SAR EVALUATION REPORT

For

CEC Wireless R&D Ltd.

West M5 Building, No.1 East Road Jiuxiangqiao Chao Yang District, Beijing, China

FCC ID: RXSC570

2004-05-02

This Report Concerns:	**Equipment Type:**
☒ Original Report	GSM/GPRS 1900 MHz Mobile Phone

Test Engineer:	Daniel Deng /
Report No.:	R0402231S(Model C570)
Test Date:	2004-03-10 / 2004-03-22
Reviewed By:	Hans Mellberg /
Prepared By:	Bay Area Compliance Laboratory Corporation (BACL) 230 Commercial Street Sunnyvale, CA 94085 Tel: (408) 732-9162 Fax: (408) 732 9164

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SUMMARY

The US Federal Communications Commission has released the report and order “Guidelines for Evaluating the Environmental Effects of RF Radiation", ET Docket No. 93-62 in August 1996 [1].

The order requires routine SAR evaluation prior to equipment authorization of portable transmitter devices, including portable telephones. For consumer products, the applicable limit is 1.6 mW/g as recommended by the ANSI/IEEE standard C95.1-1992 [6] for an uncontrolled environment (Paragraph 65). According to the Supplement C of OET Bulletin 65 “Evaluating Compliance with FCC Guide-lines for Human Exposure to Radio frequency Electromagnetic Fields", released on Jun 29, 2001 by the FCC, the device should be evaluated at maximum output power (radiated from the antenna) under “worst-case” conditions for normal or intended use, incorporating normal antenna operating positions, device peak performance frequencies and positions for maximum RF energy coupling.

This report describes the methodology and results of experiments performed on wireless data terminal. The objective was to determine if there is RF radiation and if radiation is found, what is the extent of radiation with respect to safety limits. SAR (Specific Absorption Rate) is the measure of RF exposure determined by the amount of RF energy absorbed by human body (or its parts) – to determine how the RF energy couples to the body or head which is a primary health concern for body worn devices. The limit below which the exposure to RF is considered safe by regulatory bodies in North America is 1.6 mW/g average over 1 gram of tissue mass.

The test configurations were laid out on a specially designed test fixture to ensure the reproducibility of measurements. Each configuration was scanned for SAR. Analysis of each scan was carried out to characterize the above effects in the device.

There was no SAR of any concern measured on the device for any of the investigated configurations.

1 - REFERENCE

[1] Federal Communications Commission, \Report and order: Guidelines for evaluating the environmental effects of radiofrequency radiation", Tech. Rep. FCC 96-326, FCC, Washington, D.C. 20554, 1996.

[2] David L. Means Kwok Chan, Robert F. Cleveland, \Evaluating compliance with FCC guidelines for human exposure to radiofrequency electromagnetic fields", Tech. Rep., Federal Communication Commission, O_ce of Engineering & Technology, Washington, DC, 1997.

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

[4] Niels Kuster, Ralph K.astle, and Thomas Schmid, \Dosimetric evaluation of mobile communications equipment with known precision", IEICE Transactions on Communications, vol. E80-B, no. 5, pp. 645{652, May 1997.

[5] CENELEC, \Considerations for evaluating of human exposure to electromagnetic fields (EMFs) from mobile telecommunication equipment (MTE) in the frequency range 30MHz - 6GHz", Tech. Rep., CENELEC, European Committee for Electrotechnical Standardization, Brussels, 1997.

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

[7] Katja Pokovic, Thomas Schmid, and Niels Kuster, \Robust setup for precise calibration of E-field probes in tissue simulating liquids at mobile communications frequencies", in ICECOM _ 97, Dubrovnik, October 15{17, 1997, pp. 120-24.

[8] Katja Pokovic, Thomas Schmid, and Niels Kuster, \E-field probe with improved isotropy in brain simulating liquids", in Proceedings of the ELMAR, Zadar, Croatia, 23{25 June, 1996, pp. 172-175.

[9] Volker Hombach, Klaus Meier, Michael Burkhardt, Eberhard K. uhn, and Niels Kuster, \The depen-dence of EM energy absorption upon human head modeling at 900 MHz", IEEE Transactions on Microwave Theory and Techniques, vol. 44, no. 10, pp. 1865-1873, Oct. 1996.

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[11] W. Gander, Computermathematik, Birkhaeuser, Basel, 1992.

[12] W. H. Press, S. A. Teukolsky,W. T. Vetterling, and B. P. Flannery, Numerical Recepies in C, The Art of Scientific Computing, Second Edition, Cambridge University Press, 1992.Dosimetric Evaluation of Sample device, month 1998 9

[13] NIS81 NAMAS, \The treatment of uncertainity in EMC measurement", Tech. Rep., NAMAS Executive, National Physical Laboratory, Teddington, Middlesex, England, 1994.

[14] Barry N. Taylor and Christ E. Kuyatt, \Guidelines for evaluating and expressing the uncertainty of NIST measurement results", Tech. Rep., National Institute of Standards and Technology, 1994. Dosimetric Evaluation of Sample device, month 1998 10

2 - TESTING EQUIPMENT

2.1 Equipments List & Calibration Info

Type / Model	Cal. Date	S/N:
DASY3 Professional Dosimetric System	N/A	N/A
Robot RX60L	N/A	F00/5H31A1/A/01
Robot Controller	N/A	F01/5J72A1/A/01
Dell Computer Optiplex GX110	N/A	N/A
Pentium III, Windows NT	N/A	N/A
SPEAG EDC3	N/A	N/A
SPEAG DAE3	2003-06	456
SPEAG E-Field Probe ES3DV2	2004-04-12	3019
SPEAG Generic Twin Phantom	N/A	N/A
SPEAG Light Alignment Sensor	N/A	278
Aprel Validation Dipole D-1800-S-2	2003-03-06	BCL-049
Brain Equivalent Matter (1900MHz)	Each Use	N/A
Muscle Equivalent Matter (1900MHz)	Each Use	N/A
Robot Table	Each Use	N/A
Phone Holder	Each Use	N/A
Phantom Cover	Each Use	N/A
HP Spectrum Analyzer HP8566A	N/A	2240A01930
Microwave Amp. 8349A	N/A	2644A02662
Power Meter HP436A	2004-04-02	2709A29209
Power Sensor HP8482A	2004-04-02	2349A08568
Network Analyzer HP-8752C	2004-07-30	820079
Dielectric Probe Kit HP85070A	Each Use	US99360201

2.2 Equipment Calibration Certificate

Please see the attached file.

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

Client Bay Area Comp. Lab (BACL)

CALIBRATION CERTIFICATE

Object(s)	ES3DV2 - SN:3019
Calibration procedure(s)	QA CAL-01.v2 Calibration procedure for dosimetric E-field probes
Calibration date:	October 9, 2003
Condition of the calibrated item	In Tolerance (according to the specific calibration document)

This calibration statement documents traceability of M&TE used in the calibration procedures and conformity of the procedures with the ISO/IEC 17025 international standard.

All calibrations have been conducted in the closed laboratory facility: environment temperature 22 +/- 2 degrees Celsius and humidity < 75%.

Calibration Equipment used (M&TE critical for calibration)

Model Type	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter EPM E4419B	GB41293874	2-Apr-03 (METAS, No 252-0250)	Apr-04
Power sensor E4412A	MY41495277	2-Apr-03 (METAS, No 252-0250)	Apr-04
Reference 20 dB Attenuator	SN: 5086 (20b)	3-Apr-03 (METAS No. 251-0340	Apr-04
Fluke Process Calibrator Type 702	SN: 6295803	8-Sep-03 (Sintrel SCS No. E-030020)	Sep-04
Power sensor HP 8481A	MY41092180	18-Sep-02 (Agilent, No. 20020918)	In house check: Oct 03
RF generator HP 8684C	US3642U01700	4-Aug-99 (SPEAG, In house check Aug-02)	In house check: Aug-05
Network Analyzer HP 8753E	US37390585	18-Oct-01 (Agilent, No. 24BR1033101)	In house check: Oct 03

	Name	Function	Signature
Calibrated by:	Nico Vetterli	Technician	
Approved by:	Katja Pokovic	Laboratory Director	

Date issued: October 9, 2003

This calibration certificate is issued as an intermediate solution until the accreditation process (based on ISO/IEC 17025 International Standard) for Calibration Laboratory of Schmid & Partner Engineering AG is completed.

