Research In Motion Limited
295 Phillip Street
Waterloo, Ontario
Canada N2L 3W8
+1 519 888 7465, fax +1 519 888 6906
E-mail: info@rim.net

Our Ref: 03758-CERT-CORRESP_23528 August 13, 2002

Mr. Andy Leimer
Federal Communications Commission,
Equipment Authorization Division
Application Processing Branch
7435 Oakland Mills Road
Columbia, MD 21045

Subject: Response to the FCC CRN **23528** for additional information on BlackBerry R6510IN Wireless Handheld FCC ID **L6AR6510IN**, 731 Confirmation # **EA218687**

ITEM 1:
Please refer to Appendix A for the new calibrated muscle tissue conversion factor data.

1.1 System accuracy verification for head use

f (MHz)	Limits / Measured	SAR (W/kg) 1 g/ 10g	Dielectric Parameters		Ambient Temp (°C)	Liquid Temp (°C)
			ε_r	σ [S/m]		
835	Measured	11.5 / 7.2	41.2	0.90	22.6	21.5
	Recommended Limits	10.7 / 6.8	42.3	0.91	N/A	N/A

Table 1. System accuracy (validation for head use)

1.2 Dielectric parameter measurements for 835 MHz head and muscle tissue

Title SubTitle August 02, 2002 01:37 PM			Title SubTitle August 02, 2002 10:24 AM		
Frequency	e'	e"	Frequency	e'	e"
800.000000 MHz	41.6850	19.5206	800.000000 MHz	57.2087	21.4647
805.000000 MHz	41.6543	19.4833	805.000000 MHz	57.1962	21.4539
810.000000 MHz	41.5826	19.5115	810.000000 MHz	57.1408	21.4478
815.000000 MHz	41.5121	19.4802	815.000000 MHz	57.0902	21.4059
820.000000 MHz	41.4450	19.4378	820.000000 MHz	57.0624	21.4066
825.000000 MHz	41.3820	19.4268	825.000000 MHz	57.0028	21.3799
830.000000 MHz	41.3452	19.4300	830.000000 MHz	56.9932	21.3344
835.000000 MHz	41.2506	19.4492	835.000000 MHz	56.8833	21.3167
840.000000 MHz	41.2063	19.3813	840.000000 MHz	56.8287	21.3226
845.000000 MHz	41.1184	19.3784	845.000000 MHz	56.8136	21.3130
850.000000 MHz	41.0605	19.3674	850.000000 MHz	56.7556	21.2762
855.000000 MHz	40.9968	19.3686	855.000000 MHz	56.6798	21.2468
860.000000 MHz	40.9273	19.3101	860.000000 MHz	56.6419	21.2138
865.000000 MHz	40.8439	19.3073	865.000000 MHz	56.5786	21.2238
870.000000 MHz	40.8047	19.3126	870.000000 MHz	56.5174	21.1681
875.000000 MHz	40.7555	19.2802	875.000000 MHz	56.4629	21.1535
880.000000 MHz	40.6579	19.2522	880.000000 MHz	56.4261	21.1534
885.000000 MHz	40.6158	19.2388	885.000000 MHz	56.3681	21.1512
890.000000 MHz	40.5885	19.2562	890.000000 MHz	56.3258	21.1321
895.000000 MHz	40.5449	19.1987	895.000000 MHz	56.3207	21.0980
900.000000 MHz	40.4854	19.1861	900.000000 MHz	56.2760	21.0432
905.000000 MHz	40.4390	19.1650	905.000000 MHz	56.2391	21.0436
910.000000 MHz	40.4019	19.1562	910.000000 MHz	56.2158	21.0488
915.000000 MHz	40.3461	19.1481	915.000000 MHz	56.1579	21.0318
920.000000 MHz	40.3117	19.1436	920.000000 MHz	56.1346	20.9953

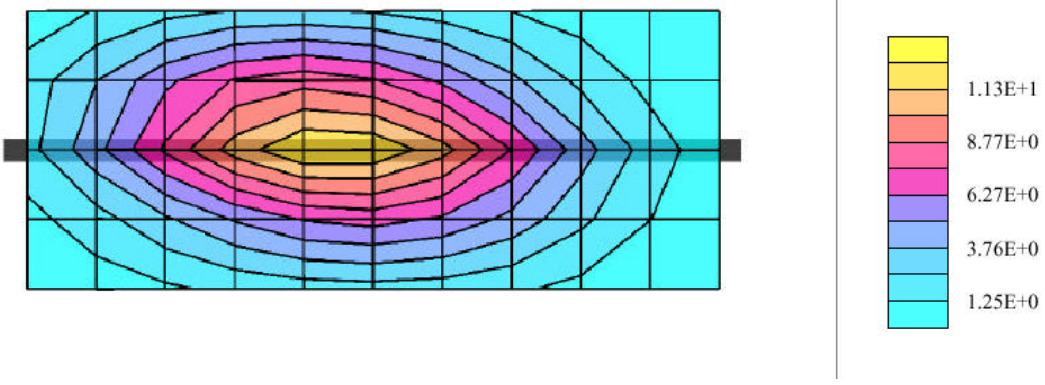
Table 2. 835 MHz head and muscle tissue dielectric parameters

1.3 Dipole validation SAR plot for 835 MHz head tissue

08/02/02

Dipole 835
SAM 1; Flat
Probe: ET3DV6 - SN1642; ConvF(6.50,6.50,6.50); Crest factor: 1.0; Head 835 MHz: σ = 0.90 mho/m ε_r = 41.3 ρ = 1.00 g/cm^3
Cube 5x5x7: Peak: 19.1 mW/g, SAR (1g): 11.5 mW/g, SAR (10g): 7.23 mW/g, (Worst-case extrapolation)
Penetration depth: 11.4 (9.7, 13.6) [mm]
Powerdrift: -0.06 dB

Tested on August 2nd, 2002
Ambient temperature: 22.6 deg. cel.
Liquid temperature: 21.4 deg. cel.



1.4 SAR Measurement results at highest power measured against the body using Holster

Mode	f (MHz)	Conducted pulse average power (dBm)	Antenna Configuration	Chamber Temp. (°C)	Liquid Temp. (°C)	SAR, averaged over 1 g (W/kg)
TDMA	806.0125	28.35	retracted	22.5	20.8	**0.43**
	806.0125	28.35	extended	22.6	20.8	0.26
	815.5000	28.35	retracted	22.7	20.9	0.39
	815.5000	28.35	extended	22.7	20.9	-
	824.9880	28.45	retracted	22.8	21.0	0.31
	824.9880	28.45	extended	22.8	21.0	-

Table 3. SAR results with holster for body configuration

1.5 SAR Measurement results at highest power measured for hand.

Mode	f (MHz)	Conducted pulse average power (dBm)	Device Config. Touching Phantom	Antenna Config.	Chamber Temp. (°C)	Liquid Temp. (°C)	SAR, averaged over 10 g (W/kg)
TDMA	806.0125	28.35	Back side	retracted	22.9	21.0	0.76
	806.0125	28.35	Back side	extended	23.0	21.0	0.70
	815.5000	28.35	Back side	retracted	23.0	21.0	**1.14**
	815.5000	28.35	Back side	extended	23.0	21.0	-
	824.9880	28.45	Back side	retracted	23.0	21.0	-
	824.9880	28.45	Back side	extended	23.0	21.0	-
	806.0125	28.35	Left edge	retracted	23.1	21.1	1.12
	806.0125	28.35	Left edge	extended	23.1	21.1	0.53
	815.5000	28.35	Left edge	retracted	22.8	21.0	1.06
	815.5000	28.35	Left edge	extended	22.8	21.0	-
	824.9880	28.45	Left edge	retracted	22.8	21.0	-
	824.9880	28.45	Left edge	extended	22.8	21.0	-

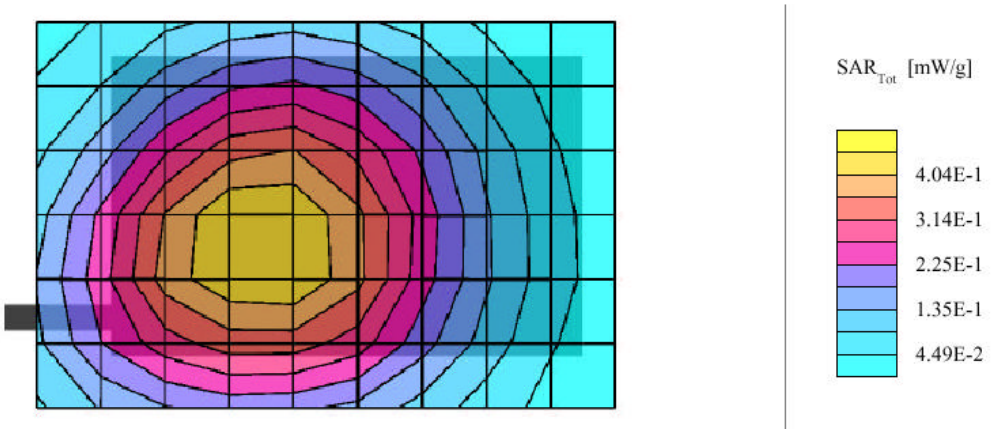
Table 4. SAR results for hand configuration

1.6 Body-worn SAR plot with the calibrated muscle conversion factor

08/02/02

BlckBerry Wireless Handheld Model No. R6510IN
SAM 2; Flat
Probe: ET3DV6 - SN1642; ConvF(6.40,6.40,6.40); Crest factor: 3.0; Muscle 835 MHz: σ = 0.99 mho/m ε_r = 56.9 ρ = 1.00 g/cm^3
Cube 5x5x7: Peak: 0.630 mW/g, SAR (1g): 0.425 mW/g, SAR (10g): 0.313 mW/g, (Worst-case extrapolation)
Penetration depth: 17.3 (14.3, 20.8) [mm]
Powerdrift: -0.19 dB

