Ministry of Interior

Telecommunications Department

Requirements
for
Cell Broadcast Center -Wireless
Emergency Alerting System

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Version 1.3

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Glossary

Term	Description
GSM	Global System for Mobile
UMTS	Universal Mobile Telecommunications System
CBC	Cell Broadcast Center
CBE	Cell Broadcast Entity
BTS	Base Transceiver Station
RNC	Radio Network Controller
CMSP	Commercial Mobile Service Provider
WPAS	Wireless Public Alerting Service
KPI	Key Performance Indicator
BPMS	Business Process Management Suite / System
AIS	Application Integration Services
SMS	Short Message Service
API	User Equipment
BPEL	Business Process Execution Language
BPML	Business Process Markup Language
WPAS	Wireless Public Alerting Service
PWS	Public Warning System
CLI	Command Line Interface
GUI	Graphical User Interface
CMAS	Commercial Mobile Alert System
NOC	Network Operation Center
SNMP	Simple Network Management protocol
CMSP	Commercial Mobile Service provider
CAP	Common Alerting Protocol
MIB	Management Information Base
ATIS	Alliance for Telecommunication Industry System
WEA	Wireless Emergency Alerting
TCP	Transmission Control Protocol
SNMP	Simple Network Management protocol
CMSP	Commercial Mobile Service provider
CAP	Common Alerting Protocol
HW	Hardware
SW	Software
MIB	Management Information Base

1 Introduction

1.1 Ministry of Interior (MOI) Telecom Department (hereinafter referred to as "MOI TELECOM") provides Telecom Services to all Security and Safety Departments of MOI, as well as other Public Safety Agencies.

1.2 This document presents a set of requirements for **Cell Broadcast Center (CBC) -Wireless Emergency Alerting System.**

2 Objectives

2.1 MOI-Qatar is looking for a complete system proposal for **Wireless Emergency Alerting System – Cell broadcast** to be provided by a single Vendor. The system, which enables MoI & other government authorities to send Mass Alerts and Notifications emergency messages through wireless carriers/Telecom service provider networks. The system shall enable delivery of Alerts, and Notifications emergency messages based on static (pre-populated) or dynamic (using circles and polygons) alerting zones for command center personnel.

3 General System Requirements

3.1 The Vendor shall Indicate if any product(s) offered or proposed, is in partnership with another vendor or provided by another vendor. Describe in detail the duration and nature of the partnership as it relates to its operation, functionality and support.

3.2 The Vendor shall highlight participation and reference in the development and implementation of the Cell Broadcast Center (CBC) & Cell Broadcast Entity - CBE (Emergency Alerting Gateway). The Vendor shall share the references of implementations: 3GPP, CMAS/WEA, ATIS and WEA (such as CMAS in US or Civil Alarms Service in Netherlands).

3.3 The Vendor shall Indicate that the proposed system is fully compliant with the standards & specifications. This standards & specifications shall include but not be limited to

    a) Supports global standards for emergency alert services

    b) Joint ATIS/TIA Emergency Alerting Gateway to Emergency Alerting Interface Specification, J-STD-101

    c) Cell Broadcast Entity (CBE) to Cell Broadcast Center (CBC) Interface Specification", ATIS-0700008

    d) The Vendor must commit technology agnostic to and fully complying with the future ATIS standard specification for CMAS 2G, 3G, 4G, and 5G.

    e) 2G/3G Cell Broadcasts (CMAS); 3GPP TS 44.012; 3GPP TS 23.041; 3GPP TS 25.331; 3GPP TS 25.324

    f) LTE Cell Broadcasts (CMAS); 3GPP TS 36.331; 3GPP TS 23.041.

    g) PWS (including KPAS); 3GPP TS 22.268.

    h) ETWS; 3GPP TS 22.168.

i) Common Alerting Protocol (CAP).

j) SMS data coding and language supports; 3GPP TS 23.040; 3GPP TS 23.038.

