MET Laboratories, Inc. *Safety Certification - EMI - Telecom Environmental Simulation*

914 WEST PATAPSCO AVENUE ! BALTIMORE, MARYLAND 21230-3432 ! PHONE (410) 354-3300 ! FAX (410) 354-3313

January 7, 2003

Benefon Oyj
PO Box 84
Salo, FINLAND FIN-2-4101

Reference: GSM/GPS PCS Phone - TGP79AE
FCC ID: QFPTGP79AE

Dear Mr. Petri Aarnio:

Enclosed is the EMC SAR Evaluation Report for the Benefon Oyj GSM/GPS PCS Phone - TGP79AE. The Benefon Oyj GSM/GPS PCS Phone - TGP79AE was tested in accordance with the measurement procedures specified in FCC OET 65 Supplement C:01-01 and shown to be capable to be in compliance for localized specific absorption rate (SAR) for uncontrolled environment/general population exposure limits specified in ANSI/IEEE Std. C95.1-1992.

Thank you for using the testing services of MET Laboratories. If you have any questions regarding these results or if MET can be of further assistance to you, please feel free to contact me. We appreciate your business and look forward to working with you again soon.

Kindest Regards,

Marianne T. Bosley
EMC Administrator
MET LABORATORIES, INC.

Enclosures: (\Benefon Oyj\EMC12379B-SAR.rpt)

DOCTEM-23 Jan 02

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Dosimetric Assessment

Test Report

for the

GSM/GPS PCS Phone - TGP79AE

Tested And Evaluated
In Accordance With
FCC OET 65 Supplement C:01-01

MET REPORT: **EMC12379B-SAR**

January 7, 2003

PREPARED FOR:

Benefon Oyj
PO Box 84
Salo, FINLAND FIN-2-4101

PREPARED BY:

MET Laboratories, Inc.
914 West Patapsco Avenue
Baltimore, Maryland 21230-3432

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MET REPORT: EMC12379B-SAR

DOSIMETRIC ASSESSMENT TEST REPORT

for the

GSM/GPS PCS Phone - TGP79AE

Tested And Evaluated
In Accordance With
FCC OET Supplement C:01-01

Prepared for

Benefon Oyj
PO Box 84
Salo, FINLAND FIN

Report Prepared By	Report Reviewed By
Marianne T. Bosley EMC ADMINISTRATOR	Liming Xu TEST ENGINEER

Final Review By

CHRISTOPHER R. HARVEY
EMC LAB DIRECTOR

Engineering Statement: The measurements shown in this report were made in accordance with the procedures specified in Supplement C to OET Bulletin 65 of the Federal Communications Commission (FCC) Guidelines [FCC 2001] for uncontrolled exposure. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment evaluated is capable of compliance for localized specific absorption rate (SAR) for uncontrolled environment/general population exposure limits specified in ANSI/IEEE Std. C95.1-1992.

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SAR EVALUATION
CERTIFICATE OF COMPLIANCE

FCC ID: **QFPTGP79AE**
APPLICANT: **Benefon Oyj**

APPLICANT NAME AND ADDRESS:		**DATE OF TEST:**	August 20, 2002
Benefon Oyj		**TEST LOCATION**:	MET LABORATORIES INC.
PO Box 84			914 West Patapsco Avenue
Salo, FINLAND FIN-2-4101			Baltimore, Maryland 21230

EUT:	GSM/GPS PCS Phone - TGP79AE		
Date of Receipt:	June 11, 2002		
Device Category:	Part 24 Licensed Portable Transmitter Held to Ear		
RF exposure environment:	Uncontrolled		
RF exposure category:	Portable		
Power supply:	Battery Operated		
Antenna:	Fixed PCS and Folding GPS (Receive) Antenna		
Production/prototype:	Identical Prototype		
Measured Standards:	PCS 1900		
Modulation:	GMSK		
Crest Factor:	GSM = 8		
TX Range:	GSM PCS 1900	1850.2 MHz - 1909.8 MHz	
RX Range:	GSM PCS 1900	1930.2 MHz - 1989.8 MHz	
Used TX Channels:	Low: ch.512	Centre: ch. 660	High: ch. 810
Maximum RF Power Output:	0.9 W EIRP	GSM PCS1900 (29.5 dBm)	
Maximum SAR Measurement (Averaged over 1g):	0.677 W/kg PCS GSM Head;	0.385 W/kg PCS GSM Body	

This wireless portable device has been tested in accordance with the measurement procedures specified in FCC/OET Bulletin 65 Supplement C (2001) and IEEE Std. 1528-200X (July 2001), and has been shown to be capable of compliance for localized specific absorption rate (SAR) for uncontrolled environment/general population exposure limits specified in ANSI/IEEE Std. C95.1 - 1992.

I attest to the accuracy of this data. All reported measurements were performed by me, or were made under my supervision, and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

I also certify that no party to this application has been denied the FCC benefits pursuant to Section 5.301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. 862.

Chris Harvey
Director, EMC Laboratory

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OBJECTIVE

The TGP79AE is a new GSM/GPS PCS Handset Phone from Benefon Oyj that operates in the 1850.2-1909.8 TX frequency range utilizing a fixed antenna. The system uses the GSM PCS 1900 standard.

The objective of the procedure was to perform a dosimetric assessment of one of the TGP79AE in the GSM PCS 1900 standard. The measurements have been carried out with the dosimetric assessment system "SARA2", and were made according to the Supplement C to OET Bulletin 65 of the Federal Communications Commission (FCC) Guidelines [FCC 2001] for evaluating compliance of mobile and portable devices with FCC limits for human exposure in the general population to radio frequency emissions.

INTRODUCTION

In the United States, the most recent FCC RF exposure criteria is documented in the publication OET 65 Supplement C Edition 01-01 [FCC 2001], which sets limits for human exposure to radio frequency electromagnetic fields in the frequency range 3kHz to 300GHz.

The safety limits used for the environmental evaluation measurements are based on the criteria published by the American National Standards Institute (ANSI) for localized specific absorption rate (SAR) in IEEE/ANSI C95.1-1992 Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz. (c) 1992 by the Institute of Electrical and Electronics Engineers, Inc., New York, New York 10017. The measurement procedure described in IEEE/ANSI C95.3-1992 Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave is used for guidance in measuring SAR due to the RF radiation exposure from the Equipment Under Test (EUT).

SAR DEFINITION

Specific absorption rate (SAR) is the biological relevant parameter describing the effects of electromagnetic fields in the frequency range of interest. It is a measure of the power absorbed per unit mass and may be spatially averaged over the total mass of an exposed body or its parts.

In mathematical terms Specific Absorption Rate (SAR) is defined as the time derivative (rate) of the incremental energy absorbed by (dissipated in) an incremental mass contained in a volume element of a given density. It is also defined as the rate of RF energy absorption per unit mass at a point in an absorbing body as given below**.** The SAR is calculated from the r.m.s. electric field strength E inside the human body, the conductivity ó and the mass density ñ of the biological tissue:

$$SAR = \frac{|E|^2 s}{r}$$

SAR is expressed in units of Watts per Kilogram (W/kg)

ó = Conductivity of the tissue-simulant material (S/m)
ñ= Mass density of the tissue-simulant material (kg/m³)
E = Total RMS electric field strength (V/m)

NOTE: The primary factors that control rate of energy absorption were found to be the wavelength of the incident field in relations to the dimensions and geometry of the irradiated organism, the orientation of the organism in relation to the polarity of field vectors, the presence of reflecting surfaces, and whether conductive contact is made by the organism with a ground plane.

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SUMMARY FOR SAR TEST REPORT

EUT	TGP79AE
FCC ID	QFPTGP79AE
Date of receipt	June 11, 2002
Date of Test	June 14, 2002-Dec. 27, 2002
RF Exposure Category	Uncontrolled
Measured Standard	PCS 1900
Measurement done by	Liming Xu

Maximum Results Found during SAR Evaluation

The equipment is deemed to fulfil the requirements if the measured values are less than or equal to the limit.

Head Configuration

Phantom Configuration	Test Position	Power (dBm)	Channel (MID)	Frequency (GHz)	Max. 1g SAR (W/kg)
Right Side of Head/ 900 mAH Battery	Tilted (15 ^{0})	29.5	660	1.879	0.677

Table 1: The Max SAR value for Head Testing Handset model TGP79AE

Body Worn Configuration

Test Configurations	Power (dBm)	Channel (MID)	Frequency (GHz)	Max. 1g SAR (W/kg)
Black Carrying Case/External GPS	29.5	660	1.879	0.385

Table 2: The Max SAR value for Body Testing Handset model TGP79AE

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DESCRIPTION OF TESTED DEVICE

FCC ID	QFPTGP79AE
Modes of Operation	PCS 1900
Modulation Mode(s)	GSM(GMSK)
Duty Cycle(s) (=1/ Crest Factor)	Crest Factor=8
Transmitter Frequency Range	1850.2-1909.8 MHz

Picture of Phone

Description of the Antenna

Fixed PCS Antenna and a Folding GPS Antenna.

Battery Options

There were two battery options one with 900mAH and other one with 1200mAH. SAR data is provided for both the battery options
.

