

Test Laboratory: HCT CO., LTD
EUT Type: Dual-Band Dual-Mode GSM/WCDMA Phone with Bluetooth
GPRS Class 10 and GPRS mode class B(GPRS and GSM, but not simultaneously)
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Nov.20, 2009

DUT: P2000; Type: Body; Serial: #1

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3
Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.975$ mho/m; $\epsilon_r = 54.3$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 – SN1631; ConvF(5.91, 5.91, 5.91); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2009-05-22
- Phantom: 835/900 Phantom ; Type: SAM

GSM Body 190/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.297 mW/g

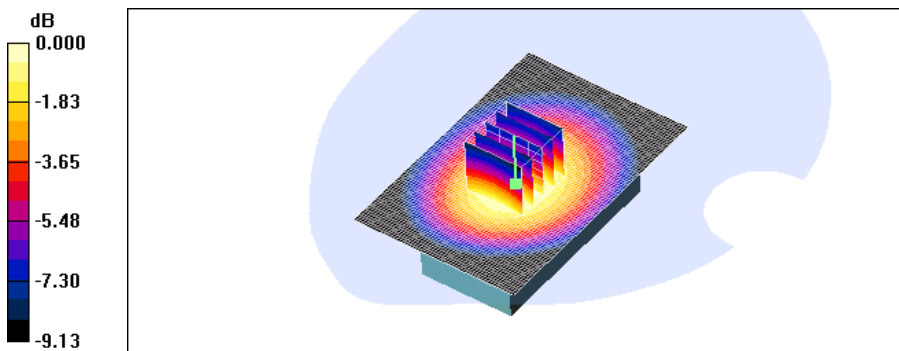
GSM Body 190/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 9.39 V/m; Power Drift = -0.053 dB

Peak SAR (extrapolated) = 0.363 W/kg

SAR(1 g) = 0.282 mW/g; SAR(10 g) = 0.204 mW/g

Maximum value of SAR (measured) = 0.301 mW/g



0 dB = 0.301mW/g

Test Laboratory: HCT CO., LTD
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GPRS Class 10 and GPRS mode class B(GPRS and GSM, but not simultaneously)
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Ambient Temperature: 21.4 °C
Test Date: Nov.20, 2009

DUT: P2000; Type: Body; Serial: #1

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:4.15
Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.975$ mho/m; $\epsilon_r = 54.3$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 – SN1631; ConvF(5.91, 5.91, 5.91); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2009-05-22
- Phantom: 835/900 Phantom ; Type: SAM

GSM Body 190/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.591 mW/g

GSM Body 190/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

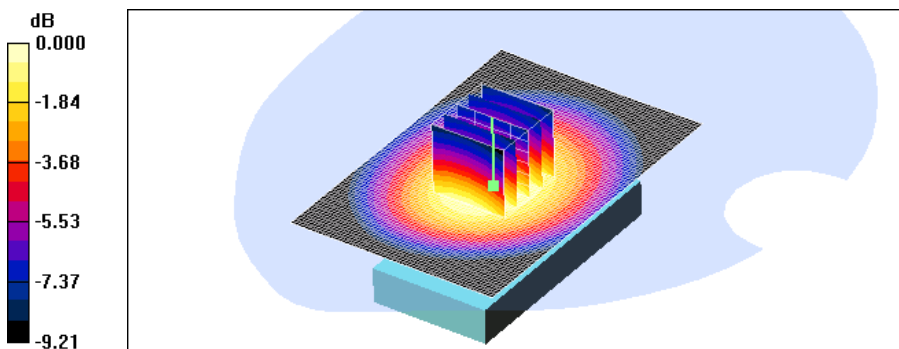
Reference Value = 11.5 V/m; Power Drift = 0.109 dB

Peak SAR (extrapolated) = 0.697 W/kg

SAR(1 g) = 0.554 mW/g; SAR(10 g) = 0.403 mW/g

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

Maximum value of SAR (measured) = 0.585 mW/g



0 dB = 0.585mW/g

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Ambient Temperature: 21.4 °C
Test Date: Nov.20, 2009

DUT: P2000; Type: Body; Serial: #1

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:4.15
Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.975$ mho/m; $\epsilon_r = 54.3$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 – SN1631; ConvF(5.91, 5.91, 5.91); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2009-05-22
- Phantom: 835/900 Phantom ; Type: SAM

GSM Body 190/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.332 mW/g

GSM Body 190/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

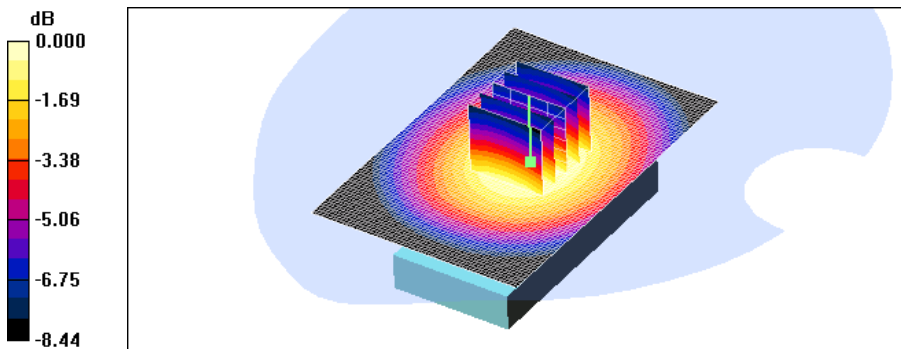
Reference Value = 12.9 V/m; Power Drift = -0.025 dB

Peak SAR (extrapolated) = 0.407 W/kg

SAR(1 g) = 0.320 mW/g; SAR(10 g) = 0.237 mW/g

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

Maximum value of SAR (measured) = 0.340 mW/g



0 dB = 0.340mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Dual-Band Dual-Mode GSM/WCDMA Phone with Bluetooth
GPRS Class 10 and GPRS mode class B(GPRS and GSM, but not simultaneously)
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Nov.20, 2009

DUT: P2000; Type: Body; Serial: #1

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3
Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.975$ mho/m; $\epsilon_r = 54.3$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 – SN1631; ConvF(5.91, 5.91, 5.91); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2009-05-22
- Phantom: 835/900 Phantom ; Type: SAM

GSM Body 190/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.297 mW/g

GSM Body 190/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

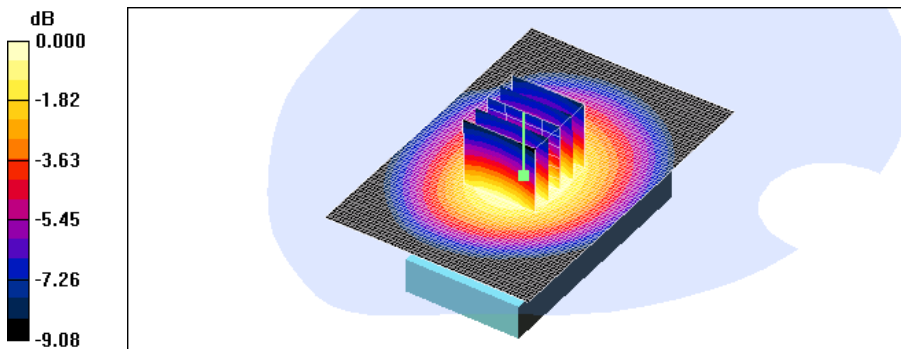
Reference Value = 9.28 V/m; Power Drift = 0.004 dB

Peak SAR (extrapolated) = 0.357 W/kg

SAR(1 g) = 0.280 mW/g; SAR(10 g) = 0.203 mW/g

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

Maximum value of SAR (measured) = 0.300 mW/g



0 dB = 0.300mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Dual-Band Dual-Mode GSM/WCDMA Phone with Bluetooth
GPRS Class 10 and GPRS mode class B(GPRS and GSM, but not simultaneously)
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Nov.21, 2009

DUT: P2000; Type: Body; Serial: #1

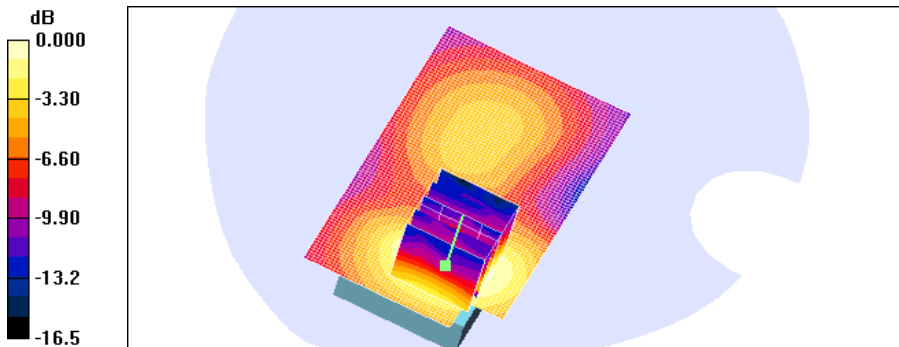
Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3
Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.53 \text{ mho/m}$; $\epsilon_r = 54.1$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1631; ConvF(4.48, 4.48, 4.48); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2009-05-22
- Phantom: 1800/1900 Phantom; Type: SAM

GSM Body 661/Area Scan (51x91x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 0.134 mW/g

GSM Body 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 5.68 V/m; Power Drift = 0.049 dB
Peak SAR (extrapolated) = 0.184 W/kg
SAR(1 g) = 0.125 mW/g; SAR(10 g) = 0.071 mW/g
Maximum value of SAR (measured) = 0.127 mW/g



0 dB = 0.127mW/g

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EUT Type: Dual-Band Dual-Mode GSM/WCDMA Phone with Bluetooth
GPRS Class 10 and GPRS mode class B(GPRS and GSM, but not simultaneously)
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Nov.21, 2009

