



Chhatrapati Sambhajanagar Municipal Corporation

(Disaster Management Department)

Out W/CSMC/DMU/2025/

दि. / /2025

Subject: Regarding obtaining quotations only for inclusion of DMR Radio System for Public Safety Services in the Disaster Management Department of Chhatrapati Sambhajanagar Municipal Corporation for disaster management.

A DMR Radio System for Public Safety Services needs to be included for the Disaster Management Department of Chhatrapati Sambhajanagar Municipal Corporation.

The work of including this DMR Radio System for Public Safety Services will be carried out by inviting public tenders. Quotations are required for the inclusion of this technology and facility.

Therefore, you are requested to submit quotations only for the DMR Radio System for Public Safety Services available with you, as per the attached technical specifications, including the basic cost along with all taxes and other necessary expenses. The quotations will be exclusively used for estimation purpose only.

Please be informed and submit your response latest by 11/09/2025 in the form of hard copies in Disaster Management Unit, Town Hall, Buddi Lane, Main building 3rd Floor, Municipal Corporation Chhatrapati Sambhajanagar and soft copies at disastermngmnt@chhsambhajanagarmc.org

INTRODUCTION

The CSMC is planning to establish a State of the art, Digital Mobile Radio (DMR) Communications System to provide robust and reliable communications for meeting the needs of disaster scenarios and day-to-day operations.

The Project aims to establish the complete infrastructure of the Digital Mobile Radio (DMR) Communications System at CSMC. The complete system infrastructure will be IP based system and must have the flexibility for future up-gradation, as the system is expected to serve primarily the Voice Communication requirements of CSMC for the next 10 years.

Specification

Supply, Installation, And Commissioning of Digital Mobile Radio Communication System For Disaster Management System Of Chhatrapati Sambhajanagar Municipal Corporation

SCOPE OF WORK

SN Scope of Work

- 1 Supply, Install, Configure, Test, and Commission the DMR system as per the list of deliverable items detailed in Annexure B
- 2 Warranty services for 3 years

ANNEXURE-A

System Equipment Specifications: Fully Digital DMR system in UHF band

SN Parameters

- 1 The system should be of Digital Open Standard and should support the DMR radio network
 - 2 There shall be two slots for each RF channel, however each station should have a minimum of 4 dynamically allocated channels
 - 3 The system shall be designed for continuous unattended 24 hours of operation
 - 4 The system should be capable of working in AC& DC
The Repeater stations shall be capable of monitoring the integrity of its equipment.
 - 5 Automatic alarm reporting on front panel diagnostic aids for detecting and isolating problems shall be provided
 - 6 The Administrator shall shut down or set as a last priority to the respective Repeater remotely through the IP network
 - 7 The Repeater shall be housed in the free-standing in-door compact cabinets. Every Cabinet shall come with a surge protection
 - 8 In case of failure of site IP Network link, the Repeaters shall work as single-site operation
 - 9 The Repeater should be capable to be configured to support analog conventional and digital conventional modes of operation
 - 10 Whenever a new Repeater is assigned Main Repeater should automatically communicate to all other sites and Repeaters of the same site
 - 11 The Repeater sites shall be interlinked to the Control Room through IP Network. The Bidder has to supply the IP RF Link
Dispatch Server, Network Management Software (NMS) shall be provided to support Subscriber and Network Management. The Network Dispatch Server, Network
 - 12 Management Software (NMS) should provide user interface for supporting management features of network elements under its administration. It should consist of one server and one console
 - 13 System should be supplied with UPS with battery backup with mounting accessories
-

1. DMR REPEATER STATION WITH ALL ACCESSORIES

DMR REPEATER

A. General

- 1 Frequency Range 400-470 MHz, Full Band
- 2 Channel Capacity 64 or more

3	Channel Spacing	25/20/12.5 KHz or better
4	Frequency Stability	±0.5 PPM or better
5	Mode of operation	Analog /and Digital
6	Protocol & Technology	Digital TDMA Technology
7	Type of Emission	Analog:11K0F3E, Digital: 4 FSK
8	Weight	Less than 10 kg
9	Dimensions	Compact. Not more than 2 RU
10	Power Source	AC: 100-240Vac, 47-63 Hz, DC: 11-14.4Vdc. The power supply should be built-in
11	Battery charger rating	12V, 3 Amps Battery charger should be built-in
12	Auto changeover	It should have auto change over the facility from AC-DC & vice-a-versa
13	Communication interface	Inbuilt Ethernet port up to IPV6 connectivity
14	Antenna Impedance	50 Ω
15	Duty Cycle & Built-in cooling system	100%
16	Display indicator	• Transmission on both slots • Receiving on both slots • Ethernet link status • Digital/Analog operation • Alarm: Minor/Major • Power AC/DC operation
17	Protection	• Protection for Reverse Polarity • RF protection against High VSWR