k) Radio Resource Control; 3GPP TS 25.331.

l) ATIS G3GSN CMAS via GSM/UMTS Cell Broadcast Service

m) The CBC platform must fully comply with the 3GPP cell broadcast standard specification, 3GPP TS 23.041 v 9.0.0, and "Technical realization of Cell Broadcast Service (CBS)"

n) The CBC platform must fully comply with the 3GPP cell broadcast standard specification, 3GPP TS 25.419 v 9.0.0, " UTRAN Iu-BC Interface: Service Area Broadcast Protocol".

o) The CMSP GW and the CBC platform shall fully comply to the ATIS specification titled "Commercial Mobile Alert Service (CMAS) for GSM/UMTS Cell Broadcast Service", ATIS-0700006, date TBD. The Vendor shall provide section by section Statement of compliance.

p) The CMSP GW and the CBC platform shall fully comply to the ATIS specification titled "Commercial Mobile Alert Service (CMAS) for GSM/UMTS Cell Broadcast Service", ATIS-0700006. The Vendor shall provide section by section Statement of compliance.

q) The CBC platform must fully comply with the 3GPP cell broadcast standard specification for the 5G AMF through CBCF Network function.

r) Ensure full alignment with Alert gateway to guarantee delivery of the alerts/messages to the targeted cells in different technologies.

s) The Emergency CBC Gateway shall support mapping the alert areas into the list of cell sites based on the physical locations of cell sites.

t) The Emergency Alerting/CBC Gateway shall support incoming alert encoding in UTF.

u) CBC must receive alert messages via the WPAC Protocol, which contains a WPAM (Wireless Public Alert Message) parameter that contains a text message, with flexibility of changing the length up to 1400 octets

3.4 All Systems, equipment and software shall be based upon the latest technology (HW & SW) and communications industry standards.

3.5 The proposed system shall provide the following features, including but not limited to:

a) Send alerts/messages to a large number of subscribers.

b) Send alerts/messages to multiple subscribers in a defined area at the same time

c) Send alerts/messages to roaming subscribers/visitors from other countries,

d) Send alerts/messages in real-time,

e) Send alerts/messages with location specific information,

f) Send alerts/messages in multiple languages,

g) Send alerts/messages even when the network is congested.

3.6 The proposed system (CBE) shall be able to maintain list of all different QATAR operators (Service Providers) cell sites with

a) Physical address/cordinates (Street address, city, county, zip code)

b) LAC association

      c) BSC/RNC association

3.7 The proposed system shall support mapping the alert areas into area ID that will be sent to CBC to map it into LAC′s and/or list of cells.

3.8 The proposed system shall support of online map and offline map.

3.9 The proposed system shall able to create predefine area/zone and assign them to Group (i.e. create Doha zone and assign this zone only to user/group X).

3.10 The proposed system shall be capable to support Dynamic Geo-mapping.

3.11 The proposed system shall support dynamic geo-mapping from polygon/circle into the list of cell sites based on the physical locations of cell sites.

3.12 The proposed system shall supporting the following functionalities:

      a) Interface with the Government administered System.

      b) Map the alert geographical areas into proper network coverage, i.e. broadcast zones and/or list of cell sites.

      c) Format the CMA/Emergency alerts into format suitable for broadcast SMS.

      d) Ensure & gurantee delivery of all alerts & messages to the targeted cells in different technologies.

3.13 Public Warning Cell Broadcast Message can be classified into, but not limited to Governmental Alert, Emergency Alert, Alert Message and Monthly Test Messages.

      a) Governmental Alert/Presidential Alerts - Applicable to wide-ranged disasters and the ones that the public may be immediately harmed (National Warning Alert).

      b) Emergency Alert - Applicable to disasters where people may be harmed (Extreme & Severe Emergency Warning Alerts).

      c) Alert Message - Applicable to alerts that can be prepared for a long time and are closely related to people's life (Emergency Alerts).

      d) Monthly Test Message – Cell Broadcast System Testing Message.

