

Test Laboratory: HCT CO., LTD

EUT Type: Cellular/PCS GSM/WCDMA/EDGE Phone with Bluetooth/ WLAN

GPRS Class 12 and GPRS mode class B(GPRS and GSM, but not simultaneously)

Liquid Temperature: 21.2 °C

Ambient Temperature: 21.4 °C

Test Date: Sep.11, 2009

DUT: GW550; Type: Bar; Serial: #1

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:2.075

Medium parameters used (interpolated): $f = 836.6 \text{ MHz}$; $\sigma = 0.996 \text{ mho/m}$; $\epsilon_r = 54.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(6.08, 6.08, 6.08); Calibrated: 2009-03-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: SAM 835/900 MHz; Type: SAM

Body 190/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm[Info: Interpolated medium parameters used for SAR evaluation.](#)

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

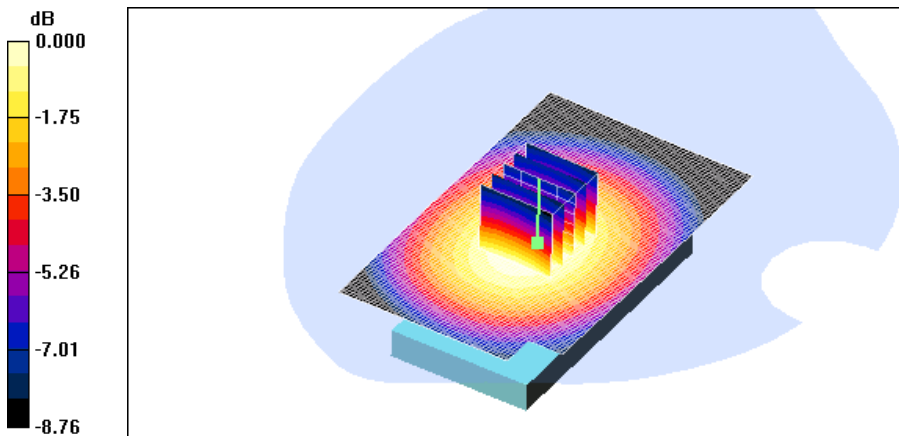
Body 190/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 17.8 V/m; Power Drift = -0.087 dB

Peak SAR (extrapolated) = 0.831 W/kg

SAR(1 g) = 0.632 mW/g; SAR(10 g) = 0.463 mW/g[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.667 mW/g



0 dB = 0.667mW/g

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GPRS Class 12 and GPRS mode class B(GPRS and GSM, but not simultaneously)

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Ambient Temperature: 21.4 °C

Test Date: Sep.11, 2009

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Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:2.075

Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.996$ mho/m; $\epsilon_r = 54.1$; $\rho = 1000$ kg/m³

Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(6.08, 6.08, 6.08); Calibrated: 2009-03-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: SAM 835/900 MHz; Type: SAM

Body 190/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.641 mW/g

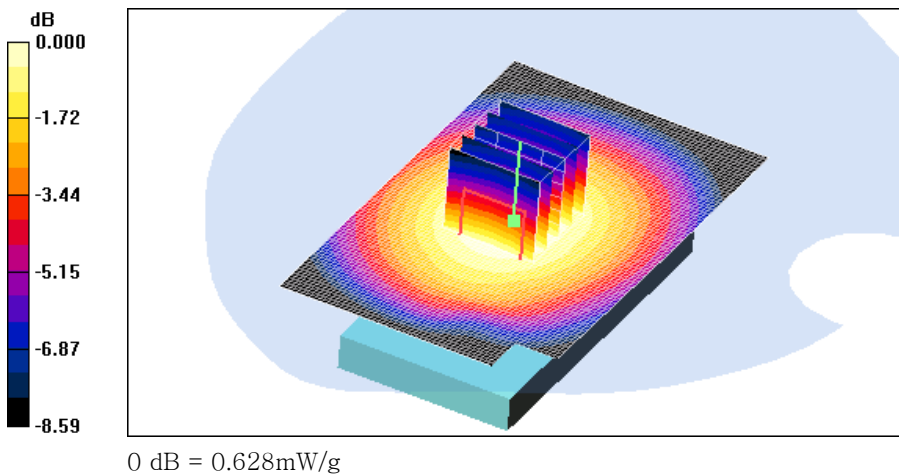
Body 190/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 19.3 V/m; Power Drift = -0.103 dB