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EUT PICTURES

Fig 1. Front of EUT

Fig 2. Back of EUT

Fig 3. Bottom of EUT

Fig 4. Left Side of EUT

Fig 5. Right Side of EUT

Fig 6. Front of EUT - GPS Out

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Body Worn Accessories

Fig 7-Both 900 and 1200mAH

Fig 8-Head Set

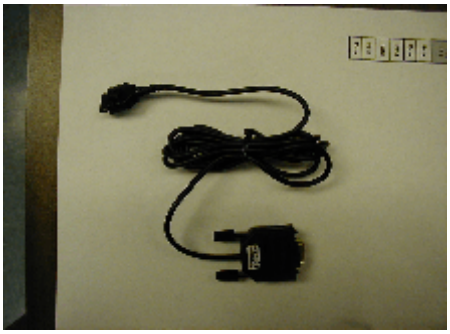

Fig 9-Data Cable

Fig 10-External GPS Antenna

Fig 11-Black Carrying Case

Fig 12-Gray Carrying Case

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TEST CONDITIONS

Environment

Test Environment	Dedicated test area
Ambient temperature	24°C ± 1 °C
Tissue simulating liquid temperature	24.2°C ± 0.5 °C
Shielded Chamber	Anechoic material strategically positioned to minimize room reflections
Ambient Noise	Very low

Table 3: Summary of Test Environment conditions

Test Signal, Frequencies and Output Power

1. The measurements are first performed at the middle channel of the operating band of the EUT. If the SAR value of the middle channel for each test configuration (Left, Right, Cheek, Tilt, Extended, Retracted) is at least 2 dB below the SAR limit, testing at the high and low channels is optional for such test configurations.

2. The phone was set to maximum power level during all the tests and at the beginning of the each test the battery was fully charged. Power output was measured before and after each test.

3. The phone was equipped with a special firmware, which allowed controlling the transmitter from its keypad.

   T During SAR testing, the EUT (PCS phone) was operated and controlled by a Rhode & Schwartz CMU 200 Base Station Simulator.

   During SAR testing, the EUT (PCS phone) was operated and controlled by an Agilent Base station HP 8924 E (with HP 83236B PCS Interface).

   Other

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TEST DETAILS

Tissue Recipes

The following recipes are provided in percentage by weight.

1900 MHz, Head: 54.90% De-Ionized Water
0.18% Salt
00% Sugar
44.92% DGBE

1900 MHz, Body: 41% De-Ionized Water
0.2% Salt
58.8% Sugar

Material Parameters

Simulant	Freq [MHz]	Room Temp [C]	Liquid Temp [C]	Parameters	Target Value	Measured Value	Deviation [%]	Limit [%]
Body	1900	24.3	24.7	Ý$_r$	54.0	55.3	2.4	+/- 5%
				ó	1.45	1.47	1.37	+/- 5%
Head	1900	24.3	24.7	Ý$_r$	39.9	41.2	3.26	+/- 5%
				ó	1.42	1.44	1.41	+/- 5%

Table 4: Parameters of the tissue simulating liquid, 1900MHz Head/Body

NOTES:

1 Parameters were measured before and after testing. These values reflect both measurements.

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TEST DETAILS

Tissue Recipes (After December 27, 2002)

The following recipes are provided in percentage by weight.

1900 MHz, Head: 54.00% De-Ionized Water
0.37% Salt
45.63% DGBE

1900 MHz, Body: 70% De-Ionized Water
0.3% Salt
29.7% DGBE

Material Parameters

Simulant	Freq [MHz]	Room Temp [C]	Liquid Temp [C]	Parameters	Target Value	Measured Value	Deviation [%]	Limit [%]
Body	1900	24.3	24.7	Ý$_r$	53.3	53.0	- 0.6	+/- 5%
				ó	1.52	1.54	1.37	+/- 5%
Head	1900	24.3	24.7	Ý$_r$	40.0	40.9	2.25	+/- 5%
				ó	1.40	1.42	1.43	+/- 5%

Table 4A: Parameters of the tissue simulating liquid, 1900MHz Head/Body

NOTES:

1 Parameters were measured before and after testing. These values reflect both measurements.

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System Validation

Following equipment is used for the system validation:

Signal Generator (Agilent E4432B)
RF Amplifier (Mini circuits ZHL-42)
Dual Directional Coupler (HP 778D)
The HP 8564E Spectrum Analyzer (used for RF power measurement)
Cables, Attenuate and Adapters

The recommended (IEEE Std 1528) set-up was used:

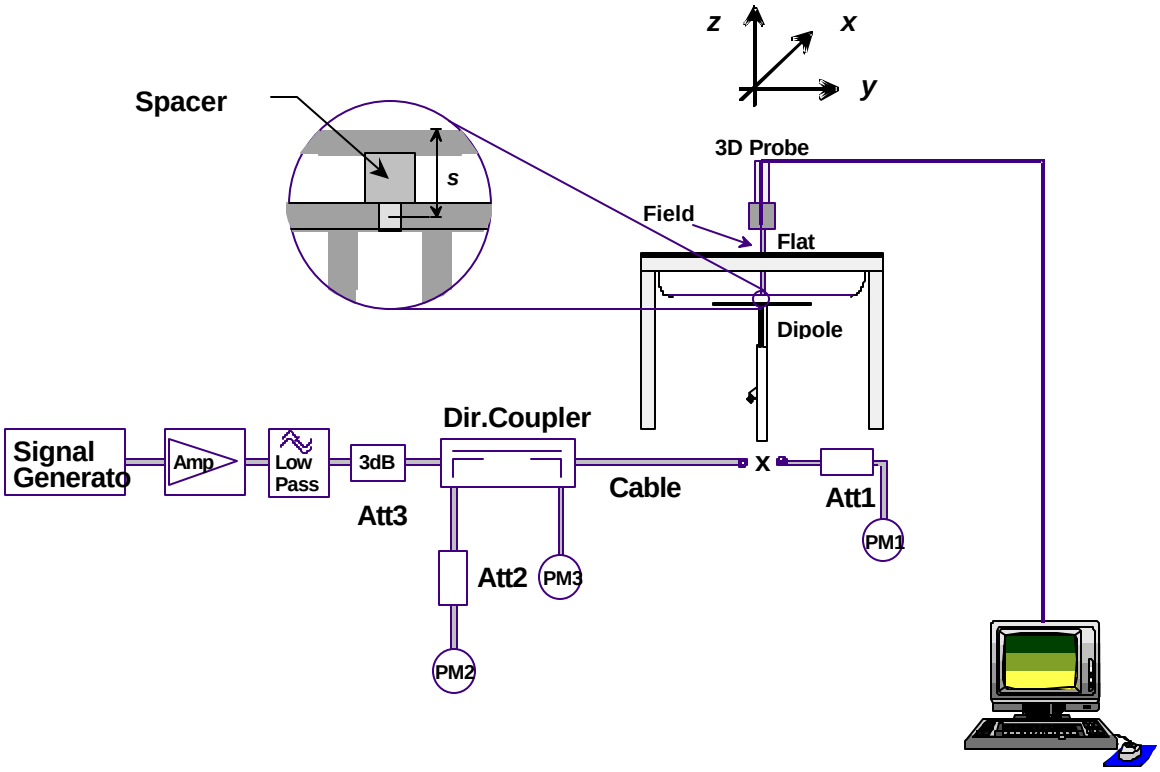

Figure 13. Performance Check Setup Diagram

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Performance Checking

Test Position:	**Flat Phantom**
Test Date:	**June 14, 2002**
Antenna Position:	**Balanced Dipole**
Probe:	**IXP-050/SN 0082 – SARf(0.51, 0.53, 0.53) Probe Cal Date 03/2002**
Med. Parameters:	**Head: Ý$_r$ = 41.2; ó = 1.44**
Pre Test Room Temperature:	**24.3 C**
Post Test Room Temperature:	**24.4 C**
Pre Test Simulant Liquid	**24.7 C**
Post Test Simulant Liquid	**24.9 C**
CH	**NA**
SAR Drift	**<2%**
SAR (1g):	**35.539**

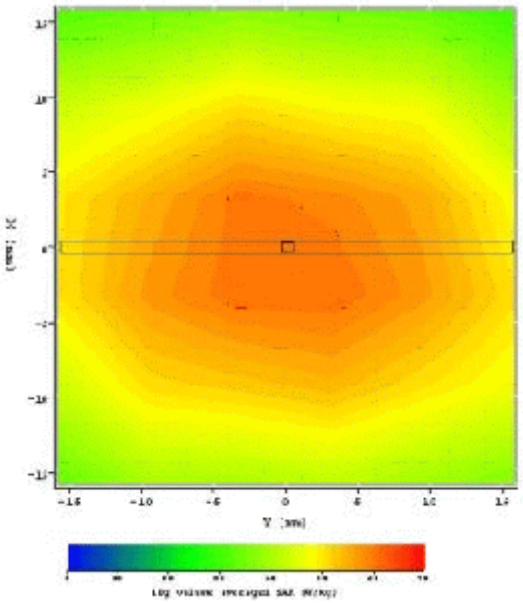

Figure 14. Day 1 Validation Measurement - 1800 MHz in head tissue

Simulant	Freq [MHz]	Room Temp [C]	Liquid Temp [C]	Parameters	Target Value	Measured Value	Deviation [%]	Limit [%]
Head	1800	24.3	24.7	Ý$_r$	40.0	41.2	3.26	+/- 5
				ó	1.40	1.44	1.41	+/- 5
				1g SAR	38.1	35.54	6.72	+/- 10

Table 5. System Validation Results - Day June 14, 2002)

NOTE:

RF Forward power = 0.117W

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Validation was done within 100MHz of test frequency

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Test Position:	**Flat Phantom**
Test Date:	**July 3, 2002**
Antenna Position:	**Balanced Dipole**
Probe:	**IXP-050/SN 0082 – SARf(0.51, 0.53, 0.53) Probe Cal Date 03/2002**
Med. Parameters:	**Head: Ý$_r$ = 41.2; ó = 1.44**
Pre Test Room Temperature:	**24.4 C**
Post Test Room Temperature:	**24.7 C**
Pre Test Simulant Liquid	**24.6 C**
Post Test Simulant Liquid	**25 C**
CH	**NA**
SAR Drift	**< 2%**
SAR (1g):	**35.554**

