



December 1, 2004
Supplement to SAR Test Report for Motorola portable cellular phone (FCC ID GKRMPX001)

Prepared by:
Steven Hauswirth
Motorola Personal Communications Sector Product Safety Laboratory
Libertyville, Illinois

Summary of FCC request for additional information

There was a request for additional information regarding Motorola's SAR Test Report for Motorola portable cellular phone (FCC ID GKRMPX001). The requested information is addressed below in the same numbering sequence received.

1) The 12 body-worn SAR plots have different relative orientations - please provide a list for these 12 plots and device orientations for each relative to GSM antenna, and whether that is device front or back in holster. Alternatively revise the affected report sections, also related to the following issues.

RESPONSE: The device was positioned in the holster with the back of the unit towards the user. This orientates the unit so the antennas are in closer proximity to the user. Revised plots have been included in Appendix 1 to illustrate the placement of the unit with respect to the plots.

2) Reply to EA699206 corresp. 27896 Tables 5 & 6 are the same as Tables 5 & 8 from original report, with the second "Table 4" of reply showing the simple addition of GSM and LAN SAR values. (This assumes the references to 15 deg tilt in the caption and header row of this 2nd "Table 4" are in error.) However, highest SAR is GPRS body at 1.46 W/kg - please demonstrate how/why SAR summation is not applicable for this configuration, also considering related issues in questions here.

RESPONSE: The GPRS and the Wi-Fi modes are not permitted to cotransmit. Motorola's position is both of these modes are data transfer modes and thus only one should transfer at a time. The software in the device prevents both data modes from transmitting at the same time.

3) Body-worn LAN data appears to have incorrect liquid and probe factors - please revise.

RESPONSE: Additional SAR measurements were taken using the same setup as the body worn measurements in the filing, except the Simulated Tissue was changed from 2.4GHz Head to 2.4GHz body and the Robot Software was upgraded to DASY4.4. Please see the updated table below for the results of these measurements. The output plots of these measurements are included in Appendix 2.

f (MHz)	Description	Conducted Output Power (dBm)	Body Worn WiFi							
			with SYN1070A				with SYN1070A & SNN5751A			
			Measured (W/kg)	Drift (dB)	Extrapolated (W/kg)	Simulate Temp (°C)	Measured (W/kg)	Drift (dB)	Extrapolated (W/kg)	Simulate Temp (°C)
WiFi 2400Mhz	Channel 1	14.77								
	Channel 6	14.77	0.147	0.0	0.15	22.9	0.041	0.0	0.04	22.0
	Channel 11	14.77								

Table 8: SAR measurement results for the portable cellular telephone FCC ID GKRMPX001 at highest possible output power. Measured against the body.

Appendix 1
Revised Body Worn GSM SAR Plots

s/n: 4400007088915

Ch# 190 Pwr Step: 5 ota

Type of Modulation: 800 gsm

Accessory Model # = case (SYN1070A)

R4 Amy Twin Phantom Rev.4 (22Aug02) Phantom; section 1 Section; Position: (90°,180°); Frequency: 837 MHz

Probe: ET3DV6R - SN1506 FCC Body.2; ConvF(5.53,5.53,5.53); Crest factor: 8.0; 835 MHz Head & Body: $\sigma = 0.98$ mho/m $\epsilon_r = 53.3$ $\rho = 1.00$ g/cm³

Cube 7x7x7: SAR (1g): 0.626 mW/g, SAR (10g): 0.349 mW/g, (Worst-case extrapolation)

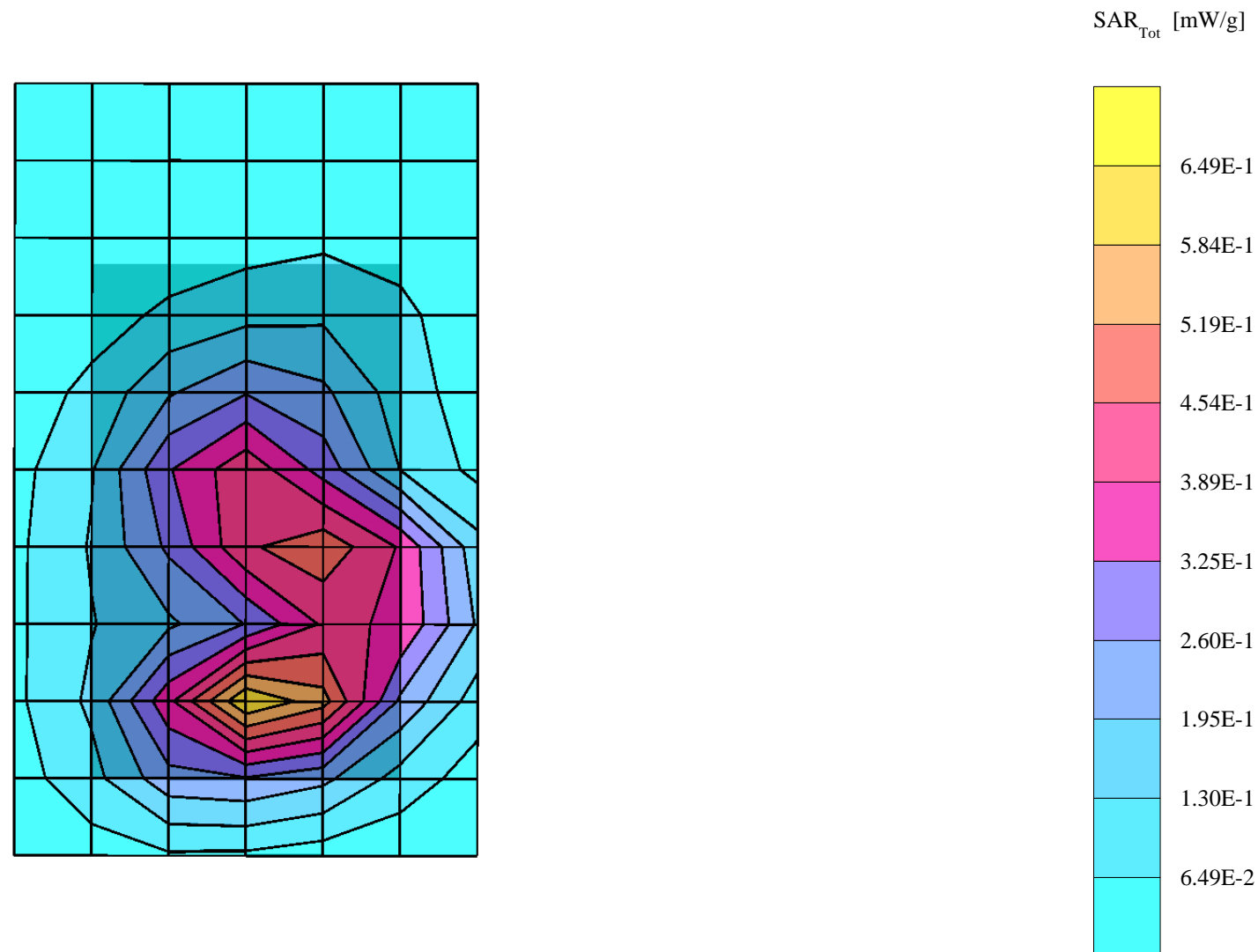
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0

