

## Appendix A – System Performance Check

Date/Time: 8/25/2005 4:43:40 PM Date/Time: 8/25/2005 4:51:54 PM

Test Laboratory: A Test Lab Techno Corp.

### System Performance Check at 1800MHz\_20050825\_Head

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:2d057

Communication System: CW; Frequency: 1800 MHz; Duty Cycle: 1:1  
Medium: Head 1800MHz Medium parameters used:  $f = 1800 \text{ MHz}$ ;  $s = 1.43 \text{ mho/m}$ ;  $\epsilon_r = 39.9$ ;  
density =  $1000 \text{ kg/m}^3$ ; Amb Temp.: 22.1 Liquid Temp.: 22.0  
Phantom section: Flat Section  
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

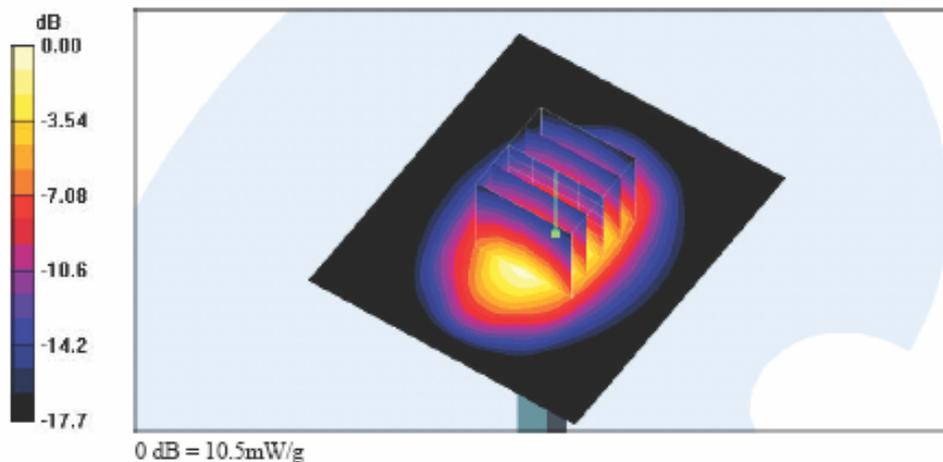
- Probe: ET3DV6 - SN1531; ConvF(5.19, 5.19, 5.19); Calibrated: 11/19/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn393; Calibrated: 4/25/2005
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

### System Performance Check at 1800MHz/Area Scan (61x71x1):

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (interpolated) = 11.5 mW/g

### System Performance Check at 1800MHz/Zoom Scan (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm  
Reference Value = 89.1 V/m; Power Drift = -0.022 dB  
Peak SAR (extrapolated) = 16.2 W/kg  
SAR(1 g) = 9.4 mW/g; SAR(10 g) = 4.99 mW/g  
Maximum value of SAR (measured) = 10.5 mW/g



Head-Tissue-Simulating-Liquid 1800MHz

Date/Time: 8/25/2005 04:20:36 PM Date/Time: 8/25/2005 04:28:49PM

Test Laboratory: A Test Lab Techno Corp.

**System Performance Check at 1800MHz\_20050825\_Body**

**DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:2d057**

Communication System: CW; Frequency: 1800 MHz; Duty Cycle: 1:1

Medium: Body 1800MHz Medium parameters used:  $f = 1800 \text{ MHz}$ ;  $s = 1.52 \text{ mho/m}$ ;  $\epsilon_r = 53.3$ ;

density =  $1000 \text{ kg/m}^3$ ; Amb Temp.: 22.3 Liquid Temp.: 22.0

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1531; ConvF(4.64, 4.64, 4.64); Calibrated: 11/19/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn393; Calibrated: 4/25/2005
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

**System Performance Check at 1800MHz/Area Scan (61x71x1):**

Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$ ; Maximum value of SAR (interpolated) = 12.0 mW/g

**System Performance Check at 1800MHz/Zoom Scan (5x5x7)/Cube 0:**

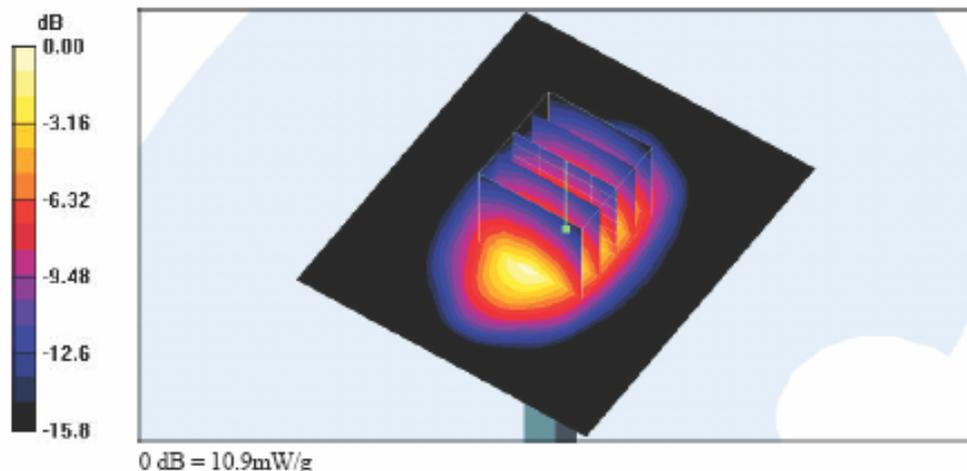
Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 89.9 V/m; Power Drift = -0.027 dB

Peak SAR (extrapolated) = 15.5 W/kg

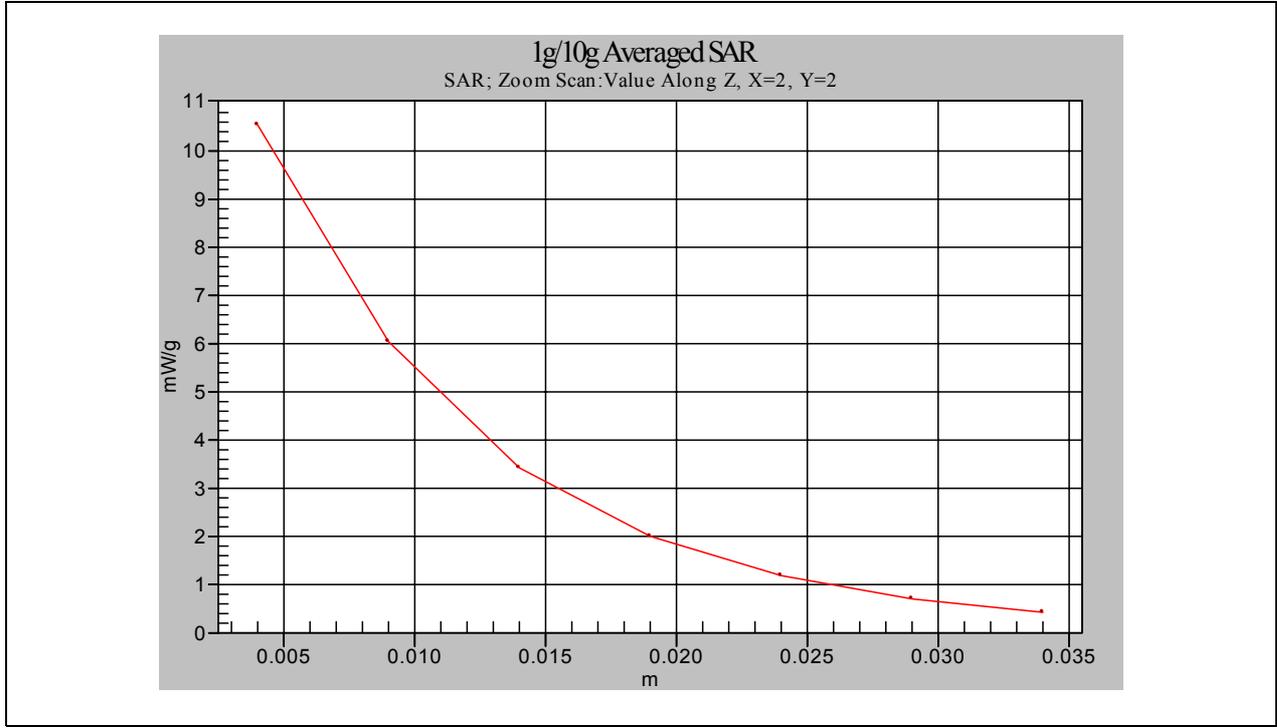
SAR(1 g) = 9.72 mW/g; SAR(10 g) = 5.38 mW/g

Maximum value of SAR (measured) = 10.9 mW/g

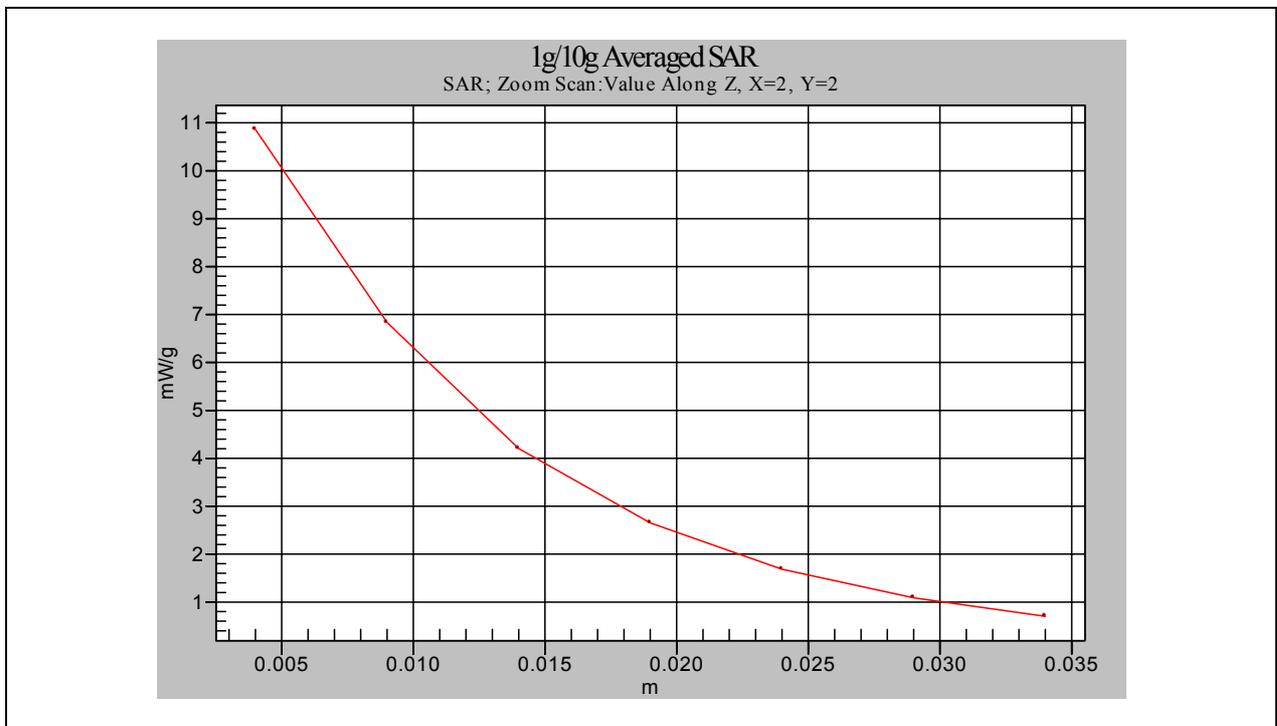


**Body-Tissue-Simulating-Liquid 1800MHz**

### Z-axis Plot of System Performance Check

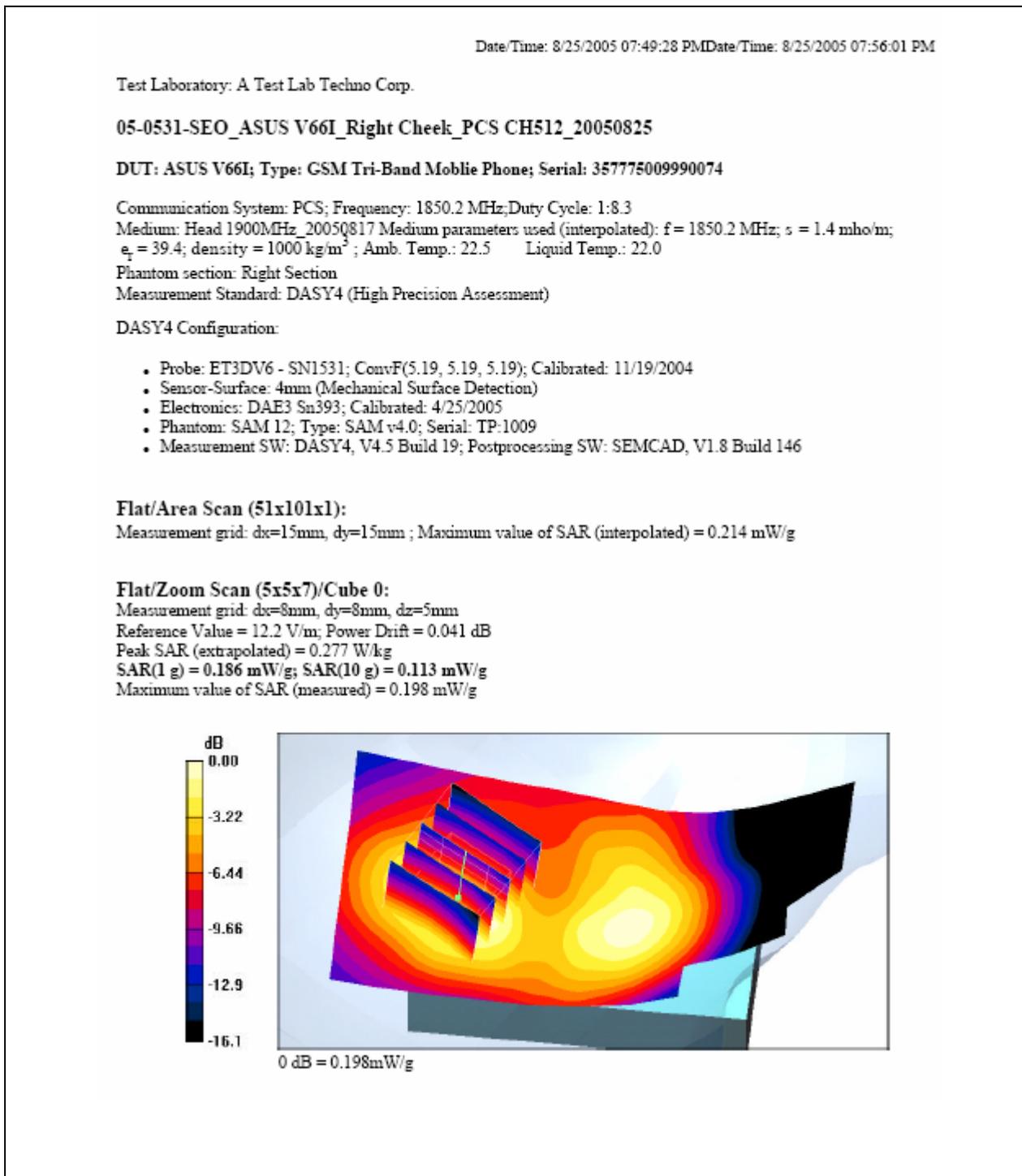


Head-Tissue-Simulating-Liquid 1800MHz



Body-Tissue-Simulating-Liquid 1800MHz

## Appendix B – SAR Measurement Data



**Head-SAR Test Result for Right Cheek Position – Channel 512**

Date/Time: 8/25/2005 8:12:12 PM Date/Time: 8/25/2005 8:19:27 PM

Test Laboratory: A Test Lab Techno Corp.