3.14 The proposed system shall support non-repudiation mechanism for all alerts received from the QATAR Government authorities.

3.15 The proposed system shall support the Emergency Alerting/CBC ″C″ interface and associated protocols between the Alert Gateway and the Emergency Alerting Gateway, as defined in the baselined specification.

3.16 The proposed system shall support TIA Emergency Alerting/CBC Standards.

3.17 The proposed system shall be designed in English & Arabic.

3.18 The proposed system shall support multiple character sets GSM-7, GSM-8 and UCS-2 and shall be able to deliver alerts in multiple languages (i.e. Arabic, English, French, Hindi etc.).

3.19 The proposed system shall support dynamic geo-targeting by mapping alert areas specified by polygons/circles to the list of base stations.

3.20 The proposed system shall be flexible of supporting other languages in the future upon MOI request.

4 Capacity, Scalability & Performance

4.1 The Vendor shall provide details on the capacity and scalability of the system to support future network growth.

4.2 The Vendor shall provide Description of the SW and HW architecture of the system, and its components.

4.3 The Vendor shall comply to system scalability for the software and hardware based on the future needs.

4.4 The Vendor shall highlight the trigger for the hardware or software scaling.

4.5 The Vendor shall provide the below information within the technical proposal:

   a) The maximum number of emergency alerts/messages per second that can be accepted from the Alert Gateway.

   b) The maximum number of base stations that can be supported without any system performance impact.

   c) The maximum number of LAC's in GSM/UMTS network that can be supported without any system performance impact.

   d) The maximum number of broadcast CBE clients that can be supported.

5 Alerts & Message Handling

5.1 The Proposed system shall support queuing for all alerts.

5.2 The Proposed system shall support Scheduled Alerts feature. This feature shall allow schedule, reschedule, cancel, or confirm alert & notifications.

5.3 The Proposed system shall support alert throttling with configurable parameters.

5.4 The Proposed system shall support configurable timer to control sending alerts destined to the same cell sites.

5.5 The Proposed system shall support configurable alert re-transmission policy.

5.6 The Proposed system shall support delivery of all alerts by first-in-first-out order, except for the following:

   a) Urgent Governmental alerts shall be processed in front of any other alerts already in the queue.

   b) Previously rejected alerts due to network congestion shall take precedent over newly arrived alerts

   c) Newly arrived alerts/messages shall take precedent over re-transmission of old alerts already successfully delivered.

6 Reliability/Redundancy

6.1 The Proposed system shall provide highest level of reliability for all critical components within the system.

6.2 The proposed system shall be designed to support In-network Local redundancy & Geo redundancy.

6.3   The Proposed system shall use redundant connections to interconnect between CBC's & CBE's.

6.4   The proposed system shall provide geographical redundancy with two geographically redundant sites functioning in Active-Active mode at all levels.

6.5   The proposed system shall have full redundancy in terms of Electrical power connectivity.

6.6   The proposed system shall have full redundancy in terms of data network connectivity.

6.7   The proposed system shall guarantee 99.999% availability.

6.8   The proposed system shall guarantee synchronization between the geo-located sites for full resiliency.

7   Backup, Failover & Disaster Recovery Plan

7.1   The system should have redundancy and be designed to provide high reliability and availability.

7.2   The Vendor shall share the detailed plan for deployment, highlighting;

    a)   Backup, Redundancy/Failover scenarios

    b)   Disaster Recovery plan

    c)   Provide details on inter-site dependency and synchronization.

7.3   The Vendor shall explain the fail-over mechanism highlighting that how platform detects failed components/process.

7.4   To ensure system reliability & availability the DR site must be activated at least for one month per year.

7.5   The Vendor shall explain needed actions to recover from such failure; and handling the existing pending Alerting transactions on the system.

