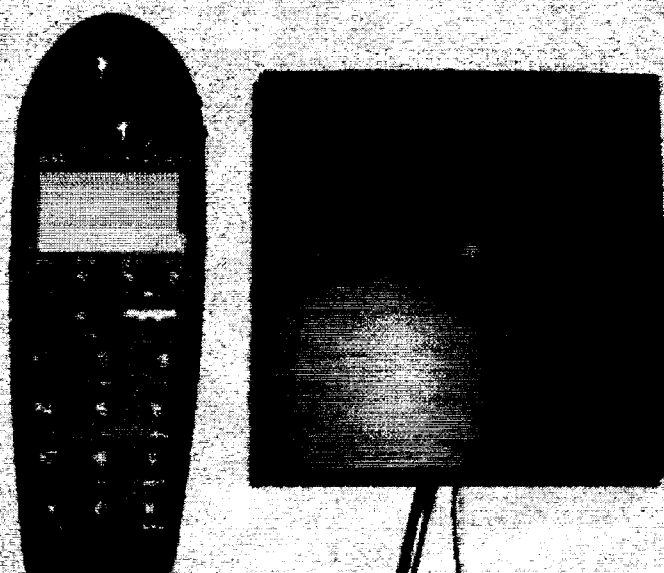


Technology Centre
Research Group E561
Measurement Report

••••• T ••Nova•

SAR measurement for wireless telephone



Model	RTX 2G4
IPEI	00064801A6
Date of Measurement:	12/20/00 and 01/18/01
Number of measurements	14
Measurement Report:	02/07/01

Contract awarder:	ETS Dr. Genz GmbH
Contract acceptor:	T-Nova GmbH
Direction:	Dr.-Ing. B. Marx, E561a
Measurement:	Dipl.-Ing. J. Buhl, E561g
Report:	Dipl.-Ing. J. Buhl, E561g

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1. General Description and Explanation

1.1 Measurement parameters

Measured frequencies f = 2400 to 2480MHz

Conversion factor of probe $ConF$ = 4.8

Max. depth of liquid in phantom h = 12 cm

Electrical characteristics of liquid in the phantom, which approximate the mean values from those of grey and white brain tissue (after Gabriel):

ϵ_r = 38.0

σ = 2.49

1.2 Measurement precision

The obtainable precision corresponds to the precision of the measurement platform at the time of delivery from the manufacturer. Since that time no change of hardware has been made. The measurement software has been updated to Version 3.1c.

2. Measurement procedure

2.1 Description of telephone positioning

The basis for the measurements is the European Specification ES 59005 of October 1998, referred hereafter as "CENELEC" or "CENELEC Draft Standards" for brevity.

The measurement procedure with the portable part was carried out so that the positions listed below correspond to the diagram shown in the CENELEC Draft Standards, section 6.3.1.1, for the left side of the head of the "Generic Twin Phantom".

1. "intended use position" corresponds to point (1) of the CENELEC Draft Standards,
2. "Optional condition 1 (touching position)" corresponds to point (2) of the CENELEC Draft Standards, the angle between the reference line of the phone and the line connecting the auditory canal openings reduced until the device touches the face of the phantom the first time, with a rubber ring of 2 mm thick material simulating the users ear.
3. "Optional condition 2 (100° rotated backwards)" corresponds to CENELEC point (3),
4. "Optional condition 3 (tilted position)" corresponds to CENELEC point (4).

Measurement report for RTX RFP-2G4

The fixed part has been measured in the following positions:

1. Touching the flat part of the "Generic Twin Phantom" with the centre of the case,
2. touching the flat part of the "Generic Twin Phantom" nearest with the antenna,
3. touching the head of the phantom besides the ear with the centre of the case,
4. touching the head of the phantom besides the ear nearest with the antenna.

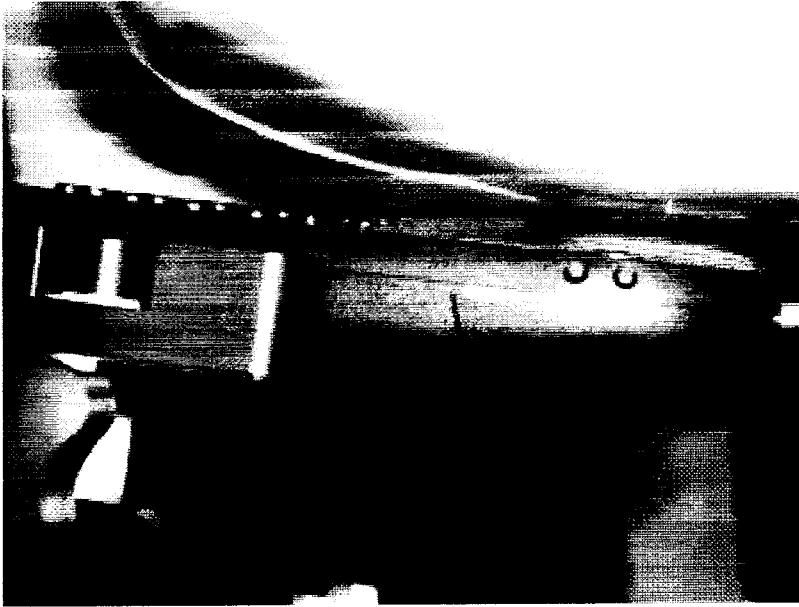


Fig. 1.
portable part,
position "intended use"