Penetration depth: 10.1 (9.5, 11.0) [mm]

Powerdrift: -0.11 dB

Antenna Position: INTERNAL

Battery Model #: SNN5750A



s/n: 4400007088915

Ch# 190 Pwr Step: 5 ota

Antenna Position: INTERNAL

Type of Modulation: 800 gsm bluetooth

Battery Model #: SNN5750A

Accessory Model # = case (SYN1070A)

R4 Amy Twin Phantom Rev.4 (22Aug02) Phantom; section 1 Section; Position: (90°,180°); Frequency: 837 MHz

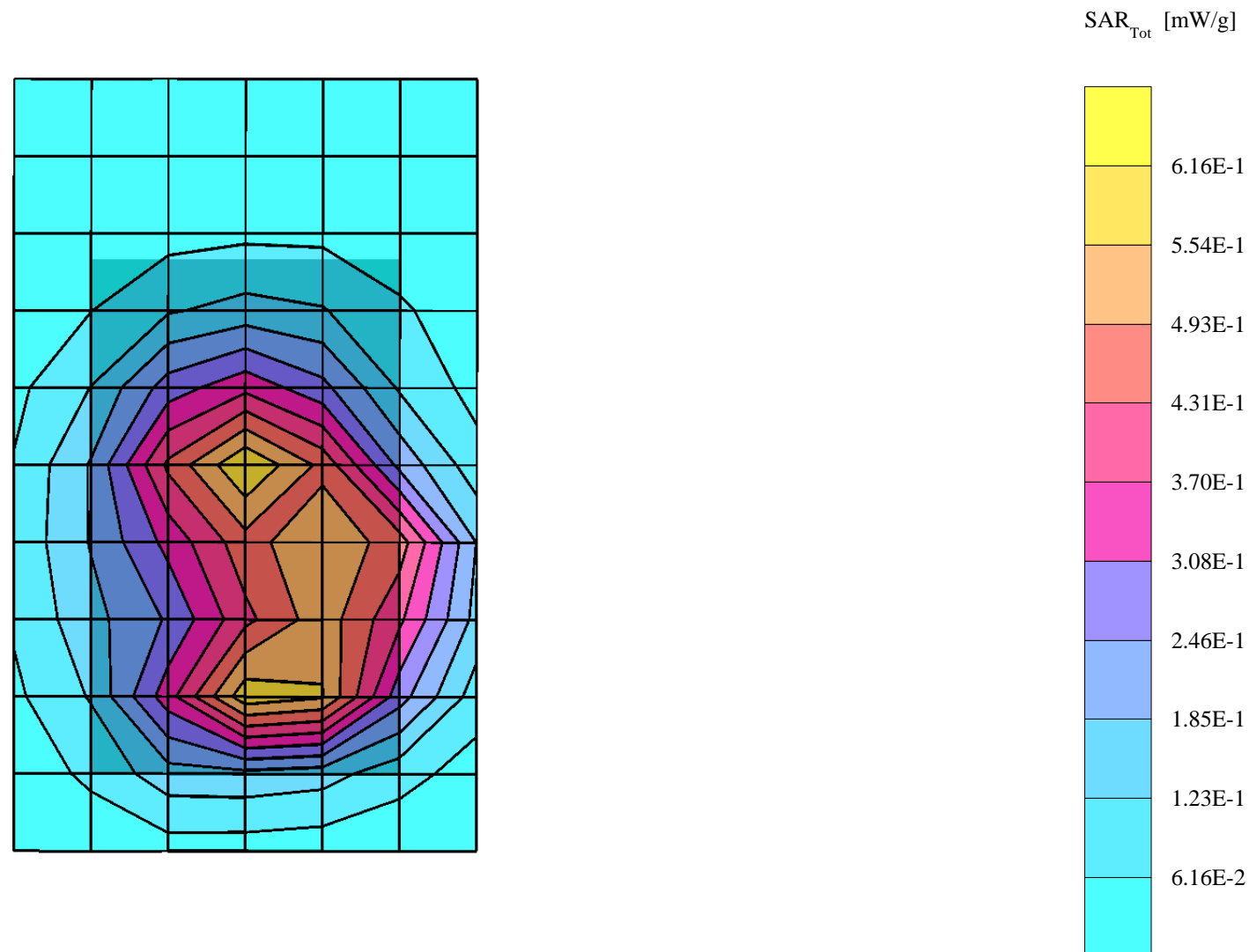
Probe: ET3DV6 - SN1514-FCC BODY2; ConvF(5.87,5.87,5.87); Crest factor: 8.0; 835 MHz Head & Body: $\sigma = 0.97$ mho/m $\epsilon_r = 53.3$ $\rho = 1.00$ g/cm³

Cube 7x7x7: SAR (1g): 0.678 mW/g, SAR (10g): 0.389 mW/g, (Worst-case extrapolation)

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

Penetration depth: 10.4 (9.8, 11.4) [mm]

Powerdrift: -0.11 dB



s/n: 4400007088915

Ch# 190 / Pwr Step: 5

Type of Modulation: GSM 850

Accessory Model #: SYN1070A

Antenna Position: Internal

Battery Model #: SNN5750A

Bluetooth Enabled

WiFi (WLAN) (Channel 6) Enabled

Simulate Temp when Measured: 20.5C

Simulate Temp after Test: 19.2C

R4 Amy Twin Phantom Rev.4 (22Aug02) Phantom; section 1 Section; Position: (90°,180°); Frequency: 837 MHz