Peak SAR (extrapolated) = 0.787 W/kg

SAR(1 g) = 0.596 mW/g; SAR(10 g) = 0.417 mW/g

Maximum value of SAR (measured) = 0.628 mW/g



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GPRS Class 12 and GPRS mode class B(GPRS and GSM, but not simultaneously)

Liquid Temperature: 21.2 °C

Ambient Temperature: 21.4 °C

Test Date: Sep.11, 2009

DUT: GW550; Type: Bar; Serial: #1

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium parameters used (interpolated): $f = 836.6 \text{ MHz}$; $\sigma = 0.996 \text{ mho/m}$; $\epsilon_r = 54.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(6.08, 6.08, 6.08); Calibrated: 2009-03-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: SAM 835/900 MHz; Type: SAM

Body 190/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.452 mW/g

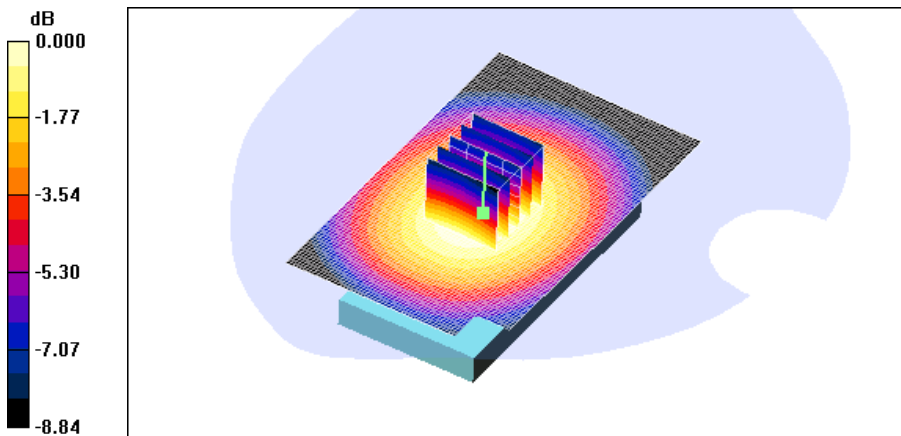
Body 190/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 14.5 V/m; Power Drift = 0.018 dB

Peak SAR (extrapolated) = 0.547 W/kg

SAR(1 g) = 0.422 mW/g; SAR(10 g) = 0.311 mW/g[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.444 mW/g



0 dB = 0.444mW/g

Test Laboratory: HCT CO., LTD

EUT Type: Cellular/PCS GSM/WCDMA/EDGE Phone with Bluetooth/ WLAN

GPRS Class 12 and GPRS mode class B(GPRS and GSM, but not simultaneously)

Liquid Temperature: 21.1 °C

Ambient Temperature: 21.3 °C

Test Date: Sep.12, 2009

DUT: GW550; Type: Bar; Serial: #1

Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.48$ mho/m; $\epsilon_r = 52$; $\rho = 1000$ kg/m³

Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(4.61, 4.61, 4.61); Calibrated: 2009-03-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: SAM 1800/1900 MHz; Type: SAM

Body 661/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.144 mW/g

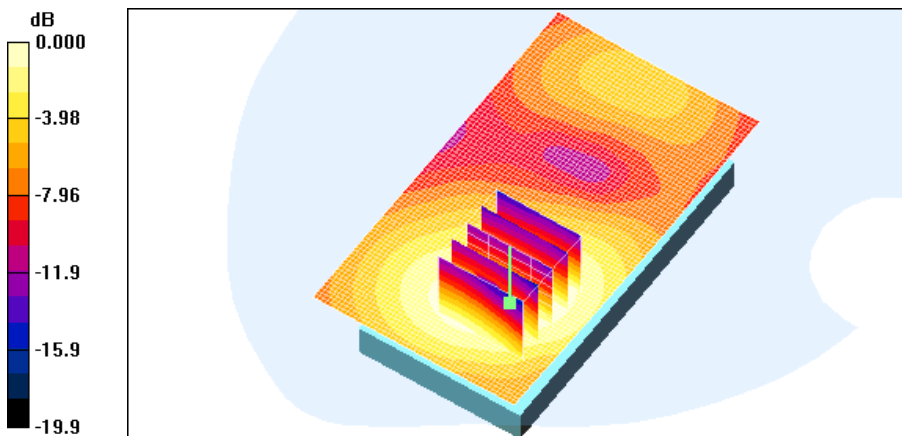
Body 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 5.98 V/m; Power Drift = -0.031 dB

