No. SAR2006005

Page 31 of 66

1900 Left Tilt Low

Electronics: DAE3 Sn536

Communication System: GSM 1900MHz Frequency: 1850.2 MHz Duty Cycle: 1:8.3

Probe: ET3DV6 - SN1736 ConvF(5.4, 5.4, 5.4)

Tilt Low/Area Scan (51x121x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.217 mW/g

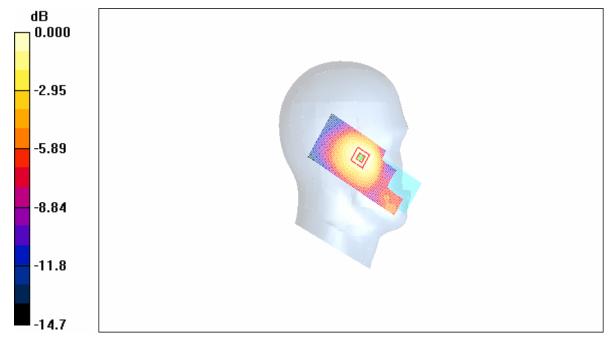
Tilt Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 6.78 V/m; Power Drift = -0.022 dB

Peak SAR (extrapolated) = 0.311 W/kg

SAR(1 g) = 0.199 mW/g; SAR(10 g) = 0.127 mW/g

Maximum value of SAR (measured) = 0.214 mW/g



 $0\ dB = 0.214 mW/g$

Fig. 11 Left Hand Tilt 15°PCS 1900MHz CH512

No. SAR2006005

Page 32 of 66

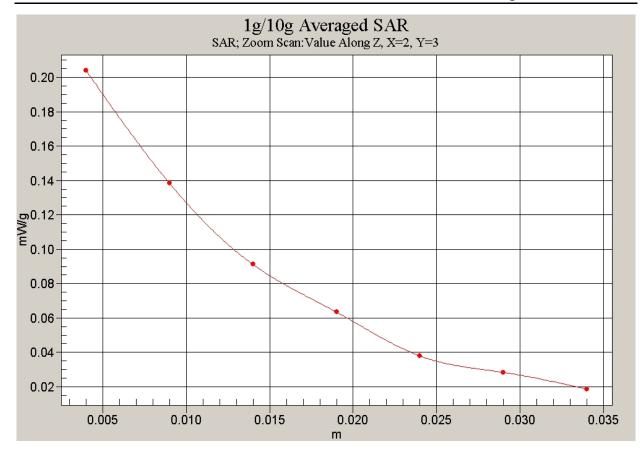


Fig. 12 Z-Scan at power reference point (PCS 1900MHz CH512)

No. SAR2006005

Page 33 of 66

1900 Right Cheek High

Electronics: DAE3 Sn536

Communication System: GSM 1900MHz Frequency: 1909.8 MHz Duty Cycle: 1:8.3

Probe: ET3DV6 - SN1736 ConvF(5.4, 5.4, 5.4)

Cheek High/Area Scan (51x121x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.584 mW/g

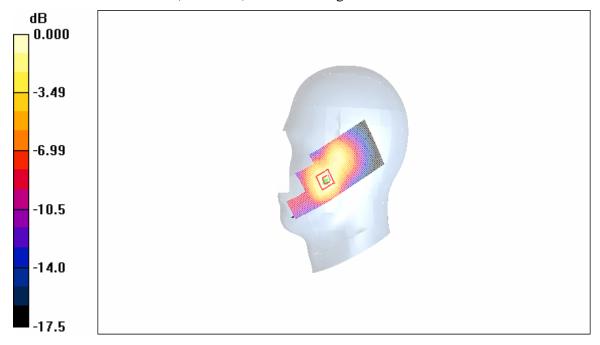
Cheek High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 6.58 V/m; Power Drift = -0.141 dB

Peak SAR (extrapolated) = 0.902 W/kg

SAR(1 g) = 0.553 mW/g; SAR(10 g) = 0.319 mW/g

Maximum value of SAR (measured) = 0.587 mW/g



0 dB = 0.587 mW/g

Fig. 13 Right Hand Touch Cheek PCS 1900MHz CH810

No. SAR2006005

Page 34 of 66

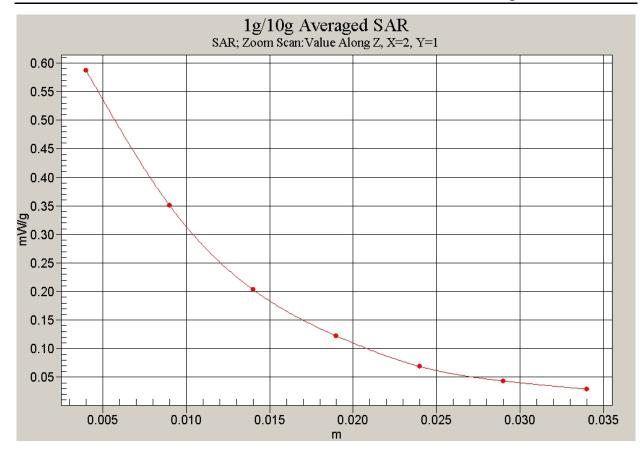


Fig. 14 Z-Scan at power reference point (PCS 1900MHz CH810)

No. SAR2006005

Page 35 of 66

1900 Right Cheek Middle

Electronics: DAE3 Sn536

Communication System: GSM 1900MHz Frequency: 1880 MHz Duty Cycle: 1:8.3

Probe: ET3DV6 - SN1736 ConvF(5.4, 5.4, 5.4)

Cheek Middle/Area Scan (51x121x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.649 mW/g

