

Test Laboratory: HCT CO., LTD
EUT Type: Dual-Band Dual-Mode GSM/WCDMA Phone with Bluetooth
Liquid Temperature: 21.4 °C
Ambient Temperature: 21.6 °C
Test Date: Apr.29, 2008

DUT: C820 ; Type: Slide Up; Serial: #1

Communication System: WCDMA1900(FCC); Frequency: 1880 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.35$ mho/m; $\epsilon_r = 40.7$; $\rho = 1000$ kg/m³
Phantom section: Right Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1798; ConvF(5.58, 5.58, 5.58); Calibrated: 2008-03-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn447; Calibrated: 2007-09-13
- Phantom: 1800/1900 Phantom; Type: SAM

Right touch 9400/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.292 mW/g

Right touch 9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 13.3 V/m; Power Drift = -0.103 dB

Peak SAR (extrapolated) = 0.388 W/kg

SAR(1 g) = 0.264 mW/g; SAR(10 g) = 0.166 mW/g

Maximum value of SAR (measured) = 0.287 mW/g



0 dB = 0.287mW/g

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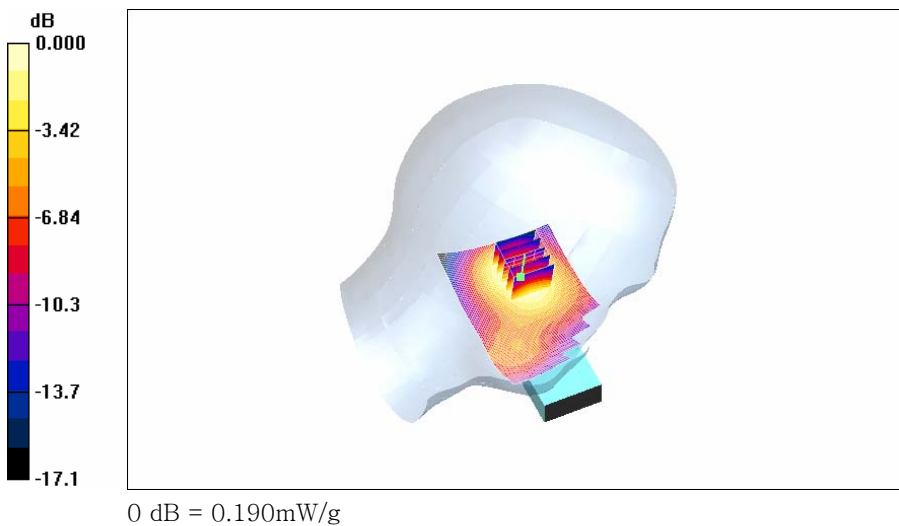
Communication System: WCDMA1900(FCC); Frequency: 1880 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.35$ mho/m; $\epsilon_r = 40.7$; $\rho = 1000$ kg/m³
Phantom section: Left Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8
Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1798; ConvF(5.58, 5.58, 5.58); Calibrated: 2008-03-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn447; Calibrated: 2007-09-13
- Phantom: 1800/1900 Phantom; Type: SAM

Left tilt 9400/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.198 mW/g

Left tilt 9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.72 V/m; Power Drift = -0.054 dB
Peak SAR (extrapolated) = 0.263 W/kg
SAR(1 g) = 0.176 mW/g; SAR(10 g) = 0.109 mW/g
Maximum value of SAR (measured) = 0.190 mW/g



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Communication System: WCDMA1900(FCC); Frequency: 1880 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.35$ mho/m; $\epsilon_r = 40.7$; $\rho = 1000$ kg/m³
Phantom section: Right Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1798; ConvF(5.58, 5.58, 5.58); Calibrated: 2008-03-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn447; Calibrated: 2007-09-13
- Phantom: 1800/1900 Phantom; Type: SAM

Right tilt 9400/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.175 mW/g

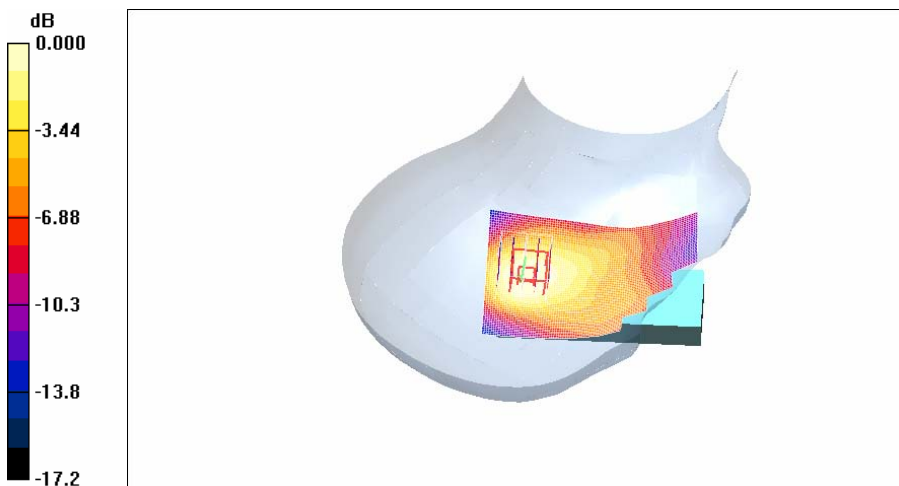
Right tilt 9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 6.22 V/m; Power Drift = -0.080 dB

Peak SAR (extrapolated) = 0.222 W/kg

SAR(1 g) = 0.152 mW/g; SAR(10 g) = 0.095 mW/g

Maximum value of SAR (measured) = 0.162 mW/g



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DUT: C820 ; Type: Slide down; Serial: #1

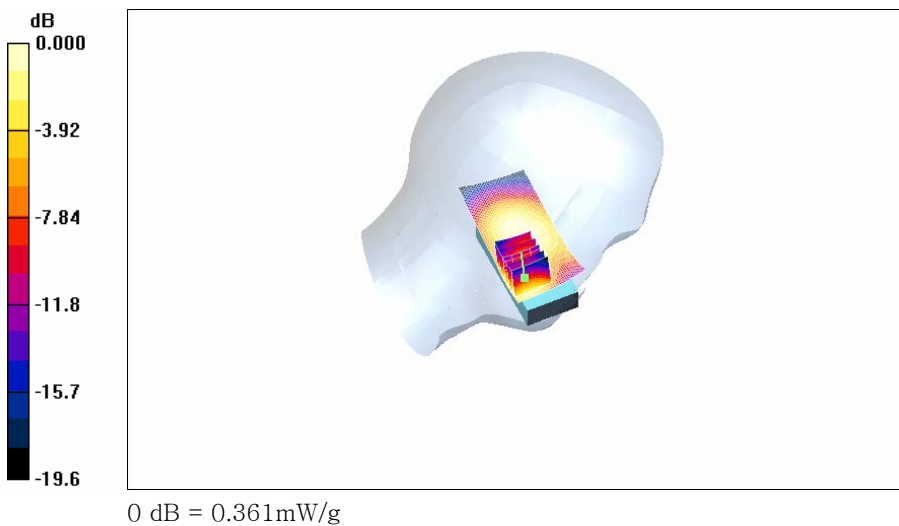
Communication System: WCDMA1900(FCC); Frequency: 1880 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.35$ mho/m; $\epsilon_r = 40.7$; $\rho = 1000$ kg/m³
Phantom section: Left Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8
Build 176

DASY4 Configuration:

- Probe: ET3DV6 – SN1798; ConvF(5.58, 5.58, 5.58); Calibrated: 2008-03-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn447; Calibrated: 2007-09-13
- Phantom: 1800/1900 Phantom; Type: SAM

Left touch 9400/Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.374 mW/g

Left touch 9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.6 V/m; Power Drift = -0.133 dB
Peak SAR (extrapolated) = 0.485 W/kg
SAR(1 g) = 0.331 mW/g; SAR(10 g) = 0.203 mW/g
Maximum value of SAR (measured) = 0.361 mW/g



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DUT: C820 ; Type: Slide down; Serial: #1

Communication System: WCDMA1900(FCC); Frequency: 1880 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.35$ mho/m; $\epsilon_r = 40.7$; $\rho = 1000$ kg/m³
Phantom section: Right Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1798; ConvF(5.58, 5.58, 5.58); Calibrated: 2008-03-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn447; Calibrated: 2007-09-13
- Phantom: 1800/1900 Phantom; Type: SAM

Right touch 9400/Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.392 mW/g

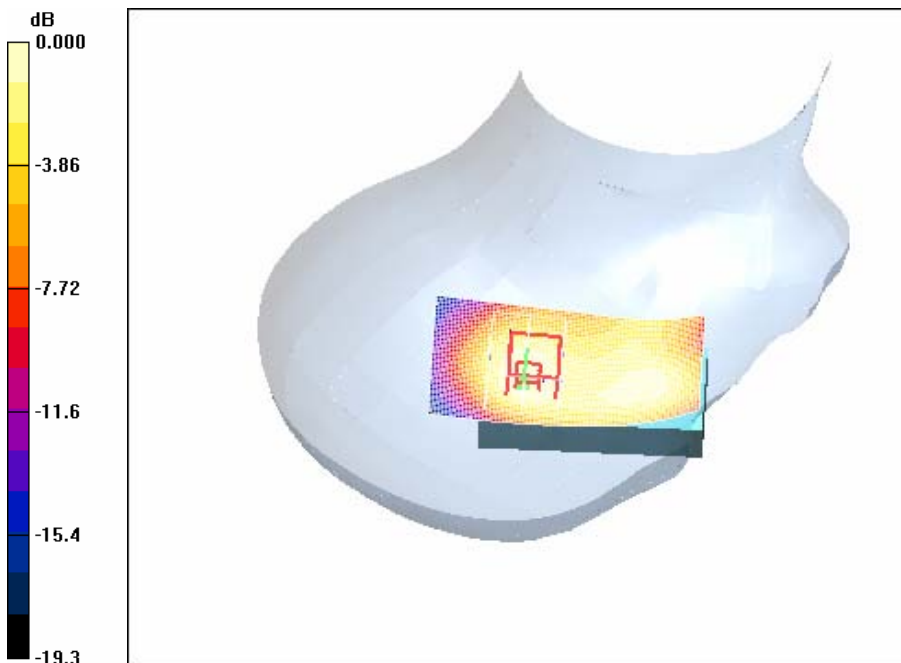
Right touch 9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 15.0 V/m; Power Drift = -0.110 dB

Peak SAR (extrapolated) = 0.493 W/kg

SAR(1 g) = 0.334 mW/g; SAR(10 g) = 0.206 mW/g

Maximum value of SAR (measured) = 0.363 mW/g



0 dB = 0.363mW/g

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DUT: C820 ; Type: Slide down; Serial: #1

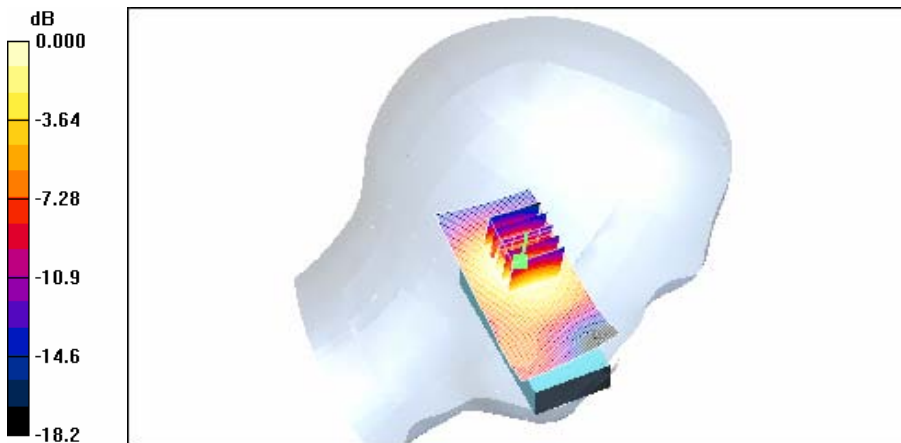
Communication System: WCDMA1900(FCC); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.35$ mho/m; $\epsilon_r = 40.7$; $\rho = 1000$ kg/m³
Phantom section: Left Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8
Build 176

DASY4 Configuration:

- Probe: ET3DV6 – SN1798; ConvF(5.58, 5.58, 5.58); Calibrated: 2008-03-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn447; Calibrated: 2007-09-13
- Phantom: 1800/1900 Phantom; Type: SAM

Left tilt 9400/Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.295 mW/g

Left tilt 9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.1 V/m; Power Drift = -0.069 dB
Peak SAR (extrapolated) = 0.382 W/kg
SAR(1 g) = 0.263 mW/g; SAR(10 g) = 0.165 mW/g
Maximum value of SAR (measured) = 0.279 mW/g



