



Accredited testing laboratory

DAR registration number: TTI-P-G 166/98

**Federal Motor Transport Authority (KBA)
DAR registration number: KBA-P 00070-97**

Appendix to the Report 4-0834-1-1/03 additional calibration and validation information

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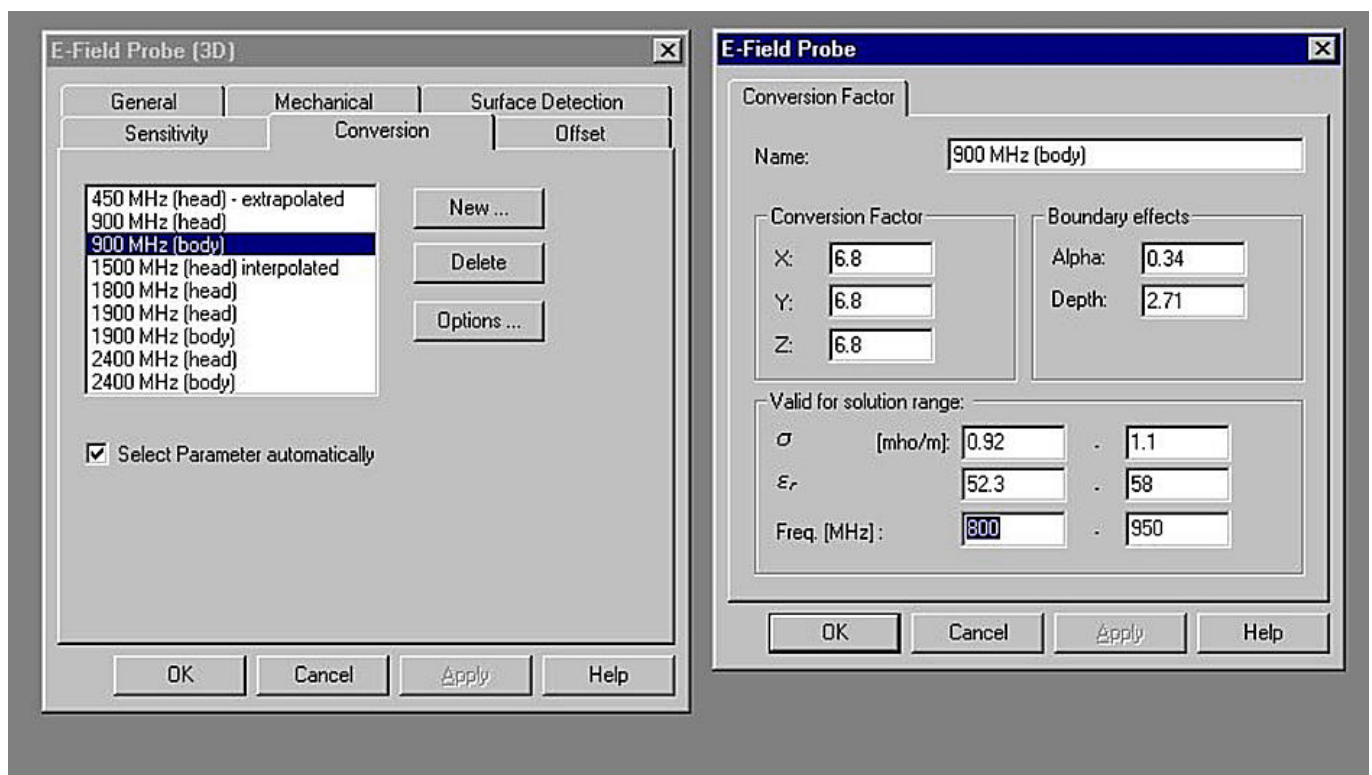
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1. Calibration information “Probe ET3DV6”

The document ,Calibration data and phantom information for test report no. 4-0834-1-1/03‘ contains calibration information to Probe S/N 1558 calibrated on March 22, 2002. It shows calibration factors for 900, 1800, 1900 and 2400MHz frequency bands. The 835 MHz frequency band as used by the Samsung SGH-S307 PCS phone is not explicitly mentioned.

Yet calibration data delivered by probe manufacturer Schmid & Partner include the 835 MHz band.

The following screenshot displaying original calibration file information shows that 900 MHz calibration covers the frequency band from 800 to 950 MHz.



Newer calibration documents issued by Schmid and Partner meanwhile include calibration information for both the 835 and 900 MHz band as shown on the following excerpt from the calibration document of probe no. 1559 dating from February 2003.

