ITS Intertek Testing Services
ETL SEMKO

Specific Absorption Rate (SAR) Test Report

for

Chi Mei Communications Systems, Inc

on the

CMCS Tri-Band GSM/GPRS Module

Model Number: Newton

Test Report: 30229741
Date of Report: April 15, 2002

Job #: 3022974
Date of Test: April 8, 2002

Total No of Pages Contained in this Report: 38

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

Tested by:	Suresh kondapalli
Reviewed by: David Chernomordik	David Chernomordik, Ph.D., EMC Technical Manager

Review Date: 4/17/02

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1.0 JOB DESCRIPTION

1.1 Client Information

The Newton has been tested at the request of:

Company: Chi Mei Communications Systems, Inc
11 F, No. 39, Chung Hua Road Sec. 1
chandler@cmcs.com.tw
Taipei, Taiwan 100
China

Name of contact: Mr. Chandler Liang
Telephone: +886-2-2370-8699, Ext 2233
Fax +886-2-2370-8399

1.2 Equipment under test (EUT)

Product Descriptions:

Equipment	**CMCS Tri-Band GSM/GPRS Module**		
Trade Name	Chi Mei Communications Systems, Inc	**Model No:**	Newton
FCC ID	Not Labeled	**S/N No.**	Not Labeled
Category	Portable	**RF Exposure**	Uncontrolled Environment
Frequency Band	1800 – 1910 MHz	**System**	GSM/GPRS

EUT Antenna Description			
Type	Monopole	**Configuration**	Fixed
Dimensions	N/A	**Gain**	0 dBi
Location	Internal		

Use of Product : Wireless Communication

Manufacturer: Chi Mei Communications Systems, Inc

Production is planned: [X] Yes, [ ] No

EUT receive date: April 8, 2002

EUT received condition: Good operating condition prototype.

Test start date: April 8, 2002

Test end date: April 8, 2002

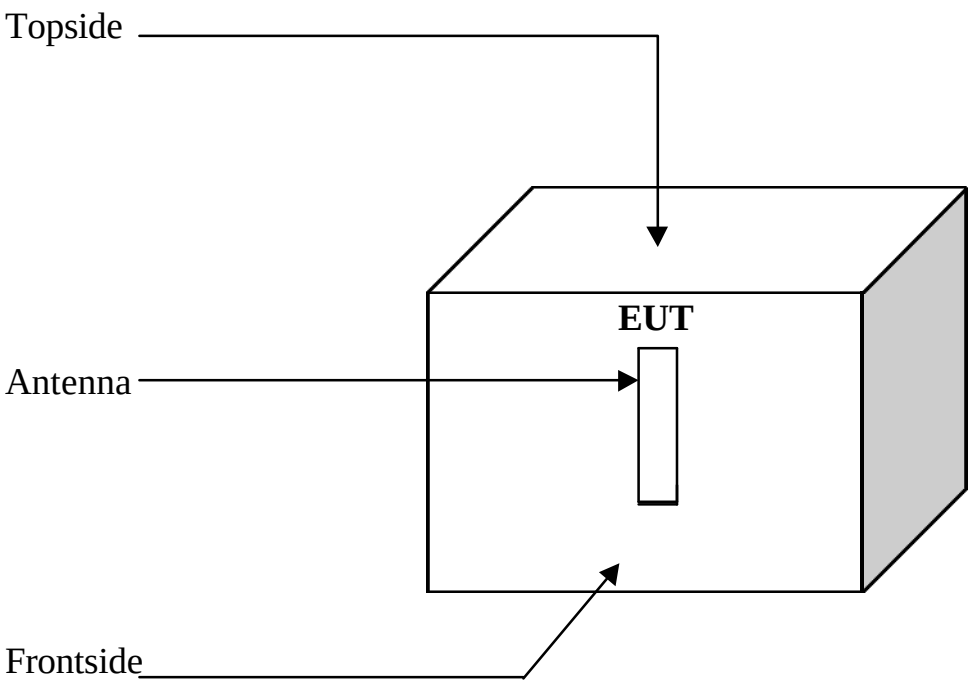
1.3 Test plan reference

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

None, the EUT is a stand-alone unit.



S = Shielded **U** = Unshielded	**F** = With Ferrite **M** = Length in Meters

1.4.2 Test Position

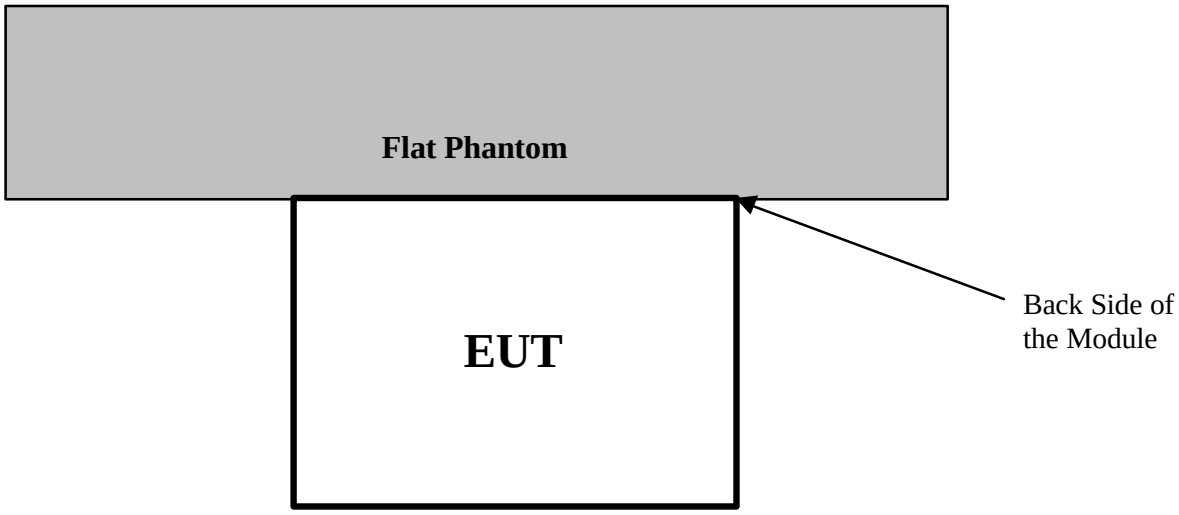


Figure 1: Module Touching Phantom, Antenna Horizontal

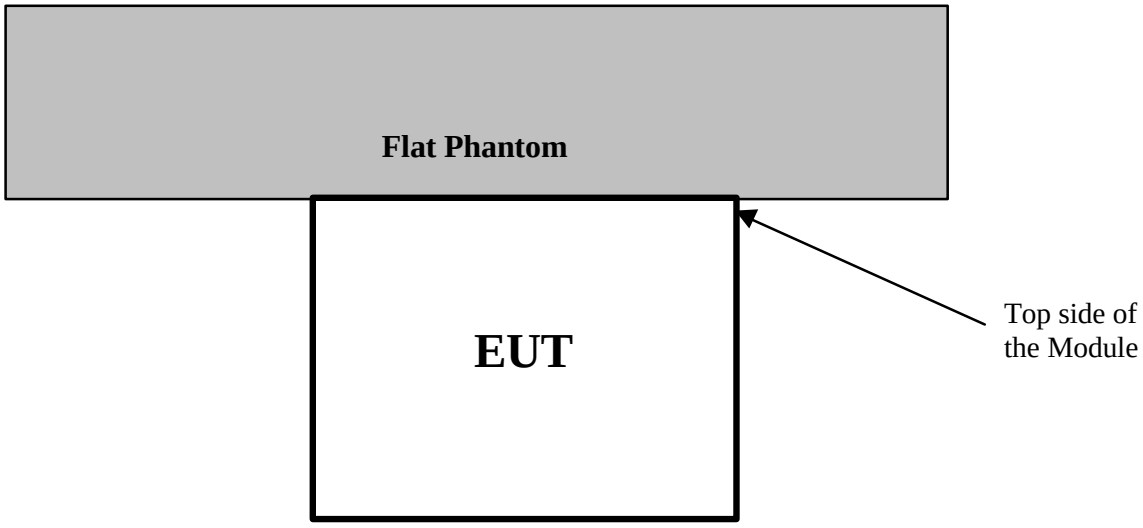


Figure 2: Module Touching Phantom, Antenna Vertical

1.4.3 Test Condition

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

EUT Antenna	Fixed length	**Orientation**	Vertical & Horizontal
Usage	Stand alone	**Distance between antenna axis at the joint and the liquid surface:**	Configuration A 32.3 mm Configuration B 15.2 mm
Simulating human Body/hand	Body	**EUT Battery**	Three "C" type Alkaline batteries

	Frequencey MHz	**dBm**
Conducted Peak output Power	1850	28.77
	1880	28.58
	1910	28.81

The EUT was tested at lowest, middle and highest operating channels defined by manufacturer.

