

Table 13: SAR Values (Head, 1900 MHz Band)

Limit of SAR (W/kg)	10 g Average	1 g Average	Power Drift (dB)
	2.0	1.6	
Test Case	Measurement Result (W/kg)		
	10 g Average	1 g Average	
Left hand, Touch cheek, Top frequency(See Fig.31)	0.152	0.353	-0.200
Left hand, Touch cheek, Mid frequency(See Fig.33)	0.173	0.339	-0.118
Left hand, Touch cheek, Bottom frequency(See Fig.35)	0.327	0.641	-0.113
Left hand, Tilt 15 Degree, Top frequency(See Fig.37)	0.061	0.093	-0.060
Left hand, Tilt 15 Degree, Mid frequency(See Fig.39)	0.069	0.108	-0.064
Left hand, Tilt 15 Degree, Bottom frequency(See Fig.41)	0.118	0.184	0.037
Right hand, Touch cheek, Top frequency(See Fig.43)	0.160	0.301	-0.200
Right hand, Touch cheek, Mid frequency(See Fig.45)	0.213	0.396	-0.131
Right hand, Touch cheek, Bottom frequency(See Fig.47)	0.347	0.601	-0.200
Right hand, Tilt 15 Degree, Top frequency(See Fig.49)	0.067	0.101	0.007
Right hand, Tilt 15 Degree, Mid frequency(See Fig.51)	0.092	0.145	0.034
Right hand, Tilt 15 Degree, Bottom frequency(See Fig.53)	0.143	0.225	-0.015

Table 14: SAR Values (Body, 1900 MHz Band)

Limit of SAR (W/kg)	10 g Average	1 g Average	Power Drift (dB)
	2.0	1.6	
Test Case	Measurement Result (W/kg)		
	10 g Average	1 g Average	
Body, Towards Ground, Top frequency(See Fig.55)	0.133	0.193	-0.200
Body, Towards Ground, Mid frequency(See Fig.57)	0.158	0.233	-0.200
Body, Towards Ground, Bottom frequency(See Fig.59)	0.280	0.441	-0.101

#### 8.4 Conclusion

Localized Specific Absorption Rate (SAR) of this portable wireless device has been measured in all cases requested by the relevant standards cited in Clause 5.2 of this report. Maximum localized SAR is below exposure limits specified in the relevant standards cited in Clause 5.1 of this test report.

## 9 Measurement Uncertainty

SN	a	Type	c	d	e = f(d,k)	f	h = c x f / e	k
	Uncertainty Component		Tol. (± %)	Prob Dist.	Div.	c <sub>i</sub> (1 g)	1 g u <sub>i</sub> (±%)	v <sub>i</sub>
1	System repetivity	A	0.5	N	1	1	0.5	9
Measurement System								
2	Probe Calibration	B	5	N	2	1	2.5	∞
3	Axial Isotropy	B	4.7	R	√3	$(1-c_p)^{1/2}$	4.3	∞
4	Hemispherical Isotropy	B	9.4	R	√3	√c <sub>p</sub>		∞
5	Boundary Effect	B	0.4	R	√3	1	0.23	∞
6	Linearity	B	4.7	R	√3	1	2.7	∞
7	System Detection Limits	B	1.0	R	√3	1	0.6	∞
8	Readout Electronics	B	1.0	N	1	1	1.0	∞
9	RF Ambient Conditions	B	3.0	R	√3	1	1.73	∞
10	Probe Positioner Mechanical Tolerance	B	0.4	R	√3	1	0.2	∞
11	Probe Positioning with respect to Phantom Shell	B	2.9	R	√3	1	1.7	∞
12	Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation	B	3.9	R	√3	1	2.3	∞
Test sample Related								
13	Test Sample Positioning	A	4.9	N	1	1	4.9	N-1
14	Device Holder Uncertainty	A	6.1	N	1	1	6.1	N-1
15	Output Power Variation - SAR drift measurement	B	5.0	R	√3	1	2.9	∞
Phantom and Tissue Parameters								
16	Phantom Uncertainty (shape and thickness tolerances)	B	1.0	R	√3	1	0.6	∞
17	Liquid Conductivity - deviation from target values	B	5.0	R	√3	0.64	1.7	∞
18	Liquid Conductivity - measurement uncertainty	B	5.0	N	1	0.64	1.7	M
19	Liquid Permittivity - deviation from target values	B	5.0	R	√3	0.6	1.7	∞
20	Liquid Permittivity - measurement	B	5.0	N	1	0.6	1.7	M

	uncertainty						
	Combined Standard Uncertainty			RSS			11.25
	Expanded Uncertainty (95% CONFIDENCE INTERVAL)			K=2			22.5