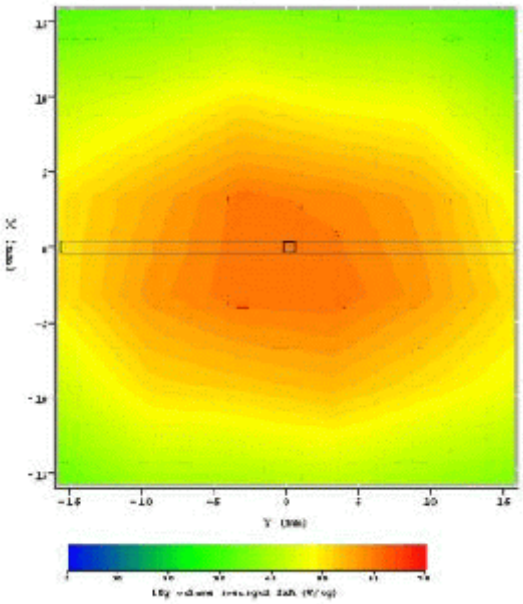

Figure 15. Day 2 Validation Measurement - 1800 MHz in head tissue

Simulant	Freq [MHz]	Room Temp [C]	Liquid Temp [C]	Parameters	Target Value	Measured Value	Deviation [%]	Limit [%]
Head	1800	24.4	24.6	Ý$_r$	40.0	41.2	3.26	+/- 5
				ó	1.40	1.44	1.41	+/- 5
				1g SAR	38.1	35.554	6.682	+/- 10

Table 6. System Validation Results - Day 1(July 3, 2002)

NOTE:
RF Forward power = 0.117W

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Validation was done within 100MHz of test frequency

Test Position:	Flat Phantom
Test Date:	October 6, 2002
Antenna Position:	Balanced Dipole
Probe:	IXP-050/SN 0082 – SARf(0.51, 0.53, 0.53) Probe Cal Date 03/2002
Med. Parameters:	Head: Ý$_r$ = 41.3; ó = 1.43
Pre Test Room Temperature:	24.4 C
Post Test Room Temperature:	24.5 C
Pre Test Simulant Liquid	24.6 C
Post Test Simulant Liquid	24.8 C
CH	NA
SAR Drift	< 2%
SAR (1g):	35.832

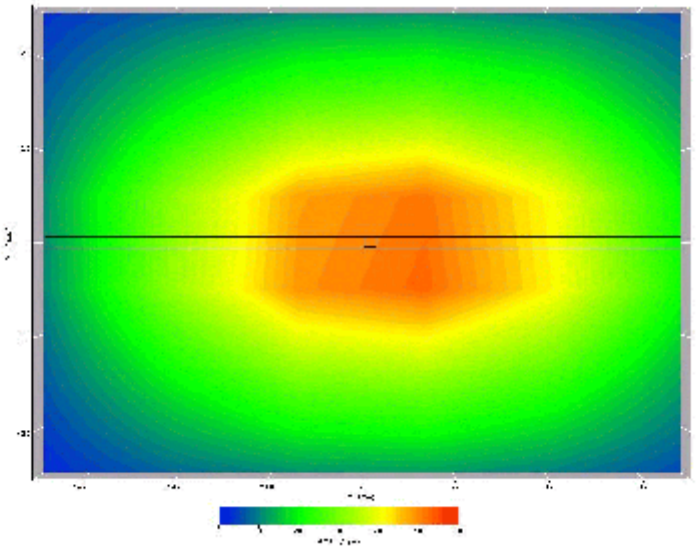

Figure 16. Day 3 Validation Measurement - 1800 MHz in head tissue

Simulant	Freq [MHz]	Room Temp [C]	Liquid Temp [C]	Parameters	Target Value	Measured Value	Deviation [%]	Limit [%]
Head	1800	24.4	24.6	Ý$_r$	40.0	41.3	3.26	+/- 5
				ó	1.40	1.43	1.41	+/- 5
				1g SAR	38.1	35.832	5.952	+/- 10

Table 7. System Validation Results - Day 3(October 6, 2002)

NOTE:
RF Forward power = 0.148W
Validation done within 100MHz of test frequency

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Test Position:	**Flat Phantom**
Test Date:	**Dec. 27, 2002**
Antenna Position:	**Balanced Dipole**
Probe:	**IXP-050/SN 0122 – SARf(0.673, 0.673, 0.673) Probe Cal Date 10/2002**
Med. Parameters:	**Head: Ý$_r$ = 40.9 ; ó = 1.42**
Pre Test Room Temperature:	**24.4 C**
Post Test Room Temperature:	**24.5 C**
Pre Test Simulant Liquid	**24.6 C**
Post Test Simulant Liquid	**24.8 C**
CH	**NA**
SAR Drift	**< 2%**
SAR (1g):	**37.32**

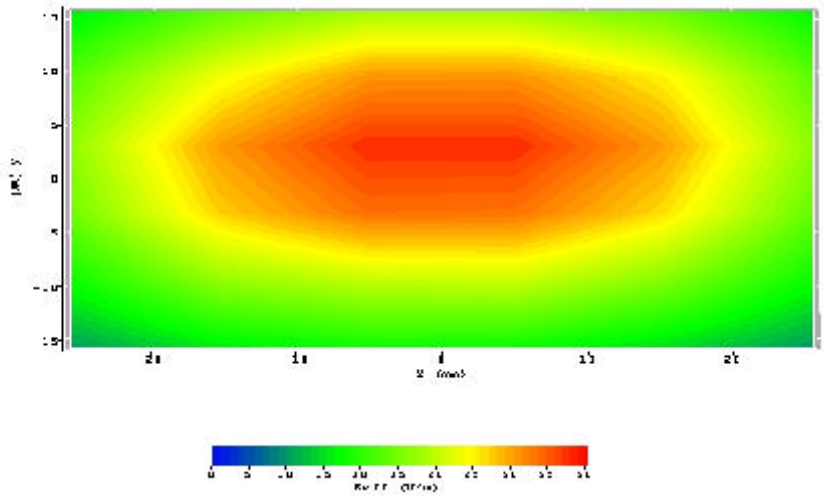

Figure 16. Validation Measurement - 1800 MHz in head tissue

Simulant	Freq [MHz]	Room Temp [C]	Liquid Temp [C]	Parameters	Target Value	Measured Value	Deviation [%]	Limit [%]
Head	1800	24.4	24.6	Ý$_r$	40.0	40.9	2.25	+/- 5
				ó	1.40	1.42	1.41	+/- 5
				1g SAR	38.1	37.32	1.95	+/- 10

Table 7. System Validation Results - (Dec. 27, 2002)

NOTE:
RF Forward power = 0.12W
Validation done within 100MHz of test frequency

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SAR Results Summary

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MEASUREMENT RESULTS (Head SAR)

Phantom Configuration	Test Position	Power dBm	Channel	Frequency (GHz)	Max. 1g SAR (W/kg)	2nd spot (W/kg)
Left Side of Head/ 1200 mAH Battery	Cheek (0 ^{0})	29.7	660(MID)	1.879	0.316	NA
	Tilted (15 ^{0})	29.7	660(MID)	1.879	0.52	NA
Right Side of Head/ 1200 mAH Battery	Cheek (0 ^{0})	29.7	660(MID)	1.879	0.568	NA
	Tilted (15 ^{0})	29.7	660(MID)	1.879	0.646 0.677(retest)	NA
Left Side of Head/ 900 mAH Battery	Cheek (0 ^{0})	29.7	660(MID)	1.879	0.308	0.048
	Tilted (15 ^{0})	29.7	660(MID)	1.879	0.537	NA
Right Side of Head/ 900 mAH Battery	Cheek (0 ^{0})	29.7	660(MID)	1.879	0.534	NA
	Tilted (15 ^{0})	29.7	660(MID)	1.879	0.657 0.671(retest)	NA

Table 8. Measured head-phantom results for PCS Handset for the model TGP79AE - GPS Antenna In

NOTES:

1	The measurements are first performed at the middle channel of the operating band of the EUT. If the SAR value of the middle channel for each test configuration (Left, Right, Cheek, Tilt, Extended, Retracted) is at least 2 dB below the SAR limit, testing at the high and low channels is optional for such test configurations.			
2	The test data reported are the worst-case SAR values with the antenna-head position set in a typical configuration.			
3	All modes of operation are investigated and worst case are reported.			
4	Multiple Hot Spots	None	T SAR was less than 2 dB of the highest peak	T Reported
5	Battery Type	Standard	Extended	T Both
6	Power Measured	T Conducted	EIRP	ERP
7	SAR Measurement System	SARA2		
8	SAR Configuration	T Head	Body	
9	Before the measurements, the test site ambient conditions were checked performing SAR measurements with the phone powered off.			

