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DRAFT TANZANIA STANDARD

(Draft for comments only)

Vehicle Tracking Systems – Requirements.

TANZANIA BUREAU OF STANDARDS

First Edition 2021

Foreword

This draft Tanzania Standard is being prepared by the Alarm and Electronic Security Systems Technical Committee of the Tanzania Bureau of Standards (TBS), under the supervision of the Electrotechnical Divisional Standards Committee (EDC)

In reporting the results of a test or analysis made in accordance with provision of this Tanzania Standard, if the final value observed or calculated is to be rounded off, it shall be done in accordance with TZS 4: 1999 *Rules for rounding-off numerical values.*

0. INTRODUCTION

Vehicle tracking technology is one of the most popular technological advancements all over the world which enables to track the location and whereabouts of the vehicle in real time. VTS functions with the help of different technologies like Global Positioning System (GPS), General Packet Radio Service (GPRS), Global System for Mobile Communication (GSM) along with other radio frequency media. Amongst all, GPS is very popular in the market for giving accurate results and is the preferred one.

1. SCOPE

This standard covers the performance requirements and test methods of vehicle tracking systems for tracking and monitoring of vehicles in real time.

2. NORMATIVE REFERENCES

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

The Unicode Standard, Version 5.0.0

W3C SOAP 1.2 Standard

ISO/ IEC 21778 *The JSON data interchange syntax*

ECMA-404 *The JSON Data Interchange Standard*

HTML 4.01 *Specification*

XForms 1.1 *W3C Recommendation*

ISO/IEC 7816-3 *Identification cards - Integrated circuit cards - Part 3: Cards with contacts - Electrical interface and transmission protocols*

IEC 60068-2-6 *Environmental testing - Part 2-6: Tests - Test Fc: Vibration (sinusoidal)*

IEC 60068-2-27 *Environmental testing - Part 2-27: Tests - Test Ea and guidance: Shock*

3. DEFINITIONS

For the purpose of this draft Tanzania Standard, the following definitions shall apply

3.1 Global positioning system (GPS)

a global navigation satellite system that provides location, velocity and time synchronization.

3.2 Global system for mobile communication (GSM)

a standardized international system for digital mobile communication.

3.3 Location Area Code (LAC)

the unique number given to each location area within a served cellular radio-accessed network.

3.4 International mobile equipment identity (IMEI)

a unique number for identifying a device on a mobile network.

3.5 Access point name

a connection to the gateway between the carrier's network and the internet.

3.6 Database management system (DBMS)

software package designed to define, manipulate, retrieve and manage data in a database.

3.7 Short message service (SMS)

a service for sending short messages of up to 160 characters (224 characters if using a 5-bit mode) to mobile devices.

3.8 Subscriber identity module (SIM)

an integrated circuit that is intended to securely store the international mobile subscriber identity (IMSI) number and its related key, which are used to identify and authenticate subscribers on mobile telephony devices.

3.9 General Packet Radio Service (GPRS)

a packet oriented mobile data standard on the 2G cellular communication network's global system for mobile communications (GSM).

3.10 Coarse acquisition code (C/A Code)

a pseudorandom noise code that is modulated onto one of the carrier frequencies of the GPS satellites, called L1 carrier.

3.11 Extensible Markup Language (XML)

is a markup language that defines a set of rules for encoding documents in a format that is both human-readable and machine-readable.

3.12 XForms

is an XML format used for collecting inputs from web forms.

4. REQUIREMENTS

4.1 General Requirements

4.1.1 Language support: All display technologies and software shall support the Unicode 5.0.0 character set. Specifically, the systems shall support English language.

4.1.2 Accessibility: The entire set of applications for VTS shall be accessible through web and mobile devices for some key features.

4.1.3 Database support: All databases used in VTS shall be standard DBMS.

4.1.4 Date and time: All information technologies shall properly display, calculate, and transmit date and time data, including, but not restricted to 21st-Century date data. All dates and time shall be displayed & printed in 'yyyy-mm-dd hh:mm:ss' format.

4.1.5 Web services: Wherever web services are used in VTS, the interchange shall conform to industry standards such as W3C SOAP 1.2 and ISO/ IEC 21778 standards.

4.1.6 Forms: All forms used in VTS shall conform to either HTML 4.01 (or above) forms or XForms 1.1

4.1.7 The system should interface to a standard SMS and email gateways using protocols with encryption.

4.1.8 Digital Signatures on Documents: All digital signatures implemented on documents shall conform to standards such as world wide web consortium (W3C) XML Signature Specifications, ECMA-404.

4.1.9 The system shall be scalable to support number of vehicles and user queries/transactions depending upon the demands of the client without affecting the performance of the system.

4.1.10 The entire set of applications and their features shall provide for various levels of secure access based on defined roles and responsibilities.

4.1.11 Application Access shall support multiple roles for a single user.

4.1.12 An Audit trail of changes to all access privileges shall be maintained and should not be possible for deletion.

4.2 Specific Requirements

The Fixed Vehicle Tracking Devices shall support the following functions:

4.2.1 The tracking device shall possess below events which will be sent to the central platform VTS system at required interval/ occurrence:

a) GPS positioning values.
b) Alerts information
c) Updating of GPS values at reconfigurable time intervals as per user requirement.
d) Storing of alerts information while disconnected from cellular network and updating back to central server upon connection to cellular network.
e) Low battery alerts.
f) Alerts on connection loss with tracking units.

g) Damage alerts from tracking units.

