



Intertek Testing Services

Specific Absorption Rate (SAR) Test Report

for

Tellus Technology

on the

CDPD Modem for PDA

Model Number: WIPClip-V131C

Test Report: 20226741

Date of Report: January 25, 2001

Job #: J20022674


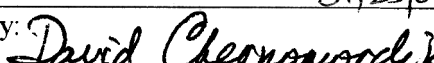
Date of Test: January 15 - 16, 2001

Total No. of Pages Contained in this Report: 19 + Data Sheets



NVLAP Laboratory Code 200201-0
Accredited for testing to FCC Parts 15



Tested by:  01/25/01	Suresh Kondapalli
Reviewed by: 	EMC Site Manager

Review Date: 01/25/01

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Tellus Technology, Model No: WIPClip-V131C

Date of Test: January 15 - 16, 2001

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1.0 Job description
1.1 Client Information

The WIPClip-V131C has been tested at the request of

Company: Tellus Technology Inc.
6140 Stevenson Blvd.
Fremont, CA 94538
USA

Name of contact: Mr. Ray Baker
Telephone: (510) 743-2100 X150
Fax: (510) 580-1600

1.2 Equipment under test (EUT)

Product Descriptions:

Equipment	CDPD Modem for PDA		
Trade Name	Tellus Technology	P/N.	WIPClipV131C
FCC ID	NZ6V8131C	S/N No.	Not Labeled
Category	Portable, Handheld	RF Exposure	Uncontrolled Environment
Frequency Band	824 -849 MHz	System	CDPD Modem

EUT Antenna Description			
Type	Dipole	Configuration	Fixed, 360° Rotation
Dimensions	30mm (L),	Gain	0 dBi

Use of Product**Manufacturer:** SAME as above.**Production is planned:** [X] Yes, No**EUT receive date:** January 14, 2001**EUT received condition:** Good working condition prototype**Test start date:** January 15, 2001**Test end date:** January 16, 2001

