

Test Laboratory: HCT CO., LTD.
EUT Type: Tri – Band CDMA Phone with Bluetooth(CDMA / PCS CDMA / AWS CDMA)
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Dec.27, 2007
Option: Front

DUT: CDM7126C,CDM7126M;Type: Folder body; Serial: #1

Communication System: CDMA 835MHz FCC; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 836.52 \text{ MHz}$; $\sigma = 0.99 \text{ mho/m}$; $\epsilon_r = 53.4$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ES3DV3 – SN3085; ConvF(5.7, 5.7, 5.7); Calibrated: 2007-11-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2007-01-25
- Phantom: 835/900 Phantom ; Type: SAM

CDMA Body 384/Area Scan (51x81x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.296 mW/g

CDMA Body 384/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

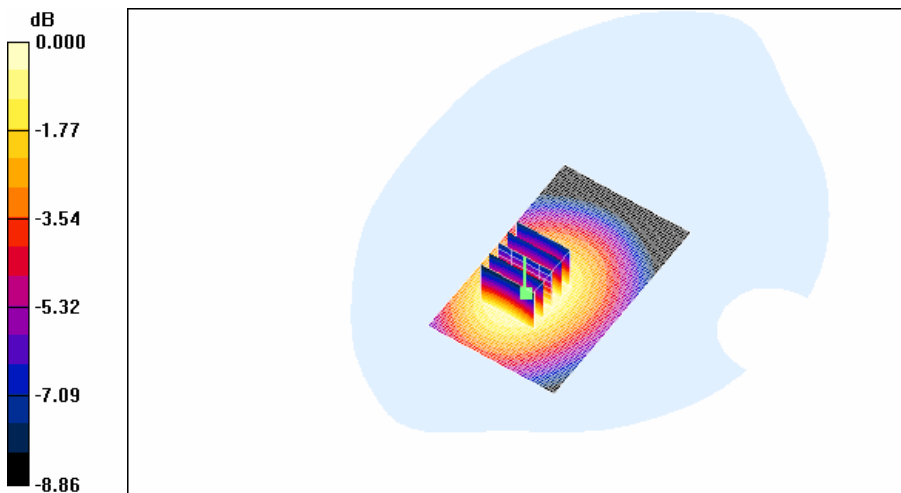
Reference Value = 10.1 V/m; Power Drift = -0.185 dB

Peak SAR (extrapolated) = 0.362 W/kg

SAR(1 g) = 0.281 mW/g; SAR(10 g) = 0.205 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.299 mW/g



0 dB = 0.299mW/g

Test Laboratory: HCT CO., LTD.

EUT Type: Tri – Band CDMA Phone with Bluetooth(CDMA / PCS CDMA / AWS CDMA)

Liquid Temperature: 21.3 °C

Ambient Temperature: 21.5 °C

Test Date: Dec.26, 2007

DUT: CDM7126C,CDM7126M;Type: Folder body; Serial: #1

Communication System: AWS 1700 MHz FCC; Frequency: 1731.25 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): $f = 1731.25$ MHz; $\sigma = 1.42$ mho/m; $\epsilon_r = 54.9$; $\rho = 1000$ kg/m³

Phantom section: Flat Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ES3DV3 – SN3085; ConvF(4.73, 4.73, 4.73); Calibrated: 2007-11-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2007-01-25
- Phantom: 1800/1900 Phantom; Type: SAM

AWS Body 425/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.338 mW/g

AWS Body 425/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

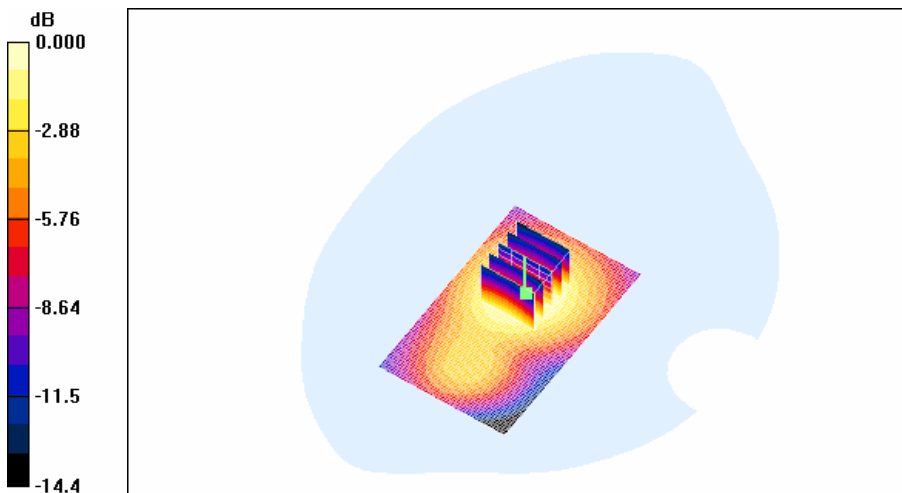
Reference Value = 13.0 V/m; Power Drift = -0.038 dB

Peak SAR (extrapolated) = 0.477 W/kg

SAR(1 g) = 0.317 mW/g; SAR(10 g) = 0.200 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.344 mW/g



0 dB = 0.344mW/g

Test Laboratory: HCT CO., LTD.
EUT Type: Tri - Band CDMA Phone with Bluetooth(CDMA / PCS CDMA / AWS CDMA)
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Dec.26, 2007
Option: Bluetooth

DUT: CDM7126C,CDM7126M;Type: Folder body; Serial: #1

Communication System: AWS 1700 MHz FCC; Frequency: 1731.25 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 1731.25 \text{ MHz}$; $\sigma = 1.42 \text{ mho/m}$; $\epsilon_r = 54.9$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ES3DV3 - SN3085; ConvF(4.73, 4.73, 4.73); Calibrated: 2007-11-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2007-01-25
- Phantom: 1800/1900 Phantom; Type: SAM

AWS Body 425/Area Scan (51x81x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.341 mW/g

AWS Body 425/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

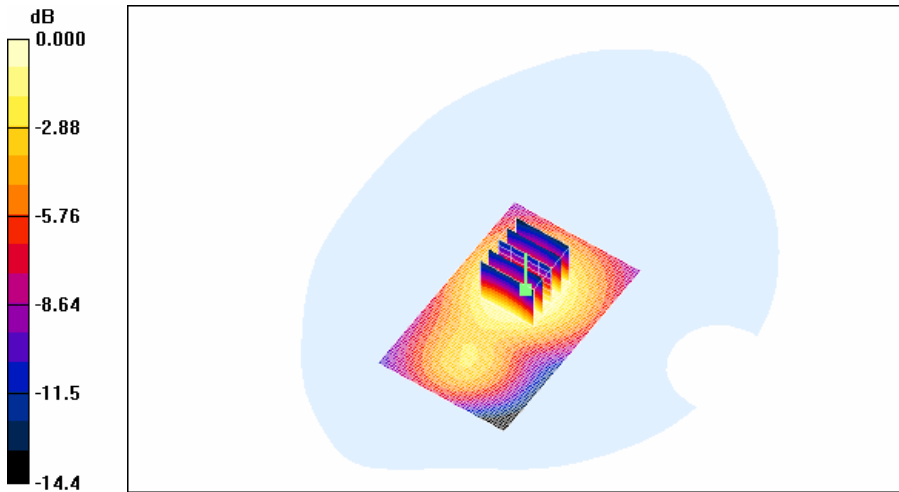
Reference Value = 13.5 V/m; Power Drift = -0.028 dB

Peak SAR (extrapolated) = 0.457 W/kg

SAR(1 g) = 0.308 mW/g; SAR(10 g) = 0.195 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.333 mW/g



0 dB = 0.333mW/g

Test Laboratory: HCT CO., LTD.
EUT Type: Tri - Band CDMA Phone with Bluetooth(CDMA / PCS CDMA / AWS CDMA)
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Dec.26, 2007
Option: Front

DUT: CDM7126C,CDM7126M;Type: Folder body; Serial: #1

Communication System: AWS 1700 MHz FCC; Frequency: 1731.25 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 1731.25$ MHz; $\sigma = 1.42$ mho/m; $\epsilon_r = 54.9$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ES3DV3 - SN3085; ConvF(4.73, 4.73, 4.73); Calibrated: 2007-11-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2007-01-25
- Phantom: 1800/1900 Phantom; Type: SAM

AWS Body 425/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.157 mW/g

AWS Body 425/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

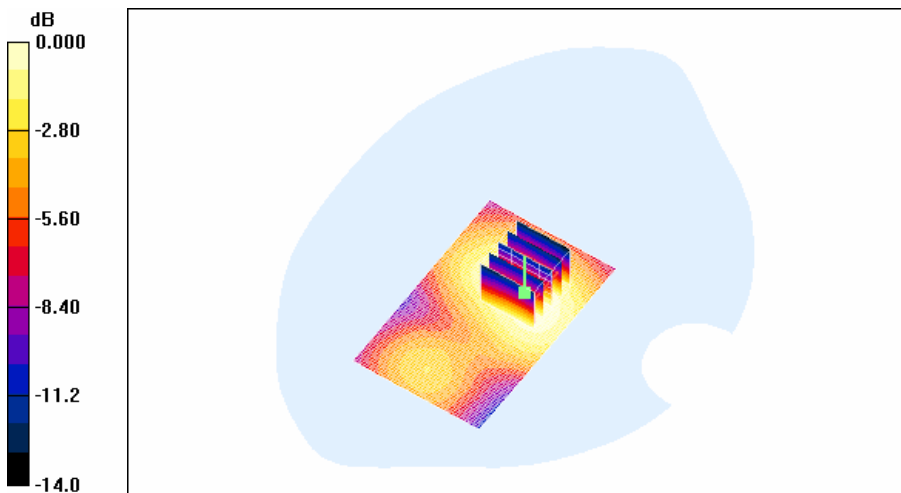
Reference Value = 9.83 V/m; Power Drift = -0.105 dB

Peak SAR (extrapolated) = 0.215 W/kg

SAR(1 g) = 0.145 mW/g; SAR(10 g) = 0.092 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.155 mW/g



0 dB = 0.155mW/g

Test Laboratory: HCT CO., LTD.