DUT: P2000; Type: Body; Serial: #1

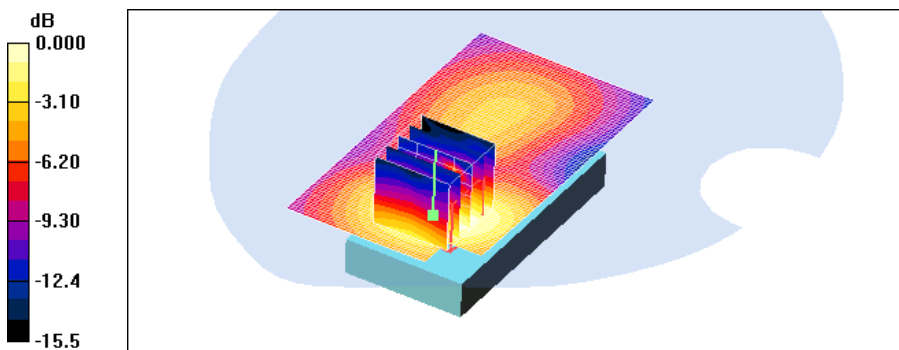
Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:4.15
Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.53 \text{ mho/m}$; $\epsilon_r = 54.1$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1631; ConvF(4.48, 4.48, 4.48); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2009-05-22
- Phantom: 1800/1900 Phantom; Type: SAM

GSM Body 661/Area Scan (51x91x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 0.262 mW/g

GSM Body 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 7.95 V/m; Power Drift = -0.099 dB
Peak SAR (extrapolated) = 0.310 W/kg
SAR(1 g) = 0.232 mW/g; SAR(10 g) = 0.139 mW/g
Maximum value of SAR (measured) = 0.250 mW/g



0 dB = 0.250mW/g

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EUT Type: Dual-Band Dual-Mode GSM/WCDMA Phone with Bluetooth
GPRS Class 10 and GPRS mode class B(GPRS and GSM, but not simultaneously)
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Nov.21, 2009

DUT: P2000; Type: Body; Serial: #1

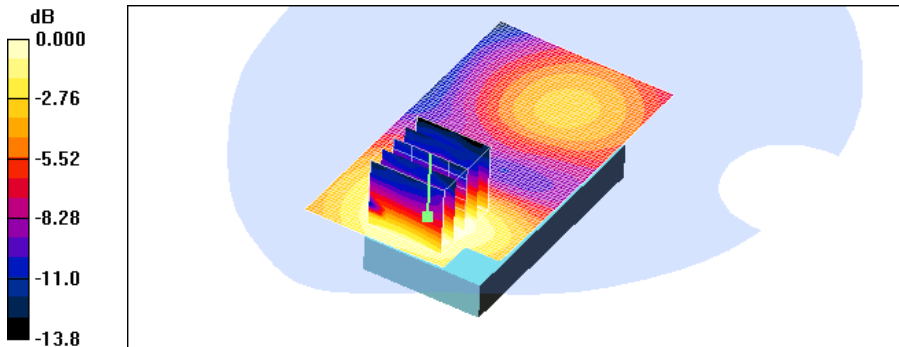
Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:4.15
Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.53 \text{ mho/m}$; $\epsilon_r = 54.1$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1631; ConvF(4.48, 4.48, 4.48); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2009-05-22
- Phantom: 1800/1900 Phantom; Type: SAM

GSM Body 661/Area Scan (51x91x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 0.159 mW/g

GSM Body 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 6.73 V/m; Power Drift = -0.130 dB
Peak SAR (extrapolated) = 0.196 W/kg
SAR(1 g) = 0.137 mW/g; SAR(10 g) = 0.087 mW/g
Maximum value of SAR (measured) = 0.149 mW/g



0 dB = 0.149mW/g

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GPRS Class 10 and GPRS mode class B(GPRS and GSM, but not simultaneously)
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Nov.21, 2009

DUT: P2000; Type: Body; Serial: #1

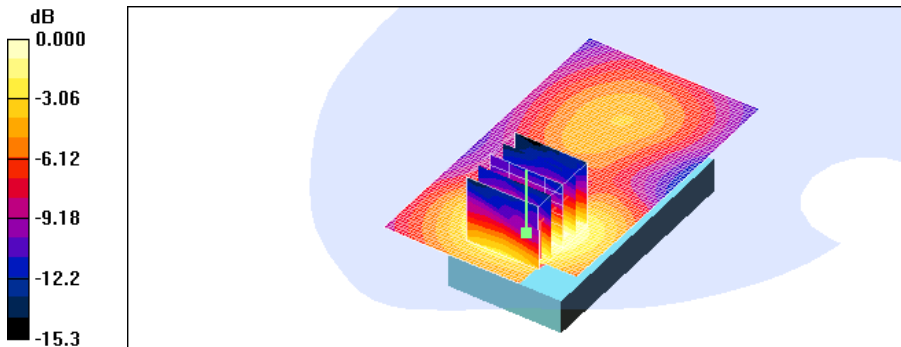
Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.53$ mho/m; $\epsilon_r = 54.1$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1631; ConvF(4.48, 4.48, 4.48); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2009-05-22
- Phantom: 1800/1900 Phantom; Type: SAM

GSM Body 661/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.131 mW/g

GSM Body 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.74 V/m; Power Drift = -0.187 dB
Peak SAR (extrapolated) = 0.163 W/kg
SAR(1 g) = 0.118 mW/g; SAR(10 g) = 0.071 mW/g
Maximum value of SAR (measured) = 0.128 mW/g



0 dB = 0.128mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Dual-Band Dual-Mode GSM/WCDMA Phone with Bluetooth
GPRS Class 10 and GPRS mode class B(GPRS and GSM, but not simultaneously)
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Nov.20, 2009

DUT: P2000; Type: Body; Serial: #1

Communication System: WCDMA850; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.975$ mho/m; $\epsilon_r = 54.3$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 – SN1631; ConvF(5.91, 5.91, 5.91); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2009-05-22
- Phantom: 835/900 Phantom ; Type: SAM

WCDMA Body 4183/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.317 mW/g

WCDMA Body 4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

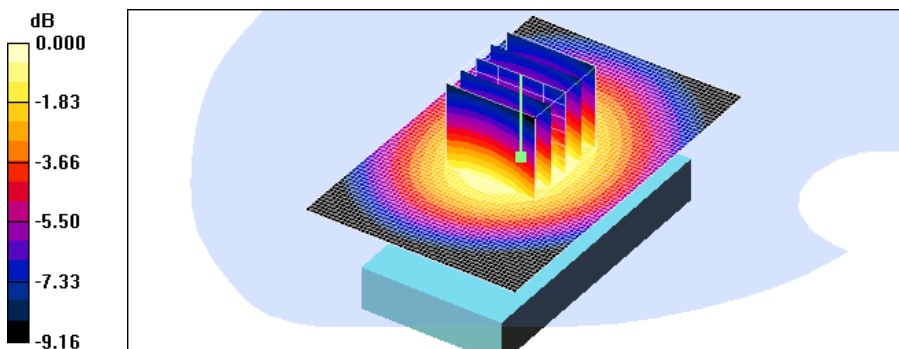
Reference Value = 10.9 V/m; Power Drift = -0.016 dB

Peak SAR (extrapolated) = 0.387 W/kg

SAR(1 g) = 0.302 mW/g; SAR(10 g) = 0.219 mW/g

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

Maximum value of SAR (measured) = 0.321 mW/g



0 dB = 0.321mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Dual-Band Dual-Mode GSM/WCDMA Phone with Bluetooth
GPRS Class 10 and GPRS mode class B(GPRS and GSM, but not simultaneously)
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Nov.20, 2009

DUT: P2000; Type: Body; Serial: #1

Communication System: WCDMA850; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.975$ mho/m; $\epsilon_r = 54.3$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 – SN1631; ConvF(5.91, 5.91, 5.91); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2009-05-22
- Phantom: 835/900 Phantom ; Type: SAM

WCDMA Body 4183/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.181 mW/g

WCDMA Body 4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

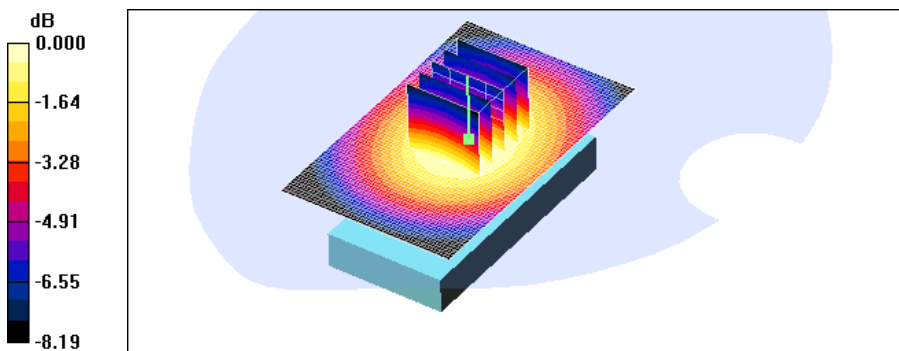
Reference Value = 9.70 V/m; Power Drift = -0.079 dB

Peak SAR (extrapolated) = 0.215 W/kg

SAR(1 g) = 0.174 mW/g; SAR(10 g) = 0.130 mW/g

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

Maximum value of SAR (measured) = 0.183 mW/g



0 dB = 0.183mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Dual-Band Dual-Mode GSM/WCDMA Phone with Bluetooth
GPRS Class 10 and GPRS mode class B(GPRS and GSM, but not simultaneously)
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Nov.21, 2009