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DUT: C820 ; Type: Slide down; Serial: #1

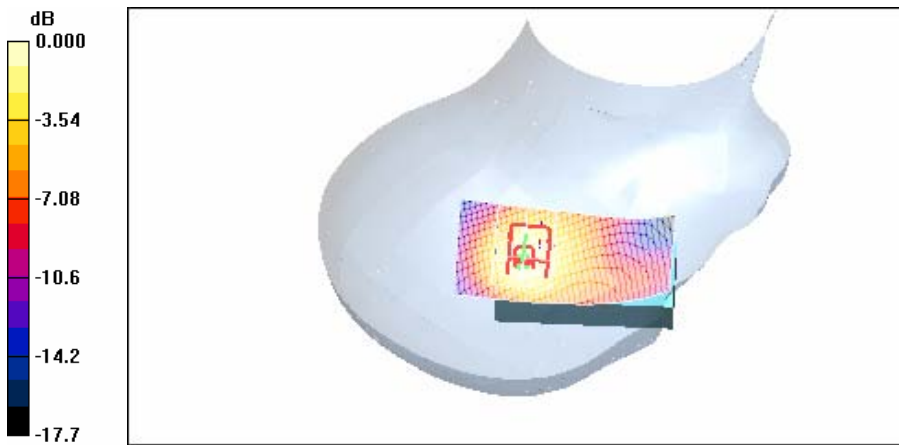
Communication System: WCDMA1900(FCC); Frequency: 1880 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.35$ mho/m; $\epsilon_r = 40.7$; $\rho = 1000$ kg/m³
Phantom section: Right Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1798; ConvF(5.58, 5.58, 5.58); Calibrated: 2008-03-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn447; Calibrated: 2007-09-13
- Phantom: 1800/1900 Phantom; Type: SAM

Right tilt 9400/Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.344 mW/g

Right tilt 9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.6 V/m; Power Drift = -0.062 dB
Peak SAR (extrapolated) = 0.443 W/kg
SAR(1 g) = 0.296 mW/g; SAR(10 g) = 0.180 mW/g
Maximum value of SAR (measured) = 0.320 mW/g



0 dB = 0.320mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Dual-Band Dual-Mode GSM/WCDMA Phone with Bluetooth
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Apr.28, 2008

DUT: C820; Type: Slide down; Serial: #1

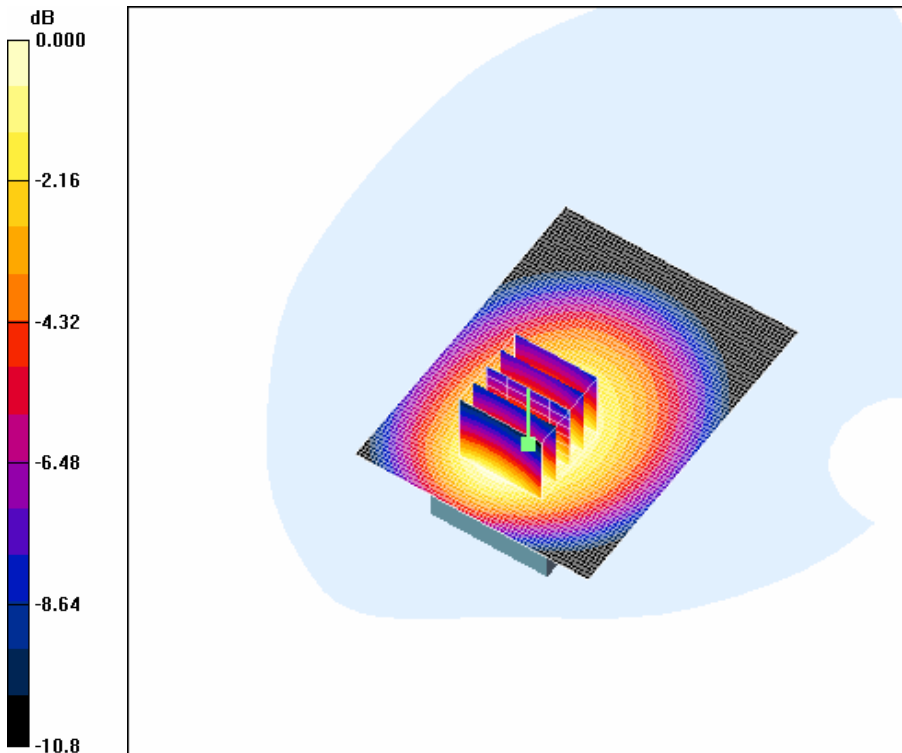
Communication System: GSM 850; Frequency: 824.2 MHz; Duty Cycle: 1:4.15
Medium parameters used: $f = 825$ MHz; $\sigma = 0.976$ mho/m; $\epsilon_r = 55.3$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1798; ConvF(6.29, 6.29, 6.29); Calibrated: 2008-03-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn447; Calibrated: 2007-09-13
- Phantom: 835/900 Phantom ; Type: SAM

GSM850 Body 128/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.23 mW/g

GSM850 Body 128/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.3 V/m; Power Drift = -0.161 dB
Peak SAR (extrapolated) = 1.44 W/kg
SAR(1 g) = 1.12 mW/g; SAR(10 g) = 0.798 mW/g
Maximum value of SAR (measured) = 1.17 mW/g



0 dB = 1.17mW/g

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EUT Type: Dual-Band Dual-Mode GSM/WCDMA Phone with Bluetooth
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Apr.28, 2008

DUT: C820; Type: Slide down; Serial: #1

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:4.15
Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.989$ mho/m; $\epsilon_r = 55.1$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1798; ConvF(6.29, 6.29, 6.29); Calibrated: 2008-03-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn447; Calibrated: 2007-09-13
- Phantom: 835/900 Phantom ; Type: SAM

GSM850 Body 190/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 1.07 mW/g

GSM850 Body 190/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

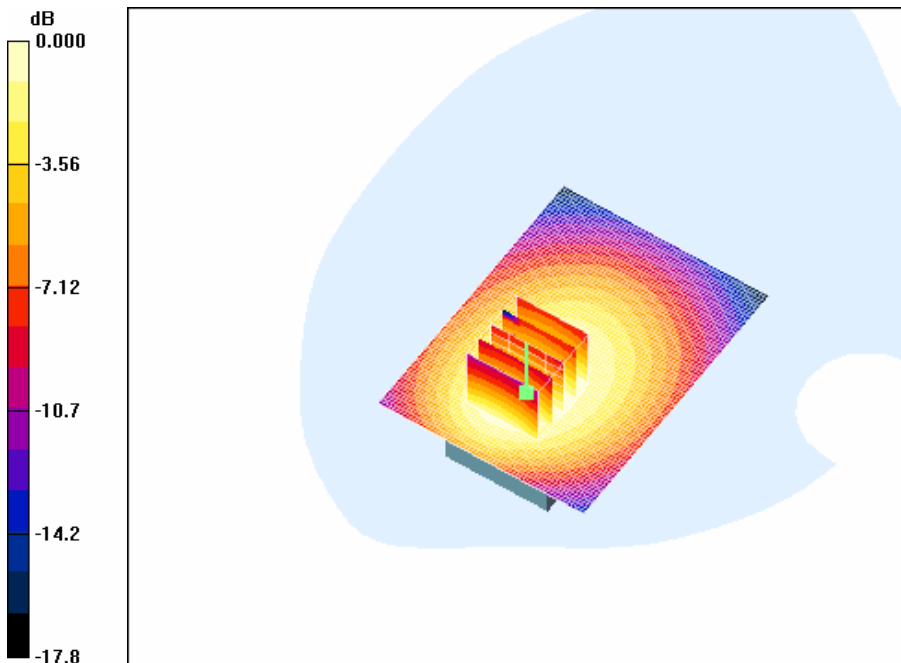
Reference Value = 14.7 V/m; Power Drift = 0.038 dB

Peak SAR (extrapolated) = 1.31 W/kg

SAR(1 g) = 0.992 mW/g; SAR(10 g) = 0.708 mW/g

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

Maximum value of SAR (measured) = 1.05 mW/g



0 dB = 1.05mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Dual-Band Dual-Mode GSM/WCDMA Phone with Bluetooth
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Apr.28, 2008

DUT: C820; Type: Slide down; Serial: #1

Communication System: GSM 850; Frequency: 848.8 MHz; Duty Cycle: 1:4.15
Medium parameters used (interpolated): $f = 848.8$ MHz; $\sigma = 1$ 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: ET3DV6 - SN1798; ConvF(6.29, 6.29, 6.29); Calibrated: 2008-03-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn447; Calibrated: 2007-09-13
- Phantom: 835/900 Phantom ; Type: SAM

GSM850 Body 251/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.768 mW/g

GSM850 Body 251/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

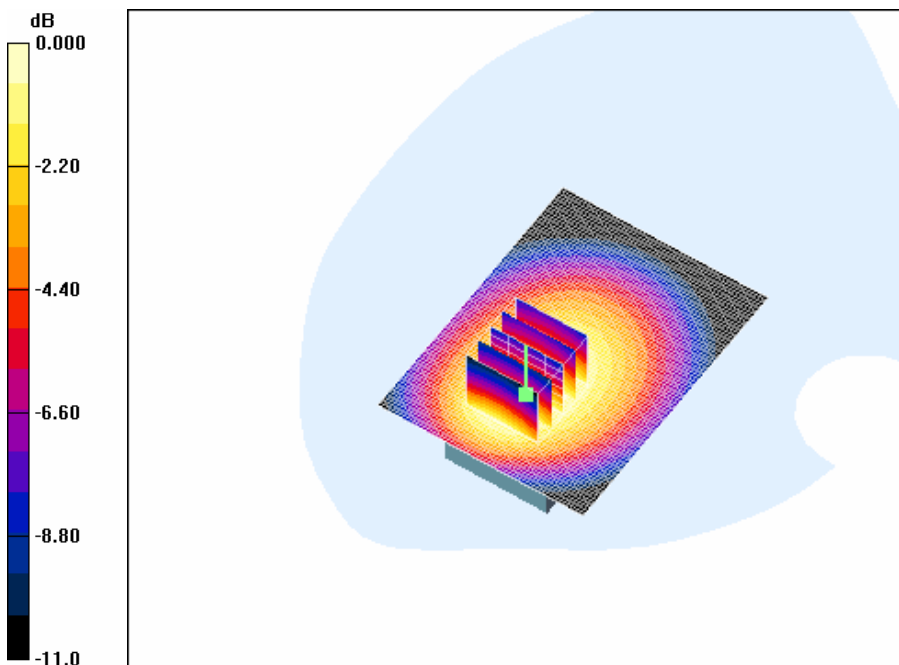
Reference Value = 12.6 V/m; Power Drift = 0.081 dB

Peak SAR (extrapolated) = 0.941 W/kg

SAR(1 g) = 0.713 mW/g; SAR(10 g) = 0.503 mW/g

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

Maximum value of SAR (measured) = 0.753 mW/g



0 dB = 0.753mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Dual-Band Dual-Mode GSM/WCDMA Phone with Bluetooth
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Apr.28, 2008

DUT: C820; Type: Slide down; Serial: #1

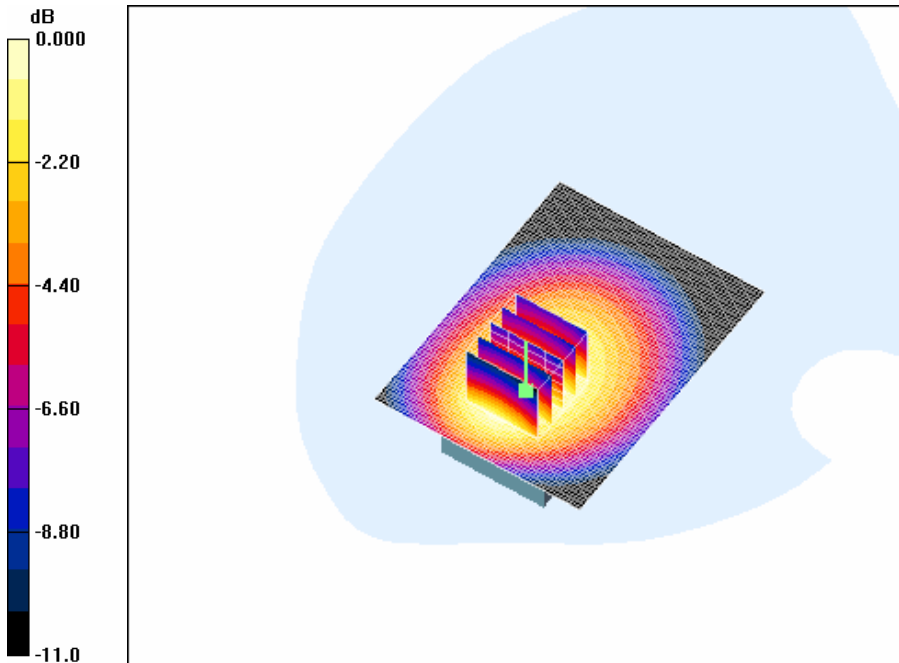
Communication System: GSM 850; Frequency: 824.2 MHz; Duty Cycle: 1:8.3
Medium parameters used: $f = 825$ MHz; $\sigma = 0.976$ mho/m; $\epsilon_r = 55.3$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1798; ConvF(6.29, 6.29, 6.29); Calibrated: 2008-03-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn447; Calibrated: 2007-09-13
- Phantom: 835/900 Phantom ; Type: SAM

