and verified as per the specified eligibility criteria. The Technical Bids of those Bidders who do not meet the required eligibility criteria, shall not be considered further and shall be technically summarily rejected. The list of pre-qualification (eligibility) documents is given below:

20.3 **List of Pre-qualifying (Eligibility) Documents to be Enclosed**

Sl. No.	Name of Document
1.	Earnest Money Deposit (EMD) – submission of original in physical form
2.	Confirmation that Bid Price and Payment Currency Quoted by the Bidder is in INR.
3.	Power of Attorney/Board Resolution for signing the Bid
4.	Consortium Agreement, if applicable
5.	ISO certificate 9001:2000 (for all Partners in case of Consortium)
6.	Sales Tax/ VAT certificate (as applicable for Indian / foreign Bidder) (for all Partners in case of Consortium)
7.	Compliance statement (as per format in Form- 5 of Sec-5)
8.	Proposed Time Schedule
9.	Copy of purchase orders and Completion certificates (as per Art-7 of SCC)
10.	Form 6/T1 and Form 6/F1 (Sec-5) duly filled in
11.	Other Documents establishing pre-qualification/ eligibility of Bidder (as per Art-7 of SCC)
12.	Annual Report for last 3 years, 2005-2006, 2006-2007 & 2007-2008 (for all Partners in case of Consortium)
13.	Certificate of meeting the eligibility criteria for grant of license operating the service on commercial basis (as per Art-12 of SCC)
14.	Confirmation of Sample submission
15.	Manufacturer's Authorization Letter
16.	IOP certificates for offered TETRA system (as per clause 1.6 of chapter 7.2 of TS)
17.	Confirmation for TEDS compliance to Radio System (in accordance with clause no.2.1.2(b & c) of Chapter 7.2)
18.	Type approval and TETRA accreditation Certificates (as per clause 1.8 & 1.9 of chapter 7.2 of TS respectively)

20.4 Technical Bid documentation shall be evaluated by GNCTD in following manner:

20.4.1 The documentation furnished by the Bidder will be examined based on the following criteria:

- Compliance to RFP document
- System design and technical solution (The Bidder shall provide complete details in the Bid)

- Other documents as required in Technical Bid

20.4.2 GNCTD at its discretion may ask Bidder(s) for additional information, visit to Bidders' site and/or arrange discussions with their professional, technical facilities to verify claims made in the Technical Bid.

20.5 Technical evaluation of Bidder shall be made on the basis of conformity to technical and operational requirements, commercial terms and conditions, time schedule of execution of project and evaluation of samples, etc.

20.6 Bids found to be non-compliant at this stage will be rejected and will not be considered further.

20.7 Technical Evaluation Criteria

The technical Bid shall meet conformance to essential Bid requirements given below-

Sl. No.	Requirements/ Features / Specifications
A.	**Commercial**
1)	The bids shall be submitted in the format specified in GCC.
2)	Compliance to Terms and conditions of GCC
3)	Compliance to Project Time schedule as specified in SCC
4)	Compliance to the Service Level Agreement (SLA) as specified in SCC.
5)	Compliance to other Terms and conditions of SCC
B.	**Network/ System Requirements**
1)	Whether the Bid offers latest state-of –the art Network Equipment
2)	Whether the Bid offers end to end encryption for overall security
3)	Whether the Core Network and Terminals are Compliant/ Upgradeable to TEDS (in accordance with clause no.2.1.2(b & c) of Chapter 7.2
4)	Whether the Bidders agree to provision of Section – 6 of RFP
C.	**Technical Specifications**
1)	Whether the Bidder has submitted the details and methodology as required in chapter 7.1 of TS
2)	Whether the Bidder has submitted reliability and availability calculations with proof
3)	Whether the Bidder has submitted the Application Programming Interface (API) documentation
4)	Whether the Bidder meets the provisions of cl. No. 2.1 , 2.2 and 2.3 of chapter 7.2 of TS
5)	Whether the Bid meets the provisions of clause of 3.4.1 (Radio signal strength) of Chapter 7.2 of TS and has submitted the required plots
6)	Whether the Bidder has submitted the required design approach and calculations
7)	Whether the handheld radio as offered in the Bid is in accordance with clause no. 3.12 of chapter 7.2 of TS
8)	Whether the Bid is in compliance to other provisions of chapter 7.2 and 7.3 of TS

Article - 21: Opening and Evaluation of Commercial Bids

21.1 The Commercial Bid of only those Bidders will be opened whose Technical Bids comply with all the Technical Evaluation Criteria. The decision of the Technical Evaluation Committee (TEC) in this regard will be final.

21.2 Evaluation of Commercial bid will be based on monthly rental quoted as per Form – 7 of Section - 5.

Article – 22: Bid Currency

22.1 Prices for products and services offered shall be quoted in Indian Rupees (INR).

22.2 All duties, taxes, cess, levies, license fees, transportation charges, administrative charges, etc. (as applicable in India) except service tax shall be included in prices. The payment of these shall be made by the Contractor.

Article – 23: Contacting GNCTD

23.1 Bidder shall not approach Employer's / Employer's Representative Officers beyond office hour and/ or outside their office premises, from the time of the Bid opening to the time of finalization of successful Bidder.

23.2 Any effort by a Bidder to influence them in the decisions on Bid evaluation, Bid comparison or finalization may result in rejection of the Bidders' offer. If the Bidder wishes to bring additional information to the notice of the Employer's / Employer's Representative Officers, it should do so in writing.

Article – 24: Lack of Information to Bidder

24.1 The Bidder shall be deemed to have carefully examined RFP document to his entire satisfaction. Any lack of information shall not in any way relieve the Bidder of his responsibility to fulfill its obligation under this RFP.

Article – 25: Fraudulent & Corrupt Practice

25.1 "Fraudulent Practice" means a misrepresentation of facts in order to influence a procurement process or the execution of the project and includes collusive practice among Bidder's (prior to or after Bid submission) designed to establish Bid prices at artificial non-competitive levels and to deprive the GNCTD of the benefits of free and open competition.

25.2 "Corrupt Practice" means the offering, giving, receiving or soliciting of anything of value, pressurizing to influence the action of a public official in the process of project execution.

25.3 GNCTD will reject a proposal for award if it determines that the Bidder recommended for award has engaged in corrupt or fraudulent practices in competing for, or in executing, the project.

Article – 26: Quality Control Document

26.1 Bidder shall submit test procedures and test cases describing expected results of these tests relating to various components of the system being supplied, installed, integrated and commissioned. These should be submitted along with the technical bid.

26.2 Bidder shall ensure that it proposed systems consistently conform to required quality and project's stated and implied needs to meet GNCTD's total satisfaction.

26.3 Bidder shall submit its Quality Assurance (QA) plans along with relevant procedures covering various activities like design, engineering, material procurement, manufacture, inspection & testing, documentation, dispatch to site, erection, installation and commissioning and O & M.

26.4 Bidder shall submit a total index of drawings and documents required for Purchaser's information along with the scheduled date of submission of each drawing/document within 2 weeks from signing the Contract Agreement.

26.5 No waiver/deviation shall be permitted after award of contract. All waiver/deviations after placement of order pertaining to design and engineering or manufacture and supply shall be addressed to GNCTD under very special circumstances.

26.6 Bidder shall submit a list of sub-contractor(s) for bought out materials for GNCTD's approval before placement of sub-orders.

26.7 Bidder shall use calibrated measuring, test Equipment, and maintain calibration records. Successful Bidder shall furnish records of calibration of measuring and test instruments including re-calibration records to GNCTD.

26.8 Inspection and Test status of product shall be identified by using markings, authorized stamps tags, route cards, inspection records etc. during the course of manufacture to clearly indicate acceptance/rejection of tests/stage of inspection performed during its manufacturing cycle. The identification of inspection and test status shall be maintained and records thereof shall be submitted as and when demanded by GNCTD.

26.9 Contractor shall maintain quality records as per its procedures. Copies of Inspection Reports and Test Records copies shall be furnished to GNCTD.

26.10 Contractor shall establish and maintain procedure for identifying the product from applicable drawings, specification or other documents during all stages of production, delivery and installation. The successful Bidder shall ensure that each product that is going in the process of fabrication/ manufacture/ construction/ erection has proper identification throughout the process including the final output.

Article – 27: Source of funds

27.1 The Employer has made sufficient provision of funds for Secured Communications Network (TETRA) for Common Wealth Games (CWG) 2010**.**

Article – 28: Application

28.1 These Conditions shall apply to the extent that they are not superseded by provisions of other parts of the RFP document.

Article – 29: Standards

29.1 The Systems to be supplied under this RFP shall conform to the standards mentioned in the Technical Specifications. Bureau of Indian Standards (BIS)/ International Telecommunication Union (ITU)/ European Telecommunications Standard Institute (ETSI), MIL, ISO standards, etc. shall be followed wherever not mentioned otherwise. Such standards shall be of the latest version by the relevant organization.

Article – 30: Approvals

30.1 Bidder shall obtain all clearances, approvals and permits including any environmental approvals, if any, as required for various stages of this project. Bidder shall also assist in clearances, approvals and permits required for the project from time to time.

30.2 Bidder shall have executed requisite shareholder and Board of Director resolutions in order to enter into Agreement with GNCTD.

30.3 The Bidder shall arrange for necessary WPC clearance.

Article – 31: Award of Contract

31.1 The acceptance of the bid will be intimated to the successful Bidder by GNCTD through e-mail or any other recognized mode of communication.

31.2 GNCTD shall be the sole judge in the matter of award of contract and the decision of GNCTD shall be final and binding.

Article – 32: Assignment & Sub Contracts

32.1 The Contractor shall deploy people of High Integrity. Police Verification is to be carried out for all deployed Human Resources by the Contractor.

32.2 The Bidder shall notify the GNCTD in writing of all subcontracts awarded under this Bid. The GNCTD reserves the right not to accord its consent to award of work to a particular sub-contractor and demand Bidder to award the same to some other sub-contractor. Such sub- contracting of work to the sub-contractor shall not relieve the Bidder from any liability or obligation under the RFP. The Bidder shall fully indemnify GNCTD for any claims/damages whatsoever arising out of the subcontracts. The bidder shall notify in writing such changes to GNCTD.

32.3 No consent of GNCTD shall be required, when an assignment by the Bidder is the result of, and part of, a corporate acquisition, merger or reorganization or to an

affiliated entity; provided that such entity shall not be relieved of the obligations of the Bidder under this RFP.

Article – 33: Governing Language

33.1 All correspondence and other documents shall be exchanged by the parties, shall be written in the English language.

Article-34: Governing Currency

34.1 INR (Indian Rupee) will only be used while quoting for this RFP. Bids received in any other currency shall not be acceptable.

Article – 35: Applicable Law

35.1 Appropriate laws of Republic of India shall govern.

Article – 36: Notice

36.1 Any notice given by one party to the other pursuant to this RFP shall be sent to the other party in writing to the other party's address communication through e-mail or any other recognized mode of communication.

36.2 A notice shall be effective from the date when notice in writing is delivered or delivered or affixed at a conspicuous place whichever is earlier.

Article – 37: Use of RFP Documents and Information

37.1 The Bidder shall not, without prior written consent from GNCTD, disclose the RFP/amendment/corrigendum/clarification, etc., or any provision thereof or any specification, plans, drawings, pattern, samples or information furnished by or on behalf of GNCTD in connection therewith to any person other than the person employed by the Bidder in the performance of the related job. Disclosure to any such employee of the Bidder shall be made in strict confidence and shall extend only as far as may be necessary for such performance.

The Bidder shall not, without prior written consent of GNCTD, make use of any document or information made available for the project except for purposes of performing the job.

37.2 All project related documents issued by GNCTD shall remain the property of GNCTD and originals and all copies shall be returned to GNCTD on completion of the Bidders performance, if so required by GNCTD.

Article – 38: Indemnification

38.1 a. The Bidder shall indemnify and hold harmless the GNCTD from any and all damages, losses, penalties, expenses and costs arising from, based on, related to or associated with the inaccuracy of any representation or covenant set forth in this RFP document or the breach of or failure to perform or satisfy any of the provisions of this RFP document or for loss of or damage to property, death or injury to person.

b. Bidder shall indemnify GNCTD and hold it harmless from all suits, actions, debts, accounts, costs, losses, and expenses of all kinds (excluding legal expenses and professional advisory service expenses) arising from or out of any adverse claims of any and all persons related to the execution of this project.

38.2 Notwithstanding anything expressed or implied in this RFP document to the contrary:-

a. The parties shall indemnify, defend and hold the other harmless against any and all third party claims.

b. Such indemnity shall not extend to any loss, death or injury or any expenses relating thereto to the extent that it was caused by any act or omission of other party or the failure of other party to take reasonable steps in mitigation thereof.

c. such indemnity shall not be applicable to any loss, damage, cost or expense in respect of, and to the extent that either party is compensated pursuant to the terms of any other Agreement or under any policy of insurance.

38.3 The Bidder shall indemnify the GNCTD against direct damage to the property of the GNCTD and others, injury and death to employees of the GNCTD and those of others if such damage, injury death is caused by the negligence or willful misconduct of the Bidder, his employees or representatives while working at the Bidders' work or at the GNCTD's site pursuant to the Contract or by the use by the Bidder of defective material or workmanship by making good such damage to property or compensating personal injury or death.

38.4 The Bidder shall, at all times, indemnify the GNCTD against any claims which may be made under the Workmen's Compensation Act, 1923 or any statutory modification thereof or otherwise for or in respect of any damages or compensation payable in consequence of any accident or injury sustained by any workman or other person whether in the employment of the Bidder or not.

38.5 For the purpose of this Article:-

a. GNCTD shall include all persons directly or indirectly associated with GNCTD including its employees.

b. Bidder shall include its directors, employees, Affiliates, sub-suppliers and sub-contractors.

38.6 Nothing in Article 38 whether expressed or implied shall relieve either Party of any express obligation to make any payment due to the other Party under the Contract.

38.6.1 **Properties and Facilities:**

Bidder shall assume full responsibility and liability for the maintenance and operation of its properties and facilities and shall indemnify and hold GNCTD harmless from all liability and expense on account of any and all damages, claims or actions, including injury to and death of persons, arising from any act, accident or omission in connection with or arising out of the installation, presence, maintenance and operation of properties and facilities of Bidder.

38.7 Control and Possession

Bidder shall be deemed to be in control and possession of the equipment necessary for the proper and normal operation of the Systems.

38.8 Indemnity against Patent Rights

(a) The Bidder assures the GNCTD that there is no infringement of any patent or industrial or intellectual property right, registered design, trade mark or copyrights occasioned by the direct supply of its products and equipment, and the documents which are subject matter of the Contract. The Bidder undertakes to indemnify the GNCTD against all costs, expenses and claims for damages made by any third party and any patent, industrial or intellectual property rights, registered design, trade mark or information/technology or resulting from any authorized use by the GNCTD of the information /technology /product/ equipment directly supplied under the Contract by the Bidder.

(b) In the event of any such claim by third party, the Bidder agrees to utilize its best efforts at its own cost and option :

(i) To negotiate the agreement with such third party or parties so that the deliveries under the Contract are no longer infringed upon by any patent or industrial/intellectual property right, etc. as above claimed by any third party/parties;

(ii) To defend any claim, assessed by a final judgement of a competent court at its own cost and expenses and to satisfy the decree/order in any such claim, suit or proceedings at its own expenses and costs;

(iii) In case the Bidder does not succeed in settling the claim/suit filed by any third party in respect of the patent or industrial/intellectual property right, etc. as above, in that event the Bidder undertakes to refund all payments regarding the infringed items made to him by the GNCTD .

(c) The GNCTD shall, however, inform the Bidder promptly or any claim or suit or any other proceedings about the alleged infringement so that the Bidder can take all measures necessary to defend such claim of suit or proceeding in respect of the alleged infringement. The GNCTD undertakes not to make any admission prejudicial to the Bidder in respect of any alleged infringement without the consent of the Bidder.

(d) The provision of this article shall survive the expiration or prior termination of the Contract until the end of the contract period.

Article – 39: Taxes & Duties

39.1 Bidder is liable for all taxes and duties, cess, levies and license fees etc., except Service Tax, as applicable in NCT of Delhi.

39.2 Mandatory taxes/duties (TDS) to be recovered/ withheld will be deducted by GNCTD.

Article – 40: Responsibility for Completeness

40.1 Any fittings or accessories which may not be specifically mentioned in the specification but which are necessary for its normal operation in accordance with agreed specifications are to be provided by the Bidder without extra charge, and the Systems must be complete in all details.

Article – 41: Packing

41.1 The Bidder shall provide such packing of the Systems as is required to prevent their damage or deterioration during shipment. The Bidder shall promptly repair or replace any System that are damaged in transit. The packing, marking, and documentation within and outside the packages shall also comply strictly with the requirements.

41.2 The Bidder shall insert in each case a packing list, fully itemized to show case number, contents, gross and net weight, and cubic measurement.

Article – 42: Deferring Shipments

42.1 If the GNCTD shall have notified the Bidder in writing that the former is not ready to take delivery of the Service, no System or materials shall be forwarded until intimation in writing shall have been given to the Bidder by the GNCTD that it is ready to take delivery of the Service.

Article – 43: Delivery and Documents

43.1 Delivery, installation, and acceptance of the Systems shall be carried out by the Bidder in accordance with Schedule of Requirements (Sec - 6) and Technical Specifications (Sec - 7).

Article – 44: Books & Records

44.1 Bidder shall maintain adequate books and records/reports in connection with Contract and shall make them available for inspection and audit by GNCTD until expiry of the performance guarantee.

Article –45: Site(s) Preparation

45.1 GNCTD will provide clean space for OCC & Backup OCC in Govt. premises as per details given in Section -6. Sites & space for the location of Base Stations will be arranged by Bidder. Bidder will have to arrange for space of its own and bear the cost. The preparation of the Base Station sites including electrical, civil, air-conditioning mechanical works, etc. would be carried out by the Bidder. Fool-proof security of these premises including provision of Bio-Metric Access System will be Bidders' responsibility.

45.2 Mistake in Drawings – The Bidder shall be responsible for any alteration of the works due to any discrepancies, errors or omissions in the drawing or other particulars supplied by the Bidder whether such drawings or particulars have been approved by the GNCTD or not, provided that such discrepancies, errors or omissions be not due to inaccurate information or particulars furnished to the Bidder on behalf of the GNCTD. If any dimensions figured upon a drawing or

plan differ from those obtained by scaling the drawing or plan, the dimensions as figured upon the drawings or plan shall be taken as correct.

45.3 The personnel of GNCTD and its Representatives shall have full access to the equipment and site(s) of the Bidder.

Article – 46: Acceptance Test

46.1 Acceptance Test shall be conducted, before commissioning by GNCTD and its Representative. The tests to be carried out, test procedures, test schedules, test equipment and tools, and expected test results are to be provided by the Contractor to meet all the specified parameters/ service requirements. The tests to be carried out test procedures, test schedules, and test results have to be approved by GNCTD /its Representative and shall be performed to demonstrate compliance to Technical Specification.

46.2 The date on which Final Acceptance Certificate is issued shall be deemed to be the date of successful commissioning of the Systems.

Article – 47: Replacement of Parts and Components

47.1 If the Systems fail to meet the standards of performance for Acceptance Testing and during warranty period due to faulty part/component, the replacement of faulty part/component has to be carried out by the Bidder free of cost. Freight, insurance and other allied expenditure like customs duties etc. for such part/component shall be the liability of the Bidder. Bidder will reimburse to GNCTD the cost incurred by GNCTD, if any, on replacement of such faulty part/component.

47.2 If it becomes necessary for the Bidder to replace or renew any defective portions of the Systems under this clause, the provisions of this clause shall apply to the portions of the Systems so replaced or renewed until the expiration of six months from the date of such replacement or renewal or until the end of the warranty period whichever may be the later. If any defects be not remedied within 15 (Fifteen) days from the date of communication thereof or within such other specific period as may be allowed by the GNCTD in his discretion on application made to that effect by the Bidder, the GNCTD may proceed to carry out the work at Bidder's risk and expense, but without prejudice to any other rights which the GNCTD may have against the Bidder in respect of such defects.

47.3 If during the progress of the work, the GNCTD or its representative shall decide and notify in writing to the Bidder that the Bidder has executed any unsound or imperfect work or has supplied any System or material inferior in quality to those specified, the Bidder on receiving details of such defects or deficiency shall, at his own expense, within seven days of his receiving the notice, or otherwise within such time as may be reasonably necessary for making in good, proceed to alter, re-construct, or remove such work, or supply fresh materials up to the standard of the particulars and in case the Bidder fails to do so, the GNCTD may, on giving the Bidder seven days notice in writing of his intention to do so, proceed to remove the work or materials complained of, and at the cost of the Bidder, perform all such work or supply all such materials, provided that nothing in this clause shall be deemed to deprive the GNCTD of or affect, any rights under the contract which he may otherwise have in respect of such defects or deficiencies.

Article – 48: Rejection of Defective System

48.1 If the completed Systems, or any portion thereof, is taken over due to being defective or fail to fulfil the requirements of the Contract, the GNCTD shall give the Bidder notice setting forth details of such defects or failure and the Bidder shall forthwith make the defective System good or alter the same to make it comply with the requirements of the Contract. Should he fail to do so within the time mutually agreed to between GNCTD and Bidder, the GNCTD may reject and replace at the cost of the Bidder, the whole or any portion of the System as the case may be, which is defective or fails to fulfil the requirements of the Contract. Such replacement shall be carried out by the GNCTD within reasonable time and at a reasonable price and where reasonably possible to the same particulars and under competitive conditions. The Bidder's full and extreme liability under this clause shall be satisfied by the payment to the GNCTD of the extra cost, if any, of such replacement, delivered and/or erected as provided for in the original Contract, such extra cost being the ascertained difference between the price paid by the GNCTD, under the provisions above mentioned, for such replacement and the Contract price for the System so replaced, and the repayment of any sum paid by the GNCTD to the Bidder in respect of such defective System. Should the GNCTD not so replace the rejected System within a reasonable time, the Bidder's full and extreme liability under this clause shall be satisfied by the repayment of all moneys paid by the GNCTD to him in respect of such System.

Article – 49: Training

49.1 Bidder shall provide training to the personnel nominated by the GNCTD to enable them to have sufficient knowledge and skill to effectively manage, maintain, use and operate System, repair/replace faulty equipment and to change/modify programme during installation, warranty and O & M period. The training schedule, content and modalities will be defined jointly by both parties. Training shall be provided in 15 batches with each batch comprising of about 50 GNCTD's authorized users/ trainers.

49.2 Class room training as well as on site training during the installation of the Systems shall be arranged by the Bidder.

49.3 Training shall be conducted in English and the contents of this training shall be approved by GNCTD. Arrangement of all training materials such as manuals, drawings, brochures etc. shall be the responsibility of the Bidder.

49.4 Bidder shall provide the time schedule of the training within 30 days of the signing of the Contract.

49.5 Training shall be arranged at the designated sites during the installation of the Systems.

49.6 If training provided is not to the satisfaction of GNCTD, it may decide to provide training to the personnel through third party, in the event of which, the Bidder will reimburse the cost incurred by the GNCTD.

49.7 The detailed methodology of Training is outlined in Technical Specification.

Article – 50: Service Period

50.1 Bidder shall provide the Services for the 'System" for a period of starting from Date of Acceptance of System upto March 2017.

Article – 51: Implementation Services

51.1 The Bidder shall provide all services specified in the RFP Document and the Technical Specifications in accordance with the highest standards of professional competence and integrity. The GNCTD reserves the right to require the replacement of any Bidder staff assigned to work on the GNCTD's site by suitable qualified staff, in case concerned staff is determined to be incompetent or loses the confidence of the GNCTD.

51.2 The Bidder shall install and commission the System at all the sites within a period as specified in this RFP document.

51.3 The Bidder shall provide the necessary technical support, Standard Operating Procedures, and other information to GNCTD and its user Departments in implementing the System applications.

Article – 52: Product Support

52.1 For products still to be delivered, the Bidder will offer to the GNCTD newer versions based on latest appropriate technology and having equal or better performance or functionality in quoted cost only; and the same shall be compatible with existing systems.

52.2 The Bidder shall provide new software version releases and documentation, if any, within 30 days of their availability in India, and not later than 3 months after they are released in the country of origin of the product, and technical support services if so specified in SCC. In no case this will affect the prices and service charges.

52.3 The Bidder shall implement software updates and new version releases, if any, within 3 months of receipt of a production ready copy thereof, provided that the new release does not adversely affect Systems operation of performance, or require extensive reworking of the Systems. In cases where the new version release adversely affects the performance of the Systems, the period for implementation of the new version shall be suitably extended and the Bidder shall continue to support and maintain the version currently in production for as long as necessary to properly implement the new version. In no case shall the Bidder cease to support or maintain a version of software less than 24 months from the date the GNCTD receives a production ready copy of a subsequent version.

52.4 The Bidder shall have Service Centre in Delhi/ National Capital Region (NCR) to undertake repair/replacement in case of any defect found in the product.

Article – 53: Bidder's Other Obligations

53.1 The Bidder will abide by the job safety, insurance, customs and immigration measure prevalent and laws in force in GNCTD /India, and will indemnify GNCTD from all demands or responsibilities arising from accidents or loss of life, the cause of which is

Bidder's negligence. The Bidder will pay all indemnities arising from such incidents and will not hold GNCTD responsible or obligated.

53.2 The Bidder is responsible for, and obligated to conduct all specified activities with due care and diligence using state-of-the-art methods and economic principles, and exercising all reasonable means to achieve the specified performance.

53.3 The Bidder is obliged to work closely with the GNCTD's/Employer's Representative's Project staff, act within its own authority, and abide by directives issued by the GNCTD. The Bidder is responsible for managing the activities of its personnel and any sub-contracted personnel, and will hold itself responsible for any misdemeanors.

53.4 The Bidder shall appoint an experienced representative to manage its performance. The representative shall be authorized to accept orders and notices on behalf of the Bidder, and to generate notices and commit the Bidder to specific courses of action. The representative may be replaced only with the prior written consent of the GNCTD.

53.5 The Bidder shall develop the Project plan, as detailed in Technical Specifications based on the Contract requirements, to be submitted to the GNCTD for review.

Article – 54: Liquidated Damages/ Termination of Contract

54.1 Should Bidder fail to deliver the stores or any part thereof, within the contracted period of delivery or in case the stores are found not in accordance with the prescribed specifications and/or approved sample, the GNCTD shall exercise his discretionary powers, either

54.1.1 to recover from Contractor as liquidated damages a sum not exceeding one percent of the annual rental per week of delay subject to a maximum limit of 20 percent of annual rental quoted by the Contractor, or

54.1.2 to purchase elsewhere on Bidder's account and at Bidder's risk stores so undelivered or others of a similar description without canceling the contract in respect of the consignment not yet due for delivery, or

54.1.3 to cancel the contract.

54.2 In the event of risk purchase store of similar description, the opinion of the GNCTD shall be final which will be exercised by it only when stores of exact specifications are not readily procurable.

54.3 In the event of action taken, the contractor shall be liable for any loss which GNCTD may sustain on that account but Bidder shall not be entitled to any saving on such purchases made against default.

54.4 The decision of the GNCTD shall be final as regards the acceptability of stores/ Service supplied by the contractor and the GNCTD shall not be required to give any reason in writing or otherwise at any time for the rejection of the stores/ Service.

Article – 55: Limitation of Liability

55.1 The Bidder shall be liable to the GNCTD for damages that may be suffered by GNCTD on account of time and cost overruns attributable to the Bidder.

55.2 Neither party shall be liable to the other for any special, indirect, incidental, consequential (including loss of profit or revenue), exemplary or punitive damages whether in contract, tort or other theories of law, even if such party has been advised of the possibility of such damages.

55.3 The total cumulative liability of either party arising from or relating to this contract shall not exceed the total amount paid to the Bidder by the client under that applicable statement of work that gives rise to such liability (as of the date the liability arose); provided however, that this limitation shall not apply to any liability for damages arising from (a) Willful misconduct or (b) Indemnification against third party claims for infringement.

Article – 56: Force Majeure:

56.1 If at any time the performance, in whole or in part, by either of any obligation under the contract agreement to be signed, shall be prevented or delayed by reasons of any war or hostility, acts of public enemy, civil commotion, sabotage, epidemic, quarantine restriction, strikes, or acts of God (hereinafter referred to as events), provided notice of happening of any such eventuality is given by either party to the other within 21 days from the date of occurrence of the event, party shall by reasons of such event, be entitled to determine the Contract arising out of the Contract nor shall either party have any claim for damages against the other in respect of such event. Obligations arising out of the Contract shall resume after the event or events have come to an end or ceased to exist. The decision of GNCTD as to whether such event or events have come to an end or ceased to exist or whether deliveries of the equipment by the Bidder have been resumed or not shall be final and conclusive. Provided both the parties may at their option terminate their obligations under the Contract, and thereupon the GNCTD shall be at liberty to take over from the Bidder all the works at a price to be fixed by the GNCTD, which shall be final, and the Bidder shall refund forthwith the amount of advance paid to it by GNCTD.

Article – 57: Variation

57.1 The quantity of TETRA Radio Terminals specified in this RFP document may go upward within a range of Twenty Five Percent (25%) of the specified numbers of terminals during the pendency of this project until March 2017. Bidder shall accordingly make sufficient provisions for this in the network design.

57.2 For the increase of requirement before September 2010, or after October 2010, the bidder may refer Form - 7. For the variation of quantity during the Commonwealth Games (September 2010 – October 2010), the same form will be referred to.

57.3 The Bidder shall also take note of variation possibility as defined in Section – 6.

Article – 58: Extension of Time

58.1 As soon as it is apparent that contract dates cannot be adhered to, an application shall be sent to GNCTD.

58.2 Without prejudice to the foregoing rights if such failure to deliver in proper time as aforesaid shall have arisen from any cause which the GNCTD may admit as a reasonable ground for an extension of the time.

58.3 Provided always that any failure or delay on 'the part of sub-contractors though their employment may have been sanctioned shall not be admitted as a reasonable ground for any extension of time or from exempting Bidder from any liability for any such loss or damage, as aforesaid and provided further that no extension shall be allowed unless application' for it shall, in the opinion of the GNCTD (which shall be final) have been made and in his opinion' is justified.

58.4 In such events, the GNCTD may decide to impose a penalty as deemed fit.

Article – 59: Arbitration

59.1 Except where otherwise provided for in the contract, all the question and disputes relating to the meeting of the specifications, designs, drawing and instructions herein before mentioned and so as to the quality of workmanship or material used on the work or as to any other question, claim, right, mater or thing whatsoever in any way arising out of to relating to the contract, designs, drawings, specifications, estimates, instructions, orders or these conditions or otherwise concerning the works or the execution or failure to execute the same whether arising during the progress of the work or after the completion or abandonment hereof shall be settled in good faith by discussion among the parties in the spirit of understanding and co-operation.

59.2 All unresolved disputes or differences shall be settled by the arbitration in accordance with Arbitration and Conciliation Act of 1996 and the venue shall be in New Delhi. The arbitral tribunal shall consist of a sole arbitrator who shall be appointed by GNCTD to act as the sole arbitrator.

SECTION – 3

SPECIAL CONDITIONS OF CONTRACT

(SCC)

Index

Special Conditions of Contract

SECTION – 3
Special Conditions of Contract

Following Articles shall supplement the General Conditions of Contract (GCC) or amend the GCC whenever there is a conflict of the provision of SCC with GCC. In that event, provisions herein shall prevail over those in the GCC. The bids shall be unconditional, failing which the bid is liable to be rejected.

Article – 1: Contract Period

The Contract period shall be from the date of signing of Agreement upto March 2017.

Article – 2: Evaluation of Commercial Bid

The prices quoted in Forms 7 specified in Section – 5 for the entire period upto March 2017 shall be evaluated to determine the price-wise ranking of Bidders. The price to be taken into consideration for evaluation of commercial bid shall be the Grand Total indicated in the above-mentioned form.

The Bidder offering lowest price shall be ranked as Lowest Priced Bid.

In regard to understanding the discounts applicable in Form no. 7, the following illustrations are given for reference:

Example 1: Calculation of Discount in Year 2
No. of terminals taken by GNCTD- 3868 nos. (3252 HH: 535 Mobile: 81 Static)

Discount to be given to GNCTD on the rental quoted as per Form- 7:-

Sl. No.	Category of TETRA Radio Terminals	Quantity	Monthly Rental in Year-1 (INR)	Monthly Rental in Year-2 (INR)
1	Handheld	3252	X	0.95X
2	Mobile	535	Y	0.95Y
3	Static	81	Z	0.95Z

EXAMPLE 2: Calculation of Discount in Year 3 –
No. of terminals taken by GNCTD- 3868 nos. (3252 HH: 535 Mobile: 81 Static)

Discount to be given to GNCTD on the rental quoted as per Form- 7:-

Sl. No.	Category of TETRA Radio Terminals	Quantity	Monthly Rental in Year-1 (INR)	Monthly Rental in Year-3 (INR)
1	Handheld	3252	X	0.90X
2	Mobile	535	Y	0.90Y
3	Static	81	Z	0.90Z

EXAMPLE 3 : Calculation of Discount in Year 4 –
No. of terminals taken by GNCTD- 3868 nos. (3252 HH: 535 Mobile: 81 Static)

Discount to be given to GNCTD on the rental quoted as per Form- 7:-

Sl. No.	Category of TETRA Radio Terminals	Quantity	Monthly Rental in Year-1 (INR)	Monthly Rental in Year-4 (INR)
1	Handheld	3252	X	0.85X
2	Mobile	535	Y	0.85Y
3	Static	81	Z	0.85Z

EXAMPLE 4 : Calculation of Discount in Year 5 –
No. of terminals taken by GNCTD- 3868 nos. (3252 HH: 535 Mobile: 81 Static)

Discount to be given to GNCTD on the rental quoted as per Form- 7:-

Sl. No.	Category of TETRA Radio Terminals	Quantity	Monthly Rental in Year-1 (INR)	Monthly Rental in Year-5 (INR)
1	Handheld	3252	X	0.80X
2	Mobile	535	Y	0.80Y
3	Static	81	Z	0.80Z

EXAMPLE 5 : Calculation of Discount in Year 6 –
No. of terminals taken by GNCTD- 3868 nos. (3252 HH: 535 Mobile: 81 Static)

Discount to be given to GNCTD on the rental quoted as per Form- 7:-

Sl. No.	Category of TETRA Radio Terminals	Quantity	Monthly Rental in Year-1 (INR)	Monthly Rental in Year-6 (INR)
1	Handheld	3252	X	0.75X
2	Mobile	535	Y	0.75Y
3	Static	81	Z	0.75Z

EXAMPLE 6 : Calculation of Discount in Year 7 –

No. of terminals taken by GNCTD- 3868 nos. (3252 HH: 535 Mobile: 81 Static)

Discount to be given to GNCTD on the rental quoted as per Form- 7:-

Sl. No.	Category of TETRA Radio Terminals	Quantity	Monthly Rental in Year-1 (INR)	Monthly Rental in Year-7 (INR)
1	Handheld	3252	X	0.70X
2	Mobile	535	Y	0.70Y
3	Static	81	Z	0.70Z

Article – 3: Award Period

Award of work shall be made upto March 2017 w.e.f. signing of Agreement.

Article – 4: Award of Contract

The Employer will award the Contract to the Bidder whose Bid has been determined to be substantially responsive to the RFP Documents and who has offered the Lowest Evaluated Bid Price provided that such Bidder has been determined to be

i. Eligible in accordance with the provisions of Article 7 of SCC
ii. Qualified in accordance with the provisions of Article 20 of GCC.

Article – 5: Validity of Bid

Bidders' offer must be valid for a minimum period of 120 days from the date of opening of Bid. Offer with lesser validity period will be rejected. In case required by Employer, the Bidder shall extend the validity of its offer.

Article – 6: Project Time Schedule

Delivery period of the "Systems" should be very clearly stated and shall be as follows:

1. Supply, delivery, installation, testing of Radio Infrastructure and other support infra-products and equipment within 20 weeks from the date of Agreement with Employer.

2. Supply, delivery and testing of Radio Terminals within 20 weeks from the date of Agreement with Employer.

3. Acceptance testing of the Network within 24 weeks from the date of Agreement with the Employer.

Bidder quoting time schedule longer than the specified period is liable to be ignored.