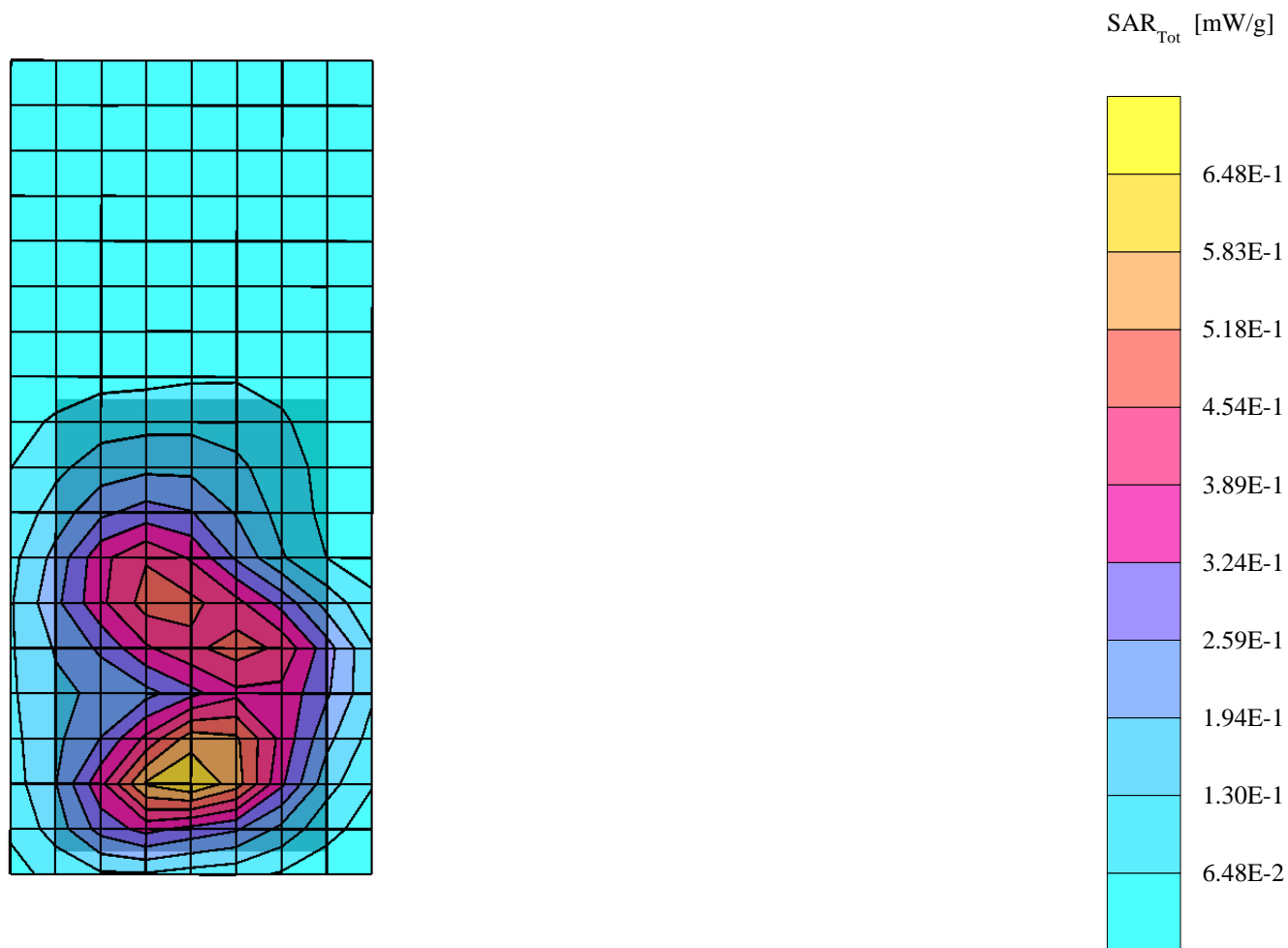
Probe: ET3DV6 - SN1514-FCC BODY2; ConvF(5.87,5.87,5.87); Crest factor: 8.0; 835 MHz Head & Body: $\sigma = 0.98$ mho/m $\epsilon_r = 53.8$ $\rho = 1.00$ g/cm³

Cube 7x7x7: SAR (1g): 0.646 mW/g, SAR (10g): 0.359 mW/g, (Worst-case extrapolation)

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

Penetration depth: 9.7 (9.1, 10.8) [mm]

Powerdrift: -0.22 dB



s/n: 4400007088915

Ch# 128 Pwr Step: burst 1 and 2=5 ota

Antenna Position: INTERNAL

Type of Modulation: 800 gprs bluetooth program Battery Model #: SNN5750A

Accessory Model # = case (SYN1070A)

R4 Amy Twin Phantom Rev.4 (22Aug02) Phantom; section 1 Section; Position: (90°,180°); Frequency: 824 MHz

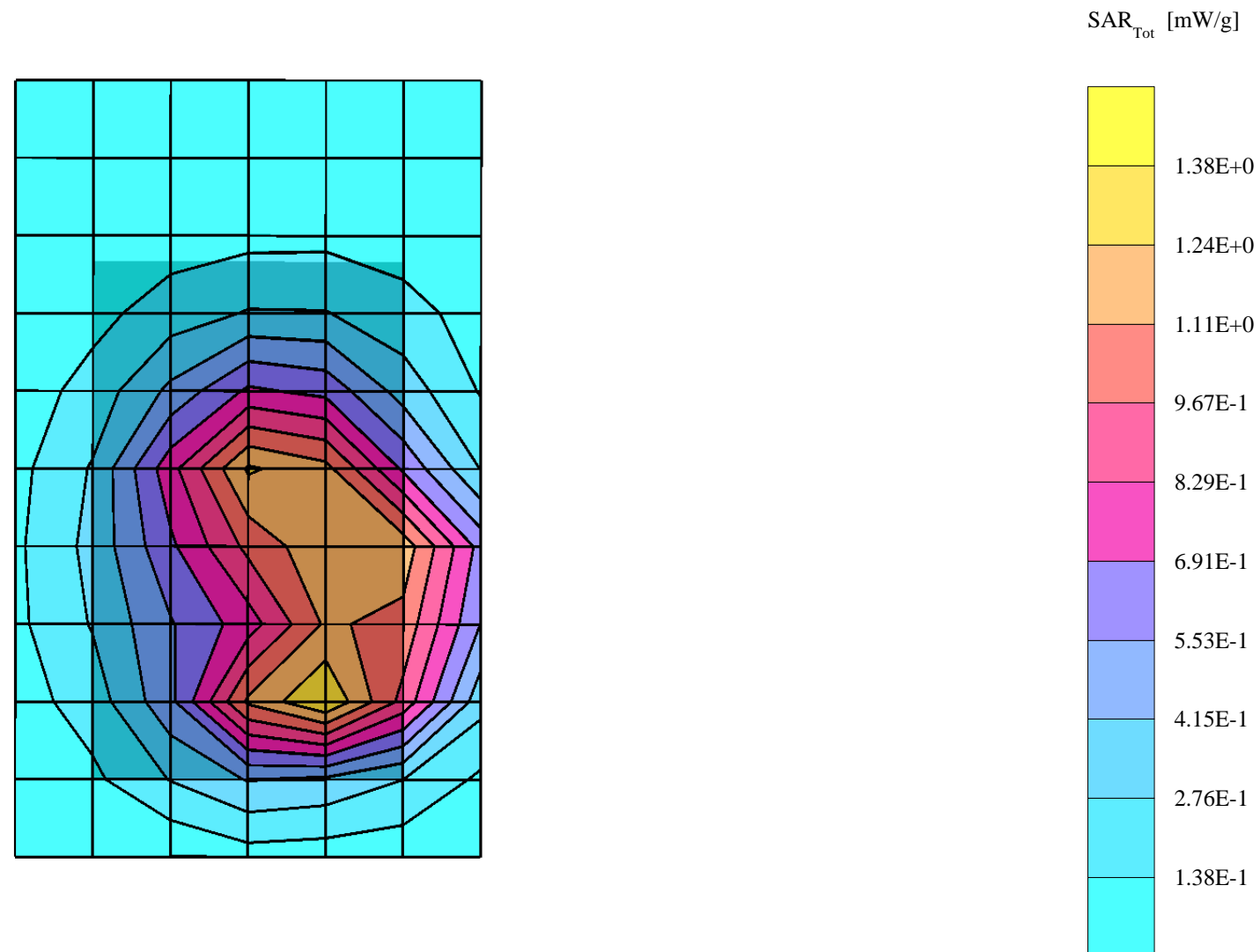
Probe: ET3DV6 - SN1514-FCC BODY2; ConvF(5.87,5.87,5.87); Crest factor: 4.0; 835 MHz Head & Body: $\sigma = 0.98$ mho/m $\epsilon_r = 53.4$ $\rho = 1.00$ g/cm³