Peak SAR (extrapolated) = 0.168 W/kg

SAR(1 g) = 0.131 mW/g; SAR(10 g) = 0.081 mW/g

Maximum value of SAR (measured) = 0.142 mW/g



0 dB = 0.142mW/g

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GPRS Class 12 and GPRS mode class B(GPRS and GSM, but not simultaneously)

Liquid Temperature: 21.1 °C

Ambient Temperature: 21.3 °C

Test Date: Sep.12, 2009

DUT: GW550; Type: Bar; Serial: #1

Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:4.15

Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.48 \text{ mho/m}$; $\epsilon_r = 52$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(4.61, 4.61, 4.61); Calibrated: 2009-03-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: SAM 1800/1900 MHz; Type: SAM

Body 661/Area Scan (51x91x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.284 mW/g

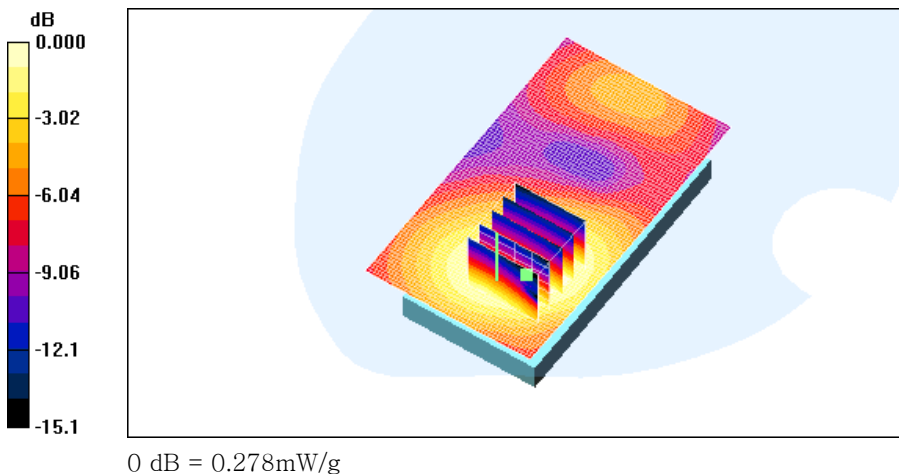
Body 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 8.34 V/m; Power Drift = 0.065 dB

Peak SAR (extrapolated) = 0.321 W/kg

SAR(1 g) = 0.256 mW/g; SAR(10 g) = 0.163 mW/g

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



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GPRS Class 12 and GPRS mode class B(GPRS and GSM, but not simultaneously)

Liquid Temperature: 21.1 °C

Ambient Temperature: 21.3 °C

Test Date: Sep.12, 2009

DUT: GW550; Type: Bar; Serial: #1

Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:2.77

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.48$ mho/m; $\epsilon_r = 52$; $\rho = 1000$ kg/m³

Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(4.61, 4.61, 4.61); Calibrated: 2009-03-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: SAM 1800/1900 MHz; Type: SAM

Body 661/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.413 mW/g

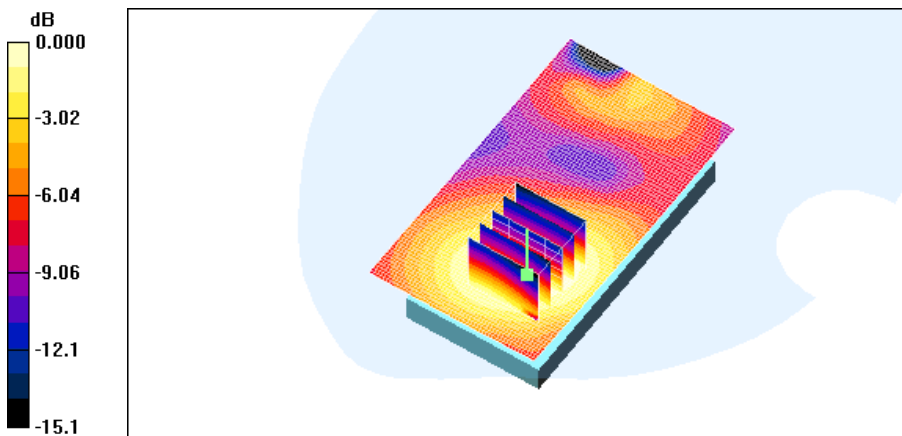
Body 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 10.2 V/m; Power Drift = 0.029 dB