1.5 Modifications required for compliance

Intertek Testing Services implemented no modifications.

1.6 Additions, deviations and exclusions from standards

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

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

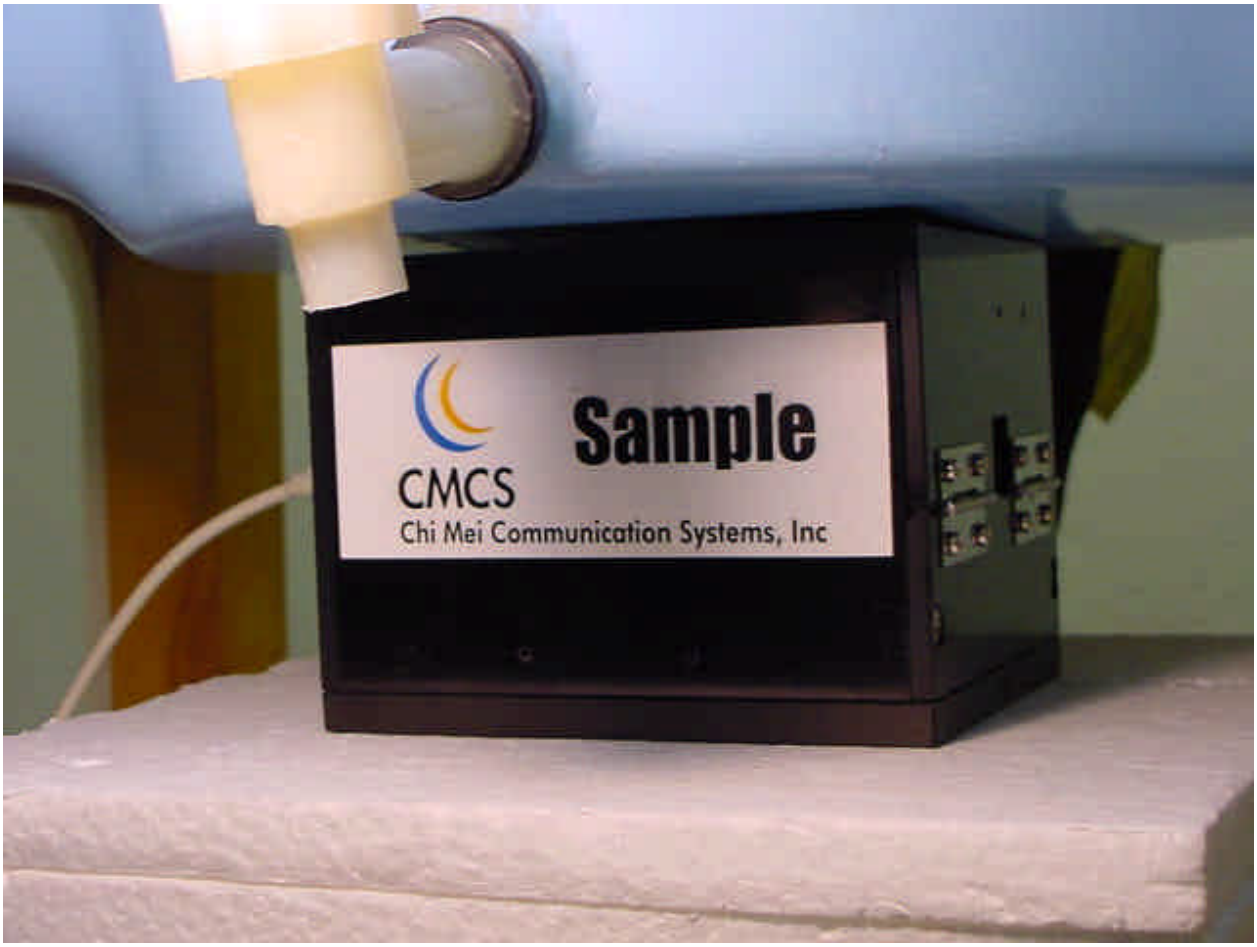
SAR Measurement Test Setup

Configuration A - Antenna Horizontal

2.2 Configuration Photographs (Continued)

SAR Measurement Test Setup

Configuration B - Antenna Vertical



2.2 Configuration Photographs (Continued)

EUT Photo

2.2 Configuration Photographs (Continued)

EUT Photo

2.3 System Verification

Prior to the assessment, the system was verified to the ±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)
D1800V2, S/N #: 214	9.77	9.46

See Plot # 5

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-axes. 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 straightforward 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-measurements 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.

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 Appendix A.

Measurement Results

Trade Name:	Chi Mei Communications	**Model No.:**	Newton
Serial No.:	Not Labeled	**Test Engineer:**	Suresh kondapalli

TEST CONDITIONS			
Ambient Temperature	23.5 °C	**Relative Humidity**	56 %
Test Signal Source	Test Mode	**Signal Modulation**	GSM
Output Power Before SAR Test	See page 6	**Output Power After SAR Test**	No change
Test Duration	23 Min. each test	**Number of Battery Change**	New battery every scan

Configuration B
EUT Position: Module touching Phantom Antenna Vertical

Channel MHz	Operating Mode	Crest Factor	Measured SAR_{1g} (mW/g)	Limit SAR_{1g} (mW/g)	Plot Number
1880	GSM	8	0.0155	1.6	1

Configuration A
EUT Position: Module touching Phantom Antenna Horizontal

Channel MHz	Operating Mode	Crest Factor	Measured SAR_{1g} (mW/g)	Limit SAR_{1g} (mW/g)	Plot Number
1850	GSM	8	0.0219	1.6	2
1880	GSM	8	0.0219	1.6	3
1910	GSM	8	0.0214	1.6	4

System Verification

Frequency MHz	Operating Mode	Crest Factor	Measured SAR_{10g} (mW/g)	Target SAR_{10g} (mW/g)	Plot Number
1800	CW	1	9.46	4.96	5

Note: a) Worst case data were reported
b) Uncertainty of the system is not included

3.0 TEST EQUIPMENT

3.1 Equipment List

The Specific Absorption Rate (SAR) tests were performed with the SPEAG model DASY 3 automated near-field scanning system, which is package, optimized for dosimetric evaluation of mobile radio [3].

The following major equipment/components were used for the SAR evaluations:

SAR Measurement System			
EQUIPMENT	**SPECIFICATIONS**	**S/N #**	**CAL. DATE**
Robot	**Stäubi RX60L**	**597412-01**	**N/A**
	Repeatability: ± 0.025mm Accuracy: $0.806x10^{-3}$ degree Number of Axes: 6		
E-Field Probe	**ET3DV6**	**1576**	**02/27/02**
	Frequency Range: 10 MHz to 6 GHz Linearity: ± 0.2 dB Directivity: ± 0.1 dB in brain tissue		
Data Acquisition	**DAE3**	**317**	**N/A**
	Measurement Range: 1µV to >200mV Input offset Voltage: < 1µV (with auto zero) Input Resistance: 200 M		
Phantom	**Generic Twin V3.0**	**N/A**	**N/A**
	Type: Generic Twin, Homogenous Shell Material: Fiberglass Thickness: 2 ± 0.1 mm Capacity: 20 liter Ear spacer: 4 mm (between EUT ear piece and tissue simulating liquid)		
Simulated Tissue	**Mixture**	**N/A**	**04/08/02**
	Please see section 6.2 for details		
Power Meter	**HP 435A w/ 8481H sensor**	**3607U00673**	**08/01/01**
	Frequency Range: 100kHz to 18 GHz Power Range: 300µW to 3W		

3.2 Muscle Tissue Simulating Liquid

Muscle Ingredients Frequency (1800 MHz)	
DGBE Dilethylene Glycol	44.92%
Toniton X-100 (Polyethylene Glycol Mono) Ether	0.1%
Salt	0.18%
Water	54.8%

The dielectric parameters were verified prior to assessment using the HP 85070A dielectric probe kit and the HP 8753C network Analyzer. The dielectric parameters were:

Frequency (MHz)	**ε_r ***	**σ *(mho/m)**	**ρ **(kg/m^3)**
1800	55.8	1.49	1000

* *Worst case uncertainty of the HP 85070A dielectric probe kit*
** *Worst case assumption*

3.3 E-Field Probe Calibration

The manufacturer in the TEM cells ifi 110 calibrated probes. To ensure consistency, a strict protocol was followed. The conversion factor (ConF) between this calibration and the measurement in the tissue simulation solution was performed by comparison with temperature measurement and computer simulations. Probe calibration factors are included in Appendix C.