**05-0531-SEO\_ASUS V66I\_Right Cheek\_PCS CH661\_20050825**

**DUT: ASUS V66I; Type: GSM Tri-Band Moblie Phone; Serial: 357775009990074**

Communication System: PCS; Frequency: 1880 MHz; Duty Cycle: 1:8.3  
Medium: Head 1900MHz\_20050817 Medium parameters used: f = 1880 MHz;  $\sigma = 1.42$  mho/m;  $\epsilon_r = 39.3$ ;  
density = 1000 kg/m<sup>3</sup>; Amb. Temp.: 22.3 Liquid Temp.: 22.0  
Phantom section: Right Section  
Measurement Standard: DASy4 (High Precision Assessment)

**DASy4 Configuration:**

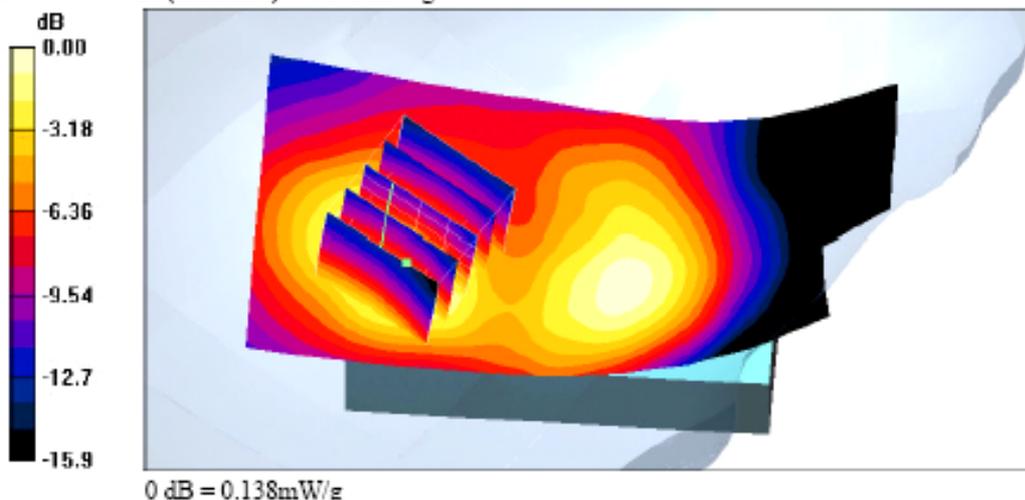
- Probe: ET3DV6 - SN1531; ConvF(5.19, 5.19, 5.19); Calibrated: 11/19/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn393; Calibrated: 4/25/2005
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASy4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

**Right Cheek/Area Scan (51x101x1):**

Measurement grid: dx=15mm, dy=15mm ; Maximum value of SAR (interpolated) = 0.144 mW/g

**Right Cheek/Zoom Scan (5x5x7)/Cube 0:**

Measurement grid: dx=8mm, dy=8mm, dz=5mm  
Reference Value = 10.3 V/m; Power Drift = -0.057 dB  
Peak SAR (extrapolated) = 0.192 W/kg  
SAR(1 g) = 0.126 mW/g; SAR(10 g) = 0.077 mW/g  
Maximum value of SAR (measured) = 0.138 mW/g



**Head-SAR Test Result for Right Cheek Position – Channel 661**

Date/Time: 8/25/2005 8:26:22 PM Date/Time: 8/25/2005 8:33:45 PM

Test Laboratory: A Test Lab Techno Corp.

**05-0531-SEO\_ASUS V66I\_Right Cheek\_PCS CH810\_20050825**

**DUT: ASUS V66I; Type: GSM Tri-Band Mobile Phone; Serial: 357775009990074**

Communication System: PCS; Frequency: 1909.8 MHz; Duty Cycle: 1:8.3  
Medium: Head 1900MHz\_2Q050817 Medium parameters used (interpolated):  $f = 1909.8$  MHz;  $s = 1.45$  mho/m;  $\epsilon_r = 38.9$ ; density = 1000 kg/m<sup>3</sup>; Amb. Temp.: 22.4 Liquid Temp.: 22.0  
Phantom section: Right Section  
Measurement Standard: DASy4 (High Precision Assessment)

DASy4 Configuration:

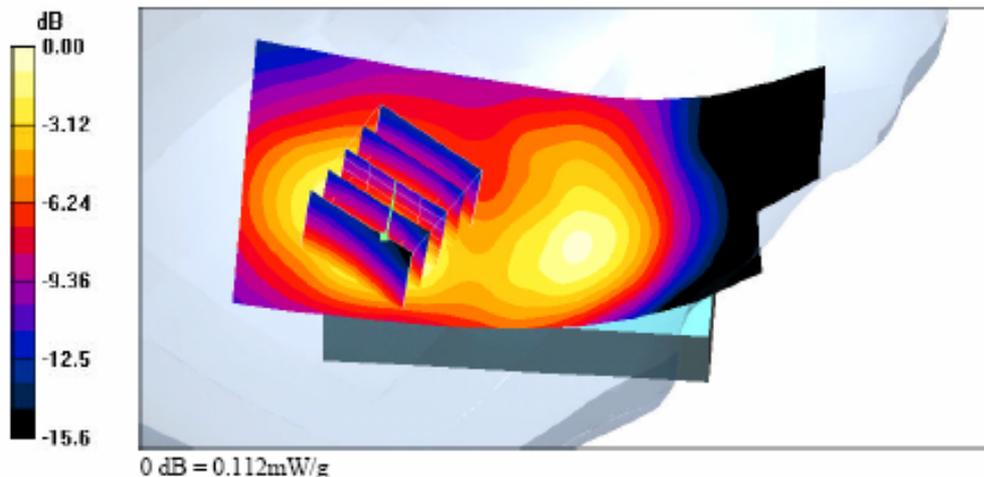
- Probe: ET3DV6 - SN1531; ConvF(5.19, 5.19, 5.19); Calibrated: 11/19/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn393; Calibrated: 4/25/2005
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASy4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

**Right Cheek/Area Scan (51x101x1):**

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (interpolated) = 0.120 mW/g

**Right Cheek/Zoom Scan (5x5x7)/Cube 0:**

Measurement grid: dx=8mm, dy=8mm, dz=5mm  
Reference Value = 9.06 V/m; Power Drift = -0.00 dB  
Peak SAR (extrapolated) = 0.153 W/kg  
SAR(1 g) = 0.104 mW/g; SAR(10 g) = 0.064 mW/g  
Maximum value of SAR (measured) = 0.112 mW/g



**Head-SAR Test Result for Right Cheek Position – Channel 810**

Date/Time: 8/25/2005 9:29:05 PM Date/Time: 8/25/2005 9:35:42 PM

Test Laboratory: A Test Lab Techno Corp.

**05-0531-SEO\_ASUS V66I\_Right Tilted\_PCS CH512\_20050825**

**DUT: ASUS V66I; Type: GSM Tri-Band Moblie Phone; Serial: 357775009990074**

Communication System: PCS; Frequency: 1850.2 MHz; Duty Cycle: 1:8.3

Medium: Head 1900MHz\_20050817 Medium parameters used (interpolated):  $f = 1850.2$  MHz;  $s = 1.4$  mho/m;  $\epsilon_r = 39.4$ ; density =  $1000$  kg/m<sup>3</sup>; Amb. Temp.: 22.4 Liquid Temp.: 22.0

Phantom section: Right Section

Measurement Standard: DASY4 (High Precision Assessment)

**DASY4 Configuration:**

- Probe: ET3DV6 - SN1531; ConvF(5.19, 5.19, 5.19); Calibrated: 11/19/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn393; Calibrated: 4/25/2005
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

**Right Tilted/Area Scan (51x101x1):**

Measurement grid:  $dx=15$ mm,  $dy=15$ mm; Maximum value of SAR (interpolated) = 0.270 mW/g

**Right Tilted/Zoom Scan (5x5x7)/Cube 0:**

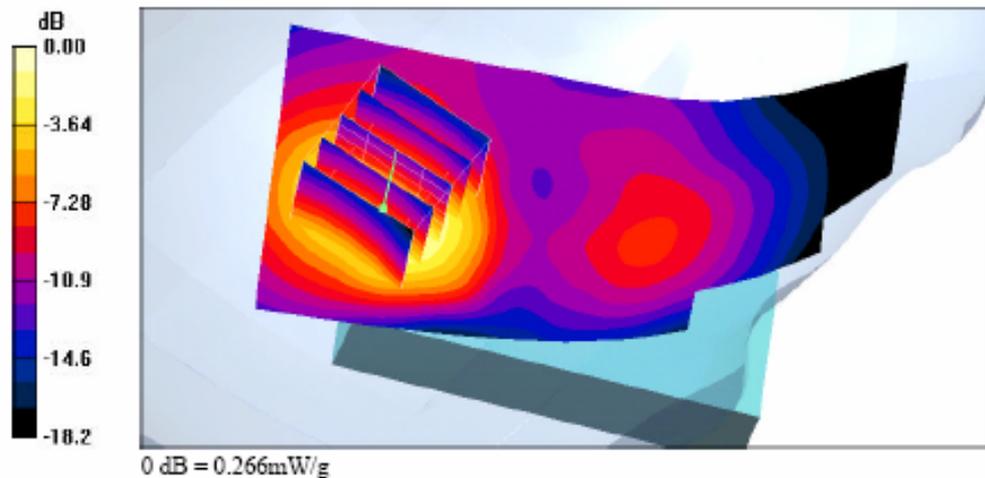
Measurement grid:  $dx=8$ mm,  $dy=8$ mm,  $dz=5$ mm

Reference Value = 14.0 V/m; Power Drift = -0.101 dB

Peak SAR (extrapolated) = 0.385 W/kg

SAR(1 g) = 0.238 mW/g; SAR(10 g) = 0.133 mW/g

Maximum value of SAR (measured) = 0.266 mW/g



**Head-SAR Test Result for Right Tilted Position – Channel 512**

Date/Time: 8/25/2005 8:41:46 PM Date/Time: 8/25/2005 8:49:05 PM

Test Laboratory: A Test Lab Techno Corp.

**05-0531-SEO\_ASUS V66I\_Right Tilted\_PCS CH661\_20050825**

**DUT: ASUS V66I; Type: GSM Tri-Band Mobile Phone; Serial: 357775009990074**

Communication System: PCS; Frequency: 1880 MHz; Duty Cycle: 1:8.3  
Medium: Head 1900MHz\_20050817 Medium parameters used:  $f = 1880$  MHz;  $s = 1.42$  mho/m;  $\epsilon_r = 39.3$ ;  
density =  $1000$  kg/m<sup>3</sup>; Amb. Temp.: 22.3 Liquid Temp.: 22.0  
Phantom section: Right Section  
Measurement Standard: DASY4 (High Precision Assessment)

**DASY4 Configuration:**

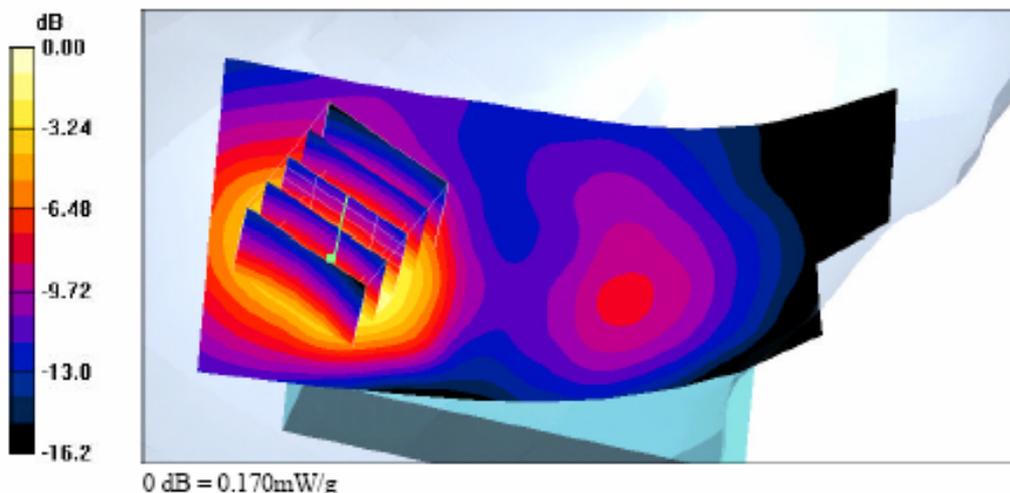
- Probe: ET3DV6 - SN1531; ConvF(5.19, 5.19, 5.19); Calibrated: 11/19/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn393; Calibrated: 4/25/2005
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

**Right Tilted/Area Scan (51x101x1):**

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (interpolated) = 0.174 mW/g

**Right Tilted/Zoom Scan (5x5x7)/Cube 0:**

Measurement grid: dx=8mm, dy=8mm, dz=5mm  
Reference Value = 11.1 V/m; Power Drift = 0.028 dB  
Peak SAR (extrapolated) = 0.246 W/kg  
SAR(1 g) = 0.153 mW/g; SAR(10 g) = 0.086 mW/g  
Maximum value of SAR (measured) = 0.170 mW/g



**Head-SAR Test Result for Right Tilted Position – Channel 661**

Date/Time: 8/25/2005 8:56:00 PM Date/Time: 8/25/2005 9:03:21 PM

Test Laboratory: A Test Lab Techno Corp.