## 10 MAIN TEST INSTRUMENTS

**Table15: List of Main Instruments**

No.	Name	Type	Serial Number	Calibration Date	Valid Period
01	Network analyzer	HP 8753E	US38433212	August 30,2006	One year
02	Power meter	NRVD	101253	June 20, 2006	One year
03	Power sensor	NRV-Z5	100333		
04	Power sensor	NRV-Z6	100011	September 2, 2006	One year
05	Signal Generator	E4433B	US37230472	September 4, 2006	One Year
06	Amplifier	VTL5400	0505	No Calibration Requested	
07	BTS	CMU 200	105948	August 15, 2006	One year
08	E-field Probe	SPEAG ET3DV6	1736	December 1, 2006	One year
09	DAE	SPEAG DAE3	536	July 11, 2006	One year

## 11 TEST PERIOD

The test is performed on June 11, 2007 to June 12, 2007

## 12 TEST LOCATION

The test is performed at Radio Communication & Electromagnetic Compatibility Laboratory of Telecommunication Metrology Center

\*\*\*END OF REPORT BODY\*\*\*

## ANNEX A MEASUREMENT PROCESS

The evaluation was performed with the following procedure:

Step 1: Measurement of the SAR value at a fixed location above the reference point was measured and was used as a reference value for assessing the power drop.

Step 2: The SAR distribution at the exposed side of the phantom was measured at a distance of 3.9 mm from the inner surface of the shell. The area covered the entire dimension of the flat phantom and the horizontal grid spacing was 10 mm x 10 mm. Based on this data, the area of the maximum absorption was determined by spline interpolation.

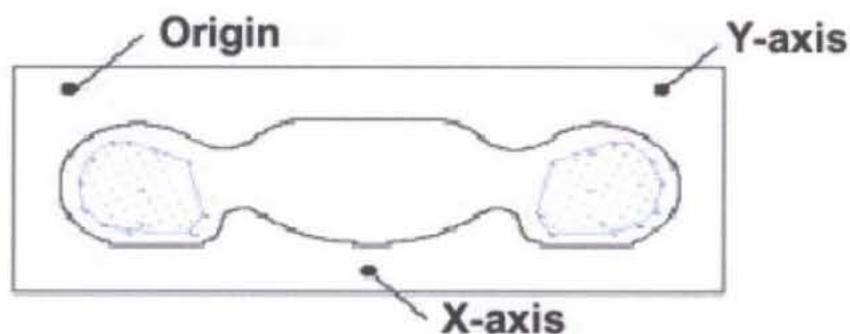
Step 3: Around this point, a volume of 30 mm x 30 mm x 30 mm was assessed by measuring 7 x 7 x 7 points. On this basis of this data set, the spatial peak SAR value was evaluated with the following procedure:

a. 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 measuring point is 1.2 mm. The extrapolation was based on a least square algorithm. A polynomial of the fourth order was calculated through the points in z-axes. This polynomial was then used to evaluate the points between the surface and the probe tip.

b. The maximum interpolated value was searched with a straightforward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1g or 10g) were computed using the 3D-Spline interpolation algorithm. The 3D-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. One thousand points (10 x 10 x 10) were interpolated to calculate the average.

c. All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.

Step 4: Re-measurement the SAR value at the same location as in Step 1. If the value changed by more than 5%, the evaluation is repeated.