Cube 7x7x7: SAR (1g): 1.46 mW/g, SAR (10g): 0.863 mW/g, (Worst-case extrapolation)

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

Penetration depth: 10.7 (9.9, 11.7) [mm]

Powerdrift: -0.19 dB



s/n: 4400007088915

Ch# 128 / Pwr Step: 5
Type of Modulation: GSM 850
Accessory Model #: SYN1070A

Antenna Position: Internal
Battery Model #: SNN5751A

Bluetooth Enabled
GPRS Mode
Simulate Temp when Measured: 20.5C

Simulate Temp after Test: 19.3C

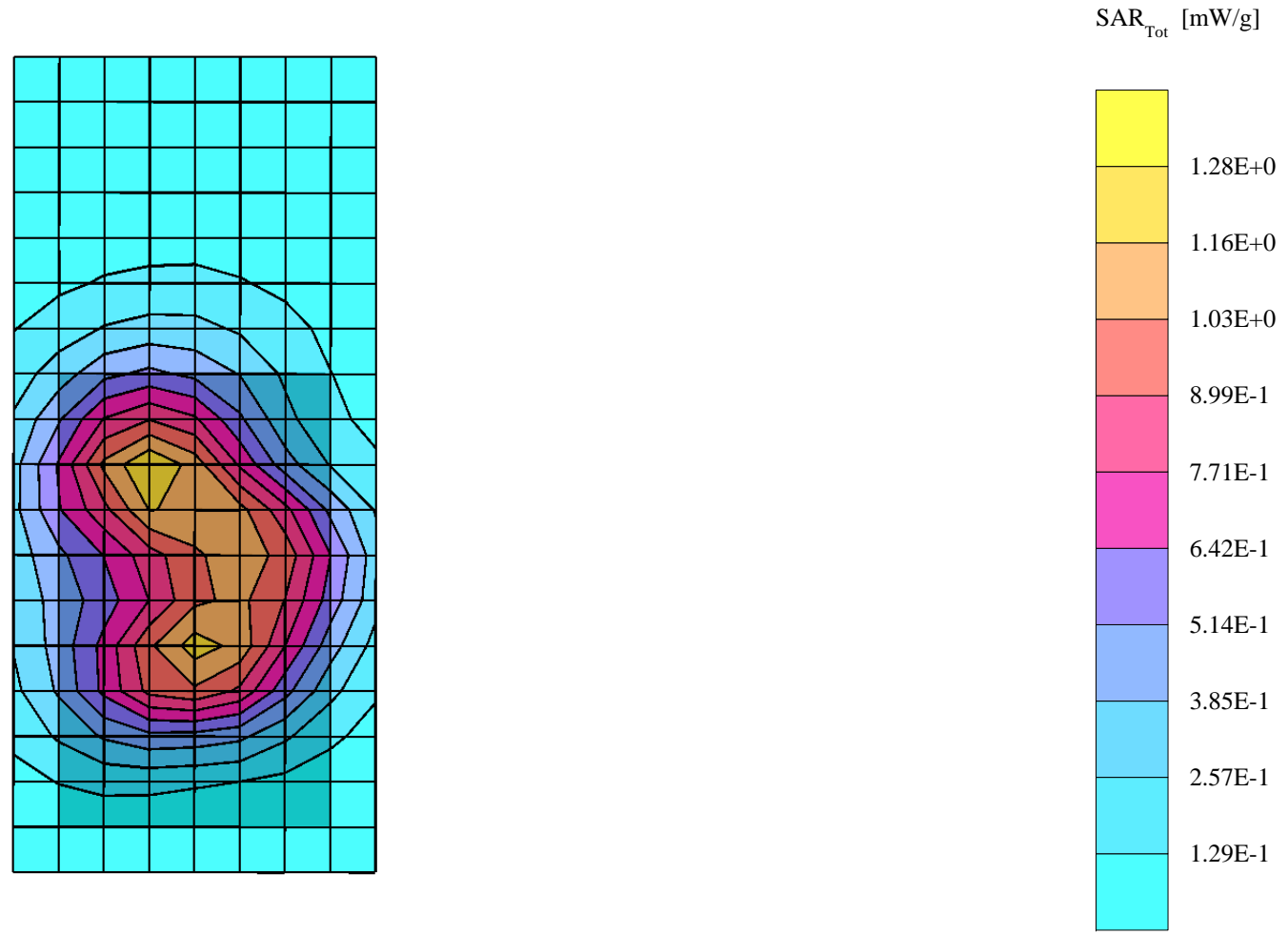
R4 Amy Twin Phantom Rev.4 (22Aug02) Phantom; section 1 Section; Position: (90°,180°); Frequency: 824 MHz
Probe: ET3DV6 - SN1514-FCC BODY2; ConvF(5.87,5.87,5.87); Crest factor: 4.0; 835 MHz Head & Body: $\sigma = 0.98$ mho/m $\epsilon_r = 53.8$ $\rho = 1.00$ g/cm³

Cube 7x7x7: SAR (1g): 1.20 mW/g, SAR (10g): 0.808 mW/g, (Worst-case extrapolation)

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

Penetration depth: 14.2 (13.6, 15.1) [mm]

Powerdrift: -0.16 dB



s/n: 4400007088915

Ch# 661 / Pwr Step: 0

Type of Modulation: gsm

Antenna Position: non

Battery Model #: snn5750a

acc: syn1070a

R4 Amy Twin Phantom Rev.4 (22Aug02) Phantom; section 2 Section; Position: (90°,180°); Frequency: 1880 MHz

