

# Engineering Standard

SAES-T-492

28 January, 2004

## VHF/UHF Land-Mobile and Fixed Radio Communication

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## Saudi Aramco DeskTop Standards

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## 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-P-100](#)

*Basic Power System Design Criteria*

[SAES-T-795](#)

*Communications Facility Grounding Systems*

#### 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*

### 3.2 Industry Codes and Standards

#### Electronic Industries Association

*EIA/TIA 603*

*Land Mobile FM or PM Communications  
Equipment Measurement and Performance  
Standards*

<i>EIA/TIA 329-B</i>	<i>Minimum Standards for Communication Antennas. Part I - Base Station Antennas</i>
<i>EIA/TIA 329-B-1</i>	<i>Minimum Standards for Communication Antennas. Part II - Vehicular Antennas</i>

## 4 Adoption

The Land Mobile FM or PM Communications Equipment Measurement and Performance Standards, EIA/TIA 603, the Minimum Standards for Communication Antennas Part I- Base Station Antenna, EIA/TIA 329-B and the Minimum Standards for Communication Antennas Part II- Vehicular Antennas 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, EIA/TIA 329-B or EIA/TIA 329-B-1 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):

<i>MI-321.015</i>	<i>Materials Requiring Saudi Arab Government Import Permits, Letters of Authorization, and/or Clearance Permits</i>
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<i>MI-321.021</i>	<i>Import Permits for Communications Equipment</i>
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5.2 VHF/UHF radio systems operated in classified areas shall be certified by Factory Mutual Research Corp. (FM) or any other association listed in paragraph 5.2.2 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 "Minimum Standard - The size of the handheld radio with battery shall not exceed 210 x 75 x 50 millimeters".

- 5.4 "Minimum Standard - The weight of the handheld radio with battery shall not exceed 850 grams".
- 5.5 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:

$$A = ( I_{TX} * 10\% + I_{RX} * 10\% + I_s * 80\% ) * 8 \quad (1)$$

Where: A = Battery capacity required for 8 hours (mA-H)  
I<sub>TX</sub> = Transmit current (mA).  
I<sub>RX</sub> = Receive current (mA).  
I<sub>s</sub> = Standby current (mA).

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

- 5.6 Communications Antennas
- 5.6.1 Base Station Antennas

Minimum standard is per EIA/TIA 329-B.

- 5.6.2 Vehicular Antennas

Minimum standard is per EIA/TIA 329-B-1.

## 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.
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- 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**

28 January, 2004

Revised the "Next Planned Update". Reaffirmed the contents of the document, and reissued with minor changes.