

SAR EVALUATION REPORT

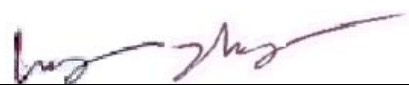
For

LIONDA TECHNOLOGY COMPANY LIMITED

Block 2 Laodong 2nd Industrial Area, Xixian, Baoan,
Shenzhen, Guangdong, China 518102

FCC ID: O63GH5850HDLD03

2003-11-26

This Report Concerns: ☒ Original Report	Equipment Type: 2.4GHz and 5.8GHz Cordless Phone – H/S Unit
Test Engineer: Eric Hong	
Report No.: R0308046S	
Test Date: 2003-11-14	
Reviewed By: Ling Zhang	
Prepared By: Bay Area Compliance Laboratory Corporation 230 Commercial Street Sunnyvale, CA 94085 Tel: (408) 732-9162 Fax: (408) 732 9164	

Note: This test report is specially limited to the above client company and the product model only. It may not be duplicated without prior written consent of Bay Area Compliance Laboratory Corporation. This report **must not** be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government.

TABLE OF CONTENTS

SUMMARY.....	3
1 - REFERENCE	5
2 - TESTING EQUIPMENT.....	6
2.1 EQUIPMENT LIST & CALIBRATION INFO	6
2.2 EQUIPMENT CALIBRATION CERTIFICATE	6
3 - EUT DESCRIPTION	27
4 - SYSTEM TEST CONFIGURATION.....	28
4.1 JUSTIFICATION	28
4.2 EUT EXERCISE PROCEDURE	28
4.3 SPECIAL ACCESSORIES	28
4.4 EQUIPMENT MODIFICATIONS	28
5 - CONDUCTED OUTPUT POWER MEASUREMENT	29
5.1 MEASUREMENT PROCEDURE.....	29
5.2 TEST RESULTS	29
6 - DOSIMETRIC ASSESSMENT SETUP.....	31
6.1 MEASUREMENT SYSTEM DIAGRAM	32
6.2 SYSTEM COMPONENTS.....	33
6.3 MEASUREMENT UNCERTAINTY	37
7 - SYSTEM EVALUATION	38
7.1 SIMULATED TISSUE LIQUID PARAMETER CONFIRMATION	38
7.2 EVALUATION PROCEDURES.....	38
7.3 SYSTEM ACCURACY VERIFICATION	39
7.4 SAR EVALUATION PROCEDURE.....	43
7.5 EXPOSURE LIMITS.....	44
8 - TEST RESULTS	45
8.1 SAR TEST DATA.....	45
8.2 PLOTS OF TEST RESULT	45
EXHIBIT A - SAR SETUP PHOTOGRAPHS	51
BACK IN TOUCH WITH PHANTOM.....	51
RIGHT HEAD CHEEK IN TOUCH WITH PHANTOM	51
RIGHT HEAD TILT IN TOUCH WITH PHANTOM.....	52
LEFT HEAD CHEEK IN TOUCH WITH PHANTOM	52
LEFT HEAD TILT IN TOUCH WITH PHANTOM.....	53
EXHIBIT B - EUT PHOTOGRAPHS	54
HANDSET - TOP VIEW	54
HANDSET - BACK VIEW	54
HANDSET – BOARD AND HOUSING VIEW	55
HANDSET - MAIN BOARD COMPONENT VIEW.....	55
HANDSET - MAIN BOARD SOLDER VIEW	56
HANDSET - TRANSCEIVER TOP SIDE VIEW.....	56
HANDSET - TRANSCEIVER BOTTOM VIEW	57
HANDSET - TRANSCEIVER COVER REMOVED COMPONENT VIEW	57
HANDSET - TRANSCEIVER COVER REMOVED SOLDER VIEW	58
ACCESSORY- HEADSET	58
EXHIBIT C – Z-AXIS.....	59

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.

The investigation was limited to the worst-case scenario from the device usage point of view. For the clarity of data analysis, and clarity of presentation, only one tissue simulation was used for the head and body simulation. This means that if SAR was found at the headset position, the magnitude of SAR would be overestimated comparing to SAR to a headset placed in the ear region.

There was no SAR of any concern measured on the device for any of the investigated configurations, please see following table for testing result summary:

Ambient Temperature (°C): 23.0

Relative Humidity (%): 51.1

Worst case SAR reading

EUT position	Frequency (MHz)	Conducted Power (W)	Test Type	Liquid	Accessory	Phantom	Measured (mW/g)	Limit (mW/g)
back in touch with phantom	5768	0.0434	Body worn	body	Headset	flat	0.0399	1.6
Right head cheek touching	5768	0.0434	Head	Head	/	flat	0.169	1.6
Right head tilt touching	5768	0.0434	Head	Head	/	flat	0.0887	1.6
Left head cheek touching	5768	0.0434	Head	Head	/	flat	0.171	1.6
Left head tilt touching	5768	0.0434	Head	Head	/	flat	0.0936	1.6

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, Office of Engineering & Technology, Washington, DC, 1997.
- [3] Thomas Schmid, Oliver Egger, and Niels Kuster, \Automated E-field scanning system for dosimetric assessments", IEEE Transactions on Microwave Theory and Techniques, vol. 44, pp. 105{113, Jan. 1996.
- [4] Niels Kuster, Ralph Kastle, and Thomas Schmid, \Dosimetric evaluation of mobile communications equipment with known precision", IEEE 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 Kuhn, and Niels Kuster, \The dependence 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.
- [10] Klaus Meier, Ralf Kastle, Volker Hombach, Roger Tay, and Niels Kuster, \The dependence of EM energy absorption upon human head modeling at 1800 MHz", IEEE Transactions on Microwave Theory and Techniques, Oct. 1997, in press.
- [11] W. Gander, Computermathematik, Birkhaeuser, Basel, 1992.
- [12] W. H. Press, S. A. Teukolsky, W. T. Vetterling, and B. P. Flannery, Numerical Recipes 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 uncertainty 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 Equipment 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	6/02	456
SPEAG E-Field Probe ET3DV6	9/7/02	1604
SPEAG Dummy Probe	N/A	N/A
SPEAG Generic Twin Phantom	N/A	N/A
SPEAG Light Alignment Sensor	N/A	278
Apprel Validation Dipole D-1800-S-2	11/6/01	BCL-049
SPEAG Validation Dipole D900V2	9/3/02	122
Brain Equivalent Matter (800MHz)	Daily	N/A
Brain Equivalent Matter (1900MHz)	Daily	N/A
Brain Equivalent Matter (2450MHz)	Daily	N/A
Muscle Equivalent Matter (800MHz)	Daily	N/A
Muscle Equivalent Matter (1900MHz)	Daily	N/A
Muscle Equivalent Matter (2450MHz)	Daily	N/A
Robot Table	N/A	N/A
Phone Holder	N/A	N/A
Phantom Cover	N/A	N/A
HP Spectrum Analyzer HP8593GM	6/20/02	3009A00791
Microwave Amp. 8349B	N/A	2644A02662
Power Meter HP436A	4/2/02	2709A29209
Power Sensor HP8482A	4/2/02	2349A08568
Signal Generator RS SMIQ O3	2/10/02	1084800403
Network Analyzer HP-8753ES	7/30/02	820079
Dielectric Probe Kit HP85070A	N/A	N/A
Apprel Validation Dipole D-2450-S-1	10/1/02	BCL-141
Dipole Antenna AD-100 (450MHz)	5/7/02	02220

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) E33DV2 - 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: 5066 (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 8461A	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

Calibrated by: Name: Nico Vetter, Function: Technician, Signature: 

Approved by: Name: Katja Rokova, Function: Laboratory Director, Signature: 

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!)