Measurement report for RTX RFP-2G4

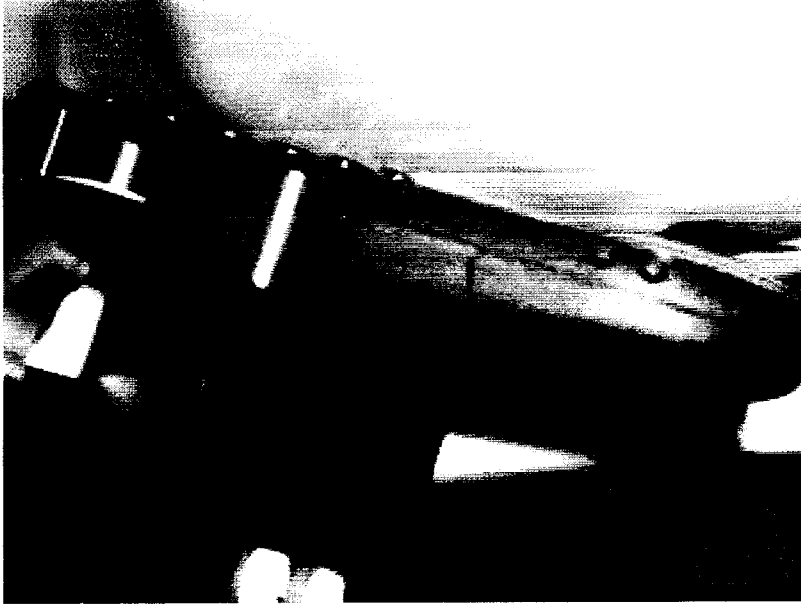


Fig. 2.
portable part,
position "touching "

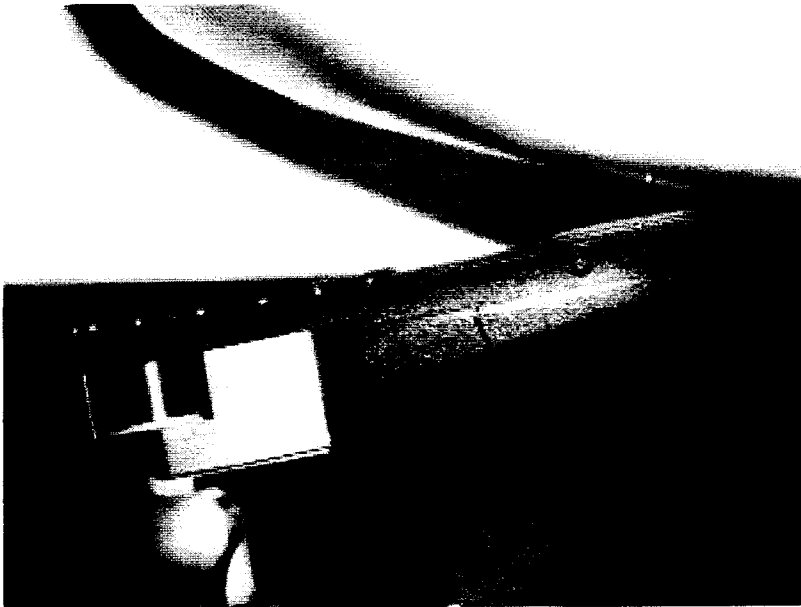


Fig. 3.
portable part,
position "100°"