**05-0531-SEO\_ASUS V66I\_Right Tilted\_PCS CH810\_20050825**

**DUT: ASUS V66I; Type: GSM Tri-Band Mobile Phone; Serial: 357775009990074**

Communication System: PCS; Frequency: 1909.8 MHz; Duty Cycle: 1:8.3

Medium: Head 1900MHz\_20050817 Medium parameters used (interpolated):  $f = 1909.8$  MHz;  $s = 1.45$  mho/m;  $\epsilon_r = 38.9$ ; density =  $1000$  kg/m<sup>3</sup>; Amb. Temp.: 22.2 Liquid Temp.: 22.0

Phantom section: Right Section

Measurement Standard: DASY4 (High Precision Assessment)

**DASY4 Configuration:**

- Probe: ET3DV6 - SN1531; ConvF(5.19, 5.19, 5.19); Calibrated: 11/19/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn393; Calibrated: 4/25/2005
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

**Right Tilted/Area Scan (51x101x1):**

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (interpolated) = 0.133 mW/g

**Right Tilted/Zoom Scan (5x5x7)/Cube 0:**

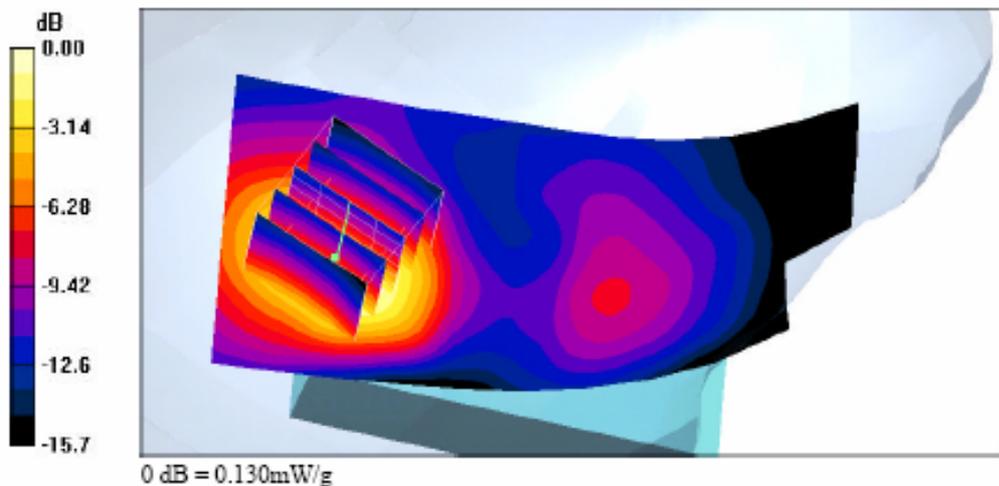
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 9.71 V/m; Power Drift = -0.023 dB

Peak SAR (extrapolated) = 0.192 W/kg

SAR(1 g) = 0.118 mW/g; SAR(10 g) = 0.067 mW/g

Maximum value of SAR (measured) = 0.130 mW/g



**Head-SAR Test Result for Right Tilted Position – Channel 810**

Date/Time: 8/25/2005 09:58:28 PM Date/Time: 8/25/2005 10:04:56 PM

Test Laboratory: A Test Lab Techno Corp.

**05-0531-SEO\_ASUS V66I\_Left Cheek\_PCS CH512\_20050825\_**

**DUT: ASUS V66I; Type: GSM Tri-Band Moblie Phone; Serial: 357775009990074**

Communication System: PCS; Frequency: 1850.2 MHz; Duty Cycle: 1:8.3  
Medium: Head\_1900MHz\_20050124\_A Medium parameters used (interpolated):  $f = 1850.2$  MHz;  $s = 1.4$  mho/m;  
 $\epsilon_r = 39.2$ ; density =  $1000$  kg/m<sup>3</sup>; Amb. Temp.: 22.3      Liquid Temp.: 22.0  
Phantom section: Left Section  
Measurement Standard: DASY4 (High Precision Assessment)

**DASY4 Configuration:**

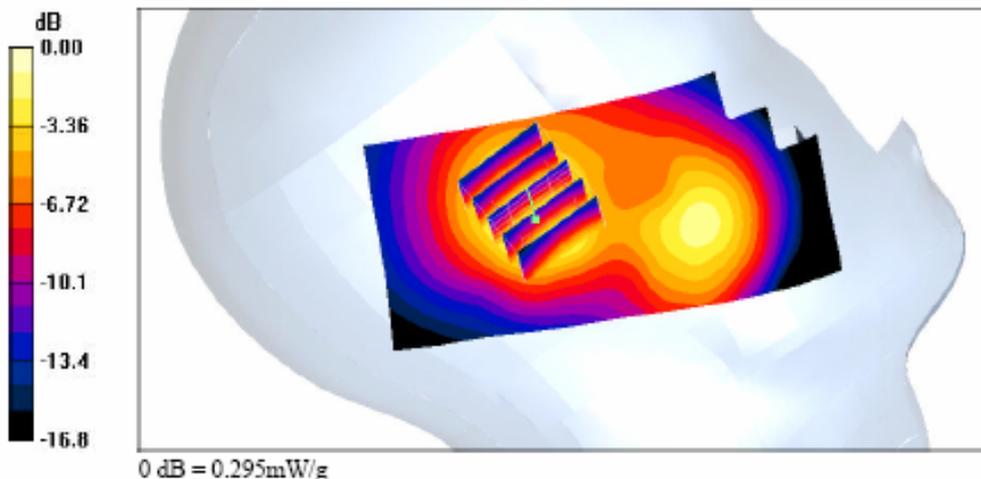
- Probe: ET3DV6 - SN1531; ConvF(5.19, 5.19, 5.19); Calibrated: 11/19/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn393; Calibrated: 4/25/2005
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

**Left Cheek/Area Scan (51x101x1):**

Measurement grid: dx=15mm, dy=15mm ; Maximum value of SAR (interpolated) = 0.318 mW/g

**Left Cheek/Zoom Scan (5x5x7)/Cube 0:**

Measurement grid: dx=8mm, dy=8mm, dz=5mm  
Reference Value = 13.2 V/m; Power Drift = 0.052 dB  
Peak SAR (extrapolated) = 0.440 W/kg  
SAR(1 g) = 0.271 mW/g; SAR(10 g) = 0.154 mW/g  
Maximum value of SAR (measured) = 0.295 mW/g



**Head-SAR Test Result for Left Cheek Position – Channel 512**

Date/Time: 8/25/2005 9:52:49 PM Date/Time: 8/25/2005 9:59:25 PM

Test Laboratory: A Test Lab Techno Corp.

05-0531-SEO\_ASUS V66I\_Left Cheek\_PCS CH661\_20050825\_

DUT: ASUS V66I; Type: GSM Tri-Band Mobile Phone; Serial: 357775009990074

Communication System: PCS; Frequency: 1880 MHz; Duty Cycle: 1:8.3  
Medium: Head 1900MHz\_20050817 Medium parameters used:  $f = 1880$  MHz;  $s = 1.42$  mho/m;  $\epsilon_r = 39.3$ ;  
density =  $1000$  kg/m<sup>3</sup>; Amb. Temp.: 22.5 Liquid Temp.: 22.0  
Phantom section: Left Section  
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

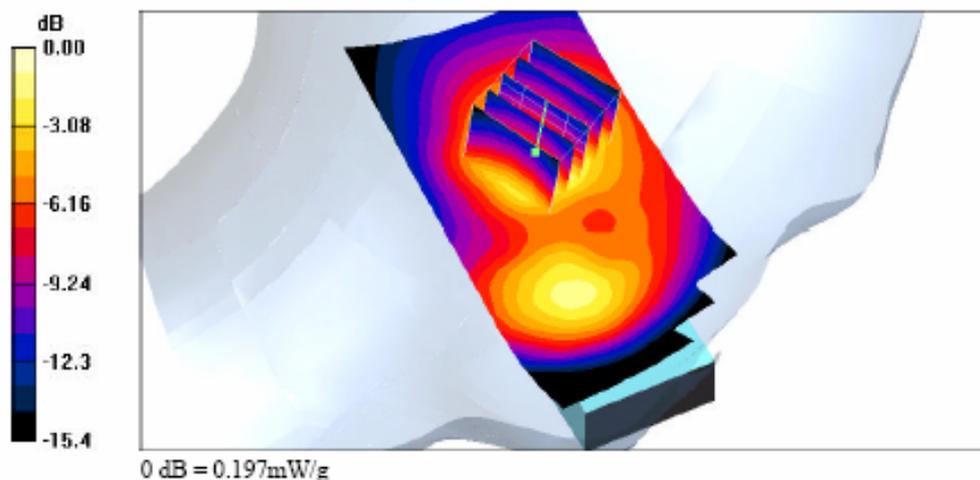
- Probe: ET3DV6 - SN1531; ConvF(5.19, 5.19, 5.19); Calibrated: 11/19/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn393; Calibrated: 4/25/2005
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Left Cheek/Area Scan (51x101x1):

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (interpolated) = 0.215 mW/g

Left Cheek/Zoom Scan (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm  
Reference Value = 11.6 V/m; Power Drift = -0.012 dB  
Peak SAR (extrapolated) = 0.296 W/kg  
SAR(1 g) = 0.182 mW/g; SAR(10 g) = 0.105 mW/g  
Maximum value of SAR (measured) = 0.197 mW/g



Head-SAR Test Result for Left Cheek Position – Channel 661

Date/Time: 8/25/2005 9:37:22 PM Date/Time: 8/25/2005 9:43:57 PM

Test Laboratory: A Test Lab Techno Corp.

**05-0531-SEO\_ASUS V66I\_Left Cheek\_PCS CH810\_20050825\_**

**DUT: ASUS V66I; Type: GSM Tri-Band Mobile Phone; Serial: 357775009990074**

Communication System: PCS; Frequency: 1909.8 MHz; Duty Cycle: 1:8.3

Medium: Head 1900MHz\_20050817 Medium parameters used (interpolated):  $f = 1909.8 \text{ MHz}$ ;  $s = 1.45 \text{ mho/m}$ ;  
 $\epsilon_r = 38.9$ ; density =  $1000 \text{ kg/m}^3$ ; Amb. Temp.: 22.5 Liquid Temp.: 22.0

Phantom section: Left Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1531; ConvF(5.19, 5.19, 5.19); Calibrated: 11/19/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn393; Calibrated: 4/25/2005
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

**Left Cheek/Area Scan (51x101x1):**

Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$ ; Maximum value of SAR (interpolated) = 0.166 mW/g

**Left Cheek/Zoom Scan (5x5x7)/Cube 0:**

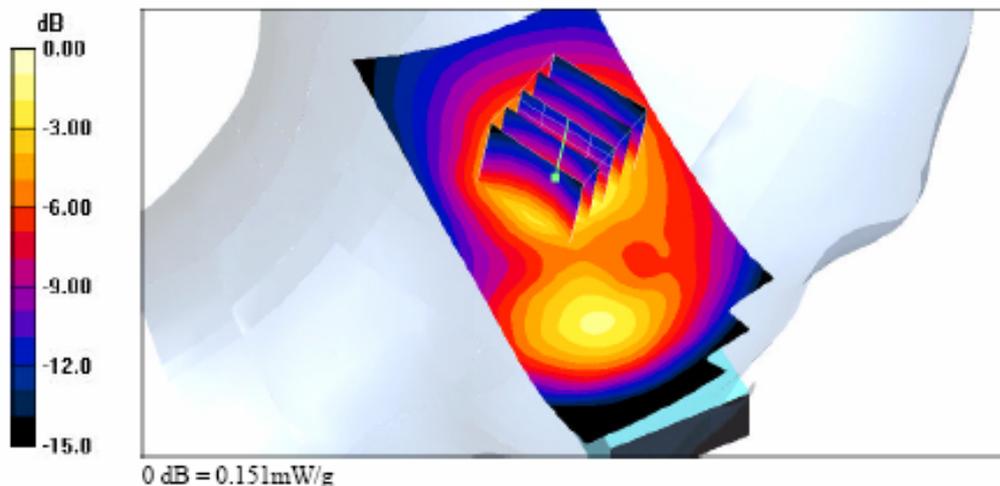
Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 9.93 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 0.223 W/kg

SAR(1 g) = 0.140 mW/g; SAR(10 g) = 0.082 mW/g

Maximum value of SAR (measured) = 0.151 mW/g



### Head-SAR Test Result for Left Cheek Position – Channel 810

Date/Time: 8/25/2005 10:06:35 PM Date/Time: 8/25/2005 10:15:04 PM

Test Laboratory: A Test Lab Techno Corp.