EUT Type: Tri – Band CDMA Phone with Bluetooth(CDMA / PCS CDMA / AWS CDMA)

Liquid Temperature: 21.2 °C

Ambient Temperature: 21.4 °C

Test Date: Dec.24, 2007

DUT: CDM7126C,CDM7126M;Type: Folder body; Serial: #1

Communication System: PCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:1

Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.54 \text{ mho/m}$; $\epsilon_r = 52$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ES3DV3 – SN3085; ConvF(4.73, 4.73, 4.73); Calibrated: 2007-11-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2007-01-25
- Phantom: 1800/1900 Phantom; Type: SAM

PCS Body 600/Area Scan (51x81x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.282 mW/g

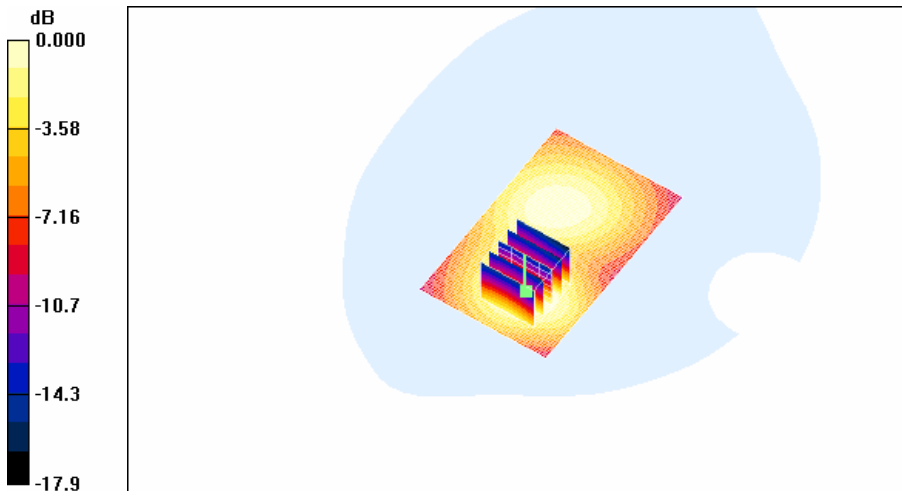
PCS Body 600/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 11.7 V/m; Power Drift = -0.015 dB

Peak SAR (extrapolated) = 0.439 W/kg

SAR(1 g) = 0.259 mW/g; SAR(10 g) = 0.149 mW/g

Maximum value of SAR (measured) = 0.280 mW/g



0 dB = 0.280mW/g

Test Laboratory: HCT CO., LTD.
EUT Type: Tri - Band CDMA Phone with Bluetooth(CDMA / PCS CDMA / AWS CDMA)
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Dec.24, 2007
Option: Bluetooth

DUT: CDM7126C,CDM7126M;Type: Folder body; Serial: #1

Communication System: PCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.54$ mho/m; $\epsilon_r = 52$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ES3DV3 - SN3085; ConvF(4.73, 4.73, 4.73); Calibrated: 2007-11-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2007-01-25
- Phantom: 1800/1900 Phantom; Type: SAM

PCS Body 600/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.285 mW/g

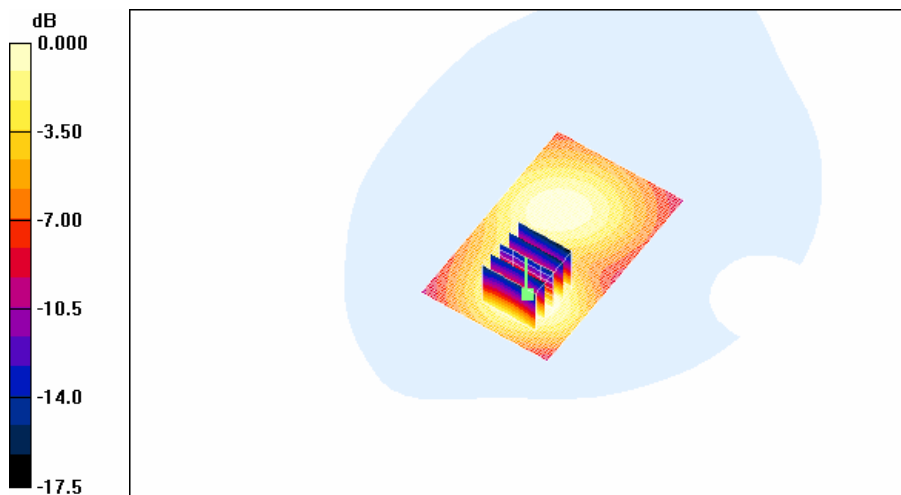
PCS Body 600/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 11.7 V/m; Power Drift = -0.066 dB

Peak SAR (extrapolated) = 0.432 W/kg

SAR(1 g) = 0.256 mW/g; SAR(10 g) = 0.148 mW/g

Maximum value of SAR (measured) = 0.278 mW/g



0 dB = 0.278mW/g

Test Laboratory: HCT CO., LTD.
 EUT Type: Tri – Band CDMA Phone with Bluetooth(CDMA / PCS CDMA / AWS CDMA)
 Liquid Temperature: 21.2 °C
 Ambient Temperature: 21.4 °C
 Test Date: Dec.24, 2007
 Option: Front

DUT: CDM7126C,CDM7126M;Type: Folder body; Serial: #1

Communication System: PCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:1
 Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.54 \text{ mho/m}$; $\epsilon_r = 52$; $\rho = 1000 \text{ kg/m}^3$
 Phantom section: Flat Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ES3DV3 – SN3085; ConvF(4.73, 4.73, 4.73); Calibrated: 2007-11-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2007-01-25
- Phantom: 1800/1900 Phantom; Type: SAM

PCS Body 600/Area Scan (51x81x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.249 mW/g

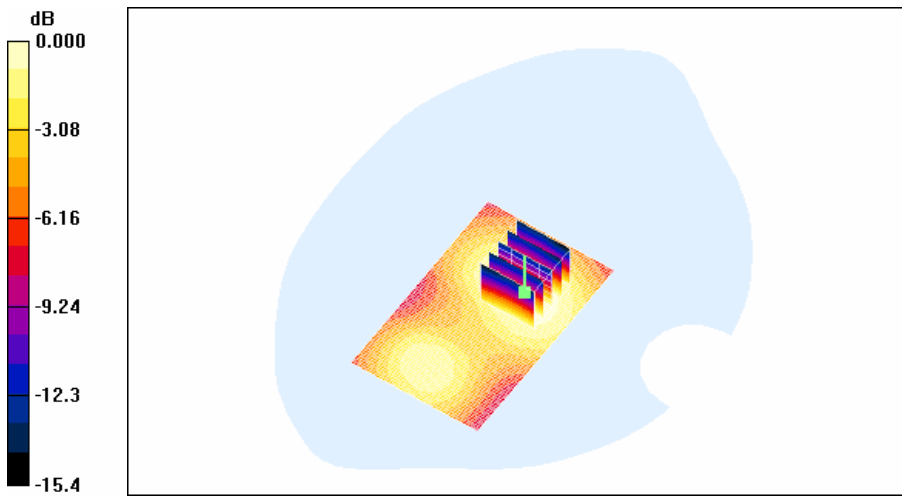
PCS Body 600/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 12.1 V/m; Power Drift = -0.022 dB

Peak SAR (extrapolated) = 0.358 W/kg

SAR(1 g) = 0.228 mW/g; SAR(10 g) = 0.141 mW/g

Maximum value of SAR (measured) = 0.247 mW/g



0 dB = 0.247mW/g

Test Laboratory: HCT CO., LTD.
EUT Type: Tri - Band CDMA Phone with Bluetooth(CDMA / PCS CDMA / AWS CDMA)
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Dec.27, 2007

DUT: CDM7126C,CDM7126M;Type: Folder; Serial: #1

Communication System: CDMA 835MHz FCC; Frequency: 848.31 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 848.31 \text{ MHz}$; $\sigma = 0.904 \text{ mho/m}$; $\epsilon_r = 40.7$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Right Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ES3DV3 - SN3085; ConvF(6.1, 6.1, 6.1); Calibrated: 2007-11-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2007-01-25
- Phantom: 835/900 Phamtom ; Type: SAM

Right touch 777/Area Scan (51x101x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.910 mW/g

Right touch 777/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

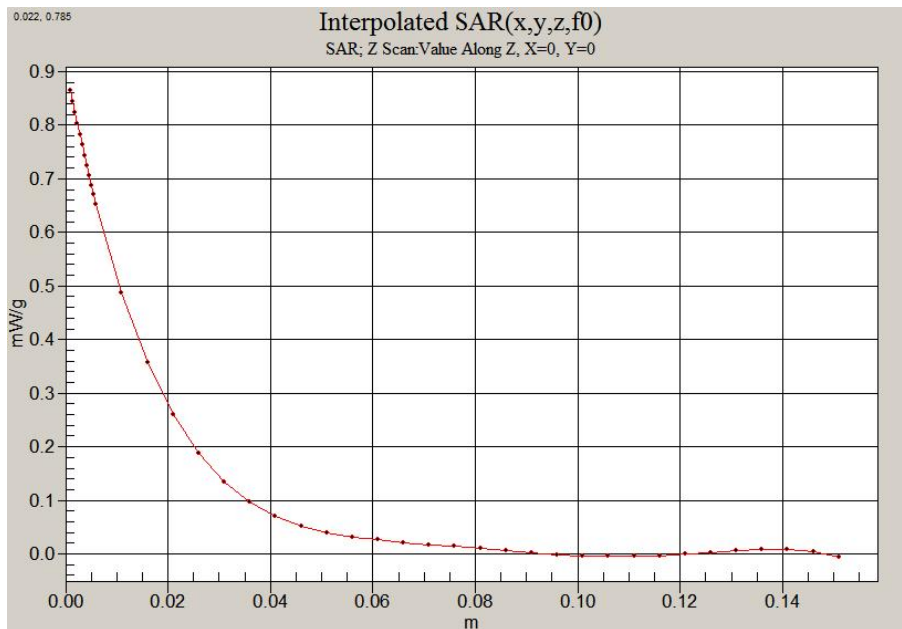
Reference Value = 31.3 V/m; Power Drift = 0.122 dB

Peak SAR (extrapolated) = 1.31 W/kg

SAR(1 g) = 0.939 mW/g; SAR(10 g) = 0.639 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.988 mW/g



0 dB = 0.988mW/g

Test Laboratory: HCT CO., LTD.