**Schmid & Partner
Engineering AG**

Zeughausstrasse 43, 8004 Zurich, Switzerland, Telephone +41 1 245 97 00, Fax +41 1 245 97 79

Probe ET3DV6

SN:1559

Manufactured:	December 1, 2000
Last calibration:	February 20, 2001
Recalibrated:	February 7, 2003

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

ET3DV6 SN:1559

February 7, 2003

DASY - Parameters of Probe: ET3DV6 SN:1559**Sensitivity in Free Space**

NormX	1.48 $\mu\text{V}/(\text{V}/\text{m})^2$
NormY	1.48 $\mu\text{V}/(\text{V}/\text{m})^2$
NormZ	1.46 $\mu\text{V}/(\text{V}/\text{m})^2$

Diode Compression

DCP X	100	mV
DCP Y	100	mV
DCP Z	100	mV

Sensitivity in Tissue Simulating Liquid

Head	900 MHz	$\epsilon_r = 41.5 \pm 5\%$	$\sigma = 0.97 \pm 5\% \text{ mho/m}$
Head	835 MHz	$\epsilon_r = 41.5 \pm 5\%$	$\sigma = 0.90 \pm 5\% \text{ mho/m}$
ConvF X	6.9 $\pm 9.5\%$ (k=2)	Boundary effect:	
ConvF Y	6.9 $\pm 9.5\%$ (k=2)	Alpha	0.31
ConvF Z	6.9 $\pm 9.5\%$ (k=2)	Depth	2.72

Head	1800 MHz	$\epsilon_r = 40.0 \pm 5\%$	$\sigma = 1.40 \pm 5\% \text{ mho/m}$
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ConvF X	5.5 $\pm 8.9\%$ (k=2)	Boundary effect:	
ConvF Y	5.5 $\pm 8.9\%$ (k=2)	Alpha	0.45
ConvF Z	5.5 $\pm 8.9\%$ (k=2)	Depth	2.85

Boundary Effect

Head	900 MHz	Typical SAR gradient: 5 % per mm		
Probe Tip to Boundary		1 mm	2 mm	
SAR _{be} [%]	Without Correction Algorithm	9.1	5.3	
SAR _{be} [%]	With Correction Algorithm	0.4	0.6	
Head	1800 MHz	Typical SAR gradient: 10 % per mm		
Probe Tip to Boundary		1 mm	2 mm	
SAR _{be} [%]	Without Correction Algorithm	13.6	9.7	
SAR _{be} [%]	With Correction Algorithm	0.3	0.3	

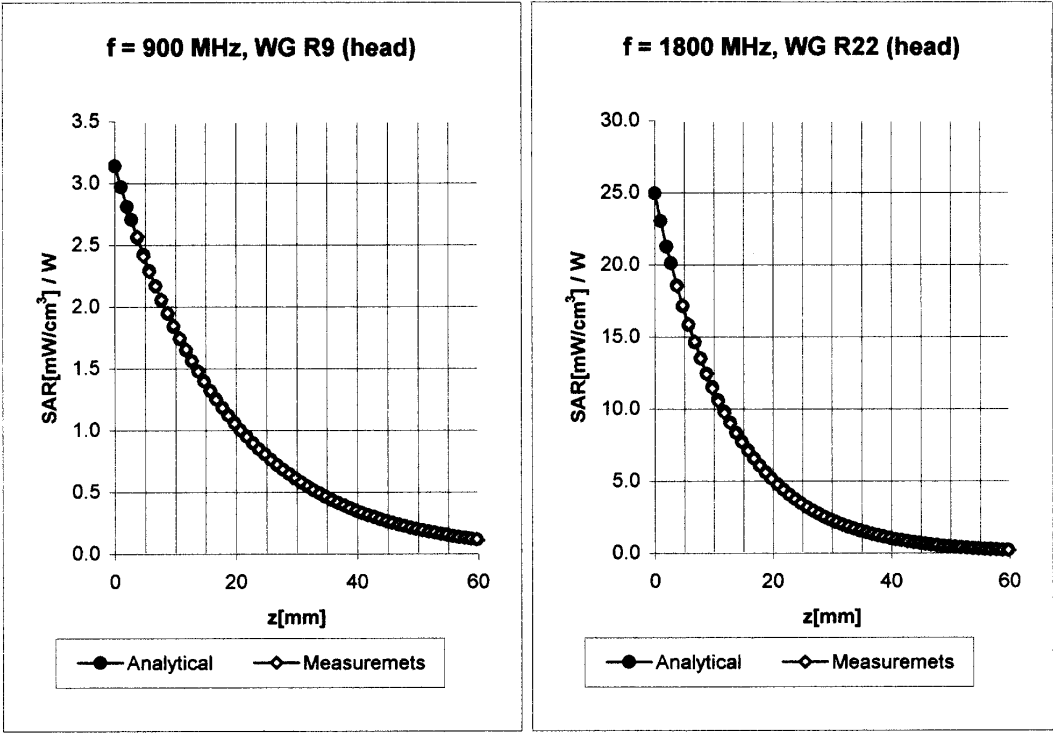
Sensor Offset

Probe Tip to Sensor Center	2.7	mm
Optical Surface Detection	1.9 $\pm$ 0.2	mm

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Conversion Factor Assessment



