

TCC

Test & Certification Center (TCC) - Dallas



Accredited Laboratory
Certificate Number: 1819-01

APPENDIX A: VALIDATION SCANS

Dipole 835 MHz, Head Validation

SAM 1 (Cellular - Brain Tissue)

Frequency: 835 MHz; Crest factor: 1.0

Validation 835MHz - Brain Tissue: $\sigma = 0.91$ mho/m $\epsilon_r = 40.8$ $\rho = 1.00$ g/cm³

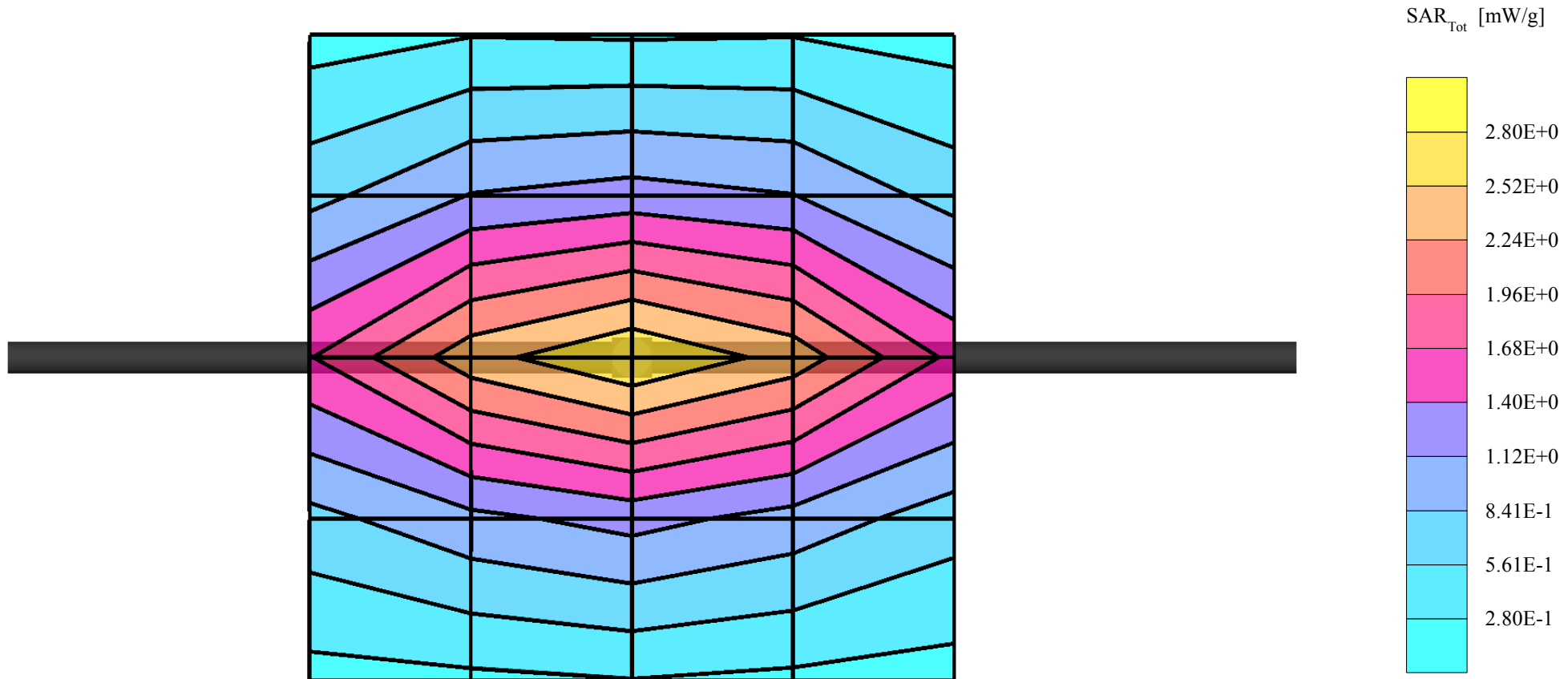
Probe: ET3DV6 - SN1516; ConvF(6.60,6.60,6.60)

Cubes (2): Peak: 3.75 mW/g ± 0.15 dB, SAR (1g): 2.42 mW/g ± 0.15 dB, SAR (10g): 1.62 mW/g ± 0.10 dB, (Advanced extrapolation)

Penetration depth: 14.2 (13.9, 14.9) [mm]

Powerdrift: 0.03 dB

Liquid Temperature (°C): 21.1



Dipole 835 MHz, Head Validation

SAM 1 (Cellular - Brain Tissue)

Frequency: 835 MHz; Crest factor: 1.0

Validation 835MHz - Brain Tissue: $\sigma = 0.92$ mho/m $\epsilon_r = 40.7$ $\rho = 1.00$ g/cm³

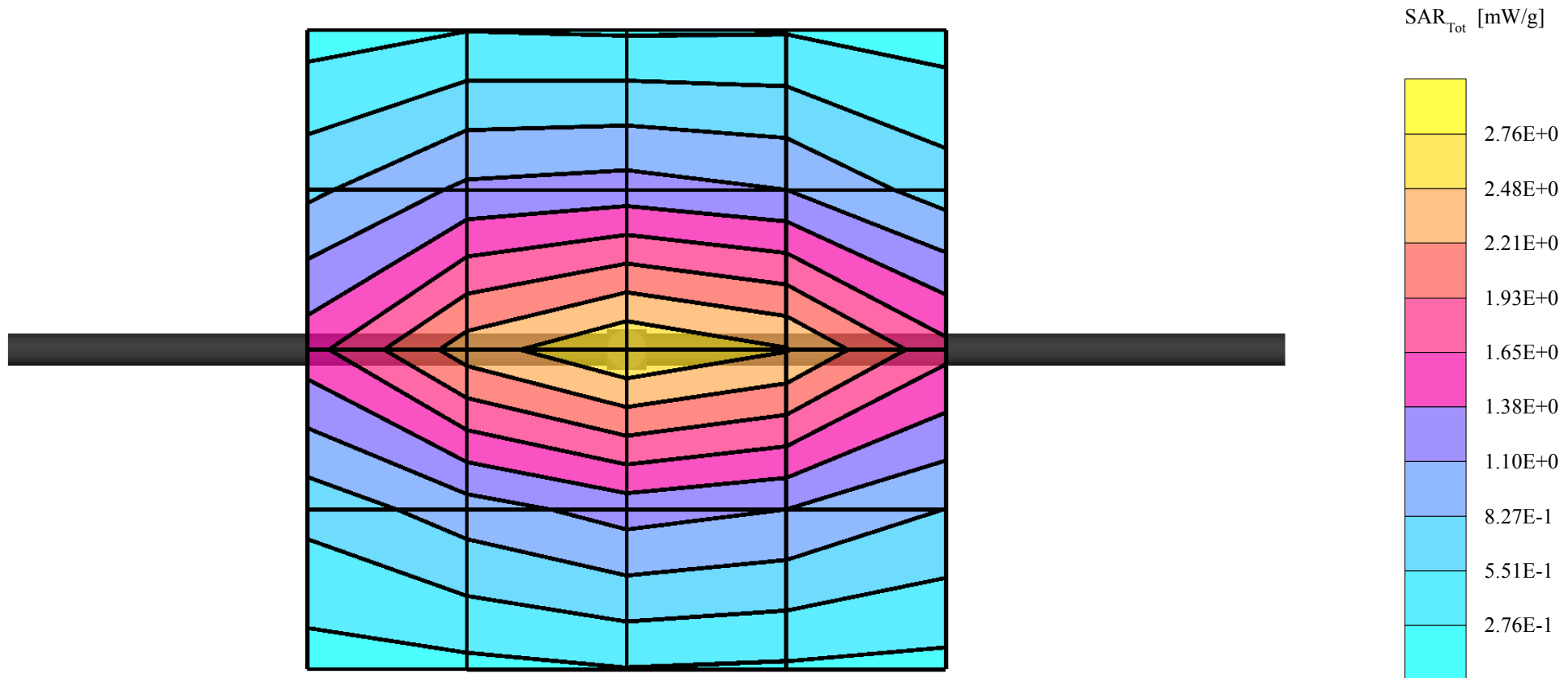
Probe: ET3DV6 - SN1516; ConvF(6.60,6.60,6.60)

Cubes (2): Peak: 3.83 mW/g ± 0.06 dB, SAR (1g): 2.39 mW/g ± 0.06 dB, SAR (10g): 1.62 mW/g ± 0.06 dB, (Advanced extrapolation)

Penetration depth: 15.0 (14.9, 15.3) [mm]

Powerdrift: 0.18 dB

Liquid Temperature (°C): 21.1



Dipole 835 MHz, Head Validation

SAM 1 (Cellular - Brain Tissue)

Frequency: 835 MHz; Crest factor: 1.0

Validation 835MHz - Brain Tissue: $\sigma = 0.90$ mho/m $\epsilon_r = 40.9$ $\rho = 1.00$ g/cm³

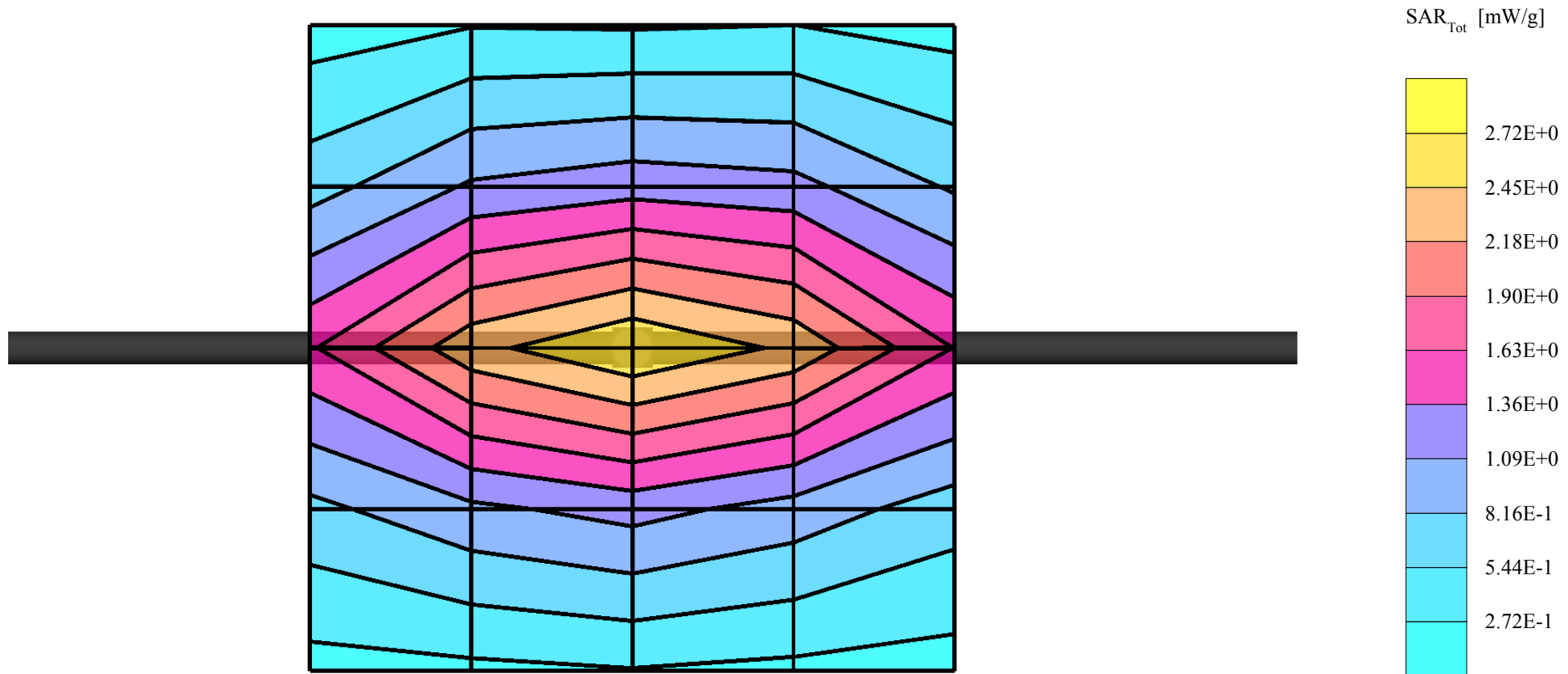
Probe: ET3DV6 - SN1516; ConvF(6.60,6.60,6.60)

Cubes (2): Peak: 3.77 mW/g ± 0.06 dB, SAR (1g): 2.35 mW/g ± 0.06 dB, SAR (10g): 1.59 mW/g ± 0.06 dB, (Advanced extrapolation)

Penetration depth: 15.2 (15.0, 15.5) [mm]

Powerdrift: 0.16 dB

Liquid Temperature (°C): 21.0



Dipole 835 MHz, Head Validation

SAM 1 (Cellular - Brain Tissue)

Frequency: 835 MHz; Crest factor: 1.0

Validation 835MHz - Brain Tissue: $\sigma = 0.90$ mho/m $\epsilon_r = 40.8$ $\rho = 1.00$ g/cm³

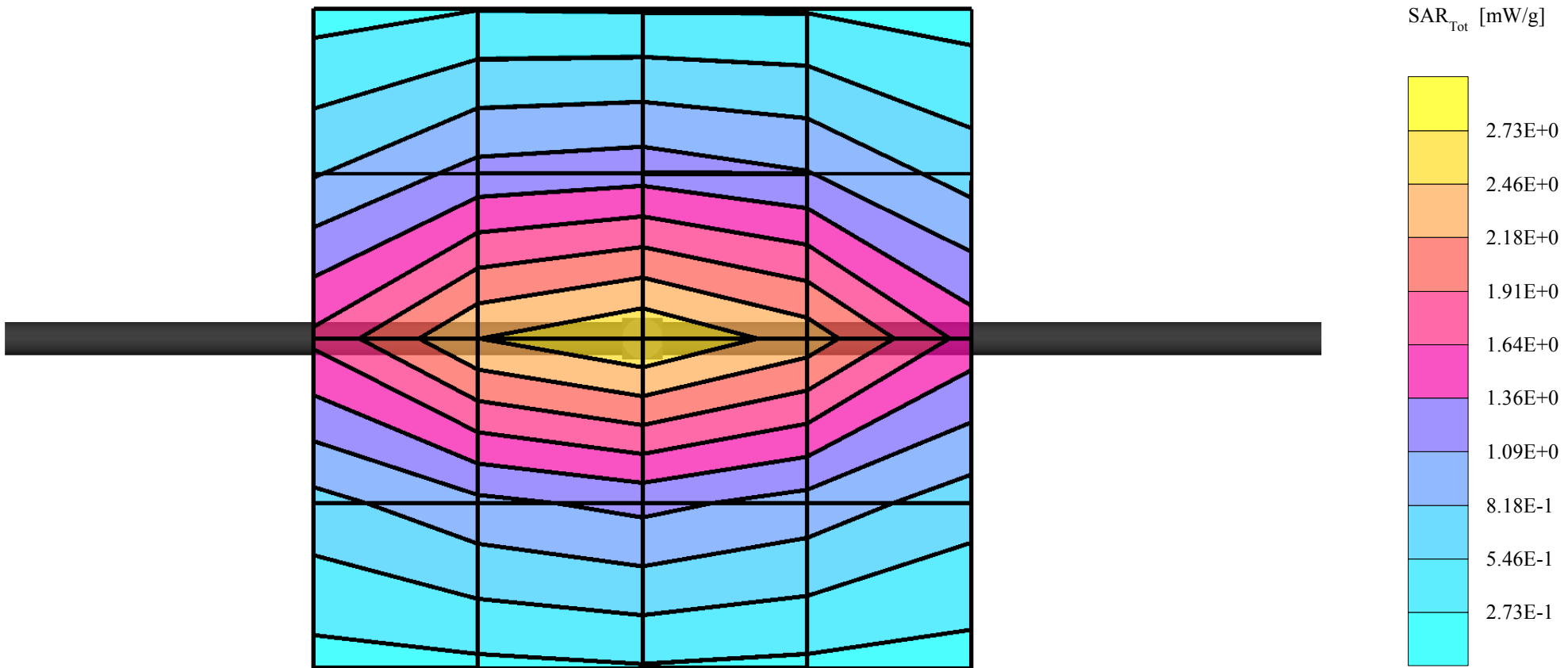
Probe: ET3DV6 - SN1516; ConvF(6.60,6.60,6.60)

Cubes (2): Peak: 3.78 mW/g ± 0.00 dB, SAR (1g): 2.38 mW/g ± 0.05 dB, SAR (10g): 1.60 mW/g ± 0.05 dB, (Advanced extrapolation)

Penetration depth: 14.8 (14.7, 15.0) [mm]

Powerdrift: 0.14 dB

Liquid Temperature (°C): 20.7



Dipole 1900 MHz, Head Validation

SAM 3 (PCS - Brain / Muscle Tissue)

Frequency: 1900 MHz; Crest factor: 1.0

Validation 1900MHz - Brain Tissue: $\sigma = 1.47$ mho/m $\epsilon_r = 38.6$ $\rho = 1.00$ g/cm³