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MEASUREMENT RESULTS (Head SAR, continued)

Phantom Configuration	Test Position	Power dBm	Channel	Frequency (GHz)	Max. 1g SAR (W/kg)	2nd spot (W/kg)
Left Side of Head/ 1200 mAH Battery	Cheek (0 ^{0})	29.7	660(MID)	1.879	0.269	0.074
	Tilted (15 ^{0})	29.7	660(MID)	1.879	0.396	NA
Right Side of Head/ 1200 mAH Battery	Cheek (0 ^{0})	29.7	660(MID)	1.879	0.406	NA
	Tilted (15 ^{0})	29.7	660(MID)	1.879	0.541	NA
Left Side of Head/ 900 mAH Battery	Cheek (0 ^{0})	29.7	660(MID)	1.879	0.306	0.036
	Tilted (15 ^{0})	29.7	660(MID)	1.879	0.4	NA
Right Side of Head/ 900 mAH Battery	Cheek (0 ^{0})	29.7	660(MID)	1.879	0.491	NA
	Tilted (15 ^{0})	29.7	660(MID)	1.879	0.534	NA

Table 9. Measured head-phantom results for PCS Handset for the model TGP79AE - GPS Antenna Out

NOTES:

1	The measurements are first performed at the middle channel of the operating band of the EUT. If the SAR value of the middle channel for each test configuration (Left, Right, Cheek, Tilt, Extended, Retracted) is at least 2 dB below the SAR limit, testing at the high and low channels is optional for such test configurations.			
2	The test data reported are the worst-case SAR values with the antenna-head position set in a typical configuration.			
3	All modes of operation are investigated and worst case are reported.			
4	Multiple Hot Spots	None	T SAR was less than 2 dB of the highest peak	T Reported
5	Battery Type	Standard	Extended	T Both
6	Power Measured	T Conducted	EIRP	ERP
7	SAR Measurement System	SARA2		
8	SAR Configuration	T Head	Body	
9	Before the measurements, the test site ambient conditions were checked performing SAR measurements with the phone powered off.			

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MEASUREMENT RESULTS (Body)

Config	Description	Battery Option	Power dBm	Channel	Frequency (GHz)	Max. 1g SAR (W/kg)	2nd spot (W/kg)
1	Black Carrying Case	900 mAH	29.7	660	1.879	0.242	NA
2	Black Carrying Case/Headset		29.7	660	1.879	0.210	NA
3	Black Carrying Case/Data Cable		29.7	660	1.879	0.260 0.340(retest)	n/a 0.01
4	Black Carrying Case/External GPS		29.7	660	1.879	0.270 0.385(retest)	0.041 0.05
5	Black Carrying Case	1200 mAH	29.7	660	1.879	0.219	NA
6	Black Carrying Case/Headset		29.7	660	1.879	0.206	NA
7	Black Carrying Case/Data Cable		29.7	660	1.879	0.181	NA
8	Black Carrying Case/External GPS		29.7	660	1.879	0.237	0.201

Table 10. Measured Body SAR results for the Handset model TGP79AE

NOTES:

1 Identical metallic component on both of the carrying harnesses. Therefore data is provided only for one of them, i.e. black carrying harness.

2 The measurements are first performed at the middle channel of the operating band of the EUT. If the SAR value of the middle channel for each test configuration (Left, Right, Cheek, Tilt, Extended, Retracted) is at least 2 dB below the SAR limit, testing at the high and low channels is optional for such test configurations.

3 The test data reported are the worst-case SAR values with the antenna-head position set in a typical configuration.

4 All modes of operation are investigated and worst case are reported.

5	Multiple Hot Spots	None	T SAR was less than 2 dB of the highest peak	T Reported
6	Battery Type	Standard	Extended	T Both
7	Power Measured	T Conducted	EIRP	ERP
8	SAR Measurement System	SARA2		
9	SAR Configuration	Head	T Body	

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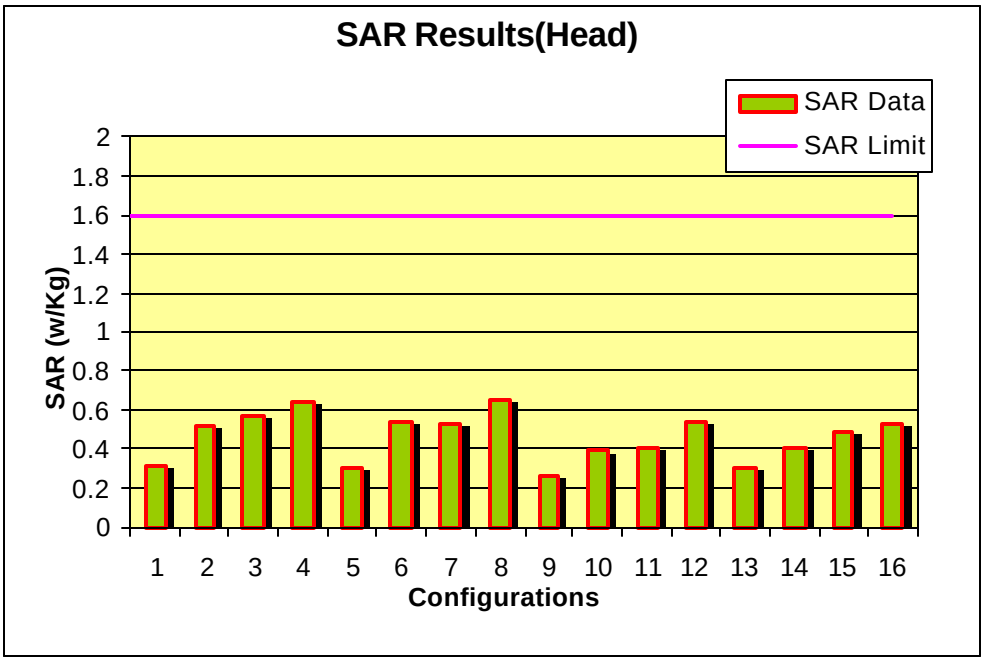
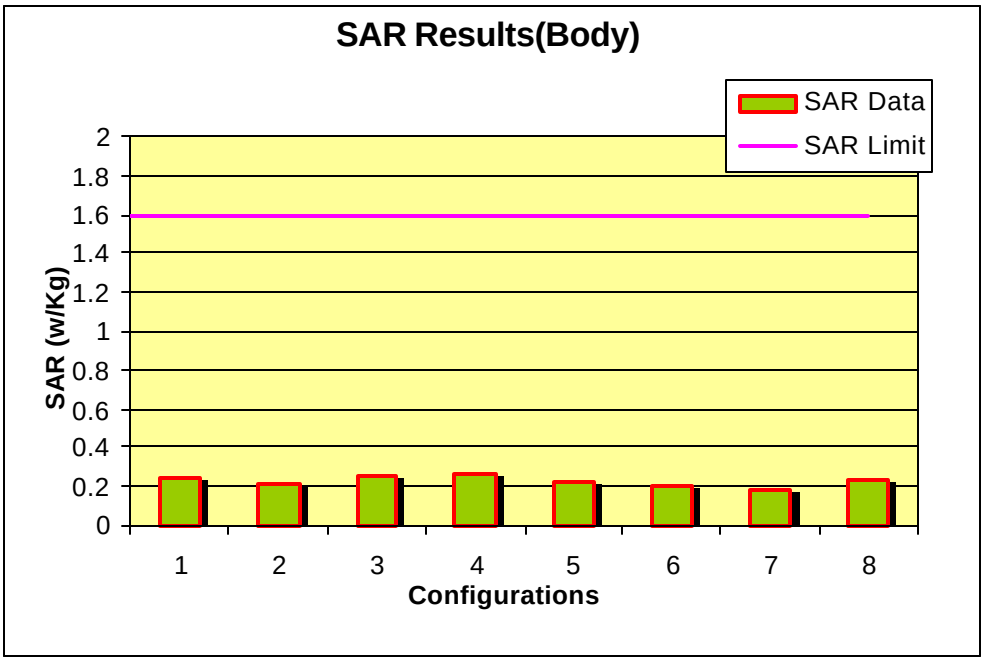
10 Before the measurements, the test site ambient conditions were checked performing SAR measurements with the phone powered off.

SAR Results (Continued)





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SAR DISTRIBUTIONS (AREA SCANS)

