

TEST REPORT

Your Ref :

Date : 30 March 2001

Our Ref : **EMC/R/01960**
(Please quote our ref. no. in reply)

Page : 1 of 20

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**FORMAL REPORT ON TESTING IN ACCORDANCE WITH
SAR (Specific Absorption Rate) Requirements
using guidelines established in :**

FCC OET Bulletin 65 - Supplement C (Edition 97-01)

OF A

**GMRS Transceiver
[Model: RadioShack 19-903]**

TEST FACILITY PSB Electrical & Electronics Test Centre
1 Science Park Drive, Singapore 118221

APPLICANT RadioShack Corporation
Fort Worth, Texas 76102,
U.S.A.
Attn: Dwayne Campbell, Manager
Tel: 817-415-3203

MANUFACTURER Tekcom Industries Ltd
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JOB NUMBER 56S00019

TEST PERIOD 10 Feb 2001 - 15 Mar 2001

PREPARED BY

A handwritten signature in black ink, appearing to read "Gary Ng Ah Chye".

Gary Ng Ah Chye
Technical Executive

APPROVED BY

A handwritten signature in black ink, appearing to read "Teo Swee Hoe".

Teo Swee Hoe
Senior Engineer

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TEST SUMMARY

The product was tested in accordance with the following standards.

Test Results Summary

Test Standards	SAR Results	Pass / Fail
<ul style="list-style-type: none"> • FCC OET Bulletin 65-1997 (Supplement C) • ANSI/IEEE Standard C95.1-1993 	<p>Model Number: RadioShack 19-903 EUT: GMRS Transceiver Operating Frequencies: 462.5625MHz to 462.7250MHz</p> <p>Face-Hand Held Location: - SAR (averaged over 1 gram of tissue): 0.8395 W/kg (At 50% Duty Cycle) Max. Field Location: X = -35 mm, Y = 0 mm</p>	<p>Pass ^{Note 1}</p>

***Based on Spatial Peak Uncontrolled exposure / General population Level :**

Brain : 1.60 W/Kg

Body : 1.60 W/Kg

Note :

1. The Waist's SAR Results for the GMRS Transceiver [Model : RadioShack 19-903], was tested but not included in this test report as requested by the RadioShack Corporation's client.

PRODUCT DESCRIPTION

Description : The Equipment Under Test (EUT) is a **GMRS Transceiver**

Applicant : RadioShack Corporation
Fort Worth, Texas 76102,
U.S.A.
Attn: Dwayne Campbell
Tel: 817-415-3203

Model Number : RadioShack 19-903

Serial Numbers : 01000009

Operating Frequencies : 462.5625MHz to 462.7250MHz

Clock / Oscillator Frequency : 21.250MHz

Port / Connectors : Detachable Spiral Antenna (BNC-Male)

Input Power : 8.4V Ni-MH Rechargeable Battery 1300mA

Accessories : Belt-Clip, Headset with Mic. and Speaker

Modifications

No modifications were made.

EUT Views



Front of EUT



Left Side of EUT

PRODUCT DESCRIPTION



Rear of EUT



Right Side of EUT



EUT with Mic.&Speaker

TEST RESULTS

The measurement results were obtained with the EUT tested in the conditions described in this report (Annex A). Detailed measurement data and plots indicating the maximum SAR location of the EUT are indicated as follow.

1. Test Results

EUT Information		Condition	
Radio Type	GMRS Transceiver.	Robot Type	6 Axis
Model Number	RadioShack 19-903	Scan Type	SAR
Serial Number	01000009	Measured Field	E
Frequency Band (MHz)	465MHz	Phantom Type	Open Back Full Body
Frequency Tested (MHz)	462.5625MHz to 462.7250MHz	Phantom Position	Face-Hand Held
Rated Output Power (W)	5.0 W (Ch0- Ch14) - Hi Power 1.0 W (Ch0 - Ch14) - Lo Power	Room Temperature	23 ± 1 °C
Antenna Type	Detachable Spiral Antenna (BNC-Male)		
Signal Type	FM		
Duty Cycle	50%		