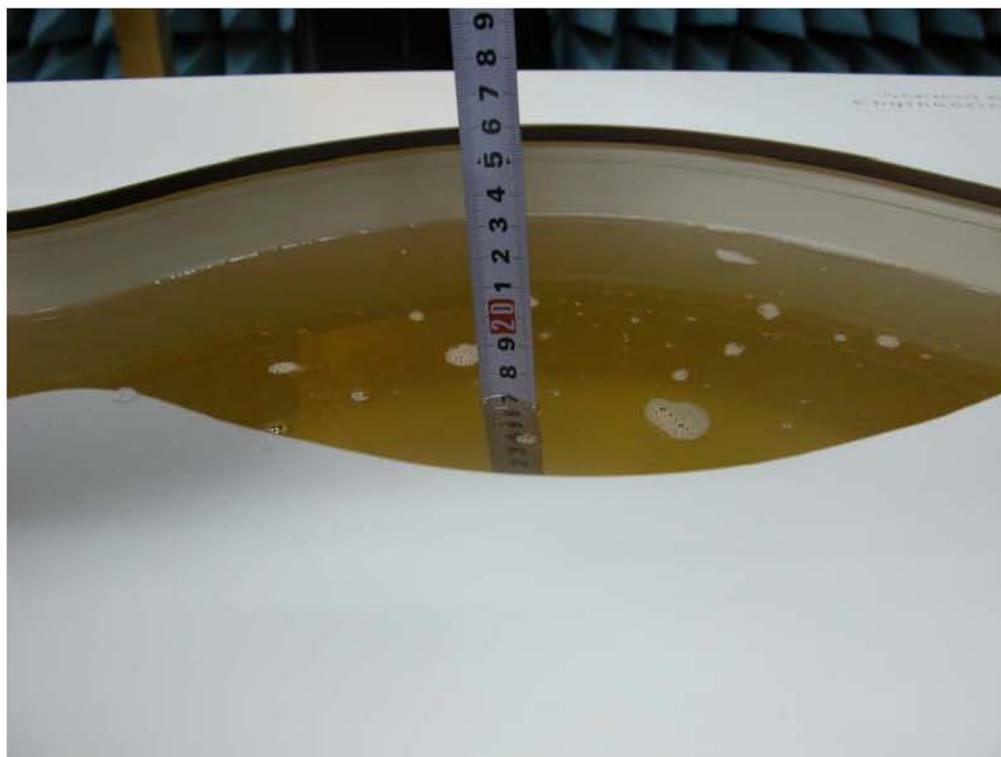


Picture A: SAR Measurement Points in Area Scan

**ANNEX B TEST LAYOUT**



**Picture B1: Specific Absorption Rate Test Layout**



**Picture B2: Liquid depth in the Flat Phantom (CDMA 835 MHz)**



Picture B3: Liquid depth in the Flat Phantom (CDMA 1900 MHz)



Picture B4: Left Hand Touch Cheek Position



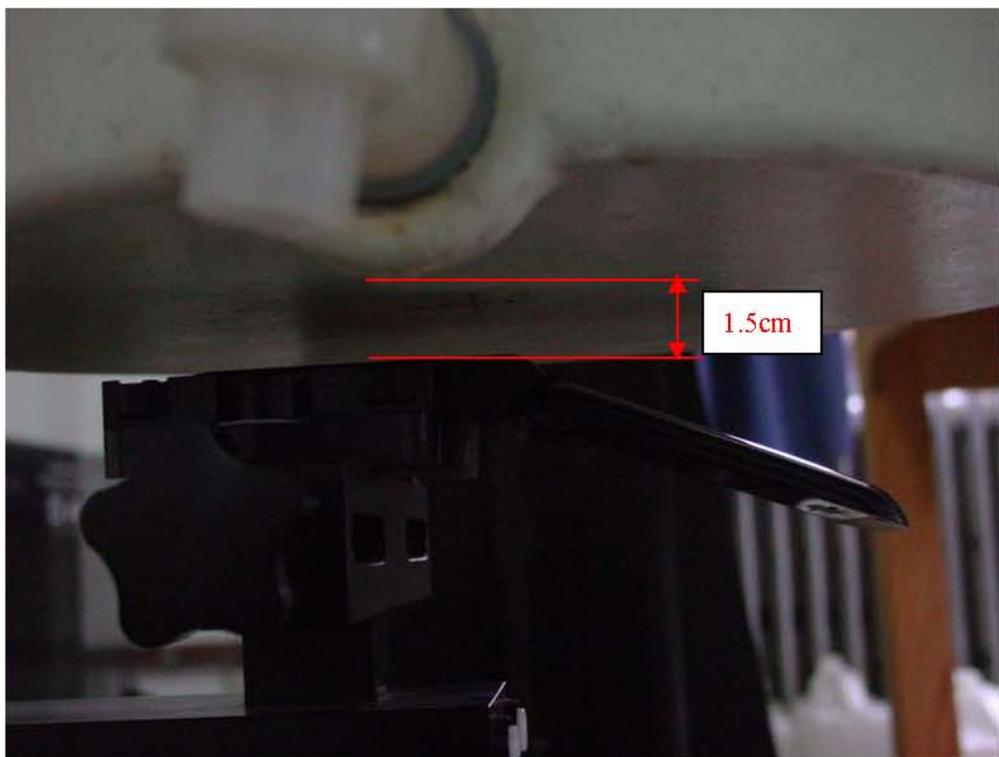
**Picture B5: Left Hand Tilt 15° Position**



**Picture B6: Right Hand Touch Cheek Position**



Picture B7: Right Hand Tilt 15° Position



Picture B8: Body-worn Position (toward ground, the distance from handset to the bottom of the Phantom is 1.5cm)

## ANNEX C GRAPH RESULTS

### CDMA 835 MHz Left Cheek High

Electronics: DAE3 Sn536

Medium: 835 Head

Medium parameters used (interpolated):  $f = 848.31$  MHz;  $\sigma = 0.93$  mho/m;  $\epsilon_r = 40$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 24.5°C      Liquid Temperature: 24.0°C

Communication System: CDMA 800 Frequency: 848.31 MHz Duty Cycle: 1:1

Probe: ET3DV6 - SN1736 ConvF(6.51, 6.51, 6.51)