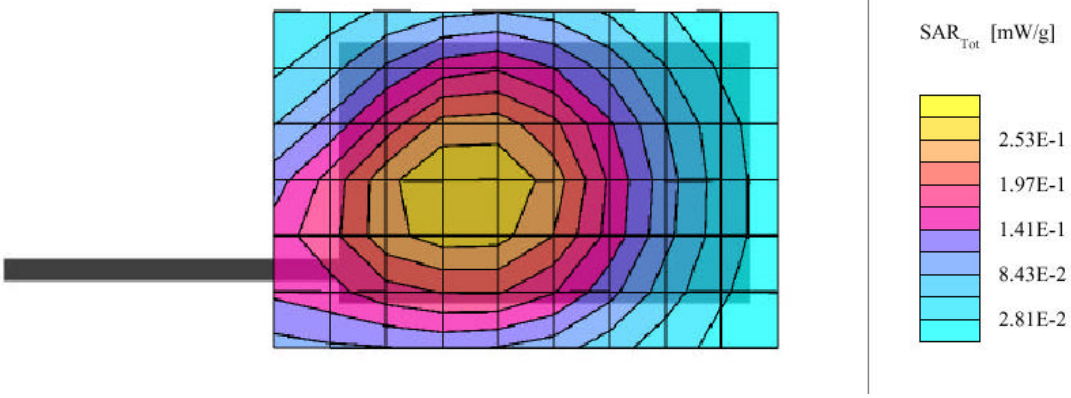
Tested on: August 2nd, 2002
Ambient temperature: 22.5 deg. cel.
Liquid temperature: 20.8 deg. cel.
Body worn with holster
Retracted antenna
Frequency: 806.0125 MHz



BlckBerry Wireless Handheld Model No. R6510IN

SAM 2; Flat
Probe: ET3DV6 - SN1642; ConvF(6.40,6.40,6.40); Crest factor: 3.0; Muscle 835 MHz: σ = 0.99 mho/m ε_r = 56.9 ρ = 1.00 g/cm^3
Cube 5x5x7: Peak: 0.388 mW/g, SAR (1g): 0.263 mW/g, SAR (10g): 0.193 mW/g, (Worst-case extrapolation)
Penetration depth: 17.4 (13.6, 21.5) [mm]
Powerdrift: -0.29 dB

Tested on: August 2nd, 2002
Ambient temperature: 22.5 deg. cel.
Liquid temperature: 20.8 deg. cel.
Body worn with holster
Extended antenna
Frequency: 806.0125 MHz



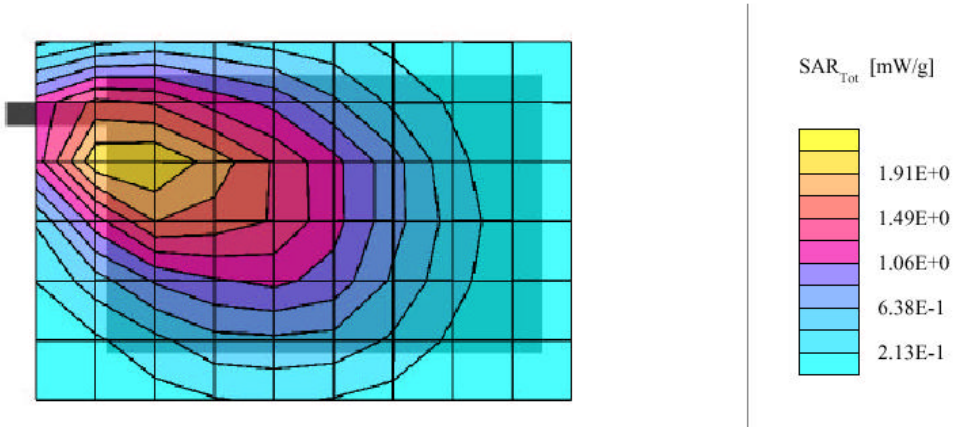
1.7 Hand SAR plots with the calibrated muscle conversion

08/02/02

BlckBerry Wireless Handheld Model No. R6510IN

SAM 2; Flat
Probe: ET3DV6 - SN1642; ConvF(6.40,6.40,6.40); Crest factor: 3.0; Muscle 835 MHz: σ = 0.99 mho/m ε_r = 56.9 ρ = 1.00 g/cm^3
Cube 5x5x7: Peak: 3.36 mW/g, SAR (1g): 1.85 mW/g, SAR (10g): 1.14 mW/g, (Worst-case extrapolation)
Penetration depth: 10.3 (9.6, 11.5) [mm]
Powerdrift: -0.22 dB

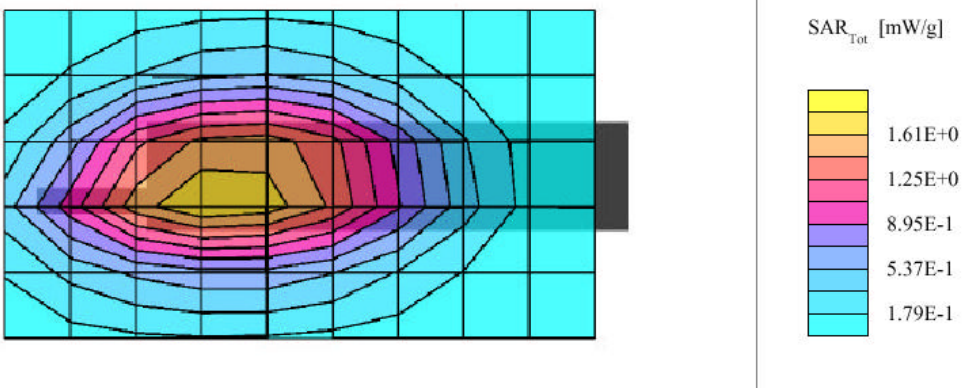
Tested on: August 2nd, 2002
Ambient temperature: 23.0 deg. cel.
Liquid temperature: 21.0 deg. cel.
Hand SAR, device back touching flat phantom
Retracted antenna
Frequency: 815.500 MHz



BlckBerry Wireless Handheld Model No. R6510IN

SAM 2; Flat
Probe: ET3DV6 - SN1642; ConvF(6.40,6.40,6.40); Crest factor: 3.0; Muscle 835 MHz: σ = 0.99 mho/m ε_r = 56.9 ρ = 1.00 g/cm^3
Cube 5x5x7: Peak: 2.99 mW/g, SAR (1g): 1.78 mW/g, SAR (10g): 1.12 mW/g, (Worst-case extrapolation)
Penetration depth: 11.9 (9.8, 14.9) [mm]
Powerdrift: -0.16 dB

Tested on: August 2nd, 2002
Ambient temperature: 23.0 deg. cel.
Liquid temperature: 21.1 deg. cel.
Hand SAR, device left edge touching flat pahntom
Retracted antenna
Frequency: 806.0125 MHz



ITEM 2:
New SAR data and plots with the date and temperature:

2.1 System accuracy verification for head use

f (MHz)	Limits / Measured	SAR (W/kg) 1 g/ 10g	Dielectric Parameters		Ambient Temp (°C)	Liquid Temp (°C)
			ε_r	σ [S/m]		
835	Measured	11.3 / 7.2	41.6	0.92	21.5	20.5
	Recommended Limits	10.7 / 6.8	42.3	0.91	N/A	N/A

Table 5. System accuracy (validation for head use)

2.2 Dielectric parameter measurements for 835 MHz head tissue

Title
SubTitle
August 01, 2002 08:59 AM

Frequency	e'	e''
800.000000 MHz	41.9472	19.8863
805.000000 MHz	41.9141	19.8416
810.000000 MHz	41.8566	19.8635
815.000000 MHz	41.8169	19.8481
820.000000 MHz	41.7490	19.8247
825.000000 MHz	41.7052	19.8269
830.000000 MHz	41.6743	19.8151
835.000000 MHz	41.6093	19.7918
840.000000 MHz	41.5411	19.7908
845.000000 MHz	41.4932	19.7843
850.000000 MHz	41.3982	19.7913
855.000000 MHz	41.3633	19.7504
860.000000 MHz	41.2474	19.7486
865.000000 MHz	41.1547	19.7508
870.000000 MHz	41.0970	19.7280
875.000000 MHz	41.0093	19.7040
880.000000 MHz	40.9041	19.6856
885.000000 MHz	40.8390	19.6964
890.000000 MHz	40.7859	19.6938
895.000000 MHz	40.7551	19.6449
900.000000 MHz	40.6626	19.6544
905.000000 MHz	40.6426	19.6377
910.000000 MHz	40.5974	19.6336
915.000000 MHz	40.5359	19.6051
920.000000 MHz	40.4802	19.6095