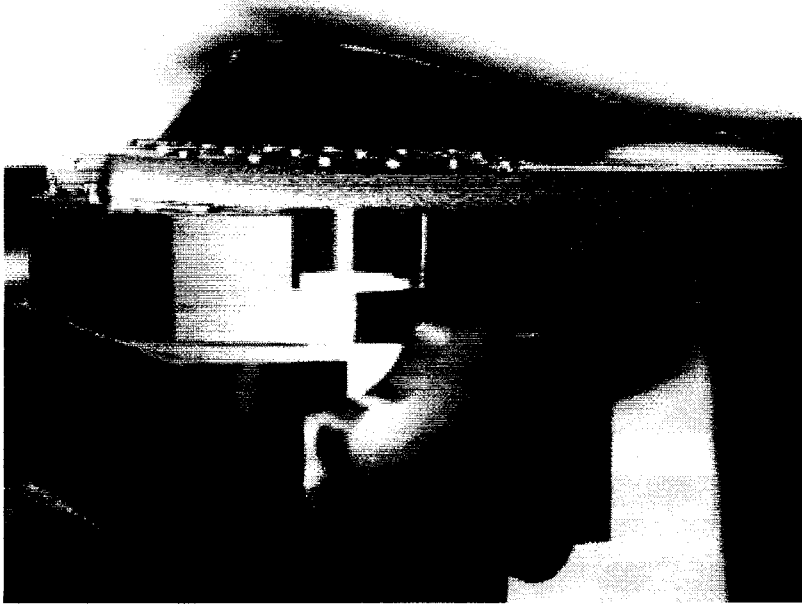


Fig. 4.
portable part,
position "tilted"

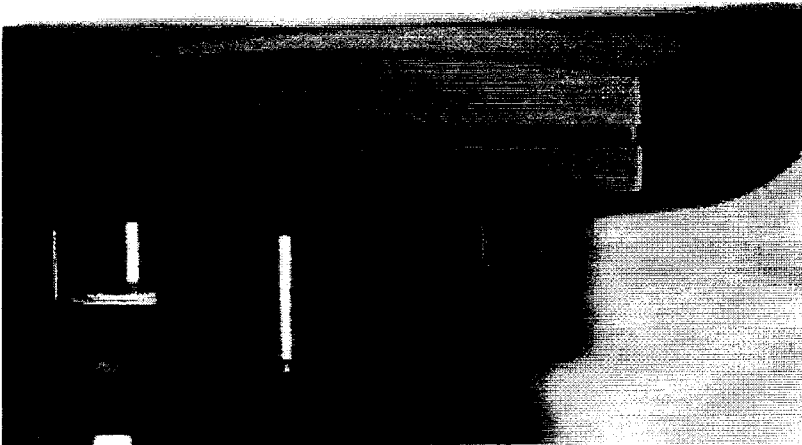


Fig. 5.
fixed part,
touching the flat part of the "Generic Twin Phantom" with the centre of the case

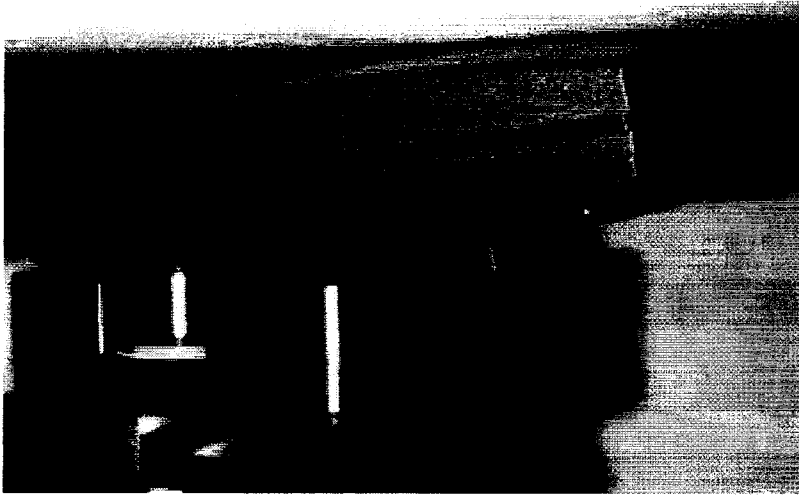


Fig. 6.
fixed part,
touching the flat part of the "Generic Twin Phantom" nearest with the antenna

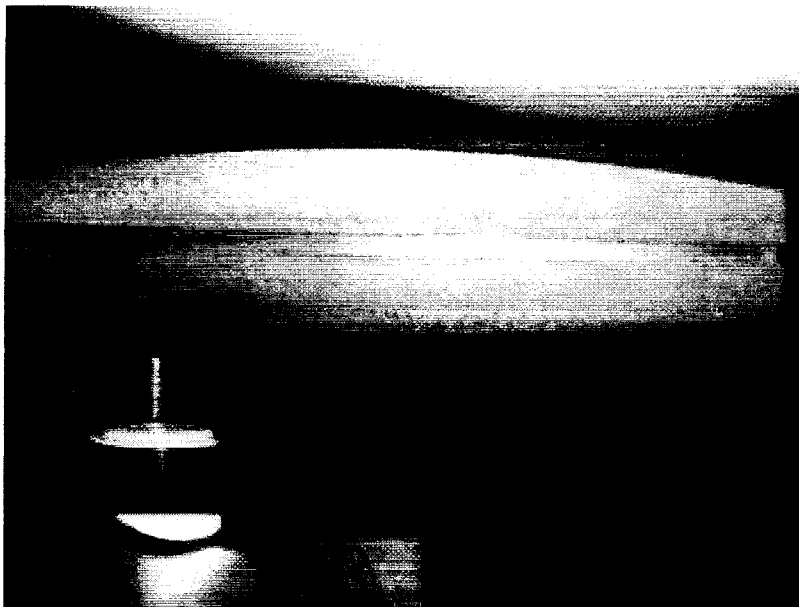


Fig. 7.
fixed part,
touching the head of the phantom besides the ear with the centre of the case



Fig. 8.
fixed part,
touching the head of the phantom besides the ear nearest with the antenna.