880-KP0301061-A Page 1 (1)

Schmid & Partner Engineering AG s p e a g

Zeughausstrasse 43, 8004 Zurich, Switzerland
Phone +41 1 245 9700, Fax +41 1 245 9779
info@speag.com, http://www.speag.com

Probe ES3DV2

SN: 3019

Manufactured: December 5, 2002
Last calibration: July 12, 2003

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

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ES3DV2 SN: 3019 July 12, 2003

DASY - Parameters of Probe: ES3DV2 SN: 3019

Sensitivity in Free Space

NormX	1.03 $\mu V/(V/m)^2$	DCP X	99
NormY	1.12 $\mu V/(V/m)^2$	DCP Y	99
NormZ	0.98 $\mu V/(V/m)^2$	DCP Z	99

Diode Compression

Sensitivity in Tissue Simulating Liquid

Head 900 MHz ε_r = 41.5 ± 5% σ = 0.97 ± 5% mho/m

Valid for f=800-1000 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	6.4 ± 9.5% (k=2)	Boundary effect:	
ConvF Y	6.4 ± 9.5% (k=2)	Alpha	0.68
ConvF Z	6.4 ± 9.5% (k=2)	Depth	1.11

Head 1800 MHz ε_r = 40.0 ± 5% σ = 1.40 ± 5% mho/m

Valid for f=1710-1910 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	5.0 ± 9.5% (k=2)	Boundary effect:	
ConvF Y	5.0 ± 9.5% (k=2)	Alpha	0.21
ConvF Z	5.0 ± 9.5% (k=2)	Depth	2.78

Boundary Effect

Head 900 MHz Typical SAR gradient: 5 % per mm

Probe Tip to Boundary		1 mm	2 mm
SAR_{be} [%]	Without Correction Algorithm	4.3	1.8
SAR_{be} [%]	With Correction Algorithm	0.0	0.1

Head 1800 MHz Typical SAR gradient: 10 % per mm

Probe Tip to Boundary		1 mm	2 mm
SAR_{be} [%]	Without Correction Algorithm	7.4	5.0
SAR_{be} [%]	With Correction Algorithm	0.0	0.1

Sensor Offset

Probe Tip to Sensor Center 2.1 mm

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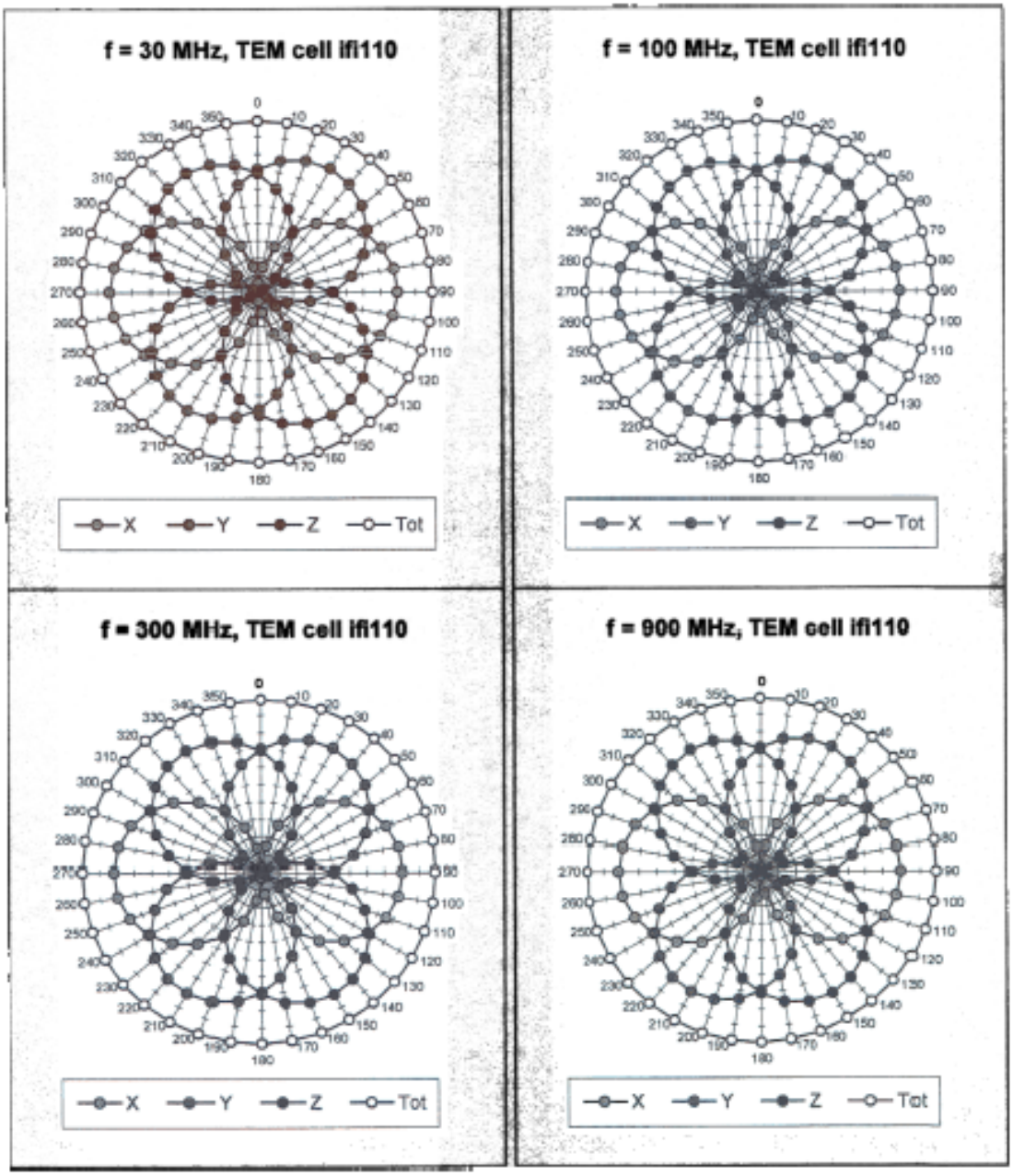
ES3DV2 SN: 3019 **July 12, 2003**

Receiving Pattern (ϕ , θ = 0°



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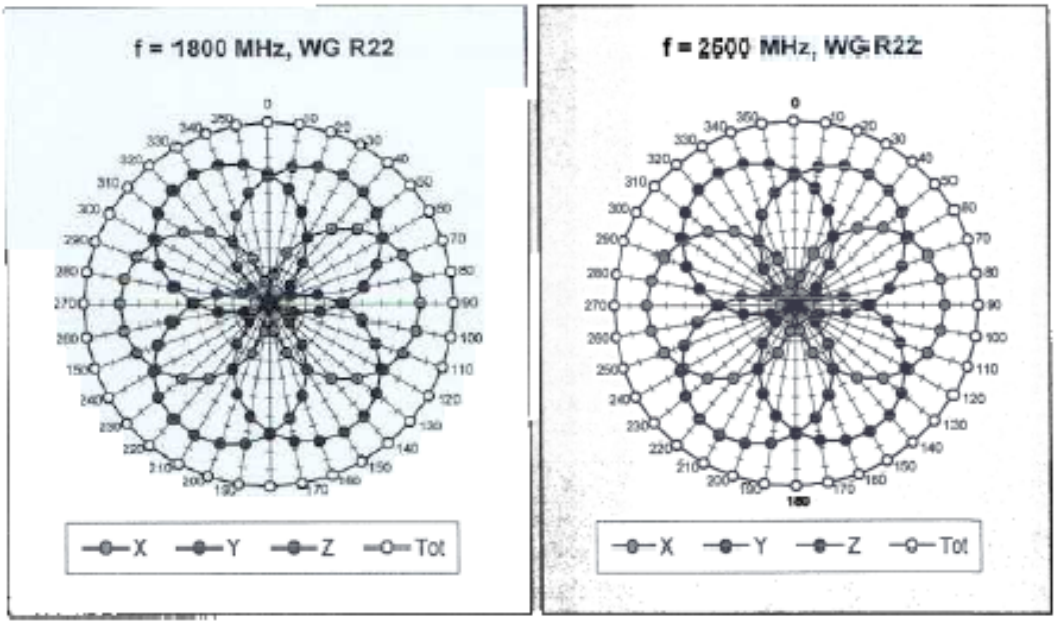
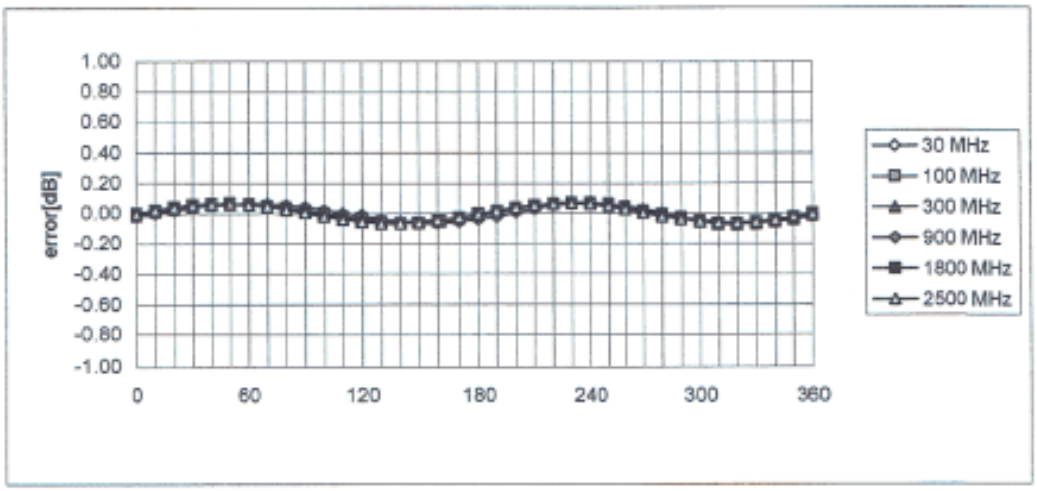
ES3DV2 SN: 3019 July 2003