DUT: P2000; Type: Body; Serial: #1

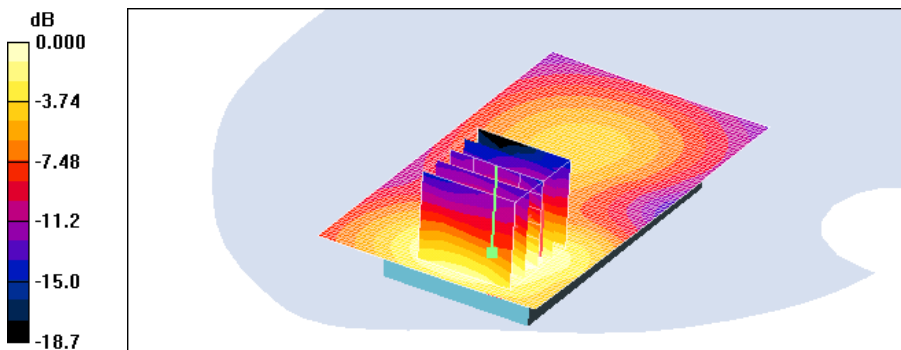
Communication System: WCDMA1900(FCC); Frequency: 1880 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.53 \text{ mho/m}$; $\epsilon_r = 54.1$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1631; ConvF(4.48, 4.48, 4.48); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2009-05-22
- Phantom: 1800/1900 Phantom; Type: SAM

WCDMA Body 9400/Area Scan (51x91x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 0.270 mW/g

WCDMA Body 9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 7.52 V/m; Power Drift = 0.002 dB
Peak SAR (extrapolated) = 0.340 W/kg
SAR(1 g) = 0.249 mW/g; SAR(10 g) = 0.149 mW/g
Maximum value of SAR (measured) = 0.270 mW/g



0 dB = 0.270mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Dual-Band Dual-Mode GSM/WCDMA Phone with Bluetooth
GPRS Class 10 and GPRS mode class B(GPRS and GSM, but not simultaneously)
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Nov.21, 2009

DUT: P2000; Type: Body; Serial: #1

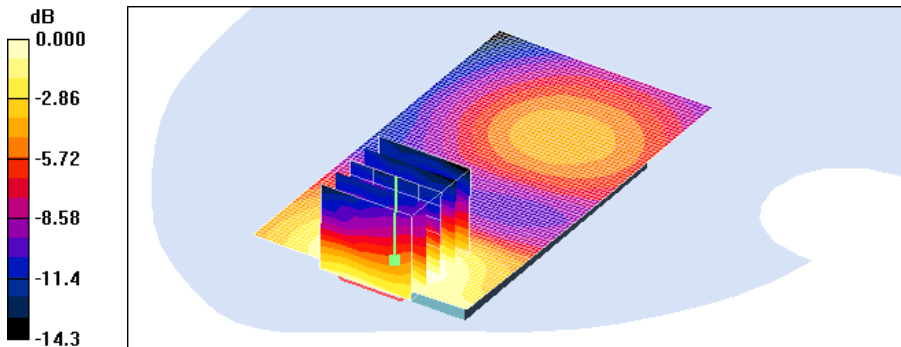
Communication System: WCDMA1900(FCC); Frequency: 1880 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.53 \text{ mho/m}$; $\epsilon_r = 54.1$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1631; ConvF(4.48, 4.48, 4.48); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2009-05-22
- Phantom: 1800/1900 Phantom; Type: SAM

WCDMA Body 9400/Area Scan (51x91x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 0.177 mW/g

WCDMA Body 9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 6.22 V/m; Power Drift = -0.098 dB
Peak SAR (extrapolated) = 0.213 W/kg
SAR(1 g) = 0.153 mW/g; SAR(10 g) = 0.096 mW/g
Maximum value of SAR (measured) = 0.167 mW/g



0 dB = 0.167mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Dual-Band Dual-Mode GSM/WCDMA Phone with Bluetooth
GPRS Class 10 and GPRS mode class B(GPRS and GSM, but not simultaneously)
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Nov.20, 2009

DUT: P2000; Type: Folder; Serial: #1

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3
Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.901$ mho/m; $\epsilon_r = 42.5$; $\rho = 1000$ kg/m³
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1631; ConvF(5.83, 5.83, 5.83); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2009-05-22
- Phantom: 835/900 Phantom ; Type: SAM

Right touch 190/Area Scan (51x111x1): Measurement grid: dx=15mm, dy=15mm

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

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

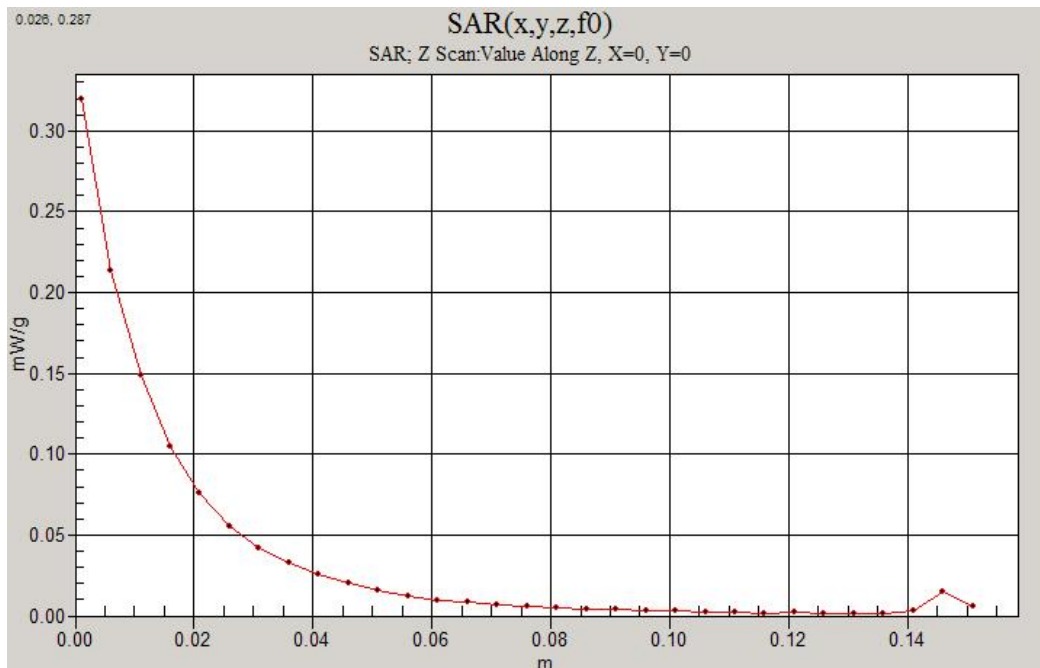
Right touch 190/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.46 V/m; Power Drift = 0.081 dB

Peak SAR (extrapolated) = 0.680 W/kg

SAR(1 g) = 0.313 mW/g; SAR(10 g) = 0.214 mW/g

Maximum value of SAR (measured) = 0.337 mW/g



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GPRS Class 10 and GPRS mode class B(GPRS and GSM, but not simultaneously)
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Nov.20, 2009

DUT: P2000; Type: Body; Serial: #1

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:4.15
Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.975$ mho/m; $\epsilon_r = 54.3$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

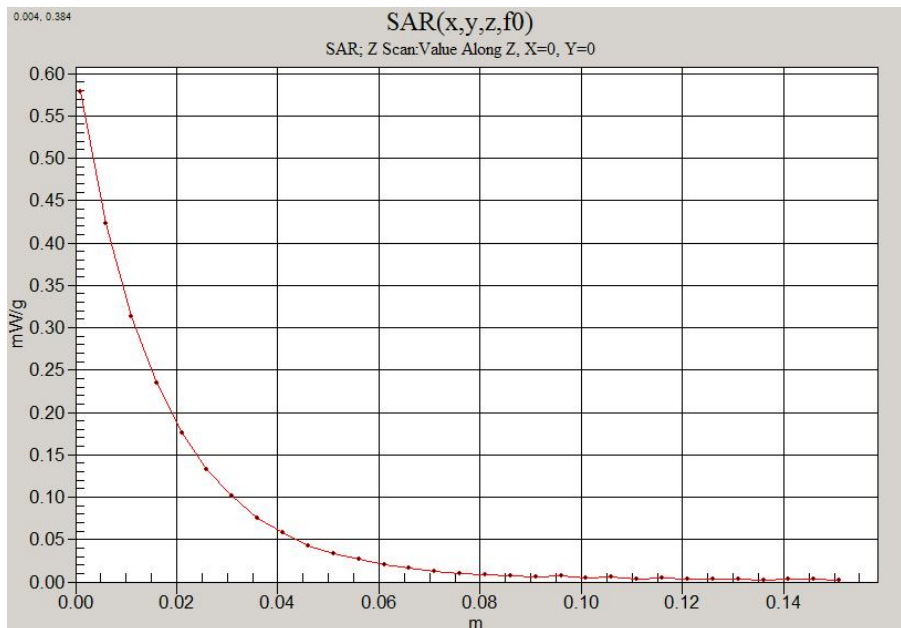
- Probe: ET3DV6 - SN1631; ConvF(5.91, 5.91, 5.91); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2009-05-22
- Phantom: 835/900 Phantom ; Type: SAM

GSM Body 190/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.591 mW/g

GSM Body 190/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.5 V/m; Power Drift = 1.09 dB
Peak SAR (extrapolated) = 0.697 W/kg
SAR(1 g) = 0.554 mW/g; SAR(10 g) = 0.403 mW/g

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

Maximum value of SAR (measured) = 0.585 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: Dual-Band Dual-Mode GSM/WCDMA Phone with Bluetooth
GPRS Class 10 and GPRS mode class B(GPRS and GSM, but not simultaneously)
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Nov.21, 2009