2.2 Important points; other matters

- none -

3. Overview of the individual measurements and summary of the measured values

Device	Position	2400 MHz		2440 MHz		2480 MHz	
		SAR 1g	SAR 10g	SAR 1g	SAR 10g	SAR 1g	SAR 10g
portable part	intended use			0,16	0,076		
	touching			0,12	0,063		
	100°			0,15	0,073		
	tilted	0,21	0,1	0,17	0,082	0,18	0,086
fixpart, ant. 1	head, centre			0,085	0,047		
fixpart, ant. 2				0,09	0,049		
fixpart, ant. 1	head, antenna			0,13	0,067		
fixpart, ant. 2				0,24	0,11		
fixpart, ant. 1	flat, centre			0,12	0,065		
fixpart, ant. 2				0,11	0,055		
fixpart, ant. 1	flat, antenna			0,18	0,083		
fixpart, ant. 2				0,13	0,072		
all SAR values in mW/g							

The measured 10g values are a factor of more than 15 under the prescribed value.

4. Graphical presentation of the measured values

Displayed are the results from area sampling "coarse scan" of each position.

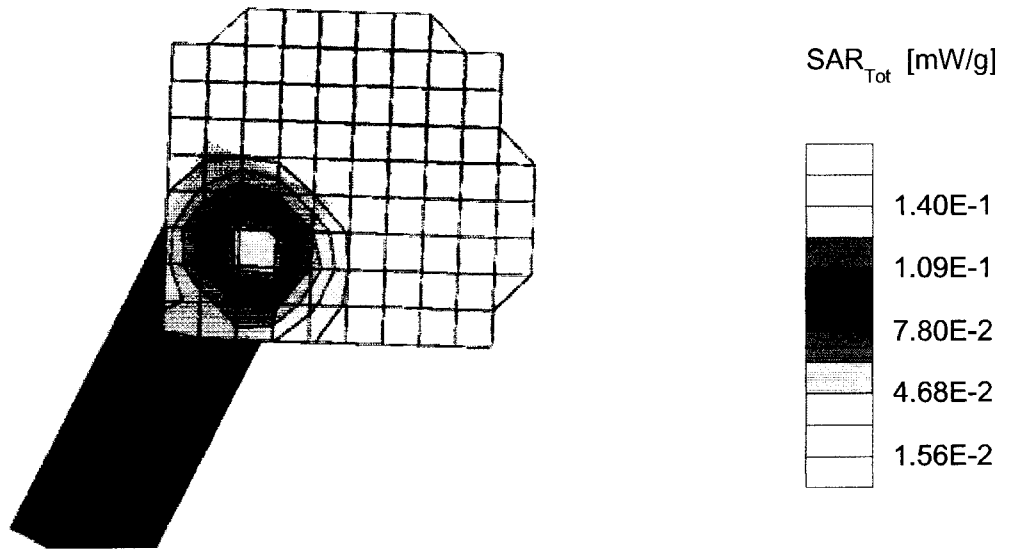
RTX Kirk Z-3040

Intended use

Generic Twin; Left Hand

Frequency: 2440 MHz; $\sigma = 2.49$ mho/m $\epsilon_r = 38.0$ $\rho = 1.00$ g/cm³