Cheek Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm,

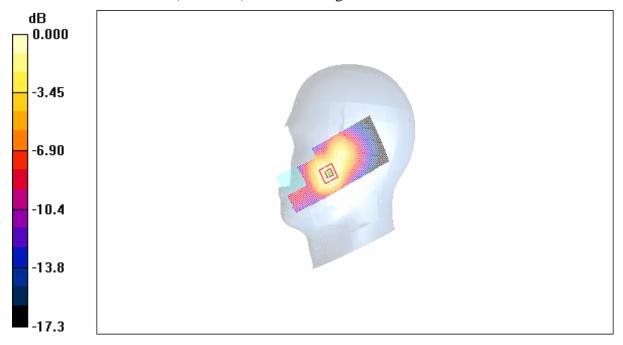
dz=5mm

Reference Value = 6.66 V/m; Power Drift = 0.011 dB

Peak SAR (extrapolated) = 0.996 W/kg

SAR(1 g) = 0.613 mW/g; SAR(10 g) = 0.354 mW/g

Maximum value of SAR (measured) = 0.653 mW/g



 $0\ dB=0.653mW/g$

Fig.15 Right Hand Touch Cheek PCS 1900MHz CH661

No. SAR2006005

Page 36 of 66

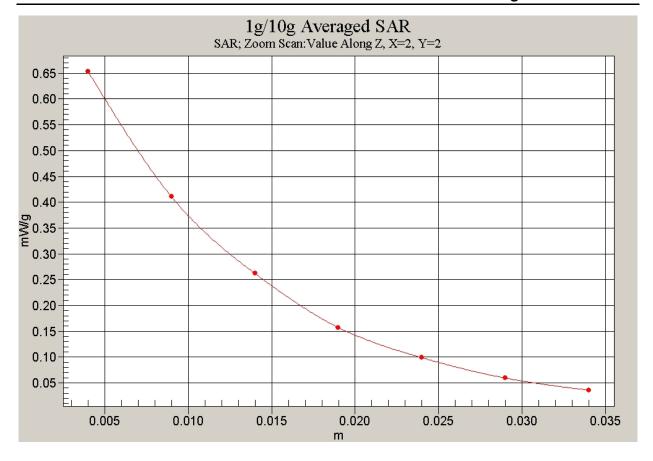


Fig. 16 Z-Scan at power reference point (PCS 1900MHz CH661)

No. SAR2006005

Page 37 of 66

1900 Right Cheek Low

Electronics: DAE3 Sn536

Communication System: GSM 1900MHz Frequency: 1850.2 MHz Duty Cycle: 1:8.3

Probe: ET3DV6 - SN1736 ConvF(5.4, 5.4, 5.4)

Cheek Low/Area Scan (51x121x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.740 mW/g

Cheek Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm,

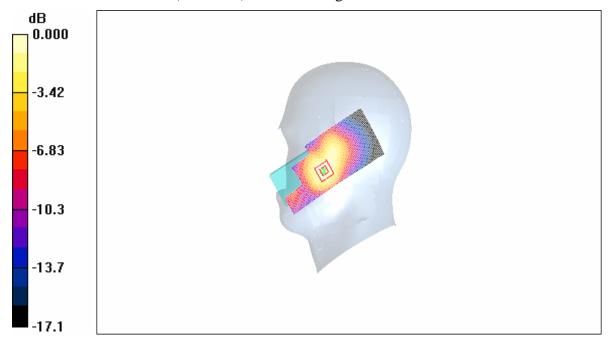
dz=5mm

Reference Value = 6.66 V/m; Power Drift = 0.157 dB

Peak SAR (extrapolated) = 1.12 W/kg

SAR(1 g) = 0.699 mW/g; SAR(10 g) = 0.405 mW/g

Maximum value of SAR (measured) = 0.740 mW/g



0 dB = 0.740 mW/g

Fig. 17 Right Hand Touch Cheek PCS 1900MHz CH512

No. SAR2006005

Page 38 of 66

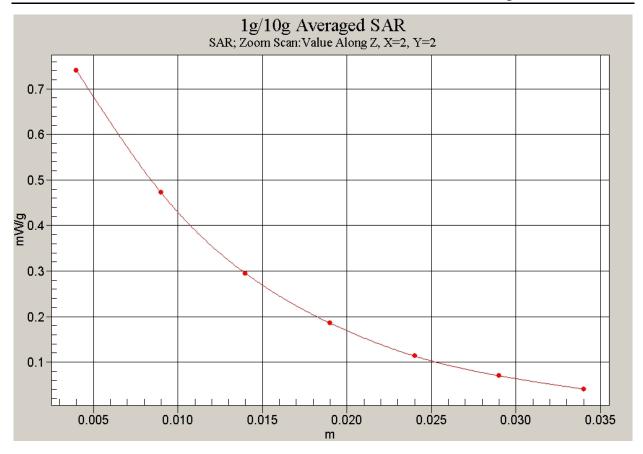


Fig. 18 Z-Scan at power reference point (PCS 1900MHz CH512)

No. SAR2006005

Page 39 of 66

1900 Right Tilt High

Electronics: DAE3 Sn536

Communication System: GSM 1900MHz Frequency: 1909.8 MHz Duty Cycle: 1:8.3

Probe: ET3DV6 - SN1736 ConvF(5.4, 5.4, 5.4)

Tilt High/Area Scan (51x121x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.304 mW/g

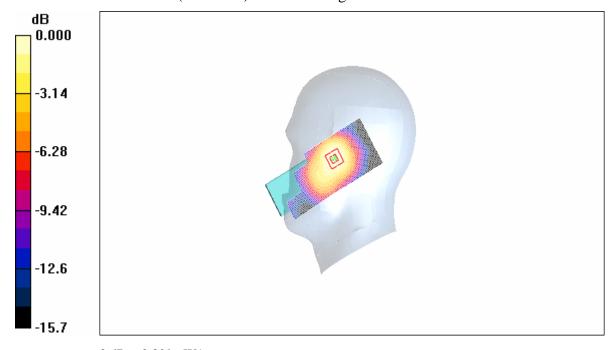
Tilt High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 6.80 V/m; Power Drift = -0.027 dB

Peak SAR (extrapolated) = 0.438 W/kg

SAR(1 g) = 0.286 mW/g; SAR(10 g) = 0.177 mW/g

Maximum value of SAR (measured) = 0.309 mW/g



 $0\ dB=0.309mW/g$

No. SAR2006005

Page 40 of 66

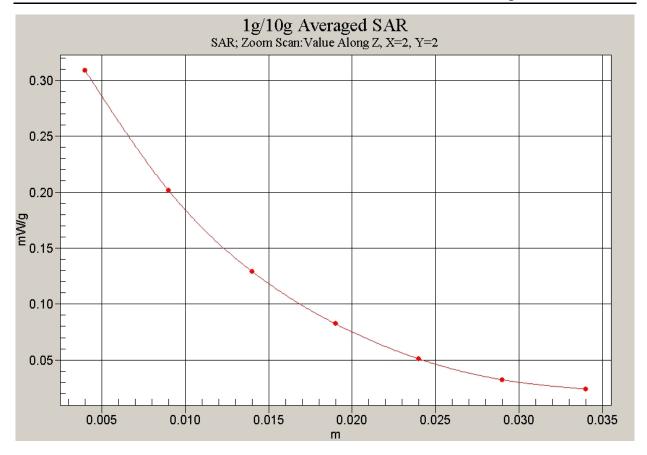


Fig. 20 Z-Scan at power reference point (PCS 1900MHz CH810)