Isotropy Error (ϕ), θ = 0°



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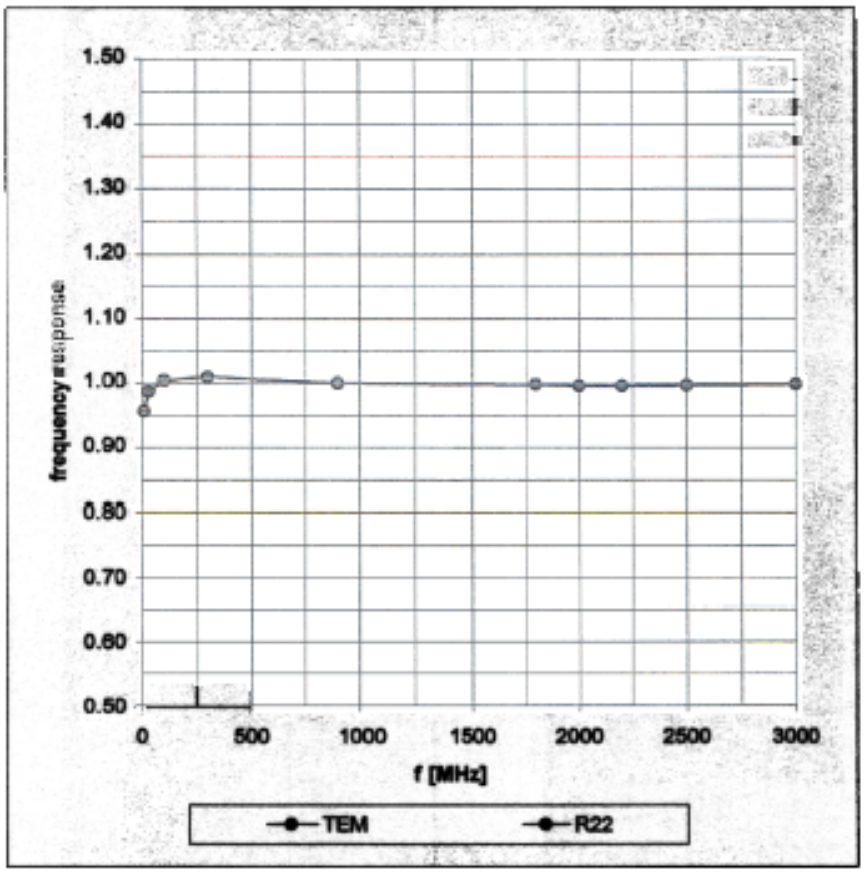
ES3DV2 SN: 3019 **July 12, 2003**

Frequency Response of E-Field

(TEM-Cell:ifi110, Waveguide R22)



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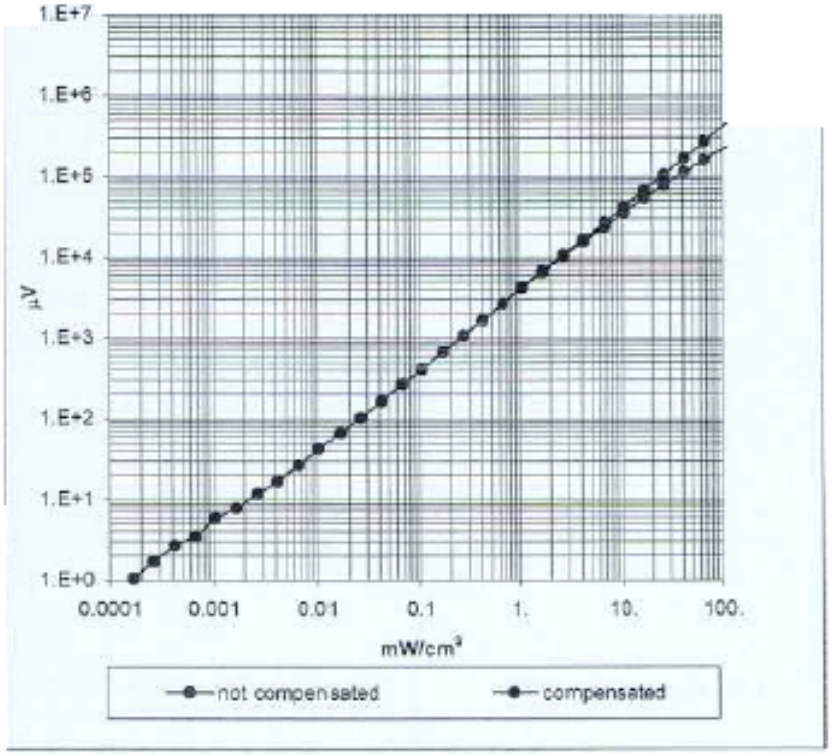
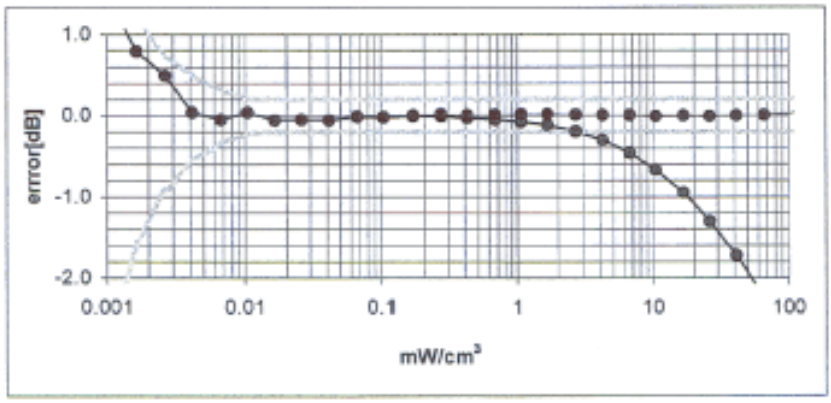
ES3DV2 SN: 3019 **July 12, 2003**

Dynamic Range f(SAR_{brain})

(Waveguide R22)





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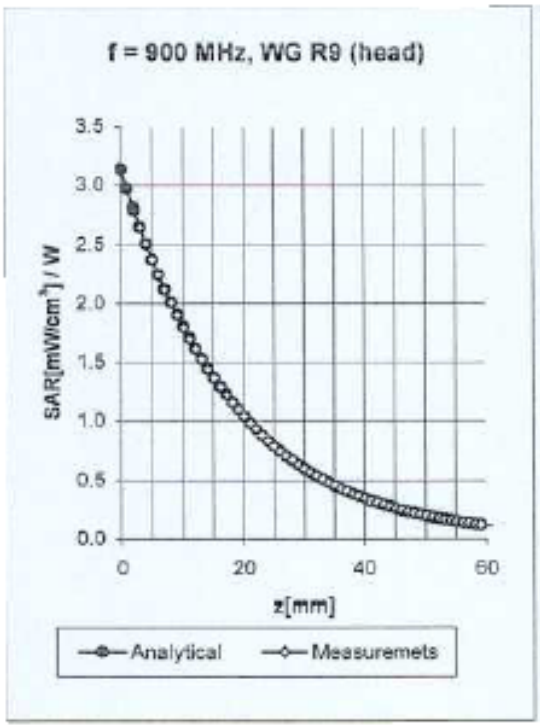
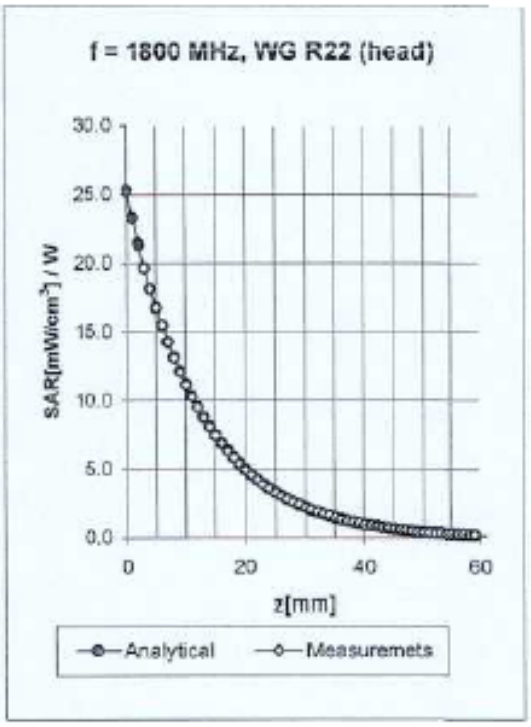
ES3DV2 SN: 3019 **July 12, 2003**

Conversion Factor Assessment





900 MHz ε_r = 41.5 ± 5% σ = 0.97 ± 5% mho/m

Valid for f=800-1000 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	**6.4** ± 9.5% (k=2)	Boundary effect:	
ConvF Y	**6.4** ± 9.5% (k=2)	Alpha	**0.68**
ConvF Z	**6.4** ± 9.5% (k=2)	Depth	**1.11**

1800 MHz ε_r = 40.0 ± 5% σ = 1.40 ± 5% mho/m

Valid for f=1710-1910 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	**5.0** ± 9.5% (k=2)	Boundary effect:	
ConvF Y	**5.0** ± 9.5% (k=2)	Alpha	**0.21**
ConvF Z	**5.0** ± 9.5% (k=2)	Depth	**2.78**