**05-0531-SEO\_ASUS V66I\_Left Tilted\_PCS CH512\_20050825\_**

DUT: ASUS V66I; Type: GSM Tri-Band Mobile Phone; Serial: 357775009990074

Communication System: PCS; Frequency: 1850.2 MHz; Duty Cycle: 1:8.3  
Medium: Head\_1900MHz\_20050124\_A Medium parameters used (interpolated):  $f = 1850.2$  MHz;  $s = 1.4$  mho/m;  
 $\epsilon_r = 39.2$ ; density =  $1000$  kg/m<sup>3</sup>; Amb. Temp.: 22.4 Liquid Temp.: 22.0  
Phantom section: Left Section  
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

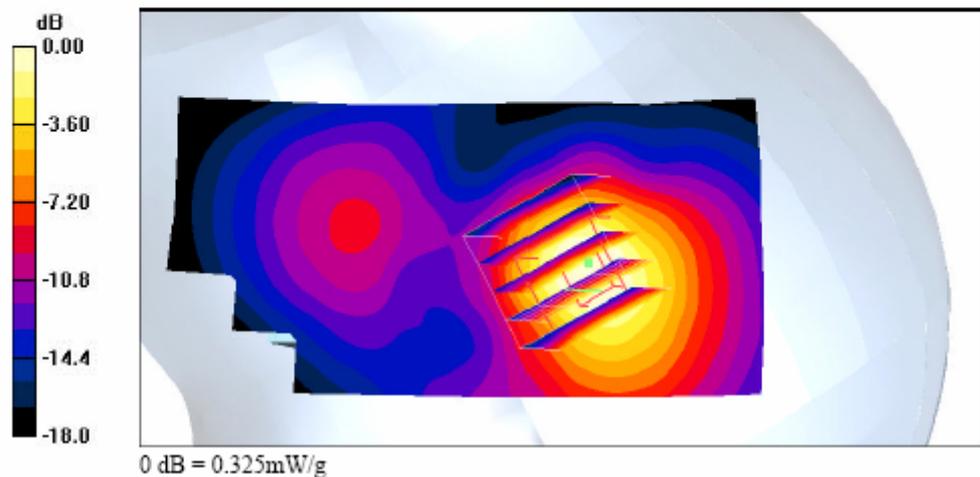
- Probe: ET3DV6 - SN1531; ConvF(5.19, 5.19, 5.19); Calibrated: 11/19/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn393; Calibrated: 4/25/2005
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

**Left Tilted/Area Scan (51x101x1):**

Measurement grid: dx=15mm, dy=15mm ; Maximum value of SAR (interpolated) = 0.345 mW/g

**Left Tilted/Zoom Scan (5x5x7)/Cube 0:**

Measurement grid: dx=8mm, dy=8mm, dz=5mm  
Reference Value = 14.0 V/m; Power Drift = -0.028 dB  
Peak SAR (extrapolated) = 0.499 W/kg  
SAR(1 g) = 0.299 mW/g; SAR(10 g) = 0.162 mW/g  
Maximum value of SAR (measured) = 0.325 mW/g



**Head-SAR Test Result for Left Tilted Position – Channel 512**

Date/Time: 8/25/2005 10:15:24 PM Date/Time: 8/25/2005 10:22:01 PM

Test Laboratory: A Test Lab Techno Corp.

**05-0531-SEO\_ASUS V66I\_Left Tilted\_PCS CH661\_20050825\_**

**DUT: ASUS V66I; Type: GSM Tri-Band Moblie Phone; Serial: 357775009990074**

Communication System: PCS; Frequency: 1880 MHz; Duty Cycle: 1:8.3  
Medium: Head 1900MHz\_20050817 Medium parameters used: f = 1880 MHz;  $\sigma = 1.42$  mho/m;  $\epsilon_r = 39.3$ ;  
density = 1000 kg/m<sup>3</sup>; Amb. Temp.: 22.2 Liquid Temp.: 22.0  
Phantom section: Left Section  
Measurement Standard: DASYS4 (High Precision Assessment)

**DASY4 Configuration:**

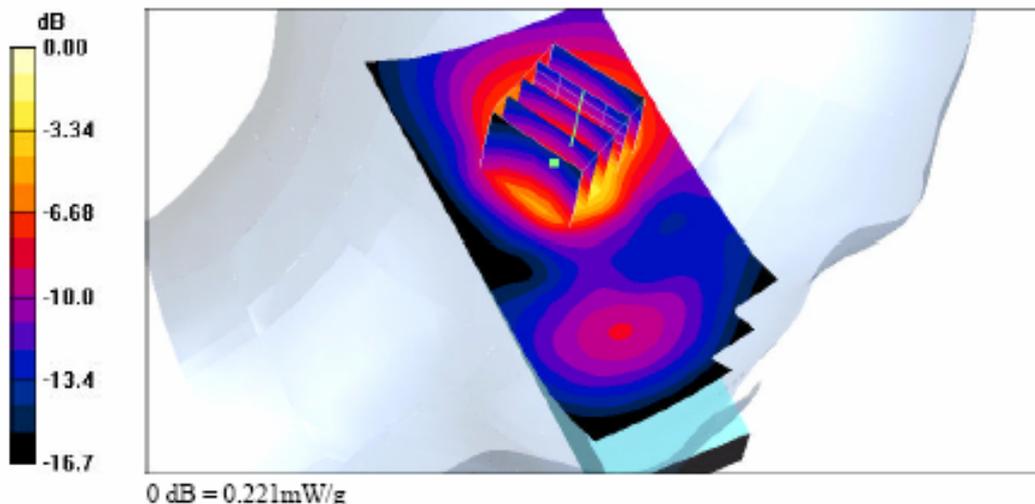
- Probe: ET3DV6 - SN1531; ConvF(5.19, 5.19, 5.19); Calibrated: 11/19/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn393; Calibrated: 4/25/2005
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASYS4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

**Left Tilted/Area Scan (51x101x1):**

Measurement grid: dx=15mm, dy=15mm ; Maximum value of SAR (interpolated) = 0.244 mW/g

**Left Tilted/Zoom Scan (5x5x7)/Cube 0:**

Measurement grid: dx=8mm, dy=8mm, dz=5mm  
Reference Value = 12.1 V/m; Power Drift = 0.024 dB  
Peak SAR (extrapolated) = 0.346 W/kg  
SAR(1 g) = 0.205 mW/g; SAR(10 g) = 0.112 mW/g  
Maximum value of SAR (measured) = 0.221 mW/g



**Head-SAR Test Result for Left Tilted Position – Channel 661**

Date/Time: 8/25/2005 10:22:44 PM/Date/Time: 8/25/2005 10:30:11 PM

Test Laboratory: A Test Lab Techno Corp.

**05-0531-SEO\_ASUS V66I\_Left Tilted\_PCS CH810\_20050825\_**

DUT: ASUS V66I; Type: GSM Tri-Band Mobile Phone; Serial: 357775009990074

Communication System: PCS; Frequency: 1909.8 MHz; Duty Cycle: 1:8.3  
Medium: Head 1900MHz\_20050817 Medium parameters used (interpolated):  $f = 1909.8$  MHz;  $\epsilon = 1.45$  mho/m;  
 $\sigma = 38.9$ ; density =  $1000$  kg/m<sup>3</sup>; Amb. Temp.: 22.2 Liquid Temp.: 22.0  
Phantom section: Left Section  
Measurement Standard: DAS4 (High Precision Assessment)

DASY4 Configuration:

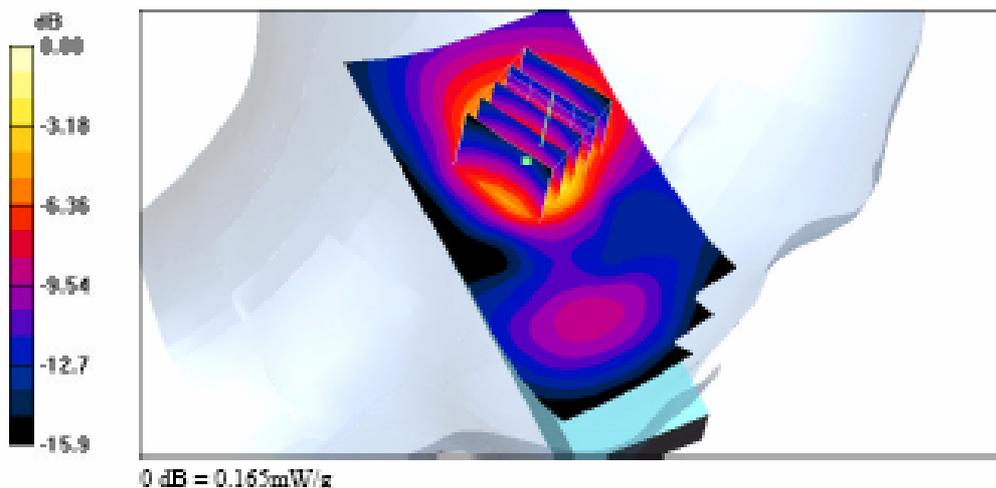
- Probe: ET3DV6 - SN1531; ComF(5.19, 5.19, 5.19); Calibrated: 11/19/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronic: DAE3 Sn393; Calibrated: 4/25/2005
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP-1009
- Measurement SW: DASY4, V4.3 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

**Left Tilted/Area Scan (51x101x1):**

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (interpolated) = 0.185 mW/g

**Left Tilted/Zoom Scan (5x5x7)/Cube 0:**

Measurement grid: dx=8mm, dy=8mm, dz=7mm  
Reference Value = 10.4 V/m; Power Drift = 0.072 dB  
Peak SAR (extrapolated) = 0.259 W/kg  
SAR(1 g) = 0.154 mW/g; SAR(10 g) = 0.084 mW/g  
Maximum value of SAR (measured) = 0.165 mW/g



**Head-SAR Test Result for Left Tilted Position – Channel 810**

Date/Time: 8/25/2005 04:05:19 AM Date/Time: 8/25/2005 04:15:24 AM

Test Laboratory: A Test Lab Techno Corp.

**05-0531-SEO\_ASUS V66I\_Flat\_PCS CH512\_20050825\_GPRS**

**DUT: ASUS V66I; Type: GSM Tri-Band Mobile Phone; Serial: 357775009990074**

Communication System: PCS 1900 GPRS(2Down,2Up); Frequency: 1850.2 MHz; Duty Cycle: 1:4.2  
Medium: Body 1900MHz\_20050820 Medium parameters used (interpolated): f = 1850.2 MHz;  $\sigma = 1.52$  mho/m;  
 $\epsilon = 51.5$ ; density = 1000 kg/m<sup>3</sup>; Amb. Temp.: 22.2 Liquid Temp.: 22.0  
Phantom section: Flat Section  
Measurement Standard: DASy4 (High Precision Assessment)

**DASY4 Configuration:**

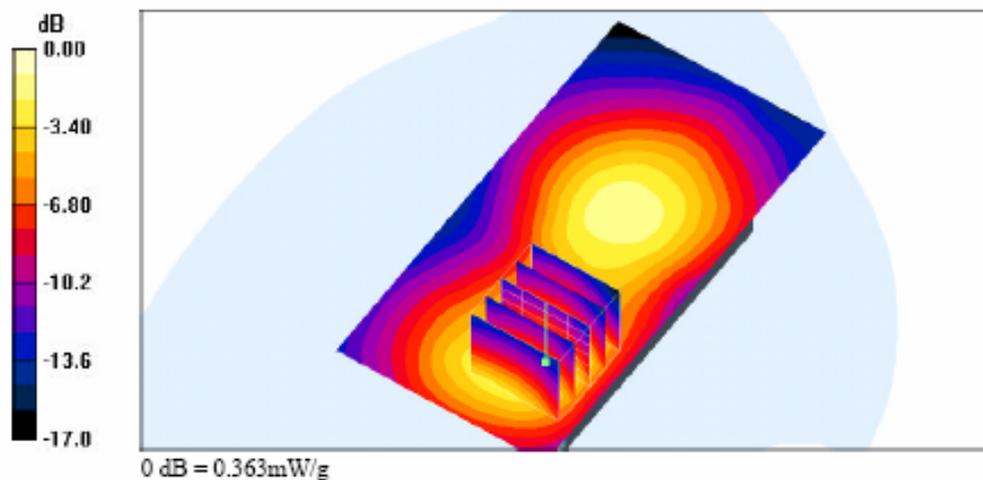
- Probe: ET3DV6 - SN1531; ConvF(4.64, 4.64, 4.64); Calibrated: 11/19/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn393; Calibrated: 4/25/2005
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASy4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

**Flat/Area Scan (51x101x1):**

Measurement grid: dx=15mm, dy=15mm ; Maximum value of SAR (interpolated) = 0.355 mW/g

**Flat/Zoom Scan (5x5x7)/Cube 0:**

Measurement grid: dx=8mm, dy=8mm, dz=5mm  
Reference Value = 14.4 V/m; Power Drift = -0.045 dB  
Peak SAR (extrapolated) = 0.515 W/kg  
SAR(1 g) = 0.321 mW/g; SAR(10 g) = 0.184 mW/g  
Maximum value of SAR (measured) = 0.363 mW/g



**Body-SAR Test Result for Flat Position – Channel 512**

Date/Time: 8/26/2005 3:46:57 AM Date/Time: 8/26/2005 3:53:13 AM

Test Laboratory: A Test Lab Techno Corp.

**05-0531-SEO\_ASUS V66I\_Flat\_PCS CH661\_20050825\_GPRS**

**DUT: ASUS V66I; Type: GSM Tri-Band Mobile Phone; Serial: 357775009990074**

Communication System: PCS 1900 GPRS(2Down,2Up); Frequency: 1880 MHz; Duty Cycle: 1:4.2  
Medium: Body 1900MHz Medium parameters used:  $f = 1880 \text{ MHz}$ ;  $s = 1.52 \text{ mho/m}$ ;  $\epsilon_r = 52.3$ ;  
density =  $1000 \text{ kg/m}^3$ ; AmbTemp.: 22.3      Liquid Temp.: 22.0  
Phantom section: Flat Section  
Measurement Standard: DASY4 (High Precision Assessment)

**DASY4 Configuration:**

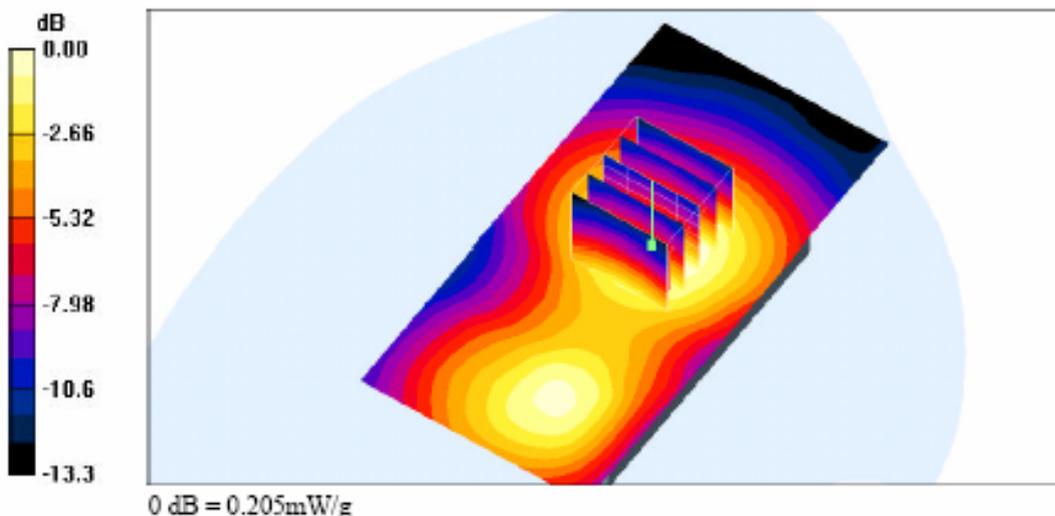
- Probe: ET3DV6 - SN1531; ConvF(4.64, 4.64, 4.64); Calibrated: 11/19/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn393; Calibrated: 4/25/2005
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

**Flat/Area Scan (51x101x1):**

Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$ ; Maximum value of SAR (interpolated) = 0.203 mW/g

**Flat/Zoom Scan (5x5x7)/Cube 0:**

Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$   
Reference Value = 11.5 V/m; Power Drift = -0.139 dB  
Peak SAR (extrapolated) = 0.283 W/kg  
SAR(1 g) = 0.191 mW/g; SAR(10 g) = 0.124 mW/g  
Maximum value of SAR (measured) = 0.205 mW/g



**Body-SAR Test Result for Flat Position – Channel 661**

Date/Time: 8/26/2005 4:01:21 AM Date/Time: 8/26/2005 4:07:37 AM

Test Laboratory: A Test Lab Techno Corp.