3.4 Measurement Uncertainty

The uncertainty budget has been determined for the DASY3 measurement system according to the NIS81 [5] and the NIST 1297 [6] documents and is given in the following table. The extended uncertainty (K=2) was assessed to be 23.5 %

UNCERTAINTY BUDGET				
Uncertainty Description	**Error**	**Distrib.**	**Weight**	**Std.Dev.**
Probe Uncertainty				
Axial isotropy	±0.2 dB	U-shape	0.5	±2.4 %
Spherical isotropy	±0.4 dB	U-shape	0.5	±4.8 %
Isotropy from gradient	±0.5 dB	U-shape	0	
Spatial resolution	±0.5 %	Normal	1	±0.5 %
Linearity error	±0.2 dB	Rectang.	1	±2.7 %
Calibration error	±3.3 %	Normal	1	±3.3 %
SAR Evaluation Uncertainty				
Data acquisition error	±1 %	Rectang.	1	±0.6 %
ELF and RF disturbances	±0.25 %	Normal	1	±0.25 %
Conductivity assessment	±10 %	Rectang.	1	±5.8 %
Spatial Peak SAR Evaluation Uncertainty				
Extrapol boundary effect	±3 %	Normal	1	±3 %
Probe positioning error	±0.1 mm	Normal	1	±1 %
Integrat. and cube orient	±3 %	Normal	1	±3 %
Cube shape inaccuracies	±2 %	Rectang.	1	±1.2 %
Device positioning	±6 %	Normal	1	±6 %
Combined Uncertainties				**±11.7 %**

3.5 Measurement Tractability

All measurements described in this report are traceable to National Institute of Standards and Technology (NIST) standards or appropriate national standards.

4.0 WARNING LABEL INFORMATION - USA

See users manual.

5.0 REFERENCES

[1] ANSI, *ANSI/IEEE C95.1-1991: IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3kHz to 300 GHz*, The Institute of electrical and Electronics Engineers, Inc., New York, NY 10017, 1992

[2] Federal Communications Commission, "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields", OET Bulletin 65, FCC, Washington, D.C. 20554, 1997

[3] Thomas Schmid, Oliver Egger, and Niels Kuster, "Automated E-field scanning system for dosimetric assessments", *IEEE Transaction on Microwave Theory and Techniques*, vol. 44, pp. 105-113, Jan. 1996.

[4] Niels Kuster, Ralph Kastle, and Thomas Schmid, "Dosimetic evaluation of mobile communications equipment with know precision", IEICE Transactions on Communications, vol. E80-B, no. 5, pp.645-652, May 1997.

[5] NIS81, NAMAS, "The treatment of uncertainty in EMC measurement", Tech. Rep., NAMAS Executive, National Physical Laboratory, Teddinton, Middlesex, England, 1994.

[6] Barry N. Tayor and Chris E. Kuyatt, "Guidelines for evaluating and expressing the uncertainty of NIST measurement results", Tech. Rep., National Institute of Standards and Technology, 1994.

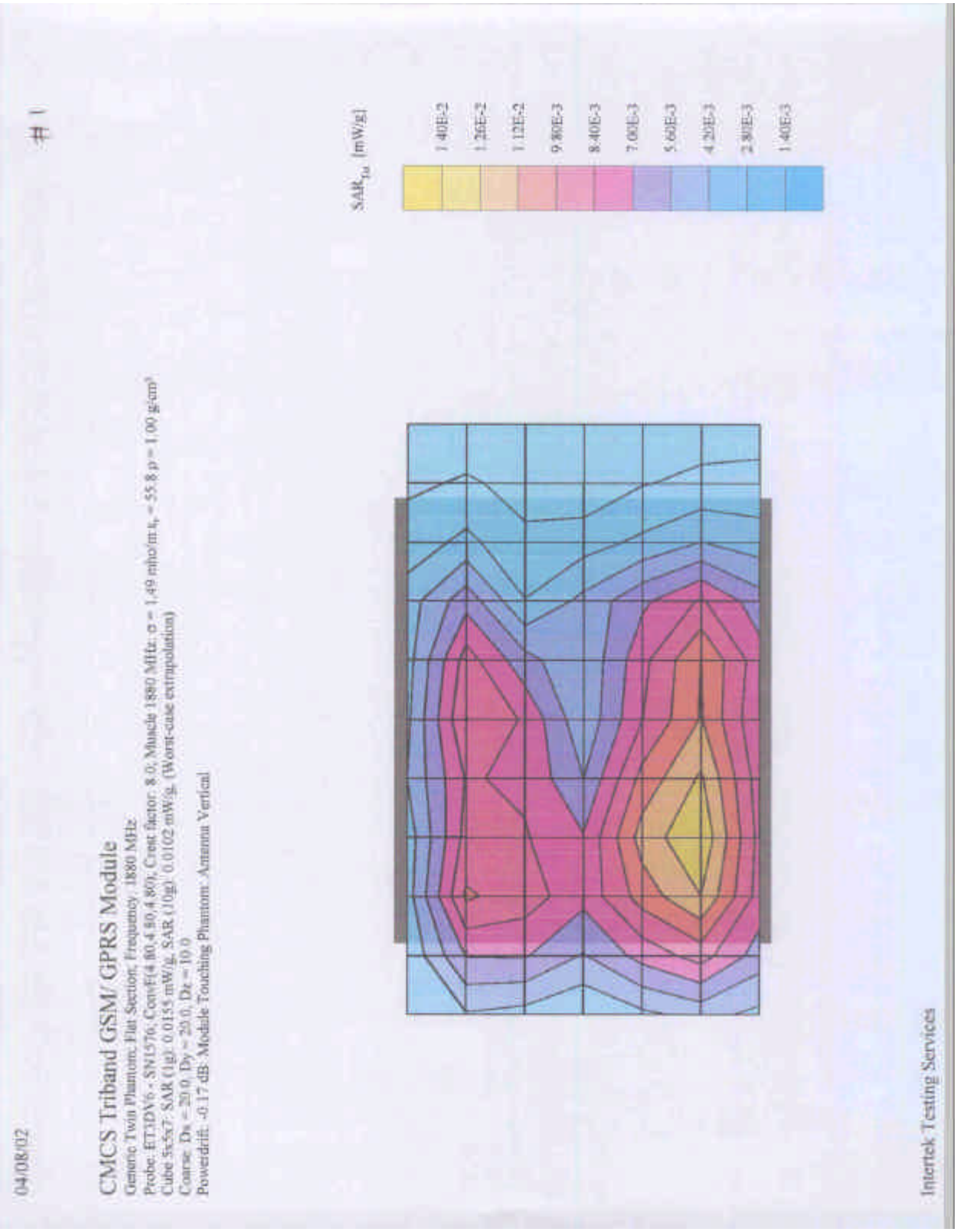
5.0 DOCUMENT HISTORY

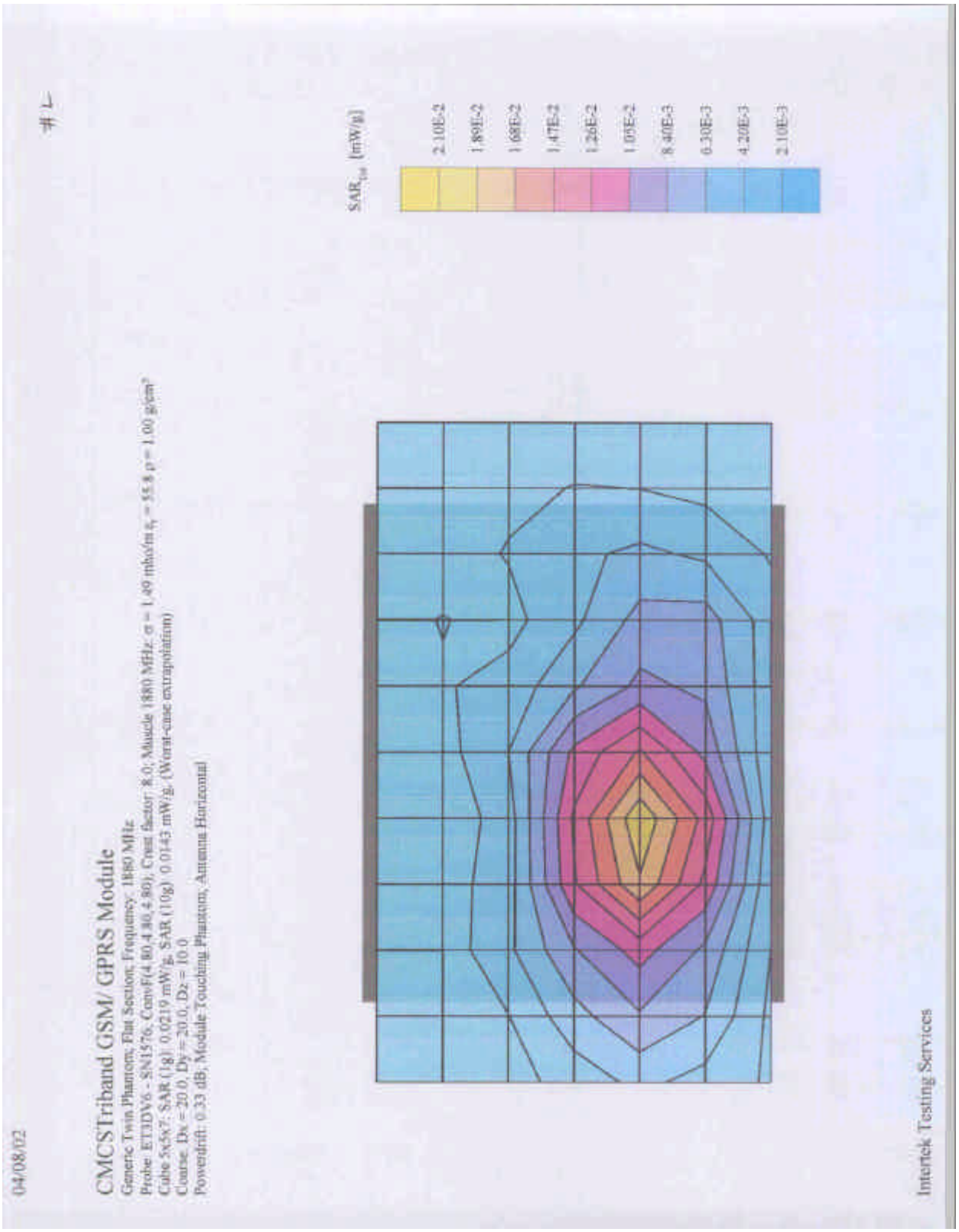
Revision/ Job Number	Writer Initials	Date	Change
1.0 /3012586	SS	April 15, 2002	Original document