The above schedule shall apply to the works in whole of NCT of Delhi including Games Village, Venues, Airports and other important areas.

Article – 7: Eligible Bidder

7.1 Eligible Bidder shall be a firm, i.e. Original Equipment Manufacturer (OEM)/System Integrator/Service Provider/ or its Authorized Representative who has downloaded the RFP document from specified website in response to the NIB for Project of "Secured Communications Network (TETRA) for Common Wealth Games (CWG) 2010" and meets eligibility criteria as mentioned below. In case the Bid is being submitted by the Authorized Representative, the credentials of the OEM/Authorized Representative shall be taken into account for determining Eligibility. However, the Authorized Representative should meet the financial parameters as defined in Cl. No**. 7**.2.2

7.2 Bidder shall have experience of having successfully completed similar contracts during last 5 years ending last day of the month before the one in which applications are invited. The Bidders experience shall be either of the following: -

7.2.1 Bidder shall have one similar completed contract costing not less than the amount equal to Rs. 88,00,00,000/- (Rs. Eighty Eight Crores only).

Or

Bidder shall have two similar completed contracts costing not less than the amount equal to Rs. 55,00,00,000/- (Rs. Fifty Five Crores only)each.

Or

Bidder shall have completed three similar contracts costing not less than the amount equal to Rs. 44,00,00,000/- (Rs. Forty Four Crores only) each.

7.2.2 Bidder/Lead Partner (In case of a consortium) shall have an average annual financial turnover, for works in field of Information & Communication Technology (ICT) for last 3 completed financial years, not less than Rs. 300,00,00,000/- (Rs. Three Hundred Crores only) each. Bidder shall submit its financial standing through Annual Report (Balance sheet, Profit & Loss account and other documentary proof) of last 3 years certified by the Bidder as well as Chartered Accountant. These documents shall be able to demonstrate the value of turnover in the field of ICT as mentioned above. The above figures shall be submitted for the financial year 2007-2008, 2006-2007 & 2005-2006. The Net-worth and Net Profit shall be positive during this period and shall be indicated as per Form 6/F1 of Section -5.

7.2.3 For Bidders, whose Financial Annual Reports/ Experience Certificates are in currency other than Indian Rupee (INR), conversion to INR shall be done by the Employer. For this, the conversion rate (Selling Rate) prevailing at the last day of the financial year of the Financial Report/Experience Certificate would be considered. Conversion rates applicable at that time, issued by Reserve Bank of India/ State Bank of India would be used.

7.2.4 In the Bidder's company (Lead Partner in case of consortium), total foreign holding, including Foreign Direct Investment (FDI) by Overseas Corporate Bodies/ NRIs/People of Indian Origin(PIO), etc., portfolio investments by FIIs, investment by foreign nationals, within the limits prescribed by RBI and borrowings, if these carry conversion options, shall not exceed 49 % of the paid equity in the entity. The bidder shall submit the balance sheet/certificate from Director or Company Secretary/DMAT

account details indicating the share details.

7.3 The Bidder can participate as consortium also. Maximum 3 firms are permitted to form a consortium and such consortium shall be formed under an Agreement on a non-judicial stamp paper of Indian Rupees one hundred, duly signed by all the firms. At least one of the consortium partners/members shall be an Indian Firm. The agreement in original shall be submitted with the Bid. Agreement document should clearly state the Lead Partner of the consortium, roles and responsibilities of each firm for the successful implementation of the said Project. It should be clearly mentioned in the consortium agreement that every firm of the consortium shall be responsible, and jointly and severally liable for the successful completion of the entire project. The Lead Partner shall be authorized to incur liabilities, receive payments and receive instruction for and on behalf of any or all consortium partners. If the Bidder uses OEM strength to pre-qualify, OEM should be a consortium partner. At least one consortium member should meet the required eligibility criteria as mentioned above in Cl. No. 7.2.1. The Lead Partner shall at least meet the financial criteria of Cl. No. 7.2.2.

7.4 A Bidder shall not be allowed to submit more than one bid either individually/ through Authorized Representative or in consortium. If so found, all such bids shall be liable to be rejected. An OEM shall not be allowed to be part of more than one consortium. An OEM, however, shall be allowed to authorize more than one Bidder.

7.5 The contractor shall establish that their proposed TETRA system is proven. For this the contractor shall, as part of their proposal, submit an Installation & Commissioning Certificate proving that from the same manufacturer of Radio System being proposed, at least one similar multisite (> 20 Base Stations) TETRA system (along with Central Infrastructure) has been commissioned for any Customer anywhere in the world over last 5 years. The commissioned system should have necessarily included Remote Base Stations, Central Switch and Dispatchers. The system must have given a trouble free satisfactory service for at least one year after commissioning. The certificate to this effect shall be issued by a Competent Authority within the Customer's Organization and submitted by him on his Official Company Stationery. Address for Correspondence, telephone, fax and email contact details must be provided for future communication, if so required. Certification from any other Individual/ Organization will not be entertained.

7.6 In order to enable the Employer to assess the authenticity of the above, the Bidder shall provide relevant and necessary documentary evidence in relation to previous similar contracts executed by the Bidder e.g. copies of the purchase order and its completion certificates, proof of certification from users towards satisfactory performance of sets, etc. Employer reserves the right to verify, at its discretion, the correctness of documentary evidence furnished by the Bidder, and successful operation and performance of qualifying projects of the Bidder.

7.7 Employer further reserves the right to verify the successful operation and performance of qualifying projects and Bidder shall arrange permission for visit by Employer/ Employer's Representative to those project sites.

7.8 In case the Bidder fails to submit all the relevant documentary evidences, its Bid is liable for rejection.

7.9 "Similar Contract" means Bidder has successfully completed a contract involving supply, installation, testing, system integration and commissioning of Digital Radio Trunking (TETRA) System.

Article – 8: SERVICE

8.1 Bidder shall be responsible for Operation & Maintenance of the **"System"** and services associated with this **"System".** The Bidder shall ensure that:

- The **"System"** including all hardware and software is available for operations during the defined period.
- Sufficient spares to ensure the efficient O & M of the **"System"** are available**.**
- The batteries are replaced by the vendor during the period of contract without any additional charges to GNCTD, to ensure trouble free services.

Article – 9: PRICE

9.1 Bidder shall quote the prices in the format specified in form of Sec.-5. The deviation in format shall be deemed as non-compliance. The prices shall be in terms of monthly rentals for the specified period. The prices shall be firm and shall be inclusive of all taxes, duties, cess, levies and license fees except Service Tax as applicable in NCT of Delhi. The Bidder shall not quote the Prices with any condition. In the event of a Bidder choosing to do so, its bid is liable to be rejected.

Article – 10: PAYMENT

10.1 Payment shall be made to the Contractor on the basis of monthly rental for Radio Terminals at the end of each quarter (3 months) of the year. The monthly rental shall come into effect after system has been accepted by the Employer. Number of terminals may vary during the pendency of the Project as per the GNCTD requirements.

10.2 The Contractor's request for payment shall be made by invoices along with following supporting documents:

- Performance statistics
- Log of network parameters along with Uptime and Downtime percentage.
- Any other document necessary in support of the service performance acceptable to GNCTD

10.3 The Contractor shall furnish copies of all tax payment receipts to GNCTD.

10.4 The detailed invoicing and payment procedures are outlined in Schedule – V and Schedule – VI of Annexure 3.1 to this Section and these shall be affected accordingly.

Article – 11: SERVICE LEVEL AGREEMENT (SLA)

11.1 Bidder shall ensure 99.95% availability of the network in accordance with performance requirements detailed in TS. The Availability of the network will be calculated on a Quarterly basis. The availability and associated penalties for the period when the Games are On shall be governed by Clause No. 11.2 given below.

11.1.1 The Uptime/Downtime calculations would be automated. The required software to calculate the Uptime/Downtime statistics shall be placed in operation by the Contractor, after approval by the Employer.

11.1.2 The following penalties will be imposed if the network availability falls below 99.95%:

S. No.	Network Availability (Uptime)	Penalty
1	99% ≤ Uptime < 99.95%	For every 0.01% of downtime lower than 99.95%, a penalty of 0.1% of current quarter's amount payable under the agreement shall be levied as penalty on the contractor for the quarter, subject to maximum of 10% of current quarters amount payable under agreement.
3	97% ≤ Uptime < 99%	A penalty of 20% of current quarter's amount payable under Agreement.
4	95% ≤ Uptime < 97%	A penalty of 30% of current quarter's amount payable under Agreement.
5	Below 95%	A penalty of 40% of current quarter's amount payable under Agreement. In the event the uptime is equal to or more than 90% but less than 95% for two (2) or more consecutive quarters, GNCTD shall have the right to terminate the Agreement.

11.1.3 The uptime / downtime calculations should be provided by the Contractor (Service Provider) to GNCTD within 15 days of the expiry of each quarter. The same will be verified by GNCTD and penalties, as applicable, will be imposed.

11.1.4 The Contractor shall have to pay the penalty to the GNCTD within 15 days of its imposition, failing which other remedies including legal actions may be initiated.

11.2 The Contractor shall also ensure the following:

Uninterrupted operation during opening and closing ceremonies and other periods of the Games. The availability of the network shall be 99.99% during this period. The penalty in the event of breach of this clause shall be 10% of current quarter's amount payable under the contract.

11.3 The contractor shall further ensure the following:-

a. Any Base Station shall not be down by more than 5 minutes at a stretch during Games at Games Venues and Village.

b. Not more than 10% of the total radio units should be down at any particular time.

c. The faulty radio units should be repaired / replaced within a period of 10 minutes during the period the Games are on and 4 hours (including travel time) during other periods.

In the event of above-mentioned failures in Cl. No. 11.3, suitable action may be initiated by GNCTD.

11.4 The Contractor shall keep provision of Scheduled generation of Reports detailing Uptime, Downtime of RF Network as well as for Complete Network (including all peripheral devices such as but not limited to Microwave, Optical Transmission equipments, Power Supply etc.), Service Degradation instance, BTS-wise Performance Statistics, etc. All such reports shall be automatic and shall be Date and Time Stamped.

11.5 Contractor shall provide the daily Traffic Statistics report indicating successful calls, Unsuccessful Calls (including but not limited to call lost during setup time, Dropped Calls, calls lost due to congestion in transmission/gateways, missed calls etc.) with details and reasons of failure, Transmission resource loading, BTS wise load distribution, identification of peak loading and Peak hours both on BTS and System Level.

Article – 12: License Responsibility

12.1 The Contractor shall be responsible for obtaining license and payment of all associated fee/ charges for operating the Service under this Project.

12.2 The Bidder shall have to obtain a Certificate from Department of Telecommunications (DOT)/ Wireless Planning Commission (WPC)/ Govt. of India, certifying that he meets the eligibility criteria for grant of license operating the Service on commercial basis. The license from DOT is granted to a company in which the holding from an Indian Citizen/Company is at least 51%. In case the Bidder already possesses such a License, a copy of the same must be attached in the Bid.

Article – 13: Draft Master Service Agreement

13.1 The contract between the Employer and the Contractor shall be governed by the Master Service Agreement (MSA), a draft of which is enclosed at Annexure-3.1 to this Section.

Annexure – 3.1

Draft Master Service Agreement

THIS AGREEMENT is made at Delhi on this day of [ ], ……., by and between The President of India through the Secretary, Department of Information Technology, Government of National Capital Territory of Delhi, having its office at 9th Floor, B Wing, Delhi Secretariat, ITO, New Delhi-110 113, hereinafter referred to as **"Director, CWG 2010 TETRA Project"** (which expression unless excluded by or repugnant to the subject or context shall mean and include its Representative, successors-in office and assigns) of the FIRST PART;

AND

_____ _____company registered under the _____(Name of the company act) having its registered office at …… through (hereinafter referred to as **"Contractor")** (which term or expression unless excluded by or repugnant to the subject or context shall mean and include its representatives, successors and permitted assignees) of the SECOND PART.

(Each individually referred to as a "Party" hereto and collectively referred to as the "Parties")

WHEREAS

A. Government of National Capital Territory of Delhi, (herein after referred to as GNCTD) intends to procure the Services for Secured Communications Network (TETRA) (hereinafter called the "Network") for Commonwealth Games (CWG) 2010 on **WET LEASE** basis. The said work shall hereinafter shall be referred to as **"Project".**

B. The GNCTD undertook selection of a suitable Contractor through competitive bidding and issued a Request for Proposal (RFP) dated [.../.../2009];

C. The Contractor is interested in providing the desired Services and submitted his Bid. His bid having been found suitable for the Project has been selected as the successful Bidder to execute the project.

NOW THEREFORE, IN VIEW OF THE MUTUAL PROMISES AND CONSIDERATION SET OUT HEREIN, the Parties have agreed as follows:

Article 1 – Definitions and Interpretation – In this Agreement, unless the context requires otherwise:

i. **Agreement** means this Agreement with all Sections of the RFP and amendment/corrigendum/clarification issued by GNCTD. In the event of a conflict between various documents, the terms of the Agreement shall prevail;

ii. **Software** means all software designed, developed, tested and deployed by the Contractor for the purposes of rendering the services to the stakeholders and includes all model, source code, object code, test

scripts along with associated documentation, involved in the development and implementation of the Project and the improvements effected during the term of the project, proprietary software components and tools deployed by the Contractor and which shall be solely owned by the Director, CWG 2010 TETRA Project;

iii. **Confidential Information** means all information, available or developed, including CWG 2010 TETRA project data (whether in written, oral, electronic or other format) which relates to the technical, financial and business, customers, suppliers, products, developments, operations, processes, data, trade secrets, design rights, know-how and personnel of each party and its affiliates which is disclosed to or otherwise learned by the other Party (whether a Party to this Agreement or to the SLA) in the course of or in connection with this agreement (including without limitation such information received during negotiations, location visits and meetings in connection with this Agreement or to the SLA);

iv. **CWG 2010 TETRA Project** means Secured Communications Network (TETRA) for Common Wealth Games (CWG) 2010;

v. **CWG 2010 TETRA Project Data** means all proprietary data of CWG 2010 TETRA Project or its nominated agencies generated out of CWG 2010 TETRA Project operations and transactions, documents and related information including but not restricted to user data which the Contractor obtains, possesses or processes in the context of providing Services to the users pursuant to this Agreement and the SLA;

vi. **Deliverables** means the products, infrastructure and services agreed to be delivered by the Contractor in pursuance of the agreement as elaborated in Volume I of the RFP in relation to the Implementation Phase and the Operations and Maintenance Phase and includes all documents related to the Project, user manual, technical manual, design, process and operating manuals, service mechanisms, policies and guidelines and source code and all its modifications;

vii. **Director CWG 2010 TETRA Project** means the Secretary, Department of Information Technology, Government of National Capital Territory of Delhi, having its office at 9th Floor, B Wing, Delhi Secretariat, ITO, New Delhi-110 113.

viii. **Departments** means various Departments of GNCTD and Govt. of India who are the stakeholders in this Project, as named in Annexure 8.3 of RFP.

ix. **Effective Date** means the date on which this Agreement is executed.

x. **Intellectual Property Rights** means and includes designs copyrights, trademarks, patents, trade secrets and all other rights in the Software, its improvement, up-gradation, modified versions that may be made from time to time, files created, database generated and compilations made.

xi. **Project Implementation** means Project Implementation schedule as per RFP for this Project;

xii. **Project Implementation Completion Date** means the date on which the acceptance testing of the project has been successfully completed on all sites as per the RFP for Phase I of the project;

xiii. **Proprietary Information** means processes, methodologies and technical and business information, including drawings, designs, formulae, flow charts, data and computer programs already owned by, or granted by third parties to a party hereto prior to its being made available under this Agreement the SLA;

xiv. **Representative** shall mean any person/agency authorized by GNCTD. This includes M/s Telecommunications Consultants India Limited (TCIL), New Delhi, who are Project Management Consultants (PMC) for this Project.

xv. **RFP or Request for Proposal** means the documents containing the Technical, Functional, Commercial and Operational Specifications for the implementation of the CWG 2010 TETRA Project and includes the amendment/corrigendum/clarification issued from time to time;

xvi. **Replacement Contractor** means any third party that the Director of CWG 2010 TETRA Project may appoint to replace the Contractor upon termination of this Agreement or the SLA to undertake the Services or part thereof;

xvii. **Services** means the services delivered to the stakeholders using the tangible and intangible assets created, procured, installed, commissioned, managed and operated by the Contractor including the tools of information and communications technology and includes but is not limited to the services specified in the RFP;

xviii. **Stakeholders** mean the specified Departments of GNCTD and Govt. of India.

xix. **Third Party Systems** means Systems (or any part thereof) in which the Intellectual Property Rights are owned by a third party and to which Contractor has been granted a license to use and which are used in the provision of Services;

xx. a. References to any statute or statutory provision include a reference to that statute or statutory provision as from time to time amended, extended, re-enacted or consolidated and to all statutory instruments made pursuant to it.

b. Unless otherwise expressly stated, the words “herein”, “hereof”, “hereunder” and similar words refer to this Agreement as a whole and not to any particular Article, Schedule. The term Articles, refers to Articles of this Agreement. The words “include” and “including” shall not be construed as terms of limitation. The words “writing” and “written” mean “in documented form”, whether electronic or hard copy, unless otherwise stated.

Article 2- Network

2.1 Development of the Network - The Contractor shall develop a Network capable of providing the following Services to the stakeholders:

i. Provide instant and secure voice and data communication between the Radio terminals, and also between Radios and Controllers. Provide Automatic Vehicle Location System and Automatic Person Location System in NCT of Delhi
ii. Provide integration with existing legacy telephone, analog VHF, GSM/ CDMA, TETRA networks in NCT of Delhi
iii. Survey, design, delivery, installation , commissioning, O&M and running the Service of the CWG 2010 TETRA Project
iv. Providing the Service after Acceptance Testing of the Network, during the Games and afterwards upto the Service Period
v. Development of VPNs amongst various stakeholders
vi. Development of Applications through APIs in consultation with various stakeholders
vii. Make best and sincere efforts to augment the subscriber base of the Radio Network
viii. The above-mentioned Services are not exhaustive and the same in totality shall be as per the provisions of RFP.
ix. The Services shall be performed in accordance with the design, functional and overall technical, commercial and SLA requirements of the RFP.

2.2 **Services -**

a. The Network shall be capable of initially providing all the services specified in the RFP.

b. The Network shall also be capable of providing additional services as specified in TS of RFP and ordered by the Director, CWG 2010 TETRA Project from time to time. For providing additional services as may be specified by the Director, CWG 2010 TETRA Project, the Contractor shall develop the Network within 15 days.

2.3 **Up-gradation**

(a) The Contractor shall be responsible for subsequent and time to time up-gradation of the Network as may be considered appropriate or necessary considering the technological and other developments and advances in this field.

(b) The Director, CWG 2010 TETRA Project may direct the Contractor to carry out such up-gradation and the period during which such up-gradation may be carried out, if the Director, CWG 2010 TETRA Project is of the opinion that such up-gradation is desirable or necessary considering the scientific advances, technological developments or need based requirements.

2.4 **Maintenance**

The Contractor shall be solely and exclusively responsible for ensuring that the Network provides the contracted services effectively and efficiently to all those

who access it during the entire period of contract to the entire satisfaction of the Director, CWG 2010 TETRA Project.

2.5 **Development Period** – The Contractor shall develop and make operational the Network to the entire satisfaction of the Director, CWG 2010 TETRA Project or his Representative within the specified period.

2.6 **Damages** – It is agreed between the Director, CWG 2010 TETRA Project and the Contractor that the amount of damages are pre-determined, pre-estimated and pre-agreed loss which will be suffered by the Director, CWG 2010 TETRA Project due to the delay in the performance of contract by the Contractor. The damages shall be applicable as mentioned in Service Level Agreement (SLA) and Liquidated Damages and the specified penalties provided in the RFP.

2.7 **Ownership** – The ownership of the Network so developed by the Contractor including all software, hardware, components, drawings, designs, formulae, flow charts, data and computer programs and other products used and developed therein shall vest with the Contractor for all purposes.

2.8 **Extensions** – The time limits set out in this Article for performance of various services may be extended in its sole discretion by the Director, CWG 2010 TETRA Project if he is satisfied that valid and sufficient reasons exist for such extension. No such extension shall exceed more than 15 days at a time in the case of development of the CWG 2010 TETRA Network.

2.9 **Payment for Network**- The Payment to the Contractor shall be as per provisions of Section – 3 of the RFP and Schedule VI of this Agreement.

ARTICLE 3 – FINANCIAL TERMS

3.1 **Payments**

a) Payment for quarterly rental by the Departments/ stakeholders shall be based on the Gross Receipts from Radio rental fees as indicated in RFP and quoted by the Contractor.

b) Except as otherwise provided for herein or as agreed between the Parties in writing, the Departments shall not be required to make any payments in respect of the Services other than those covered by the terms of payment as stated in the Terms of Payment Schedule.

ARTICLE 4 – COMMENCEMENT & SERVICE PERIOD

4.1

a) **Commencement and Duration of this Agreement** – This Agreement shall come into effect from the date of Signing of this Agreement (hereinafter called the "Effective Date") and shall continue till the completion of the Service Period to the satisfaction of the Director, CWG 2010 TETRA Project.

b) During this period, the Contractor shall take all reasonable and proper care of the entire hardware and software, network or any other information technology infrastructure components used for the project and other facilities leased / owned by the Contractor exclusively in terms of the delivery of the Services as per this Agreement (hereinafter the "Assets") in proportion to their use and

control of such Assets which will include all upgradation/ enhancements and improvements to meet the current needs of the project.

ARTICLE 5 – CONDITIONS PRECEDENT

5.1 Conditions Precedent

a) Subject to express terms to the contrary, the rights and obligations under this Agreement shall take effect only upon fulfillment by the Contractor of all the Conditions Precedent set out below. These conditions precedent have to be fulfilled within 15 days from the "Effective date". The Director, CWG 2010 TETRA Project, may at any time in its sole discretion waive fully or partially any of the Conditions Precedent for the Contractor.

b) Provide Performance Security to the Director, CWG 2010 TETRA Project.

c) Provide the Director, CWG 2010 TETRA project certified true copies of its constitutional documents and board resolutions authorizing the execution, delivery and performance of this Agreement;

d) Provide the Director, CWG 2010 TETRA Project certified true copies of the consortium's inter-se or back-to-back agreement, if applicable; and

e) Shall have completed/ achieved the acceptance testing and certification and commissioning, of the CWG 2010 TETRA Project at Delhi as per requirements of this RFP and providing the services to the stakeholders in conformity to this Agreement, successfully and to the satisfaction of the Director of CWG 2010 TETRA Project as stated in Governance Schedule.

5.2 Non-fulfillment of Conditions Precedent

a) In the event that any of the Conditions Precedent has not been fulfilled by the Contractor and the same has not been waived by the Director, CWG 2010 TETRA Project fully or partially, this Agreement shall cease to have any effect as of that date.

b) In the event that the Agreement fails to come into effect on account of non-fulfillment of the Contractor's Conditions Precedent, the Director of CWG 2010 TETRA Project shall not be liable in any manner whatsoever to the Contractor.

c) In the event that vacant possession of any of the CWG 2010 TETRA Project facilities and/or CWG 2010 TETRA Project data has been delivered to the Contractor prior to the fulfillment in full of the Conditions Precedent, upon the termination of this Agreement such shall immediately revert to the Director, CWG 2010 TETRA project, free and clear from any encumbrances or claims.

d) Instead of terminating this Agreement as provided herein, the Parties may extend the time for fulfilling the Conditions Precedent and the Term of this Agreement by mutual agreement. It is clarified that any extension of time shall be subject to imposition of penalties on the Contractor linked to the delay in fulfilling the Conditions Precedent.

ARTICLE 6 – DISCREPANCIES

6.1 Discrepancies – The RFP shall form part of this Agreement. In the case of any discrepancy, contradiction or ambiguity, the interpretation of the Director, CWG 2010 TETRA Project shall be final and binding on the Contractor.

ARTICLE 7 – OTHER OBLIGATIONS

7.1 Approvals and Required Consents-

a) The Parties shall cooperate to procure, maintain and observe all relevant and customary regulatory and governmental licenses, clearances and applicable approvals (hereinafter the "Approvals") necessary for the Contractor to provide the Services. The costs of such Approvals shall be borne by the Contractor.

b) Both parties will give each other all co-operation and information reasonably required to meet their respective obligations under this Agreement.

c) The Director, CWG 2010 TETRA Project shall use reasonable endeavors to assist the Contractor to obtain the Required Consents. In the event that any Required Consent is not obtained, the Contractor and the Director, CWG 2010 TETRA Project will co-operate with each other in achieving a reasonable alternative arrangement as soon as reasonably practicable for the Director, CWG 2010 TETRA Project to continue to process its work with as minimal interruption to its business operations as is commercially reasonable until such Required Consent is obtained, provided that the Contractor shall not be relieved of its obligations to provide the Services and to achieve the Service Levels until the Required Consents are obtained if and to the extent that the Contractor's obligations are dependent upon such Required Consents.

d) During the duration of the project, the Contractor shall not employ any personnel of the Department of Information Technology, GNCTD and its Representative.

7.2 Taxes and duties

a) All Taxes, duties, levies, cess and license fees etc. except Service Tax, as applicable in NCT of Delhi, shall be borne by the Contractor.

b) The Director, CWG 2010 TETRA Project/ The Departments shall be entitled for withholding taxes, from the amounts due and payable to the Contractor wherever applicable.

c) In the event of any increase or decrease of the rate of taxes due to any statutory notification/s during the Term of the Agreement the consequential effect shall be to the account of the Contractor.

d) The parties shall cooperate to enable each Party to accurately determine its own tax liability and to minimize such liability to the extent legally permissible. In connection therewith, the Parties shall provide each other with all relevant information requested by the other Party, provided the same is reasonable.

7.3 Security and Safety

a) The Contractor will comply with the directions issued from time to time by the Director, CWG 2010 project and the standards related to the security and safety as stated in the RFP, in so far as it applies to the provision of the Services.

b) Each Party shall also comply with CWG 2010 TETRA Project's information technology security and standards policies in force from time to time at each location.

c) The Parties shall use reasonable endeavors to report forthwith in writing to each other all identified attempts (whether successful or not) by unauthorized persons (including unauthorized persons who are employees of any Party) either to gain access to or interfere with the CWG 2010 TETRA Project's data, facilities or Confidential Information.

d) The Parties shall promptly report to each other any act or omission which they are aware that could have an adverse effect on the proper conduct of safety and information technology security at CWG 2010 TETRA Project facilities.

7.4 Force Majeure

a) Neither Party to this Agreement or to the SLA shall be liable to the other for any loss or damage which may be suffered by the other due (directly) to the extent and for the duration of any cause beyond the reasonable control of the Party unable to perform ("Force Majeure") events such as but not limited to acts of God not confined to the premises of the Party claiming the Force Majeure, strike, lock-outs beyond its control, labour disturbance not caused at the instance of the Party claiming Force Majeure, acts of government or other competent authority, war, terrorist activities, military operations, riots, epidemics, civil commotions etc. No failure, delay or other default of any contractor to either Party shall entitle such Party to claim Force Majeure under this Article.

b) The Party seeking to rely on Force Majeure shall promptly, within 7 days, notify the other Party of the occurrence of a Force Majeure event as a condition precedent to the availability of this defense with particulars detail in writing to the other Party and shall demonstrate that it has and is taking all reasonable measures to mitigate the events of Force Majeure.

c) In the event the Force Majeure substantially prevents, hinders or delays the Contractor's performance of Services necessary for the operation of CWG 2010 TETRA Project's critical business functions for a period in excess of 5 days, Director, CWG 2010 TETRA Project may declare that an emergency exists.

d) When the events leading to Force Majeure no longer exist, Director CWG 2010 TETRA Project will issue a notice to the Contractor to resume normal services at all affected sites and for all operations within a period of 7 days. In the event that the Contractor is not able to resume services within the said period or such extended period as may be fixed by Director, CWG 2010 TETRA Project may terminate the Agreement and/or obtain substitute performance from an alternate supplier. If there is any further delay despite the extended period,

Director, CWG 2010 TETRA project will have the option to invoke the Performance Guarantee.

e) All payments pursuant to termination due to Force Majeure event shall be in accordance with the Terms of Payment Schedule.

Article 8 – Breach, Rectification and Termination

8.1 Termination

a) In the event that either Party believes that the other is in breach of its Obligations under this Agreement, such aggrieved Party may terminate this Agreement after giving valid notice to the other Party. Any notice served pursuant to this Article shall give reasonable details of the breach. The events of breach may include but not limited to the following:

i. If the Network fails to function to the satisfaction of the Director, Network for a period of one week, the Director, CWG 2010 TETRA Project, will serve a notice for curing this breach within 2 days. In case the breach continues after the notice period, the Director, CWG 2010 TETRA Project may terminate this Agreement.

ii. If there is a default in providing satisfactory services to the stakeholders (Govt. Departments) by the Contractor as per this Agreement, continuously for more than one week, the Director, CWG 2010 TETRA Project, will serve a notice for curing this breach within 2 days. In case the material breach continues after the notice period, the Director, CWG 2010 TETRA Project may terminate this Agreement.

iii. Time is of the essence of the contract. If there is a delay, for reasons attributable to the Contractor, of more than two months in the Project implementation by the Contractor; Director, CWG 2010 TETRA Project may terminate this Agreement after affording a reasonable opportunity to the Contractor to explain the circumstances leading to such a delay. Further, Director, CWG 2010 TETRA Project may also invoke the Performance Guarantee of the Contractor.

iv. If there is a delay by the Director, CWG 2010 TETRA Project in handing over the locations in time, not providing support for integration of CWG 2010 TETRA system with the Communication systems of the participating departments and agencies of GNCTD, or not providing the certification of the Implementation Phase, then the Contractor may give a two months notice for curing the breach. In the event the Breach continues, the Contractor may have the option to terminate the Agreement. On such termination, the Director, CWG 2010 TETRA Project shall not be liable for any financial consequences.

a) Where a change of management of the Contractor has occurred whereby the Contractor's company has merged, amalgamated or been taken over, due to which the majority shareholding of the Contractor has been transferred to another entity, Director CWG 2010 TETRA Project can by a 6 months written notice, terminate this Agreement and such notice shall become effective at the end of the notice period.

b) When this Agreement is terminated, the Contractor shall be liable to compensate the Director, CWG 2010 TETRA Project for all the losses and damages suffered or are likely to be suffered due to the wrongful action of the Contractor, in accordance with provisions of RFP

8.2 Data Protection

a) In the course of providing the Services the Contractor may be compiling, processing and storing proprietary CWG 2010 TETRA Project data relating to the users.

b) The Contractor is required to perform or adhere to security measures concerning the CWG 2010 project Data which were in place

i. as of the Effective Date; and
ii. those made available to it in writing from time to time

c) The Contractor shall not transfer any CWG 2010 TETRA Project data to others persons unless otherwise authorized by Director, CWG 2010 TETRA Project in this regard.

ARTICLE–9- INTELLECTUAL PROPERTY

9.1 Intellectual Property

a) Except to the extent otherwise expressly provided in this Agreement, Director, CWG 2010 project shall retain exclusive intellectual property rights to all the data, forms, compilations & other work products of the CWG 2010 TETRA Project and nothing herein shall or will be construed or deemed to grant to the Contractor any right, title, license, sub-license, proprietary right or other claim against or interest in, to or under (whether by estoppel, by implication or otherwise) to the aforesaid right.

b) Nothing contained in this Agreement shall or will be construed or deemed to grant to the Contractor any right, title, license or other interest in, to or under (whether by estoppel, by implication or otherwise) any logo, trademark, trade name, service mark or similar designations of CWG 2010 TETRA Project

c) Contractor shall not use the CWG 2010 TETRA Project data to provide services for the benefit of any third party, as a service bureau

d) Contractor shall indemnify, defend and hold harmless CWG 2010 TETRA Project and their respective officers, employees, successors and assigns, from and against any and all losses arising from claims by third parties that any deliverable (or the access, use or other rights thereto) created by Contractor pursuant to this Agreement, or any equipment, software, information, methods of operation or other intellectual property (or the access, use or other rights thereto) provided by Contractor pursuant to this Agreement, infringes a copyright, patent or constitutes misappropriation or unlawful disclosure or use of another Party's trade secret under the laws of the India (collectively“, "Infringement Claims"

e) Director, CWG 2010 TETRA Project shall have no liability or obligation to

Contractor or any other Party to the extent the Infringement Claim is based upon any use of the equipment, software, information, methods of operation or other intellectual property (or the access, use or other rights thereto) for the benefit of any Party (including any use by Contractor or its nominees outside the scope of the Services) other than for CWG 2010 TETRA Project

f) All the rights, title and interests in and to, and ownership in, Proprietary Information of Contractor, which is provided to Director, CWG 2010 TETRA Project, and all modifications, enhancements and other derivative works of such Contractor Proprietary Information“ ("Contractor Proprietary Information"), shall remain solely with Director, CWG 2010 TETRA Project/Contractor. The Contractor will upon the award of the Project in its favor, declare the status of all the Contractor Proprietary Information along with documentary support sufficient to establish its sole legal rights in the aforesaid Proprietary Information to Director, CWG 2010 TETRA Project. This Proprietary Information shall refer to that which has been owned by the Contractor prior to commencement of this Agreement. However, any software that may be acquired from third parties during the term of this Agreement and that which may be developed by the Contractor during the course of the Agreement specifically for CWG 2010 TETRA Project shall not be considered as Contractor Proprietary Information by the CWG 2010 TETRA Project. Director, CWG 2010 TETRA Project shall be entitled to use the Contractor Proprietary Information only in connection with the Services or to the extent necessary for CWG 2010 TETRA Project's normal operational, repair and maintenance purposes related to the Services. To the extent that the Contractor Proprietary Information is incorporated within the Deliverables, Contractor and its employees engaged hereby grant to Director, CWG 2010 TETRA Project a worldwide, perpetual, irrevocable, transferable, paid-up right and license to use, copy, modify (or have modified), transport to CWG 2010 TETRA Project facilities, and prepare from them, use and copy derivative works for the benefit of and internal use of CWG 2010 TETRA Project such Contractor Proprietary Information. Director, CWG 2010 TETRA Project's rights pursuant to the preceding sentence include the right to disclose such Contractor Proprietary Information to third party contractors solely for use on CWG 2010 TETRA Project provided that all such third party contractors execute, deliver and comply with any customary confidentiality and nondisclosure agreements reasonably required by Director, CWG 2010 TETRA Project.

g) Upon the expiration or any termination of this Agreement (and also in respect of the SLA), Contractor shall undertake the actions set forth below in this Article to assist Director of CWG 2010 TETRA Project to procure replacement services equivalent to Services provided herein

   i. Further the Contractor undertakes to negotiate in good faith with Director CWG 2010 TETRA Project and any relevant Replacement Contractor in respect of commercial terms applying to all Contractor Intellectual Property Rights and which Director of CWG 2010 TETRA Project and any relevant Replacement Contractor require to enable them to provide or receive services substantially equivalent to the Services hereunder.

   ii. In respect of Third Party Intellectual Property Rights, Contractor undertakes to assist Director CWG 2010 TETRA Project to secure such consents or licenses from such third parties as are necessary to enable Director CWG 2010 TETRA Project to receive services substantially equivalent to the

Services hereunder. The obligations of the Contractor under this Article shall be considered part of the services performed by the Contractor under the Exit Management Services

9.2 Confidentiality

a) The Contractor recognizes that during the term of this Agreement sensitive data will be procured and made available to it, its agents and others working for or under the Contractor. Disclosure or usage of the data by any such recipient may cause harm not only to the stakeholders whose data is used but also to all others. The function of Director, CWG 2010 TETRA Project requires the Contractor, its agents to demonstrate utmost care, sensitivity and strict confidentiality. Any breach of this Article will result in Director, CWG 2010 TETRA Project and its nominees receiving a right to seek injunctive relief and damages without any limit, from the Contractor.

b) Each Party agrees as to any Confidential Information disclosed by a Party to this Agreement (the "Discloser") to the other Party (the "Recipient"):

(i) to take such steps necessary to protect the Discloser's Confidential Information from unauthorized use, reproduction and disclosure as the Recipient takes in relation to its own Confidential Information of the same type, but in no event less than reasonable care; and

(ii) to use such Confidential Information only for the purposes of this Agreement or as otherwise expressly permitted or expressly required by this Agreement or as otherwise permitted by the Discloser in writing; and

(iii) not, without the Discloser's prior written consent, to copy the Confidential Information or cause or allow it to be copied, directly or indirectly, in whole or in part, except as otherwise expressly provided in this Agreement, or as required in connection with Recipient's use as permitted under this Article, or as needed for the purposes of this Agreement, provided that any proprietary legends and notices (whether of the Discloser or of a Third Party) are not removed or obscured; and

(iv) not, without the Discloser's prior written consent, to disclose, transfer, publish or communicate the Confidential Information in any manner to any person except as permitted under this Agreement.

c) The restrictions of this Article shall not apply to Confidential Information that:

(i) is or becomes generally available to the public through no breach of this Article by the Recipient; and
(ii) was in the Recipient's possession free of any obligation of confidence prior to the time of receipt of it by the Recipient hereunder; and
(iii) is developed by the Recipient independently of any of Discloser's Confidential Information; and
(iv) is rightfully obtained by the Recipient from third parties authorized at that time to make such disclosure without restriction; and
(v) is identified in writing by the Discloser as no longer proprietary or confidential; or
(vi) is required to be disclosed by law, regulation or Court Order, provided

that the Recipient gives prompt written notice to the Discloser of such legal and regulatory requirement to disclose so as to allow the Discloser reasonable opportunity to contest such disclosure.

d) The provisions of this Article shall survive the expiration or any earlier termination of this Agreement.

e) Subject as otherwise expressly provided in this Agreement all Confidential Information in tangible or electronic form under the control of the Recipient shall either be destroyed, erased or returned to the Discloser promptly upon the earlier of:

(i) The written request of the Discloser, or,
(ii) Termination or expiry of this Agreement Notwithstanding the forgoing, both Parties may retain, subject to the terms of this Article, a reasonable number of copies of the other Party's Confidential Information solely for confirmation of compliance with the confidentiality obligations of this Agreement.

f) Neither Party is restricted by the provisions of this Article from using (including using to provide products or perform services on behalf of third parties) any ideas, concepts, knowhow and techniques that are related to the Recipient's business activities and which are retained in unaided memories of the Recipient's employees or agents (and not intentionally memorized for the purpose of later recording or use) (collectively, the "Residuals"). This Article shall not permit the disclosure or use by either Party of any financial (including business plans), statistical, product, personnel or customer data of the other Party. Each Party agrees not to disclose the source of the Residuals.

g) Both Parties agree that monetary damages would not be a sufficient remedy for any breach of this Article by the other Party and that Director, CWG 2010 TETRA Project and Contractor, as appropriate, shall be entitled to equitable relief, including injunction and specific performance as a remedy for any such breach. Such remedies shall not be deemed to be the exclusive remedies for a breach by a Party of this Article, but shall be in addition to all other remedies available at law or equity to the damaged Party.

h) In connection with the Services, Contractor may from time to time undertake one or more quality assessment reviews for the purpose of improving CWG 2010 TETRA Project. In order for such reviews to be frank and candid, for the greatest benefit to both Director of CWG 2010 TETRA Project and Contractor, they shall be kept confidential to the greatest extent possible. However, the Parties agree that in the event of default by the Contractor in meeting the commitments under this project, any documentation created in connection with such quality assessment reviews can be used in any arbitration or legal proceedings against Contractor related to this Agreement or the Services.

