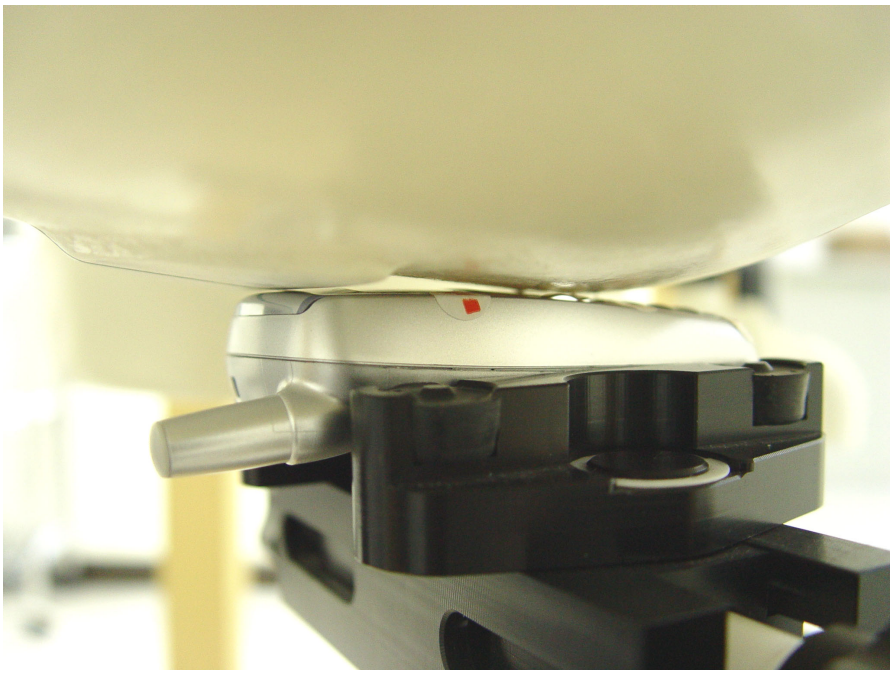


Fig. 9.3 Right Cheek

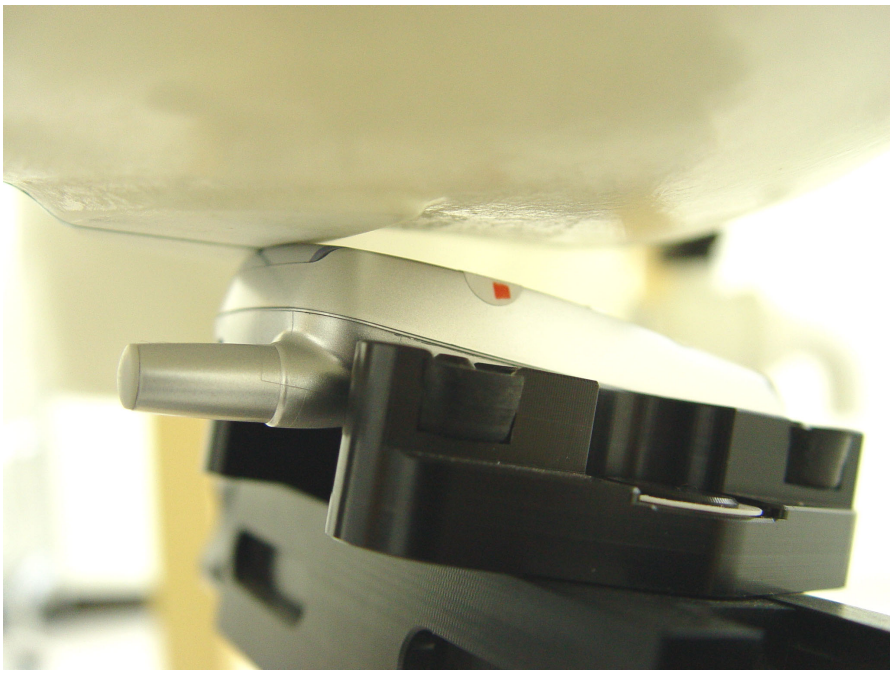


Fig. 9.4 Right Tilted

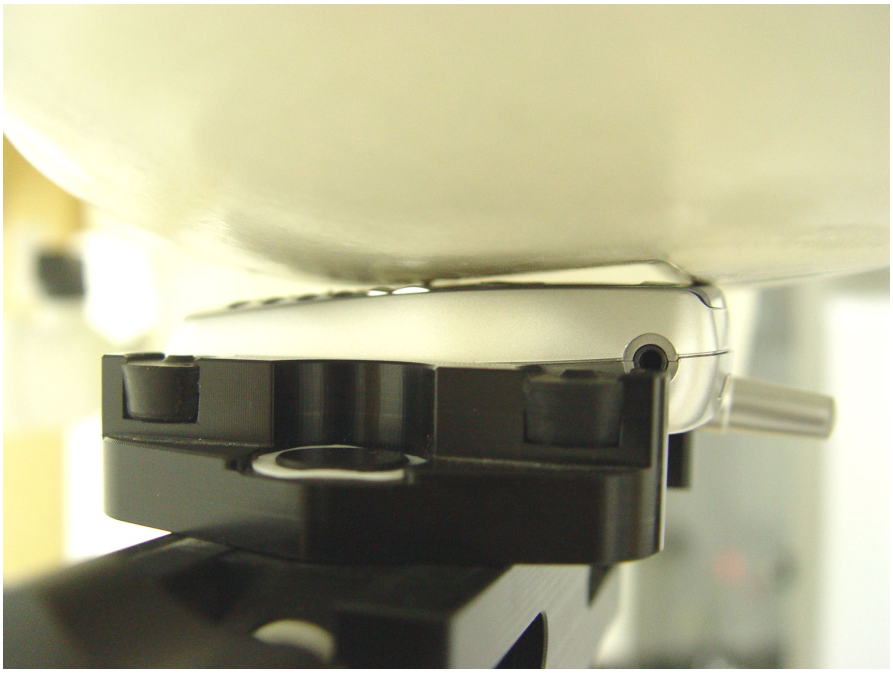


Fig. 9.5 Left Cheek

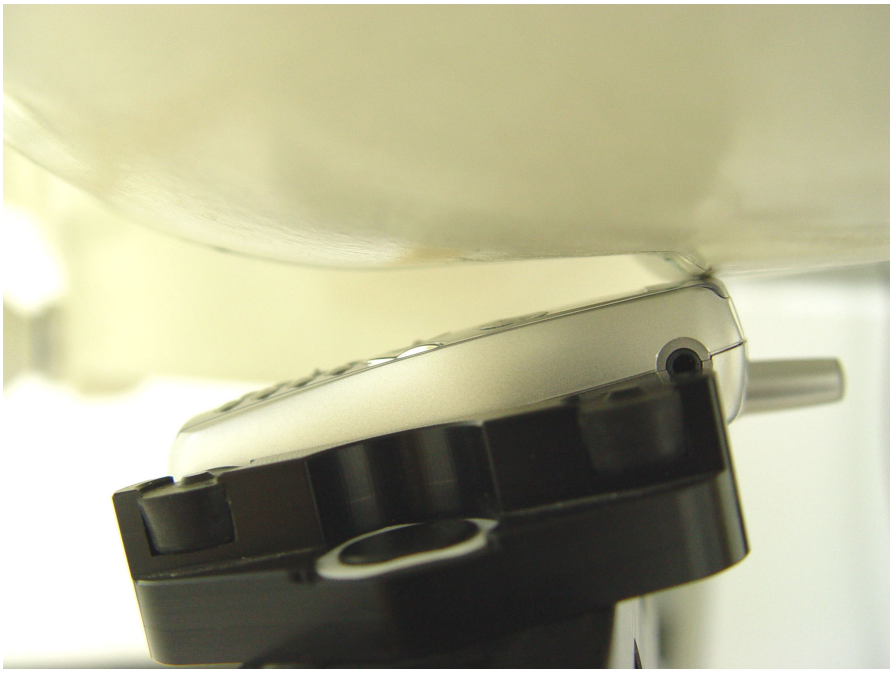


Fig. 9.6 Left Tilted

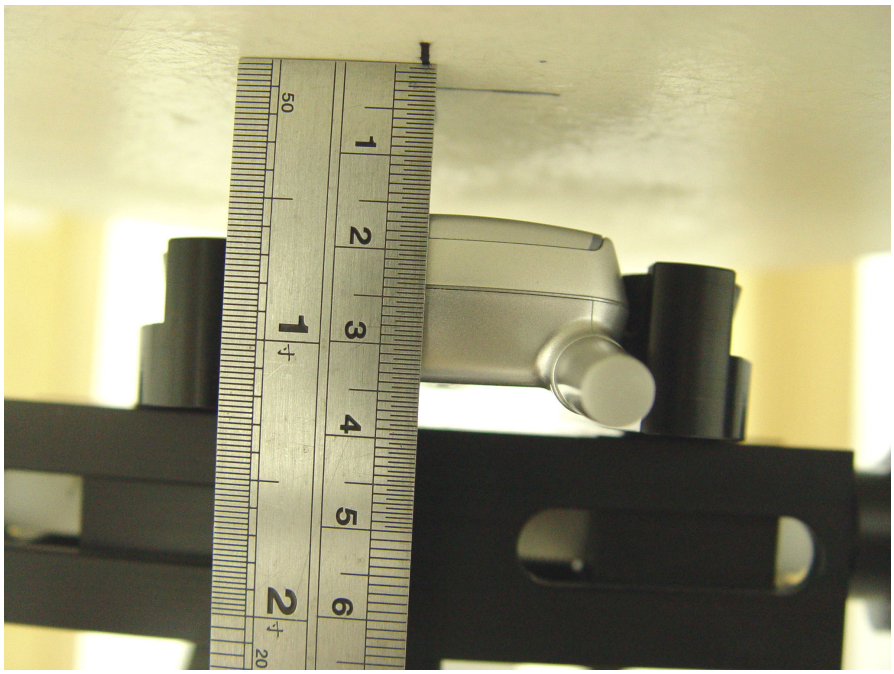


Fig. 9.7 Body Worn-keypad up

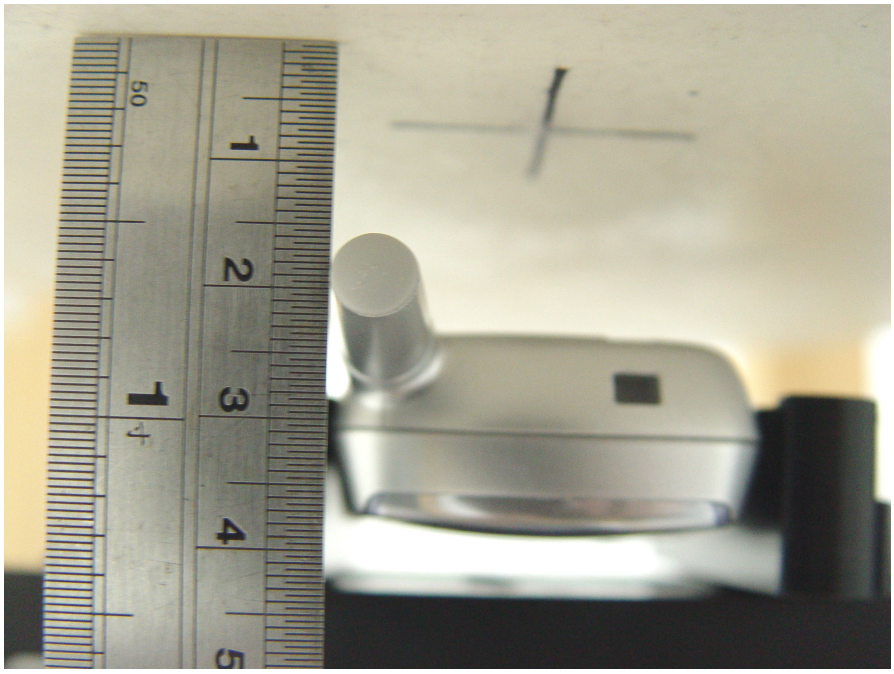


Fig. 9.8 Body Worn-keypad down

10. Measurement Procedures

The measurement procedures are as follows:

- Linking DUT with base station emulator CMU200 in middle channel for PCS band
- Setting PCL=0 for PCS on CMU200 to allow DUT to radiate maximum output power
- Measuring output power through RF cable and power meter
- Placing the DUT in the positions described in the last section
- Setting scan area, grid size and other setting on the DASY4 software
- Taking data for the lowest, middle, and highest channel on each testing position

According to the IEEE P1528 draft standard, the recommended procedure for assessing the peak spatial-average SAR value consists of the following steps:

- Power reference measurement
- Area scan
- Zoom scan
- Power reference measurement

10.1 Spatial Peak SAR Evaluation

The procedure for spatial peak SAR evaluation has been implemented according to the IEEE1528-2003 standard. It can be conducted for 1g and 10g, as well as for user-specific masses. The DASY4 software includes all numerical procedures necessary to evaluate the spatial peak SAR value.

Base on the Draft: SCC-34, SC-2, WG-2-Computational Dosimetry, IEEE P1528/D1.2 (Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques), a new algorithm has been implemented. The spatial-peak SAR can be computed over any required mass.

The base for the evaluation is a "cube" measurement. The measured volume must include the 1g and 10g cubes with the highest averaged SAR values. For that purpose , the center of the measured volume is aligned to the interpolated peak SAR value of a previously performed area scan.