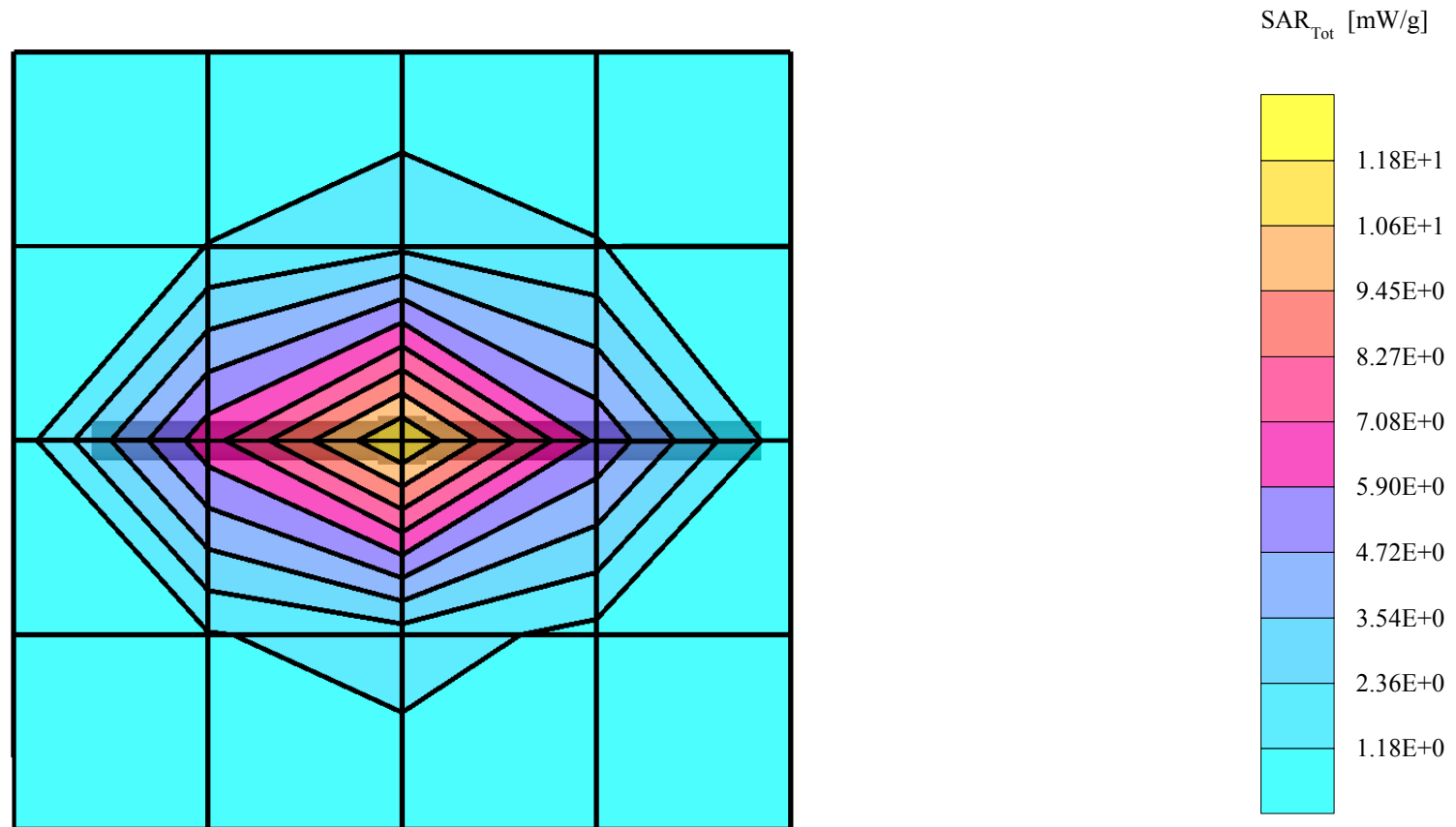
Probe: ET3DV6 - SN1516; ConvF(5.00,5.00,5.00)

Cubes (2): Peak: 16.6 mW/g ± 0.05 dB, SAR (1g): 9.63 mW/g ± 0.04 dB, SAR (10g): 5.24 mW/g ± 0.05 dB, (Advanced extrapolation)

Penetration depth: 9.9 (9.8, 10.2) [mm]

Powerdrift: 0.14 dB

Liquid Temperature (°C): 21.0



Dipole 1900 MHz, Head Validation

SAM 3 (PCS - Brain / Muscle Tissue)

Frequency: 1900 MHz; Crest factor: 1.0

Validation 1900MHz - Brain Tissue: $\sigma = 1.47$ mho/m $\epsilon_r = 38.5$ $\rho = 1.00$ g/cm³

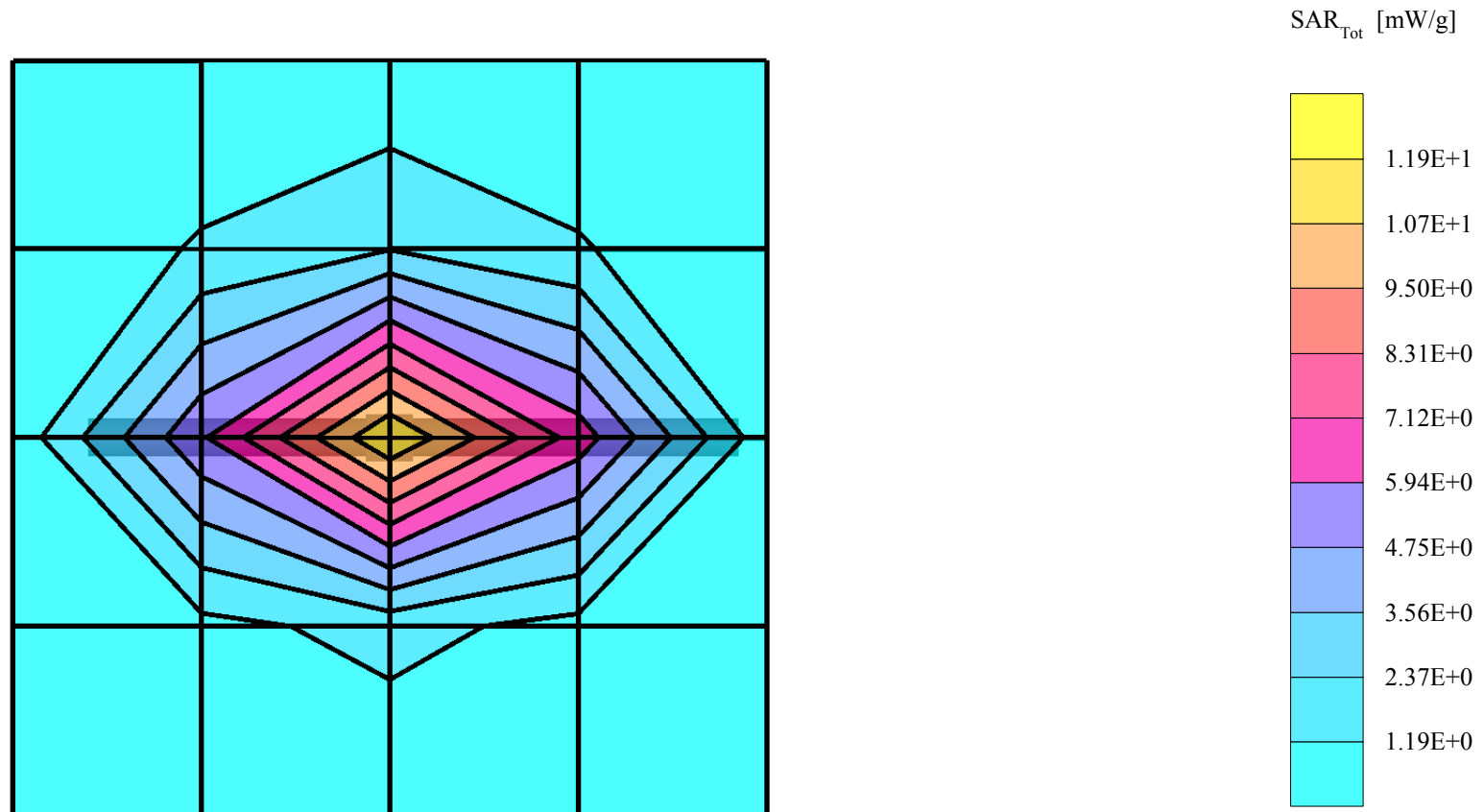
Probe: ET3DV6 - SN1516; ConvF(5.00,5.00,5.00)

Cubes (2): Peak: 16.8 mW/g ± 0.01 dB, SAR (1g): 9.69 mW/g ± 0.05 dB, SAR (10g): 5.18 mW/g ± 0.06 dB, (Advanced extrapolation)

Penetration depth: 9.4 (9.3, 9.5) [mm]

Powerdrift: 0.09 dB

Liquid Temperature (°C): 19.2



Dipole 835 MHz, Body Validation

SAM 2 (Cellular - Muscle Tissue)

Frequency: 835 MHz; Crest factor: 1.0

Validation 835MHz - Muscle Tissue: $\sigma = 0.96$ mho/m $\epsilon_r = 53.3$ $\rho = 1.00$ g/cm³

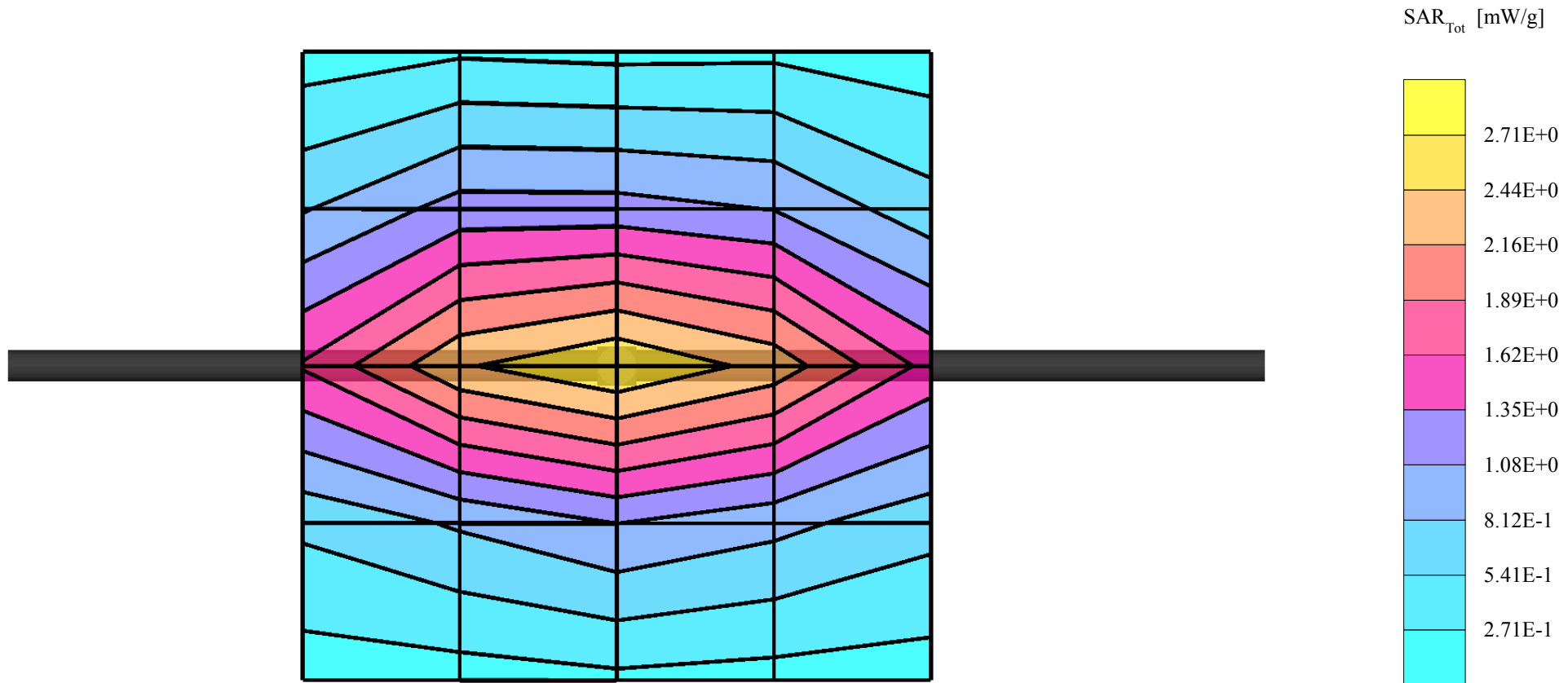
Probe: ET3DV6 - SN1516; ConvF(6.50,6.50,6.50)

Cubes (2): Peak: 3.74 mW/g ± 0.05 dB, SAR (1g): 2.37 mW/g ± 0.06 dB, SAR (10g): 1.63 mW/g ± 0.05 dB, (Advanced extrapolation)

Penetration depth: 16.0 (15.7, 16.6) [mm]

Powerdrift: 0.11 dB

Liquid Temperature (°C): 21.3



Dipole 835 MHz, Body Validation

SAM 2 (Cellular - Muscle Tissue)

Frequency: 835 MHz; Crest factor: 1.0

Validation 835MHz - Muscle Tissue: $\sigma = 0.95$ mho/m $\epsilon_r = 53.4$ $\rho = 1.00$ g/cm³

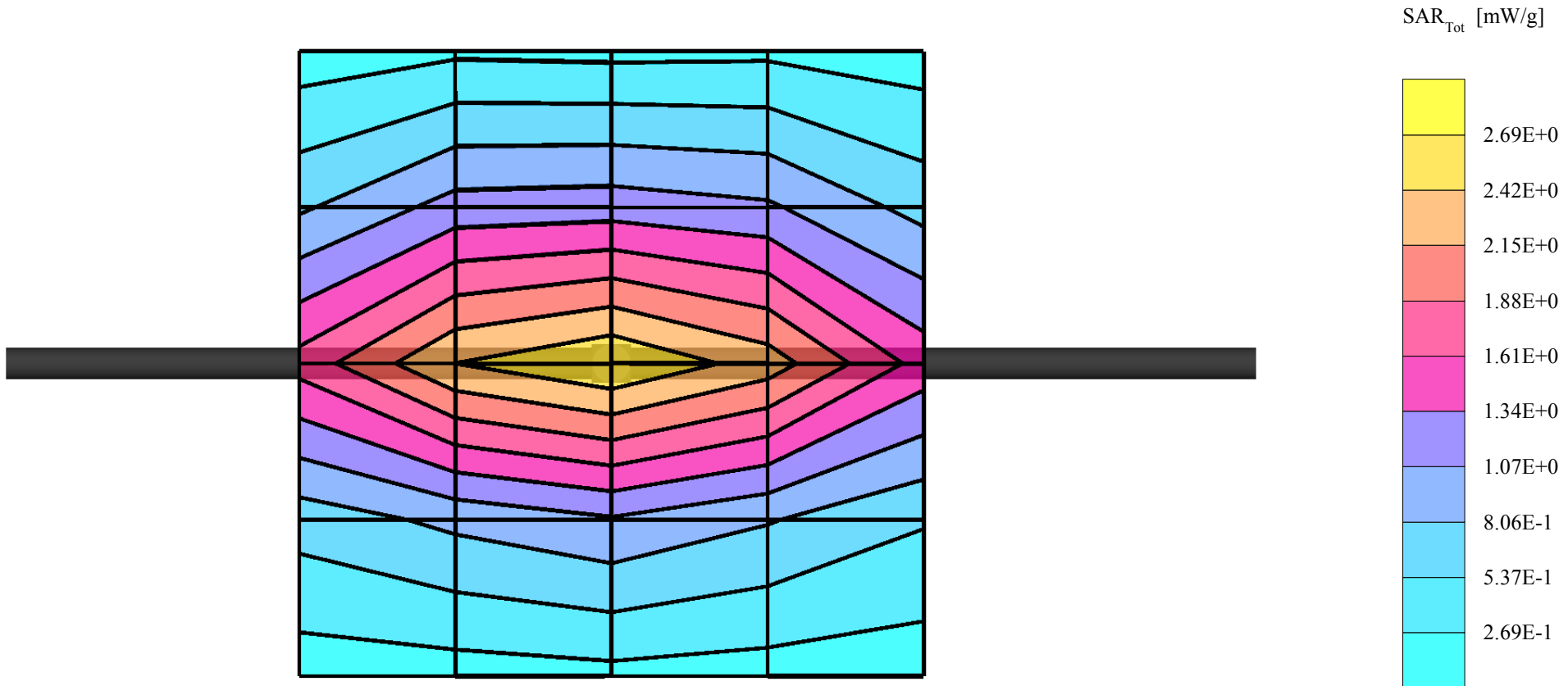
Probe: ET3DV6 - SN1516; ConvF(6.50,6.50,6.50)

Cubes (2): Peak: 3.67 mW/g ± 0.02 dB, SAR (1g): 2.36 mW/g ± 0.05 dB, SAR (10g): 1.61 mW/g ± 0.05 dB, (Advanced extrapolation)

Penetration depth: 15.5 (15.3, 15.9) [mm]

Powerdrift: 0.14 dB

Liquid Temperature (°C): 21.4



Dipole 835 MHz, Body Validation

SAM 2 (Cellular - Muscle Tissue)

Frequency: 835 MHz; Crest factor: 1.0

Validation 835MHz - Muscle Tissue: $\sigma = 0.95$ mho/m $\epsilon_r = 53.0$ $\rho = 1.00$ g/cm³