EUT Type: Tri - Band CDMA Phone with Bluetooth(CDMA / PCS CDMA / AWS CDMA)

Liquid Temperature: 21.3 °C

Ambient Temperature: 21.5 °C

Test Date: Dec.27, 2007

DUT: CDM7126C,CDM7126M;Type: Folder body; Serial: #1

Communication System: CDMA 835MHz FCC; Frequency: 836.52 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): $f = 836.52 \text{ MHz}$; $\sigma = 0.99 \text{ mho/m}$; $\epsilon_r = 53.4$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ES3DV3 - SN3085; ConvF(5.7, 5.7, 5.7); Calibrated: 2007-11-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2007-01-25
- Phantom: 835/900 Phamtom ; Type: SAM

CDMA Body 384/Area Scan (51x81x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.588 mW/g

CDMA Body 384/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

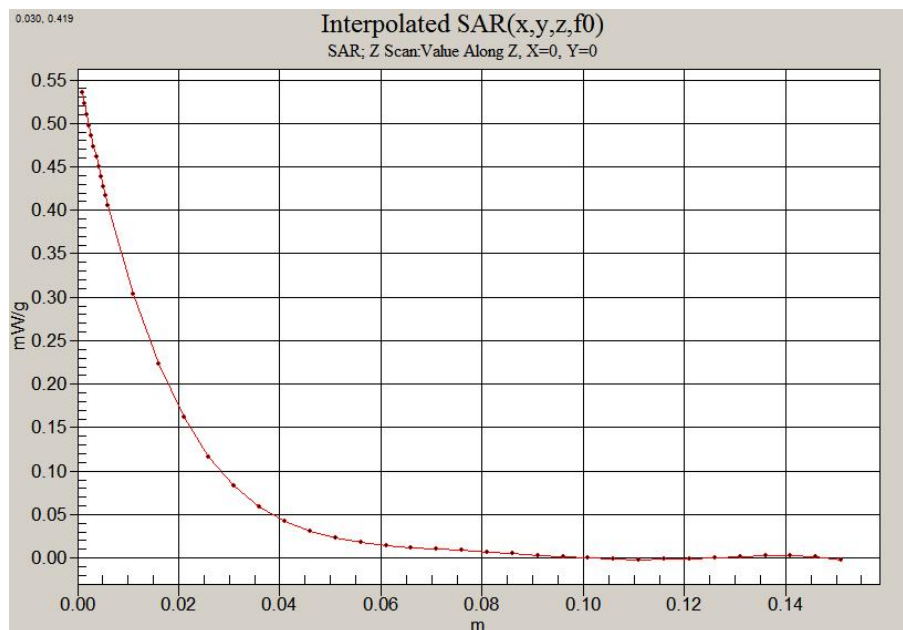
Reference Value = 12.8 V/m; Power Drift = -0.185 dB

Peak SAR (extrapolated) = 0.745 W/kg

SAR(1 g) = 0.561 mW/g; SAR(10 g) = 0.396 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.599 mW/g



0 dB = 0.599mW/g

Test Laboratory: HCT CO., LTD.

EUT Type: Tri - Band CDMA Phone with Bluetooth(CDMA / PCS CDMA / AWS CDMA)

Liquid Temperature: 21.3 °C

Ambient Temperature: 21.5 °C

Test Date: Dec.26, 2007

DUT: CDM7126C,CDM7126M;Type: Folder; Serial: #1

Communication System: AWS 1700 MHz FCC; Frequency: 1711.25 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): $f = 1711.25$ MHz; $\sigma = 1.32$ mho/m; $\epsilon_r = 40.2$; $\rho = 1000$ kg/m³

Phantom section: Right Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ES3DV3 - SN3085; ConvF(5.04, 5.04, 5.04); Calibrated: 2007-11-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2007-01-25
- Phantom: 1800/1900 Phantom; Type: SAM

Right Touch 25/Area Scan (51x101x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.608 mW/g

Right Touch 25/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

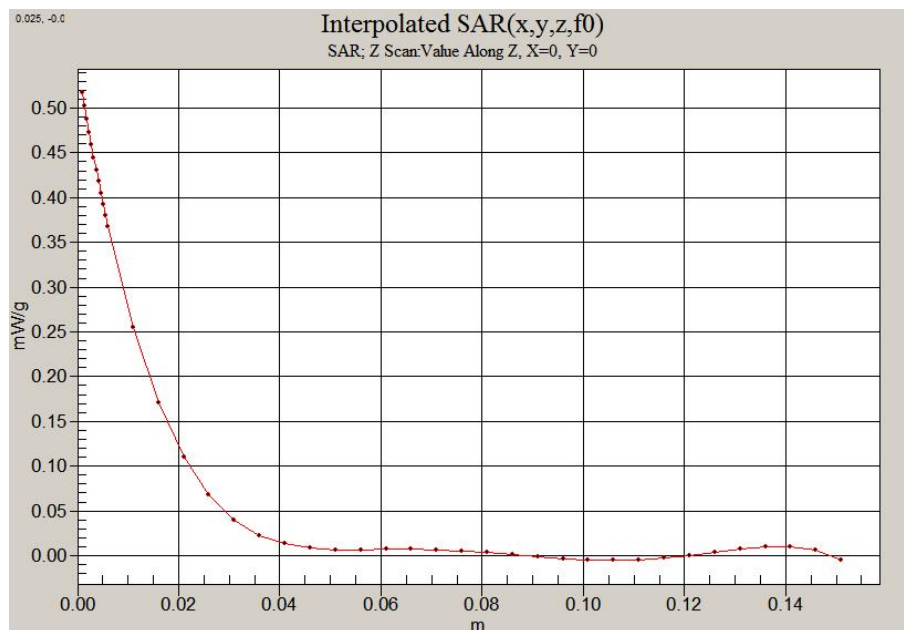
Reference Value = 19.4 V/m; Power Drift = -0.060 dB

Peak SAR (extrapolated) = 0.819 W/kg

SAR(1 g) = 0.575 mW/g; SAR(10 g) = 0.373 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.611 mW/g



0 dB = 0.611mW/g

Test Laboratory: HCT CO., LTD.

EUT Type: Tri - Band CDMA Phone with Bluetooth(CDMA / PCS CDMA / AWS CDMA)

Liquid Temperature: 21.3 °C

Ambient Temperature: 21.5 °C

Test Date: Dec.26, 2007

DUT: CDM7126C,CDM7126M;Type: Folder body; Serial: #1

Communication System: AWS 1700 MHz FCC; Frequency: 1731.25 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): $f = 1731.25$ MHz; $\sigma = 1.42$ mho/m; $\epsilon_r = 54.9$; $\rho = 1000$ kg/m³

Phantom section: Flat Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ES3DV3 - SN3085; ConvF(4.73, 4.73, 4.73); Calibrated: 2007-11-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2007-01-25
- Phantom: 1800/1900 Phantom; Type: SAM

AWS Body 425/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.338 mW/g

AWS Body 425/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

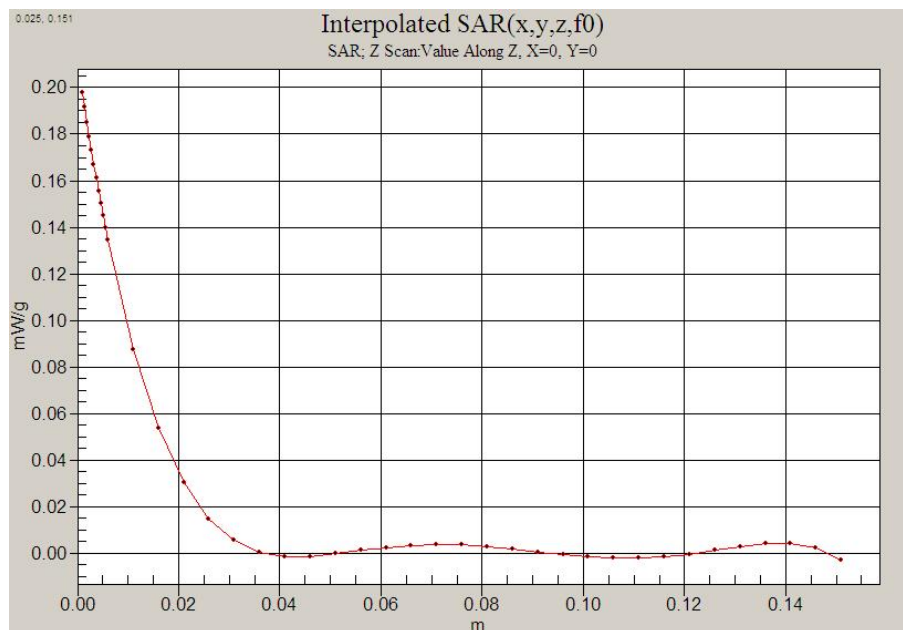
Reference Value = 13.0 V/m; Power Drift = -0.038 dB

Peak SAR (extrapolated) = 0.477 W/kg

SAR(1 g) = 0.317 mW/g; SAR(10 g) = 0.200 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.344 mW/g



0 dB = 0.344mW/g

Test Laboratory: HCT CO., LTD.