No. SAR2006005

Page 41 of 66

1900 Right Tilt Middle

Electronics: DAE3 Sn536

Communication System: GSM 1900MHz Frequency: 1880 MHz Duty Cycle: 1:8.3

Probe: ET3DV6 - SN1736 ConvF(5.4, 5.4, 5.4)

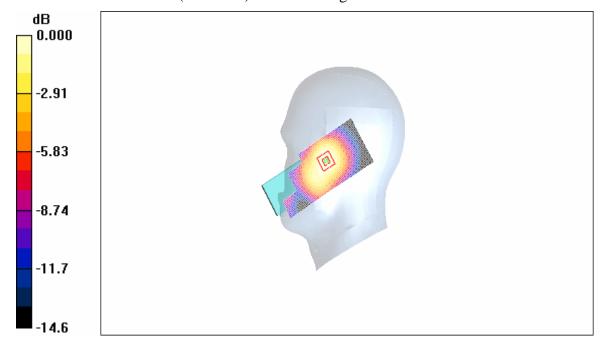
Tilt Middle/Area Scan (51x121x1): Measurement grid: dx=10mm, dy=10mm Maximum value of SAR (interpolated) = 0.251 mW/g

Tilt Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 6.44 V/m; Power Drift = -0.059 dB

Peak SAR (extrapolated) = 0.370 W/kg

SAR(1 g) = 0.239 mW/g; SAR(10 g) = 0.149 mW/gMaximum value of SAR (measured) = 0.259 mW/g



0 dB = 0.259 mW/g

Fig. 21 Right Hand Tilt 15°PCS 1900MHz CH661

No. SAR2006005

Page 42 of 66

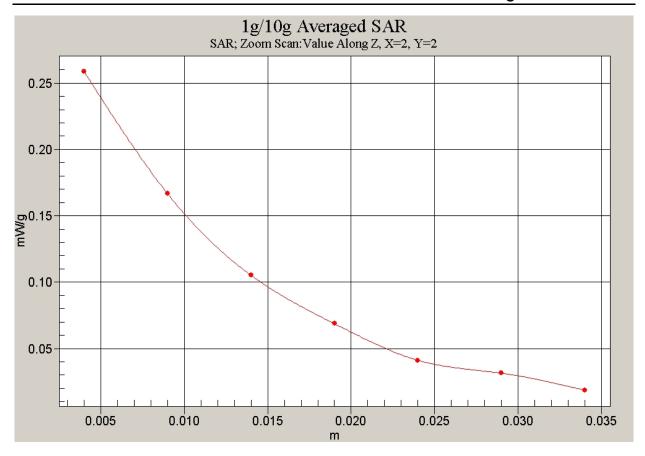


Fig. 22 Z-Scan at power reference point (PCS 1900MHz CH661)

No. SAR2006005

Page 43 of 66

1900 Right Tilt Low

Electronics: DAE3 Sn536

Communication System: GSM 1900MHz Frequency: 1850.2 MHz Duty Cycle: 1:8.3

Probe: ET3DV6 - SN1736 ConvF(5.4, 5.4, 5.4)

Tilt Low/Area Scan (51x121x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.208 mW/g

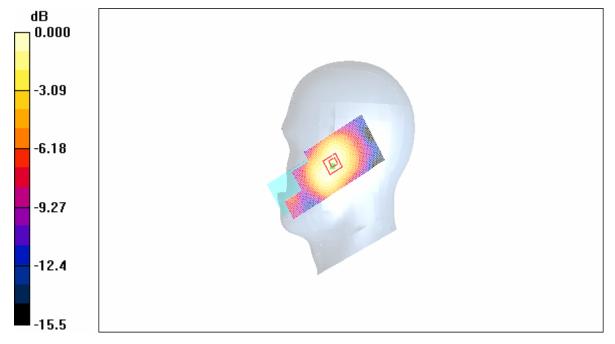
Tilt Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 6.26 V/m; Power Drift = -0.022 dB

Peak SAR (extrapolated) = 0.305 W/kg

SAR(1 g) = 0.200 mW/g; SAR(10 g) = 0.126 mW/g

Maximum value of SAR (measured) = 0.212 mW/g



0 dB = 0.212 mW/g

No. SAR2006005

Page 44 of 66

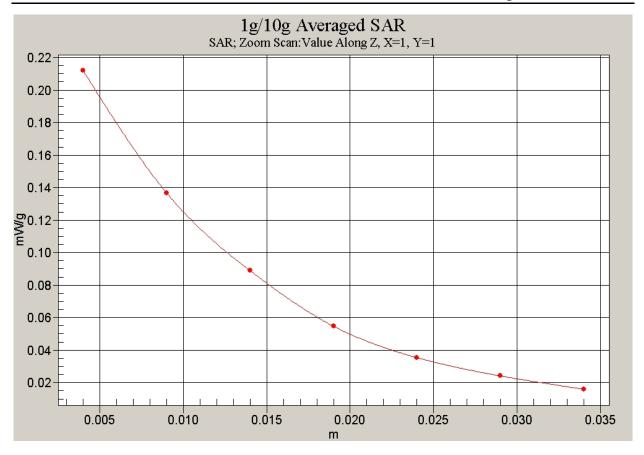


Fig. 24 Z-Scan at power reference point (PCS 1900MHz CH512)

No. SAR2006005

Page 45 of 66

1900 Body Toward Ground High

Electronics: DAE3 Sn536

Communication System: GSM 1900MHz Frequency: 1909.8 MHz Duty Cycle: 1:8.3

Probe: ET3DV6 - SN1736 ConvF(4.88, 4.88, 4.88)

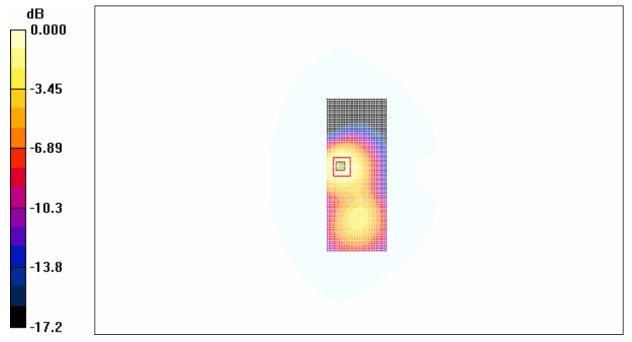
Toward Ground High/Area Scan (51x121x1): Measurement grid: dx=10mm, dy=10mm Maximum value of SAR (interpolated) = 0.582 mW/g

Toward Ground High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 15.8 V/m; Power Drift = -0.057 dB