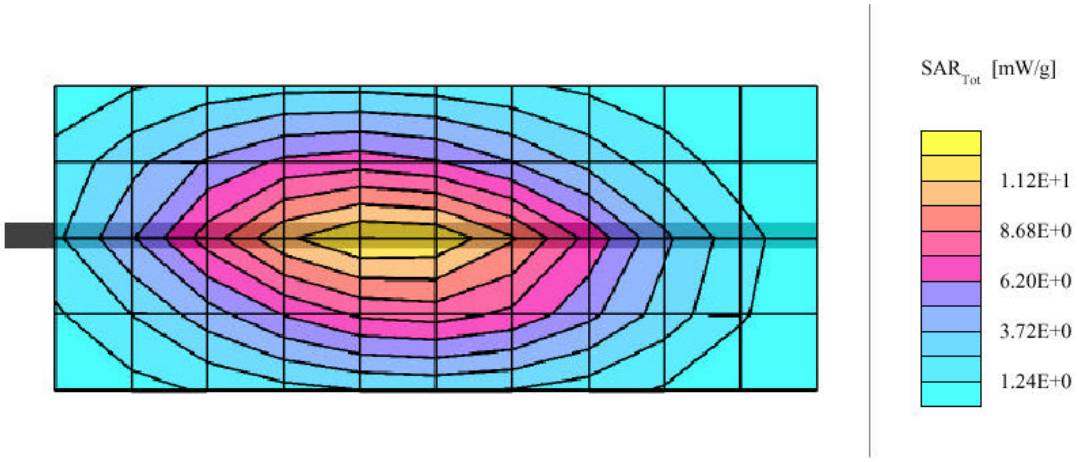
Table 6. 835 MHz head tissue dielectric parameters

2.3 Dipole validation SAR plot for 835 MHz head tissue

08/01/02

Dipole 835
SAM 1; Flat
Probe: ET3DV6 - SN1644; ConvF(6.51,6.51,6.51); Crest factor: 1.0; Head 835 MHz: σ = 0.92 mho/m ε_r = 41.6 ρ = 1.00 g/cm^3
Cube 5x5x7: Peak: 18.4 mW/g, SAR (1g): 11.3 mW/g, SAR (10g): 7.16 mW/g, (Worst-case extrapolation)
Penetration depth: 11.6 (10.2, 13.5) [mm]
Powerdrift: 0.05 dB

Tested on August 1st, 2002
Room Temperature: 21.5 deg. cel.
Liquid Temperature: 20.5 deg. cel.

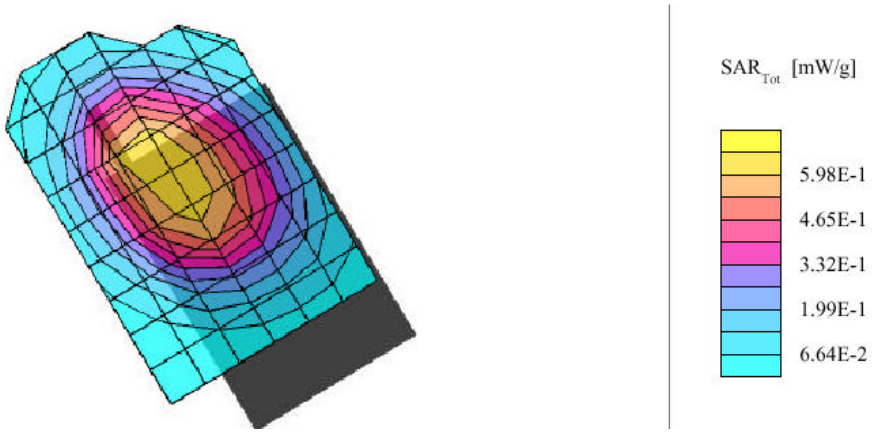


2.4 New head SAR plots with date and temperature

08/01/02

BlckBerry Wireless Handheld Model No. R6510IN
SAM 1; Righ Hand
Probe: ET3DV6 - SN1644; ConvF(6.51,6.51,6.51); Crest factor: 3.0; Head 835 MHz: σ = 0.92 mho/m ε_r = 41.6 ρ = 1.00 g/cm^3
Cube 5x5x7: Peak: 1.35 mW/g, SAR (1g): 0.865 mW/g, SAR (10g): 0.593 mW/g * Max outside, (Worst-case extrapolation)
Penetration depth: 12.6 (11.0, 14.7) [mm]
Powerdrift: -0.26 dB

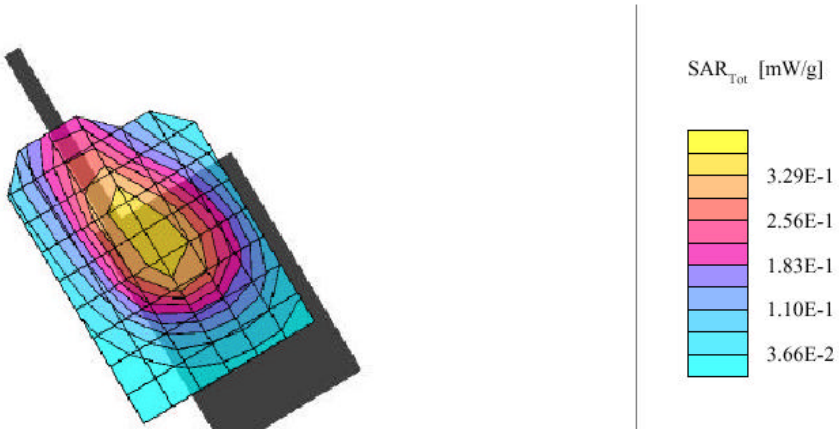
Tested on August 1st, 2002
Room Temperature: 21.8 deg. cel.
Liquid Temperature: 20.6 deg. cel.
Touch right side of head
Retracted antenna
Frequency: 806.0125 MHz



BlackBerry Wireless Handheld Model No. R6510IN

SAM 1; Righ Hand
Probe: ET3DV6 - SN1644; ConvF(6.51,6.51,6.51); Crest factor: 3.0; Head 835 MHz: σ = 0.92 mho/m ε_r = 41.6 ρ = 1.00 g/cm^3
Cube 5x5x7: Peak: 0.699 mW/g, SAR (1g): 0.486 mW/g * , SAR (10g): 0.354 mW/g * Max outside, (Worst-case extrapolation)
Penetration depth: 17.9 (16.2, 19.6) [mm]
Powerdrift: -0.37 dB

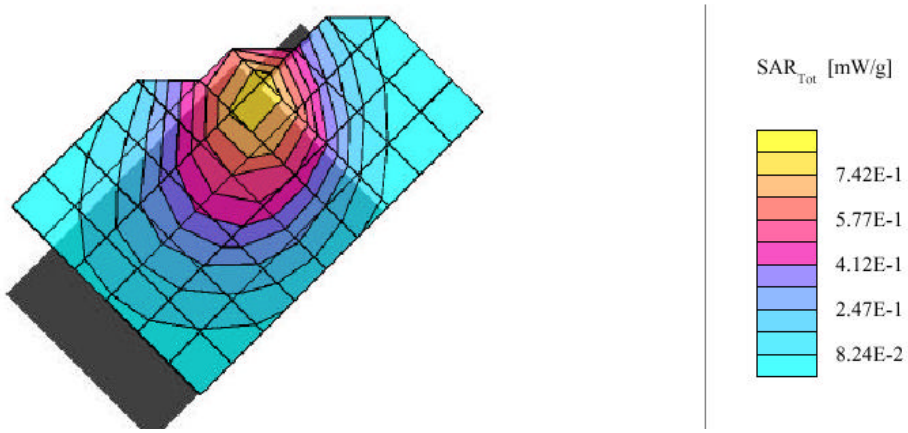
Tested on August 1st, 2002
Room Temperature: 21.8 deg. cel.
Liquid Temperature: 20.6 deg. cel.
Touch right side of head
Extended antenna
Frequency: 806.0125 MHz



BlckBerry Wireless Handheld Model No. R6510IN

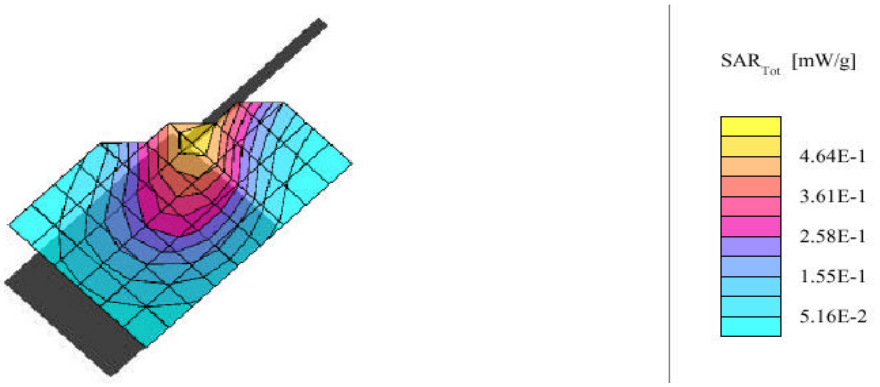
SAM 1; Left Hand
Probe: ET3DV6 - SN1644; ConvF(6.51,6.51,6.51); Crest factor: 3.0; Head 835 MHz: $\sigma = 0.92$ mho/m $\varepsilon_r = 41.6$ $\rho = 1.00$ g/cm^3
Cube 5x5x7: Peak: 1.35 mW/g, SAR (1g): 0.838 mW/g, SAR (10g): 0.557 mW/g, (Worst-case extrapolation)
Penetration depth: 13.4 (11.0, 16.4) [mm]
Powerdrift: -0.16 dB

Tested on August 1st, 2002
Room Temperature: 22.5 deg. cel.
Liquid Temperature: 21.0 deg. cel.
Tilted left side of head
Retracted antenna
Frequency: 806.0125 MHz



BlckBerry Wireless Handheld Model No. R6510IN
SAM 1; Left Hand
Probe: ET3DV6 - SN1644; ConvF(6.51,6.51,6.51); Crest factor: 3.0; Head 835 MHz: σ = 0.92 mho/m ε_r = 41.6 ρ = 1.00 g/cm^3
Cube 5x5x7: Peak: 0.766 mW/g, SAR (1g): 0.497 mW/g, SAR (10g): 0.340 mW/g, (Worst-case extrapolation)
Penetration depth: 14.1 (12.3, 16.5) [mm]
Powerdrift: -0.06 dB

Tested on August 1st, 2002
Room Temperature: 22.5 deg. cel.
Liquid Temperature: 21.0 deg. cel.
Tilted left side of head
Extended antenna
Frequency: 806.0125 MHz



ITEM 3:
The 1.58 W is the ERP measurement which is the radiated peak power measured with a tuned dipole antenna and a Spectrum Analyzer in peak detector mode.
However, the 0.7 W is the maximum pulse average RF conducted power measured directly at the output port of the device.