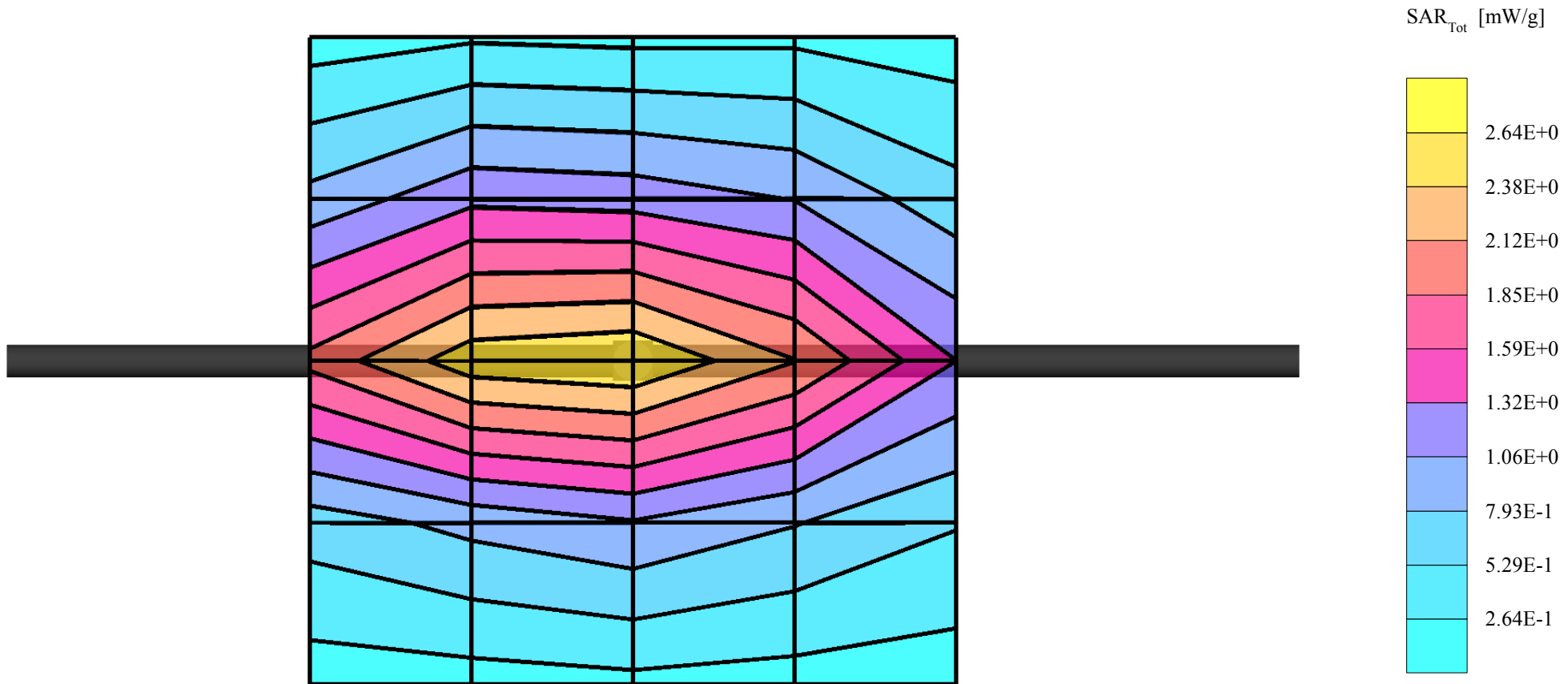
Probe: ET3DV6 - SN1516; ConvF(6.50,6.50,6.50)

Cubes (2): Peak: 3.72 mW/g ± 0.03 dB, SAR (1g): 2.37 mW/g ± 0.05 dB, SAR (10g): 1.61 mW/g ± 0.05 dB, (Advanced extrapolation)

Penetration depth: 15.5 (15.3, 15.8) [mm]

Powerdrift: 0.11 dB

Liquid Temperature (°C): 21.3



Dipole 1900 MHz, Body Validation

SAM 3 (PCS - Brain / Muscle Tissue)

Frequency: 1900 MHz; Crest factor: 1.0

Validation 1900MHz - Muscle Tissue: $\sigma = 1.58$ mho/m $\epsilon_r = 52.0$ $\rho = 1.00$ g/cm³

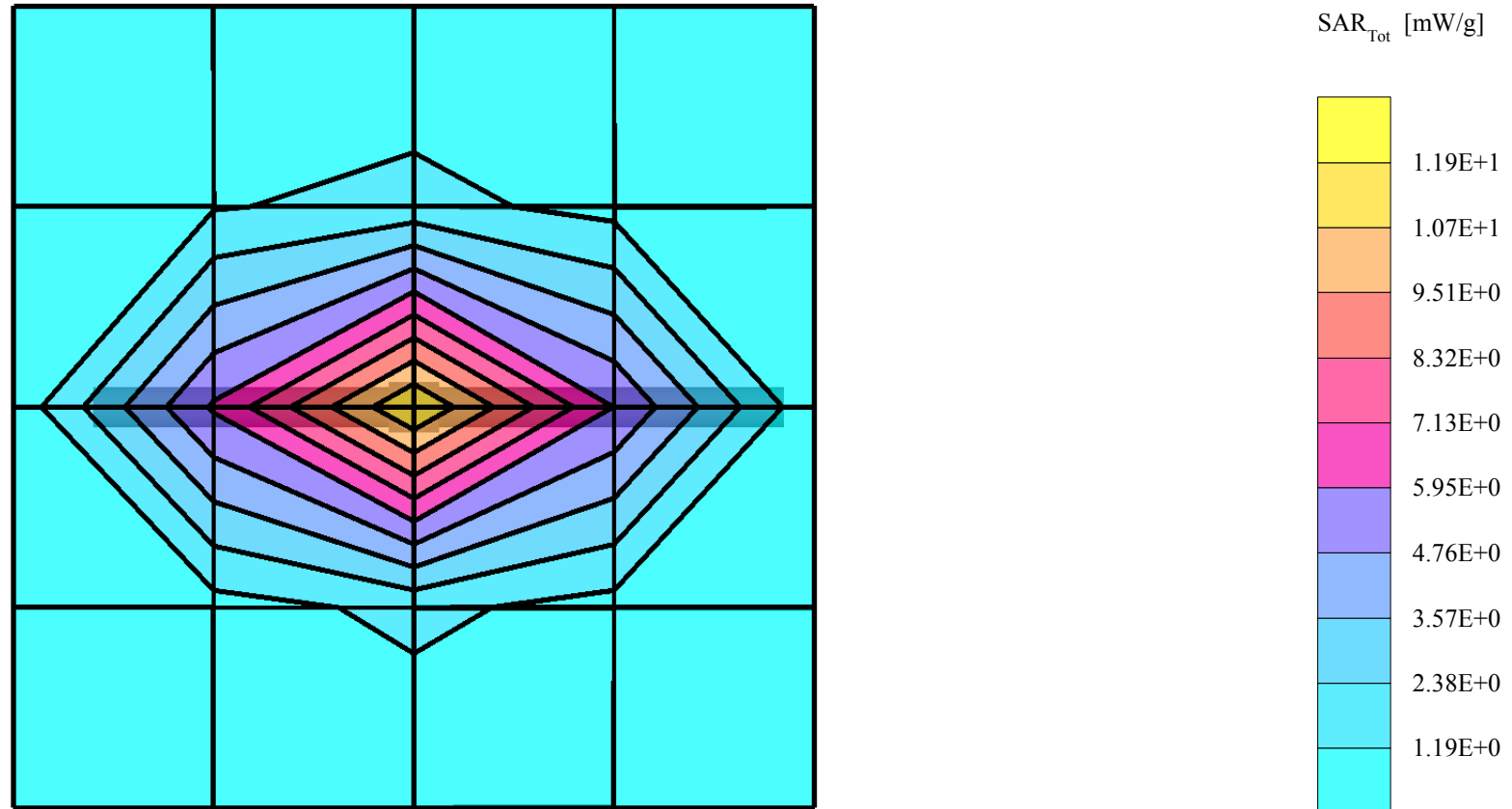
Probe: ET3DV6 - SN1516; ConvF(4.80,4.80,4.80)

Cubes (2): Peak: 16.0 mW/g ± 0.00 dB, SAR (1g): 9.49 mW/g ± 0.06 dB, SAR (10g): 5.18 mW/g ± 0.06 dB, (Advanced extrapolation)

Penetration depth: 10.5 (10.4, 10.7) [mm]

Powerdrift: 0.05 dB

Liquid Temperature (°C): 20.3



Dipole 1900 MHz, Body Validation

SAM 3 (PCS - Brain / Muscle Tissue)

Frequency: 1900 MHz; Crest factor: 1.0

Validation 1900MHz - Muscle Tissue: $\sigma = 1.57$ mho/m $\epsilon_r = 51.4$ $\rho = 1.00$ g/cm³

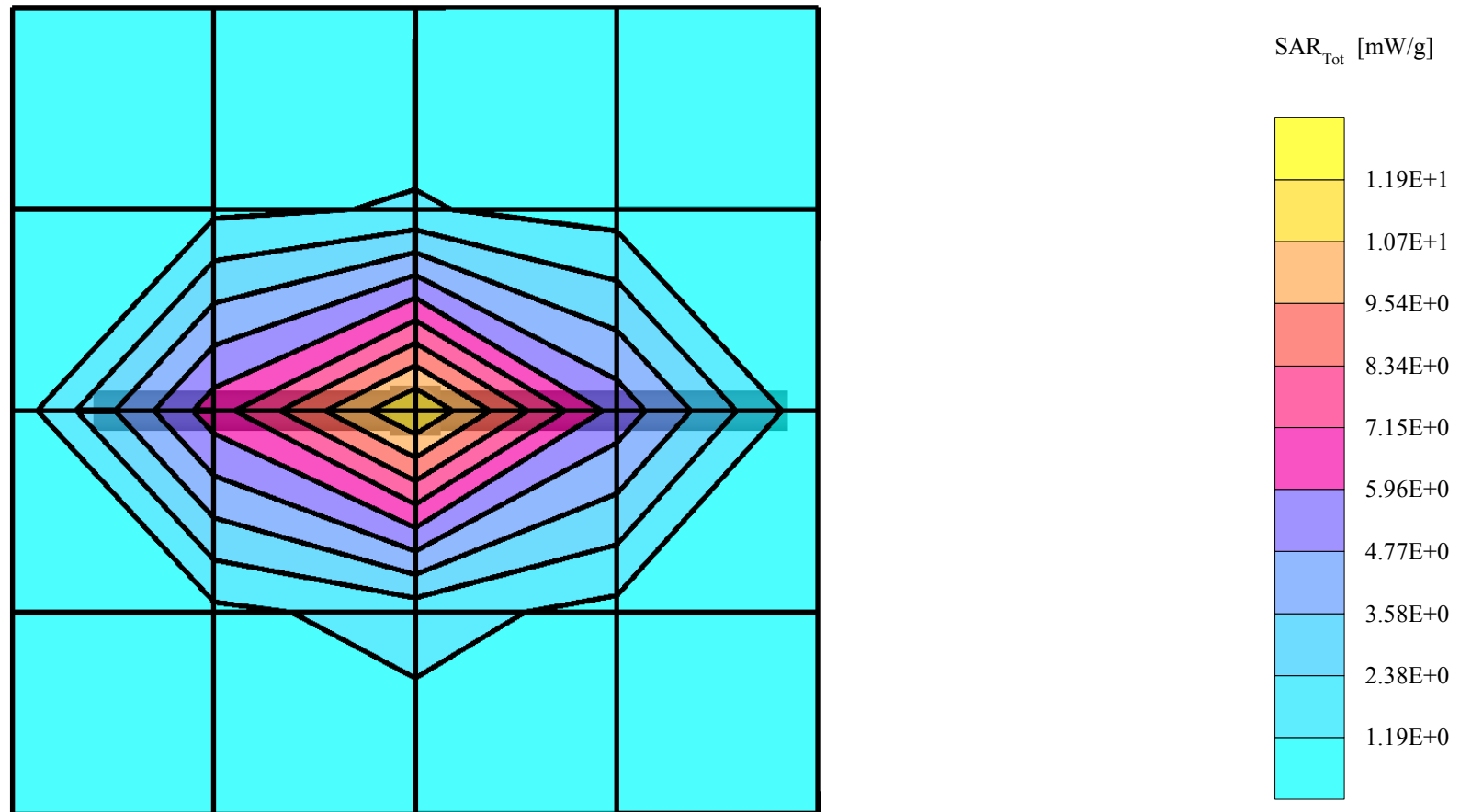
Probe: ET3DV6 - SN1516; ConvF(4.80,4.80,4.80)

Cubes (2): Peak: 16.5 mW/g ± 0.02 dB, SAR (1g): 9.58 mW/g ± 0.04 dB, SAR (10g): 5.15 mW/g ± 0.05 dB, (Advanced extrapolation)

Penetration depth: 10.0 (10.0, 10.2) [mm]

Powerdrift: 0.11 dB

Liquid Temperature (°C): 19.5



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APPENDIX B: MEASUREMENT SCANS

NPM-10, GSM 850, Channel 251, Left Cheek Position with BLC-2 Battery

SAM 1 (Cellular - Brain Tissue) Phantom

Frequency: 849 MHz; Crest factor: 8.0

Cellular Band - Brain Tissue: $\sigma = 0.90$ mho/m $\epsilon_r = 40.7$ $\rho = 1.00$ g/cm³

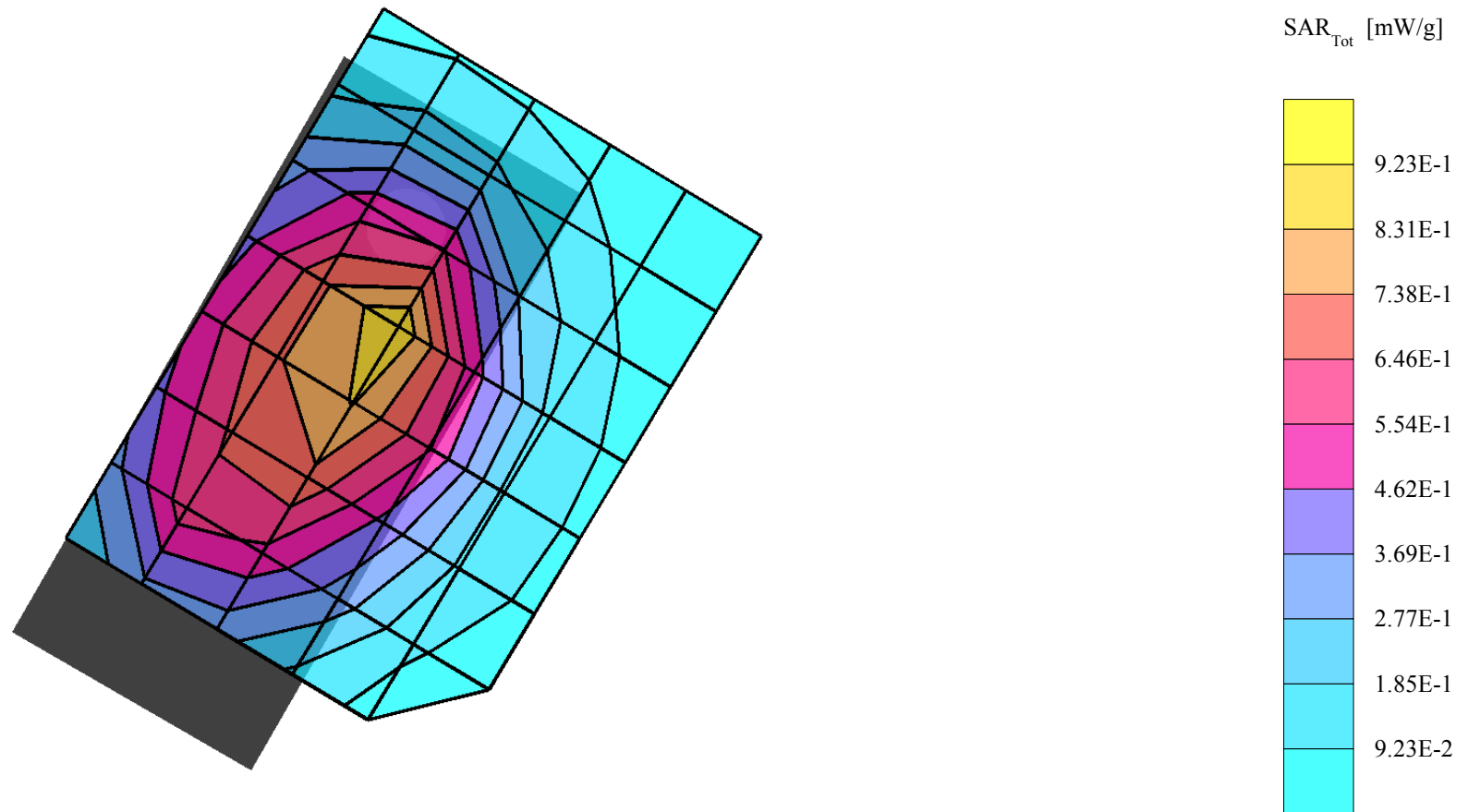
Probe: ET3DV6 - SN1516; ConvF(6.60,6.60,6.60)

Cubes (2): SAR (1g): 0.837 mW/g ± 0.16 dB, SAR (10g): 0.584 mW/g ± 0.14 dB, (Worst-case extrapolation)

Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0

Powerdrift: -0.07 dB

Liquid Temperature (°C): 20.7



NPM-10, GSM 850, Channel 190, Left Tilt Position with BLC-2 Battery

SAM 1 (Cellular - Brain Tissue) Phantom

Frequency: 837 MHz; Crest factor: 8.0

Cellular Band - Brain Tissue: $\sigma = 0.92$ mho/m $\epsilon_r = 40.7$ $\rho = 1.00$ g/cm³

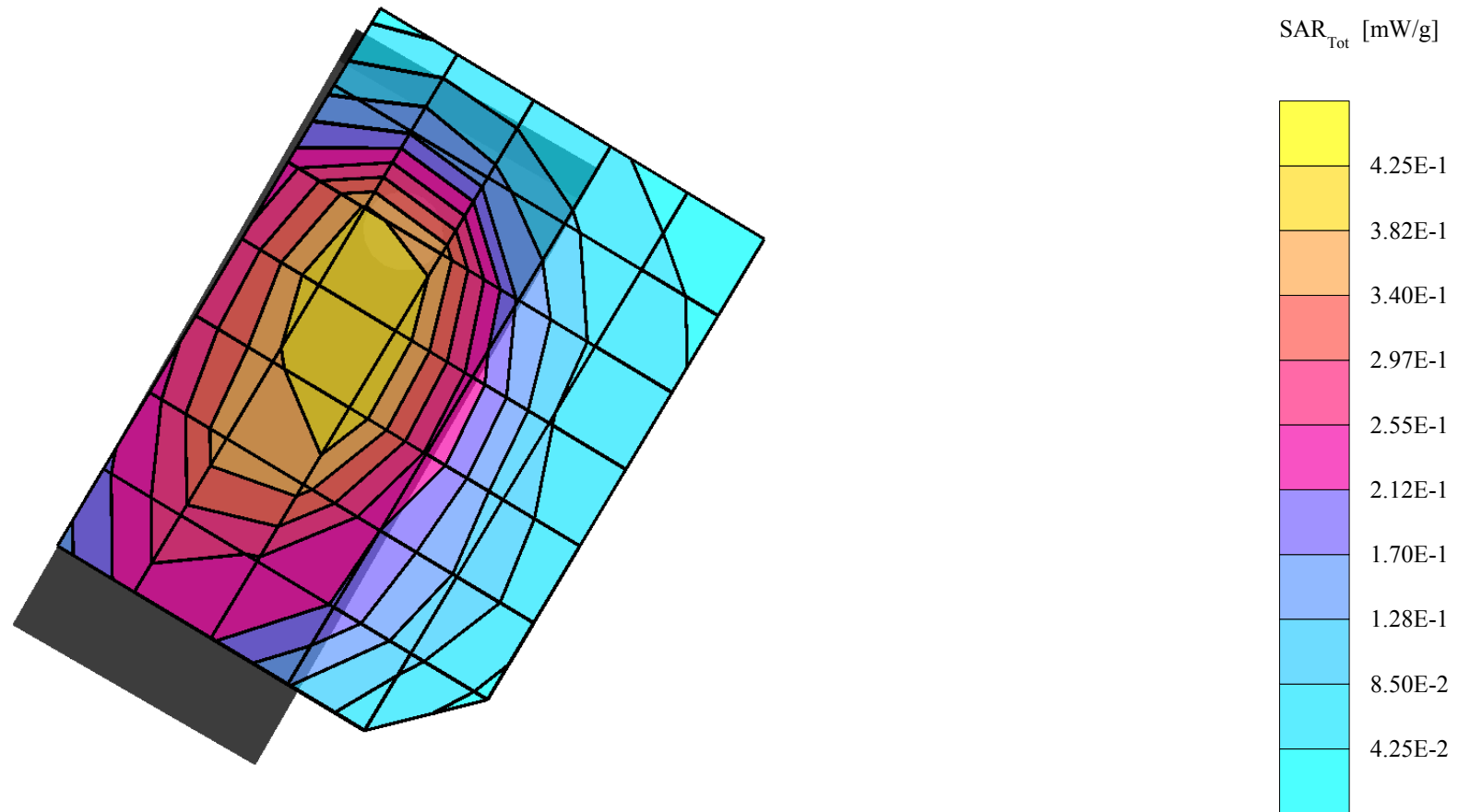
Probe: ET3DV6 - SN1516; ConvF(6.60,6.60,6.60)

Cube 5x5x7: SAR (1g): 0.421 mW/g, SAR (10g): 0.306 mW/g, (Worst-case extrapolation)

Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0

Powerdrift: 0.01 dB

Liquid Temperature (°C): 21.1



NPM-10, GSM 850, Channel 190, Right Cheek Position with BLC-2 Battery

SAM 1 (Cellular - Brain Tissue) Phantom

Frequency: 837 MHz; Crest factor: 8.0

Cellular Band - Brain Tissue: $\sigma = 0.92$ mho/m $\epsilon_r = 40.7$ $\rho = 1.00$ g/cm³

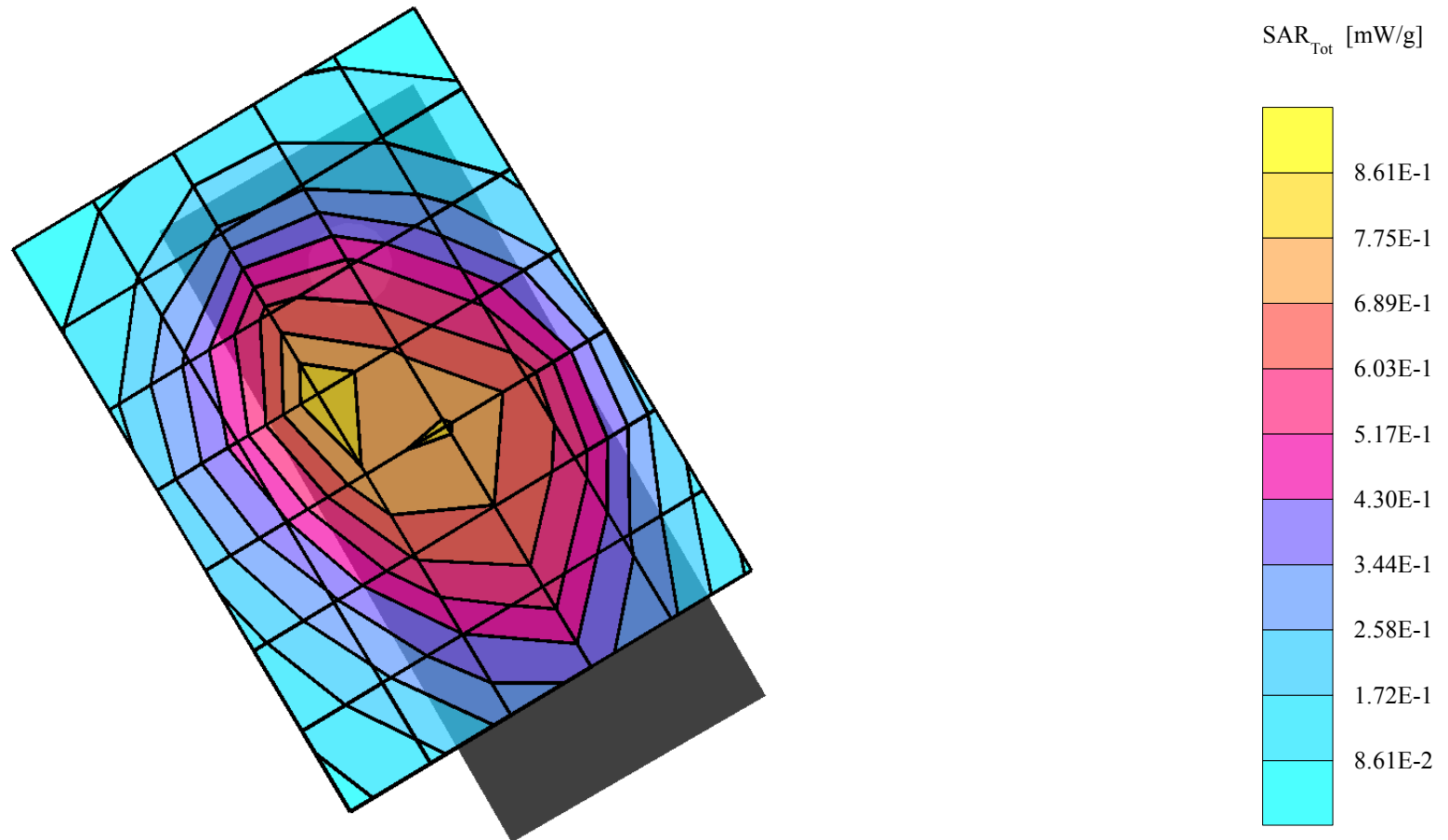
Probe: ET3DV6 - SN1516; ConvF(6.60,6.60,6.60)

Cube 5x5x7: SAR (1g): 0.816 mW/g, SAR (10g): 0.568 mW/g, (Worst-case extrapolation)

Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0

Powerdrift: 0.10 dB

Liquid Temperature (°C): 21.1



NPM-10, GSM 850, Channel 190, Right Tilt Position with BLC-2 Battery

SAM 1 (Cellular - Brain Tissue) Phantom

Frequency: 837 MHz; Crest factor: 8.0

Cellular Band - Brain Tissue: $\sigma = 0.92$ mho/m $\epsilon_r = 40.7$ $\rho = 1.00$ g/cm³

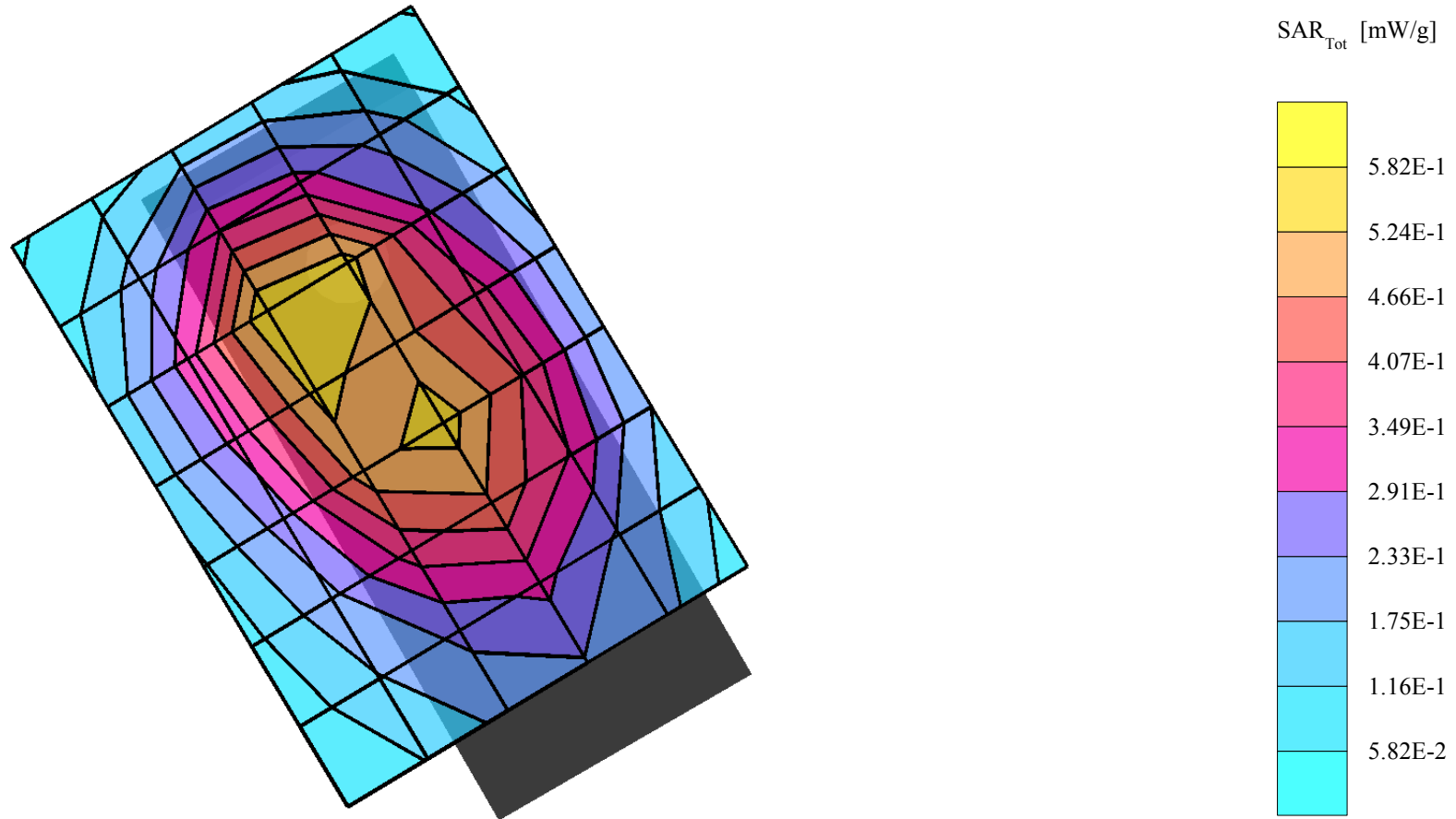
Probe: ET3DV6 - SN1516; ConvF(6.60,6.60,6.60)

Cubes (2): SAR (1g): 0.524 mW/g \pm 0.35 dB, SAR (10g): 0.365 mW/g \pm 0.36 dB, (Worst-case extrapolation)

Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0

Powerdrift: -0.09 dB

Liquid Temperature (°C): 21.1



NPM-10, GSM 1900, Channel 661, Left Cheek Position with BLC-2 Battery

SAM 3 (PCS - Brain / Muscle Tissue) Phantom

Frequency: 1880 MHz; Crest factor: 8.0

PCS Band - Brain Tissue: $\sigma = 1.45$ mho/m $\epsilon_r = 38.8$ $\rho = 1.00$ g/cm³

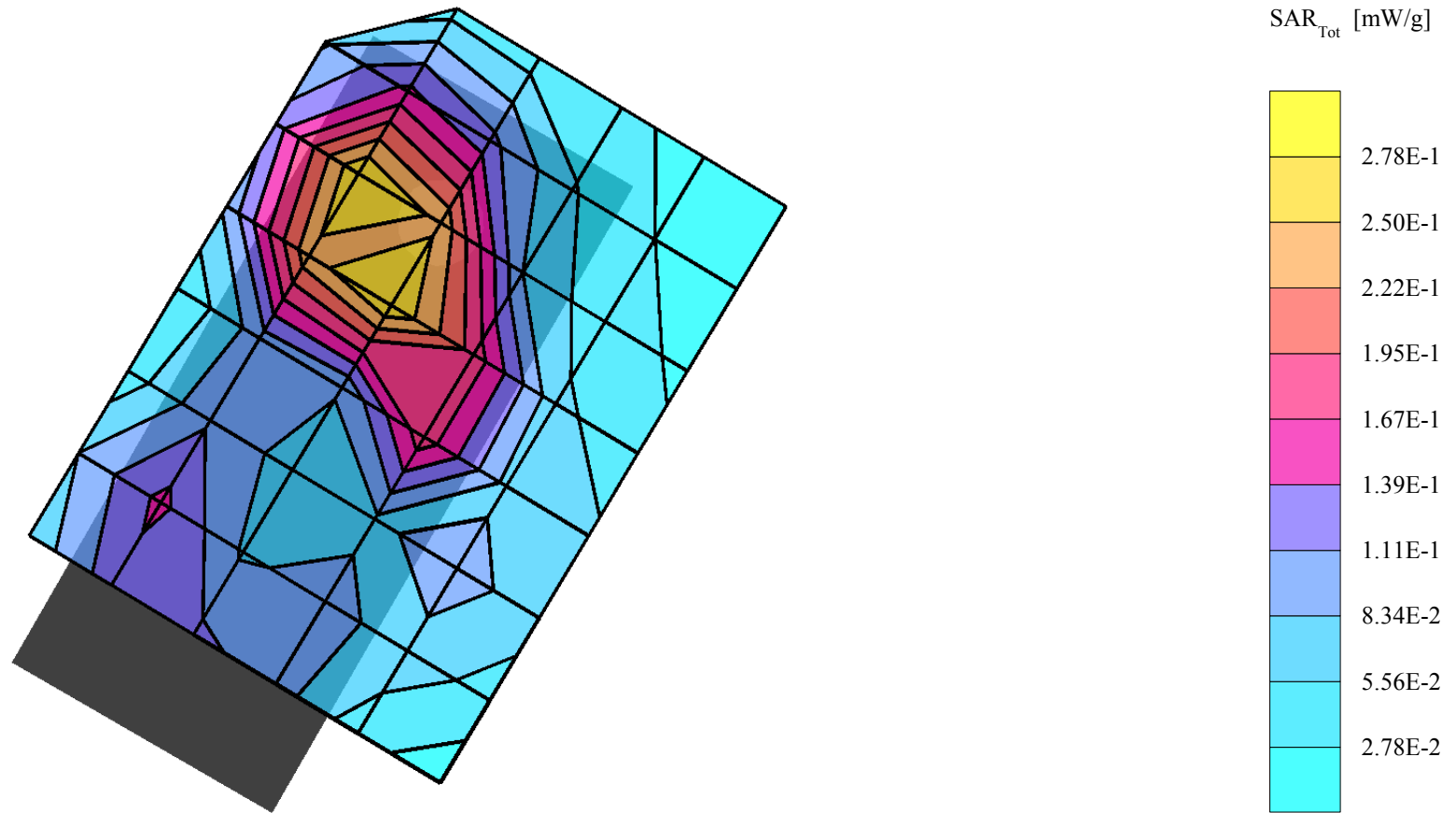
Probe: ET3DV6 - SN1516; ConvF(5.00,5.00,5.00)

