REQUEST FOR PROPOSAL

For

Selection of System Integrator for Design, Supply, Implementation and Maintenance of a Digital Trunked Radio System (DTRS) in the Police Commissionerates of Ahmedabad city and Gandhinagar district areas

Volume – 2 : Scope of Work

Tender No. : HWT041218524

Invited By:
Office of the ADGP (Technical Services), Gujarat State, Home Department, Government of Gujarat

GIL, Gujarat

Contents

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2. Glossary

Sr. No.	Terms	Meaning
1.	AMC	Annual Maintenance Contract
2.	APCO	Association of Public-Safety Communications Officials
3.	APLS	Automatic Person Location System
4.	AVLS	Automatic Vehicle Location System
5.	BER	Bit Error Rate
6.	BOM	Bill of Material
7.	BSS	Base Station Subsystem
8.	BTS/BS	Base Transceiver Station/Base Station
9.	CAD	Computer Aided Dispatch
10.	CCC	Command and Control Centre
11.	CDRS	Centralized Digital Recording System
12.	CMRTS	Captive Mobile Radio Trunking Services
13.	DAQ	Delivered Audio Quality
14.	DD	Demand Draft
15.	DG	Diesel Generator
16.	DMO	Direct Mode Operation
17.	DoT	Department of Telecommunications
18.	DTRS	Digital Trunked Radio System
19.	EIRP	Effective (or equivalent) Isotropic Radiated Power
20.	EMD	Earnest Money Deposit
21.	ETSI	European Telecommunications Standard Institute
22.	FCAPS	Full Fault, Configuration, Accounting, Performance, and Security
23.	GIS	Geographical Information Systems
24.	GPS	Global Positioning System
25.	GoG	Government of Gujarat
26.	GIL	Gujarat Informatics Limited
27.	GSP-HD	Gujarat State Police - Home Department
28.	GUI	Graphical User Interface
29.	HDIITS	Home Department Integrated Information Technology Solution
30.	IDS	Integrated Dispatch Solution

Sr. No.	Terms	Meaning
31.	INR	Indian Rupee
32.	IOP	Interoperability
33.	IP	Internet Protocol
34.	ISI	Inter System Interface
35.	ISSI	Inter RF Subsystem Interface
36.	KML/KMZ	Keyhole Markup Language/ Keyhole Markup language Zipped
37.	KVA	Kilovolt-ampere
38.	LAN	Local Area Network
39.	LCD	Liquid Crystal Display
40.	LoI	Letter of Intent
41.	LTE	Long Term Evolution
42.	MHz	Megahertz
43.	MPLS	Multiprotocol Label Switching
44.	MW	Microwave
45.	NMS	Network Management System
46.	NPV	Net Present Value
47.	O&M	Operation and Maintenance
48.	OEM	Original Equipment Manufacture
49.	OTAR	Over The Air Rekeying
50.	PABX	Private Automatic Branch Exchange
51.	PAC	Precision Air Conditioning
52.	PBG	Performance Bank Guarantee
53.	PHQ	Police Head Quarter
54.	PMO	Project Management Office
55.	PMR	Private Mobile Radio
56.	PSTN	Public Switched Telephone Network
57.	PTT	Push-to-Talk
58.	QoS	Quality of Service
59.	RF	Radio Frequency
60.	RFP	Request For Proposal
61.	SACFA	Standing Advisory Committee for Frequency Allocation
62.	SDS	Short Data Service

Sr. No.	Terms	Meaning
63.	SI	System Integrator
64.	SIP	Session Initiation Protocol
65.	SLA	Service Level Agreement
66.	SMPS	Switched Mode Power Supply
67.	SoW	Scope of Work
68.	TDMA	Time Division Multiple Access
69.	TETRA	Terrestrial Trunked Radio
70.	TFT	Thin Film Transistor
71.	TMO	Trunked Mode Operation
72.	TQ	Technical Qualification
73.	UHF	Ultra-High Frequency
74.	UPS	Uninterrupted Power Supply
75.	USB	Universal Serial Bus
76.	VHF	Very High Frequency
77.	VoIP	Voice over Internet Protocol
78.	WAN	Wide Area Network
79.	WPC	Wireless Planning & Coordination

3. Project Background

3.1. About the Project

Gujarat Police currently uses VHF communication systems for voice communication across the network with set of repeater stations. With the advancement in technology, there is a need felt to modernize police communication systems that are at par with the latest technology, safe and secured, and also be able to carry some amount of data and images. Gujarat Police, Home department intends to procure such a set up for its State police and para police forces. Home Department, Government of Gujarat has decided to implement Digital Trunked Radio System (DTRS) in the entire State of Gujarat & initially it has been decided to implement DRTS in the jurisdiction of following in the first phase:

a) Ahmedabad city

b) Gandhinagar district

In the second phase, it has been envisaged to cover the below mentioned jurisdiction.

a) Ahmedabad Rural

b) Vadodara City, Vadodara Rural, Chhota Udepur

c) Surat City, Surat Rural, Tapi

d) Rajkot City, Rajkot Rural, Morbi

In the third phase, it has been envisaged to cover the remaining areas of Gujarat.

3.2. Project Objectives

1. To establish safe and secure communication between field force and control centers which cannot be tampered by unauthorized personnel.
2. To establish robust Digital Network which will provide all inherent advantages of Digital technology over Analog Network with fulfilling all present and future needs of Police and Home Department.
3. To establish digital network with defined roadmap to enable the provision of broadband LTE services in the future to equip Police team for all future requirements.
4. To achieve better control in day to day communication by defining different priority levels to Police officials with different designation as per protocols.
5. To establish fully scalable IP based network which should be capable of integrating remaining areas of Gujarat state in future.

3.3. Project Beneficiaries

The beneficiaries of the project would be:

1. State and Para Police Forces of the State of Gujarat
2. Home Department, Gujarat Police, Government of Gujarat
3. The citizens of the State of Gujarat

3.4. Benefits Envisaged

Some of the key benefits of this project would be:

1. Improved communication between field force and control center.
2. Quick response to emergency situations like flood, earthquake, riots.
3. Police will be able to offer more secured and safe living atmosphere to citizens.
4. Police will be able to successfully manage all crowd gathering events like Rathyatra festival, political public meetings, kankaria carnival, kite festival, Ganesh festival etc.

4. Project Scope

Design, Supply, Installation, commissioning, testing and maintenance (for a period of 5 years) of mission critical open standard Digital Trunked Radio System either from APCO (P25 – Phase 2) or ETSI (TETRA) as per the specifications provided in this RFP.

4.1. Geographical Coverage

Home Department, Government of Gujarat has decided to implement Digital Trunked Radio System (DTRS) in the entire State of Gujarat & initially it has been decided to implement DRTS in the jurisdiction of following in the first phase:

a) Ahmedabad city

b) Gandhinagar District

In the second phase it has been envisaged to cover the following areas of Gujarat.

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d) Rajkot City, Rajkot Rural, Morbi

Google earth maps (KMZ/KML file) showing boundaries / area of Network coverage requirement will be provided to selected bidder.

Approximate area of both geographic locations are as per below.

Sr. No.	Jurisdiction	Approximate Area (Sq. Km)
1	Ahmedabad City	447
2	Gandhinagar District	2118
	Total	**2565**

4.2. Number of Police Personal as on Sep '17

Below mentioned details of Police strength is provided to bidder for better understanding and Network planning. Gujarat Police may procure additional radios over the quantities mentioned in BoQ in future. Network capacity is to be planned for minimum 15,000 subscribers expandable to 30,000 for both geographies.

Area of Implementation		Number of users
Ahmedabad Area	Ahmedabad City	8000
	Gandhinagar District	2550
	Total	**10550**

4.3. Details of Police Stations and Other Locations

1. List of police stations, headquarters, outpost / chowky and other police offices is provided in Annexure – I.
2. List of police stations, Government buildings / places where space is available as per below considerations for installation of tower, shelter, DG and earthing pits etc. is provided in Annexure – II. This is an indicative list. Bidders will have to conduct detailed field survey at these locations to examine the suitability of available space and raw power for the proposed solution. It is envisaged that monopole will be installed in city area (with consideration of point nos. – 1, 2 & 4) and lattice tower will be installed in rural windy areas (with consideration of point nos. – 3 & 4)
   a) 3 Mtr X 3 Mtr space for installation of monopole and construction of earthing pits.
   b) Approximately 1.5 Mtr X 2 Mtr space for DG installation.
   c) 10 Mtr X 10 Mtr space for installation of lattice tower (may be required at some rural areas due to high wind velocity), earthing pits and DG.
   d) 3 Mtr X 3 Mtr space for establishment of equipment setup either in room or pre-fabricated shelter.

4.4. RF Survey and Planning of Network

1. Bidder will be responsible for below mentioned activities to finalize the design of network. This is an indicative list of activities, Bidder will be responsible for designing fully reliable and scalable network as per the specification provided in this RFP.
   a) Pre – survey of entire geographical area to capture clutter details like building area, building size, building height, vegetation, water bodies, high tension power lines, glass buildings etc. and defining the area as dense-urban, urban, suburban, rural etc.
   b) Preparation of nominal design of network by inputting clutter details, number of user details, coverage area, indoor coverage requirement, BTS output power based on offered technology and electronics, frequency (800 MHz band) etc. in RF planning and simulation tool.
   c) Multiple iterations may be required for coverage prediction and preparation of nominal design of network which would indicate number of sites required to cover specified geographical area to cater to specified number of users, nominal latitude and longitude of sites, antenna height required etc.
   d) Bidder will be responsible to carry out detailed field survey for proposed nominal locations of sites to check suitability of locations with respect to following:
      i. Possibility of getting permission to acquire ground based site or roof top site at suitable location in field and modifying nominal design of network (if required) in case site needs to be shifted due to any field restrictions.
      ii. Possibility of shifting site to nearby Police locations like Police stations / Police Headquarters / any other Government buildings and modifying nominal design of network accordingly.
      iii. Checking suitability of proposed nominal location of site with respect to any tall building shadows / high tension power lines / water bodies / glass building etc.
   e) Bidder will be responsible to ensure full in-building coverage in the building / places / campuses listed in Annexure – III. SI may propose in-building solution with amplifiers in their Network planning. Below mentioned functional requirements must be met in the design of the Network such that group/individual/emergency call can be initiated in trunking mode of operation with minimum Delivered Audio Quality of 3.4.
      i. Network coverage should be available in basement parking areas up to G-2 level.

ii. Network coverage should be available in any area of multistoried building (with any number of floors) and its campus.

iii. If any building has multiple layers of concrete/wooden/glass partitions inside to build multiple cabins, at least two wall penetration coverage must be available.

f) Visit of sites before quoting the tender is desired and permissible. The bidder can get permission in writing to visit the Police stations during the tender process.

g) The bidder shall submit the tender by considering the base station sites to be planned at Police Stations and other govt. office locations as per list given in Annexure –I and II only. Bidder may plan to visit any of the location with prior approval for feasibility survey for BTS site planning.

h) Bidder shall submit the RF design and Frequency plan to prove that the proposed solution is able to provide the required coverage for the proposed project locations under current phase. Non-compliance to requirement or non-submission of RF design will be considered as non-responsive bid and liable to be rejected.

i) There may be instances where temporary coverage will be required inside the building (other than the critical buildings and important places defined in Annexure – III) for an operation. Bidder should explain in their response how this requirement can be achieved.

j) The bidder shall visit the existing sites, access the suitability of the sites for installation of proposed base stations. The additional requirements at the site with respect to shelter, electrical requirements, infrastructure, temperature maintaining system, power backup facilities shall be quoted by the bidder if the site is chosen for installation of the base station.

k) The successful bidder will take complete responsibility for furnishing and installing system equipment and ancillary facilities and provide the necessary engineering of all equipment provided.

l) The successful bidder will be responsible for system performance including a guarantee of radio coverage, installation of base station sites and IP based Communication, district/area wise central Dispatch equipment/consoles, leased line/MPLS connectivity, optimization of the radio infrastructure, integration of proposed Network system with existing CAD application / any new CAD application purchased in future by Gujarat Police, training system users and maintenance personnel, and achieving satisfactory system performance.

m) The bidder may use existing infrastructure of Gujarat police for base stations where available. However, ensuring required uptime as per defined SLA is under bidder's SOW including existing infrastructure if any utilized.

n) The bidder shall include (not limited to) the following in their scope :

i. Tower (monopole / lattice tower) construction as per site requirement

ii. Shelter construction at BTS sites wherever required.

iii. The infrastructure required at the chosen locations for housing the equipment.

iv. The temperature maintenance system required at the locations.

v. Surge and lightning protection system at the sites.

o) Subscriber radios shall be capable of accessing any and all sites within the Network system of both the geographies for ease of seamless roaming and to get all services while roaming.

p) The bidder should be able to conduct drive-test/field measurements to prove these results.

q) RF design should comprise at least the following documents:

i. Link budget calculation and detail, aimed at defining the maximum propagation losses for both uplink and downlink

ii. Detail of all systems gains and losses, for both uplink and downlink

iii. Individual coverage map for every base station

iv. Coverage map for the group of base stations

r) The bidder will quote for adequate no. of Base Station sites to serve the communication needs of the users and all requirements mentioned in this RFP. The no. of base stations shall be defined in the RF design submitted by the bidder. While sizing base station requirement, bidder must also take event base requirements in consideration which needs to be supported by network from day one. CoW (Cell on Wheel) type of Base Stations will be planned and deployed on field to provide coverage and capacity with required numbers of frequency pairs as and when required. SI will have to provide and maintain minimum 1 number of CoW Base Station along with required vehicle in each geography area for immediate deployment when required. Locations where public gathering events happen are provided in Annexure – IV for better coverage and Base Station sites planning.

4.5. Frequency Planning

1. Frequency planning is one of the most important aspect of trunked radio network design to decide accurately the number of frequency pairs required per Base Stations in defined license areas to cater to specified number of users / talk groups in that area.
2. SI will be responsible for accurate frequency planning based on functional requirement of Gujarat Police to ensure that only the sufficient and required frequency pairs are demanded from WPC, DoT to protect the purchaser from paying extra frequency charges to Government.
3. SI will be responsible to check the possibility of frequency reuse in the license area within the permissibility of latest guidelines issued by different Government authorities.
4. Frequency assignment must be defined so that users can access voice and data features in each point of the covered area without degradation of services due to co-channel and adjacent channel interferences. SI will also have to define frequency plan for Direct Mode Operation (DMO).
5. SI will also support the purchaser to convince Government authorities (WPC, DoT) in case additional frequency pairs are required to cater to increased traffic by providing RF design documents to justify the need of additional frequency pairs.
6. SI will submit detailed RF design and frequency plan to prove that the suggested number of frequency pairs will be sufficient to cater to required number of users after considering various technological aspects of offered DTRS technology like control channel requirement, number of time slots offered on a spot frequency etc.
7. Indicative list of locations where public gathering events happen and major police bandobast is arranged for safety and security of citizens is provided in Annexure – IV. SI will have to consider these locations for accurate frequency planning to build required capacity in the Network from Day-1.
8. Indicative list of number of talk groups required per geographic area for day to day function and additional talk groups to be formed during major police bandobast during any public gathering events is provided in Annexure – V. SI will have to consider these details for accurate frequency planning to build required capacity in the Network from Day-1.
9. SI will have to project the spectrum charges cost diligently in consideration of the latest amendments and orders issued by Wireless Planning and coordination Wing (WPC) with 95% accuracy in the

Annexure – E of the Section – 14.5 in Vol – 1 of this RFP. The spectrum charges amount projected shall not be considered in any of the bidder selection criteria.

10. The proposed DTRS Solution system shall work in UHF 800 MHz frequency band to be allotted by WPC.
11. The frequencies required for the implementation of the project shall be vested with police department. However, successful bidder is responsible for extending support in application submission, follow up and necessary approval to be obtained from WPC for frequency allotment on issuance of LOI.
12. The charges payable towards the CMRTS license, SACFA clearances shall be paid by Gujarat Police. The bidder shall coordinate with the Wireless Planning and Coordination Wing (WPC) for obtaining the clearances and licenses.

4.6. Network Architecture

1. DTRS Network should fulfill below mentioned basic requirements.
   a) Procurement of Carrier Class, Digital Radio Trunking system for Police communications in areas under the jurisdiction of Police Commissionerates of Ahmedabad city and Gandhinagar district, with full scalability for future expansion to the rest of the areas of the State.
   b) Provide better coverage and better voice quality than that of the existing analog system of Gujarat Police.
   c) The expansion shall be possible by simply adding the base stations as per the RF study & user terminals, without the need to add any new switching hardware in the provided switch if maximum number of base stations per switch has not been reached.
   d) Technology proposed in this tender shall be an open standard from either APCO (P25 – Phase 2) or ETSI (TETRA). Technology shall be trunked based; no conventional and hybrid technology shall be accepted.
   e) Provide secure communication with Air Interface encryption for mission critical voice and data/images. The system must comply with ETSI EN 300 392-7 Security Class – 3 Or Advanced Encryption Standard (AES).
   f) Provide basic advantages of DTRS network like communication on one-to-one basis, select group basis as well as broadcast.
   g) Provide digital voice quality with spectrum efficiency.
   h) Integration of the existing VHF and UHF infrastructure with the new DTRS network infrastructure.
   i) Integration of the existing services like HDIITS, dial 100, 108 call center, CAD, e-Gujcop, SASGUJ, applications for name search and vehicle number search etc. with the new DTRS network services. Proposed systems shall be capable of sharing data with other systems of Police Department. For example, (1) the proposed systems shall be capable enough to facilitate the sharing of a particular incident generated in CAD system to Mobile Data terminal in the field; (2) the proposed systems shall be capable of connecting PSTN call directly to the field officer on his radio terminal.
   j) Radio Dispatch Console functionality must support advanced performance tracking and reporting capabilities for all dispatchers.
   k) Provide highly reliable, scalable and fully redundant network to Gujarat Police to enhance efficiency of field staff.
   l) Sizing and delivering IP backbone connectivity by means of MPLS/leased lines, between BTSs and local/central switching room with necessary bandwidth. Redundancy is under bidder scope of work. Proposed connectivity must ensure easy scalability and redundancy in place from day one.

m) Procure light weight walkie-talkie (digital trunk radio handhelds), mobile radio units for vehicles & fixed /static radios with built-in GPS, as per the Bill of Quantity mentioned in RFP.

2. Provide all services related and not limited to design, supply, installation, commissioning, configuration, integration, training to users (as per training plan, mutually agreed by bidder and Gujarat Police, Home Department) and the technical maintenance and operations of all supplies –hardware and software– for a period of 5 years from the date of Go-live including software upgrades.

4.6.1. Network Diagram

1. SI will be responsible to submit detailed Network architecture diagram for both geographic areas indicating following parameters (not limited to). Site wise details should be submitted with Network diagram.

   a) Number of BTS sites planned with latitude, longitude and address

   b) Type of site planned (ground based / roof top)

   c) Type of tower planned (3/4 lagged self-supporting towers / ground based mast / guyed wire mast tower)

   d) Antenna height planned for each site

   e) Offered switching technology

   f) Connectivity planned between sites and centralized switches (redundant switches) through Leased Circuits / MPLS links via Optical Fibre / MW / RF

   g) IP router and WAN / LAN switches connectivity planned for sites connectivity with core network elements like Network Management System (NMS), traffic logging / voice recorder server, data storage server, telephone interconnect system, dispatch control system etc.

   h) Number of frequency pairs and base station transceivers planned per Base Station equipment per site

   i) Antenna system proposed (sectored topology / omnidirectional solution) with details of other associated elements like combiner, duplexer, Rx multicoupler etc.

   j) Electrical utility set up (UPS, SMPS, Battery Bank, DG, PAC etc.) planned per site

2. SI will have to submit above mentioned details for both geographic areas. Following details will also have to be submitted for all applicable elements for all sites in a geographic area.