SAR (1g): 0.159 mW/g, SAR (10g): 0.0757 mW/g



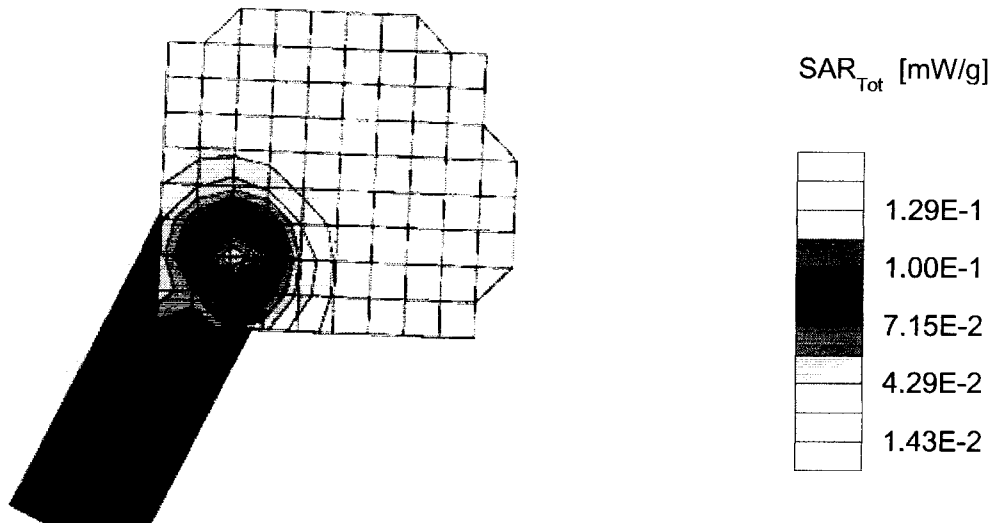
RTX Kirk Z-3040

Touching

Generic Twin; Left Hand

Frequency: 2440 MHz; $\sigma = 2.49$ mho/m $\epsilon_r = 38.0$ $\rho = 1.00$ g/cm³

SAR (1g): 0.124 mW/g, SAR (10g): 0.0626 mW/g



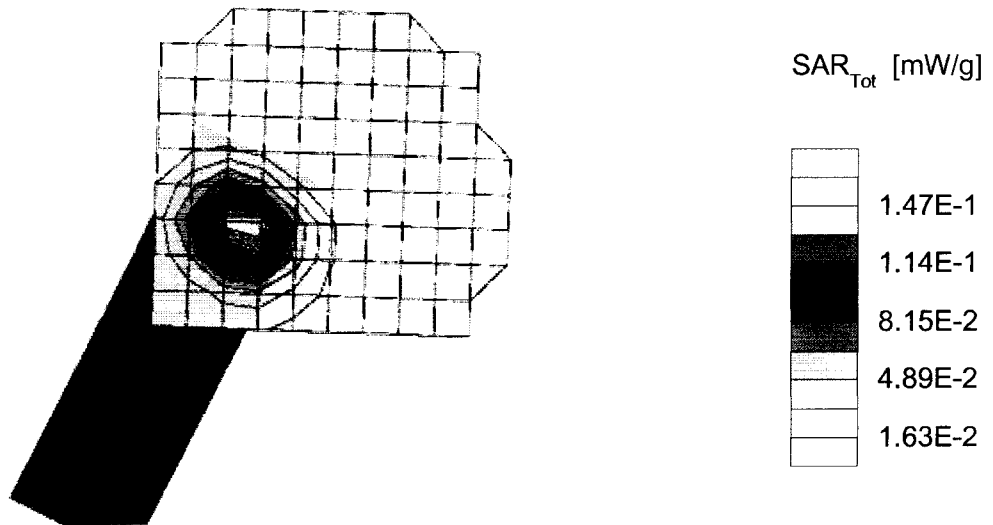
RTX Kirk Z-3040

Position 100°

Generic Twin; Left Hand

Frequency: 2440 MHz; $\sigma = 2.49$ mho/m $\epsilon_r = 38.0$ $\rho = 1.00$ g/cm³

SAR (1g): 0.154 mW/g, SAR (10g): 0.0728 mW/g



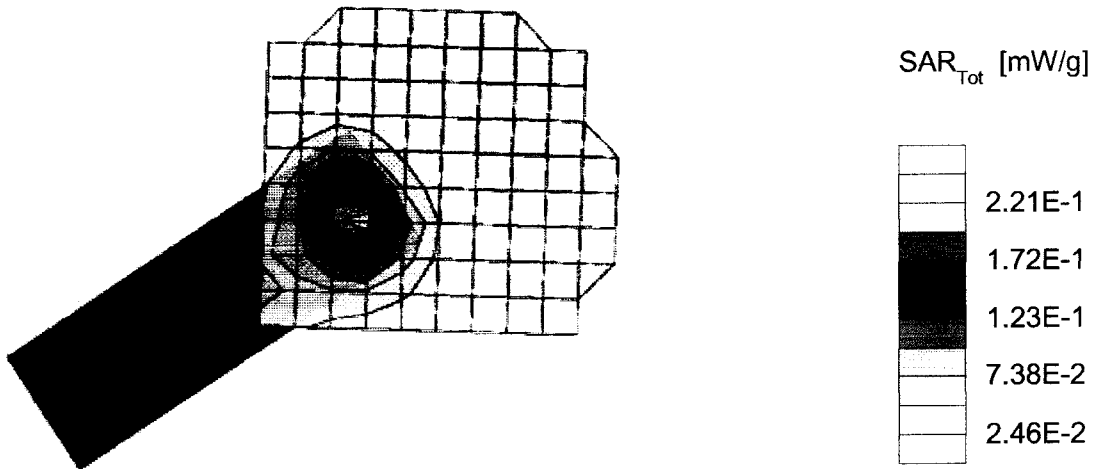
RTX Kirk Z-3040

Tilted, TX_0

Generic Twin; Left Hand

Frequency: 2400 MHz; $\sigma = 2.49$ mho/m $\epsilon_r = 38.0$ $\rho = 1.00$ g/cm³