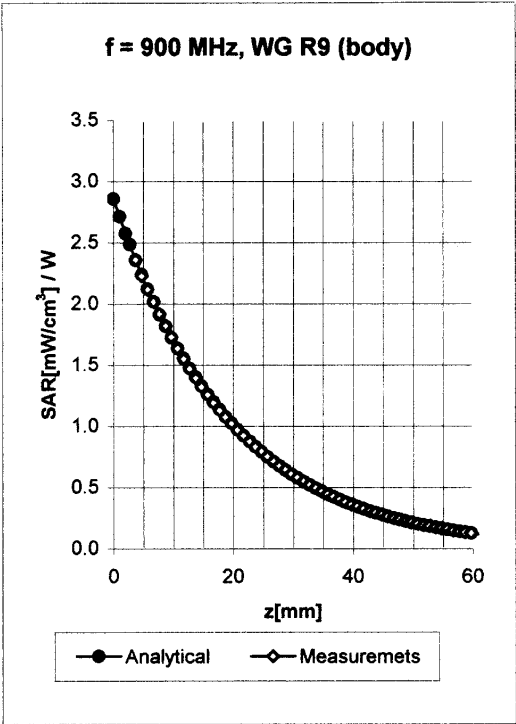
Head	900 MHz	$\epsilon_r = 41.5 \pm 5\%$	$\sigma = 0.97 \pm 5\%$ mho/m	
Head	835 MHz	$\epsilon_r = 41.5 \pm 5\%$	$\sigma = 0.90 \pm 5\%$ mho/m	
	ConvF X	6.9 ± 9.5% (k=2)	Boundary effect:	
	ConvF Y	6.9 ± 9.5% (k=2)	Alpha	0.31
	ConvF Z	6.9 ± 9.5% (k=2)	Depth	2.72

Head	1800 MHz	$\epsilon_r = 40.0 \pm 5\%$	$\sigma = 1.40 \pm 5\% \text{ mho/m}$
ConvF X	5.5 $\pm 8.9\%$ (k=2)	Boundary effect:	
ConvF Y	5.5 $\pm 8.9\%$ (k=2)	Alpha	0.45
ConvF Z	5.5 $\pm 8.9\%$ (k=2)	Depth	2.85

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Conversion Factor Assessment



Body	900 MHz	$\epsilon_r = 55.0 \pm 5\%$	$\sigma = 1.05 \pm 5\% \text{ mho/m}$
Body	835 MHz	$\epsilon_r = 55.2 \pm 5\%$	$\sigma = 0.97 \pm 5\% \text{ mho/m}$
ConvF X	6.8 $\pm 9.5\%$ (k=2)	Boundary effect:	
ConvF Y	6.8 $\pm 9.5\%$ (k=2)	Alpha	0.34
ConvF Z	6.8 $\pm 9.5\%$ (k=2)	Depth	2.71

2. Comparitive validation with a 900 MHz System validation dipole

For system validation it is generally recommended to use a validation dipole matched to the frequency band which is used by the device under test. At the date of test a special dipole for 835 MHz was not available so a standard dipole for 900 MHz was used. As this dipole has a poor return loss behaviour at 835 MHz (8 dB only) validation was performed at 900 MHz.

At the time of test the validation was performed using 835 MHz liquid parameters although calibration information of the dipole only gives reference data with 900 MHz liquids.

Though liquid parameters are similar and frequency difference is not too big an additional validation has been performed to allow a comparison between different set-ups.

The following pages contain validation results both with 835 MHz and with 900 MHz head and body liquids in order to show that similar results can be reached.

2.1. Tissue simulating liquids : parameters

Used Target Frequency	Target Head Tissue		Measured Head Tissue		Measured Date
	Permittivity	Conductivity [S/m]	Permittivity	Conductivity [S/m]	
835	41.5	0.90	43.0	0.93	2003-03-21
900	41.5	0.97	42.1	0.97	2003-03-21

Table 1: Parameter of the head tissue simulating liquid

Used Target Frequency	Target Body Tissue		Measured Body Tissue		Measured Date
	Permittivity	Conductivity [S/m]	Permittivity	Conductivity [S/m]	
835	55.2	0.97	57.7	1.01	2003-03-21
900	55.0	1.05	57.6	1.02	2003-03-21

Table 2: Parameter of the body tissue simulating liquid

The dielectric properties have been measured using the contact probe method at 20.8°C.

2.2. System validation results

Validation Kit	Liquid	Target Peak SAR (1000 mW) (+/- 10%)	Target SAR _{1g} (1000 mW) (+/- 10%)	Measured Peak SAR	Measured SAR _{1g}	Measured date
D900V2 S/N: 102	900 MHz head	15.8 mW/g	10.6 mW/g	17.2 mW/g	11.1 mW/g	2003-03-21
D900V2 S/N: 102	835 MHz head	not defined	not defined	16.8 mW/g	10.6 mW/g	2003-03-21
D900V2 S/N: 102	900 MHz body	16.2 mW/g	11.1 mW/g	17.0 mW/g	10.9 mW/g	2003-03-21
D900V2 S/N: 102	835 MHz body	not defined	not defined	17.3 mW/g	11.1 mW/g	2003-03-21