Sr. No.	Part Code No.	Item Description	Quantity
1.			
2.			

3. Minimum number of Base Station sites to be implemented is indicated in below table. SI will be responsible to plan adequate number of Base Stations equal / greater than the specified minimum numbers for any offered technology to fulfill the requirements specified in this tender.

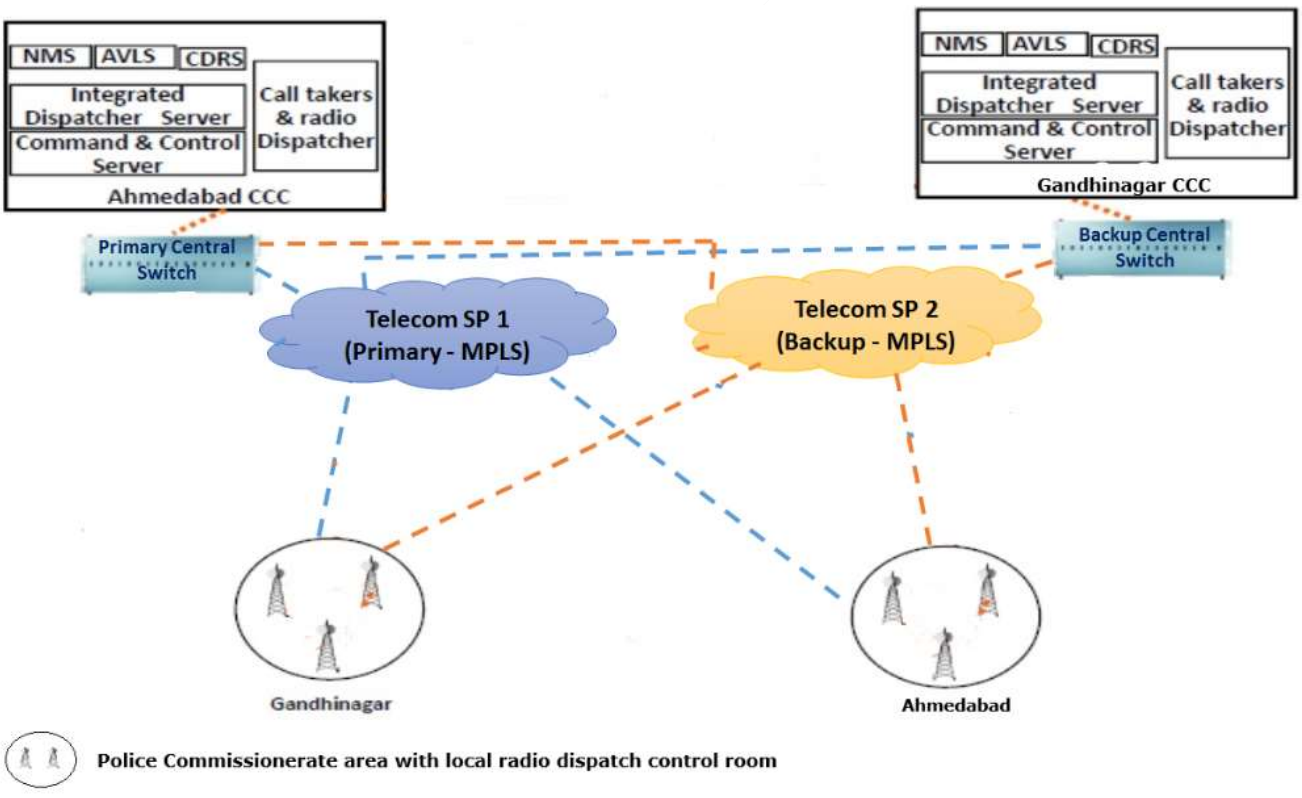
4. If, Network design will not comply to Acceptance Testing criteria as mentioned in Section – 4.10 of this RFP due to inadequate number of Base Stations sites implemented, then SI will have to plan & implement any additional sites required free of cost to comply to Acceptance Testing criteria. Gujarat Police will not make any additional reimbursement for same.

5. In case this task of Network redesigning and implementing & commissioning additional sites will take more than 30 days to make any geographical area complied to Acceptance Testing criteria, then Gujarat Police may forfeit PBG at its own discretion. 30 days for this purpose will be counted as per calendar days from the day of declaring any geographical area non-compliant to Acceptance Testing criteria.

Area of Implementation		Minimum Number of Base Stations For APCO P25	Minimum Number of Base Stations For ETSI TERTA
Ahmedabad Area	Ahmedabad City	6	11
	Gandhinagar District		
	Total	**6**	**11**

6. SI will be free to plan more than one Base Station equipment per Base Station site as per the overall equipment designing / solution provided to meet the Network capacity needs (i.e. no. of voice & data channels per Base Station site). In this case, SI will have to provide all the required associated equipments for powering up the antenna assembly and accordingly space, power and load bearing capacity of tower / shelter will need to be planned.

7. Indicative Network block diagram is given below.



a) Above network architecture is a tentative network design for DTRS solution requirement as stated in the project scope of this RFP.

b) The solution proposed must provide higher reliability, better performance, higher security and easy scalability.

c) As shown in the diagram Ahmedabad and Gandhinagar will act as two central locations for hosting central switching components acting as primary and fallback center respectively. Both centers should be hosting following components along with necessary any other required components to fulfill RFP project scope requirement :

i. Central Switching Device

ii. AVLS, NMS and CDRS applications servers/system

iii. Radio dispatch server and consoles

iv. Command and Control Server

Indicative specifications for dispatch server, NMS server, workstations and CDRS are provided in Annexure – VI.

d) All BTS at each geography as mentioned in scope of this RFP must be connected to both central switching centers by means of MPLS / Leased Line connectivity from 2 different service providers.

e) Ahmedabad will act as primary central switching center. In case of primary link failure at BTS site location, the traffic shall be routed to primary switching center at Ahmedabad through backup MPLS / Leased Line connectivity from other service provider without any disruption in services of DTRS.

f) In case of link failure or central switching device failure at primary Ahmedabad switching location, all traffic from BTS to the central switching center shall be shifted from primary to backup location of Gandhinagar automatically within not more than 60 seconds in such a way that complete system shall be running with full capacity.

g) Proper MPLS / Leased Line bandwidth sizing shall be done by bidder for central and all BTS locations.

h) Bidder will also be required to quote for bandwidth charges for required contract period of 5 years with necessary required hardware for same. Hardware cost shall be considered in calculation of QCBS. Recurring charges for bandwidth shall also be considered in calculation of QCBS, however it will be directly paid to service providers on quarterly basis post invoice generation of same and after applying SLA criteria.

4.6.2. Link Budget

1. SI will be responsible to show link budget calculation in their proposed solution for both uplink (between terminal radios and Base Station) and downlink (between Base Station and terminal radios) path.
2. SI will have to specify following parameters and explain / justify the relation between these values and configuration for radiating equipment.

Parameters

i. Base Station TX Power out of TRX

ii. Base Station TX Power at Antenna connector (if combiners are used in design, SI will have to mention combiner output power for different number of transceivers)

iii. Base Station Loss on TX path

iv. Base Station TX Antenna Gain

v. Base Station RX Antenna Gain

vi. Base Station Diversity RX Gain

vii. Base Station Loss on RX path

viii. Base Station RX Sensitivity

ix. Hand portable TX Power EIRP and RX sensitivity

x. Vehicular radio TX Power EIRP and RX sensitivity

xi. Height of Base Station antenna and radio antenna

xii. Human body loss for portable radios (when used on carry holster)

xiii. Building wall penetration loss for in-building coverage

3. SI will have to describe every additional loss considered in the link budget calculation.

4.6.3. Indicative Bill of Quantity

1. Bidder will have to supply below mentioned minimum components (not limited to) as part of implementation of DTRS Network.

Sr. No.	Description	UoM	Indicative Quantity
1.	Full Digital Radio Trunking Switch with Redundant Zone Controller as per scope of work with all the required hardware, software, applicable licenses and 5 years on-site warranty	Nos.	2
2.	Network Management System with Two Clients as per scope of work with all the required hardware, software, applicable licenses and 5 years on-site warranty	Nos.	2
3.	Over The Air Rekeying (OTAR) Key Management System with Two clients at both switching centers as per scope of work with all the required hardware, software, applicable licenses and 5 years on-site warranty	Lot	2
4.	Over The Air Programing (OTAP) functionality at both switching centers as per scope of work with all the required hardware, software, applicable licenses and 5 years on-site warranty	Lot	2
5.	Base Station Sites with Redundant Site Controller, transceivers, combiner, RF Cable, Antennae System and Accessories as per scope of work with all the required hardware, software, applicable licenses and 5 years on-site warranty	Nos.	6/11
6.	Radio Dispatcher Consoles at 2 Control Rooms as per scope of work with all the required hardware, software, applicable licenses and 5 years on-site warranty	Nos.	9
7.	Integrated CAD Consoles at Central Control Room with call taking and dispatching facilities as per scope of work with all the required hardware, software, applicable licenses and 5 years onsite warranty	Nos.	30
8.	Backbone connectivity between Base Stations and switches	Lot	1

Sr. No.	Description	UoM	Indicative Quantity
9.	Digital Voice Recording Server for 50 Channel recording with replay workstation at two locations as per scope of work with all the required hardware, software, applicable licenses and 5 years on-site warranty	Nos.	2
10.	Automatic Vehicle Location Service with AVLS Server with Application, AVLS Map Viewing Client, Digital Map as per scope of work with all the required hardware, software, applicable licenses and 5 years on-site warranty	Nos.	2
11.	Telephone Interconnect Gateway as per scope of work with all the required hardware, software, applicable licenses and 5 years on-site warranty	Nos.	2
12.	Gateway for integration with existing VHF & UHF network as per scope of work with all the required hardware, software, applicable licenses and 5 years on-site warranty	Lot	2
13.	Server with operating system as per scope of work with all the required hardware, software, applicable licenses and 5 years on-site warranty	Lot	2
14.	Cell on wheel (CoW) with suitable vehicle as per scope of work with all the required hardware, software, applicable licenses and 5 years on-site warranty	Nos.	2
15.	IP Router as per scope of work with all the required hardware, software, applicable licenses and 5 years on-site warranty	Nos.	6/11
16.	IP Switch as per scope of work with all the required hardware, software, applicable licenses and 5 years on-site warranty	Nos.	As per design
17.	Towers, shelter and air-conditioning (as per scope of work with all the required hardware, software, applicable licenses and 5 years on-site warranty)	Nos.	6/11
18.	20 KVA UPS with Battery Bank for 8 Hrs Backup (used for DTRS Switch, other Network components and also for co-located Dispatcher Consoles at PHQ) as per scope of work with all the required hardware, software, applicable licenses and 5 years on-site warranty	Nos.	2
19.	10 KVA UPS with Battery Bank for 8 Hrs Backup (used for Base Station) as per scope of work with all the required hardware, software, applicable licenses and 5 years on-site warranty	Nos.	6/11
20.	SMPS as per scope of work with all the required hardware, software, applicable licenses and 5 years on-site warranty	Nos.	As per design
21.	20 KVA Diesel Generator as per scope of work with all the required hardware, software, applicable licenses and 5 years on-site warranty	Nos.	2
22.	10 KVA Diesel Generator as per scope of work with all the required hardware, software, applicable licenses and 5 years on-site warranty	Nos.	6/11
23.	Critical Spares for Network infrastructure as per scope of work with all the required hardware, software, applicable licenses and 5 years on-site warranty	Lot	2
24.	Bidirectional amplifier for In-building coverage as per scope of work with all the required hardware, software, applicable licenses and 5 years on-site warranty	Nos.	30

Sr. No.	Description	UoM	Indicative Quantity
25.	External / outside antenna for In-building coverage with 5 years on-site warranty	Nos.	30
26.	Low profile antenna for In-building coverage with 5 years on-site warranty	Nos.	150
27.	RF cable for In-building coverage with 5 years on-site warranty	Mtr	4500
28.	Radio Programming Kit as per scope of work with all the required hardware, software, applicable licenses and 5 years on-site warranty	Nos.	5
29.	Portable radios as per scope of work with all the required hardware, software, applicable licenses and base warranty	Nos.	4404
30.	Mobile vehicle radios as per scope of work with all the required hardware, software, applicable licenses and base warranty	Nos.	998
31.	Fixed station radios as per scope of work with all the required hardware, software, applicable licenses and base warranty	Nos.	189
32.	License for radios (to be used at Switch end for users up to 30,000) in a lot of 15,000 licenses which should support radios from any OEM in future without any additional cost	Nos.	15000
33.	Application for Smartphone Based Terminals with all the required hardware, software, applicable licenses and 5 years on-site warranty	Nos.	50
34.	Mobile Data Terminal with all the required hardware, software, applicable licenses and 5 years on-site warranty	Nos.	200
35.	Spare batteries for portable radios with 5 years on-site warranty	Nos.	2000
36.	Multi-unit battery charger for 6 nos. batteries	Nos.	200
37.	Basic Hands free kit for portable radios	Nos.	2000
38.	Special Hand free kit with helmet mounted earphones and wind fording microphone (with windscreen) for Police bikers	Nos.	850
39.	Portable radio charging kit to be connected with bike alternator for Police bikers	Nos.	850
40.	Carry holster with swivel belt clip for portable radio	Nos.	4404
41.	User license for AVLS / APLS in a lot of 10000	Nos.	10000
42.	Radio handset allotment tracking and inventory management software with 5 user license	Nos.	1
43.	Annual maintenance contract (AMC) for handset aerial, battery and charging stations.	Years	5
44.	Any other miscellaneous items	LS	1

Note:

1. The quantities mentioned are tentative in nature. The actual quantity may vary at the time of implementation.

2. While price for user radio licenses (to be used at Switch end) are to be quoted for a lot of 15,000 licenses, Gujarat Police may procure additional radios & licenses as per requirement in future at the pro rata of quoted rate as per rate validity mentioned in Section – 8.23 of Vol – 1 of this RFP. This clause is applicable to all line items mentioned in above BoQ.
3. Bidders will have to list all items considered in line of "Any other miscellaneous items" into their unpriced BOM in technical bid documents.

4.7. Network Features

Network architecture should provide below mentioned features.

Sr. No.	Feature Description	Compliance (Yes/No)
1.	SI has to offer all services related to design, supply, installation, commissioning, configuration, training to users (as per training plan, mutually agreed by bidder and Gujarat Police, Home Department) and the technical maintenance of all supplies – hardware, software and services– for a period of 5 years (with 5 years of warranty for all products and systems including hardware and software) from the date of Go live including software upgrades (additional costs for additional hardware required by a forthcoming expansion shall be payable).	
2.	The following are the indicative talk groups to be created and should be functioning 24 x7 in Gujarat State. > All Traffic > All Police Stations > All PCR Van > CP/DYSP/SP Groups - District Wise / Zone Wise > PI Group Zone Wise at each district > PI/PSI/Mobile Van group area wise > All Broadcast Group > VVIP Group Apart from the above required number of Talk groups, proposed solution should be capable of creating additional talk groups as and when required form Control Centre / NoC through suitable rights provided to the administrator / user.	
3.	The successful implementation of the project in all aspects i.e., full handheld coverage in both geographical areas, channel availability, group configuration etc. as per the requirement of this tender is solely vested with the successful bidder.	
4.	The base stations proposed shall be connected to redundant switches with redundancy backbone connectivity. Primary connectivity shall be provided through last mile on fiber media and backup link shall be provided through last mile on MW / RF functioning in licensed frequency bands from different service provider. Necessary bandwidth planning for each site shall be done for this MPLS/ LL backbone connectivity.	
5.	The agreement for the Leased Line / MPLS shall be signed by Gujarat Police. The rental charges for same shall be paid by the bidder for the first Five years and shall be included in the Bill of Material. The bill will be compensated by the department. The bandwidth required at the individual locations with redundancy shall be in place as per the sizing of solution proposed by respective bidder.	
6.	The network shall be so designed that seamless automatic changeover to the other link takes place in case of any failure in the default link. The bidder shall include the testing method in the bid and provide the necessary materials for testing.	

Sr. No.	Feature Description	Compliance (Yes/No)
7.	The base stations and control center shall work with 8 hours power backup without interruption with sufficient number of batteries in case of failure of raw power.	
8.	The number of base stations/Switches/Controller shall be chosen and designed such that no single site failure has significant impact on the coverage/capacity of the entire network.	
9.	Proposed solution should have a central switching in high availability option from day one with central switches deployed at 2 different geographical locations. In which the central switching center for proposed DTRS solution shall be established at Shahibag Police HQ location in Ahmedabad with redundancy site at Gandhinagar CP office.	
10.	Radio dispatch center shall be established in both the central switching control rooms of both geographic areas. Ahmedabad city control room will have 6 nos. radio dispatch consoles. Gandhinagar district control room will have 3 nos. radio dispatch consoles.	
11.	Where members of a talk group are not present at a site, that site should not be activated for a conversation involving the said talk group. This shall ensure that valuable channel resources are not tide-up unnecessarily, and is a critical requirement in this wide area system.	
12.	The System Controller shall be programmable via the Network management / Central configuration terminal with information which will designate subscriber radio as either wide area users or single site users.	
13.	The following mode of telephone communication must be capable of being supported by the system : > Mobile / Hand-Held radio to Landline/IP PABX (SIP over IP) and vice versa.	
14.	The communication should be secure and be able to carry on one-to-one basis, select group basis as well as for broadcast, with encrypted transmission of mission critical voice and data communication.	
15.	The proposed system should be able to send messages along with time stamp of the network that cannot be tampered with.	
16.	The proposed system should be able to automatically send location coordinates from mobile / handheld devices to AVLS / APLS that cannot be tampered with. The AVLS solution of the proposed system shall provide a maximum refresh time equal to 5 minutes or less for stationary vehicles. The AVLS solution of the proposed system shall make vehicle mobile radios to send location latitude – longitude information once they travel to 500 mtr from the previously communicated location for moving vehicles. This way, the AVLS solution will work with trigger based on time / distance for a fleet of 10000 users from Day-1 and expandable to 100000 users. The bidder will have to provide all the required hardware, software and applicable licenses (licenses to support initial 10000 users) including AVLS Server with Application, AVLS Map Viewing Client, Digital Map etc. as per scope of work. AVLS/APLS solution should support radios from any OEM. The bidder shall be free to design overall solution which may provide trigger at smaller time / distance interval if frequency planning permits to do so without affecting voice traffic. Gujarat Police may decide to implement APLS in future for all radio users if further required frequency pairs will be made available.	
17.	The Bidder shall visit the site and get technical information to integrate new sites and equipment smoothly.	

