

UMDONI LOCAL MUNICIPALITY



Introduction

Project Overview

The Umdoni Local Municipality is seeking to purchase a modern and state-of-the-art wide area voice/data network for use throughout the Umdoni Service Area utilizing DMR, TDMA technology. The integrated network should be a highly reliable, fault tolerant system which will meet current needs and provide a growth path for future expansion. The system is expected to serve the current communication needs of Umdoni, and it must have the flexibility of adapting to changing system requirements and new technology without the need to replace major equipment elements.

The network must also allow for the addition of RF sites to increase coverage should the need arise.

Vendors are encouraged to propose a network design that will best meet the requirements of the Umdoni Local Municipality.

The system shall be proposed as a complete network with firm prices for all of the equipment, software and services required by these specifications.

Any components, whether hardware or software, required for the systems to be usable and fully operational, will need to be included in the Vendor's final proposal with cost.

Vendors will also be asked to segment their pricing, vat included, whereby Umdoni Local Municipality can see the effects of adding or deleting components and services.

Submission of a proposal shall be conclusive evidence that the Vendor has investigated and is satisfied as to the conditions to be encountered in performing this work.

Ref. No.	Description	Compliance	Remarks
1.	INTRODUCTION		
1.1	This tender calls for a digital two way radio communications network for the Umdoni Local Municipality, of which the detail requirements are provided in subsequent chapters of this specification.		
1.2	Compliant, ICASA registered service providers are invited to submit their offers against the specifications as a tender response before or on the specified submission deadline at the designated location, as specified elsewhere.		
2.	RESPONSE TO REQUIREMENTS AND SPECIFICATIONS		
2.1	Suppliers shall explicitly state the words "Comply" or "Do not Comply" regarding the requirements and specifications contained in this document.		
3.	ALTERNATIVE OFFERS		
3.1	Suppliers may not submit alternative offers that do not comply with the advertised specification.		
4.	ACCEPTANCE OF BID		
4.1	The Umdoni Local Municipality reserves the right to accept any offer, part of an offer or no offer at all. Suppliers shall provide a clear answer against this clause by simply stating either "Accepted" or "Not accepted".		
5.	SUPPLIER EXPERIENCE		
5.1	The Umdoni Local Municipality requires the services of an experienced South African supplier with at least 10 years' experience in executing projects of this nature and of similar size.		
5.2	The supplier shall have facilities for configuration, supply, repair and installation of radio equipment that can be inspected to assess competency levels and experience in two way radio communications.		
5.3	The supplier shall provide references of similar work undertaken as proof of capabilities and track record.		
5.4	A recognized certification, such as ISO9001:2008 shall be an advantage.		

6.	ASSUMPTIONS MADE BY SUPPLIERS		
6.1	No assumptions shall be made and stated by suppliers in their bid reply.		
6.2	It shall be the supplier's responsibility to obtain all information required to submit a comprehensive tender response that makes provision for all requirements. In the event of any uncertainties regarding the interpretation of the requirements or specifications, the supplier shall clarify such uncertainties with the Umdoni Local Municipality.		
7.	SUBMISSION OF TENDER RESPONSE		
7.1	All additions to the tender document i.e. Attachments, Brochures, Coverage Prediction Maps, etc. shall be neatly bound and submitted, complete with an index page to ensure that all information submitted is received by Umdoni Local Municipality.		
7.2	Any loose pages or brochures submitted not bound as stated above will be unacceptable. Pages shall be numbered and/or the number of pages of each attachment and brochure shall be indicated in the index.		