**05-0531-SEO\_ASUS V66I\_Flat\_PCS CH810\_20050825\_GPRS**

**DUT: ASUS V66I; Type: GSM Tri-Band Moblie Phone; Serial: 35777509990074**

Communication System: PCS 1900 GPRS(2Down,2Up); Frequency: 1909.8 MHz;Duty Cycle: 1:4.2  
Medium: Body 1900MHZ Medium parameters used (interpolated):  $f = 1909.8$  MHz;  $s = 1.54$  mho/m;  $\epsilon_r = 52$ ;  
density =  $1000$  kg/m<sup>3</sup> ; Amb. Temp.: 22.3 Liquid Temp.: 22.0  
Phantom section: Flat Section  
Measurement Standard: DASY4 (High Precision Assessment)

**DASY4 Configuration:**

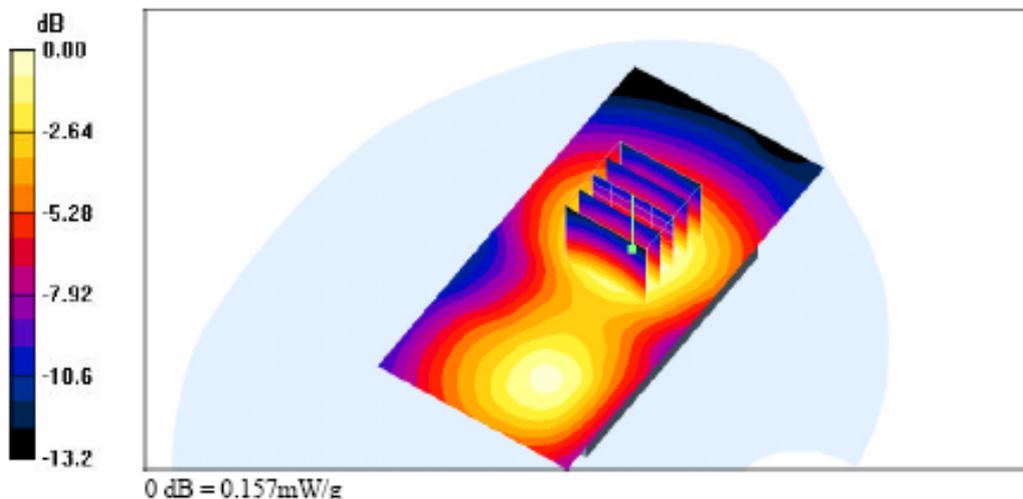
- Probe: ET3DV6 - SN1531; ConvF(4.64, 4.64, 4.64); Calibrated: 11/19/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn393; Calibrated: 4/25/2005
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

**Flat/Area Scan (51x101x1):**

Measurement grid: dx=15mm, dy=15mm ; Maximum value of SAR (interpolated) = 0.160 mW/g

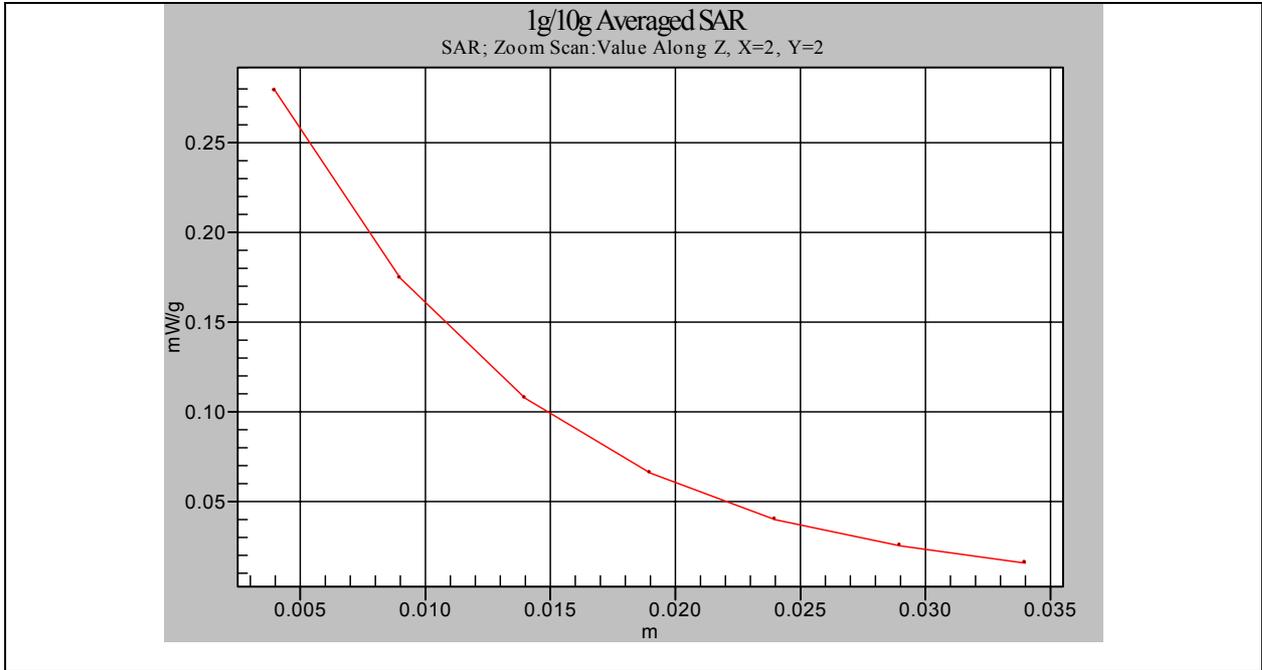
**Flat/Zoom Scan (5x5x7)/Cube 0:**

Measurement grid: dx=8mm, dy=8mm, dz=5mm  
Reference Value = 9.75 V/m; Power Drift = 0.105 dB  
Peak SAR (extrapolated) = 0.224 W/kg  
SAR(1 g) = 0.148 mW/g; SAR(10 g) = 0.096 mW/g  
Maximum value of SAR (measured) = 0.157 mW/g

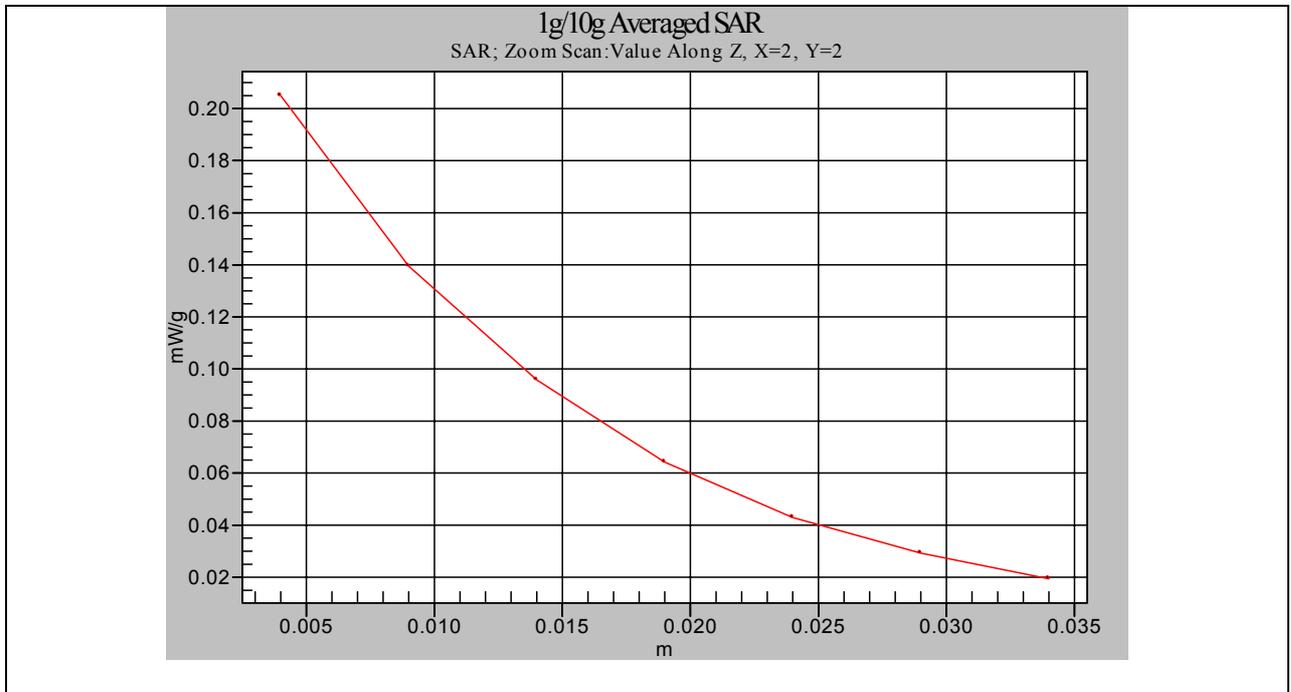


**Body-SAR Test Result for Flat Position – Channel 810**

### Z-axis Plot for Maximum SAR



Head-SAR Test Result for Left Tilted Position – Channel 512



Body-SAR Test Result for Flat Position – Channel 512

**Appendix C – Dipole Calibration**

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



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

Accreditation No.: **SCS 108**

Client: **Auden** Certificate No: **D900V2-172\_Jan05**

CALIBRATION CERTIFICATE

Object: **D900V2 - SN: 172**

Calibration procedure(s): **QA CAL-05.v6  
Calibration procedure for dipole validation kits**

Calibration date: **January 18, 2005**

Condition of the calibrated item: **In Tolerance**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).  
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter EPM E442	GB37480704	12-Oct-04 (METAS, No. 251-00412)	Oct-05
Power sensor HP 8481A	US37292783	12-Oct-04 (METAS, No. 251-00412)	Oct-05
Reference 20 dB Attenuator	SN: 5086 (20g)	10-Aug-04 (METAS, No 251-00402)	Aug-05
Reference 10 dB Attenuator	SN: 5047.2 (10r)	10-Aug-04 (METAS, No 251-00402)	Aug-05
Reference Probe ET3DV6	SN 1507	26-Oct-04 (SPEAG, No. ET3-1507_Oct04)	Oct-05
DAE4	SN 601	07-Jan-05 (SPEAG, No. DAE4-601_Jan05)	Jan-06
DAE4	SN 907	03-May-04 (SPEAG, No. DAE907_May04)	May-05

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (SPEAG, in house check Oct-03)	In house check: Oct-05
RF generator R&S SML-03	100698	27-Mar-02 (SPEAG, in house check Dec-03)	In house check: Dec-05
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (SPEAG, in house check Nov-04)	In house check: Nov-05

	Name	Function	Signature
Calibrated by:	Judith Müller	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: January 19, 2005

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Certificate No: D900V2-172\_Jan05

Page 1 of 9

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



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

Accreditation No.: SCS 108

**Glossary:**

TSL tissue simulating liquid  
ConvF sensitivity in TSL / NORM x,y,z  
N/A not applicable or not measured

**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
- c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

**Additional Documentation:**

- d) DASy4 System Handbook

**Methods Applied and Interpretation of Parameters:**

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

**Measurement Conditions**

DASY system configuration, as far as not given on page 1.

<b>DASY Version</b>	DASY4	V4.4
<b>Extrapolation</b>	Advanced Extrapolation	
<b>Phantom</b>	Modular Flat Phantom V4.9	
<b>Distance Dipole Center - TSL</b>	15 mm	with Spacer
<b>Area Scan resolution</b>	dx, dy = 15 mm	
<b>Zoom Scan Resolution</b>	dx, dy, dz = 5 mm	
<b>Frequency</b>	900 MHz ± 1 MHz	

**Head TSL parameters**

The following parameters and calculations were applied.