GSM850 Body 128/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.660 mW/g

GSM850 Body 128/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.1 V/m; Power Drift = 0.014 dB
Peak SAR (extrapolated) = 0.783 W/kg
SAR(1 g) = 0.607 mW/g; SAR(10 g) = 0.434 mW/g
Maximum value of SAR (measured) = 0.647 mW/g



0 dB = 0.647mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Dual-Band Dual-Mode GSM/WCDMA Phone with Bluetooth
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Apr.28, 2008
Option: Front

DUT: C820; Type: Slide down; Serial: #1

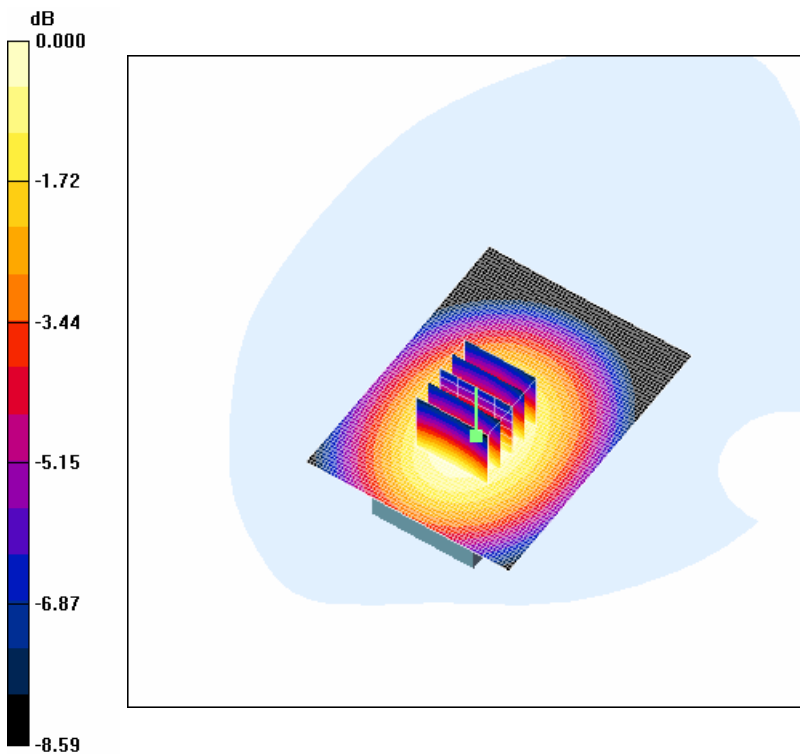
Communication System: GSM 850; Frequency: 824.2 MHz; Duty Cycle: 1:4.15
Medium parameters used: $f = 825$ MHz; $\sigma = 0.976$ mho/m; $\epsilon_r = 55.3$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1798; ConvF(6.29, 6.29, 6.29); Calibrated: 2008-03-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn447; Calibrated: 2007-09-13
- Phantom: 835/900 Phantom ; Type: SAM

GSM850 Body 128/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.422 mW/g

GSM850 Body 128/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.7 V/m; Power Drift = 0.023 dB
Peak SAR (extrapolated) = 0.488 W/kg
SAR(1 g) = 0.395 mW/g; SAR(10 g) = 0.295 mW/g
Maximum value of SAR (measured) = 0.413 mW/g



0 dB = 0.413mW/g

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Liquid Temperature: 21.4 °C
Ambient Temperature: 21.6 °C
Test Date: Apr.29, 2008

DUT: C820; Type: Slide down; Serial: #1

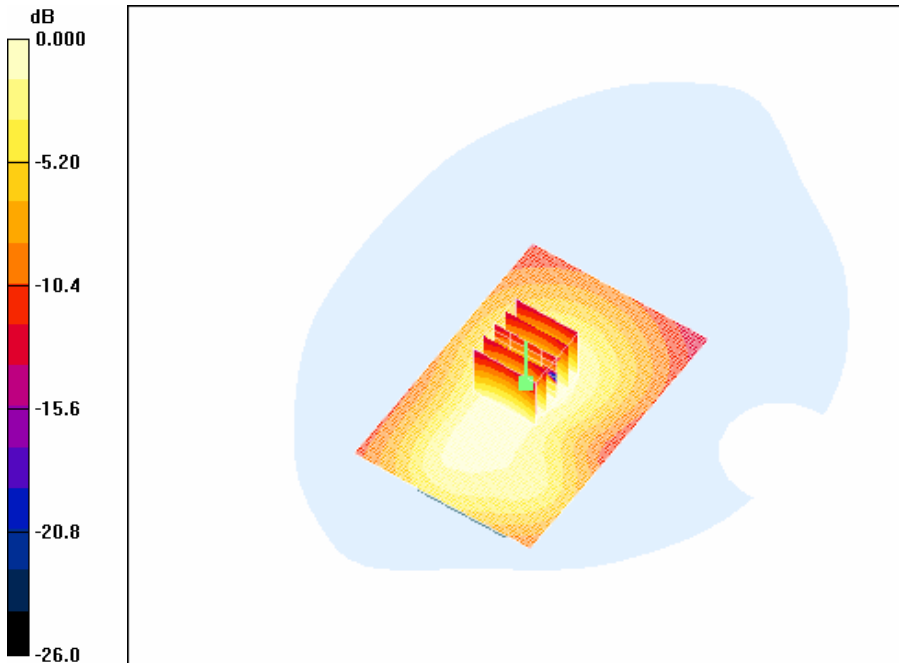
Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:4.15
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.53$ mho/m; $\epsilon_r = 54.2$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1798; ConvF(5.38, 5.38, 5.38); Calibrated: 2008-03-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn447; Calibrated: 2007-09-13
- Phantom: 1800/1900 Phantom; Type: SAM

GSM1900 Body 661/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.325 mW/g

GSM1900 Body 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.2 V/m; Power Drift = -0.089 dB
Peak SAR (extrapolated) = 0.472 W/kg
SAR(1 g) = 0.292 mW/g; SAR(10 g) = 0.181 mW/g
Maximum value of SAR (measured) = 0.314 mW/g



0 dB = 0.314mW/g

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Liquid Temperature: 21.4 °C
Ambient Temperature: 21.6 °C
Test Date: Apr.29, 2008
Option: Front

DUT: C820; Type: Slide down; Serial: #1

Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:4.15
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.53$ mho/m; $\epsilon_r = 54.2$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1798; ConvF(5.38, 5.38, 5.38); Calibrated: 2008-03-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn447; Calibrated: 2007-09-13
- Phantom: 1800/1900 Phantom; Type: SAM

GSM1900 Body 661/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.112 mW/g

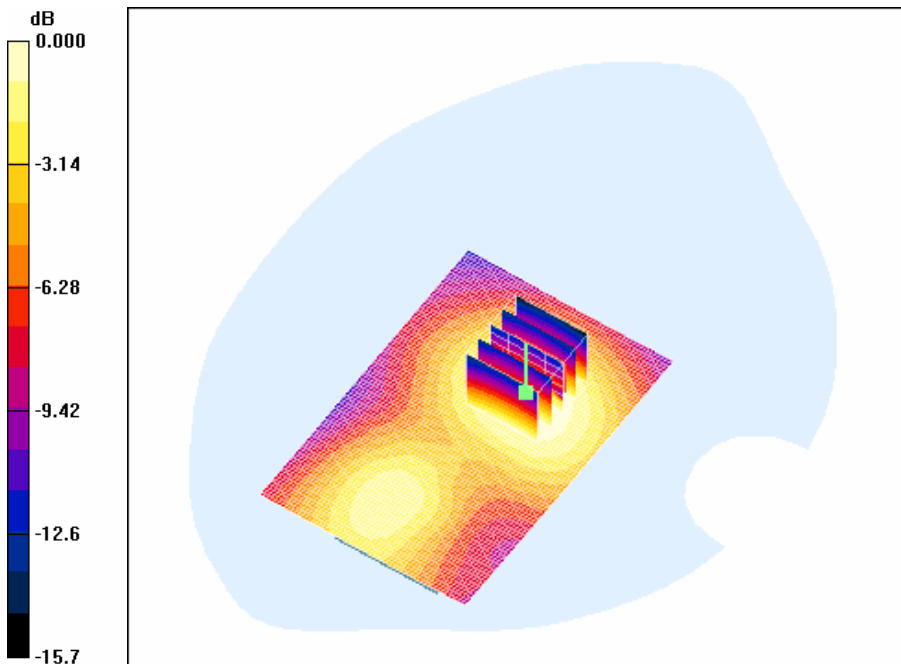
GSM1900 Body 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 8.02 V/m; Power Drift = -0.047 dB

Peak SAR (extrapolated) = 0.158 W/kg

SAR(1 g) = 0.105 mW/g; SAR(10 g) = 0.066 mW/g

Maximum value of SAR (measured) = 0.112 mW/g



0 dB = 0.112mW/g

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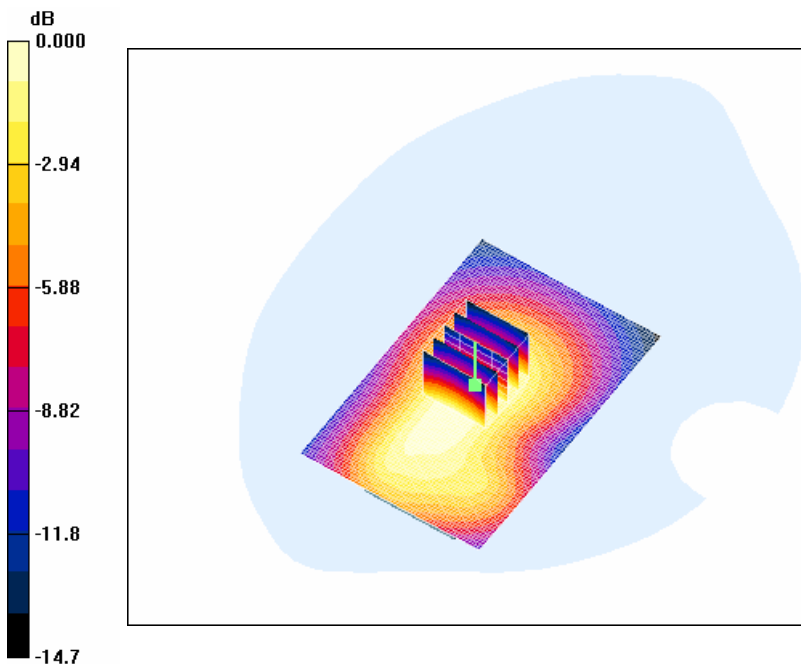
Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.53$ mho/m; $\epsilon_r = 54.2$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1798; ConvF(5.38, 5.38, 5.38); Calibrated: 2008-03-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn447; Calibrated: 2007-09-13
- Phantom: 1800/1900 Phantom; Type: SAM

GSM1900 Body 661/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.185 mW/g

GSM1900 Body 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.20 V/m; Power Drift = 0.055 dB
Peak SAR (extrapolated) = 0.271 W/kg
SAR(1 g) = 0.168 mW/g; SAR(10 g) = 0.104 mW/g
Maximum value of SAR (measured) = 0.181 mW/g



0 dB = 0.181mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Dual-Band Dual-Mode GSM/WCDMA Phone with Bluetooth
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Apr.28, 2008

DUT: C820; Type: Slide down; Serial: #1

Communication System: WCDMA850; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.989$ mho/m; $\epsilon_r = 55.1$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1798; ConvF(6.29, 6.29, 6.29); Calibrated: 2008-03-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn447; Calibrated: 2007-09-13
- Phantom: 835/900 Phantom ; Type: SAM

WCDMA 850 Body 4183/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.679 mW/g