Scope of the Requirement

Ref. No.	Description	Compliance	Remarks
8.	GENERAL		
8.1	<p>The supplier shall supply, install (including all integration), test and commission the following equipment and installations at the proposed / chosen sites for the infrastructure of the radio communications system:</p> <ul style="list-style-type: none"> • 1 x Repeater Base Station and Antenna System installed at designated site. • Supply of Terminals, Portables & Mobiles. • All RF equipment shall be neatly installed or mounted in 19" cabinets inside the equipment accommodation, located on the site. 		
9.	OVERVIEW OF REQUIREMENTS		
	Project Overview		
9.1	The Umdoni Local Municipality, is seeking to purchase a modern and state-of-the-art DMR T2 digital repeater Terminals, (Vehicle mobiles & Portables) The integrated network should be a highly reliable and ETSI approved.		
9.2	The system is expected to serve the current requirements of Umdoni Local Municipality, but it must have the flexibility and the scalability of adapting to changing user requirements and new technology without the need to replace major network elements. Proposals must detail future expansion strategy to illustrate the ability of the system to grow with future needs or additional budget.		
9.3	Umdoni Local Municipality intends to implement data applications and accommodate additional users beyond the initial identified requirements and therefore requires that this network allows for future growth of the network. The network must also allow for the addition of radio sites to increase coverage should the need arise.		
9.4	The system shall operate in the VHF Band frequency band range.		

9.5	The system shall be proposed as a complete network with firm prices for all of the equipment, software and installation labour.		
9.6	Any and all components, whether hardware or software, required for the systems to be usable and fully operational, shall be included in the supplier's final proposal with cost. The price listed in the supplier's proposal shall be a Full-Turnkey Price, including freight to and installation at the site locations in the Service Area.		
9.7	Suppliers are requested to break down and detail their pricing.		
9.8	Submission of a proposal shall be conclusive evidence that the supplier has investigated and is satisfied with the conditions to be encountered in performing this work.		
10.	Network Description		
10.1	The Council, ultimate goal is to satisfy its communications requirements and to obtain a fully compliant Digital Mobile Radio Network based upon the TDMA technology, VHF, 2 time slots system to be installed at the designated site. It is the responsibility of the service provider to recommend the sites to cover the communications needs for the entire District.		
11.	Coverage Design		
11.1	Suppliers shall provide coverage plots at 95% reliability of the Service Area from the sites provided.		
11.2	The system coverage performance will be verified as a part of acceptance testing.		
12.	Radio User configuration		
12.1	An operator shall be able to enter and maintain the configuration information for the radios and talk groups belonging to their organization. The network shall be able to support multiple organizations, each of which shall enter and maintain its own radio user configuration independently.		

Ref. No.	Description	Compliance	Remarks
13.	IMPLEMENTATION SERVICES		
	General Requirement		
13.1	As a part of the response, the supplier shall provide complete description and pricing for these project services as outlined in this section.		
13.2	The project shall include complete installation and optimization of the digital mobile radio infrastructure which consists of Digital / Analog Repeater, Handheld Portable, Vehicle Mobile Radios and other associated equipment necessary for reliable operation of the procured system.		
13.3	All radio user units shall be installed by trained and manufacturer accredited technicians.		

Infrastructure Equipment Specifications

Repeater Equipment Specifications

The repeater equipment is used to transmit and receive voice, data and control messages over the air to subscriber units registered to the corresponding site. All repeater equipment shall comply with the following standards:

RF and EMC Compliances

RF	EN 300 113-1, EN 300 113-2 (ETSI)
EMC	EN 301 489 1, EN 301 489 5 (ETSI)

Safety and Environmental Compliances

Safety	EN 60950-1 (ETSI)
	Low Pressure (Altitude) MIL-STD-810G Method 500 5 Procedure 2
Environmental	Humidity MIL-STD-810G Method 507 5 Procedure 2
	Vibration MIL-STD-810G Method 514 6 Procedure 1
	Shock MIL-STD-810G Method 516 6 Procedure 1

Each repeater channel shall comprise of a transmitter, receiver, power supply and systems interface. A minimum of 1 complete repeater channel shall be housed in a sub-rack occupying a maximum of 1 rack units in a standard 19" rack or cabinet.