**Cheek High/Area Scan (51x121x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.388 mW/g

**Cheek High/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 6.53 V/m; Power Drift = -0.200 dB

Peak SAR (extrapolated) = 0.783 W/kg

**SAR(1 g) = 0.351 mW/g; SAR(10 g) = 0.178 mW/g**

Maximum value of SAR (measured) = 0.378 mW/g

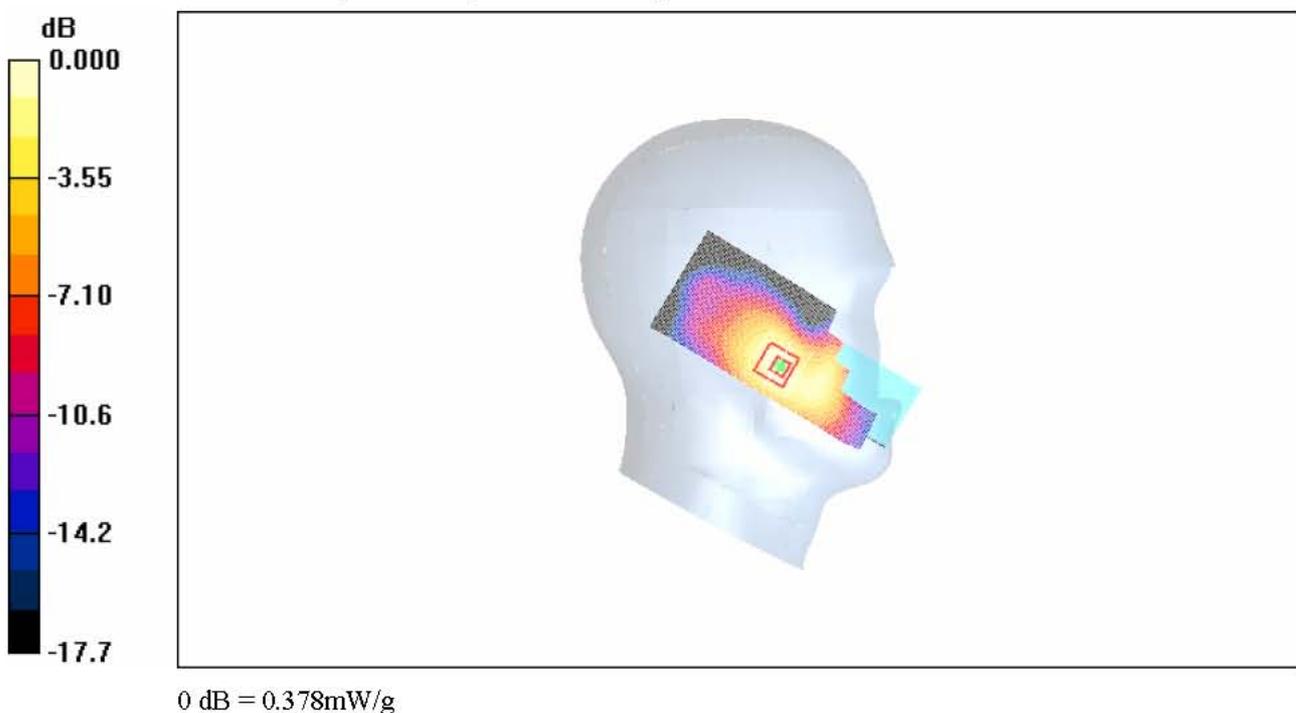


Fig. 1 Left Hand Touch Cheek CDMA 835MHz CH777

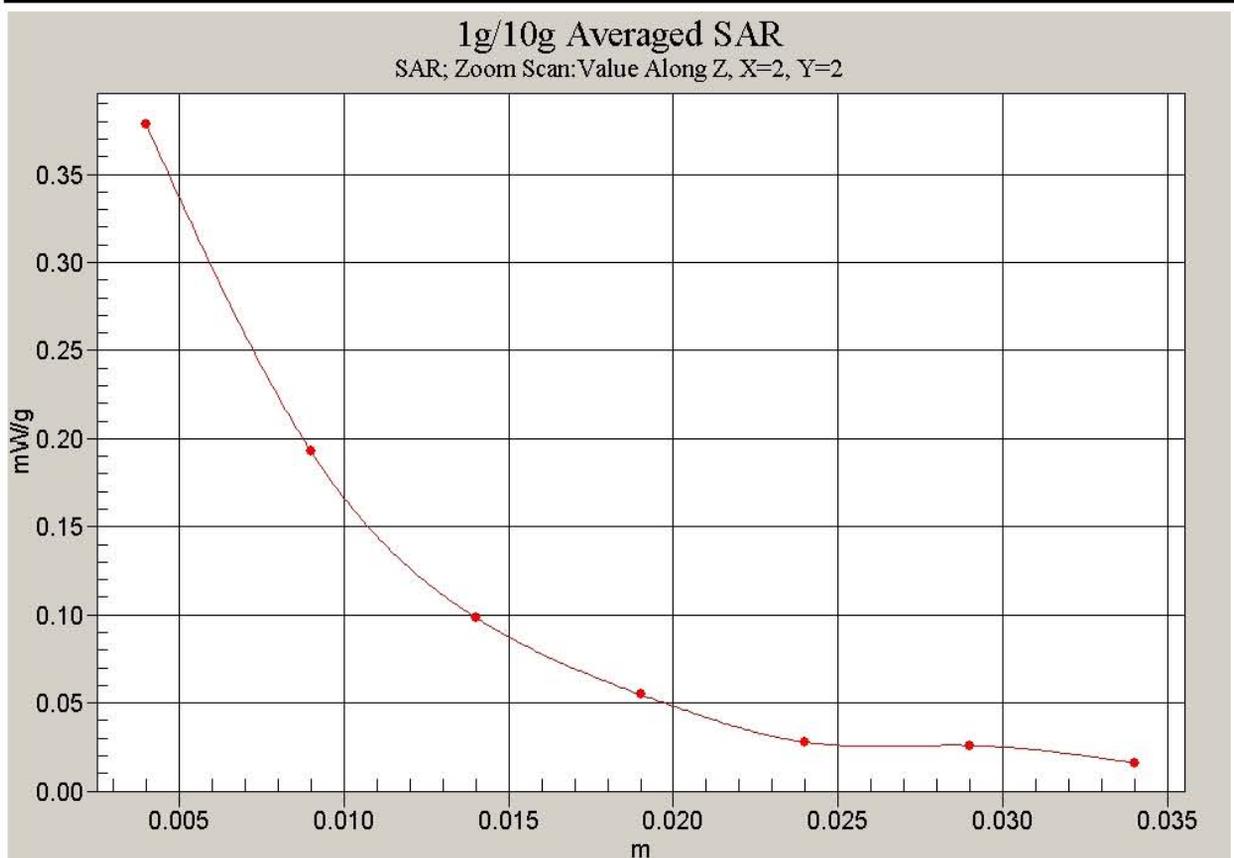


Fig. 2 Z-Scan at power reference point (CDMA 835MHz CH777)

**CDMA 835 MHz Left Cheek Middle**

Electronics: DAE3 Sn536