WCDMA 850 Body 4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

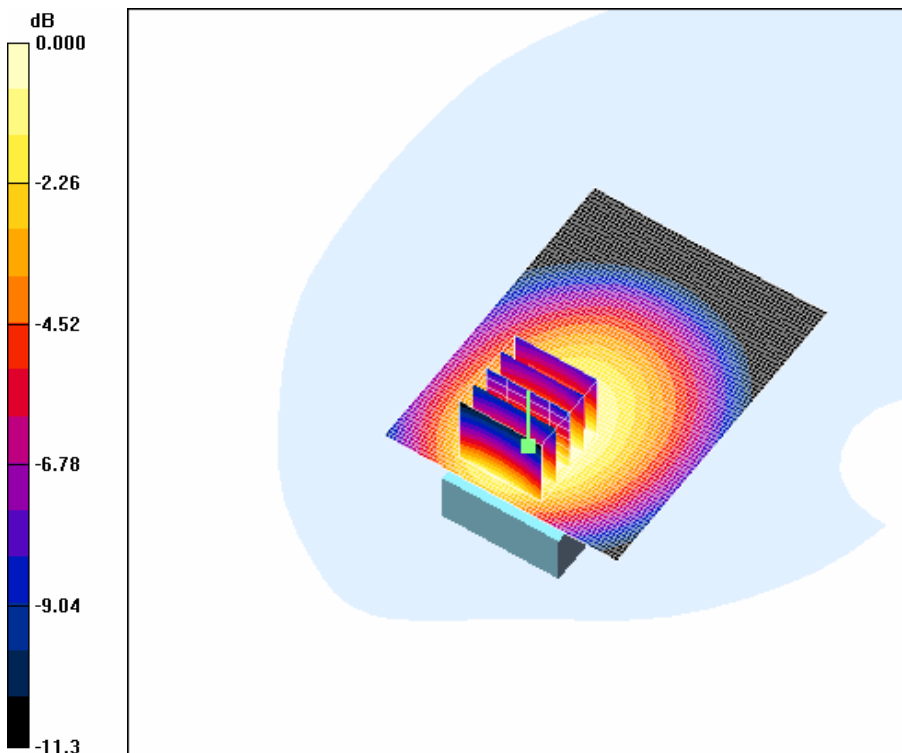
Reference Value = 12.0 V/m; Power Drift = -0.048 dB

Peak SAR (extrapolated) = 0.807 W/kg

SAR(1 g) = 0.612 mW/g; SAR(10 g) = 0.436 mW/g

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

Maximum value of SAR (measured) = 0.651 mW/g



0 dB = 0.651mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Dual-Band Dual-Mode GSM/WCDMA Phone with Bluetooth
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Apr.28, 2008
Option: Front

DUT: C820; Type: Slide down; Serial: #1

Communication System: WCDMA850; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.989$ mho/m; $\epsilon_r = 55.1$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1798; ConvF(6.29, 6.29, 6.29); Calibrated: 2008-03-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn447; Calibrated: 2007-09-13
- Phantom: 835/900 Phantom ; Type: SAM

WCDMA 850 Body 4183/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.237 mW/g

WCDMA 850 Body 4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

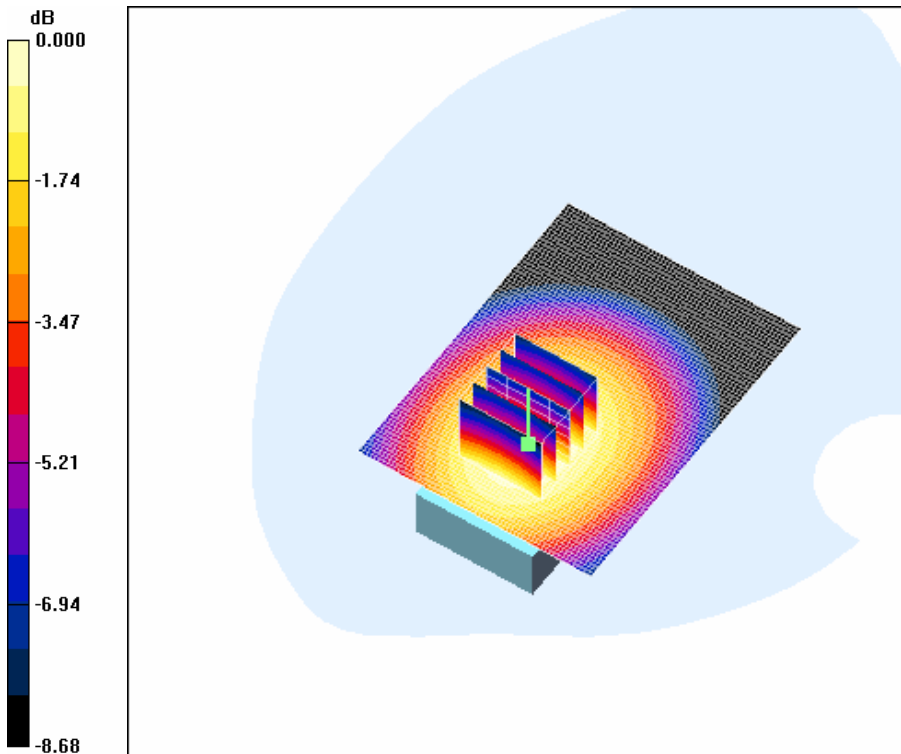
Reference Value = 8.56 V/m; Power Drift = -0.095 dB

Peak SAR (extrapolated) = 0.278 W/kg

SAR(1 g) = 0.222 mW/g; SAR(10 g) = 0.165 mW/g

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

Maximum value of SAR (measured) = 0.234 mW/g



0 dB = 0.234mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Dual-Band Dual-Mode GSM/WCDMA Phone with Bluetooth
Liquid Temperature: 21.4 °C
Ambient Temperature: 21.6 °C
Test Date: Apr.29, 2008

DUT: C820; Type: Slide down; Serial: #1

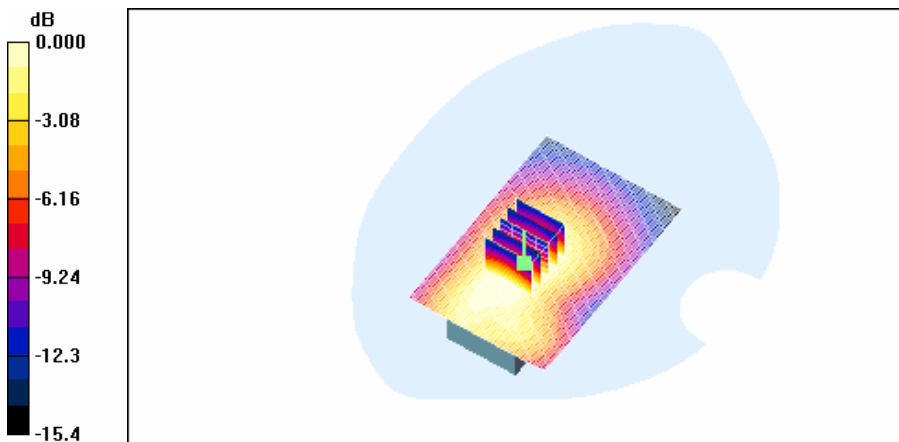
Communication System: WCDMA1900(FCC); Frequency: 1880 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.53$ mho/m; $\epsilon_r = 54.2$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1798; ConvF(5.38, 5.38, 5.38); Calibrated: 2008-03-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn447; Calibrated: 2007-09-13
- Phantom: 1800/1900 Phantom; Type: SAM

WCDMA 1900 Body 9400/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.501 mW/g

WCDMA 1900 Body 9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.0 V/m; Power Drift = -0.190 dB
Peak SAR (extrapolated) = 0.719 W/kg
SAR(1 g) = 0.439 mW/g; SAR(10 g) = 0.273 mW/g
Maximum value of SAR (measured) = 0.471 mW/g



0 dB = 0.471mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Dual-Band Dual-Mode GSM/WCDMA Phone with Bluetooth
Liquid Temperature: 21.4 °C
Ambient Temperature: 21.6 °C
Test Date: Apr.29, 2008
Option: Front

DUT: C820; Type: Slide down; Serial: #1

Communication System: WCDMA1900(FCC); Frequency: 1880 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.53$ mho/m; $\epsilon_r = 54.2$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1798; ConvF(5.38, 5.38, 5.38); Calibrated: 2008-03-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn447; Calibrated: 2007-09-13
- Phantom: 1800/1900 Phantom; Type: SAM

WCDMA 1900 Body 9400/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.179 mW/g

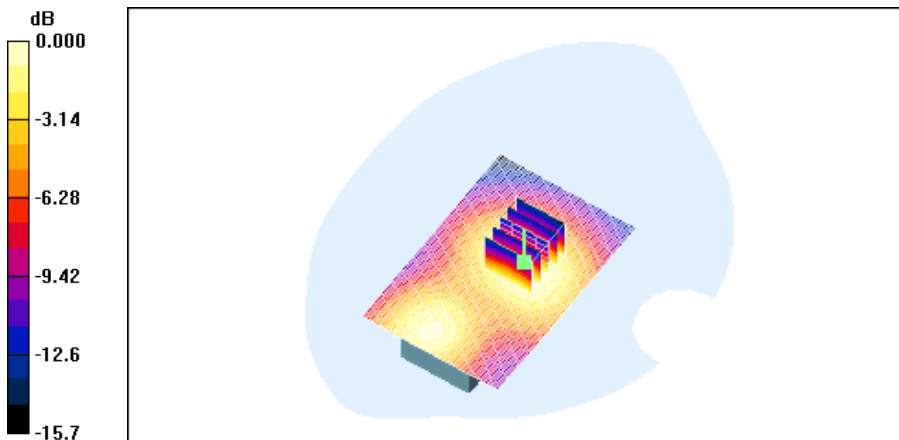
WCDMA 1900 Body 9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 9.83 V/m; Power Drift = -0.023 dB

Peak SAR (extrapolated) = 0.265 W/kg

SAR(1 g) = 0.172 mW/g; SAR(10 g) = 0.108 mW/g

Maximum value of SAR (measured) = 0.186 mW/g



0 dB = 0.186mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Dual-Band Dual-Mode GSM/WCDMA Phone with Bluetooth
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Apr.28, 2008

DUT: C820; Type: Slide Up; Serial: #1

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3
Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.873$ mho/m; $\epsilon_r = 42.2$; $\rho = 1000$ kg/m³
Phantom section: Right Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1798; ConvF(6.79, 6.79, 6.79); Calibrated: 2008-03-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn447; Calibrated: 2007-09-13
- Phantom: 835/900 Phantom ; Type: SAM

Right touch 190/Area Scan (51x101x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.490 mW/g

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

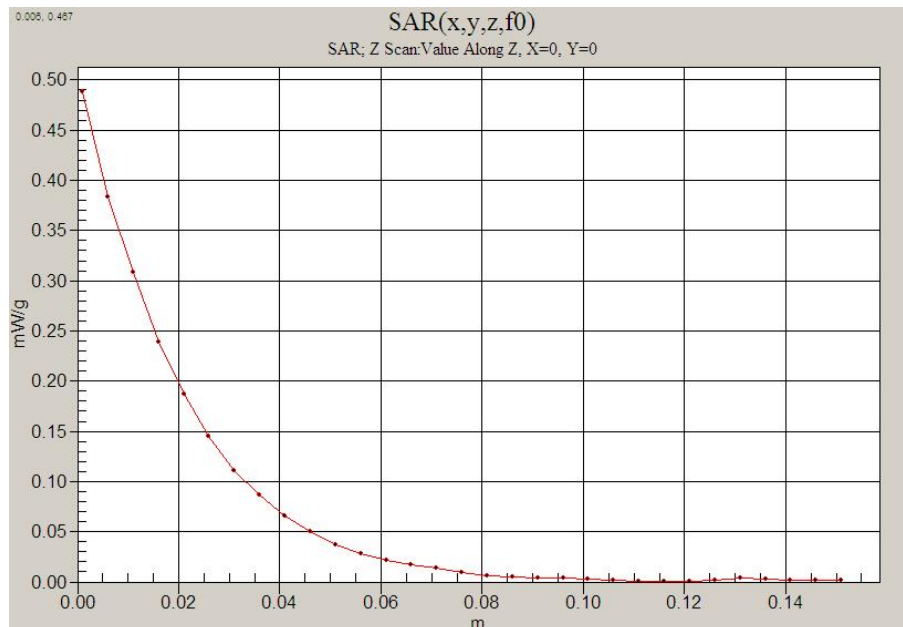
Reference Value = 23.8 V/m; Power Drift = 0.055 dB

Peak SAR (extrapolated) = 0.541 W/kg

SAR(1 g) = 0.467 mW/g; SAR(10 g) = 0.359 mW/g

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

Maximum value of SAR (measured) = 0.486 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: Dual-Band Dual-Mode GSM/WCDMA Phone with Bluetooth
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Apr.28, 2008