The repeater channel systems interface shall be IP-based (10/100 Base-Tx/Rx) and no other external infrastructure shall be required for access to IP infrastructure

All repeater equipment shall comply with the following minimum operational specifications:

Parameter	Value
Frequency Ranges VHF	146-174MHz
Programmable Operating modes	DMR Tier 2
Channel Spacing	12.5kHz
Ambient Air Temperature Operating Range at 100% Transmit Duty Cycle	-30°C to +60°C (-22°F to 140°F)
Environmental Standards	MIL-STD-810F
Power Requirements	220Vac at 50 to 60Hz or 13.8Vdc
Transmit Power VHF Band	50W at 100% Duty Cycle at -30°C to +60°C VHF
Frequency Stability	± 0.5 ppm
Transmit Rise Time	< 2 ms
Adjacent channel power	< -60 dBc (EN_300_113-1) (12.5 kHz digital)
Transmit Audio Distortion	$< 3\%$
Modulation Fidelity	$< 2\%$
Digital Sensitivity	< -120 dBm @ 5% BER
Intermodulation rejection	≥ 80 dB @ 5% BER

Repeater Programming and Maintenance

All programming diagnostic, SNMP and associated software shall be Windows or Linux based

All repeater equipment should be upgradable from DMR T2 to a Tier 3 trunked system by simply adding a new software licence key. Equipment requiring hardware add-ons or replacement will not be considered

General Subscriber Unit Specifications

All portables, mobiles and desktop stations will automatically detect and respond in the analog or digital, encrypted or unencrypted mode.

Vendors will present certificates of DMR Association interoperability (IOP) testing for all of the proposed radios.

All subscriber units should be upgradable from DMR T2 to a Tier 3 trunked operational system by simply adding a new software licence key. Equipment requiring hardware add-ons or replacement will not be considered

All portable and mobile radios proposed must meet the following MIL 810 C/D/E/F & G environmental standards:

- Low Pressure
- High Temperature
- Low Temperature
- Temperature Shock
- Solar Radiation
- Rain
- Humidity
- Salt Fog
- Dust
- Vibration
- Shock

The mobile radio should be ingress protected to the IP54 specification (at least) without the use of any additional IP rated housing.

The portable radio shall have achieved an IP67 rating.

Mobile Radio Subscriber Unit Specifications

The mobile radio unit must comprise of the following minimum radio interfaces:

- Power Switch
- Volume Control
- Transmit/Busy Indicator
- Multiple line alphanumeric display
- Alphanumeric keypad
- Emergency Key
- Channel/Talkgroup selection
- Interface for the connection of external I/O control
- GPS ready interface
- BNC or Mini UHF antenna connector
- Options space for 3rd Party integration
- Bluetooth and / or Wi-Fi options available via future upgrade path

All mobile radio subscriber units shall comply with the following minimum operational specifications:

Parameter	Value
Frequency Range VHF	136 to 174MHz
Channel Spacing	12.5kHz/15kHz narrowband 25kHz/30kHz wideband
Ambient Air Temperature Operating Range	-30°C to +60°C (-22°F to 140°F)
Water and Dust Ingress Protection	IP54
Power Requirements	13.8VDC
Output Power	25W
Frequency Stability	± 0.5ppm
Transmit Rise Time	< 50ms
Transmit Audio Distortion	< 3% at 1KHz 60% deviation
Analog Sensitivity	-120 dBm (<0.22µv) (12dB SINAD)
Digital Sensitivity	-119 dBm (<0.25µv) at 5% BER
Intermodulation rejection	> 70 dB
Adjacent Channel Selectivity	> 60dB at 12.5kHz
Receive Audio Distortion	< 3% at 1KHz 60% deviation

Portable Radio Subscriber Unit Specifications

The portable radio unit must comprise of the following radio interfaces.