Medium: 835 Head

Medium parameters used (interpolated):  $f = 836.52$  MHz;  $\sigma = 0.928$  mho/m;  $\epsilon_r = 40.1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 24.5°C      Liquid Temperature: 24.0°C

Communication System: CDMA 800 Frequency: 836.52 MHz Duty Cycle: 1:1

Probe: ET3DV6 - SN1736 ConvF(6.51, 6.51, 6.51)

**Cheek Middle/Area Scan (51x121x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.324 mW/g

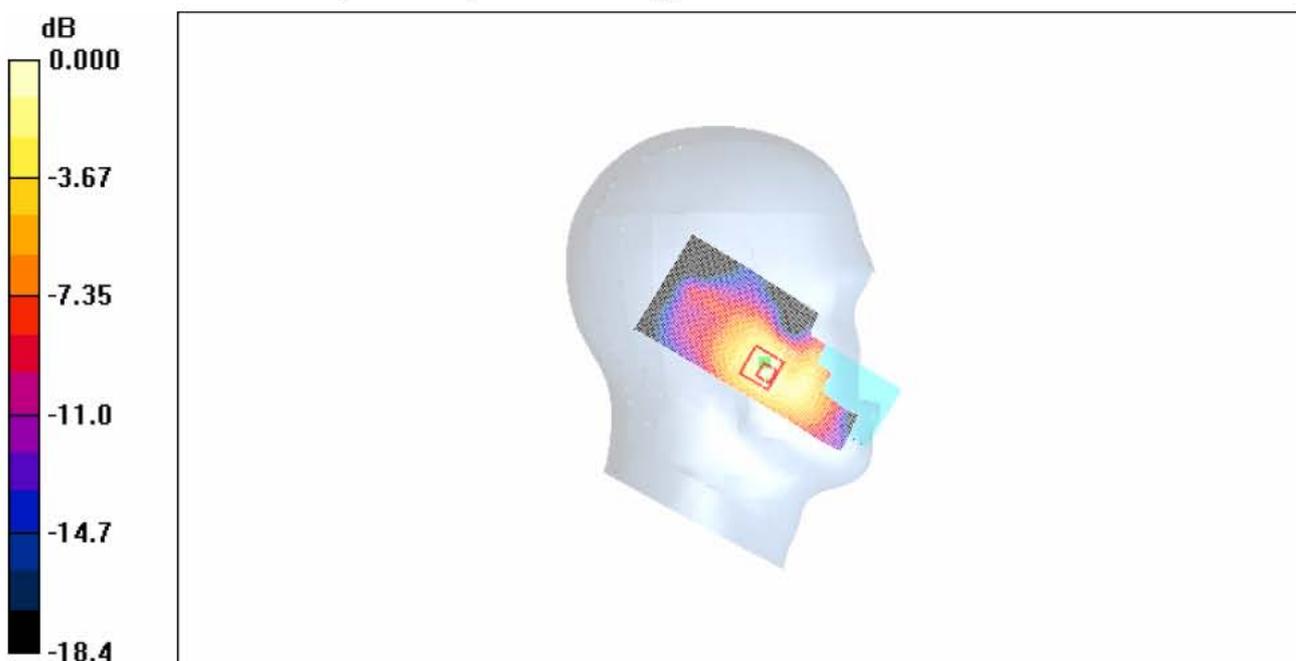
**Cheek Middle/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 6.09 V/m; Power Drift = -0.200 dB