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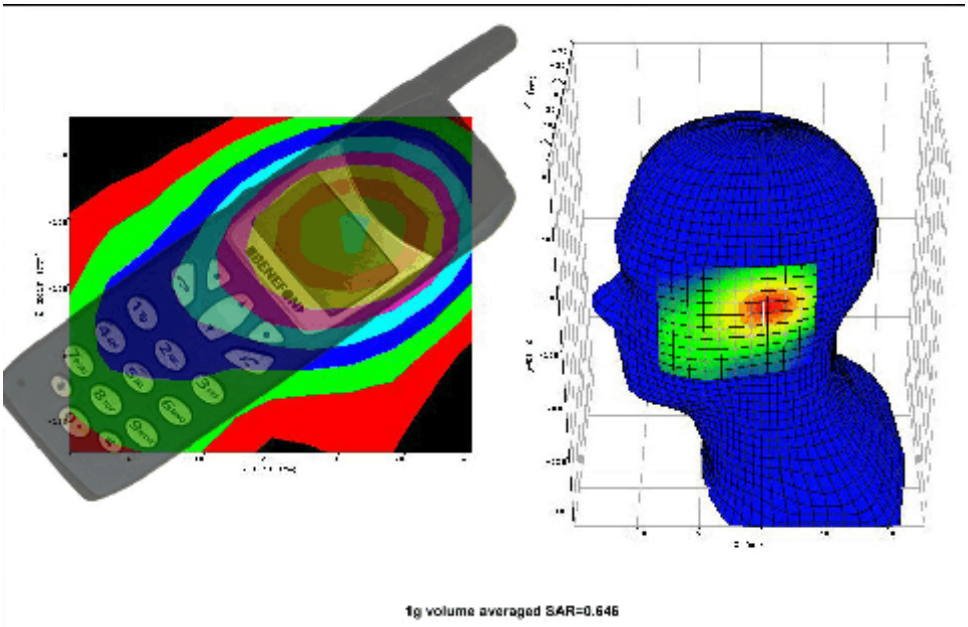
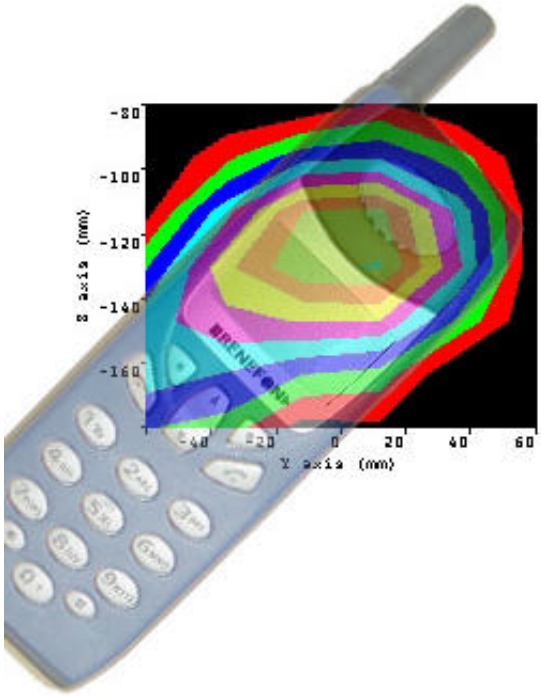
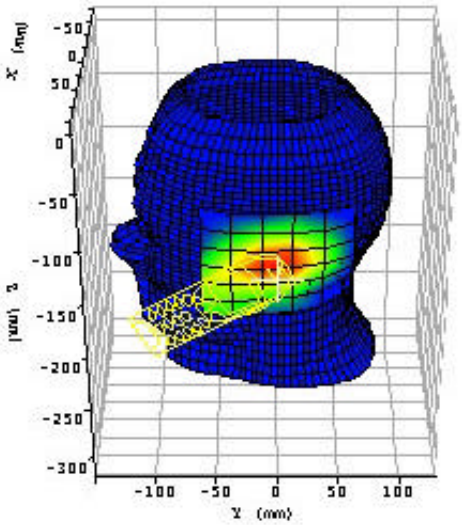
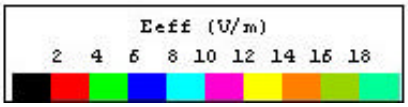
Test Position:	**Upright Phantom; Right Hand Section; Tilted Position; 1200 mAH Battery**
Test Date:	**June 14, 2002**
Antenna Position:	**Fixed PCS Antenna and GPS Antenna IN**
Probe:	**IXP-050/SN 0082 – SARf(0.51, 0.53, 0.53) Probe Cal Date 03/2002**
Med. Parameters:	**1900 MHz Head: $Ý_r$ = 41.2; ó = 1.44**
Pre Test Room Temperature:	**24.3 C**
Post Test Room Temperature:	**24.4 C**
Pre Test Simulant Liquid	**24.7 C**
Post Test Simulant Liquid	**24.9 C**
CH 660;	**Crest Factor = 8(GSM)**
SAR Drift	**< 2%**
SAR (1g):	**0.646 W/Kg**



Test Position:	**Upright Phantom; Right Hand Section; Tilted Position; 1200 mAH Battery**
Test Date:	**Dec. 27, 2002**
Antenna Position:	**Fixed PCS Antenna and GPS Antenna IN**
Probe:	**IXP-050/SN 0122 – SARf(0.673, 0.673, 0.673) Probe Cal Date 10/2002**
Med. Parameters:	**1900 MHz Head: Ý$_r$ = 40.9 ; ó = 1.42**
Pre Test Room Temperature:	**24.3 C**
Post Test Room Temperature:	**24.4 C**
Pre Test Simulant Liquid	**24.7 C**
Post Test Simulant Liquid	**24.9 C**
CH 660;	**Crest Factor = 8(GSM)**
SAR Drift	**< 2%**
SAR (1g):	**0.677 W/Kg**







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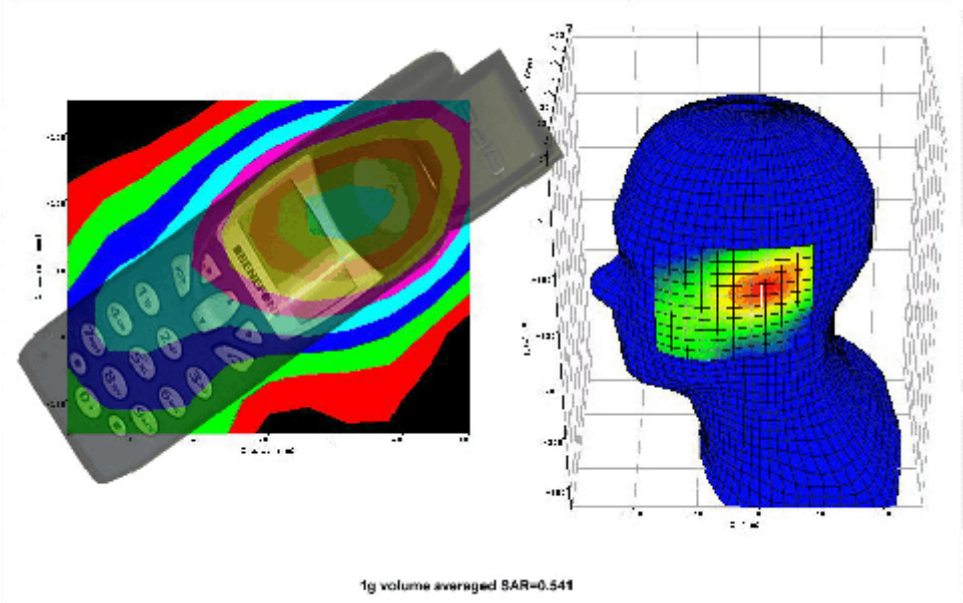
Test Position:	**Upright Phantom; Right Hand Section; Tilted Position; 1200 mAH Battery**
Test Date:	**June 14, 2002**
Antenna Position:	**Fixed PCS Antenna and GPS Antenna OUT**
Probe:	**IXP-050/SN 0082 – SARf(0.51, 0.53, 0.53) Probe Cal Date 03/2002**
Med. Parameters:	**1900 MHz Head: Ý$_r$ = 41.2; ó = 1.44**
Pre Test Room Temperature:	**24.3 C**
Post Test Room Temperature:	**24.4 C**
Pre Test Simulant Liquid	**24.7 C**
Post Test Simulant Liquid	**24.9 C**
CH 660;	**Crest Factor = 8(GSM)**
SAR Drift	**< 2%**
SAR (1g):	**0.541 W/Kg**



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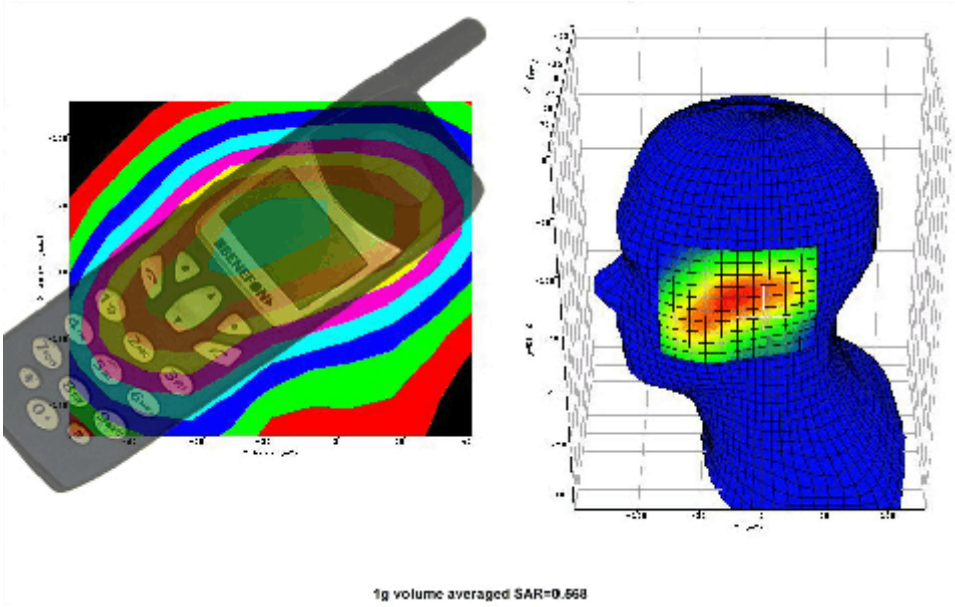
Test Position:	**Upright Phantom; Right Hand Section; Cheek Position; 1200 mAH Battery**
Test Date:	**June 14, 2002**
Antenna Position:	**Fixed PCS Antenna and GPS antenna IN**
Probe:	**IXP-050/SN 0082 – SARf(0.51, 0.53, 0.53) Probe Cal Date 03/2002**
Med. Parameters:	**1900 MHz Head: Ý$_r$ = 41.2; ó = 1.44**
Pre Test Room Temperature:	**24.3 C**
Post Test Room Temperature:	**24.4 C**
Pre Test Simulant Liquid	**24.7 C**
Post Test Simulant Liquid	**24.9 C**
CH 660;	**Crest Factor = 8(GSM)**
SAR Drift	**< 2%**
SAR (1g):	**0.568 W/Kg**