7.6   The Vendor shall explain the fail-over mechanism between two geographically redundant components/NE's (CBC & CBE). How the redundant NE will take over all or part of the load of the failed component.

7.7   The Vendor shall describe the traffic overload control mechanism highlighting:

    a)   Overload condition detection

    b)   Impact of overload condition on transactions that are in-process.

8   Security

8.1   The Vendor shall study and comply to MOI-Telecom security requirements, policies and standards that will be shared later.

8.2   The proposed system shall provide Robust Security features, including but not limited to

    a)   Access control, Role based permissions

    b)   Spam prevention. Encryption

    c)   Denial of service attack mitigation

    d)   Proactive penetration testing

8.3   The proposed system shall prevent unauthorized access and access by unauthorized users.

8.4   The proposed system shall support TCP/IP & IPsec interface between CBCs & CBE's.

9 System Connectivity

9.1   The service provider shall provide the physical & logical connectivity between the CBC(BMC) and the CBE (Alert GW) in MOI-Telecom premises.

10 Network Operation, Administration and Management

10.1   The CBC(BMC) Management, operation, security & technical support shall be the responsibility of Service providers.

10.2   The Vendor shall explain how the operation and maintenance of the proposed system, and the ability of the system to support the following functions for operation and maintenance, including but not limited to:

   a) Configuration

   b) Administration

   c) Fault management

   d) Accounting Management

   e) Security

   f) Performance

   g) Real-time control

   h) Software upgrades, releases and patches

10.3   The Vendor shall mention the monitoring interfaces and how MOI-Telecom O&M personnel will be able to view component status and perform diagnostics from local and/or remote locations.

10.4   The Contractor shall describe alarm outputs and how they are handled or transferred to an alarm management sub-system, and ensure all alarm information will be presented and integrated with MOI-Telecom NOC locations during project implementation.

10.5   The Contractor shall list the service measurements to measure/monitor the performance, and utilization of various resources of the offered system.

10.6   The Contractor shall provide detailed alarm documentation which describes all alarm messages, including Trap ID or Alarm ID and information fields in each alarm message (e.g. severity, additional text, etc.).

10.7   The proposed system shall provide Comprehensive Element Management System, including but not limited to

   a) Administration

   b) Dashboard for KPIs

   c) Troubleshooting

   d) Provisioning (WEA elements, Network Connections, Zone definition).

    e)   Alert management (Search, Test Alerts)

    f)   Comprehensive reports on volume, uptime, delivery rates and throughput.

10.8 All system components/ NE Shall have the capability to generate 'CLEARED' events for generated alarms and a detailed description is available on how to correlate clear/alarm pair.

10.9 All system components/ NE shall have the capability to log own alarms and events, and to retrieve historical alarms and events from a Log.

10.10 All system components/ NE shall have the capability to:

    a)   Block alarms that are not necessary

    b)   Filter/turn off the forwarding of alarms

    c)   Suspends and resume the forwarding of alarms

    d)   Managing alarm functions by alarm group(s)

10.11 The proposed system shall provide detailed reporting for different KPIs. The Vendor shall provide sample of report.

11 Event Log, Alarms, Reports and Statistics

11.1 The proposed system shall generate event logs that are accessible via the web-based GUI.

11.2 The proposed system shall be able to store event logs locally on its system for a minimum of 365 days so that they are accessible by the operator.

11.3 The proposed system shall support log forwarding to syslog server.

11.4 The proposed system shall generate and store message logs with detailed records for up to 365 days and provide a web-based GUI interface for operator to view these message logs.

11.5 The proposed system shall be able to export logs to external system.

11.6 The proposed system shall be able to generate multiple levels of severity alarms. Alarm shall be displayed locally and shall be reported to the MOI NOCs using Simple Network Management Protocol (SNMP) traps.