Peak SAR (extrapolated) = 0.654 W/kg

**SAR(1 g) = 0.306 mW/g; SAR(10 g) = 0.154 mW/g**

Maximum value of SAR (measured) = 0.348 mW/g



0 dB = 0.348mW/g

**Fig. 3 Left Hand Touch Cheek CDMA 835MHz CH384**

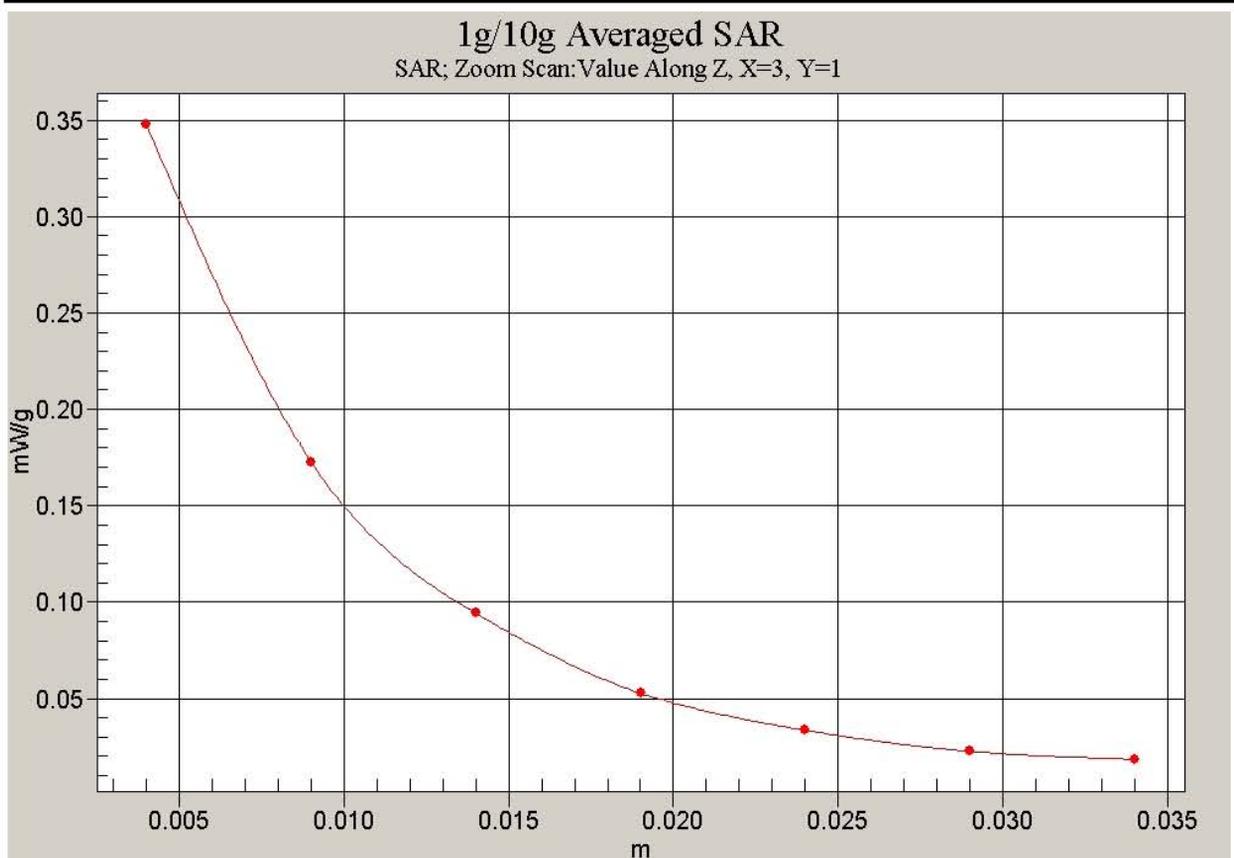


Fig. 4 Z-Scan at power reference point (CDMA 835MHz CH384)

**CDMA 835 MHz Left Cheek Low**

Electronics: DAE3 Sn536

Medium: 835 Head

Medium parameters used (interpolated):  $f = 824.7$  MHz;  $\sigma = 0.925$  mho/m;  $\epsilon_r = 40.2$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 24.5°C      Liquid Temperature: 24.0°C

Communication System: CDMA 800 Frequency: 824.7 MHz Duty Cycle: 1:1

Probe: ET3DV6 - SN1736 ConvF(6.51, 6.51, 6.51)