EUT Type: Tri - Band CDMA Phone with Bluetooth(CDMA / PCS CDMA / AWS CDMA)

Liquid Temperature: 21.3 °C

Ambient Temperature: 21.5 °C

Test Date: Dec.24, 2007

DUT: CDM7126C,CDM7126M;Type: Folder; Serial: #1

Communication System: PCS1900; Frequency: 1851.25 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): $f = 1851.25$ MHz; $\sigma = 1.38$ mho/m; $\epsilon_r = 39$; $\rho = 1000$ kg/m³

Phantom section: Left Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ES3DV3 - SN3085; ConvF(5.04, 5.04, 5.04); Calibrated: 2007-11-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2007-01-25
- Phantom: 1800/1900 Phantom; Type: SAM

Left touch 25/Area Scan (51x101x1): Measurement grid: dx=15mm, dy=15mm[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 1.27 mW/g

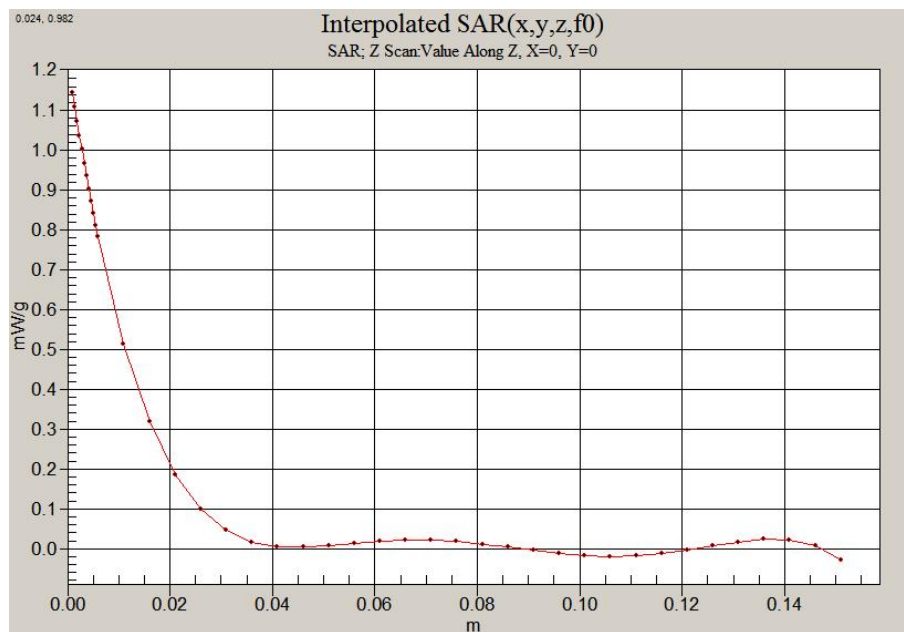
Left touch 25/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 12.9 V/m; Power Drift = 0.056 dB

Peak SAR (extrapolated) = 1.58 W/kg

SAR(1 g) = 1.13 mW/g; SAR(10 g) = 0.712 mW/g[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.21 mW/g



0 dB = 1.21mW/g

Test Laboratory: HCT CO., LTD.

EUT Type: Tri – Band CDMA Phone with Bluetooth(CDMA / PCS CDMA / AWS CDMA)

Liquid Temperature: 21.3 °C

Ambient Temperature: 21.5 °C

Test Date: Dec.24, 2007

DUT: CDM7126C,CDM7126M;Type: Folder body; Serial: #1

Communication System: PCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:1

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.54$ mho/m; $\epsilon_r = 52$; $\rho = 1000$ kg/m³

Phantom section: Flat Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ES3DV3 – SN3085; ConvF(4.73, 4.73, 4.73); Calibrated: 2007-11-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2007-01-25
- Phantom: 1800/1900 Phantom; Type: SAM

PCS Body 600/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.282 mW/g

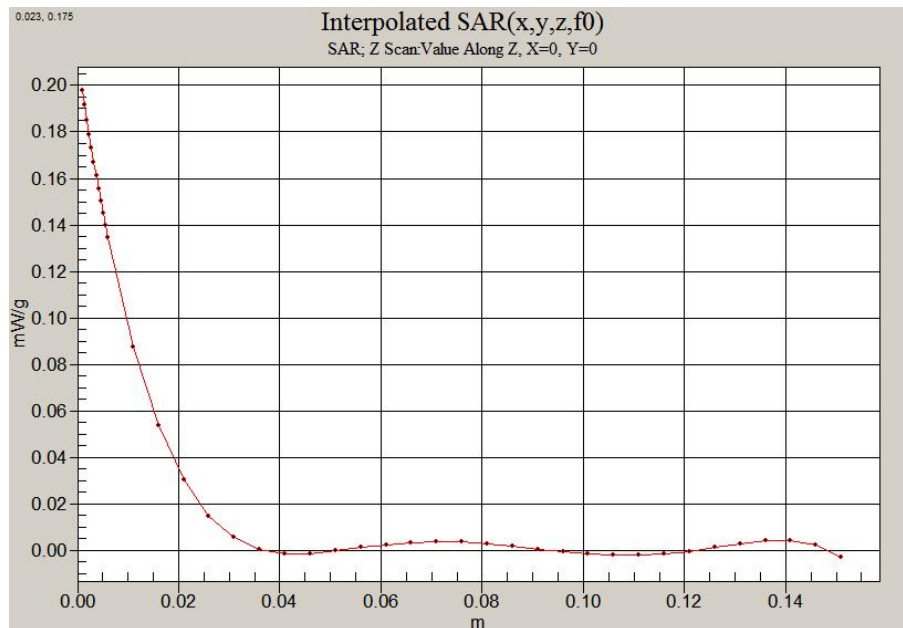
PCS Body 600/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 11.7 V/m; Power Drift = -0.015 dB

Peak SAR (extrapolated) = 0.439 W/kg

SAR(1 g) = 0.259 mW/g; SAR(10 g) = 0.149 mW/g

Maximum value of SAR (measured) = 0.280 mW/g



0 dB = 0.280mW/g

Attachment 2. – Dipole Validation Plots

■ Validation Data (835 MHz Head)

Test Laboratory: HCT CO., LTD.

Input Power 1W (30dBm)

Liquid Temp: 21.3 °C

Test Date: Dec.27, 2007

DUT: Dipole 835 MHz; Serial: D835V2 - SN:481

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.895 \text{ mho/m}$; $\epsilon_r = 40.9$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ES3DV3 - SN3085; ConvF(6.1, 6.1, 6.1); Calibrated: 2007-11-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2007-01-25
- Phantom: 835/900 Phantom ; Type: SAM

Validatoin 835 MHz/Area Scan (61x81x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 10.0 mW/g

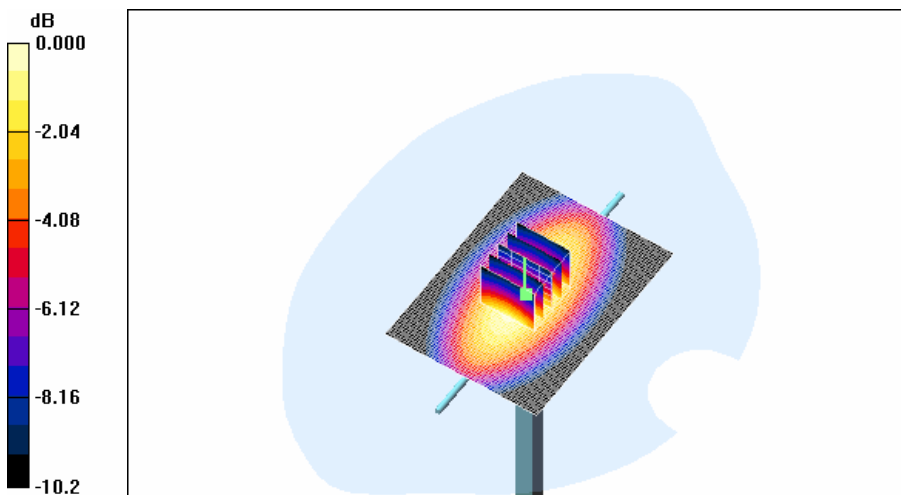
Validatoin 835 MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 108.6 V/m; Power Drift = 0.016 dB

Peak SAR (extrapolated) = 13.3 W/kg

SAR(1 g) = 9.33 mW/g; SAR(10 g) = 6.17 mW/g

Maximum value of SAR (measured) = 10.2 mW/g



0 dB = 10.2mW/g

■ Validation Data (1800 MHz Head)

Test Laboratory: HCT CO., LTD.

Input Power 1W (30dBm)

Liquid Temp: 21.3 °C

Test Date: Dec.26, 2007

DUT: Dipole 1800 MHz; Serial: D1800V2 – SN:2d066

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

Medium parameters used: $f = 1800 \text{ MHz}$; $\sigma = 1.4 \text{ mho/m}$; $\epsilon_r = 39.9$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ES3DV3 – SN3085; ConvF(5.04, 5.04, 5.04); Calibrated: 2007-11-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2007-01-25
- Phantom: 1800/1900 Phantom; Type: SAM

Validation 1800 MHz/Area Scan (61x61x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 42.3 mW/g

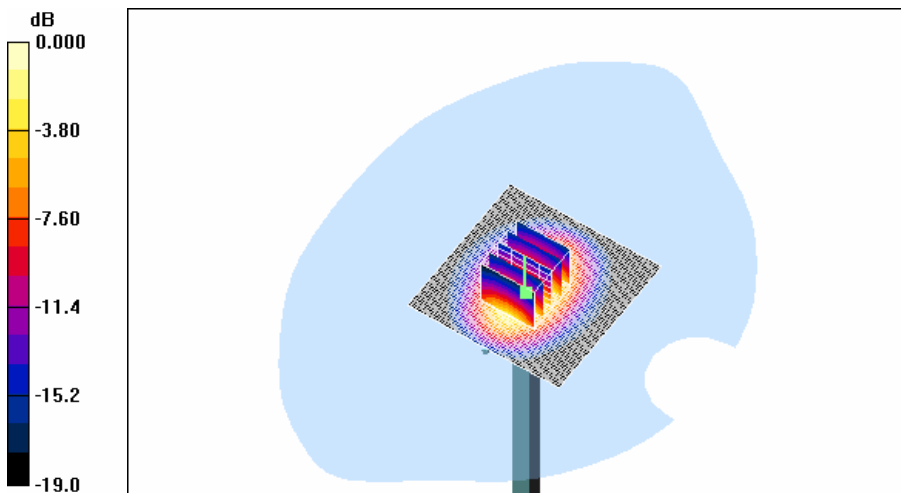
Validation 1800 MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 168.9 V/m; Power Drift = -0.002 dB

Peak SAR (extrapolated) = 67.2 W/kg

SAR(1 g) = 36 mW/g; SAR(10 g) = 18.6 mW/g

Maximum value of SAR (measured) = 39.6 mW/g



0 dB = 39.6mW/g

■ Validation Data (1900 MHz Head)

Test Laboratory: HCT CO., LTD.