SAR (1g): 0.212 mW/g, SAR (10g): 0.102 mW/g



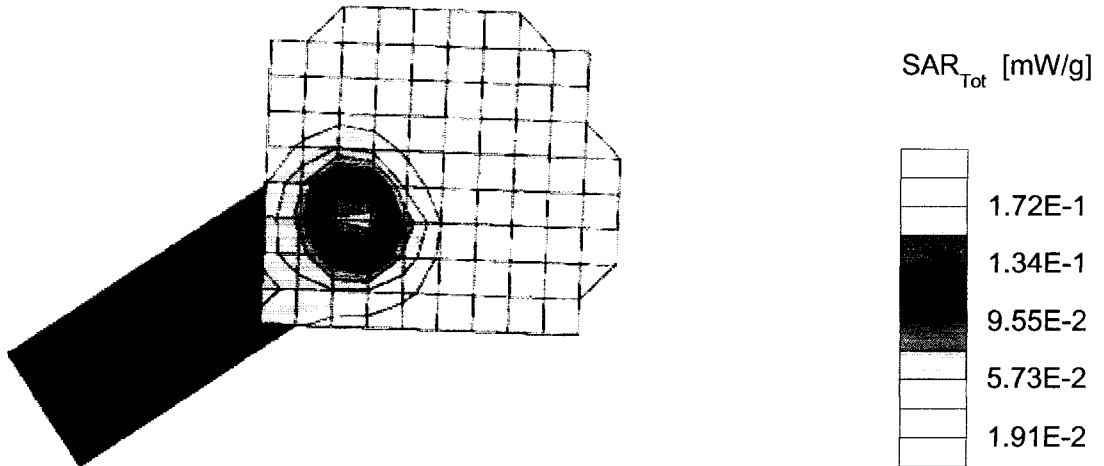
RTX Kirk Z-3040

Tilted, TX_40

Generic Twin; Left Hand

Frequency: 2440 MHz; $\sigma = 2.49$ mho/m $\epsilon_r = 38.0$ $\rho = 1.00$ g/cm³

SAR (1g): 0.167 mW/g, SAR (10g): 0.0820 mW/g



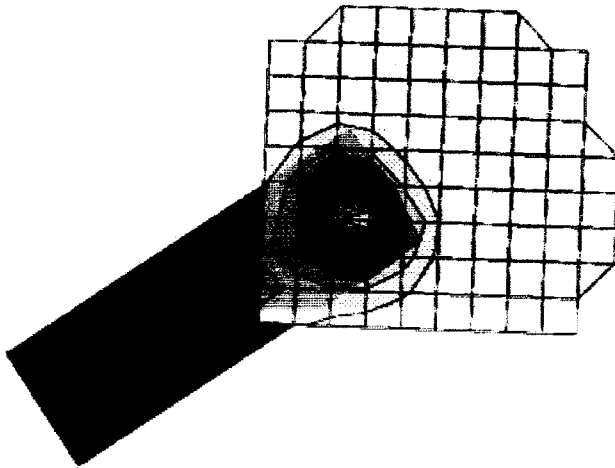
RTX Kirk Z-3040

Tilted, TX_78

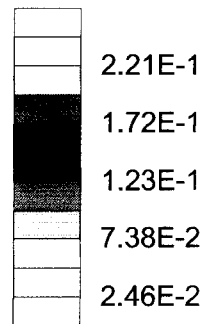
Generic Twin; Left Hand

Frequency: 2480 MHz; $\sigma = 2.49$ mho/m $\epsilon_r = 38.0$ $\rho = 1.00$ g/cm³

SAR (1g): 0.178 mW/g, SAR (10g): 0.0857 mW/g



SAR_{Tot} [mW/g]



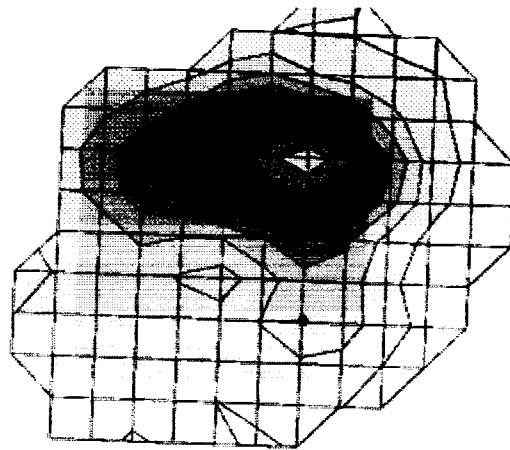
RTX RFP 2G4

Fixpart with centre at ear of head phantom, antenna 1

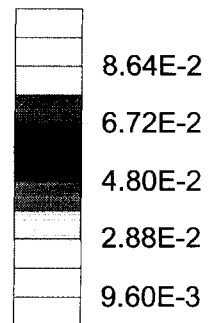
Generic Twin; Left Hand

Frequency: 2440 MHz; $\sigma = 2.49$ mho/m $\epsilon_r = 38.0$ $\rho = 1.00$ g/cm³