The entire evaluation of the spatial peak values is performed within the postprocessing engine (SEMCAD). The system always gives the maximum values for the 1g and 10g cubes. The algorithm to find the cube with highest averaged SAR is divided into the following stages:

- extraction of the measured data (grid and values) from the Zoom Scan
- calculation of the SAR value at every measurement point based on all stored data (A/D values and measurement parameters)

- generation of a high-resolution mesh within the measured volume

- interpolation of all measured values form the measurement grid to the high-resolution grid
- extrapolation of the entire 3-D field distribution to the phantom surface over the distance from sensor to surface
- calculation of the averaged SAR within masses of 1g and 10g

10.2 Scan Procedures

First **Area Scan** is used to locate the approximate location(s) of the local peak SAR value(s). The measurement grid within an **Area Scan** is defined by the grid extent, grid step size and grid offset. Next, in order to determine the EM field distribution in a three-dimensional spatial extension, **Zoom Scan** is required. The **Zoom Scan** measures 5x5x7 points with step size 8, 8 and 5 mm. The **Zoom Scan** is performed around the highest E-field value to determine the averaged SAR-distribution over 1 g.

10.3 SAR Averaged Methods

In DASY4, the interpolation and extrapolation are both based on the modified Quadratic Shepard's method. The interpolation scheme combines a least-square fitted function method and a weighted average method which are the two basic types of computational interpolation and approximation.
Extrapolation routines are used to obtain SAR values between the lowest measurement points and the inner phantom surface. The extrapolation distance is determined by the surface detection distance and the probe sensor offset. The uncertainty increases with the extrapolation distance. To keep the uncertainty within 1% for the 1 g and 10 g cubes, the extrapolation distance should not be larger then 5 mm.

11. SAR Test Results

11.1 Right Cheek

Bands	Chan.	Freq. (MHz)	Modulation type	Conducted Power (dBm)	Power Drift (dB)	Measured 1g SAR (W/kg)	Limits (W/Kg)	Results
PCS	512 (Low)	1850.2	GMSK	29.7	0	0.495	1.6	Pass
	661(Mid)	1880.0	GMSK	29.45	0.1	0.57	1.6	Pass
	810 (High)	1909.8	GMSK	29.46	0	0.581	1.6	Pass

11.2 Right Tilted

Bands	Chan.	Freq. (MHz)	Modulation type	Conducted Power (dBm)	Power Drift (dB)	Measured 1g SAR (W/kg)	Limits (W/Kg)	Results
PCS	512 (Low)	1850.2	GMSK	29.7	-0.1	0.515	1.6	Pass
	661 (Mid)	1880.0	GMSK	29.45	0	0.577	1.6	Pass
	810 (High)	**1909.8**	**GMSK**	**29.46**	**-0.007**	**0.601**	**1.6**	**Pass**

11.3 Left Cheek

Bands	Chan.	Freq. (MHz)	Modulation type	Conducted Power (dBm)	Power Drift (dB)	Measured 1g SAR (W/kg)	Limits (W/Kg)	Results
PCS	512 (Low)	1850.2	GMSK	29.7	0	0.376	1.6	Pass
	661 (Mid)	1880.0	GMSK	29.45	-0.1	0.439	1.6	Pass
	810 (High)	1909.8	GMSK	29.46	0	0.445	1.6	Pass

11.4 Left Tilted

Bands	Chan.	Freq. (MHz)	Modulation type	Conducted Power (dBm)	Power Drift (dB)	Measured 1g SAR (W/kg)	Limits (W/Kg)	Results
PCS	512 (Low)	1850.2	GMSK	29.7	0	0.432	1.6	Pass
	661 (Mid)	1880.0	GMSK	29.45	-0.1	0.464	1.6	Pass
	810 (High)	1909.8	GMSK	29.46	-0.1	0.465	1.6	Pass

11.5 Body Worn-keypad up

Bands	Chan.	Freq. (MHz)	Modulation type	Conducted Power (dBm)	Power Drift (dB)	Measured 1g SAR (W/kg)	Limits (W/Kg)	Results
PCS	512 (Low)	1850.2	GMSK	29.7	-	-	-	-
	661 (Mid)	1880.0	GMSK	29.45	0	0.136	1.6	Pass
	810 (High)	1909.8	GMSK	29.46	-	-	-	-

11.6 Body Worn-keypad down

Bands	Chan.	Freq. (MHz)	Modulation type	Conducted Power (dBm)	Power Drift (dB)	Measured 1g SAR (W/kg)	Limits (W/Kg)	Results
PCS	512 (Low)	1850.2	GMSK	29.7	-	-	-	-
	661 (Mid)	**1880.0**	**GMSK**	**29.45**	**0**	**0.206**	**1.6**	**Pass**
	810 (High)	1909.8	GMSK	29.46	-	-	-	-