When the transmitter is ON in its assigned time slot, the RF power of the tx signal averaged over the duration of the tx slot is lower than the peak power.

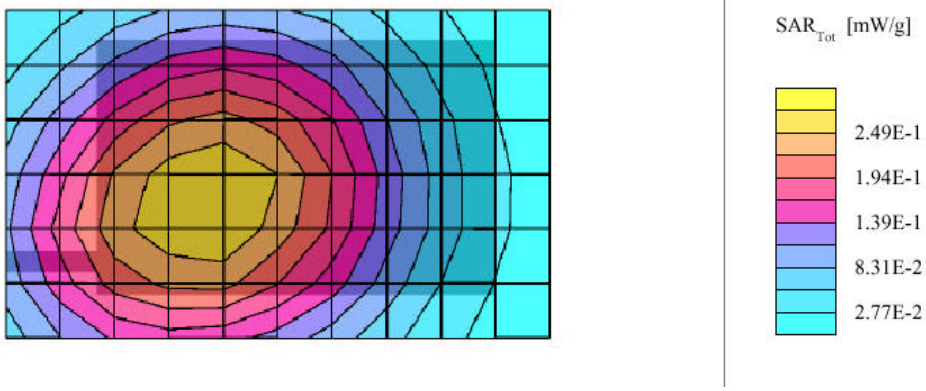
ITEM 4:
The Push-To-Talk feature (Dispatch mode) that we will be operating differs from other iDEN phones. We do not have a "high audio speaker" that would allow the device to be used as a walkie-talkie (ie speaking into the speaker in front of the face). For the Dispatch mode, we will use the phone as a normal interconnect call because the speaker will require you to hold it to your ear in a normal fashion.

Despite the fact that this device is not held to the face, the SAR tests for face were performed with a 2.5 cm separation distance from the flat phantom and the SAR plots are shown below. Please refer to Appendix B for set up photos.

BlckBerry Wireless Handheld Model No. R6510IN

SAM 1; Flat
Probe: ET3DV6 - SN1644; ConvF(6.51,6.51,6.51); Crest factor: 3.0; Head 835 MHz: $\sigma = 0.92$ mho/m $\varepsilon_r = 41.6$ $\rho = 1.00$ g/cm^3
Cube 5x5x7: Peak: 0.379 mW/g, SAR (1g): 0.262 mW/g, SAR (10g): 0.191 mW/g, (Worst-case extrapolation)
Penetration depth: 17.0 (14.3, 19.7) [mm]
Powerdrift: -0.52 dB

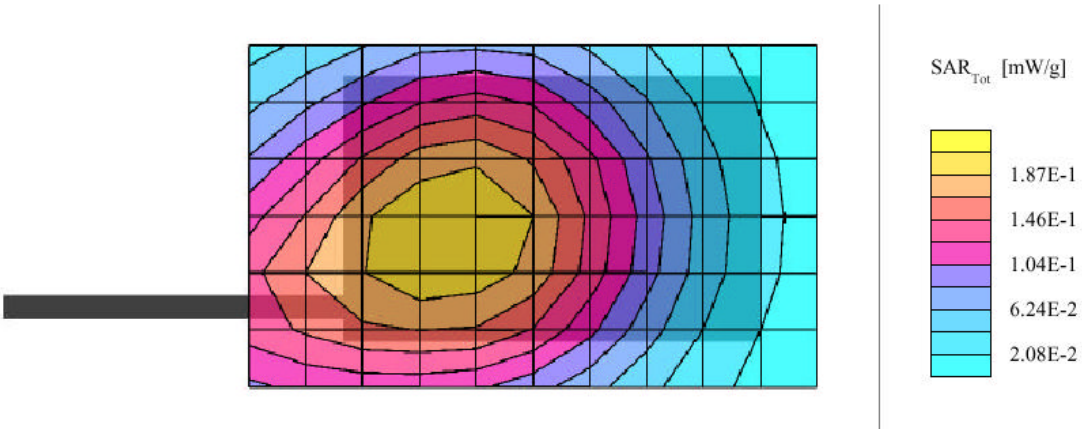
Tested on August 1st, 2002
Room Temperature: 22.5 deg. cel.
Liquid Temperature: 21.0 deg. cel.
Face SAR, device 2.5 cm away from flat section of phantom
Retracted antenna
Frequency: 815.500 MHz



BlckBerry Wireless Handheld Model No. R6510IN

SAM 1; Flat
Probe: ET3DV6 - SN1644; ConvF(6.51,6.51,6.51); Crest factor: 3.0; Head 835 MHz: $\sigma = 0.92$ mho/m $\varepsilon_r = 41.6$ $\rho = 1.00$ g/cm^3
Cube 5x5x7: Peak: 0.294 mW/g, SAR (1g): 0.205 mW/g, SAR (10g): 0.150 mW/g, (Worst-case extrapolation)
Penetration depth: 16.8 (15.9, 17.9) [mm]
Powerdrift: 0.09 dB

Tested on August 1st, 2002
Room Temperature: 22.5 deg. cel.
Liquid Temperature: 21.0 deg. cel.
Face SAR, device 2.5 cm away from flat section of phantom
Extended antenna
Frequency: 815.500 MHz



I trust that your questions have been fully answered, however if further clarification is required please do not hesitate to contact the undersigned.

Yours truly,

Masud S. Attayi, P.Eng.
Senior Engineer, Compliance & Certification
Research In Motion Limited
Tel: +1 519 888–7465 x2442
Fax:+1 519 888-6906
Email: mattayi@rim.net
Web: www.rim.net
Web: www.blackberry.net

APPRENDIX A: PROBE CALIBRATION

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:	1642
Place of Calibration:	Zurich
Date of Calibration:	July 26, 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:	U. Kellel
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:1642

Manufactured:	November 7, 2001
Last calibration:	November 26, 2001
Recalibrated:	July 26, 2002

Calibrated for System DASY3

DASY3 - Parameters of Probe: ET3DV6 SN:1642

Sensitivity in Free Space

Diode Compression

NormX	1.62 $\mu V/(V/m)^2$	DCP X	96	mV
NormY	1.85 $\mu V/(V/m)^2$	DCP Y	96	mV
NormZ	1.61 $\mu V/(V/m)^2$	DCP Z	96	mV

Sensitivity in Tissue Simulating Liquid

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

ConvF X	6.5 ± 8.9% (k=2)	Boundary effect:	
ConvF Y	6.5 ± 8.9% (k=2)	Alpha	0.34
ConvF Z	6.5 ± 8.9% (k=2)	Depth	2.68

Head **1800 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	0.53
ConvF Z	5.4 ± 8.9% (k=2)	Depth	2.33

Boundary Effect

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

Probe Tip to Boundary		1 mm	2 mm
SAR_{be} [%]	Without Correction Algorithm	9.9	5.7
SAR_{be} [%]	With Correction Algorithm	0.4	0.5

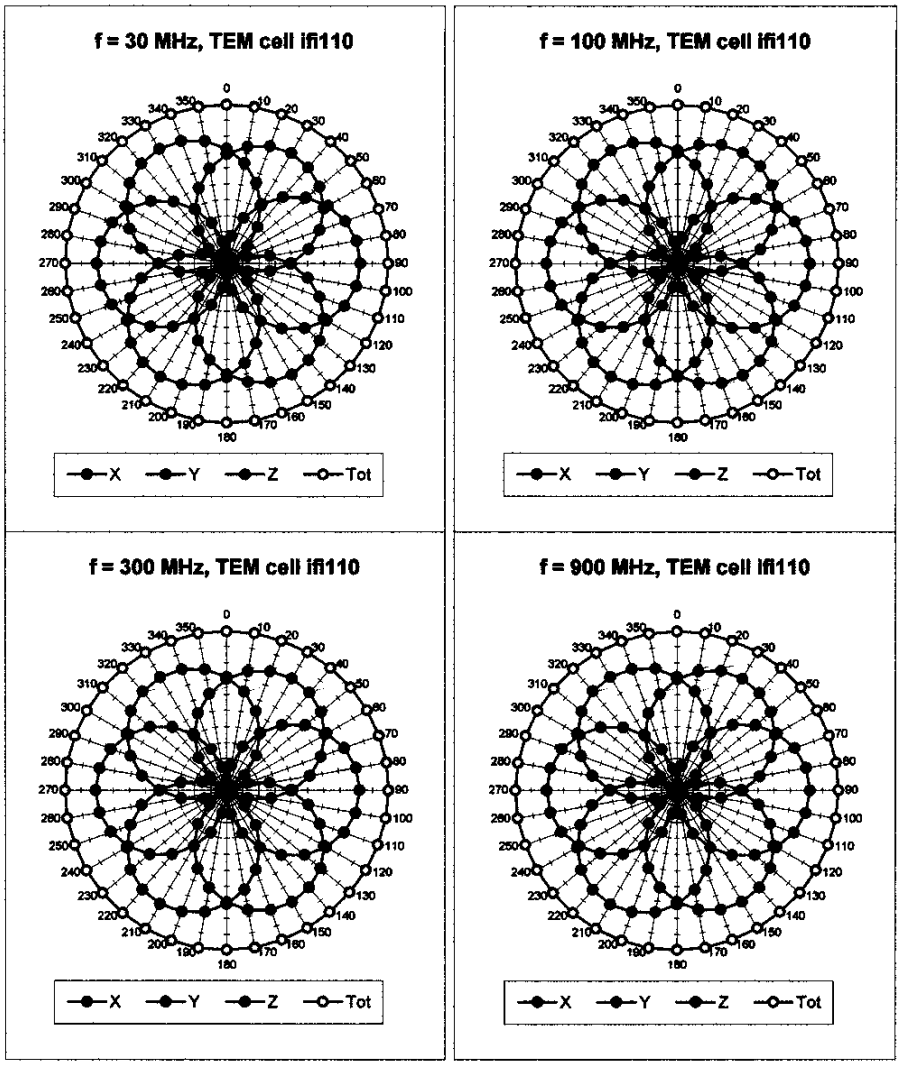
Head **1800 MHz** **Typical SAR gradient: 10 % per mm**