Cube 5x5x7: SAR (1g): 0.291 mW/g, SAR (10g): 0.177 mW/g, (Worst-case extrapolation)

Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0

Powerdrift: -0.02 dB

Liquid Temperature (°C): 21.0



NPM-10, GSM 1900, Channel 661, Left Tilt Position with BLC-2 Battery

SAM 3 (PCS - Brain / Muscle Tissue) Phantom

Frequency: 1880 MHz; Crest factor: 8.0

PCS Band - Brain Tissue: $\sigma = 1.45$ mho/m $\epsilon_r = 38.8$ $\rho = 1.00$ g/cm³

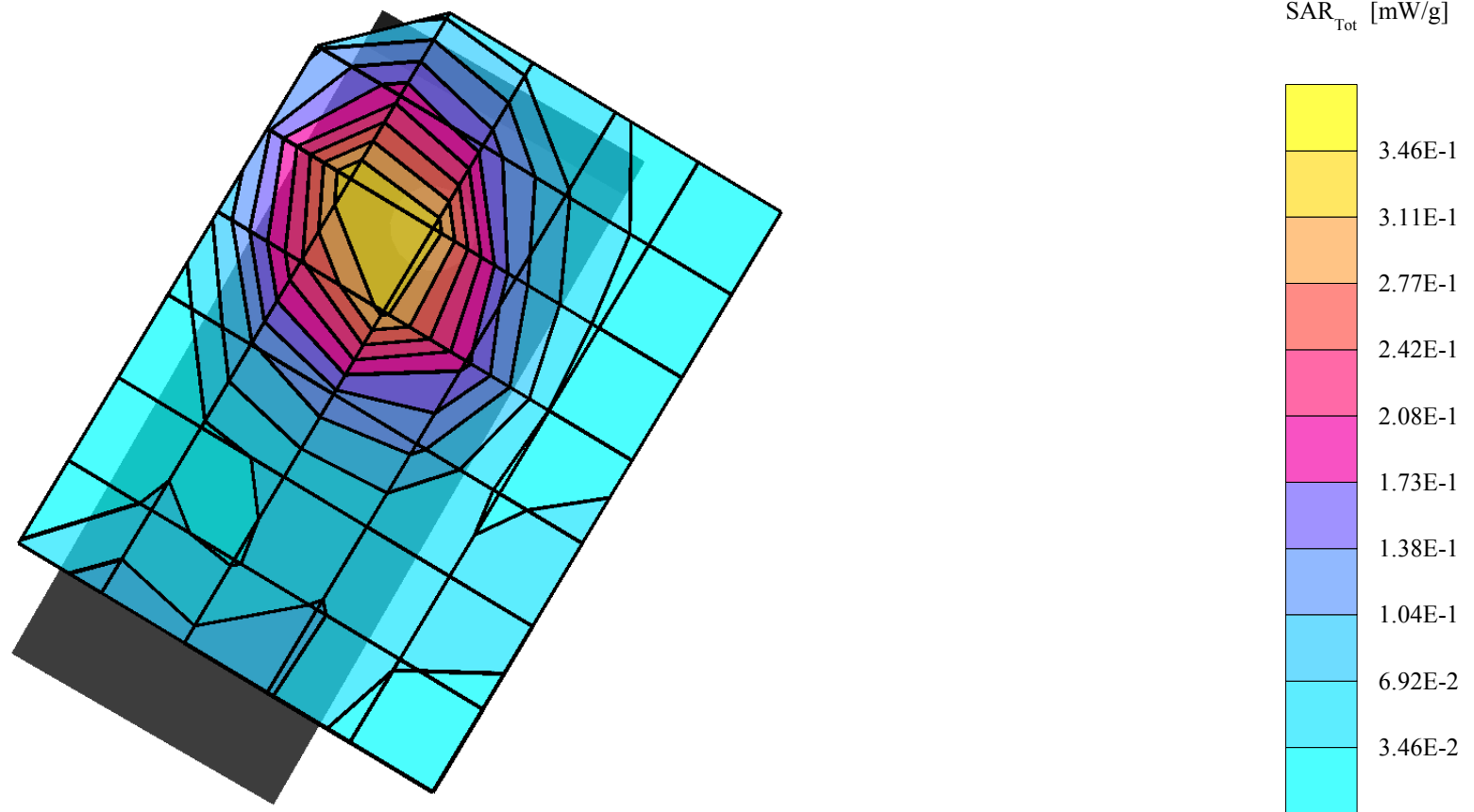
Probe: ET3DV6 - SN1516; ConvF(5.00,5.00,5.00)

Cube 5x5x7: SAR (1g): 0.365 mW/g, SAR (10g): 0.215 mW/g, (Worst-case extrapolation)

Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0

Powerdrift: -0.02 dB

Liquid Temperature (°C): 21.0



NPM-10, GSM 1900, Channel 661, Right Cheek Position with BLC-2 Battery

SAM 3 (PCS - Brain / Muscle Tissue) Phantom

Frequency: 1880 MHz; Crest factor: 8.0

PCS Band - Brain Tissue: $\sigma = 1.45$ mho/m $\epsilon_r = 38.6$ $\rho = 1.00$ g/cm³

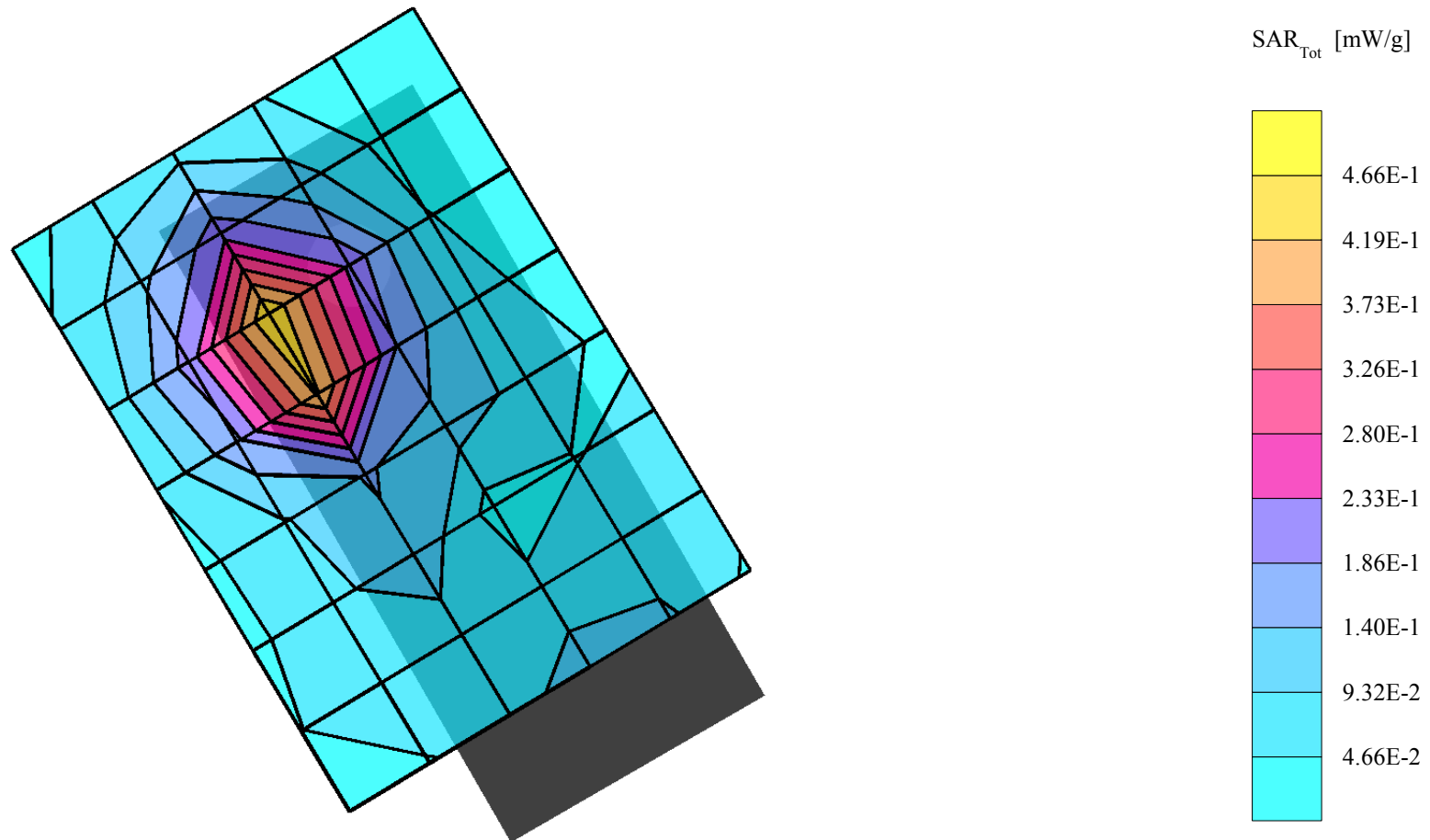
Probe: ET3DV6 - SN1516; ConvF(5.00,5.00,5.00)

Cube 5x5x7: SAR (1g): 0.454 mW/g, SAR (10g): 0.246 mW/g, (Worst-case extrapolation)

Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0

Powerdrift: 0.15 dB

Liquid Temperature (°C): 19.2



NPM-10, GSM 1900, Channel 512, Right Tilt Position with BLC-2 Battery

SAM 3 (PCS - Brain / Muscle Tissue) Phantom

Frequency: 1850 MHz; Crest factor: 8.0

PCS Band - Brain Tissue: $\sigma = 1.45$ mho/m $\epsilon_r = 38.8$ $\rho = 1.00$ g/cm³

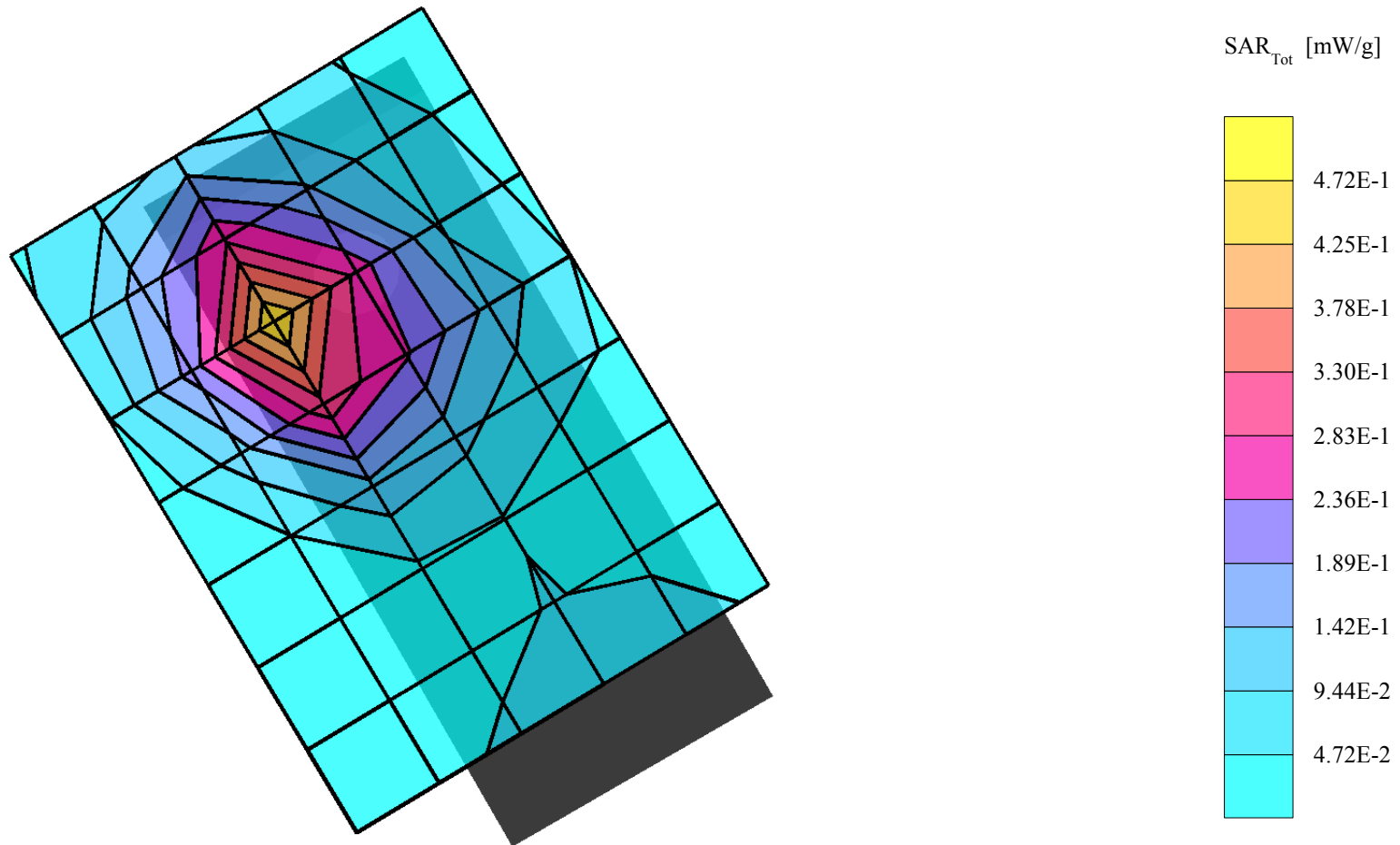
Probe: ET3DV6 - SN1516; ConvF(5.00,5.00,5.00)

Cube 5x5x7: SAR (1g): 0.435 mW/g, SAR (10g): 0.242 mW/g, (Worst-case extrapolation)

Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0

Powerdrift: 0.08 dB

Liquid Temperature (°C): 21.0



NPM-10, GSM 850, Channel 128, Flat Position with 15mm Spacer - Back of Phone, BLC-2 Battery and HDE-2 Headset

SAM 2 (Cellular - Muscle Tissue) Phantom

Frequency: 824 MHz; Crest factor: 8.0

Cellular Band - Muscle Tissue: $\sigma = 0.96$ mho/m $\epsilon_r = 53.4$ $\rho = 1.00$ g/cm³

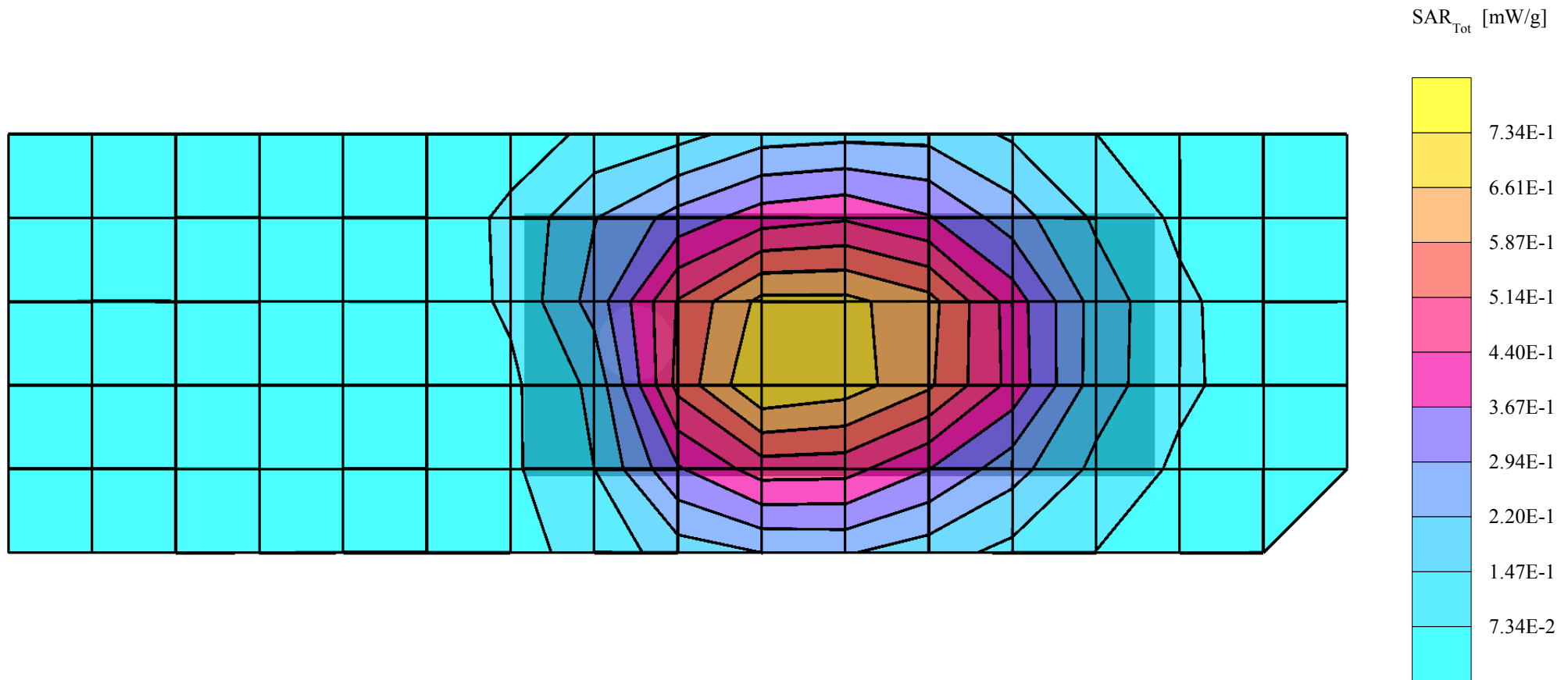
Probe: ET3DV6 - SN1516; ConvF(6.50,6.50,6.50)