9.3 Personnel

a) Personnel assigned by Contractor to perform the services shall be employees of Contractor, and under no circumstances will such personnel be considered employees of CWG 2010 TETRA Project. Contractor shall have the sole responsibility for supervision and control of its personnel and for payment of such

personnel's entire compensation, including salary, withholding of income taxes and social security taxes, worker's compensation, employee and disability benefits and the like and shall be responsible for all employer obligations under all applicable laws.

b) Contractor shall use its best efforts to ensure that sufficient number of personnel is employed to perform the services, and those personnel have appropriate qualifications to perform the services. Director, CWG 2010 TETRA Project shall have the right to require the removal or replacement of any Contractor personnel performing work under this Agreement. In the event that Director, CWG 2010 TETRA Project requests that any Contractor personnel be replaced, the substitution of such personnel shall be accomplished pursuant to a mutually agreed upon schedule but not later than 7 working days.

c) The Contractor shall also be responsible to train certain employees of CWG 2010 TETRA Project in accordance with provisions of the RFP with regard to the Services being provided by the Contractor as and when required by CWG 2010 TETRA Project during the Term of this Project. The parameters of the training shall be communicated by Director, CWG 2010 TETRA Project to the Contractor periodically and shall be in accordance with the latest procedures and processes available in the relevant areas of work.

d) In the event Director, CWG 2010 TETRA Project identifies any personnel of Contractor as "Key Personnel", then the Contractor shall not remove such personnel without the prior written consent of Director, CWG 2010 TETRA Project.

e) Except as stated in this Article, nothing in this Agreement will limit the ability of the Contractor to freely assign or reassign its employees; provided that Contractor shall be responsible, at its expense, for transferring all appropriate knowledge from personnel being replaced to their replacements. Director, CWG 2010 TETRA Project shall have the right to review and approve Contractor's plan for any such knowledge transfer. Contractor shall maintain the same standards for skills and professionalism among replacement personnel as in personnel being replaced.

9.4 Independent Contractor

9.4.1 Nothing in this Agreement or the SLA shall be construed as establishing or implying any partnership or joint venture between the Parties to this Agreement. Except as expressly stated in this Agreement nothing in this Agreement shall be deemed to constitute any Parties as the agent of any other Party or authorizes either Party

(i) to incur any expenses on behalf of the other Party,
(ii) to enter into any engagement or make any representation or warranty on behalf of the other Party,
(iii) to pledge the credit of or otherwise bind or oblige the other Party, or
(iv) to commit the other Party in any way whatsoever without in each case obtaining the other Party's prior written consent.

9.5 Sub Contractors

9.5.1 Contractor shall be allowed to subcontract any work related to the CWG 2010

TETRA Project under the provisions of RFP. It is clarified that the Contractor shall be the principal employer for all claims arising from the liabilities statutory or otherwise, concerning the subcontractors. The Director, CWG 2010 TETRA Project shall not be liable in any respect whatsoever. The Contractor undertakes to indemnify Director, CWG 2010 TETRA Project or its nominated agencies from any claims on the grounds stated hereinabove.

9.6 Assignment

9.6.1 All terms and provisions of this Agreement shall be binding on and shall inure to the benefit of Director, CWG 2010 TETRA Project, Contractor and any assignment or transfer of this Agreement or any rights hereunder by either Party shall be strictly prohibited.

9.7 Notices

a) Any notice or other document, which may be given by either Party under this Agreement, shall be given in writing in person or by pre-paid recorded delivery post.

b) In relation to a notice given under this Agreement, any such notice or other document shall be addressed to the other Party's principal or registered office address as set out below:

Secretary (IT),
Department of Information Technology,
Government of National Capital Territory of Delhi,
Delhi Secretariat, ITO, Delhi-110 113
Tel:
Fax:……
E-mail: ……

Contractor:
Tel: …….
Fax: …
E-mail: ……

c) Any notice or other document shall be deemed to have been given to the other Party (or, if relevant, its relevant associated company) when delivered (if delivered in person) if delivered between the hours of 9.30 am and 5.30 pm at the address of the other Party set forth above or on the next working day thereafter if delivered outside such hours, and 7 days from the date of posting (if by letter).

9.8 Severability and Waiver

a) If any provision of this Agreement or any part thereof, are found by any court or administrative body of competent jurisdiction to be illegal, invalid or unenforceable, the illegality, invalidity or unenforceability of such provision or part provision shall not affect the other provisions of this Agreement or the remainder of the provisions in question which shall remain in full force and effect. The relevant Parties shall negotiate in good faith in order to agree to substitute for any illegal, invalid or unenforceable provision, a valid and enforceable provision which achieves to the greatest extent possible the

economic, legal and commercial objectives of the illegal, invalid or unenforceable provision or part provision.

b) No failure to exercise or enforce and no delay in exercising or enforcing on the part of either Party to this Agreement of any right, remedy or provision of this Agreement shall operate as a waiver of such right, remedy or provision in any future application nor shall any single or partial exercise or enforcement of any right, remedy or provision preclude any other or further exercise or enforcement of such right, remedy or provision or the exercise or enforcement of any other right, remedy or provision.

9.9 Ethics

9.9.1 Contractor represents, warrants and covenants that it has given no commitments, payments, gifts, kickbacks, lavish or expensive entertainment, or other things of value to any employee or agent of CWG 2010 TETRA Project, or its nominated agencies in connection with this agreement and acknowledges that the giving of any such payment, gifts, entertainment, or other things of value is strictly in violation of CWG 2010 TETRA Project 's standard policies and may result in cancellation of this Agreement.

9.10 Survivability

9.10.1 The termination or expiry of this Agreement for any reason shall not affect or prejudice any terms of this Agreement, or the rights of the Parties under them which are either expressly or by implication intended to come into effect or continue to be in effect after such expiry or termination.

ARTICLE 10 - GOVERNING LAW AND DISPUTES

a) This Agreement shall be governed in all respects by the laws of India.

b) Any dispute or difference whatsoever arising between the parties to this Contract out of or relating to the construction, meaning, scope, operation or effect of this Contract or the validity of the breach thereof, which cannot be resolved amicably, shall be referred to an arbitrator to be appointed by Director CWG 2010 TETRA Project. The provisions of the Arbitration and Conciliation Act, 1996 including any modifications, Rules or re-enactments thereof. The Arbitration proceedings will be held at, Delhi, India.

Article 11 - AMENDMENT

The Parties acknowledge and agree that amendment to this agreement shall be made in writing in accordance with the procedure this Agreement is executed and signed.

IN WITNESS WHEREOF the Parties hereunto have by duly authorized representatives set their respective hands and seal to these present on the date mentioned above:

For and on Behalf of the President of India	For the Contractor
_____	_____
Secretary, Department of Information Technology, GNCTD	

SCHEDULE -I

CHANGE CONTROL SCHEDULE

1. CHANGE CONTROL PROCEDURE

a. This Schedule describes the procedure to be followed in the event of any proposed change to the Master Service Agreement ("MSA"), Project Implementation Phase, and Operation and Maintenance SLA. Such changes shall include, but shall not be limited to, changes in the scope of services provided by the Contractor and changes to the terms of payment as stated in the Terms of Payment Schedule.

b. Director of CWG 2010 TETRA Project and the Contractor recognize that frequent change is an inevitable part of delivering Services and that a significant element of this change can be accomplished by re-organizing processes and responsibilities without a material effect on the cost. The Contractor will endeavor, wherever reasonably practicable, to effect change without an increase in the terms of payment as stated in the Terms of Payment Schedule and Director of CWG 2010 TETRA Project will work with the Contractor to ensure that all changes are discussed and managed in a constructive manner.

c. This Change Control Schedule sets out the provisions which will apply to changes to (a) the MSA; (b) the Project Implementation; and (c) Operation and Maintenance SLA

1.1. CHANGE CONTROL NOTE ("CCN")

a. Change requests in respect of the MSA, the Project Implementation, or the Operation and Maintenance SLA will emanate from the Parties' respective Project Managers who will be responsible for obtaining approval for the change and who will act as its sponsor throughout the Change Control Process and will complete Part A of the CCN attached as Appendix A hereto. CCNs will be presented to the other Party's Project Manager who will acknowledge receipt by signature of the CCN.

b. The Contractor and Director of CWG 2010 TETRA Project, while preparing the CCN, shall consider the change in the context of the following parameter, namely whether the change is beyond the scope of Services including ancillary and concomitant services required and as detailed in the RFP and is suggested and applicable only after the testing, commissioning and certification of the Project Implementation Phase as set out in this Agreement.

c. It is hereby also clarified that the payment for the change of scope as stated will be calculated as per the estimated man-month effort quoted by the Contractor in its bid and stated in a man-month effort to be submitted by the Contractor prior to taking up the change of control event and accepted by Director of CWG 2010 TETRA Project.

1.2 QUOTATION

a. The Contractor shall assess the CCN and complete Part B of the CCN. In completing Part B of the CCN the Contractor shall provide as a minimum:

(i) a description of the change;
(ii) a list of deliverables required for implementing the change;
(iii) a timetable for implementation;
(iv) any relevant acceptance criteria;
(v) an assessment of the value of the proposed change;
(vi) material evidence to prove that the proposed change is not already covered within the scope of the project, SLA, or MSA.

b. Prior to submission of the completed CCN to Director of CWG 2010 TETRA Project, or its nominated agencies, the Contractor will undertake its own internal review of the proposal and obtain all necessary internal approvals. As a part of this internal review process, the Contractor shall consider the materiality of the proposed change in the context of the MSA, the Project Implementation, Operation and Maintenance SLA affected by the change and the total effect that may arise from implementation of the change.

c. Materiality criteria will be established by Director of CWG 2010 TETRA Project and the Contractor's Project Manager. Changes requiring no escalation of authority can be implemented. Discussion and agreement as to materiality will be held in accordance with the Governance Schedule.

1.3 Costs

1.3.1 Each Party shall be responsible for its own costs incurred in the quotation, preparation of CCNs and in the completion of its obligations described in this process provided the Contractor meets the obligations as set in the CCN. In the event the Contractor is unable to meet the obligations as defined in the CCN then the cost of getting it done by third party will be borne by the Contractor.

1.4 Reporting

1.4.1 Change requests and CCNs will be reported monthly to each Party's Project Managers who will prioritize and review progress.

1.5 Obligations

1.5.1 The Contractor shall be obliged to implement any proposed changes once approval in accordance with above-mentioned procedure has been given, with effect from the date agreed for implementation.

SCHEDULE- II

EXIT MANAGEMENT SCHEDULE

1 EXIT MANAGEMENT

1.1 PURPOSE

a. This Schedule sets out the provisions, which will apply on termination of the MSA, the Project Implementation, Operation and Maintenance SLA.

b. In the case of termination of the Project Implementation and/or Operation and Maintenance SLA due to illegality, the Parties shall agree at that time whether, and if so during what period, the provisions of this Schedule shall apply.

c. The Parties shall ensure that their respective associated entities carry out their respective obligations set out in this Exit Management Schedule.

1.2 Co-operation and Provision of Information During the Exit Management Period

a. The Contractor will allow Director of TETRA PROJECT, CWG 2010 TETRA Project access to information reasonably required to define the then current mode of operation associated with the provision of the services to enable the Director of CWG 2010 TETRA Project to assess the existing services being delivered;

b. Promptly on reasonable request by Director of CWG 2010 TETRA Project, the Contractor shall provide access to and copies of all information held or controlled by them which they have prepared or maintained in accordance with the MSA, the Project Implementation, and the Operation and Maintenance SLA relating to any material aspect of the services (whether provided by the Contractor or any associated entity). Director of CWG 2010 TETRA Project shall be entitled to copy all such information. Such information shall include details pertaining to the services rendered and other performance data. The Contractor shall permit Director of CWG 2010 TETRA project and/or any Replacement Contractor to have reasonable access to its employees and facilities as reasonably required by Director of CWG 2010 TETRA Project to understand the methods of delivery of the services employed by the Contractor and to assist appropriate knowledge transfer.

c. The Contractor shall along with Director of CWG 2010 TETRA Project ensure the transfer of knowledge of the infrastructure, services, processes, changes from the personnel of the Contractor to the personnel of Director, CWG 2010 TETRA Project or personnel/agency appointed by the Director, CWG 2010 TETRA Project. This knowledge transfer is to ensure the smooth transition, operation and maintenance of the CWG 2010 TETRA Project so that the service delivery and quality is not impacted. The knowledge transfer process shall start 6 months prior to the exit management period and shall continue until it has been signed-off and approved as completed by the Director of CWG 2010 TETRA Project. The Contractor shall ensure that all

source code, artifacts, documents on the systems, services, processes and personnel are provided to the Director, CWG 2010 TETRA Project in an organized manner.

1.3 Confidential Information, security and data

a. The Contractor will promptly on the commencement of the exit management period supply to Director of CWG 2010 TETRA Project the following:

(i) Updated and current version of the source code for all the applications in CWG 2010 TETRA Project
(ii) documentation relating to CWG 2010 TETRA Project's Intellectual Property Rights;
(iii) CWG 2010 TETRA Project data and confidential information;
(iv) all current and updated CWG 2010 TETRA Project data as is reasonably required for purposes of CWG 2010 TETRA Project or its nominated agencies transitioning the services to its Replacement Contractor in a readily available format nominated by Director of CWG 2010 TETRA Project;
(v) all other information (including but not limited to documents, records and agreements) relating to the services reasonably necessary to enable CWG 2010 TETRA Project or its nominated agencies, or its Replacement Contractor to carry out due diligence in order to transition the provision of the services to CWG 2010 TETRA Project or its nominated agencies, or its Replacement Contractor (as the case may be).

b. Before the expiry of the exit management period, the Contractor shall deliver to Director of CWG 2010 TETRA Project all new or up-dated materials from the categories set out in Article above and shall not retain any copies thereof, except that the Contractor shall be permitted to retain one copy of such materials for archival purposes only.

c. Before the expiry of the exit management period, unless otherwise provided under the MSA, Director of CWG 2010 TETRA Project shall deliver to the Contractor all forms of Contractor confidential information, which is in the possession or control of CWG 2010 TETRA Project or its users.

1.4 Employees

a. Promptly on reasonable request at any time during the exit management period, the Contractor shall, subject to applicable laws, restraints and regulations (including in particular those relating to privacy) provide to Director of CWG 2010 TETRA Project a list of all employees (with job titles) of the Contractor dedicated to providing the services at the commencement of the exit management period;

b. Where any national, regional law or regulation relating to the mandatory or automatic transfer of the contracts of employment from the Contractor to Director of CWG 2010 TETRA PROJECT, or its nominees, or a

Replacement Contractor ("Transfer Regulation") applies to any or all of the employees of the Contractor, then the Parties shall comply with their respective obligations under such Transfer Regulations.

c. To the extent that any Transfer Regulation does not apply to any employee of the Contractor, CWG 2010 TETRA Project, or its Replacement Contractor may make an offer of employment or contract for services to such employee of the Contractor and the Contractor shall not enforce or impose any contractual provision that would prevent any such employee from being hired by Director of CWG 2010 TETRA Project or any Replacement Contractor.

1.5 Transfer of Certain Agreement

a. On request by Director of CWG 2010 TETRA Project, the Contractor shall effect such assignments, transfers, licences and sub-licences, as Director of CWG 2010 TETRA Project may require, in favor of Director of CWG 2010 TETRA Project, or its Replacement Contractor in relation to any equipment lease, maintenance or service provision agreement between Contractor and third party lessors, vendors, and which are related to the services and reasonably necessary for the carrying out of replacement services by Director, CWG 2010 TETRA Project or its Replacement Contractor.

1.6 Rights of Access to Premises

a. At any time during the exit management period, where Assets are located at the Contractor's premises, the Contractor will be obliged to give reasonable rights of access to (or, in the case of Assets located on a third party's premises, procure reasonable rights of access to) Director of CWG 2010 TETRA Project, and/or any Replacement Contractor in order to make an inventory of the Assets.

b. The Contractor shall also give Director of CWG 2010 TETRA Project or its nominated agencies, or any Replacement Contractor right of reasonable access to the Contractor's premises and shall procure Director of CWG 2010 TETRA Project or its nominated agencies and any Replacement Contractor rights of access to relevant third party premises during the exit management period and for such period of time following termination or expiry of the MSA as is reasonably necessary to migrate the services to Director of CWG 2010 TETRA Project or its nominated agencies, or a Replacement Contractor.

SCHEDULE -III

1. AUDIT, ACCESS AND REPORTING SCHEDULE

1.1 Purpose

This Schedule details the technical audit, access and reporting rights and obligations of Director of CWG 2010 TETRA Project and the Contractor under the MSA, Project Implementation, Operation and Maintenance SLA.

1.2 Audit Notice and Timing

a. As soon as reasonably practicable after the Effective Date, the Parties shall use their best endeavors to agree to a timetable for routine technical audits during the Project Implementation Phase and the Operation and Maintenance Phase. Such timetable may be reviewed every three months. During the Implementation Phase and during the Operation & Maintenance Phase, Director of CWG 2010 TETRA Project shall conduct routine audits in accordance with such agreed timetable and shall not be required to give the Contractor any further notice of carrying out such audits.

b. Director of CWG 2010 TETRA Project may conduct non-timetabled audits at his/ her own discretion if he/ she reasonably believes that such non-timetabled audits are necessary as a result of an act of fraud or a security violation, or a breach of confidentiality obligations by the Contractor or his employees, or other entities, provided that the requirement for such an audit is notified in writing to the Contractor a reasonable period time prior to the audit (taking into account the circumstances giving rise to the reasonable belief) stating in a reasonable level of detail the reasons for the requirement and the alleged facts on which the requirement is based.

c. The frequency of audits shall be once before completion of Acceptance Testing, during the first year of implementation and yearly afterwards provided always that Director of CWG 2010 TETRA project shall endeavour to conduct such audits with the lowest levels of inconvenience and disturbance practicable being caused to the Contractor. From second year audits will be conducted annually.

d. The audit and access rights contained within this Schedule shall survive the termination or expiration of the MSA for a period of twenty-four (24) months.

1.3 Access

a. The Contractor shall provide to Director of CWG 2010 TETRA Project reasonable access to employees, suppliers, agents, third party facilities, including leased premises used for CWG 2010 TETRA Project as detailed in of the RFP, documents, records and systems reasonably required for audit and shall provide all such persons with routine assistance in connection with the audits and inspections. Director of CWG 2010 TETRA Project shall have the right to copy and retain copies of any relevant records. The Contractor shall make every reasonable effort to co-operate with them.

1.4 Audit Rights

a. Director of CWG 2010 TETRA Project shall have the right to audit and inspect suppliers, agents, third party facilities, including leased premises used for Network Systems (as detailed in RFP), documents, records, procedures and systems relating to the provision of the services, but only to the extent that they relate to the provision of the services, as shall be reasonably necessary to verify:

(i) The security, integrity and availability of all CWG 2010 TETRA Project data processed, held or conveyed by the Contractor on behalf of CWG 2010 TETRA Project and documentation related thereto;
(ii) That the actual level of performance of the services is the same as specified in the SLA;
(iii) That the Contractor has complied with the relevant technical standards, and has adequate internal controls in place; and
(iv) The compliance of the Contractor with any other obligation under the MSA and SLA.

b. For the avoidance of doubt, the audit rights under this Schedule shall not include access to the Contractor's profit margins or overheads associated with any obligation under the MSA.

1.5 Audit Rights of Suppliers and Agents

a. The Contractor shall use reasonable endeavors to achieve the same audit and access provisions as defined in this Schedule with suppliers and agents who supply labour, services, equipment or materials in respect of the services. The Contractor shall inform Director of CWG 2010 TETRA Project prior to supply agreement of any failure to achieve the same rights of audit or access.

b. Reporting: The Contractor will provide quarterly reports to Director of CWG 2010 TETRA Project regarding any specific aspects of the project and in context of the audit and access information as required by Director of CWG 2010 TETRA Project.

1.6 Action and Review

a. Any change or amendment to the systems and procedures of the Contractor, or associated entity, where applicable arising from the audit report shall be agreed within thirty (30) calendar days from the submission of the said report.

b. Any discrepancies identified by any audit pursuant to this Schedule shall be immediately notified to Director of CWG 2010 TETRA Project or the appropriate CWG 2010 TETRA Project Manager and the Contractor’s Project Manager who shall determine what action should be taken in respect of such discrepancies in accordance with the terms of the MSA.

1.7 Terms of Payment

Director of CWG 2010 TETRA Project and the Contractor shall bear their own costs of any audits and inspections. The terms of payment are inclusive of any costs of the Contractor, for all reasonable assistance and information provided under the MSA, the Project Implementation, Operation and Management SLA by the Contractor pursuant to this Schedule.

1.8 Records and Information

For the purposes of audit in accordance with this Schedule, the Contractor shall maintain true and accurate records in connection with the provision of the services and the Contractor shall handover all the relevant records and documents upon the termination or expiry of the MSA.

SCHEDULE- IV

GOVERNANCE SCHEDULE

1 GOVERNANCE SCHEDULE

1.1 PURPOSE

The purpose of this Schedule is to

i. establish and maintain the formal and informal processes for managing the relationship between Director of CWG 2010 TETRA Project and the Contractor (including the outputs from other Schedules to this Agreement;
ii. define the principles that both Parties wish to follow to ensure the delivery of the Services;
iii. ensure the continued alignment of the interests of the Parties;
iv. ensure that the relationship is maintained at the correct level within each Party;
v. create the flexibility to revise and maintain the relationship and this Agreement during the Term;
vi. enable contract administration and performance management.

1.2 GOVERNANCE STRUCTURE

a. **Project Managers:** The relationship under this Agreement will be managed by the Project Managers appointed by each Party, who will provide the interface between the executive management of the respective Parties.

b. Within one month following the Effective Date, Director of CWG 2010 TETRA Project or its nominated agencies and the Contractor shall each appoint a Project Manager (hereinafter 'the Project Manager'). In the case of CWG 2010 TETRA Project, the Project Manager will be an individual who is appointed by GNCTD. In the case of the Contractor, the Project Manager will be an individual who is an organizational peer. In the event that either Party wishes to substitute its Project Manager it will do so in manner in which the original appointment is made and notify the other Party of such substitution as soon as reasonably practicable but at the latest within fourteen days of the substitution.

c. The Project Managers shall have responsibility for maintaining the interface and communication between the Parties.

d. GNCTD may appoint a Program Management Unit within 2 weeks of the Effective Date.

e. The Director, CWG 2010 TETRA Project will monitor the progress of the project. The broad activities include
   i. consideration of Quarterly Performance Reports;
   ii. consideration of matters arising out of the Change Control Schedule;
   iii. matters to be brought before the Management Committee in

accordance with the MSA and the Schedules;

iv. any matter brought before the Management Committee by the Contractor under this Article; and

v. any other issue which either Party wishes to add to the agenda.

f. In the event that there is any material factor which affects the delivery of the services or the terms of payment as stated in the Terms of Payment schedule, the Parties agree to discuss with the Director, CWG 2010 TETRA Project any appropriate amendment to the Agreement or any Service Level Agreements or Statement of Works including any variation to the terms of payment as stated in the Terms of Payment Schedule. Any variation so agreed shall be implemented through the change control procedure as set out in the Change Control Schedule.

1.3 Governance Procedures

a. The Contractor shall document the agreed structures in a procedures manual.

b. The agenda for each meeting of the Director, CWG 2010 TETRA Project shall be set to reflect the discussion items referred to above and extraordinary items may be added either with the agreement of the Parties or at the request of either Party. Copies of the agenda for meetings of the Management Committee, along with relevant pre-reading material, shall be distributed at least one week in advance of the relevant meeting.

c. All meetings and proceedings will be documented; such documents to be distributed to both Parties and copies shall be kept as a record. All actions, responsibilities and accountabilities arising out of any meeting shall be tracked and managed.

d. The Parties shall ensure as far as reasonably practicable that the Director, CWG 2010 TETRA Project shall resolve the issues and resolve the objectives placed before them and that members representing that Party are empowered to make relevant decisions or have easy access to empowered individuals for decisions to be made to achieve this.

SCHEDULE -V

INVOICING AND SETTLEMENT SCHEDULE

1. In respect of monthly rental, the Contractor shall be eligible to receive quarterly payments. Subject to the specific terms of Service Level Agreement, the Contractor shall submit its invoices in accordance with the following principles:

   (i) Director, CWG 2010 TETRA Project shall be invoiced by the Contractor for the services. Generally and unless otherwise agreed in writing between the Parties or expressly set out in the Service Level Agreement, the Contractor shall raise an invoice as per the terms of payment as stated in the Terms of Payment Schedule quarterly in arrears.

   (ii) Any invoice presented in accordance with this Article shall be in a form agreed with Director, CWG 2010 TETRA Project

2. The Contractor shall invoice all payments by the fifth working day of every quarter in respect of rental charges. Invoices shall be accurate and all adjustments to or changes in the terms of payment as stated in the Terms of Payment Schedule shall be applied to the next payment within four weeks of the receipt of the previous invoice.

3. GNCTD shall make sincere efforts to arrange payment of rental charges from the Departments within 30 working days of the receipt of Invoice by Director, CWG 2010 TETRA Project subject to SLA adjustments (debits and credits).

4. The Departments shall be entitled to delay or withhold payment of any invoice or part of it delivered by the Contractor under this Schedule where Departments dispute such invoice or part of it provided that such dispute is bona fide. The withheld amount shall be limited to that which is in dispute. Any exercise by Departments under this Article shall not entitle the Contractor to delay or withhold provision of the Services.

SCHEDULE - VI

TERMS OF PAYMENT SCHEDULE

1. CWG 2010 TETRA Project is a Service project. Accordingly, the payment will be made only if Services are rendered by the Contractor in accordance with this Agreement & the operational SLA.

2. Payments to the Contractor for rental charges will be on a Quarterly Rental basis as per the SLA.

3. Applicable penalties as given in the RFP will be deducted from the Contractor, in case of defaults by the Contractor in meeting the SLA.

4. In the event of premature termination of the Agreement prior to the launch of CWG 2010 TETRA Project, the Contractor shall not be eligible to receive any compensation or payment.

5. In the event of the premature termination of the Agreement post-commencement of the operations, the Contractor would be eligible to be paid for the cost of Hardware, Software and Networking that might be taken over by Director of CWG 2010 TETRA project pursuant to the provisions of the agreement, calculating the cost of the Assets, at the depreciated book value as per Income Tax Act Rules.

Appendix A - Change Control Note (CCN)

Change Control Note **CCN Number:**

Part A: Initiation

Title:

Originator:

Sponsor:

Date of Initiation:

Part B: Details of Proposed Change

(To include reason for change and appropriate details/specifications. Identify any attachments as A1, A2, and A3 etc.)

Authorised by GNCTD Date:

Name:
Signature: Date:
Received by the Partner

Name:

Signature:

(Identify any attachments as B1, B2, and B3 etc.)

Changes to Services, charging structure, payment profile, documentation, training, service levels and component working arrangements and any other contractual issue.

Brief Description of Solution:

Impact:

Deliverables:

Timetable:

Charges for Implementation: (including a schedule of payments)	
Other Relevant Information: (including value-added and acceptance criteria)	
Authorised by the Partner	**Date:**
Name:	
Signature:	
Change Control Note	**CCN Number :**
Part C : Authority to Proceed	
Implementation of this CCN as submitted in Part A, in accordance with Part B is: (tick as appropriate)	
Approved Rejected **Requires Further Information (as** follows, **or as** Attachment **1** etc.)	
for GNCTD its nominated agencies	**For the Operator**
Signature	Signature
Name	Name
Title	Title
Date	Date

SECTION – 4

RFP CHECKLIST

Section – 4

CHECKLIST FOR BIDDER

S. No.	Item	Yes / No	Page No.
1	Whether the Bidder has got himself registered with the GNCTD portal		
2	Whether EMD is deposited in physical form?		
3	Whether copy of sales-tax/ VAT registration is enclosed?		
4	Whether attested copy of latest Sales-tax/ VAT clearance certificate is enclosed?		
5	Whether samples are deposited?		
6	Whether last two years' production & sales figures of manufacturing unit in quantity and value is enclosed?		
7	Whether all required technical information/ literature/catalogues is enclosed?		
8	Whether Authorization letter from OEM or Principal is enclosed?		
9(a)	Whether Valid ISO 9001:2000 certificate of the Bidder; and OEM if the Bidder is not the OEM, is enclosed?		
9(b)	Whether Valid ISO 27001 certificate is enclosed?		
9(c)	Whether PF registration certificate (if applicable)		
9(d)	Whether Certified copy of the receipt of latest Income - Tax filed with Income Tax Department and copy of PAN number is enclosed?		
10	Whether Consortium Agreement (if applicable) is enclosed?		
11	Whether IOP Certificates for offered TETRA system is enclosed ?		
12	Whether proof for claiming Purchase Preference is enclosed?		
13	Whether Compliance statement of all sections of RFP is provided?		
14	Whether Power of Attorney/Board Resolution to sign Bid is enclosed?		
15	Whether financial figures for last 3 years are enclosed?		
16	Whether time schedule of project is submitted, and is in conformity with specified schedule?		
17	Confirmation whether the offered TETRA products incorporated provides the latest state-of-the art technical features.		
18	Whether adequate system design has been provided?		
19	Whether the price has been quoted in the specified format		
20	Whether the certificate as required in Article-12 of Section-3 has been enclosed?		
21	Confirm that the offered AVLS system has no proprietary item?		

Note: All Xerox documents must be attested by Public Notary/ Gazetted officer/ Self Attested.

DECLARATION

We solemnly declare that we have attached all the documents mentioned here above and mentioned in the RFP. We also understand that non-compliance of any documents will be treated as non-responsive Bid and we will forfeit our claim to participate in the RFP automatically and our Bid shall be liable to rejection.

Signature of Authorized person _____

Name of Authorized person _____

_____

Date and Place:

SECTION – 5
RFP FORMS

TABLE OF CONTENTS

Form - 1

Section – 5

RFP Forms

RFP Letter Form

Date:_____

From

(Registered name and address of the Bidder)

To
Secretary (IT),
Delhi Secretariat,
Govt. of NCT of Delhi
New Delhi – 110 113

Sir,

Having examined the RFP documents, we the undersigned, offer to supply, install, test, integrate and commission and provide Service for Secured Communications Network (TETRA) for Common Wealth Games (CWG) 2010, also called the **"System"** as detailed in the bidding document in response to RFP number …….dated .....

We undertake to:

1. maintain validity of the RFP for a period of 120 days from the date of RFP opening as specified in the RFP document, which shall remain binding upon us and may be accepted at any time before the expiration of that period.

2. supply, install, test, integrate, commission, operate and maintain, and provide Service for the **"System"** on wet lease basis for period upto March 2017 in conformity with the RFP documents (and as amended from time to time).

3. execute all contractual documents and provide all securities & guarantees as required in the RFP document (and as amended from time to time).

4. until a formal Contract is prepared and executed, this RFP, together with your written acceptance thereof and your notification of award, shall constitute a binding Contract on us.

5. supply the products and Systems from eligible countries as secified in the RFP

Dated this _____ day of _____.

Signature
…….
(in the capacity of)
Duly authorized to sign Bid for and on behalf of
…….(name of Company)

Witness:
(Signature with name and designation)
Address:

Form - 2

BID SECURITY (EMD FORMAT)

Whereas …… (hereinafter called "the Bidder") has submitted its Bid dated. ……. for the **"Secured Communications Network (TETRA) for Common Wealth Games (CWG) 2010",** (hereinafter called "the RFP"), National Capital Territory of Delhi.

Know All men by these presents that WE……(Branch Name) of ……(Bank Name) having our registered office at ……(hereinafter called "the BANK") are bound unto Government of NCT of Delhi (hereinafter called "GNCTD"), in the sum of Rs 3,00,00,000/- (Indian Rupees Three Crores Only) for which payment will and truly to be made to the said Govt., the BANK binds itself, its successors and assigns by these present.

THE CONDITIONS of the obligation are:

1. If the Bidder withdraws his bid during the period of bid validity specified by the Bidder on the RFP Letter or

2. If the Bidder, having been notified of the acceptance of his Bid by the Purchaser during the period of bid validity

   (a) Fails or refuses to execute the Contract, if required; or
   (b) Fails or refuses to furnish the Performance Security, in accordance with the Instructions to Bidders.

We undertake to pay the GNCTD upto the above amount upon receipt of its first written demand, without the GNCTD having to substantiate its demand, provided that in its demand, the GNCTD will note that the amount claimed by it is due to it owing to the occurrence of one or both of the two conditions specifying the occurred condition or conditions.

This Guarantee will remain in force up to and including 45 days after the period of bid validity and any demand in respect thereof should reach the BANK not later than the specified date/ dates.

Signature of the Bank Authority.
Name
Signed in Capacity of

Name & Signature of witness
Address of witness

Full address of Branch
Tel No. of Branch
Fax No. of Branch

Form - 3

Performance Bank Guarantee Format

Secretary (IT)
Delhi Secretariat,
IP Estate,
The Govt. of NCT of Delhi,
New Delhi – 110 113.