ES3DV2 SN: 3019

July 12, 2003

DASY - Parameters of Probe: ES3DV2 SN: 3019**Sensitivity in Free Space****Diode Compression**

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

Sensitivity in Tissue Simulating Liquid

Head **900 MHz** $\epsilon_r = 41.5 \pm 5\%$ $\sigma = 0.97 \pm 5\%$ mho/m
Valid for f=800-1000 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

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

Head **1800 MHz** $\epsilon_r = 40.0 \pm 5\%$ $\sigma = 1.40 \pm 5\%$ mho/m
Valid for f=1710-1910 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	5.0 $\pm 9.5\%$ (k=2)	Boundary effect:	
ConvF Y	5.0 $\pm 9.5\%$ (k=2)	Alpha	0.21
ConvF Z	5.0 $\pm 9.5\%$ (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

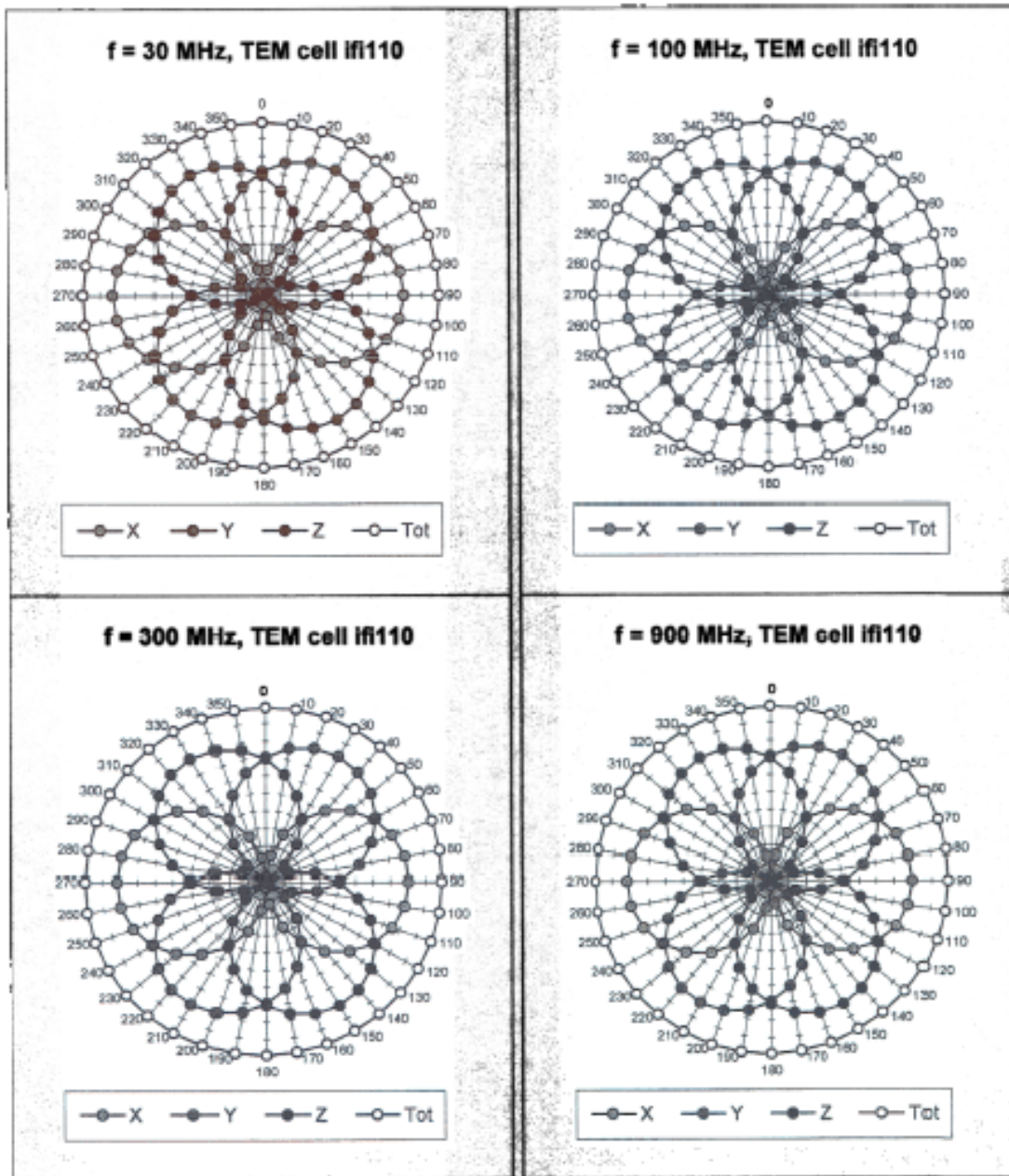
Probe Tip to Boundary		1 mm	2 mm
SAR _{be} [%] Without Correction Algorithm		7.4	5.0
SAR _{be} [%] With Correction Algorithm		0.0	0.1

Sensor Offset

Probe Tip to Sensor Center	2.1	mm
----------------------------	------------	-----------