DUT: C820; Type: Slide down; Serial: #1

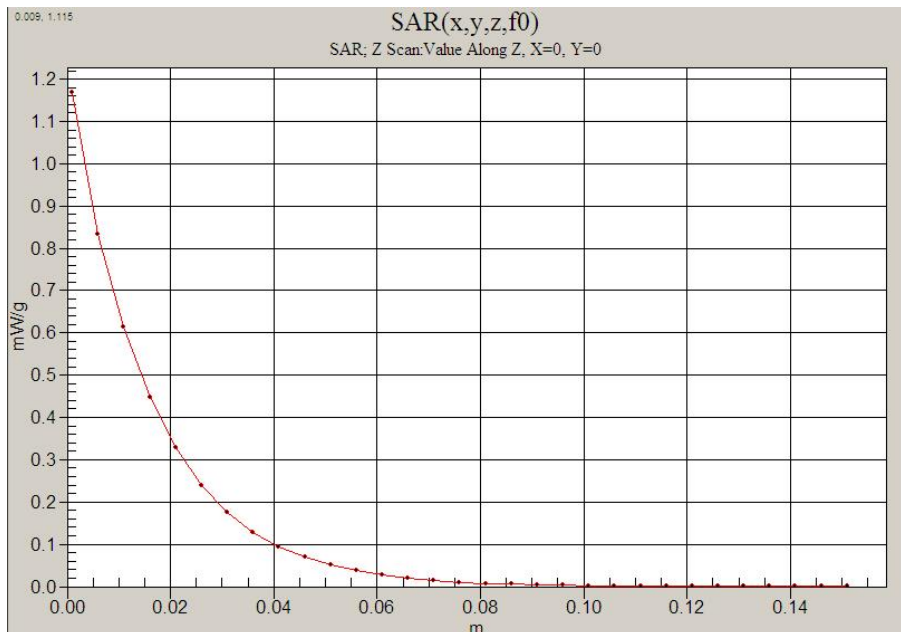
Communication System: GSM 850; Frequency: 824.2 MHz; Duty Cycle: 1:4.15
Medium parameters used: $f = 825$ MHz; $\sigma = 0.976$ mho/m; $\epsilon_r = 55.3$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1798; ConvF(6.29, 6.29, 6.29); Calibrated: 2008-03-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn447; Calibrated: 2007-09-13
- Phantom: 835/900 Phamtom ; Type: SAM

GSM850 Body 128/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.23 mW/g

GSM850 Body 128/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.3 V/m; Power Drift = -0.161 dB
Peak SAR (extrapolated) = 1.44 W/kg
SAR(1 g) = 1.12 mW/g; SAR(10 g) = 0.798 mW/g
Maximum value of SAR (measured) = 1.17 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: Dual-Band Dual-Mode GSM/WCDMA Phone with Bluetooth
Liquid Temperature: 21.4 °C
Ambient Temperature: 21.6 °C
Test Date: Apr.29, 2008

DUT: C820 ; Type: Slide down; Serial: #1

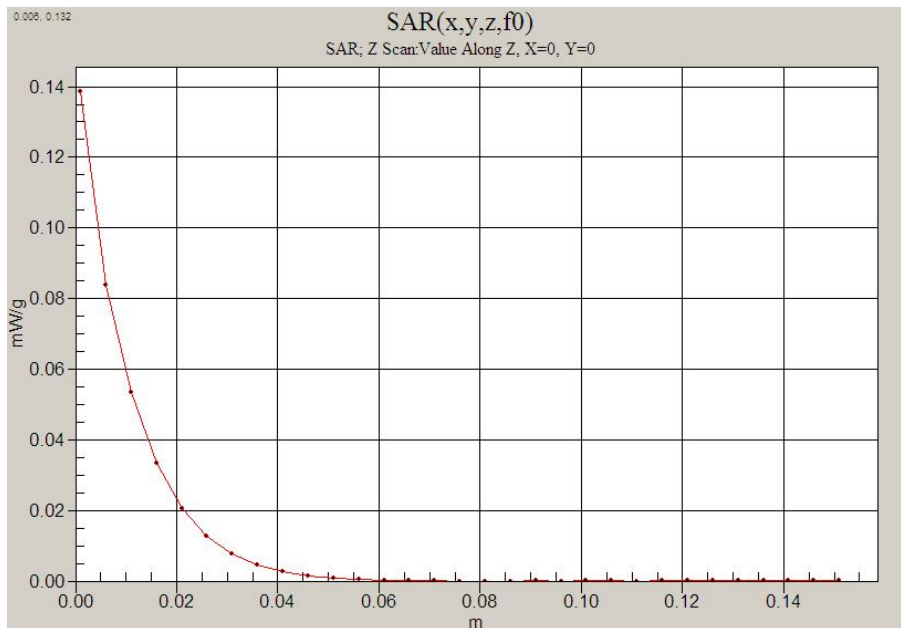
Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.35$ mho/m; $\epsilon_r = 40.7$; $\rho = 1000$ kg/m³
Phantom section: Right Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1798; ConvF(5.58, 5.58, 5.58); Calibrated: 2008-03-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn447; Calibrated: 2007-09-13
- Phantom: 1800/1900 Phantom; Type: SAM

Right touch 661/Area Scan (41x71x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.145 mW/g

Right touch 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.06 V/m; Power Drift = 0.080 dB
Peak SAR (extrapolated) = 0.191 W/kg
SAR(1 g) = 0.129 mW/g; SAR(10 g) = 0.079 mW/g
Maximum value of SAR (measured) = 0.141 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: Dual-Band Dual-Mode GSM/WCDMA Phone with Bluetooth
Liquid Temperature: 21.4 °C
Ambient Temperature: 21.6 °C
Test Date: Apr.29, 2008

DUT: C820; Type: Slide down; Serial: #1

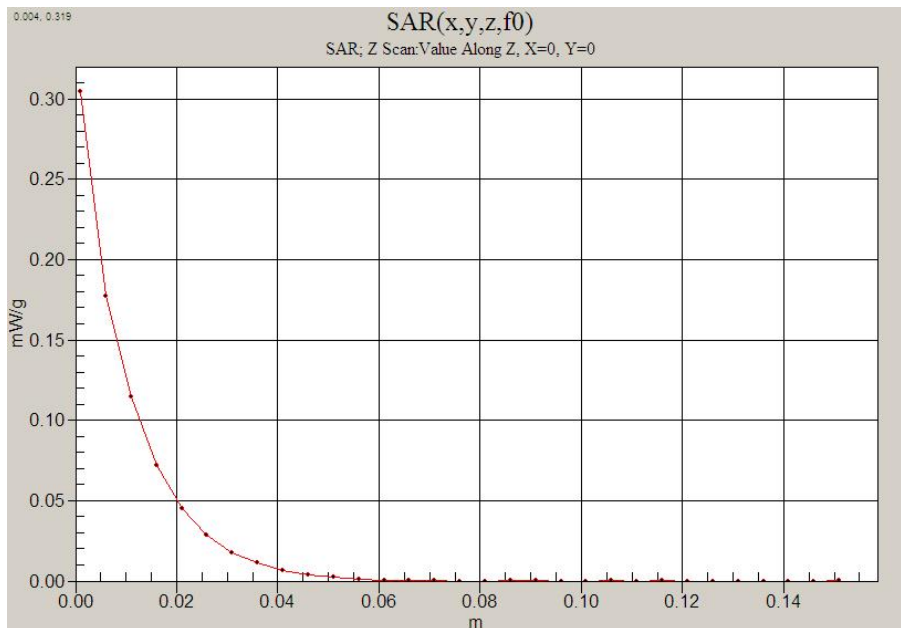
Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:4.15
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.53$ mho/m; $\epsilon_r = 54.2$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1798; ConvF(5.38, 5.38, 5.38); Calibrated: 2008-03-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn447; Calibrated: 2007-09-13
- Phantom: 1800/1900 Phantom; Type: SAM

GSM1900 Body 661/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.325 mW/g

GSM1900 Body 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.2 V/m; Power Drift = -0.089 dB
Peak SAR (extrapolated) = 0.472 W/kg
SAR(1 g) = 0.292 mW/g; SAR(10 g) = 0.181 mW/g
Maximum value of SAR (measured) = 0.314 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: Dual-Band Dual-Mode GSM/WCDMA Phone with Bluetooth
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Apr.28, 2008

DUT: C820; Type: Slide Up; Serial: #1

Communication System: WCDMA850; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.873$ mho/m; $\epsilon_r = 42.2$; $\rho = 1000$ kg/m³
Phantom section: Right Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1798; ConvF(6.79, 6.79, 6.79); Calibrated: 2008-03-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn447; Calibrated: 2007-09-13
- Phantom: 835/900 Phantom ; Type: SAM

Right touch 4183/Area Scan (41x101x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.570 mW/g

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

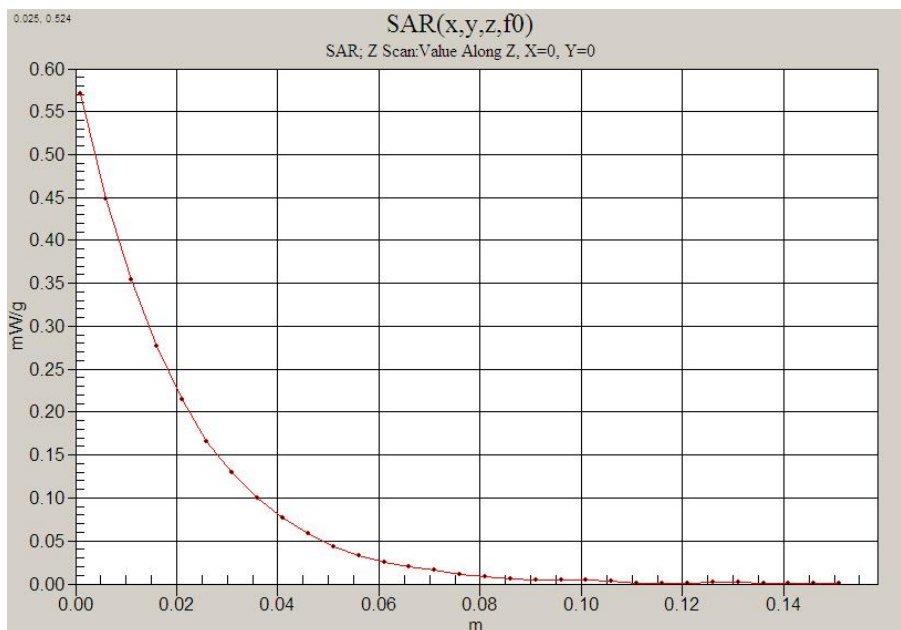
Reference Value = 25.5 V/m; Power Drift = 0.073 dB

Peak SAR (extrapolated) = 0.638 W/kg

SAR(1 g) = 0.545 mW/g; SAR(10 g) = 0.417 mW/g

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

Maximum value of SAR (measured) = 0.566 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: Dual-Band Dual-Mode GSM/WCDMA Phone with Bluetooth
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Apr.28, 2008

DUT: C820; Type: Slide down; Serial: #1

Communication System: WCDMA850; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.989$ mho/m; $\epsilon_r = 55.1$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1798; ConvF(6.29, 6.29, 6.29); Calibrated: 2008-03-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn447; Calibrated: 2007-09-13
- Phantom: 835/900 Phantom ; Type: SAM

WCDMA 850 Body 4183/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.679 mW/g

WCDMA 850 Body 4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

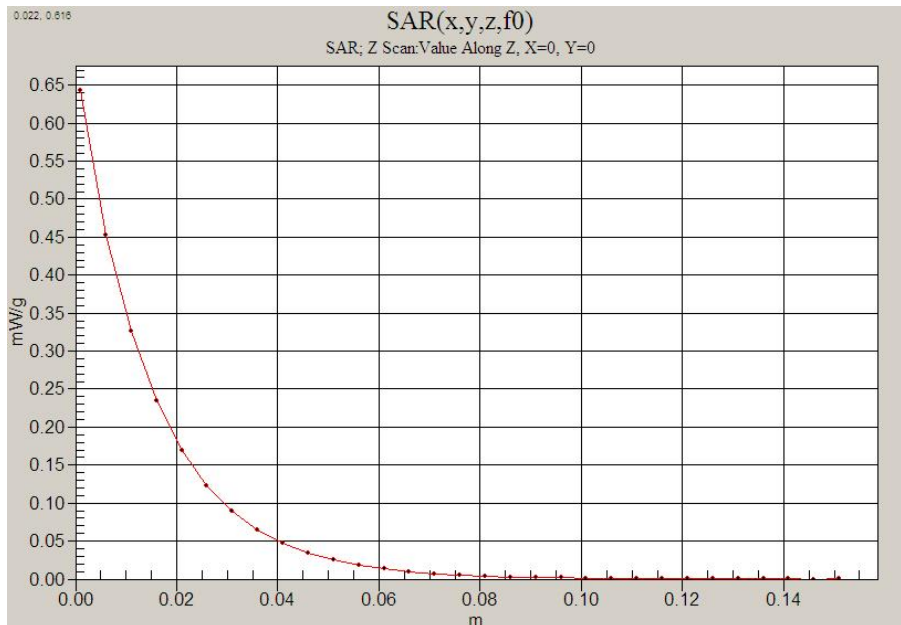
Reference Value = 12.0 V/m; Power Drift = -0.048 dB