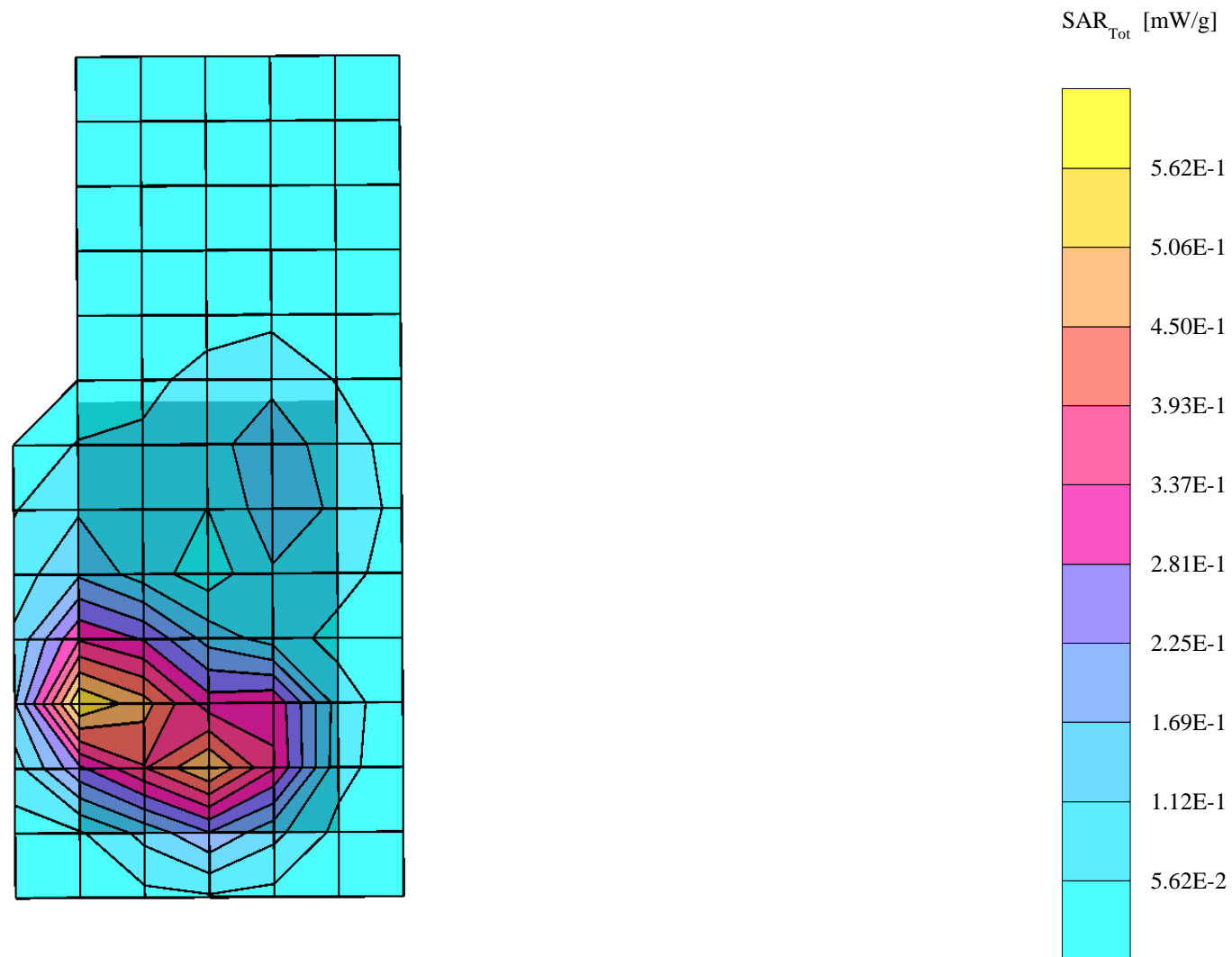
Probe: ET3DV6 - SN1514-FCC BODY2; ConvF(4.46,4.46,4.46); Crest factor: 8.0; 1880 MHz Head & Body: $\sigma = 1.59$ mho/m $\epsilon_r = 52.1$ $\rho = 1.00$ g/cm³

Cube 7x7x7: SAR (1g): 0.617 mW/g, SAR (10g): 0.332 mW/g, (Worst-case extrapolation)

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

Penetration depth: 9.0 (8.1, 10.5) [mm]

Powerdrift: -0.00 dB



s/n: 4400007088915

Ch# 661 / Pwr Step: 0

Type of Modulation: gsm

Antenna Position: non

Battery Model #: snn5750a

acc: syn1070a w/blu2th

R4 Amy Twin Phantom Rev.4 (22Aug02) Phantom; section 2 Section; Position: (90°,180°); Frequency: 1880 MHz

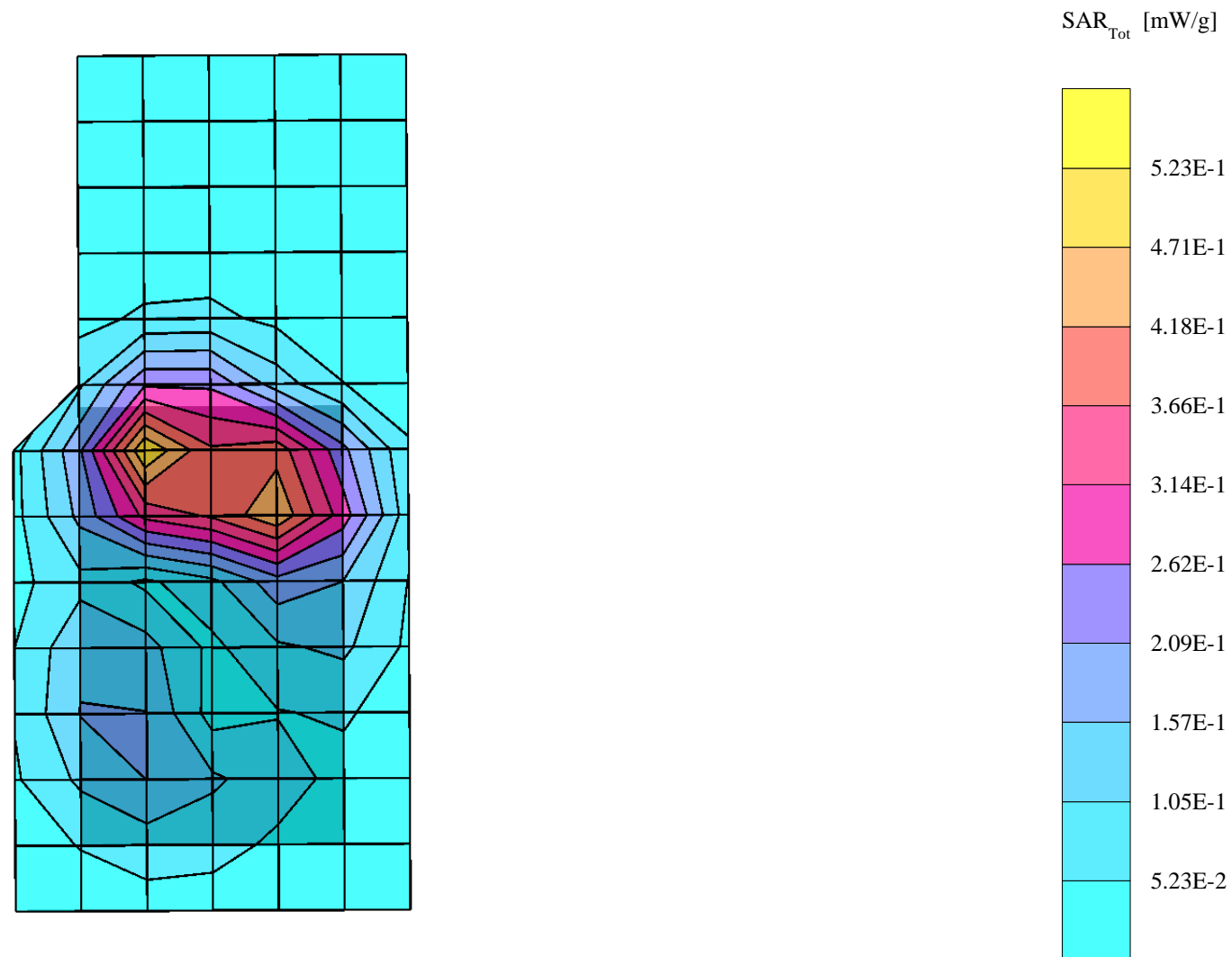
Probe: ET3DV6 - SN1514-FCC BODY2; ConvF(4.46,4.46,4.46); Crest factor: 8.0; 1880 MHz Head & Body: $\sigma = 1.59$ mho/m $\epsilon_r = 52.1$ $\rho = 1.00$ g/cm³