Sr. No.	Feature Description	Compliance (Yes/No)
18.	To achieve maximum availability, time for the full functionality of the DTRS to reestablished after a failure in the main switch and the takeover by the redundant one (users must be able to set up calls after that time after the failure) - should be 60 seconds or less.	
19.	Connection to PABX should be available in switch.	
20.	Full Fault, Configuration, Accounting, Performance, and Security (FCAPS) functionality must be available in NMS.	
21.	Support for mutual authentication should be available.	
22.	Support to perform software upgrades for all networks components remotely. If upgrade fails, system administrator must be able to roll back to previous working configuration from centralized system.	
23.	Integrated Workstations must be provided with capability to act as Radio Dispatcher with full functionality for each selected profile.	
24.	Setting up of redundant Transmission links from primary Central switch as well as the secondary switch to all base stations.	
25.	Patching of existing VHF/UHF communication with communication through new DTRS system. As these VHF/UHF networks are distributed across the state, the interface shall be provided at the base station level. Bidder should explain how this integration will take place in their proposal.	
26.	GPS based Tracking System for Handheld and Mobile units, to monitor the movement of all the vehicles and police personnel. The Tracking System shall upload the position data automatically to the control room in real time.	
27.	Network Management System with 2 workstations / clients must be provided at both the switching centers.	
28.	The proposed DRTS shall be able to integrate with GPS based Tracking System, which is also to be provided by the bidder.	
29.	The coverage requirements shall be met with indoor Base stations only and outdoor repeater based solution will not be accepted.	
30.	Bidder shall suggest the requirement & size of network connectivity bandwidth for connecting Base Stations to Core Switch for DTRS Network.	
31.	Bidder shall suggest "architecture capable of specified coverage and Quality of Services (QoS) required for mission-critical operation of the system". Accordingly, bidder is required to propose & quote for the required Point to Point/MPLS network connectivity. Transparent connection of the network elements using global accepted Ethernet/IP is preferred, avoiding conversions from another physical medium (E1s, G.703, V.35, X.21 or similar) to Ethernet/IP or vice versa).	

Sr. No.	Feature Description	Compliance (Yes/No)
32.	The proposed digital trunked radio network will consist of the following: • Main and fully Redundant core switching system to be provided with card level redundancy – For ex. : redundant power cards. • Base Station sites with at least 16 channels (15 voice traffic channels + 1 control channel) in Ahmedabad city. • Base Station sites with at least 8 channels (7 voice traffic channels + 1 control channel) in Gandhinagar district. • If additional channels are required for AVLS or data application (as dedicated channels), they must be provided separately of the requested voice traffic channels. Remotely configurable & plug & play modules for flexibility must be provided for all locations. • Dispatcher Consoles • Hand-Held/ portable radios • Fixed/Static radios • Mobile Radios for vehicle configuration • Interfaces at Network infrastructure and subscriber radios to facilitate GPS based Tracking System for surveillance of team and vehicle. • Gateway for Integration of Legacy VHF & UHF systems with the DRTS at both geographical areas. • Special Hand free kit with helmet mounted earphones and wind fording microphone (with windscreen) & Portable radio charging kit to be connected with bike alternator for Police bikers as per quantity specified in BOQ in section – 4.6.3 of this volume of the RFP. Portable radio sets in similar quantity (out of total quantity being purchased as per BOQ in this RFP) will need to be specially adapted for mounting on motorcycle platform for charging from the bike alternator. • All other BOQ line item as specified with quantity details in BOQ in section – 4.6.3 of this volume of the RFP.	
33.	For redundancy reasons, the switches shall be provided in active - redundant mode with automatic switchover, so that base stations and dispatcher consoles may connect to any of the switches, depending on which transmission lines are available. This is a critical requirement to have 99.9% availability. The Bidder is required to explain in their solution proposal, how this is being achieved.	
34.	Bidders are required to state the maximum number of base stations that can be connected to each core switch.	
35.	All call types shall be maintained across the system. Talk group calls, subscriber radio to subscriber radio calls, etc. shall follow a user or group throughout the area of operation. When the active radio user moves out of one site into another, the call shall follow the user.	
36.	The above call processing shall not unnecessarily tie up multiple channels at multiple sites for the same user. The system shall be efficient in order to minimize the number of channels used in any given conversational scenario. Subscriber radio shall be capable of accessing any of the sites within the system for the ease of roaming.	
37.	Both switches can be separated in different locations offering geographical redundancy.	
38.	The system shall be able to perform backups of the architecture configuration and the subscriber management, it should be also possible to restore a previous configuration.	
39.	An Ethernet/IP based protocol shall be available in the infrastructure to enable interconnection of data from the radio terminals with external applications. This will	

Sr. No.	Feature Description	Compliance (Yes/No)
	provide Gujarat police with the maximum flexibility to integrate existing and future application with the network.	
40.	The Ethernet/IP based protocol of the proposed DTRS system shall be capable of providing below mentioned services along with integrating with third party applications, external databases, external recorders, control center solutions. • To monitor radio terminals actions (call set ups, text messages, pre-defined messages, registering and un-registering processes) • Dynamic groups creation, deletion, radio assignments and radio de-assignments • Establishment of individual (half-duplex and/or duplex) and group calls • Establishment of phone calls using the PABX/PSTN connection of the system • Sending/receive SDS and Status messages – i.e. using the payload for databases queries – • AVL/APL tracking information • IP connectivity for the packet data service • In order to provide the easiest integration with other applications, voice format used for the connectivity shall be based on standard VoIP.	
41.	For ease of the integration, all the above services shall be offered by a single gateway, avoiding complex interaction with several different network components.	
42.	The leased line / MPLS charges for 5 years shall be part of the tender cost and shall be considered in arriving the lowest acceptable tender.	
43.	The proposed system should have a defined roadmap to enable the provision of broadband LTE services in the future.	

4.8. Sizing Requirements

Geographical area and projected user density are mentioned in Section – 4.1 and 4.2 of this Vol – 2 of the RFP.

Requirement of sizing of Network infrastructure is detailed in below table.

Sr. No.	Description	Compliance (Yes/No)
1.	The site chosen for installation of base station/site controllers shall be clearly mentioned in the bid with all necessary additional requirements to be quoted in the bid itself.	
2.	One minimum 10 KVA Generator shall be provided at each Base station sites with proper electrical connectivity, safety measures and automatic change over. The generator shall be installed on a 6 feet raised platform with steps. The bidder will be allowed to plan higher capacity generator as per their detailed planning and power rating of all equipment.	
3.	Each base station site shall have support for at least 16 channels (15 voice traffic channels + 1 control channel) in Ahmedabad city and 8 channels (7 voice traffic channels + 1 control channel) in Gandhinagar district area. If additional channels are required for AVLS or data application (as dedicated channels), they must be provided separately of the requested voice traffic channels. The bidder shall specify with technical documents the maximum number of channels the proposed system can support per site.	

Sr. No.	Description	Compliance (Yes/No)
4.	The system must have the capability of integrating multiple sites together.	
5.	The system must also have the capability of modular expansion in channels by adding extra hardware (up to the capacity) at each site without license for the additional radio and system for future upgradation.	
6.	A Talk group is defined as group of members having the same functions or role and where there is a need to communicate with each other. The system when shipped shall support at least 500 Talk groups, with the capability to expand. The bidder shall specify the maximum number of talk groups the proposed system can support.	
7.	Any subscriber radio can be programmed to be a member of any talk group either at initial implementation or at any time in the future. Bidders shall describe how this process would take place and what would be the restrictions when a subscriber radio is added in a talk group.	
8.	All subscriber radios shall be capable of being assigned with talk groups address designators. All subscriber radios operating within the same talk group must receive both sides of every conversation addressed to or from the talk group.	
9.	The entire system shall be IP based such that future expansion of sites is possible. Other Manufacturer's Radio terminals of Digital Open Standard working on same technology as proposed by bidder should operate on the system with standard trunking features. Bidder shall submit test report /certificate for the proposed subscriber radios and switch/controller in compliance to proposed technology requirement. The bidder shall demonstrate the interoperability (IOP) with sample sets of other vendors.	
10.	If the system becomes fully loaded (all available RF voice channels are assigned) the second and lower precedence level requests for a voice channel will be placed in a queue. The queue will cause the system to assign voice channels (as they become available). According to the priority levels bidders shall specify the length of queue.	
11.	The proposed system should have a defined roadmap to enable the provision of broadband LTE services in the future.	
12.	The handheld devices should be capable of being used for GPS based Tracking as well as be able to send up to 20 pre-defined messages.	
13.	Mobile radio units for vehicles & fixed configuration with in-built GPS should be capable of being used for GPS based tracking for all the vehicles they are mounted on, be able to transmit data from field as well as be able to send up to 20 pre-defined messages.	
14.	Number of supported base stations per switch - minimum 100	
15.	Number of carriers supported per switch – minimum 200. Supporting additional RF carriers per Switch should be scored in the technical evaluation.	
16.	Base Station to switch connection - Ethernet/IP	
17.	Provisioning and maintenance of UPS site solution for Control room and Base station sites.	
18.	Infrastructure for central switch / control rooms, servers, PCs, switches in control room for connectivity.	
19.	NMS, Dispatch control and application software for control room with associated servers.	

Sr. No.	Description	Compliance (Yes/No)
20.	The minimum quantity of base stations mentioned in the RFP is indicative and bidders are required to quote more base stations if required as per the offered technology or their design. Bidders are not allowed to quote less number of base stations than the minimum specified in the RFP.	
21.	If additional channels are required for AVL or data application (as dedicated channels), they must be provided separately of the requested traffic channels. (Remotely configurable & with plug & play modules for flexibility).	
22.	Bidder is required to provide details of Power, Space & mounting details for each & every equipment / components for the proposed system as a part of their technical proposal.	
23.	Easy and cost-effective scalability is key in order to enable the DTRS to grow in the future and to protect the investment. Licenses for additional base stations up to the maximum capacity of the switch shall be costed in the offer for the DTRS.	
24.	All the licenses related to Network system and radios should be perpetual.	
25.	Switch shall be equipped to support at least 500 talk groups expandable to 1,000.	
26.	Switch should be able to support at least 40 Dispatchers, expandable to 100.	
27.	Switch shall have centralized architecture.	
28.	The switch shall support at least 15,000 subscribers from Day-1, expandable to 30,000. There will not be any additional hardware or license requirement to support these 15000 subscribers. Provision of support of these 15000 subscribers in switch will support subscriber radios from any OEM in future without any additional cost.	
29.	Switch must be delivered including all the licenses for the maximum supported carriers for the switch. This will provide Gujarat police easier and cost-effective scalability in the future.	
30.	The switch shall have redundant control/supervisory cards, hard-disk and power supply with hot swap capability.	
31.	Interfaces: The switch should provide gateways for > PABX/PSTN > IP Protocol to 3rd party applications > VHF & UHF existing Network integration	
32.	Voice recording system should support minimum 50 simultaneous voice calls / channels (group and individual calls) at both control centers. The Centralized Digital Recording System shall store the call recordings for minimum 30 days & store Call Details Records (CDRs) for a period of 1 year and after that the back-up of the same shall be taken on suitable media.	

4.9. Installation and Commissioning

1. **Self-Supporting Mast / Tower / Guyed Wire Mast**

   a) SI will be responsible to plan, supply, install, test and maintain Monopoles for antenna installation in all city areas.

   b) In rural areas also Monopole installation will be preferred. However, where Monopole is not suitable due to high wind speed, SI will be free to plan and install lattice towers including supply, test and maintenance in the scope.

   c) SI will have to utilize existing pole/tower infrastructure available at various Police Stations for this Project.

   d) SI will be responsible to get the soil testing done from authorized agencies approved by suitable Government authorities before installation of Monopole / Lattice towers. SI will have to submit this report to Gujarat Police and GIL.

   e) SI will be responsible to obtain necessary clearances from various Government authorities like SACFA etc. for height clearance of towers before installation.

   f) SI will also be free to plan Guyed Wire Mast on terrace of Police Stations / Government buildings in places where Base Stations are required as per RF Network design and ground space is not available in the Police / Government infrastructures available in that area.

   g) Guyed Wire Mast installation on building terrace will subject to availability of required space and SI will have to get building stability test done from authorized agencies approved by suitable Government authorities before installation of mast.

   h) SI will have to provide necessary documents of load bearing capacity of Monopole/lattice towers before installation of antennas.

   i) SI will have to ensure proper galvanizing of pole/tower to protect it from rusting.

2. **Pre-Fabricated Shelter**

   a) SI will have to supply, install, commission and maintain pre-fabricated shelters wherever required for Network equipment and electrical utilities installation.

   b) Indicative specification of shelter is provided in Annexure – VII.

3. **Lightning-proof measures**

   a) The SI shall comply with lightning-protection and anti –interference measures for system structure, equipment type selection, equipment earthing, power, signal cables laying. The SI shall describe the planned lightning-protection and anti –interference measures in the feasibility report. Corresponding lightning arrester shall be erected for the entrance cables of power line, data transmission cables. All crates shall have firm, durable shell. Shell shall have dustproof, antifouling, waterproof function & should capable to bear certain mechanical external force.

4. **Earthing System**

a) All electrical components are to be earthen by connecting two earth tapes from the frame of the component ring and will be connected via several earth electrodes. The cable arm will be earthen through the cable glands. The entire applicable IT infrastructure i.e. signal junction or command centre shall have adequate earthing.

5. Cabling Infrastructure

a) The System Integrator shall provide standardized cabling for all devices and subsystems in the field.

b) SI shall ensure the installation of all necessary cables and connectors between the devices assembly. For pole mounted devices the cables shall be routed down inside of the pole and through underground duct to the shelter.

c) All cables shall be clearly labelled with indelible indications that can clearly be identified by maintenance personnel. The proposed cables shall meet the valid directives and standards.

d) Cabling must be carried out per relevant BIS standards. All cabling shall be documented in a cable plan by the SI.

6. Design, Supply, Installation & Commissioning of the Field Equipment

a) The Scope includes Supply, Installation, commissioning and Customization (as required) of various field systems Based on the approved feasibility report, the SI will undertake the system configuration and customization in line with the changed, improved or specific requirements of Police:

b) The implementation methodology and approach must be based on the global best practices in-order to meet the defined Service Levels during the operation.

c) Best efforts have been made to define major functionalities for each sub- system of Project. However, System Integrator should not limit its offerings to the functionalities proposed in this RFP and is suggested to propose any functionality over and above what has already been given in this tender.

d) The SI shall design the field level equipment architecture to ensure maximum optimization of network equipment, poles, mounting infrastructures, power supply equipment including electric meters.

e) The system integrator shall be required to submit a detailed installation report post installation of all the equipment at approved locations. The report shall be utilized during the acceptance testing period of the project to verify the actual quantity of the equipment supplied and commissioned under the project.

7. Preparation and implementation of the Information security policy, including policies on backup

a) The SI shall prepare the Information Security Policy for the overall Project and the same would be reviewed and then finalized by Gujarat Police & its authorized committees. The Security policy needs to be submitted by the System Integrator within 1st quarter of the issue of WO to SI.

4.10. Acceptance Testing

1. The bidders are required to verify compliance to each & every specification mentioned in this RFP for Partial Acceptance Testing (PAT) and Final Acceptance Testing (FAT), during the course of the project through clearly defined & approved Test Plans & Inspection documents.
2. Partial Acceptance Testing (PAT) will be carried out at the end of successful installation and commissioning of scope of work for one Geographical area.
3. Final Acceptance Testing (FAT) will be carried out for entire Network of both Geographical areas.
4. The tests to assess & prove the ability of the system may be categorized as

a) Factory Acceptance Test

These tests shall be carried out at the Factory/Lab of the manufacturer before the goods can be dispatched for delivery. The Factory Acceptance tests shall invariably consist of the following activities:

i. The successful bidder will provide a detail Factory acceptance plan.

ii. The successful bidder will provide the test reports from the factory.

iii. The successful bidder will provide the list of all offered equipment with their serial numbers.

iv. Factory Acceptance Test will be conducted at OEMs place of manufacturing before shipping to Project site.

All the equipment will be checked at Project site by Gujarat Police team and note down their serial numbers.

b) Inspection of delivered goods

i. The inspection of supplied goods with respect to the specifications mentioned in the RFP as well as the technical brochures of the equipment quoted by the bidder along with their technical bid will be inspected by Gujarat Police.

ii. Any deviation found in the specifications of the produced goods from the bid specifications as well as the product quoted / offered in the technical bid may lead to the cancellation of the order, forfeiture of EMD/PBG and prohibition in the participation in the future purchase of Government of Gujarat. Gujarat Police will not be responsible for any time delay which may arise due to any deviation from the bid technical specification found at the time of inspection and the bidder has to deliver and install the ordered goods within prescribed time limit.

iii. Site Acceptance Tests: These tests shall comprise of detailed procedures to assess & verify the functional capabilities of the installed components at a site against the RFP specifications.

c) Partial Acceptance Test and Final Acceptance Test

i. Standard Coverage Acceptance Test Plans (CATP) are defined in the Telecommunications Industry Association's (TIA) Technical Service Bulletin TSB-88A, Section 7 "Performance Confirmation". This bulletin is titled "Wireless Communications Systems, Performance in Noise- and Interference-Limited Situations, Recommended Methods for Technology-Independent Modelling, Simulation, and Verification," as the common technical reference for which testing will be conducted, thus

providing a baseline for terminology, definitions, and methodology. This shall comprise of the following major components:

d) Tile Based Radio Frequency Coverage Testing

i. The successful bidder is required to demonstrate the availability of RF coverage as mentioned in the RFP, with the number of base stations proposed in his Radio Frequency (RF) design (submitted with technical bid). The RF coverage shall be checked physically as well as with the help of specialized software tool or by using spectrum analyzers. If the required RF coverage is not found to be satisfactory, then successful bidder will be required to rectify the same by adding extra base stations over and above the number of base stations mentioned in the RF design with no additional cost.

e) Coverage Area

i. The coverage area is the geographical region in which communications will be provided by SI that meets or exceeds the specified Channel Performance Criterion (CPC) at the coverage reliability for the specified equipment configuration.

f) Reliability

i. Reliability is the percentage of locations/tiles within the coverage area that meet or exceed the specified Channel Performance Criterion (CPC). SI will prepare coverage maps indicating the area within which the proposed DTRS system is predicted to provide at least 95% reliability. All geographical area achieving 95% reliability (95% accessible tiles are passed from CPC perspective) will be considered as pass.

g) Tile Size

i. For radio coverage acceptance testing, entire coverage area will be uniformly divided into equally sized tiles starting from one reference point. The test tiles will be 1 Km by 1 Km square. In certain dense and critical (from Police functioning perspective) city areas, test tile size will be 500 Mtr by 500 Mtr square. All accessible tiles will be tested. Gujarat Police team and SI's team will jointly identify all inaccessible tiles before starting coverage testing which will be eliminated from the acceptance test calculation. The actual test location within each test tile will be randomly selected by the test vehicle crossing into the test tile at an arbitrary point, with an arbitrary speed and direction at the discretion of the Gujarat Police team member. SI will provide each day's raw test data in electronic CSV or equivalent file format to Gujarat Police no later than the next working day after the test data is taken.

h) Channel Performance Criterion (CPC)

i. The CPC is the specified minimum design performance level in a faded channel. For proposed system's voice communication, the CPC is a 2.0% BER (mean) for handheld devices in all the region, which under standard faded performance conditions provides a Delivered Audio Quality of DAQ-3.4. For proposed system's data communication, the CPC provides a Message Success Rate (MSR) of 95%.

i) Bit Error Rate (BER)

i. The Bit Error Rate (BER) is the percentage of number of bit errors divided by the total number of transmitted bits during a studied time interval. BER is defined as a mean measurement of received bit error rate taken over a distance exceeding 40 wavelengths.

j) Message Success Rate (MSR)

i. The Message Success Rate is the percent of data test messages successfully delivered within the maximum number of protocol tries for a given predicted coverage area. A successful delivery is defined as transmitting a test message and receiving its corresponding acknowledgement within four automated attempts accomplished within 20 seconds within the same test tile.

k) Verification of CATP Test Equipment

i. SI team member will verify below points before each day's test.

ii. All test radio(s) installed in the test vehicle(s) are the same device type and configuration as used to predict coverage, including the antenna type and mounting location.

iii. All test radio(s) are operating satisfactorily.

iv. All mobile test receiver(s) used are calibrated with coverage testing hardware and software package.

v. All GPS navigation, computer and CATP software application is functioning properly and set up for the day's test.