12.References

[1] FCC 47 CFR Part 2 “Frequency Allocations and Radio Treaty Matters; General Rules and Regulations”
[2] IEEE Std. P1528-2003, “Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques”, April 21, 2003
[3] Supplement C (Edition 01-01) to OET Bulletin 65 (Edition 97-01), “Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to RF Emissions”, June 2001
[4] IEEE Std. C95.3-2002, “IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields-RF and Microwave”, 2002
[5] IEEE Std. C95.1-1999, “IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz”, 1999
[6] Robert J. Renka, “Multivariate Interpolation Of Large Sets Of Scattered Data”, University of Noth Texas ACM Transactions on Mathematical Software, vol. 14, no. 2, June 1988, pp. 139-148
[7] DAYS4 System Handbook

Appendix A - System Performance Check Data

Test Laboratory: Sporton International Inc. SAR Testing Lab Date/Time: 07/01/04 17:32:57

System Check_Head_1900MHz_20040701

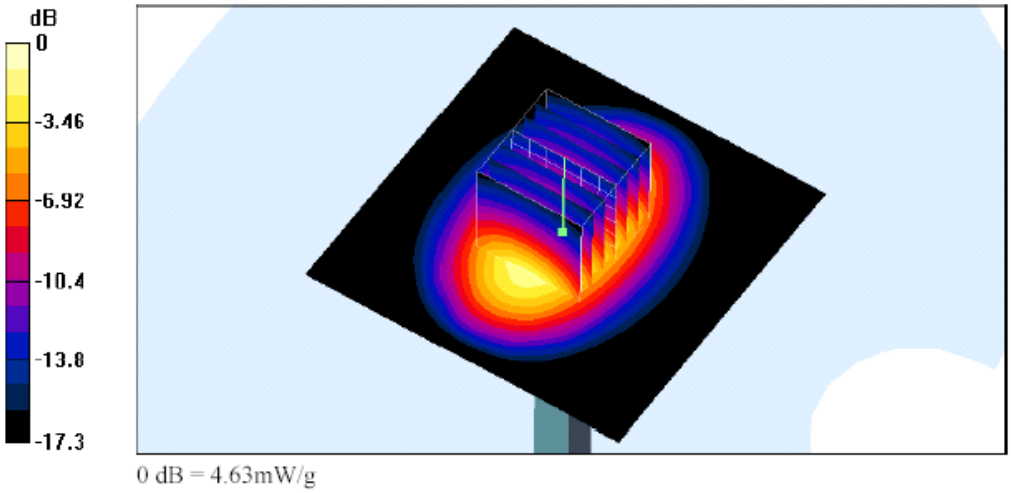
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d041

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: HSL_1900 Medium parameters used: f = 1900 MHz; σ = 1.46 mho/m; ε_r = 39.3; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1788; ConvF(5.3, 5.3, 5.3); Calibrated: 8/29/2003
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 11/21/2003
- Phantom: SAM 12; Type: QD 000 P40 C; Serial: TP-1150
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112

Pin=100mW/Area Scan (91x91x1): Measurement grid: dx=10mm, dy=10mm
Reference Value = 60.1 V/m; Power Drift = -0.1 dB
Maximum value of SAR (interpolated) = 4.7 mW/g

Pin=100mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 60.1 V/m; Power Drift = -0.1 dB
Maximum value of SAR (measured) = 4.63 mW/g
Peak SAR (extrapolated) = 7.09 W/kg
SAR(1 g) = 4.07 mW/g; SAR(10 g) = 2.14 mW/g



0 dB = 4.63mW/g

Test Laboratory: Sporton International Inc. SAR Testing Lab Date/Time: 07/02/04 09:10:42