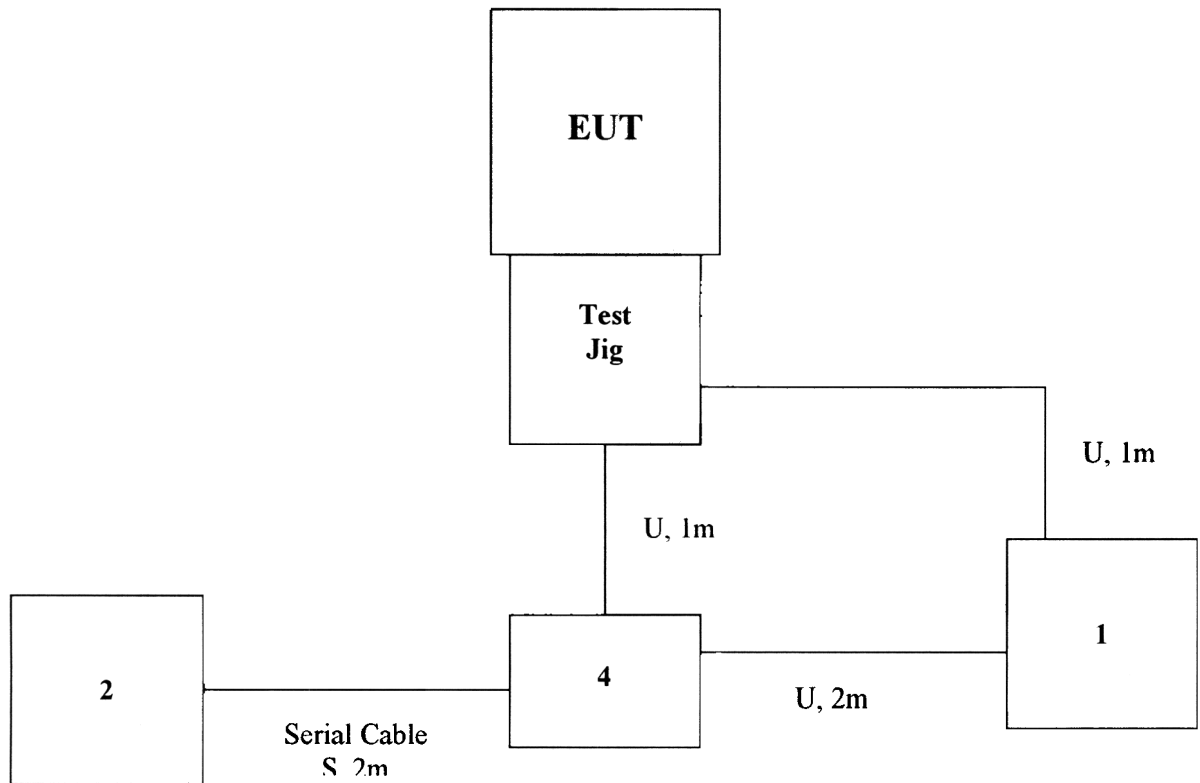
.3 Test plan reference

FCC rule part 2.1093, FCC Docket 96-326 & Supplement C to OET Bulletin 65

1.4 System test configuration

1.4.1 System block diagram & Support equipment

The diagram shown below details test configuration of the equipment under test.



S:	Shielded	U:	Unshield	F:	With Ferrite Core
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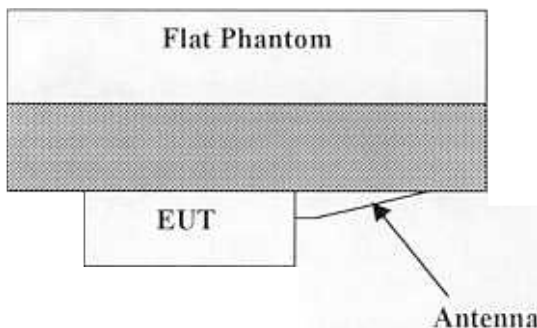
Support Equipment				
Equip. #	Equipment	Manufacturer	Model #	S/N #
1	Power Supply	HP	6236B	
2	Laptop PC	Compaq	Presario	
3	Test Jig	Tellus		
4	RS-232-Adaptor	Tellus		

.4.2 Test Position

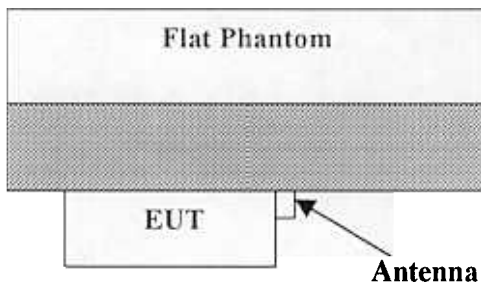
Three test configurations were used to show compliance with the FCC RF human exposure requirements. In all configurations, the WIPClip-V131C was configured for testing in a typical fashion (as a customer would normally use it). Due to the application and usage of the product, SAR measurements with the human head region are not necessary. Table 1 below describes the setup and condition:

Table 1, Equipment Setup	
Configuration	Description
A	<ul style="list-style-type: none"> • Antenna in horizontal position, distance from antenna to Phantom = 2mm • Simulating close proximity of human body
B	<ul style="list-style-type: none"> • Antenna in horizontal position, distance from antenna to Phantom = 2mm Antenna turned 90 Deg Left Simulating close proximity of human body

Configuration A



Configuration B



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1.4.3 Test Condition

During tests, the worst case data (max. RF coupling) was determined with following conditions:

EUT Antenna	Fixed length	Orientation	N/A
Usage	Handheld Device Operates with a PDA	Distance between antenna axis at the joint and the liquid surface:	2mm
Simulating human Body/hand	Yes	EUT Battery	Unit powered from External Power supply.
Power output	26.0 dBm (ERP), 28dBm (EIRP)		

The spatial peak SAR values were accessed for lowest, middle and highest operating channels defined by the manufacturer.

Antenna port power measurement was performed, with the HP 435A power meter, before and after the SAR tests to ensure that the WIPClip-V131C operated at the highest power level.

1.5 Modifications required for compliance

No modifications were implemented by Intertek Testing Services.

1.6 Additions, deviations and exclusions from standards

No additions, deviations or exclusions have been made from standard.

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2.0 SAR EVALUATION**2.1 SAR Limits**

The following FCC limits for SAR apply to devices operate in General Population/Uncontrolled Exposure environment:

EXPOSURE (General Population/Uncontrolled Exposure environment)	SAR (W/kg)
Average over the whole body	0.08
Spatial Peak (1g)	1.60
Spatial Peak for hands, wrists, feet and ankles (10g)	4.00

2.2 Configuration Photographs

SAR measurement Test Setup



**SAR measurement Test Setup
(Configuration A)**



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SAR measurement Test Setup (cont.)