Peak SAR (extrapolated) = 0.807 W/kg

SAR(1 g) = 0.612 mW/g; SAR(10 g) = 0.436 mW/g

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

Maximum value of SAR (measured) = 0.651 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: Dual-Band Dual-Mode GSM/WCDMA Phone with Bluetooth
Liquid Temperature: 21.4 °C
Ambient Temperature: 21.6 °C
Test Date: Apr.29, 2008

DUT: C820 ; Type: Slide down; Serial: #1

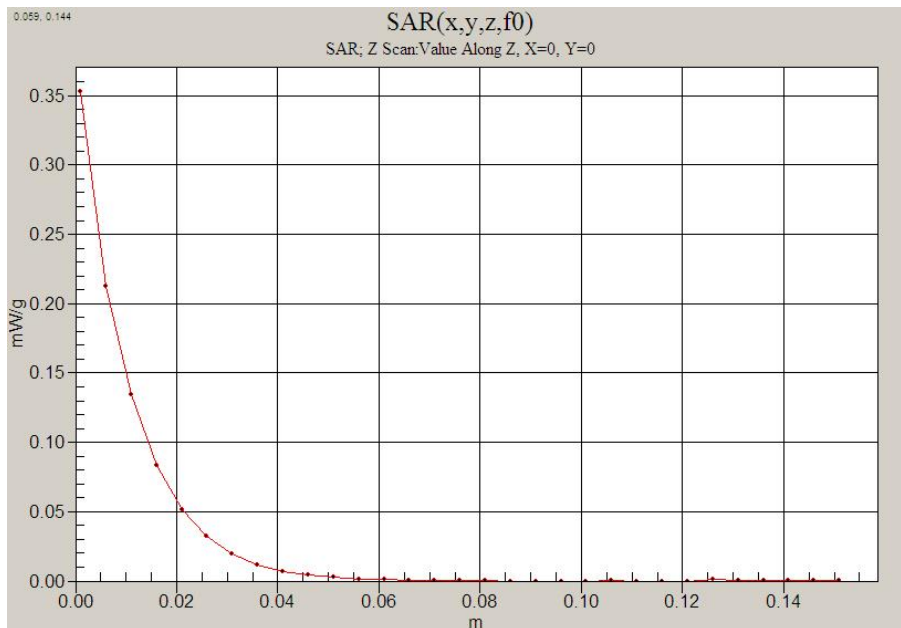
Communication System: WCDMA1900(FCC); Frequency: 1880 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.35$ mho/m; $\epsilon_r = 40.7$; $\rho = 1000$ kg/m³
Phantom section: Right Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1798; ConvF(5.58, 5.58, 5.58); Calibrated: 2008-03-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn447; Calibrated: 2007-09-13
- Phantom: 1800/1900 Phantom; Type: SAM

Right touch 9400/Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.392 mW/g

Right touch 9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.0 V/m; Power Drift = -0.110 dB
Peak SAR (extrapolated) = 0.493 W/kg
SAR(1 g) = 0.334 mW/g; SAR(10 g) = 0.206 mW/g
Maximum value of SAR (measured) = 0.363 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: Dual-Band Dual-Mode GSM/WCDMA Phone with Bluetooth
Liquid Temperature: 21.4 °C
Ambient Temperature: 21.6 °C
Test Date: Apr.29, 2008

DUT: C820; Type: Slide down; Serial: #1

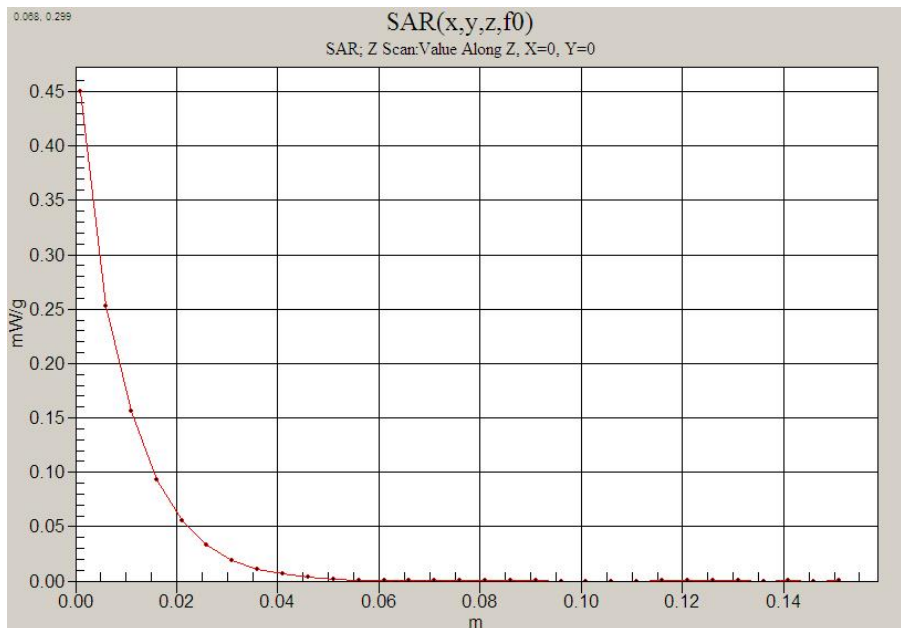
Communication System: WCDMA1900(FCC); Frequency: 1880 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.53$ mho/m; $\epsilon_r = 54.2$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1798; ConvF(5.38, 5.38, 5.38); Calibrated: 2008-03-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn447; Calibrated: 2007-09-13
- Phantom: 1800/1900 Phantom; Type: SAM

WCDMA 1900 Body 9400/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.501 mW/g

WCDMA 1900 Body 9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.0 V/m; Power Drift = -0.190 dB
Peak SAR (extrapolated) = 0.719 W/kg
SAR(1 g) = 0.439 mW/g; SAR(10 g) = 0.273 mW/g
Maximum value of SAR (measured) = 0.471 mW/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: Apr.28, 2008

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

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 835$ MHz; $\sigma = 0.871$ mho/m; $\epsilon_r = 42.2$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1798; ConvF(6.79, 6.79, 6.79); Calibrated: 2008-03-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn447; Calibrated: 2007-09-13
- Phantom: 835/900 Phantom ; Type: SAM

Validation 835 MHz/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 10.1 mW/g

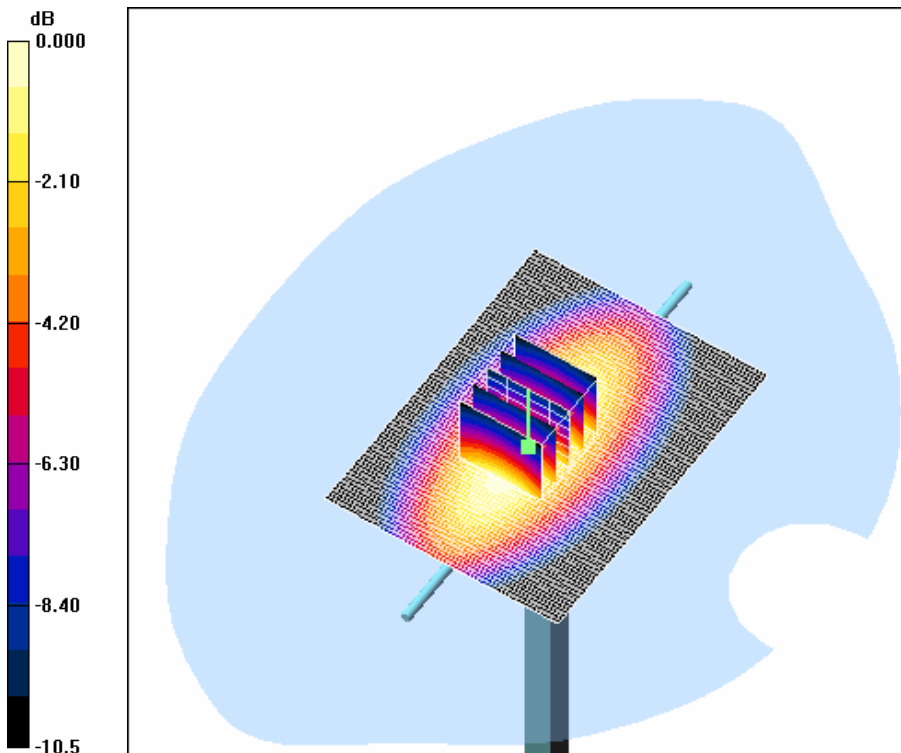
Validation 835 MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 110.0 V/m; Power Drift = 0.024 dB

Peak SAR (extrapolated) = 13.7 W/kg

SAR(1 g) = 9.35 mW/g; SAR(10 g) = 6.13 mW/g

Maximum value of SAR (measured) = 10.1 mW/g



0 dB = 10.1mW/g

■ Validation Data (1900 MHz Head)

Test Laboratory: HCT CO., LTD
Input Power 1W (30dBm)
Liquid Temp: 21.4 °C
Test Date: Apr.29, 2008

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 – SN: 5d038

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1900$ MHz; $\sigma = 1.38$ mho/m; $\epsilon_r = 40.6$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 – SN1798; ConvF(5.58, 5.58, 5.58); Calibrated: 2008-03-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn447; Calibrated: 2007-09-13
- Phantom: 1800/1900 Phantom; Type: SAM

Validation 1900MHz/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 47.6 mW/g

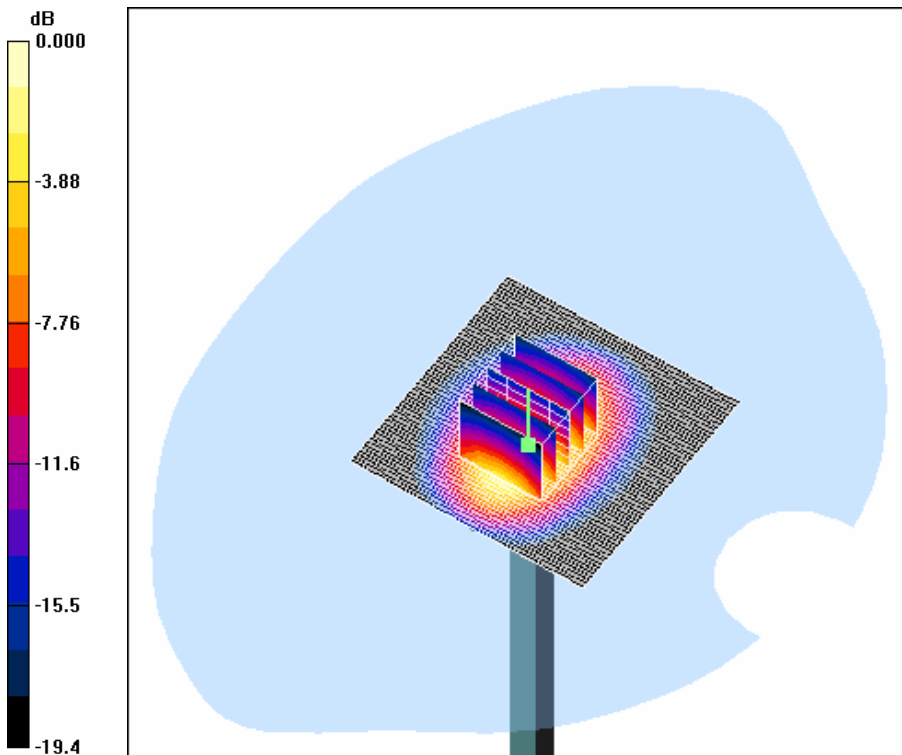
Validation 1900MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 177.8 V/m; Power Drift = 0.006 dB

Peak SAR (extrapolated) = 70.6 W/kg

SAR(1 g) = 38.4 mW/g; SAR(10 g) = 19.7 mW/g

Maximum value of SAR (measured) = 43.0 mW/g



■ Dielectric Parameter (835 MHz Head)