vi. Set up the DTRS sites to rotate through all available working channels at each site, except for control channel and BER test channel for the day of test.

vii. Change the control channel at each site at the beginning of each day to a different control channel from the previous day's test.

viii. Move the BER test to a different working channel at each site at the beginning of each day.

ix. Reset test receivers to monitor correct BER test channels assigned for the day's test.

l) BER Testing Procedure

i. A quantitative coverage acceptance test will be performed to provide objective verification of the proposed DTRS system to ensure that it provides the faded performance threshold for the specified Channel Performance Criterion (DAQ- 3.4) in specific coverage area. The procedure for the objective BER coverage test will be as follows:

ii. A calibrated digital voice test receiver will be connected to an antenna installed on the test vehicle. The test receiver will monitor transmissions from the fixed network radio sites.

iii. A Global Positioning System (GPS) receiver will provide the computer with the location and speed of the test vehicle.

iv. A laptop computer with software package and a mapping database which includes highways and local streets political boundaries, rivers, and railroads will be used to capture readings.

v. SI personnel will drive the test vehicles (minimum two field test teams per region) over a route planned to cover all the accessible tiles within the coverage test area. Other SI personnel in each team will operate the Software package.

vi. During the objective coverage test, the laptop computer will display the vehicle's location on a map of the coverage test area overlaid with the test tiles/grids. Software will automatically initiate BER

measurements when the GPS receiver indicate that a test grid has been entered. The computer provides a visual indication that a measurement has been completed in a tile.

vii. In each test tile, a series of sequential measurements (subsamples) will be made. This test location measurement, containing a number of subsamples will constitute the test sample for this location. The test sample will establish the local mean BER within the test grid/tile. A mean of multiple subsamples is used rather than a single measurement to ensure that the measurement is not biased by taking a single sample that might be at a peak or null point on the radio wave. BER testing will be performed in the talk-out direction, to a mobile test receiver in a vehicle. SI will ensure that all channels will be utilized in the BER test protocol. **All tiles achieving 2% BER will be considered as pass.**

viii. At the conclusion of the test, all data will be compiled. For each coverage area, the area reliability percentage will be calculated by dividing the number of passed grids/tiles by the total number of tested grids/tiles in the coverage area. Inaccessible grids/tiles will be excluded from the calculation.

m) DAQ Testing Procedure

i. To perform a statistically valid subjective DAQ test, a large group of people will be used to ensure high confidence in the results. The group of personnel participating in the subjective test will be calibrated with the sound of radio conversations at DAQ-3.4 level.

ii. The test participants will be divided into teams, each consisting of personnel from SI team and Police Department.

iii. As the field test teams drive through the coverage area, test locations within each tile will be randomly selected for the subjective coverage test. Minimum 15 locations will be tested for DAQ in a tile and if 14 locations are passed (which will achieve 95% success rate), than the tile will be considered as pass.

iv. The DAQ coverage test will utilize a portable/mobile radio equipped with a speaker microphone with an antenna at shoulder level for testing in transmit (talk-in) and receive (talk-out) directions between a dispatch console and a mobile test receiver in a vehicle.

v. The test teams will evaluate the DAQ value of the test transmission, and record the pass / fail rating for each transmission in the grid/tile on the test sheets as well as any pertinent notes for the location.

vi. For each test in each grid, each field test team will call out which grid number they are in, and give a test count. The dispatch console team will answer back with the grid number and say the transmission is “loud and clear” or “please repeat last transmission.” Then the field team will answer back with the grid number and will say the transmission was “loud and clear” or “please repeat last transmission.”

vii. At each grid/tile location, each field test team member will listen to a talk-out audio transmission and evaluate the DAQ value of the test transmission and record the pass / fail rating of all transmissions for each grid. Team members stationed at the control point will evaluate talk-in audio quality of transmissions from the test field unit in that grid and record the pass / fail rating of all transmissions for that grid. This way, each team will maintain a test log to record subjective pass / fail rating of all transmissions for each test grid. Subjective evaluation will be based on the Delivered Audio Quality definitions. The pass / fail rating for each test grid/tile will be the pass / fail consensus of all team members’ subjective evaluations for that grid.

viii. SI will ensure that all channels will be utilized in the DAQ test protocol.

ix. A grid rated below DAQ-3.4 on the first trial will be immediately retested. The retest will be done at three feet away from the original location. If the rating of the second retest fails, the grid/tile will be counted as fail. If the rating of the second test is pass, a third test will be taken to prove that the first failure was an anomaly. If the rating of the third test is a pass, the grid will be counted as a pass. If the rating of the third test is a fail, the grid/tile will be counted as a fail.

x. At the conclusion of the test, all data will be compiled. For each coverage area, the area reliability percentage will be calculated by dividing the number of passed grids/tiles by the total number of tested grids/tiles in the coverage area. Inaccessible grids/tiles will be excluded from the calculation.

xi. Below mentioned table may be used to capture tile wise pass / fail result of both BER and DAQ testing.

Tile No.	Mean Latitude	Mean Longitude	Mean BER (%)	Talk-In DAQ 3.4 Test	Talk-Out DAQ 3.4 Test	Tile (Pass / Fail)

n) Message Success Rate (MSR) Testing Procedure

i. Each MSR test transmission will consist of one 200-byte inbound message and one 200-byte outbound message, both of which define the "CATP Message Size" used to predict coverage.

ii. Automated coverage testing hardware and software package will initiate an inbound test message transmission by the portable/mobile radio and will monitor the radio for an ACK that confirms success of the inbound test message.

iii. In case of non-receipt of ACK, it will initiate another try. The software will be adjusted such that four tries are accomplished within twenty seconds.

iv. When a test message is transmitted, the automated coverage testing hardware and software package's display will indicate "Testing", along with the number of seconds since transmission and the try number, until an acknowledgment (ACK) is received from the fixed network equipment, or all tries are exhausted.

v. The reception of an acknowledgment (ACK) will indicate a successful inbound link communication. No acknowledgment of the test transmission after all protocol tries are exhausted will constitute an inbound link failure of the test point.

vi. If an ACK is received by the radio, the automated coverage testing hardware and software package will conclude that test location and will record that test location as passed.

vii. If an ACK is not received after four tries, the test location will be recorded as failed.

viii. Minimum 15 locations will be tested for MSR in a tile and if 14 locations are passed (which will achieve 95% Message Success Rate), than the tile will be considered as pass.

ix. Below mentioned table may be used to capture tile wise pass / fail result of both inbound and outbound Message Success Rate testing.

Tile No.	Mean Latitude	Mean Longitude	14 Inbound Test Data Message Acknowledged (Yes/ No)	Tile (Pass / Fail)	14 Outbound Test Data Message Acknowledged (Yes/ No)	Tile (Pass / Fail)

o) Subscriber Access Testing Procedure

i. Push to Talk (PTT) Access Test – SI will provide a PTT test to demonstrate the establishment of two-way communications within each grid/tile in a coverage area.

ii. The test team will use the PTT button on the non-fixed unit in accordance with product default specifications and wait for the tone indicating establishment or failure of communications.

iii. If the first attempt fails, a second attempt will be made. If both attempts fail, the test location fails for this test. If either attempt succeeds, the test location passes for this test.

iv. The radios used in the test will be set at factory default specifications. The test will be designed to utilize equally all available frequencies according to the channel plan.

v. This test will be carried out at all locations where DAQ testing will be done. Minimum 15 locations will be tested for PTT access test in a tile and if 14 locations are passed (which will achieve 95% success rate), than the tile will be considered as pass.

vi. Below mentioned table may be used to capture tile wise pass / fail result of Subscriber Access testing.

Tile No.	Mean Latitude	Mean Longitude	PTT Access Grant Attempt 1 (Yes / No)	PTT Access Grant Attempt 2 (Yes / No)	Tile (Pass / Fail)

p) Indicative Test Log for All Test Locations within a Tile

i. Below mentioned Test Log table is an indicative format to capture test result data for all 15 locations within any tile. Such Test Log sheet will be maintained for all tiles.

Test Location No.	Landmark	Talk-In DAQ 3.4 (Ok / Not Ok)	Talk-Out DAQ 3.4 (Ok / Not Ok)	Inbound Test Data Message Acknowledged (Yes/ No)	Outbound Test Data Message Acknowledged (Yes/ No)	PTT Access Grant Attempt 1 (Yes / No)	PTT Access Grant Attempt 2 (Yes / No)	Test Location (Pass / Fail)
1.								
2.								
3.								
4.								
5.								
6.								
7.								
8.								
9.								
10.								

11.								
12.								
13.								
14.								
15.								

q) Functional Testing

i. The successful bidder is also required to demonstrate following minimum parameters as per the requirements mentioned in this RFP:

System Level

1. Logs and Alarms
2. Queuing functionality
3. Type 1 Handover in roaming
4. Subscriber Registration and Authentication
5. Late Entry
6. Priority Scanning
7. Pre-emption

Voice Calls

1. Semi Duplex Individual call for Radio Subscribers
2. Full Duplex Individual call from Radio Subscriber
3. Group Calls
4. Emergency Call
5. PSTN to radio terminal call

Data Services

1. Status and Short Data Messages
2. Sending SDS / status message during speech call
3. Sending GPS coordinates by pressing Push To Talk (PTT)

Dispatcher

1. Group Monitoring
2. Ambience listening

3. Combining of Groups
4. Dynamic Group Number Assignment (DGNA)
5. Radio Terminal disable / enable
6. Subscriber Tracking
7. Man down situation

Network Management

1. Remote Base Station and controller Management
2. Subscriber Management
3. Performance Management
4. Call set up time

General Tests

1. Radio Coverage Test
2. Checked Received Signal Strength Indicator (RSSI) of handheld radio and Mobile radio subscribers in the Vehicle at the locations listed by customer
3. Check TX power of base station at the top of cabinet
4. Check TX power of base station at the antenna port on top of tower
5. Check Voltage Standing Wave Ratio (VSWR) at each base station site
6. Fallback Mode
7. Repeater / conventional mode in case of failure of site controller
8. Direct Mode Option

Redundancy

1. Checking System Redundancy
2. Switch Redundancy
3. Check redundancies in critical modules of base station
4. Check IP links redundancy

Application Based Features

1. Image Push
2. Database query

r) Integrated Systems Tests

i. As specified in the RFP, integration of proposed systems with existing Dial 100, 108 call center, e-GujCop, SASGUJ , HDIITS, CAD, Video Surveillance System, etc.

s) Cost of Inspection & testing

i. All the cost of testing equipment along with required necessary hardware, software and approval (if any) for inspection of Network equipment and testing of network (PAT and FAT) will be borne solely by the bidder. All required testing equipment will be arranged by the bidder. Such inspections/approval of equipment by Gujarat Police representative will not relieve the suppliers of their obligations / responsibility to supply as contemplated in the specifications.

4.11. System Functionality and Performance Parameters

The proposed DTRS Network should offer below mentioned functionality and performance as listed in table.

Sr. No.	Feature	Compliance (Yes/No)
1.	The RF coverage has to provide the digital Bit Error Rate (BER) of <=2% that provides a minimum Delivered Audio Quality (DAQ) of 3.4 or above for audio signal and MSR of 95% for both outbound (talk-out) and inbound (talkback) communications with 95% reliability using handheld device and other necessary required hardware and software. Detailed RF coverage testing procedure is mentioned in Section – 4.10.	
2.	The DAQ shall be defined as follows: DAQ Definition >1 - Unusable. Speech present but not understandable. > 2 - Speech understandable with considerable effort. Requires frequent repetition due to noise or distortion. > 3 - Speech understandable with slight effort. Requires occasional repetition due to noise or distortion. > 3.4 - Speech understandable without repetition. Some noise or distortion present. > 4 - Speech easily understandable. Little noise or distortion. > 4.5 - Speech easily understandable. Rare noise or distortion. 5 Perfect. No distortion or noise discernible.	
3.	The audio quality shall be ensured by the joint field test along with the technical personnel of the department during PAT and FAT.	
4.	The signal strength in various locations in identified geography shall be measured. The equipment for measuring the signal strength shall be provided by the bidder for testing.	

Sr. No.	Feature	Compliance (Yes/No)
5.	The proposed system must comply with encryption standard of ETSI EN 300 392-7 Security Class – 3 Or Advanced Encryption Standard (AES). The proposed system should be capable of supporting Digital voice and data. The proposed system shall also support Encrypted Digital voice call with the following features – > Radios equipped with secure capability can have the option to communicate in either the clear mode or encrypted. > Air Interface encrypted radio communication between two or more radios must be ensured. This means that for a call involving two or more BTS sites, the voice signal remains in its encrypted form both over the air as well as over the link (microwave or RF or optic fiber) connecting the sites. > Monitoring of all calls, both non-encrypted and encrypted from a dispatch console. > Transmitting to the subscriber radio from a dispatch console in either non-encrypted or encrypted mode.	
6.	The system should be able to support subscriber radios from different OEMs in future. Bidder will have to provide IOP certificate for the proposed system and solution. Bidder will have to provide details of Network functionalities which will not be supported on this new radios from different OEMs.	
7.	The system proposed in these 2 geographic areas will have to support with the selected system of same technology (may be procured from different OEM) for Phase – 2 in future for purpose of integration of both Networks. Bidder will have to provide details of Network functionalities which will not be supported while interfacing with other DTRS Network in future. Bidder will also have to provide details of whether or not Dispatch console proposed at present by the bidder will be able to communicate with and support Dispatch console of other Network in future.	
8.	The system shall not unnecessarily tie up multiple channels at any sites, for all call types, for the same user. The system must be efficient in order to minimize the number of channels used in any given conversational scenario. The bidder shall describe how the channel can be efficiently allocated.	
9.	The signaling language will permit the system to assign not less than 15000 unique individual radio IDs (Identification), with the capability to expand. The bidder shall specify the maximum number of unique individual radio IDs the proposed system can support.	
10.	All radios must have the capability of being a member of any or all talk groups. Regardless of the talk group affiliation, the radio ID for subscriber radio shall not change. Each subscriber radio will have its unique individual radio ID, independent of talk group and/or telephones interconnect capability.	
11.	The bidder shall describe in detail the modulation schemes used in the proposed system.	
12.	The system and subscriber radio features and facilities should preferably be software upgradable. The method of software upgrading shall minimize the impact to Gujarat police operations. If the configuration change has an un-intended impact on system performance, the configurator shall be able to restore the system to the earlier working configuration	

Sr. No.	Feature	Compliance (Yes/No)
13.	The proposed system should allow a dispatch console operator to preempt or over-ride a particular subscriber radio into a selective call, group call to pass important conversation.	
14.	A minimum of 8 (eight) levels of priority shall be incorporated in the system to ensure timely processing of calls, including group call, individual calls as well as intercom calls. A Network Management Terminal shall assign individual and group priority levels to all subscriber radios. The levels of priority are classified as follows - > Emergency Priority: This shall be highest level of priority. Upon activation of the emergency button, the next available voice channel shall be immediately assigned regardless of system loading. In case all voice channels are occupied, then lowest priority call will be dropped and same channel will be assigned to Emergency Priority call. > Operation Priority: This shall be the next 7 levels of priorities, to be assigned according to the requirements of the users. > Voice priority: System should support voice communication priority over data communication. The system can be setup to ensure that subscriber receives a voice call while on data channel ensuring that the voice call always has priority.	
15.	In an adverse signaling condition, when a subscriber radios request for voice channel is not properly received by the system on the first try, the subscriber radio shall automatically send the request again, until the request is acknowledged or the maximum allowed number of retries is reached. The bidder shall specify the maximum number of retries for the system.	
16.	Whenever a subscriber radio leaves the coverage of the signaling channel, and attempts to access the system (via PTT), an audible alert shall be sounded. This alert must have distinct tones other than any other audible tones generated by the subscriber radio. This will enable the end user to determine that the radio unit is out of contact with the system.	
17.	Dispatch console shall be alerted by visual or audio indication if called radio is out of contact.	
18.	In addition to audible alert, a visual indication of this condition is preferred to be displayed on the operator console.	
19.	When the system is fully loaded and the subscriber radio requests for a voice channel by pushing the PTT button, a distinct system busy tone shall sound on the radio, as long as the PTT button is pushed.	
20.	The system shall provide a call-back feature when any subscriber radio is placed in to the system busy queue.	
21.	The system will cause the subscriber radio to emit an audible alert, specific for call back, and the subscriber radio shall automatically access the assigned channel.	
22.	The system shall broadcast continuous updates of the channel assignments of talk groups to all subscriber radios enabling the late entrant radios to automatically join conversation in progress.	
23.	The system must allow the Network management terminal to disable any subscriber radio(s) currently operational on the system. The Network management terminal must indicate when it succeeds in disabling the subscribe radio. A disabled subscriber radio must not be able to transmit/receive both voice and data nor otherwise join into any voice conversation on the system.	

Sr. No.	Feature	Compliance (Yes/No)
24.	If for any reason the trunked system is shutdown or disabled, any disabled subscriber radios must remain disabled.	
25.	A disabled subscriber radio can only be re-enabled by the Network management terminal. Once this is accomplished, an indication will be sent to the network management terminal.	
26.	The Network manager should be able to disable a radio unit with a message over the air interface.	
27.	While disabled, radio unit must be disabled from making or receiving calls and sending or receiving data but must be able to perform normal site registration procedures so that its position can be tracked.	
28.	The disabled radio status must be stored in a non-volatile memory of the radio so that it cannot be defeated by removing power.	
29.	The network manager should be able to re-enable a temporary disabled radio with a message over the air interface.	
30.	To preserve system throughput, the operation of enabling and disabling radios be done on the control channel. Bidder shall describe the above process in detail.	
31.	It is imperative that the failure of both primary and secondary site link will result in that site going into local site trunking mode and works independently from the rest of the sites in the system. Local Site trunking mode shall still provide limited trunking features just like any single site trunking system. Bidder can specify the features that will be available in single site operation.	
32.	The proposed Multi-channel Trunked Radio System shall have the capabilities to assign more than one control channels.	
33.	In the event that the active control channel fails, the site controller will automatically assign another channel as the control channel without affecting the normal operation.	
34.	Roaming subscriber radios operating in the system shall be equipped with the capability to monitor signal strengths of the adjacent BTS sites. This allows the subscriber radios to automatically select the site with the best signal, instead of re-affiliating with the next available site when the audio quality at the current site becomes unacceptable. Rest of the subscriber radios should be able to operate only in the pre-specified site.	
35.	When a radio user enters a site and changes the talk group selector on his radio or switches on the radio, the radio shall automatically transmits its unique ID and its talk group affiliation to the system controller. Upon the receipt of such information from the subscriber radio, the system controller shall determine the site affiliation of the radios and update its database with all the new information pertaining to the radio. The whole process should be automatic.	
36.	To allow the system controller to maintain an accurate, up-to-date database on the location of each subscriber radio, the system must also be able to determine if a radio is out of range, switched off or re-affiliated with another site. Thus, calls shall not be assigned to users who are not active on the system.	