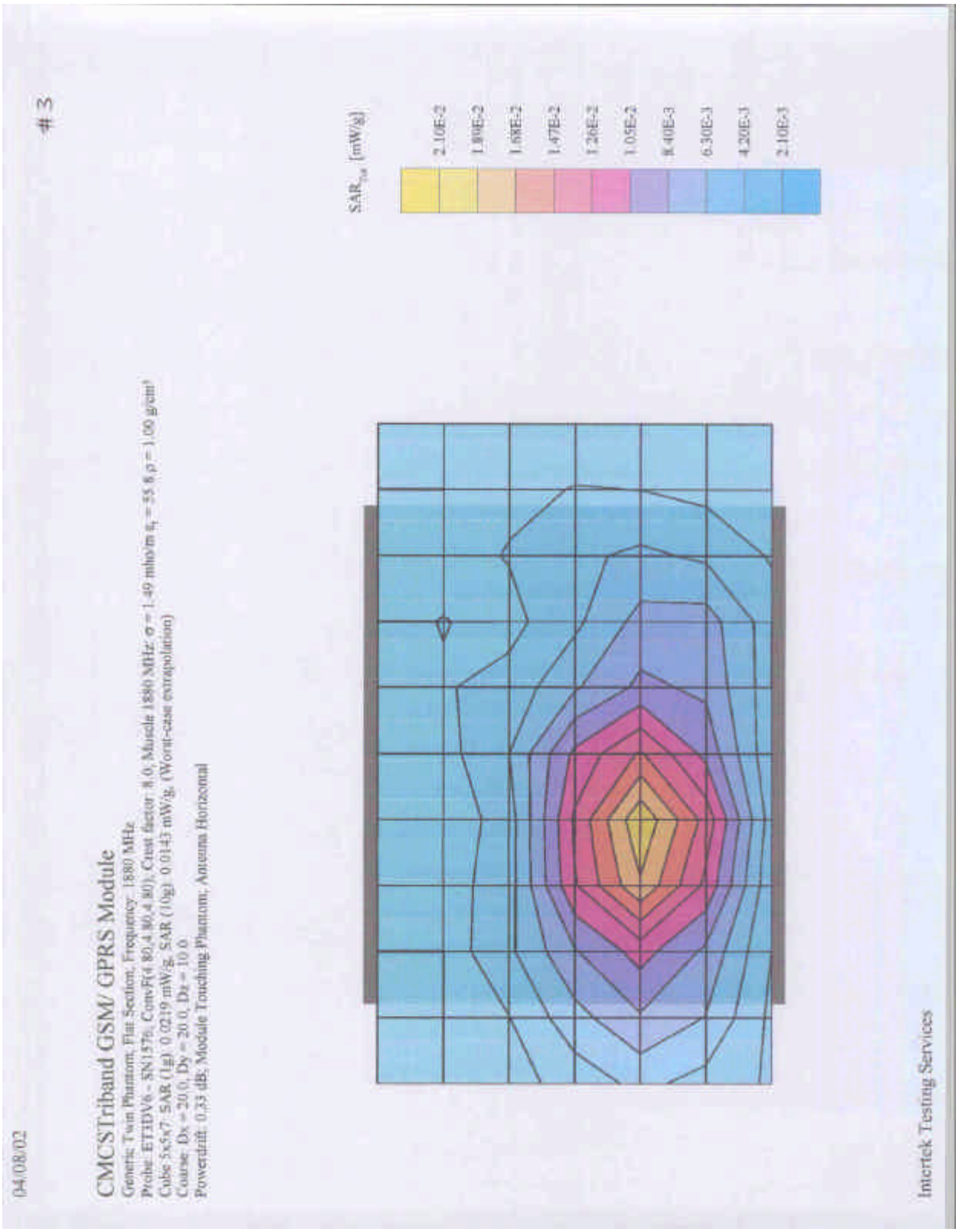
APPENDIX A - SAR Evaluation Data

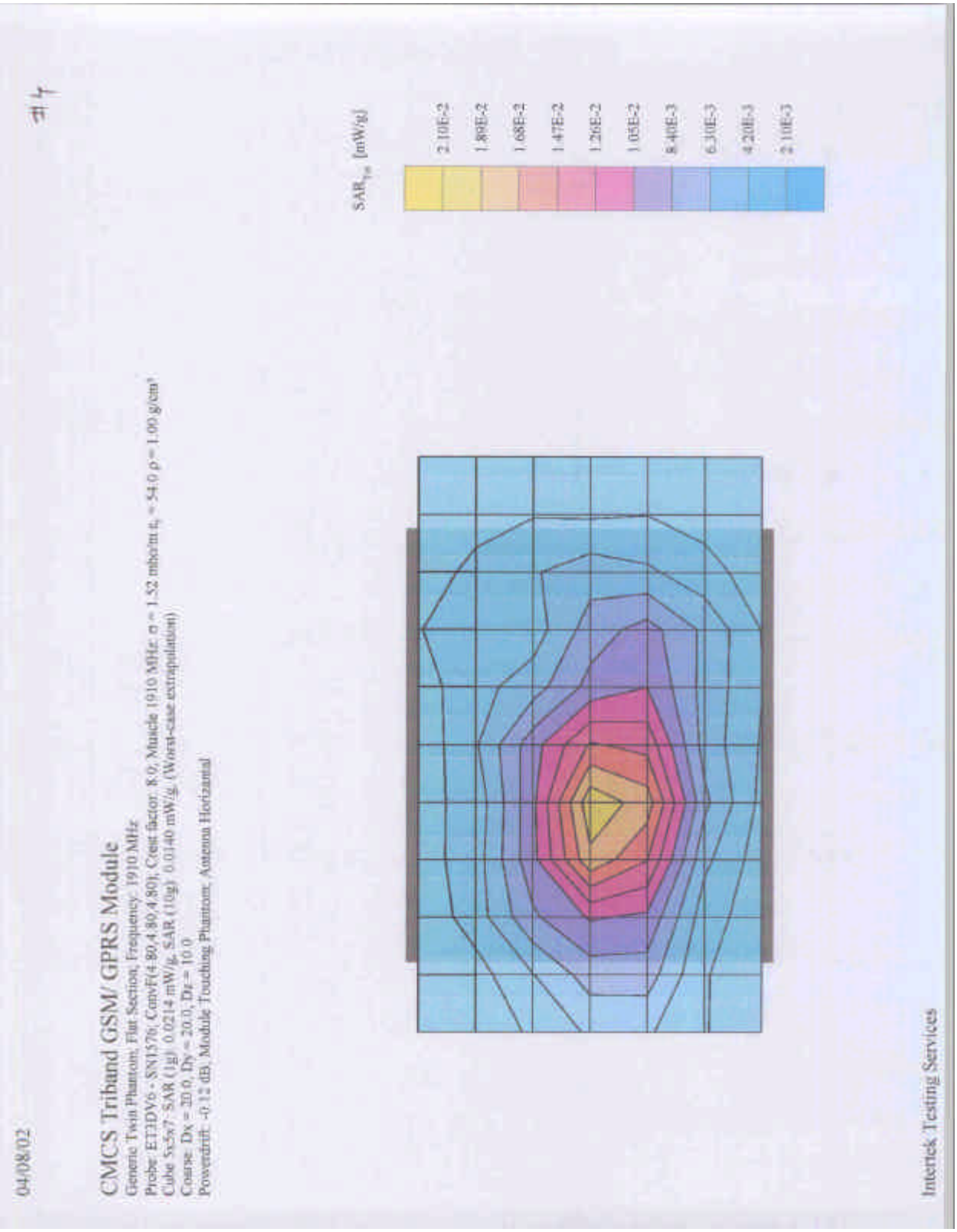
Please note that the graphical visualization of the phone position onto the SAR distribution gives only limited information on the current distribution of the device, since the curvature of the head results in graphical distortion. Full information can only be obtained either by H-field scans in free space or SAR evaluation with a flat phantom.