B. Transmitter

SN Parameters	Values Required
1 RF Power Output	1-50W (Programmable/selectable)
2 Type of Emission	12.5khz Data: 7K60F1D & 7K60FXD 12.5khz Voice: 7K60F1E & 7K60FXE
3 Digital Modulation	4 FSK or better
4 Adjacent Channel Power	62 dB or better
5 Digital Vocoder	AMBE+2

C. Receiver

SN Parameters	Values Required
1 Sensitivity	Analog: 0.22 μV (12 dB SINAD) or better Digital: 0.22 μV @ 5% BER or better

SN Parameters	Values Required
---------------	-----------------

2	Adjacent Channel Selectivity	55 dB or better
3	Intermodulation	73 dB or better
4	spurious rejection	90dB or lower
5	Audio Distortion	Less than 1%

D. Environmental Specifications

SN Parameters	Values Required
---------------	-----------------

1	Operating Temperature Range	-30°C to +60°C
2	Humidity	95% non-condensing at 50° C

E. Accessories

SN Parameters	Values Required
---------------	-----------------

1	Single Antenna System	It should have ultra-low noise receiver preamplifier, should have the facility to select Rx Gain and should have a facility to monitor and generate an alarm for DC power and Rx LNA fail
2	RF Surge Protector Unit with a patch cord	Should be supplied Gas Discharge Tube type, Bulkhead Coaxial RF Surge Protector. it should support 20Ka surge current
3	Coaxial cable	Should be supplied UV resistant, Low Loss Dielectric Foam coaxial Cable with company crimped N-male connectors at both ends. The cable length should be 50 meters
4	Antenna	Should be supplied High performance broad bandwidth collinear antenna. Antenna gain should be 6Db. It should have internally DC grounded for lightning protection and the reduction of precipitation noise
5	Antenna mounting stand	Should be supplied 30mtr Triangular tubular mast
6	UPS with battery backup and mounting stand	Should be supplied online UPS. It should be based on high-frequency microprocessor with six hours of battery backup
7	Cabinet	Should be supplied floor mount cabinet

2. DMR STATIC SET WITH ALL ACCESSORIES

A. General

SN Parameters	Values Required
1 Frequency Range	403 – 470 MHz, (Full Band)
2 No of Channels	1000 or higher
3 Channel Spacing	12.5 kHz or better
4 Frequency Stability	± 0.5 PPM or better
5 Protocol & Technology	Digital TDMA Technology
6 Type of Operation	Simplex and Semi-duplex, Press to Talk
7 Type of Antenna	Yagi/Omni
8 Weight	Less than 2000 grams
9 Power Source	10.8 to 15.6 Volt DC ±15%
10 Communication Interface	Ethernet/RS232 and Bluetooth
11 Display	Color Display Multifunction alphanumeric with backlight
12 Compatibility	With Existing Analog radio and DMR radio
13 Type of Emission	Analog:11K0F3E, Digital: 4 FSK
14 Protection	• Protection for Reverse Polarity• RF protection against High VSWR
15 Signaling System	2 tone/5 tone/DTMF

B. Transmitter

SN Parameters	Values Required
1 RF Power Output	25W Programmable/Selectable
2 Type of Emission	12.5 KHz Data: 7K60F1D & 7K60FXD 12.5 KHz Voice: 7K60F1E & 7K60FXE

SN Parameters	Values Required
---------------	-----------------

3	Digital Modulation	4 FSK or better
4	Adjacent Channel Power	60 dB or better
5	Digital Vocoder	AMBE+2

C. Receiver

SN Parameters	Values Required
---------------	-----------------

1	Sensitivity	Analog: 0.22 μ V (12 dB SINAD) or better Digital: 0.19 μ V @ 5% BER or better
2	Adjacent Channel Selectivity	50 dB or better
3	Intermodulation	75 dB or better
4	Audio Output	Minimum 3W
5	Audio Distortion	3% or better