Peak SAR (extrapolated) = 0.476 W/kg

SAR(1 g) = 0.376 mW/g; SAR(10 g) = 0.241 mW/g

Maximum value of SAR (measured) = 0.405 mW/g



0 dB = 0.405mW/g

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GPRS Class 12 and GPRS mode class B(GPRS and GSM, but not simultaneously)

Liquid Temperature: 21.1 °C

Ambient Temperature: 21.3 °C

Test Date: Sep.12, 2009

DUT: GW550; Type: Bar; Serial: #1

Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:2.075

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.48$ mho/m; $\epsilon_r = 52$; $\rho = 1000$ kg/m³

Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(4.61, 4.61, 4.61); Calibrated: 2009-03-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: SAM 1800/1900 MHz; Type: SAM

Body 661/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.554 mW/g

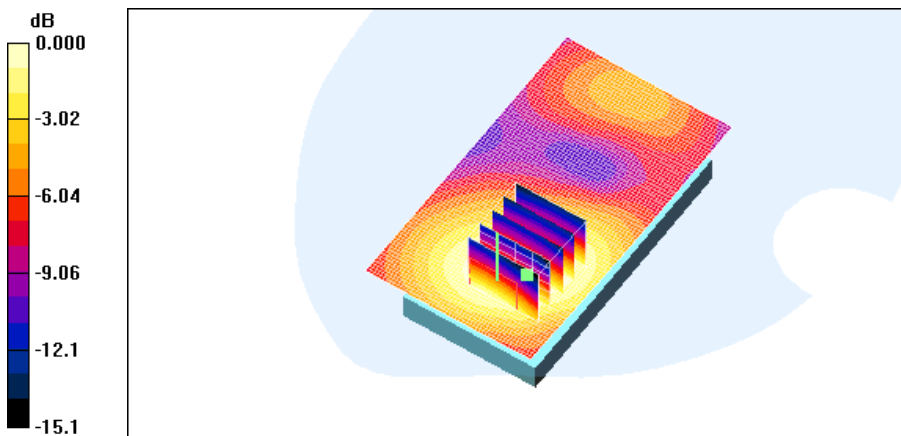
Body 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 11.9 V/m; Power Drift = -0.009 dB

Peak SAR (extrapolated) = 0.623 W/kg

SAR(1 g) = 0.498 mW/g; SAR(10 g) = 0.317 mW/g

Maximum value of SAR (measured) = 0.541 mW/g



0 dB = 0.541mW/g

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GPRS Class 12 and GPRS mode class B(GPRS and GSM, but not simultaneously)

Liquid Temperature: 21.1 °C

Ambient Temperature: 21.3 °C

Test Date: Sep.12, 2009

DUT: GW550; Type: Bar; Serial: #1

Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:2.075

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.48$ mho/m; $\epsilon_r = 52$; $\rho = 1000$ kg/m³

Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(4.61, 4.61, 4.61); Calibrated: 2009-03-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: SAM 1800/1900 MHz; Type: SAM

Body 661/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.311 mW/g

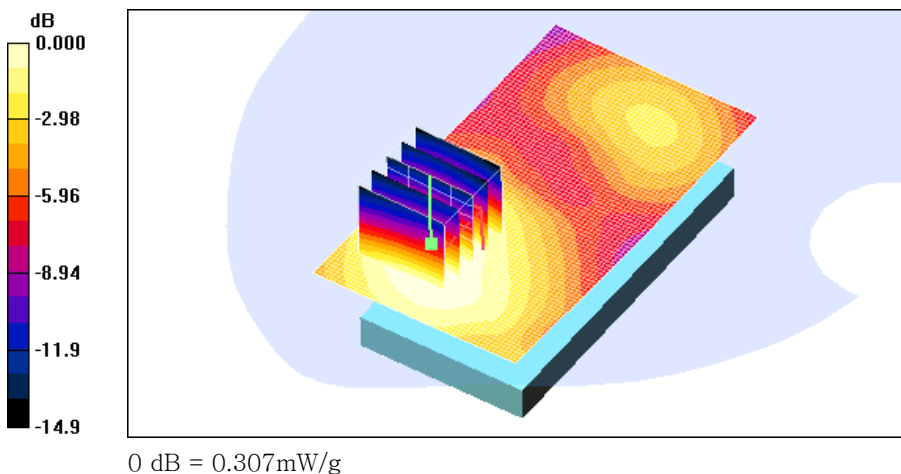
Body 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 11.4 V/m; Power Drift = -0.118 dB