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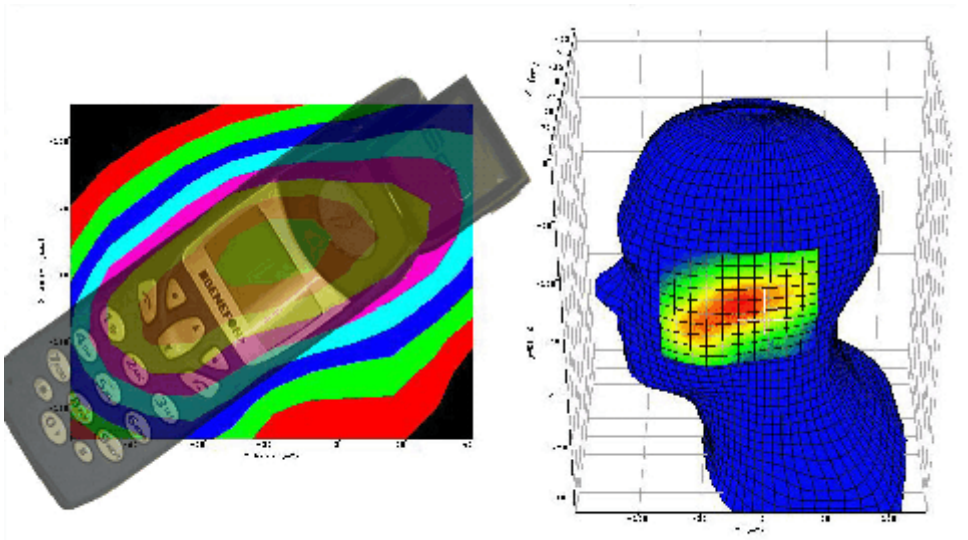
Test Position:	**Upright Phantom; Right Hand Section; Cheek Position; 1200 mAH Battery**
Test Date:	**June 14, 2002**
Antenna Position:	**Fixed PCS Antenna and GPS antenna OUT**
Probe:	**IXP-050/SN 0082 – SARf(0.51, 0.53, 0.53) Probe Cal Date 03/2002**
Med. Parameters:	**1900 MHz Head: Ý$_r$ = 41.2; ó = 1.44**
Pre Test Room Temperature:	**24.3 C**
Post Test Room Temperature:	**24.4 C**
Pre Test Simulant Liquid	**24.7 C**
Post Test Simulant Liquid	**24.9 C**
CH 660;	**Crest Factor = 8(GSM)**
SAR Drift	**< 2%**
SAR (1g):	**0.406 W/Kg**



1g volume averaged SAR=0.406

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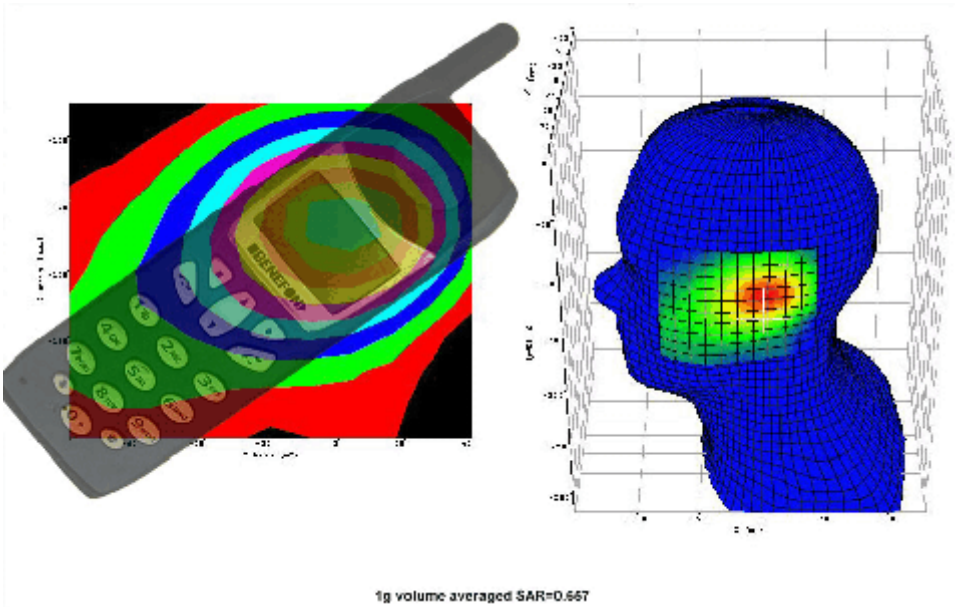
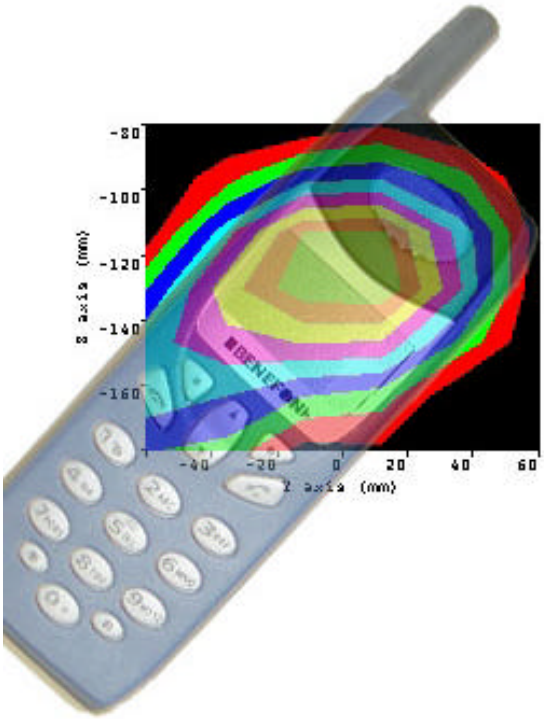
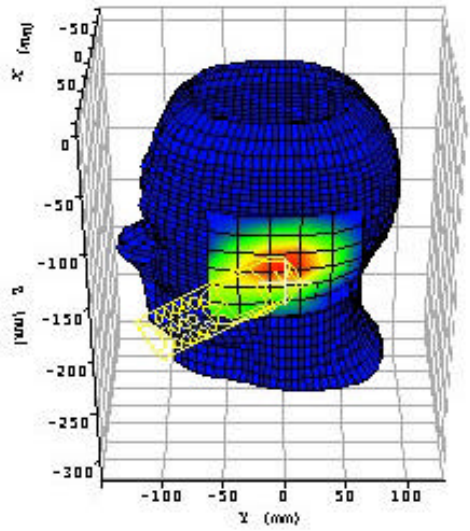
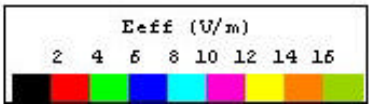
Test Position:	**Upright Phantom; Right Hand Section; Tilted Position; 900 mAH Battery**
Test Date:	**June 14, 2002**
Antenna Position:	**Fixed PCS Antenna and GPS Antenna IN**
Probe:	**IXP-050/SN 0082 – SARf(0.51, 0.53, 0.53) Probe Cal Date 03/2002**
Med. Parameters:	**1900 MHz Head: $\acute{Y}_r$ = 41.2; ó = 1.44**
Pre Test Room Temperature:	**24.3 C**
Post Test Room Temperature:	**24.4 C**
Pre Test Simulant Liquid	**24.7 C**
Post Test Simulant Liquid	**24.9 C**
CH 660;	**Crest Factor = 8(GSM)**
SAR Drift	**< 2%**
SAR (1g):	**0.657 W/Kg**



Test Position:	**Upright Phantom; Right Hand Section; Tilted Position; 900 mAH Battery**
Test Date:	**Dec. 27, 2002**
Antenna Position:	**Fixed PCS Antenna and GPS Antenna IN**
Probe:	**IXP-050/SN 0122 – SARf(0.673, 0.673, 0.673) Probe Cal Date 10/2002**
Med. Parameters:	**1900 MHz Head: Ý$_r$ = 40.9 ; ó = 1.42**
Pre Test Room Temperature:	**24.3 C**
Post Test Room Temperature:	**24.4 C**
Pre Test Simulant Liquid	**24.7 C**
Post Test Simulant Liquid	**24.9 C**
CH 660;	**Crest Factor = 8(GSM)**
SAR Drift	**< 2%**
SAR (1g):	**0.671 W/Kg**







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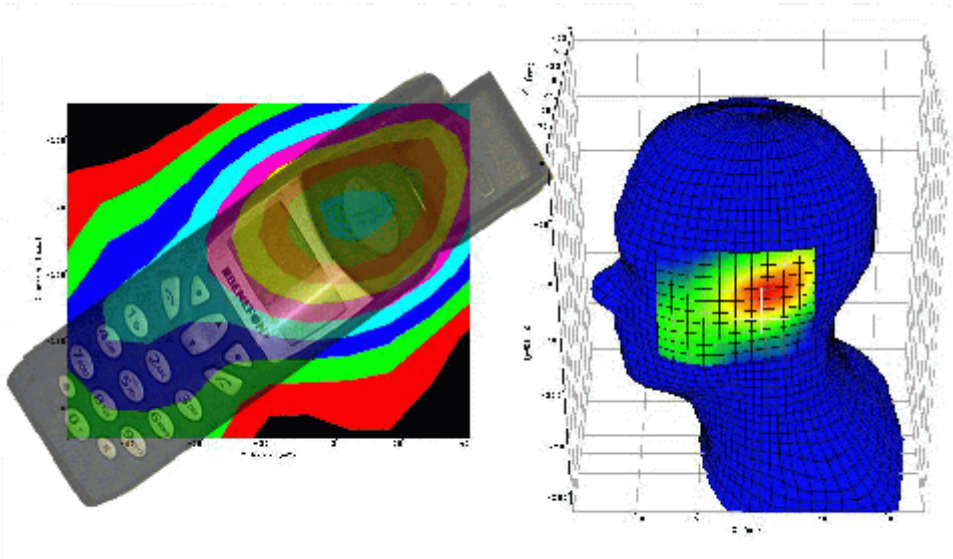
Test Position:	**Upright Phantom; Right Hand Section; Tilted Position; 900 mAH Battery**
Test Date:	**June 14, 2002**
Antenna Position:	**Fixed PCS Antenna and GPS Antenna OUT**
Probe:	**IXP-050/SN 0082 – SARf(0.51, 0.53, 0.53) Probe Cal Date 03/2002**
Med. Parameters:	**1900 MHz Head: $\acute{Y}_r$ = 41.2; ó = 1.44**
Pre Test Room Temperature:	**24.3 C**
Post Test Room Temperature:	**24.4 C**
Pre Test Simulant Liquid	**24.7 C**
Post Test Simulant Liquid	**24.9 C**
CH 660;	**Crest Factor = 8(GSM)**
SAR Drift	**< 2%**
SAR (1g):	**0.534 W/Kg**