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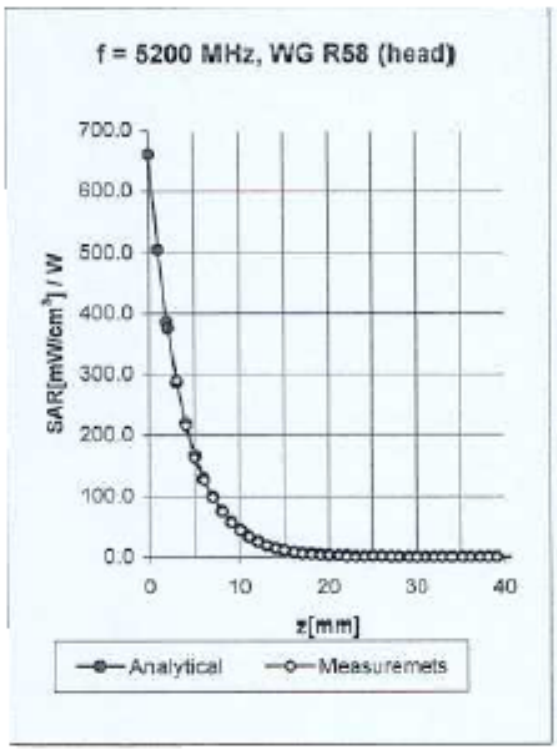
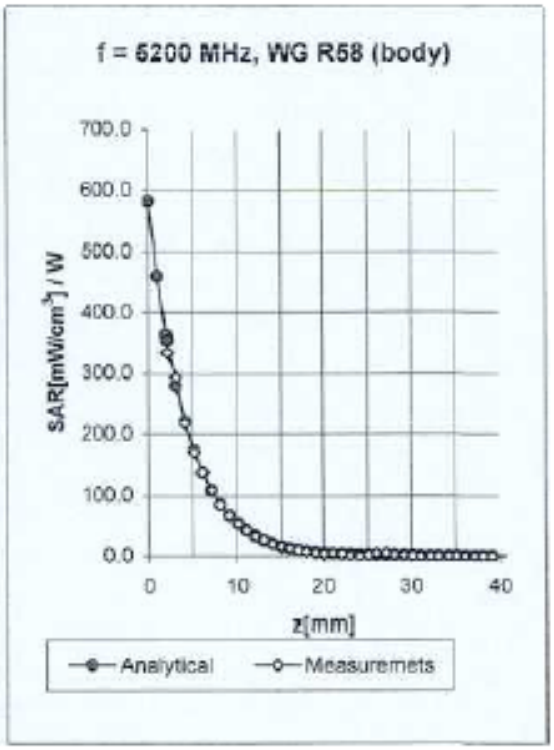
ES3DV2 SN: 3019 **July 12, 2003**

Conversion Factor Assessment





Head 5200 MHz ε_r = 36.0 ± 5% σ = 4.66 ± 5% mho/m

Valid for f=4940-5460 MHz with Head Tissue Simulating Liquid according to OET 65 Suppl. C

ConvF X	**2.3** ± 14.6% (k=2)	Boundary effect:	
ConvF Y	**2.3** ± 14.6% (k=2)	Alpha	**1.05**
ConvF Z	**2.3** ± 14.6% (k=2)	Depth	**1.50**

Body 5200 MHz ε_r = 49.0 ± 5% σ = 5.30 ± 5% mho/m

Valid for f=4940-5460 MHz with Body Tissue Simulating Liquid according to OET 65 Suppl. C

ConvF X	**1.4** ± 14.6% (k=2)	Boundary effect:	
ConvF Y	**1.4** ± 14.6% (k=2)	Alpha	**1.01**
ConvF Z	**1.4** ± 14.6% (k=2)	Depth	**1.85**

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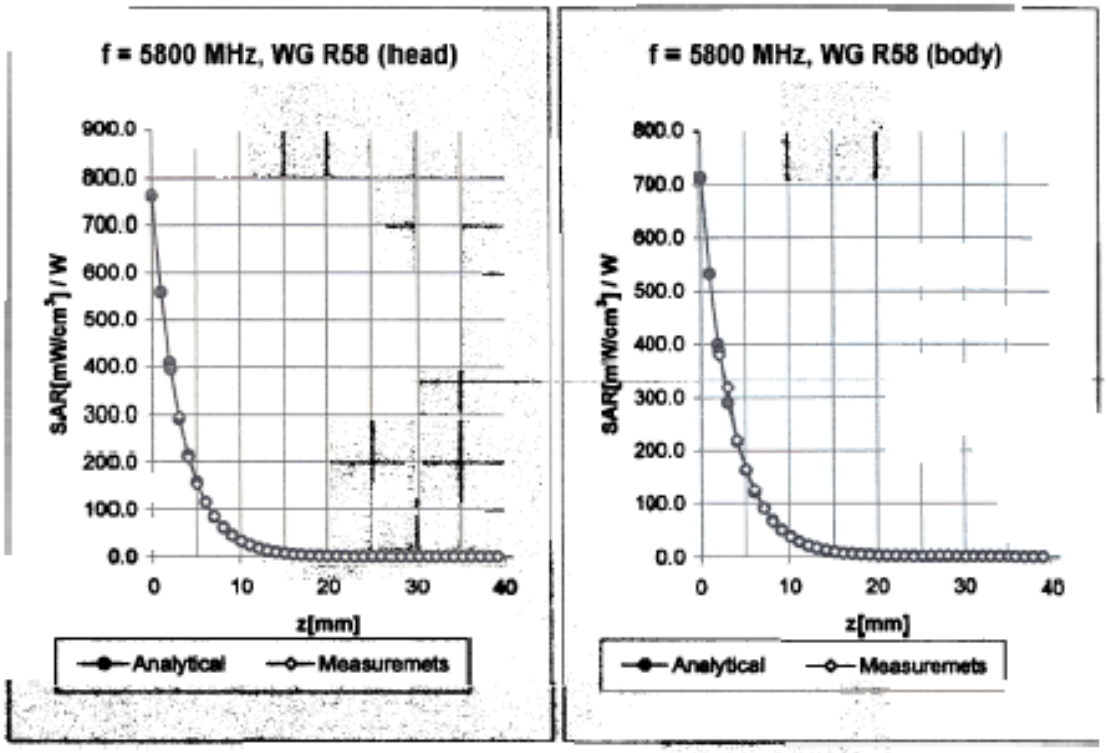
Conversion Factor Assessment



Head **5800** **MHz** **ε_r = 35.3 ± 5%** **σ = 5.27 ± 5% mho/m**

Valid for f=5510-6090 MHz with Head Tissue Simulating Liquid according to OET 65 Suppl. C

ConvF X	**1.8** ± 14.6% (k=2)	Boundary effect:	
ConvF Y	**1.8** ± 14.6% (k=2)	Alpha	**0.90**
ConvF Z	**1.8** ± 14.6% (k=2)	Depth	**1.90**

Body **5800** **MHz** **ε_r = 48.2 ± 5%** **σ = 6.00 ± 5% mho/m**

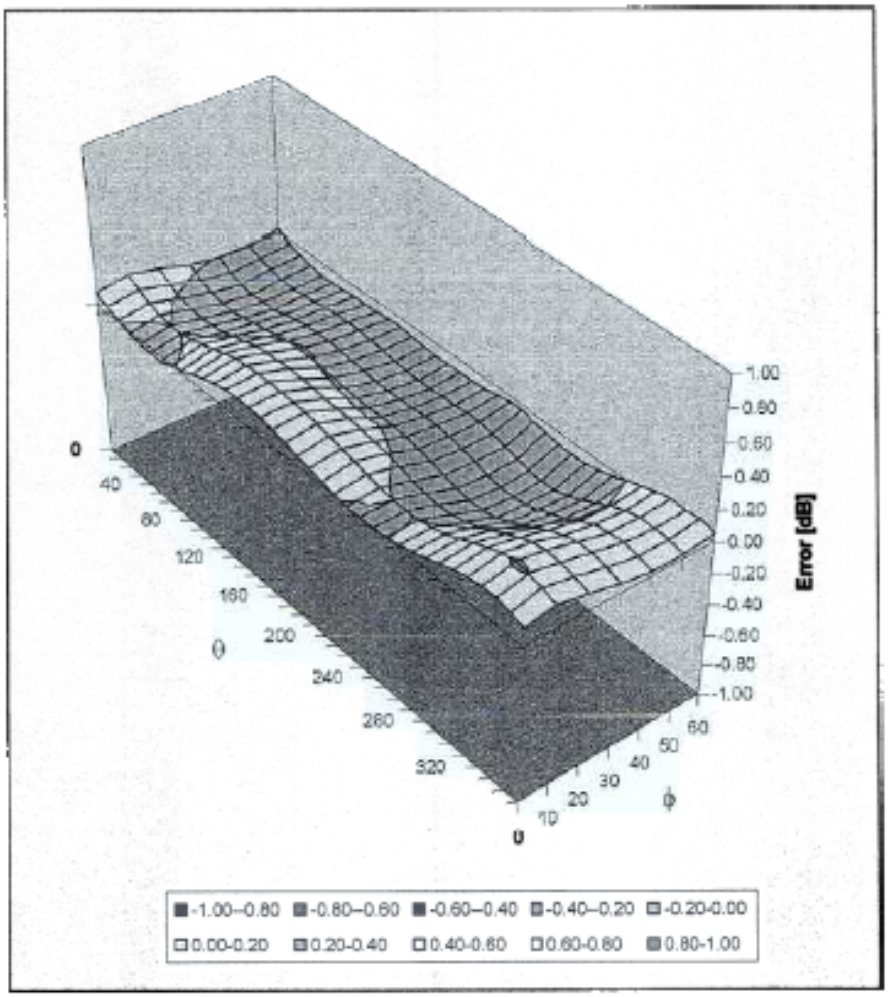
Valid for f=5510-6090 MHz with Body Tissue Simulating Liquid according to OET 65 Suppl. C