Type of Tissue	Brain
Target Frequency (MHz)	465
Target Dielectric Constant	43.5
Target Conductivity (S/m)	0.87
Composition (by weight)	Water (42.72%) Sugar (54.37%) Salt (2.72%) Bactericide (0.19%)
Measured Dielectric Constant	44.4
Measured Conductivity (S/m)	0.90
Probe Name	PSB-1-E3
Probe Orientation	Isotropic
Probe Offset (mm)	3.0
Sensor Factor	10.8
Conversion Factor	0.715
Calibration Date (M/M/DD/YY)	26/02/01

TEST RESULTS

Face-Hand Held SAR Test Results for Model: RadioShack 19-903

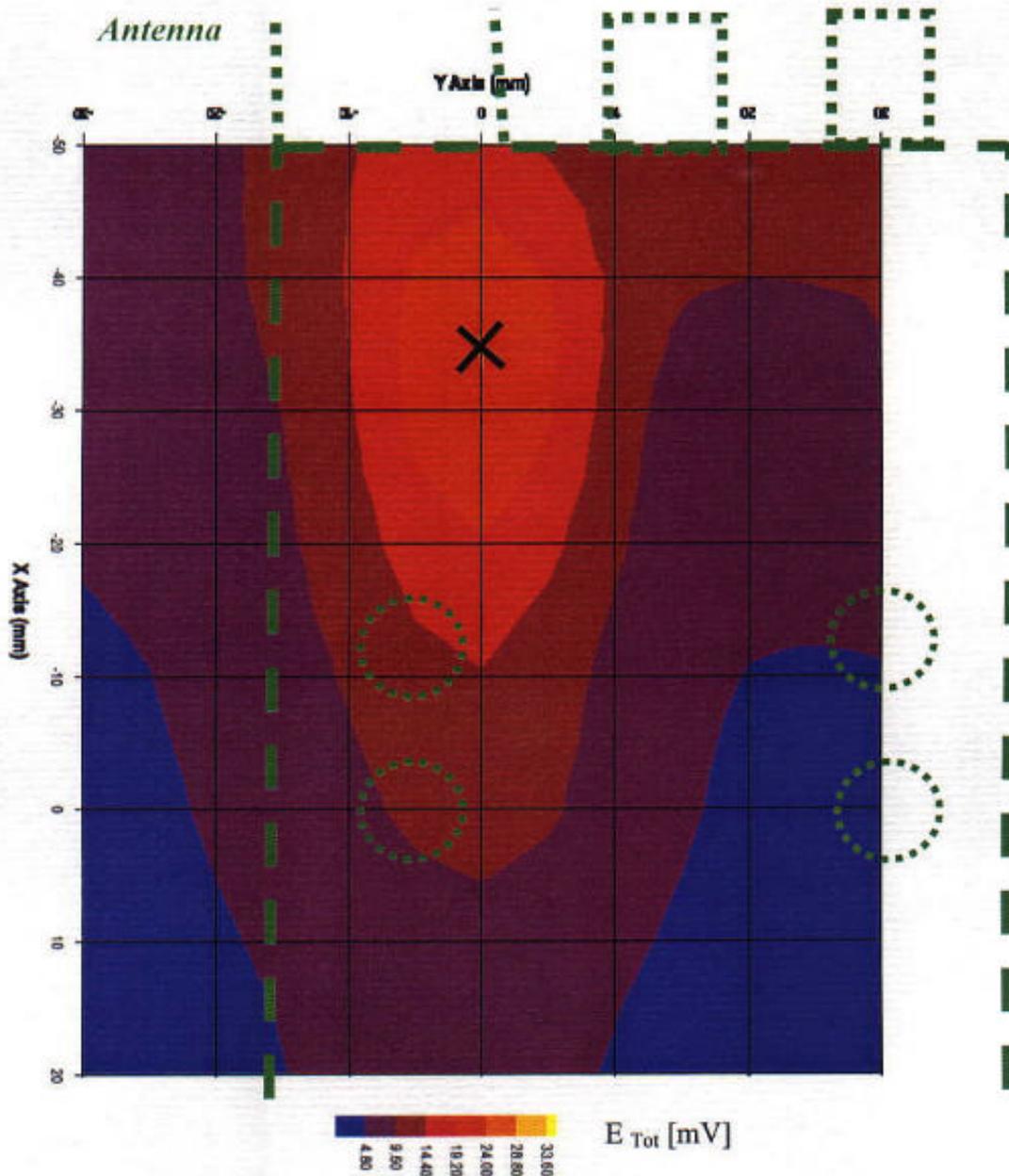
Channel	Frequency (MHz)	Antenna Position	Max. Conducted Power (before SAR measurement)	Max. Conducted Power (after SAR measurement)	1 cm Voltage (mV)	SAR (W/Kg)	
8	462.550	Fixed	4.53 Watts	3.83 Watts	19.987	1.679	0.8395 (50% Duty Cycle)
14	462.725	Fixed	4.51 Watts	3.62 Watts	8.186	1.346	0.673 (50% Duty Cycle)
Tissue : Brain Dielectric Constant : 44.4 Conductivity : 0.90 Probe : PSB-I-E3 Conversion Factor = 0.715				ANSI / IEEE C95.1 1992 – Safety Limit Spatial Peak Uncontrolled Exposure / General Population Brain : 1.60 W/Kg (averaged over 1 gram)			