(With due stamp duty if applicable)

OUR LETTER OF GUARANTEE No. : _____

In consideration of Government of National Capital Territory of Delhi (GNCTD), having its office at Delhi Secretariat, IP Estate, New Delhi (INDIA) (hereinafter referred to as " GNCTD" which expression shall unless repugnant to the content or meaning thereof include all its successors, administrators and executors) and having entered into an agreement dated _____/issued Purchase Order No. _____ dated _____ with/on M/s _____ (hereinafter referred to as "The Service Provider" which expression unless repugnant to the content or meaning thereof, shall include all the successors, administrators, and executors).

WHEREAS the Service Provider having unequivocally accepted to provide the Service as per terms and conditions given in the Agreement dated _____ /Purchase Order No. _____ dated _____ and GNCTD having agreed that the Supplier shall furnish to GNCTD a Performance Guarantee for the faithful performance of the entire contract, to the extent of 10% (ten percent) of the value of the Agreement/ Purchase Order i.e. for _____.

We, _____ ("The Bank") which shall include OUR successors, administrators and executors herewith establish an irrevocable Letter of Guarantee No. _____ in your favour for account of _____ (The Service Provider) in cover of performance guarantee in accordance with the terms and conditions of the Agreement/Purchase Order.

Hereby, we undertake to pay upto but not exceeding _____ (say _____ only) upon receipt by us of your first written demand accompanied by your declaration stating that the amount claimed is due by reason of the Supplier having failed to perform the Agreement and despite any contestation on the part of above named supplier.

This Letter of Guarantee will expire on _____ including 30 days of claim period and any claims made hereunder must be received by us on or before expiry date after which date this Letter of Guarantee will become of no effect whatsoever whether returned to us or not.

_____
Authorized Signature
Manager
Seal of Bank

Form – 4

Manufacturer's Authorization

(It should be submitted on original letterhead of Manufacturer)

To
Secretary (IT)
Delhi Secretariat,
The Govt. of NCT of Delhi,
New Delhi – 110 113.

Dear Sir,

Whereas *[name of the manufacturer]* who are established and reputable manufacturers of *[name/or description of the products*], having production facilities *at [address of factory*], do hereby authorize *[name and address of the Supplier*] to submit a bid, and subsequently sign the Contract with you against RFP No.: 6431 dated March 14, 2009 for the above products produced by us.

We hereby extend full guarantee for the products offered for supply by the above firm against the said RFP and duly authorize said firm to act on our behalf in fulfilling all installation, technical support and maintenance obligations required by Govt. of NCT of Delhi (GNCTD), including the availability of spares for at least seven years.

[Signature for and on behalf of manufacturer]
Note: This letter of authority must be on the letterhead of the manufacturer, must be signed by a competent person and having the power of attorney to bind the manufacturer, and must be included by the Bidder in its RFP.

Form - 5

Compliance Statement

(Clause-by-clause compliance statement for the entire RFP document in the format given below to be provided)

RFP No.: 6431

S. No.	**Section/ Article/ Clause**	**Compliance (**Please Write "Yes" or "No" or "partially complied")	**Remarks (**Explanation by the Bidder as to how "No" or "Partially complied" affects or otherwise the overall performance of the System)	**Reference to page no of Bidder's proposal.**

Form- 6/T1

Format for Pre-qualification of Bidder (Technical)

(Experience in supply, Installation, testing, integration and commissioning of similar TETRA Systems over last 5 years)

RFP No.: 6431
Name of the Bidder:

S. No.	Name of the customer	Address of the Installation	Start Date of Project	Completion Date of the Project	Scope of the work. Also specify the systems installed	Value of the Contract

Note: - Please attach purchase order/ contract agreement and completion certificate for each of the project details mentioned above along with this Form.

Form-6/F1

Format for Pre-qualification of Bidder (Financial)

(Financial Strength of the Bidder)

S.No.	Name of Bidder/ Consortium member	Turnover (In the Field of ICT)			Net worth			Net Profit		
		2005-2006	2006-2007	2007-2008	2005-2006	2006-2007	2007-2008	2005-2006	2006-2007	2007-2008

Note: Please attach duly certified and audited financial statements by a Chartered Accountant of last three financial years along with this form. Also attach certificate of incorporation of Bidder /all consortium partners. In case Bidder is Authorized Representative of OEM, the financial statements of both Authorized Representative & OEM, shall be submitted.

Form - 7

Commercial Bid

Sl. No.	Category of TETRA Radio Terminals	Quantity	Monthly Rental (in INR)	Total no. of months	Total Rental amount (in INR)- in figures (To be calculated as Quantity x Monthly Rental x Total No. of Months)	Total Rental amount (in INR)- in words
1	**Handheld** (Service Period – from Acceptance of Network, i.e., Jan. 2010 to March 2017)	3252		87		
2	**Mobile** (Service Period – from Acceptance of Network, i.e., Jan. 2010 to March 2017)	535		87		
3	**Static** (Service Period – from Acceptance of Network, i.e., Jan. 2010 to March 2017)	81		87		
4	**Handheld** (Additional Requirement of Radio Terminals during Commonwealth Games .i.e., Service Period – from September 2010 to October 2010)	6942		2		
5	**Mobile** (Additional Requirement of Radio Terminals during Commonwealth Games .i.e., Service Period – from September 2010 to October 2010)	140		2		
6	**Static** (Additional Requirement of Radio Terminals during Commonwealth Games .i.e., Service Period – from September 2010 to October 2010)	10		2		
Grand Total						

Commercial Terms:

A. Monthly Rental (Service Period – from Acceptance of Network, i.e., Jan. 2010 to March 2017)

1. The Monthly rental shall include all taxes, duties, cess, levies, transportation charges and license fee, except service tax applicable in India.

2. The bidder shall give 5% discount on the Rentals each year. The Base for such discount shall be Rental Quoted for Year -1. Discounts shall begin from Year-2.

B. Additional Requirement of Radio Terminals during Commonwealth Games

Monthly Rental (Service Period – from September 2010 to October 2010)

1. The Monthly rental shall include all taxes, duties, cess, levies, transportation charges and license fee except service tax applicable in India.

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SECTION – 6

SCHEDULE OF REQUIREMENTS

SECTION – 6

SCHEDULE OF REQUIREMENTS

The Govt. of NCT of Delhi (GNCTD) intends to procure the Services for Secured Communications Network (TETRA) (hereinafter called the "Network") for Commonwealth Games (CWG) 2010 on WET LEASE basis. The said work shall hereinafter be referred to as "Project". The aims, objectives and salient applications of the Project, to be established as per the requirements and specifications outlined in various sections of this document, shall be following:

1. To set up a viable, efficient and mission-critical communication Network which shall enable uninterrupted and instant voice and data communication on 24x7 basis. The Network shall be able to function effectively at all times, including times when the Network handles peak load of subscribers.

2. The Network shall incorporate enough capacity to prevent the possibility of traffic congestion even during the occurrence of any type of emergency during the CWG, so that all types of calls, as defined in Sec.-7 Technical Specifications (TS), can get established without delay.

3. The Contractor shall ensure adequate redundancies for all Network elements at the Venue of Game's Opening and Closing Ceremony so as to ensure that there is no interruption of Service at the same during that period. This shall be achieved by provisioning of adequate manpower, spares and repair facilities at the concerned Network locations particularly for this requirement.

4. The Contractor shall store sufficient spares of Radio Terminals in order to ensure that there is no interruption of communication at any point of time, particularly during Opening and Closing Ceremony of the Games.

5. The Overall Network shall incorporate sufficient redundancies and alternate paths to allow the Network availability as defined in Sec.-3 of TS.

6. The Network shall provide security and Quality of Service (QOS) as defined in Chapter–7.2 of TS.

7. The Network shall incorporate one Master Operation and Control Center (OCC) and a Backup Operation and Control Center (BCC), to set up at following locations:

Sl. No.	Category	Location
1	Operation and Control Center (OCC)	Metcalfe House, Civil Lines, Ring Road, New Delhi-110054
2	Backup Operation and Control Center (BCC)	O/o Home Guards and Civil Defence, Manak Bhawan (Basement), 9, Bahadur Shah Zafar Marg, ITO, New Delhi – 11002

Table 6-1: Operation & Control Center Locations

Suitable interconnection arrangements, as defined in Chap.7.2 of TS, shall be provided by the Contractor.

8. i.) In addition to OCC and BCC, provision shall be made for 4 no. of Local Control Rooms (LCR) in regard to Automatic Vehicle Location System (AVLS) in Delhi at the premises of following user Departments:

Sl. No.	Name of User Deptt.	Location
1	Delhi Police PCR vans	Police Hq., ITO (Existing)
2	Delhi Transport Corporation (DTC)	DTC Hq. at Indraprastha
3	Delhi Fire Services (DFS)	DFS Hq. at Palika Kendra (Existing)
4	Health and Family Welfare (CATS/ Ambulance)	Bela Road, ISBT(Existing)

Table – 6.2: Location of LCRs

ii.) Out of above-mentioned LCRs, the LCR of Delhi Police, Delhi Fire Service and Health and Family Welfare already exist. The Contractor shall set up new LCRs at the other user premises. Each LCR shall be connected to both the OCC and BCC by means of OFC lease line. A Microwave backup shall be provided to each OFC line link.

iii.) The Bidder shall carry out the survey and examine the technical characteristics of existing Local Control Rooms for AVLS and shall provide the means of carrying the AVLS data to the central OCC and BCC.

iv.) The methodology of setting up the OCC, BCC & LCR and the share of responsibility of various resources at these is explained in TS.

9. The Network elements shall incorporate latest state-of-the art features, as on the time of submission of bid for this RFP, of TETRA and AVLS technologies.

10. The Contractor shall set up the Network, Operate and Maintain, and provide Service upto March 2017. The Contractor shall provide comprehensive training to various user Departments of Govt. of GNCTD, so that the users gain sufficient capability in operation of the Network, including the Radio terminals.

11. During the post-games Service period, the contractor shall retain the handsets, core network and infrastructure elements of the network necessary to cater to the legacy requirement of the Employer as well as from other organizations. The legacy requirement as specified in this RFP is the one keeping in view the present demand. The RFP document also envisages the possibility of the subscriber base increasing from the specified level. The offer from the Bidders must take into account the present and possible future subscriber base.

12. In addition to the provisions made in the RFP, in regard to subscriber variations during the period Games are on, the Bidder shall take note that the subscriber base can go up even higher than the specified levels in the event of emergency situations. In such scenarios, sufficient provision must be kept for expansion of the capacity of the Network as expeditiously as possible so that Network continues to operate without any congestion and interruption of service during the on-going Games.

13. The software portion of the Network shall be adequately protected and secured so as to eliminate any possible attempts of intrusion, hacking etc. The Network shall support future upgrades in the software without any modifications in the hardware

14. The Bidders shall note that even though the site for new OCC, BCC and LCRs shall be provided by the employer, the Bidder shall arrange other sites as required for deployment of the entire Network and equip those with required telecom and other support infra equipment, such as UPS, AC, etc. The Bidder shall be responsible for and take full-proof measures to guarantee the security of the sites other than OCC, BCC and LCRs. The sites so selected by the Bidder shall take into account various relevant factors like space, ventilation, environmental hazards, cleanliness of the site and surroundings, etc. so that the service provided by the overall Network is able to meet the specified performance requirements.

15. a.) The current Subscriber base of the proposed network includes the requirement from January 2010 to March 2017 and also the special requirement of Commonwealth games 2010 during the period September 2010 to October 2010. The present, legacy and special requirements of Commonwealth Games is composed of various user departments of GNCTD and Government of India and the same is tabulated as under:-

S.No.	Category of TETRA Radio Terminal	Requirement of Radio Terminals	Additional Requirements of Radio Terminals (Quantity) during Common Wealth Games
		From the period Jan 2010 to March 2017 (87 Months).	From the period Sept 2010 to Oct 2010 (2 Months).
1	Handheld	3252	6942
2	Mobile (Vehicular)	535	140
3	Static	81	10

Table 6-3 Requirement of Radio Terminals

b.) As stated in the RFP Document, the Bidder will design the network to take care of subscriber base going upwards by 25%, if any. The network design shall also take into account the expansion provisions of Clause No.2 of this section. The Contractor (Service Provider) shall have the liberty to increase subscriber base by inducting subscriber from Government Organizations, Ministries, Public Sector Undertakings, non-Government organizations and the private sector also without compromising the security of the network.

c.) The Bidder will carry out all possible market study by his experience from other countries, cities so as to increase the subscriber base as mentioned above at his own risk and cost. Government presumes, without any liability to the employer, that a good vendor may with its efforts, increase the subscriber base from other agencies as mentioned above. However, the analysis has to be done by the vendor in this regard and the Government shall not take any liability of increasing the subscriber base and shall not be held responsible in case the vendor is not able to increase its subscriber base. Further, the requirement of Govt. of NCT of Delhi and some other departments of Government of India are as tabulated in Table 6-3 above.

16. The proposed TETRA based network to be set up for the CWG 2010 shall incorporate the Network elements as detailed in Technical Specifications (TS) of the RFP. A typical Bill of Material for the Network is indicated in Annexure-6.2 of this Section.

The detailed quantities of the Network subsystems shall be prepared by the Bidder based on its design and equipment characteristics to meet the overall performance requirements and shall be in conformity with the TS.

17. The new Network shall be able to integrate with existing TETRA networks of Delhi Metro Rail Corporation (DMRC), Delhi International Airport Ltd. (DIAL) to provide coverage of CWG handsets at both elevated and, if technically feasible, underground (tunnel) sections. The Bidder shall interface with M/s DMRC and shall detail as to how this shall be achieved.

18. A new Tetra Network for the Airport Express Link, being setup by M/s Delhi Airport Metro Express Pvt. Ltd.(DAMEPL), is expected to be commissioned by end of 2009. It consists of Underground and Elevated Sections. The Bidder shall interface with M/s DAMEPL to provide linkage of the CWG network with DAMEPL underground network. The Bidder shall detail as to how this shall be achieved.

Annexure 6.1

Details of Subscriber Base

Subscriber Load Distribution		
S.No.	**Name of Venues**	**Subscriber Load**
1	Dr. S.PMukherjee AquaticComplex	765
2	Siri Fort Sports Complex	825
3	Talkatora Indoor Stadium	765
4	Indira Gandhi Sports Complex	2,230
5	Maj. Dhyan Chand National Stadium	2,700
6	Thyagaraj Sports Complex	880
7	Delhi University	880
8	Dr. Karni Singh Shooting Range	770
9	Yamuna Sports Complex	825
10	Jawaharlal Nehru Stadium(JNS) - Venue also for Opening & Closing Ceremony of the Games	10,000
11	R. K. Khanna Tennis Complex	590
12	Games Village	1,235

Annexure – 6.2

TYPICAL BILL OF MATERIAL (BOM)

Sl. No.	Item Description	Quantity
Schedule 1 - Supply		
1	Radio Base Station equipped with site wise requirement of Base Radio (of capacity as per Specified Traffic Load), redundant controllers Base Station , Tx/ Rx Antenna etc.	As per design Requirements of TS
2	Antenna Structure for Radio Base Station with antenna tower, As per design, foundation, earthing, fencing, Electrical, Aviation Lamps, Tower Paint etc.	As per requirements in S.No. 1 above
3	Handheld Radio (GPS Enabled) with full function key model with LCD display+ required accessories + battery & charger (refer chap. 2 of TS)	As defined in Section - 6 of the RFP
4	Static Radio (GPS Enabled) in (1+1) configuration with full function key model with LCD display+ accessories + battery & charger, Antenna unit, Connecting Cables, Power Supply Unit (refer chap. 2 of TS)	As defined in Section - 6 of the RFP
5	Mobile Radio (GPS Enabled), with Fist Microphone, Loudspeaker, Whip antenna, Power supply unit, GPS Module, Radio Modem battery and Charger (refer chap. 2 of TS)	As defined in Section - 6 of the RFP
6	Radio Central Infrastructure + NMS at OCC (Including CDRS) and including the following:	
a.	**Interface Gateways**	
i.	Analog VHF Gateway	1
ii.	Data Gateway	1
iii.	EPABX Gateway	1
iv.	AVL Gateway	1
v.	TETRA Gateway	1
vi.	GSM/CDMA Gateway	1
b.	**Dispatcher Unit**	
i.	Dispatcher Application and Terminals (1 + 1) as per TS	1
ii.	Voice and data Recorder as per TS	1
c.	Single port programming kit including laptop to cater for programming of Radio Units (Handheld, Mobile and Static Radio)	Lot
7	**Radio Central Infrastructure + NMS at BCC (Including CDRS)**	
a.	**Interface Gateways**	
i.	Analog VHF Gateway	1

ii.	Data Gateway	1
iii.	EPABX Gateway	1
iv.	AVL Gateway	1
v.	TETRA Gateway	1
vi.	GSM/CDMA Gateway	1
b.	**Dispatcher Unit**	
i.	Dispatcher Application and Terminals (1 + 1) as per TS	1
ii.	Voice and data Recorder as per TS	1
c.	Single port programming kit including laptop to cater for programming of Radio Units (Handheld, Mobile and Static Radio)	Lot
8	**Dispatcher Unit for new LCRs (1 no.)**	
i.	Dispatcher Application and Terminals (1 + 1) as per TS	1
ii.	Voice and data Recorder as per TS	1
9	**Power Supply for OCC Site**	
a	Online UPS for 4 hours backup.	1
b	DG Sets (or alternate means)	1
10	**Power Supply for BCC Site**	
a	Online UPS for 4 hours backup.	1
b	DG Sets (or alternate means)	1
11	**Power Supply for new LCR sites**	
a	DG for LCR (Capacity as per Load Calculations and Requirements of TS)	1
b	Online UPS LCR (Capacity as per Load Calculations and Requirements of TS)	1
12	**Power Supply for BTS Sites**	As per design Requirements of TS
a	Online UPS for 4 hours backup.	As per design Requirements of TS
b	DG Sets (or alternate means)	As per design Requirements of TS
13	**Site Preparation for BTS Sites**	As per design Requirements of TS
a	Shelter	As per design Requirements of TS

b	Air-conditioner	As per design Requirements of TS
14	Connectivity between BTS Sites (OFC Connectivity for Connecting Base Stations sites in Self Healing Ring & and Microwave)	As per design Requirements of TS
15	**Connectivity between OCC/BCC and LCR Sites**	
a	**Connectivity between OCC & BCC**	
	OFC lease Line	1
	Microwave Link	1
b	**Connectivity between 4 LCRs and OCC**	
	OFC lease Line	1 each
	Microwave Link	1 each
c	**Connectivity between 4 LCRs and BCC**	
	OFC lease Line	1 each
	Microwave Link	1 each
16	Test Equipment for TETRA Network	AS per Requirements of TS
17	Test Equipment to measure BER, and other essential parameters of TETRA, Microwave, lease lines, etc.	AS per Requirements of TS
18	Spares	As per Requirement of TS
Schedule A2 – Services – in lot - AS per Requirements of TS		
1	Application Engineering and Documentation	
2	Interface Application Engineering	
3	Installation, Testing & Commissioning	
4	Providing Service of the Network	
5	As built Drawings for Network	
6	Training as per TS	
7	Supply, Delivery and installation of Site Material (Racks, Distribution Boards, DDF, ODF, MDF, IDF, connectors, connecting cables, power, cables, data cables, etc) for complete installation / Testing/ / Commissioning / O&M of Network.	

Note: 1) Detailed BoQ for each item, complete with Model number details, to be provided herein. The Bidder to indicate the quantity in the relevant column as per its System design.
2) Any other item, not mentioned herein above, to meet the specified requirements shall be included in the BOM.

SECTION – 7

TECHNICAL SPECIFICATIONS

CHAPTER – 7.1

TABLE OF CONTENTS

CHAPTER – 7.1

General Technical Requirements

1. INTRODUCTION

1.1 Scope and Purpose

1.1.1 This section covers the design, provisioning, delivery, installation, testing, commissioning, O&M and support on wet lease basis for the Radio system, CDRS, infra and backbone connectivity, etc. to be supplied and set up under this Contract.

1.1.2 This Section is divided into three subsections:

CHAPTER 1 : General Technical Requirements

This Chapter covers scope of the works, system design, verification, testing, commissioning, installation, operation, power distribution, maintenance support, spares, special tools, test equipment, Training, documentation and programme requirements of all subsystems.

CHAPTER 2 : Radio System including Support Infrastructure

This chapter specifies the Technical scope of works and performances, functional and design requirements of Radio System including Support Infrastructure, like power, air-conditioning, tower, shelter, etc.

CHAPTER 3 : Centralized Digital Recording System (CDRS)

This chapter specifies the Technical scope of works and performances, functional and design requirements and interfaces of the Centralized Digital Recording System.

1.2 Relevant Documents

1.2.1 This Technical Specification (TS) shall be read in conjunction with the General Conditions of Contract (GCC) and any other document forming part of the RFP.

1.2.2 In the event of a conflict between the TS and any other standards or specifications quoted in the RFP, the requirements of the TS shall prevail.

1.3 Overview of Proposed System

1.3.1 Various user Departments of the Employer are using conventional non - trunked analog VHF Radios. Some Departments such as Delhi Police and Department of Family and Health Welfare have additionally set up UHF Radio Trunking systems. For efficient and secured management of all voice and data communication between the Law enforcement agencies, organizers of

the Games, emergency services and the nodal responsible agencies for the CWG 2010 the existing VHF, PSTN subscribers are to be integrated with the proposed Integrated Communication System based on Digital TETRA Radio Trunking System.

1.3.2 There are about 600 no. of existing Analog VHF sets with various user Departments.

1.3.3 The new Communication System shall provide all necessary channels for carrying voice and data signals during and after the games. The necessary control channels for monitoring and supervision, Command and Control shall be provided. An automatic Vehicle Location System (AVLS) working on the TETRA Network Radios, for monitoring and management of designated vehicles, shall be provided.

1.3.4 Various gateways for interconnection of the TETRA Network with existing wire-line and wireless telecommunication facilities of existing Govt. Departments shall be provided so as to ensure optimum utilization of the existing resources in the new Network.

1.3.5 The backbone transmission Network, which shall provide the required Communication Channels in the new Network, shall have high reliability, availability and expandability.

1.3.6 The Radio system shall enable communication between the fixed strategic locations and the moving vehicles as well as the moving working personnel not only around the Game's venues but across the whole length and breadth of Delhi including all its borders. The Radio system shall also employ indoor coverage techniques at the sites wherever required.

1.3.7 The successful contractor shall provide all the supplies and services in order to facilitate the above-mentioned applications in accordance with the details provided in this document.

1.3.8 A Centralized Digital Recording System is to be provided at both OCC and BCC for multichannel voice and data recording of Communication, two way radio conversations, and emergency or file messages broadcast from respective OCCs.

1.3.9 A master clock system shall be provided to distribute the time signal to all the telecom system at various locations of the Network. The System should have capability of accepting master clock input from a standard source to take care of failure situations.

2. SCOPE OF WORKS

2.1 General Requirements

2.1.1 The Radio system, CDRS, infra and backbone connectivity, etc to be designed, supplied, installed, tested and commissioned and the overall network set up by the Contractor under this Contract shall meet all the requirements as defined in the Technical Specifications.

2.2 Scope of Supplies

2.2.1 The scope of supply shall include all necessary hardware, software, firmware, accessories, materials and documentation. The detailed requirements shall be as given in the Chapter 7.2 and Chapter 7.3 of Technical Specifications. The contractor shall note that Annexure 1 of Section - 6 gives the minimum BOQ to be covered as part of the scope of work and any other item or enhancement of the listed items required to complete the Contract shall also be provided as part of this Contract.

2.3 Scope of Services

2.3.1 The detailed requirements of the services to be provided by the Contractor shall be as given in the GCC and TS.

2.3.2 The scope of service to be performed by the Contractor shall include, but not be limited to, the following:

(1) Survey, Design, delivery, installation, testing and commissioning, O&M, system quality assurance of the overall Radio Network, presentations, reviews and audit support as specified in the Specification.

(2) Project management of implementation of the System.

(3) Quality and safety management.

(4) Overall site supervision and management.

(5) Operation and maintenance support services.

(6) Submission of documentation.

(7) Training for Employer's staff.

(8) Provision of spares, tools and test equipment

(9) Interface management

(10) Manpower resources

3. PERFORMANCE REQUIREMENTS

3.1 General

3.1.1 The Contractor shall ensure that all equipment and material used is able to meet the specified availability throughout its service life as required to minimize the ongoing maintenance costs.

3.1.2 The System shall be so designed as to have a minimum of 7 years service life operating continuously.

3.1.3 The system shall, to the extent practicable, have no credible failure, which will directly cause an interruption or delay in the service. The contractor shall demonstrate that the probability of occurrence of the failures shall be in accordance with reliability and availability requirement defined in Chapter 7.2 & 7.3.

3.2 Reliability Requirements

3.2.1 The inability to perform a required function, the occurrence of unexpected action by the equipment, or the degradation of performance to below the required specifications shall constitute a failure.

3.2.2 The Reliability Plan shall identify a comprehensive list of reliability-related submissions such as specifications, standards, method statements, procedures, drawings and records to the Employer's Representative for review. The Reliability Plan shall include the dates of the Submissions.

3.3 Availability Requirements

3.3.1 Detailed availability requirements are given in Chapter 7.2 & 7.3 of this Technical Specification.

3.3.2 The Contractor shall submit calculations with reliability block diagrams for each sub-system to demonstrate the compliance with required availability figures. The availability calculation shall take all possible failure modes into consideration. The calculation shall be based on the Contractor's submitted equipment MTBF figures, MTTR figures and the configuration of each sub-system.

3.3.3 The Contractor shall predict the system failure rate or MTBF figures of each sub-system from the availability calculations.

3.3.4 Equipment duplication, hot-standby protection, parallel-run, path diversity, etc. shall be adopted whenever necessary and appropriate to meet the required availability.

3.3.5 Error detection and correction mechanism shall be included in the communication links as appropriate depending on the nature and functional criticality of the data conveyed.

3.3.6 Switchover between redundant equipment or between redundant routings shall occur automatically and in a hitless manner upon failure and shall be transparent to the users. Toggling in switchovers shall be prevented.

3.3.7 The Contractor shall conduct analysis and propose methods, if any, for further improvements of the availability of each sub-system beyond the minimum required availability figures mentioned above.

3.4 Maintainability Requirements

3.4.1 The System shall be designed such that the MTTR figures for restoring the operation of the System from fault condition shall be as specified in GCC/ SCC.

3.4.2 The MTTR figures shall be calculated from the individual equipment weighted by the failure rate of the equipment.

3.4.3 The MTTR figure shall be the total time calculated from the moment the occurrence of the fault at site is reported to the maintenance personnel to the time when the System is fully restored to normal operation. Time taken for the maintenance personnel to arrive at the site is included for the purpose of calculation of the MTTR figure.

3.4.4 The Contractor shall provide the history records from past works showing the achievement of MTTR figures declared. Where such records are not available, the Contractor shall provide simulation of faults to demonstrate that the declared MTTR figures are indeed achievable.

3.4.5 All plug-in modules shall permit hot swapping so as not to affect the normal or emergency operation of the System.

3.4.6 The System shall be suitably designed to minimize the need for frequent preventive maintenance.

3.4.7 The System shall be so designed so as to avoid the need for a total shutdown for preventive maintenance. In the event that a total shutdown is inevitable, the preventive maintenance shall not require the System to be non-operational for more than two hours during off peak hours to be decided in consultation with the Employer.

3.4.8 Built-in self-diagnostics, power-up self test and sufficient test points shall be provided in the System to minimize the time required to locate a fault.

3.4.9 All components, materials, software and supports required for repair and servicing of the System shall be available during the entire lifetime of the System.

3.4.10 The Contractor shall submit Maintainability Plan to the Employer's Representative for review in accordance with RAMS Plan.

3.4.11 The Maintainability Plan shall describe the analytical methods to be used during design and development stages to demonstrate compliance with maintainability requirements specified herein and to identify the maintainability-critical items of the System.

3.4.12 The Maintainability Plan shall identify a comprehensive list of maintainability-related submissions such as specifications, standards, method statements, procedures, drawings and records to the Employer's Representative for review. The Maintainability Plan shall include the date of submission.

3.5 System Safety Requirements

3.5.1 The Contractor shall perform the mandatory safety activities.

3.5.2 The Contractor shall support other likely Project Contractors in relation to conduct of CWG 2010 with the provision of information and relevant analysis where the availability and usability of the Telecommunications System is a contributing factor to the overall system risk.

3.5.3 The design of the System shall minimize the risk of fire.

3.5.4 The design of the System shall minimize the build-up of static, as well as the effects of static discharge during maintenance.

3.5.5 No Toxic or asbestos-containing materials shall be used anywhere in the System.

3.6 Electromagnetic Compatibility (EMC)

3.6.1 The Contractor shall ensure and demonstrate that the System is adequately protected against electromagnetic interference (EMI) among the systems. The Contractor is required to conduct type tests as well as full EMC tests. Tests to be conducted shall include but not limited to satisfying standards as following:

(1) Overall compliance of EN50121-1 & EN50121-4 and

(2) Specific Standards of immunity

-	Electrostatic discharge	:	IEC1000-4-2
-	Radio frequency fields	:	IEC1000-4-3
-	Electric fast transient/burst	:	IEC1000-4-4
-	Surge	:	IEC1000-4-5
-	Conducted RF	:	IEC1000-4-6
-	Power frequency magnetic field	:	IEC1000-4-8
-	Pulse magnetic field	:	IEC1000-4-9
-	Damped Oscillatory magnetic field	:	IEC1000-4-10
-	Voltage dips, short interruptions	:	IEC1000-4-11
-	Oscillatory Waves	:	IEC1000-4-12
-	Harmonics and inter harmonics	:	IEC1000-4-13
-	Voltage fluctuation	:	IEC1000-4-14
-	Conducted disturbance	:	IEC1000-4-16
-	Ripple DC Power Supply	:	IEC1000-4-17
-	Variation of power frequency	:	IEC1000-4-28
-	Digital Radio phone	:	IEC (Latest)
-	Radiated emission	:	EN50081-1
-	Conducted emission	:	EN50081-1

3.6.2 The Contractor shall provide detailed calculations and inter-modulation analysis to establish electromagnetic compatibility (EMC) among the sub-systems and with other systems in close proximity.

3.6.3 The maximum levels of out of band emission shall be such as to ensure that the subsystems perform in conformity with the criteria given in the respective Chapters of the TS.

3.6.4 The maximum levels of radiated and conducted EMI of the System shall not exceed the levels specified in EN50081-1.

3.6.5 Any equipment consisting of sensitive electronic components that is likely to be handled or touched by any person shall be protected against electrostatic discharge and shall be tested as defined in IEC1000-4-2.

3.6.6 All CRT-based monitors shall be adequately shielded from external EMI to prevent distortion of picture or any other form of visual disturbance.

3.6.7 None of the CRT-based monitors shall interfere with the operation of any other CRT-based monitors in close proximity.

3.6.8 All test shall be conducted to meet EMC severity levels specified by the relevant international standards. As a minimum, the EMC severity levels for industrial equipment shall apply.

3.6.9 Suppression of electromagnetic or electrostatic interference including any hardware shall be deemed to be Contractor's responsibility.

3.6.10 The contractor shall ensure that all intra system EMI are taken care of through proper design and other measures. All major subsystems shall be tested for emissions and immunities in accordance with the appropriate international standards.

3.7 Inter-system EMC

3.7.1 The contractor shall ensure that all equipments are designed and constructed in accordance with latest versions of EMC standards including but not limited to EN50082, EN50121, EN50123, EN50155, IEC571, IEC1000 or equivalents to ensure proper functioning.

3.7.2 Adequate safety margins between the immunity levels of the Telecommunications Systems and the emission levels of other electrical and electronic equipment must be maintained.

3.7.3 The design of the software shall take into consideration that with the interference injected into the system, it is possible to produce an abnormal condition. For example the program may become "locked up" awaiting a signal which will never arrive (system hang). It is important therefore that the various possible failures are analysed and appropriate actions are taken when failures are detected.

3.7.4 The probabilities of various conditions which could lead to an unreliable operation must be determined wherever applicable.

3.7.5 Relevant EMC test certificates for all standard off-the-shelf products shall be submitted to the Employer's Representative for review.

4. FUNCTIONAL REQUIREMENTS

4.1 General

The Contractor shall design the System such that operation of the System shall be in line with the provisions in the TS under normal and emergency conditions.

4.2 Operation

4.2.1 General

4.2.1.1 This part of the document only covers the general operational requirements of the System.

4.2.1.2 The Technical operational requirements and modes of individual Sub-systems shall be as given in Chapter 2, 3 of the TS.

4.2.2 Man-Machine Interfaces (MMI)

4.2.2.1 The Contractor shall provide user-friendly Man-Machine Interfaces.

5. DESIGN REQUIREMENTS

5.1 General

5.1.1 Design Approach

5.1.1.1 The Contractor shall adopt a structured, modular and top-down approach for the design and exercise proper control to ensure that the designs are in accordance with the requirements given in the Specifications.

5.1.1.2 The technologies adopted for the design of the System shall be :

(1) field proven with past successful applications references

(2) Conforming to open international standards.

5.1.1.3 The System shall be designed for continuous unattended operation for extended periods of time.

5.1.1.4 All of the Contractor's key staff shall be located in Delhi. The Contractor's staff shall be competent with sufficient experience in the individual responsibility areas. The Contractor shall attach a list & CV of its key responsible officers in the Bid.

5.1.1.5 The Contractor shall submit a Design Plan with requirements as stipulated in the TS.

5.1.2 Design Verification and Validation

5.1.2.1 The Contractor shall submit detailed design calculations and supporting drawings, documents, etc., for the applicable Subsystems to the Employer's Representative for review.

5.1.2.2 The design calculations shall demonstrate that the Contractor's design fully complies with the requirements given in the Specification. The design calculations shall further demonstrate that the ratings, capacity and quantity of the proposed equipment are adequate.

5.1.2.3 The Contractor shall furnish the following calculations and analysis for Radio System and CDRS as a minimum:

(1) Estimation of the power consumption and heat dissipation per equipment location

(2) Prediction of the reliability and availability of the Subsystem.

5.1.2.4 The requirements on design calculations specific to the Subsystems shall be as given in Chapter 7.2 & 7.3 of the TS.

5.1.3 Design Review

5.1.3.1 The Contractor shall ensure that all design submissions are accurate, fully compliant relevant and of good quality before they are submitted to the Employer's Representative for review.

5.1.3.2 The Contractor shall ensure that all comments of the Employer's Representative have been properly incorporated or otherwise resolved before resubmission.

5.1.3.3 The Contractor shall exercise adequate control to ensure that the number of resubmissions is minimized.

5.1.3.4 In addition to the Contractor's own design reviews and the Baseline Design Review, the Contractor shall carry out design review meetings with the Employer's Representative at the appropriate design stages with at least one slated prior to the conclusion of the preliminary design and the final design. The Contractor shall include presentation of this design at the meeting and demonstrate how his design complies fully to all aspects of System requirements. The Employer's Representative's comments thereto shall be recorded and duly incorporated in the design.

5.1.3.5 The following issues shall be addressed during each of the design review meetings:

(1) Reliability, Availability, Maintainability and Safety (RAMS)
(2) Ergonomics and Human Factor Engineering
(3) Design Progress
(4) Interface Issues.

5.2 Equipment Design

5.2.1 General Considerations

5.2.1.1 Specific equipment design requirements for radio, CDRS and associated subsystems are given in Chapter 7.2, 7.3 of the TS.

5.2.1.2 The offered equipment shall be field proven with past history of successful performance.

5.2.1.3 For all heat dissipating equipment including power amplifiers, the Contractor shall provide the following as necessary and applicable:

(1) local warning signs

(2) local over-temperature alarm indications

(3) remote over-temperature alarm monitoring

(4) facilities for remote power ON/OFF

5.2.1.4 All active equipment shall have LED indications indicating :

(1) normal operating conditions

(2) normal power supply

(3) alarm conditions

5.2.1.5 All equipment shall be designed and constructed to operate without degradation in quality, performance or loss of function in the electromagnetic environment prevalent in a standard metropolitan environment including indoor spaces.

5.2.2 Fire and Smoke Precautions

5.2.2.1 The cable routes shall be suitably designed to prevent trapping of rubbish which could later become a fire hazard.

5.2.2.2 Every possible precaution must be taken to prevent the flow of fault currents through the cables. Communication cables must be kept away from high tension power supply cables.