(Configuration B)



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2.3 System Verification

Prior to the assessment, the system was verified to the $\pm 5\%$ of the specifications by using the system validation kit. The validation was performed at 1800 MHz.

Validation kit	Targeted SAR _{1g} (mW/g)	Measured SAR _{1g} (mW/g)
D900V2, S/N #: 0013	4.03	3.97

2.4 Evaluation Procedures

The SAR evaluation was performed with the following procedures:

- a. SAR was measured at a fixed location above the reference point and used as a reference value for the assessing the power drop.
- b. The SAR distribution at the exposed side of the flat Phantom was measured at a distance of 30 mm from the inner surface of the shell. The area covered the entire dimension of the head and the horizontal grid spacing was 20 mm x 20 mm. Based on this data, the area of the maximum absorption was determined by spline interpolation.
- c. Around this point, a volume of 32 mm x 32 mm x 34 mm was assessed by measuring 5 x 5 x 7 points. On the basis of this data set, the spatial peak SAR value was evaluated with the following procedure:
 - i) The data at the surface were extrapolated, since the center of the dipoles is 2.7 mm away from the tip of the probe and the distance between the surface and the lowest measurement point is 1.6 mm. The extrapolation was based on a least square algorithm. A polynomial of the fourth order was calculated through the points in Z-axis. This polynomial was then used to evaluate the points between the surface and the probe tip.
 - ii) The maximum interpolated value was searched with a straight-forward algorithm. Around this maximum, the SAR values averaged over the spatial volumes (1g or 10g) were computed using the 3-D spline interpolation algorithm. The 3-D spline is composed of three one-dimensional splines with the “Not a knot” condition (in x, y and z directions). The volume was integrated with the trapezoidal algorithm. 1000 points (10 x 10 x 10) were interpolated to calculate the average.
 - iii) All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.
- d. Re-measurement of the SAR value at the same location as in step a. above. If the value changed by more than 5 %, the evaluation was repeated.

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2.5 Test Results

The results on the following page(s) were obtained when the device was tested in the condition described in this report. Detail measurement data and plots, which reveal information about the location of the maximum SAR with respect to the device, are reported in the following pages.

Tellus Technology, Model No: WIPClip-V131C

Date of Test: January 15 - 16, 2001

Measurement Results

Trade Name:	Tellus Technology Inc	Model No.:	WIPClip-V131C
Serial No.:	Not Labeled	Test Engineer:	Suresh Kondapalli

TEST CONDITIONS

Ambient Temperature	23 °C	Relative Humidity	55 %
Test Signal Source	Test Mode	Signal Modulation	CDPD all 1's data
Radiated Power (ERP) Before SAR Test	26.0 dBm	Radiated Power (ERP) After SAR Test	26.0dBm
Test Duration	23 Min.	Number of Battery Change	1

EUT Position: Face Up, Touching Phantom

Channel MHz	Operating Mode	Duty Cycle ratio	Measured SAR _{10g} (mW/g)	Plot Number
824.04	CDPD	1	2.43	1
836.01	CDPD	1	2.06	2
848.97	CDPD	1	2.35	3

EUT Position: Face Up, Antenna tilted 90Deg Left, Touching Phantom

Channel MHz	Operating Mode	Duty Cycle ratio	Measured SAR _{10g} (mW/g)	Plot Number
824.04	CDPD	1	2.53	4
836.01	CDPD	1	2.13	5
848.97	CDPD	1	2.31	6

Note: a) Worst case data were reported. EUT Evaluated for Hands Wrists, feet and ankles only
 b) Duty cycle factor included in the measured SAR data
 c) Uncertainty of the system is not included