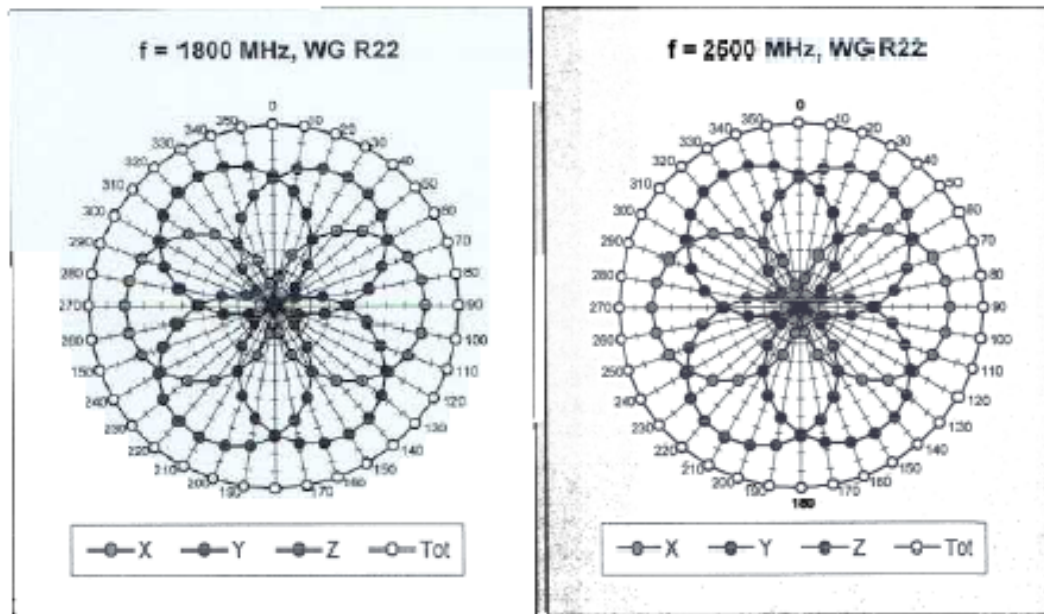
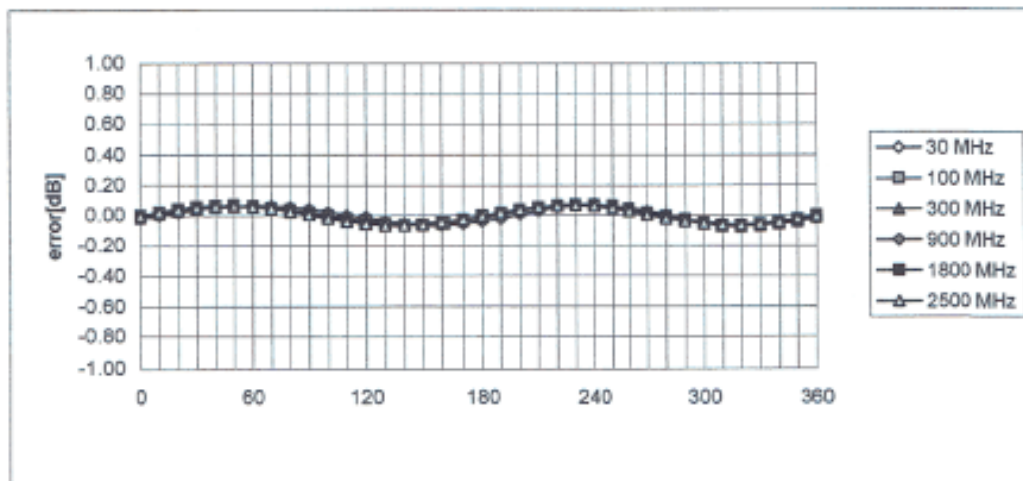
ES3DV2 SN: 3019

July 12, 2003

Receiving Pattern (ϕ , $\theta = 0^\circ$)

ES3DV2 SN: 3019

July 2003

Isotropy Error (ϕ), $\theta = 0^\circ$ 

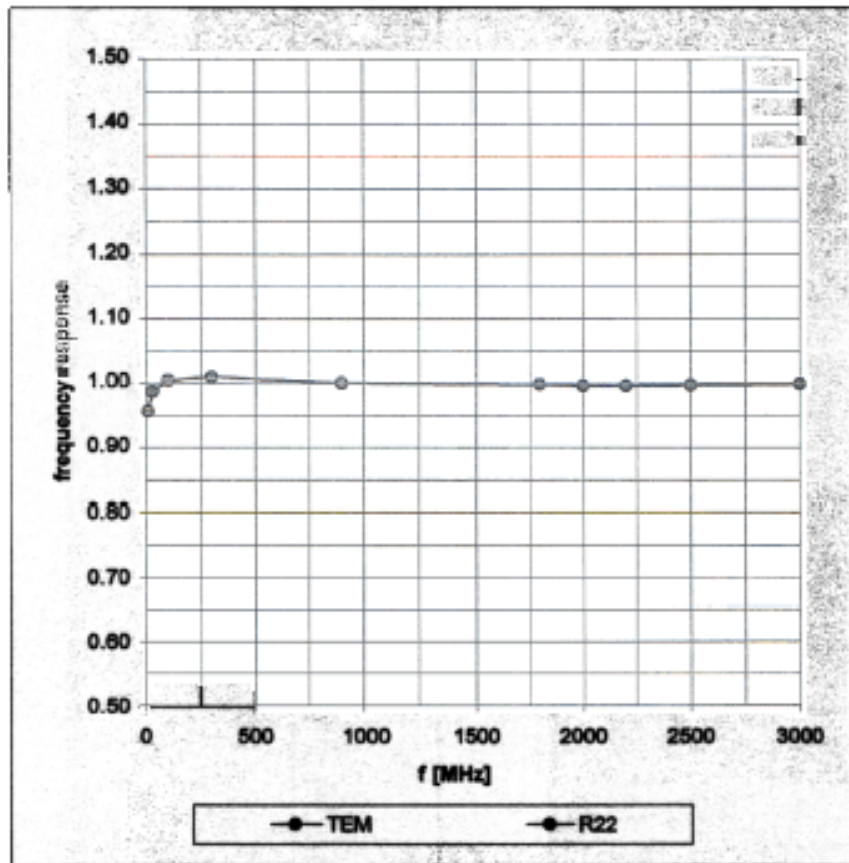
Page

ES3DV2 SN: 3019

July 12, 2003

Frequency Response of E-Field

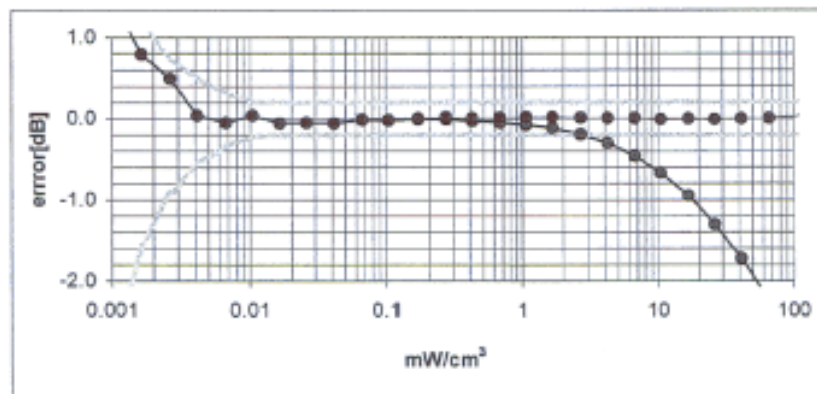
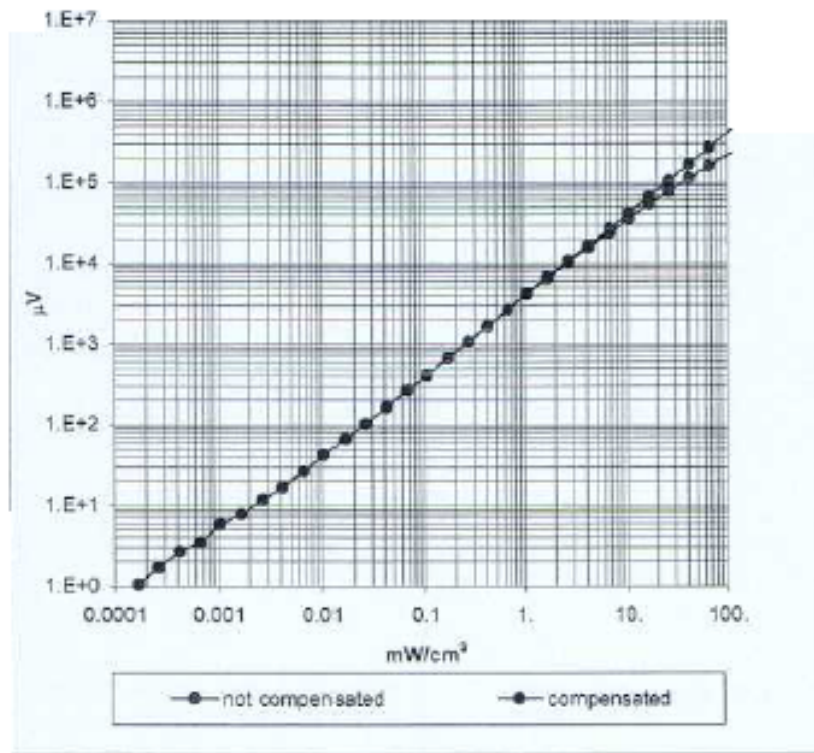
(TEM-Cell:Ifi110, Waveguide R22)