Cube 7x7x7: SAR (1g): 0.513 mW/g, SAR (10g): 0.282 mW/g, (Worst-case extrapolation)

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

Penetration depth: 10.2 (9.3, 11.5) [mm]

Powerdrift: -0.12 dB



s/n: 4400007088915

Ch# 661 Pwr Step: 0 Antenna Position: non

Type of Modulation: gsm1900- WIFI ch6 continuous mod tx 11mbps/cck

Battery Model #: SNN5751a

Accessory Model # = case (SYN1070A)

R4 Amy Twin Phantom Rev.4 (22Aug02) Phantom; section 2 Section; Position: (90°,180°); Frequency: 1880 MHz

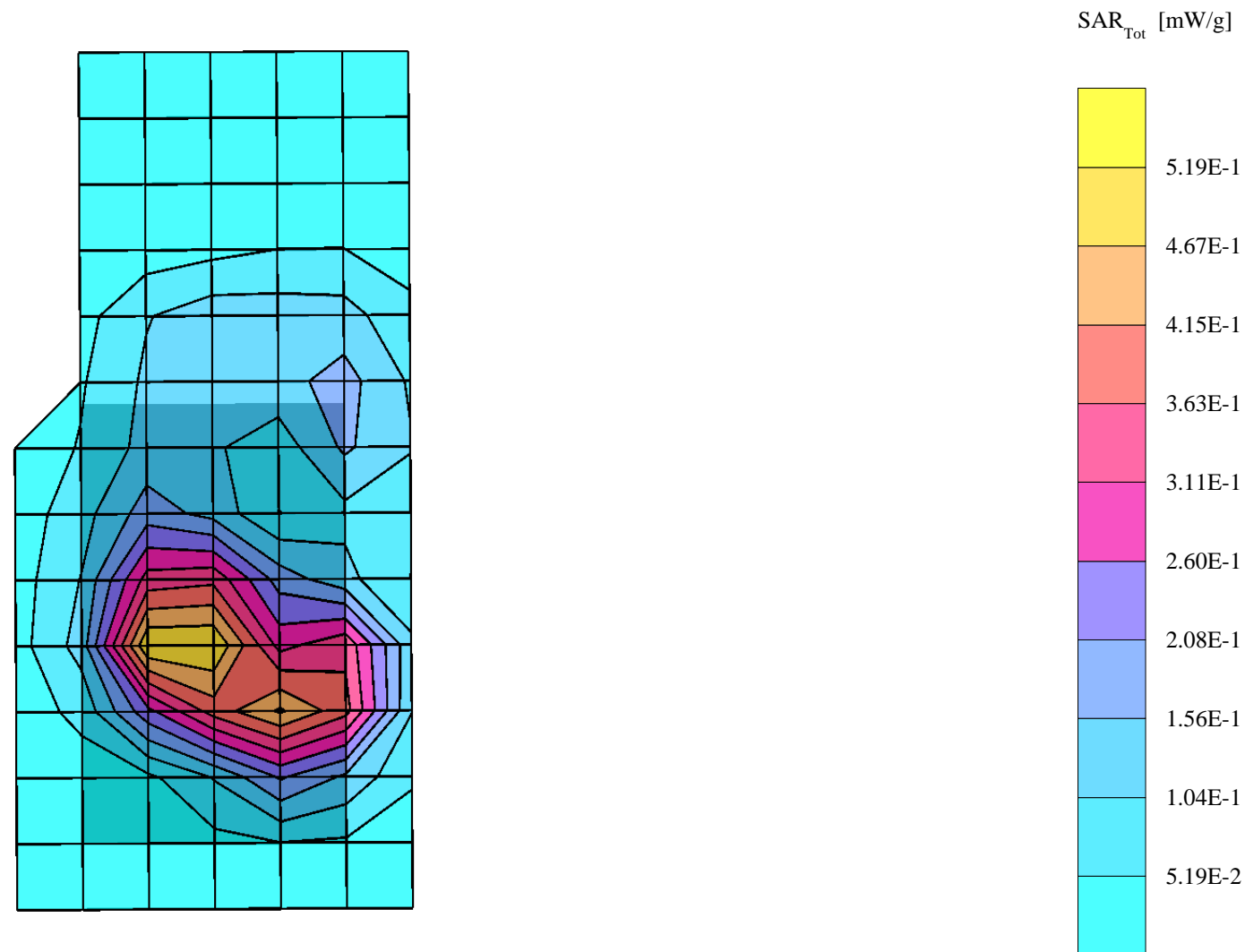
Probe: ET3DV6 - SN1514-FCC BODY2; ConvF(4.46,4.46,4.46); Crest factor: 8.0; 1880 MHz Head & Body: $\sigma = 1.59$ mho/m $\epsilon_r = 52.0$ $\rho = 1.00$ g/cm³

Cube 7x7x7: SAR (1g): 0.615 mW/g, SAR (10g): 0.333 mW/g, (Worst-case extrapolation)

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

Penetration depth: 8.8 (7.9, 10.4) [mm]

Powerdrift: -0.07 dB



s/n: 4400007088915

Ch# 810 Pwr Step: 0 Antenna Position: non

Type of Modulation: gprs1900- bluetooth

Battery Model #: SNN5750a

Accessory Model # = case (SYN1070A)

R4 Amy Twin Phantom Rev.4 (22Aug02) Phantom; section 2 Section; Position: (90°,180°); Frequency: 1909 MHz