Peak SAR (extrapolated) = 0.370 W/kg

SAR(1 g) = 0.281 mW/g; SAR(10 g) = 0.180 mW/g

Maximum value of SAR (measured) = 0.307 mW/g



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GPRS Class 12 and GPRS mode class B(GPRS and GSM, but not simultaneously)

Liquid Temperature: 21.1 °C

Ambient Temperature: 21.3 °C

Test Date: Sep.12, 2009

DUT: GW550; Type: Bar; Serial: #1

Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.48 \text{ mho/m}$; $\epsilon_r = 52$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(4.61, 4.61, 4.61); Calibrated: 2009-03-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: SAM 1800/1900 MHz; Type: SAM

Body 661/Area Scan (51x91x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.144 mW/g

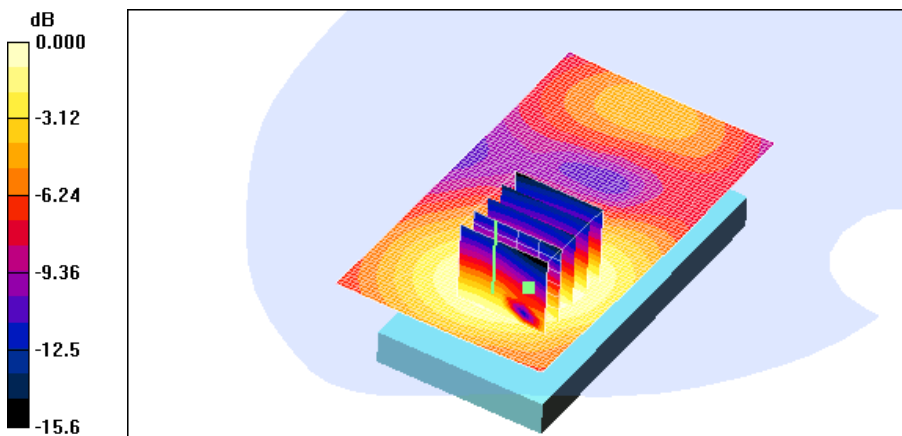
Body 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 6.02 V/m; Power Drift = -0.047 dB

Peak SAR (extrapolated) = 0.204 W/kg

SAR(1 g) = 0.132 mW/g; SAR(10 g) = 0.084 mW/g

Maximum value of SAR (measured) = 0.141 mW/g



0 dB = 0.141mW/g

Test Laboratory: HCT CO., LTD

EUT Type: Cellular/PCS GSM/WCDMA/EDGE Phone with Bluetooth/ WLAN

GPRS Class 12 and GPRS mode class B(GPRS and GSM, but not simultaneously)

Liquid Temperature: 21.2 °C

Ambient Temperature: 21.4 °C

Test Date: Sep.11, 2009

DUT: GW550; Type: Bar; Serial: #1

Communication System: WCDMA850; Frequency: 836.6 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.996$ mho/m; $\epsilon_r = 54.1$; $\rho = 1000$ kg/m³

Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(6.08, 6.08, 6.08); Calibrated: 2009-03-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: SAM 835/900 MHz; Type: SAM