11.7 The Emergency Alerting Gateway shall collect at least the following traffic statistic on configured interval and provide hourly summary, at a minimum, the following traffic statistics:

    a)   Total number of alerts received from the CBE.

    b)   Total number of successful alerts response sent to the CBE.

    c)   Total number of unsuccessful alerts response sent to the CBE.

    d)   Total number of alerts sent to the QATAR Networks.

    e)   Total number of successful alerts response received from the QATAR Networks through networks CBC reporting.

    f)   Total number of unsuccessful alerts response received from the QATAR Networks through networks CBC reporting.

11.8   The proposed system shall provide statistical reports that allow the MOI-Telecom to view Hourly, Daily, and Monthly alerts traffic statistics.

11.9   The generated statistics shall capture all failed alerts per cause code.

11.10 Statistics and reports shall be stored on the system and available for review for 60 months.

11.11 The proposed system shall support sending traffic statistics to external server(s) using SFTP or SNMP trap.

11.12 The proposed system shall support SNMP v2 or v3 for reporting alarms and statistics to the MOI Network Operation Center (NOC).

12   User Interface, User profiles, Groups, Roles & Permissions

12.1   The Proposed system shall have Graphical User Interface (GUI) support Arabic and English languages, and be able to support multiple users without impacting the performance.

12.2   MOI admin shall be able to use the CLI access or web-based GUI to configure and manage the system.

12.3   The Proposed system shall support 100 concurrent connections to CBE, without any performance impact.

12.4   Customizable user-friendly interface to change the "look & Feel).

12.5   User access should use username/password plus SMS OTP(Optional).

12.6   The proposed system shall support the following User creation and rights, including but not limited to;

   a) Create groups with different roles

   b) Create users and assign them to Groups

   c) Access & permissions to functions, features, menus, should be assigned to roles

   d) No Limits in user/group creation.

12.7   The proposed GUI shall support the following functionalities, including but not limited to;

   a) Create predefine area/zone and assign them to Group (i.e. create Doha zone and assign this zone only to user/group X)

   b) User can draw many polygons for the targeted area to be considered as one zone

   c) User can upload the list of targeted cells 2g/3g/4g and show the targeted zones on the MAP.

   d) User can use KML files to select the area and upload it in the GUI.

   e) Import/Export of KML files

   f) User can draw many polygons at the same time and system should do the geo-fencing to determine the targeted cells.

   g) User should be able to see the actual coverage of the selected areas in the MAP 2G/3G/4G, and decide to remove some cells by simple one step action(click).

   h) Area/Zone can be stored as template(history) and reused next time.

12.8   The proposed system shall support integration with Active Directory (AD).

12.9 The user interface shall support User ID and Password with different levels of access privileges. For example (System Administrator, Group Administrator, Viewer, Regular User, Approving User).

12.10 MOI team shall be able to use the web-based GUI to view the system statistics, message logs, event logs, and alarms (In general User event/activity history).

12.11 MOI team shall be able to use the web-based GUI to monitor the system Key Performance Indicator (KPI) on a real-time basis, such as memory usage and CPU utilization.

13 System Roadmap

13.1 The proposed system shall be designed with flexibility to support other applications in the future.

13.2 The Vendor shall provide product roadmap and evolution for the proposed system.

13.3 The Vendor shall provide a list of new features included within the product/system Roadmap. i.e. Multi-media Broadcasting, multi-media CMA alert etc.

14 Experience:

14.1 The Vendor shall provide a list of global commercial deployment references where the Cell Broadcasting system is being used for Emergency Alerting.

14.2 The Vendor shall provide the following information regarding their experience:

   a) Number of years in business.

   b) Year's of experience with providing the types of systems described in this requirement document.

   c) Reference's; A list of all systems similar to those described in this RFP that the Vendor has provided to other businesses or governmental entities. Specifying below information

        i.   End-to-End system (CBC & CBE)

        ii. If CBC only, provide details/specs of other end – CBE

   d) References for Tier 1 deployments for different technologies 2G, 3G, 4G, Femto and 5G.

End of Document