**Cheek Low/Area Scan (51x121x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.382 mW/g

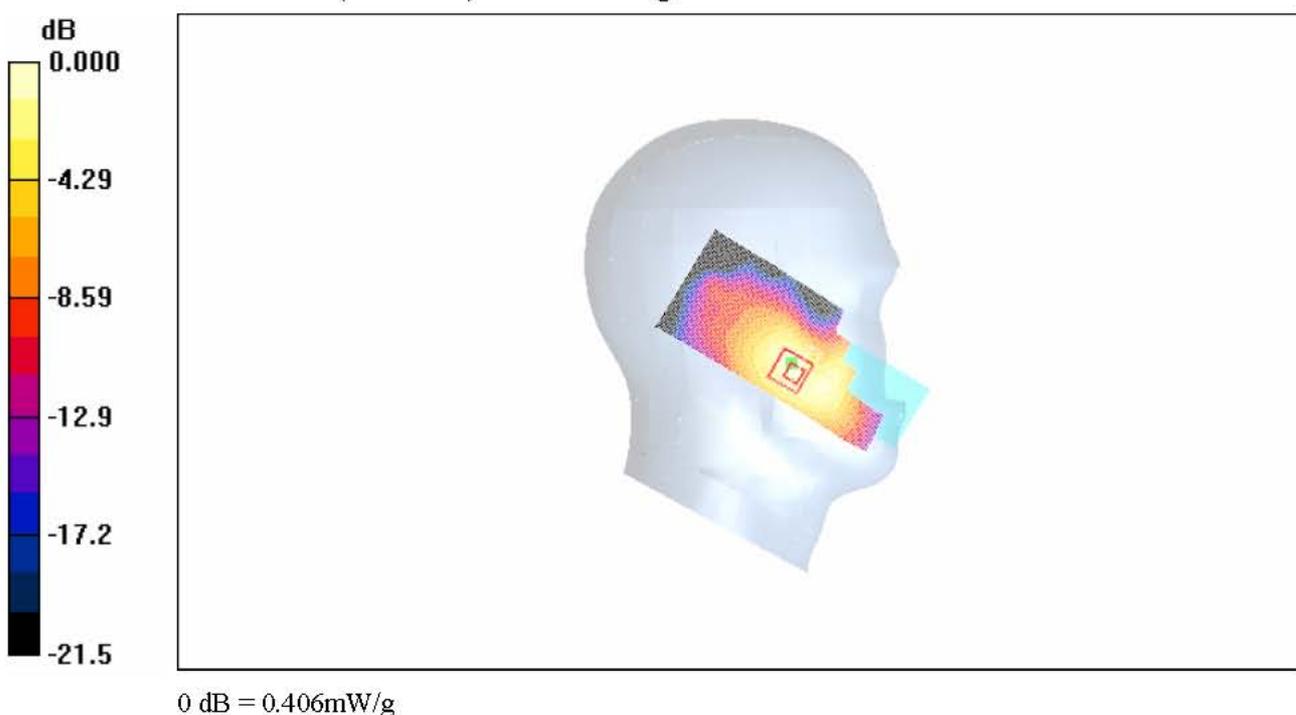
**Cheek Low/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 6.75 V/m; Power Drift = -0.200 dB