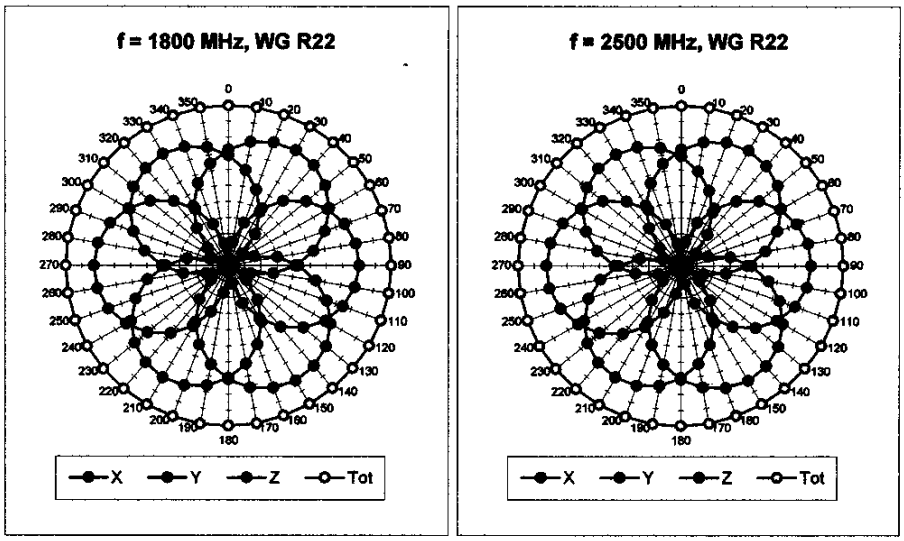
Probe Tip to Boundary		1 mm	2 mm
SAR_{be} [%]	Without Correction Algorithm	12.0	7.8
SAR_{be} [%]	With Correction Algorithm	0.2	0.2

Sensor Offset

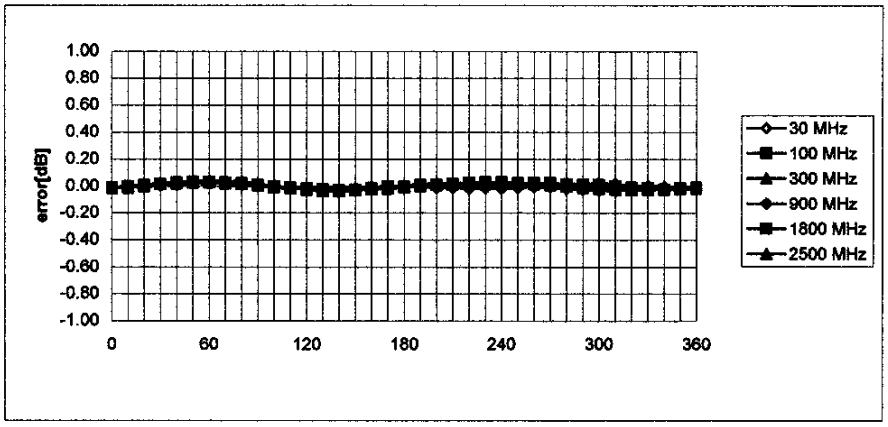
Probe Tip to Sensor Center	2.7	mm
Optical Surface Detection	1.1 ± 0.2	mm

Receiving Pattern (ϕ), θ = 0°



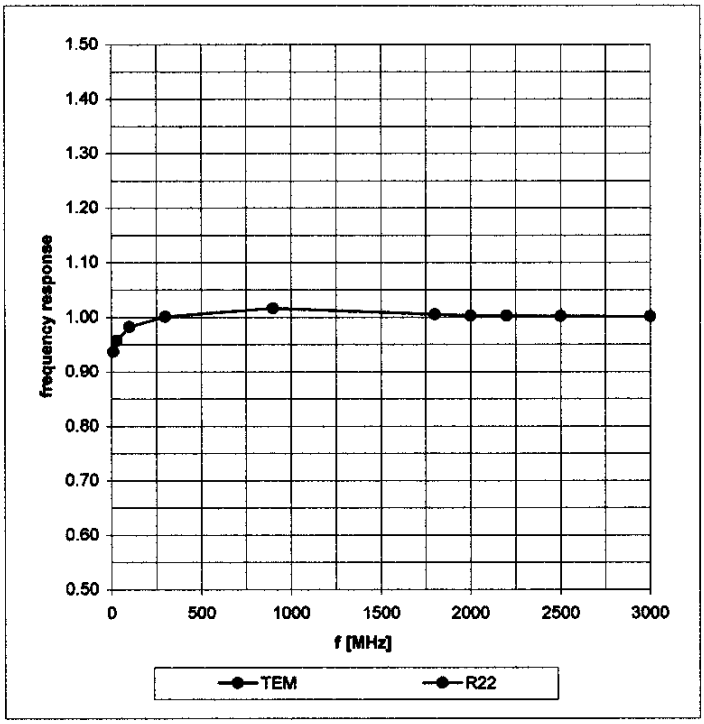


Isotropy Error (ϕ), θ = 0°



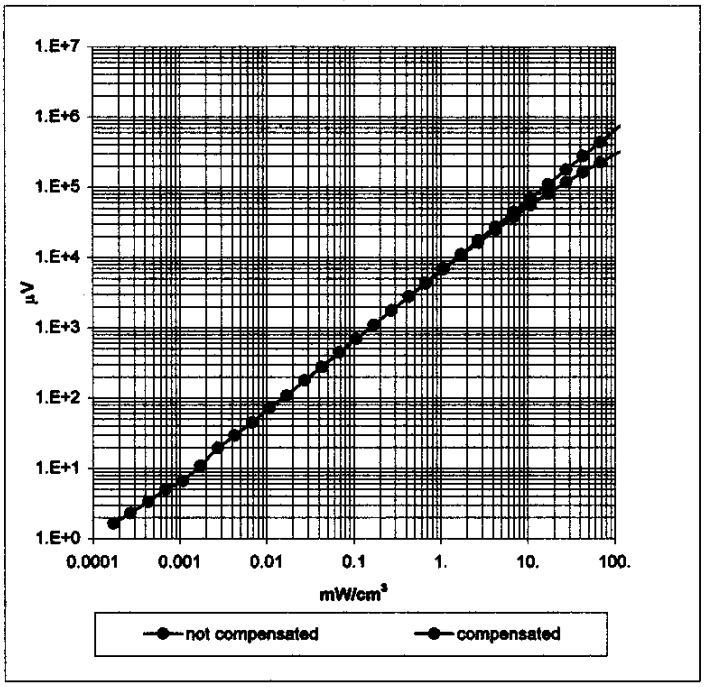
Frequency Response of E-Field

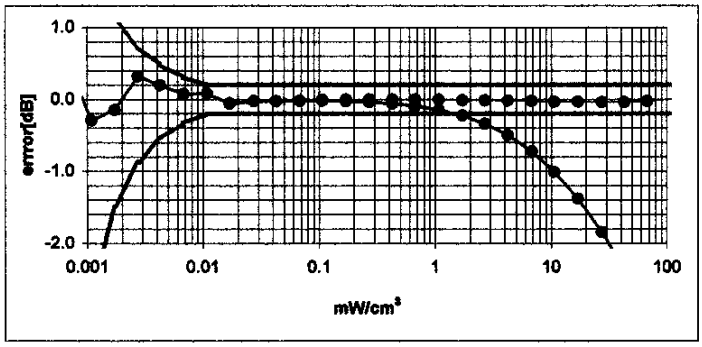
(TEM-Cell:ifi110, Waveguide R22)