1g volume averaged SAR=0.534

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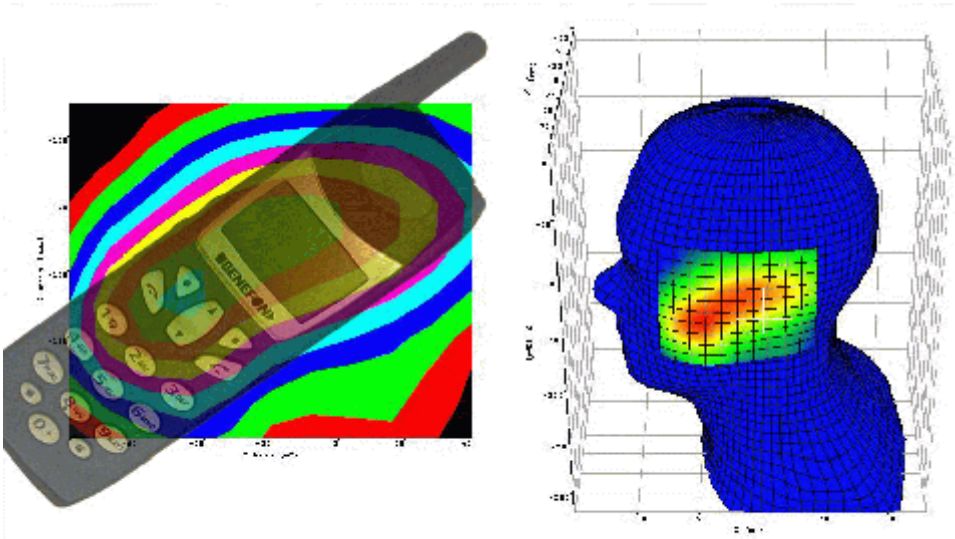
Test Position:	**Upright Phantom; Right Hand Section; Cheek Position; 900 mAH Battery**
Test Date:	**June 14, 2002**
Antenna Position:	**Fixed PCS Antenna and GPS Antenna IN**
Probe:	**IXP-050/SN 0082 – SARf(0.51, 0.53, 0.53) Probe Cal Date 03/2002**
Med. Parameters:	**1900 MHz Head: Ý$_r$ = 41.2; ó = 1.44**
Pre Test Room Temperature:	**24.3 C**
Post Test Room Temperature:	**24.4 C**
Pre Test Simulant Liquid	**24.7 C**
Post Test Simulant Liquid	**24.9 C**
CH 660;	**Crest Factor = 8(GSM)**
SAR Drift	**< 2%**
SAR (1g):	**0.534 W/Kg**



1g volume averaged SAR=0.634

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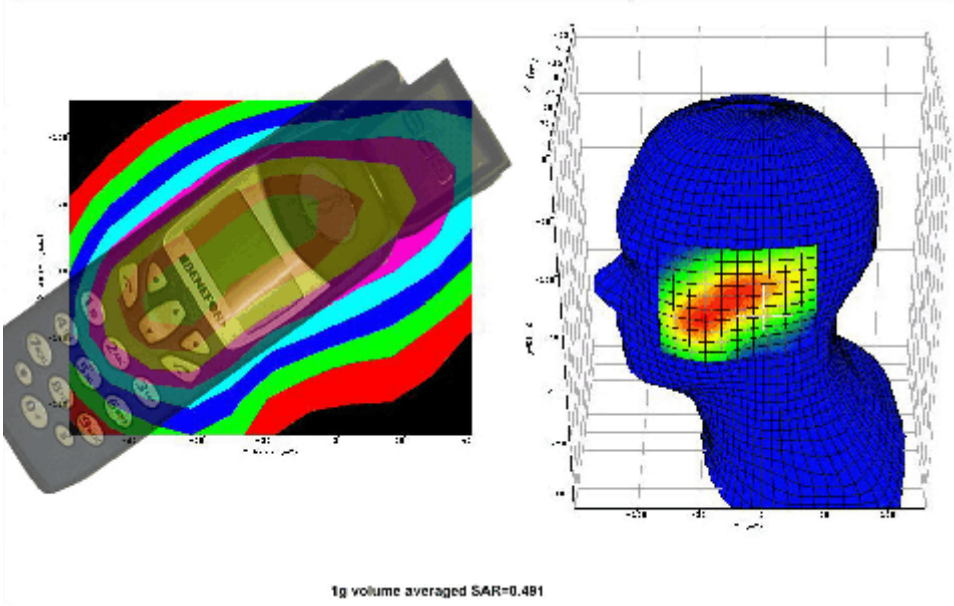
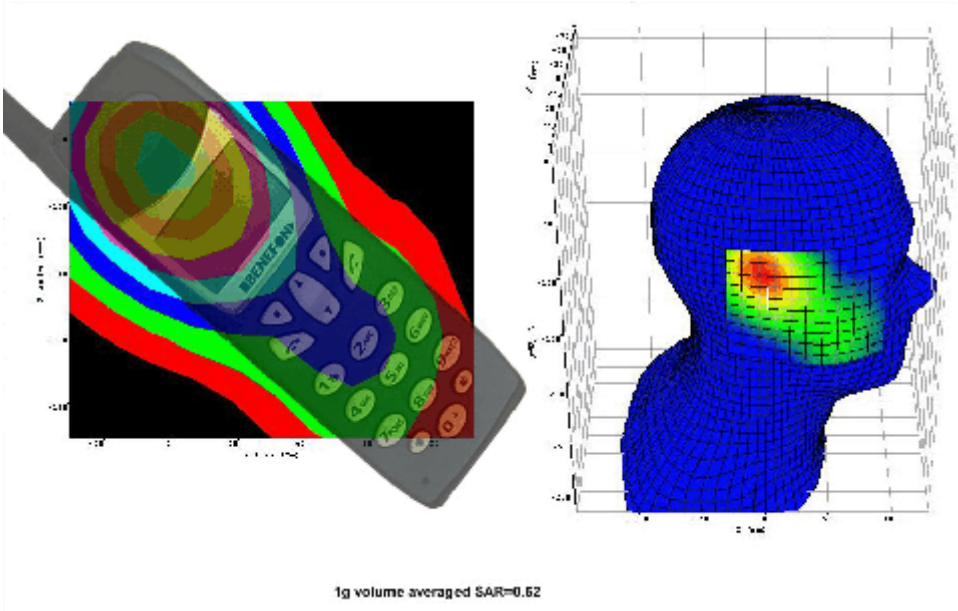
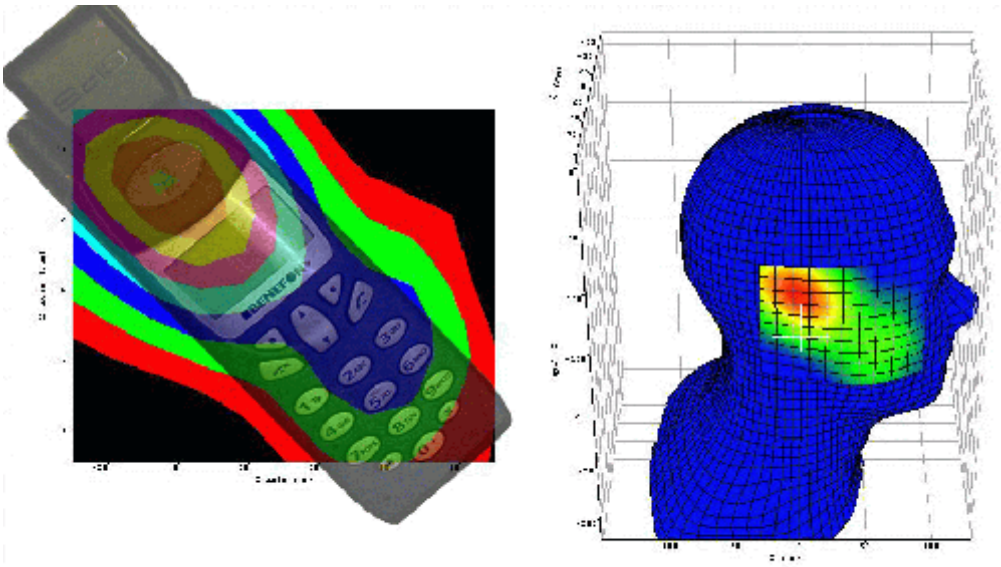
Test Position:	**Upright Phantom; Right Hand Section; Cheek Position; 900 mAH Battery**
Test Date:	**June 14, 2002**
Antenna Position:	**Fixed PCS Antenna and GPS antenna OUT**
Probe:	**IXP-050/SN 0082 – SARf(0.51, 0.53, 0.53) Probe Cal Date 03/2002**
Med. Parameters:	**1900 MHz Head: $\acute{Y}_r$ = 41.2; ó = 1.44**
Pre Test Room Temperature:	**24.3 C**
Post Test Room Temperature:	**24.4 C**
Pre Test Simulant Liquid	**24.7 C**
Post Test Simulant Liquid	**24.9 C**
CH 660;	**Crest Factor = 8(GSM)**
SAR Drift	**< 2%**
SAR (1g):	**0.491 W/Kg**