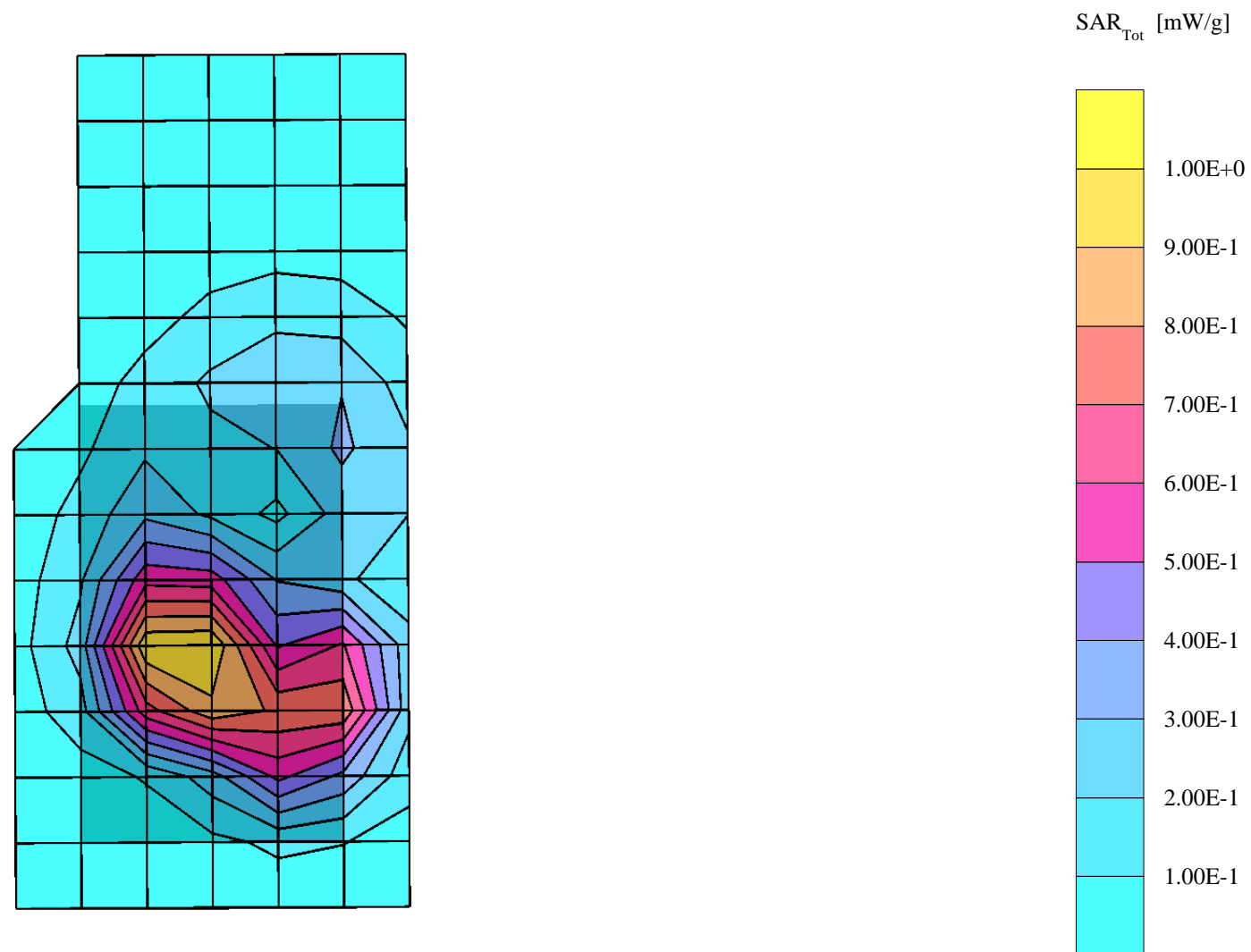
Probe: ET3DV6 - SN1514-FCC BODY2; ConvF(4.46,4.46,4.46); Crest factor: 4.0; 1880 MHz Head & Body: $\sigma = 1.59$ mho/m $\epsilon_r = 52.0$ $\rho = 1.00$ g/cm³

Cube 7x7x7: SAR (1g): 1.22 mW/g, SAR (10g): 0.655 mW/g, (Worst-case extrapolation)

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

Penetration depth: 8.8 (7.9, 10.3) [mm]

Powerdrift: -0.03 dB



s/n: 4400007088915

Ch# 810 Pwr Step: burst 1 and 2=0 ota Antenna Position: INTERNAL

Type of Modulation: 1900 gprs bluetooth program Battery Model #: SNN5751A

Accessory Model # = case (SYN1070A)

R4 Amy Twin Phantom Rev.4 (22Aug02) Phantom; section 2 Section; Position: (90°,180°); Frequency: 1910 MHz

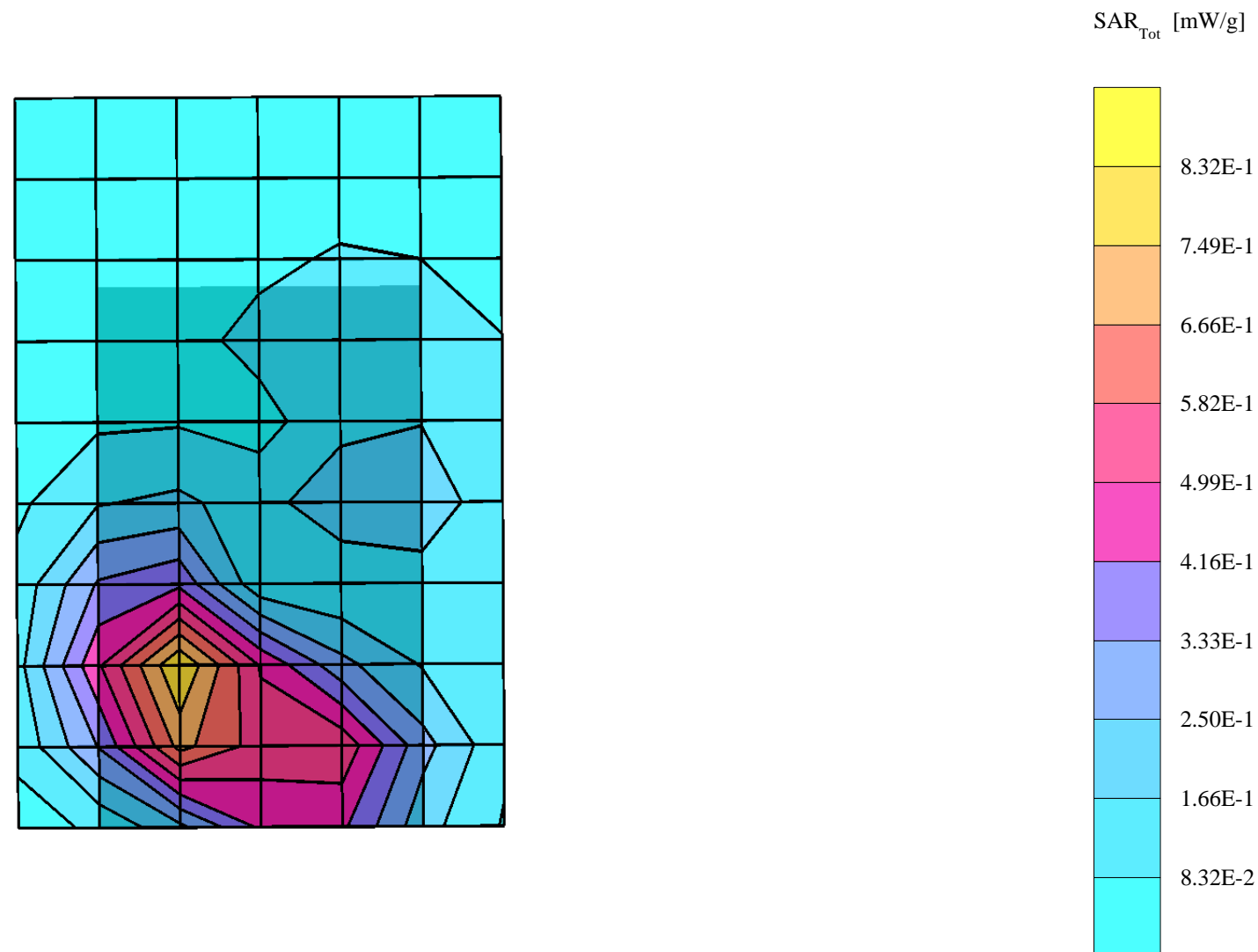
Probe: ET3DV6 - SN1514-FCC BODY2; ConvF(4.46,4.46,4.46); Crest factor: 4.0; 1880 MHz Head & Body: $\sigma = 1.59$ mho/m $\epsilon_r = 51.0$ $\rho = 1.00$ g/cm³