Sr. No.	Feature	Compliance (Yes/No)
37.	The trunked system shall permit any properly equipped subscriber radios to selectively call another radio, regardless of their talk group affiliations or locations within the wide area system. Without involving other subscriber radio users in the system, this shall provide privacy to the parties involved in the private conversation. The two radios communicating in the selective call mode shall be capable of displaying the other radio ID on the radio display.	
38.	The system shall allow subscriber radios to be grouped into talk groups/subgroups. Under normal operation, group members will communicate with the dispatch console operator as well as with other members in the same talk group. The subscriber radio user shall be able to talk to other talk groups that are preprogrammed on the radio by manual selection on the radio. The proposed subscriber radios should receive and display the ID of the transmitting radio.	
39.	It shall be possible to group any combination of talk groups into a higher level group for purposes of multi talk group/collective calling.	
40.	Collective calls can be configured to interrupt group calls or wait until all group traffic has ceased before being processed.	
41.	Subscriber radios shall respond to a collective call without requiring the subscriber radio users to change the talk group affiliation. Each collective call shall require only one (1) RF voice channel per BTS to conserve frequency resources.	
42.	The proposed system shall immediately allocate a voice channel on priority to the authorized radio subscriber even when all the channels are busy, by pressing a single button on the subscriber's radio. The emergency channel assigned will remain with the radio subscriber for a preset period of time.	
43.	The administrator / user with suitable rights should be able to configure various talk groups as per the requirement.	
44.	The proposed system should be able to send messages along with time stamp of the network- that cannot be tampered with.	
45.	The proposed system should be able to automatically send location coordinates from mobile / handheld devices to AVLS / APLS - that cannot be tampered with.	
46.	Automatic switchover of control channel to 2nd RF carrier in case of failure.	
47.	Fallback support of group Call, individual call and Emergency Call should be there.	
48.	Availability of Encryption in fallback like normal operation complying ETSI EN 300 392-7 Security Class – 3 Or Advanced Encryption Standard (AES).	
49.	Network Management System Workstations at Ahmedabad & Gandhinagar shall be able to disable, stun & Kill stolen radios. To avoid the stunning of radios through a fake base station, it is necessary that the system shall provide mechanisms to authenticate both terminals and base stations before communications are enabled. Bidder shall explain the authentication process in their proposed system.	
50.	The proposed network must achieve on-street coverage of 95% and full in-building coverage in the building / places / campuses listed in Annexure – III.	

Sr. No.	Feature	Compliance (Yes/No)
51.	The proposed trunked system shall support future expansion to more sites in a wide area Trunking system, capable of supporting seamless roaming in all the areas and still maintain radio users' communication within the network and other radio users to get all services while roaming.	
52.	Allocation of additional secondary control channels or dedicated data channels to increase GPS reporting capability or higher density of users, shall be possible to do it dynamically and remotely during the operation of the system, from the Network Management Terminal.	
53.	To not compromise system security, same level of encryption shall be maintained even in the event of Base Station change to fall back mode.	
54.	Handhelds shall have the capability to run short data applications allowing users to access back office database applications or receive customized job dispatch messages. Such applications should use control channel /data channel in order not to load traffic channels for speech calls. To avoid load on traffic channel, data applications and AVLS should either work on control channel or dedicated data channel. Bidder should specify clearly their response how the application will work in their offered system.	
55.	A minimum of 8 levels of priority shall be incorporated in the system to ensure timely processing of calls, including group call, individual calls.	
56.	Calls that are queued shall be serviced in order of priority. Calls in the queue with the same priority shall normally be handled on a first in first out basis.	
57.	To facilitate call continuity, the queue shall prioritize between calls from radio units with the same priority, so that a call from the more recently serviced radio unit shall be handled first.	
58.	If the system becomes fully loaded (all available RF voice channels have been assigned) the second and lower precedence level requests for a voice channel will be placed in a queue. The queue will cause the system to assign voice channels (as they become available) according to the priority levels.	
59.	When in group call mode, a radio unit shall be able to request a traffic channel to transmit to their attached talk group by simply pressing a Push-to-Talk (PTT) button.	
60.	When in group call mode, the Radio Unit shall automatically receive a call from any of the talkgroups to which it is attached, without any action being required by the user. When a user is on any group call, radio should have capability to automatically or manually accept other group call being initiated in another talkgroup to which radio is part of. User should be able to configure radio for either automatic or manual change over to another group call from live call based on priority.	
61.	To enable fast response to unexpected events the system must provide the capability to create dynamic groups that are assigned to the users without their intervention. Users must be notified that a new talk group has been assigned to them. This feature shall be available from the NMS and from the dispatcher consoles.	

Sr. No.	Feature	Compliance (Yes/No)
62.	The radio system shall offer an integrated emergency strategy, including highest priority mission critical voice calls, an automatic emergency alarm, a live microphone, and special dispatch console features. The bidder shall analyze and propose a solution to adapt the emergency mechanism according to the Standard Operating Procedures of the Police Department.	
63.	The offered system shall support emergency call or status message to dispatcher, individual address and group address. It shall be possible as well to configure an emergency call to PABX/PSTN address	
64.	The trunked system shall permit any properly equipped subscriber radios to selectively call another radio, regardless of their talk group affiliations or locations within the wide-area system.	
65.	The system shall allow a radio unit to send a pre-coded message over the air interface to the dispatcher console or to other radio units (individually or group based), without requiring voice communication.	
66.	Similarly, the dispatcher console shall be able to send a pre-coded message over the air to a radio terminal or to a group of them by addressing a talk group, without requiring voice communications.	
67.	The system shall allow a radio unit to send text messages like pre-coded status message in the same conditions mentioned in the above two points.	
68.	The system shall support Subscriber tracking and monitoring. The subscriber tracking information shall be updated automatically by means of a polling system and not on manual request basis. The polling system shall take into account the current distribution of the terminals in the base stations to avoid collisions over air, by polling at the same time radios in different base stations. This will enable a better usage of the RF spectrum.	
69.	To allow the system controller to maintain an accurate, up-to-date database on the location of each subscriber radio, the system shall also be able to determine if a radio is registered to the system, engaged in an individual call, group selected by radio terminal, base station to which the subscriber is currently registered.	
70.	Each radio unit shall automatically send appropriate request to the radio system at: Power-On Change of base station Coming into coverage area from non-coverage area Change of talkgroup attachment	
71.	The radio system shall ensure that each radio unit shall de-register from the system on power-off, in order to safeguard radio resources.	
72.	To safeguard traffic channel resources, the radio system shall have a mechanism for de-registering radio units that are no longer available, and have failed to re-register with the radio system. For example, when the user has strayed out of radio coverage or suffered power losses.	
73.	The proposed radio system shall offer roaming feature to allow a radio unit to maintain their link with the radio system whenever they move out of the geographic coverage area of one base station and into that of another.	

Sr. No.	Feature	Compliance (Yes/No)
74.	The proposed radio system shall support seamless roaming across all the sites of both the geographies such that all call types are maintained and handed over from site to site without re-establishment of call.	
75.	In the fallback mode, the user shall be able to have following services. Bidder shall clearly specify if these services will be provided in the offered solution. Individual calls PABX/PSTN calls (if Base Station is connected to a PABX) Group calls Emergency Calls Text Messages Pre-defined messages Packet data Late Entry Registration	
76.	The Radio system shall be configured in such a way that when a base station loses connection with the system infrastructure, it shall no longer supports roaming and shall immediately enter local site trunking mode, whereby each base station continues to independently support call trunking even when isolated from switching equipment.	
77.	When a base station is operating independently from the switching equipment, it shall broadcast the loss of roaming to all registered radio units.	
78.	The system shall support Ambience Listening; the dispatcher shall be able to listen to a terminal that is not currently engaged in a call to find out what is happening around the terminal. During ambience listening, the terminal shall behave as a terminal not in use i.e. it shall not indicate in any visible or audible way that it is transmitting. The ambience listening session is terminated if a call is made from the terminal; the sending or receiving of status or SDS messages has no effect on ambience listening.	
79.	The offered system shall support a mechanism to disable the usage of the radio terminal temporary and permanent. The feature is most commonly used in situations where the radio terminal has been stolen. Disabling over the air shall also prevent direct mode communications.	
80.	Temporarily disabled terminals shall not be able to make or receive voice calls, or any other data transmission.	
81.	Each base site shall provide the necessary control and signaling functions to interact with the main System controller for dynamic allocation of channels to the requesting subscriber radios.	
82.	The base stations shall be designed for continuous unattended 24 hours of operation. Loss of one carrier shall not affect the operation of the other carriers.	
83.	The base stations shall not have any single point of failure. This can be achieved by the base station design (i.e. distributing control functions between the carriers) or by redundant modules. Avoidance of single point of failure should include modules connection, Ethernet switches, synchronous boards, power supply modules, etc).	
84.	The base stations shall be capable of monitoring the integrity of its equipment. Automatic alarm reporting to Network Management terminal shall be provided.	

Sr. No.	Feature	Compliance (Yes/No)
85.	The base stations shall be housed in free standing in-door cabinets. Every base station shall come with a surge protection.	
86.	Base station shall be able to detect increased reversed power before and after the combiner and to send the appropriate alarms directly to the Network Management System.	
87.	If the offered base station shall use GPS synchronization or internal clock to synchronizing its carriers (as in a TDMA system), the loss of GPS signal must not cause any service breaks of the base station.	
88.	In case of failure of a RF carrier supporting the main control channel, the offered base station shall automatically switch the main control channel to another RF carrier.	
89.	Radio base station and other remote components of system shall be capable of being configured remotely from the network management system application.	
90.	System configuration and maintenance functions shall be accessible by an intuitive GUI, avoiding complex command line configuration methods.	
91.	The system shall store in a database a list of all events of significance in the operation of the network. It shall be possible to filter by date, hour, component or site location to better find out any issue or wrong behavior in the configuration of the system.	
92.	The system shall support remote software upgrade from a dedicated application at a centralized location of all base stations of the system. The application shall have a historical details of the software upgrades and the possibility of reverting back to a previous version if required.	
93.	From the NMS, it shall be possible to define the services, priorities and call rights for the radio terminals over the air, so that when changes are needed, then there is no need of bringing radio terminals to central location for re-programming.	
94.	Any change in the configuration of the system or in the operation parameters of the radio subscriber shall not require a complete restart of the system. To enable highest availability, only in limited circumstances a restart of the reconfigured module will be needed.	
95.	Addition or replacement of the modules of the switch and Base station components shall not require to switch off the cabinet, in other words, all modules shall be hot-swap to enable an easier maintenance of the network.	
96.	Replacement of modules in the field shall not require a reconfiguration from scratch. Modules shall be plug & play, so after the correct IP address is configured, operating parameters shall be downloaded from the configuration repository in the switch.	
97.	The proposed trunked radio system shall be equipped with dispatch equipment to allow radio dispatchers to monitor and participate in activities of the subscriber radio units under their operation.	

Sr. No.	Feature	Compliance (Yes/No)
98.	The proposed Network system must integrate with existing CAD application / any new CAD application purchased in future by Gujarat Police Existing CAD / future CAD System will provide below mentioned call taking and dispatch functionality. • Dial 100 Call from any geography will land at a central location where a central call taker will initiate an incident report. • Incident report will be provided to the central dispatcher. • Central dispatcher will forward only the legitimate incidents to the respective local geographic dispatch locations through existing dispatch application. • With the support of integration of existing CAD with proposed DTRS Network system / AVLS system, local dispatcher will find out the PCR van / 108 ambulance nearest to the incident location and inform PCR van through static DTRS radio and to the 108 ambulance through wireline / cellular telephone system.	
99.	The system shall provide the OTAP (Over The Air Programming) facility. The dispatcher shall be authorized to define the services, priorities and call rights and update the firmware versions into the system over the air, so that when changes are needed, then there is no need of bringing radio terminals to central location for re-programming.	
100.	The system should provide suitable software application for radio handset allotment tracking and overall inventory management.	
101.	The dispatcher console shall operate on standard Personal Computer (PC) and it shall feature an intuitive, user friendly Graphical User Interface (GUI).	
102.	In addition to the PC, the wireline dispatcher position shall be provided with a loudspeaker, a headset, a desk microphone and foot PTT switch.	
103.	The headset shall reproduce the audio from the talk group which have been selected for operation. The loudspeaker shall reproduce the audio from all other monitored talk groups.	
104.	The Hand-portable radio Unit shall be equipped with emergency button that is easy to locate for activation of Emergency Call.	
105.	The hand-portable radio unit shall be able to initiate and receive full-duplex telephone calls to/from PSTN or PABX subscribers.	
106.	A single-unit battery charger capable of charging 1 radio with battery attached and 1 additional spare battery shall be available for each hand-portable radio unit.	
107.	All hand-portable radio units should have support for emergency calls, priority calls and other supplementary features as mentioned in this RFP.	
108.	All hand-portables shall preferably have support for expanded connectivity. Hand-portable shall preferably have built in Bluetooth.	

4.12. Technical Specifications of Radios and Equipment

1. SI will be responsible to supply portable / handheld, mobile and static radios and Network equipment supporting following features. This is an indicative list of minimum requirements, SI is free to suggest and provide radios and equipment with higher capability and functionality.

a) BTS Technical Specification

Sr. No.	Feature	Compliance (Yes/No)
1.	All Base station sites shall be provisioned with suitable fire extinguishers of ABC class for safety purposes with necessary tools. The tool kit shall comprise of Set of spanner, Screw driver set, hammer, cutting pliers, wire stripper, Megger, Digital meter (to measure Resistance, AC/DC voltage, current 600 A or above, frequency, etc.). Safety belt with clamps and head gear for Tower climbing – 2 per base station.	
2.	Frequency Band: 800 MHz	
3.	Transmit Power: Minimum 15W	
4.	Input Power: 230 Vac, 50/60Hz or -48 Vdc	
5.	Operating Ambient Temperature: -10 to +55 deg Celsius	
6.	Combiner Options (if any) : Cavity Combiner / Auto Tuned Cavity	
7.	Carrier Spacing: 25KHz or 12.5 KHz	
8.	Transmission: Two Ethernet ports with inbuilt multiplexer for either loop protection or redundancy. Minimum bandwidth required shall be stated in the bidder response. Native Ethernet/IP connectivity is preferred.	

b) Dispatcher Technical Specification

Sr. No.	Feature	Compliance (Yes/No)
1	The Dispatcher Console screen shall be a user friendly GUI having features such as pull-down menus, drag and drop capability etc.	
2	The Dispatcher Console control functions shall be depicted as graphic ions on the computer screen.	
3	Dispatcher access shall be protected by login and password.	
4	Shall be identified by their user name (login) and password	
5	Dispatcher shall be based on standard hardware components Standard PC based computer Flat screen or better Audio equipment (Loudspeaker, headphone, foot PTT)	
6	It shall be possible to define dispatcher access rights only to certain sub-parts of subscriber population.	
7	Dispatcher shall be easily configurable (monitor able identities, dispatcher rights)	
8	Dispatcher positions shall be located anywhere along the network. Bidder shall specify the characteristics of the connection.	
9	Dispatcher shall be able to display all the calls in progress involving subscribers belonging to the said dispatcher.	
10	Dispatcher shall be able to monitor (listen the voice) of simultaneous calls.	

Sr. No.	Feature	Compliance (Yes/No)
11	Dispatcher shall be able to intervene into half duplex calls; shall they be individual or group.	
12	Dispatcher shall be able to initiate an ambiance listening on authorized subscriber.	
13	Dispatcher shall be configured with a pre-emptive priority.	
14	Dispatcher shall be informed about the missed calls.	
15	Dispatcher shall be able to forward any details to another dispatcher.	
16	In addition to the above features, dispatcher shall be able to perform following tasks • Send and receive half duplex individual and groups calls • to/from radio subscribers • to/from PABX/PSTN subscribers • to/from other dispatcher	
17	Send and receive full duplex individual calls • to/from radio subscribers • to/from PABX/PSTN subscribers • to/from other dispatcher	
19	Send and receive individual and group pre-defined messages • to/from radio subscribers • to/from other dispatchers	
20	Send and receive individual and group text messages • to/from radio subscribers • to other dispatchers	
21	Send and receive individual SMS messages • to/from radio subscribers • to other dispatchers • to/from cellular phones	
22	Group monitoring • Ability to view group activities of at least 50 groups simultaneously	

c) Hand Held Radio Unit Technical Specification

Sr. No.	Feature	Compliance (Yes/No)
1.	Subscriber Radios shall be compliant to all applicable standards as are required.	
2.	Hand-Portable Radio Units with in-built GPS for GPS based Tracking	
3.	Radio units shall be robust, simple to operate, light in weight and compact	
4.	All radio units should support adaptive power control to maximize power efficiency.	
5.	Each radio unit shall support distinct modes of operation for group calls, individual calls.	

Sr. No.	Feature	Compliance (Yes/No)
6.	Radio units shall have mechanism to support direct communication between subscribers units.	
7.	Each radio unit shall give a visual indication of signal strength and remaining battery charge time.	
8.	The pre-defined messages, as and when required, shall be changed / reloaded. The handheld devices should be capable to send up to 20 pre-defined messages.	
9.	The hand-portable unit shall preferably weigh less than 275 grams with high capacity battery (minimum backup required is 12 Hrs for 85/5/10 cycle (Standby/ transmitting/receiving)) – 3rd party certification needs to be provided for battery capacity) for ease of carrying around.	
10.	The hand-portable unit shall provide a minimum RF output of 1.8 watt.	
11.	The hand-portable unit shall provide a minimum audio output of 1 watt.	
12.	The hand-portable radio unit shall have static receiver sensitivity level of <= -112 dBm typical and dynamic receiver sensitivity of <= -106 dBm typical.	
13.	The operating temperature radio unit shall be in the range -20 to +60 degree Celsius. The hand-portable radio unit shall meet International standard for Shock & Vibration and humidity as those standards specification requires equipment to undergo mechanical extensive shock and vibration, dust and humidity test procedures according to IP 66.	
14.	The Hand-portable radio unit shall be sealed against ingress of dust and water to IP66 standard.	
15.	The Hand-portable radio unit shall comply with MIL-STD-810 E/F/G Or ETSI 300-019 1-7 standard for shock, drop and vibration.	
16.	The hand-portable radio unit shall support at least 1,000 talkgroups in Trunked Mode Operation (TMO).	
17.	The hand-portable should support a multi-folded structure for talkgroups management of at least three levels.	
18.	The hand-portable radio unit shall have integrated GPS receiver with accuracy up to 50 meters or better and functionality to send location updates. It shall have built-in receiver for 10 Channels or more.	
19.	The hand-portable radio unit shall support call history (missed calls/dialed calls/received calls) of at least 100 calls.	
20.	The hand-portable radio unit shall have a minimum 1.8” large, backlit, Full color transflective TFT display with minimum resolution of 176X220 pixels.	
21.	The batteries shall have a life of more than 500 charge/recharge cycles, when operated in accordance with the manufacturers recommended procedures.	
22.	The hand held radio should provide below functionality.	
	Man down detection	
	Full duplex audio support	
	Priority channel scanning	

Sr. No.	Feature	Compliance (Yes/No)
	DMO Repeater functionality	
	hot mic talk option (for 2 hands functions)	
	Over-the-Air Programming functionality	
	Over-the-Air Re-keying functionality	
	The hand held radio should preferably provide Bluetooth and Wi-Fi support.	
23.	The radio must comply with ETSI EN 300 392-7 Security Class – 3 Or Advanced Encryption Standard (AES) for Air Interface encryption.	
24.	Bidder will have to supply radios (at least 5% in city areas and 10% in rural / district areas wherever refinery units are located) which meet required specific standards defined by international bodies for operation in refinery areas.	

d) Mobile Radio Unit Technical Specification

Sr. No.	Feature	Compliance (Yes/No)
1.	Subscriber Radios shall be compliant to all applicable standards as are required.	
2.	Mobile Radio Units with in-built GPS for Vehicle tracking.	
3.	Radio units shall be robust, simple to operate, light in weight and compact.	
4.	All radio units shall support adaptive power control to maximize power efficiency.	
5.	Each radio unit shall support distinct modes of operation for group calls, individual calls.	
6.	Radio units shall have mechanism to support direct communication between subscribers units.	
7.	Each radio unit shall give a visual indication of signal strength.	
8.	The pre-defined messages, as and when required, shall be changed / reloaded. The mobile radio devices should be capable to send up to 20 pre-defined messages.	
9.	The Mobile Radio Unit shall provide a minimum RF output of 10 Watt.	
10.	The mobile radios shall be of remote mount type consisting of a radio transceiver set, dash mounted console, 5m interconnect console cable and other items necessary for a complete installation in the trunk/boot of the vehicle. All mounting hardware shall be furnished.	
11.	In addition to a standard console, the radio shall support a handset based console for greater mounting flexibility also allowing an existing legacy dash console to be used during the migration phase.	
12.	A motorcycle kit installation of the vehicle radio shall be offered with options for simple limited control installation and full control installation with IP66 console.	