Input Power 1W (30dBm)

Liquid Temp: 21.2 °C

Test Date: Dec.24, 2007

DUT: Dipole 1900 Serial: D1900V2 – SN:5d032

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

Medium parameters used: $f = 1900 \text{ MHz}$; $\sigma = 1.45 \text{ mho/m}$; $\epsilon_r = 38.7$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ES3DV3 – SN3085; ConvF(5.04, 5.04, 5.04); Calibrated: 2007-11-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2007-01-25
- Phantom: 1800/1900 Phantom; Type: SAM

Validation 1900MHz/Area Scan (61x61x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 43.5 mW/g

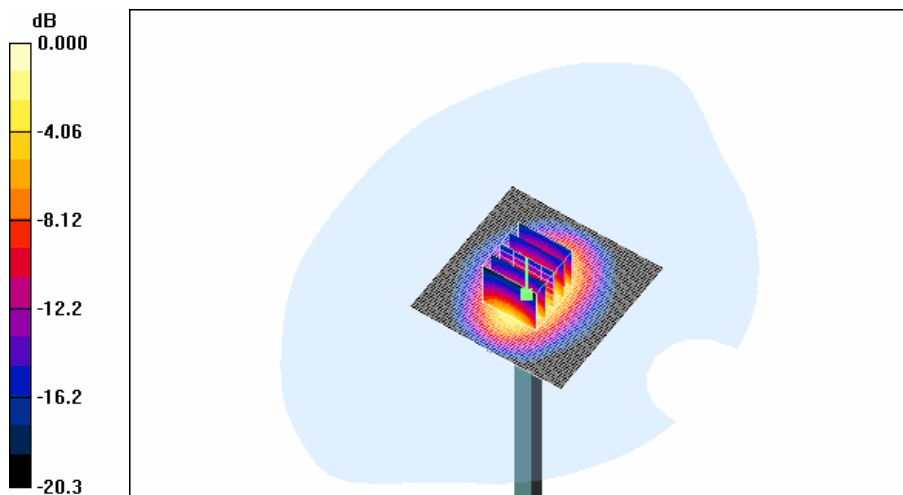
Validation 1900MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 165.5 V/m; Power Drift = -0.015 dB

Peak SAR (extrapolated) = 71.8 W/kg

SAR(1 g) = 37.2 mW/g; SAR(10 g) = 18.7 mW/g

Maximum value of SAR (measured) = 41.0 mW/g



0 dB = 41.0mW/g

■ Dielectric Parameter (835 MHz Head)

Title CDM7126C, CDM7126M

SubTitle CDMA835(Head)

Test Date Dec.27, 2007

Frequency	e'	e''
800000000	40.8120	19.2635
805000000	40.8771	19.3288
810000000	40.8741	19.3198
815000000	40.8929	19.3102
820000000	40.9543	19.2409
825000000	40.9099	19.2907
830000000	40.8811	19.2778
835000000	40.9008	19.2674
840000000	40.8451	19.2098
845000000	40.8031	19.1802
850000000	40.7084	19.1451
855000000	40.6340	19.1409
860000000	40.4470	19.0969
865000000	40.3404	19.0417
870000000	40.2297	19.0392
875000000	40.0997	19.0174
880000000	39.9396	18.9547
885000000	39.7984	18.9526
890000000	39.6766	18.9257
895000000	39.5511	18.9154
900000000	39.4973	18.8753

■ Dielectric Parameter (835 MHz Body)

Title CDM7126C, CDM7126M

SubTitle CDMA835(Body)

Test Date Dec.27, 2007

Frequency	e'	e''
800000000	53.7661	21.3261
805000000	53.6768	21.3446
810000000	53.6362	21.3686
815000000	53.6026	21.3451
820000000	53.5759	21.2913
825000000	53.4439	21.3146
830000000	53.4747	21.3074
835000000	53.3959	21.3008
840000000	53.3722	21.2306
845000000	53.3413	21.2292
850000000	53.2826	21.2379
855000000	53.2600	21.1359
860000000	53.2162	21.1503
865000000	53.1675	21.1773
870000000	53.1375	21.0795
875000000	53.1303	21.0696
880000000	53.0610	21.0620
885000000	52.9966	20.9948
890000000	52.9648	21.0104
895000000	52.9478	20.9941
900000000	52.8771	20.9985

■ Dielectric Parameter (1800 MHz Head)

Title CDM7126C, CDM7126M

SubTitle AWS (Head)

Test Date Dec.26, 2007

Frequency	e'	e''
1700000000	40.2478	13.8451
1710000000	40.1899	13.8661
1720000000	40.1550	13.8864
1730000000	40.1501	13.9236
1740000000	40.0981	13.9476
1750000000	40.1343	13.9290
1760000000	40.1102	13.9645
1770000000	40.0679	13.9519
1780000000	40.0051	13.9550
1790000000	39.9314	13.9836
1800000000	39.8546	13.9744
1810000000	39.7696	13.9648
1820000000	39.7427	14.0332
1830000000	39.6558	14.0560
1840000000	39.6334	14.0973
1850000000	39.6164	14.1747
1860000000	39.6061	14.1628
1870000000	39.6214	14.1954
1880000000	39.6012	14.1987
1890000000	39.5643	14.2216
1900000000	39.5145	14.2317

■ Dielectric Parameter (1800 MHz Body)

Title CDM7126C, CDM7126M

SubTitle AWS1800(Body)

Test Date Dec.26, 2007

Frequency	e'	e''
1700000000	55.0348	14.7560
1710000000	55.0016	14.7758
1720000000	54.9618	14.7409
1730000000	54.8774	14.7711
1740000000	54.8537	14.7686
1750000000	54.8030	14.7936
1760000000	54.7983	14.8127
1770000000	54.7503	14.8661
1780000000	54.7413	14.8968
1790000000	54.7248	14.9378
1800000000	54.7019	14.9734
1810000000	54.6513	14.9965
1820000000	54.6433	15.0228
1830000000	54.5939	15.0344
1840000000	54.5601	15.0321
1850000000	54.5335	15.0236
1860000000	54.4534	15.0162
1870000000	54.4456	15.0323
1880000000	54.4083	15.0950
1890000000	54.3680	15.1758
1900000000	54.3535	15.2138

■ Dielectric Parameter (1900 MHz Head)

Title CDM7126C, CDM7126M

SubTitle PCS1900(Head)

Test Date Dec.24, 2007

Frequency	e'	e''
1850000000	38.9893	13.3595
1855000000	38.9755	13.3465
1860000000	38.9402	13.3855
1865000000	38.9480	13.4455
1870000000	38.9394	13.4977
1875000000	38.8863	13.4674
1880000000	38.8369	13.5240
1885000000	38.8187	13.5731
1890000000	38.7614	13.5726
1895000000	38.7657	13.6373
1900000000	38.7445	13.6794
1905000000	38.7212	13.7081
1910000000	38.6962	13.7053
1915000000	38.6925	13.7217
1920000000	38.6612	13.7407
1925000000	38.5801	13.7735
1930000000	38.5577	13.7401
1935000000	38.5378	13.7756
1940000000	38.5443	13.7827
1945000000	38.5348	13.8058
1950000000	38.5466	13.7656

■ Dielectric Parameter (1900 MHz Body)

Title CDM7126C, CDM7126M

SubTitle PCS1900(Body)

Test Date Dec.24, 2007

Frequency	e'	e''
1850000000	52.0997	14.5920
1855000000	52.1335	14.5921
1860000000	52.0841	14.6325
1865000000	52.1005	14.6405
1870000000	52.0491	14.6936
1875000000	52.0415	14.6651
1880000000	52.0354	14.6786
1885000000	52.0264	14.7127
1890000000	51.9962	14.7224
1895000000	51.9950	14.7317
1900000000	51.9403	14.7169
1905000000	51.9967	14.7535
1910000000	51.9628	14.7492
1915000000	51.9457	14.7549
1920000000	51.9456	14.8027
1925000000	51.9132	14.7828
1930000000	51.9052	14.8128
1935000000	51.8867	14.8309
1940000000	51.8684	14.8524
1945000000	51.8696	14.8597
1950000000	51.8246	14.8629

Attachment 3. – Probe Calibration Data

**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 Accreditation Service (SAS)
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 **Samsung (Dymstec)**

Certificate No: **ES3-3085_Nov07**

CALIBRATION CERTIFICATE

Object **ES3DV3 - SN:3085**

Calibration procedure(s) **QA CAL-01.v6
Calibration procedure for dosimetric E-field probes**

Calibration date: **November 19, 2007**

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 $(22 \pm 3)^{\circ}\text{C}$ and humidity $< 70\%$.

Calibration Equipment used (MATE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	29-Mar-07 (METAS, No. 217-00670)	Mar-08
Power sensor E4412A	MY41495277	29-Mar-07 (METAS, No. 217-00670)	Mar-08
Power sensor E4412A	MY41496087	29-Mar-07 (METAS, No. 217-00670)	Mar-08
Reference 3 dB Attenuator	SN: S5054 (3c)	8-Aug-07 (METAS, No. 217-00719)	Aug-08
Reference 20 dB Attenuator	SN: S5095 (20b)	29-Mar-07 (METAS, No. 217-00671)	Mar-08
Reference 30 dB Attenuator	SN: S5129 (30b)	8-Aug-07 (METAS, No. 217-00720)	Aug-08
Reference Probe ES3DV2	SN: 3013	4-Jan-07 (SPEAG, No. ES3-3013_Jan07)	Jan-08
DAE4	SN: 654	20-Apr-07 (SPEAG, No. DAE4-654_Apr07)	Apr-08
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (SPEAG, in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Oct-07)	In house check: Oct-08

Calibrated by:	Name Katja Pokovic	Function Technical Manager	Signature
Approved by:	Name Niels Kuster	Quality Manager	

Issued: November 20, 2007

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

Certificate No: ES3-3085_Nov07

Page 1 of 9

OK to use
2007/12/19

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 Accreditation Service (SAS)
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 _{x,y,z}	sensitivity in free space
ConvF	sensitivity in TSL / NORM _{x,y,z}
DCP	diode compression point
Polarization ϕ	ϕ rotation around probe axis
Polarization θ	θ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\theta = 0$ is normal to probe axis

Calibration is Performed According to the Following Standards:

- 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
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

Methods Applied and Interpretation of Parameters:

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

ES3DV3 SN:3085

November 19, 2007

Probe ES3DV3

SN:3085

Manufactured:	April 12, 2005
Last calibrated:	November 23, 2006
Recalibrated:	November 19, 2007

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

Certificate No: ES3-3085_Nov07

Page 3 of 9

ES3DV3 SN:3085

November 19, 2007

DASY - Parameters of Probe: ES3DV3 SN:3085

Sensitivity in Free Space^A

NormX	1.23 ± 10.1%	$\mu V/(V/m)^2$
NormY	1.25 ± 10.1%	$\mu V/(V/m)^2$
NormZ	1.32 ± 10.1%	$\mu V/(V/m)^2$

Diode Compression^B

DCP X	91 mV
DCP Y	93 mV
DCP Z	93 mV

Sensitivity in Tissue Simulating Liquid (Conversion Factors)

Please see Page 8.