5.2.2.3 All the above requirements shall be fully complied with, without compromising any of the mechanical or electrical properties of the cable.

5.3 Environmental Conditions

5.3.1 All equipment shall be protected from damage or degradation in performance due to shock or vibration as experienced in metropolitan environment.

5.3.2 Unless otherwise specified, all telecommunication equipment installed under this Contract shall be designed for operation in temperatures of 0°C to +50° C.

5.3.3 The Telecommunication Equipment Rooms except the OCC and BCC shall be provided with air-conditioning by the Contractor to maintain the room temperature at 24 +/- 2°C.

5.4 System Expansion

5.4.1 The Contractor shall design the System with sufficient capacity such that the System can operate properly under peak load traffic conditions, in accordance with Sec.-6 of the RFP and with sufficient margins in performance to ensure normal operation for any change in design assumptions and operating conditions.

5.4.2 The Contractor shall adopt a modular approach for design to enable System expansion with minor modifications such as parameter changes or additions of modules without the need for substantial equipment replacement or software rewrite.

5.4.3 The Contractor shall submit a System Expansion Plan to the Employer's Representative for review.

6. VERIFICATION, TESTING AND COMMISSIONING

6.1 General Guidelines for Testing and Commissioning

6.1.1 The Contractor shall perform stage-wise testing and commissioning activities in accordance with the requirements given in this Specification.

6.1.2 The Contractor shall ensure that the Employer's Representative prior to the commencement of the test has reviewed test documentation associated with any test without objection.

6.1.3 The Contractor shall ensure the System is in a state ready for testing and commissioning before the commencement of the tests witnessed by the Employer's Representative. The Contractor may conduct trial tests by himself before the Employer's Representative witnesses the tests, if necessary.

6.1.4 Test results of the Contractor's own trial tests shall be made available to the Employer's Representative on request before the tests are witnessed by the Employer's Representative.

6.1.5 The Contractor shall satisfy himself that all items interfacing to other Project Contractors, who may be working for CWG 2010, are in satisfactory condition for the Contractor's tests to be carried out.

6.1.6 The Contractor shall provide all necessary test instruments, special tools, emulators, simulators and test software to carry out the tests.

6.1.7 The Contractor shall provide simulation for testing in case the interfacing equipment is not available for testing.

6.1.8 The Contractor shall extend full support to the Employer's Representative and provide all necessary facilities to enable convenient inspection of materials, work and testing.

6.1.9 The Contractor shall investigate and provide corrective actions for all the faults detected during the tests. The tests shall be resumed only after all the faults are properly cleared. The Contractor shall submit fault report to the Employer's Representative to describe the symptom and causes of the faults and the corrective actions taken.

6.1.10 If the operation of other project contractor's system or equipment is suspected to be affected by the system during the test, the contractor shall withhold the test, investigate and provide corrective actions, if necessary, before resumption. The test shall be resumed only after the interference has been eliminated or found not to be related to the system.

6.2 Testing Stages

6.2.1 The Contractor shall carry out testing and commissioning activities in the following phases:

(1) Installation Tests

(2) Provisional Acceptance Tests (PAT)

(3) Final Acceptance Tests (FAT)

(4) Integrated Testing and Commissioning

6.3 On-site Testing and Commissioning

6.3.1 General

The Contractor shall prepare and submit to the Employer's Representative for review an On-site Testing and Commissioning Plan.

6.3.2 Installation Tests

6.3.2.1 Installation Tests shall be carried out on individual Subsystem location by location after the completion of equipment's physical installation.

6.3.2.2 The objective of the installation tests shall be to ensure the following:

1) the equipment is installed in accordance with the reviewed design documentation

2) the equipment is installed in accordance with the requirements detailed in this Specification

3) all cables are properly and accurately connected and terminated

4) all installation works are of acceptable workmanship

6.3.2.3 The Contractor shall develop Installation Tests Procedures and submit to the Employer's Representative for review.

6.3.2.4 The Installation Test shall not be started unless the test procedures have been reviewed without objection by the Employer's Representative.

6.3.2.5 All installed equipment and cables shall be physically inspected against all relevant review design documentation.

6.3.2.6 The Contractor shall measure the end-to-end performance of all cores of the copper cables and optical fibre cables, including all spare cores, laid between different locations.

6.3.2.7 All the installation test results, physical locations of the equipment and serial numbers shall be captured in the test record forms. The Contractor shall include completed test record forms in the Test Report and submit to the Employer's Representative for review.

6.3.3 Provisional Acceptance Tests

6.3.3.1 Provisional Acceptance Tests shall be carried out on individual Subsystem location by location, on areas or section basis to verify the functions, performance and services coverage at the stage :

(1) after successful completion of the Installation Tests

(2) after the Subsystems have been configured with correct settings and parameters

(3) properly connected to the power supply and can be switched on for Provisional Acceptance Tests

(4) before the equipment of different locations are connected up and ready for Final Acceptance Tests

6.3.3.2 The Contractor shall develop Provisional Acceptance Tests in accordance with the requirements of TS.

6.3.3.3 The Contractor shall develop Provisional Acceptance Tests Procedures for each Subsystem and submit to the Employer's Representative for review.

6.3.3.4 The Provisional Acceptance Tests procedures shall include:

(1) Objectives of the Provisional Acceptance Tests for all Subsystems

(2) List of specifications and standards, reviewed design documentation for reference

(3) Step-by-step test instructions

(4) List of test instrument and special tools

(5) Test record forms

(6) Pass or fail criteria

6.3.3.5 The functional, electrical and timing performances of the Subsystems shall be verified against the requirements and relevant international standards.

6.3.3.6 Wherever applicable, the Contractor shall have local loop back tests on circuits for electrical performance measurement such as error rate and signal level measurement.

6.3.3.7 All local alarms, control and monitoring functions shall be verified.

6.3.3.8 All equipment settings and parameters shall be verified and recorded in the reviewed test record forms.

6.3.3.9 Coverage test shall be carried out on location basis for the Radio system.

6.3.3.10 The Contractor shall perform functional check and signal strength measurement on the radio system for each channel at spots reviewed by the Employer's Representative to verify the radio signal coverage requirements given in Chapter 2 of this TS, and shall cover, but not be limited to:

(1) Each Games Stadia

(2) Games village

(3) Other games venues and training centers (Ref. Annex 8.1 & 8.2)

(4) Each ancillary building

(5) All entrances, exits, subways at all venues

(6) Indira Gandhi International Airport (IGIA)/ DIAL

6.3.3.11 The Contractor shall conduct continuous signal strength following the pre-determined paths given by the Employer's Representative with the frequency of the radio system. The Contractor shall submit such graphs/plots of the drive test which indicate the signal strength, BER and time stamp of the readings, as part of the Provisional Acceptance Test Results of the Radio System.

6.3.3.12 The Provisional Acceptance Tests are considered completed only if the Employer's Representative without objection reviews the Provisional Acceptance Test Results.

6.3.3.13 Upon completion of the Provisional Acceptance Test, the individual Subsystem shall be operational and ready to be connected to other Subsystems and interfacing systems for testing.

6.3.4 Final Acceptance Tests

6.3.4.1 Final Acceptance Tests shall be carried out to ensure that the System operates in accordance with functional and electrical performance requirements given in the Technical Specification.

6.3.4.2 Final Acceptance Tests shall be carried out at the following stages:

(1) after completion of Provisional Acceptance Tests for each Subsystems

(2) After all individual Subsystems have been connected together and the System as a whole is capable to operate in all respect in accordance with the requirements given in the Technical Specification.

6.3.4.3 The Contractor shall submit a Final Acceptance Tests Plan to the Employer's Representative for review.

6.3.4.4 The Contractor shall conduct end-to-end circuit test to verify the circuit integrity and electrical performance for all circuits including spare.

6.3.4.5 All alarm points shall be verified with simulated faults.

6.3.4.6 All protection mechanisms such as hot-standby, parallel redundancy, automatic switchover, etc, built into the System and individual Subsystem shall be verified.

6.3.4.7 The system response time of relevant Subsystems and the System shall be tested and measured.

6.3.4.8 The Contractor shall carry out load test on each Subsystem to verify the designed system capacity and performance in accordance with the requirements given in the Technical Specification under full load condition.

6.3.4.9 The Contractor shall carry out tests on the operation of the System in accordance with the normal operation procedures and emergency operation procedures, which has been reviewed without objection by the Employer's Representative.

6.3.4.10 The Contractor shall carry out tests on OCC & BCC operation of the System in accordance with approved operation procedures as below:

(1) When OCC is the master control

(2) When BCC takes over as master control

6.3.4.11 The Contractor shall conduct tests to verify the proper inter-operation among Subsystems.

6.3.4.12 The Final Acceptance Tests are considered completed only if the Final Acceptance Tests results are reviewed by the Employer's Representative without objection.

6.3.4.13 Upon completion of the Final Acceptance Tests, the System shall operate in accordance with the functional and performance requirements given in the TS.

6.3.5 Integrated Testing and Commissioning

6.3.5.1 The Contractor shall carry out Integrated Testing and Commissioning after the completion of the Final Acceptance Tests.

6.3.5.2 The Contractor shall co-ordinate with the Employer's Representative and with all the interfacing Project Contractors to ensure all the interface test activities are completed in accordance with the program on Completion Plan.

6.3.5.3 The Contractor shall provide all necessary supports, conduct investigation and provide corrective actions, if necessary, to ensure all matters related to interfacing are properly resolved.

6.3.5.4 Within one week upon completion of all interface test activities, the Contractor shall submit the test results to the Employer's Representative for review.

6.3.5.5 After the test results of all interface test activities have been reviewed by the Employer's Representative without objection, the Contractor shall start the reliability demonstration test in accordance with the reviewed reliability demonstration test plan.

6.3.5.6 The Contractor shall advise the Employer's Representative in writing the commencement date of the reliability demonstration test.

6.3.5.7 The reliability demonstration test period shall be at least three months.

6.3.5.8 The Contractor shall submit a Reliability Demonstration Test Plan to the Employer's Representative for review at least three months before the test.

6.3.5.9 The Contractor shall include the following in the reliability demonstration test plan as a minimum:

(1) Calculation of the maximum allowable number of failures equipment, Subsystems and System during the reliability demonstration period in accordance with requirements on reliability performance of the equipment, Subsystem and System given in Technical specification.

(2) Definition of relevant failures

(3) Pass and fail criteria

(4) Sample of fault logs

6.3.5.10 During the reliability demonstration test period, the Contractor shall record details of all faults in a fault log which shall include:

(1) The date and time the fault occurs

(2) The date and time the Contractor's staff arrive on site

(3) The date and time the fault is cleared and the normal operation restored

(4) The description of the fault

(5) The cause of the fault

(6) Equipment or component replaced

6.3.5.11 The fault log reporting should have automatic ticket generation using help desk software module of NMS with an updated status.

6.3.5.12 All fault logs shall be submitted to the Employer's Representative for review.

6.3.5.13 The reliability demonstration test is considered a failure if :

(1) The actual number of relevant failures exceeds the maximum allowable number of failures for any equipment, Subsystems or System identified in the reliability demonstration test plan.

(2) Any fault resulting from the design omission or commission of error requires design modification in order to fix the fault.

6.3.5.14 If the reliability demonstration test fails, the Contractor shall provide all the necessary corrective actions and rectify the fault to the satisfaction of the Employer's Representative.

6.3.5.15 The reliability demonstration test shall be repeated on the affected Subsystem or Subsystems for another three months until the test is successfully completed.

6.3.5.16 Within two weeks upon completion of the reliability demonstration test, the Contractor shall submit the test result for the Employer's Representative to review.

6.3.5.17 The Integrated Testing and Commissioning is considered completed only if all the test results of the Integrated Testing and Commissioning have been reviewed by the Employer's Representative without objection.

6.3.6 Service Trials

6.3.6.1 The Contractor shall provide all necessary support and attendance to the Employer's Representative during the Service Trials period in accordance with the requirements given in General Specification.

6.3.6.2 The Contractor shall provide on-site supports to the Employer's Representative in all aspects related to the operation of the System. The Contractor shall also conduct investigation and provide corrective actions for any problem related to the System or the interfaces with the System.

6.3.6.3 The Contractor shall assign competent staff to support the Service Trials as required by the Employer's Representative. The persons shall be the

engineering staff who shall have sufficient skill and knowledge of the System and shall have been involved in the design, installation or commissioning of the System.

6.3.6.4 The Contractor shall submit a manpower plan to the Employer's Representative for review at least one month before the commencement of the Service Trials.

6.3.6.5 The manpower plan shall include the organization chart of the Contractor's Service Trials supporting group, individual person's role and responsibility and 24-hour contacts for emergency cases.

6.3.6.6 The contractor shall be responsible for all consumables such as fuel supply to DG Sets, Power etc. at his own cost.

6.4 INSTALLATION

6.4.1 General

6.4.1.1 The Contractor shall supervise all installation of the Works and shall ensure all technical, safety and quality matters adhered to the design reviewed by the Employer's Representative.

6.4.1.2 The Contractor shall maintain the Site in a neat and tidy state at all times. The Contractor shall also clear the Site daily before leaving.

6.4.1.3 The Contractor shall provide all necessary and sufficient resources such as tools, test instrument, spares, equipment, manpower and communication facilities to complete all the installation activities.

6.4.1.4 The Contractor shall ensure that his staff is competent and possess all the necessary skills to carry out the installation in a proper and safe manner.

6.4.1.5 The Contractor shall carry out site surveys to ensure sufficient knowledge on the Site before submitting the relevant installation drawings and installation related submissions to the Employer's Representative for review.

6.4.1.6 The Contractor shall submit calculation, if required by the Employer's Representative, to demonstrate the proposed brackets and mounting methods are sufficient to withstand the wind loading for the equipment.

6.4.1.7 The Contractor shall submit installation method statements for each type of installation activities at least three months before the commencement of the activity to the Employer's Representative for review.

6.4.1.8 The installation method statement shall include the details on the methods and procedures of installation, site arrangement, manpower resources, equipment and tools required. Drawings shall be included to illustrate the proposed installation details.

6.4.1.9 All installation activities shall commence only after the method statement and related submissions have been reviewed without objection by the Employer's Representative.

6.4.1.10 The Contractor shall assign competent site supervisors for each work site to be responsible for all site-related matters.

6.4.1.11 The Contractor shall carry out regular site audit on both technical and safety matters and maintain records of the site audits. The Contractor shall make these records available to the Employer's Representative for inspection upon request.

6.5 Installation Programme

6.5.1 The Contractor shall submit Installation Programme for review by the Employer's Representative not later than 3 months from the award of work.

6.5.2 The Contractor shall co-ordinate with relevant Project Contractors to agree the date of access to the physical areas to carry out installation activities.

6.5.3 The Contractor shall develop the Installation Programme and take the following into account:

(1) Installation schedule

(2) Key Dates and Milestones

(3) Site access

6.5.4 The Contractor shall also bring to the notice with justification all relevant constraints, which may affect the Installation Programme, to the Employer's Representative's attention.

6.5.5 The Contractor shall include dependencies between relevant activities in the Installation Programme.

6.5.6 The Contractor shall ensure sufficient floats or slacks in all activities and avoid critical paths built in his Installation Programme. In case critical paths cannot be avoided, the Contractor shall highlight any critical paths to the Employer's Representative's attention.

6.5.7 The Contractor shall propose contingency plan to ensure all the major Key Dates and Milestones can be met in case there is slippage in the installation activities.

6.5.8 Any subsequent changes in the reviewed Installation Programme shall be submitted to the Employer's Representative for review.

6.6 Installation Works

6.6.1 Installation in Equipment Rooms

The following equipment rooms, as defined in Chap. 7.2 of TS shall be provided by Employer:

1) Central Equipment Room at OCC & BCC

2) Local Control Rooms (LCR)

6.6.1.1 For exact room dimensions the Contractor shall co-ordinate with the Employer and the concerned Govt. Departments and finalise the final room plans.

6.6.1.2 All floor mounted equipment cabinets at the equipment room shall be securely bolted to ground, properly aligned and levelled.

6.6.1.3 All wall-mounted equipment shall be installed at appropriate height to avoid any hazards to the person passing by. The Contractor shall ensure the wall is of sufficient strength to hold the wall-mounted equipment in a secure and safe manner.

6.6.1.4 The floor mounted equipment cabinets shall be arranged in the way to allow sufficient space at the front and rear side of the cabinets for maintenance access. Sufficient space shall also be allowed for front maintenance access of the wall mounted equipment.

6.6.1.5 The equipment layout within the equipment room shall be designed to allow sufficient clearance for space out of the equipment rooms in case of emergency.

6.6.1.6 The Contractor shall submit the following to the Employer's Representative for review at least three months before the commencement of the installation inside the equipment room :

(1) Drawings showing the equipment layouts and positions of the racks, cabinets and enclosures.

(2) Racks, cabinets layout drawings showing the arrangement of individual module.

(3) Specifications, sample of all the mounting brackets and accessories.

(4) Equipment mounting and installation methods.

(5) Schematic diagrams and wiring diagrams of the System.

(6) Electrical distribution within the room including the earthing details.

(7) Cable route diagrams for cables within the room.

6.6.1.7 Installation work inside the room shall be carried only after these submissions have been reviewed without objection by the Employer's Representative.

6.7 Earthing Policy

6.7.1 An earthing system shall be designed to assure personnel safety and protection of installations against damage. It shall also serve as a common voltage reference and to contribute to the mitigation of disturbances.

6.7.2 The earthing system shall generally meet the requirements of IEEE 1100, NFPA 780, IEC 1024.

6.7.3 To achieve the primary goal of assuring personnel safety and damage control, a low impedance path shall be made available to the current generated due to lightning or power system fault. The potential differences between any two points shall be as low as possible.

6.7.4 To achieve the secondary goal of providing protection for sensitive and interconnected electronic and electrical systems, earthing shall be designed to minimize the noise voltage generated by currents from two or more circuits flowing through common earth impedance and to avoid creating earth loops susceptible to magnetic fields and differences in earth potential.

6.7.5 Earthing shall be designed to accomplish the following minimum requirements:

a) Protect personnel and equipment from electrical hazards, including lightning.

b) Reduce potential to system neutrals.

c) Reduce or eliminate the effects of electrostatic interference and electromagnetic interference arising from extraneous sources at the sites designated/selected by the bidder.

d) Providing a proper earthing method for all equipment enclosures, cabinets, drawers, assemblies and sub-assemblies.

e) Provide a clean zero-volt reference point.

6.7.6 There shall be two separate earth connections, a Main Earth Connection and Clean Earth Connection.

6.7.7 The earthing system shall meet, but not be limited to, the following:

a) The resistance to earth of the system “earth terminal” must remain within the stipulated limits at all locations and under all climatic conditions.

b) Any electrical joints in the earthing system shall be protected from moisture ingress by using proper wrapping, sealing with waterproof tapes, or such other measures.

6.7.8 The earthing arrangements for Antenna Towers and Antennae shall be such that :

a) The zone of coverage shall afford protection of all objects forming part of the Antenna Towers and Antennae including any objects near the base of the tower, and this factor shall be taken into consideration while deciding the height of the lightning conductor at the top of the tower.

b) Earthing of VHF/UHF Antenna Feeder Cables having Copper Sheaths shall be such as to maintain a low resistance connection to the earth.

Any junction forming a part of this connection shall be protected from moisture ingress by using proper wrapping, sealing with water-proof tapes, or such other measures. The connection shall be inspected periodically at intervals frequent enough to ensure that the earth connection meets all the requirements.

6.7.9 Main earth shall be provided at UPS Room. Main Earth shall be terminated by the Contractor at a copper strip. These copper strips shall be of adequate size to accommodate Main Earth Termination requirement of other contractors also; if applicable.

6.7.10 The Clean Earthing arrangements for Telecom Equipment shall be as below :

a) All Telecom Equipments must be protected using a mesh of copper "earth" strips of appropriate cross-sectional dimensions, forming a local Clean Earth Bus.

b) Each equipment rack shall be connected electrically to this bus. This bus shall be connected to the external ring earth at the shortest possible distance from two opposite points of this bus.

c) All joints of this connection shall be protected from moisture ingress by using proper wrapping, sealing with water-proof tapes, or such other measures.

d) The earthing connection shall be inspected periodically at intervals frequent enough to ensure that the earth connection meets all the requirements.

6.7.11 The earthing electrodes for the Clean Earth shall be located at least 20 m away from the Main Earth.

6.7.12 The route of the Clean Earth shall be so chosen as to minimize the effect of any inductive interference.

6.7.13 For the purpose of measurement of earth resistance, a small interconnecting copper strip of appropriate cross-section shall be provided in the ring earth in a small manhole chamber so that the ring earth can be broken from the loop.

6.7.14 The earth resistance at any point on the Clean Earth shall be below 0.5 ohm, and that for the Main Earth shall not exceed 2.0 ohm at any location and under any soil and/or climatic condition.

6.7.15 All metal work and metallic items (including chassis) shall be earthed to the Main Earth to ensure the safety of personnel.

6.7.16 The earthing methods and details shall be submitted to the Employer's Representative for review.

6.8 Transient Protection

6.8.1 General

a) Despite the provision of earthing as specified above, failure of communication equipment do occur on account of finite earth resistance during occurrence of high voltage transients.

b) Typically, a transient is a temporary, usually short duration, surge voltage of limited energy. Electronic equipment with high input impedance is inherently more susceptible to transients.

c) Physical distance from the transient source does not necessarily guarantee immunity from transients.

6.8.2 Requirements for effective transient protection

An effective transient protection system must protect the communication equipment from transients of the following specifications as a minimum:
MIL-STD-704A or equivalent

7. Operation of Service including Operation and Maintenance Support

7.1 General

7.1.1 The Contractor shall investigate all failures, major failures, repetitive failures, design defects and provide all necessary corrective actions throughout the Contract period.

7.1.2 The Contractor shall investigate interference problems either from or to the systems of other Project Contractors and provide all necessary corrective actions throughout the Contract period.

7.2 Operating and Maintenance Documentation

7.2.1 The Contractor shall prepare Operation and Maintenance documentation and the Employer's Operation and Maintenance Manual Specification.

7.2.2 The first submission shall be made to the Employer's representative for review at least three months prior to the issue of the Completion Certificate for the Works.

7.3 Maintenance Plan

7.3.1 The Contractor shall submit a Maintenance Plan in accordance with provisions in TS/GCC to the Employer's Representative for review before the commencement of installation activities.

7.3.2 The Maintenance Plan shall describe the Contractor's proposed maintenance regime for preventive and corrective maintenance of the System, including, but not be limited to the following:

(1) The maintenance philosophy and approach

(2) All necessary tasks for the corrective maintenance

(3) Frequency of each maintenance task

7.3.3 The Contractor shall include the following information on each maintenance task described in the Maintenance Plan :

(1) The equipment, Subsystems covered in the task

(2) Step by step procedure to carry out the task

(3) Tools and test equipment list of each task

(4) Diagrams and flowcharts for illustration, if applicable

(5) Recovery procedures, if applicable

(6) Precautions the maintenance personnel has to follow

(7) Estimated duration and manpower required

7.3.4 In addition to the Maintenance Plan, the Contractor shall also submit a Yearly Routine Maintenance Schedule to the Employer's Representative for review and shall indicate the schedule of maintenance tasks in a calender year.

7.4 Software Support

7.4.1 General

7.4.1.1 The Contractor shall provide all changes, debugging, updates, modifications and upgrade of all the software delivered for the System including data configuration tables if such changes are necessary and in order to maintain the normal operation and meet the requirements given in this Technical Specification.

7.4.1.2 Any changes and modifications of the software shall not degrade the performance or have adverse impacts of the System.

7.4.1.3 The Contractor shall maintain backup copies of all software developed or delivered for the System.

7.4.1.4 The Contractor shall ensure that all new versions are fully tested and validated and reviewed without objection by the Employer's Representative prior to loading into the System.

7.4.1.5 The Contractor shall provide training for the Employer's staff for use of new version, as and when incorporated.

7.5 Security Obligations

7.5.1 Within 14 days of the installation of any software, which is developed or modified for this Contract, into the Permanent Works by the Contractor, the Contractor shall submit to the Employer's Representative for retention by the Employer two backup copies of the software, which shall include, without limitation:

(1) all source and executable code including all data configuration tables

(2) all design documentation relating to the software

(3) any specified development tools required for maintenance of the software, including, but not limited to, editors, compilers and linkers.

7.6 Workshop Repair

7.6.1 The Contractor shall collect and repair defective parts that are removed from the System during maintenance or from the Employer.

7.6.2 The Contractor shall perform all necessary adjustments or alignments as to the repaired parts. The repair of defective parts can only be considered as completed and returned to stock or back to the System if the parts are tested and verified fit for use in the System.

7.6.3 The Contractor shall use only components of equal or higher specification than the original components in his repair activities.

7.6.4 The performance of the defective parts after repair shall not be degraded or deteriorated due to repairing.

7.6.5 The maximum turnaround time for workshop repair shall be less than 28 calendar days. The turnaround time is started to count when the defective parts are removed from the system and ended when the parts are repaired and returned to stock or to the System. Any extension of workshop repair time shall be agreed with the Employer.

8. SPARES, SPECIAL TOOLS AND TEST EQUIPMENT

8.1 Spares

8.1.1 General

8.1.1.1 The Contractor shall provide his own spares during installation and commissioning period as well as for support during the Service period.

8.1.1.2 The Contractor shall submit the lists of spares within two weeks of the commencement date of the works to the Employer's Representative for review. The lists shall include:

(1) Grouping by Subsystem, diagnostic and test equipment and special tools, as applicable, for stocking identification

(2) A cross-reference and indexing system for replacement components common to more than one subsystem

(3) Detailed description with references and correlation with the maintenance manuals.

8.2 Special Tools and Test Equipment

8.2.1 The Contractor shall provide his own test equipment and tools during the installation, commissioning periods, and Service period.

8.2.2 The recommended special tools and test equipment shall be of appropriate types and sufficient quantities to enable the Employer to carry out his own operation and maintenance of the system. Test equipment shall be recommended for the purpose of testing, trouble shooting, programme diagnosis and equipment calibration.

8.2.3 All special tools and test equipment shall be supplied together with operation manual, complete diagrams, schematics, assembly and connection drawings, maintenance and calibration instructions for the special tools or test equipment.

8.2.4 A load simulator shall be supplied to check the network performance under peak subscriber load conditions. The subscriber load details are indicated in Sec.- 6 of the RFP.

9. TRAINING

9.1 General Requirements

9.1.1 The contractor shall provide comprehensive training to the employer's staff including Employer's trainers, in accordance with the requirements contained in this Technical Specification and in the general specification.

9.1.2 The contractor shall set up training class rooms at site, where he shall provide competent training instructors, training manuals, training simulators, all necessary aids and materials as required for all the training courses.

9.1.3 All the training courses shall be conducted during installation period and completed before the commencement of testing and commissioning. No training course shall be started before the completion of design phase.

9.1.4 The training courses shall be conducted at Employer's place and at the site(s).

9.1.5 The training instructors shall be qualified, competent, with sufficient years of practical experience in the relevant fields and possesses good communication skills.

9.1.6 The training instructors shall be either the system designer or engineering staff of the contractor, the contractor's subcontractors or the equipment manufacturers.

9.2 Training Plan

9.2.1 Within sixty days after the Commencement Date of the Works, the Contractor shall submit a training Plan to the Employer's Representative for review.

9.2.2 The training Plan shall include, but not limited to the following :

(1) The program of the training courses and submission schedule of the training materials

(2) Overview and description of objectives of each training course

(3) The location where the training courses to be conducted

(4) Set ups for practical exercises

(5) The Contractor's training organization chart, including the role and responsibilities of individual key persons

(6) The qualification and experience of the training instructors

(7) Details of training simulators to be provided or developed, if applicable.

9.3 Training courses

9.3.1 The Contractor shall provide training courses for each of the Subsystems, including, but not be limited to :

(1) Radio System

(2) Centralized Digital Recording System (CDRS)

(3) Microwave Link

9.3.2 Different types of training courses of each Subsystem shall be provided for staff from different disciplines. Operations training courses shall be provided for the operations staff. System engineering and maintenance courses shall be provided for engineering and maintenance staff. The Employer's training Instructors shall attend all types of training courses such that the Employer's training Instructors shall be able to subsequently train the Employer's staff in all aspects of operation and maintenance of the System.

9.3.3 The size and number of training batches shall be as per provisions of GCC.

9.3.4 The Contractor shall determine the number of classes for each type of training course to ensure the objective of the course can be met.

9.4 Operations Training Courses

9.4.1 The operations training courses shall be developed to provide all necessary knowledge and skills for operations staff of the Employer to operate the system under normal and emergency situations and recovery from minor or

simple faults. In Technical, the training course shall include the following as minimum :

(1) Overview of the Telecommunications System

(2) Brief description of the operation principle of the Subsystem

(3) Operational features and functions

(4) Familiarization and use of all man-machine interfaces involved

(5) Reading and interpretation of system status and alarm messages or indications

(6) Normal operating procedures

(7) Operating procedures under emergency situations

(8) Procedures for recovery from minor or simple faults

(9) Use of Operation and Maintenance Manuals and documentation

9.4.2 Technical exercise shall be included in the operations training course for each trainee to operate and manage the system under normal and emergency operating conditions and simple fault recovery.

9.5 System Engineering and Basic Maintenance Courses

9.5.1 System Engineering and basic Maintenance Courses shall be developed to provide all necessary knowledge and skills :

(1) To perform basic maintenance, including both preventive and corrective maintenance, on the System; and

(2) To perform system engineering management including system parameter configuration, enhancement, expansion and provision of new circuits.

9.5.2 The Contractor shall determine the content of the courses and the courses shall include the following as minimum :

(1) Overview of the Telecommunications System

(2) Background theory

(3) System features and functions

(4) System configuration and operation principles

(5) Description of system components and equipment down to card or module level

(6) Test and commissioning procedures

(7) Use of test equipment and special tools

(8) Reading and interpretation of alarm indications, messages and printouts

(9) Preventive maintenance procedures

(10) Fault diagnosis, troubleshooting and corrective maintenance procedures

(11) Equipment setting and parameter configuration

(12) Use of equipment manuals, Operation and Maintenance manuals circuit diagrams and wiring schematics

(13) Methods and procedures to provide new circuits, system expansion and enhancement

(14) Data, software backup and loading

(15) Use of software such as peripheral control and configuration, utility database structure, generation and modification

9.5.3 Practical exercises shall be provided for each trainee to practice the following as minimum :

(1) Use of test equipment and special tools

(2) Preventive maintenance

(3) Fault diagnosis and troubleshooting with induced faults set by the Contractor to simulate real-life situation

(4) Faulty modules or cards replacement and restore the system to normal operation

9.6 Training Materials

9.6.1 At last two months before the commencement of the training course, the contractor shall submit all the training materials including the trainer's guides, training manual for trainees, training aid and presentation material to the Employer's Representative for review. The training material shall be prepared in a form that allows easy future reproduction.

9.6.2 The format of the trainer's guides and training manual for trainees shall be submitted to the Employer's Representative for review.

9.6.3 The Contractor shall, for each course, distribute two sets of trainer's guides, one set of training manual for each trainee, two sets of trainer's guides and three additional sets of training manual to the Employer's Representative before the commencement of training course.

9.6.4 The trainer's guide shall be prepared in accordance with the requirements given in the GCC and TS.

9.6.5 All the training materials shall be accurate and match with the actual design of the System.

9.7 Training Records

9.7.1 The Contractor shall devise a system, standards in assessing the level of knowledge, understanding of the course content and proficiency of the trainees. The system and standards shall be submitted to the Employer's Representative for review four weeks before the commencement of the training course.

9.7.2 The Contractor shall issue appropriate training certificate to the trainees who pass the assessment.

9.8 Course Evaluation

9.8.1 The Contractor shall develop questionnaires to trainees for each training course in determining the level of satisfaction with the course content. Appropriate scoring weightage shall be assigned to each question in the questionnaires such that the scores shall reflect the trainee's satisfaction to the training course. The questionnaires shall be submitted to the Employer's Representative for review four weeks before the commencement of the training course.

9.8.2 Upon completion of each training course, the Contractor shall distribute the questionnaires to the trainees to fill in.

9.8.3 The Contractor shall submit a training report to the Employer's Representative for review within two weeks after completion of each course. The training report shall include a summary of the training course conducted, the results of trainee's assessment and the course evaluation questionnaires.

9.8.4 The Contractor shall submit the course evaluation criteria to the Employer's Representative for review identifying the criteria for success of the course.

9.9 Documentation

9.9.1 General

9.9.1.1 The Contractor shall submit a Submission Programme. The Submission Programme shall identify all submissions to be furnished, submission titles, submission numbers and target submission dates.

9.9.1.2 The Contractor shall provide configuration management to ensure that the system is correctly configured. The Contractor shall ensure that a configuration control programme is maintained. The programme shall ensure that the configuration of each item is recorded and maintained during the life of the Contract.

9.9.1.3 The Contractor shall submit a Project Management Plan to the Employer's Representatives for review as laid down in the TS. The Project Management Plan shall identify the persons to be responsible and the methods and arrangement to carry out the Project Management.

9.10 Submission Requirement

9.10.1 General

9.10.1.1 The Contractor shall include records of amendment in each submission with the following details:

(1) Revision History and status of submissions.

(2) Description on Changes for each revision.

(3) The Contractor's signature for authorization of the submission indicating proper design check has been carried out before submitting to Employer's Representative.

9.10.1.2 The revision status and date of preparation of the submission shall be clearly indicated at the header of each page of the submission.

9.10.1.3 The first submission shall be revision 0 and subsequent revisions shall be A, then B, so and so forth.

9.10.1.4 The Contractor shall maintain records of the submission and updated record shall be included in the Monthly Progress Report. The submission record shall include the following details:

(1) Submission number and Submission title

(2) Revision history

(3) Status of Employer's Representatives Response for each revision.

(4) Submission dates and dates of return from the Employer's Representative for each revision.

(5) Current Status

9.10.2 Levels of Submission.

9.10.2.1 The Contractor shall adopt top-down approach and submit submissions of the following levels in a logical sequence for the review of the Employer's Representative:

(1) System level related submission.

(2) Equipment level related submission

(3) Installation design related submission

(4) Design calculations

(5) Management plans and procedures

(6) Approval certificates

(7) Miscellaneous submissions

9.10.2.2 System level related submissions shall show the total system including the configuration block diagrams, operating principle, system features and functions, capacity, expandability, interconnection within the Subsystem, between Subsystems.

9.10.2.3 Equipment level related submission shall show the specifications on electrical, mechanical and functionality of the equipment/material employed for the System and the Subsystems.

9.10.2.4 Installation design related submissions shall include:

(1) The installation methods and procedures for different types of installation activities.

(2) Drawing showing the equipment location and positions,

(3) Schematic and wiring diagram

(4) Cable core plan and numbering schemes

(5) Equipment mounting details.

(6) Configuration data, parameter and settings.

(7) Cable routing drawings

(8) Layouts in equipment racks, in equipment rooms, and all other equipment locations.

9.10.2.5 Design calculation shall demonstrate the performance of the System and Subsystems. Detailed requirement on calculation submissions are given in respective section of individual Subsystem.

9.10.2.6 The Contractor shall submit a copy of certificates from relevant parties and authorities as required including equipment calibration, certificates from manufacturers and laboratories.

9.11 As Built-documentation

9.11.1 The as-built documentation shall describe the System as installed and provide sufficient information for other users, maintainers and developers to execute their responsibilities. All documentation shall be submitted for review by the Employer's Representatives, and also include (but not limited to):

(1) Operation and Maintenance Manuals.

(2) Configuration Data Tables

(3) As-built drawings

9.11.2 The configuration data tables shall be prepared for each individual Subsystem and on an item-by-item basis as well as on location basis.

9.11.3 The as-built drawing shall show the as-built details of the works and shall include:

(1) Bill of quantity of equipment on location basis.

(2) Location and connectivity of all equipment and cables.

(3) Schematic and wiring diagrams.

(4) Cable core plan and numbering scheme.

(5) Equipment mounting details.

(6) Cable routing drawings

(7) Layout in equipment racks and equipment rooms

CHAPTER – 7. 2

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CHAPTER – 7. 2

RADIO SYSTEM INCLUDING SUPPORT INFRASTRUCTURE

1 PERFORMANCE REQUIREMENTS

1.1 General

1.1.1 Further to the general performance requirements specified in Chapter- 7.1 of the Technical specification, additional performance requirements for the Radio system shall be as specified below.