D. Environmental Specifications

SN Parameters	Values Required
---------------	-----------------

1	Operating Temperature Range	-30°C to +60°C
2	Storage Temperature	-40°C to +85°C
3	MIL-STD	D/E/F/G or Equivalent from Govt. of India approved test labs and IP54
4	Humidity	95% non-condensing at 50° C

E. Accessories

SN Parameters	Values Required
1 RF Surge Protector Unit with a patch cord	Should be supplied Gas Discharge Tube type, Bulkhead Coaxial RF Surge Protector. it should support 20Ka surge current
2 Coaxial cable	Should be supplied UV resistant, Low Loss Dielectric Foam Coaxial Cable with company crimped N-male connectors at both ends. The cable length should be 30 meters
3 Antenna	Should be supplied Magnetic mount/Ground plane antenna
4 GPS Antenna	Should be supplied
5 Power supply unit cum battery charger	Should be supplied

F. Features

SN Parameters	Values Required
1 Caller ID Display	Should be available
2 Scan with priority	Should be available
3 Time out Timer	The time should be programmed to best suit the application
4 Display	Should be available
5 Mode of calls	Selective Call, Group Call, inter and intragroup call facilities
Remote Radio	
6 Kill, Stun / Revive Facility	Should be available
7 Mode of operation	Analog Conventional, Digital conventional, Digital single site, multi-site operations & Support for DMR Tier-III up-gradation
8 Emergency Button	Allow the user to obtain help in a critical situation
9 Status message and SMS Facility	<ul style="list-style-type: none"> • Status messaging facility • Short and long data message Facility • Messaging facility using PCs one to many Radios

SN Parameters	Values Required
10 Radio Programming Facility	<ul style="list-style-type: none"> • Front panel programming with password protection • PC Programmable through the USB interface • Over the Air programming
11 Signal Strength Indicator	Received signal strength indicator bar or digital readout
12 OTAP	Should have provision for over the air frequency re-programming and other parameters through RF network and Wi-Fi connectivity
13 Integrated Bluetooth	Radio should have built-in Bluetooth for sharing radio configuration for programming and support voice hands-free operations
14 GPS capability	<p>1. Inbuilt GPS with TTFF<10 sec. 2. Horizontal Accuracy < 5 meters</p> <p>3. GPS Data Access methods a) By polling b) By fetching (on request)c) Every PTT d) Vendor should mention- coordinate file format. Necessary hardware, and software shall be provided that is required for making radios "GPS enabled" and for receiving and extracting GPS data/information for the use of location tracking purposes</p>
15 Networking	Should IP based for automatic roaming and radio should support multi-site multi repeater trunking etc
16 Repeater Access Control	Radio should have the capability of programming access key to preventing unauthorized access of repeaters
17 Noise cancellation	Radio should have a noise cancellation facility
18 Other Features	<ul style="list-style-type: none"> • Alphanumeric list of 256 users for sending SMS & for selective calling • Alphanumeric channel alias • Alphanumeric PTT ID alias • Facility to assign Network access codes, CTCSS/DCS • Call alert • Talk around mode • Emergency call facility(SOS) with emergency beacon for ease of searching radio in a distress • Late entry • Busy channel lockout • Automatically adjusts the radio volume according to the environmental noise level • Predefined text messages • Automatic number identification • Power level low/high front panel switchable with soft key • Automatic read of the written text on radios as a message or channel alias • Channel Announcement • Simultaneous voice and data transmission • Simultaneous functioning of two different groups through a single carrier in Digital Mode through the repeater • Externally accessible accessory connector. (For connecting programming kit. Repeater interface, data interface etc)