SAR (1g): 0.0849 mW/g, SAR (10g): 0.0466 mW/g



SAR_{Tot} [mW/g]



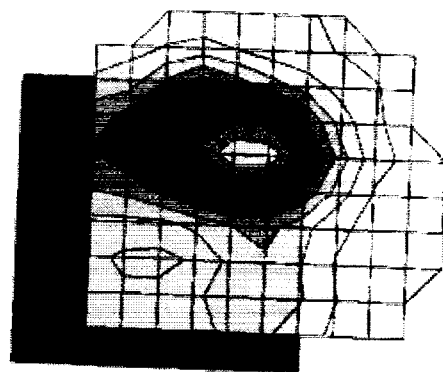
RTX RFP 2G4

Fixpart with centre at ear of head phantom, antenna 2

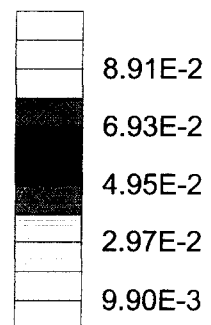
Generic Twin; Left Hand

Frequency: 2440 MHz; $\sigma = 2.49$ mho/m $\epsilon_r = 38.0$ $\rho = 1.00$ g/cm³

SAR (1g): 0.0898 mW/g, SAR (10g): 0.0491 mW/g



SAR_{Tot} [mW/g]



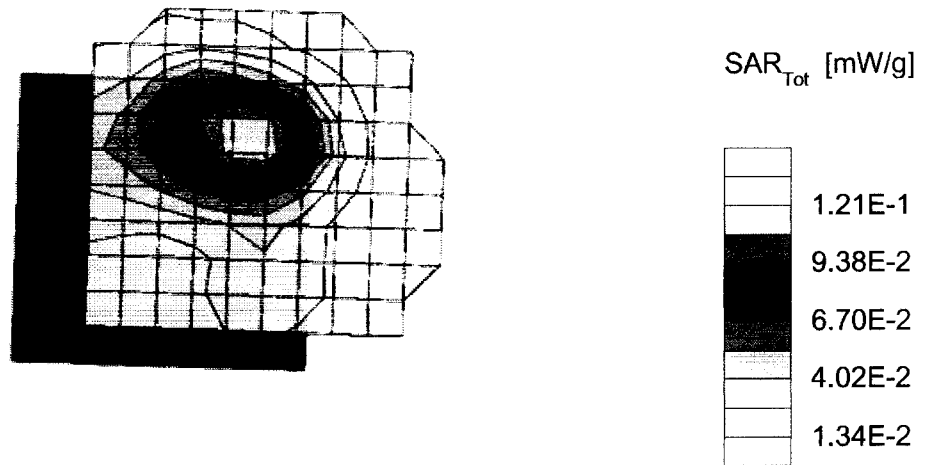
RTX RFP 2G4

Fixpart with antenna 1 near head phantom

Generic Twin; Left Hand

Frequency: 2440 MHz; $\sigma = 2.49$ mho/m $\epsilon_r = 38.0$ $\rho = 1.00$ g/cm³

SAR (1g): 0.130 mW/g, SAR (10g): 0.0671 mW/g



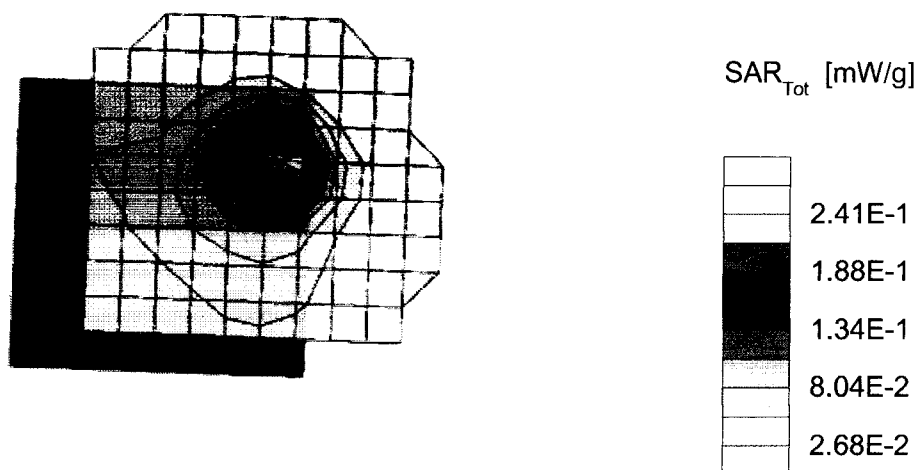
RTX RFP 2G4

Fixpart with antenna 2 near head phantom

Generic Twin; Left Hand

Frequency: 2440 MHz; $\sigma = 2.49$ mho/m $\epsilon_r = 38.0$ $\rho = 1.00$ g/cm³