1.2 Applicable Standards

1.2.1 The contractor shall ensure that the Radio system equipment supplied under the contract comply with the relevant ETSI specifications/ standards. The latest version of these ETSI specifications, indicated below, as prevalent on the date of supply, shall be applicable.

Terrestrial Trunked Radio (TETRA);
Voice plus Data (V+D);

ETSI EN 300 392-1 Part 1: General Design
ETSI EN 300 392-2 Part 2: Air Interface (AI)
ETSI EN 300 392-3 Part 3: Inter System Interface (ISI)
ETSI EN 300 392-4 Part 4: Gateways (PSTN and ISDN)
ETSI EN 300 392-5 Part 5: Voice plus Data (V+D) Peripheral Equipment Interface (PEI)
ETSI EN 300 392-7 Part 7: Security
ETSI EN 300 392-9 Part 9: Voice plus Data (V+D) Supplementary Services - General Design
ETSI EN 300 392-10 Part 10: Supplementary Services (SS) Stage 1
ETSI EN 300 392-11 Part 11: SS Stage 2
ETSI EN 300 392-12 Part 12: SS Stage 3

ETSI EN 100 392-15 Frequency bands, duplex spacing & channel numbering.
ETSI EN 100 392-16 Network Performance Metrics
ETSI EN 100 392-18 Location Information protocol (LIP)
ETSI EN 300 394 Conformance Testing
ETSI EN 300 395 Speech Codec

Technical Requirement for Direct Mode Operation (DMO)
ETSI EN 300 396-1 General Network design
ETSI EN 300 396-2 Radio Aspects
ETSI EN 300 396-3 MS-MS Radio Air Interface
ETSI EN 300 396-4 Type 1 Repeater Air Interface
ETSI EN 300 396-5 Gateway Air Interface
ETSI EN 300 396-6 Security
ETSI EN 300 396-7 Type 2 Repeater Air Interface
ETSI EN 300 396-10 Managed Direct Mode (MDMO)

User Requirement Specification TETRA Release 2/TEDS

ETSI TR 102 021-1: Part 1: General overview".
ETSI TR 102 021-2: Part 2: High Speed Data".
ETSI TR 102 021-3: Part 3: Codec".
ETSI TR 102 021-4: Part 4: Air Interface Enhancements".
ETSI TR 102 021-5: Part 5: Interworking and Roaming".
ETSI TR 102 021-6: Part 6: Subscriber Identity Module (SIM)".
ETSI TR 102 021-7: Part 7: Security".

1.3 Availability Requirements

1.3.1 In determining the availability of the Radio system, reliability block diagrams using field failure rates for commercially available equipment shall be produced. Any equipment without field failure data shall have its failure rate determined strictly in accordance with MIL-HBK-217F or similar method for its appropriate operating environment. Any degraded mode of operation or re-configuration functions provided by the Radio system shall not be included in the determination of the system availability.

1.3.2 The conditions which shall be considered as failures shall include, but not be limited to:

- failure to initiate individual call
- failure to initiate group call
- failure to initiate emergency call
- failure to initiate system call
- failure to perform dynamic re-group set-up
- failure for any one base station
- failure of control equipment
- Radio MMI unable to receive a call

1.3.3 The Radio system shall have an overall availability of better than 99.95%, and 99.99 %, the latter figure being for during the period the Games are On.

1.3.4 The Radio Management System shall be considered unavailable if any of the functions provided by the system cannot be properly exercised. The availability of the Radio Management System shall be better than 99.95%/ 99.99 % for the respective periods as mentioned in cl. No. 1.3.4 above.

1.3.5 The Radio system interface to the following systems shall be reliable and availability shall be better than 99.95 %/ 99.99 % for the respective periods as mentioned in cl. No. 1.3.4 above:

- Telephone system

- OFC Lease line
- Microwave link

1.4 Maintainability Requirements

1.4.1 The Mean Time to Restore (MTTR) of the Radio system to full normal operation following a failure shall be as defined in GCC/SCC.

1.5 System Safety Requirements

1.5.1 All equipment must comply with, and be installed in conformance with IEC 65 IEC 364 or equivalent National Electric Code/ Uniform Building Code of safety standards.

1.5.2 All metallic enclosures shall be provided with an earth terminal. Earthing of all equipment shall be in accordance with the overall guidelines for earthing laid down in Chapter 7.1 of the TS.

1.6 Interoperability requirements

1.6.1 The Radio system supplier shall have previously demonstrated working radio interoperability tests between their radio equipment and the equipment of another radio vendor. The radio system supplier must submit documentation that has demonstrated interoperability. This test certification must be issued by only Accredited Test Houses of TETRA. The Interoperability Profile (IOP) certificates have to be submitted for the Central Infrastructure Equipment. Copy of IOP Certificates issued for compliance to each of the following TETRA features for the Central Infrastructure Equipment to be necessarily submitted as part of the Bid:

- Core System
- Short Data Service
- Dynamic Group Number Assignment
- Packet Data
- Air Interface Encryption
- End to End Encryption
- Authentication

1.7 Application Programme Interface

1.7.1 The radio system supplier shall submit as part of their proposal all Application Programming Interface (API) documentation that show the functions that will be used in the interface design between the radio and non-radio system. This is a mandatory requirement and no other document such as flow charts will be permitted as acceptable. During execution of the Contract, Contractor shall also be required to provide the actual API's for future use of GNCTD, at no additional price. In case of non-compliance or non-availability for any of the above important features, the Bid shall be considered as technically non-compliant and shall be liable to rejection.

1.8 Type Approval and Type examination certificate

1.8.1 The Radio system supplier shall submit as part of their proposal, Type Approval certification/Type examination certificate from only Accredited Test Houses of TETRA. Type Approval certification/ Type examination certification should be provided for Central Equipment, Base Stations, Mobiles and Handhelds and should indicate the ETSI Standard that have been approved to be indicated in the Certificate. Certification form issued by any other Body will not be considered. In that event, the Bid shall be treated as technically non-compliant and shall be liable to rejection.

1.9 Tetra Accreditation

1.9.1 The Bidder shall deliver Service through TETRA equipment from a manufacturer who shall be TETRA Accredited one of TETRA Central Infrastructure equipment (including Base Stations) and equipment shall have Inter-Operability Certificates issued by TETRA Accredited Test House. Current Copy of valid IOP certificate to be submitted. The Certification shall cover all features as listed above in Clause 1.6 as a minimum. In case of non-compliance or non-availability for any of the above important features, the Bid shall be considered as technically non-compliant and shall be liable to rejection.

2 FUNCTIONAL REQUIREMENTS

2.1 General

2.1.1 The Radio system shall be a digital trunked radio system operating in the 350/400/800 MHz frequency band conforming to the TETRA standards as defined by ETSI.

2.1.2 a.) The Radio system shall support both voice and data communications. The bit rate shall be 7.2 KBPS per time slot for data communications as a minimum.

Capability to use Multi slots should be indicated to allow user to use as a minimum 2 time slots simultaneously in each carrier of the new base stations.

b.) The Core Radio Equipment supplied should be TEDS compliant,

c.) Radio Terminals (Handheld, Mobile, and Static) should be TEDS Upgradeable. Radio Terminals should be made TEDS Compliant within one month of its implementation in any one country internationally, and not later than June 2010. The onus of providing information on the deployment of above-mentioned network lies on the Bidder. This implementation has to be done without any cost implications to GNCTD. The Bidder not complying with the clause (b) & (c) above is liable to be rejected.

2.1.3 The channel access method shall be TDMA.

2.1.4 The Radio System shall provide a common radio communication platform to all radio users.

2.1.5 The CER in OCC and BCC shall be equipped with all control and monitoring equipment. The suitable EPBAX, telephones, etc. shall be provided. The central control system shall be fault tolerant, and in a hot-standby configuration.

2.1.6 The End to End encryption for overall Radio System, inclusive of radio terminals and core infrastructure, in accordance with specifications of ETSI EN 302-109 or equivalent, approved/recommended algorithms shall be provided. The bidder should take necessary care to examine the export regulations related to End to End encryption to ensure the timely supply of encryption enabled equipment and terminals as per the specified time schedule of the RFP.

2.1.7 Suitable arrangements for boosting RF signal strength, if required, for the following shall be provided:-

1. Indoor Stadium (Ref. Annexure – 8.1)

2. Emergency Wards of Hospitals (Ref. Annexure – 8.4)

The Bidder shall make survey of these locations and offer appropriate solutions.

2.1.8 The radio communications shall be continuously recorded in a digital voice recorder(s) to be provided under this Contract. (refer Chapter 7.3 of this TS).

2.2 Radio System Coverage

2.2.1 The Radio System shall provide coverage throughout the area of National Capital Territory (**NCT**) of Delhi including its borders, and the new metro rail tunnels which are under construction. The NCT map is enclosed at Annexure 8.5.

2.2.2 The Design requirements required to be submitted are given in Chapter 7.1 and Section 6 of this RFP document. Contractor shall also submit to the Employer's Representative for review, the coverage calculations and coverage plots (both up-link & down-link) to confirm that the required RF coverage stated above can be achieved.

2.2.3 The Bidder will have the flexibility to decide the number of Base Stations in his network design.

2.2.4 The requirements of verification, testing and commissioning are given in this Chapter. In addition the Contractor shall conduct continuous radio frequency signal strength test following the pre-determined paths given by the Employer's Representative. The Contractor shall submit graphs of the signal strength measurement as part of the Provisional Acceptance Test Results of the radio system to verify contract compliance for both UP-link and Down-link signals.

2.3 System Requirements

2.3.1 The major functional requirements of the Radio System for GNCTD are:

- Instant communication between the Controller in OCCs and other designated controllers in LCRs for operations.
- Instant communication between designated controllers and the staff with Radio units in the field
- Instant Emergency communication
- Communication between maintenance and operating staff
- Data communication for text messages and other control and management functions.

2.3.2 OCC/BCC/LCR Operation

OCC/BCC

2.3.2.1 As explained in Schedule of Requirements, new OCC, BCC and LCRs shall be set up by the Contractor for this project. Some of the LCRs are existing and some new ones are to be deployed.

2.3.2.2 The BCC shall be fully duplicated in configuration of OCC. Amongst other duplicated functions, it shall incorporate automatic updating of data records of OCC.

2.3.2.3 The site for OCC and BBCC shall be provided by the Employer. The Contractor shall survey the sites and submit a floor plan so as to accommodate its equipment. The estimated floor area of 2500 square feet / 1300 square feet for the OCC and BCC respectively shall be available .The contractor shall also provide UPS,DG sets (or any other means in lieu of DG set) and towers at these sites. The air conditioning shall be provided by the Employer. In case, any minor civil works, partitioning, etc. are to be carried out, the same shall be done by the Employer for which the contractor shall provide sufficient advance information and required details. It is therefore imperative that, immediately after award of the work, the Contractor shall work on this issue in consultation with Employer/Employer's Representative.

2.3.2.4 In order to setup microwave links and OFC lease lines for providing connectivity to the Network Elements, the contractor shall be responsible for interacting with the PSTN companies and WPC and obtaining necessary clearances. The Employer shall provide authority letters in this regard.

2.3.2.5 The staff for running the Service shall be provided by the Contractor. The Escalation Matrix for resolution of issues, complaints shall be submitted by the Contractor. The Contractor may note that Representative from various user Departments of the Employer shall be present in the control rooms for providing command and control. Sufficient logistic arrangements for these shall be kept in readiness.

2.3.2.6 The Employer shall provide requisite security cover at the sites and provide entry passes for the contractor's staff.

2.3.2.7 All the recurring expenses like Electricity, Diesel, Water, consumables etc. at these sites shall be met by the Contractor.

LCRs

2.3.2.8 The estimated floor area available for new LCRs is 300 square feet. As indicated earlier, a few LCRs already exist. However, the feed/signal from the existing LCR shall be taken to the OCC and BCC by means of Leased line and Microwave, to be arranged by the Contractor.

2.3.2.9 The new LCRs shall be setup within the premises of the concerned user department as already specified. The contractor shall setup the required equipment in these locations and provide the required Leased line and Microwave connectivity.

2.3.2.10 Other provisions as detailed in case of OCC /BCC above shall be applicable.

2.4 System Call Types

The Radio system shall enable and provide following categories of calls:

2.4.1 Individual call

2.4.1.1 The system shall support Individual (point to point) voice calls between any two parties. The individual call shall be full duplex, as a minimum from any radio to and from a Dispatcher. It shall also allow Full Duplex call from Handheld to Handheld for the system being supplied.

2.4.2 Group Call

2.4.2.1 The radio system shall support group voice calls, enabling communication between number of users within a pre-defined area, all being members of the same call group. It shall be possible to modify the composition of the call groups within the network. Any user may be a member of one or more call groups. It shall be possible to modify the local area over which group calls are implemented within the network. System shall incorporate suitable mechanism to co-ordinate calls between users intending to speak during a group call. Only one member of the group involved in a group call can speak at any one time. It shall, however, be possible for a Controller (Dispatcher) to interrupt the talking member. These calls shall be half duplex and shall be permitted to all users. A Dispatcher may be a member of multiple talkgroups.

2.4.3 Broadcast Call

Broadcast call shall be one-way call from a single user to all users of the same call group within a pre-defined area. Only OCC/ BCC shall be permitted to initiate broad cast call.

2.4.3.1 Data Call

2.4.3.1.1 The System shall support the following:

1) Unprotected data - 28.8 Kbps or higher.

2) Packet connectionless-oriented data

3) Pre-formatted/ pre-defined text messages from the mobile radio, hand-held portable radio and from the OCC

4) Short data messages (SDS). For sending short data series via the control channel types: Type 1 (16 bits), Type 2 (32 bits), Type 3 (64 bits), Type 4 (2047 bits).

5) Possibility of simultaneous voice and status / SDS

2.4.3.1.2 The system should be supplied with a Packet Data Gateway as per ETSI standards/ guidelines. External access to the Radio system through the PDG should be firewall protected. The firewall shall be supplied as part of the Contract.

2.4.3.2 Emergency Call

Mobile, hand-held, static terminals and Control Centres (OCC & BCC) shall be permitted to initiate Emergency Call. An emergency call can be either a group call or an announcement/ broadcast call. When the system is busy, emergency calls shall be set up immediately by ruthlessly pre-empting the lower priority call in progress. The lower priority call is dropped and the required resources immediately granted to the emergency call.

2.4.3.3 Direct Mode Operations (DMO) call

2.4.3.3.1 DMO voice calls shall be possible both ways between the mobile and another mobile, mobile and handheld and between handhelds located within a radius of 2 Km in above-ground areas.

2.4.3.3.2 The DMO voice services supported by the Radios shall be, but not limited to the following:

i. DMO/ TMO (trunked mode operation) Gateway, to be supplied as part of the scope of work.

ii. In DMO mode, the radio should use single frequency for communication.

2.4.3.3.3 The system should be supplied with required number of TMO Repeaters for indoor coverage applications or otherwise. The TMO Repeater shall allow TMO to TMO repeater operation for range extension. The minimum input sensitivity of the TMO repeater shall be –85 dBm.

2.5 System Call Requirements

2.5.1 A minimum of eight priority levels shall be available for assignment to radio users of varying importance. Priority setting shall be configurable from the central control.

2.5.2 All calls initiated by the controller to the mobile shall be able to use the Radio ID number.

2.5.3 All calls initiated by the controller to the mobile shall be able to use the Radio ID number.

2.5.4 All calls meant for a handheld radio shall use the Radio ID Number.

2.5.5 Calls originating from Controller shall have overriding priority over all other calls, except Emergency calls.

2.6 System Features

2.6.1 User Validation

2.6.1.1 When a user attempts to gain an entry into the system, its Radio Identity Number (RIN) shall be verified and validated prior to permitting access to the Radio System. User without valid RIN shall be barred from accessing the system.

2.6.2 Fast Channel Access

2.6.2.1 The average channel access time, defined as the elapsed time from the push-to-talk (PTT) operation to the time when the originator receives the transmit prompt tone shall not be greater than 300ms subject to the availability of a voice channel.

2.6.3 Random Retries

2.6.3.1 If access is not granted on the first attempt, all the radios shall automatically re-send the call requested without user intervention. The Contractor shall submit to the Employer's Representative for review the details on the number of retries available and the duration during which this occurs.

2.6.4 Multi-party Voice Calls

2.6.4.1 The system shall support multi-party voice communications between minimum up to six different parties. The call shall be half-duplex and shall be authorized by Dispatcher.

2.6.5 Continuous Channel Updating

2.6.5.1 Control channel shall continuously transmit assignment information allowing a user to join calls already in progress even if a user misses the initial assignment due to a momentary signal fade or other effects (late entry).

2.6.6 Multiple Priority Levels

2.6.6.1 A minimum of eight different priority levels shall be available for assignment to users of varying importance. The Radio system's different priorities shall be assigned to each radio and talkgroup. When the system gets busy, radios with higher priority shall get a traffic channel allocated before radios with lower priority.

2.6.6.2 Emergency calls are assigned the highest priority. This shall be ensured even as a ruthless pre-emption.

2.6.6.3 The system shall provide the recent user priority to enhance call continuity. If a call has cleared in a pause in speech, but another user wishes to speak soon after, the priority level of the group is increased for a timed queue. Therefore call continuity is preserved whilst making the most efficient use of system resources.

2.6.6.4 The system shall allow Dispatcher to interrupt ongoing radio traffic, should it be necessary.

2.6.7 Call Queuing and Call-back

2.6.7.1 When all voice channels have been assigned and the Radio system is fully loaded, new calls requested shall be queued according to its pre-assigned priorities until a voice channel becomes available. Equal priority users shall be queued on a first-in-first-out basis among themselves. The user shall receive a busy tone indicating that the system is currently busy and the call has been queued.

2.6.7.2 Channels shall be assigned to users, as they become available, according to their position in the queue. The user shall receive a 'call back tone' informing the user that a channel is now available and the call can now proceed.

2.6.7.3 The system shall support user priority functionality. If, during a group call, a user is slow to making a response and the traffic channel is de-allocated, the call enters a recent user queue. If the user then responds within 10 seconds, the call will be given priority for a traffic channel over new calls (of the same priority) also waiting for a traffic channel allocation. Recent user Priority shall let a talkgroup call have more conversational continuity when there is a busy queue.

2.6.8 Out of Range Indication

2.6.8.1 Audio and visual indications shall be available to inform the user when the radio is out of the RF coverage range of the Radio system. The indication shall be generated automatically when a request for channel is not acknowledged or when the radio fails to receive coming channel information. The audio and visual indication shall remain until the radio moves back into the coverage range.

2.6.9 User Registration

2.6.9.1 A user shall automatically be registered after successfully logging on to the Radio system under the RF coverage zone of a base station. The Radio system shall have a record of the location of all active users such that frequencies are assigned only at the RF coverage zone of the base station where group members are present. The Radio system shall not assign channel at a base station where group members are not present.

2.6.9.2 The Radio system shall ensure that a user is only registered within one Base Station Radio coverage zone at any one time. The registration shall be continuously updated to reflect the current user identities and locations.

2.6.10 User De-Registration

2.6.10.1 The Radio System shall de-register users to ensure that no channels are assigned at a base station unnecessarily.

2.6.10.2 The Contractor shall submit to the Employer's representative for review the details of the de-registration.

2.6.11 Handoff

2.6.11.1 The Radio system shall support seamless handoff across all the RF coverage zones of base stations in the Radio system such that all calls in progress regardless of the call types and call modes shall be maintained with minimum interruption to an ongoing call, so that the call does not drop at all.

2.6.11.2 The Contractor shall submit details of the hand off process as part of the Detailed design during Contract execution.

2.6.12 Dynamic Re-Grouping

2.6.12.1 Radios in different talk-groups shall establish a new talk-group automatically on the receipt and acknowledgement of re-grouping instructions sent over the air by the Radio system. There shall not be any limitation on the number of radios in each talk group and the combination talk groups arrangements.

2.6.13 System Call

2.6.13.1 A system call shall be one way broadcast call to all the radio located at one or more / all sites users in the Radio system. A system call shall be initiated only from a Dispatcher with a predefined priority level.

2.6.13.2 A system call shall be initiated in a "polite" or "pre-emption" mode from the Dispatcher logged in with the highest priority only. The "polite" mode shall wait until all the radios are idling before the system call can proceed. The "pre-emption" mode shall interrupt all communications in progress and broadcast to all users in the Radio system immediately.

2.6.13.3 Visual indications shall be available at the called handheld radios to inform the users of an incoming system call.

2.6.13.4 The system call shall be terminated only by the Dispatcher that initiates the call.

2.6.14 Critical Site Assignment / Home Location Area

2.6.14.1 The system shall preferably but not essentially support Critical Site Assignment/ Home Location Area, which is a TETRA service that supplements the group call service.

2.6.15 Data Communication

2.6.15.1 The Radio system shall support the following data applications as a minimum:

2.6.15.1 Text Messages

2.6.15.1.1 A minimum of 100 pre-formatted messages shall be stored in the Radio system and each message size shall be up to a maximum of 128 alphanumeric characters. The status message service allows a Radio terminal to send a pre-formatted status message to the dispatch console system and vice versa.

2.6.15.1.2 The pre-formatted message shall be input through the Dispatcher keyboard and each message shall be up to a maximum of 128 alphanumeric characters.

2.6.15.1.3 The Radio system shall support at least 100 status messages and each message size shall be up to a maximum of 40 alphanumeric characters.

2.6.15.1.4 The system shall generate an acknowledgement that is returned to the originating Radio terminal to indicate that the status message has been delivered to the dispatch console system.

2.6.15.2 General Data Applications

2.6.15.2.1 Radio system shall support data communication between the controller and mobile users.

2.6.15.2.2 The data communication shall be supported by Short-Data service and by Packet Data Gateway. It should be possible to do data transfer between two handhelds by linking a laptop computer to handhelds.

2.6.15.2.3 The system shall support data rates as per TETRA2 TEDS service.

2.6.15.2.4 The system shall support Dedicated Data Channels. This shall be achieved by dedicating specific traffic channels to handle data only.

2.6.15.3 Talking Party Identification for Telephone Interconnect Calls.

Identity of the called or calling party shall be displayed.

2.6.15.4 Closed User Group

Any user who is not within the list of allowed users shall not be able to gain access to any of the functions and services provided by the network.

2.6.16 Call barring

It shall be possible, using network management system, to prevent individual radio users from making calls to or receiving calls from certain categories of radio users within the network.

2.6.16.1 Barring of Incoming Calls (BIC)

Each radio user shall be barred by the Network Manager from receiving incoming telephone interconnect calls from certain specified numbers or number ranges. The numbers and ranges are to be specified in Exclusion Classes. Each radio user can be associated with a single Exclusion Class. If a telephone interconnect call is received from a number that matches one of the disallowed dialing patterns in the exclusion class, the call shall be rejected.

2.6.16.2 Barring of Outgoing Calls (BOC)

Each radio user shall be barred by the Network manager from making outgoing telephone interconnect calls. The numbers and ranges are to be specified in Exclusion Classes. Each radio user can be associated with a single Exclusion Class. If a radio user attempts to make a call to a number that matches one of the disallowed dialing patterns in the exclusion class, the call shall be rejected.

2.6.17 Preferred Control Channel

2.6.17.1 All radio shall remain affiliate to a preferred control channel of a designated base station if the signal strength is at an acceptable level in all circumstances including the base station in local trunking mode.

2.6.17.2 When the preferred control channel signal strength falls below the acceptable level, the radio shall affiliate to another control channel with acceptable signal level.

2.6.18 Requested Sites

The system shall support Requested Sites which is a TETRA supplementary service that supports the group call service.

2.7 Dispatcher Functionality

2.7.1 General

2.7.1.1 All Dispatchers shall have their individual identities.

2.7.1.2 The contractor shall detail the expansion ability of their Dispatcher network within the switch configuration that has been offered. At least 25% spare capacity shall be equipped in the system supplied to support 25% Dispatchers more in future without any hardware/ software up-gradation.

2.7.1.3 The radio system shall support a Hierarchical Dispatcher configuration for the OCC. The higher a Technical user is in the Hierarchy, the greater their priority within the network.

2.7.1.4 The Dispatcher shall provide controllers with full functionality with ease of operation and enable reliable communication between users.

2.7.1.5 An unanswered call that has not been acknowledged shall result in an audible "beep" which shall be made periodically until all calls are acknowledged.

2.7.2 Emergency call

2.7.2.1 The Controller shall be able to acknowledge an emergency call by pressing a predefined number on the Dispatcher keyboard.

2.7.2.2 In the Dispatcher screen window, scroll bar shall be displayed with visual and audible alert showing detail of the ID, location from which the emergency call was originated. The Controller shall be able to acknowledge the call and then select the calling to activate two-way communication. If such a call is not answered within a pre-defined number of seconds the call shall be transferred automatically to another designated controller.

2.7.3 Priority Alert Call

A pop-up window with visual and audible alert shall show details of the ID and location from which a priority call was originated when there is an incoming "High Priority" call Controller shall be able to acknowledge the call and then select to activate the communication.

2.7.4 Call Inclusion

The Traffic Controller shall be able to perform 'Call Inclusion' to participate in active call allowing use of pre-emption and a forced call clearing capability.

2.7.5 Group patching

2.7.5.1 The Controller shall be able to perform multiple Group Patching to handle call authorization specific types of call and / or specific users.

2.7.5.2 The Dispatcher shall be able to pre-store configurations of the Patch groups. These shall preferably stored in folders represented on the desktop. The Controller shall be able to do on one of the Patch folders to bring that folder forward.

2.7.5.3 The Controller shall be able to modify the members of the Patch groups by bringing the folder forward, clicking on the Patch Edit button and adding members to the group. Members may be removed from the group by clicking again on an "unselect" option.

2.7.5.4 The Controller shall be able to perform Dynamic Regrouping for modification of Individual and Group priorities.

2.7.5.5 The Controller shall be able to regroup the Talk-groups dynamically to allow flexible and versatile group communication. Group call shall be on an "Everyone hears Everyone" basis in line with traditional open channels. Group

call communication shall be achieved by pressing a PTT switch (on the MMI or by a foot switch) following selection of the group.

2.7.6 Calling Party Identification

2.7.6.1 The Dispatcher shall include Calling Line Identification to display the calling user identification and which Radio Base Station is used.

2.7.6.2 Dispatcher shall include Connected Line Identification to display the called user identification for Telephone Interconnect Call.

2.7.7 Late Entry Facility

Late Entry facility shall be provided for users that are busy or unavailable at the time a group call is established. They shall be invited to join in the call at regular intervals for the duration of that call.

2.7.8 Remote Radio Activation

The Controller shall be able to remotely switch on the microphone and transmitter of the Mobile radio or Handheld and listen to the received audio. There should be no indication on the radio to indicate that it is being monitored.

2.7.9 Dynamic Time-out Disable

In emergency situations, the system shall be able to cancel the dynamic time out feature of the Radio Base Station.

2.7.10 Dispatcher-ICONS Toolbar

2.7.10.1 A toolbar on the screen to perform all the Dispatcher call functions shall be provided and shall also include the following buttons. The finalized identification and wording of the buttons shall be reviewed and approved by the Employer's Representative.

These shall include as a minimum.

1) All Mute
2) Monitor
3) Transmit
4) Telephone Dialer
5) View
6) Time Out

2.7.10.2 **Dispatcher Side menu**

An additional menu panel shall be provided on the display to allow the type of call to be selected such as pre-set PA messages (digital voice stored on the Hard Disk, normal voice, status, priority or emergency calls.

2.7.10.3 **Dispatcher Window templates**

The Controller shall be able to set up individual user screen configurations i.e., different controller window templates. The terminal shall save and recall different user defined screen layouts, allowing different Controllers to quickly call up preference file base on the log-in role of the controller.

2.7.11 Dispatcher Log-on Facilities.

2.7.11.1 The Dispatcher shall incorporate Access Control features and bring up a password-protected Log on dialogue box to provide access control and security and validation of access permission when the system is switched on so that the Dispatcher is set to the default condition for available buttons and actions.

2.7.11.2 A password protected exit dialogue box shall be provided and be activated when the button is pressed to ensure that the user really wants to exit the system.

2.7.11.3 It should be possible to take over control of another Dispatcher while also retaining its own Dispatcher control. On taking over control, calls should be routed to both the Dispatchers.

2.8 Handheld User Radio Calls

2.8.1 General

2.8.1.1 All Handheld radios shall support the following call features. These features shall be configurable through radio field programming tools and also through the workstation of the radio management system. Handheld radio users shall be able to call other radio users and OCC subject to their level of access.

2.8.1.2 The Contractor shall configure all the call features nominated by the Employers' Representative.

2.8.1.3 A short audible and visual indication of functional identity of the calling party/ group shall be displayed for each call.

2.8.2 Call Types

The handheld Radio shall support following voice communication as a minimum:

2.8.2.1 **Individual call**

1) Individual call shall allow two users to talk to each other on one-to-one basis.

2) The conversation of the individual call shall not be heard by other radio user in the talkgroup.

2.8.2.2 **Group Call**

1) Radio user shall normally communicate with each other in a single group. All radio shall be pre-programmed to belong to a number of groups.

2) Group call shall be initiated by selecting the desired talkgroup position on the handheld radio and depressing PTT.

3) The user may speak in a group call when permission in the form of audio indications is granted by the network after the request by using the PTT function.

4) An out of range indication shall be provided when the user moves out of the group call area whilst the call is in progress.

2.8.2.3 **Broadcast calls**

The user shall be informed that he cannot speak as part of the broadcast call.

2.8.2.4 **Emergency Call**

- Emergency call shall be initiated by handheld through a dedicated function key and depress PTT as a group call;
- When the channels of the base station are occupied, ruthless pre-emption shall allow the emergency call to take occupied channel away from the lowest priority talkgroup at all affiliated base stations to provide instantaneous emergency voice communication;
- Visual and audible indications shall be available at the called handheld radios and/or the OCC to inform the radio users of an incoming emergency call;
- Emergency calls shall be in the form of group or broadcast call;
- The emergency call shall be terminated by the calling party only.

2.8.2.5 **Telephone Interconnect Call**

Designated Handheld radios shall have the capability of initiating or receiving telephone calls from designated telephones of Govt. Dept. directly without the radio MMI Controller intervention.

2.8.3 Handheld Operation

2.8.3.1 **Enter/ Leave Direct mode**

The Handheld radio shall be capable of being manually switched to

communicate directly in DMO.

2.8.3.2 **Register/ De-register**

Handhelds shall be capable of registering/ de-registering on putting ON/OFF of handheld radio.

2.9 Call types

2.9.1 Individual Call

2.9.1.1 Individual call shall allow two radios to talk to each other on one-to-one basis, of which one or both could be handhelds.

2.9.1.2 The conversation of the individual call shall not be heard by other radio users in the talk-group.

2.9.2 GROUP CALL

2.9.2.1 A group call shall be initiated by the OCC only, by selecting the desired talk-group on his Dispatcher.

2.9.2.2 The handheld radio/ mobile radio shall be permitted to join a group call when so selected by the OCC.

2.9.2.3 An OCC initiated group call shall be terminated by the OCC only.

2.9.3 EMERGENCY CALL

2.9.3.1 Emergency call shall be initiated by the handheld radio/ mobile radio through a dedicated function key.

2.9.3.2 When all the channels of the relevant base station are occupied, ruthless pre-emption shall allow the emergency call to take an occupied channel away from the lowest priority talk-group or user to provide instantaneous emergency voice communication.

2.9.3.3 Visual and audible indications shall be available at the called Handheld radios and/ or the OCC to inform the radio users of an incoming emergency call.

2.9.3.4 The emergency call shall be terminated by the calling party only.

2.9.4 DISTRESS CALL (using DMO)

2.9.4.1 A distress call shall be a special call to be operated in the manner described in this Chapter.

2.9.4.2 A distress call shall be possible without the use of radio infrastructure

2.10 OCC Radio Calls

2.10.1 General

2.10.1.1 The controller shall be able to selectively call any registered radio in the radio system.

2.10.1.2 The Dispatcher shall maintain a list of at least 1000 Trunking Group ID's which are exclusive to the operation of the call scheme within the network. The remaining Trunking group ID's shall be available for normal dispatch calls operations.

2.11 Call Logging

2.11.1 The radio system shall log all call activities, both incoming and outgoing calls, and all Status/ Messages including Free Text Messages for audit trails indicating action, result, timing.

2.11.2 Access to call log shall be possible using the Controllers Dispatcher and centrally in the OCC.

2.11.3 The call logs shall be maintained in the Radio system for extended periods of at least 4 weeks and can be archived subsequently.

2.11.4 The radio system shall include a utility for log inspection and search.

2.11.5 The call logs shall be able to be exported to Microsoft Excel, Access or similar without interrupting normal operation of the radio system.

2.11.6 Call history with an easy-to-read, on-screen listing of previous incoming and outgoing calls including emergency calls shall be provided on a separate pop up windows.

2.11.7 The most recent outgoing calls in the call history list and the older ones shall be able to be scrolled down.

2.11.8 The Controller shall be able to scroll through the call history to see any that may have scrolled off the screen.

2.11.9 Each call log shall identify the source of the call, the time the call activated and the time of the call being acknowledged by the Called party.

2.11.10 The most recent incoming call in the call history list and the older ones shall be able to be scrolled down.

2.12 NETWORK MANAGEMENT SYSTEM

2.12.1 General

2.12.1.1 The Radio Network Management System shall cover all activities relating to the overall control, supervision, maintenance and configuration of the entire radio network to ensure the most efficient use of the available resources.

2.12.1.2 The Radio Management System shall be a centralized control system with Management Workstation, system database, log printer and mass storage device to be located at the CER at OCC's.

2.12.1.3 A database shall be built for defining the system hardware and software configurations. Any change in database shall be updated automatically on system disk or mass storage device so that an up-to-date version of the software is available should a system failure or power-down event occur.

2.12.1.4 It shall be possible to ascertain the number of subscribers, including the VPN wise statistics, in the Network. It shall be possible to query the present status of the subscribers in the Network.

2.12.2 Radio Network Configuration Management

2.12.2.1 The management system shall provide functions to exercise control, collect and provide information to the network elements. Typical functions offered shall include, but not be limited to :

1) Provisioning, element configuration, status and control

2) Subscriber management

3) Data management

2.12.2.2 The radio network provisioning, element configuration, status and control shall include but will not be limited to the following:

1) Creation, modification, deletion of supervised entities (e.g. site, transceiver, radio channel etc.)

2) Control channel management strategy

3) Traffic channel management strategy

4) Network Topology information

5) Adjacent cell information at system boundary

2.12.2.3 Subscriber Management shall include management of individual subscriber and subscribers in Groups:

1) Individual subscribers

a. Controller

b. Worker/ volunteer

c. General Staff

d. Data Services

e. Administration / management

2) Subscription in groups

a. A mobile may be a member of more than one group. It shall be possible to activate/ deactivate the mobile's subscription to these groups.

b. Activating a group on the mobile shall allow a user to receive a call from that group

c. Deactivating a group on the mobile shall prevent a user to receive a call from that group

2.12.2.4 Database Administration shall include but not be limited to:

1) Creation of data for new subscribers, including all privileges, priorities and subscribed services
2) Disabling of subscriber
3) Updating of subscriber data in terms of subscriber and operator requirements
4) Deletion of subscriber data due to a subscriber request or operator description
5) Call usage

2.12.3 Performance Management

2.12.3.1 The performance management shall provide data concerning the performance of the Radio System and individual channels with respect to traffic volume so as to optimize the system configuration, equipment deployment, user grouping and future sizing of the Radio system.