WipClip -V131C

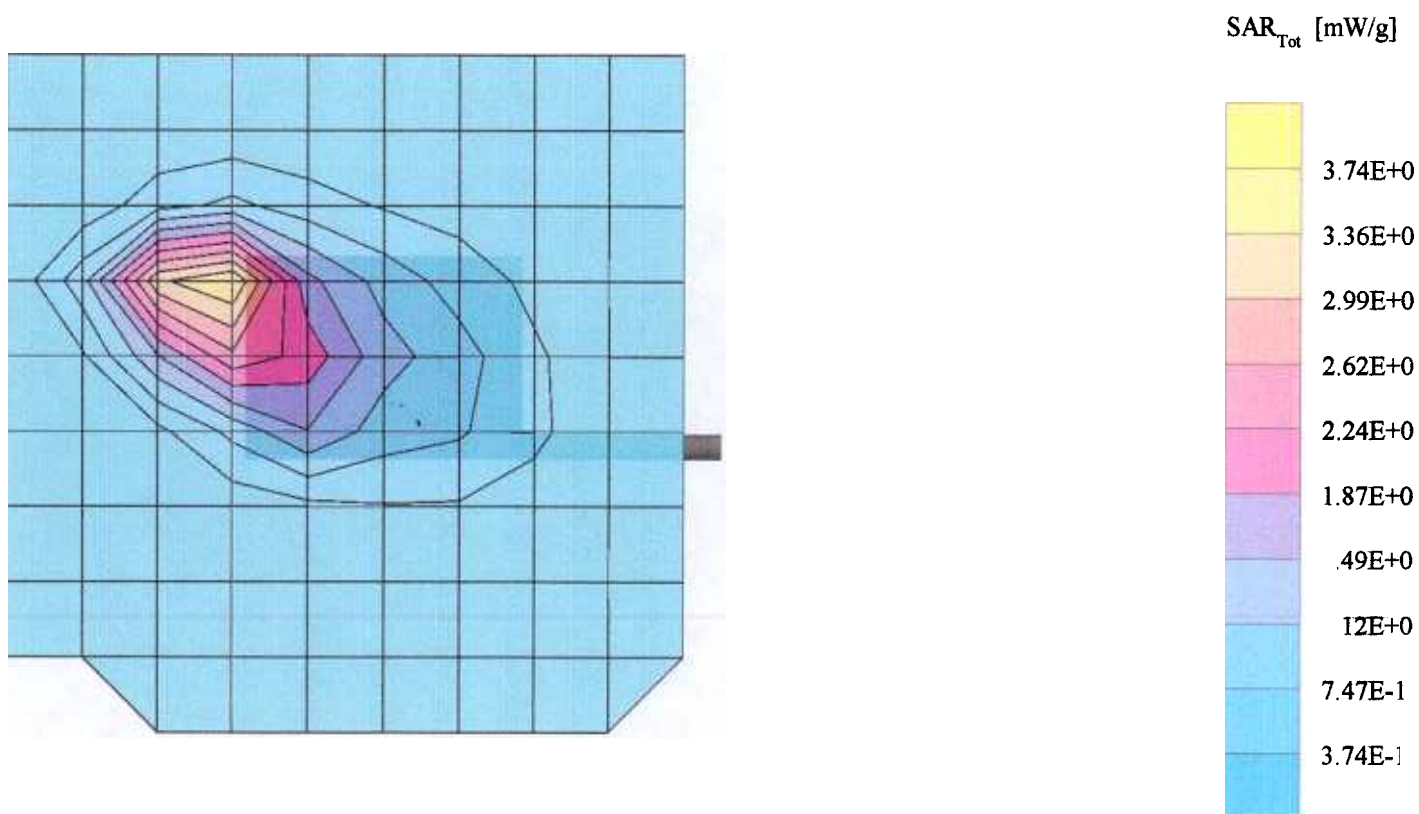
Generic Twin Phantom; Flat Section; Position: (90°,90°); Frequency: 824 MHz

Probe: ET3DV5 - SN1333; ConvF(5.70,5.70,5.70); Crest factor: 1.0; Muscle 835 MHz: $\sigma = 0.88$ mho/m $\epsilon_r = 51.1$ $\rho = 1.00$ g/cm³

Cube 5x5x7: SAR (1g): 4.06 mW/g, SAR (10g): 2.43 mW/g, (Worst-case extrapolation)

Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0

Powerdrift: 0.00 dB; Face Up, 824.04MHz



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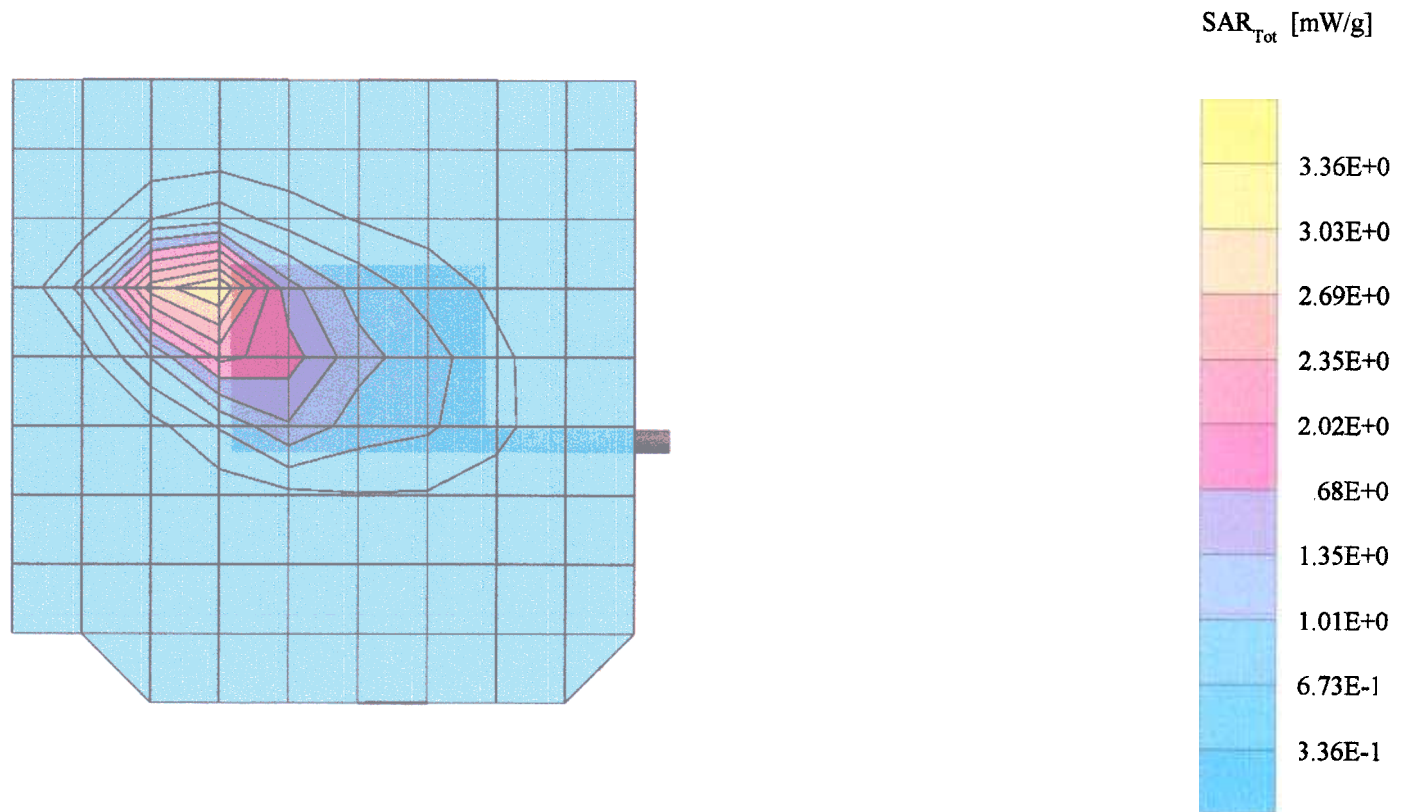
Generic Twin Phantom; Flat Section; Position: (90°,90°); Frequency: 836 MHz

Probe: ET3DV5 - SN1333; ConvF(5.70,5.70,5.70); Crest factor: 1.0; Muscle 835 MHz: $\sigma = 0.88$ mho/m $\epsilon_r = 51.1$ $\rho = 1.00$ g/cm³

Cube 5x5x7: SAR (1g): 3.45 mW/g, SAR (10g): 2.06 mW/g, (Worst-case extrapolation)

Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0

Powerdrift: 0.06 dB; Face up, 836.01MHz,



WipClip -V131C

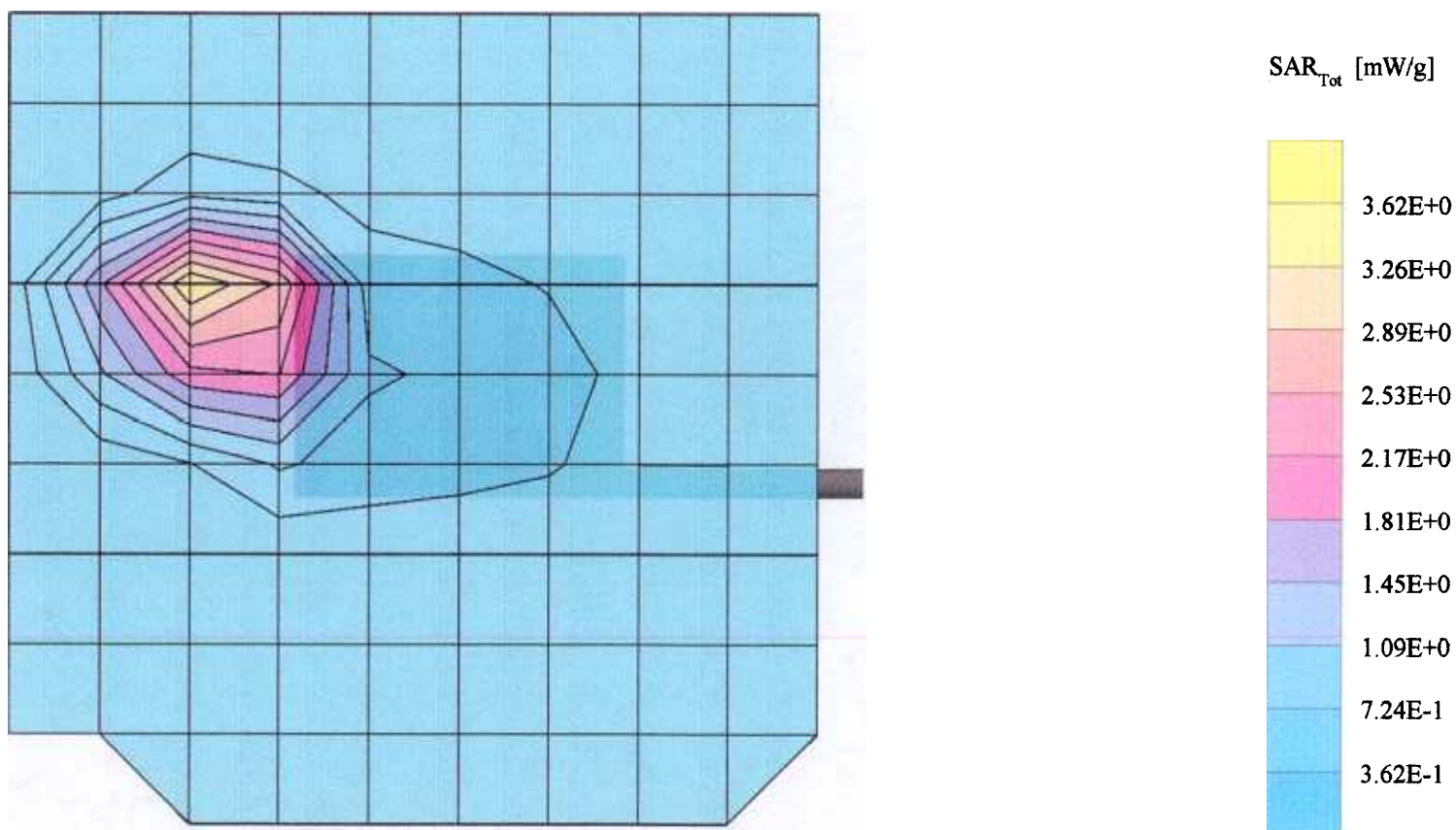
Generic Twin Phantom; Flat Section; Position: (90°,90°); Frequency: 849 MHz

Probe: ET3DV5 - SN1333; ConvF(5.70,5.70,5.70); Crest factor: 1.0; Muscle 849MHz: $\sigma = 0.90$ mho/m $\epsilon_r = 51.0$ $\rho = 1.00$ g/cm³

Cube 5x5x7: SAR (1g): 4.04 mW/g, SAR (10g): 2.35 mW/g, (Worst-case extrapolation)

Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0

Powerdrift: -0.01 dB; Fcae Up, 848.97MHz



WipClip -V131C

Generic Twin Phantom; Flat Section; Position: (90°,90°); Frequency: 824 MHz

Probe: ET3DV5 - SN1333; ConvF(5.70,5.70,5.70); Crest factor: 1.0; Muscle 835 MHz: $\sigma = 0.88$ mho/m $\epsilon_r = 51.1$ $\rho = 1.00$ g/cm³

Cube 5x5x7; SAR (1g): 4.22 mW/g, SAR (10g): 2.53 mW/g, (Worst-case extrapolation)

Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0

Powerdrift: 0.01 dB; Face Up, 824.04MHz, Antenna tilted 90 deg Left