Cube 5x5x7: SAR (1g): 0.731 mW/g, SAR (10g): 0.524 mW/g, (Worst-case extrapolation)

Coarse: Dx = 15.0, Dy = 15.0, Dz = 12.0

Powerdrift: -0.06 dB

Liquid Temperature (°C): 21.4



NPM-10, GSM 1900, Channel 661, Flat Position with 15mm Spacer - Back of Phone, BLC-2 Battery and HDE-2 Headset

SAM 3 (PCS - Brain / Muscle Tissue) Phantom

Frequency: 1880 MHz; Crest factor: 8.0

PCS Band - Muscle Tissue: $\sigma = 1.56$ mho/m $\epsilon_r = 52.1$ $\rho = 1.00$ g/cm³

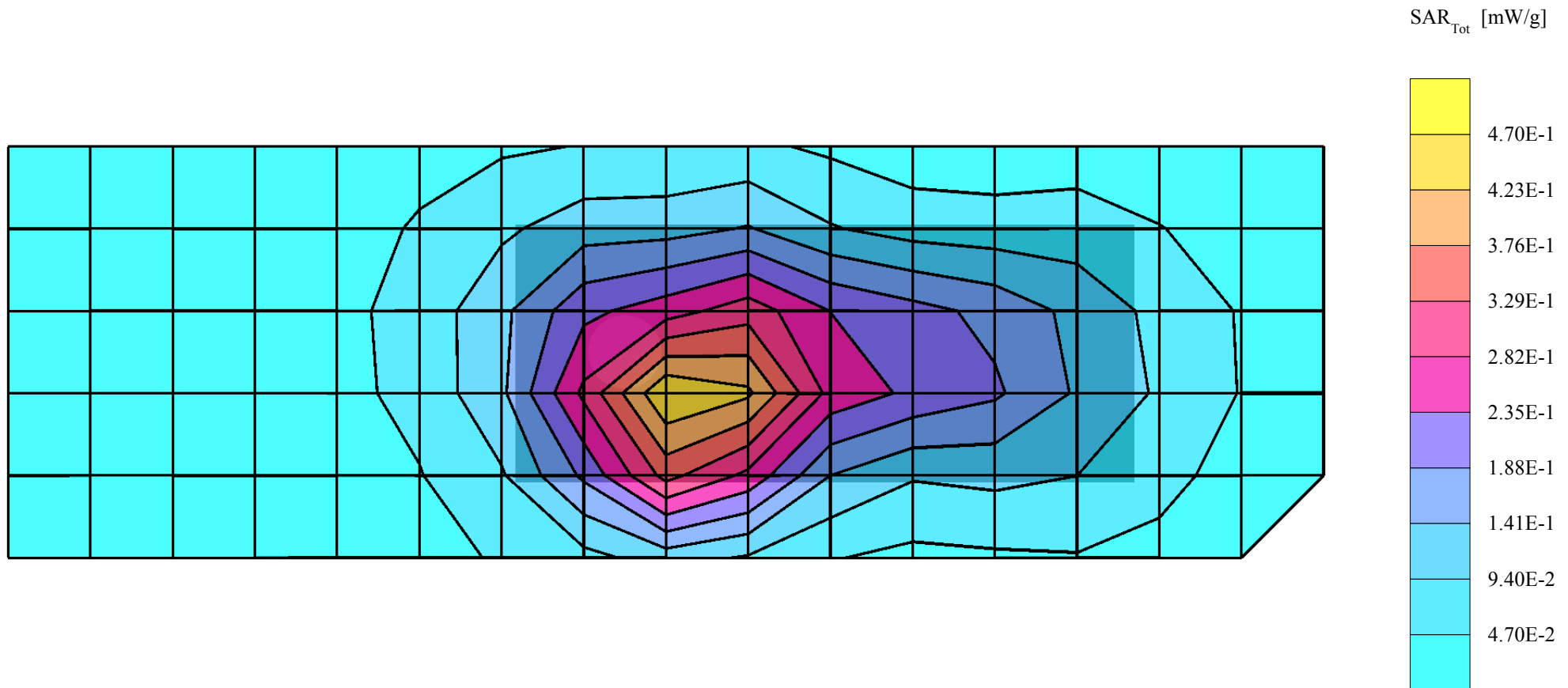
Probe: ET3DV6 - SN1516; ConvF(4.80,4.80,4.80)

Cube 5x5x7: SAR (1g): 0.459 mW/g, SAR (10g): 0.283 mW/g, (Worst-case extrapolation)

Coarse: Dx = 15.0, Dy = 15.0, Dz = 12.0

Powerdrift: 0.00 dB

Liquid Temperature (°C): 20.3



NPM-10, GSM 850, Channel 251, Left Cheek Position with BLC-2 Battery

SAM 1 (Cellular - Brain Tissue) Phantom

Frequency: 849 MHz; Crest factor: 8.0

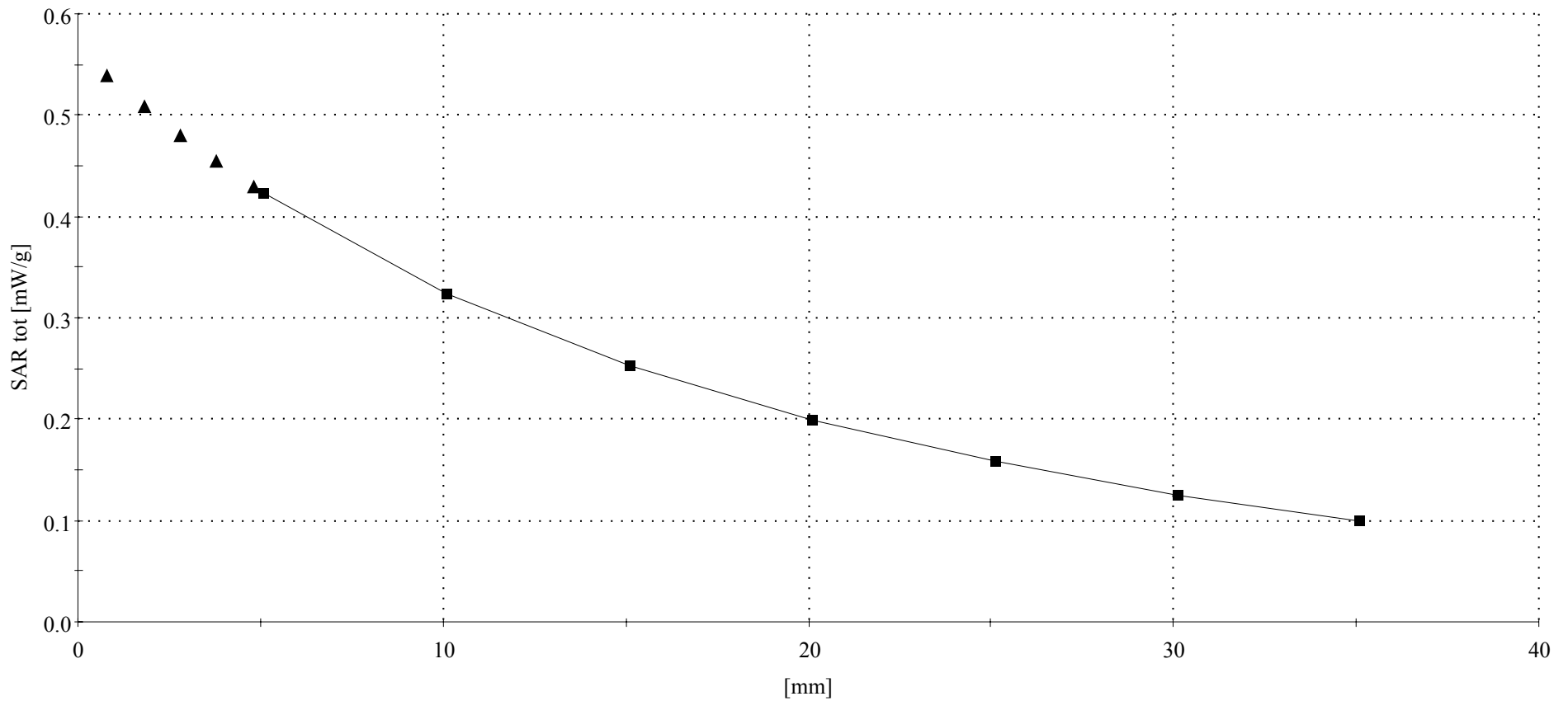
Cellular Band - Brain Tissue: $\sigma = 0.90$ mho/m $\epsilon_r = 40.7$ $\rho = 1.00$ g/cm³

Probe: ET3DV6 - SN1516; ConvF(6.60,6.60,6.60)

Cubes (2): SAR (1g): 0.837 mW/g \pm 0.16 dB, SAR (10g): 0.584 mW/g \pm 0.14 dB, (Worst-case extrapolation)

Cube 5x5x7: Dx = 8.0, Dy = 8.0, Dz = 5.0

Liquid Temperature (°C): 20.7



NPM-10, GSM 1900, Channel 661, Right Cheek Position with BLC-2 Battery

SAM 3 (PCS - Brain / Muscle Tissue) Phantom

Frequency: 1880 MHz; Crest factor: 8.0

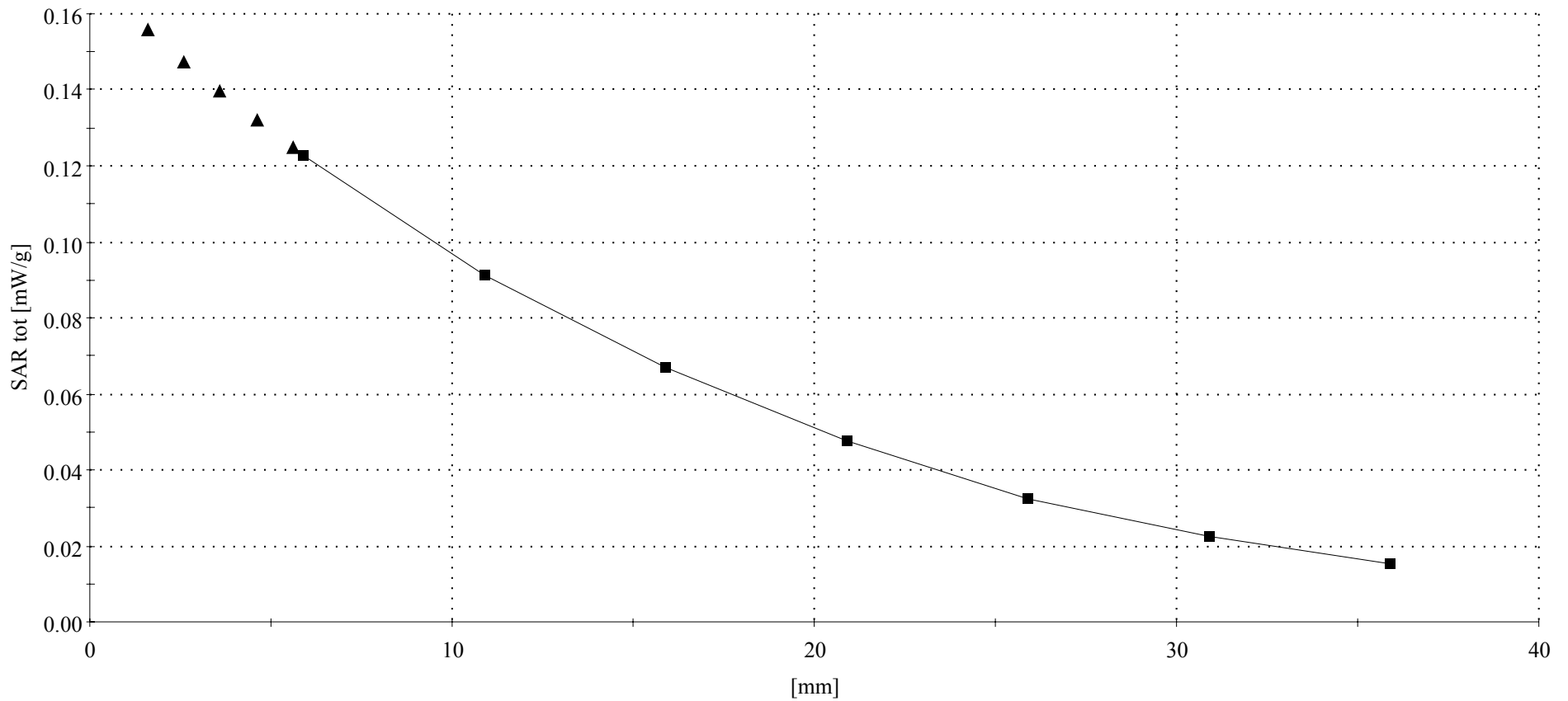
PCS Band - Brain Tissue: $\sigma = 1.45$ mho/m $\epsilon_r = 38.6$ $\rho = 1.00$ g/cm³

Probe: ET3DV6 - SN1516; ConvF(5.00,5.00,5.00)

Cube 5x5x7: SAR (1g): 0.454 mW/g, SAR (10g): 0.246 mW/g, (Worst-case extrapolation)

Cube 5x5x7: Dx = 8.0, Dy = 8.0, Dz = 5.0

Liquid Temperature (°C): 19.2



NPM-10, GSM 850, Channel 128, Flat Position with 15mm Spacer - Back of Phone, BLC-2 Battery and HDE-2 Headset

SAM 2 (Cellular - Muscle Tissue) Phantom

Frequency: 824 MHz; Crest factor: 8.0

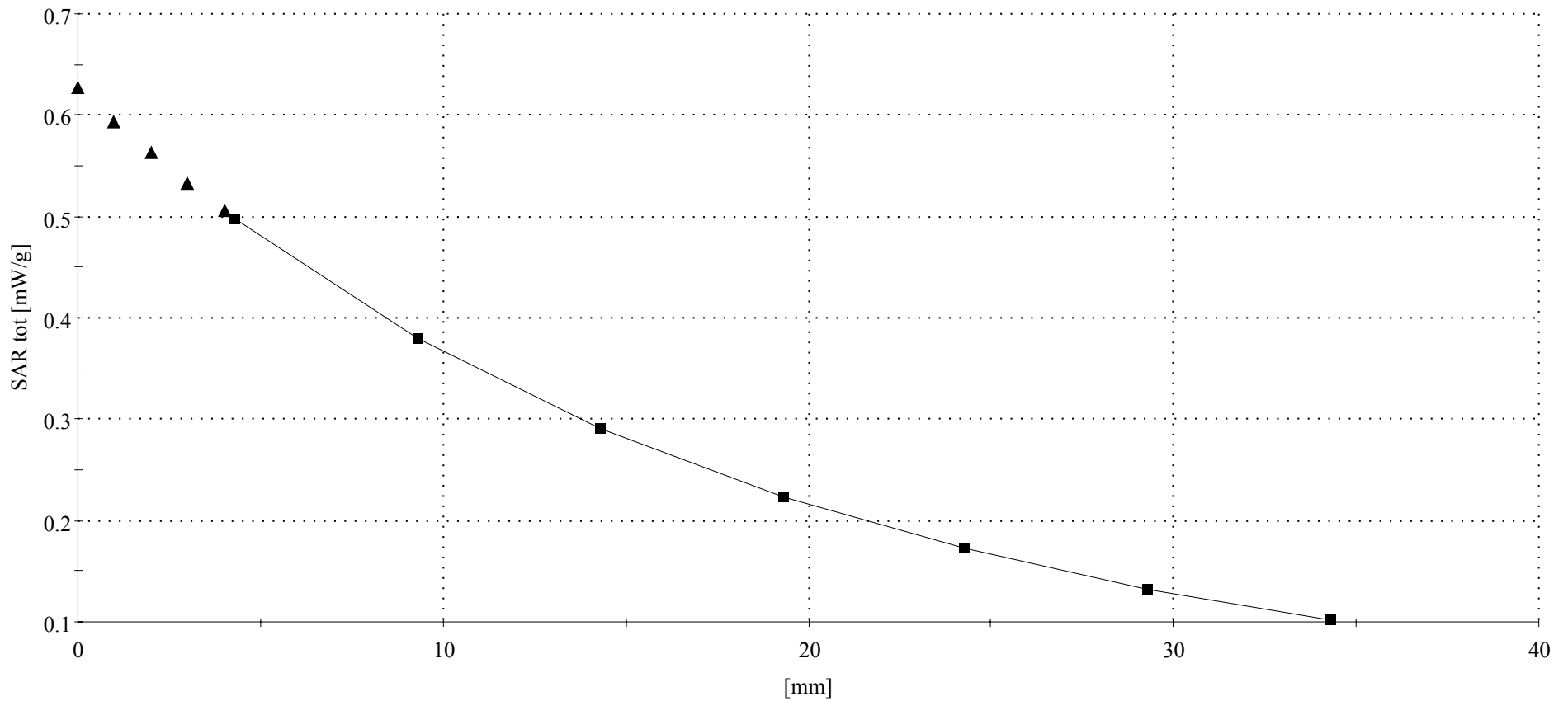
Cellular Band - Muscle Tissue: $\sigma = 0.96$ mho/m $\epsilon_r = 53.4$ $\rho = 1.00$ g/cm³