Peak SAR (extrapolated) = 0.857 W/kg

SAR(1 g) = 0.512 mW/g; SAR(10 g) = 0.299 mW/gMaximum value of SAR (measured) = 0.559 mW/g



0 dB = 0.559 mW/g

No. SAR2006005

Page 46 of 66

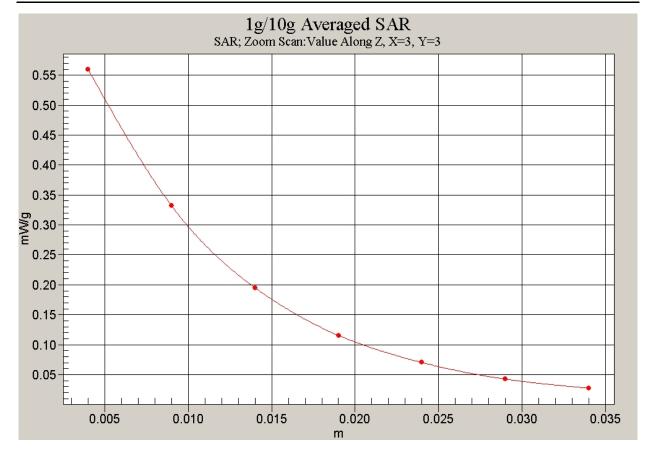


Fig. 26 Z-Scan at power reference point (PCS 1900MHz, Body Towards Ground, CH810)

No. SAR2006005

Page 47 of 66

1900 Body Toward Ground Middle

Electronics: DAE3 Sn536

Communication System: GSM 1900MHz Frequency: 1880 MHz Duty Cycle: 1:8.3

Probe: ET3DV6 - SN1736 ConvF(4.88, 4.88, 4.88)

Toward Ground Middle/Area Scan (51x121x1): Measurement grid: dx=10mm,

dy=10mm

Maximum value of SAR (interpolated) = 0.580 mW/g

Toward Ground Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm,

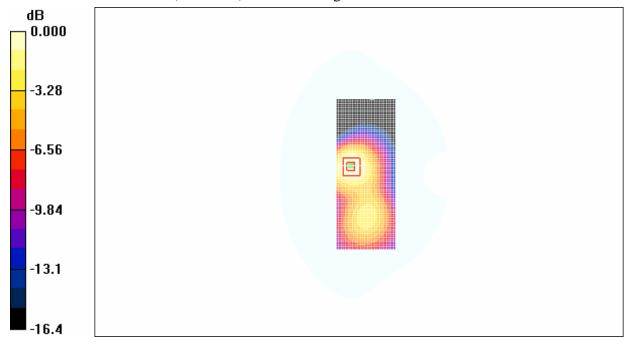
dy=5mm, dz=5mm

Reference Value = 16.2 V/m; Power Drift = -0.078 dB

Peak SAR (extrapolated) = 0.836 W/kg

SAR(1 g) = 0.513 mW/g; SAR(10 g) = 0.303 mW/g

Maximum value of SAR (measured) = 0.559 mW/g



0~dB=0.559mW/g

No. SAR2006005

Page 48 of 66

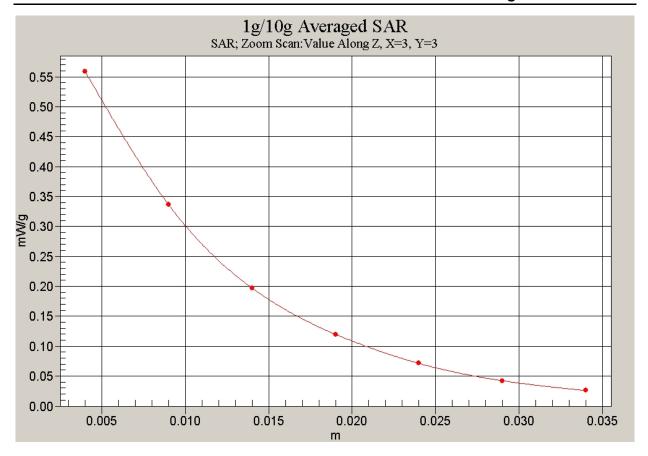


Fig. 28 Z-Scan at power reference point (PCS 1900MHz, Body Towards Ground, CH661)

No. SAR2006005

Page 49 of 66

1900 Body Toward Ground Low

Electronics: DAE3 Sn536

Communication System: GSM 1900MHz Frequency: 1850.2 MHz Duty Cycle: 1:8.3

Probe: ET3DV6 - SN1736 ConvF(4.88, 4.88, 4.88)

Toward Ground Low/Area Scan (51x121x1): Measurement grid: dx=10mm, dy=10mm Maximum value of SAR (interpolated) = 0.610 mW/g

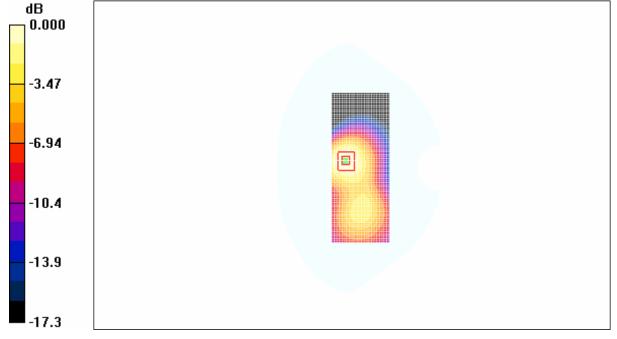
Toward Ground Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 16.5 V/m; Power Drift = 0.059 dB

Peak SAR (extrapolated) = 0.866 W/kg

SAR(1 g) = 0.534 mW/g; SAR(10 g) = 0.318 mW/g

Maximum value of SAR (measured) = 0.583 mW/g



0 dB = 0.583 mW/g

No. SAR2006005

Page 50 of 66

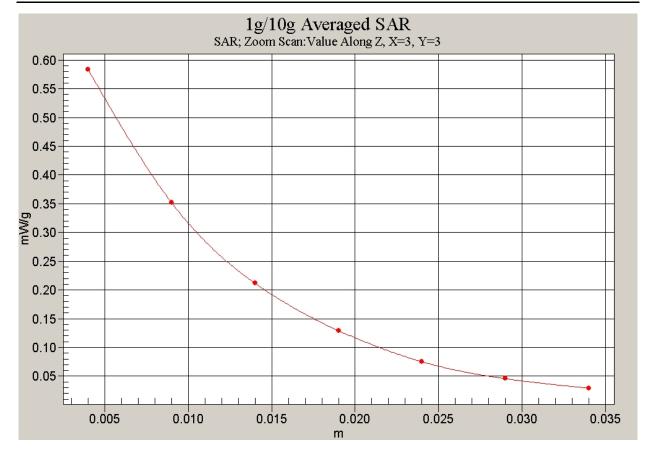


Fig. 30 Z-Scan at power reference point (PCS 1900MHz, Body Towards Ground, CH512)