DUT: P2000; Type: Folder; Serial: #1

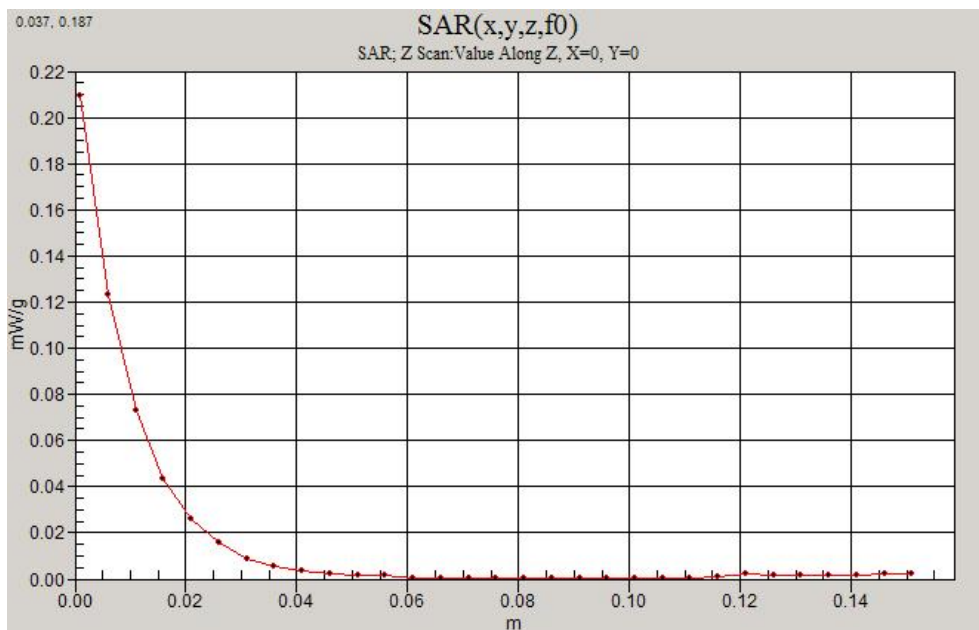
Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3
Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.39 \text{ mho/m}$; $\epsilon_r = 39.5$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1631; ConvF(5.07, 5.07, 5.07); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2009-05-22
- Phantom: 1800/1900 Phantom; Type: SAM

Right touch 661/Area Scan (51x111x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 0.207 mW/g

Right touch 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 2.85 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.290 W/kg
SAR(1 g) = 0.199 mW/g; SAR(10 g) = 0.121 mW/g
Maximum value of SAR (measured) = 0.217 mW/g



Test Laboratory: HCT CO., LTD
 EUT Type: Dual-Band Dual-Mode GSM/WCDMA Phone with Bluetooth
 GPRS Class 10 and GPRS mode class B(GPRS and GSM, but not simultaneously)
 Liquid Temperature: 21.3 °C
 Ambient Temperature: 21.5 °C
 Test Date: Nov.21, 2009

DUT: P2000; Type: Body; Serial: #1

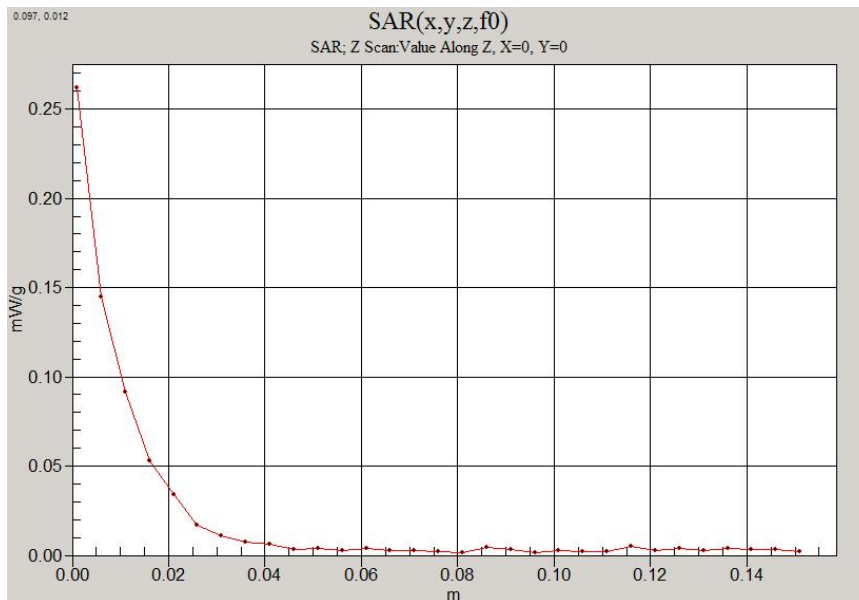
Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:4.15
 Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.53 \text{ mho/m}$; $\epsilon_r = 54.1$; $\rho = 1000 \text{ kg/m}^3$
 Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1631; ConvF(4.48, 4.48, 4.48); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2009-05-22
- Phantom: 1800/1900 Phantom; Type: SAM

GSM Body 661/Area Scan (51x91x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
 Maximum value of SAR (interpolated) = 0.262 mW/g

GSM Body 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
 Reference Value = 7.95 V/m; Power Drift = -0.099 dB
 Peak SAR (extrapolated) = 0.310 W/kg
SAR(1 g) = 0.232 mW/g; SAR(10 g) = 0.139 mW/g
 Maximum value of SAR (measured) = 0.250 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: Dual-Band Dual-Mode GSM/WCDMA Phone with Bluetooth
GPRS Class 10 and GPRS mode class B(GPRS and GSM, but not simultaneously)
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Nov.20, 2009

DUT: P2000; Type: Folder; Serial: #1

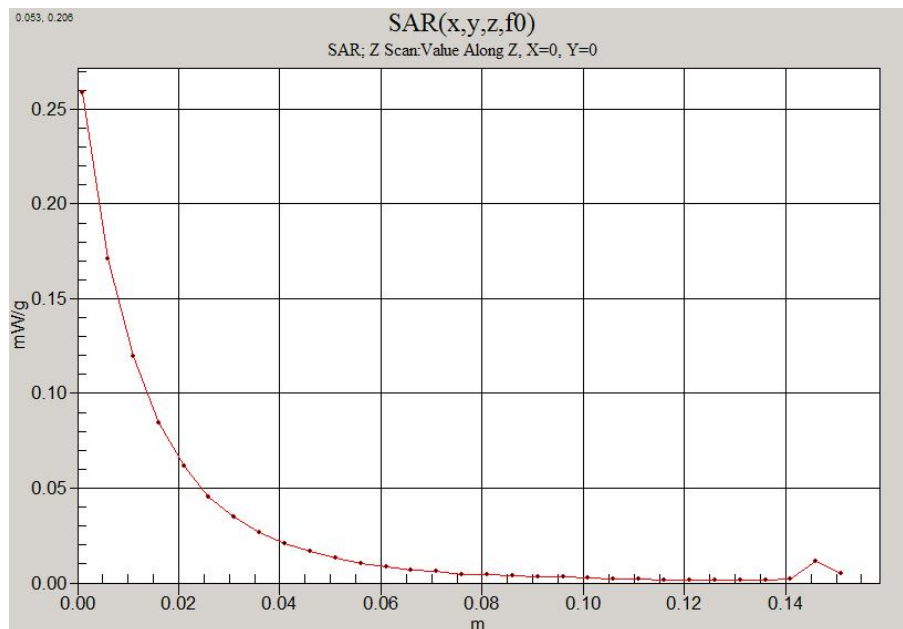
Communication System: WCDMA850; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.901$ mho/m; $\epsilon_r = 42.5$; $\rho = 1000$ kg/m³
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1631; ConvF(5.83, 5.83, 5.83); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2009-05-22
- Phantom: 835/900 Phantom ; Type: SAM

Right touch 4183/Area Scan (51x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.273 mW/g

Right touch 4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.45 V/m; Power Drift = 0.049 dB
Peak SAR (extrapolated) = 0.489 W/kg
SAR(1 g) = 0.249 mW/g; SAR(10 g) = 0.169 mW/g
Maximum value of SAR (measured) = 0.270 mW/g



Test Laboratory: HCT CO., LTD
 EUT Type: Dual-Band Dual-Mode GSM/WCDMA Phone with Bluetooth
 GPRS Class 10 and GPRS mode class B(GPRS and GSM, but not simultaneously)
 Liquid Temperature: 21.2 °C
 Ambient Temperature: 21.4 °C
 Test Date: Nov.20, 2009

DUT: P2000; Type: Body; Serial: #1

Communication System: WCDMA850; Frequency: 836.6 MHz; Duty Cycle: 1:1
 Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.975$ mho/m; $\epsilon_r = 54.3$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

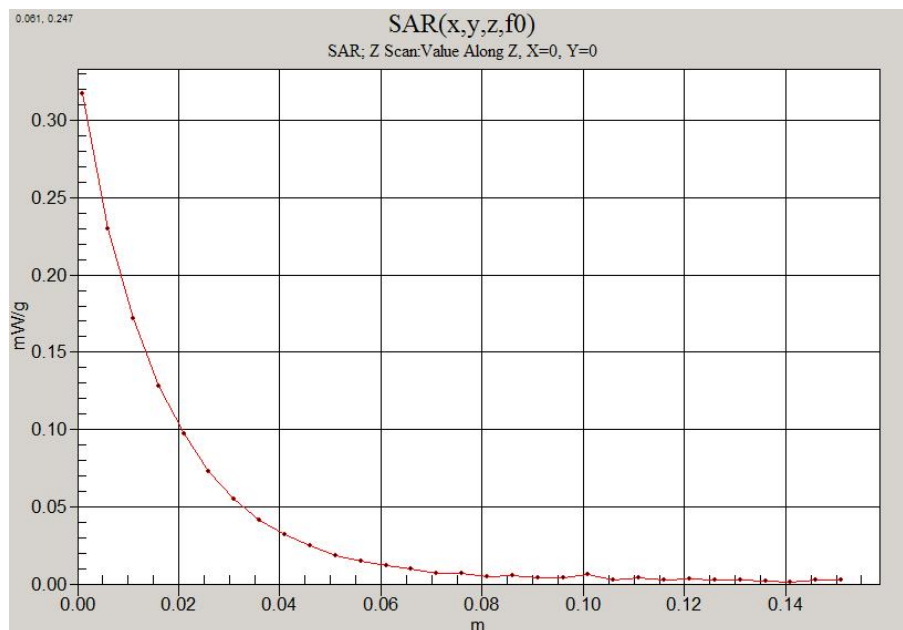
- Probe: ET3DV6 - SN1631; ConvF(5.91, 5.91, 5.91); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2009-05-22
- Phantom: 835/900 Phantom ; Type: SAM