Boundary Effect

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

Sensor Center to Phantom Surface Distance		3.0 mm	4.0 mm
SAR _{iso} [%]	Without Correction Algorithm	3.9	1.0
SAR _{iso} [%]	With Correction Algorithm	0.4	0.1

TSL **1810 MHz** **Typical SAR gradient: 10 % per mm**

Sensor Center to Phantom Surface Distance		3.0 mm	4.0 mm
SAR _{iso} [%]	Without Correction Algorithm	8.6	5.7
SAR _{iso} [%]	With Correction Algorithm	0.6	0.3

Sensor Offset

Probe Tip to Sensor Center **2.0 mm**

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

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

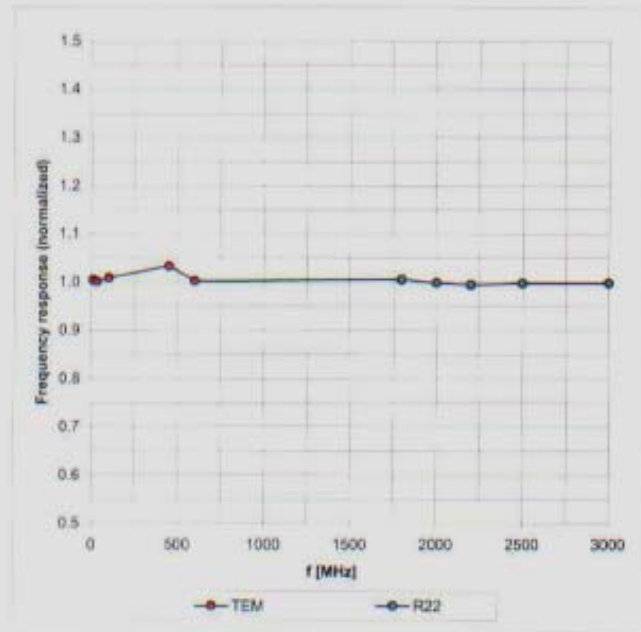
^B Numerical linearization parameter: uncertainty not required.

ES3DV3 SN:3085

November 19, 2007

Frequency Response of E-Field

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



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

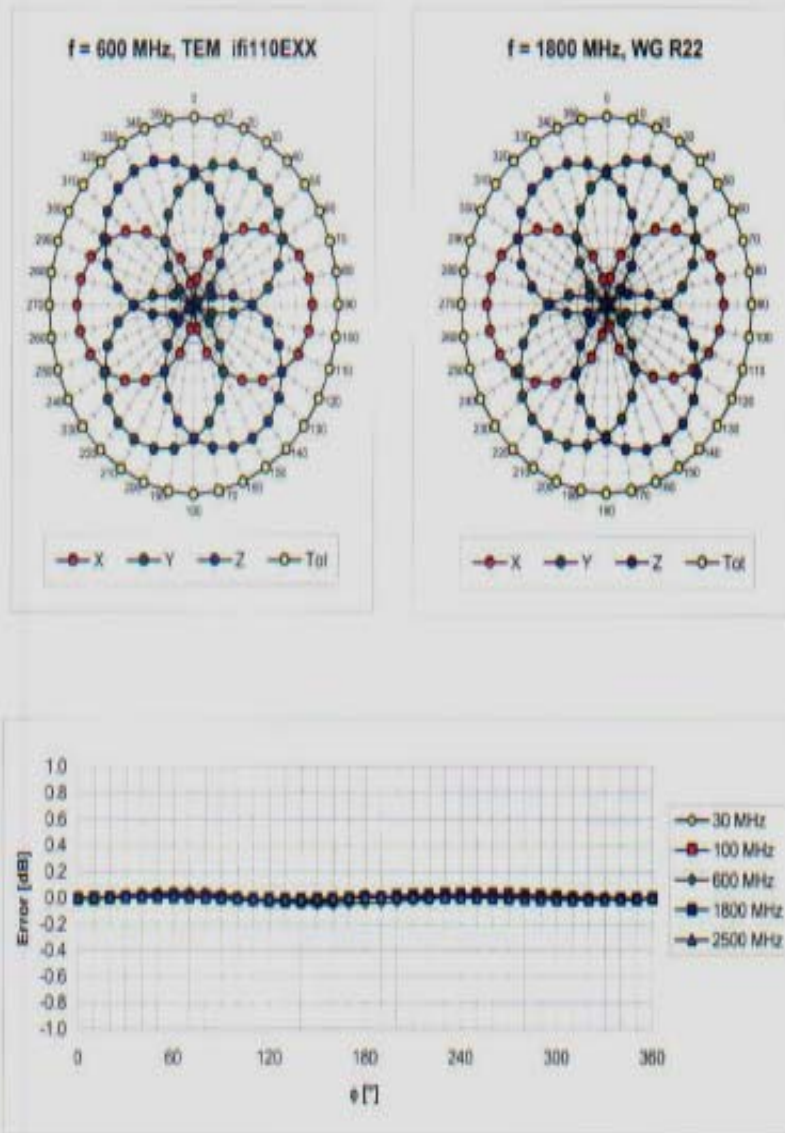
Certificate No: ES3-3085_Nov07

Page 5 of 9

ES3DV3 SN:3085

November 19, 2007

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

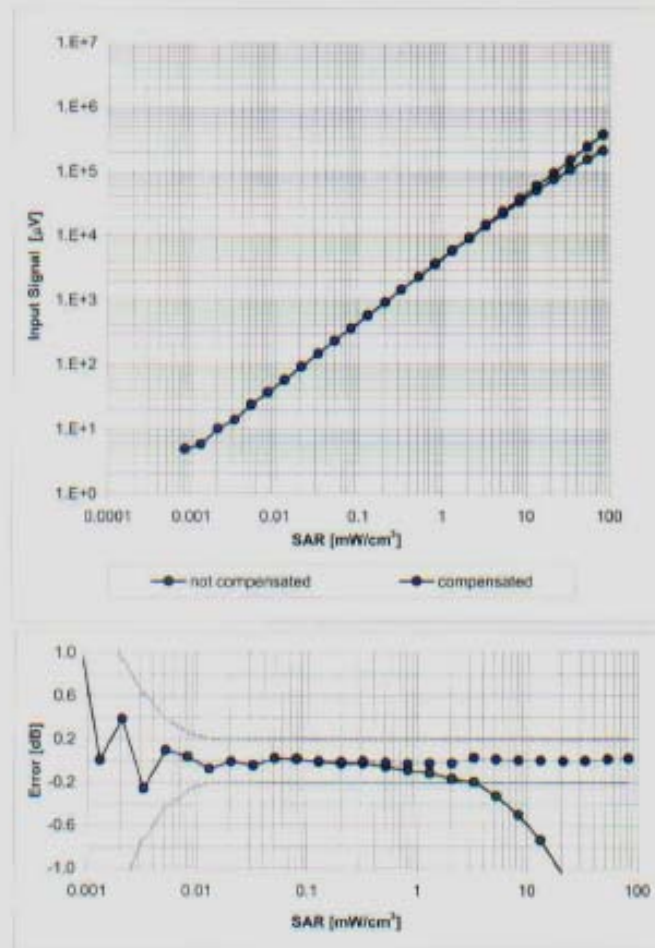


Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ ($k=2$)

ES3DV3 SN:3085

November 19, 2007

Dynamic Range $f(\text{SAR}_{\text{head}})$
(Waveguide R22, $f = 1800 \text{ MHz}$)



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

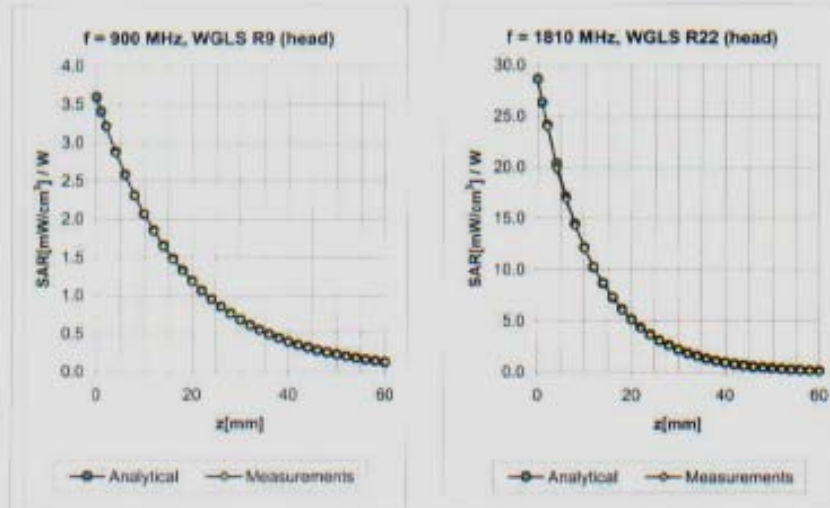
Certificate No: ES3-3085_Nov07

Page 7 of 9

ES3DV3 SN:3085

November 19, 2007

Conversion Factor Assessment



f [MHz]	Validity [MHz] ^C	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.66	1.44	6.10 ± 11.0% (k=2)
1810	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.59	1.55	5.04 ± 11.0% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.90	1.23	5.70 ± 11.0% (k=2)
1810	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.77	1.42	4.73 ± 11.0% (k=2)
2000	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.87	1.28	4.37 ± 11.0% (k=2)