ES3DV2 SN: 3019

July 12, 2003

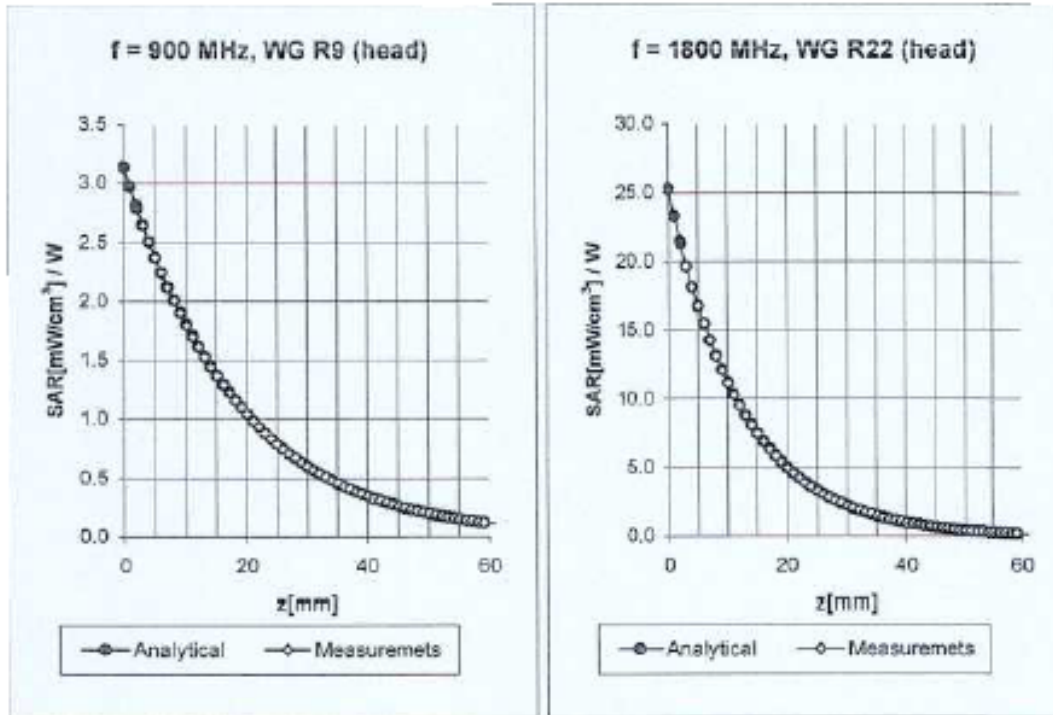
Dynamic Range $f(\text{SAR}_{\text{brain}})$ (Waveguide R22)



ES3DV2 SN: 3019

July 12, 2003

Conversion Factor Assessment



900 MHz $\epsilon_r = 41.5 \pm 5\%$ $\sigma = 0.97 \pm 5\%$ mho/m

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

ConvF X	$6.4 \pm 9.5\%$ (k=2)	Boundary effect:
ConvF Y	$6.4 \pm 9.5\%$ (k=2)	Alpha
ConvF Z	$6.4 \pm 9.5\%$ (k=2)	Depth

1800 MHz $\epsilon_r = 40.0 \pm 5\%$ $\sigma = 1.40 \pm 5\%$ mho/m

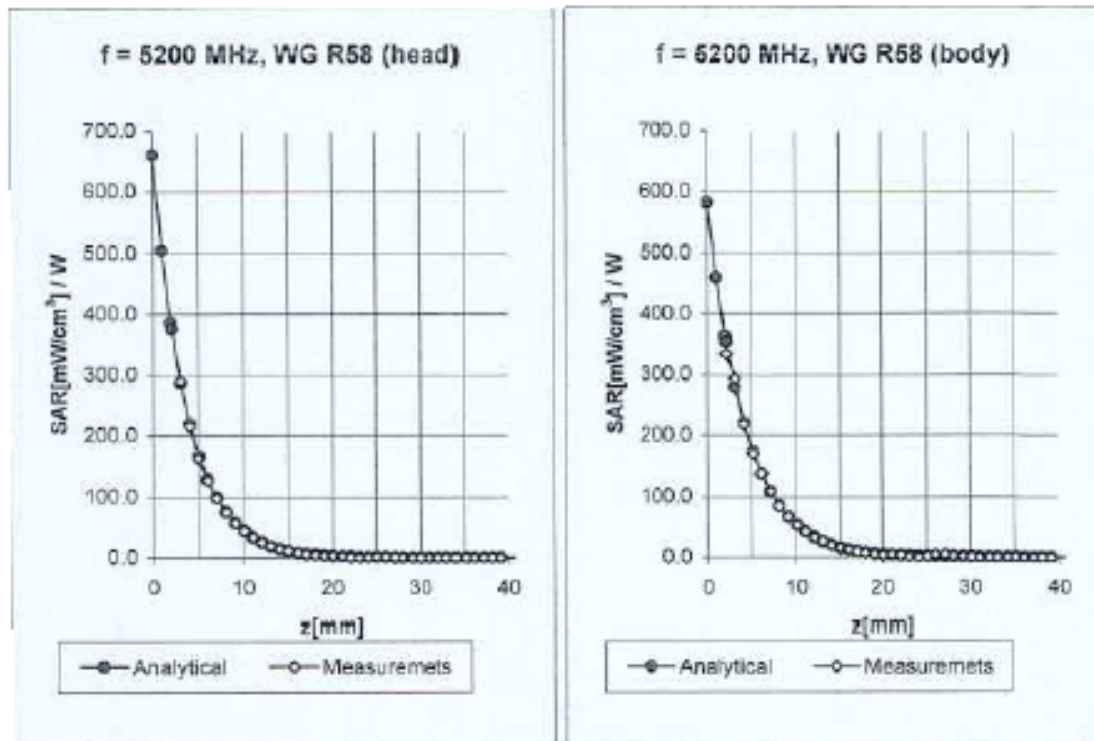
Valid for f=1710-1910 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	$5.0 \pm 9.5\%$ (k=2)	Boundary effect:
ConvF Y	$5.0 \pm 9.5\%$ (k=2)	Alpha
ConvF Z	$5.0 \pm 9.5\%$ (k=2)	Depth