System Check_Body_1900MHz_20040702

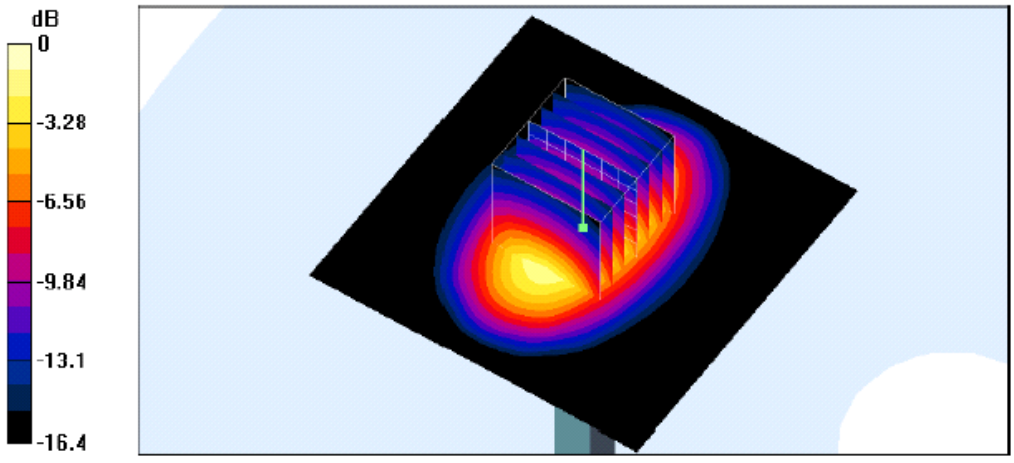
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d041

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: MSL_1900 Medium parameters used: f = 1900 MHz; σ = 1.59 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1788; ConvF(5, 5, 5); Calibrated: 8/29/2003
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 11/21/2003
- Phantom: SAM 12; Type: QD 000 P40 C; Serial: TP-1150
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112

Pin=100mW/Area Scan (91x91x1): Measurement grid: dx=10mm, dy=10mm
Reference Value = 57.3 V/m; Power Drift = -0.1 dB
Maximum value of SAR (interpolated) = 4.66 mW/g

Pin=100mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 57.3 V/m; Power Drift = -0.1 dB
Maximum value of SAR (measured) = 4.47 mW/g
Peak SAR (extrapolated) = 6.64 W/kg
SAR(1 g) = 3.95 mW/g; SAR(10 g) = 2.12 mW/g



0 dB = 4.47mW/g

Appendix B - SAR Measurement Data

Test Laboratory: Sporton International Inc. SAR Testing Lab Date/Time: 07/01/04 19:08:48

Right Cheek_PCS Ch810_20040701

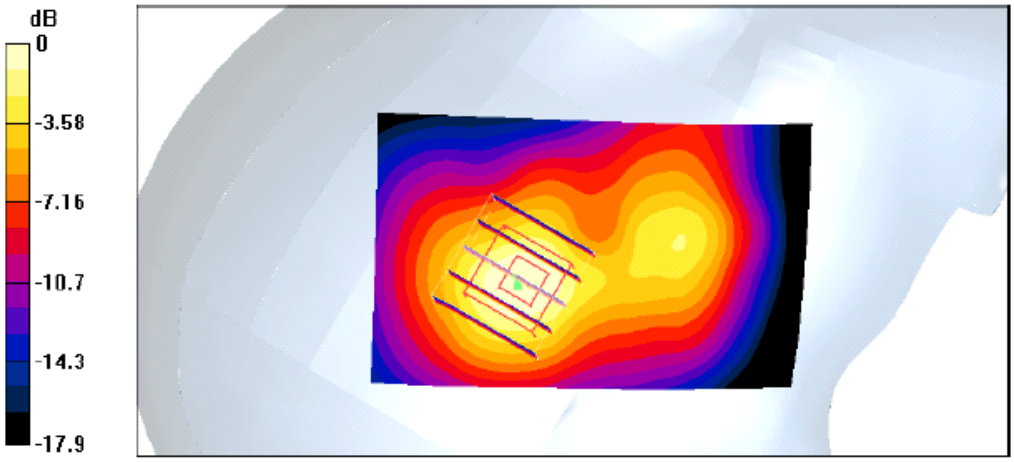
DUT: Panasonic EB-A102; Type: GSM Tri-Band Mobile Phone; Serial: 350421030000600

Communication System: PCS; Frequency: 1909.8 MHz;Duty Cycle: 1:8.3
Medium: HSL_1900 Medium parameters used (interpolated): f = 1909.8 MHz; σ = 1.46 mho/m; ε_r = 39.2; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1788; ConvF(5.3, 5.3, 5.3); Calibrated: 8/29/2003
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 11/21/2003
- Phantom: SAM 12; Type: QD 000 P40 C; Serial: TP-1150
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112

Ch810/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 14.3 V/m; Power Drift = -0.0 dB
Maximum value of SAR (interpolated) = 0.672 mW/g

Ch810/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.3 V/m; Power Drift = -0.0 dB
Maximum value of SAR (measured) = 0.637 mW/g
Peak SAR (extrapolated) = 0.985 W/kg
SAR(1 g) = 0.581 mW/g; SAR(10 g) = 0.315 mW/g



0 dB = 0.637mW/g

Test Laboratory: Sporton International Inc. SAR Testing Lab Date/Time: 07/01/04 19:40:30