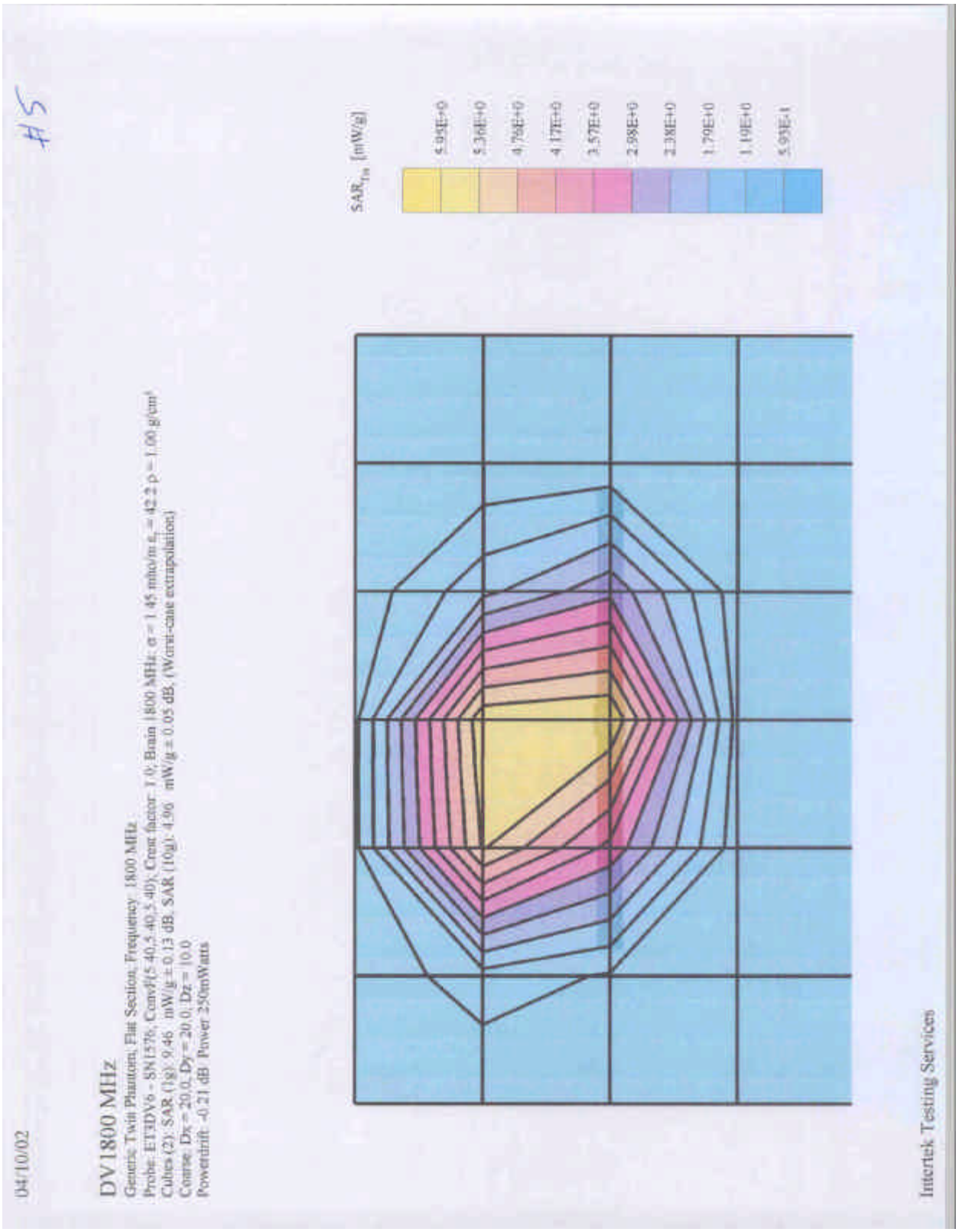
Power drift is the measurement of power drift of the device over one complete SAR scan.


#1
SAR1g (mW/g)
1.40E-2
1.26E-2
1.12E-2
9.80E-3
8.40E-3
7.00E-3
5.60E-3
4.20E-3
2.80E-3
1.40E-3
CMCS Triband GSM/ GPRS Module
Generic Twin Phantom; Flat Section; Frequency: 1880 MHz
Probe: ET3DV6 - SN1576; ConvF(4.80,4.80,4.80); Crest factor: 8.0; Muscle 1880 MHz: σ = 1.49 mho/m εr = 55.8 ρ = 1.00 g/cm³
Cube 5x5x7: SAR (1g): 0.0155 mW/g, SAR (10g): 0.0102 mW/g, (Worst-case extrapolation)
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Powerdrift: -0.17 dB; Module Touching Phantom; Antenna Vertical
04/08/02
Intertek Testing Services


#1
SAR_{1g} (mW/g)
2.10E-2
1.89E-2
1.68E-2
1.47E-2
1.26E-2
1.05E-2
8.40E-3
6.30E-3
4.20E-3
2.10E-3
CMCSTriband GSM/ GPRS Module
Generic Twin Phantom; Flat Section; Frequency: 1880 MHz
Probe: ET3DV6 - SN1576; ConvF(4.80,4.80,4.80); Crest factor: 8.0; Muscle 1880 MHz: σ = 1.49 mho/m εr = 55.8 ρ = 1.00 g/cm³
Cube 5x5x7: SAR (1g): 0.0219 mW/g, SAR (10g): 0.0143 mW/g, (Worst-case extrapolation)
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Powerdrift: 0.33 dB; Module-Touching Phantom; Antenna Horizontal
04/08/02
Intertek Testing Services


#3
SAR1g (mW/g)
2.10E-2
1.89E-2
1.68E-2
1.47E-2
1.26E-2
1.05E-2
8.40E-3
6.30E-3
4.20E-3
2.10E-3
CMCSTriband GSM/ GPRS Module
Generic Twin Phantom; Flat Section; Frequency: 1880 MHz
Probe: ET3DV6 - SN1575; ConvF(4.80,4.80,4.80); Crest factor: 8.0; Muscle 1880 MHz: σ = 1.49 mho/m εr = 55.6 ρ = 1.00 g/cm³
Cube 5x5x7: SAR (1g): 0.0219 mW/g, SAR (10g): 0.0143 mW/g, (Worst-case extrapolation)
Course: Dx = 20.0, Dy = 20.0, Dz = 10.0
Powerdrift: 0.33 dB; Module Touching Phantom; Antenna Horizontal
04/08/02
Intertek Testing Services


#4
SAR1g [mW/g]
2.10E-2
1.89E-2
1.68E-2
1.47E-2
1.26E-2
1.05E-2
8.40E-3
6.30E-3
4.20E-3
2.10E-3
CMCS Triband GSM/ GPRS Module
Generic Twin Phantom; Flat Section; Frequency: 1910 MHz
Probe: ET3DV6 - SN1570; ConvF(4.80,4.80,4.80); Crest factor: 8.0; Muscle 1910 MHz: σ = 1.52 mho/m ε_r = 54.0 ρ = 1.00 g/cm³
Cube 5x5x7: SAR (1g): 0.0214 mW/g, SAR (10g): 0.0140 mW/g, (Worst-case extrapolation)
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Powerdrift: -0.12 dB, Module Touching Phantom: Antenna Horizontal
04/08/02
Intertek Testing Services


#5
SAR$_{1g}$ [mW/g]
5.95E+0
5.36E+0
4.76E+0
4.17E+0
3.57E+0
2.98E+0
2.38E+0
1.79E+0
1.19E+0
5.95E-1
04/10/02
DV1800 MHz
Generic Twin Phantom; Flat Section; Frequency: 1800 MHz
Probe: ET3DV6 - SN1576; ConvF(5.40,5.40,5.40); Crest factor: 1.0; Brain 1800 MHz: σ = 1.45 mho/m ε$_r$ = 42.2 ρ = 1.00 g/cm^3
Cube 2: SAR (1g): 9.46 mW/g ± 0.13 dB, SAR (10g): 4.96 mW/g ± 0.05 dB, (Worst-case extrapolation)
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Powerdrift: -0.21 dB Power 250mWatts
Intertek Testing Services

APPENDIX B - E-Field Probe Calibration Data

See attached.

Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland, Phone +41 1 245 97 00, Fax +41 1 245 97 79

Calibration Certificate

Dosimetric E-Field Probe

Type:	**ET3DV6**
Serial Number:	**1576**
Place of Calibration:	**Zurich**
Date of Calibration:	**February 27, 2002**
Calibration Interval:	**12 months**

Schmid & Partner Engineering AG hereby certifies, that this device has been calibrated on the date indicated above. The calibration was performed in accordance with specifications and procedures of Schmid & Partner Engineering AG.

Wherever applicable, the standards used in the calibration process are traceable to international standards. In all other cases the standards of the Laboratory for EMF and Microwave Electronics at the Swiss Federal Institute of Technology (ETH) in Zurich, Switzerland have been applied.

Calibrated by:

Approved by:

Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland, Telephone +41 1 245 97 00, Fax +41 1 245 97 79

Probe ET3DV6

SN:1576

Manufactured:	April 6, 2001
Last calibration:	April 20, 2001
Recalibrated:	February 27, 2002

Calibrated for System DASY3

ET3DV6 SN:1576 **February 27, 2002**

DASY3 - Parameters of Probe: ET3DV6 SN:1576

Sensitivity in Free Space

NormX	1.77 $\mu V/(V/m)^2$	
NormY	1.81 $\mu V/(V/m)^2$	
NormZ	1.76 $\mu V/(V/m)^2$	

Diode Compression

DCP X	98	mV
DCP Y	98	mV
DCP Z	98	mV

Sensitivity in Tissue Simulating Liquid

Head	900 MHz	ε_r = 41.5 ± 5%	σ = 0.97 ± 5% mho/m
Head	835 MHz	ε_r = 41.5 ± 5%	σ = 0.90 ± 5% mho/m
ConvF X	7.0 ± 9.5% (k=2)	Boundary effect:	
ConvF Y	7.0 ± 9.5% (k=2)	Alpha	0.30
ConvF Z	7.0 ± 9.5% (k=2)	Depth	2.51

Head	1800 MHz	ε_r = 40.0 ± 5%	σ = 1.40 ± 5% mho/m
Head	1900 MHz	ε_r = 40.0 ± 5%	σ = 1.40 ± 5% mho/m
ConvF X	5.4 ± 9.5% (k=2)	Boundary effect:	
ConvF Y	5.4 ± 9.5% (k=2)	Alpha	0.45
ConvF Z	5.4 ± 9.5% (k=2)	Depth	2.30

Boundary Effect

Head **900 MHz** **Typical SAR gradient: 5 % per mm**

Probe Tip to Boundary		1 mm	2 mm
SAR_{be} [%]	Without Correction Algorithm	7.6	4.3
SAR_{lin} [%]	With Correction Algorithm	0.3	0.5

Head **1800 MHz** **Typical SAR gradient: 10 % per mm**

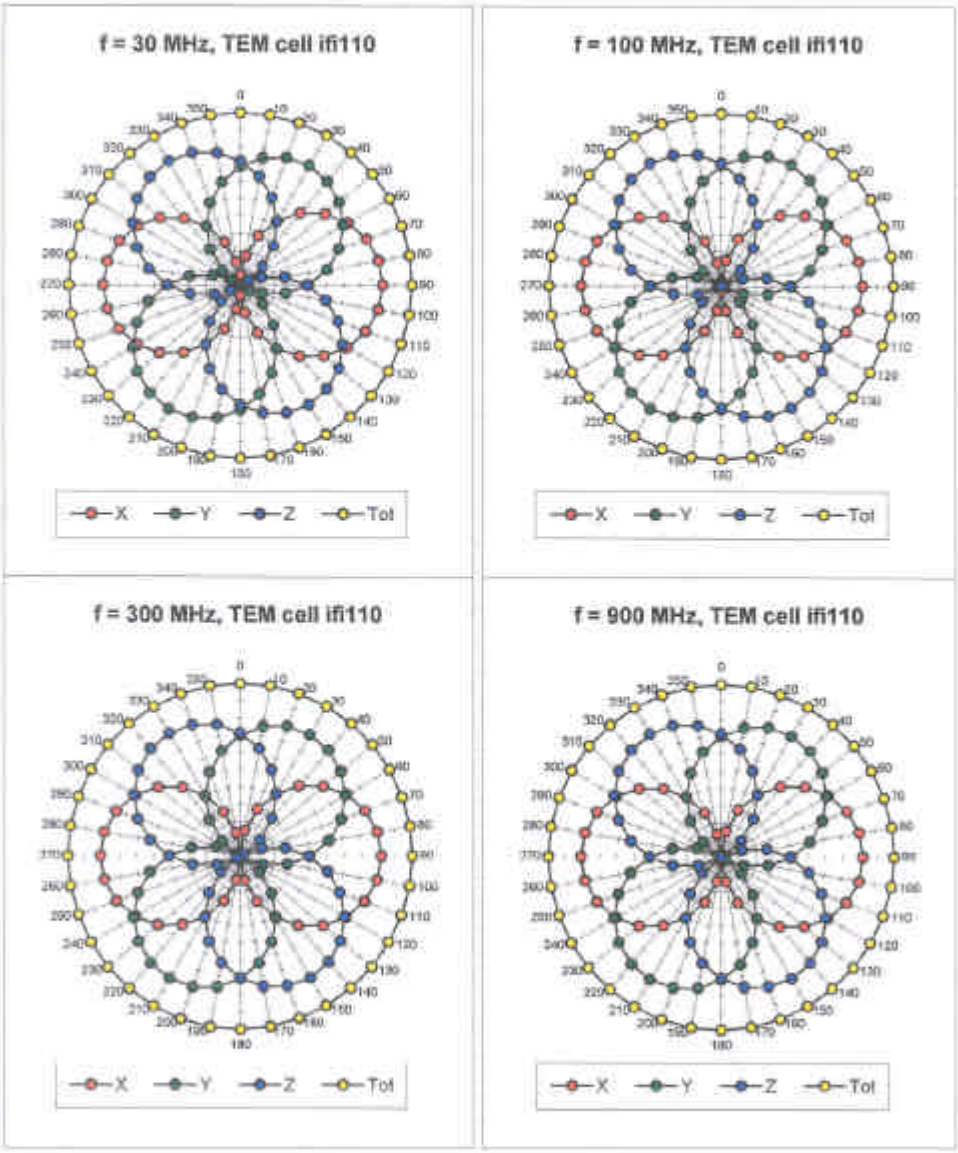
Probe Tip to Boundary		1 mm	2 mm
SAR_{be} [%]	Without Correction Algorithm	9.7	6.6
SAR_{lin} [%]	With Correction Algorithm	0.2	0.3

Sensor Offset

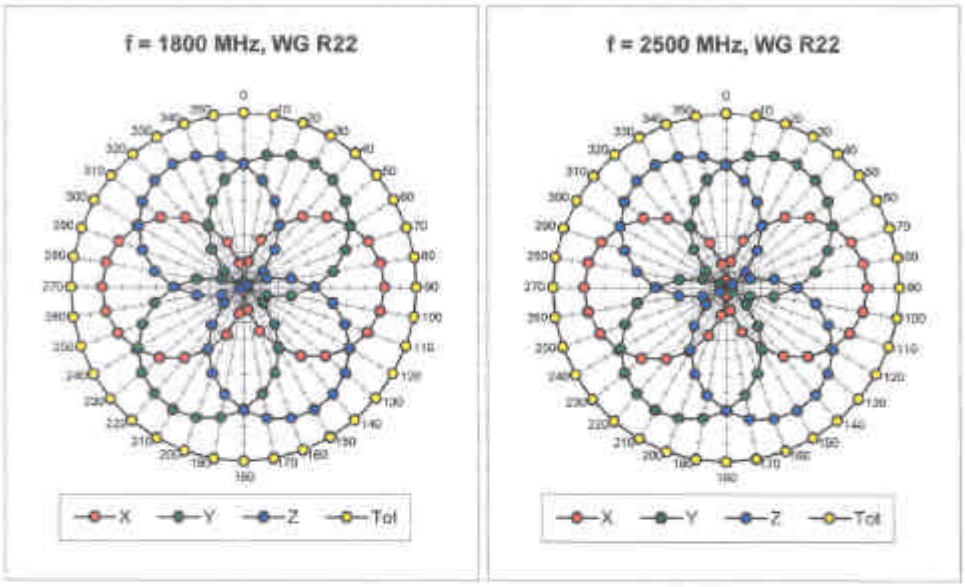
Probe Tip to Sensor Center	2.7	mm
Optical Surface Detection	1.9 ± 0.2	mm