ES3DV2 SN: 3019

July 12, 2003

Conversion Factor Assessment



Head **5200** **MHz** $\epsilon_r = 36.0 \pm 5\%$ $\sigma = 4.66 \pm 5\%$ mho/m

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

ConvF X	2.3 $\pm 14.6\%$ (k=2)	Boundary effect:	
ConvF Y	2.3 $\pm 14.6\%$ (k=2)	Alpha	1.05
ConvF Z	2.3 $\pm 14.6\%$ (k=2)	Depth	1.50

Body **5200** **MHz** $\epsilon_r = 49.0 \pm 5\%$ $\sigma = 5.30 \pm 5\%$ mho/m

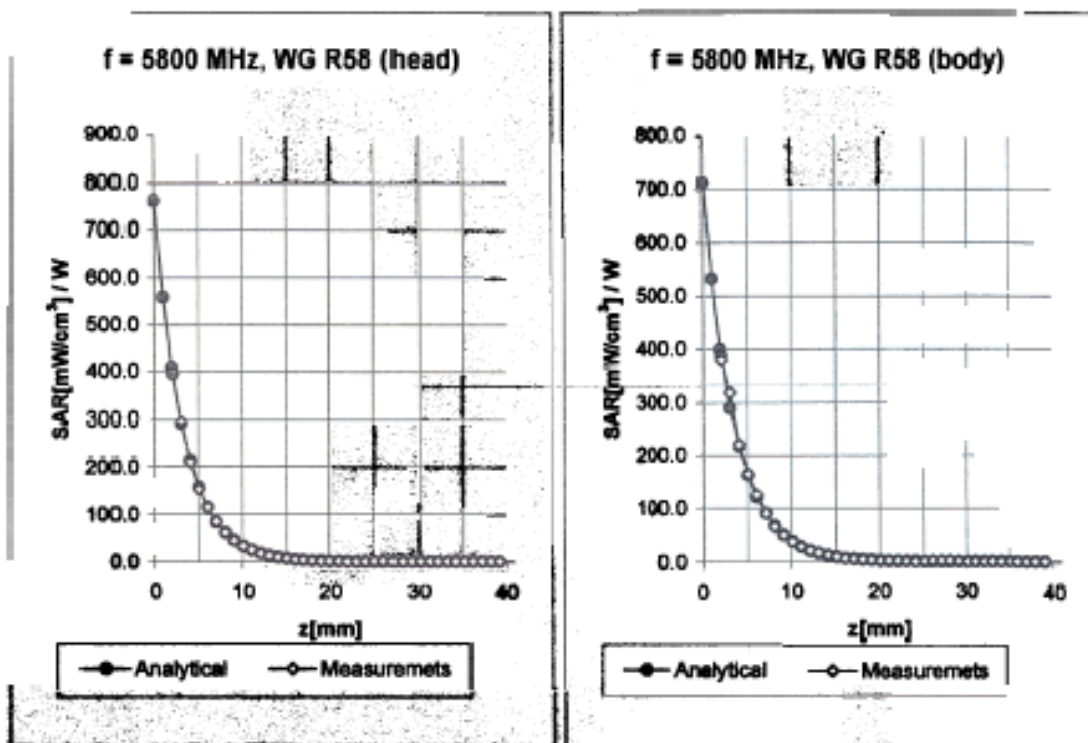
Valid for f=4940-5460 MHz with Body Tissue Simulating Liquid according to OET 65 Suppl. C

ConvF X	1.4 $\pm 14.6\%$ (k=2)	Boundary effect:	
ConvF Y	1.4 $\pm 14.6\%$ (k=2)	Alpha	1.01
ConvF Z	1.4 $\pm 14.6\%$ (k=2)	Depth	1.85

ES3DV2 SN: 3019

July 12, 2003

Conversion Factor Assessment



Head 5800 MHz $\epsilon_r = 35.3 \pm 5\%$ $\sigma = 5.27 \pm 5\%$ mho/m

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

ConvF X	$1.8 \pm 14.6\%$ (k=2)	Boundary effect:	
ConvF Y	$1.8 \pm 14.6\%$ (k=2)	Alpha	0.90
ConvF Z	$1.8 \pm 14.6\%$ (k=2)	Depth	1.90

Body 5800 MHz $\epsilon_r = 48.2 \pm 5\%$ $\sigma = 6.00 \pm 5\%$ mho/m

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

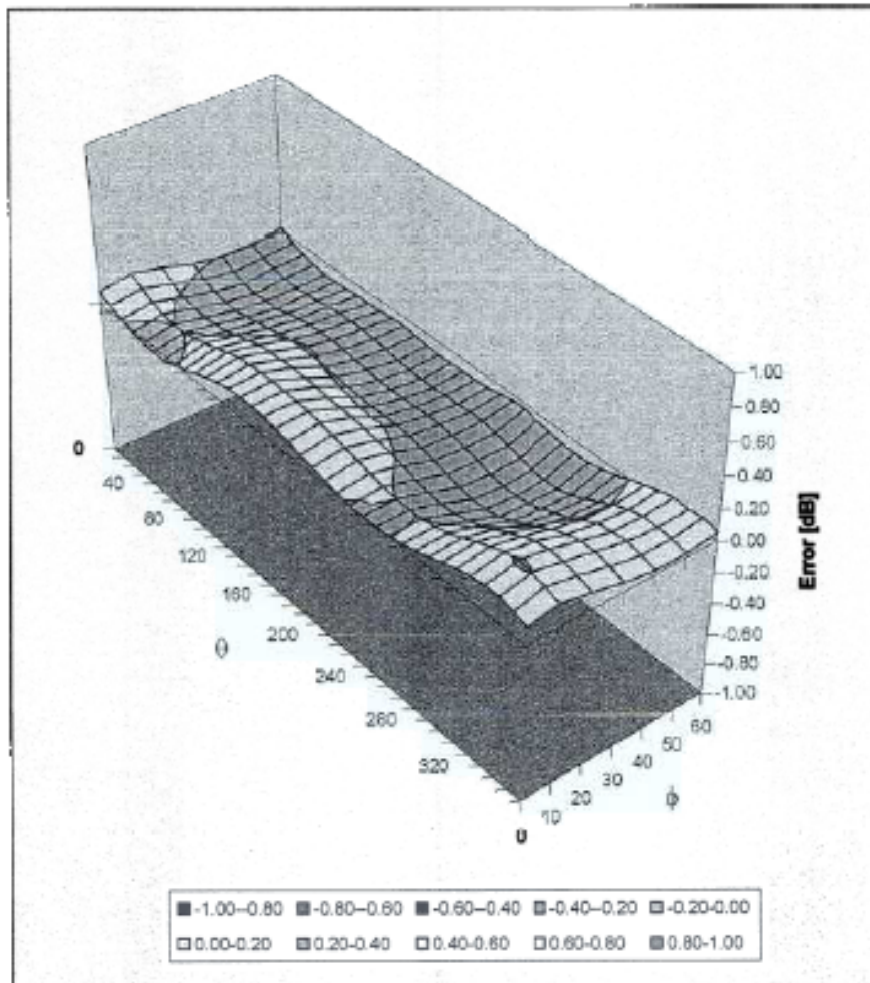
ConvF X	$1.2 \pm 14.6\%$ (k=2)	Boundary effect:	
ConvF Y	$1.2 \pm 14.6\%$ (k=2)	Alpha	1.18
ConvF Z	$1.2 \pm 14.6\%$ (k=2)	Depth	1.65