ConvF X	**1.2** ± 14.6% (k=2)	Boundary effect:	
ConvF Y	**1.2** ± 14.6% (k=2)	Alpha	**1.18**
ConvF Z	**1.2** ± 14.6% (k=2)	Depth	**1.65**

ES3DV2 SN: 3019 **July 12, 2003**

Deviation from Isotropy in HSL

Error (θϕ), f = 900 MHz



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Zeughausstrasse 43, 8004 Zurich, Switzerland
Phone +41 1 245 9700, Fax +41 1 245 9779
info@speag.com, http://www.speag.com

Probe ES3DV2

SN:3019

Additional Conversion Factors

Manufactured:	December 5, 2002
Last calibration:	July 12, 2003
Add. calibration:	October 9, 2003

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

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DASY - Parameters of Probe: ES3DV2 SN:3019

Sensitivity in Free Space

NormX	**1.05** $\mu V/(V/m)^2$
NormY	**1.14** $\mu V/(V/m)^2$
NormZ	**0.98** $\mu V/(V/m)^2$

Diode Compression

DCP X	**99**
DCP Y	**99**
DCP Z	**99**

Sensor Offset

Probe Tip to Sensor Center	**2.1**	mm

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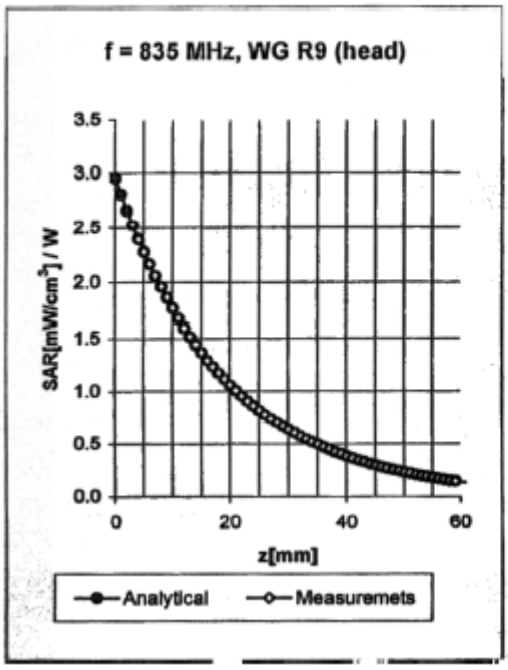
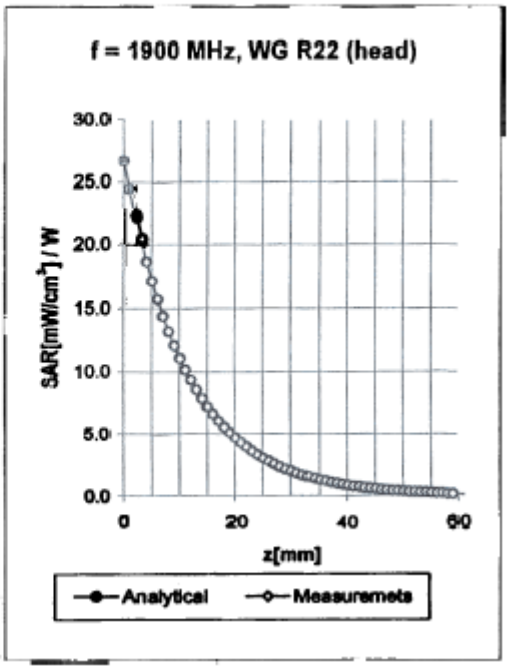
Conversion Factor Assessment





Head **835 MHz** **ε_r = 41.5 ± 5%** **σ = 0.90 ± 5% mho/m**

Valid for f=793-877 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	**6.5** ± 9.5% (k=2)	Boundary effect:	
ConvF Y	**6.5** ± 9.5% (k=2)	Alpha	**0.35**
ConvF Z	**6.5** ± 9.5% (k=2)	Depth	**1.46**

Head **1900 MHz** **ε_r = 40.0 ± 5%** **σ = 1.40 ± 5% mho/m**

Valid for f=1805-1995 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	**4.7** ± 9.5% (k=2)	Boundary effect:	
ConvF Y	**4.7** ± 9.5% (k=2)	Alpha	**0.22**
ConvF Z	**4.7** ± 9.5% (k=2)	Depth	**3.48**

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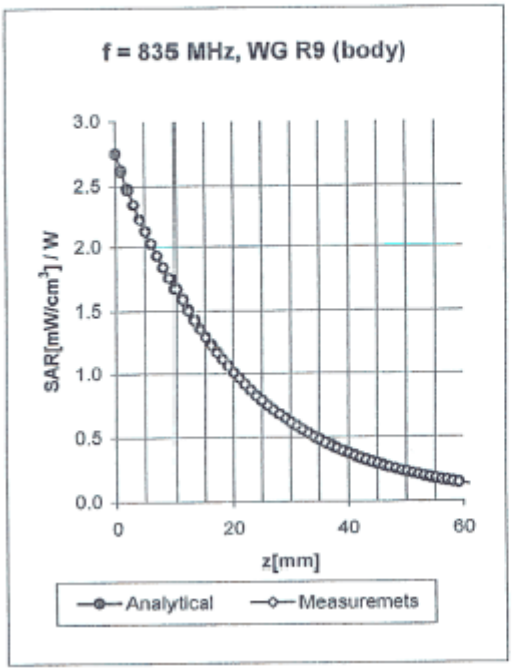
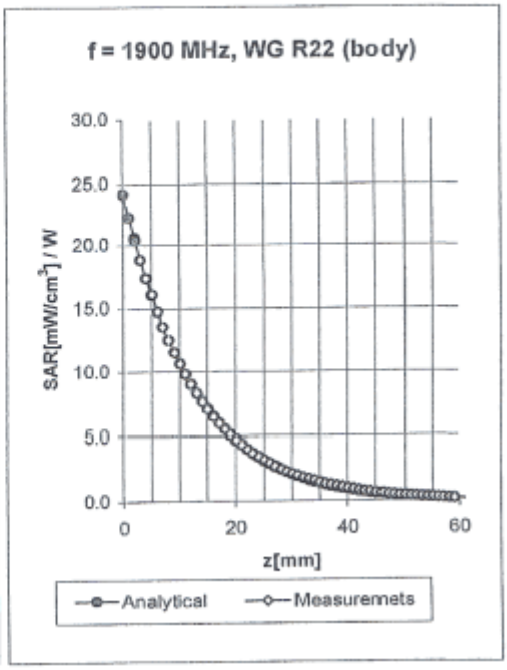
Conversion Factor Assessment





Body **835 MHz** ε_r **= 55.2 ± 5%** σ **= 0.97 ± 5% mho/m**

Valid for f=793-877 MHz with Body Tissue Simulating Liquid according to OET 65 Suppl. C

ConvF X	**6.1** ± 9.5% (k=2)	Boundary effect:	
ConvF Y	**6.1** ± 9.5% (k=2)	Alpha	**0.24**
ConvF Z	**6.1** ± 9.5% (k=2)	Depth	**2.00**

Body **1900 MHz** ε_r **= 53.3 ± 5%** σ **= 1.52 ± 5% mho/m**

Valid for f=1805-1995 MHz with Body Tissue Simulating Liquid according to OET 65 Suppl. C

ConvF X	**4.6** ± 9.5% (k=2)	Boundary effect:	
ConvF Y	**4.6** ± 9.5% (k=2)	Alpha	**0.24**
ConvF Z	**4.6** ± 9.5% (k=2)	Depth	**2.64**

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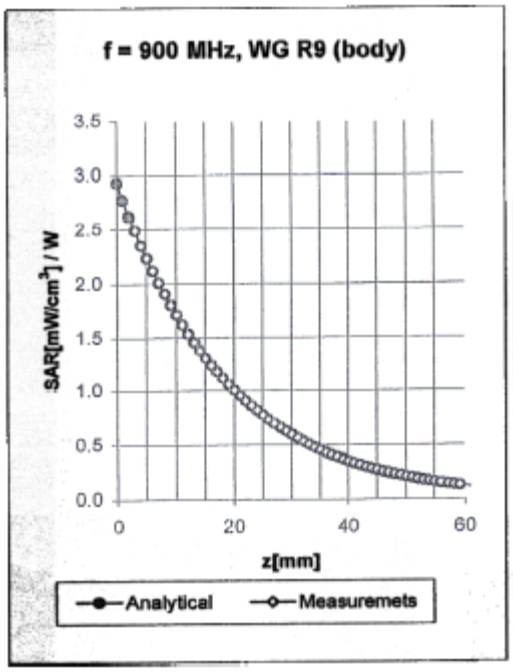
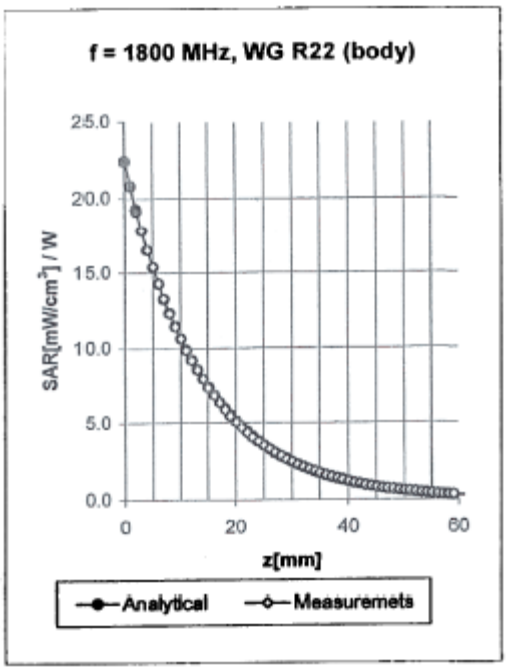
Conversion Factor Assessment