3. DMR PORTABLE HANDHELD RADIO SET

A. General

SN Parameters	Values Required
1 Frequency Range	400 – 470 MHz (Full Band)
2 No of Channels	1000 or higher with a continuous rotator button
3 Channel Spacing	12.5/20/25 kHz or better
4 Frequency Stability	±0.5 PPM or better
5 Protocol & Technology	Digital TDMA Technology (2 slots)
6 Type of Operation	Simplex and Semi-duplex, Press to Talk
7 Type of Antenna	Helical Antenna
8 Weight	Less than 320 g with battery
9 Power Source	7.5V Li-ion Rechargeable battery pack of original OEM. Capacity 2200mAh. Note: Bidder should submit complete BIS test report for the quoted battery from authorized Govt. laboratory in reference of handheld batteries
10 Display	It should have 2.4" 320*240 px. QVGA display with up to 10 lines of text. It should have Day / Night screen mode
11 Compatibility	With Existing Analog radio and DMR radio
12 Protection	• Protection for Reverse Polarity• RF protection against High VSWR
13 Connectivity	Should have inbuilt Bluetooth 5.2 and Wi-Fi(2.4 / 5GHz)
14 Hazardous Certifications	ANSI/TIA 4950 and CAN/CSA C22.2 No. 157-92 as intrinsically safe for use in Class I, II, III, Division 1, Groups C, D, E, F, G, Division 2, Groups A, B, C, D

B. Transmitter

SN Parameters	Values Required
1 RF Power Output	1 to 4 Watt or better (Programmable/Selectable)
2 Type of Emission	7K60F1W (Combination of 12.5KHz voice & data)
3 Digital Modulation	4 FSK or better
4 Adjacent Channel Power	60 dB or better

C. Receiver

SN Parameters	Values Required
1 Sensitivity	Analog: 0.16 μ V (12 dB SINAD) or better Digital: 0.14 μ V @ 5% BER or better
2 Adjacent Channel Selectivity	60 dB or better
3 Inter-modulation	70 dB or better
4 Spurious Rejection	70 dB or better

D. Environmental Specifications

SN Parameters	Values Required
1 Operating Temperature Range	-30°C to +60°C
2 Storage Temperature	-40°C to +85°C
3 Dust & Water Intrusion	IP68(Submersion up to 2m, 2hrs)
4 Packaging	MIL-STD 810 D & E

E. Wi-Fi Specifications (Optional)

SN Parameters	Values Required
1 Frequency Range	2.4 GHz, 5 GHz

SN	Parameters	Values Required
2	Standards Supported	Wi-Fi 5/IEEE 802.11a/b/g/n/ac
3	Security Protocol Supported	WPA3, WPA2
4	Maximum Number of SSIDs	128

F. Bluetooth Specifications

SN	Parameters	Values Required
1	Version	5.2
2	Range	Class 2, 10m
3	Supported Profiles	Bluetooth Headset Profile (HSP), Serial Port Profile (SPP), Personal Area Network (PAN), Generic Attributes (GATT), In-door location (Bluetooth LE Passive Scanning)
4	Simultaneous Connections	1 audio accessory and up to 4 data devices

G. Audio Specifications

SN	Parameters	Values Required
1	Digital Vocoder Type	AMBE+2
2	Audio Output (Rated/Max)	1W/3W
3	Audio Distortion (Rated)	≤1.5%
4	Maximum Speech Loudness by Default	102 phon @ 30cm
5	Maximum Programmable Speech loudness	107 phon @ 30cm
6	Operating System	Linux

H. Accessories

SN	Parameters	Values Required
1	Battery Charger	Single unit rapid rate charger

F. Features

SN	Parameters	Values Required
1	Caller ID Display	Should be available
2	Facility for locking channel or keypad locking	Should be available
3	Scan with priority	Should be available
4	Time out Timer	The time should be programmed to best suit the application
5	Mode of calls	Selective Call, Group Call, inter and intragroup call facilities
6	Remote Radio Disable / Enable Facility	Should be available
7	Mode of operation	Analog Conventional, Digital conventional, Digital single site, multi-site operations & Support for DMR Tier-III up-gradation
8	Emergency Button	Allow the user to obtain help in a critical situation
9	Status message and SMS Facility	• Status messaging facility• Short and long data message Facility• Messaging facility using PCs one to many Radios
10	Radio Programming Facility	• Front panel programming with password protection• PC Programmable through the USB interface• Over the Air programming
11	DTMF Front panel keypad with backlit	Should be available
12	Selector knobs	Exclusive knobs for volume control and channel selection
13	Battery Strength Bar	Should be available. Digital readout and alert for low battery
14	Signal Strength Indicator	Received signal strength indicator bar or digital readout
15	OTAP	Should have provision for over the air frequency re-programming and other parameters including software updates