ES3DV2 SN: 3019

July 12, 2003

Deviation from Isotropy in HSL

Error ($\theta\phi$), $f = 900$ MHz



Leugnausstrasse 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!)

DASY - Parameters of Probe: ES3DV2 SN:3019**Sensitivity in Free Space**

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

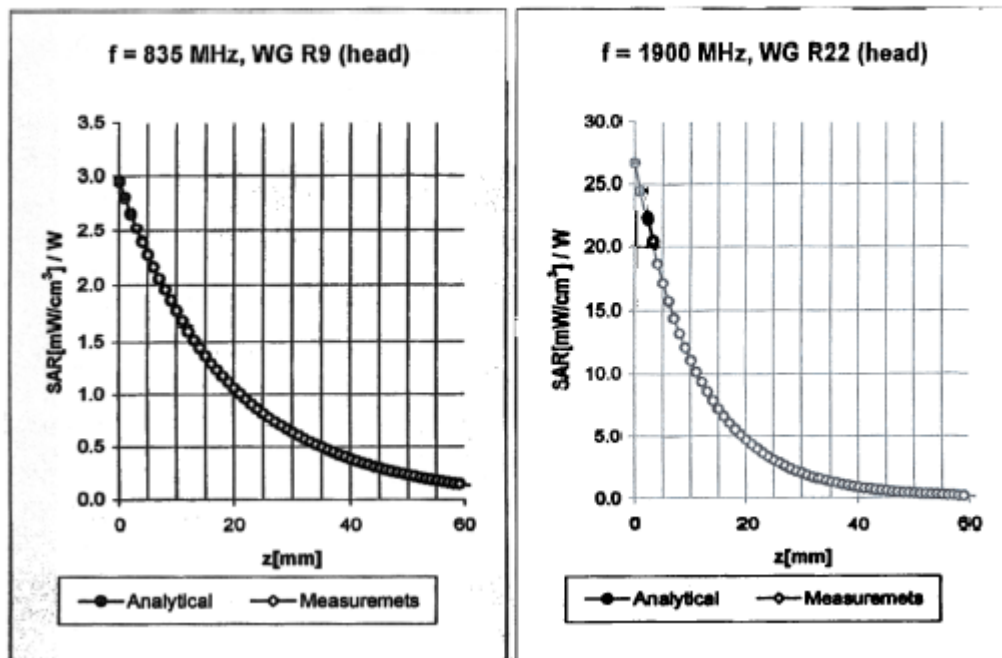
Diode Compression

DCP X	99
DCP Y	99
DCP Z	99

Sensor Offset

Probe Tip to Sensor Center	2.1	mm
----------------------------	------------	----

Conversion Factor Assessment



Head 835 MHz $\epsilon_r = 41.5 \pm 5\%$ $\sigma = 0.90 \pm 5\%$ mho/m

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

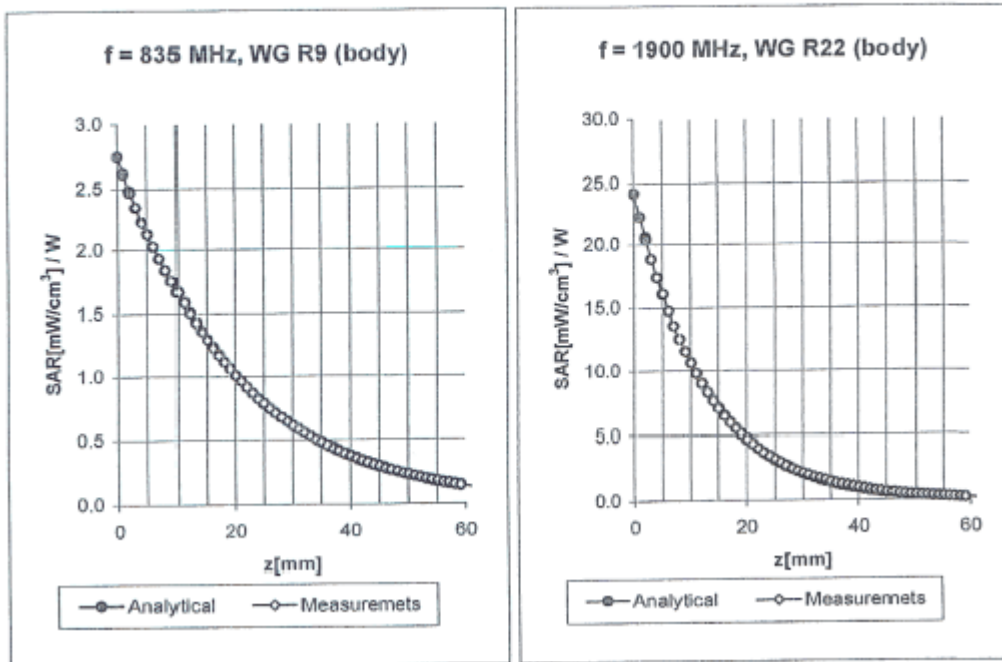
ConvF X	$6.5 \pm 9.5\%$ (k=2)	Boundary effect:	
ConvF Y	$6.5 \pm 9.5\%$ (k=2)	Alpha	0.35
ConvF Z	$6.5 \pm 9.5\%$ (k=2)	Depth	1.46

Head 1900 MHz $\epsilon_r = 40.0 \pm 5\%$ $\sigma = 1.40 \pm 5\%$ mho/m

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

ConvF X	$4.7 \pm 9.5\%$ (k=2)	Boundary effect:	
ConvF Y	$4.7 \pm 9.5\%$ (k=2)	Alpha	0.22
ConvF Z	$4.7 \pm 9.5\%$ (k=2)	Depth	3.48

Conversion Factor Assessment



Body **835 MHz** $\epsilon_r = 55.2 \pm 5\%$ $\sigma = 0.97 \pm 5\% \text{ mho/m}$