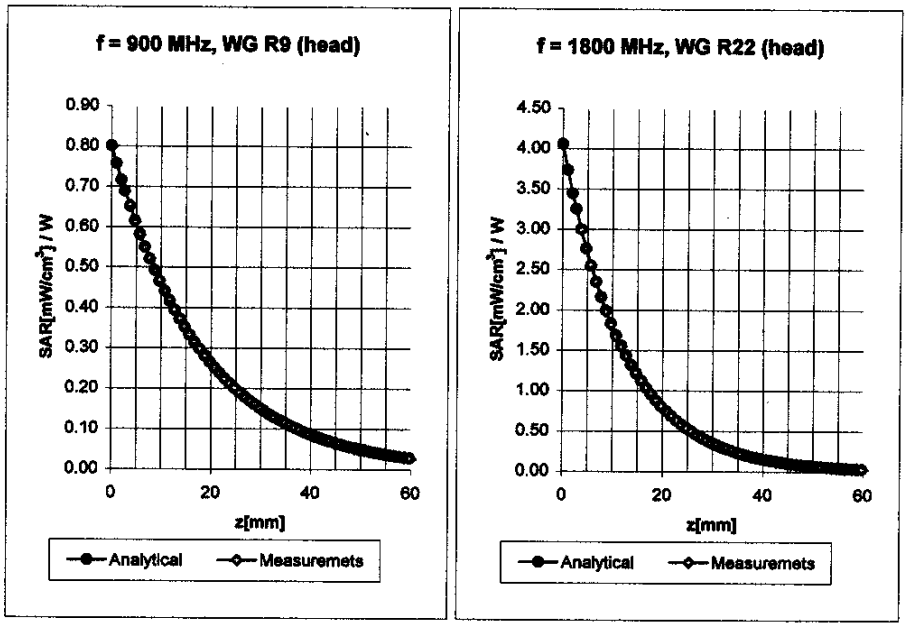
Dynamic Range f(SAR_{brain})

(Waveguide R22)





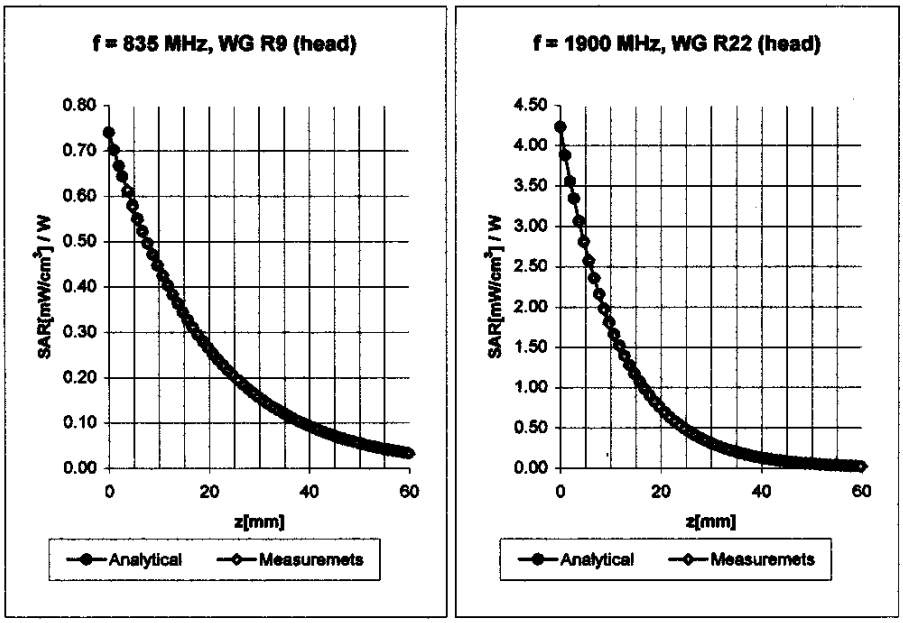
Conversion Factor Assessment



Head	900 MHz	ε_r = 41.5 ± 5%	σ = 0.97 ± 5% mho/m
ConvF X	6.5 ± 8.9% (k=2)	Boundary effect:	
ConvF Y	6.5 ± 8.9% (k=2)	Alpha	0.34
ConvF Z	6.5 ± 8.9% (k=2)	Depth	2.68

Head	1800 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	0.53
ConvF Z	5.4 ± 8.9% (k=2)	Depth	2.33

Conversion Factor Assessment



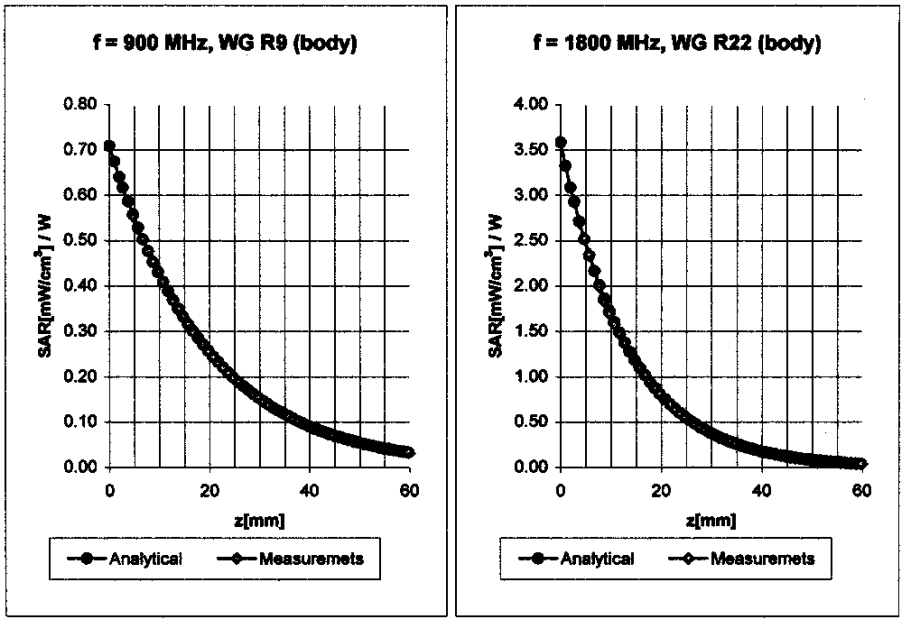
Head **835 MHz** ε_r = 41.5 ± 5% σ = 0.90 ± 5% mho/m

ConvF X	**6.5** ± 8.9% (k=2)	Boundary effect:	
ConvF Y	**6.5** ± 8.9% (k=2)	Alpha	**0.34**
ConvF Z	**6.5** ± 8.9% (k=2)	Depth	**2.65**

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

ConvF X	**5.3** ± 8.9% (k=2)	Boundary effect:	
ConvF Y	**5.3** ± 8.9% (k=2)	Alpha	**0.57**
ConvF Z	**5.3** ± 8.9% (k=2)	Depth	**2.28**

Conversion Factor Assessment



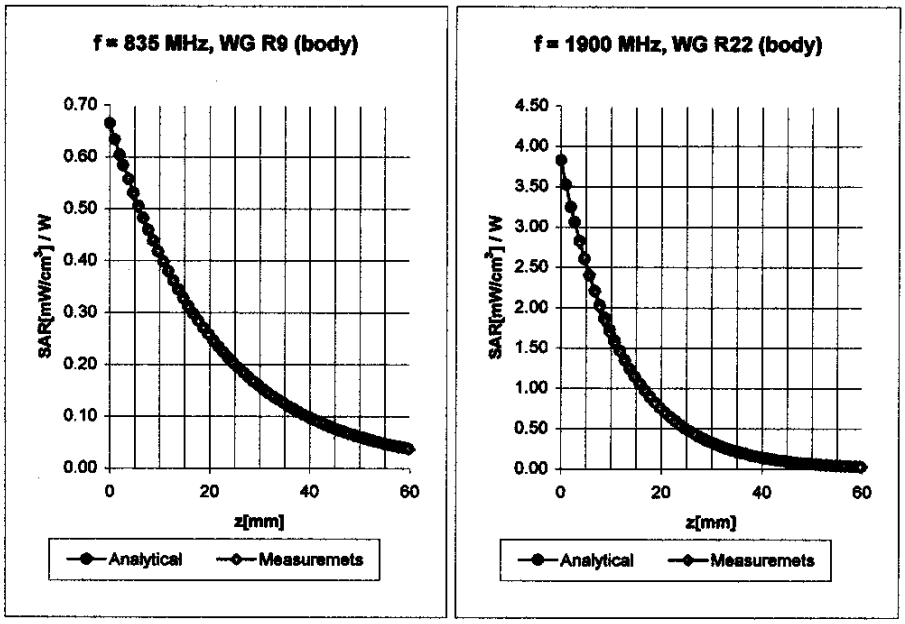
Body **900 MHz** ε_r = **55.2 ± 5%** σ = **0.97 ± 5% mho/m**

ConvF X	**6.3** ± 8.9% (k=2)	Boundary effect:	
ConvF Y	**6.3** ± 8.9% (k=2)	Alpha	**0.36**
ConvF Z	**6.3** ± 8.9% (k=2)	Depth	**2.63**

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

ConvF X	**5.2** ± 8.9% (k=2)	Boundary effect:	
ConvF Y	**5.2** ± 8.9% (k=2)	Alpha	**0.61**
ConvF Z	**5.2** ± 8.9% (k=2)	Depth	**2.30**