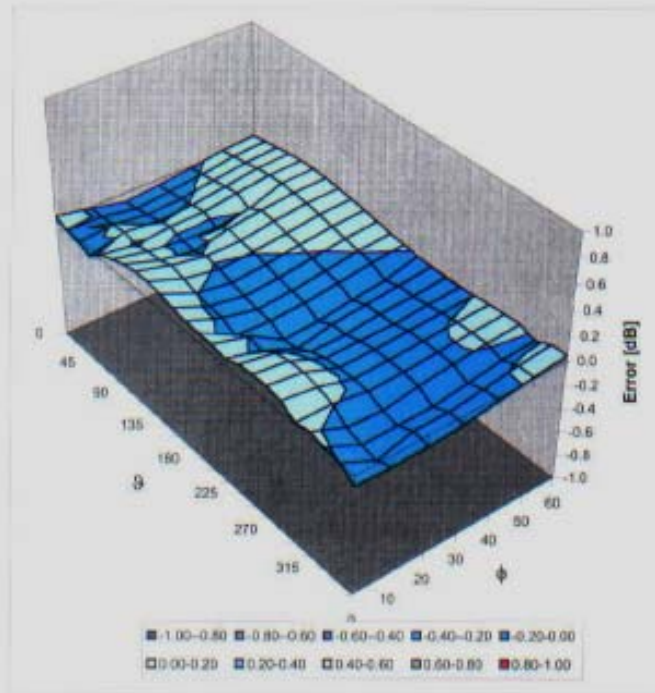
^C The validity of ± 100 MHz only applies for DASV v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

ES3DV3 SN:3085

November 19, 2007

Deviation from Isotropy in HSL

Error (ϕ , θ), $f = 900$ MHz



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

Certificate No: ES3-3085_Nov07

Page 9 of 9

Attachment 4. – Dipole Calibration Data

**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 **KTL (Dymstec)**

Certificate No: **D835V2-481_May07**

CALIBRATION CERTIFICATE

Object **D835V2 - SN: 481**

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

Calibration date: **May 24, 2007**

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-442A	GB37480704	03-Oct-06 (METAS, No. 217-00608)	Oct-07
Power sensor HP 8481A	US37292783	03-Oct-06 (METAS, No. 217-00608)	Oct-07
Reference 20 dB Attenuator	SN: 5086 (20g)	10-Aug-06 (METAS, No 217-00591)	Aug-07
Reference 10 dB Attenuator	SN: 5047.2 (10r)	10-Aug-06 (METAS, No 217-00591)	Aug-07
Reference Probe ET3DV6 (HF)	SN 1507	19-Oct-06 (SPEAG, No. ET3-1507_Oct06)	Oct-07
DAE4	SN 601	30-Jan-07 (SPEAG, No. DAE4-601_Jan07)	Jan-08

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (SPEAG, in house check Oct-05)	In house check: Oct-07
RF generator Agilent E4421B	MY41000675	11-May-05 (SPEAG, in house check Nov-05)	In house check: Nov-07
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (SPEAG, in house check Oct-06)	In house check: Oct-07

Calibrated by:	Name	Function	Signature
	Claudio Leubler	Laboratory Technician	
Approved by:	Name	Function	Signature
	Katja Pokovic	Technical Manager	

Issued: May 30, 2007

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) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- 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	V4.7
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V4.9	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz $\pm$ 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	41.6 $\pm$ 6 %	0.90 mho/m $\pm$ 6 %
Head TSL temperature during test	(22.0 $\pm$ 0.2) °C	---	---

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.30 mW / g
SAR normalized	normalized to 1W	9.20 mW / g
SAR for nominal Head TSL parameters ¹	normalized to 1W	9.21 mW / g $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.51 mW / g
SAR normalized	normalized to 1W	6.04 mW / g
SAR for nominal Head TSL parameters ¹	normalized to 1W	6.05 mW / g $\pm$ 16.5 % (k=2)

¹ Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

Appendix**Antenna Parameters with Head TSL**

Impedance, transformed to feed point	52.8 Ω - 3.3 j Ω
Return Loss	- 27.5 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.394 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	April 23, 2003

DASY4 Validation Report for Head TSL

Date/Time: 24.05.2007 11:49:09

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:481

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: HSL 900 MHz;

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.9 \text{ mho/m}$; $\epsilon_r = 41.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507 (HF); ConvF(6.09, 6.09, 6.09); Calibrated: 19.10.2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.01.2007
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; ;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Pin = 250 mW; d = 15 mm/Zoom Scan (7x7x7)/Cube 0:

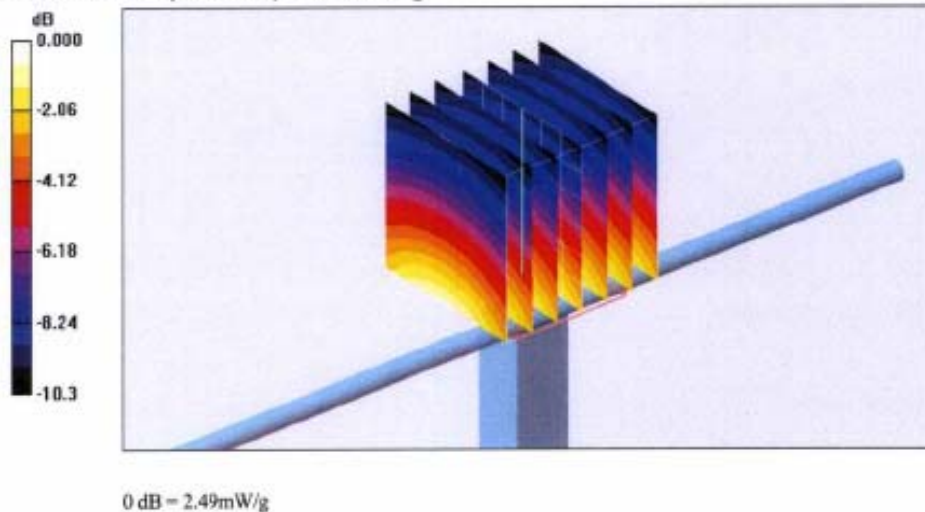
Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 55.0 V/m; Power Drift = -0.015 dB

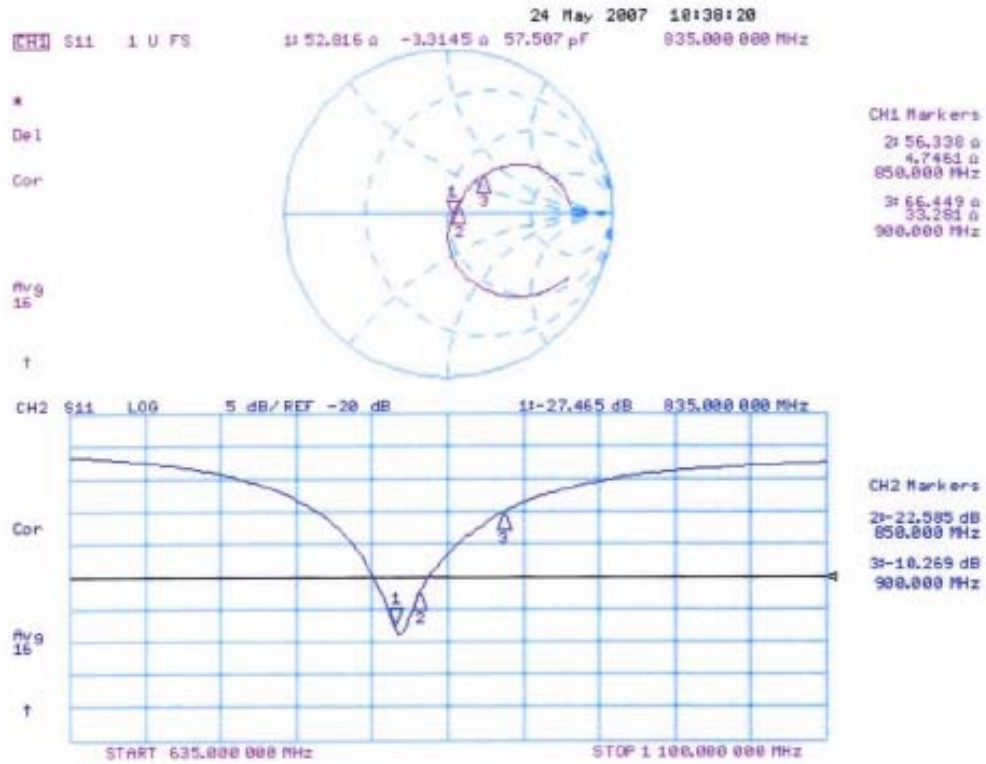
Peak SAR (extrapolated) = 3.30 W/kg

SAR(1 g) = 2.3 mW/g; SAR(10 g) = 1.51 mW/g

Maximum value of SAR (measured) = 2.49 mW/g



Impedance Measurement Plot for Head TSL



**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 **KTL (Dymstec)**

Certificate No: **D1800V2-2d066_May07**

CALIBRATION CERTIFICATE

Object **D1800V2 - SN: 2d066**

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

Calibration date: **May 23, 2007**

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-442A	GB37480704	03-Oct-06 (METAS, No. 217-00608)	Oct-07
Power sensor HP 8481A	US37292783	03-Oct-06 (METAS, No. 217-00608)	Oct-07
Reference 20 dB Attenuator	SN: 5086 (20g)	10-Aug-06 (METAS, No 217-00591)	Aug-07
Reference 10 dB Attenuator	SN: 5047.2 (10r)	10-Aug-06 (METAS, No 217-00591)	Aug-07
Reference Probe ET3DV6	SN: 1507	19-Oct-06 (SPEAG, No. ET3-1507_Oct06)	Oct-07
DAE4	SN 601	30-Jan-07 (SPEAG, No. DAE4-601_Jan07)	Jan-08
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (SPEAG, in house check Oct-05)	In house check: Oct-07
RF generator Agilent E4421B	MY41000675	11-May-05 (SPEAG, in house check Nov-05)	In house check: Nov-07
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (SPEAG, in house check Oct-06)	In house check: Oct-07

	Name	Function	Signature
Calibrated by:	Claudio Leubler	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	
			Issued: May 30, 2007