Title C820
SubTitle GSM850/WCDMA850(Head)
Test Date Apr.28, 2008

Frequency	e'	e''
800000000	42.3908	18.7743
805000000	42.3553	18.7996
810000000	42.2990	18.7659
815000000	42.2447	18.7749
820000000	42.2535	18.7769
825000000	42.2017	18.7692
830000000	42.1911	18.7922
835000000	42.1875	18.7446
840000000	42.1276	18.7553
845000000	42.1400	18.7244
850000000	42.0583	18.6896
855000000	41.9990	18.6748
860000000	41.9769	18.6442
865000000	41.8918	18.6579
870000000	41.7794	18.6086
875000000	41.6807	18.6017
880000000	41.6254	18.5672
885000000	41.5216	18.6027
890000000	41.4714	18.6123
895000000	41.3857	18.5333
900000000	41.3255	18.5366

■ Dielectric Parameter (835 MHz Body)

Title C820
SubTitle GSM850/WCDMA850(Body)
Test Date Apr.28, 2008

Frequency	e'	e''
800000000	55.6285	21.4127
805000000	55.6126	21.3582
810000000	55.4878	21.3609
815000000	55.4354	21.3092
820000000	55.3399	21.2909
825000000	55.2774	21.2665
830000000	55.1848	21.2481
835000000	55.1374	21.2576
840000000	55.0463	21.2063
845000000	54.9917	21.2189
850000000	54.9068	21.1774
855000000	54.8300	21.1824
860000000	54.7746	21.1686
865000000	54.7195	21.1388
870000000	54.6342	21.1533
875000000	54.6054	21.1299
880000000	54.5739	21.0705
885000000	54.5345	21.0570
890000000	54.4923	21.0607
895000000	54.4448	21.0086
900000000	54.4054	20.9747

■ Dielectric Parameter (1900 MHz Head)

Title C820
SubTitle GSM1900/WCDMA1900(Head)
Test Date Apr.29, 2008

Frequency	e'	e''
1850000000	40.8132	12.7752
1855000000	40.7832	12.7900
1860000000	40.7757	12.8204
1865000000	40.7874	12.8564
1870000000	40.7565	12.8959
1875000000	40.7680	12.9076
1880000000	40.7084	12.9480
1885000000	40.6673	12.9701
1890000000	40.6809	12.9834
1895000000	40.6418	13.0165
1900000000	40.6383	13.0349
1905000000	40.6165	13.0565
1910000000	40.6245	13.1002
1915000000	40.5872	13.1202
1920000000	40.5316	13.1166
1925000000	40.5155	13.1404
1930000000	40.5196	13.1447
1935000000	40.4387	13.1288
1940000000	40.4351	13.1741
1945000000	40.3748	13.1744
1950000000	40.3429	13.1943

■ Dielectric Parameter (1900 MHz Body)

Title C820
SubTitle GSM1900/ WCDMA1900 (Body)
Test Date Apr.29, 2008

Frequency	e'	e''
1850000000	54.1977	14.5513
1855000000	54.1936	14.6347
1860000000	54.2437	14.6309
1865000000	54.2280	14.6358
1870000000	54.2238	14.6486
1875000000	54.2218	14.6592
1880000000	54.2090	14.6578
1885000000	54.2039	14.6640
1890000000	54.1768	14.6425
1895000000	54.1105	14.6657
1900000000	54.0968	14.6654
1905000000	54.0450	14.6754
1910000000	54.0323	14.6634
1915000000	53.9699	14.6692
1920000000	53.9484	14.7288
1925000000	53.9172	14.7350
1930000000	53.8839	14.7617
1935000000	53.8434	14.7957
1940000000	53.8485	14.8303
1945000000	53.8200	14.8641
1950000000	53.8391	14.8889

Attachment 3. – Probe Calibration Data

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Zeughausstrasse 43, 8004 Zurich, Switzerland



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Accreditation No.: **SCS 108**

Client **HCT (Dymstec)**

Certificate No: **ET3-1798_Mar08**

CALIBRATION CERTIFICATE

Object: **ET3DV6 - SN:1798**

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

Calibration date: **March 20, 2008**

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

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	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	MY41498087	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: S5086 (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	2-Jan-08 (SPEAG, No. ES3-3013_Jan08)	Jan-09
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	US3642UD1700	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

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

Issued: March 21, 2008

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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:

- 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

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 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.

ET3DV6 SN:1798

March 20, 2008

Probe ET3DV6

SN:1798

Manufactured:	August 14, 2003
Last calibrated:	August 25, 2006
Recalibrated:	March 20, 2008

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

ET3DV6 SN:1798

March 20, 2008

DASY - Parameters of Probe: ET3DV6 SN:1798

Sensitivity in Free Space^A

Diode Compression^B

NormX	1.97 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP X	93 mV
NormY	1.84 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP Y	93 mV
NormZ	2.00 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP Z	94 mV

Sensitivity in Tissue Simulating Liquid (Conversion Factors)

Please see Page 8.

Boundary Effect

TSL 900 MHz Typical SAR gradient: 5 % per mm

Sensor Center to Phantom Surface Distance		3.7 mm	4.7 mm
SAR _{iso} [%]	Without Correction Algorithm	9.5	5.7
SAR _{iso} [%]	With Correction Algorithm	0.8	0.7

TSL 1810 MHz Typical SAR gradient: 10 % per mm

Sensor Center to Phantom Surface Distance		3.7 mm	4.7 mm
SAR _{iso} [%]	Without Correction Algorithm	12.4	7.8
SAR _{iso} [%]	With Correction Algorithm	0.9	0.8

Sensor Offset

Probe Tip to Sensor Center 2.7 mm

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

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

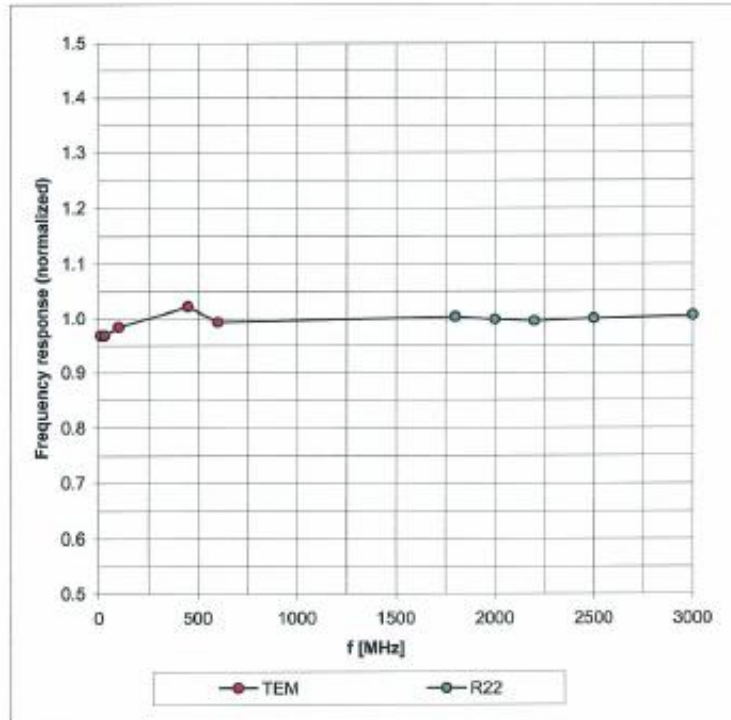
^B Numerical linearization parameter: uncertainty not required.

ET3DV6 SN:1798

March 20, 2008

Frequency Response of E-Field

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

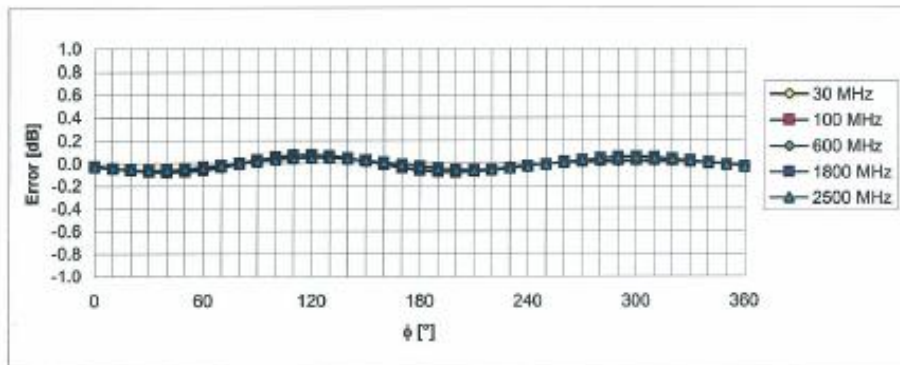
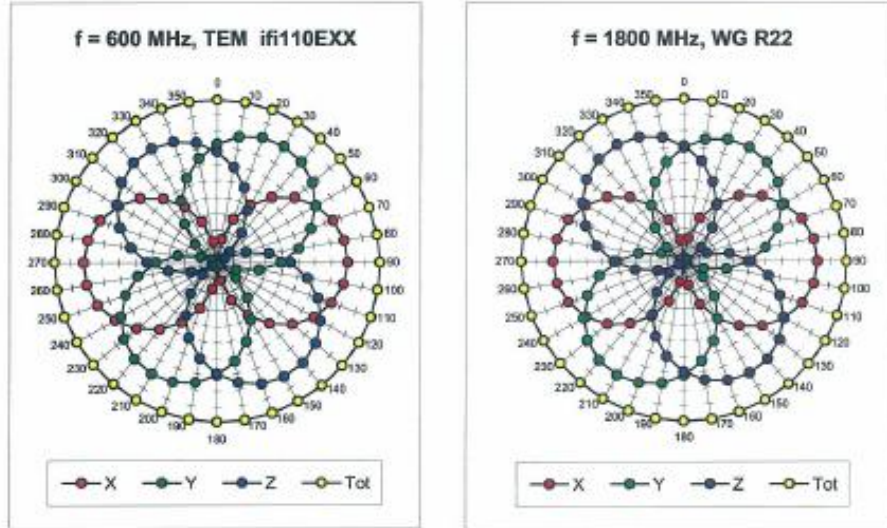


Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ ($k=2$)

ET3DV6 SN:1798

March 20, 2008

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

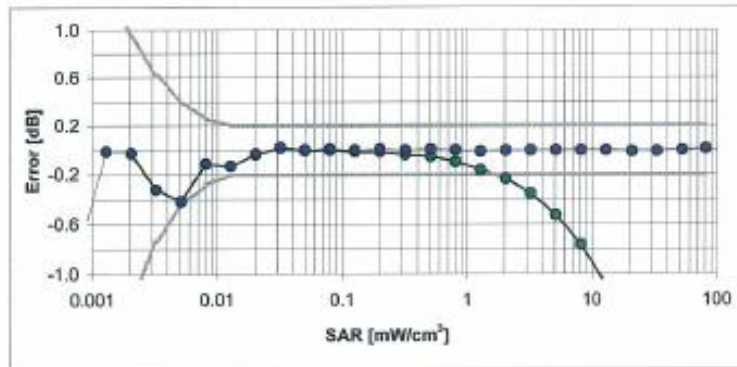
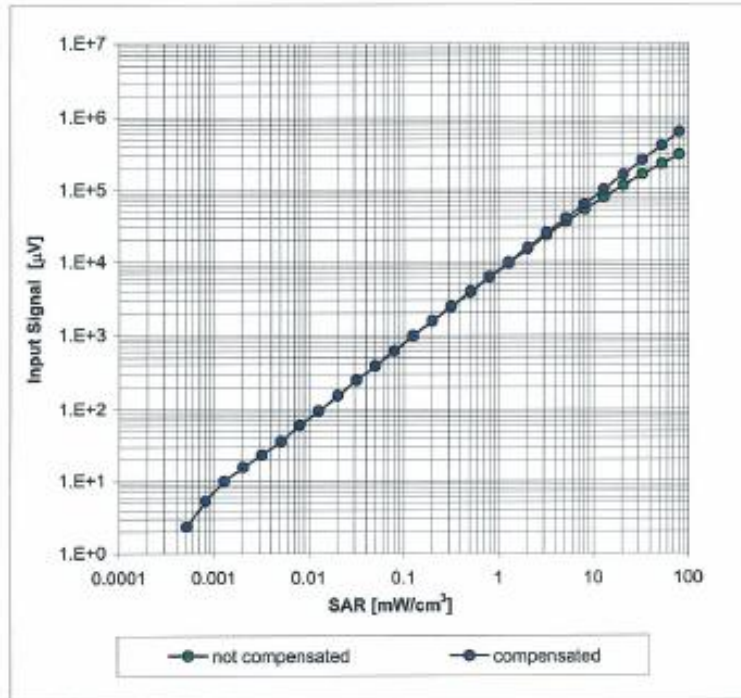


Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ (k=2)