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

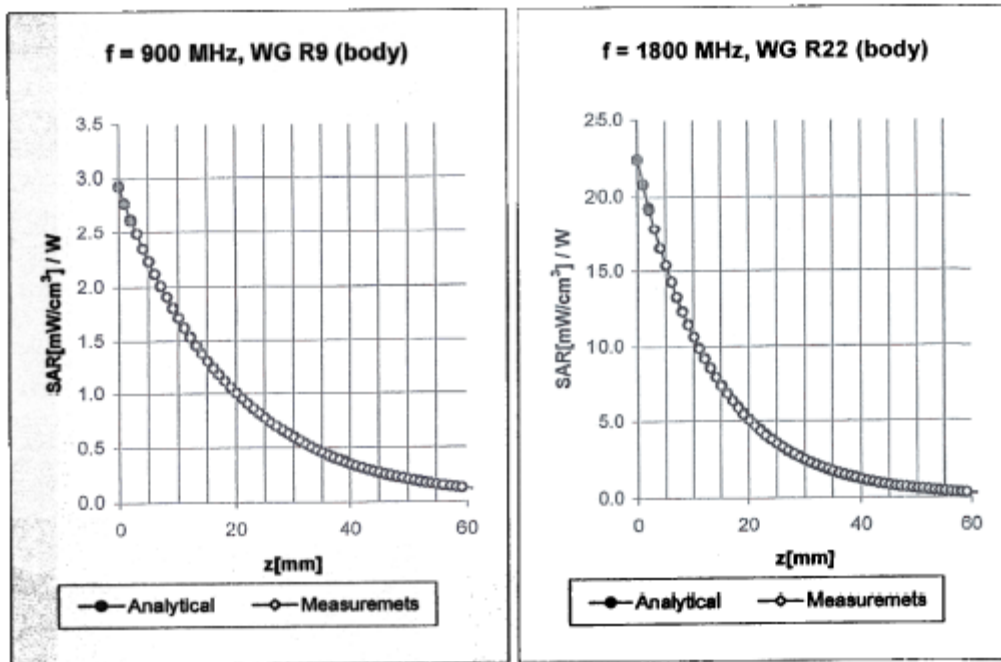
ConvF X	6.1 $\pm 9.5\%$ (k=2)	Boundary effect:
ConvF Y	6.1 $\pm 9.5\%$ (k=2)	Alpha 0.24
ConvF Z	6.1 $\pm 9.5\%$ (k=2)	Depth 2.00

Body **1900 MHz** $\epsilon_r = 53.3 \pm 5\%$ $\sigma = 1.52 \pm 5\% \text{ mho/m}$

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

ConvF X	4.6 $\pm 9.5\%$ (k=2)	Boundary effect:
ConvF Y	4.6 $\pm 9.5\%$ (k=2)	Alpha 0.24
ConvF Z	4.6 $\pm 9.5\%$ (k=2)	Depth 2.64

Conversion Factor Assessment



Body 900 MHz $\epsilon_r = 55.0 \pm 5\%$ $\sigma = 1.05 \pm 5\%$ mho/m

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

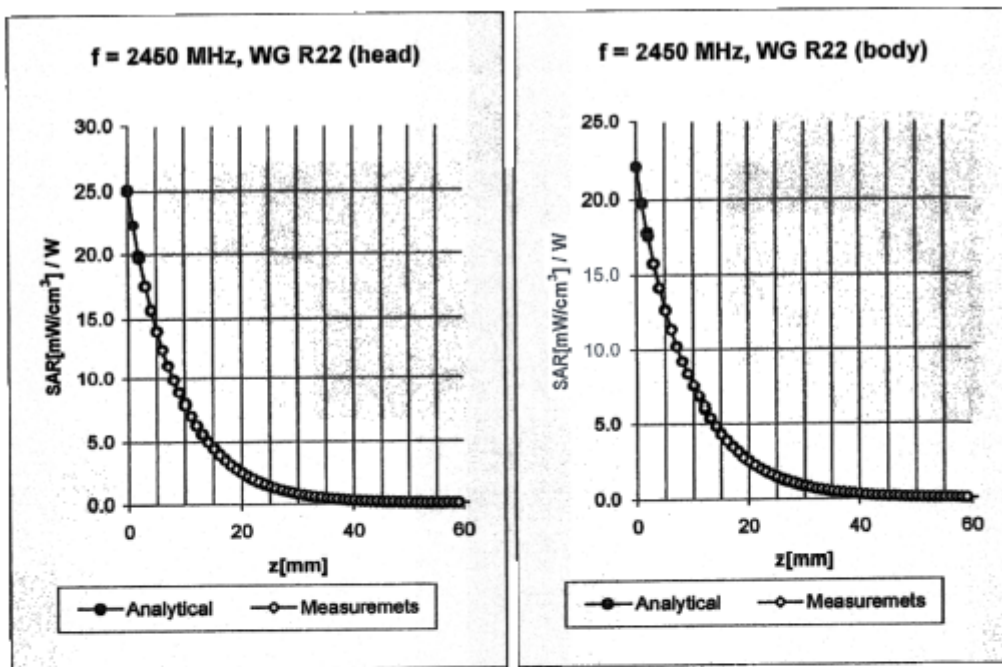
ConvF X	6.1 $\pm$ 9.5% (k=2)	Boundary effect:
ConvF Y	6.1 $\pm$ 9.5% (k=2)	Alpha 0.27
ConvF Z	6.1 $\pm$ 9.5% (k=2)	Depth 1.82

Body 1800 MHz $\epsilon_r = 53.3 \pm 5\%$ $\sigma = 1.52 \pm 5\%$ mho/m

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

ConvF X	4.7 $\pm$ 9.5% (k=2)	Boundary effect:
ConvF Y	4.7 $\pm$ 9.5% (k=2)	Alpha 0.23
ConvF Z	4.7 $\pm$ 9.5% (k=2)	Depth 2.99

Conversion Factor Assessment



Head **2450 MHz** $\epsilon_r = 39.2 \pm 5\%$ $\sigma = 1.80 \pm 5\%$ mho/m

Valid for f=2400-2500 MHz with Head Tissue Simulating Liquid according to EN 60381, P1528-200X

ConvF X	4.5 $\pm 9.5\%$ (k=2)	Boundary effect:
ConvF Y	4.5 $\pm 9.5\%$ (k=2)	Alpha 0.40
ConvF Z	4.5 $\pm 9.5\%$ (k=2)	Depth 1.62

Body **2450 MHz** $\epsilon_r = 52.7 \pm 5\%$ $\sigma = 1.95 \pm 5\%$ mho/m

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

ConvF X	4.2 $\pm 9.5\%$ (k=2)	Boundary effect:
ConvF Y	4.2 $\pm 9.5\%$ (k=2)	Alpha 0.32
ConvF Z	4.2 $\pm 9.5\%$ (k=2)	Depth 1.98

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

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 ($\pm$ standard deviation)

150 MHz ConvF **$8.7 \pm 8\%$**

$\epsilon_r = 52.3 \pm 5\%$
 $\sigma = 0.76 \pm 5\% \text{ mho/m}$
(head tissue)