Right Tilted_PCS Ch661_20040701

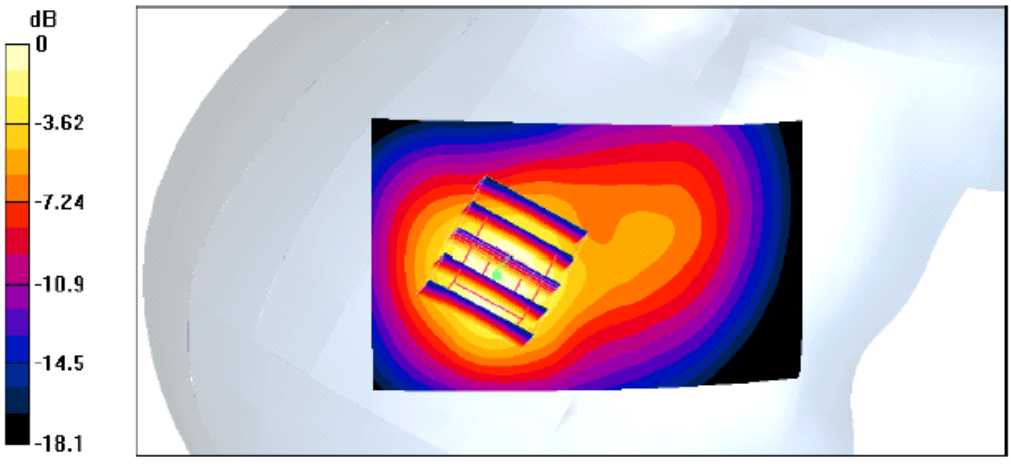
DUT: Panasonic EB-A102; Type: GSM Tri-Band Mobile Phone; Serial: 350421030000600

Communication System: PCS; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: HSL_1900 Medium parameters used: f = 1880 MHz; σ = 1.44 mho/m; ε_r = 39.4; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1788; ConvF(5.3, 5.3, 5.3); Calibrated: 8/29/2003
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 11/21/2003
- Phantom: SAM 12; Type: QD 000 P40 C; Serial: TP-1150
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112

Ch661/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 17.6 V/m; Power Drift = -0.0 dB
Maximum value of SAR (interpolated) = 0.670 mW/g

Ch661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.6 V/m; Power Drift = -0.0 dB
Maximum value of SAR (measured) = 0.623 mW/g
Peak SAR (extrapolated) = 0.955 W/kg
SAR(1 g) = 0.577 mW/g; SAR(10 g) = 0.317 mW/g



0 dB = 0.623mW/g

Test Laboratory: Sporton International Inc. SAR Testing Lab Date/Time: 07/01/04 19:54:03

Right Tilted_PCS Ch810_20040701

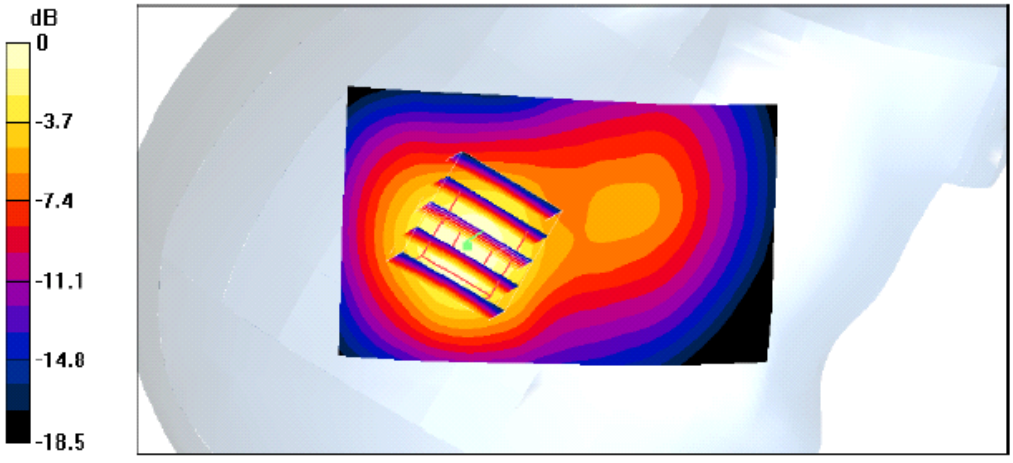
DUT: Panasonic EB-A102; Type: GSM Tri-Band Mobile Phone; Serial: 350421030000600

