Engineering Standard

SAES-T-492 4 June 2013

VHF/UHF Land-Mobile and Fixed Radio Communication

Document Responsibility: Communications Standards Committee

Saudi Aramco DeskTop Standards

Table of Contents

Previous Issue: 18 July 2012 Next Planned Update: 8 March 2014
Revised paragraphs are indicated in the right margin

Primary contact: Abdullatif, Abdulaahim Habib on 966-3-8801356

1 Scope

This standard presents minimum mandatory requirements for engineering of VHF/UHF mobile and fixed radio telecommunications systems which will promote compatibility between existing and future equipments. It includes transmitters, receivers, portable/personal transceivers and antennas for both base stations and vehicles.

2 Conflicts and Deviations

Any deviations, providing less than the mandatory requirements of this standard require written waiver approval as per Saudi Aramco Engineering Procedure SAEP-302.

3 References

The selection of material and equipment, and the design, construction, maintenance, and repair of equipment and facilities covered by this standard shall comply with the latest edition of the references listed below, unless otherwise noted.

3.1 Saudi Aramco References

Saudi Aramco Engineering Procedure

SAEP-302	*Instructions for Obtaining a Waiver of a Mandatory Saudi Aramco Engineering Requirement*

Saudi Aramco Engineering Standards

SAES-B-068	*Electrical Area Classification*
SAES-P-100	*Basic Power System Design Criteria*
SAES-T-795	*Communications Facility Grounding Systems*
SAES-Z-004	*Supervisory Control and Data Acquisition (SCADA) System*

Material Instructions (MIs)

MI-321.015	*Materials Requiring Saudi Arab Government Import Permits, Letters of Authorization, and/or Clearance Permits*
MI-321.021	*Import Permits for Communications Equipment*

General Instructions (GIs)

GI-1603.000	*Importation of Communications Equipment*

3.2 Industry Codes and Standards

Electronic Industries Association

EIA/TIA 329-C	*Minimum Standards for Communication Antennas - Base Station Antennas*
EIA/TIA 329.2-C	*Minimum Standards for Communication Antennas - Vehicular Antennas*
EIA/TIA 603-C	*Land Mobile FM or PM Communications Equipment Measurement and Performance Standards*

4 Adoption

The Land Mobile FM or PM Communications Equipment Measurement and Performance Standards, EIA/TIA 603-C; the Minimum Standards for Communication Antennas-Base Station Antenna, EIA/TIA 329-C; and the Minimum Standards for Communication Antennas-Vehicular Antennas, EIA/TIA 329.2-C as published by Electronic Industries Association (EIA/TIA) are hereby adopted as Saudi Aramco Engineering Standard SAES-T-492, VHF/UHF Land-Mobile and Fixed Radio Communication.

Deviations to EIA/TIA 603-C, EIA/TIA 329-C or EIA/TIA 329.2-C are identified as exceptions or additions in the Design section of this Standard.

5 Design

5.1 All radio equipments that are mentioned in this standard must conform to all government requirements for importation of radio telecommunication equipment into the Kingdom. For procedure on radio equipment importation, refer to the following Material Instructions (MIs) and GIs:

MI-321.015	*Materials Requiring Saudi Arab Government Import Permits, Letters of Authorization, and/or Clearance Permits*
MI-321.021	*Import Permits for Communications Equipment*
GI-1603.000	*Importation of Communications Equipment*

5.2 Area Classification

VHF/UHF radio systems operated in classified areas shall be according to SAES-B-068 and certified by Factory Mutual Research Corp. (FM) or any other association listed in paragraph 8.2 of SAES-P-100, "Basic Power System Design Criteria" for either:

Class 1, Division 1, Gas Groups C&D (Ethylene & Propane).

Class 1, Division 2, Gas Groups A, B, C & D (Acetylene, Hydrogen, Ethylene & Propane).

Or

Class 1, Zone 1, Gas Groups IIb (Ethylene & Propane).

Class 1, Zone 2, Gas Groups IIc (Acetylene, Hydrogen, Ethylene & Propane).

5.3 The battery shall be capable of carrying the load of the handheld radio for a minimum of 8 hours. Minimum battery capacity can be calculated per standard duty cycle of 10-10-80% as follows:

$$A = (I_{TX} * 10\% + I_{RX} * 10\% + I_S * 80\%) * 8$$

Where: A = Battery capacity required for 8 hours (mA-H)

I_{TX} = Transmit current (mA).

I_{RX} = Receive current (mA).

I_S = Standby current (mA).

Transmit, receive and standby currents are given by the manufacturer.

5.4 Communications Antennas

5.4.1 Base Station Antennas

Minimum standard is per EIA/TIA 329-C.

5.4.2 Vehicular Antennas

Minimum standard is per EIA/TIA 329-C.

Commentary Note:

The antennas requirements for Radio Frequency Dispatch unit (Desktop Radio) can be derived from the Vehicular Antennas requirement, since Radio Frequency Dispatch unit can be treated as a special case of Vehicular Antennas requirements.

5.5 When VHF/UHF radio is used for SCADA communications, it shall adhere to SAES-Z-004.

6 Installation

6.1 The instructions issued by the manufacturer shall be followed unless specific exceptions or deviations are noted in writing and/or on the installation/ construction drawings.

6.2 Grounding of radio equipment and antenna shall be in accordance with SAES-T-795, "Communications Facility Grounding Systems."

7 Testing and Inspection

Field testing and inspection of the radio equipment shall be recorded in a log book and handed to Proponent Department. Field Tests shall include, as a minimum requirement, the following:

7.1 Inspecting solid connections of wires and grounds to insure safety and proper operation.

7.2 Verifying the operating frequencies of transmitters and receivers.

7.3 Verifying RF power of transmitter and confirming coverage area of base station.

7.4 Checking RF cable and antenna matching and Voltage Standing Wave Ratio, VSWR.

7.5 Checking Signal-to-Noise Ratio, SINAD, for receiver systems.

Revision Summary

8 March 2009	Revised the "Next Planned Update." Reaffirmed the contents of the document, and reissued with several editorial changes.
18 July 2012	Editorial revision to change the primary contact.
4 June 2013	Editorial revision.