- Power Switch
- Volume Control
- Transmit/Busy Indicator
- Multiple line alphanumeric display
- Alphanumeric keypad
- Emergency Key
- Channel/Talkgroup selector
- Audio accessory interface

All portable radio subscriber units shall comply with the following minimum operational specifications:

Parameter	Value
Frequency Range VHF	136 to 174MHz
Channel Spacing	12.5kHz/15kHz narrowband 25kHz/30kHz wideband
Ambient Air Temperature Operating Range	-30°C to +60°C (-22°F to 140°F)
Water and Dust Ingress Protection	IP67
Transmit Power	5W (VHF)
Frequency Stability	± 1.0ppm

Transmit Rise Time	< 50ms
Transmit Audio Distortion	< 3% at 1KHz 60% deviation
Analog Sensitivity	< -120dBm (12dB SINAD)
Digital Sensitivity	< -119dBm (5 % BER) (EN 300 113)
Intermodulation rejection	-70dB (EN 300 113)
Adjacent Channel Selectivity	TIA603C-65dB ETSI - 60dB
Receive Audio Distortion	< 3%
Antenna Impedence	50ohm
Battery Capacity	3200mAh LI-Ion
Time Slot	TDMA <57dBm
Hum & Noise	-40dB@12.5KHz
Vocoder Type	AMBE+2TM
Dimension (H*W*D)	126*58*37mm
Weight	258g

Subscriber Unit Programming

All hardware and software required for programming the subscriber units must be included in the pricing schedule.

Programming software should be Windows XP or Windows 7 or Windows 10 based and utilize a RS232 or USB including RS232 adaptor communications port for the connection of subscriber units to the programming terminal

IMPLEMENTATION

General

As a part of the response, Vendor will provide complete description and pricing for this project as outlined in this section. The project shall include complete installation and optimization of the DMR radio infrastructure which is comprised of a single repeater.

All Subscriber Units will be programmed and installed by the Vendor.

Project Schedule

Vendor will provide detailed project schedule identifying as the minimum:

- Completion of system design review
- Dates of shipping of the equipment
- Installation dates
- Training dates
- System optimization dates
- Delivery of "as built" system documentation

Acceptance Test Plan

Vendor will provide detailed Acceptance Test Plan including, but not limited to:

- Infrastructure and Subscriber Unit testing
- Coverage testing in accordance with the latest recommendations

WARRANTY AND MAINTENANCE

General

As part of their proposal, Vendor shall provide one-year warranty.

The warranty and maintenance period shall begin on the date of final system acceptance.

Vendor shall provide the necessary labor, parts, supplies, procedures, transportation, test equipment and facilities to maintain the new Vendor-provided equipment, firmware and software to the level of factory performance and within requirements contained herein within the warranty period.

Warranty Maintenance Contract Term

A 3 year maintenance services shall be provided as part of the communications system. This will form phase 2 of the project.

Vendor shall certify that a stock of replacement parts for each item included in the equipment response is maintained and that Vendor is capable of replacing such parts, assemblies, modules and devices for each item of equipment included in the purchase, as well as updating all appropriate software.

Vendor shall also certify that a stock of replacement parts for each critical component to be supplied as part of the communication system shall be immediately available at all times during the initial warranty period.

In addition, Vendor shall certify that all replacement parts shall remain available to Umdoni Local Municipality for a period of five years following final system acceptance. Prior to final system acceptance,

Training

The vendor will describe how training on the operation and support of the system can be provided to:

- Users
- Supervisors
- Umzumbe Local Municipality support staff.

PRICING SCHEDULE**NB:**

1. All prices to include vat.
2. Vendors to provide a price breakdown on a company letterhead.
3. Pricing for a 3 year Maintenance contract . (optional)

Repeater Site 1

Item	Description	Quantity	Unit Price	Total Price
1	Repeater RF Equipment & Antenna System	1		

Installation Labour – Repeater

Item	Description	Quantity	Unit Price	Total Price
1	Installation Labour - Repeater	1		

Subscriber units: (Portable & Vehicle Mobile)

Item	Description	Quantity	Unit Price	Total Price
1	DMR 1000CH, Full Feature VHF, Portable with GPS, including Radio, Antenna, Battery, Charger, Belt Clip & User Guides	1		
2	DMR 100CH, VHF Vehicle Mobile with GPS and Antenna	1		
3	Labour – Vehicle Installation	1		