WCDMA Body 4183/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm
 Maximum value of SAR (interpolated) = 0.317 mW/g

WCDMA Body 4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
 Reference Value = 10.9 V/m; Power Drift = -0.016 dB
 Peak SAR (extrapolated) = 0.387 W/kg
SAR(1 g) = 0.302 mW/g; SAR(10 g) = 0.219 mW/g

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

Maximum value of SAR (measured) = 0.321 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: Dual-Band Dual-Mode GSM/WCDMA Phone with Bluetooth
GPRS Class 10 and GPRS mode class B(GPRS and GSM, but not simultaneously)
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Nov.21, 2009

DUT: P2000; Type: Folder; Serial: #1

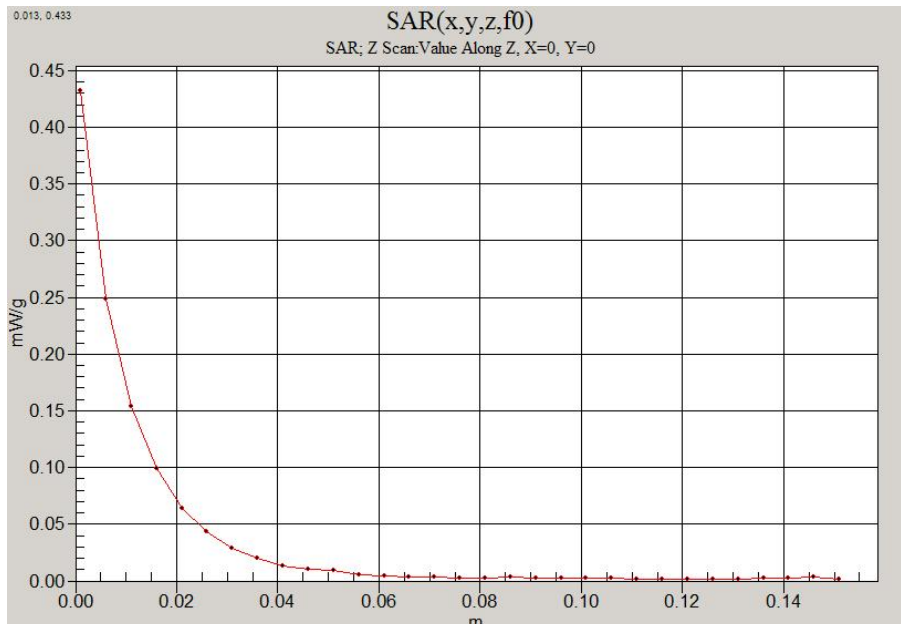
Communication System: WCDMA1900(FCC); Frequency: 1880 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.39$ mho/m; $\epsilon_r = 39.5$; $\rho = 1000$ kg/m³
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1631; ConvF(5.07, 5.07, 5.07); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2009-05-22
- Phantom: 1800/1900 Phantom; Type: SAM

Right touch 9400/Area Scan (51x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.405 mW/g

Right touch 9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.49 V/m; Power Drift = -0.100 dB
Peak SAR (extrapolated) = 0.553 W/kg
SAR(1 g) = 0.381 mW/g; SAR(10 g) = 0.237 mW/g
Maximum value of SAR (measured) = 0.422 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: Dual-Band Dual-Mode GSM/WCDMA Phone with Bluetooth
GPRS Class 10 and GPRS mode class B(GPRS and GSM, but not simultaneously)
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Nov.21, 2009

DUT: P2000; Type: Body; Serial: #1

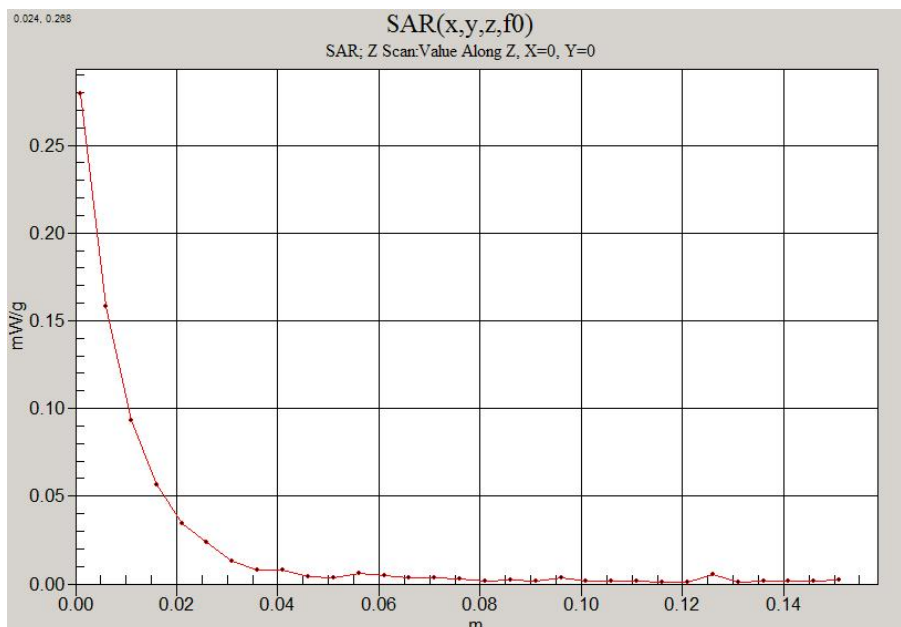
Communication System: WCDMA1900(FCC); Frequency: 1880 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.53$ mho/m; $\epsilon_r = 54.1$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1631; ConvF(4.48, 4.48, 4.48); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2009-05-22
- Phantom: 1800/1900 Phantom; Type: SAM

WCDMA Body 9400/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.270 mW/g

WCDMA Body 9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.52 V/m; Power Drift = 0.002 dB
Peak SAR (extrapolated) = 0.340 W/kg
SAR(1 g) = 0.249 mW/g; SAR(10 g) = 0.149 mW/g
Maximum value of SAR (measured) = 0.270 mW/g



Attachment 2. – Dipole Validation Plots

■ Validation Data (835 MHz Head)

Test Laboratory: HCT CO., LTD
Input Power 100 mW (20 dBm)
Liquid Temp: 21.2 °C
Test Date: Nov.20, 2009

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 – SN:441

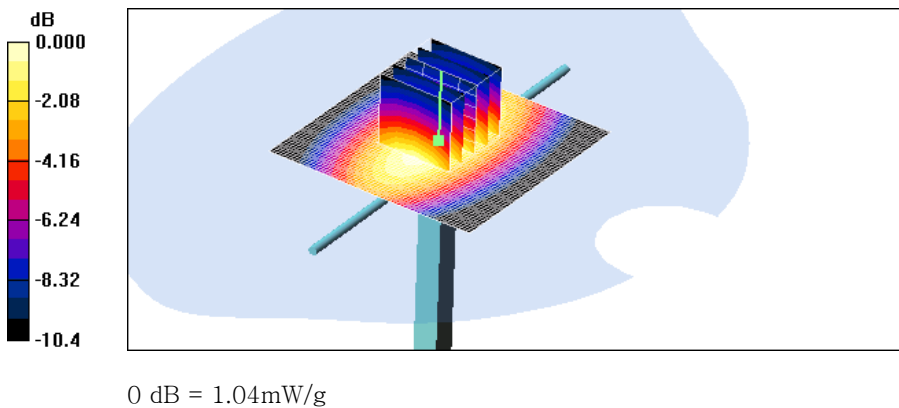
Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.9 \text{ mho/m}$; $\epsilon_r = 42.5$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 – SN1631; ConvF(5.83, 5.83, 5.83); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2009-05-22
- Phantom: SAM 835/900 MHz; Type: SAM

Validation 835MHz/Area Scan (61x61x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 1.04 mW/g

Validation 835MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 35.5 V/m; Power Drift = -0.047 dB
Peak SAR (extrapolated) = 1.38 W/kg
SAR(1 g) = 0.963 mW/g; SAR(10 g) = 0.635 mW/g
Maximum value of SAR (measured) = 1.04 mW/g



■ Validation Data (1900 MHz Head)

Test Laboratory: HCT CO., LTD
Input Power 100 mW (20 dBm)
Liquid Temp: 21.3 °C
Test Date: Nov.21, 2009