2.12.3.2 The performance management shall produce statistical reports on the channel usage and the Radio System performance. The performance management shall have facilities to monitor base channel traffic on real-time basis. This will allow for flexible adaptation of traffic configurations to the dynamic traffic requirement. This shall include the following:

1) Traffic measures for data collection and data logging for which the following information shall be available as a minimum:

a. Up and down link radio channel activities.

b. Infrastructure entities activity log

c. Individual subscriber activity log

d. Group subscriber log

2) The traffic activity summery report which shall have detailed breakdown of traffic information by base station, Network node, Gateway/ interface and by channel. The following data shall be recorded as a minimum:

a. RIN

b. talkgroup ID

c. time, date and duration

d. type of call

e. base station and channel involved in the call

f. usage time of each channel

g. traffic summary for each channel for 24 hours period at 15 minutes interval

h. usage time of a radio

2.12.3.3 The following statistical reports shall be available as a minimum:

a. Hourly

b. Daily

c. Weekly

d. Monthly

e. Summary

2.12.3.4 Administration of the following performance measurements shall be provided as a minimum:

a. Generation of new measurements

b. Remote measurements

c. Activation/ deactivation of measurements

d. Information processing of traffic measurements

e. Automatic creation of statistics performed by the system administrator

f. Presentation of statistical data

g. Logging of connectivity parameters

2.12.3.5 The performance measurement data generation shall cover at least the levels of traffic produced by the users and by control signaling. This shall include the following:

a. Number of active individual users per base station

b. Number of registered individual users per location

c. Number of active user groups per base station

d. Number of queued call requests by call type and average queued times per base station

e. Number of emergency calls per individual user and per active talk group

f. Number of single site calls and average duration

g. Total number of messages per duration

h. Total number of messages per user group

2.12.3.6 Measurement of service quality shall include the Average and worst case call waiting times for different call types, priority levels, supplementary services invoked per base station.

Measurements on network aspects shall include the following:

a. Percentage utilization per radio traffic channel

b. Percentage utilization per major network entity (gateways, interfaces, switches)

c. Total number of calls

d. Sum duration of total calls

e. Number of calls by call type

f. Average queue length per priority

Measurement of system availability shall include but will not be limited to the following:

g. Provision of Radio Tx/Rx availability statistics

h. Network link availability

2.12.4 Security Management

2.12.4.1 The security management functions shall be but not limited to the following:

a. Definition of different levels of permitted access to network nodes and network functions by specific authorized personnel

b. Supervision of access control

c. Access control to network management services

2.12.5 Fault and Alarm Management

2.12.5.1 Fault and Alarm Monitoring

2.12.5.1.1 The radio management system shall be provided with the capability of monitoring system alarm status on a real time basis.

2.12.5.1.2 The radio management shall have the ability to store the alarm details in the database for future enquires and to access the fault alarm history database for retrieval of alarm history data.

2.12.5.1.3 In addition to the alarms and status to be shown on the management Workstation, status of major equipment of the system shall be monitored and displayed with visual indications to the local radio equipment racks.

2.12.5.2 Alarm Handling

2.12.5.2.1 The functions for alarm supervision shall include, but not be limited to the following:

2.12.5.2.2 Supervising individually the functionality of each system upto Base Station level, including monitoring and control of transfer links, power supplies, and other equipment

I. Performing fault recognition in real time

II. Investigation and localization of failures

The following alarm conditions shall be provided to the radio management system as a minimum:

i. loss of communication links

ii. loss of master clock synchronization

iii. failure of power supply unit

iv. changeover to redundant central equipment

v. base station health status

vi. receiver coupler health status through RF distribution system fault status

vii. central equipment health status

viii. low power and no power alarms for all transmitters

ix. Indication of receiver failures

x. Internal diagnostics failure result for radio, control console, interface or gateway equipment.

All failure alarms shall be time and date stamped.

2.12.5.2.3 The failure alarms shall be classified into major or minor alarms by the radio management system and be user configurable.

2.12.5.2.4 Visual and audible indications shall be available for any failure alarm reported to the radio management system. The audible indication shall be enabled and disabled through the radio management system Workstation.

The alarm log shall display the following as a minimum:

- description of the alarm;
- time and date of the alarm generated;

2.12.5.2.5 The alarm history database shall be provided with sufficient capacity to store the reported alarms for a period of at least four weeks without carrying out housekeeping functions.

2.12.5.3 Alarm Displays

2.12.5.3.1 The Contractor shall provide the following general capabilities and characteristics for alarm display as a minimum:

- the ability to quickly filter the alarm display to view alarms generated from Technical system component or by a geographic location:
- a colour coding scheme indicating the alarm severity according to the alarm classifications and alarm priority levels;
- the display of the alarms in chronological order along with their associated stamps;
- a scrollable interface, to allow the radio management Workstation user to view new alarms that can directly display on one a single screen; and the facility to acknowledge alarms.

2.12.6 Fault Printing

2.12.6.1 The radio management system shall be equipped with a common maintenance printer for production of hard copies of graphical screen information, system parameter for maintenance fault history, listing of pre-defined system information and various performance management reports. The maintenance printer shall be connected to the radio management system workstation.

2.12.6.2 The log printer connected to the radio management Workstation shall print out real time logging of the maintenance activities as well as fault events.

2.13 Field Programming

2.13.1 All the radios including base station, Handheld radio and Mobile radio shall have a port for field programming and diagnostic access through a notebook computer.

2.13.2 The Contractor shall provide one notebook computer complete with all the necessary software and hardware.

2.13.3 All the radios in the system including, base station, Handheld radio and radio shall be based on a flexible software design to allow programming by a notebook computer.

2.14 System Expansion

The new Network shall support higher data rates as per TETRA2 TEDS service in accordance with clause no.2.1.2 (b & c) of Chapter 7.2. Bidder shall detail as to how this shall be achieved. Failure to do so by the Bidder shall be treated as the Technical Bid being non-compliant and shall be liable to be rejected.

All central equipment at both the OCC's shall be equipped and supplied with at least 25 % spare capacity each, so that without any software & hardware expansion, it shall be possible to link & to add at least 25% more Base Stations and 25% more Dispatchers at each OCC.

2.15 Virtual Private Network

2.15.1 The OCC System shall provide creation of various Virtual Private Networks within the system provided wherein; it shall be possible to create various sub-organizations managing their individual users. The physical management of the network shall take place centrally only. However dispatchers within each sub-organization shall be able to manage all the Operational Tasks securely within their own VPN.

2.15.2 All relevant authorities shall be able to use the same proposed System/ Network for their internal communication in a secure way in their own virtual private Networks but at the same time enable communication with other organizations in predefined or dynamic talk groups. The shared communication infrastructure and VPNs shall ensure privacy. Organizations' must not have visibility and access communication in other agencies except via controlled cooperation groups. Network operator shall not have visibility inside each organization's VPN structure. The Bidder shall explain how VPNs and technical operation of the network are implemented on the offered solution. Failure to do so shall be treated as the Bidder's bid being technically non-compliant and shall be liable to be rejected.

2.16 Automatic Vehicle Location System (AVLS)/ Automatic Person Location System (APLS)

2.16.1 The OCC system provided shall be supplied with a Automatic Vehicle Location and Automatic Person Location System. This application shall be supported on a separate Dispatcher for AVL/APL, in the OCC with the Fault Management Controller. The Dispatcher shall show a map of the city along with the GNCTD. Mobiles & Handhelds which have the GPS feature enabled and are out in the open for the GPS to be activated, shall be tracked on the Dispatcher MMI screen. The Dispatcher screen shall show the coordinates of the location of a Technical user along with the User ID and shall track its

movement as it moves. For, providing this feature, a separate AVL/APL Server shall be provided and interfaced to the Radio system. The Server shall have features such as message ques and prioritization so as to avoid network congestion that might be caused by sending automated SDS for the AVL/APL application, when a large number of user congregate within the area of a single base station.

2.16.2 The person in control shall be able to know the location of vehicles and Personnel (carrying Radio Units with GPS) automatically over a defined period of time.

2.16.3 The Radio Units having built-in GPS should support the following:

- GPS activity indicator
- Current position information
- Position information sending on request or on triggers (eg: time, distance, status message)
- Position sending during red key calls and public emergency calls

2.16.4 The radio shall automatically update its GPS location when one of the following events happens:

- When polled
- After moving a pre-defined distance
- After a pre-defined time has lapsed
- When an emergency call is made

Bidder shall demonstrate GPS accuracy of ± 10 meters or better

2.16.5 **Digital Map:**

The Base Map shall have the following layers with a 1:10000 scale:

- All Games Venues, Village, Training Venues.
- Hospitals, Trauma Centers.
- Roads
- Zoom in and Zoom out facility
- Railway Tracks, Railway Stations/Metro Stations.
- Airport
- Buildings
- Land use
- Locality
- Police Stations and Police Out posts(To be provided by Delhi Police)
- Police Station boundaries (To be provided by Delhi Police)
- Emergency Services
- Important Land marks
- Road intersections
- Customizable layers (to be provided by User Departments)

3 DESIGN REQUIREMENTS

3.1 General

3.1.1 The Radio System shall conform to all the relevant and current ITU-R, ITU-T, ETSI and UIC Recommendations.

3.1.2 Manufacture and assembly of all equipment shall be done incorporating standard current practices adopted by the International Electro-technical Commission (IEC)/ ISO 9000.

3.1.3 The software data security shall be compliant to ISO 27001 and certification for the same shall be submitted in the Bid.

3.1.4 In addition to the Design requirements as identified in CHAPTER 7.1 of this Technical Specification, the Radio system shall meet the technical system performance and equipment specification as specified herein.

3.1.5 The Central Radio system and the Base Stations shall be supplied with fault–tolerant system architecture so as to ensure continuous operation with minimal loss of facilities in the event of equipment failure.

3.1.6 The Contractor shall obtain approval for all the equipment from the Employer's representative and assist the latter, on frequency assignment and radio equipment license application.

3.1.7 The system shall be expandable to the limits as defined in this Chapter

3.1.8 The software shall be designed to accommodate the ultimate, fully expanded capacity without requiring any change to the hardware or firmware of the installed system and without adversely affecting the overall operation or performance of the Radio System.

3.1.9 The system shall be designed to allow ease of use by the users of the system.

3.1.10 The system shall provide facilities to allow ease of maintenance and full reporting of system status derived from the NMS.

3.1.11 Contractor shall arrange to provide GNCTD with Monthly MIS reports.

3.1.12 The system shall be safe in operation and shall not place users at risk.

3.1.13 An emergency call shall, in the event of all channels being busy, be put through immediately by forcibly disconnecting any ongoing call.

3.1.14 All Base Station radio equipment with the exception of mobiles and handhelds shall be capable of operating off (-) 48 VDC (nominal) power supply with variations from (-) 40 VDC to (-) 60 VDC. The equipment shall be capable of withstanding voltage spikes of up to 3 V over the maximum voltage. The Central Infrastructure equipment shall be operated from 240 V AC supply from the OCC UPS System. The Central Infrastructure Equipment shall be capable to be worked from the UPS within variations of + 10 % to – 20 % voltages and ripple content 2 %.

3.2 System Radio Channel Requirements

3.2.1 The Radio system shall provide 2 % Grade of Service and 35 seconds of mean holding time.

3.2.2 The Radio system shall support the following modes of traffic as a minimum.

3.2.2.1 Normal traffic, this shall be the communication between radios under the RF coverage zone of the same base station.

3.2.2.2 Inter-base station traffic, this shall be the communication between radios under the RF coverage zones of different base stations.

3.2.2.3 Emergency traffic shall be the communications during emergency operations.

3.2.3 Channels shall be assigned dynamically on demand to meet the system-wide criteria for mobile radio communication.

3.3 Frequency Planning

3.3.1 The system shall operate within the frequency band 350/400/800 MHz. The minimum channel separation shall be 25/45 KHz and the duplex frequency separation shall be 10 MHz. The radio system shall be designed for DMO channels as well.

3.3.2 The Contractor shall perform radio frequency planning ensuring efficient use of the available frequency pairs. The frequency plan including detailed calculations shall be submitted to the Employer's representative for review, as part of the Design stage.

3.3.3 The system design shall have suitable safeguards to ensure that the operation of a radio set from any other system is either debarred, or its operation does not effect the operation of this Radio System of GNCTD in any way.

3.3.4 The Contractor shall enclose detailed calculations as part of the Design stage, to establish that there will be no interference from other radio communication links operating in this area in the same band of frequencies.

3.3.5 The use of radio frequency spectrum in India is regulated by the Wireless Planning and Coordination (WPC) Wing of the Ministry of Communications, Government of India. Frequency clearance for the use of specific frequencies is to be obtained. Based on the frequency plan proposed by the Contractor, approval from WPC shall be obtained. The Contractor, if so required by the WPC, shall incorporate specific changes in the frequency plan, after mutual discussions.

3.3.6 Delhi Metro Rail Corporation (DMRC) is already using TETRA system in 380-400 Mhz frequency band for operation of its Metro Rail Network in Delhi. The Contractor is advised to interact with DMRC/ WPC with regard to frequency planning of the proposed network.

3.3.7 Two sets of Simulation Tool, one for Employer and the other for Employer's Representative, used for frequency planning shall be provided as part of the scope of supply. The Tool shall also be capable of Radio coverage simulation, both indoor and outdoor for TETRA & GSM. It is preferred that the Tool shall be a Windows based COTS product, so that future support is assured.

3.4 Technical System Performance

3.4.1 Radio Signal Strength

3.4.1.1 The minimum signal level under the worst case from the relevant base station, received by any handheld/mobile (Vehicular) radio antenna, shall be at least -85 dBm for the specified coverage area and, preferably more around the games venues and village. The uplink and downlink audio quality level under such conditions also should be good.

3.4.1.2 Signal level of minimum -95 dBm for 95% locations shall be available inside all the Games venue and Village, equipment rooms, plant rooms & operation control rooms. The uplink and downlink audio quality level under such conditions also should be good.

3.4.1.3 Additionally, minimum signal level of -95 dBm shall be available for Indoor Coverage (single wall coverage) of other buildings in NCT of Delhi.

3.4.1.4 The above mentioned signal levels are the worst case Down Link signal levels after taking into account all losses such as propagation losses, feeder losses, body loss, Fading, building loss, penetration losses, multiple floor / wall penetration losses, climatic losses ,etc..

3.4.1.5 The system should be designed and commissioned with a margin of at least 3 db signal level better than above mentioned worst case minimum signal levels.

3.4.1.6 The Down-Link signal to a Handheld inside all rooms on the lowest floor of all buildings should meet the signals mentioned in 3.4.1.2 above. Similarly the Up-link signal from a Handheld inside all rooms on the lowest floor of all buildings should be reasonably balanced with the down-link signal to ensure good and successful voice communication.

3.4.1.7 Any equipment like TETRA TMO Repeater, Indoor RF Coverage network etc. required to provide full indoor coverage inside stadia rooms, hospital's Emergency areas (as defined in Annexure 8.2 and Annexure 8.4 respectively) shall have to be provided by the Contractor within the contract value and time schedule. The Bidder shall make survey of the concerned sites.

3.4.1.8 The Bidder may note that some of the outdoor stadia may have more than one wall rooms for players necessitating use of Indoor RF Coverage network there. The Bidder shall fully satisfy himself by physical survey of such sites.

3.4.1.9 Any instrument required to verify the above mentioned levels during the field acceptance tests, like Base Station Tester and/or test software, shall have to be supplied by the Contractor within the Contract.

3.4.1.9 The RF Plots to be submitted by Contractor shall include both up-link and down-link plots for all types of radios.

3.4.2 Call Hand-over Time between Base Stations

3.4.2.1 The call hand-over between the RF coverage zones of different base stations shall be seamless to the radio users and should not drop/ interrupt on-going call.

3.4.2.2 The call hand-over time shall not exceed 500 milliseconds, which is measured as the time taken when the radio detects signal strength below a pre-defined level to establish communication using an adjacent base station site providing the new channel.

3.4.3 Call Set-up Time

3.4.3.1 The individual call set-up time for the radios under the RF coverage zone of its base station shall not exceed 300 milliseconds, which is measured as the time taken after the PTT switch of the radio is depressed to establish the communication link.

3.4.3.2 The individual call set-up time for the radios under the RF coverage zones of different base stations shall not exceed 300 to 500 milliseconds, which is measured as the time taken after the PTT switch of the radio is depressed to establish the communication link.

3.4.3.3 The group call set-up time for radios under the RF coverage zone of the same base station shall not exceed 300 milliseconds, which is measured as the time taken after the PTT switch of the radio is depressed to establish the communication link.

3.4.3.4 The group-call set-up time for radios under the RF coverage zone of different base stations shall not exceed 300 to 500 milliseconds, which is measured as the time taken after the PTT switch of the radio is depressed to establish the communication link.

3.4.3.5 The call set-up time by the dispatcher shall not exceed 300 milliseconds, which is measured as taken when after the Controller's last action required to dispatch a call to establish communication link.

3.5 Central Switching Equipment Specification

3.5.1 General

3.5.1.1 The central switch equipment shall be highly reliable, fault tolerant and capable of support non-stop on line call processing. Irrespective, whether it is Circuit Switched or IP based system, the overall functionalities as in the following clauses need to be met.

3.5.1.2 The central switch equipment shall be provided with a hot standby with automatic changeover in the event of a failure of the working ui1it. The redundancy shall be at sites of OCC & BCC.

3.5.1.3 The critical hardware modules including central processing device, data bus and memory device shall be redundant with built-in diagnostic software to ensure continuous operation single or multiple module failures.

3.5.1.4 Central switch equipment changeover between main and hot standby shall

occur with minimum interruption to the call processing, so that an ongoing call is not disrupted in any case.

3.5.1.5 The central equipment hardware and software shall be of modular design for ease of future expansion. The central Switch supplied shall as a minimum be equipped for 100 simultaneous talk group conversations between Mobiles to Dispatchers.

3.5.1.6 The central equipment shall have a duplicated database for the storage of system application software; call processing, radio-location tracking, channel allocations and diagnostics.

3.5.1.7 The Central equipment audio switch shall have non-blocking functionality to allow any portion system or otherwise, if applicable), Switched to any other port without any predefined limitation. (In case of circuit switched)

3.5.1.8 The links between the central equipment and the audio switching equipment shall have fully duplicated functionality (in case circuit switched system or otherwise, as applicable).

3.5.1.9 The major components of the audio switch (or its functionality, as applicable) including the central processing unit and the power supply shall be duplicated to prevent the loss of more than one connection or port during a faulty condition. In the event that any port/ connection fails, the switch functionality shall continue to operate.

3.5.1.10 Switching controller (or its functionality, as applicable) shall control the gateways to other type of networks such as LAN, PSTN, EPABX etc. A transcoder functionality may be needed to convert these inputs into ACELP before going into the TETRA infrastructure.

3.5.1.11 There shall be no limitations on the distance of link between switch and base station.

3.6 Built-In Test Routine

3.6.1 The central equipment shall have built in test routines for the testing of base stations, user interface control equipment and central switching equipment and central switching equipment of the radio system. These routines shall be operated in an off line mode to allow a complete functional test of the module in problem.

The built in test routines shall be initiated by the following as a minimum:

1) Local maintenance commands via a notebook computer connected to the local maintenance port

2) Remote maintenance commands via the radio management system Workstation

3) Self initiated as a result of the on-line error detection

4) Self initiated as part of the power up-initialization process

3.6.2 Audio Logging

3.6.2.1 The Contractor shall provide the interface facilities for audio logging of the Radio system channels.

3.6.2.2 Audio togging shall be achieved using the Centralized Digital Recording System as provided for in this Technical Specification.

3.7 Dispatcher

3.7.1 General

3.7.1.1 A self-diagnostic test shall be performed automatically upon every initialization of the Dispatcher readiness state.

3.7.1.2 The fault and self-diagnostics information shall be processed and displayed on the Dispatcher to indicate the status of the Dispatcher.

3.7.1.3 The Dispatchers shall be designed for 24 hours per day, seven days a week continuous operation with an equipment design life of at least 10 years. The computers and peripheral interface circuitry shall be implemented using printed circuit board technology.

3.7.1.4 All Dispatchers shall be designed and built to the same specification and shall be fully interchangeable. The Contractor shall ensure that they are operationally and mechanically compatible.

3.7.1.5 All Dispatchers shall be possible to allow OCC to assume or relinquish command and control from one OCC controller to another or possibly to only one Controller managing all mobiles and Handhelds on the network.

3.7.1.6 Dispatcher shall be capable of suppressing data tune signals, interference noise and squelch bursts to avoid discomfort to users wearing head sets and reduce ambient noise in the control centre.

3.7.1.7 It shall provide directional loudspeakers and restrictions on volume settings so as to keep the noise levels in the control centre at minimum.

3.7.1.8 Volume controls shall be readily and constantly accessible.

3.7.1.9 Sound fields shall be generated on loudspeakers, headset or both simultaneously.

3.7.1.10 All OCC controller activities shall be logged for audit trails indicating action, result, timing responsibility. Time logs shall be maintained in the NMS for extended periods and can be archived subsequently. The NMS shall provide a utility for log inspection and search.

3.7.1.11 The Dispatcher shall be a self-contained sub-system which shall interface to the Central Control equipment equipped with gooseneck microphone, select & unselect speakers, headset, pc console interface, etc.

3.7.1.12 In order to maintain operational independence for maintenance and failure scenarios, the Dispatcher shall be a fully self-contained sub-system and its failure shall not impact call process elements of the Radio Communication System.

3.7.1.13 Failure of the Dispatcher infrastructure shall not impact Mobile and Handheld calls using Radio system Infrastructure.

3.7.1.14 Software upgrade or modification of the Dispatcher Sub system and the Radio Communication System shall be independent and loading on one network should have minimum effect on the performance of the other.

3.7.1.15 The Dispatcher control equipment shall be in a hot standby configuration.

3.7.2 Dispatcher Functionality

3.7.2.1 The Dispatcher functionality shall include but not limited to the following:-

i. Integrated Radio access through a Graphical User Interface (GUI)

ii. Dynamic call net up

iii. Text Transmissions

iv. Status Message selection and initiation

v. Emergency Call Handling

vi. Database of all Radio ID Number Assignment

vii. Graphical display of Radio Location superimposed on Map of Delhi.

3.7.3 Dispatcher Call initiation

3.7.3.1 It shall be possible to initiate calls via screen selection using mouse/trackball. It shall be possible to initiate call to all radios by their Id No.

3.7.3.2 The Dispatcher shall enable a silent Radio check initialisation. The Dispatcher shall receive a acknowledgement from the target radio if it is turned on and within the system's coverage range.

3.7.3.3 The Dispatcher shall display all Radio Base Stations current status when requested and to display high level alarms when faults are detected in the Radio Communication System by the NMS.

3.7.3.4 In general when alarm is raised, an audible and visual alarm shall be sounded and alarm indication on the display commences to flash and shall give a description of the fault.

3.7.3.5 Keeping-in the "Cancel Alarm" command on the display shall stop the audible alarm display shall change to steady.

3.7.3.6 The alarm display shall disappear after the fault is rectified.

3.7.3.7 Incoming voice and data calls shall be displayed in an incoming call window on the Dispatcher of the Controller with an audible ringing tone and indicate by colour change of the Radio Base Station through which the calling is currently working.

3.7.3.8 The Controller shall be able to acknowledge the incoming call and select to

establish two-way communication.

3.7.3.9 Incoming calls from Handhelds shall indicate the Caller ID, the location he is operating from and the call type. The call type could be Voice, SMS, or Data.

3.7.3.10 Telephone Interconnect (PSTN/EPABX call) shall be provided and include patching between Radio users and telephone landline users of Govt. Dept. The Controller shall be able to include a Third Party, so that three parties can be included in a conference type call. The Controller shall be able to leave the call, whereupon the call continues between the other two parties. For example, a Controller shall establish a call to a EPABX/ PSTN party and then include a radio unit which is not authorized to make EPABX/PSTN calls. The Controller shall then detach himself from the call, leaving the radio unit and EPABX/PSTN party connected.

3.7.4 Dispatcher Application Program Interface

3.7.4.1 The Dispatcher shall interface to the Trunked Radio Network through an Application Program Interface (API) which will also serve as a firewall so that no adverse operations on the Dispatcher system will affect the operation of real time call processing of the trunked Radio Communication System.

3.7.4.2 The Bidder shall provide full specifications and documentation of the API for review and approval by Employer's Representative. The API's shall also be supplied during the Contract execution stage along with documentation for use.

3.7.5 Dispatcher Servers

3.7.5.1 The Contractor shall offer a flexible and structured Dispatcher system which operates on Employer server network on a stable and proven Operating system.

3.7.5.2 The Duplicated Dispatcher Servers shall be located in OCC and BCC.

3.7.5.3 The Dispatcher Servers shall be in a fully redundant configuration with ‘hot standby’ features whereby recovery of a failed hardware or software component can proceed without interruption of operations. Specifically there shall be one Dispatcher server that will operate in “Master” state, processing network traffic while a second Dispatcher standby server operates in the passive “standby” state. In the event of failure of the master Dispatcher server the standby Dispatcher server shall automatically assume master status and resumes processing network traffic.

3.7.5.4 The clock timing of the Dispatcher Servers shall synchronize with the Master clock.

3.7.6 Dispatcher Hardware

3.7.6.1 The Control Centre (s) users shall be able to access the Dispatcher server and the voice dispatch system from a single Dispatcher and the Dispatchers shall be networked together via a LAN/Ethernet.

3.7.6.2 As a minimum, each Dispatcher shall be equipped with a gooseneck, microphone, loudspeakers with volume control, PTT switches for radio operation, fort switch and a head-set with input jack.

3.7.6.3 The Dispatcher shall also include a set of dedicated function keys to enable OCC controllers to execute functions quickly without having to look at the screen.

3.7.6.4 The Dispatcher server should be based on a proven and stable operating system with Ethernet card and TCP/IP communication protocol.

3.7.7 Dispatcher Multi-Tasking Environment

3.7.7.1 The Dispatcher system shall be fully Integrated Console Dispatch system and offer a reliable, real time, multi-tasking environment permitting multiple applications.

3.7.7.2 All the Dispatchers shall be connected together via a local area network (LAN).

3.7.7.3 The Dispatcher position personality information shall be downloaded from the server's master database to Dispatcher position computers via the LAN. A local copy of the configurations shall be stored in each Dispatcher position computer.

3.7.7.4 In the event of failure of the LAN connection the Dispatcher positions shall continue to operate with the current configuration.

3.7.7.5 Dispatch screen configuration shall be created by the supervisor and stored on the server. Dispatcher position computer may then access the different configuration over the local area network. The screen configuration will be password protected to ensure proper usage.

3.7.8 Dispatcher Graphical User Interface (GUI)

3.7.8.1 The GUI shall be WIMP (Windows, Icon, Menus, and Pointing) style interface that allows controllers to have easy control and fast response.

3.7.8.2 The GUI shall employ a combination of graphic presentations and pull down menus.

3.7.8.3 The GUI shall provide a consistent style of presentation shall be used across all the different functions.

3.7.8.4 The Contractor shall detail the functionality and presentation of the system to meet all the requirements specified in Section for review by the Employer's Representative

3.7.8.5 The contractor shall include full samples of all the various screen layouts and GUI configurations for review by the Employee's Representatives.

3.7.8.6 Multiple windows shall be able to be opened concurrently.

3.7.8.7 Each Dispatcher shall be equipped with the following as a minimum:

- Keyboard.
- Mouse as the pointing device
- Headset with microphone and loudspeaker.
- Loudspeaker
- Desktop noise canceling microphone with integrated PTT switch or gooseneck console microphone with a separate PTT.
- Foot operated PTT Switch.
- Data Interface Socket.

3.7.8.8 All functionality accessible via the point device shall also be available though the keyboard via configurable (hot) keys and / or via keyboard macros.

3.7.8.9 All workstation displays shall support high-resolution color graphics, and shall be of color screen.

3.7.8.10 The screen display shall as a minimum show:

1) A topological map of Delhi highlighting the geographical location of the Radio Base Stations.

2) An exploded view showing a graphical representation of the section which controlled by the Controller.

3) An exploded view showing a graphical representation of the area of the Radio Base Station which is selected by the controller.

3.8 Radio Base Station Requirements

3.8.1 General

3.8.1.1 The Radio base station shall consist of no. of channels/ carriers as per Bidder's design with inherent redundancy.

3.8.1.2 Each base station carrier shall be connected via OFC link to the switching controller at the OCC. A backup Microwave link shall also be provided. The frequency and other design parameters of microwave link will be so chosen by Bidder as to be in accordance with its design of radio base stations. The Base Stations shall work in a ring configuration, so that link failure on one side shall not affect the working of any Base Station. Hence, the Base Station shall have dual ports for connection in the ring configuration.

3.9 Radio Base Station Communication System

3.9.1 As a minimum, the contractor shall supply, install, test and commission the following elements for each radio base station communication system:

1) Remote controlled trunk radio base stations (including base transceivers, Base controllers, Environmental alarm system, RF distribution system, equipment cabinets, combiners and filters, low loss feeder, antenna and mounting system etc.

2) The contractor shall install Radio base Station equipment in the Telecommunication equipment rooms (TER) at the sites selected and provided by Bidder as needed to provide the specified area coverage throughout Delhi.

3) The contractor shall submit the details of radio network design and the locations of radio base station sites and aerial support structure necessary to provide the specified area coverage throughout the outdoor and indoor portions of GNCTD radio network.

4) Maintenance facilities (testing of base transceivers, base controller etc) shall be incorporated such that the testing of any radio base station equipment can be carried out in the by local operation of control switches, without interruption to the whole base transceiver station.

5) The contractor shall provide Fall back operation for radio base stations to operate in local site operation and maintenance, in the case of failure within the system.

6) In case of total failure to the base station controller, the subscriber users shall revert to the Direct Mode Operation.

7) Diversity reception shall be provided for protection against failure in receive antennas or receiver multi-couplers and to provide gain in the Up-Link path. The Base Station shall preferably but not essentially support 3 diversity receiver inputs, although the system to be supplied presently shall work essentially on 2 receiver inputs.

8) Contractor to provide fault reporting and remote control functions at the Radio Base Station/ NMS. The Radio Base Station shall have port for interfacing to a portable notebook computer. The portable notebook computer provided shall include the necessary software to present the data in user friendly format. The selection of functions and data to be monitored shall be menu driven by the portable notebook computer. The data indicating real-time Radio Communication System performance shall be displayed in an informative and comprehensive manner. Information shall be presented graphically where possible. The Contractor shall provide a full description of Radio Communication System performance functions to be monitored, as well as those which are not monitored.

9) Diagnostic tests can be carried out to determine the performance of the Radio Base Station. The testing shall be able to be carried out during normal system operation without interfering with other channels. The tests shall be based on measurements related to transmitted output power and received RSSI (Radio Signal Strength Indication).

10) The Contractor shall ensure that the maintenance of the Radio Base Station can be carried out while the Radio Base Station is operational without affecting other functions. It shall be possible to carry out

maintenance on all redundant cards and components without having to remove or disconnect other cards and components.

11) The Base stations shall be able to work in Wide Area and also in Local Site Trunking Mode with or without GPS. The Base Stations shall be provided with dual GPS for synchronization. In case of failure of one GPS, the Base Station shall automatically switch over to the other GPS through the site controller. In case of failure of even the second GPS, the Base Station shall immediately send an alarm to Central NMS but the Base Station shall continue to work in Wide Area for at least 20 days without synchronization problems for wide area calls.

12) The Contractor shall take special care to install GPS antennas at locations apart and through different cables following different routes.

3.10 Radio Base Station

3.10.1 The Radio Base Station shall be supplied with the following Engineering facilities:

1) Unblocked access to all channels available at the Radio Base Station for local monitoring of incoming and outgoing transmission within the Radio Base Station Radio Communication System.

2) Local Keying of transmitter through control software.(by a service Laptop).

3) Fully shielded-removable modules with front-mount controls and diagnostic.

4) Readily expendable without degradation of the final output power.

5) Software upgrades applied without the need for a site visit.

6) Radio Base Stations shall operate in full duplex mode for all communications.

3.10.2 Radio Base Station Combiner

All transmitter combiners shall be totally passive. N-type RF connectors shall be used for interfacing between RF equipment.

3.10.3 Technical Specifications

3.10.3.1 Radio Base Station

Number of Carrier	As per the Bidder's Design to meet Performance Requirements of the Contract. Bidder to state the number of carriers at different locations.
Frequency Range	350/400/800 MHz
RF Carrier Spacing	25 KHz/ 45 KHz

Mode of Operation	Full Duplex; Voice and Data
Duplex Spacing	10 MHz
Antenna Impedance	50 Ohm
RF Connector Type	50 Ohm
TX Output Power	Minimum 25W at top of the Base Station cabinet (after combiner included), adjustable in specified ratio, Open/ Short circuit protected
Scalability	Required
Modulation	Pi/4 DQPSK – Digital Phase Modulation
Gross Bit Rate 1 Carrier	36 kbps
Min. Data Transfer Rate	7.2 kbps per slot
Transmission Method	TDMA
Channels Per Carrier	Four (4)
Speech Codec	ACELP (Gross bit rate 7.2 kbps)
Call Set Up Time	< 300 milli seconds
Frequency Tolerance	± 0.1 ppm
Adjacent Channel Power	- 60 dBc
Dynamic Sensitivity	4% BER for TCH 7.2 at –106 dBm
Static Sensitivity	Better than or equal to –115 dBm at 4% BER
Power Supply	Nominal - 48 V DC (-41 V to -60 V DC) Redundant, Hot Swappable Power Supply Modules
Alarms	Alarms for Door Open, Overheat, High BER, etc.

Other features (desirable but not essential)

Transmission	- Support for Fractional E1 - Daisy Chaining of BTS - Support for Satellite Transmission.
Modules/Cards	Hot swappable Cards/Modules

3.10.3.2 Combiners / Active splitters / Duplexer

VSWR	Better than 1.5 for all ports
Port impedance	50 ohm
RF Connectors	50 ohm N-type
Input RF Power Rating	Adequate for simultaneous operation of all TX inputs
Number of Ports	As per Bidder's design.
Antennas	Minimum One for Tx and Two for Rx
Duplexer	Internal or External Provided, so that can also operate with a single antenna, in case required.

3.10.4 Base Station Control (BSC) Module

3.10.4.1 The base station shall have fully redundant base station control modules in hot-standby mode of operation. The switchover of the base station control module and the power supply shall be transparent to the users, and shall automatically occur in case of failure of one BSC.

3.10.4.2 The base station control module shall be co-located with the base station to perform the following as a minimum:

1) Interface to the OFC lease line (wherever available, otherwise copper lease line/microwave link to transmit audio and data signal to OCC and

2) Initiate local trunking mode.

3.10.4.3 The front panel of the base station control module shall have indicators for the display of base station status.

3.10.5 Local Trunking Mode

3.10.5.1 The base station shall operate in local trunking mode in one of the following situations as a minimum:

1) manually from radio-management system

2) automatically upon the detection of the loss of communication link between central equipment and local equipment

3) Automatically upon the detection of central equipment failure.

3.10.5.2 Any additional equipment at the Base Station Site, like GPS receivers, for maintaining synchronization in site trunking mode, shall be supplied as part of the work.

3.10.5.3 In local trunking mode, communication shall be restricted to the radios under

the RF coverage zone of the base station only.

3.10.5.4 Manual switching of the base station to normal operation when operating in local trunking mode shall be possible. Switch shall be achieved either from the base station control module front panel or the local terminal.

3.10.5.5 The system shall support Group call and Emergency call, even in Site Trunking mode.

3.10.5.6 In Local Site Trunking mode, the base station shall allow up to minimum of 1000 Radio terminals to be simultaneously registered. All radios that were registered when the site entered to continue to be registered, and new registrations will be accepted.

3.10.6 Health Status Reporting

The Base station shall have an alarm system which shall report the health status to the radio management system as a minimum:

1) RF forward power

2) power amplifier fail

3) power amplifier temperature

4) transceiver fail

5) local trunking mode

6) control channel fail

7) control channel transceiver switchover

8) power supply unit fails

3.10.6.1 Built-in Test Routine

3.10.6.1.1 Built-in test routines shall be able to test the base stations and central equipment system. These routines shall operate in an off-line mode to allow a complete functional of the module in problem.

3.10.6.1.2 Built-in Test Routines shall be initiated by the following as a minimum:

- Local maintenance commands via a notebook computer connected to the local maintenance port.
- Remote maintenance commands via the radio management system Workstation.
- Self initiated as a result of the on-line error detection
- Self initiated as part of the power up-initialization process.

3.10.7 Antenna Network

3.10.7.1 General

3.10.7.1.1 The Contractor shall provide both indoor and outdoor antenna networks for the RF coverage in radio network.

3.10.7.1.2 The antenna network shall be designed for the propagation of wide band radio signals in the frequency ranges 350/400/800 MHz.

3.10.7.1.3 The antenna network shall be designed so that the signal level received at the farthest point from the transmitting and receiving ends of the radiating component of the network is not less than the minimum required RF signal level into the respective receivers.