No. SAR2006005

Page 51 of 66

1900 Body Toward Ground High with GPRS

Electronics: DAE3 Sn536

Communication System: GSM 1900MHz GPRS Frequency: 1909.8 MHz Duty Cycle: 1:4

Probe: ET3DV6 - SN1736 ConvF(4.88, 4.88, 4.88)

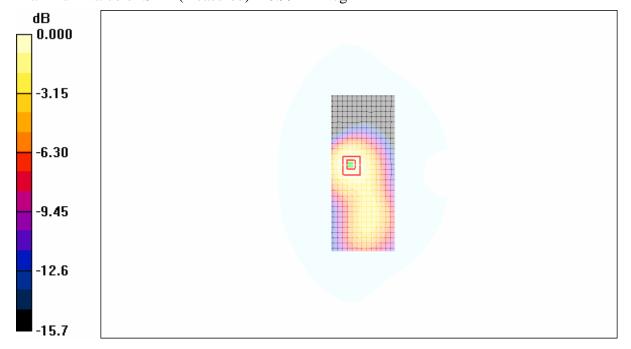
Toward Ground High/Area Scan (81x181x1): Measurement grid: dx=10mm, dy=10mm Maximum value of SAR (interpolated) = 0.992 mW/g

Toward Ground High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 22.9 V/m; Power Drift = 0.046 dB

Peak SAR (extrapolated) = 1.58 W/kg

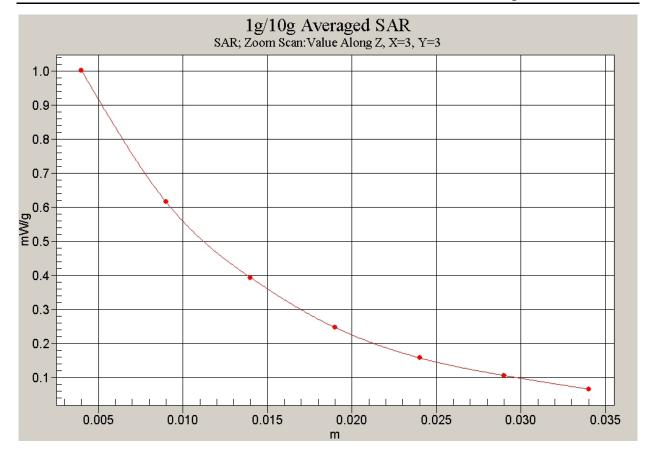
SAR(1 g) = 0.925 mW/g; SAR(10 g) = 0.561 mW/gMaximum value of SAR (measured) = 0.994 mW/g



 $0\ dB=0.994mW/g$

No. SAR2006005

Page 52 of 66



No. SAR2006005

Page 53 of 66

1900 Body Toward Ground Middle with GPRS

Electronics: DAE3 Sn536

Communication System: GSM 1900MHz GPRS Frequency: 1880 MHz Duty Cycle: 1:4

Probe: ET3DV6 - SN1736 ConvF(4.88, 4.88, 4.88)

Toward Ground Middle/Area Scan (81x181x1): Measurement grid: dx=10mm,

dy=10mm

Maximum value of SAR (interpolated) = 1.16 mW/g

Toward Ground Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm,

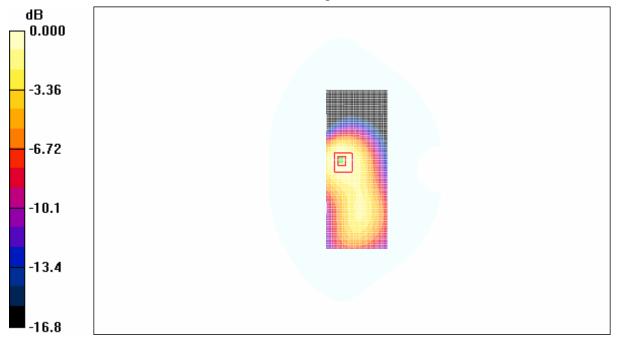
dy=5mm, dz=5mm

Reference Value = 24.3 V/m; Power Drift = -0.163 dB

Peak SAR (extrapolated) = 1.69 W/kg

SAR(1 g) = 1.02 mW/g; SAR(10 g) = 0.628 mW/g

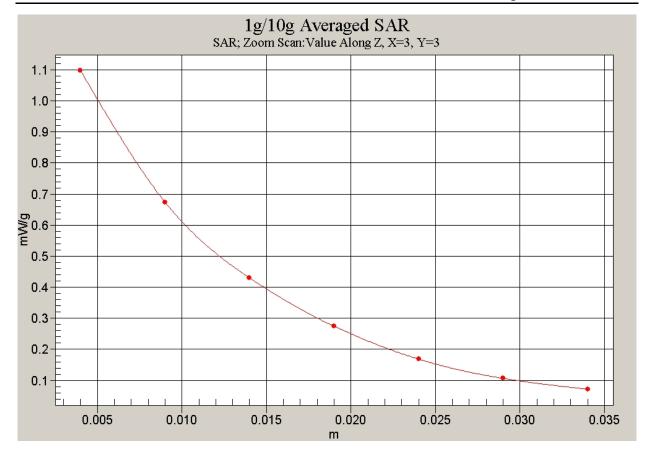
Maximum value of SAR (measured) = 1.10 mW/g



0 dB = 1.10 mW/g

No. SAR2006005

Page 54 of 66



No. SAR2006005

Page 55 of 66

1900 Body Toward Ground Low with GPRS

Electronics: DAE3 Sn536

Communication System: GSM 1900MHz GPRS Frequency: 1850.2 MHz Duty Cycle: 1:4

Probe: ET3DV6 - SN1736 ConvF(4.88, 4.88, 4.88)

Toward Ground Low/Area Scan (81x181x1): Measurement grid: dx=10mm, dy=10mm Maximum value of SAR (interpolated) = 1.21 mW/g