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

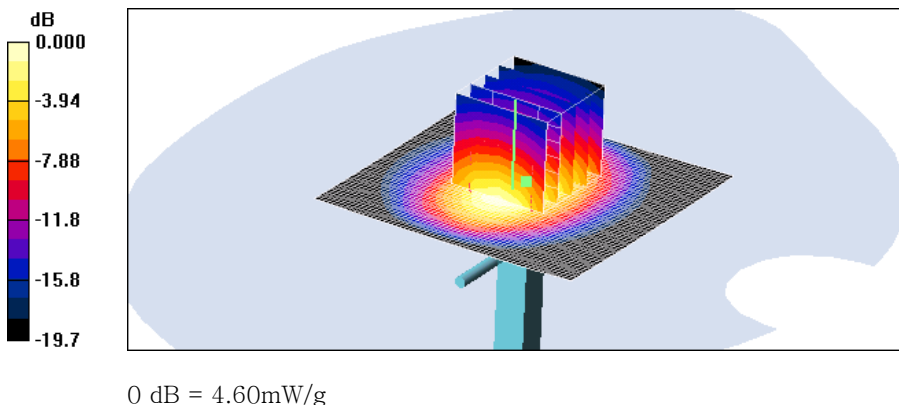
Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1900 \text{ MHz}$; $\sigma = 1.42 \text{ mho/m}$; $\epsilon_r = 39.5$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1631; ConvF(5.07, 5.07, 5.07); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2009-05-22
- Phantom: SAM 1800/1900 MHz; Type: SAM

Dipole 1900MHz Validation/Area Scan (61x61x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 4.85 mW/g

Dipole 1900MHz Validation/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 61.3 V/m; Power Drift = 0.001 dB
Peak SAR (extrapolated) = 6.81 W/kg
SAR(1 g) = 4.11 mW/g; SAR(10 g) = 2.16 mW/g
Maximum value of SAR (measured) = 4.60 mW/g



■ Dielectric Parameter (835 MHz Head)

Title P2000
SubTitle GSM850(Head)
Test Date Nov.20, 2009

Frequency	e'	e''
800000000	42.8428	19.4667
805000000	42.7918	19.4374
810000000	42.7259	19.4289
815000000	42.7073	19.4127
820000000	42.6227	19.4259
825000000	42.5978	19.4383
830000000	42.5212	19.3965
835000000	42.4930	19.3730
840000000	42.4329	19.3275
845000000	42.3663	19.3470
850000000	42.3218	19.3134
855000000	42.2803	19.3052
860000000	42.1977	19.3298
865000000	42.0978	19.3083
870000000	42.0422	19.2946
875000000	41.9793	19.2529
880000000	41.9473	19.2784
885000000	41.8907	19.2356
890000000	41.8395	19.2418
895000000	41.7347	19.2492
900000000	41.6895	19.2191

■ Dielectric Parameter (835 MHz Body)

Title P2000
SubTitle GSM850(Body)
Test Date Nov.20, 2009

Frequency	e'	e''
800000000	54.8995	21.1448
805000000	54.8371	21.0785
810000000	54.7711	21.0558
815000000	54.6918	21.0133
820000000	54.5741	21.0414
825000000	54.5343	21.0426
830000000	54.4505	20.9913
835000000	54.3543	20.9562
840000000	54.3340	20.9440
845000000	54.3066	20.9579
850000000	54.2340	20.9342
855000000	54.2392	20.9703
860000000	54.1984	20.9433
865000000	54.2368	20.9389
870000000	54.2348	20.9389
875000000	54.2203	20.9457
880000000	54.1916	20.9168
885000000	54.1808	20.9259
890000000	54.1718	20.8820
895000000	54.1777	20.8859
900000000	54.0866	20.8761

■ Dielectric Parameter (1900 MHz Head)

Title P2000
SubTitle GSM1900(Head)
Test Date Nov.21, 2009

Frequency	e'	e''
1800000000	39.9918	13.1392
1810000000	39.9659	13.1531
1820000000	39.9103	13.1370
1830000000	39.8568	13.1712
1840000000	39.7898	13.1478
1850000000	39.7244	13.1780
1860000000	39.6654	13.1686
1870000000	39.5926	13.2161
1880000000	39.5451	13.2776
1890000000	39.5421	13.3318
1900000000	39.4995	13.4288
1910000000	39.4973	13.4522
1920000000	39.4804	13.4968
1930000000	39.4277	13.5025
1940000000	39.3784	13.5209
1950000000	39.3366	13.4994
1960000000	39.2716	13.4905
1970000000	39.2211	13.4756
1980000000	39.1402	13.5104
1990000000	39.0524	13.5502
2000000000	39.0563	13.5816

■ Dielectric Parameter (1900 MHz Body)

Title P2000
SubTitle GSM1900(Body)
Test Date Nov.21, 2009

Frequency	e'	e''
1850000000	54.1341	14.5426
1855000000	54.1105	14.5846
1860000000	54.1526	14.5884
1865000000	54.1240	14.6278
1870000000	54.1476	14.6225
1875000000	54.1110	14.6359
1880000000	54.1221	14.6124
1885000000	54.0869	14.6025
1890000000	54.0729	14.5990
1895000000	54.0123	14.6244
1900000000	54.0120	14.6266
1905000000	53.9160	14.5899
1910000000	53.8929	14.6140
1915000000	53.8840	14.6136
1920000000	53.8171	14.6686
1925000000	53.7893	14.6940
1930000000	53.7377	14.7016
1935000000	53.7125	14.7285
1940000000	53.7175	14.7710
1945000000	53.7136	14.8073
1950000000	53.7250	14.8436

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)

Accreditation No.: SCS 108

The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Client H-CT (Dymstec)

Certificate No: ET3-1631_Jun09

CALIBRATION CERTIFICATE

Object ET3DV6 - SN:1631

Calibration procedure(s) QA CAL-01.v6, QA CAL-12.v5 and QA CAL-23.v3
Calibration procedure for dosimetric E-field probes

Calibration date: June 24, 2009

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 (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	1-Apr-09 (No. 217-01030)	Apr-10
Power sensor E4412A	MY41495277	1-Apr-09 (No. 217-01030)	Apr-10
Power sensor E4412A	MY41498087	1-Apr-09 (No. 217-01030)	Apr-10
Reference 3 dB Attenuator	SN: S5054 (3c)	31-Mar-09 (No. 217-01026)	Mar-10
Reference 20 dB Attenuator	SN: S5086 (20b)	31-Mar-09 (No. 217-01028)	Mar-10
Reference 30 dB Attenuator	SN: S5129 (30b)	31-Mar-09 (No. 217-01027)	Mar-10
Reference Probe ES3DV2	SN: 3013	2-Jan-09 (No. ES3-3013_Jan09)	Jan-10
DAE4	SN: 660	9-Sep-08 (No. DAE4-660_Sep08)	Sep-09
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-08)	In house check: Oct-09

Calibrated by:	Name Jeton Kastrati	Function Laboratory Technician	Signature
Approved by:	Name Katja Pokovic	Function Technical Manager	Signature

Issued: June 24, 2009

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

Certificate No: ET3-1631_Jun09

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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**

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., $\vartheta = 0$ 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 $\vartheta = 0$ ($f \leq 900$ 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 E^2 -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.

ET3DV6 SN:1631

June 24, 2009

Probe ET3DV6

SN:1631

Manufactured:	October 12, 2001
Last calibrated:	October 29, 2001
Modified:	June 17, 2009
Recalibrated:	June 24, 2009

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

ET3DV6 SN:1631

June 24, 2009

DASY - Parameters of Probe: ET3DV6 SN:1631

Sensitivity in Free Space^A

Diode Compression^B

NormX	1.86 ± 10.1%	$\mu V/(V/m)^2$	DCP X	93 mV
NormY	1.83 ± 10.1%	$\mu V/(V/m)^2$	DCP Y	92 mV
NormZ	1.75 ± 10.1%	$\mu V/(V/m)^2$	DCP Z	92 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 _{be} [%]	Without Correction Algorithm	11.8	7.6
SAR _{be} [%]	With Correction Algorithm	0.9	0.6

TSL 1750 MHz Typical SAR gradient: 10 % per mm

Sensor Center to Phantom Surface Distance		3.7 mm	4.7 mm
SAR _{be} [%]	Without Correction Algorithm	15.7	10.6
SAR _{be} [%]	With Correction Algorithm	0.8	0.7

Sensor Offset

Probe Tip to Sensor Center	2.7 mm
Optical Surface Detection	not supported

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).

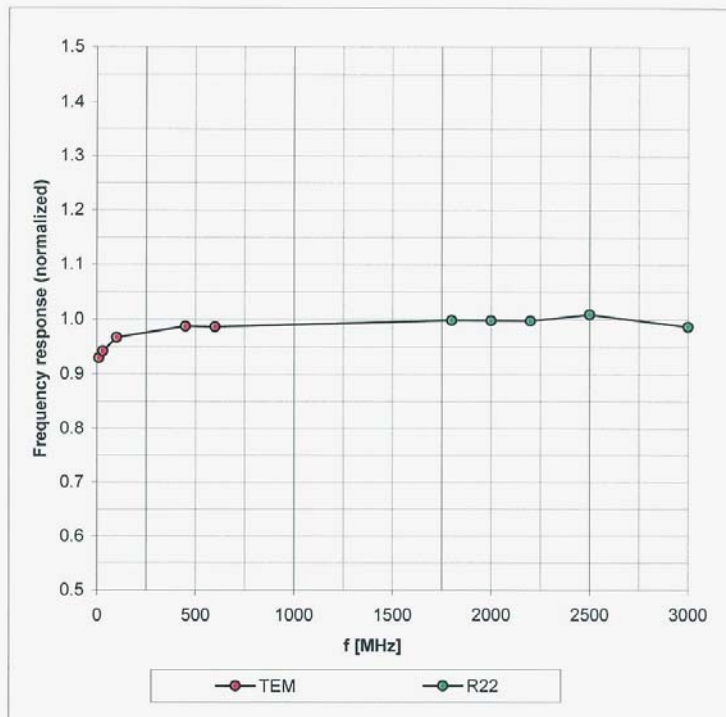
^B Numerical linearization parameter; uncertainty not required.