Body 900 MHz ε_r = 55.0 ± 5% σ = 1.05 ± 5% mho/m

Valid for f=855-945 MHz with Body Tissue Simulating Liquid according to OET 65 Suppl. C

ConvF X	6.1 ± 9.5% (k=2)	Boundary effect:	
ConvF Y	6.1 ± 9.5% (k=2)	Alpha	0.27
ConvF Z	6.1 ± 9.5% (k=2)	Depth	1.82

Body 1800 MHz ε_r = 53.3 ± 5% σ = 1.52 ± 5% mho/m

Valid for f=1710-1890 MHz with Body Tissue Simulating Liquid according to OET 65 Suppl. C

ConvF X	**4.7** ± 9.5% (k=2)	Boundary effect:	
ConvF Y	**4.7** ± 9.5% (k=2)	Alpha	**0.23**
ConvF Z	**4.7** ± 9.5% (k=2)	Depth	**2.99**

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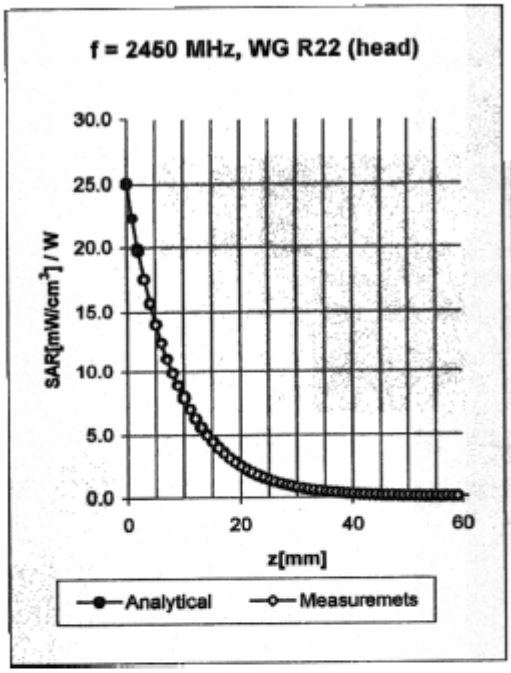
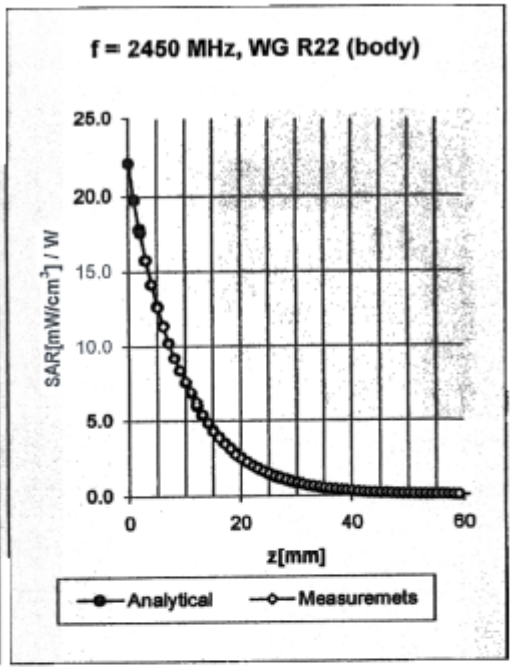
Conversion Factor Assessment





Head **2450 MHz** ε_r = 39.2 ± 5% σ = 1.80 ± 5% mho/m

Valid for f=2400-2500 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	**4.5** ± 9.5% (k=2)	Boundary effect:	
ConvF Y	**4.5** ± 9.5% (k=2)	Alpha	**0.40**
ConvF Z	**4.5** ± 9.5% (k=2)	Depth	**1.62**

Body **2450 MHz** ε_r = 52.7 ± 5% σ = 1.95 ± 5% mho/m

Valid for f=2400-2500 MHz with Body Tissue Simulating Liquid according to OET 65 Suppl. C

ConvF X	**4.2** ± 9.5% (k=2)	Boundary effect:	
ConvF Y	**4.2** ± 9.5% (k=2)	Alpha	**0.32**
ConvF Z	**4.2** ± 9.5% (k=2)	Depth	**1.98**

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Additional Conversion Factors

for Dosimetric E-Field Probe

Type:	ES3DV2
Serial Number:	3019
Place of Assessment:	Zurich
Date of Assessment:	October 13, 2003
Probe Calibration Date:	October 9, 2003

Schmid & Partner Engineering AG hereby certifies that conversion factor(s) of this probe have been evaluated on the date indicated above. The assessment was performed using the FDTD numerical code SEMCAD of Schmid & Partner Engineering AG. Since the evaluation is coupled with measured conversion factors, it has to be recalculated yearly, i.e., following the re-calibration schedule of the probe. The uncertainty of the numerical assessment is based on the extrapolation from measured value at 900 MHz or at 1800 MHz.

Assessed by:

ES3DV2-SN:3019 October 13, 2003

Zeughausstrasse 43, 8004 Zurich, Switzerland
Phone +41 1 245 9700, Fax +41 1 245 9779
info@speag.com, http://www.speag.com

Dosimetric E-Field Probe ES3DV2 SN:3019

Conversion factor (± standard deviation)

150 MHz	ConvF	**8.7 ± 8%**	$\varepsilon_r = 52.3 \pm 5\%$ $\sigma = 0.76 \pm 5\%$ mho/m (head tissue)
150 MHz	ConvF	**8.3 ± 8%**	$\varepsilon_r = 61.9 \pm 5\%$ $\sigma = 0.80 \pm 5\%$ mho/m (body tissue)
450 MHz	ConvF	**7.4 ± 8%**	$\varepsilon_r = 43.5 \pm 5\%$ $\sigma = 0.87 \pm 5\%$ mho/m (head tissue)
450 MHz	ConvF	**7.3 ± 8%**	$\varepsilon_r = 56.7 \pm 5\%$ $\sigma = 0.94 \pm 5\%$ mho/m (body tissue)

ES3DV2-SN:3019 **October 13, 2003**

Certificate of Calibration Verification

Description of EUT	Tuned Dipole Antenna
EUT Model Number	D-1800-S-1
EUT Serial Number	BCL-049
Center Frequency	1800 MHz

Calibration Date: 12 April 2004

Testing conditions:

per P1528/D1.2:2003:

Ambient Temperature (18-25 °C)	23 °C
Ambient Humidity	43%
Liquid Temperature at start of measurements:(≤2°C)	21 °C
Liquid temperature at end of measurements:	21 °C
Date and time at beginning of test:	2004-04-09-16:20 PST
Date and time at beginning of test:	2004-04-09-19:40 PST

Equipment used for measurements

Network Analyzer	HP	8752C	1 Nov 2002
Impedance adapter	AGILENT	43961A	31 Oct 2003
Short Reference	HP	04191-85300	31 Oct 2003
Open Reference	HP	04191-85302	31 Oct 2003
Load Reference	HP	04191-85301	31 Oct 2003
Signal Generator	HP	83650B	29 Feb 2004

Calibration Cable: SMA Utiflex, 3.05 meter cable S/N 99E1206 (Number 8)

Phantom Model:	SAM
Liquid:	1800 MHz, Head Liquid
Liquid Validation Date:	12 April 2004
Quantity of Liquid in Phantom:	19.8 Liters

Measurement Procedure

In accordance with IEEE P1528/D1.2:2003, 8.3.4, 8.2.3 through 8.2.4

Liquid Validation

Instrument	Manufacturer	Model	Calibrated
Network Analyzer	HP	4396B	1 Nov 2002
Dielectric Probe Kit,	Agilent	85070C	Each Use
H_2O, 18 M-Ohm	BACL		Each Use
Probe, SAR 10 kHz - 6 GHz	SPEAG	ES3DV2	9 Oct 2003

Attestation:

I hereby attest that the equipment are suitable for the performance requirements of IEEE P1528/D1.2:2003 and the personnel operating the test equipment and measurements are properly trained to perform the verification of this calibration procedure set forth in IEEE P1528/D1.2:2003.