Conversion Factor Assessment



Body **835 MHz** ε_r = 55.0 ± 5% σ = 1.05 ± 5% mho/m

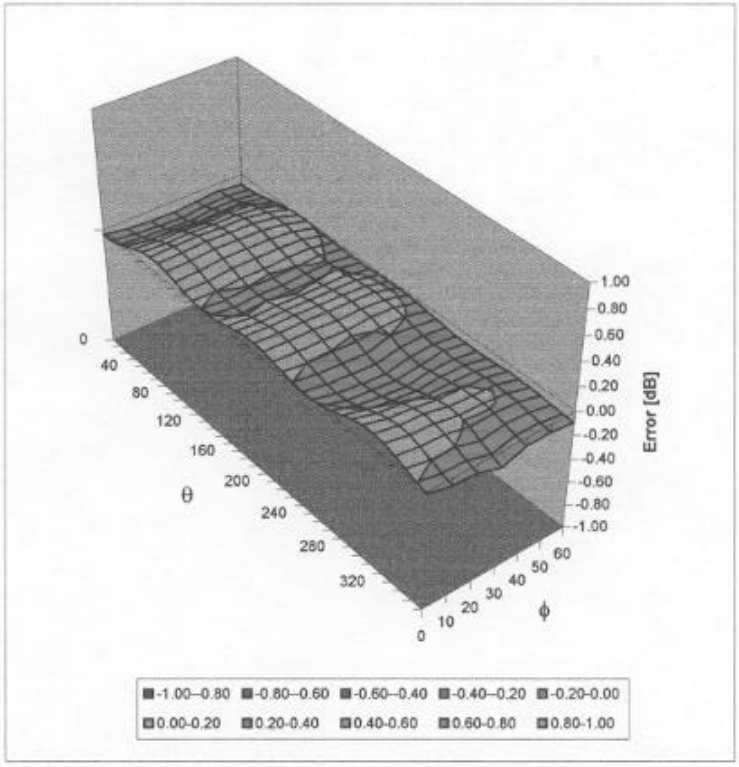
ConvF X	**6.4** ± 8.9% (k=2)	Boundary effect:	
ConvF Y	**6.4** ± 8.9% (k=2)	Alpha	**0.36**
ConvF Z	**6.4** ± 8.9% (k=2)	Depth	**2.66**

Body **1900 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	**0.74**
ConvF Z	**4.8** ± 8.9% (k=2)	Depth	**2.07**

Deviation from Isotropy in HSL

Error (θ,φ), f = 900 MHz



Schmid & Partner
Engineering AG

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

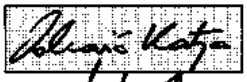
Calibration Certificate

Dosimetric E-Field Probe

Type:	ET3DV6
Serial Number:	1644
Place of Calibration:	Zurich
Date of Calibration:	November 26, 2001
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:1644

Manufactured: November 7, 2001
Calibrated: November 26, 2001

Calibrated for System DASY3

DASY3 - Parameters of Probe: ET3DV6 SN:1644

Sensitivity in Free Space

Diode Compression

NormX	1.77 $\mu V/(V/m)^2$	DCP X	98 mV
NormY	1.91 $\mu V/(V/m)^2$	DCP Y	98 mV
NormZ	1.85 $\mu V/(V/m)^2$	DCP Z	98 mV

Sensitivity in Tissue Simulating Liquid

Head 450 MHz ε_r = 43.5 ± 5% σ = 0.87 ± 10% mho/m

ConvF X	7.07 extrapolated	Boundary effect:	
ConvF Y	7.07 extrapolated	Alpha	0.37
ConvF Z	7.07 extrapolated	Depth	2.27

Head 800 - 1000 MHz ε_r = 39.0 - 43.5 σ = 0.80 - 1.10 mho/m

ConvF X	6.51 ± 9.5% (k=2)	Boundary effect:	
ConvF Y	6.51 ± 9.5% (k=2)	Alpha	0.43
ConvF Z	6.51 ± 9.5% (k=2)	Depth	2.25

Head 1500 MHz ε_r = 40.4 ± 5% σ = 1.23 ± 10% mho/m

ConvF X	5.76 interpolated	Boundary effect:	
ConvF Y	5.76 interpolated	Alpha	0.52
ConvF Z	5.76 interpolated	Depth	2.22

Head 1700 - 1910 MHz ε_r = 39.5 - 41.0 σ = 1.20 - 1.55 mho/m

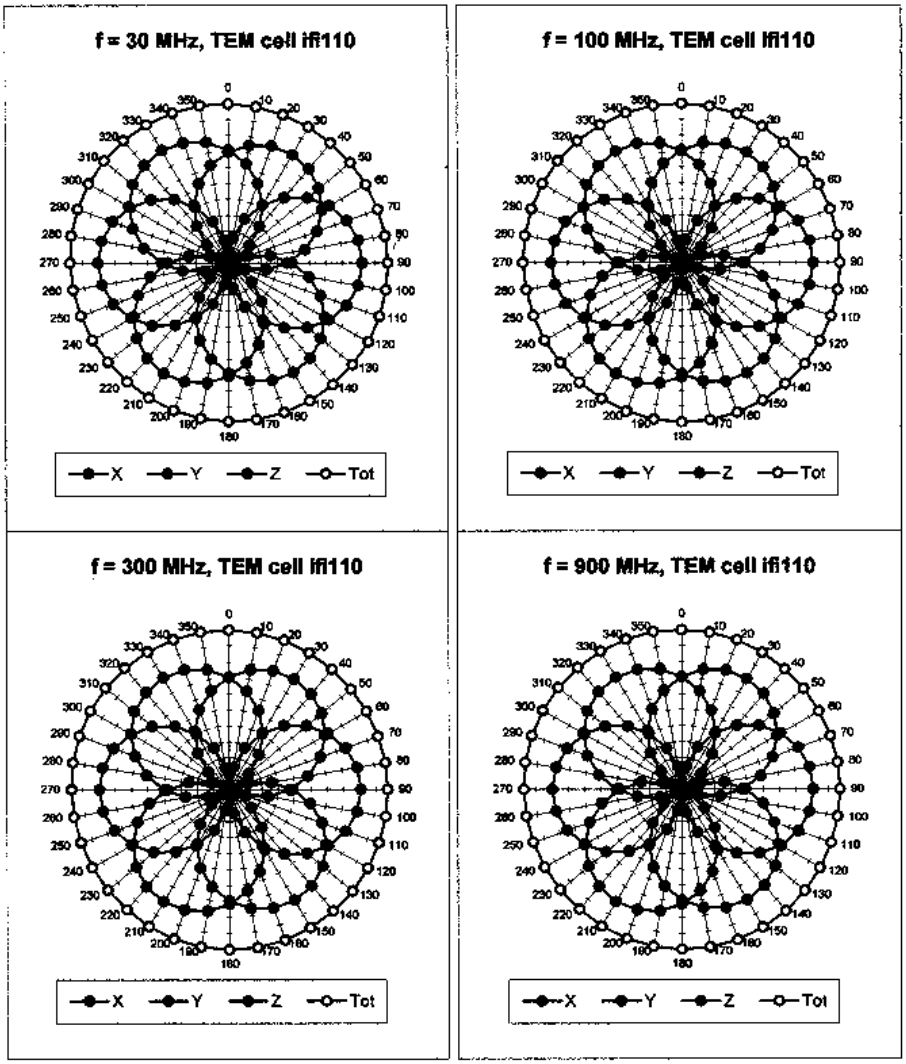
ConvF X	5.39 ± 9.5% (k=2)	Boundary effect:	
ConvF Y	5.39 ± 9.5% (k=2)	Alpha	0.56
ConvF Z	5.39 ± 9.5% (k=2)	Depth	2.20

Sensor Offset

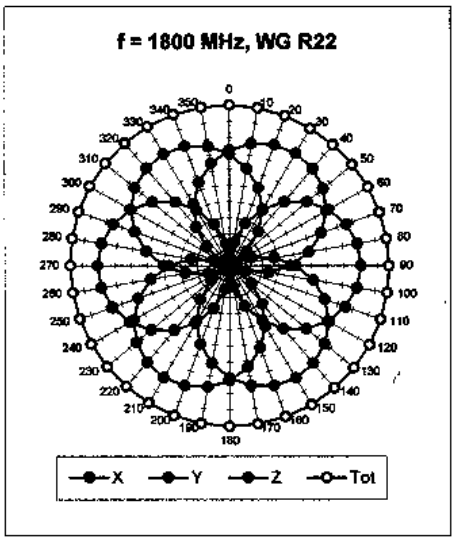
Probe Tip to Sensor Center	2.7	mm
Optical Surface Detection	1.4 ± 0.2	mm