Sr. No.	Feature	Compliance (Yes/No)
13.	The Mobile Radio Unit shall have faded receiver sensitivity level of <= -107 dBm.	
14.	The operating temperature of radio unit shall be in the range -30 to 60 degree celsius. The Mobile Radio Unit shall meet international standard (MIL-STD-810 E/F/G Or ETSI 300-019 1-7 Or ETSI EN 300 019-2-5 standard) for shock, drop,vibration, dust and humidity as those standards specification require equipment to undergo mechanical extensive shock and vibration, and humidity test procedures.	
15.	The Mobile Radio Unit shall be equipped with an emergency key that is easy to locate for activation of Emergency Call.	
16.	The Mobile Radio Unit shall support at least 1,000 Talkgroups in Trunked Mode Operation (TMO).	
17.	The mobile radio unit shall have integrated GPS receiver and functionality to send location updates. It shall have built-in receiver for 10 Channel or more.	
18.	The Mobile Radio Unit shall support telephone interconnect operation.	
19.	Each unit shall be provided with a fist microphone and a loudspeaker.	
20.	Each unit shall have an LCD display console.	
21.	Mobile radio unit shall have minimum 8dBi antenna.	
22.	The radio should be DC powered.	
23.	The radio must comply with ETSI EN 300 392-7 Security Class – 3 Or Advanced Encryption Standard (AES) for Air Interface encryption.	

e) Static Radio Unit Technical Specification

Sr. No.	Feature	Compliance (Yes/No)
1.	Subscriber Radios shall be compliant to all applicable standards as are required.	
2.	Static Radio Units with in-built GPS.	
3.	Radio units shall be robust, simple to operate, light in weight and compact.	
4.	All radio units shall support adaptive power control to maximize power efficiency.	
5.	Each radio unit shall support distinct modes of operation for group calls, individual calls.	
6.	Radio units shall have mechanism to support direct communication between subscribers units.	
7.	Each radio unit shall give a visual indication of signal strength.	
8.	The pre-defined messages, as and when required, shall be changed / reloaded. The static radio devices should be capable to send up to 20 pre-defined messages.	
9.	The static Radio Unit shall provide a minimum RF output of 10 Watt.	

Sr. No.	Feature	Compliance (Yes/No)
10.	The Mobile Radio Unit shall have faded receiver sensitivity level of <= -107 dBm.	
11.	The operating temperature of radio unit shall be in the range -30 to 60 degree Celsius The Static Radio Unit shall meet international standard (MIL-STD-810 E/F/G Or ETSI 300-019 1-7 Or ETSI EN 300 019-2-5 standard) for shock, drop, vibration, dust and humidity as those standards specification require equipment to undergo mechanical extensive shock and vibration, and humidity test procedures.	
12.	The static Radio Unit shall be equipped with an emergency button that is easy to locate for activation of Emergency Call.	
13.	The static Radio Unit shall support at least 1,000 Talkgroups in Trunked Mode Operation (TMO).	
14.	The static Radio Unit shall support telephone interconnect operation.	
15.	Each unit shall be provided with a fist microphone and a loudspeaker.	
16.	Each unit shall have an LCD display console.	
17.	Static radio unit shall have minimum 8dBi ground plane base antenna.	
18.	230V AC/ DC power supply unit	
19.	The radio must comply with ETSI EN 300 392-7 Security Class – 3 Or Advanced Encryption Standard (AES) for Air Interface encryption.	

f) Smartphone Based Terminals

Sr. No.	Feature	Compliance (Yes/No)
1.	The system shall offer possibilities to add smartphone users to PMR communication services.	
2.	This enables authorized persons e.g. to follow PMR group communication without need to carry a PMR device, or to be in touch with a PMR group outside of PMR coverage.	
3.	The bidder shall specify the functional interoperability between the PMR system and smartphone users, which shall be seamlessly integrated to the PMR system, including group memberships, group calls, individual calls, SDS messaging or AVL tracking for example. It shall be possible to manage smartphone users with the same dispatching management tool as used for PMR users.	
4.	The bidder shall specify the interface between the PMR system and the external network (3G/4G/5G). The security within the PMR network shall never be at risk.	
5.	The offered system shall include all needed SW and HW components to parametrize the smartphones to access the PMR services.	

g) Mobile Data Terminal

Sr. No.	Feature	Compliance (Yes/No)
1.	The terminal shall be dash mountable in Police cars with discrete and strong mount.	
2.	The terminal shall have AVL sub system for vehicle monitoring and telematics.	
3.	The terminal shall have in-built GPS.	
4.	The terminal shall have in-built Wi-Fi.	
5.	The terminal shall be DC powered from vehicle battery and should have internal battery for at least 2 hours operation.	
6.	The terminal shall have at least 4" X 5" capacitive touch screen.	
7.	The terminal shall have RFID card reader.	
8.	The terminal should support over the air update.	
9.	The terminal shall have at least 1 USB port.	
10.	The terminal shall support text messages and status messages.	

4.13. Technical Stage Documents

Bidder will have to submit below listed documents in the bid.

Sr. No.	Particulars	Documents to be submitted	Details provided (Yes/No)
1.	Concept, Design and Solution – Bidder shall provide a narrative and graphical description in sufficient detail to clearly define the proposed concept(s)	Concept, Design and Solution diagram	
2.	Products to be used, their availability and their specifications	Products specifications/ Product Brochures	
3.	Technical compliance with reference (to submit Brochures /specifications)	Line by Line Technical compliance	
4.	Factory acceptance plan and test reports.	Plan and test reports	
5.	All Hardware requirements, system software and application software	Bill of Quantity	
6.	Sample Project Management Plan, including reasonable target dates, major tasks and steps	Project Management Plan	
7.	RF Design to provide the required coverage and frequency plan	RF Design	

8.	IOP certificates from third party as a proof of availability of full functionality	IOP certificates	
9.	Compliance certificate for support with the selected system of same technology (may be procured from different OEM) for Phase – 2 in future for purpose of integration with proposed Network.	Compliance certificate	
10.	Bidder's Self-Assessment Matrix for Technical scoring (As mentioned in RFP)	Self-Assessment Matrix	

4.14. Training Requirement

1. The Bidder shall provide employee training for all Call Takers and Administrative Staff. Training shall be detailed in the proposal. Details shall include a full training curriculum and the level of proficiency expected for each training module or class. Bidder is expected to provide following:
2. **Operational training** of Hand held devices to all users & refresher training once in year for project duration. Also set of police staff say 300 to 500, are to be trained as trainers who would, in turn, impart Operational training of Hand held devices to their colleagues as & when required.
3. **Detailed & intense technical training** for Operations & Maintenance of Core Components like Command & Control Centre servers, central switch, Base Stations, dispatch applications, NMS etc. for 100 persons per CP/SP up to 500.

5. Project and Operation & Maintenance Teams

5.1. Project Management Office (PMO)

1. A Project Management office will be set up during the start of the project. The PMO will, at the minimum, include a designated full time Project Manager from SI. It will also include key persons from other relevant stakeholders including members of Gujarat Police and other officials / representatives by invitation. The operational aspects of the PMO need to be handled by the SI including maintaining weekly statuses, minutes of the meetings, weekly / monthly project plans, etc.
2. PMO will meet formally on a weekly basis covering, at a minimum, the following agenda items:
   a) Project Progress
   b) Delays, if any – Reasons thereof and ways to make-up lost time
   c) Issues and concerns
   d) Performance and SLA compliance reports
   e) Unresolved and escalated issues
   f) Project risks and their proposed mitigation plan
   g) Discussion on submitted deliverable
   h) Timelines and anticipated delay in deliverable if any
   i) Any other issues that either party wishes to add to the agenda
   j) ITC infrastructure procurement and deployment status
3. The SI shall recommend PMO structure for the project implementation phase and operations and maintenance phase. The SI shall also circulate written progress reports at agreed intervals to Gujarat Police and other stakeholders. Project status report shall include Progress against the Project Management Plan, status of all risks and issues, exceptions and issues along with recommended resolution etc.
4. Other than the planned meetings, in exceptional cases, project status meeting may be called with prior notice to the SI. Gujarat Police reserves the right to ask the SI for the project review reports other than the standard weekly review reports.

5.2. Steering Committee

1. The Steering Committee will consist of senior stakeholders from Gujarat Police, its nominated agencies and SI. SI will nominate Project Director to be a part of the Project Steering Committee.
2. The SI shall participate in monthly Steering Committee meetings and update Steering Committee on Project progress, Risk parameters (if any), Resource deployment and plan, immediate tasks, and any obstacles in project. The Steering committee meeting will be a forum for seeking and getting approval for project decisions on major changes etc.
3. All relevant records of proceedings of Steering Committee should be maintained, updated, tracked and shared with the Steering Committee and Project Management Office by SI.

4. During the development and implementation phase of the project, it is expected that there will be at least fortnightly Steering Committee meetings. During the O&M phase, the meetings will be held at least once a quarter.
5. Other than the planned meetings, in exceptional cases, Gujarat Police may call for a Steering Committee meeting with prior notice to the SI.

5.3. Technical Committee to Carry Out PAT and FAT

1. Gujarat Police will form a committee of their technical team members under the leadership of ADGP (Technical Services) to carry out Partial Acceptance Test (PAT) and Final Acceptance Test (FAT). . This committee will evaluate the performance of network and its components along with offered functionalities.

5.4. Project Team

1. The table below provides the minimum qualification of a Project team for entire Project implementation phase. The below team should be placed onsite for entire Project implementation phase. Bidder shall not engage any Project team members / labors having criminal records, unsound mind and poor health. Bidder shall have to provide detailed profiles of all team members as per the format given in Section – 12.5 of Vol – 1 of this RFP.

Sr. No.	Designation	Desired Qualification	Team Size
1	Project Manager	• BE /B. Tech with M.Tech/MBA • Minimum 10 Years of Experience in large scale ICT infrastructure projects. • Relevant Exp.: Minimum 3 Years of experience as a project manager of large scale DTRS Projects. • Preference would be given to experts having PMP / Prince2 certification.	1
2	RF Network Design Expert / Solution Architect	• BE /B. Tech • Minimum 7 Years of Experience in large scale Radio Frequency Wireless projects. • Relevant Exp.: Minimum 3 Years of experience in designing and implementing Radio Frequency Wireless DTRS Networks.	1
3	Site Manager	• BE / B.Tech • Minimum 5 Years of Experience in RF Wireless projects.	1 per Commissionerate area
4	BSS Engineer	• BE / B.Tech • Minimum 3 Years of Experience in installation and commissioning of RF components in big scale projects. • Bidder will have to select 1 of them as a manager and mention the name of the resource in the bid.	1 per Commissionerate area
5	Network Engineer	• BE / B.Tech • Minimum 3 Years of Experience in WAN / LAN projects, installation and commissioning of router and switches.	1 per Commissionerate area

Sr. No.	Designation	Desired Qualification	Team Size
		• Preference would be given to experts having CCNA certification. • Bidder will have to select 1 of them as a manager and mention the name of the resource in the bid.	
6	Electrical engineers	• BE / B.Tech • Minimum 3 Years of Experience in installation and commissioning of electrical utilities. • Bidder will have to select 1 of them as a manager and mention the name of the resource in the bid.	1 per Commissionerate area
7	Civil engineers	• BE / B.Tech • Minimum 3 Years of Experience in construction of Telecom towers and shelters. • Bidder will have to select 1 of them as a manager and mention the name of the resource in the bid.	1 per Commissionerate area

5.5. Operation and Maintenance Team

1. SI will have to provide below mentioned minimum manpower during entire Operation and Maintenance period. SI will be free to deploy more manpower to adhere to the SLAs mentioned in Vol – 1 of this RFP. Bidder shall not engage any O&M team members / labors having criminal records, unsound mind and poor health.

Sr. No.	Designation	Desired Qualification	Team Size
1	O&M Manager	• BE /B. Tech with M.Tech/MBA • Minimum 10 Years of Experience in large scale ICT infrastructure projects. • Relevant Exp.: Minimum 3 Years of experience as an O&M manager of large scale DTRS Projects.	1
2	Site Maintenance Manager	• BE / B.Tech • Minimum 5 Years of Experience in RF Wireless projects.	1 per Commissionerate area
3	BSS Engineer	• BE / B.Tech • Minimum 3 Years of Experience in installation and commissioning of RF components in big scale projects.	1 per Commissionerate area
4	Network Engineer	• BE / B.Tech • Minimum 3 Years of Experience in WAN / LAN projects, installation and commissioning of router and switches. • Preference would be given to experts having CCNA certification.	1 per Commissionerate area
5	Electrical engineers	• BE / B.Tech • Minimum 3 Years of Experience in installation and commissioning of electrical utilities.	1 per Commissionerate area

6. Annexure I – List of Police Stations and other buildings

6.1. Locations of Ahmedabad City

Sr. No.	Name of the Locations	PIN CODE	Latitude	Longitude	Present Mobile Radio Model	Type of Aerial Mast (Lattice/ Monopole)	Present Height of the Antenna above Ground Level (Mtr)	Present Height of the Antenna above Top of the Building (Mtr)
1	SHAHIBAG POLICE CONTROL ROOM	380004	23.0580N	72.5930E	VHF MOTO. GM -338 UHF-KENWOOD 980		15	4
2	ELLISEBRIDGE POLICE STATION	380006	23.0220N	72.5753E	MOTO. GM -300		10	4
3	GOMTIPUR POLICE STATION	380021	23.0181N	72.6121E	MOTO. GM -300		15	4
4	RAKHIYAL POLICE STATION	380023	23.0200N	72.6299E	MOTO. GM -300		10	4
5	KAGDAPITH POLICE STATION	380022	23.0338N	72.5850E	MOTO. GM -300		10	4
6	RAMOL POLICE STATION	382449	23.0023N	72.6490E	MOTO. GM -300	MONOPOLE	10	4
7	SATELLITE POLICE STATION	380015	23.0332N	72.5168E	MOTO. GM -300		10	4
8	NIKOL POLICE STATION	382350	23.0446N	72.0668E	MOTO. GM -300		7	4
9	SABARMATI POLICE STATION	380005	23.0833N	72.6667E	MOTO. GM -300	MONOPOLE	10	4

Sr. No.	Name of the Locations	PIN CODE	Latitude	Longitude	Present Mobile Radio Model	Type of Aerial Mast (Lattice/ Monopole)	Present Height of the Antenna above Ground Level (Mtr)	Present Height of the Antenna above Top of the Building (Mtr)
10	KHADIYA POLICE STATION	380001	23.0219N	72.5944E	MOTO. GM -300		10	4
11	BAPUNAGAR POLICE STATION	380024	23.0404N	72.6283E	MOTO. GM -300		7	4
12	ANANDNAGAR POLICE STATION	380007	23.0333N	72.5168E	MOTO. GM -300		12	2
13	ISANPUR POLICE STATION	382443	22.9766N	72.5972E	MOTO. GM -300		11	4
14	ODHAV POLICE STATION	382445	23.0322N	72.6753E	MOTO. GM -300		11	4
15	CHANDKHEDA POLICE STATION	382424	23.1115N	72.5726E	MOTO. GM -300		7	4
16	DANILIMDA POLICE STATION	380028	22.9960N	72.5825E	MOTO. GM -300		11	4
17	PALDI POLICE STATION	380007	23.0396N	72.5660E	MOTO. GM -300		7	4
18	VATVA POLICE STATION	382440	22.9471N	72.6210E	MOTO. GM -300		11	8
19	RANIP POLICE STATION	382480	23.0775N	72.5767E	MOTO. GM -300		11	4
20	VEJALPUR POLICE STATION	380051	22.6800N	73.5700E	MOTO. GM -300		8	4
21	DARIYAPUR POLICE STATION	380001	23.0436N	72.5826E	MOTO. GM -300		8	4

Sr. No.	Name of the Locations	PIN CODE	Latitude	Longitude	Present Mobile Radio Model	Type of Aerial Mast (Lattice/ Monopole)	Present Height of the Antenna above Ground Level (Mtr)	Present Height of the Antenna above Top of the Building (Mtr)
22	GUJRAT UNIVERSITY POLICE STATION	380009	23.0363N	72.5465E	MOTO. GM -300		11	4
23	MEGHANINAGAR POLICE STATION	380016	22.2587N	71.1924E	MOTO. GM -300	MONOPOLE	7.5	0.5
24	GAYAKWAD HAVELI POLICE STATION	380001	23.0396N	72.0566E	MOTO. GM -300		8	4
25	KARANJ POLICE STATION	380001	21.3373N	72.7474E	MOTO. GM -300		11	4
26	VATVA G.I.D.C POLICE STATION	382440	22.4420N	72.6210E	MOTO. GM -300	MONOPOLE	11	7
27	KRUSHNANAGAR POLICE STATION	382345	23.0641N	72.0641E	MOTO. GM -300		8	4
28	SAHPUR POLICE STATION	380004	23.0362N	72.5813E	MOTO. GM -300		8	4
29	NARODA POLICE STATION	382345	23.0641N	72.6422E	MOTO. GM -300	MONOPOLE	12	4
30	NAVRAGPURA POLICE STATION	380009	23.0374N	72.5663E	MOTO. GM -300		12	4
31	VASTRAPUR POLICE STATION	380015	23.0360N	72.5294E	MOTO. GM -300	MONOPOLE	12	4
32	GATLODIYA POLICE STATION	380061	23.0690N	72.5393E	MOTO. GM -300		8	4
33	SOLA POLICE STATION	380063	23.6110N	72.5350E	MOTO. GM -300	MONOPOLE	12	4

Sr. No.	Name of the Locations	PIN CODE	Latitude	Longitude	Present Mobile Radio Model	Type of Aerial Mast (Lattice/ Monopole)	Present Height of the Antenna above Ground Level (Mtr)	Present Height of the Antenna above Top of the Building (Mtr)
34	NARANPURA POLICE STATION	380013	23.0575N	72.5530E	MOTO. GM -300		12	4
35	MADHUPURA POLICE STATION	380004	23.0575N	72.5809E	MOTO. GM -300		9	1
36	KALUPUR POLICE STATION	380001	23.0292N	72.0600E	MOTO. GM -300		12	4
37	SHAHIBAUG POLICE STATION	380004	23.0580N	72.5930E	MOTO. GM -300		12	4
38	SARDARNAGAR POLICE STATION	382475	23.0853N	72.6170E	MOTO. GM -300		8	4
39	AMARAIWADI POLICE STATION	380006	23.0063N	72.6225E	MOTO. GM -300		14	4
40	KHOKHRA POLICE STATION	380008	22.9003N	72.6165E	MOTO. GM -300		14	4
41	MAHILA POLICE STATION WEST	380009	23.0374N	72.5663E	MOTO. GM -300		10	2
42	RIVER FORNT WEST POLICE STATION	380007	23.0396N	72.5660E	MOTO. GM -300		8	4
43	SARKHEJ POLICE STATION	382210	22.9833N	72.5000E	MOTO. GM -300	Lattice	20	0.5
44	SHERKOTDA POLICE STATION	380001	23.0296N	72.6121E	MOTO. GM -300		10	3
45	MANINAGAR POLICE STATION	380008	22.9995N	72.6030E	MOTO. GM -300		12	4