- Remarks:
1. All modes of operations were investigated and the worst-case SAR levels are reported.
 2. A fully charged Ni-MH Battery is used for each mode of operation.
 3. The worst-case SAR value was found to be 0.8395W/Kg (50% Duty Cycle), which is lower than the maximum limit of 1.60 W/Kg.

TEST RESULTS

Face-Hand Held SAR Measurement

Model: RadioShack 19-903 Ch8: 462.5500MHz Max. Conducted Power = 4.53 Watts
Brain Tissue : $\epsilon_r = 44.4$ $\sigma = 0.90$ mho/m $\rho = 1.0$ g/cm³
Probe : PSB-I-E3 Conversion Factor = 0.715
SAR (1 gram) = 1.679 W/Kg (100% Duty Cycle) SAR (10 gram) = 0.910 W/Kg (100% Duty Cycle)
Max. Field Location: X = -35 mm Y = 0 mm



TEST RESULTS

Face-Hand Held SAR Measurement

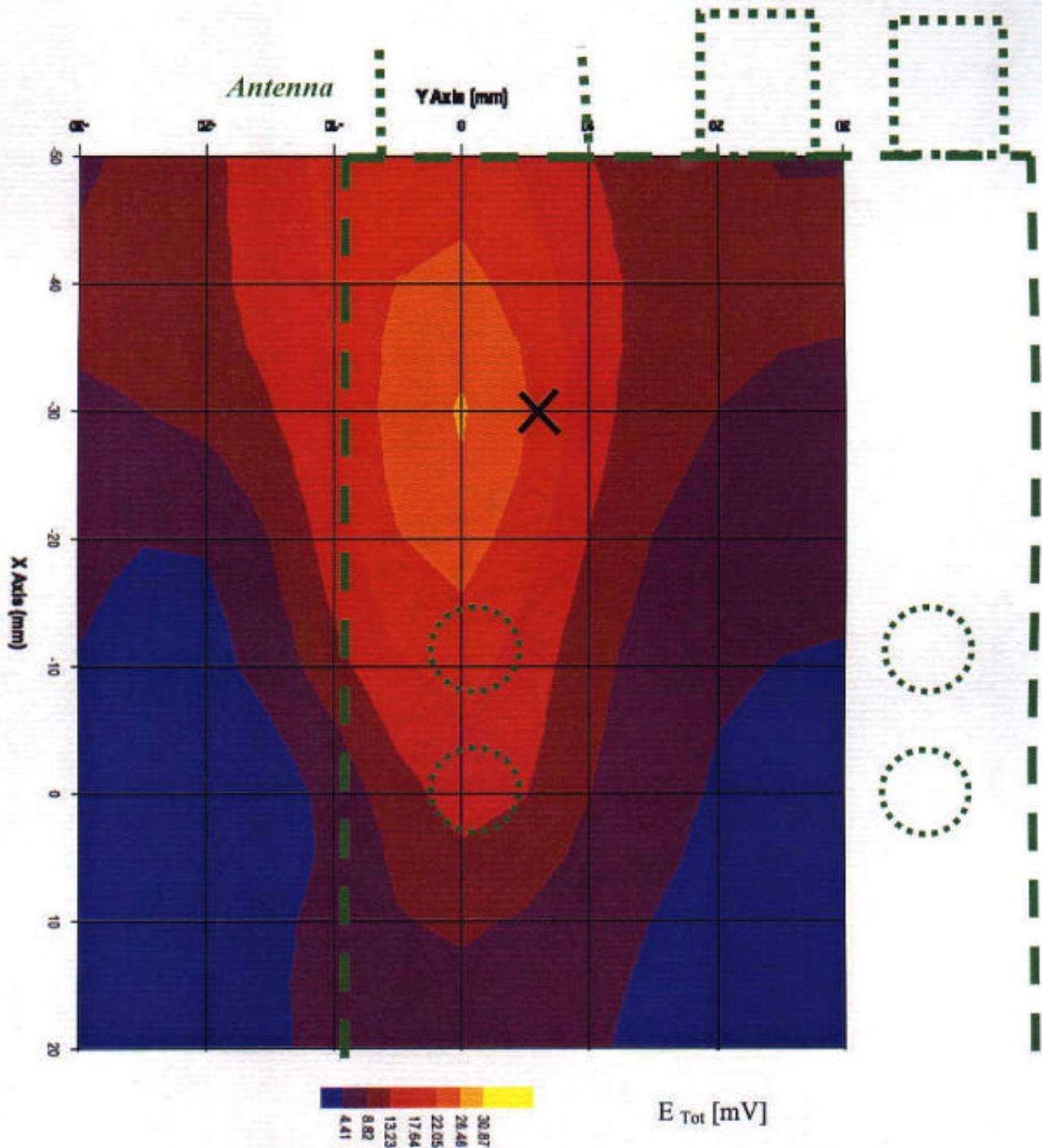
Model: RadioShack 19-903 Ch14: 462.725MHz Max. Conducted Power = 4.51 Watts