Probe: ET3DV6 - SN1516; ConvF(6.50,6.50,6.50)

Cube 5x5x7: SAR (1g): 0.731 mW/g, SAR (10g): 0.524 mW/g, (Worst-case extrapolation)

Cube 5x5x7: Dx = 8.0, Dy = 8.0, Dz = 5.0

Liquid Temperature (°C): 21.4



NPM-10, GSM 1900, Channel 661, Flat Position with 15mm Spacer - Back of Phone, BLC-2 Battery and HDE-2 Headset

SAM 3 (PCS - Brain / Muscle Tissue) Phantom

Frequency: 1880 MHz; Crest factor: 8.0

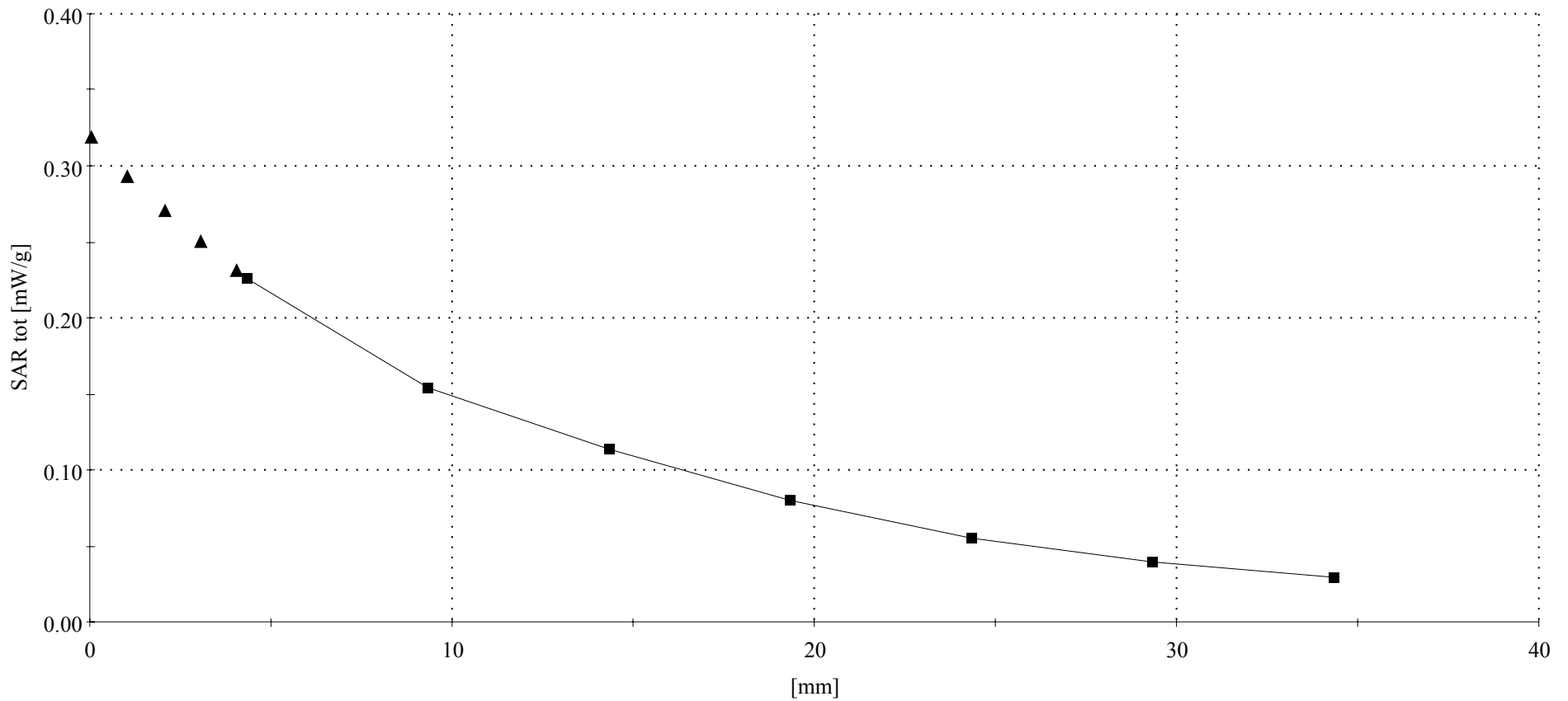
PCS Band - Muscle Tissue: $\sigma = 1.56$ mho/m $\epsilon_r = 52.1$ $\rho = 1.00$ g/cm³

Probe: ET3DV6 - SN1516; ConvF(4.80,4.80,4.80)

Cube 5x5x7: SAR (1g): 0.459 mW/g, SAR (10g): 0.283 mW/g, (Worst-case extrapolation)

Cube 5x5x7: Dx = 8.0, Dy = 8.0, Dz = 5.0

Liquid Temperature (°C): 20.3



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APPENDIX C: RELEVANT PAGES FROM PROBE CALIBRATION REPORT(S)

Client **Nokia Mobile Phones (San Diego)**

CALIBRATION CERTIFICATE

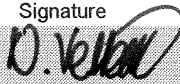

Object(s) **ET3DV6 - SN:1516**
 Calibration procedure(s) **QA CAL-01.v2
Calibration procedure for dosimetric E-field probes**
 Calibration date: **February 26, 2003**
 Condition of the calibrated item **In Tolerance (according to the specific calibration document)**

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	Scheduled Calibration
RF generator HP 8684C	US3642U01700	4-Aug-99 (in house check Aug-02)	In house check: Aug-05
Power sensor E4412A	MY41495277	8-Mar-02	Mar-03
Power sensor HP 8481A	MY41092180	18-Sep-02	Sep-03
Power meter EPM E4419B	GB41293874	13-Sep-02	Sep-03
Network Analyzer HP 8753E	US38432426	3-May-00	In house check: May 03
Fluke Process Calibrator Type 702	SN: 6295803	3-Sep-01	Sep-03

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

Date issued: February 26, 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.

DASY - Parameters of Probe: ET3DV6 SN:1516

Sensitivity in Free Space

NormX	1.67 $\mu\text{V}/(\text{V}/\text{m})^2$
NormY	1.52 $\mu\text{V}/(\text{V}/\text{m})^2$
NormZ	1.69 $\mu\text{V}/(\text{V}/\text{m})^2$

Diode Compression

DCP X	95	mV
DCP Y	95	mV
DCP Z	95	mV

Sensitivity in Tissue Simulating Liquid

Head	835 MHz	$\epsilon_r = 41.5 \pm 5\%$	$\sigma = 0.90 \pm 5\% \text{ mho}/\text{m}$
Head	900 MHz	$\epsilon_r = 41.5 \pm 5\%$	$\sigma = 0.97 \pm 5\% \text{ mho}/\text{m}$
ConvF X	6.6 $\pm 9.5\%$ (k=2)	Boundary effect:	
ConvF Y	6.6 $\pm 9.5\%$ (k=2)	Alpha	0.35
ConvF Z	6.6 $\pm 9.5\%$ (k=2)	Depth	2.76
Head	1900 MHz	$\epsilon_r = 40.0 \pm 5\%$	$\sigma = 1.40 \pm 5\% \text{ mho}/\text{m}$
Head	1800 MHz	$\epsilon_r = 40.0 \pm 5\%$	$\sigma = 1.40 \pm 5\% \text{ mho}/\text{m}$
ConvF X	5.0 $\pm 9.5\%$ (k=2)	Boundary effect:	
ConvF Y	5.0 $\pm 9.5\%$ (k=2)	Alpha	0.57
ConvF Z	5.0 $\pm 9.5\%$ (k=2)	Depth	2.57

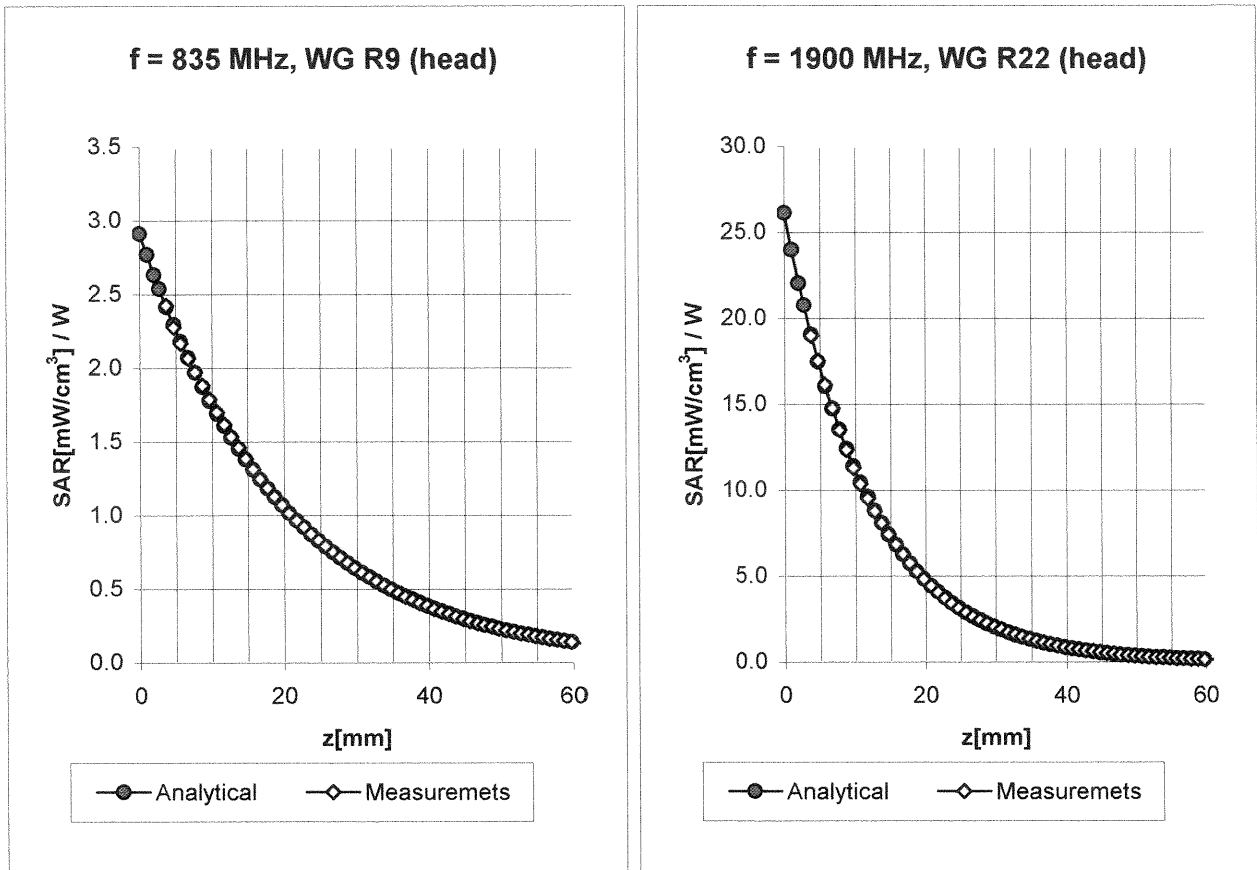
Boundary Effect

Head	835 MHz	Typical SAR gradient: 5 % per mm	
	Probe Tip to Boundary	1 mm	2 mm
	SAR _{be} [%] Without Correction Algorithm	10.7	6.1
	SAR _{be} [%] With Correction Algorithm	0.5	0.7
Head	1900 MHz	Typical SAR gradient: 10 % per mm	
	Probe Tip to Boundary	1 mm	2 mm
	SAR _{be} [%] Without Correction Algorithm	15.4	10.4
	SAR _{be} [%] With Correction Algorithm	0.2	0.3

Sensor Offset

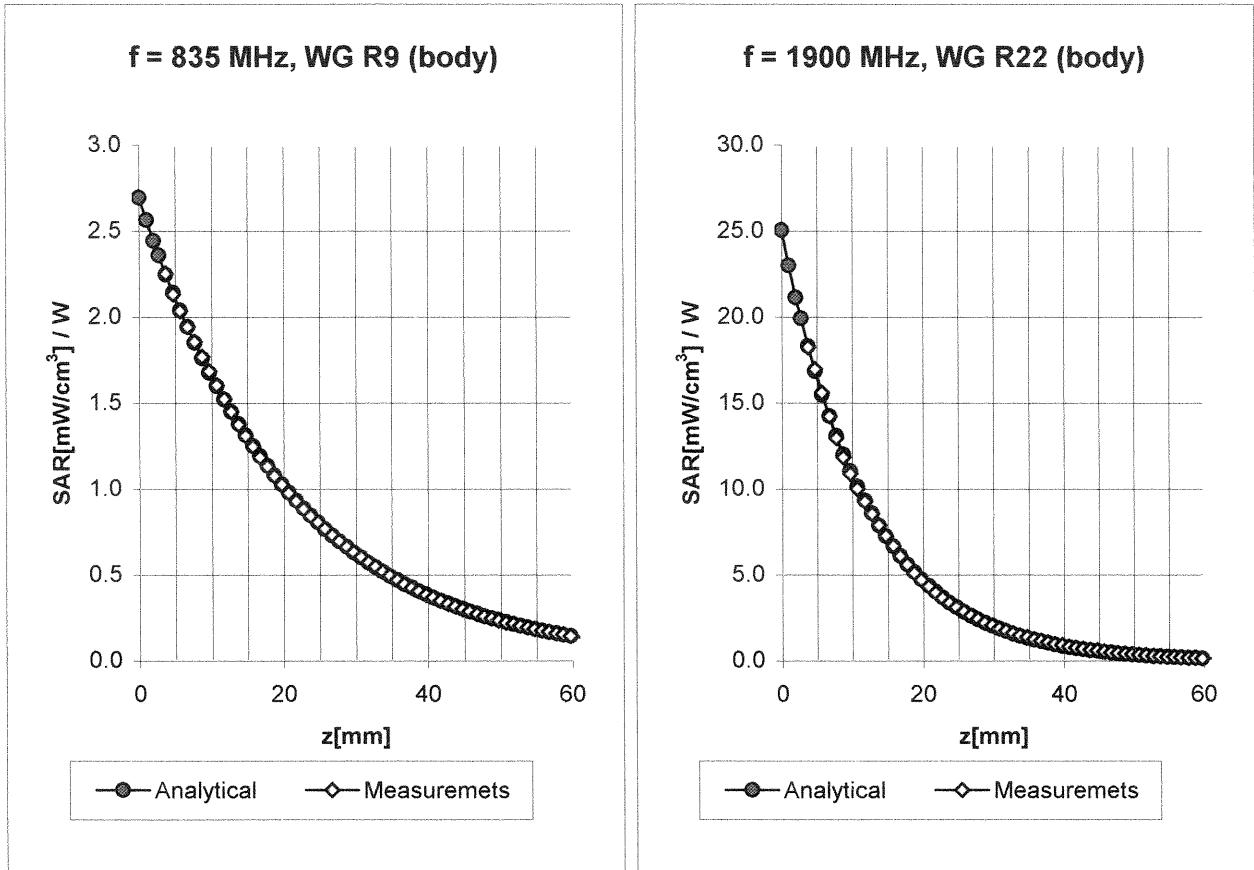
Probe Tip to Sensor Center	2.7	mm
Optical Surface Detection	1.6 \pm 0.2	mm

Conversion Factor Assessment



Head	835 MHz	$\epsilon_r = 41.5 \pm 5\%$	$\sigma = 0.90 \pm 5\%$ mho/m
Head	900 MHz	$\epsilon_r = 41.5 \pm 5\%$	$\sigma = 0.97 \pm 5\%$ mho/m
	ConvF X	6.6 $\pm 9.5\%$ (k=2)	Boundary effect:
	ConvF Y	6.6 $\pm 9.5\%$ (k=2)	Alpha 0.35
	ConvF Z	6.6 $\pm 9.5\%$ (k=2)	Depth 2.76
Head	1900 MHz	$\epsilon_r = 40.0 \pm 5\%$	$\sigma = 1.40 \pm 5\%$ mho/m
Head	1800 MHz	$\epsilon_r = 40.0 \pm 5\%$	$\sigma = 1.40 \pm 5\%$ mho/m
	ConvF X	5.0 $\pm 9.5\%$ (k=2)	Boundary effect:
	ConvF Y	5.0 $\pm 9.5\%$ (k=2)	Alpha 0.57
	ConvF Z	5.0 $\pm 9.5\%$ (k=2)	Depth 2.57