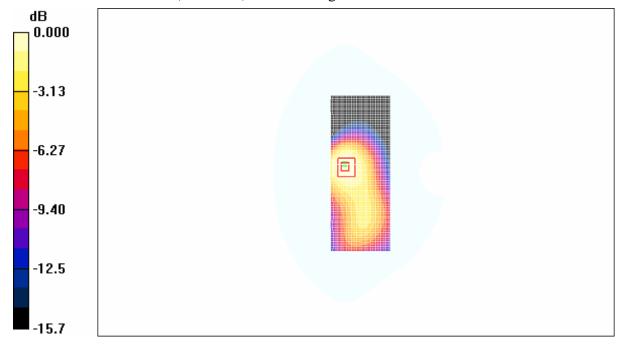
Toward Ground Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 24.3 V/m; Power Drift = -0.145 dB

Peak SAR (extrapolated) = 1.75 W/kg

SAR(1 g) = 1.07 mW/g; SAR(10 g) = 0.662 mW/g

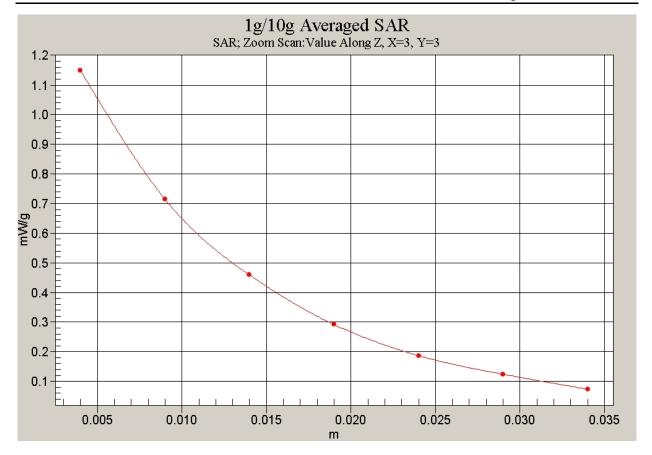
Maximum value of SAR (measured) = 1.15 mW/g



0 dB = 1.15 mW/g

No. SAR2006005

Page 56 of 66



Page 57 of 66

ANNEX D SYSTEM VALIDATION RESULTS

1900MHzDAE536Probe1736

Electronics: DAE3 Sn536

Communication System: CW Frequency: 1900 MHz Duty Cycle: 1:1

Probe: ET3DV6 - SN1736 ConvF(5.4, 5.4, 5.4)

System Validation/Area Scan (101x101x1): Measurement grid: dx=10mm, dy=10mm

Reference Value = 92.1 V/m; Power Drift = 0.1 dB Maximum value of SAR (interpolated) = 11.2 mW/g

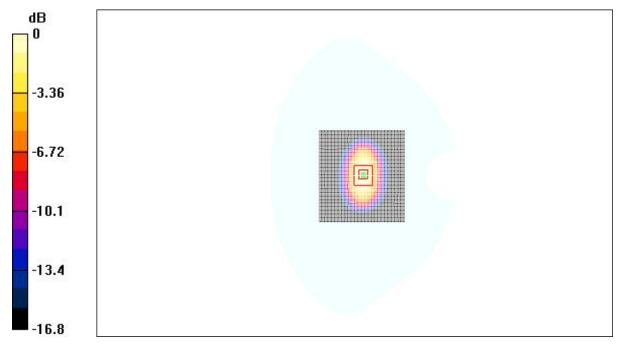
System Validation/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 92.1 V/m; Power Drift = 0.1 dB

Maximum value of SAR (measured) = 11.3 mW/g

Peak SAR (extrapolated) = 16.9 W/kg

SAR(1 g) = 9.91 mW/g; SAR(10 g) = 5.27 mW/g



0 dB = 11.3 mW/g

No. SAR2006005

Page 58 of 66

ANNEX E PROBE CALIBRATION CERTIFICATE

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



S Schweizerischer Kalibrierdienst Service suisse d'étalonnage C Servizio svizzero di taratura

Swiss Calibration Service

Accredited by the Swiss Federal Office of Metrology and Accreditation The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Client TMC-Auden