4.2.2 Vehicle particulars sent to the control room shall at least contain the following information:

a) Vehicle Registration Number
b) Driver's Name
c) Latitude (in decimal degrees)
d) Longitude (in decimal degrees)
e) Altitude
f) GPS timestamp (YYYY-MM-DD HH:MM:SS)
g) Speed (km/h)
h) Bearing (Direction In degrees)
i) Odometer (km)
j) Satellite_count (Receivable number of satellites)
k) HDOP (Horizontal Dilution of Precision-Quality of signal)
l) RSSI (Received Signal Strength Indication)
m) LAC (Local Area Code)
n) Cell_ID (Cell ID)
o) MCC (Mobile Country Code)
p) IMEI (International Mobile Equipment Identity)
q) Data Received Time (Time Received by Server – YYYY-MM-DD HH:MM:SS)
r) Data Process Time (Time insert into Database – YYYY-MM-DD HH:MM:SS)
s) MGS_ID (Unique data running number-64bits)

4.2.3 Vehicle specific activities for each event sent to the VTS

a) Movement/Logging (Default)
b) Engine ON
c) Engine OFF
d) Speeding
e) Harsh Braking
f) Harsh Turning
g) Harsh Acceleration
h) Panic Button (Driver's Side)*
i) Internal Battery Low
j) External Battery Disconnected

k) Excessive Idling
l) Accident reconstruction
m) Panic Button (Passenger Side)*
n) Device Tampering
o) Black box Data logging
p) External power voltage
q) Device internal battery voltage
r) Fuel reading*

Note: * Optional feature as per regulator or client requirements

4.2.3 Add on info

a) Distance travelled in km
b) Trip duration in minutes

4.2.4 SMS/ Data Specifications

Table 1: SMS/ Data Specifications

1	SMS	Normal MS-SMS data
2	Frequency	As per allowed bandwidth and frequency for operations in Tanzania
3	Data	GPRS (Type B class 10) and other technologies
4	SIM	ISO/ IEC 7816-3
5	Antenna	Suitable Antenna for efficient operation

4.2.5 GPS Specifications

Table 2: GPS Specifications

1	Frequency	As per allowed bandwidth and frequency for operations in Tanzania
2	C/A Code	Standard Positioning Service
3	Channels	Minimum 16-Channels
4	Sensitivity	Minimum –158 dBm Acquisition without external assistance
5	Accuracy	Horizontal: <6 meters (50%) Altitude: <11 meters (50%)

		Velocity: 0.06 m/sec
6	Antenna	Suitable antenna for mounting on target vehicles

4.2.6 Environmental Specifications

Table 3: Environmental Specifications

1	Temperature	Operating -20°C to +70°C
2	Humidity	5% to 95% RH non-condensing at +40°C
3	Enclosure	Certified IP 65 or equivalent
4	Vibration	IEC 60068-2-6
5	Shock	IEC 60068-2-27

5. Marking

5.1 The following information shall be marked on the VTS hardware indelibly and shall be externally visible:

a) Serial number and model designation,
b) IMEI number
c) Name and trademark of the manufacturer, and
d) Country of manufacture.

5.2 Certification Marking - The metal detector may also be marked with the TBS Certification Mark.

NOTE - The use of the Standard Mark is governed by the provisions of the Standards Act, 2009 and the Rules and Regulations made thereunder. Details of conditions under which a licence for the use of the TBS Certification Mark may be granted to manufacturers or processors may be obtained from the Tanzania Bureau of Standards.

6. TEST METHODS

6.1 General Test Conditions

6.1.1 *Environment* - At the time of the tests, the ambient temperature shall be between 5 and 40°C and the relative humidity shall be between 10 and 90 percent.

6.1.2 *Preparation* - New batteries of the type listed in the operator's manual shall be installed at the beginning of the tests and as instructed in any test method. Any set up or calibration adjustments specified in the operator's manual shall be performed, if required.

6.1.3 *Tests* - The following tests shall be performed:

a) Weight,
b) Battery consumption test,
c) Vibration test,
d) Shock test, and
e) Drop test.

6.2 Vibration Test

6.2.1 The VTS hardware shall be mounted and tested in accordance with IEC 60068-2-6 and an equal number of samples shall be subjected to vibration test in each of the three principal axes. The vibration severity should be 10 to 55 Hz within a duration of 12 hours.

6.2.2 After this test, the VTS hardware shall be visually examined and there shall not be any damage or deterioration. The performance of the VTS shall be checked, and it shall meet the requirement of 4.2.

6.3 Shock Test

6.3.1 The VTS hardware shall be mounted and tested in accordance with IEC 60068-2-27 at an acceleration of 1000 m/s^2 and for 6 ms.

6.3.2 After this test, the VTS shall-be visually examined and there shall not be any damage or deterioration. The performance of VTS shall be checked and it shall meet the requirement of 4.2.

6.4 Drop and Topple

6.4.1 The VTS shall be subjected to this test according to IEC 60068-2-31. The height of fall shall be 1000 mm.

6.4.2 After this test, the VTS shall be visually examined and there shall not be any damage or deterioration. The performance of VTS shall be checked and it shall meet the requirement of 4.2