ET3DV6 SN:1576 February 27, 2002

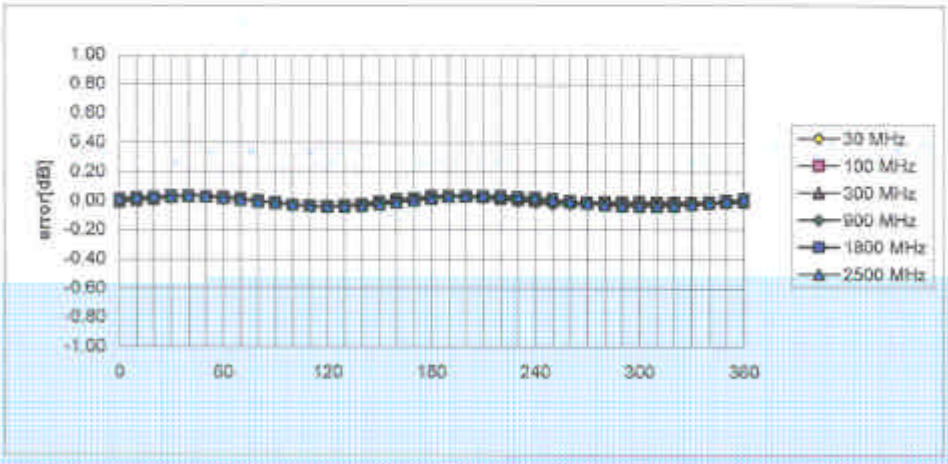
Receiving Pattern (ϕ), θ = 0°



ET3DV6 SN:1576 February 27, 2002



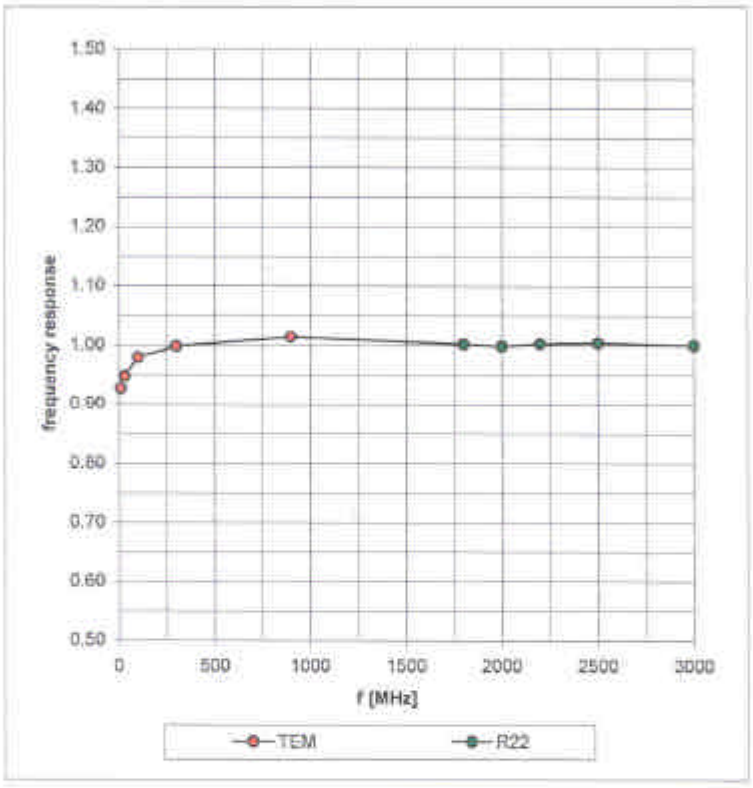
Isotropy Error (ϕ), θ = 0°



ET3DV6 SN:1576 February 27, 2002

Frequency Response of E-Field

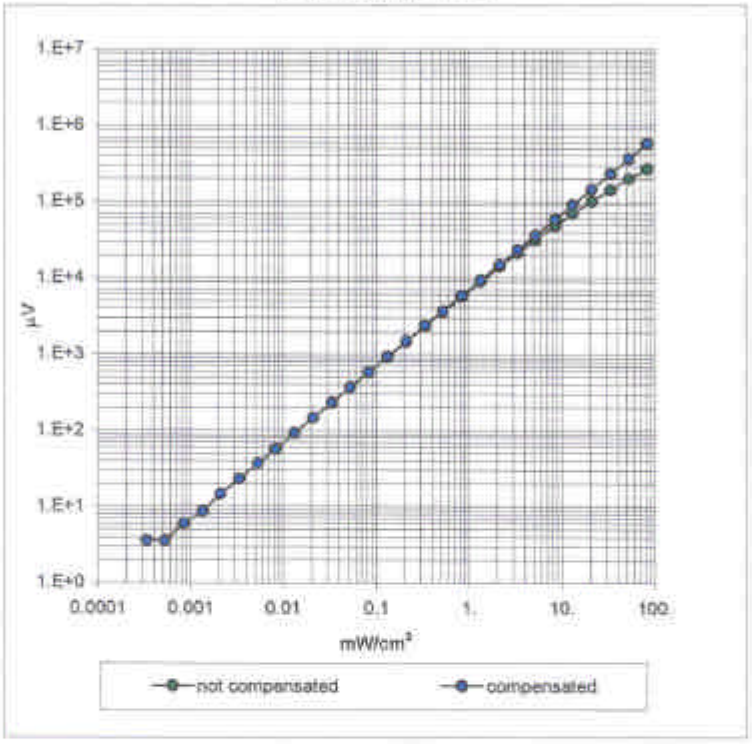
(TEM-Cell:ifi110, Waveguide R22)

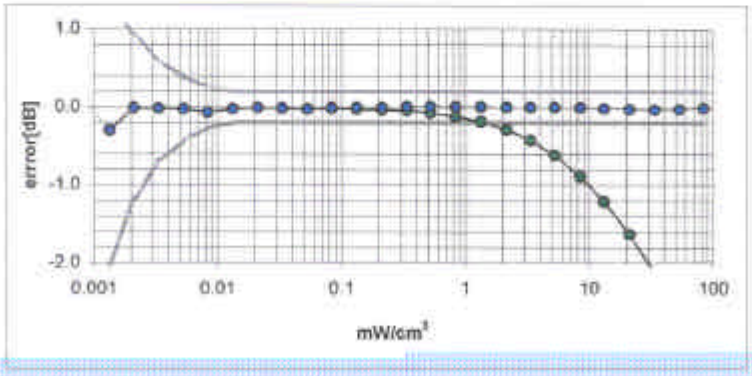


ET3DV6 SN:1576 February 27, 2002

Dynamic Range f(SAR_{brain})

(Waveguide R22)





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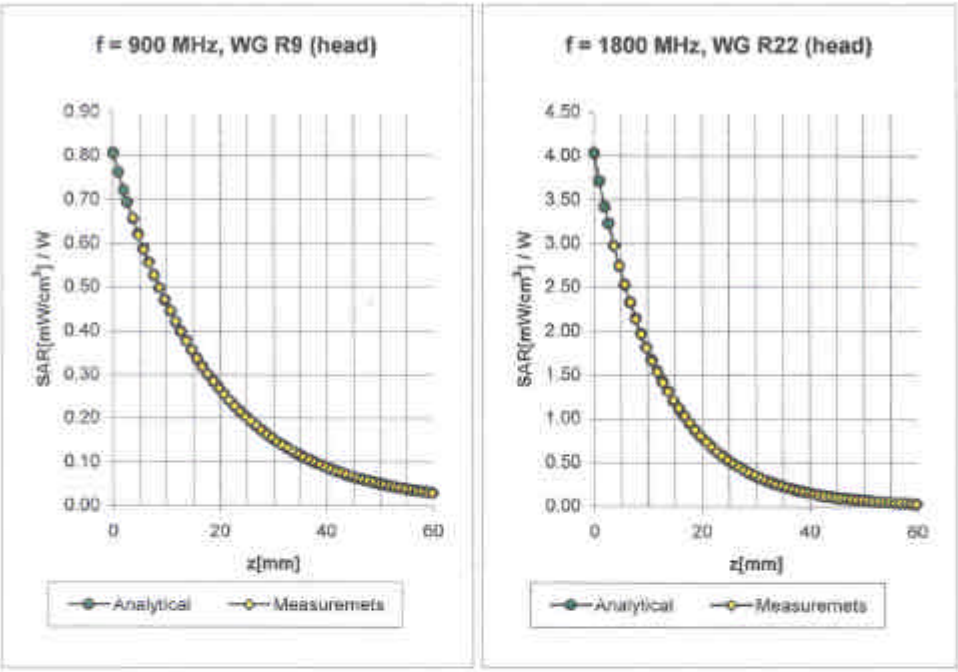
Conversion Factor Assessment