Certificate No: ET3-1736_Nov05

Accreditation No.: SCS 108

ALIBRATION	CERTIFICAT	E	The state of the state of		
Dbject	ET3DV6 - SN:1736				
Calibration procedure(s)	QA CAL-01.v5 Calibration procedure for dosimetric E-field probes				
Calibration date:	November 25, 2	2005			
Condition of the calibrated item	In Tolerance				
The measurements and the unce	ertainties with confidence	ational standards, which realize the physical units o probability are given on the following pages and arrory facility: environment temperature $(22 \pm 3)^{\circ}$ C an	e part of the certificate.		
Calibration Equipment used (M&	TE critical for calibration)				
	ID#	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration		
ower meter E4419B	GB41293874	3-May-05 (METAS, No. 251-00466)	May-06		
Power meter E4419B Power sensor E4412A	GB41293874 MY41495277	3-May-05 (METAS, No. 251-00466) 3-May-05 (METAS, No. 251-00466)	May-06 May-06		
Power meter E4419B Power sensor E4412A Power sensor E4412A	GB41293874 MY41495277 MY41498087	3-May-05 (METAS, No. 251-00466) 3-May-05 (METAS, No. 251-00466) 3-May-05 (METAS, No. 251-00466)	May-06 May-06 May-06		
Power meter E4419B Power sensor E4412A Power sensor E4412A Reference 20 dB Attenuator	GB41293874 MY41495277 MY41498087 SN: S5086 (20b)	3-May-05 (METAS, No. 251-00466) 3-May-05 (METAS, No. 251-00466) 3-May-05 (METAS, No. 251-00466) 3-May-05 (METAS, No. 251-00467)	May-06 May-06		
Power meter E4419B Power sensor E4412A Power sensor E4412A Reference 20 dB Attenuator Reference Probe ES3DV2	GB41293874 MY41495277 MY41498087	3-May-05 (METAS, No. 251-00466) 3-May-05 (METAS, No. 251-00466) 3-May-05 (METAS, No. 251-00466)	May-06 May-06 May-06 May-06		
Power meter E4419B Power sensor E4412A Power sensor E4412A Reference 20 dB Attenuator Reference Probe ES3DV2 DAE4	GB41293874 MY41495277 MY41498087 SN: S5086 (20b) SN: S5086 (20b)	3-May-05 (METAS, No. 251-00466) 3-May-05 (METAS, No. 251-00466) 3-May-05 (METAS, No. 251-00466) 3-May-05 (METAS, No. 251-00467) 3-May-05 (METAS, No. 251-00467)	May-06 May-06 May-06 May-06 May-06		
Power meter E4419B Power sensor E4412A Power sensor E4412A Reference 20 dB Attenuator Reference Probe ES3DV2 DAE4 Reference Probe ES3DV2	GB41293874 MY41495277 MY41498087 SN: S5086 (20b) SN: S5086 (20b) SN: 3013	3-May-05 (METAS, No. 251-00466) 3-May-05 (METAS, No. 251-00466) 3-May-05 (METAS, No. 251-00466) 3-May-05 (METAS, No. 251-00467) 3-May-05 (METAS, No. 251-00467) 7-Jan-05 (SPEAG, No. ES3-3013_Jan05)	May-06 May-06 May-06 May-06 May-06 Jan-06		
Power meter E4419B Power sensor E4412A Power sensor E4412A Reference 20 dB Attenuator Reference Probe ES3DV2 DAE4 Reference Probe ES3DV2	GB41293874 MY41495277 MY41498087 SN: S5086 (20b) SN: S5086 (20b) SN: 3013 SN: 907	3-May-05 (METAS, No. 251-00466) 3-May-05 (METAS, No. 251-00466) 3-May-05 (METAS, No. 251-00466) 3-May-05 (METAS, No. 251-00467) 3-May-05 (METAS, No. 251-00467) 7-Jan-05 (SPEAG, No. ES3-3013_Jan05) 21-Jun-05 (SPEAG, No. DAE4-907_Jun05)	May-06 May-06 May-06 May-06 May-06 Jan-06 Jun-06 Scheduled Check In house check: Dec-05		
Power meter E4419B Power sensor E4412A Power sensor E4412A Power sensor E4412A Reference 20 dB Attenuator Reference Probe ES3DV2 DAE4 Reference Probe ES3DV2 Reference Probe ES3DV2 Reference Probe ES3DV2 Reference Probe ES3DV2	GB41293874 MY41495277 MY41498087 SN: S5086 (20b) SN: S5086 (20b) SN: 3013 SN: 907	3-May-05 (METAS, No. 251-00466) 3-May-05 (METAS, No. 251-00466) 3-May-05 (METAS, No. 251-00466) 3-May-05 (METAS, No. 251-00467) 3-May-05 (METAS, No. 251-00467) 7-Jan-05 (SPEAG, No. ES3-3013_Jan05) 21-Jun-05 (SPEAG, No. DAE4-907_Jun05)	May-06 May-06 May-06 May-06 May-06 Jan-06 Jun-06 Scheduled Check		
Power meter E4419B Power sensor E4412A Power sensor E4412A Power sensor E4412A Reference 20 dB Attenuator Reference Probe ES3DV2 DAE4 Reference Probe ES3DV2 Reference Probe ES3DV2 Reference Probe ES3DV2 Reference Probe ES3DV2	GB41293874 MY41495277 MY41498087 SN: S5086 (20b) SN: S5086 (20b) SN: 3013 SN: 907	3-May-05 (METAS, No. 251-00466) 3-May-05 (METAS, No. 251-00466) 3-May-05 (METAS, No. 251-00466) 3-May-05 (METAS, No. 251-00467) 3-May-05 (METAS, No. 251-00467) 7-Jan-05 (SPEAG, No. ES3-3013_Jan05) 21-Jun-05 (SPEAG, No. DAE4-907_Jun05) Check Date (in house) 4-Aug-99 (SPEAG, in house check Dec-03)	May-06 May-06 May-06 May-06 May-06 Jan-06 Jun-06 Scheduled Check In house check: Dec-05		
Power meter E4419B Power sensor E4412A Power sensor E4412A Reference 20 dB Attenuator Reference Probe ES3DV2 DAE4 Reference Probe ES3DV2 Secondary Standards RF generator HP 8648C Network Analyzer HP 8753E	GB41293874 MY41495277 MY41498087 SN: S5086 (20b) SN: S5086 (20b) SN: 3013 SN: 907	3-May-05 (METAS, No. 251-00466) 3-May-05 (METAS, No. 251-00466) 3-May-05 (METAS, No. 251-00466) 3-May-05 (METAS, No. 251-00467) 3-May-05 (METAS, No. 251-00467) 7-Jan-05 (SPEAG, No. ES3-3013_Jan05) 21-Jun-05 (SPEAG, No. DAE4-907_Jun05) Check Date (in house) 4-Aug-99 (SPEAG, in house check Dec-03) 18-Oct-01 (SPEAG, in house check Nov-04)	May-06 May-06 May-06 May-06 May-06 Jan-06 Jun-06 Scheduled Check In house check: Dec-05 In house check: Nov 05		
Primary Standards Power meter E4419B Power sensor E4412A Power sensor E4412A Reference 20 dB Attenuator Reference Probe ES3DV2 DAE4 Reference Probe ES3DV2 DAE4 Reference Probe ES3DV2 CSECONDARY Standards RF generator HP 8648C Network Analyzer HP 8753E Calibrated by:	GB41293874 MY41495277 MY41498087 SN: S5086 (20b) SN: S5086 (20b) SN: 3013 SN: 907	3-May-05 (METAS, No. 251-00466) 3-May-05 (METAS, No. 251-00466) 3-May-05 (METAS, No. 251-00466) 3-May-05 (METAS, No. 251-00467) 3-May-05 (METAS, No. 251-00467) 7-Jan-05 (SPEAG, No. 253-3013_Jan05) 21-Jun-05 (SPEAG, No. DAE4-907_Jun05) Check Date (in house) 4-Aug-99 (SPEAG, in house check Dec-03) 18-Oct-01 (SPEAG, in house check Nov-04)	May-06 May-06 May-06 May-06 May-06 Jan-06 Jun-06 Scheduled Check In house check: Dec-05 In house check: Nov 05		

No. SAR2006005

Page 59 of 66

Calibration Laboratory of Schmid & Partner

Engineering AG Zeughausstrasse 43, 8004 Zurich, Switzerland

Accredited by the Swiss Federal Office of Metrology and Accreditation
The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates



Schweizerischer Kalibrierdienst Service suisse d'étalonnage Servizio svizzero di taratura

Accreditation No.: SCS 108

Swiss Calibration Service

Glossary:

TSL tissue simulating liquid
NORMx,y,z sensitivity in free space
ConF sensitivity in TSL / NORMx,y,z
DCP diode compression point
Polarization φ rotation around probe axis

Polarization 9 9 rotation around an axis that is in the plane normal to probe axis (at

measurement center), i.e., $\vartheta = 0$ is normal to probe axis

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003

 b) CENELEC EN 50361, "Basic standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones (300 MHz - 3 GHz), July 2001

Methods Applied and Interpretation of Parameters:

- NORMx,y,z: Assessed for E-field polarization θ = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not effect the E²-field uncertainty inside TSL (see below ConvF).
- NORM(f)x,y,z = NORMx,y,z * frequency_response (see Frequency Response Chart). This
 linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of
 the frequency response is included in the stated uncertainty of ConvF.
- DCPx,y,z: DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). DCP does not depend on frequency nor media.
- ConvF and Boundary Effect Parameters: Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORMx,y,z * ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- Spherical isotropy (3D deviation from isotropy): in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

No. SAR2006005

Page 60 of 66

ET3DV6 SN:1736

November 25, 2005

Probe ET3DV6

SN:1736

Manufactured:

September 27, 2002

Last calibrated:

July 14, 2005

Recalibrated:

November 25, 2005

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

No. SAR2006005

Page 61 of 66

ET3DV6 SN:1736

November 25, 2005

DASY - Parameters of Probe: ET3DV6 SN:1736

Sensitivity in Fre	Diode Compression				
NormX	1.97 ± 10.1%	$\mu V/(V/m)^2$	DCP X	93 mV	
NormY	1.75 ± 10.1%	$\mu V/(V/m)^2$	DCP Y	93 mV	
NormZ	1.97 ± 10.1%	$\mu V/(V/m)^2$	DCP Z	93 mV	

Sensitivity in Tissue Simulating Liquid (Conversion Factors)

Please see Page 8.

Boundary Effect

TSL

900 MHz

Typical SAR gradient: 5 % per mm

Sensor Center t	3.7 mm	4.7 mm	
SAR _{be} [%]	Without Correction Algorithm	9.6	5.0
SAR _{be} [%]	With Correction Algorithm	0.1	0.3

TSL

1810 MHz

Typical SAR gradient: 10 % per mm

Sensor Cente	r to Phantom Surface Distance	3.7 mm	4.7 mm	
SAR _{be} [%]	Without Correction Algorithm	13.2	8.8	
SAR _{be} [%]	With Correction Algorithm	0.6	0.1	

Sensor Offset

Probe Tip to Sensor Center

2.7 mm

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

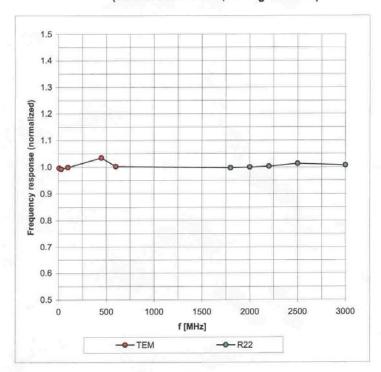
^A The uncertainties of NormX,Y,Z do not affect the E²-field uncertainty inside TSL (see Page 8).

^B Numerical linearization parameter: uncertainty not required.

November 25, 2005

Frequency Response of E-Field

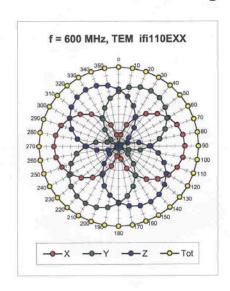
(TEM-Cell:ifi110 EXX, Waveguide: R22)

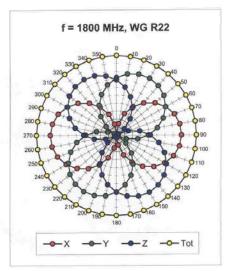


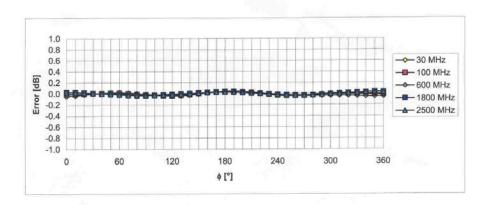
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

November 25, 2005

Receiving Pattern (ϕ), $\vartheta = 0^{\circ}$





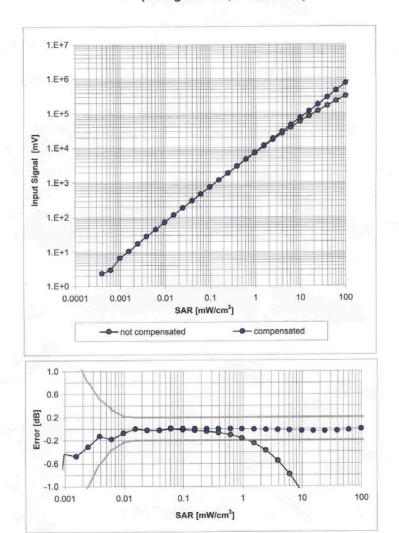


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

November 25, 2005

Dynamic Range f(SAR_{head})

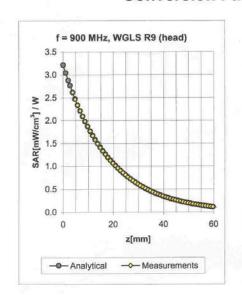
(Waveguide R22, f = 1800 MHz)

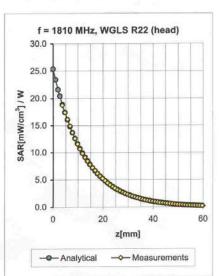


Uncertainty of Linearity Assessment: ± 0.6% (k=2)

November 25, 2005

Conversion Factor Assessment





f [MHz]	Validity [MHz] ^C	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.56	1.85	6.51 ± 11.0% (k=2)
1810	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.57	2.47	5.40 ± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.62	2.29	4.67 ± 11.8% (k=2)
450	± 50 / ± 100	Body	56.7 ± 5%	0.94 ± 5%	0.12	1.61	7.74 ± 13.3% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	$1.05 \pm 5\%$	0.47	2.15	6.45 ± 11.0% (k=2)
1810	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.53	2.78	4.88 ± 11.0% (k=2)
2450	±50/±100	Body	52.7 ± 5%	1.95 ± 5%	0.65	2.11	4.35 ± 11.8% (k=2)

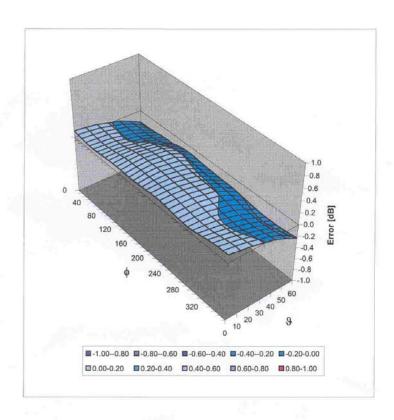
Certificate No: ET3-1736_Nov05

^c The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

November 25, 2005

Deviation from Isotropy in HSL

Error (φ, θ), f = 900 MHz



Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)