Communication System: PCS; Frequency: 1909.8 MHz;Duty Cycle: 1:8.3
Medium: HSL_1900 Medium parameters used (interpolated): f = 1909.8 MHz; σ = 1.46 mho/m; ε_r = 39.2; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1788; ConvF(5.3, 5.3, 5.3); Calibrated: 8/29/2003
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 11/21/2003
- Phantom: SAM 12; Type: QD 000 P40 C; Serial: TP-1150
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112

Ch810/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 17.2 V/m; Power Drift = -0.007 dB
Maximum value of SAR (interpolated) = 0.691 mW/g

Ch810/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.2 V/m; Power Drift = -0.007 dB
Maximum value of SAR (measured) = 0.647 mW/g
Peak SAR (extrapolated) = 1.01 W/kg
SAR(1 g) = 0.601 mW/g; SAR(10 g) = 0.327 mW/g



0 dB = 0.647mW/g

Test Laboratory: Sporton International Inc. SAR Testing Lab Date/Time: 07/02/04 09:26:26

Body_PCS Ch661_Keypad Down With 1.5cm Gap _20040702

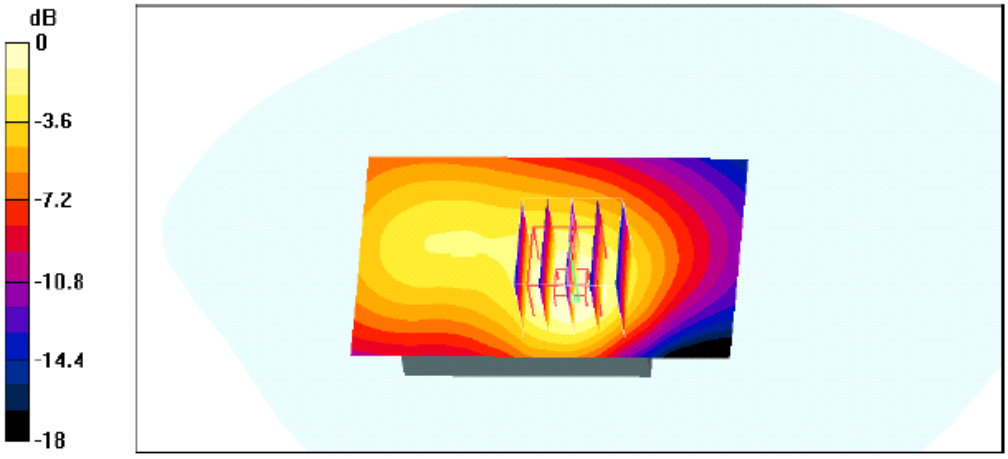
DUT: Panasonic EB-A102; Type: GSM Tri-Band Mobile Phone; Serial: 350421030000600

Communication System: DCS 1900; Frequency: 1880 MHz;Duty Cycle: 1: 8.3
Medium: MSL_1900 Medium parameters used: f = 1880 MHz; σ = 1.58 mho/m; ε_r = 52; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1788; ConvF(5, 5, 5); Calibrated: 8/29/2003
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 11/21/2003
- Phantom: SAM 12; Type: QD 000 P40 C; Serial: TP-1150
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112

Ch661/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 9 V/m; Power Drift = -0.0 dB
Maximum value of SAR (interpolated) = 0.232 mW/g

Ch661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9 V/m; Power Drift = -0.0 dB
Maximum value of SAR (measured) = 0.224 mW/g
Peak SAR (extrapolated) = 0.334 W/kg
SAR(1 g) = 0.206 mW/g; SAR(10 g) = 0.125 mW/g



0 dB = 0.224mW/g

Test Laboratory: Sporton International Inc. SAR Testing Lab Date/Time: 07/01/04 19:54:03

Right Tilted_PCS Ch810_20040701

DUT: Panasonic EB-A102; Type: GSM Tri-Band Mobile Phone; Serial: 350421030000600

Communication System: PCS; Frequency: 1909.8 MHz;Duty Cycle: 1:8.3
Medium: HSL_1900 Medium parameters used (interpolated): f = 1909.8 MHz; σ = 1.46 mho/m; ε_r = 39.2; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1788; ConvF(5.3, 5.3, 5.3); Calibrated: 8/29/2003
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 11/21/2003
- Phantom: SAM 12; Type: QD 000 P40 C; Serial: TP-1150
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112

Ch810/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 17.2 V/m; Power Drift = -0.007 dB
Maximum value of SAR (interpolated) = 0.691 mW/g

Ch810/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.2 V/m; Power Drift = -0.007 dB
Maximum value of SAR (measured) = 0.647 mW/g
Peak SAR (extrapolated) = 1.01 W/kg
SAR(1 g) = 0.601 mW/g; SAR(10 g) = 0.327 mW/g