Sr. No.	Name of the Locations	PIN CODE	Latitude	Longitude	Present Mobile Radio Model	Type of Aerial Mast (Lattice/ Monopole)	Present Height of the Antenna above Ground Level (Mtr)	Present Height of the Antenna above Top of the Building (Mtr)
46	VADAJ POLICE STATION	380013	23.0575N	72.5530E	MOTO. GM -300		12	4
47	A TRAFFIC POLICE STATION	380063	23.6110N	72.5350E	MOTO. GM -300		12	4
48	B TRAFFIC POLICE STATION	380009	23.0575N	72.5530E	MOTO. GM -300		10	4
49	C TRAFFIC POLICE STATION	380001	23.0292N	72.0600E	MOTO. GM -300		8	1
50	D TRAFFIC POLICE STATION	380001	23.0292N	72.0600E	MOTO. GM -300		8	4
51	E TRAFFIC POLICE STATION	380001	21.3373N	72.7474E	MOTO. GM -300		4	0
52	F TRAFFIC POLICE STATION	380004	23.0580N	72.5930E	MOTO. GM -300		12	4
53	G TRAFFIC POLICE STATION	382345	23.0641N	72.6422E	MOTO. GM -300		8	4
54	H TRAFFIC POLICE STATION	380024	23.0404N	72.6283E	MOTO. GM -300		8	4
55	I TRAFFIC POLICE STATION	382443	22.9766N	72.5972E	MOTO. GM -300		11	4
56	J TRAFFIC POLICE STATION	382449	23.0023N	72.6490E	MOTO. GM -300		8	4
57	K TRAFFIC POLICE STATION	380028	22.9960N	72.5825E	MOTO. GM -300		11	4

Sr. No.	Name of the Locations	PIN CODE	Latitude	Longitude	Present Mobile Radio Model	Type of Aerial Mast (Lattice/ Monopole)	Present Height of the Antenna above Ground Level (Mtr)	Present Height of the Antenna above Top of the Building (Mtr)
58	L TRAFFIC POLICE STATION	380027	23.0580N	72.5930E	MOTO. GM -300		4	0
59	M TRAFFIC POLICE STATION	380007	23.0396N	72.5660E	MOTO. GM -300		4	0
60	N TRAFFIC POLICE STATION	380015	23.0332N	72.5168E	MOTO. GM -300		10	4
61	RIVER FORNT EAST POLICE STATION	380004	23.0575N	72.5809E	MOTO. GM -300		5	1
62	MAHILA POLICE STATION EAST	380004	23.0580N	72.5930E	MOTO. GM -300		12	4
63	VASANA POLICE STATION	382460	22.6800N	73.5700E	MOTO. GM -300		5	1
64	JUHAPURA CHOWKY	380055	22.6800N	73.5700E	MOTO. GM -300		6	2
65	VEJALPUR CHOWKY	380051	22.6800N	73.5700E	MOTO. GM -300		6	2
66	SONAL PARK CHOWKY	380055	22.6800N	73.5700E	MOTO. GM -300		7	1
67	JIVRAJ CHOWKY	380055	22.6800N	73.5700E	MOTO. GM -300		6	1.5
68	TULSI PARK CHOWKY	380021	23.0181N	72.6121E	MOTO. GM -300		5	1
69	BOMBE HOUSING CHOWKY	380021	23.0181N	72.6121E	MOTO. GM -300		5	1

Sr. No.	Name of the Locations	PIN CODE	Latitude	Longitude	Present Mobile Radio Model	Type of Aerial Mast (Lattice/ Monopole)	Present Height of the Antenna above Ground Level (Mtr)	Present Height of the Antenna above Top of the Building (Mtr)
70	RAJPUR CHOWKY	380021	23.0181N	72.6121E	MOTO. GM -300		6	1
71	SILVAR CHOWKY	380021	23.0181N	72.6121E	MOTO. GM -300		6	1
72	GARDERN CHOWKY	380021	23.0181N	72.6121E	MOTO. GM -300		5	1
73	KAMDAR CHOWKY	380021	23.0181N	72.6121E	MOTO. GM -300		5	1
74	JAMALPUR CHOWKY	380001	23.0396N	72.0566E	MOTO. GM -300		7	2
75	PANCH PIPLY CHOWKY	380001	23.0396N	72.0566E	MOTO. GM -300		7	2
76	KHMASHA CHOWKY	380001	23.0396N	72.0566E	MOTO. GM -300		6	1
77	VASANT RAJAB CHOWKY	380001	23.0396N	72.0566E	MOTO. GM -300		6	1
78	ASTODIYA CHOWKY	380043	23.0219N	72.5944E	MOTO. GM -300		5	1
79	SARANGPUR CHOWKY	380001	23.0219N	72.5944E	MOTO. GM -300		5	1
80	RAIPUR CHOWKY	380001	23.0219N	72.5944E	MOTO. GM -300		6	1
81	MANEK CHOWK CHOWKY	380001	23.0219N	72.5944E	MOTO. GM -300		5	1

Sr. No.	Name of the Locations	PIN CODE	Latitude	Longitude	Present Mobile Radio Model	Type of Aerial Mast (Lattice/ Monopole)	Present Height of the Antenna above Ground Level (Mtr)	Present Height of the Antenna above Top of the Building (Mtr)
82	DARIYAPUR TAMBU CHOWKY	380001	23.0436N	72.5826E	MOTO. GM -300		6	1
83	DABAGARWAD CHOWKY	380001	23.0436N	72.5826E	MOTO. GM -300		6	1
84	DARIYAPUR CHAKLA CHOWKY	380001	23.0436N	72.5826E	MOTO. GM -300		7	1
85	JAVERIWAD CHOWKY	380001	23.0292N	72.0600E	MOTO. GM -300		6	1
86	DHIKWA CHOWKY	380001	23.0292N	72.0600E	MOTO. GM -300		5	1
87	PANCH KUVA CHOWKY	380001	23.0292N	72.0600E	MOTO. GM -300		7	1
88	KALUPUR BHAR CHOWKY	380001	23.0292N	72.0600E	MOTO. GM -300		6	1
89	KHANPUR CHOWKY	380004	23.0362N	72.5813E	MOTO. GM -300		6	1
90	RANGILA CHOWKY	380004	23.0362N	72.5813E	MOTO. GM -300		5	1
91	DEHLI CHAKLA CHOWKY	380004	23.0362N	72.5813E	MOTO. GM -300		5	1
92	NAGORIWAD CHOWKY	380004	23.0362N	72.5813E	MOTO. GM -300		5	1
93	DUDHESHWAR CHOWKY	380004	23.0575N	72.5809E	MOTO. GM -300		5	1

Sr. No.	Name of the Locations	PIN CODE	Latitude	Longitude	Present Mobile Radio Model	Type of Aerial Mast (Lattice/ Monopole)	Present Height of the Antenna above Ground Level (Mtr)	Present Height of the Antenna above Top of the Building (Mtr)
94	PREM DARWAJA CHOWKY	380001	23.0575N	72.5809E	MOTO. GM -300		5	1
95	IDGAHA CHOWKY	380016	23.0575N	72.5809E	MOTO. GM -300		6	1
96	SAHPUR DARWAJA BHAR CHOWKY	380004	23.0575N	72.5809E	MOTO. GM -300		5	1
97	SADBHAVANA CHOWKY	382440	22.9471N	72.6210E	MOTO. GM -300		5	1
98	SASTRI BRIDGE CHOWKY	382440	22.9471N	72.6210E	MOTO. GM -300		6	1
99	GEEKANTA CHOWKY	380001	21.3373N	72.7474E	MOTO. GM -300		5	1
100	RUPALI CHOWKY	380001	21.3373N	72.7474E	MOTO. GM -300		4	1
101	PATHHAR KUVA CHOWKY	380001	21.3373N	72.7474E	MOTO. GM -300		4	1
102	SAHA ALAM CHOWKY	380028	22.9995N	72.6030E	MOTO. GM -300		5	1
103	NAROL CHOWKY	382405	22.9960N	72.5825E	MOTO. GM -300		5	1
104	CP CHAMBER	380004	23.0580N	72.5930E	UHF- KENWOOD VHF- MOTO 338		11	1

Sr. No.	Name of the Locations	PIN CODE	Latitude	Longitude	Present Mobile Radio Model	Type of Aerial Mast (Lattice/ Monopole)	Present Height of the Antenna above Ground Level (Mtr)	Present Height of the Antenna above Top of the Building (Mtr)
105	SECTOR-1 CHAMBER	380004	23.0580N	72.5930E	UHF-KENWOOD		11	1
106	DCP ZONE-5 OFFICE	380006	23.0063N	72.6225E	UHF-KENWOOD		11	1
107	SOG Office	382210	22.9833N	72.5000E	MOTO. GM -300		11	1
108	HQ OFFICE	380004	23.0580N	72.5930E	MOTO. GM -300		4	1
109	MT OFFICE	380004	23.0580N	72.5930E	MOTO. GM -300		4	1
110	METRO COURT	380004	23.0362N	72.5813E	KENWOOD 7100		15	1
111	MIRZAPUR SESSION COURT	380004	23.0362N	72.5813E	KENWOOD 7100		15	1
112	SESSION COURT NAVARANGPURA	380009	23.0374N	72.5663E	KENWOOD 7100		8	1
113	CRIME OFFICE	380001	23.0396N	72.0566E	MOTO. GM -300		6	1
114	DCP CONTROL ROOM	380004	23.0580N	72.5930E	UHF-KENWOOD 980		11	1
115	TRAFFIC OFFICE	380009	23.0374N	72.5663E	MOTO. GM -300		11	1
116	LG CHOWKY	380008	22.9995N	72.6046E	MOTO. GM -300		5	1

Sr. No.	Name of the Locations	PIN CODE	Latitude	Longitude	Present Mobile Radio Model	Type of Aerial Mast (Lattice/ Monopole)	Present Height of the Antenna above Ground Level (Mtr)	Present Height of the Antenna above Top of the Building (Mtr)
117	VADILAL CHOWKY	380006	23.0216N	72.5711E	MOTO. GM -300		11	2
118	CIVIL CHOWKY	380004	23.0497N	72.6031E	MOTO. GM -300		5	3
119	SHOLA CIVIL CHOWKY	380063	23.0834N	72.5262E	MOTO. GM -300		5	4

6.2. Locations of Gandhinagar District

Sr. No.	Name of the Locations	PIN CODE	Latitude	Longitude	Present Mobile Radio Model	Type of Aerial Mast (Lattice/ Monopole)	Present Height of the Antenna above Ground Level (Mtr)	Present Height of the Antenna above Top of the Building (Mtr)
1	Control Room	382028	23.251	72.649	Moto GM-338 Moto GM-950i	monopole	21	
2	Adalaj Pstn	382421	23.1637	72.5819	Moto GM-338 Moto GM-300	monopole	19	
3	Chiloda Pstn	382355	23.22784	72.73017	Icom ICF 5023	monopole	19	
4	Dabhoda Pstn	382355	23.17731	72.74724	Icom ICF 5023	monopole	19	

Sr. No.	Name of the Locations	PIN CODE	Latitude	Longitude	Present Mobile Radio Model	Type of Aerial Mast (Lattice/ Monopole)	Present Height of the Antenna above Ground Level (Mtr)	Present Height of the Antenna above Top of the Building (Mtr)
5	Dahegam Pstn	382305	23.22483	73.2092	Icom ICF 5023 Moto GM 950i	monopole	19	
6	Infocity Pstn	382009	23.22145	72.63961	ICF 5023 Moto GM300	monopole	19	
7	Kalol City Pstn	382721	23.23577	752.4961	ICF 5023	monopole	19	
8	kalol Taluka Pstn	382721	23.23517	72.49714	ICF 5023	monopole	19	
9	Mahila Po stn	382330	23.21259	72.63884	Moto GM 300	monopole	19	
10	Mansa Pstn	382845	23.42882	72.65279	ICF 5023 Moto GM 950i	monopole	19	
11	Pethapur Pstn	382610	23.2604	72.66903	ICF 5023	monopole	19	
12	Rakhiyal Pstn	382315	23.25095	72.90191	Moto GM 950i	monopole	19	
13	Satej Pstn	382721	23.1076	72.47297	ICF 5023 Moto GM300	monopole	19	
14	Sector- 7Pstn	382007	23.21331	72.63676	ICF 5023	monopole	19	
15	Sector- 21Pstn	382021	23.2275	72.66322	Motorola GM 950i	monopole	19	
16	Bahiyal OP	382308	23.07283	72.88547	Motorola GM 950i	GPA	10	

Sr. No.	Name of the Locations	PIN CODE	Latitude	Longitude	Present Mobile Radio Model	Type of Aerial Mast (Lattice/ Monopole)	Present Height of the Antenna above Ground Level (Mtr)	Present Height of the Antenna above Top of the Building (Mtr)
17	Balava OP	382721	23.35275	72.64423	IC 2100H	GPA	10	
18	Chhala OP	382321	23.3347	72.77415	IC 2100H	GPA	12	
19	Mahudi OP	382855	23.49184	72.78285	IC 2100H	GPA	15	
20	Moti Adaraj OP	382721	23.25878	72.59748	IC 2100H	GPA	10	
21	Moti Bhoyan OP	382721	23.2644	23.26439		GPA	12	
22	Nardipur OP	382735	23.31578	72.56718	IC 2100H	GPA	10	
23	Unava OP	382650	23.3329	72.65943	IC 2100H	GPA	10	
24	Uvarsad OP	382422	23.22378	72.61456	IC 2100H	GPA	12	
25	Valad OP	382355	23.15864	72.68311		GPA	10	
26	Varsoda OP	382835	23.42833	72.73588	IC 2100H	GPA	15	
27	Rly. OP GNR	382011	23.0983	72.58201	IC 2100H	GPA	10	
28	Kalol Rly OP	382721	23.23662	72.48318	IC 2100H	GPA	12	

Sr. No.	Name of the Locations	PIN CODE	Latitude	Longitude	Present Mobile Radio Model	Type of Aerial Mast (Lattice/ Monopole)	Present Height of the Antenna above Ground Level (Mtr)	Present Height of the Antenna above Top of the Building (Mtr)
29	Dabhoda Rly. OP	382355	23.21564	72.63694	IC 2100H	GPA	10	
30	Gandhi - Kalol P.choki	382721	23.13319	72.58221	Motorola GM 950i	GPA	12	
31	Koba P.choki	382007	23.13317	72.63259	Motorola GM 950i	GPA	15	
32	LCB - 28P.choki	382028	23.24902	72.64821	IC 2100H	GPA	10	
33	Mansa Tower P.choki	382845	23.2633	72.64198	IC 2100H	GPA	15	
34	Sector -8 P.choki	382007	23.201555	72.64721	IC 2100H	GPA	10	
35	Sector -12 P.choki	382011	23.22286	72.63934	IC 2100H	GPA	10	
36	Sector -17P.choki	382016	23.22858	72.65207	IC 2100H	GPA	10	
37	Sector -21 P.choki	382021	23.22704	72.66267	IC 2100H	GPA	10	
38	Sector-24 P.choki	382074	23.24333	72.64279	IC 2100H	GPA	10	
39	SDPO Sec - 7	382007	23.21564	72.72694	Motorola GM 950i	GPA	10	
40	Dysp Div Sec-9 Office	382007	23.20947	72.65813	Motorola GM-338	GPA	10	

Sr. No.	Name of the Locations	PIN CODE	Latitude	Longitude	Present Mobile Radio Model	Type of Aerial Mast (Lattice/ Monopole)	Present Height of the Antenna above Ground Level (Mtr)	Present Height of the Antenna above Top of the Building (Mtr)
41	Commando Office	382028			Motorola GM 950I	GPA	10	
42	Traffic Office sec-22	382021	23.23741	72.6557		GPA	10	
43	C.I.D. IB Sec-30	382030	23.24948	72.67129	Motorola GM 300	GPA	10	
44	Rajbhavan	382001	23.22355	72.64461	Motorola GM 300	GPA	10	
45	CM House	382001			Motorola GM 950i Motorola GM-338	GPA	10	
46	Home Control	382010	23.21688	72.65542		GPA	10	
47	Salamati Shakha	382021	23.21927	72.64616	Motorola GM-300	GPA	10	
48	Mantri in Gate	382001	23.21728	72.67214	Motorola GM-300	GPA	10	
49	15 Vrindavan Raysan	382007	23.16714	72.64254	Motorola GM 950i	GPA	10	

7. Annexure II – List of Police Stations and Government Buildings / Places with adequate space

7.1. Police Stations

Sr. No.	Geography Area	Police Station Name	Latitude	Longitude	
1.	Ahmedabad City	GOMTIPUR POLICE STATION	23.0181N	72.6121E	
2.	Ahmedabad City	RAKHIYAL POLICE STATION	23.0200N	72.6299E	
3.	Ahmedabad City	SATELLITE POLICE STATION	23.0332N	72.5168E	
4.	Ahmedabad City	SABARMATI POLICE STATION	23.0833N	72.6667E	
5.	Ahmedabad City	BAPUNAGAR POLICE STATION	23.0404N	72.6283E	
6.	Ahmedabad City	ISANPUR POLICE STATION	22.9766N	72.5972E	
7.	Ahmedabad City	ODHAV POLICE STATION	23.0322N	72.6753E	
8.	Ahmedabad City	VATVA POLICE STATION	22.9471N	72.6210E	
9.	Ahmedabad City	DARIYAPUR POLICE STATION	23.0436N	72.5826E	
10.	Ahmedabad City	GAYAKWAD HAVELI POLICE STATION	23.0396N	72.0566E	
11.	Ahmedabad City	KARANJ POLICE STATION	21.3373N	72.7474E	
12.	Ahmedabad City	VATVA G.I.D.C POLICE STATION	22.4420N	72.6210E	
13.	Ahmedabad City	VASTRAPUR POLICE STATION	23.0360N	72.5294E	
14.	Ahmedabad City	GATLODIYA POLICE STATION	23.0690N	72.5393E	
15.	Ahmedabad City	SOLA POLICE STATION	23.6110N	72.5350E	
16.	Ahmedabad City	SHAHIBAUG POLICE STATION	23.0580N	72.5930E	
17.	Ahmedabad City	SARDARNAGAR POLICE STATION	23.0853N	72.6170E	
18.	Ahmedabad City	AMARAIWADI POLICE STATION	23.0063N	72.6225E	
19.	Ahmedabad City	KHOKHRA POLICE STATION	22.9003N	72.6165E	
20.	Ahmedabad City	SARKHEJ POLICE STATION	22.9833N	72.5000E	
21.	Ahmedabad City	SHERKOTDA POLICE STATION	23.0296N	72.6121E	

22.	Ahmedabad City	MANINAGAR POLICE STATION	22.9995N	72.6030E	
23.	Ahmedabad City	VASANA POLICE STATION	22.6800N	73.5700E	
24.	Ahmedabad City	SOG Branch	22.9833N	72.5000E	
25.	Ahmedabad City	Crime Branch	23.0396N	72.0566E	
26.	Gandhinagar	S.P.office gandhinagar	23.251	72.649	
27.	Gandhinagar	sector-21	23.2275	72.4729	
28.	Gandhinagar	sector-7	23.2133	72.4729	
29.	Gandhinagar	Infocity	23.2214	72.6396	
30.	Gandhinagar	Adalaj	23.1637	72.5819	No space for lattice tower
31.	Gandhinagar	Chiloda	23.2278	72.7310	No space for lattice tower
32.	Gandhinagar	Dabhoda	23.1778	72.7472	No space for lattice tower
33.	Gandhinagar	Dahegam	23.2248	73.2092	No space for lattice tower
34.	Gandhinagar	Kalol city	23.2357	72.4916	No space for lattice tower
35.	Gandhinagar	Kalol taluka	23.2351	72.4971	No space for lattice tower
36.	Gandhinagar	Pethapur	23.2604	72.6693	No space for lattice tower
37.	Gandhinagar	Mansa	23.4288	72.6527	No space for lattice tower
38.	Gandhinagar	Rakhiyal	23.2509	72.9019	No space for lattice tower
39.	Gandhinagar	Santej	23.1076	72.4729	No space for lattice tower
40.	Gandhinagar	Mahila p.stn	23.2159	72.6388	No space for lattice tower