150 MHz ConvF **$8.3 \pm 8\%$**

$\epsilon_r = 61.9 \pm 5\%$
 $\sigma = 0.80 \pm 5\% \text{ mho/m}$
(body tissue)

450 MHz ConvF **$7.4 \pm 8\%$**

$\epsilon_r = 43.5 \pm 5\%$
 $\sigma = 0.87 \pm 5\% \text{ mho/m}$
(head tissue)

450 MHz ConvF **$7.3 \pm 8\%$**

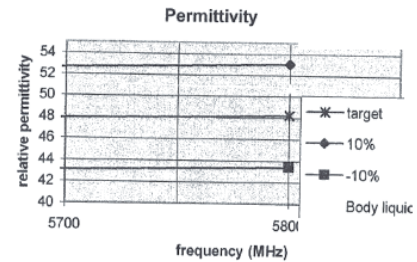
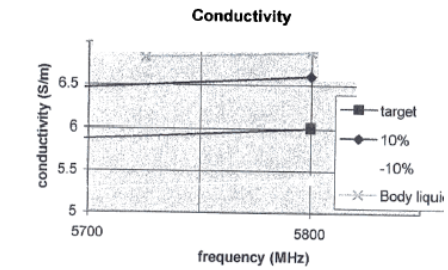
$\epsilon_r = 56.7 \pm 5\%$
 $\sigma = 0.94 \pm 5\% \text{ mho/m}$
(body tissue)

ES3DV2-SN:3019

October 13, 2003

Freq. (MHz)	Amplitude (dB)	Phase (deg)	Rel. Perm	Condy (S/m)	Freq. (MHz)	Rel. Perm.	Condy (S/m)
5725	-53.5	152	51	6.829	400	45.3	0.87
5800	-54	138	50.81	6.891	835	41.5	0.9
5825	-54.75	134	50.65	6.996	900	41.5	0.97
					1450	40.5	1.2
					1800	40	1.4
					2000	40	1.4
					2450	39.2	1.8
					3000	38.5	2.4
					5800	48.2	6
					400	49.83	0.96 10
					835	45.65	0.99 High %
					900	45.65	1.07
					1450	44.55	1.32
					1800	44.00	1.54
					2000	44.00	1.54
					2450	43.12	1.98
					3000	42.35	2.64
					5800	53.02	6.60
					400	40.77	0.78 10
					835	37.35	0.81 Low %
					900	37.35	0.87
					1450	36.45	1.08
					1800	36.00	1.26
					2000	36.00	1.26
					2450	35.28	1.62
					3000	34.65	2.16
					5800	43.38	5.4

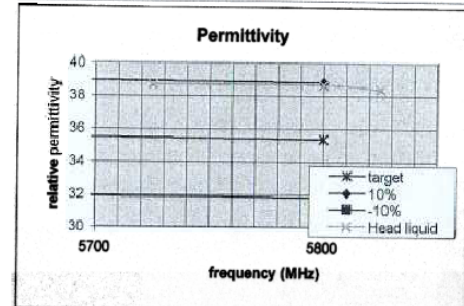
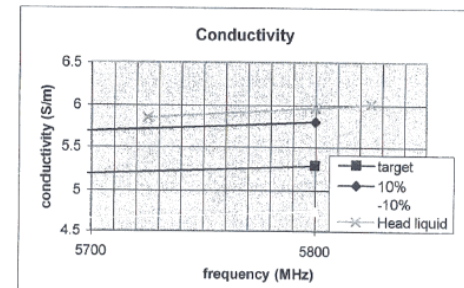
0



Freq. (MHz)	Amplitude (dB)	Phase (deg)	Rel. Perm	Condy (S/m)	Freq. (MHz)	Rel. Perm.	Condy (S/m)
5725	-51.65	-20.5	38.7	5.849	400	45.3	0.87
5800	-52.5	-35	38.68	5.959	835	41.5	0.9
5825	-53	-35.6	38.39	6.008	900	41.5	0.97
					1450	40.5	1.2
					1800	40	1.4
					2000	40	1.4
					2450	39.2	1.8
					3000	38.5	2.4
					5800	35.33	5.27
					400	49.83	0.96 10
					835	45.65	0.99 High %
					900	45.65	1.07
					1450	44.55	1.32
					1800	44.00	1.54
					2000	44.00	1.54
					2450	43.12	1.98
					3000	42.35	2.64
					5800	38.86	5.80
					400	40.77	0.78 10
					835	37.35	0.81 Low %
					900	37.35	0.87
					1450	36.45	1.08
					1800	36.00	1.26
					2000	36.00	1.26
					2450	35.28	1.62
					3000	34.65	2.16
					5800	31.797	4.743

5

0



3 - EUT DESCRIPTION

Transmitter Frequency:	5729.280 - 5808.128 MHz
Applicant:	LIONDA TECHNOLOGY COMPANY LIMITED
Product Description:	2.4GHz and 5.8GHz Cordless Phone, H/S Unit
FCC ID:	O63GH5850HDLD03
Maximum Output Power:	15.67 dBm (0.0369 W)
Dimension:	6.5"L x 2.0" W x 1.1" H
RF Exposure environment:	Population / Uncontrolled
Applicable Standard	FCC CFR 47, Part 15C
Application Type:	Certification

¹Specific Absorption Rate (SAR) is a measure of the rate of energy absorption due to exposure to an RF transmitting source (wireless portable device).

²IEEE/ANSI Std. C95.1-1992 limits are used to determine compliance with FCC ET Docket 93-62.

Note: The test data was good for test sample only. It may have deviation for other test samples.

4 - SYSTEM TEST CONFIGURATION

4.1 Justification

The system was configured for testing in a typical fashion (as normally used by a typical user).

4.2 EUT Exercise Procedure

The EUT exercising program used during SAR testing was designed to exercise the various system components in a manner similar to a typical use.

4.3 Special Accessories

All interface cables used for compliance testing are shielded. The EUT is featured shielded metal connectors.

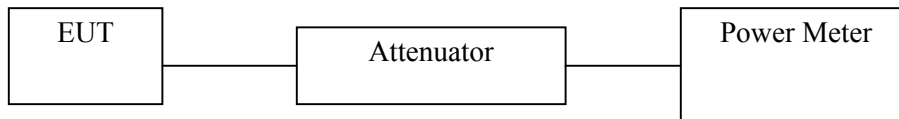
4.4 Equipment Modifications

No modification(s) were made to ensure that the EUT complies with the applicable limits.

5 - CONDUCTED OUTPUT POWER MEASUREMENT

5.1 Measurement Procedure

1. Place the EUT on a bench and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to a spectrum analyzer.
3. Add a correction factor to the display.



5.2 Test Results

Channel (MHz)	Output Power in dBm	Cable Loss dB	Corrected Output Power dBm	Output Power in W
5729.28	15.17	0.7	15.87	0.0386
5768.19	15.67	0.7	16.37	0.0434
5808.20	15.67	0.7	16.37	0.0434

Note: The power output may depend on the intended use of the EUT. For all tests, the EUT was set to maximum conditions.