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

Certificate No: D1800V2-2d066_May07

Page 1 of 6

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) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- 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	V4.7
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1800 MHz $\pm$ 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	39.3 $\pm$ 6 %	1.39 mho/m $\pm$ 6 %
Head TSL temperature during test	(21.6 $\pm$ 0.2) °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	condition	
SAR measured	250 mW input power	9.17 mW /g
SAR normalized	normalized to 1W	36.7 mW /g
SAR for nominal Head TSL parameters ¹	normalized to 1W	36.5 mW / g $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.88 mW /g
SAR normalized	normalized to 1W	19.5 mW /g
SAR for nominal Head TSL parameters ¹	normalized to 1W	19.4 mW / g $\pm$ 16.5 % (k=2)

¹ Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

Appendix**Antenna Parameters with Head TSL**

Impedance, transformed to feed point	49.4 Ω - 3.3 j Ω
Return Loss	- 29.4 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.212 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	April 01, 2003

DASY4 Validation Report for Head TSL

Date/Time: 23.05.2007 12:07:19

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:2d066

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

Medium: HSL U10 BB;

Medium parameters used: $f = 1800$ MHz; $\sigma = 1.39$ mho/m; $\epsilon_r = 39.4$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507 (HF); ConvF(5.03, 5.03, 5.03); Calibrated: 19.10.2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.01.2007
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; ;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0:

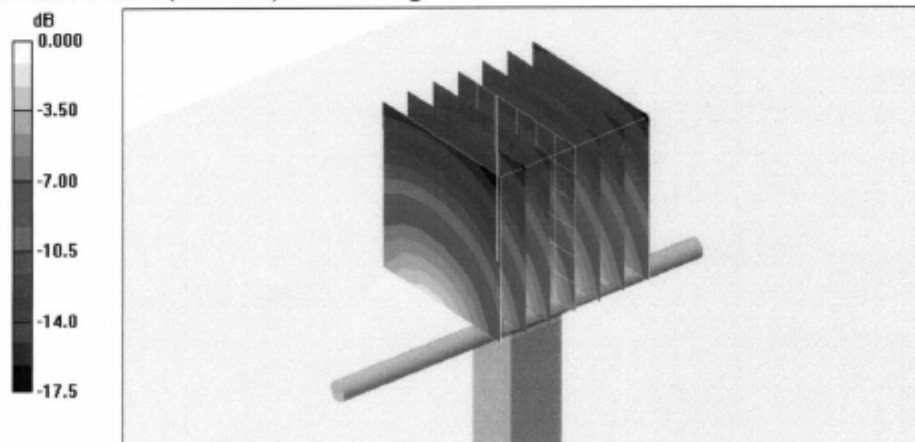
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 89.3 V/m; Power Drift = 0.063 dB

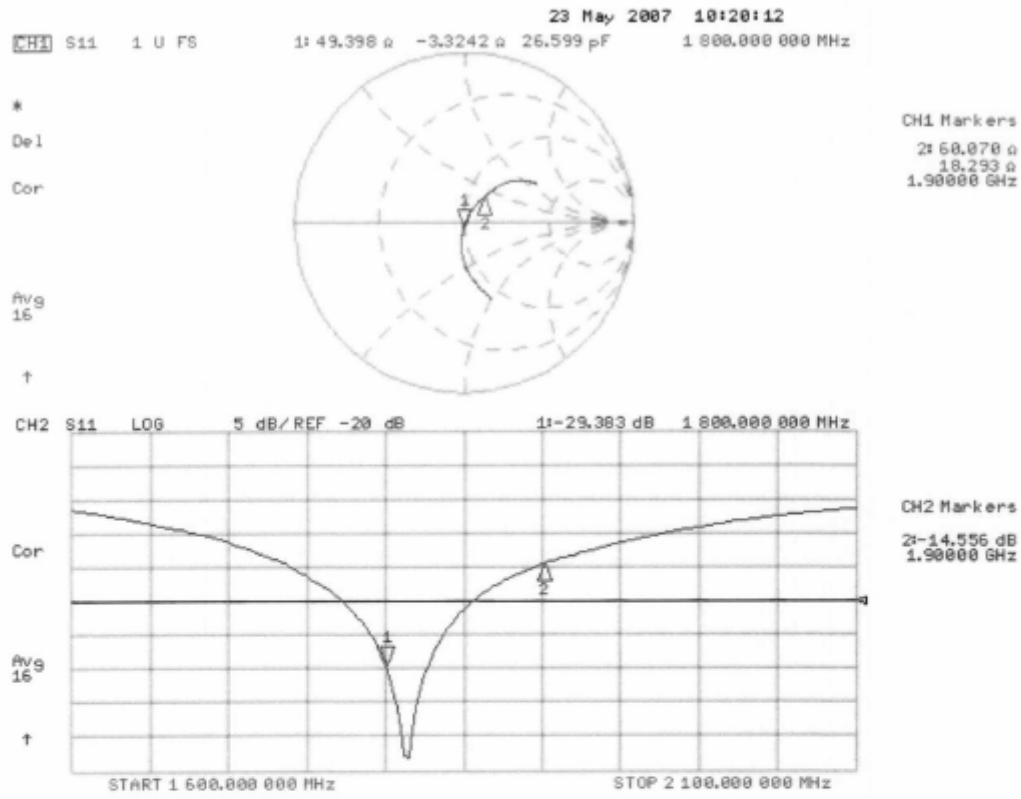
Peak SAR (extrapolated) = 15.7 W/kg

SAR(1 g) = 9.17 mW/g; SAR(10 g) = 4.88 mW/g

Maximum value of SAR (measured) = 10.2 mW/g



Impedance Measurement Plot for Head TSL



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 H-CT (Dymstec)

Certificate No: D1900V2-5d032_Feb07

CALIBRATION CERTIFICATE

Object D1900V2 - SN: 5d032

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

Calibration date: February 20, 2007

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-442A	GB37480704	03-Oct-06 (METAS, No. 217-00608)	Oct-07
Power sensor HP 8481A	US37292783	03-Oct-06 (METAS, No. 217-00608)	Oct-07
Reference 20 dB Attenuator	SN: 5086 (20g)	10-Aug-06 (METAS, No 217-00591)	Aug-07
Reference 10 dB Attenuator	SN: 5047.2 (10r)	10-Aug-06 (METAS, No 217-00591)	Aug-07
Reference Probe ET3DV6	SN: 1507	19-Oct-06 (SPEAG, No. ET3-1507_Oct06)	Oct-07
DAE4	SN 601	30-Jan-07 (SPEAG, No. DAE4-601_Jan07)	Jan-08
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (SPEAG, in house check Oct-05)	In house check: Oct-07
RF generator Agilent E4421B	MY41000675	11-May-05 (SPEAG, in house check Nov-05)	In house check: Nov-07
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (SPEAG, in house check Oct-06)	In house check: Oct-07

Calibrated by:	Name Mike Meili	Function Laboratory Technician	Signature
Approved by:	Name Katja Pokovic	Function Technical Manager	Signature

Issued: February 21, 2007

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:

- 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
- 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
- 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:

- 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	V4.7
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz $\pm$ 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	38.8 $\pm$ 6 %	1.43 mho/m $\pm$ 6 %
Head TSL temperature during test	(21.0 $\pm$ 0.2) °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm ³ (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 ¹	normalized to 1W	37.2 mW / g $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	5.03 mW / g
SAR normalized	normalized to 1W	20.1mW / g
SAR for nominal Head TSL parameters ¹	normalized to 1W	19.8 mW / g $\pm$ 16.5 % (k=2)

¹ Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	$53.5 \Omega + 3.3 j\Omega$
Return Loss	- 26.6 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.192 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	March 17, 2003

DASY4 Validation Report for Head TSL

Date/Time: 20.02.2007 14:35:32

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d032

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

Medium: HSL U10 BB;

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.43$ mho/m; $\epsilon_r = 38.9$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507 (HF); ConvF(4.97, 4.97, 4.97); Calibrated: 19.10.2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.01.2007
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0:

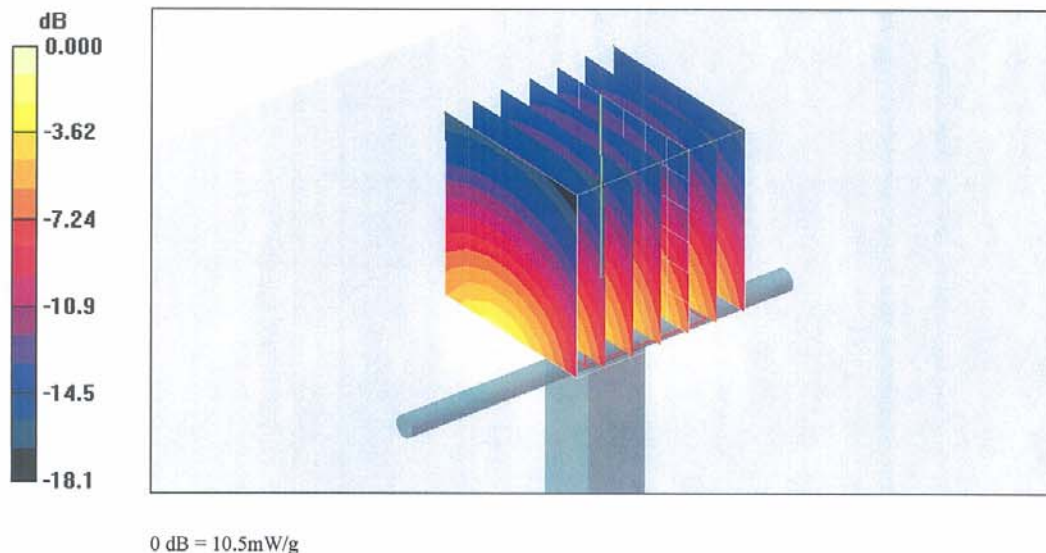
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 90.3 V/m; Power Drift = 0.006 dB

Peak SAR (extrapolated) = 16.4 W/kg

SAR(1 g) = 9.55 mW/g; SAR(10 g) = 5.03 mW/g

Maximum value of SAR (measured) = 10.5 mW/g



Impedance Measurement Plot for Head TSL