SAR (1g): 0.238 mW/g, SAR (10g): 0.106 mW/g



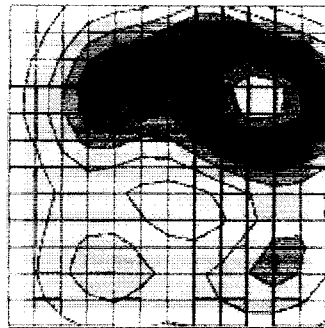
RTX RFP 2G4

Fixpart with centre near flat phantom, antenna 1

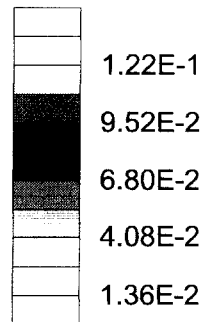
Generic Twin; Flat

Frequency: 2440 MHz; $\sigma = 2.49$ mho/m $\epsilon_r = 38.0$ $\rho = 1.00$ g/cm³

SAR (1g): 0.122 mW/g, SAR (10g): 0.0650 mW/g



SAR_{Tot} [mW/g]



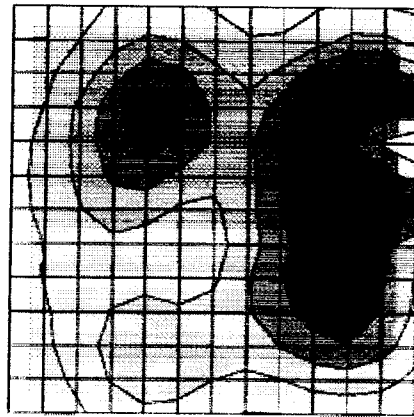
RTX RFP 2G4

Fixpart with centre near flat phantom, antenna 2

Generic Twin; Flat

Frequency: 2440 MHz; $\sigma = 2.49$ mho/m $\epsilon_r = 38.0$ $\rho = 1.00$ g/cm³

SAR (1g): 0.107 mW/g, SAR (10g): 0.0551 mW/g



SAR_{Tot} [mW/g]



1.14E-1

8.89E-2

6.35E-2

3.81E-2

1.27E-2

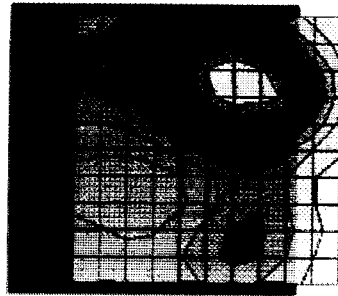
RTX RFP 2G4

Fixpart with antenna 1 near flat phantom

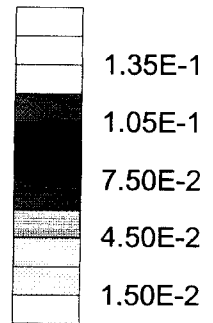
Generic Twin; Flat

Frequency: 2440 MHz; $\sigma = 2.49$ mho/m $\epsilon_r = 38.0$ $\rho = 1.00$ g/cm³

SAR (1g): 0.134 mW/g, SAR (10g): 0.0722 mW/g



SAR_{Tot} [mW/g]



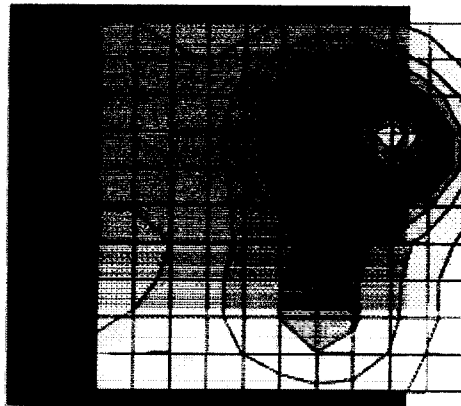
RTX RFP 2G4

Fixpart with antenna 2 near flat phantom

Generic Twin; Flat

Frequency: 2440 MHz; $\sigma = 2.49$ mho/m $\epsilon_r = 38.0$ $\rho = 1.00$ g/cm³

SAR (1g): 0.178 mW/g, SAR (10g): 0.0831 mW/g



SAR_{Tot} [mW/g]