Test Position:	**Upright Phantom; Left Hand Section; Tilted Position; 1200 mAH Battery**
Test Date:	**June 14, 2002**
Antenna Position:	**Fixed PCS Antenna and GPS Antenna IN**
Probe:	**IXP-050/SN 0082 – SARf(0.51, 0.53, 0.53) Probe Cal Date 03/2002**
Med. Parameters:	**1900 MHz Head: Ý$_r$ = 41.2; ó = 1.44**
Pre Test Room Temperature:	**24.3 C**
Post Test Room Temperature:	**24.4 C**
Pre Test Simulant Liquid	**24.7 C**
Post Test Simulant Liquid	**24.9 C**
CH 660;	**Crest Factor = 8(GSM)**
SAR Drift	**< 2%**
SAR (1g):	**0.520 W/Kg**



Test Position:	**Upright Phantom; Left Hand Section; Tilted Position; 1200 mAH Battery**
Test Date:	**July 3, 2002**
Antenna Position:	**Fixed PCS Antenna and GPS antenna OUT**
Probe:	**IXP-050/SN 0082 – SARf(0.51, 0.53, 0.53) Probe Cal Date 03/2002**
Med. Parameters:	**1900 MHz Head: Ý$_r$ = 41.2; ó = 1.44**
Pre Test Room Temperature:	**24.4 C**
Post Test Room Temperature:	**24.7 C**
Pre Test Simulant Liquid	**24.6 C**
Post Test Simulant Liquid	**25 C**
CH 660;	**Crest Factor = 8(GSM)**
SAR Drift	**< 2%**
SAR (1g):	**0.396 W/Kg**



1g volume averaged SAR=0.396

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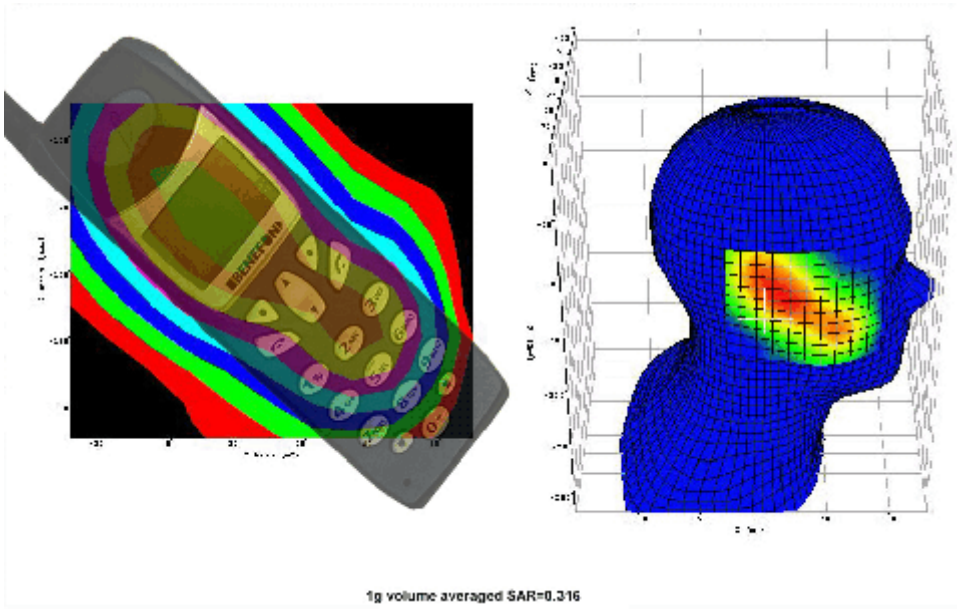
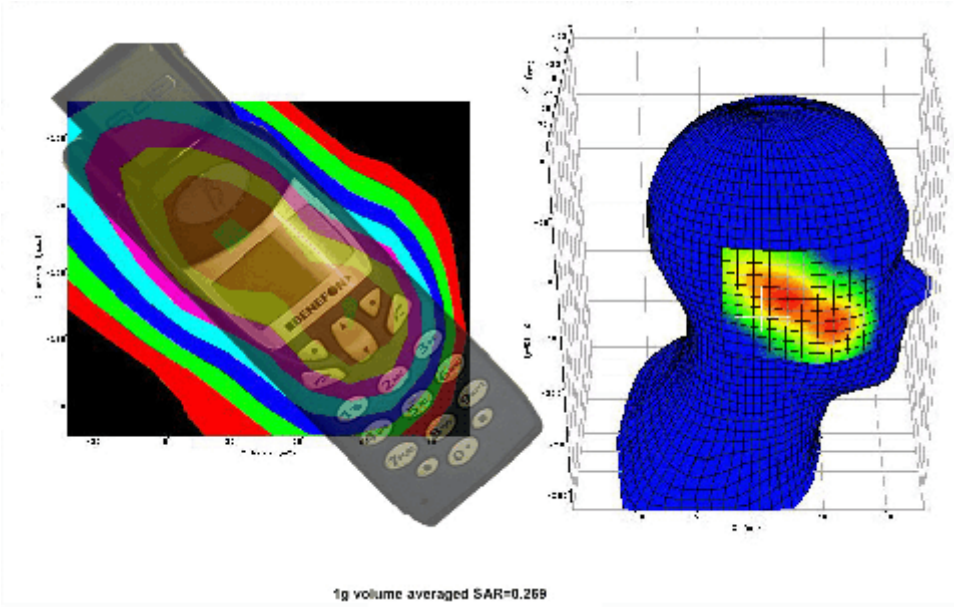
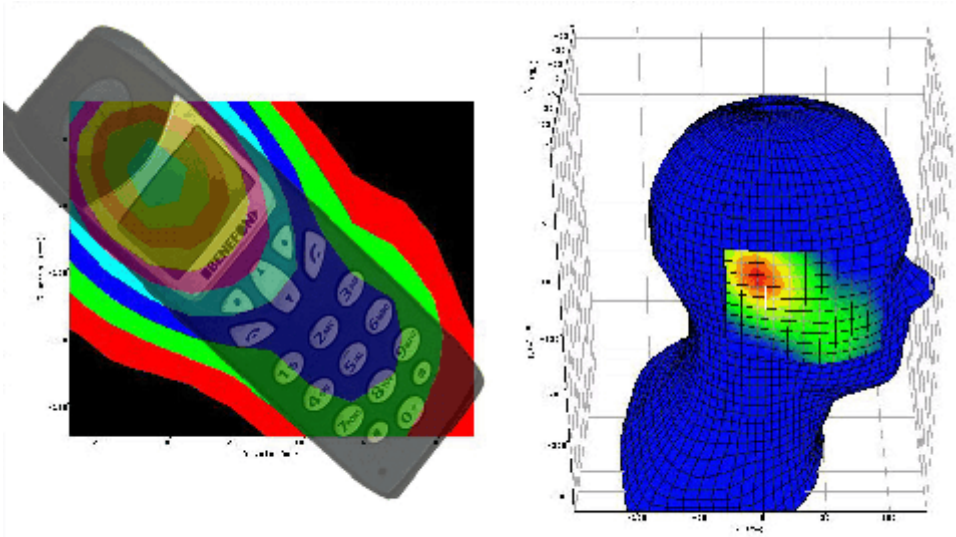
Test Position:	**Upright Phantom; Left Hand Section; Cheek Position; 1200 mAH Battery**
Test Date:	**July 3, 2002**
Antenna Position:	**Fixed PCS Antenna and GPS antenna In**
Probe:	**IXP-050/SN 0082 – SARf(0.51, 0.53, 0.53) Probe Cal Date 03/2002**
Med. Parameters:	**1900 MHz Head: Ý$_r$ = 41.2; ó = 1.44**
Pre Test Room Temperature:	**24.4 C**
Post Test Room Temperature:	**24.7 C**
Pre Test Simulant Liquid	**24.6 C**
Post Test Simulant Liquid	**25 C**
CH 660;	**Crest Factor = 8(GSM)**
SAR Drift	**< 2%**
SAR (1g):	**0.316 W/Kg**



Test Position:	**Upright Phantom; Left Hand Section; Cheek Position; 1200 mAH Battery**
Test Date:	**July 3, 2002**
Antenna Position:	**Fixed PCS Antenna and GPS Antenna OUT**
Probe:	**IXP-050/SN 0082 – SARf(0.51, 0.53, 0.53) Probe Cal Date 03/2002**
Med. Parameters:	**1900 MHz Head: Ý$_r$ = 41.2; ó = 1.44**
Pre Test Room Temperature:	**24.4 C**
Post Test Room Temperature:	**24.7 C**
Pre Test Simulant Liquid	**24.6 C**
Post Test Simulant Liquid	**25 C**
CH 660;	**Crest Factor = 8(GSM)**
SAR Drift	**< 2%**
SAR (1g):	**0.269 W/Kg**



Test Position:	**Upright Phantom; Left Hand Section; Tilted Position; 900 mAH Battery**
Test Date:	**July 3, 2002**
Antenna Position:	**Fixed PCS Antenna and GPS antenna IN**
Probe:	**IXP-050/SN 0082 – SARf(0.51, 0.53, 0.53) Probe Cal Date 03/2002**
Med. Parameters:	**1900 MHz Head: Ý$_r$ = 41.2; ó = 1.44**
Pre Test Room Temperature:	**24.4 C**
Post Test Room Temperature:	**24.7 C**
Pre Test Simulant Liquid	**24.6 C**
Post Test Simulant Liquid	**25 C**
CH 660;	**Crest Factor = 8(GSM)**
SAR Drift	**< 2%**
SAR (1g):	**0.537 W/Kg**



1g volume averaged SAR=0.537

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