The validation antenna herein meets the minimum requirements of 20 dB insertion loss

2004-04-12

Hans T. Mellberg
Engineering Manager

Date

1800 MHz Head Liquid validation Date :12APR2004

Ambient Temp = 23 °C Liquid Temp = 22 °C

Frequency	e'	e''	σ (σ = 2πf$\varepsilon_o\varepsilon''$)
1850000000.0000	38.8246	13.2534	
1852000000.0000	38.7736	13.2429	
1854000000.0000	38.8400	13.2576	
1856000000.0000	38.8463	13.2425	
1858000000.0000	38.8167	13.2672	
1860000000.0000	38.8129	13.2552	
1862000000.0000	38.8118	13.2476	
1864000000.0000	38.7654	13.2345	
1866000000.0000	38.7686	13.2633	
1868000000.0000	38.7997	13.2690	
1870000000.0000	38.7262	13.2308	
1872000000.0000	38.7413	13.2642	
1874000000.0000	38.7458	13.2802	
1876000000.0000	38.7127	13.2833	
1878000000.0000	38.7145	13.2799	
1880000000.0000	38.7380	13.2633	
1882000000.0000	38.7086	13.2820	
1884000000.0000	38.7111	13.2991	
1886000000.0000	38.7184	13.2656	
1888000000.0000	38.7086	13.2724	
1890000000.0000	38.6697	13.2703	
1892000000.0000	38.6773	13.3051	
1894000000.0000	38.6729	13.2817	
1896000000.0000	38.6377	13.2805	
1898000000.0000	38.6113	13.2648	
1900000000.0000	38.6019	13.2714	1.40
1902000000.0000	38.5554	13.2951	
1904000000.0000	38.5535	13.2851	
1906000000.0000	38.5103	13.3424	
1908000000.0000	38.5402	13.3692	
1910000000.0000	38.5162	13.3760	
1912000000.0000	38.4971	13.3857	
1914000000.0000	38.5126	13.3651	
1916000000.0000	38.4920	13.3817	
1918000000.0000	38.5463	13.3665	
1920000000.0000	38.5063	13.3804	
1922000000.0000	38.4973	13.3868	
1924000000.0000	38.5244	13.3470	
1926000000.0000	38.5362	13.3583	
1928000000.0000	38.5352	13.3774	
1930000000.0000	38.5427	13.3676	
1932000000.0000	38.5433	13.3562	
1934000000.0000	38.5374	13.3814	
1936000000.0000	38.5717	13.4048	
1938000000.0000	38.5057	13.4235	
1940000000.0000	38.5314	13.4375	
1942000000.0000	38.5104	13.4338	
1944000000.0000	38.4827	13.4285	
1946000000.0000	38.4545	13.4411	
1948000000.0000	38.4227	13.4385	
1950000000.0000	38.3682	13.4325	

System Validation for 1900 MHz Head Liquid (Ambient Temp = 23 C, Liquid Temp = 22 C, Forward Power = 20.42 dBm, 4/12/2004)

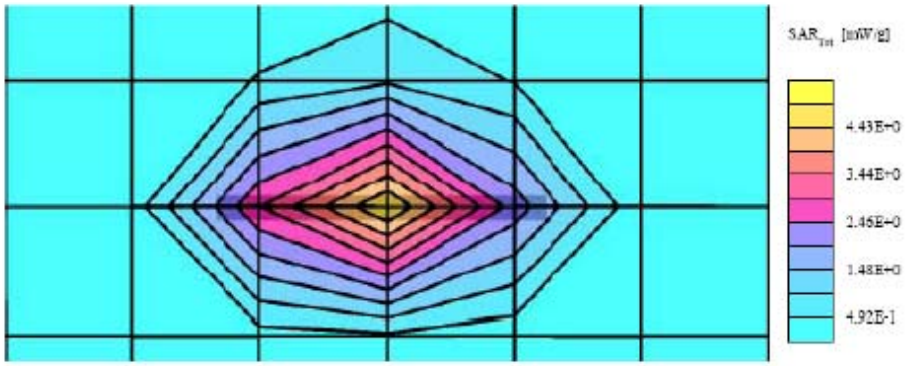
SAM Phantom; Flat Section; Position: (90°,90°); Frequency: 1900 MHz

Probe: ES3DV2 - SN3019; Conv/F(4.70,4.70,4.70); Crest factor: 1.0; Head Liquid 1900 MHz: σ = 1.40 mho/m ε_r = 40.0 ρ = 1.00 g/cm³

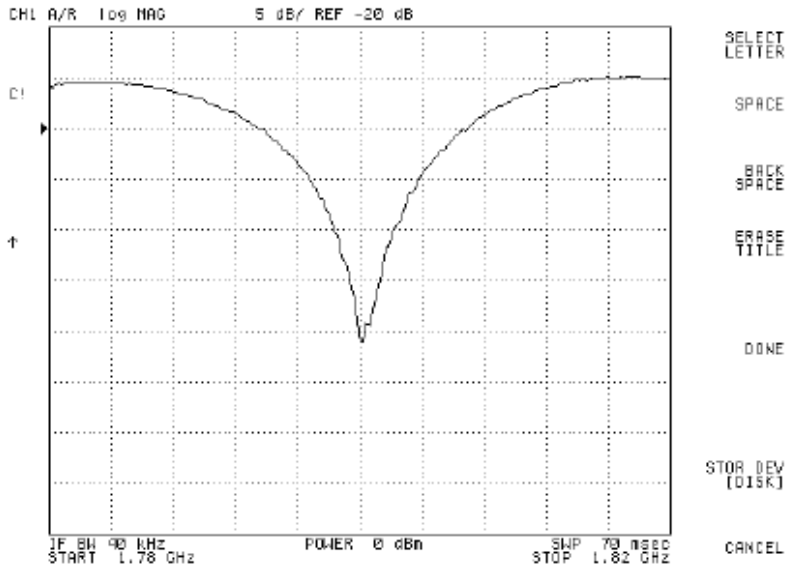
Cube 5x5x7: SAR (1g): 4.38 mW/g, SAR (10g): 2.21 mW/g, (Worst-case extrapolation)

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

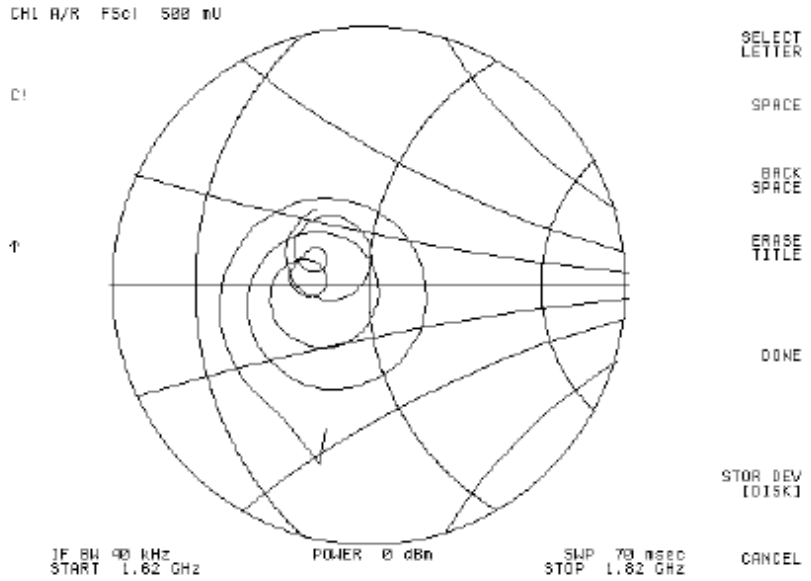
Powerdrift: 0.01 dB



Insertion Loss Plot
S11



Smith Chart


CH1 A/R FSc1 500 mU
C1
SELECT LETTER
SPACE
BACK SPACE
ERASE TITLE
DONE
STOR DEV [DISK]
CANCEL
IF BW 40 kHz
START 1.62 GHz
POWER 0 dBm
SWP 70 msec
STOP 1.82 GHz

1900MHz Head Liquid Validation 3/10/2004

frequency	e'	e''
1850000000.0000	38.8450	13.7005
1852000000.0000	38.7742	13.6721
1854000000.0000	38.7823	13.6941
1856000000.0000	38.8751	13.7058
1858000000.0000	38.9043	13.7753
1860000000.0000	38.9070	13.7912
1862000000.0000	38.8484	13.7519
1864000000.0000	38.9234	13.8405
1866000000.0000	39.0285	13.8739
1868000000.0000	39.0330	13.8519
1870000000.0000	38.9652	13.8601
1872000000.0000	38.9879	13.8909
1874000000.0000	39.0060	13.9259
1876000000.0000	39.0512	13.9025
1878000000.0000	38.9968	13.9099
1880000000.0000	38.9445	13.8984
1882000000.0000	38.9947	13.9344
1884000000.0000	39.0110	13.9488
1886000000.0000	38.9734	13.8990
1888000000.0000	38.9066	13.8597
1890000000.0000	38.9571	13.8896
1892000000.0000	38.9883	13.8929
1894000000.0000	38.9796	13.9250
1896000000.0000	38.9166	13.8629
1898000000.0000	38.8529	13.8297
1900000000.0000	38.8881	13.8229
1902000000.0000	38.9185	13.8274
1904000000.0000	38.8438	13.7826
1906000000.0000	38.7802	13.7553
1908000000.0000	38.7951	13.7764
1910000000.0000	38.8272	13.7982
1912000000.0000	38.7752	13.7657
1914000000.0000	38.6622	13.6857
1916000000.0000	38.6467	13.6857
1918000000.0000	38.6555	13.7237
1920000000.0000	38.6597	13.7274
1922000000.0000	38.6206	13.6614
1924000000.0000	38.5491	13.6372
1926000000.0000	38.5252	13.6399
1928000000.0000	38.5220	13.6121
1930000000.0000	38.3925	13.5523
1932000000.0000	38.3421	13.5500
1934000000.0000	38.3890	13.5521
1936000000.0000	38.4319	13.5937
1938000000.0000	38.3715	13.5955
1940000000.0000	38.2840	13.5190
1942000000.0000	38.2941	13.5311
1944000000.0000	38.2982	13.5545
1946000000.0000	38.2425	13.5522
1948000000.0000	38.2032	13.5237
1950000000.0000	38.1804	13.5616