	<b>Temperature</b>	<b>Permittivity</b>	<b>Conductivity</b>
<b>Nominal Head TSL parameters</b>	22.0 °C	41.5	0.97 mho/m
<b>Measured Head TSL parameters</b>	(22.0 ± 0.2) °C	41.4 ± 6 %	0.97 mho/m ± 6 %
<b>Head TSL temperature during test</b>	(22.2 ± 0.2) °C	----	----

**SAR result with Head TSL**

<b>SAR averaged over 1 cm<sup>3</sup> (1 g) of Head TSL</b>	condition	
SAR measured	250 mW input power	2.67 mW / g
SAR normalized	normalized to 1W	10.7 mW / g
SAR for nominal Head TSL parameters <sup>1</sup>	normalized to 1W	<b>10.7 mW / g ± 17.0 % (k=2)</b>

<b>SAR averaged over 10 cm<sup>3</sup> (10 g) of Head TSL</b>	condition	
SAR measured	250 mW input power	1.72 mW / g
SAR normalized	normalized to 1W	6.88 mW / g
SAR for nominal Head TSL parameters <sup>1</sup>	normalized to 1W	<b>6.87 mW / g ± 16.5 % (k=2)</b>

<sup>1</sup> Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

**Body TSL parameters**

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.0	1.05 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	54.3 ± 6 %	1.07 mho/m ± 6 %
Body TSL temperature during test	(22.0 ± 0.2) °C	---	---

**SAR result with Body TSL**

SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL	condition	
SAR measured	250 mW input power	2.81 mW / g
SAR normalized	normalized to 1W	11.2 mW / g
SAR for nominal Body TSL parameters <sup>2</sup>	normalized to 1W	<b>11.0 mW / g ± 17.0 % (k=2)</b>

SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.82 mW / g
SAR normalized	normalized to 1W	7.28 mW / g
SAR for nominal Body TSL parameters <sup>1</sup>	normalized to 1W	<b>7.13 mW / g ± 16.5 % (k=2)</b>

<sup>2</sup> Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

**Appendix**

**Antenna Parameters with Head TSL**

Impedance, transformed to feed point	48.6 $\Omega$ - 6.9 j $\Omega$
Return Loss	- 23.0 dB

**Antenna Parameters with Body TSL**

Impedance, transformed to feed point	44.8 $\Omega$ - 8.1 j $\Omega$
Return Loss	- 19.9 dB

**General Antenna Parameters and Design**

Electrical Delay (one direction)	1.398 ns
----------------------------------	----------

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

**Additional EUT Data**

Manufactured by	SPEAG
Manufactured on	September 23, 2002

**DASY4 Validation Report for Head TSL**

Date/Time: 01/18/05 04:23:39

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN:172**

Communication System: CW-900; Frequency: 900 MHz;Duty Cycle: 1:1

Medium: HSL 900 MHz;

Medium parameters used:  $f = 900 \text{ MHz}$ ;  $\sigma = 0.97 \text{ mho/m}$ ;  $\epsilon_r = 41.4$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(5.95, 5.95, 5.95); Calibrated: 26.10.2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 07.01.2005
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001;
- Measurement SW: DASY4, V4.4 Build 11; Postprocessing SW: SEMCAD, V1.8 Build 133

**Pin = 250 mW; d = 15 mm/Area Scan (81x81x1):** Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (interpolated) = 2.88 mW/g

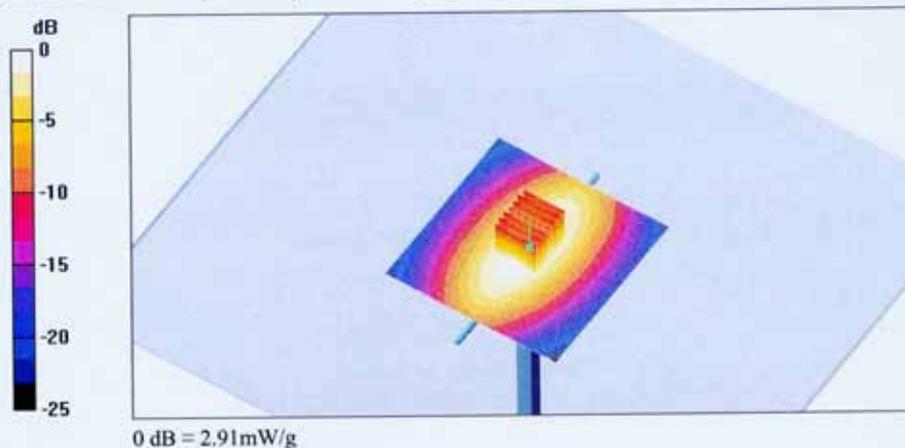
**Pin = 250 mW; d = 15 mm/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 57.2 V/m; Power Drift = 0.0 dB

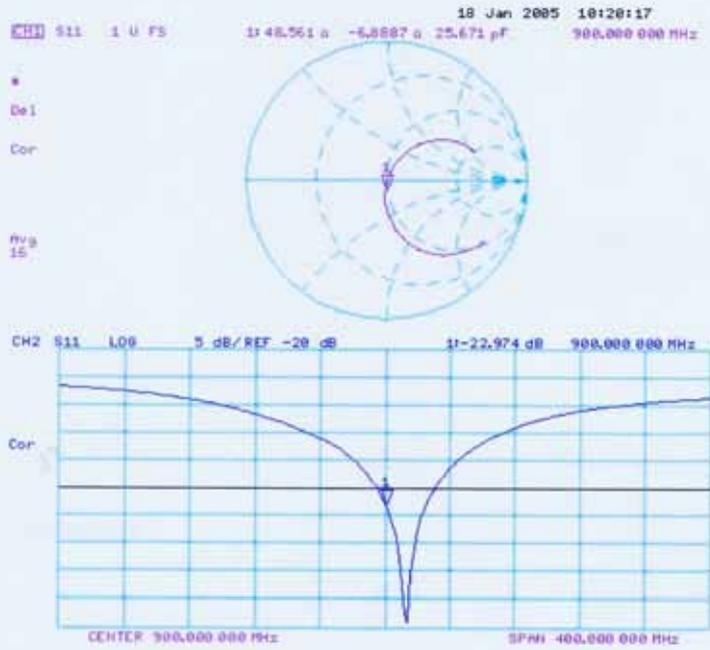
Peak SAR (extrapolated) = 3.96 W/kg

**SAR(1 g) = 2.67 mW/g; SAR(10 g) = 1.72 mW/g**

Maximum value of SAR (measured) = 2.91 mW/g



Impedance Measurement Plot for Head TSL



**DASY4 Validation Report for Body TSL**

Date/Time: 01/11/05 12:19:31

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN:172**

Communication System: CW-900; Frequency: 900 MHz;Duty Cycle: 1:1

Medium: MSL 900 MHz;

Medium parameters used:  $f = 900 \text{ MHz}$ ;  $\sigma = 1.07 \text{ mho/m}$ ;  $\epsilon_r = 54.3$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(5.77, 5.77, 5.77); Calibrated: 26.10.2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn907; Calibrated: 03.05.2004
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001;
- Measurement SW: DASY4, V4.4 Build 10; Postprocessing SW: SEMCAD, V1.8 Build 133

**Pin = 250 mW; d = 15 mm/Area Scan (81x81x1):** Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (interpolated) = 3.09 mW/g

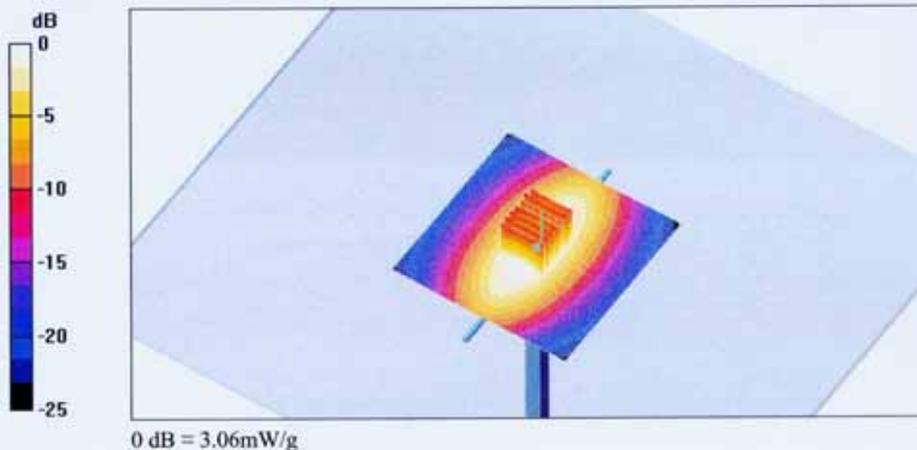
**Pin = 250 mW; d = 15 mm/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

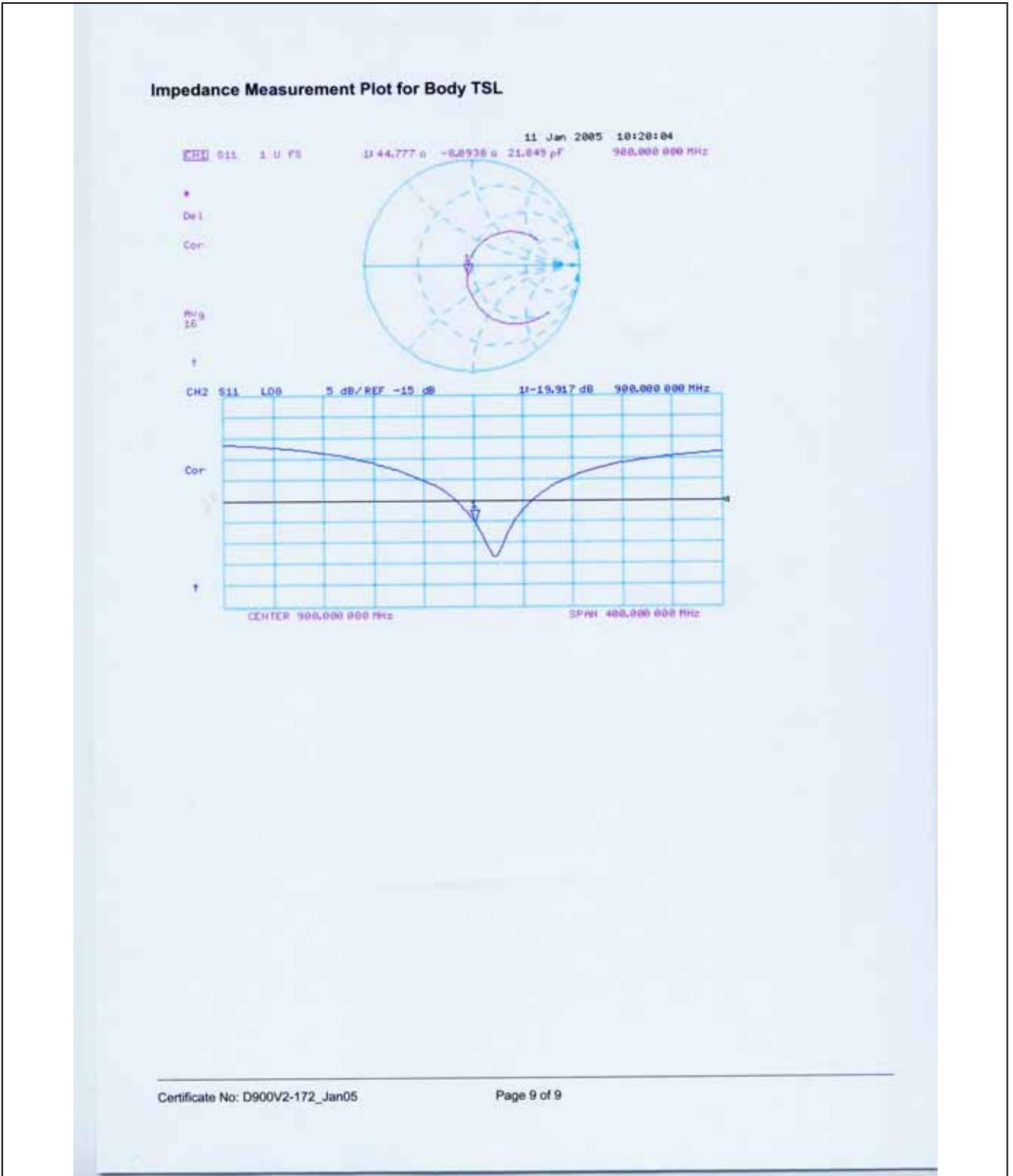
Reference Value = 56.2 V/m; Power Drift = -0.007 dB

Peak SAR (extrapolated) = 4.06 W/kg

**SAR(1 g) = 2.81 mW/g; SAR(10 g) = 1.82 mW/g**

Maximum value of SAR (measured) = 3.06 mW/g





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



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

Accreditation No.: **SCS 108**

Client **Auden**

Certificate No: **D1800V2-2d057\_Jan05**

**CALIBRATION CERTIFICATE**

Object: **D1800V2 - SN: 2d057**

Calibration procedure(s): **QA CAL-05.v6  
 Calibration procedure for dipole validation kits**

Calibration date: **January 17, 2005**

Condition of the calibrated item: **In Tolerance**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).  
 The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter EPM E442	GB37480704	12-Oct-04 (METAS, No. 251-00412)	Oct-05
Power sensor HP 8481A	US37292783	12-Oct-04 (METAS, No. 251-00412)	Oct-05
Reference 20 dB Attenuator	SN: 5086 (20g)	10-Aug-04 (METAS, No 251-00402)	Aug-05
Reference 10 dB Attenuator	SN: 5047.2 (10r)	10-Aug-04 (METAS, No 251-00402)	Aug-05
Reference Probe ET30V6	SN 1507	26-Oct-04 (SPEAG, No. ET3-1507_Oct04)	Oct-05
DAE4	SN 601	07-Jan-05 (SPEAG, No. DAE4-601_Jan05)	Jan-06

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (SPEAG, in house check Oct-03)	In house check: Oct-05
RF generator R&S SML-03	100698	27-Mar-02 (SPEAG, in house check Dec-03)	In house check: Dec-05
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (SPEAG, in house check Nov-04)	In house check: Nov-05

	Name	Function	Signature
Calibrated by:	Judith Müller	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: January 20, 2005

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

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



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

Accreditation No.: **SCS 108**

**Glossary:**

TSL tissue simulating liquid  
ConvF sensitivity in TSL / NORM x,y,z  
N/A not applicable or not measured

**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
- c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

**Additional Documentation:**

- d) DASY4 System Handbook

**Methods Applied and Interpretation of Parameters:**

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

**Measurement Conditions**

DASY system configuration, as far as not given on page 1.