Head	900 MHz	ε_r = 41.5 ± 5%	σ = 0.97 ± 5% mho/m
Head	835 MHz	ε_r = 41.5 ± 5%	σ = 0.90 ± 5% mho/m
ConvF X	7.0 ± 9.5% (k=2)	Boundary effect:	
ConvF Y	7.0 ± 9.5% (k=2)	Alpha	0.30
ConvF Z	7.0 ± 9.5% (k=2)	Depth	2.51

Head	1800 MHz	ε_r = 40.0 ± 5%	σ = 1.40 ± 5% mho/m
Head	1900 MHz	ε_r = 40.0 ± 5%	σ = 1.40 ± 5% mho/m
ConvF X	5.4 ± 9.5% (k=2)	Boundary effect:	
ConvF Y	5.4 ± 9.5% (k=2)	Alpha	0.45
ConvF Z	5.4 ± 9.5% (k=2)	Depth	2.30

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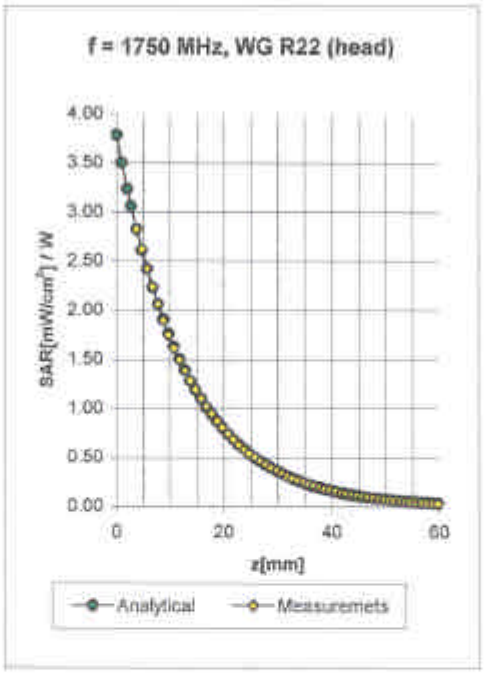

Head 1750 MHz ε_r = 40.0 ± 5% σ = 1.40 ± 5% mho/m

ConvF X	**5.4** ± 8.9% (k=2)	Boundary effect:	
ConvF Y	**5.4** ± 8.9% (k=2)	Alpha	**0.45**
ConvF Z	**5.4** ± 8.9% (k=2)	Depth	**2.27**

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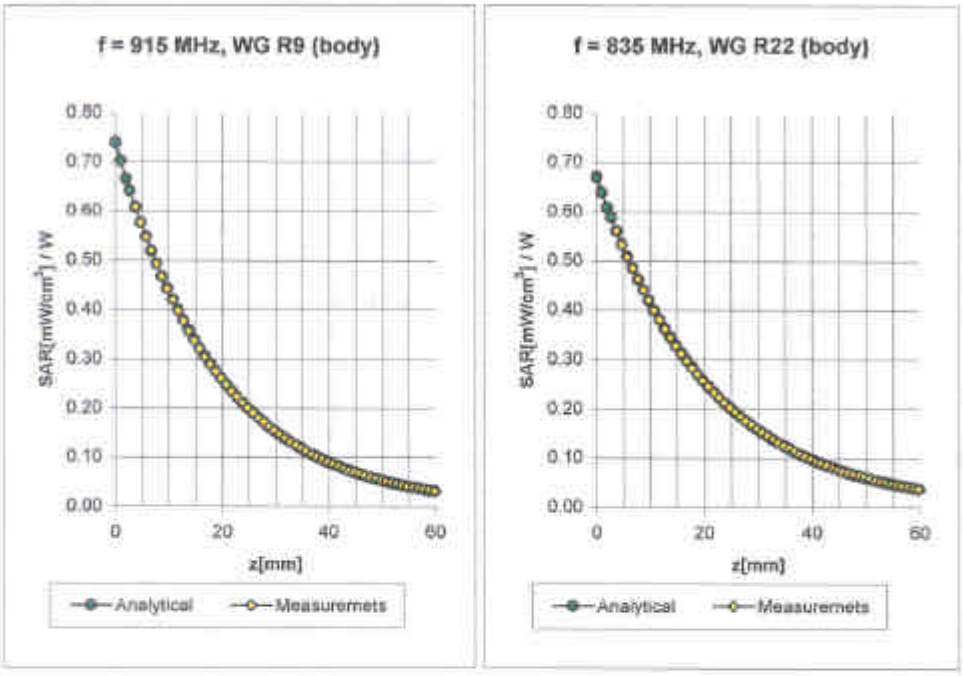
Conversion Factor Assessment



Body	915 MHz	ε_r = 55.0 ± 5%	σ = 1.06 ± 5% mho/m
ConvF X	6.7 ± 8.9% (k=2)	Boundary effect:	
ConvF Y	6.7 ± 8.9% (k=2)	Alpha	0.45
ConvF Z	6.7 ± 8.9% (k=2)	Depth	2.01

Body	835 MHz	ε_r = 55.2 ± 5%	σ = 0.97 ± 5% mho/m
ConvF X	6.7 ± 8.9% (k=2)	Boundary effect:	
ConvF Y	6.7 ± 8.9% (k=2)	Alpha	0.34
ConvF Z	6.7 ± 8.9% (k=2)	Depth	2.37

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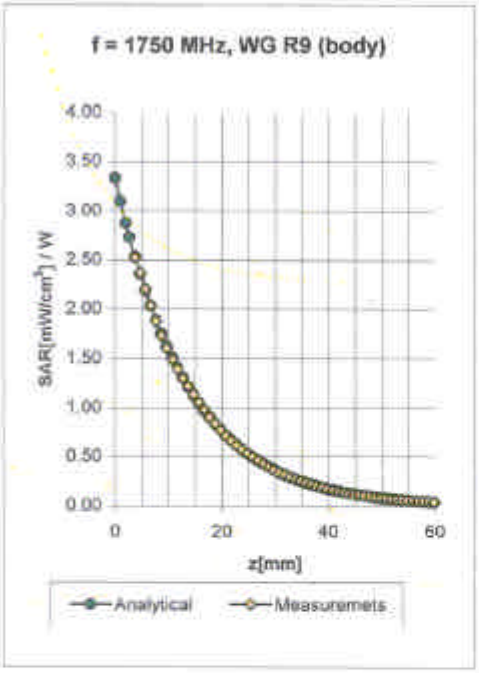
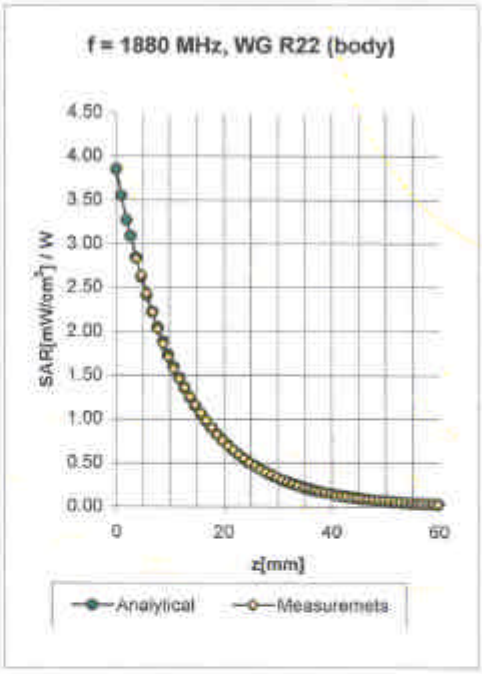
Conversion Factor Assessment





Body **1750 MHz** ε_r = 53.3 ± 5% σ = 1.52 ± 5% mho/m

ConvF X	**5.1** ± 8.9% (k=2)	Boundary effect:	
ConvF Y	**5.1** ± 8.9% (k=2)	Alpha	**0.51**
ConvF Z	**5.1** ± 8.9% (k=2)	Depth	**2.31**

Body **1880 MHz** ε_r = 53.3 ± 5% σ = 1.52 ± 5% mho/m

ConvF X	**4.8** ± 8.9% (k=2)	Boundary effect:	
ConvF Y	**4.8** ± 8.9% (k=2)	Alpha	**0.63**
ConvF Z	**4.8** ± 8.9% (k=2)	Depth	**2.10**

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Deviation from Isotropy in HSL

Error (θ,φ), f = 900 MHz