ET3DV6 SN:1631

June 24, 2009

Frequency Response of E-Field

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

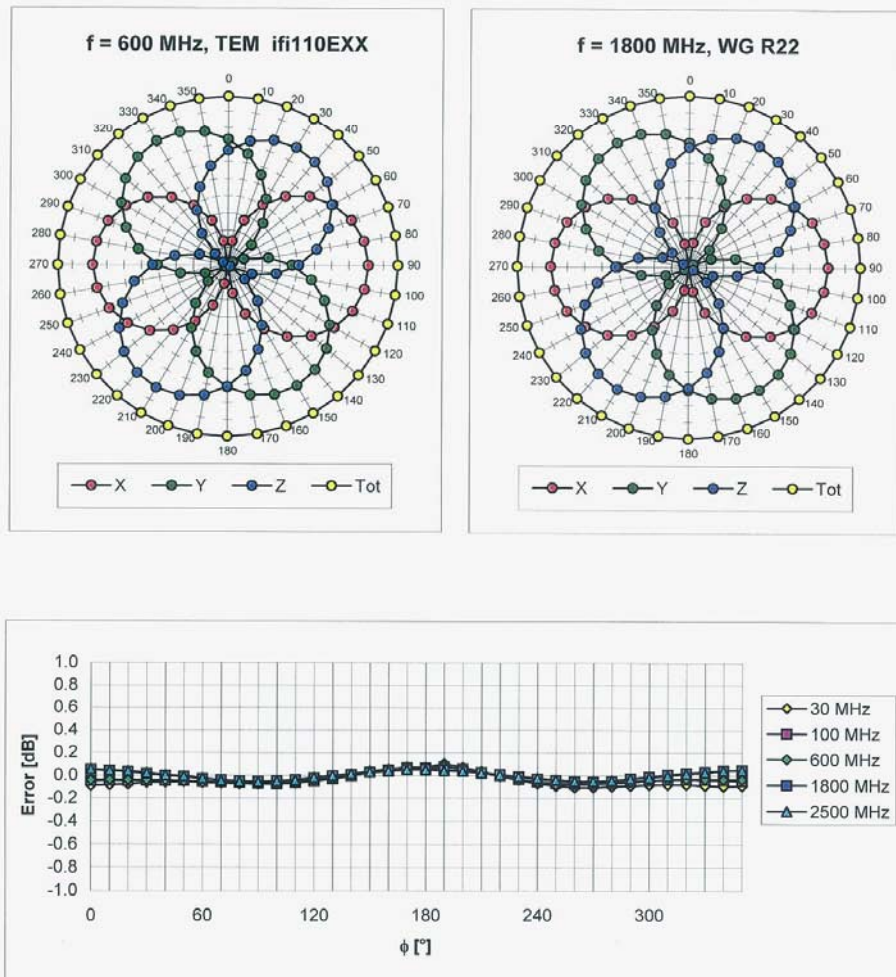


Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ ($k=2$)

ET3DV6 SN:1631

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



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

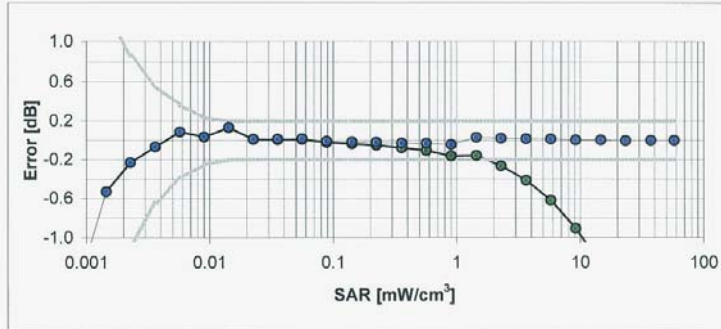
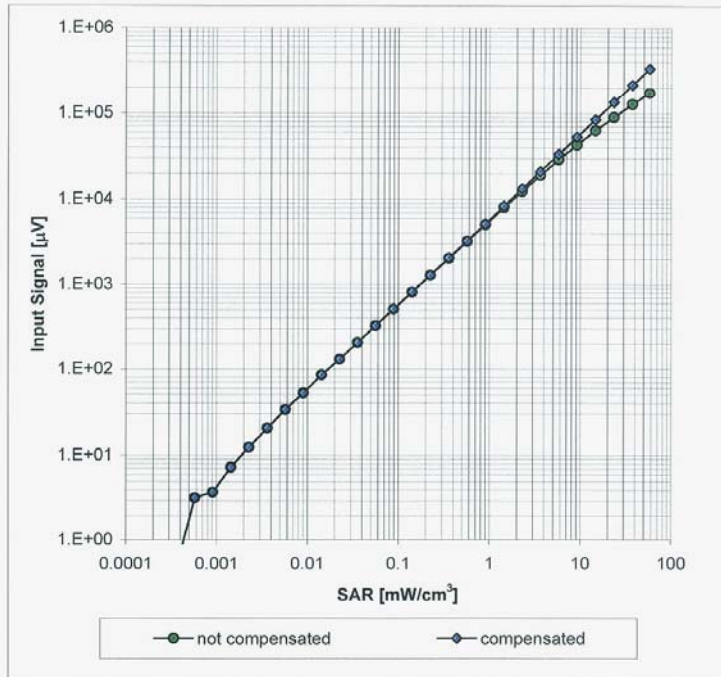
Certificate No: ET3-1631_Jun09

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June 24, 2009

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

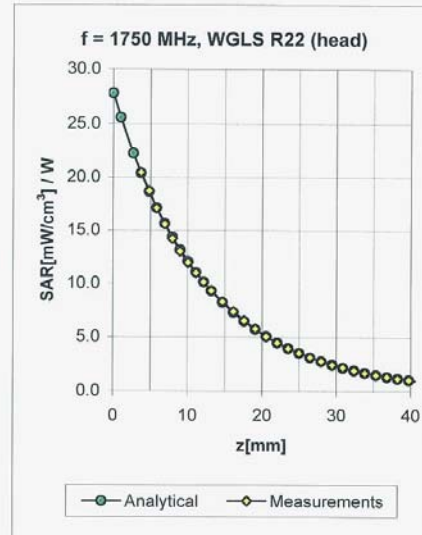
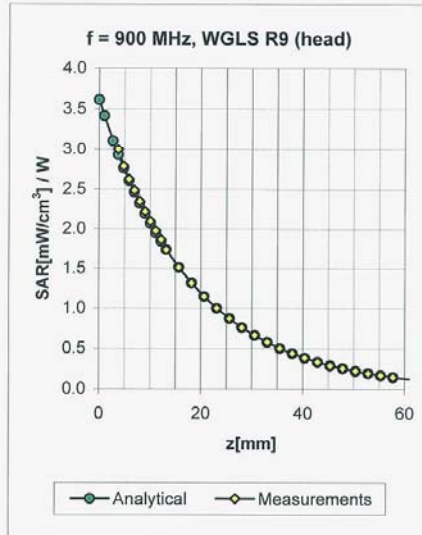


Uncertainty of Linearity Assessment: $\pm 0.6\%$ ($k=2$)

ET3DV6 SN:1631

June 24, 2009

Conversion Factor Assessment



f [MHz]	Validity [MHz] ^C	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
450	± 50 / ± 100	Head	43.5 ± 5%	0.87 ± 5%	0.30	1.98	6.83 ± 13.3% (k=2)
835	± 50 / ± 100	Head	41.5 ± 5%	0.90 ± 5%	0.34	2.67	5.83 ± 11.0% (k=2)
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.25	3.45	5.67 ± 11.0% (k=2)
1750	± 50 / ± 100	Head	40.1 ± 5%	1.37 ± 5%	0.67	2.50	5.30 ± 11.0% (k=2)
1900	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.71	2.45	5.07 ± 11.0% (k=2)
1950	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.69	2.46	4.90 ± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.99	1.90	4.52 ± 11.0% (k=2)
450	± 50 / ± 100	Body	56.7 ± 5%	0.94 ± 5%	0.23	2.04	7.31 ± 13.3% (k=2)
835	± 50 / ± 100	Body	55.2 ± 5%	0.97 ± 5%	0.51	2.18	5.91 ± 11.0% (k=2)
1750	± 50 / ± 100	Body	53.4 ± 5%	1.49 ± 5%	0.63	3.28	4.67 ± 11.0% (k=2)
1900	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.82	2.63	4.48 ± 11.0% (k=2)
1950	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.92	2.40	4.60 ± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.99	1.80	4.21 ± 11.0% (k=2)

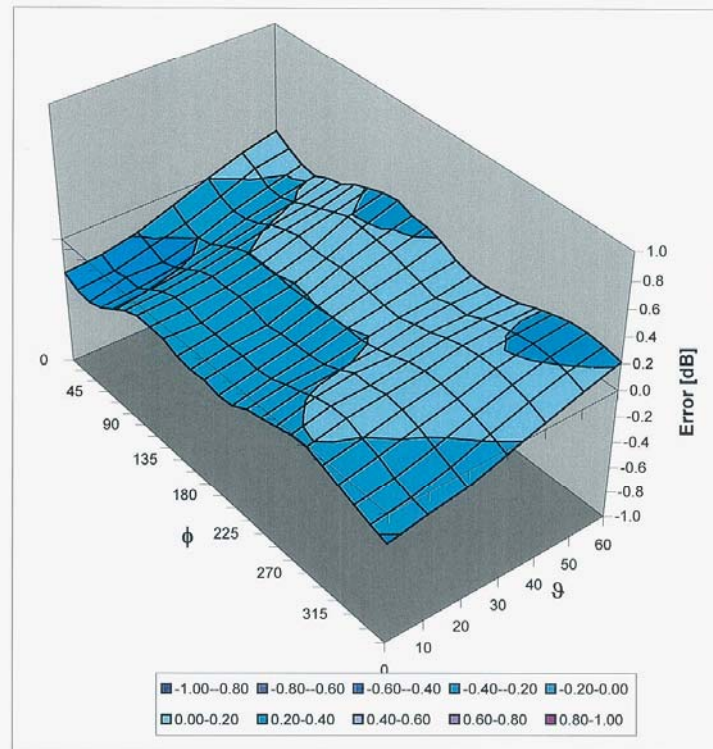
^C The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