DASY Version	DASY4	V4.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Area Scan resolution	dx, dy = 15 mm	
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1800 MHz ± 1 MHz	

**Head TSL parameters**

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.0 ± 6 %	1.37 mho/m ± 6 %
Head TSL temperature during test	(22.0 ± 0.2) °C	---	---

**SAR result with Head TSL**

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	condition	
SAR measured	250 mW input power	9.55 mW / g
SAR normalized	normalized to 1W	38.2 mW / g
SAR for nominal Head TSL parameters <sup>1</sup>	normalized to 1W	<b>38.6 mW / g ± 17.0 % (k=2)</b>

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.10 mW / g
SAR normalized	normalized to 1W	20.4 mW / g
SAR for nominal Head TSL parameters <sup>1</sup>	normalized to 1W	<b>20.6 mW / g ± 16.5 % (k=2)</b>

<sup>1</sup> Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

**Body TSL parameters**

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.5 ± 6 %	1.49 mho/m ± 6 %
Body TSL temperature during test	(22.0 ± 0.2) °C	----	----

**SAR result with Body TSL**

SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL	condition	
SAR measured	250 mW input power	9.83 mW / g
SAR normalized	normalized to 1W	39.3 mW / g
SAR for nominal Body TSL parameters <sup>2</sup>	normalized to 1W	<b>39.4 mW / g ± 17.0 % (k=2)</b>

SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.33 mW / g
SAR normalized	normalized to 1W	21.3 mW / g
SAR for nominal Body TSL parameters <sup>1</sup>	normalized to 1W	<b>21.4 mW / g ± 16.5 % (k=2)</b>

<sup>2</sup> Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

**Appendix**

**Antenna Parameters with Head TSL**

Impedance, transformed to feed point	47.7 $\Omega$ - 3.3 j $\Omega$
Return Loss	- 27.7 dB

**Antenna Parameters with Body TSL**

Impedance, transformed to feed point	44.9 $\Omega$ - 3.7 j $\Omega$
Return Loss	- 23.6 dB

**General Antenna Parameters and Design**

Electrical Delay (one direction)	1.202 ns
----------------------------------	----------

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

**Additional EUT Data**

Manufactured by	SPEAG
Manufactured on	October 16, 2002

**DASY4 Validation Report for Head TSL**

Date/Time: 01/17/05 12:14:44

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN2d057**

Communication System: CW-1800; Frequency: 1800 MHz; Duty Cycle: 1:1

Medium: HSL 1800 MHz;

Medium parameters used:  $f = 1800$  MHz;  $\sigma = 1.37$  mho/m;  $\epsilon_r = 40$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(5.07, 5.07, 5.07); Calibrated: 26.10.2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 07.01.2005
- Phantom: Flat Phantom 5.0; Type: QD000P50AA; Serial: 1001;
- Measurement SW: DASY4, V4.4 Build 11; Postprocessing SW: SEMCAD, V1.8 Build 133

**Pin = 250 mW; d = 10 mm 2/Area Scan (81x81x1):** Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (interpolated) = 10.9 mW/g

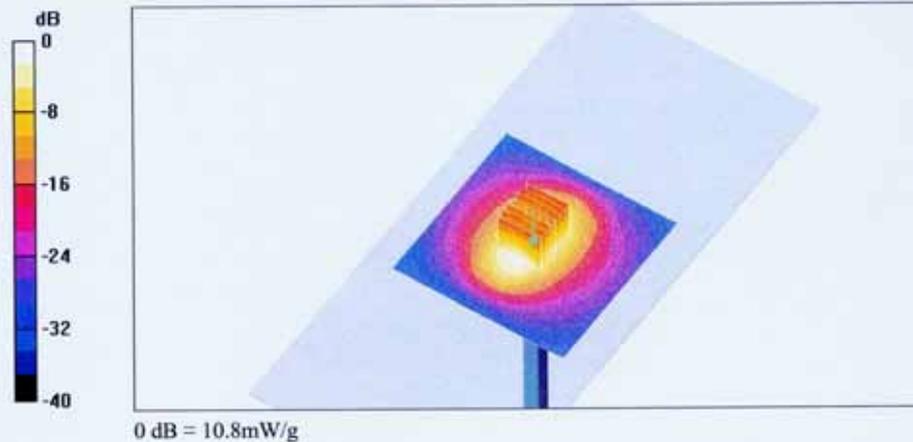
**Pin = 250 mW; d = 10 mm 2/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 90.8 V/m; Power Drift = 0.1 dB

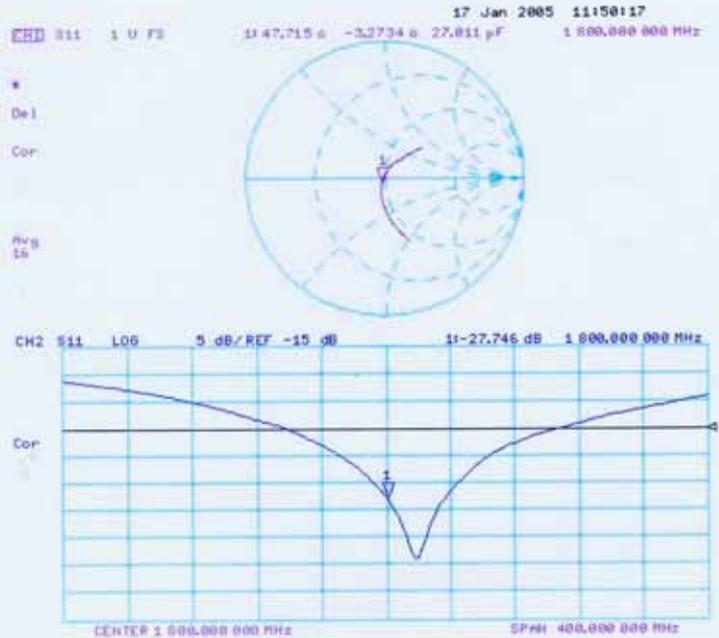
Peak SAR (extrapolated) = 16.3 W/kg

**SAR(1 g) = 9.55 mW/g; SAR(10 g) = 5.1 mW/g**

Maximum value of SAR (measured) = 10.8 mW/g



Impedance Measurement Plot for Head TSL



**DASY4 Validation Report for Body TSL**

Date/Time: 01/12/05 17:36:06

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN2d057**

Communication System: CW-1800; Frequency: 1800 MHz; Duty Cycle: 1:1

Medium: Muscle 1800 MHz;

Medium parameters used:  $f = 1800$  MHz;  $\sigma = 1.49$  mho/m;  $\epsilon_r = 52.5$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(4.52, 4.52, 4.52); Calibrated: 26.10.2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 07.01.2005
- Phantom: Flat Phantom 5.0; Type: QD000P50AA; Serial: 1001;
- Measurement SW: DASY4, V4.4 Build 11; Postprocessing SW: SEMCAD, V1.8 Build 133

**Pin = 250 mW; d = 10 mm/Area Scan (81x81x1):** Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (interpolated) = 11.3 mW/g

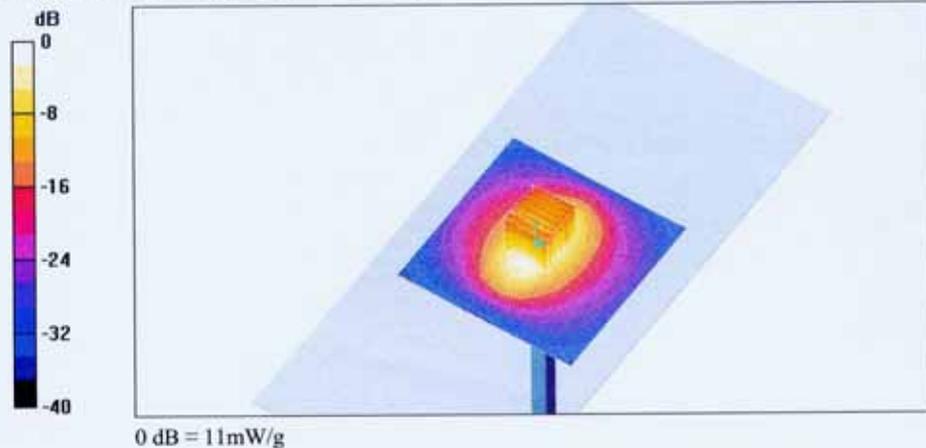
**Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 87.6 V/m; Power Drift = 0.1 dB

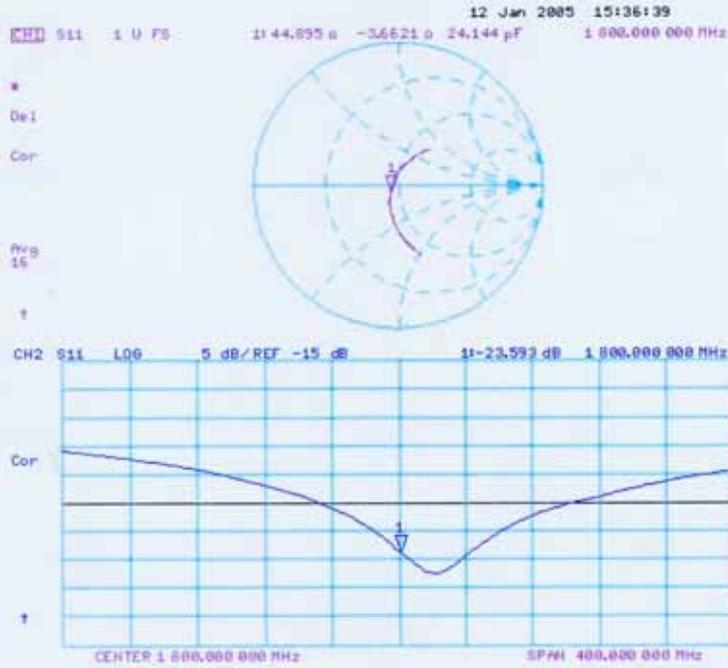
Peak SAR (extrapolated) = 16.1 W/kg

**SAR(1 g) = 9.83 mW/g; SAR(10 g) = 5.33 mW/g**

Maximum value of SAR (measured) = 11 mW/g



### Impedance Measurement Plot for Body TSL



**Appendix D – Probe Calibration**

**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

Client: **Auden**



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

Accreditation No.: **SCS 108**

Certificate No: **ET3-1531\_Nov04**

**CALIBRATION CERTIFICATE**

Object: **ET3DV6 - SN:1531**

Calibration procedure(s): **QA CAL-01.v5  
Calibration procedure for dosimetric E-field probes**

Calibration date: **November 19, 2004**

Condition of the calibrated item: **In Tolerance**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).  
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

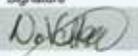
Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	5-May-04 (METAS, No. 251-00388)	May-05
Power sensor E4412A	MY41495277	5-May-04 (METAS, No. 251-00388)	May-05
Reference 3 dB Attenuator	SN: S5054 (3c)	3-Apr-03 (METAS, No. 251-00403)	Aug-05
Reference 20 dB Attenuator	SN: S5066 (20b)	3-May-04 (METAS, No. 251-00389)	May-05
Reference 30 dB Attenuator	SN: S5129 (30b)	3-Apr-03 (METAS, No. 251-00404)	Aug-05
Reference Probe ES3DV2	SN:3013	8-Jan-04 (SPEAG, No. ES3-3013_Jan04)	Jan-05
DAE4	SN: 617	29-Sep-04 (SPEAG, No. DAE4-617_Sep04)	Sep-05

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092180	18-Sep-02 (SPEAG, in house check Oct-03)	In house check: Oct 05
RF generator HP 8648C	US3642U01700	4-Aug-99 (SPEAG, in house check Dec-03)	In house check: Dec-05
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Nov-03)	In house check: Nov 04

Calibrated by: **Nico Vetterli**  
Function: **Laboratory Technician**

Approved by: **Katja Pokovic**  
Function: **Technical Manager**

Signature:   


Issued: November 20, 2004

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Certificate No: ET3-1531\_Nov04

Page 1 of 9

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



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

Accreditation No.: **SCS 108**

**Glossary:**

TSL tissue simulating liquid  
NORM<sub>x,y,z</sub> sensitivity in free space  
ConF sensitivity in TSL / NORM<sub>x,y,z</sub>  
DCP diode compression point  
Polarization  $\phi$   $\phi$  rotation around probe axis  
Polarization  $\vartheta$   $\vartheta$  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:**

- NORM<sub>x,y,z</sub>: Assessed for E-field polarization  $\vartheta = 0$  ( $f \leq 900$  MHz in TEM-cell;  $f > 1800$  MHz: R22 waveguide). NORM<sub>x,y,z</sub> are only intermediate values, i.e., the uncertainties of NORM<sub>x,y,z</sub> does not effect the E<sup>2</sup>-field uncertainty inside TSL (see below ConvF).
- NORM(f)<sub>x,y,z</sub> = NORM<sub>x,y,z</sub> \* 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.
- DCP<sub>x,y,z</sub>: 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  $f \leq 800$  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 NORM<sub>x,y,z</sub> \* 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  $\pm 50$  MHz to  $\pm 100$  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.

ET3DV6 SN:1531

November 19, 2004

# Probe ET3DV6

## SN:1531

Manufactured:	July 15, 2000
Last calibrated:	September 19, 2003
Recalibrated:	November 19, 2004

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

ET3DV6 SN:1531

November 19, 2004

**DASY - Parameters of Probe: ET3DV6 SN:1531**

Sensitivity in Free Space<sup>A</sup>

Diode Compression<sup>B</sup>

NormX	1.43 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP X	94 mV
NormY	1.49 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP Y	94 mV
NormZ	1.55 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP Z	94 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 to Phantom Surface Distance		3.7 mm	4.7 mm
	SAR <sub>tot</sub> [%] Without Correction Algorithm		9.7	5.1
	SAR <sub>tot</sub> [%] With Correction Algorithm		0.1	0.3
TSL	1810 MHz	Typical SAR gradient: 10 % per mm		
	Sensor Center to Phantom Surface Distance		3.7 mm	4.7 mm
	SAR <sub>tot</sub> [%] Without Correction Algorithm		13.5	9.0
	SAR <sub>tot</sub> [%] With Correction Algorithm		0.9	0.0

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%.

<sup>A</sup> The uncertainties of NormX,Y,Z do not affect the E<sup>2</sup>-field uncertainty inside TSL (see Page 8).

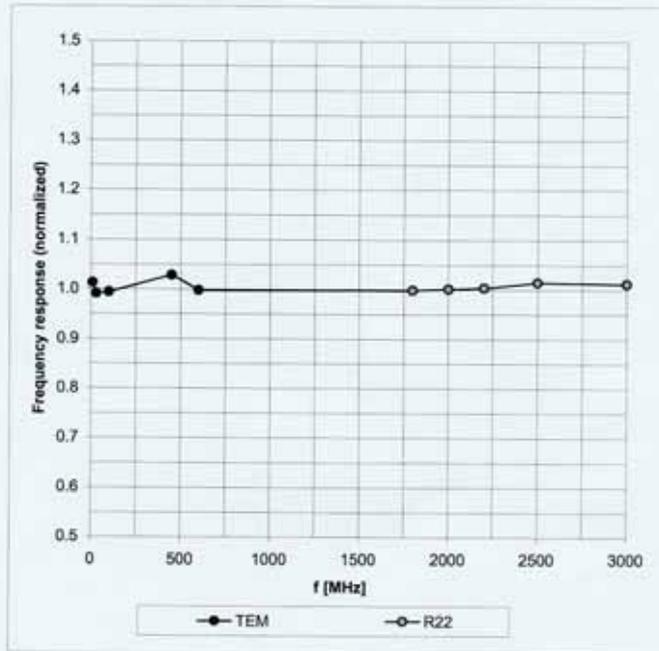
<sup>B</sup> Numerical linearization parameter: uncertainty not required.