$\sigma = \omega \varepsilon_o \varepsilon'' = 2 \pi f \varepsilon_o \varepsilon'' = 1.4611$

where $f = 1900 \times 10^6$

$\varepsilon_o = 8.854 \times 10^{-12}$

$\varepsilon'' = 13.8229$

1900MHz Body Liquid Validation 3/10/2004

frequency	e'	e''
1850000000.0000	53.0993	14.1385
1852000000.0000	53.0784	14.1647
1854000000.0000	53.1314	14.1475
1856000000.0000	53.1099	14.1345
1858000000.0000	53.1235	14.1508
1860000000.0000	53.1118	14.1719
1862000000.0000	53.1205	14.1793
1864000000.0000	53.1269	14.1575
1866000000.0000	53.1395	14.1838
1868000000.0000	53.1087	14.1724
1870000000.0000	53.1283	14.1840
1872000000.0000	53.1411	14.1937
1874000000.0000	53.1193	14.1855
1876000000.0000	53.1279	14.1729
1878000000.0000	53.1534	14.1799
1880000000.0000	53.1292	14.2245
1882000000.0000	53.0994	14.1671
1884000000.0000	53.0894	14.1908
1886000000.0000	53.0685	14.1448
1888000000.0000	53.0366	14.1403
1890000000.0000	53.0385	14.1745
1892000000.0000	53.0304	14.1587
1894000000.0000	53.0338	14.1829
1896000000.0000	53.0006	14.1558
1898000000.0000	52.9803	14.1749
1900000000.0000	52.9437	14.1941
1902000000.0000	52.9171	14.1820
1904000000.0000	52.8994	14.1648
1906000000.0000	52.8932	14.1875
1908000000.0000	52.8768	14.1929
1910000000.0000	52.8293	14.1721
1912000000.0000	52.8383	14.2046
1914000000.0000	52.8295	14.1986
1916000000.0000	52.7736	14.1992
1918000000.0000	52.7503	14.2156
1920000000.0000	52.7394	14.2294
1922000000.0000	52.7298	14.2333
1924000000.0000	52.7131	14.2646
1926000000.0000	52.7186	14.2783
1928000000.0000	52.6877	14.3110
1930000000.0000	52.6534	14.3037
1932000000.0000	52.6334	14.2870
1934000000.0000	52.6537	14.3688
1936000000.0000	52.6565	14.3911
1938000000.0000	52.6257	14.3994
1940000000.0000	52.5847	14.3741
1942000000.0000	52.5792	14.3932
1944000000.0000	52.5568	14.4094
1946000000.0000	52.5589	14.3879
1948000000.0000	52.5628	14.4050
1950000000.0000	52.5270	14.4176

$\sigma = \omega \varepsilon_o \varepsilon'' = 2 \pi f \varepsilon_o \varepsilon'' = 1.5003$

where $f = 1900 \times 10^6$

$\varepsilon_o = 8.854 \times 10^{-12}$

$\varepsilon'' = 14.1941$

1900MHz Head Liquid Validation 3/22/2004

frequency	e'	e''
1850000000.0000	39.0307	14.0872
1852000000.0000	38.9674	14.0934
1854000000.0000	38.9674	14.0687
1856000000.0000	38.9253	14.0428
1858000000.0000	38.8970	14.0512
1860000000.0000	38.8597	14.0430
1862000000.0000	38.8223	14.0160
1864000000.0000	38.7975	13.9971
1866000000.0000	38.7591	13.9875
1868000000.0000	38.7374	13.9877
1870000000.0000	38.7162	13.9822
1872000000.0000	38.6403	13.9892
1874000000.0000	38.6150	13.8902
1876000000.0000	38.5864	13.8798
1878000000.0000	38.5433	13.7745
1880000000.0000	38.5564	13.7769
1882000000.0000	38.5112	13.6713
1884000000.0000	38.5151	13.6262
1886000000.0000	38.4988	13.6411
1888000000.0000	38.4617	13.5445
1890000000.0000	38.4671	13.5593
1892000000.0000	38.4432	13.5837
1894000000.0000	38.4488	13.5955
1896000000.0000	38.4327	13.5132
1898000000.0000	38.4286	13.5444
1900000000.0000	38.4209	13.5654
1902000000.0000	38.4469	13.5755
1904000000.0000	38.4578	13.5234
1906000000.0000	38.4560	13.4662
1908000000.0000	38.4723	13.4497
1910000000.0000	38.4822	13.4431
1912000000.0000	38.4958	13.4223
1914000000.0000	38.5182	13.4490
1916000000.0000	38.5113	13.4341
1918000000.0000	38.5379	13.3952
1920000000.0000	38.5717	13.4009
1922000000.0000	38.5552	13.4954
1924000000.0000	38.6026	13.3832
1926000000.0000	38.6046	13.3957
1928000000.0000	38.6150	13.3813
1930000000.0000	38.6457	13.3751
1932000000.0000	38.6572	13.3736
1934000000.0000	38.6455	13.3666
1936000000.0000	38.6613	13.3537
1938000000.0000	38.6611	13.3472
1940000000.0000	38.6982	14.3396
1942000000.0000	38.6720	14.3304
1944000000.0000	38.6749	14.2910
1946000000.0000	38.6575	14.2793
1948000000.0000	38.6823	14.2682
1950000000.0000	38.6708	14.2467

$\sigma = \omega \varepsilon_o \varepsilon'' = 2 \pi f \varepsilon_o \varepsilon'' = 1.4338$

where $f = 1900 \times 10^6$

$\varepsilon_o = 8.854 \times 10^{-12}$

$\varepsilon'' = 13.5654$

1900MHz Body Liquid Validation 3/22/2004

frequency	e'	e''
1850000000.0000	52.8448	13.7993
1852000000.0000	52.8627	13.7892
1854000000.0000	52.8130	13.8094
1856000000.0000	52.7874	13.8186
1858000000.0000	52.7629	13.8422
1860000000.0000	52.7364	13.8369
1862000000.0000	52.6773	13.8475
1864000000.0000	52.6666	13.8912
1866000000.0000	52.6738	13.9089
1868000000.0000	52.6151	13.9032
1870000000.0000	52.5828	13.8990
1872000000.0000	52.5769	13.9401
1874000000.0000	52.5391	13.9841
1876000000.0000	52.5123	13.9999
1878000000.0000	52.5077	14.0035
1880000000.0000	52.4878	14.0375
1882000000.0000	52.4682	14.0553
1884000000.0000	52.4360	14.0916
1886000000.0000	52.4466	14.0970
1888000000.0000	52.4204	14.1128
1890000000.0000	52.4249	14.1194
1892000000.0000	52.4036	14.1601
1894000000.0000	52.3833	14.1633
1896000000.0000	52.4199	14.1750
1898000000.0000	52.3698	14.1825
1900000000.0000	52.4144	14.2183
1902000000.0000	52.3858	14.1860
1904000000.0000	52.3970	14.2153
1906000000.0000	52.3896	14.2160
1908000000.0000	52.4433	14.2143
1910000000.0000	52.4179	14.2218
1912000000.0000	52.4362	14.2285
1914000000.0000	52.4439	14.2309
1916000000.0000	52.4567	14.2015
1918000000.0000	52.5080	14.2030
1920000000.0000	52.5140	14.1960
1922000000.0000	52.5524	14.2048
1924000000.0000	52.5437	14.2281
1926000000.0000	52.5365	14.1961
1928000000.0000	52.5641	14.1600
1930000000.0000	52.5978	14.1760
1932000000.0000	52.5641	14.1641
1934000000.0000	52.5859	14.1613
1936000000.0000	52.5988	14.1476
1938000000.0000	52.6168	14.1424
1940000000.0000	52.6571	14.1355
1942000000.0000	52.6173	14.1460
1944000000.0000	52.6254	14.1394
1946000000.0000	52.6152	14.1369
1948000000.0000	52.6293	14.1129
1950000000.0000	52.6229	14.1128

$\sigma = \omega \varepsilon_o \varepsilon'' = 2 \pi f \varepsilon_o \varepsilon'' = 1.5024$

where $f = 1900 \times 10^6$

$\varepsilon_o = 8.854 \times 10^{-12}$

$\varepsilon'' = 14.2183$

3 - EUT DESCRIPTION

Applicant:	CEC Wireless R&D Ltd.
Product Description:	GSM/GPRS 1900 MHz Mobile Phone
Product Model Number:	C570
FCC ID:	RXSC570
Serial Number:	351657001922816
Maximum RF Output Power:	30 dBm
RF Exposure environment:	General Population/Uncontrolled
Applicable Standard	FCC CFR 47, Part 24
Application Type:	Certification