Cube 7x7x7: SAR (1g): 0.858 mW/g, SAR (10g): 0.471 mW/g, (Worst-case extrapolation)

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

Penetration depth: 8.9 (8.1, 10.3) [mm]

Powerdrift: -0.09 dB



Appendix 2

New SAR distribution plots for WiFi Body Worn Configuration

Date/Time: 11/30/04 16:41:07

Test Laboratory: Motorola

WiFi Body Worn with Normal Battery

DUT: MPX220; Type: SA; Serial: 4400007088915; DUT Notes:

Procedure Notes: Ch# 6 Pwr Step: Continuous Antenna Position: Internal

Battery Model #: SNN5750A Accessory Model # = SYN1070A

Communication System: Wi-Fi 2450; Frequency: 2437 MHz; Duty Cycle: 1:1

Medium: 2450 Glycol Body; Medium parameters used: $\sigma = 2.04$; mho/m, $\epsilon_r = 50.1$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ET3DV6 - SN1514; ConvF(4.24, 4.24, 4.24); Calibrated: 7/22/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn398; Calibrated: 2/16/2004
- Phantom: R4 : Sect.2, Amy Twin; Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.4 Build 3; Postprocessing SW: SEMCAD, V1.8 Build 130

Amy Twin Phone Template/Area Scan - Normal Body (15mm) (12x7x1): Measurement

grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.149 mW/g

Amy Twin Phone Template/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm,

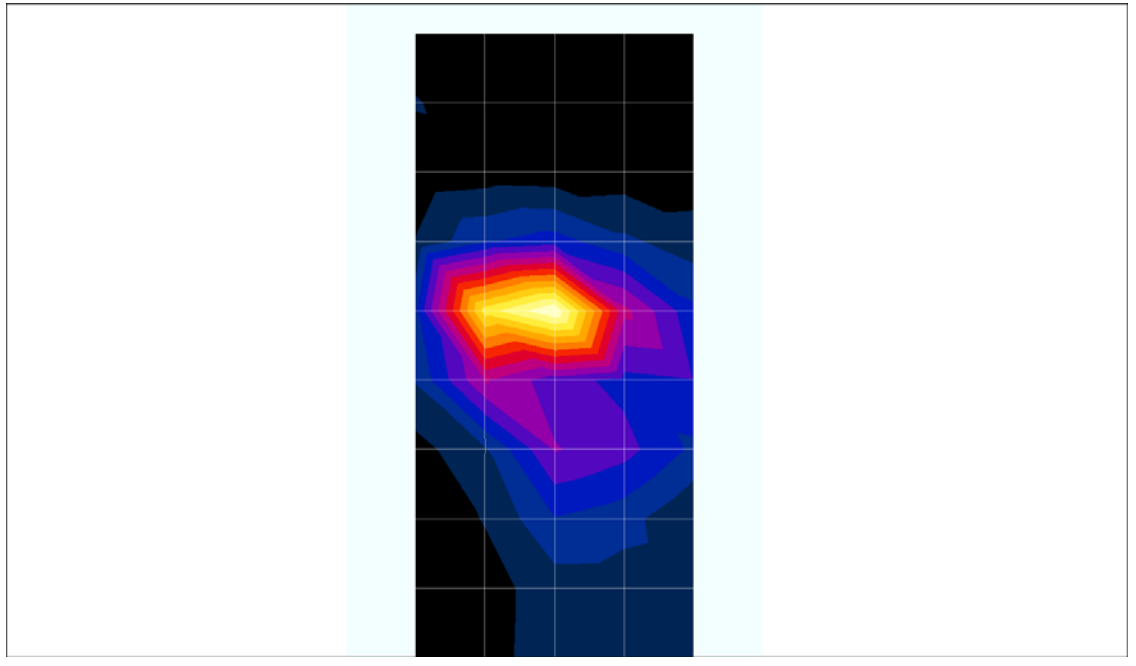
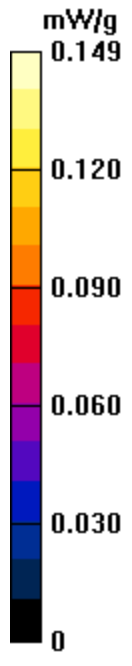
dy=5mm, dz=5mm

Reference Value = 8.68 V/m; Power Drift = -0.0 dB

Peak SAR (extrapolated) = 0.332 W/kg

SAR(1 g) = 0.147 mW/g; SAR(10 g) = 0.069 mW/g

Maximum value of SAR (measured) = 0.158 mW/g



Date/Time: 11/30/04 17:50:36

Test Laboratory: Motorola

Wi-Fi Body Worn with Extended Battery

DUT: MPX220; Type: SA; Serial: 4400007088915; DUT Notes:

Procedure Notes: Ch# 6 / Pwr Step: Continuous Antenna Position: Internal

Battery Model #: SNN5751A Accessory Model # = SYN1070A

Simulate Temp when Measured: 22.0C

Communication System: Wi-Fi 2450; Frequency: 2437 MHz; Duty Cycle: 1:1

Medium: 2450 Glycol Body; Medium parameters used: $\sigma = 2.04$; mho/m, $\epsilon_r = 50.1$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ET3DV6 - SN1514; ConvF(4.24, 4.24, 4.24); Calibrated: 7/22/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn398; Calibrated: 2/16/2004
- Phantom: R4 : Sect.2, Amy Twin; Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.4 Build 3; Postprocessing SW: SEMCAD, V1.8 Build 130

Amy Twin Phone Template/Area Scan - Normal Extended Body (15mm) (15x7x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.040 mW/g

Amy Twin Phone Template/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 4.24 V/m; Power Drift = -0.0 dB

Peak SAR (extrapolated) = 6.06 W/kg

SAR(1 g) = 0.041 mW/g; SAR(10 g) = 0.021 mW/g

Maximum value of SAR (measured) = 0.045 mW/g