Conversion Factor Assessment



Body	835 MHz	$\epsilon_r = 55.2 \pm 5\%$	$\sigma = 0.97 \pm 5\%$ mho/m
Body	900 MHz	$\epsilon_r = 55.0 \pm 5\%$	$\sigma = 1.05 \pm 5\%$ mho/m
	ConvF X	6.5 $\pm 9.5\%$ (k=2)	Boundary effect:
	ConvF Y	6.5 $\pm 9.5\%$ (k=2)	Alpha 0.52
	ConvF Z	6.5 $\pm 9.5\%$ (k=2)	Depth 2.12
Body	1900 MHz	$\epsilon_r = 53.3 \pm 5\%$	$\sigma = 1.52 \pm 5\%$ mho/m
Body	1800 MHz	$\epsilon_r = 53.3 \pm 5\%$	$\sigma = 1.52 \pm 5\%$ mho/m
	ConvF X	4.8 $\pm 9.5\%$ (k=2)	Boundary effect:
	ConvF Y	4.8 $\pm 9.5\%$ (k=2)	Alpha 0.71
	ConvF Z	4.8 $\pm 9.5\%$ (k=2)	Depth 2.32

TCC

Test & Certification Center (TCC) - Dallas



Accredited Laboratory
Certificate Number: 1819-01

APPENDIX D: RELEVANT PAGES FROM DIPOLE VALIDATION KIT REPORT(S)

Test Laboratory: SPEAG, Zurich, Switzerland
File Name: SN487_SN1507_HSL835_260503.da4

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN487
Program: Dipole Calibration

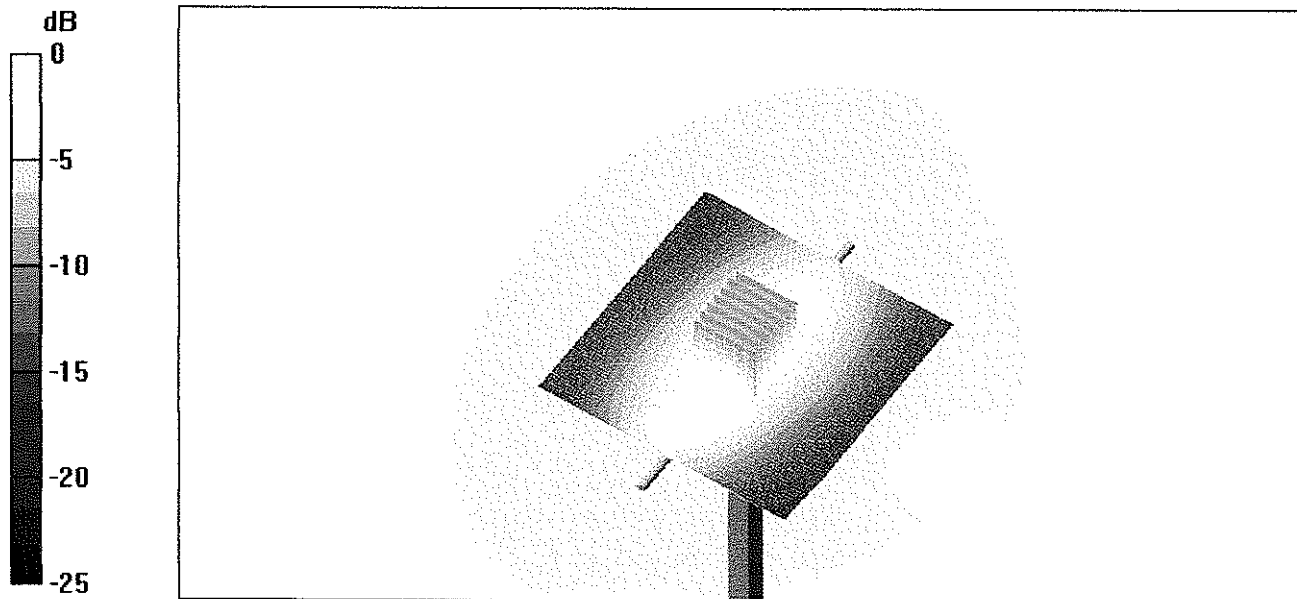
Communication System: CW-835; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: HSL 835 MHz ($\sigma = 0.89$ mho/m, $\epsilon_r = 42.8$, $\rho = 1000$ kg/m³)
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(6.7, 6.7, 6.7); Calibrated: 1/18/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 - SN411; Calibrated: 1/16/2003
- Phantom: SAM with CRP - TP1006; Type: SAM 4.0; Serial: TP:1006
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Pin = 250 mW; d = 15 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 56.4 V/m
Power Drift = 0.004 dB
Maximum value of SAR = 2.63 mW/g

Pin = 250 mW; d = 15 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 3.57 W/kg
SAR(1 g) = 2.45 mW/g; SAR(10 g) = 1.6 mW/g
Reference Value = 56.4 V/m
Power Drift = 0.004 dB
Maximum value of SAR = 2.61 mW/g



0 dB = 2.61mW/g

Client

Nokia Inc. Texas

CALIBRATION CERTIFICATE

Object(s) **D835V2 - SN:487**

Calibration procedure(s) **QA CAL-05 v2
Calibration procedure for dipole validation kits**

Calibration date: **July 17, 2003**

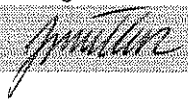
Condition of the calibrated item **In Tolerance (according to the specific calibration document)**

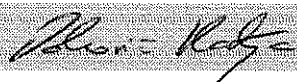
This calibration statement documents traceability of M&TE used in the calibration procedures and conformity of the procedures with the ISO/IEC 17025 international standard.

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
RF generator R&S SML-03	100698	27-Mar-2002 (R&S, No. 20-92389)	In house check: Mar-05
Power sensor HP 8481A	MY41092317	18-Oct-02 (Agilent, No. 20021018)	Oct-04
Power sensor HP 8481A	US37292783	30-Oct-02 (METAS, No. 252-0236)	Oct-03
Power meter EPM E442	GB37480704	30-Oct-02 (METAS, No. 252-0236)	Oct-03
Network Analyzer HP 8753E	US37390585	18-Oct-01 (Agilent, No. 24BR1033101)	In house check: Oct 03

	Name	Function	Signature
Calibrated by:	Judith Mueller	Technician	

	Name	Function	Signature
Approved by:	Katja Pokovic	Laboratory Director	

Date issued: July 17, 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.

Test Laboratory: SPEAG, Zurich, Switzerland
File Name: SN487_SN1507_M835_170703.da4

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN487
Program: Dipole Calibration

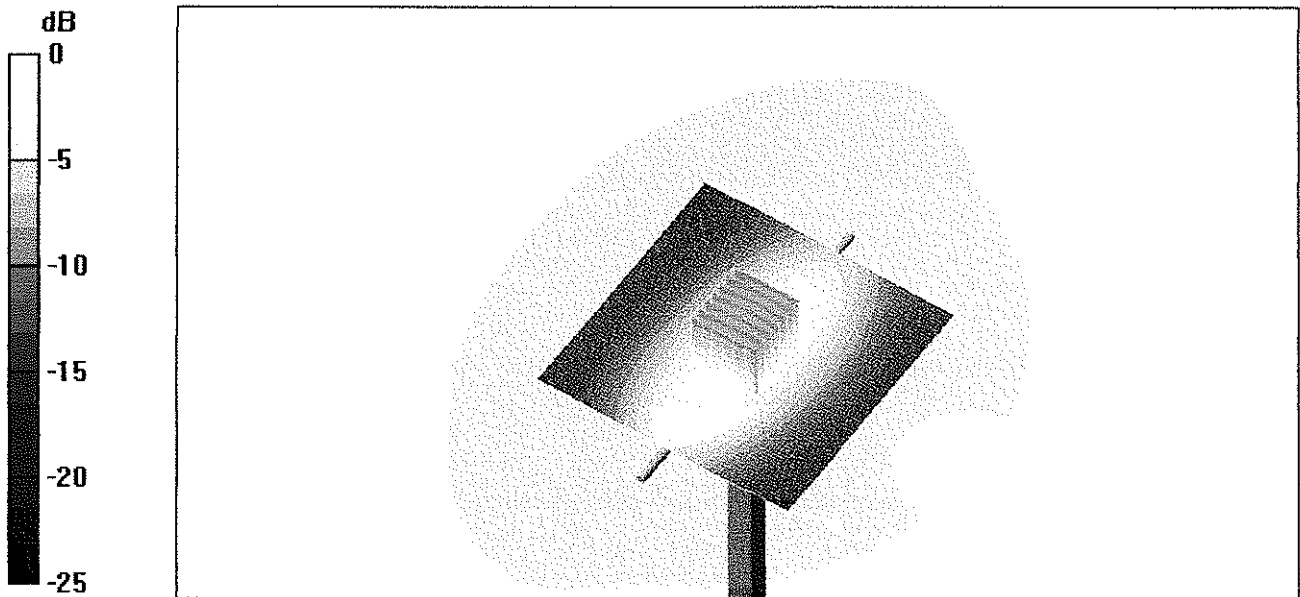
Communication System: CW-835; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: Muscle 835 MHz ($\sigma = 0.96$ mho/m, $\epsilon_r = 54.03$, $\rho = 1000$ kg/m³)
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(6.3, 6.3, 6.3); Calibrated: 1/18/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 - SN411; Calibrated: 1/16/2003
- Phantom: SAM with CRP - TP1006; Type: SAM 4.0; Serial: TP:1006
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Pin = 250 mW; d = 15 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 55.2 V/m
Power Drift = 0.009 dB
Maximum value of SAR = 2.7 mW/g

Pin = 250 mW; d = 15 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 3.62 W/kg
SAR(1 g) = 2.52 mW/g; SAR(10 g) = 1.66 mW/g
Reference Value = 55.2 V/m
Power Drift = 0.009 dB
Maximum value of SAR = 2.71 mW/g



0 dB = 2.71mW/g

Client **Nokia Inc. Texas**

CALIBRATION CERTIFICATE

Object(s) **D1900V2 - SN:504**

Calibration procedure(s) **QA CAL-05.v2
Calibration procedure for dipole validation kits**

Calibration date: **July 16, 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
RF generator R&S SML-03	100698	27-Mar-2002 (R&S, No. 20-92389)	In house check: Mar-05
Power sensor HP 8481A	MY41092317	18-Oct-02 (Agilent, No. 20021018)	Oct-04
Power sensor HP 8481A	US37292783	30-Oct-02 (METAS, No. 252-0236)	Oct-03
Power meter EPM E442	GB37480704	30-Oct-02 (METAS, No. 252-0236)	Oct-03
Network Analyzer HP 8753E	US37390585	18-Oct-01 (Agilent, No. 24BR1033101)	In house check: Oct 03

	Name	Function	Signature
Calibrated by:	Judith Mueller	Technician	

Approved by:	Katja Pokovic	Laboratory Director	
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Date issued: July 17, 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.

Test Laboratory: SPEAG, Zurich, Switzerland
File Name: SN504_SN1507_HSL1900_160703.da4

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN504
Program: Dipole Calibration

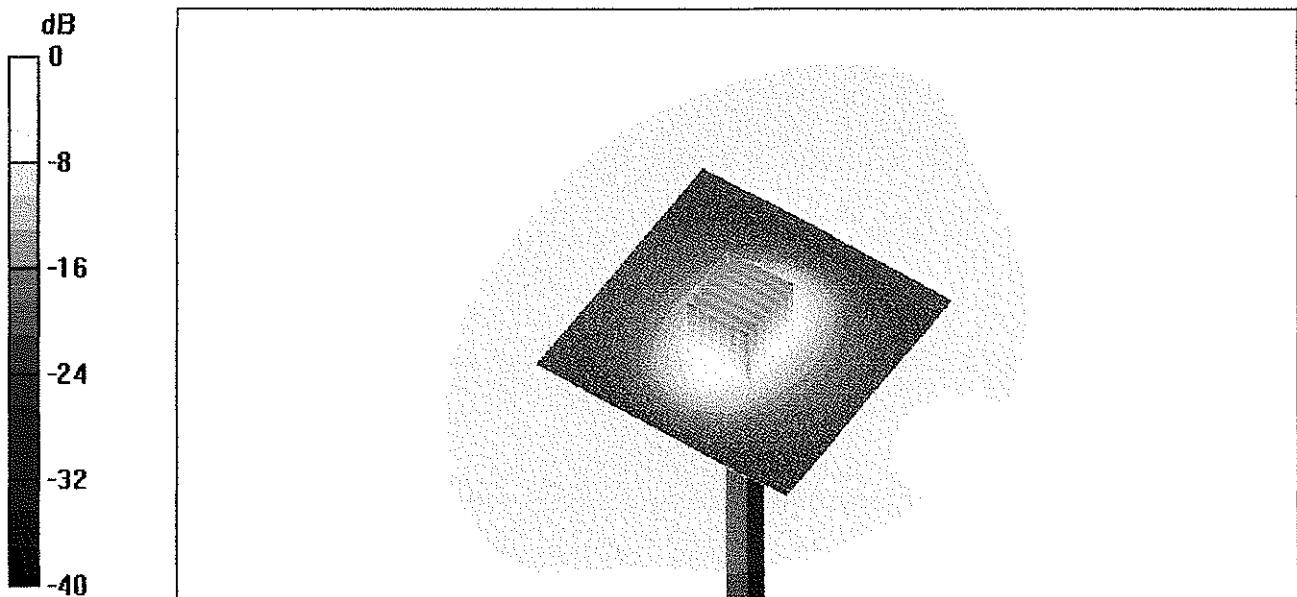
Communication System: CW-1900; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: HSL 1900 MHz ($\sigma = 1.46$ mho/m, $\epsilon_r = 40.17$, $\rho = 1000$ kg/m³)
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(5.2, 5.2, 5.2); Calibrated: 1/18/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 - SN411; Calibrated: 1/16/2003
- Phantom: SAM with CRP - TP1006; Type: SAM 4.0; Serial: TP:1006
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Pin = 250 mW; d = 10 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 93.5 V/m
Power Drift = -0.02 dB
Maximum value of SAR = 11.4 mW/g

Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 17.6 W/kg
SAR(1 g) = 10.2 mW/g; SAR(10 g) = 5.29 mW/g
Reference Value = 93.5 V/m
Power Drift = -0.02 dB
Maximum value of SAR = 11.4 mW/g



0 dB = 11.4mW/g

Test Laboratory: SPEAG, Zurich, Switzerland
File Name: SN504_SN1507_M1900_160703.da4

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN504
Program: Dipole Calibration

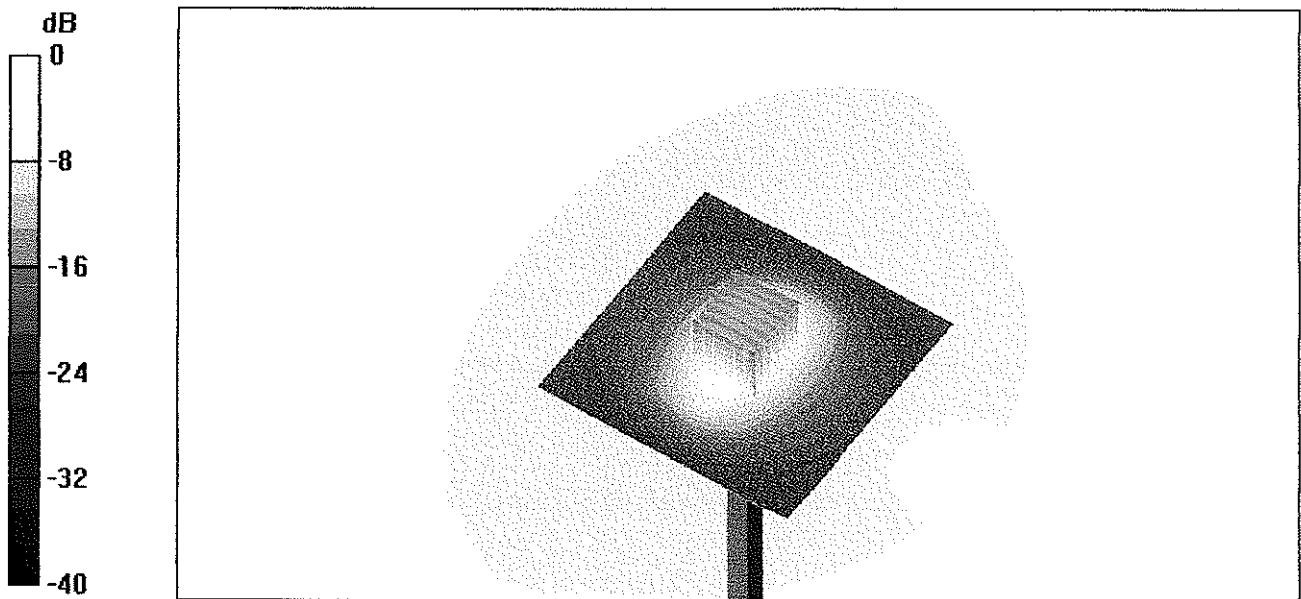
Communication System: CW-1900; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: Muscle 1900 MHz ($\sigma = 1.6$ mho/m, $\epsilon_r = 50.87$, $\rho = 1000$ kg/m³)
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(4.8, 4.8, 4.8); Calibrated: 1/18/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 - SN411; Calibrated: 1/16/2003
- Phantom: SAM with CRP - TP1006; Type: SAM 4.0; Serial: TP:1006
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Pin = 250 mW; d = 10 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 92 V/m
Power Drift = 0.02 dB
Maximum value of SAR = 11.7 mW/g

Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 18.2 W/kg
SAR(1 g) = 10.5 mW/g; SAR(10 g) = 5.45 mW/g
Reference Value = 92 V/m
Power Drift = 0.02 dB
Maximum value of SAR = 11.8 mW/g



0 dB = 11.8mW/g