Peak SAR (extrapolated) = 0.797 W/kg

**SAR(1 g) = 0.359 mW/g; SAR(10 g) = 0.178 mW/g**

Maximum value of SAR (measured) = 0.406 mW/g

**Fig. 5 Left Hand Touch Cheek CDMA 835MHz CH1013**

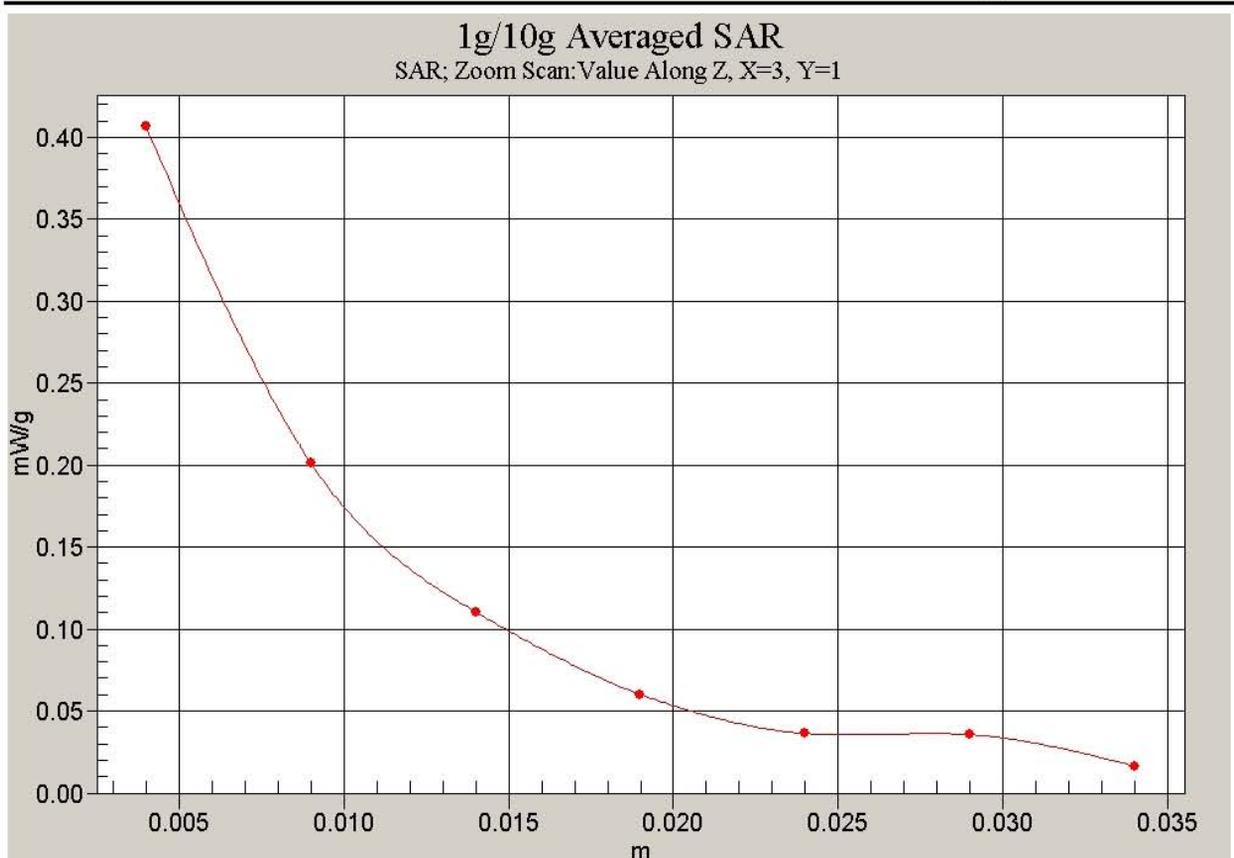


Fig. 6 Z-Scan at power reference point (CDMA 835MHz CH1013)

**CDMA 835 MHz Left Tilt High**

Electronics: DAE3 Sn536

Medium: 835 Head

Medium parameters used (interpolated):  $f = 848.31$  MHz;  $\sigma = 0.93$  mho/m;  $\epsilon_r = 40$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 24.5°C      Liquid Temperature: 24.0°C

Communication System: CDMA 800 Frequency: 848.31 MHz Duty Cycle: 1:1

Probe: ET3DV6 - SN1736 ConvF(6.51, 6.51, 6.51)

**Tilt High/Area Scan (51x121x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.082 mW/g

**Tilt High/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 5.88 V/m; Power Drift = -0.108 dB

Peak SAR (extrapolated) = 0.091 W/kg

**SAR(1 g) = 0.073 mW/g; SAR(10 g) = 0.052 mW/g**

Maximum value of SAR (measured) = 0.078 mW/g

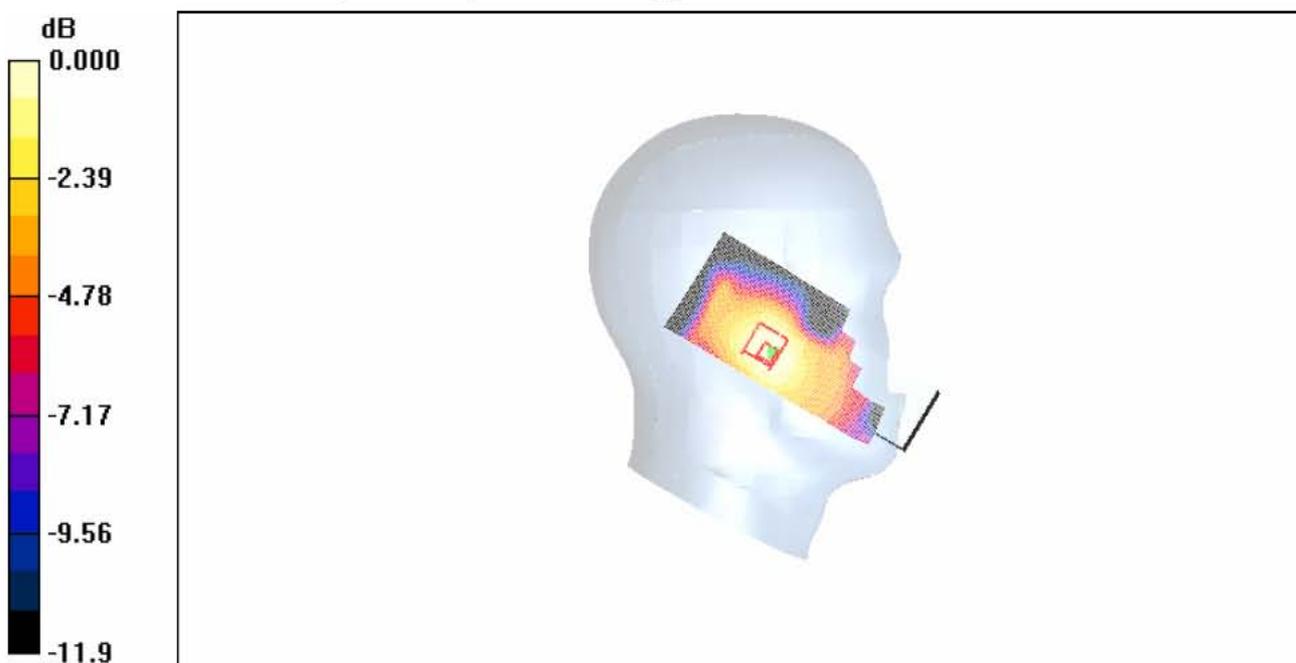


Fig. 7 Left Hand Tilt 15°CDMA 835MHz CH777