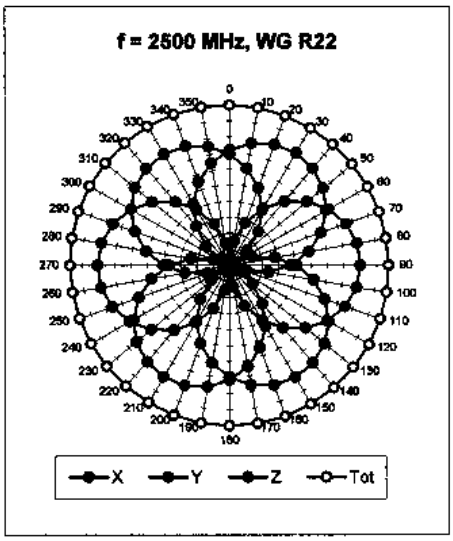
ET3DV6 SN:1644

Receiving Pattern (ϕ), θ = 0°

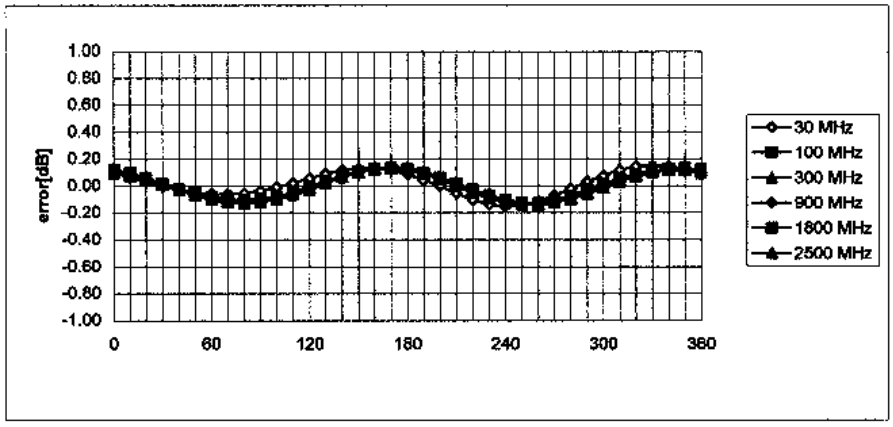


ET3DV6 SN:1644



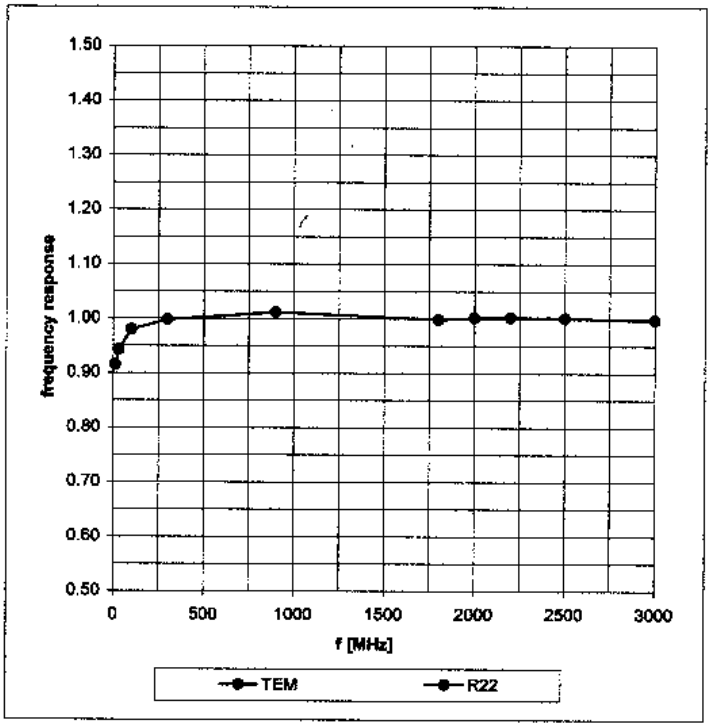


Isotropy Error (ϕ), θ = 0°



Frequency Response of E-Field

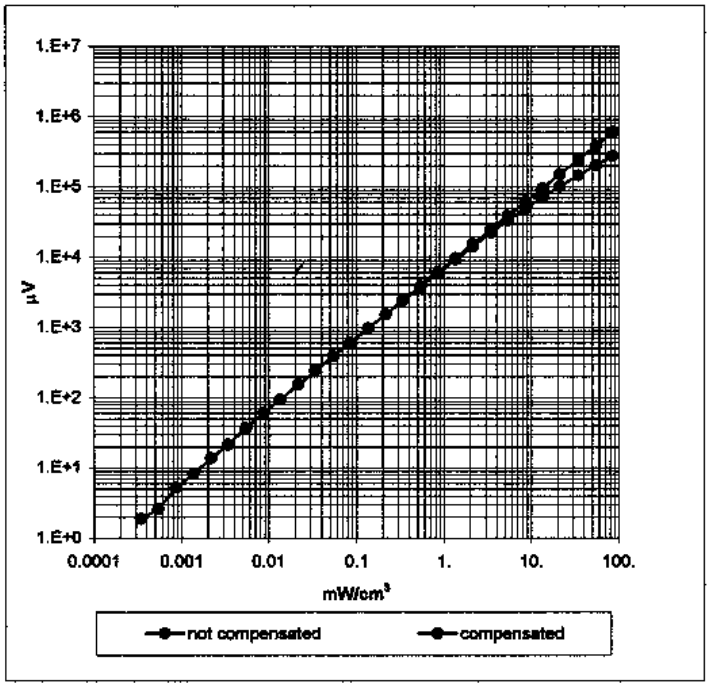
(TEM-Cell:ifi110, Waveguide R22)

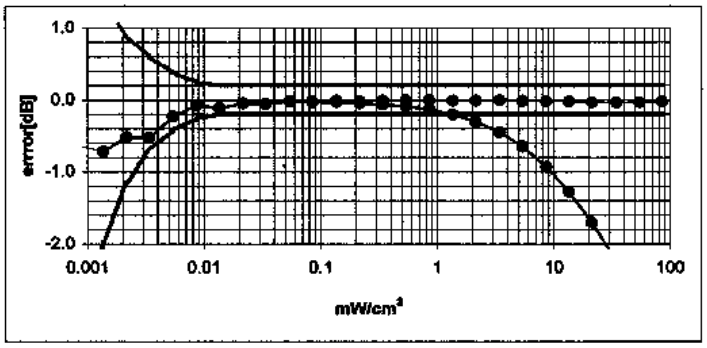


ET3DV6 SN:1644

Dynamic Range f(SAR_{brain})

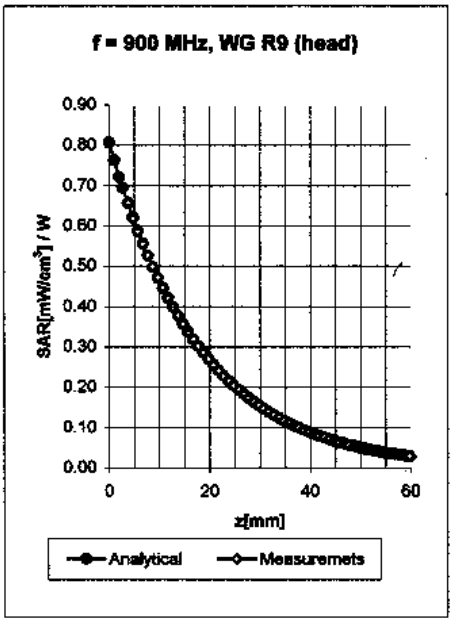
(Waveguide R22)

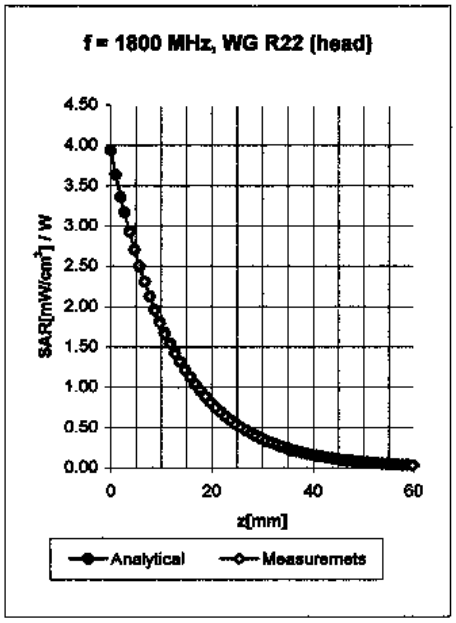




ET3DV6 SN:1644

Conversion Factor Assessment





Head **800 - 1000 MHz** ε_r = 39.0 - 43.6 σ = 0.80 - 1.10 mho/m

ConvF X	**6.51** ± 9.5% (k=2)	Boundary effect:	
ConvF Y	**6.51** ± 9.5% (k=2)	Alpha	**0.43**
ConvF Z	**6.51** ± 9.5% (k=2)	Depth	**2.25**

Head **1700 - 1910 MHz** ε_r = 39.5 - 41.0 σ = 1.20 - 1.55 mho/m

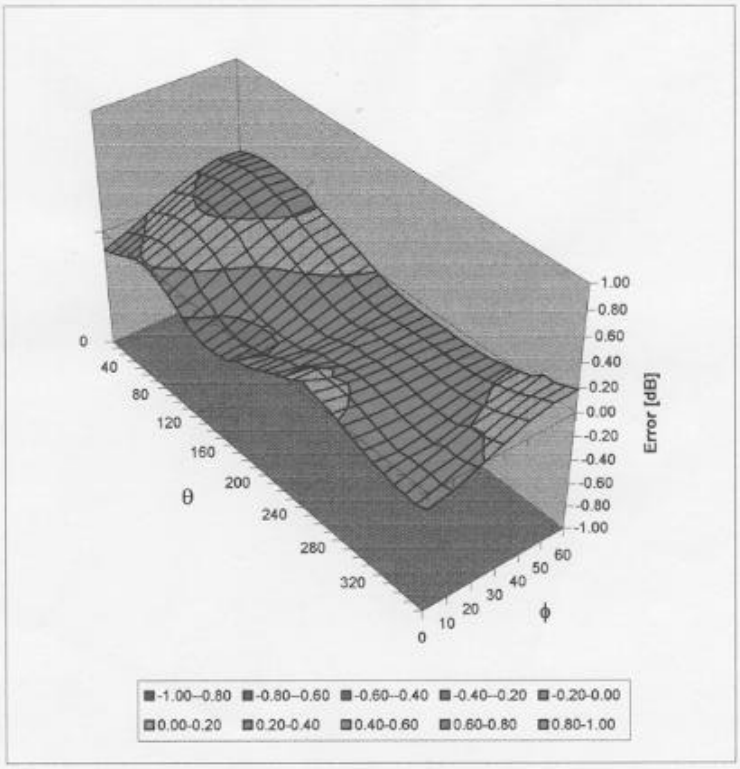
ConvF X	**5.39** ± 9.5% (k=2)	Boundary effect:	
ConvF Y	**5.39** ± 9.5% (k=2)	Alpha	**0.56**
ConvF Z	**5.39** ± 9.5% (k=2)	Depth	**2.20**

Page 7 of 9

ET3DV6 SN:1644

Deviation from Isotropy in HSL

Error (θ,φ), f = 900 MHz



APPENDIX B: SAR SETUP PHOTOS FOR FACE

Figure B1. Face SAR with 2.5 cm separation distance, retracted antenna

Figure B1. Face SAR with 2.5 cm separation distance, extended antenna