Brain Tissue: $\epsilon_r = 44.4$ $\sigma = 0.90$ mho/m $\rho = 1.0$ g/cm³

Probe : PSB-I-E3 Conversion Factor = 0.715

SAR (1 gram) = 1.346 W/Kg (100% Duty Cycle) SAR (10 gram) = 0.740 W/Kg (100% Duty Cycle)

Max. Field Location: X = -30 mm Y = 0 mm



ANNEX A

TEST INSTRUMENTATION & GENERAL PROCEDURE

A.1 Measurement System Specifications

Positioning Equipment	Probe
Type : 3D Near Field Scanner	Sensor : E-Field
Location Repeatability : 0.1mm	Spatial Resolution : 0.1 cm ³
Speed 180 °/sec	Isotropic Response : ± 0.25 dB
AC motors	Dynamic Range : 2 kW/g to 100 mW/g
Computer	Phantom
Type : 700 MHz Pentium III	Tissue: Simulated Tissue with electrical characteristics similar to those of the human at normal body temperature.
Memory : 128MB SDRAM	Shell : Fiberglass human shell shaped (1.5 mm thick)
Operating System : Windows NT	
Monitor : 17" LCD	

A.2 Test Procedures

In the SAR measurement, the positioning of the probes must be performed with sufficient accuracy to obtain repeatable measurements in the presence of rapid spatial attenuation phenomena. The accurate positioning of the E-field probe is accomplished by using a high precision robot. The robot can be taught to position the probe sensor following a specific pattern of points. In a first sweep, the sensor is positioned as close as possible to the interface, with the sensor enclosure touching the inside of the fiberglass shell. The SAR is measured on a grid of points, which covers the curved surface of the phantom in an area larger than the size of the DUT. After the initial scan, a high-resolution grid is used to locate the absolute maximum measured energy point. At this location, attenuation versus depth scan will be accomplished by the measurement system to calculate the SAR value.

A.3 Phantom

The phantom used in the evaluation of the RF exposure of the user of the wireless device is a clear fiberglass enclosure 1.5 mm thick, shaped like a human head or body and filled with a mixture simulating the dielectric characteristics of the brain, muscle or other types of human tissue. The maximum width of the cranial model is 17 cm, the cephalic index is 0.7 and the crown circumference of the cranial model is 61 cm. The ear is 6 mm above the outer surface of the shell.