ET3DV6 SN:1531

November 19, 2004

### Frequency Response of E-Field

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

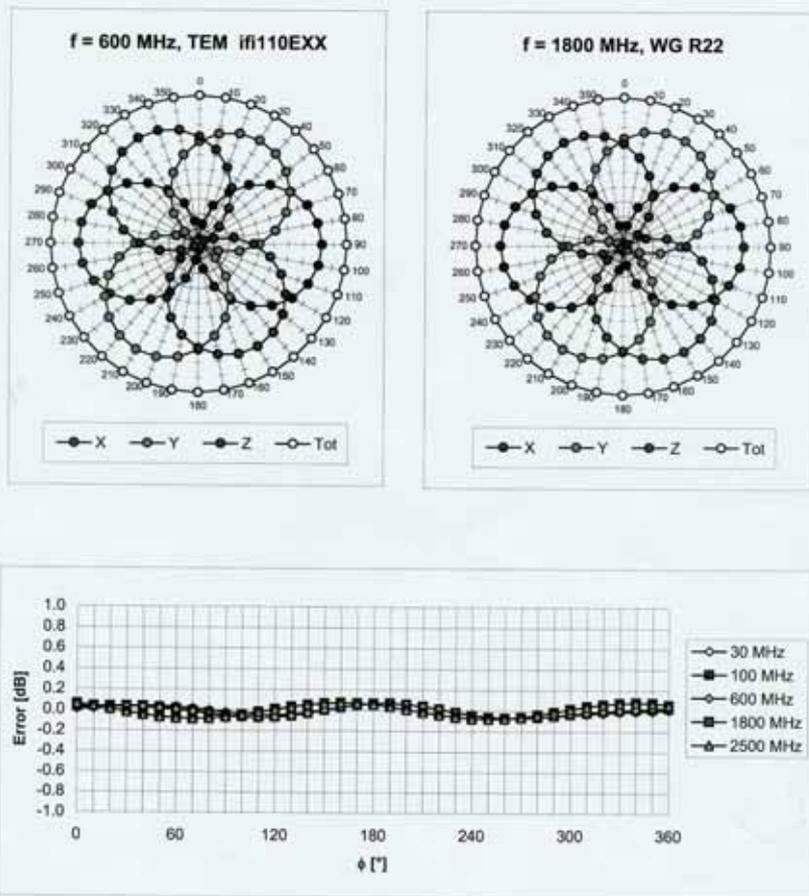


Uncertainty of Frequency Response of E-field:  $\pm 6.3\%$  (k=2)

ET3DV6 SN:1531

November 19, 2004

### Receiving Pattern ( $\phi$ ), $\theta = 0^\circ$

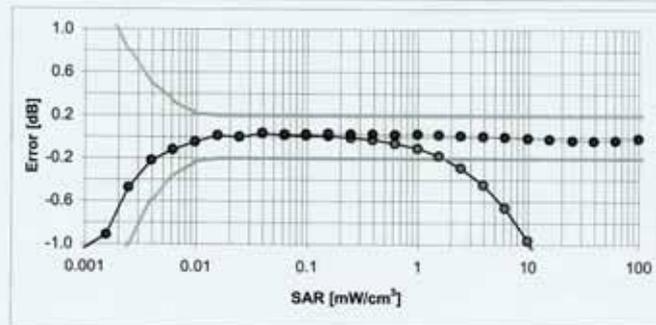
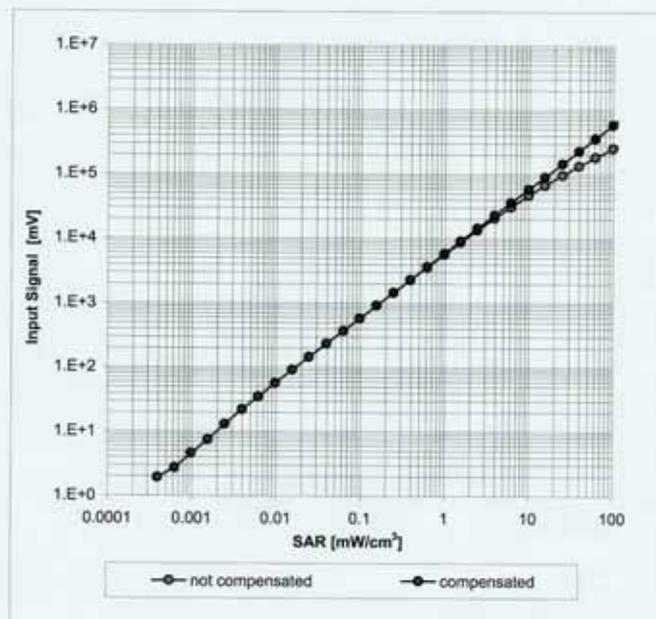


Uncertainty of Axial Isotropy Assessment:  $\pm 0.5\%$  (k=2)

ET3DV6 SN:1531

November 19, 2004

### Dynamic Range $f(SAR_{head})$ (Waveguide R22, $f = 1800$ MHz)

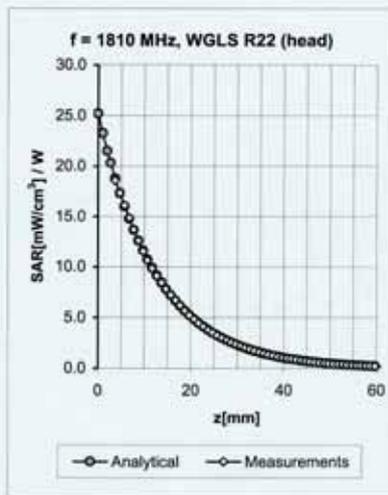
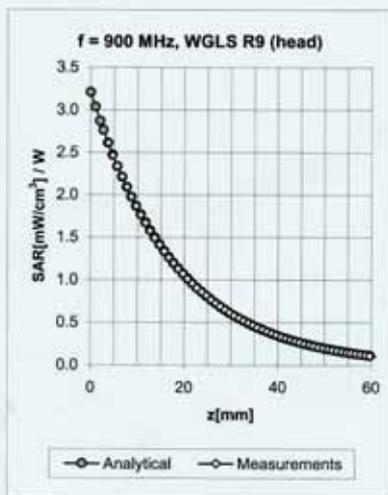


Uncertainty of Linearity Assessment:  $\pm 0.6\%$  (k=2)

ET3DV6 SN:1531

November 19, 2004

### Conversion Factor Assessment



f [MHz]	Validity [MHz] <sup>c</sup>	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.67	1.82	6.19 ± 11.0% (k=2)
1810	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.66	2.26	5.19 ± 11.0% (k=2)
2000	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.63	2.48	4.72 ± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.73	2.16	4.56 ± 11.8% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.63	1.96	6.03 ± 11.0% (k=2)
1810	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.60	2.67	4.64 ± 11.0% (k=2)
2000	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.61	2.70	4.31 ± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.83	1.84	4.28 ± 11.8% (k=2)

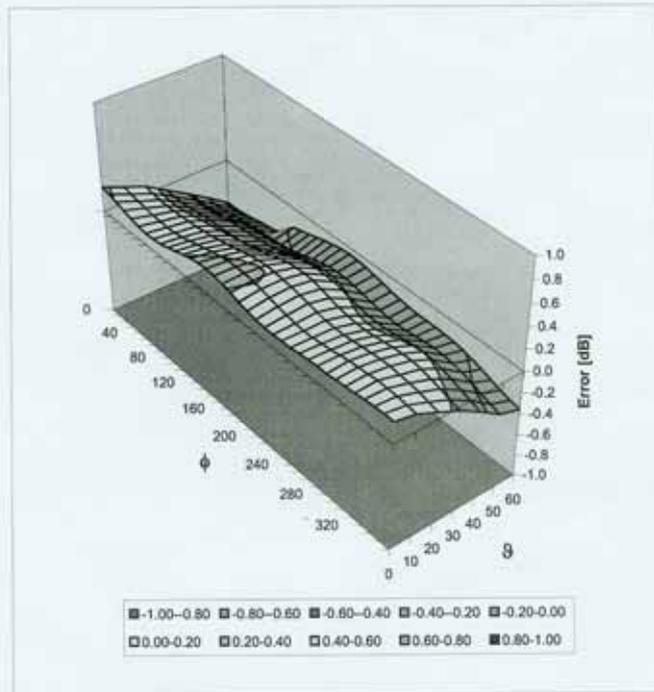
<sup>c</sup> The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

ET3DV6 SN:1531

November 19, 2004

### Deviation from Isotropy in HSL

Error ( $\phi$ ,  $\theta$ ),  $f = 900$  MHz



Uncertainty of Spherical Isotropy Assessment:  $\pm 2.6\%$  (k=2)

**Appendix E – Data Acquisition Electronic (DAE) Calibration**

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

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

Accreditation No.: **SCS 108**

Client **Auden**

Certificate No: **DAE3-393\_Apr05**

CALIBRATION CERTIFICATE

Object	DAE3 - SD 000 D03 AA - SN: 393
Calibration procedure(s)	QA CAL-06.v11 Calibration procedure for the data acquisition unit (DAE)
Calibration date:	April 25, 2005
Condition of the calibrated item	In Tolerance

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility; environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Fluke Process Calibrator Type 702	SN: 6295603	7-Sep-04 (Sintrel, No.E-040073)	Sep-05

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Calibrator Box V1.1	SE UMS 006 AB 1002	16-Jul-04 (SPEAG, in house check)	In house check Jul-05

Calibrated by:

Name: Daniel Steinacher  
 Function: Technician

Signature: *[Signature]*

Approved by:

Name: Fin Bombolt  
 Function: R&D Director

Signature: *[Signature]*

Issued: April 25, 2005

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Certificate No: DAE3-393\_Apr05

Page 1 of 5

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



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

Accreditation No.: **SCS 108**

**Glossary**

DAE digital acquisition electronics  
Connector angle information used in DASY system to align probe sensor X to the robot coordinate system.

**Methods Applied and Interpretation of Parameters**

- *DC Voltage Measurement:* Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.
- *Connector angle:* The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.
- The following parameters contain technical information as a result from the performance test and require no uncertainty.
- *DC Voltage Measurement Linearity:* Verification of the Linearity at +10% and -10% of the nominal calibration voltage. Influence of offset voltage is included in this measurement.
- *Common mode sensitivity:* Influence of a positive or negative common mode voltage on the differential measurement.
- *Channel separation:* Influence of a voltage on the neighbor channels not subject to an input voltage.
- *AD Converter Values with inputs shorted:* Values on the internal AD converter corresponding to zero input voltage
- *Input Offset Measurement:* Output voltage and statistical results over a large number of zero voltage measurements.
- *Input Offset Current:* Typical value for information; Maximum channel input offset current, not considering the input resistance.
- *Input resistance:* DAE input resistance at the connector, during internal auto-zeroing and during measurement.
- *Low Battery Alarm Voltage:* Typical value for information. Below this voltage, a battery alarm signal is generated.
- *Power consumption:* Typical value for information. Supply currents in various operating modes.

**DC Voltage Measurement**

A/D - Converter Resolution nominal

High Range: 1LSB = 6.1 $\mu$ V, full range = -100...+300 mV

Low Range: 1LSB = 61nV, full range = -1.....+3mV

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

Calibration Factors	X	Y	Z
High Range	404.034 $\pm$ 0.1% (k=2)	404.290 $\pm$ 0.1% (k=2)	404.188 $\pm$ 0.1% (k=2)
Low Range	3.97015 $\pm$ 0.7% (k=2)	3.95219 $\pm$ 0.7% (k=2)	3.95274 $\pm$ 0.7% (k=2)

**Connector Angle**

Connector Angle to be used in DASY system	18 $^{\circ}$ $\pm$ 1 $^{\circ}$
---	----------------------------------

**Appendix**

**1. DC Voltage Linearity**

High Range	Input (μV)	Reading (μV)	Error (%)
Channel X + Input	200000	200000.3	0.00
Channel X + Input	20000	19997.98	-0.01
Channel X - Input	20000	-19991.49	-0.04
Channel Y + Input	200000	199999.8	0.00
Channel Y + Input	20000	19995.58	-0.02
Channel Y - Input	20000	-19991.04	-0.04
Channel Z + Input	200000	200000.5	0.00
Channel Z + Input	20000	19996.71	-0.02
Channel Z - Input	20000	-20001.13	0.01

Low Range	Input (μV)	Reading (μV)	Error (%)
Channel X + Input	2000	1999.9	0.00
Channel X + Input	200	199.99	0.00
Channel X - Input	200	-200.44	0.22
Channel Y + Input	2000	1999.9	0.00
Channel Y + Input	200	199.28	-0.36
Channel Y - Input	200	-200.86	0.43
Channel Z + Input	2000	1999.9	0.00
Channel Z + Input	200	199.22	-0.39
Channel Z - Input	200	-201.08	0.54

**2. Common mode sensitivity**

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Common mode Input Voltage (mV)	High Range Average Reading (μV)	Low Range Average Reading (μV)
Channel X	200	12.51	11.50
	- 200	-10.12	-11.21
Channel Y	200	9.52	9.45
	- 200	-10.88	-11.19
Channel Z	200	3.35	2.94
	- 200	-4.99	-5.03

**3. Channel separation**

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Input Voltage (mV)	Channel X (μV)	Channel Y (μV)	Channel Z (μV)
Channel X	200	-	3.00	-0.31
Channel Y	200	1.48	-	5.95
Channel Z	200	-0.82	1.03	-

**4. AD-Converter Values with inputs shorted**

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	High Range (LSB)	Low Range (LSB)
Channel X	16144	16008
Channel Y	16013	16872
Channel Z	16448	16957

**5. Input Offset Measurement**

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

Input 10MΩ

	Average (μV)	min. Offset (μV)	max. Offset (μV)	Std. Deviation (μV)
Channel X	1.00	0.39	2.17	0.24
Channel Y	-1.33	-2.17	-0.42	0.26
Channel Z	-0.62	-2.27	1.61	0.40

**6. Input Offset Current**

Nominal Input circuitry offset current on all channels: <25fA

**7. Input Resistance**

	Zeroing (MOhm)	Measuring (MOhm)
Channel X	0.1999	200.6
Channel Y	0.2001	200.4
Channel Z	0.1999	200.1

**8. Low Battery Alarm Voltage** (verified during pre test)

Typical values	Alarm Level (VDC)
Supply (+ Vcc)	+7.9
Supply (- Vcc)	-7.6

**9. Power Consumption** (verified during pre test)

Typical values	Switched off (mA)	Stand by (mA)	Transmitting (mA)
Supply (+ Vcc)	+0.0	+6	+14
Supply (- Vcc)	-0.01	-8	-9

**10. Common Mode Bit Generation** (verified during pre test)

Typical values	Bit set to High at Common Mode Error (V <sub>OC</sub> )
Channel X, Y, Z	+1.25