3.10.7.1.4 The system should be designed so that for Down-Link signal, the signal strength received at the farthest point of required coverage area from the corresponding base station for that area, is more than the minimum dynamic Signal strength required by a handheld after taking into account losses for factors like body loss, indoor penetration loss, losses for factors like body loss, indoor penetration loss, feeder margin, etc.

3.10.7.1.5 For Up-Link signal, the system should be so designated so that signal received at the BTS antenna input par from a handheld at 1.5 m right at the farthest point of required coverage area from the corresponding base station for that area, is more than the minimum dynamic signal strength required by the BTS after taking into account losses for factors like body loss, indoor, penetration loss, feeder margin, antenna cable feeder loss multi-coupler loss, etc.

3.10.7.1.6 The Bidder shall provide the details of achieving indoor coverage at the locations mentioned in TS.

3.10.7.1.7 The Contractor shall submit all the calculations of signal loss in the antenna network for the Employer's Representative to review the adequacy of the Design as part of the Design Stage.

3.10.7.2 Outdoor Antenna

3.10.7.2.1 The outdoor antenna shall be robust construction utilizing corrosion resistant aluminium alloy and shall be protected from lightning strike.

The feeder cable connection shall be weatherproof and fully sealed.

The outdoor antenna shall meeting the following requirement as a minimum:

1)	Operating frequency (Tx/ Rx)	: 350/400/800 MHz
2)	Bandwidth	: as required for optimum operation to cover the operational requirements in TETRA band.
2)	V.S.W.R.	: 1.5: 1

4) Maximum power input : 150 W

At above-the- ground sites, the radio system shall provide at leas one aerial for transmitting and two aerial for receiving at each Base Station site. Diversity receiving aerials shall be provided.

3.11 Mobile Radio Unit/ Static Radio Unit

The Radio shall be fully compliant with the relevant ETSI TERTA radio equipment standards.

3.11.1 Technical Specifications of Mobile Radio

3.11.1.1 The technical specification of the Mobile radios and associated equipment are given below:

Frequency Range	:	350/400/800 MHz
Channel Spacing	:	25 kHz/ 45 KHz
Modulation	:	Pi/4 DQPSK
Mode of Operation	:	Both single and dual frequency, simple and full duplex, trunked and direct mode
Antenna Impedance	:	50 Ohm
RF Connector Type	:	N-type 50 Ohm
TX Output Power	:	Minimum 3W, Open/Short circuit protected
Transmitter/ Receiver	:	10 MHz Separation
Dynamic Sensitivity	:	-103 dBm
Static Sensitivity	:	-112 dBm
Power from	:	vehicle battery (cars & buses qty as defined in Sec.-6)
Display	:	LCD Color

3.11.1.2 The microphone and audio circuits shall be sensitive enough to provide full modulation when it is used within 150 mm from the speaker's mouth.

3.11.1.3 Protection against mismatch of RF output impedance is essential.

3.11.1.4 When handset is taken off-look the speech should be routed to the speaker of handset and the cab-speaker volume should be lowered.

3.11.1.5 Required accessories for vehicle mounting, as well as the associated antenna shall be provided.

3.11.2 Technical Specifications of Static Radio

i) The desk-mounted units shall have technical characteristics similar to that of Mobile Radio Units, to ensure commonality of equipment across the Network.

ii) The power supply for desk-mounted Radio Units shall operate from the local VAC supply.

iii) Radio Units for permanent desk-mounted use shall permit access to all services available to hand-held and mobile Radio Units.

iv) The unit shall be connectable to a permanent external antenna. The mast for the same be provided by the Contractor.

v) The unit shall be supplied with:

- A permanent external antenna and coaxial feeder
- All cables, mounting brackets and fittings
- A handset
- Minimum 3 dB gain antenna

3.12 Handheld Radio

3.12.1 General

3.12.1.1 The Contractor shall provide all handheld radio of full function key model.

3.12.1.2 The Handheld shall be robust, splash proof rugged and made with die-cast chassis or equivalent to withstand dropping test at 1 m above concrete ground without any damage.

3.12.1.3 The radio shall comply with the following international standards:

1) EIA RS – 316 A or equivalent International Standards for humidity, vibration and shock.

2) MIL STD 810C/D/E or equivalent International Standard for low pressure, high temperature, low temperature, solar radiation, rain, humidity, salt, fog, dust, vibration and shock

3) IP 54 or equivalent, concerning condensing (Water & Dust) requirements

4) Shall conform to ETSI300019 or equivalent standard for climatic conditions.

3.12.1.4 It shall provide emergency buttons on the equipment. The emergency buttons shall be designed not to be evoked easily by inadvertent action.

3.12.1.5 The Handheld radio shall complete with a “screw-in” type of detachable antenna, belt clip and battery.

3.12.1.6 The Handheld radio shall have "auto power off" feature to protect the battery from over-discharging at low voltage. It shall not consume any power when the radio is switched off.

3.12.1.7 The Handheld radio shall have a local port for the connection to a notebook computer for field programming and diagnostic.

3.12.1.8 The speaker and the microphone shall preferably be in front of the Radio

3.12.2 Display Window

3.12.2.1 The Handheld radio shall have a back-lit display window. The display window shall display a minimum of four lines of alphanumeric characters and twelve characters on each line simultaneously.

3.12.2.2 The display window shall display the following as a minimum:

1) calling party identification

2) incoming call mode including individual call, group call, emergency call and system call message

3) real time signal strength

4) real time battery power level

3.12.3 Indicators and Switches

3.12.3.1 The Handheld radio shall incorporate the following indicators and switches minimum:

1) rotary switch for volume control and button/switch for power on/off control

2) rotary switch to allow minimum 16 talk-group selection at a time and minimum 18 ranges through menu button, to give minimum 256 talk group selection.

3) Back-lit on/off key

4) Call feature selection key

5) Call feature scroll key

6) Software programmable key

7) PTT switch

8) Transmit indicator

9) Power on indicator

3.12.3.2 It shall provide Standard interface such as RS 232 for connecting computer equipment for data services.

3.12.3.3 It shall be able to adjust the RF power automatically according to the distance. It is away from the Base station / repeater.

3.12.3.4 It shall have audible or visual indication for low battery status.

3.12.4 Transceiver

3.12.4.1 All the Handheld radios shall meet the following requirement as a minimum:

(1)	Normal operating frequency Tx/Rx	:	350/400/800 MHz
(2)	Channel spacing	:	25 KHz/45 KHz
(3)	Priority Scanning	:	Equipped with it
(4)	Transmit / Receive separation	:	10 MHz
(5)	Modes of operation	:	Both single and dual frequency simplex and full duplex, trunked and direct mode.
(6)	Operation temperature	:	-20°C to 55°C
(7)	Maximum size incl. Battery	:	150mm * 60mm * 50mm
(8)	Maximum weight (including battery)	:	< 300 gm
(9)	Spurious harmonics 1. adjacent channel 2. wide band noise	 : :	 Less than – 60 dB below carrier Less than – 80 dB below carrier
(10)	RF Power Output	:	1 W minimum
(11)	Frequency Stability	:	0.2 ppm Locked
(12)	Modulation	:	Pi/4 DQPSK
(13)	Transmission method	:	TDMA (4 Channels per carrier)
(14)	Speech coding method	:	ACELP, 4.8 kbps
(15)	Minimum Data Rate	:	7.2 kbps per slot (28.8 kbps with 4 Time slot)
(16)	Dynamic Rx Sensitivity	:	<-103dBm
(17)	Static Rx Sensitivity	:	<-112dBm
(18)	Audio output	:	Not less than 500 mW
(19)	Power on adjacent Channel	:	< 60 dBc
(20)	With AVL/APL localization facility		Equipped with it
(21)	Radio Management	:	Temporary Enable/Disable (Stunning), Permanent Enable/Disable (Killing)
(22)	Display	:	LCD color Display
(23)	GPS	:	With inbuilt GPS feature and accuracy of better than 10 meters.
(24)	Software Upgrade	:	Handset shall be TEDS upgradable in accordance with clause no.2.1.2 (b & c) of Chapter 7.2

3.12.5 Handheld Radio Accessories

3.12.5.1 The Contractor shall provide the following Handheld radio accessories as a minimum:

1) Clip on extension microphone with speaker or being able to wear the Handheld on the chest.

2) carrying case with strap and shoulder strap

3) earpiece & Handheld's clip

3.12.6 Built-in Test Routine

3.12.6.1 Built-in rest routines shall test the Handheld radio. These routines shall operate in an off line mode to allow a complete functional test of the module in problem.

3.12.6.2 Built-in test routines shall be initiated by the following as a minimum:

1) local maintenance commands via a notebook computer connected to the local maintenance port

2) self initiated as part of the power up-initialization process.

3.12.7 Battery Charger

3.12.7.1 The Contractor shall provide single unit desktop battery charger with each Handheld Radio capable of operating from AC mains of 240 V + 10 %, single phase at 50 Hz + 5% for the recharging of battery packs completed with over-charged and over-discharged protection. The charger shall have suitable protection against wide voltage variations and transients.

3.12.7.2 AC main voltage circuits must be isolated from low voltage circuits and all exposed metal parts of the charger must be properly earthed by an earth continuity conductor to the mains plug.

3.12.7.3 Additionally, a total of 90 no. of multiple unit desktop battery chargers shall be supplied.

3.12.7.4 The battery charger provided shall have the following facilities as a minimum:

1) power on or charging-in-progress indication

2) quick charge mode

3) Battery pack fully charged indication.

3.12.7.5 The charger shall provide automatic charging current regulation (constant current), including avoidance of over charge and regulation by cell temperature sensing. It shall have trickle charging capability after a full charge.

3.12.8 Battery Unit

3.12.8.1 The Handheld radio battery unit provided shall be leak-proof Li-ion and shall not exhibit any memory effect.

3.12.8.2 Each handheld radio shall be provided with one Spare Battery. For emergency services such as Fire Service and Police (refer Annexure 8.3 for the quantities of these two Services/ Departments). two number of spare batteries per handheld radio shall be supplied.

3.12.8.3 The battery when fully charged, shall supply power to the Handheld radio for a minimum of 15 hours of continuous operation at 5/20/75 cycle.

3.12.8.4 The battery pack shall be securely and firmly connected to the Handheld radio by a simple-locking mechanism. No tools shall be required to connect and disconnect the battery.

3.12.8.5 The battery shall sustain a minimum of 400 charging and recharging cycles without degrading by 10% of the nominal operating voltage.

3.13 Network Management System

3.13.1 The network management system shall be equipped with a proven real-time operating system to support the specified management functions.

3.13.2 Each network management workstation shall be equipped with a TFT/LCD colour display with at least “1280 x 1024” pixels resolution to provide graphical representation and display of the Radio system.

3.13.3 The mass storage device shall be provided with storage capacity for at least 4 weeks of event logging data and system configuration data.

3.13.4 The mass storage device shall be provided with the necessary facilities for downloading the configuration and alarm data files to other secondary storage medium. The file shall be in format easily read and processed by commercial available software applications.

3.14 Towers at Radio Base Stations

3.14.1 The towers shall be designed and constructed for working and installation in the geographical and environmental conditions of Delhi. Existing towers may also be used that meet the minimum requirements mentioned herein.

3.14.2 All towers shall comply with the requirements of Standard EIA/TIA-222-E and India Standard IS-800, 226/2062, 1367, 1161, 2629, 5358. In case of any conflict between the two standards, the Indian Standards shall prevail.

3.14.3 The towers shall be self-supporting steel structure.

3.14.4 All steel used shall be hot dip galvanized in full compliance with the relevant ISO or ASTM specifications or IS 4759. The galvanized tower members shall further be treated suitably to protect from rusting.

3.14.5 Any damage to the galvanizing during the erection shall be made good by the contractor before acceptance by the Employer's representative.

3.14.6 The towers shall be designed to withstand a minimum wind load of 180 kmph or the maximum wind speed of the concerned zone as currently defined by the Indian Meteorological Department (whichever is higher) while supporting the maximum number of antennae plus four additional antennae required of the same type/size, located at full height.

3.14.7 For design purposes, the combined projected area of these antennae shall be maximized against the wind direction.

3.14.8 The tower loading must take into account the wind load, seismic conditions (zone iv), antenna loads, all tower accessories and at least 100% safety margin against structural failure for the actual anticipated configuration.

3.14.9 The Contractor shall design/build/erect the base/foundations/earthing/ fencing of the tower. It is expected that the foundations can be constructed from standard concrete and reinforcing steel. However, the Contractor shall ensure the adequacy of the soil bearing pressure to support the weight of the tower as well as the antennae/support structures and to resist the overturning moments generated in the survival wind speed, which shall be the highest recorded wind gust speed for the Delhi area. During construction of the Tower foundation, the Contractor shall be responsible for the safety of the site and the structures nearby, The earthing design shall be as per IS 3043 or better standard for radio Towers and the foundation and earthing design shall be got approved by the Employer before implementation.

3.14.10 A rest platform with guard railing and seat every 20 m and a 400 mm wide climbing ladder with 20 mm diameter rungs at intervals of 300 mm to the top of the tower shall be provided.

3.14.11 The ladder shall be securely and rigidly fixed so that the tower faces form a safety cage. Backward tilt shall not be acceptable.

3.14.12 The linear and torsional sway of the tower under the worst loading conditions shall be restricted to a value such that no degradation of the system performance is experienced.

3.14.13 All tower connections nuts and bolts shall be made of steel conforming to the requirements of ASTM A-39A or A-325 or an equivalent international standard, and shall be hot galvanised. Locks nuts shall be provided and installed for all bolts without exception.

3.14.14 All towers shall be equipped with a suitable cable rack to house the feeder cable to antenna and cable clamps of suitable design shall be provided and installed.

3.14.15 The towers shall be equipped with Aviation Warning Lights in conformity with the relevant requirements of ICAO.

3.14.16 Pockets and depressions likely to hold water shall be avoided, and where unavoidable, shall have suitable draining facility.

3.14.17 For earthing of the tower, holes of suitable diameter shall be made near the base of the tower. At least two earths at adequate distance apart bit interconnected shall be provided. The earth resistance should be less than one ohm under all weather conditions.

3.14.18 The tower shall have lightning conductors of appropriate design and size, which shall be earthed through dedicated copper conductors of suitable cross section coming down from the top of the tower to the base of the tower to be grounded.

3.14.19 A means of preventing unauthorized access onto the ladder shall be provided.

3.14.20 It would be preferable to have Radio Tower structure which consumes as less space as possible.

3.15 TECHNICAL SPECIFICATIONS OF GATEWAYS

3.15.1 TELEPHONY GATEWAY

i. The Telephony gateway should provide the cross communication between the Digital Trunking radio subscribers and an existing telephony system.

ii. It should provide the required interfaces to existing and legacy telephony systems.

iii. It should provide the required interfaces to existing wireless and wireline telephony systems, namely, PSTN, GSM and CDMA Networks.

iv. It should provide feature transparency between the two networks.

v. It should be integrated into the switch itself.

vi. Minimum Hardware Specifications - Rack Mounted

3.15.2 ANALOG VHF GATEWAY

i. The System should be able to connect to existing legacy VHF network. And allow voice calls between the two networks. (Broadcast and Selective)
ii. It should provide the required interfaces to existing and legacy VHF systems
iii. It should support minimum 6 VHF channels
iv. Minimum Hardware Specifications - Rack Mounted

3.15.3 ALS GATEWAY

3.15.3.1 General Requirements

i. The System should be able to connect to Automatic Locator System (ALS) and allow data communication between networks.

ii. It should provide the required interfaces to Automatic Vehicle Locator system.

iii. Minimum Hardware Specifications - Rack Mounted

3.16 POWER ARRANGEMENTS

(a) Central OCC and BCC Site

i. **UPS**: Online 1-ph /3-ph (N+1) configuration; Floor mountable with 4 hour battery backup as per below given specifications.

S. N	Item	Description
1.	Power Rating	As per Bidder's System Design.
2.	Input Voltage	160 - 280 V
3.	Input Frequency	50 Hz+/-10%
4.	Output voltage	230 +/-1%
5.	Output Frequency	50Hz
6.	Wave form	Pure sine wave
7.	Harmonic Distortion.	Less than equal to 3%
8.	Harmonic Distortion with	Less than equal to 5%
9.	By pass switch	Static and manual
10.	Overload Capacity	125% - 1min.
		150 % - 30 sec
11.	Input Power Factor	0.9
12.	Output Power Factor	0.7
13.	Overall Efficiency (AC to AC)	90%
14.	Automatic internal bypass	Automatic internal bypass
15.	Protection	Input AC Over / under voltage & short circuit, Output over voltage, Overload & short circuit, Over temperature, Battery over charge, battery low.
16.	Visual Indications	Mains on (load on mains), Load on inverter, load on standard battery charging. Low battery indication / overload indication
17.	SNMP	SNMP based Monitoring and Management using SNMP based Network Management Systems thus providing centralized monitoring and monitoring from any node on SWAN Remote shutdown/ switch on necessary password protection
18.	Generator Compatibility	The UPS should be generator compatible with power walk- in facility

ii. **Diesel Generator Set :** Generator should be noiseless, smoke free, Auto start and SNMP enabled. The equipment should comply with latest CPCB standards for noise level & emission and should support canopy based installation. Specifications are as follows:

1	Generator (Silent Mode)	
1.1	Generator Capacity	As per Bidder's System Design
1.2	Common Mounting Arrangement (Engine & Alternator)	MS Fabricated base with AVM padding
2	Diesel Engine	
2.1	Standard	ISO 8525
3	Alternator	
3.1	Output Voltage	230+/- 1%
3.2	Output Voltage	0.8 Pf (lag)
3.3	Output Frequency	50 Hz
3.4	No Load Harmonic	≤ 1.5%
3.5	Output Voltage Regulation	AVR
3.6	Overload Capacity	10% for one hour in 12 hrs. duration
4	AMF Control Panel	
4.1	Engine Instrumentation	Lube oil pressure, Coolant, Temp Voltmeter, Ammeter, Frequency Meter, Current Transformer, Fuses
4.2	AMF Logic	(Feed back time) 5 Sec. ~ 15 Sec.
5	Fuel Tank	
5.1	Fuel Tank Capacity	Sufficient for 4 hrs. running
5.2	Fuel Tank Safety	Drain valve, Air vent and out let
6	Battery	
6.1	Initial State	Dry and uncharged
6.2	Battery Charging	Through alternator & through A/C Mains
7	Acoustic Enclosure	
7.1	Standards	IP: 23
8	Oil Consumption	Managed by Contractor

The Contractor shall be free to use any other means in lieu of DG set.

(b). Base Station Site :

i. UPS Online Type with 4-hour battery backup on full load. The specifications shall be as given above for Central sites.

ii. DG Set: Genset should be noiseless, smoke free, Auto start and SNMP enabled. All these equipment should be complied with latest CPCB standards for noise level & emission and should support canopy based installation. The specifications shall be as given above for Central sites.

The Contractor shall be free to use any other means in lieu of DG set.

3.17 Shelter and Air Conditioner

Specifications	Details
Minimum Size	As per Bidder's requirement
Shape and Design	As per telecom standards
Temperature	Should withstand -10^{o} C to +70^{o} C
Dismantling and Reassembling	The components should be easily transported to any difficult terrain and erected/ dismantled fast with ordinary tools requiring no high skills
Lighting	Concealed brass fittings with ISI mark Switches and Sockets with concealed copper wiring (where ever required) in ratio of one point per 20 sq.ft(approximately). (Fan, Cooler, A.C. to be supplied by owner if desired).
Flooring	Antistatic flooring

3.18 Specifications for Microwave System

3.18.1 Engineering requirements

3.18.1.1 The equipment shall incorporate state of the art technology.

3.18.1.2 The equipment shall be of compact and composite construction and lightweight. Manufacturer shall furnish the actual dimensions and weight of the equipment.

3.18.1.3 All connectors shall be reliable and of standard type to ensure failure free operation under environmental conditions specified in this TS.

3.18.1.4 All connectors and the cables used shall be of low loss type and suitably shielded.

3.18.1.5 The equipment shall be housed in standard 19" or slim rack with maximum heights of 2250 mm and with front access.

3.18.1.6 The equipment shall have natural cooling which shall not involve any forced cooling such as by using fans etc. either inside or outside the equipment. However, in case this is unavoidable and the fans are used, these shall be DC operated and shall not impact on the MTBF of the equipment.

3.18.1.7 The supervisory indications and other control switches shall be provided at convenient locations on the bay preferably at a height around 1500mm for ease of maintenance.

3.18.1.8 The plug- in units shall be hot swappable to allow their removal/insertion while the equipment is in energized condition.

3.18.1.9 Each sub- assembly shall be clearly marked with schematic reference to show its function, so that it is identifiable from the lay out diagram in the handbook.

3.18.1.10 Each terminal block and individual tags shall be numbered suitably with clear identifying code and shall correspond to the associated wiring drawings.

3.18.1.11 All controls, switches, indicators etc. shall be clearly marked to show their circuit designation and functions.

3.18.2 Quality Requirements

The equipment shall be manufactured in accordance with international quality standards ISO 9001 or ISO 9002 for which the manufacturer should be duly accredited. A quality plan describing the quality assurance system followed by the manufacturer would be required to be submitted.

The equipment shall confirm to the requirements for environment specified in TS.

3.18.3 Maintenance Requirements:

3.18.3.1 Maintenance philosophy centers around replacing faulty units/subsystems after quick on-line analysis through monitoring sockets, alarm indications and build-in test equipment. The actual repair will be undertaken at centralized repairs centres. The corrective measures at site shall involve replacement of faulty units/sub-systems.

3.18.3.2 The equipment shall have easy access for servicing and maintenance.

3.18.4 ACCESSORIES

3.18.4.1 The supplier shall provide complete set of :

All the necessary interfaces, connectors, connecting cables, special tools and accessories required for satisfactory and convenient operation of equipment. Types of connectors, adapters to be used and accessories of the approved quality shall be clearly indicated in the operation manuals.

3.18.4.2 Software and the arrangement to load the software at site.

3.18.5 Frequency Specifications

3.18.5.1 The operation of the equipment shall be in the licensed microwave frequency band of 7 Ghz/15 Ghz/ any other frequency band

3.18.6 SYSTEM SPECIFICATIONS

Frequency band (licensed)	As per Bidder's Design
Bit rate from/to MUX	As per Vendors Design catering to the maximum traffic between the two nodes
Interface towards MUX	HDB-3 as per ITU-T G-703 120 ohms.

Repeater	Regenerative type or back to back terminals with the conditions that supervisory and order wire shall be through all the repeater station
Jitter • output jitter (in the absence of input jitter) • Input jitter tolerance • Jitter transfer	As per ITU – T G-823/ G-921(for international network)
Bit rate tolerance	As per ITU-T G703
Line data rate	To be furnished by the Bidder
Type of modulation/ demodulation	To be furnished by the Bidder
Redundancy	
Supervisory channels	Supervisory channels for omnibus order wire and remote supervisory shall be provided. Express order wire and telecomm and channels are optional.

3.18.7 Order wires

3.18.7.1 Type - Digital.

3.18.7.1.1 Features - 0.3 to 3.4 KHZ with omnibus calling facility on loud speaker and buzzer with visual indication and speech on loud speaker and handsets. Potential free contact for extension of buzzer calling facility to be centralized place shall be provided. Handsets, loudspeaker and buzzer shall form part of the equipment.

3.18.7.1.2 Nominal 4W TX/RX level – to be specified by Bidder. Level adjustment facility shall be provided. Suitable access for line up shall be provided.

Chapter –7.3

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Chapter –7.3

Centralized Digital Recording system (CDRS)

1. INTRODUCTION

1.1 General

1.1.1 This chapter specifies Technical and performance requirements of the Centralized Digital Recording system.

1.1.2 This Chapter shall be read in the conjunction with other Chapters of the Technical Specification (TS), GCC, SCC and other documents forming part of the Contract.

1.2 Overview of Centralized Digital Recording System

1.2.1 CDRS facility shall be provided in both OCC & Backup OCC. The CDRS shall provide multichannel voice and data recording and indexing of all communication through the TETRA switch.

1.2.2 The CDRS shall also have the facility to record direct PSTN or E1-PRI lines in the OCC and BCC.

2. SCOPE OF THE WORKS

2.1 Scope of Supply for CDRS

2.1.1 The scope of supply shall include, but not be limited to, the following:

1. Complete CDRS Equipment with all interfaces to meet with the scope of work for OCC and BCC.

2. All installation, testing, commissioning and O&M, including the material therein.

3. Any other item required to complete the scope of the work.

3. PERFORMANCE REQUIREMENTS

3.1 General

3.1.1 Fault tolerant design with protections against failure shall be provided in order to achieve the system availability.

3.2 Reliability

3.2.1 The inability to perform any required function, the occurrence of unexpected action or the degradation of performance below the specifications shall be considered as a failure.

3.2.2 As per the design requirements CDRS has to work in 1 + 1 mode (2 units in parallel). Contractor shall provide MTBF values for the CDRS and submit calculations for the availability of the designed system.

3.3 Maintainability Requirements

3.3.1 The Mean Time to Restore (MTTR) of the master clock system shall be less than 10 minutes during the Games and four hours at other times (all inclusive).

4. FUNCTIONAL REQUIREMENTS

4.1 CDRS shall perform multichannel voice recording of the following:

(1) all the communication from and to the Consoles in OCC's. Interface with CDRS shall be at E1 level.

(2) two way radio conversations:

- Multi-channel voice recording @ two channels per Dispatcher and minimum 75 channels for talk groups other than through Dispatcher at OCC. The recording capacity of the CDRS at both the OCCs shall be identical.
- All Private Radio Calls between any type of Radios, in both the OCC's.
- All emergency calls and broadcast calls from any type of radios.
- PABX calls to radio.

(3) The recording channels on the recording medium shall be allocated among the consoles at the OCC.

4.2 The choice of recording medium shall be subject to the review by the Employer's representative.

4.3 The Contractor shall interface the Radio System with the multi-channel digital voice recorder in main and hot-standby mode (1+1) of operation, for the recording of all radio communications including Private Calls between any Radios (except DMO for all radios). The number of Channels in the recorder should be sufficient to record all this communication for at least 4 weeks duration, and to archive this information for at least one year period.

4.4 The CDRS shall be synchronized with the Master Clock system with the time deviation not more than 2 seconds without manual adjustment. Date and time stamp shall be encoded and recorded.

4.5 The CDRS shall automatically changeover to the standby module within 1 second for the standby unit to become active and start recording under the following conditions:

(1) pre-schedule daily changeover from the active to the standby module;

(2) whenever fault is detected on the active module which affects the normal recording; and

(3) Whenever the capacity of the active recording medium reaches its end before the daily changeover time.

4.6 During changeover, overlap recording of a minimum of half an hour shall be provided to ensure there is no time gap in recording for the changeover mechanism.

4.7 The CDRS shall support simultaneous recording and playback or change recording medium without disrupting the on-line recording.

4.8 The CDRS shall provide facilities for user to tag/remark any voice or data record for retrieval later.

4.9 The CDRS shall provide search function for user to locate any part of the recording medium in terms of :

(1) date and time

(2) by channel

(3) search by marker placed by the user

(4) By User ID.

4.10 The search shall be on channel basis or a combination of a minimum of two channels simultaneously.

4.11 The CDRS shall provide automatic gain control for voice message recording

4.12 The CDRS shall provide voice operated start/stop (VOX) operation for automatic recording of conversation without user intervention.

4.13 The CDRS shall automatically reposition the recording medium to the end of the last recording when the record command is initiated.

4.14 Control, administration and management functions shall be provided through the from panel of the CDRS of a workstation (to be supplied) connected to the CDRS and the following functions, as a minimum, shall be provided:

(1) audio monitoring of any channel under recording or playback mode;

(2) recording medium movement control including playback, fast forward, fast backward, record, stop and pause;

(3) recording medium counter indicating the recording time elapsed;

(4) recording medium movement indicator and

(5) display of operation status including power on/off, current time, channel number, operation mode.

(6) Export of the recorded conversation between any two parties, so that it can be played back on any Computer with a standard commercially available software for playing back audio files. The conversation between two parties shall automatically be played back in the actual sequence of conversation between the two parties.

4.15 The Centralized Digital Recording System shall meet the following specifications:

1)	Frequency Response	:	300 to 3400 Hz within ± 3 dB
2)	Signal to noise ratio	:	> 42 dB
3)	Cross talk immunity	:	> 60 dB at 1 KHz
4)	Distortion	:	< 3%
5)	Automatic gain control level	:	± 3 dB in recording level for all input levels
6)	Number of drives	:	2 minimum

SECTION – 8

ANNEXURES

ANNEXURE – 8.1

LIST OF SPORT VENUES

Sl.No.	Sport	Name of Venue	Indoor venue
1	Aquatics	Dr. S.P.Mukherjee. Aquatics Complex	
2	Archery	Yamuna Sports Complex India Gate	Yes
3	Athletics	Jawaharlal Nehru Stadium	
4	Badminton	Siri Fort Sports Complex	Yes
5	Boxing	Talkatora Indoor Stadium	Yes
6	Cycling	Indira Gandhi Sports Complex	Yes
7	Gymnastics	Indira Gandhi Sports Complex	Yes
8	Hockey	Maj. Dhyan Chand National Stadium	
9	Lawn Bowls	Jawaharlal Nehru Stadium	
10	Netball	Thyagaraj Sports Complex	Yes
11	Rugby 7s	Delhi University	
12	Shooting	Dr. Karni Singh Shooting Range	Yes
13	Squash	Siri Fort Sports Complex	Yes
14	Table Tennis	Yamuna Sports Complex	Yes
15	Tennis	R.K. Khanna Sports Complex	
16	Weightlifting	Jawaharlal Nehru Stadium	
17	Wrestling	Indira Gandhi Sport Complex	Yes

Note: The bidder is advised to refer the website of Commonwealth Games Organizing Committee (CWGOC) also in regard to the details given in Annexure 8.1 and 8.2.

ANNEXURE – 8.2

TRAINING VENUES

Sl.No.	Sport (number of Training Venues)	Training Venue
1	Aquatics (4)	- Maj. Dhyan Chand National. Stadium
		- Siri Fort Complex
		- Yamuna Sports Complex
		- Games Village
2	Athletics (4)	- Thyagaraj Sports Complex
		- Chattrasal Stadium
		- Games Village
		- Delhi University
3	Badminton (2)	- Siri Fort Sports Complex
		- Saket Sports Complex
4	Boxing (1)	- Delhi University
5	Cycling (1)	- Velodrome, I.G. Sports Complex (Road Even Routes to be finalized)
6	Gymnastics (2)	- I.G. Indoor Stadium
		- Yamuna Sports Complex (Rythmic Gymnastics)
7	Hockey (2)	- Maj. Dhyan Chand Nat. Stadium
		- Shivaji Stadium
8	Lawn Bowls (2)	- Siri Fort Sports Complex
		- Delhi Public School, R.K. Puram
9	Netball (2)	- Delhi University
		- Games Village
10	Rugby 7s (8)	- St. Stephen's College
		- Hindu College
		- Khalsa College
		- Ramjas College
		- Kirorimal College
		- Sri Ram College of Commerce
		- Daulatram College
		- Jamia Milia Islamia University
11	Shooting (2)	- Dr. Karni Singh Shooting Range
		- CRPF Campus, Kadarpur
12	Squash (1)	- Siri Fort Sports Complex
13	Table Tennis (2)	- Yamuna Sports Complex
		- Jamia Milia Islamia
14	Weightlifting (1)	- Games Village
15	Wrestling (3)	- Sri Ram College of Commerce (Women)
		- Games Village
		- Ludlow Castle
16	Tennis (2)	- R.K. Khanna Sports Complex
		- Siri Fort Sport Complex
17	Archery (1)	- Yamuna Sports Complex

Annexure 8.3

User Requirement of TETRA Radios for CWG 2010

Sl. No.	Govt. Department	Requirement during Period of Sept-Oct 2010			Requirement during Period of Jan 2010 – Mar 2017 (Legacy Requirement; excluding Sept-Oct 2010)		
		No. of Static Terminals	No. of Handheld	No. of Mobile (vehicular)	No. of Static Terminals	No. of Handheld	No. of Mobile (vehicular)
1	PFA	0	42	0	0	0	0
2	NDMC	0	20	0	0	0	0
3	Delhi Jal Board	0	150	0	0	100	0
4	Home Guard & Civil Defence	20	60	0	20	60	0
5	**Delhi Police***	61	2195	101	61	2195	101
6	Health & Family welfare	0	802	0	0	527	0
7	DDA	0	300	0	0	0	0
8	MCD	0	500	0	0	200	0
9	DTC	0	232	574	0	0	434
10	Delhi Transco/NDPL/others	0	221	0	0	0	0
11	Delhi Fire Service	10	80	0	0	0	0
12	PWD	0	100	0	0	0	0
13	Divisional Commissioner, ISBT	0	170	0	0	170	0

Sl. No.	Govt. Department	Requirement during Period of Sept-Oct 2010			Requirement during Period of Jan 2010 – Mar 2017 (Legacy Requirement; excluding Sept-Oct 2010)		
		No. of Static Terminals	No. of Handheld	No. of Mobile (vehicular)	No. of Static Terminals	No. of Handheld	No. of Mobile (vehicular)
14	Irrigation & Flood Control	0	0	0	0	0	0
15	DMRC	0	0	0	0	0	0
16	CWG organising Committee (CWGOC)	0	5252	0	0	0	0
17	Ministry of Culture & Youth Affairs, GOI	0	20	0	0	0	0
18	Sports Authority of India	0	50	0	0	0	0
	Total	**91**	**10,194**	**675**	**81**	**3,252**	**535**

Note:

(a) * - 61 Static Terminals in 1+1 Configuration

ANNEXURE – 8.4

LIST OF HOSPITALS
REQUIRING SPECIAL INDOOR WIRELESS COVERAGE IN EMERGENCY AREAS

I. LIST OF DELHI GOVERNMENT HOSPITALS

1. Acharya Biskhu Government Hospital, Moti Nagar
2. Aruna Asaf Ali Government Hospital, Rajpur Road
3. Babu Jagjivan Ram Memorial Hospital , Jahnagirpuri
4. Bhagvan Mahavir Hospital , Pitampura
5. Chacha Nehru Paeds. Hospital, Geeta Colony
6. Deen Dayal Upadhyay Hospital , Hari Nagar
7. Dr. N C Joshi Memorial Hospital, Karol Bagh
8. Dr. Hedgevar Arogya Sansthan, Karkardooma
9. Dr. Baba Saheb Ambedkar Hospital, Rohini
10. GB Pant Hospital, Jawahar Lal Nehru Marg, Delhi
11. Guru Gobind Singh Government Hospital , Raghubir Nagar.
12. Guru Tegh Bahadur Hospital, Dilshad Garden, Delhi
13. Jag Pravesh Chand Hospital, Shatri Park
14. Janakpuri Super Speciality Hospital
15. Lal Bahadur Shastri Hospital , Khichdipur
16. Lok Nayak Hospital, Jawahar Lal Nehru Marg, Delhi
17. Maharishi Balmiki Hospital , Pooth Khurd
18. Madan Mohan Malaviya Hospital, Malviya Nagar
19. Rajiv Gandhi Super Speciality Hospital. Tahir Pur
20. Rao Tula Ram Memorial Hospital , Jaffarpur
21. Sanjay Gandhi Memorial Hospital, Mangol Puri
22. Sardar Vallabh Bhai Patel Hospital. Patel Nagar
23. Satyawadi Raja Harish Chander Hospital, Narela
24. Sushruta Trauma Centre, Bela Road, Delhi

II. ESI HOSPITALS

25. IG ESI Hospital, Jhilmil, Delhi
26. ESI Hospital, Basai Darapur, Delhi
27. ESI Hospital, Rohini, Delhi
28. ESI Hospital, Okhla, Delhi

III. MCD MAJOR HOSPITALS

29. Hindu Rao Hospital
30. Swami Dayanand Hospital, Shahdara
31. Kasturba Hospital, Jama Masjid

IV. GOVT. OF INDIA HOSPITALS

32. AIIMS incl. Apex. Trauma Centre
33. Safdarjung Hospital
34. RML hospital
35. LHMC and associated Sucheta Kriplani and Kalawati Saran Hospitals

ANNEXURE – 8.5

Map of NCT of Delhi

(Uploaded in Separate File on the Specified Website).