ET3DV6 SN:1798

March 20, 2008

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

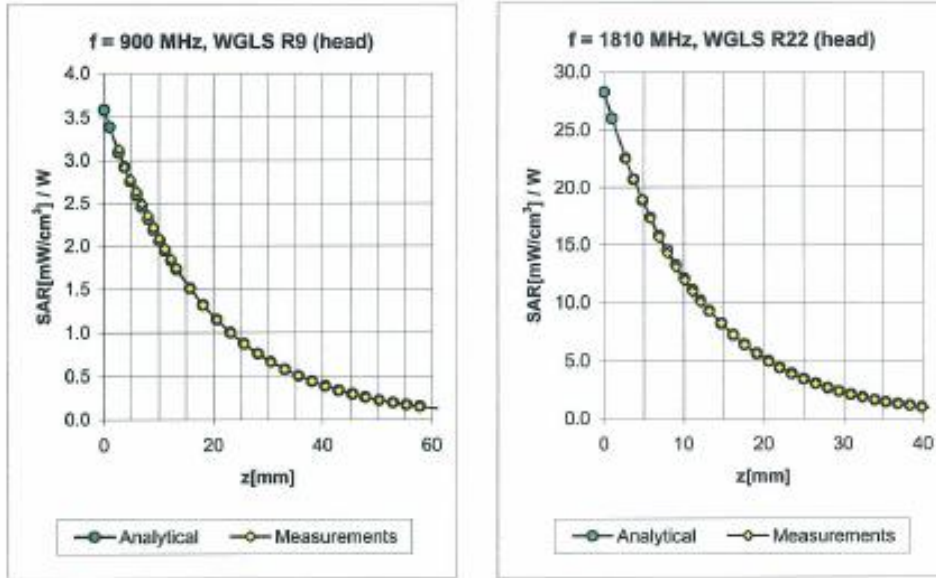


Uncertainty of Linearity Assessment: ± 0.6% (k=2)

ET3DV6 SN:1798

March 20, 2008

Conversion Factor Assessment



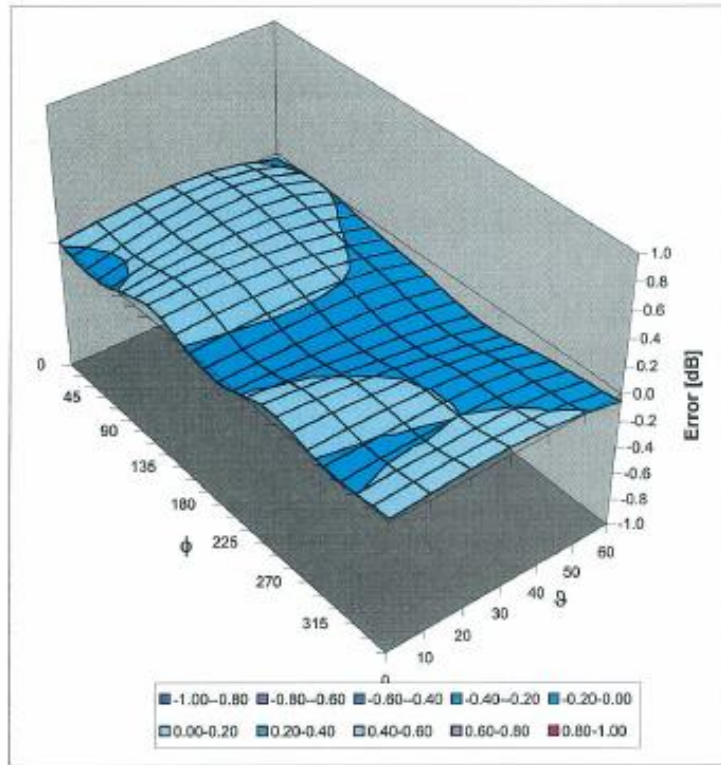
f [MHz]	Validity [MHz] ^c	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.78	1.68	6.79 ± 11.0% (k=2)
1810	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.50	2.40	5.58 ± 11.0% (k=2)
1950	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.48	2.50	5.24 ± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.95	1.40	4.81 ± 11.8% (k=2)
835	± 50 / ± 100	Body	55.2 ± 5%	0.97 ± 5%	0.92	1.59	6.29 ± 11.0% (k=2)
1810	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.53	2.31	5.38 ± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.73	1.76	4.32 ± 11.8% (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:1798

March 20, 2008

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 **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: **Claudio Leubler** (Name), **Laboratory Technician** (Function), *[Signature]* (Signature)

Approved by: **Katja Pokovic** (Name), **Technical Manager** (Function), *[Signature]* (Signature)

Issued: May 30, 2007

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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:

- 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 ± 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 ± 0.2) °C	41.6 ± 6 %	0.90 mho/m ± 6 %
Head TSL temperature during test	(22.0 ± 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	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 ± 17.0 % (k=2)

SAR averaged over 10 cm³ (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 ± 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: $f = 835$ MHz; $\sigma = 0.9$ mho/m; $\epsilon_r = 41.6$; $\rho = 1000$ kg/m³

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:

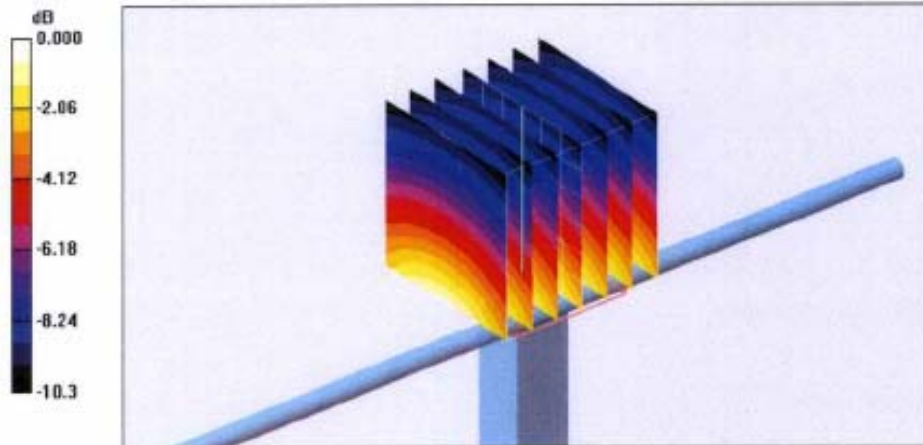
Measurement grid: dx=5mm, dy=5mm, dz=5mm

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

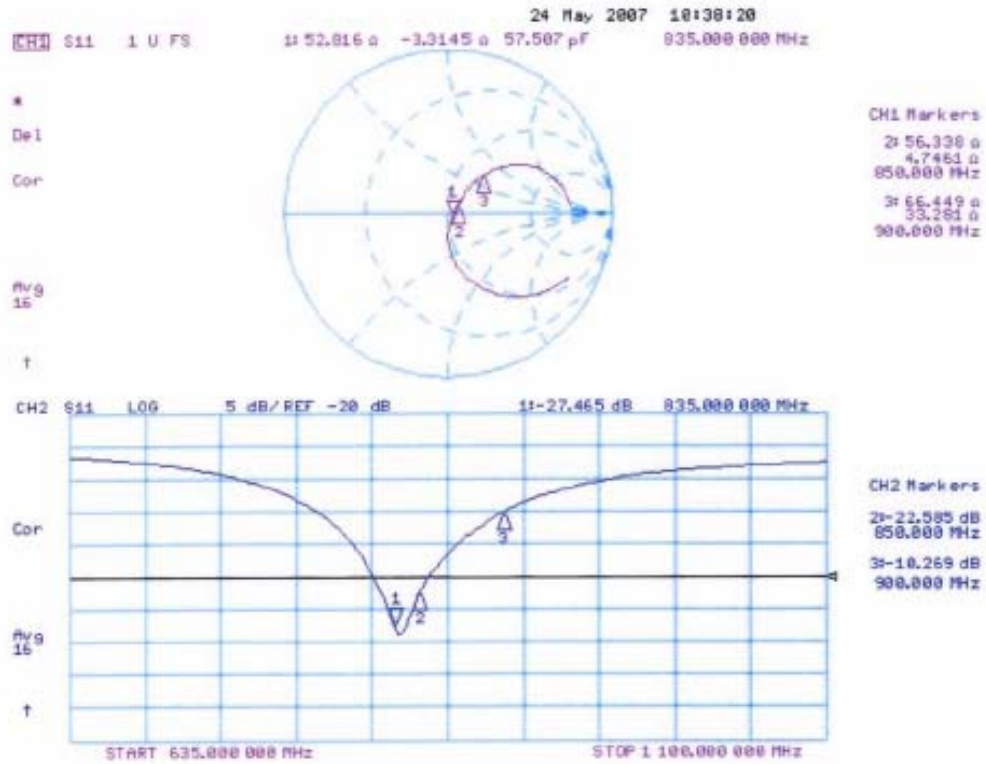
Peak SAR (extrapolated) = 3.30 W/kg

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



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Accreditation No.: **SCS 108**

Client **KTL (Dymstec)**

Certificate No: **D1900V2-5d038_Nov07**

CALIBRATION CERTIFICATE

Object **D1900V2 - SN: 5d038**

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

Calibration date: **November 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	04-Oct-07 (METAS, No. 217-00736)	Oct-08
Power sensor HP 8481A	US37292783	04-Oct-07 (METAS, No. 217-00736)	Oct-08
Reference 20 dB Attenuator	SN: 5086 (20g)	07-Aug-07 (METAS, No 217-00718)	Aug-08
Reference 10 dB Attenuator	SN: 5047.2 (10r)	07-Aug-07 (METAS, No 217-00718)	Aug-08
Reference Probe ET3DV6 (HF)	SN: 1507	26-Oct-07 (SPEAG, No. ET3-1507_Oct07)	Oct-08
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-07)	In house check: Oct-08
RF generator R&S SMT-06	100005	4-Aug-99 (SPEAG, in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (SPEAG, in house check Oct-07)	In house check: Oct-08

Calibrated by:	Name Mercel Fehr	Function Laboratory Technician	Signature
Approved by:	Name Katja Pokovic	Function Technical Manager	Signature

Issued: November 20, 2007

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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:

- 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	1900 MHz ± 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 ± 0.2) °C	38.8 ± 6 %	1.45 mho/m ± 6 %
Head TSL temperature during test	(21.0 ± 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	9.84 mW / g
SAR normalized	normalized to 1W	39.4 mW / g
SAR for nominal Head TSL parameters ¹	normalized to 1W	38.0 mW / g ± 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	5.13 mW / g
SAR normalized	normalized to 1W	20.5 mW / g
SAR for nominal Head TSL parameters ¹	normalized to 1W	20.1 mW / g ± 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	55.3 Ω + 4.3 $\mu\Omega$
Return Loss	- 23.8 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.195 ns
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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	July 04, 2003

DASY4 Validation Report for Head TSL

Date/Time: 20.11.2007 13:46:09

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d038

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

Medium: HSL U10 BB;

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.45$ mho/m; $\epsilon_r = 38.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507 (HF); ConvF(4.86, 4.86, 4.86); Calibrated: 26.10.2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn801; Calibrated: 30.01.2007
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; ;
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 172

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

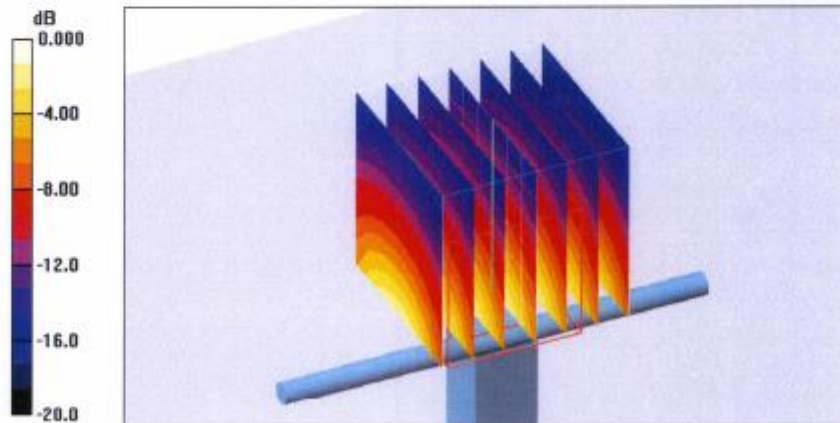
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 92.4 V/m; Power Drift = 0.019 dB

Peak SAR (extrapolated) = 17.4 W/kg

SAR(1 g) = 9.84 mW/g; SAR(10 g) = 5.13 mW/g

Maximum value of SAR (measured) = 11.2 mW/g



0 dB = 11.2mW/g

Impedance Measurement Plot for Head TSL