ET3DV6 SN:1631

June 24, 2009

Deviation from Isotropy in HSL

Error (ϕ , θ), $f = 900$ MHz



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

Attachment 4. – Dipole Calibration Data

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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client **HTC (Dymstec)**

Certificate No: **D835V2-441_May09**

CALIBRATION CERTIFICATE

Object **D835V2 - SN: 441**

Calibration procedure(s) **QA CAL-05.v7
Calibration procedure for dipole validation kits**

Calibration date: **May 25, 2009**

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 (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	08-Oct-08 (No. 217-00898)	Oct-09
Power sensor HP 8481A	US37292783	08-Oct-08 (No. 217-00898)	Oct-09
Reference 20 dB Attenuator	SN: 5086 (20g)	31-Mar-09 (No. 217-01025)	Mar-10
Type-N mismatch combination	SN: 5047.2 / 06327	31-Mar-09 (No. 217-01029)	Mar-10
Reference Probe ES3DV2	SN: 3025	30-Apr-09 (No. ES3-3025_Apr09)	Apr-10
DAE4	SN: 601	07-Mar-09 (No. DAE4-601_Mar09)	Mar-10
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-07)	In house check: Oct-09
RF generator R&S SMT-06	100005	4-Aug-99 (in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-08)	In house check: Oct-09

Calibrated by:	Name Jeton Kastrati	Function Laboratory Technician	Signature
Approved by:	Katja Pokovic	Technical Manager	

Issued: May 25, 2009

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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
- 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
- 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:

- DASY4/5 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	DASY5	V5.0
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	40.8 $\pm$ 6 %	0.89 mho/m $\pm$ 6 %
Head TSL temperature during test	(21.6 $\pm$ 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	2.38 mW / g
SAR normalized	normalized to 1W	9.52 mW / g
SAR for nominal Head TSL parameters ¹	normalized to 1W	9.56 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	1.56 mW / g
SAR normalized	normalized to 1W	6.24 mW / g
SAR for nominal Head TSL parameters ¹	normalized to 1W	6.26 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	50.3 Ω - 7.4 j Ω
Return Loss	- 22.7 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.393 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 09, 2001

DASY5 Validation Report for Head TSL

Date/Time: 25.05.2009 09:55:22

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:441

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

Medium: HSL 900 MHz

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.89 \text{ mho/m}$; $\epsilon_r = 40.7$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Probe: ES3DV2 - SN3025; ConvF(5.86, 5.86, 5.86); Calibrated: 30.04.2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 07.03.2009
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

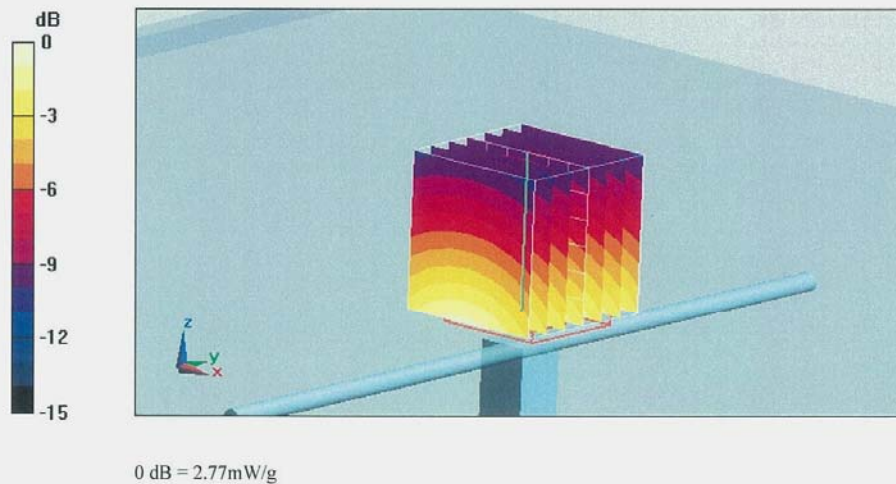
Pin=250mW; dip=15mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 57.1 V/m; Power Drift = 0.0073 dB

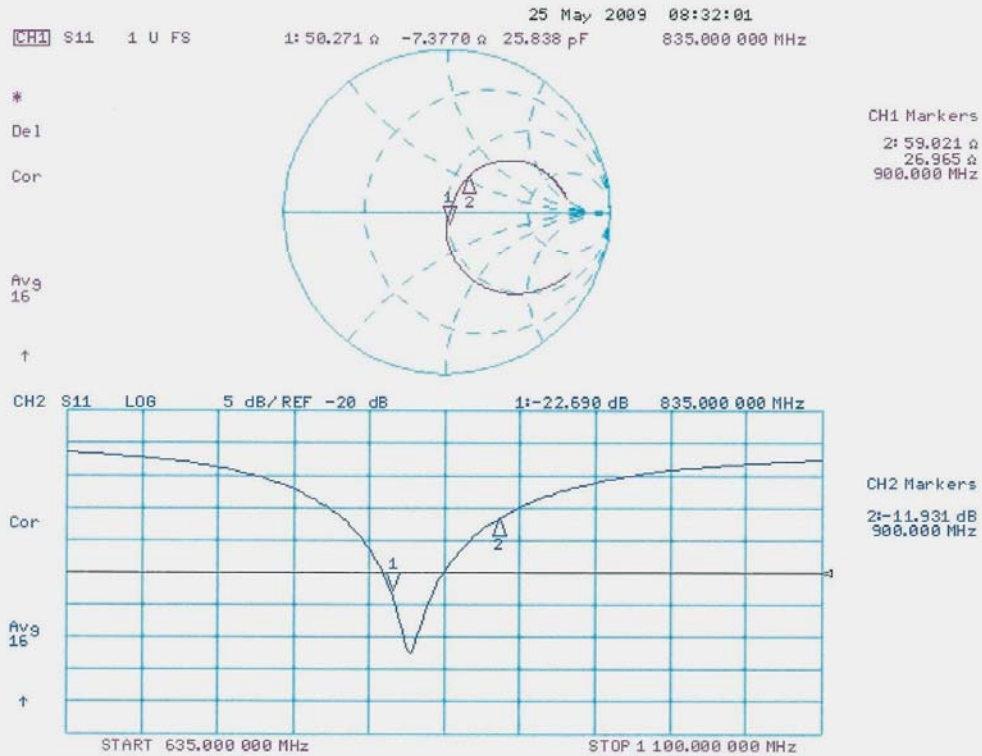
Peak SAR (extrapolated) = 3.53 W/kg

SAR(1 g) = 2.38 mW/g; SAR(10 g) = 1.56 mW/g

Maximum value of SAR (measured) = 2.77 mW/g



Impedance Measurement Plot for Head TSL



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Accreditation No.: SCS 108

Client **HCT (Dymstec)**

Certificate No: D1900V2-5d032_Jul09

CALIBRATION CERTIFICATE

Object **D1900V2 - SN: 5d032**

Calibration procedure(s) **QA CAL-05.v7**
Calibration procedure for dipole validation kits

Calibration date: **July 20, 2009**

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	08-Oct-08 (No. 217-00898)	Oct-09
Power sensor HP 8481A	US37292783	08-Oct-08 (No. 217-00898)	Oct-09
Reference 20 dB Attenuator	SN: 5086 (20g)	31-Mar-09 (No. 217-01025)	Mar-10
Type-N mismatch combination	SN: 5047.2 / 06327	31-Mar-09 (No. 217-01029)	Mar-10
Reference Probe ES3DV2	SN: 3025	30-Apr-09 (No. ES3-3025_Apr09)	Apr-10
DAE4	SN: 601	07-Mar-09 (No. DAE4-601_Mar09)	Mar-10
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-07)	In house check: Oct-09
RF generator R&S SMT-06	100005	4-Aug-99 (in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-08)	In house check: Oct-09

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

Issued: July 22, 2009

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Certificate No: D1900V2-5d032_Jul09

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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:

- DASY4/5 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	DASY5	V5.0
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	40.9 $\pm$ 6 %	1.43 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	10.2 mW / g
SAR normalized	normalized to 1W	40.8 mW / g
SAR for nominal Head TSL parameters ¹	normalized to 1W	40.5 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	5.36 mW / g
SAR normalized	normalized to 1W	21.4 mW / g
SAR for nominal Head TSL parameters ¹	normalized to 1W	21.4 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	51.2 Ω + 4.4 j Ω
Return Loss	- 27.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.197 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

DASY5 Validation Report for Head TSL

Date/Time: 20.07.2009 14:41:47

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 U11 BB

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.43$ mho/m; $\epsilon_r = 40.9$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Probe: ES3DV2 - SN3025; ConvF(4.88, 4.88, 4.88); Calibrated: 30.04.2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 07.03.2009
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

Pin = 250 mW; dip = 10 mm, scan at 3.0 mm/Zoom Scan (dist=3.0 mm, probe 0deg)

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

Reference Value = 94.5 V/m; Power Drift = 0.063 dB

Peak SAR (extrapolated) = 18.6 W/kg

SAR(1 g) = 10.2 mW/g; SAR(10 g) = 5.36 mW/g

Maximum value of SAR (measured) = 12.8 mW/g



0 dB = 12.8mW/g

Impedance Measurement Plot for Head TSL