7.2. Government Buildings / Places

Sr. No.	Geography Area	Government Facility Name	Height of the Building (In Mtr)	Latitude	Longitude
1.	Ahmedabad City	APNA BAZAR (BAHUMALI BHAVAN), LAL DARWAJA	38	21.3373N	72.7474E
2.	Ahmedabad City	POLICE H.Q.	37	23.0580N	72.5930E
3.	Gandhinagar	GIFT CITY	84 (28 storey bidg.)	23.1586	72.6831
4.	Gandhinagar	Police bhavan	21 (07 storey bidg)	23.2133	72.6589
5.	Gandhinagar	Udhyog bhavan	30 (10 storey bidg)	23.2225	72.6467
6.	Gandhinagar	New sachivalay	24 (08 storey bidg)	23.2202	72.6584

8. Annexure III – List of Critical Buildings and Important Places

Sr. No.	Area	List of Critical Buildings and Important Places From Indoor Coverage Perspective	Latitude	Longitude
1.	Ahmedabad City	CP OFFICE	23.0580N	72.5930E
2.	Ahmedabad City	POLICE HEAD QUARTER	23.0580N	72.5930E
3.	Ahmedabad City	CIVIL HOSPITAL	23.0497N	72.6031E
4.	Ahmedabad City	SOLA CIVIL HOSPITAL	23.0834N	72.5262E
5.	Ahmedabad City	GSC HOSPITAL	23.0296N	72.6121E
6.	Ahmedabad City	ALPHA ONE MALL	23.0360N	72.5294E
7.	Gandhinagar	Mahatma Mandir	23.2717	72.6335
8.	Gandhinagar	New sachivalay	23.2202	72.6584
9.	Gandhinagar	Rajbhavan	23.2236	72.6746
10.	Gandhinagar	Akshardham	23.2330	72.6747

9. Annexure IV - Locations Where Public Gathering Events Happen

Sr. No.	Geography Area	Location Name	Latitude	Longitude	Remarks
1.	Ahmedabad City	RIVERFRONT EVENT CENTRE	23.01383N	72.573427E	
2.	Ahmedabad City	RIVERFRONT PARK	23.06233N	72.58529E	
3.	Ahmedabad City	KANKARIA	23.0063N	72.6026E	
4.	Ahmedabad City	MOTERA STADIUM ROAD	23.0917N	72.5975E	
5.	Ahmedabad City	AIRPORT	23.0734N	72.6266E	
6.	Ahmedabad City	G.M.D.C.	23.0396N	72.566E	
7.	Ahmedabad City	SARDAR PATEL STADIUM	23.0919N	72.5975E	
8.	Ahmedabad City	GUJ. UNI. GROUND	23.0396N	72.5404E	
9.	Ahmedabad City	A.E.C. GROUND	23.0450N	72.5224E	
10.	Ahmedabad City	JAGANNATH TEMPLE	23.0396N	72.0566E	
11.	Ahmedabad City	ISKON TEMPLE	23.0271N	72.508E	
12.	Ahmedabad City	VAISHNO DEVI TEMPLE	23.396N	72.566E	
13.	Ahmedabad City	GAYAKWAD HAVELI P"STN AREA	23.0396N	72.0566E	RATHYATRA ROUTE
14.	Ahmedabad City	KALUPUR P"STN AREA	23.0292N	72.0600E	RATHYATRA ROUTE
15.	Ahmedabad City	KARANJ P"STN AREA	21.3373N	72.7474E	RATHYATRA ROUTE
16.	Ahmedabad City	KHADIA P"STN AREA	23.0219N	72.5944E	RATHYATRA ROUTE
17.	Ahmedabad City	SHAHPUR P"STN AREA	23.0362N	72.5813E	RATHYATRA ROUTE
18.	Ahmedabad City	DARIYAPUR P"STN AREA	23.0436N	72.5826E	RATHYATRA ROUTE
19.	Ahmedabad City	MADHUPURA P"STN AREA	23.0575N	72.5809E	RATHYATRA ROUTE
20.	Ahmedabad City	SHAHER KOTDA P"STN AREA	23.0296N	72.6121E	RATHYATRA ROUTE
21.	Ahmedabad City	SCIENCE CITY	23.0651N	72.5115E	
22.	Ahmedabad City	GUJ HIGH COURT	23.0802N	72.5247E	
23.	Ahmedabad City	METRO COURT	23.0362N	72.5813E	
24.	Ahmedabad City	SABARMATI AASHRAM	23.0608N	72.5809E	
25.	Ahmedabad City	TOWN HALL	23.022699N	72.570764E	

26.	Ahmedabad City	TAGOR HALL	23.012737N	72.571135E	
27.	Ahmedabad City	THAKOR BHAI DESAI HALL,H.K	23.024399N	72.560023E	
28.	Ahmedabad City	PANDIT DINDYAL HALL,RAJPATH CLUB NEAR	23.03461N	72.502748E	
29.	Ahmedabad City	BHAI KAKA HALL	23.024078N	72.560034E	
30.	Ahmedabad City	Y.M.C.A CLUB	23.004816N	72.501432E	
31.	Ahmedabad City	KARNAVATI CLUB	23.024017N	72.505968E	
32.	Ahmedabad City	RAJPATH CLUB	23.034282N	72.508993E	
33.	Ahmedabad City	KALUPUR RAILWAY STATION	23.028558N	72.600291E	
34.	Ahmedabad City	S.T STAND	23.019491N	72.592201E	
35.	Ahmedabad City	TRANS STADIA	23.010959N	72.598847E	

10. Annexure V – Requirement of Talk Groups

Sr. No.	Geography Area	Minimum Number of Talk Groups Required for Day to Day Function of Police Team	Additional Minimum Number of Talk Groups Required for Events
1	Ahmedabad City	10	8
3	Gandhinagar District	6	8

11. Annexure VI - Indicative Hardware Specifications

1. These are indicative hardware / software specifications. Bidders are free to provide hardware and software with higher capabilities for the entire system to fulfill all the requirements mentioned in this RFP. Bidders are required to provide necessary solution to run the system in a seamless manner. The bidder should ensure that all the required infrastructure such as hardware (servers, racks, switching, cabling, etc) as well as the required licensed system software such as operating system, databases should be provided & all the licenses should be with latest version & perpetual in nature & should be in the name of purchaser.

a) Integrated Dispatch Server Specifications:

##	Description
Case Style	RACK (2U)
Cache	12MB (1 x 12MB) Level 3 cache
CPU	Intel® Xeon® Processor E5620 (2.40 GHz, 12MB L3 Cache, 80W, DDR3-1066, HT, Turbo 1/1/2/2) or higher
DVD-ROM	Slim SATA DVD-RW
Chipset	Intel 5520 chipset or higher
Controller	Smart Array P410i/256MB Controller (RAID 0/1/1+0/5)
Expansion Bays	9 (8 SFF hot plug HD bays, 1 Slimline media bay supporting Optional DVD, CD or Floppy drive)
Expansion Slots	3 Total (1 PCIe Gen2 x8; 2 PCIe Gen2 x4); Additional 3 available with optional riser.
Hard Drive	(2) 300GB SAS 10K SFF DP ENT HD
Keyboard	PS/2 Black(Microsoft #ZG6-00006)
Mouse	PS/2 Black Mouse 2-Button
Management	iLO 3
NIC	(2) NC382i Dual Multifunction Gigabit Server Adapters 4 Ports TOTAL
PCI-X Riser option	Mixed PCI -x Riser Cage Kit
Ports	0 Parallel, 1 Serial (9-Pin), 5 USB (2 rear, 2 front, 1 internal), PS/2 Keyboard and Mouse ports
Power Supply	(1) 460W Hot Plug power supply, redundant optional
Power Supply	Redundant 460W power supply kit
Power Cord	Nema 5-15P to IEC320-C13ar
RAM	6 GB (3 x 2 GB) PC3-10600R (DDR3-1333) Registered DIMMs. Note: If only 1 processor is installed, only half the DIMM slots are available. System composed of 3 channels. Not Required but recommended to load channels similarly if possible.
Video	Integrated ATI ES1000 1280 x 1024 (64MB video standard)
Weight/Dimensions	Max 60 lb (27.22 kg); Min 47.18 lb (20.41 kg); 3.38h x 17.25w x 27.25d in (8.59 x 44.54 x 69.98 cm)
Operating System	Windows Server Standard 2012 or higher

b) NMS Server Specs:

##	Description
Case Style	Friction Rail Kit
Cache	10MB (1x10MB) Level 3 cache
CPU	Intel® Xeon® E5-2609 (2.4GHz/4-core/10MB/6.4GT-s QPI/80W) Processor or higher
DVD-ROM	SATA DVD RW JackBlack Optical Drive
Chipset	Intel® C600 Series Chipset
Controller	Smart Array P420i/ZM (RAID 0/1/1+0)
Controller Cache	512MB P-series Smart Array Flash Backed Write Cache
Expansion Bays	9 (8 SFF hot plug HD bays, 1 Slimline media bay supporting Optional DVD)
Expansion Slots	3 slots 1 x16 (x16 speed); 2 x8 (1 x4 speed);
Hard Drive	(3) 300GB SAS 10K SFF DP ENT HD
Keyboard	PS/2 Black(Microsoft #ZG6-00006)
Mouse	PS/2 Black Mouse 2-Button
Management	iLO Management Engine Standard
NIC	Ethernet 1Gb 4-port 331FLR Adapter
NIC	(4) Model 331T, PCIE 2.0 x 4 Low Profile 10MB LAN, 100MB LAN, Gigabit LAN – 10Base-t, 100Base-TX, 100Base-T, Network Adapter
Ports	1 Serial (9-Pin), 7 USB (4 rear, 2 front, 1 internal), NO PS/2 SUPPORT
Power Supply	460W Common Slot Gold Hot Plug Power Supply (92% Efficient)
Power Supply	460W Common Slot Gold Hot Plug Power Supply Kit
Power Cord	(2) Nema 5-15P to IEC320-C13
RAM	16GB (1x4GB) (3x4GB) PC3L-10600R (DDR3-1333) Registered DIMMS
Video	Integrated Matrix G200 video standard
Weight/Dimensions	Max 61 lb; Min 41 lb; 3.44 x 17.54 x 27.50 in (H x W x D)
Operating System	Windows Server Standard 2012 or higher

c) Call Taking & Radio Dispatch Workstation Specifications:

##	Description
Case Style / Units	Convertible tool less Mini-tower 85% Energy Efficient
Chip Set	Intel® C216 chipset or higher
CPU	Intel Core i7-3770 processor, 3.4/3.9 GHz, 77W, 8 MB cache, 1600 MHz memory, Quad-Core, HT, Intel HD Graphics 4000, featuring Intel vPro Technology or higher
Optical Drive	16X DVD+/-RW SATA SuperMulti
Expansion Bays	2 (1 Internal 3.5", 1 External 5.25)
Expansion Slots	4 (1 PCI; 1 PCIe Gen3 [x16]; 1 PCIe Gen2 x4 / x16 connector; 1 PCIe Gen2 x1
Floppy Drive	None
Hard Drive	250GB SATA 7200 rpm 6Gb/s 3.5" HDD
Keyboard	USB Standard Keyboard

##	Description
Mouse	USB optical 2-Button scrolling mouse carbon
NIC	Integrated Intel 82579LM PCIeGbE Controller
Front I/O	4 USB 2.0, 1 headphone and 1 microphone
Rear I/O	1 VGA and 1 Display Port output from Intel HD graphics (available on specific processors only); 4 USB 3.0 ports, 2 USB 2.0 ports, 1 standard and 1 optional serial port, 1 optional parallel port, 2 PS/2, RJ-45 (NIC), 1 Audio Line-in, and 1 Audio Line-out; 2 IEEE 1394b ports(optional).
Power Supply	240 watts wide-ranging, active Power Factor Correction, 90% Efficient
RAM	4 GB (2x2GB) DDR3-1600 nECCUnbuffered DIMMS; Intel® Core i5/i7 processors only support non-ECC memory;
Software	Windows 7 Professional or higher
Software	Localization Kit
Video	NVIDIA NVS 310 512MB Graphics Card
Weight/Dimensions	16.5 lbs typical configuration; HxWxD 3.95 x 13.3 x 15.0 in

d) Server Cabinet Specs:

a) Black Seismic Zone 4 Rated 42U Cabinet
b) Caster Set
c) Front & Rear Doors
d) Solid Top
e) Solid Shelf
f) Power Strip - qty 2
g) M6 Caged Nuts

e) Centralized Digital Recording System:

i. This specification is for an advanced digital Recording solutions for Control room. The equipment supplied must be designed for continuous duty operation (e.g., 24 hours per day, 365 days per year). The Centralized Digital Recording System shall store the call recordings for minimum 30 days & store Call Details Records (CDRs) for a period of 1 year and after that the back-up of the same shall be taken on suitable media.
ii. The recording system shall be built as per following specifications

- Open architecture
- Capable of capturing, storing, retrieving and replaying voice and data including packet data interactions of all types of VHF trunking, telephone calls.
- GSM style compression
- Interfaces- E1, analogue, Ethernet standard PABX
- Support archiving to network storage system
- Browser based search
- Remote management capability

iii. The storage device shall be of IP based Area Network RAID type with minimum capacity to store 10 Terabyte expandable to 50 TB. Redundant hot swap power supply, cooling fan and disk drives. It should have Gigabit Ethernet/ fiber channel ports
iv. In addition to above features, the system shall also support the following features--
v. The System will also record all the transactions on the screen of the control room operators, video and the map data along with the GPS positions of the handsets, vehicles or personnel, which are loaded with location based sensors.
vi. The graphical user interface for search, replay and dubbing must be user friendly and simple to operate. It must include the ability to simultaneously search and replay recorded telephone, VOIP, Screen recording, GPS data on GIS maps, conventional and digital radio channels as well as trunked radio communications using captured data from system without any extraneous process by the operator. All communications regarding a specific incident should be able to be replayed together in the sequence in which the communications occurred.
vii. The CDRS shall provide an Instant Recall application, which must be a client software application solution integrated with the CDRS.
viii. The bidder is required to propose the CDRS with at-least 60 number of recording channels at each of the two control rooms for following requirement, which shall be upgradable as per the overall expansion plan as mentioned in this RFP:

- Channels connected to trunked radio system.
- Channels connected to conventional radio frequencies.
- Channels connected to Dispatcher consoles for radio traffic
- Channels connected to Dispatcher telephone stations
- Channels connected to Call-Taker telephone stations
- Channels connected to Video Wall Screens
- Channels connected to operator screens
- Channels connected to GPS data on GIS maps

ix. The system must allow simple and quick search based on frequently used search parameters. At least three search parameters could be configured by the user to best fit its needs. The system must support searches using annotation data including text annotation, voice annotation and bookmarks as the search criteria. Searches by text annotations must be available by any part of the text content.
x. The system must allow multimedia and multi-source searches from a single application without the need to switch between screens and databases for each media type or source.
xi. The system must be capable of displaying multimedia search results graphically arranged by time of recording to allow a full view of the incident picture.
xii. The system must allow for the user to configure the graphical display by channel, resource, radio-id, and talk-group. The system must be capable of displaying multimedia search results in table format. The system must allow for the user to configure the table display to include any of the available fields in the database and to sort the table by any of its columns.
xiii. The system must allow saving the audio with both spoken date and time.
xiv. The system must provide the ability to print the recordings' associated data in a table format.
xv. The System incident information management application must enable review of audio recordings done by the system without the need to switch to the reconstruction application.

12. Annexure VII – Indicative Pre-Fabricated Shelter Specification

#	Parameters	Minimum Specifications	Bidders Compliance (Yes, No)
1.	Internal dimensions	Length – 4000mm,Width – 3000mm, Height – 3000mm	
2.	Thickness of Inner Wall skin	0.8 mm percolated GI sheet	
3.	Thickness of Outer Wall skin	0.6 mm percolated GI sheet	
4.	Core material between inner wall skin and outer wall skin	a. 80 mm thick Poly Urethane Foam b. Density of 40kg/Cu. m. c. Thermal conductivity: < 0.02 W/m. Degree Kelvin	
5.	Superstructure wind load	160 Kmph	
6.	Integral projected roof	100 mm on all four sides to give rain Protection	
7.	Base Frame Load capacity	3500 kg/Square meter.	
8.	Floor Insulation	55 mm thick PUF	
9.	Floor load capacity	2500 kg/Square meter	
10.	Door	Insulated Metallic door 920 mm X 2140 mm fitted with EPDM rubber gasket	
11.	Door Locks Standard	Single point Mortise lock	
12.	Door Hinges	Stainless steel pickproof Hinges (3 Nos.)	
13.	Cable tray	a. 250 mm wide powder coated aluminum perforated cable tray b. Thickness 2 mm	
14.		Shelter shall be self-standing, self-supporting galvanized steel structure.	
15.		Shelter roof shall be cambered with a ratio of 1:10 to the side of the shelter	
16.		Shelter shall be designed on steel channel frame and secured using foundation bolts.	
17.		A 19 mm thick waterproof ply shall rest on the shelter floor. It shall be fire retardant, fungus proof, termite proof and anti-abrasive.	
18.		Floor shall be covered with 2 mm thick green color anti-static mat and aluminum angle of 40 X 40 X 3 mm all around.	
19.		Door rain guard to be provided above the door for smooth operations.	

#	Parameters	Minimum Specifications	Bidders Compliance (Yes, No)
20.		Shelter shall have cut-outs for following: • Fiber cable • Power cable • Air Condition inlet & outlet • Earthing cable	
21.		Shelter shall be water and dust proof.	
22.		Shelter shall have adjustable anti-corrosive steel access ladder.	
23.		Shelter shall have solid hook mounted door stopper.	
24.		The foundation shall be made of reinforced cement concrete with suitable grade to sustain entire load of shelter and equipment.	
25.		The foundation shall be designed in accordance with local rules and regulations and the municipal / concerned government authorities guidelines to be adhered.	
26.		While constructing the foundation bearing capacity of soil, seismic load and wind load to be accounted for.	
27.		The foundation shall support the shelter at least 4 points with vertical RCC Column having arrangement of base plate and foundation bolt to fix the shelter steel on I-beams.	
28.		The shelter shall have adequate lighting system and safety equipment.	
29.		The fencing (if required) height shall be at least 2.5 meters tall with 0.6 meters of Barbed wire strands mounted above it.	
30.		The Fence wall (if required) shallbe at least at a distance of 2-3 meters from shelter on all sides	
31.		There shall be a MS gate with locking arrangement for safety	
32.		The shelter shall be equipped with(CO_2 /FM200/NOVAC) fire suppression system for fire safety	
33.		The shelter shall be equilights to provide illumination level of 600 - 750 lux in the shelter for eight (8) hours in case of power failure.	
34.		The shelter shall have provision for adequate lighting so that illumination level of 750 – 1000 lux is maintained.	

#	Parameters	Minimum Specifications	Bidders Compliance (Yes, No)
35.		The shelter shall have acrylic based polymer coating in three layers to cover entire roof joints to provide rain shield on the shelter and the coating shall withstand UV rays and expansion / contraction under extreme weather condition.	