SN Parameters	Values Required
16 GPS capability	<ol style="list-style-type: none"> 1. Cold Start TTFF≤60 sec. 2. Hot Start TTFF≤10 sec. 3. Horizontal Accuracy<5 meters 4. GPS Data Access methods a) By polling b) By fetching (on request) c) Every PTT d) Vendor should mention coordinate file format. 2. Necessary hardware, and software shall be provided that is required for making radios "GPS enabled" and for receiving and extracting GPS data/information for the use of location tracking purposes
20 Networking	Should IP based for automatic roaming and radio should support multi-site multi repeater etc
21 Repeater Access Control	Radio should have the capability of programming access key to preventing unauthorized access of repeaters
22 Noise cancellation	Radio should have a noise cancellation facility
23 Other Features	<ul style="list-style-type: none"> • Alphanumeric list of 256 users for sending SMS & for selective calling • Alphanumeric channel alias • Alphanumeric PTT ID alias • Facility to assign Network access codes, CTCSS/DCS • Call alert • Talk around mode • Emergency call facility(SOS) with emergency beacon for ease of searching radio in a distress • Late entry • Busy channel lockout • Automatically adjusts the radio volume according to the environmental noise level • Predefined text messages • Automatic number identification • Capable of VOX hands-free operation • Power level low/high front panel switchable with soft key • It shall have future compatibility of Automatic read of the written text on radios as a message or channel alias • Channel Announcement • It should have work order ticketing feature • It shall have future compatibility of indoor location tracking, event driven location update, outdoor location tracking • It should have user selectable audio profile • Simultaneous voice and data transmission • It should have basic safety privacy • It shall have future compatibility for auto recording / playback • It should have Automatic Acoustic Feedback Suppression • It should have Adaptive Dual Microphone Noise Suppression • It should have remote monitor feature • It should have robust and corrosion-proof side connector • It should have integrated accelerometer • Simultaneous functioning of two different groups through a single carrier in Digital Mode through the repeater • It should have sleek & ergonomic form factor • It should have GCAI accessory port

4. DISPATCHER RADIO SERVER/CLIENT SOFTWARE

A. Radio Server Architecture

SN Parameters	Values Required
1 Client-Server	Multiple dispatch consoles to connect multiple Radio servers via IP. A dispatcher can be located at any distance from the Radio server. The radio server should have provision for installing a redundant server working in passive mode and tracking primary server presence through the IP connection. If the primary server accidentally goes down, the redundant server becomes active and all the dispatch consoles are automatically switched to the redundant server. Dispatch console to connect multiple Radio servers. The system must store events and voice logs at both Server and Dispatcher computers. A single Radio server should be able to handle multiple different radio networks simultaneously. The dispatcher should have provision for offline operation mode (when Server is not available) to analyse events and voice logs, GPS tracks
2 Direct IP connection to Repeaters	Direct IP interface to Repeater for all functionality including voice calls from Dispatcher
3 Analog Mode	Analog channels support tAnalog Remote Radio Patch with Digital Radio Network Open channel voice calls MDC signalling
4 Digital Intercom Patch	Should have provision for direct SIP connection to PBX
5 Event Logging	Voice and event logging at both Dispatcher Consoles and Radio servers
6 Telemetry Service	Telemetry Command control - minimum 3 remote I/O control to control remote Digital subscriber GPIO contacts for NO/NC operation
7 Dispatcher Functionality	Radio dispatch, GPS tracking, PBX interconnect, Data Transmission, Data and Voice Logging, Real time monitoring, etc
8 Other	Modbus protocol interface without any external hardware. Redundancy support interface inbuilt FID integration support Cellular GPS integration support

ANNEXURE-B

COMMERCIALs

SN	Description	Qty	Unit	Unit Basic Price	Total Basic Price	GST	Total Price incl. GST
1	DMR Repeater station with all accessories	2	lot				
2	DMR Static Set with all accessories	8	set				
3	DMR Portable Handheld Radio Set	30	set				
5	Dispatcher Radio Server/Client software	1	Lot				
6	Installation, commissioning	1	Job				
7	Frequency liasoning	1	Job				

Grand total basic price = _____

Grand total price incl. GST = _____

Signed
Deputy Commissioner 04
&
Department Head
Disaster Management Department
Chhatrapati Sambhajnagar Municipal Corporation