Body 4183/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.356 mW/g

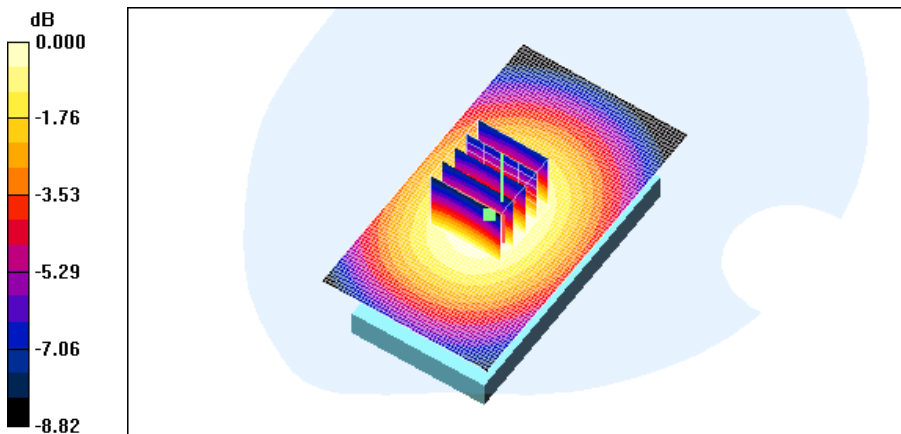
Body 4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 13.1 V/m; Power Drift = -0.116 dB

Peak SAR (extrapolated) = 0.442 W/kg

SAR(1 g) = 0.334 mW/g; SAR(10 g) = 0.246 mW/g[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.350 mW/g



0 dB = 0.350mW/g

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GPRS Class 12 and GPRS mode class B(GPRS and GSM, but not simultaneously)

Liquid Temperature: 21.2 °C

Ambient Temperature: 21.4 °C

Test Date: Sep.11, 2009

DUT: GW550; Type: Bar; Serial: #1

Communication System: WCDMA850; Frequency: 836.6 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated): $f = 836.6 \text{ MHz}$; $\sigma = 0.996 \text{ mho/m}$; $\epsilon_r = 54.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(6.08, 6.08, 6.08); Calibrated: 2009-03-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: SAM 835/900 MHz; Type: SAM

Body 4183/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm[Info: Interpolated medium parameters used for SAR evaluation.](#)

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

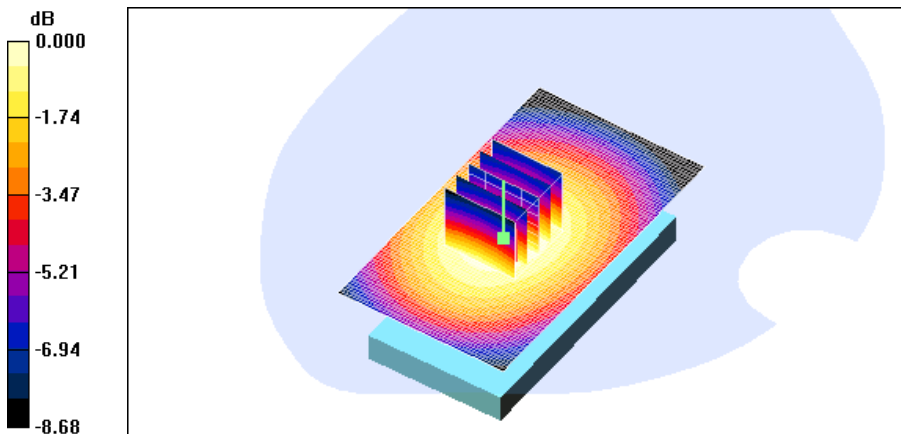
Body 4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 12.7 V/m; Power Drift = -0.043 dB

Peak SAR (extrapolated) = 0.422 W/kg

SAR(1 g) = 0.323 mW/g; SAR(10 g) = 0.239 mW/g[Info: Interpolated medium parameters used for SAR evaluation.](#)

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



0 dB = 0.341mW/g

Test Laboratory: HCT CO., LTD

EUT Type: Cellular/PCS GSM/WCDMA/EDGE Phone with Bluetooth/ WLAN

GPRS Class 12 and GPRS mode class B(GPRS and GSM, but not simultaneously)

Liquid Temperature: 21.1 °C

Ambient Temperature: 21.3 °C

Test Date: Sep.12, 2009

DUT: GW550; Type: Bar; Serial: #1

Communication System: WCDMA1900(FCC); Frequency: 1880 MHz;Duty Cycle: 1:1

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.48$ mho/m; $\epsilon_r = 52$; $\rho = 1000$ kg/m³

Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(4.61, 4.61, 4.61); Calibrated: 2009-03-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: SAM 1800/1900 MHz; Type: SAM

Body 9400/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

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

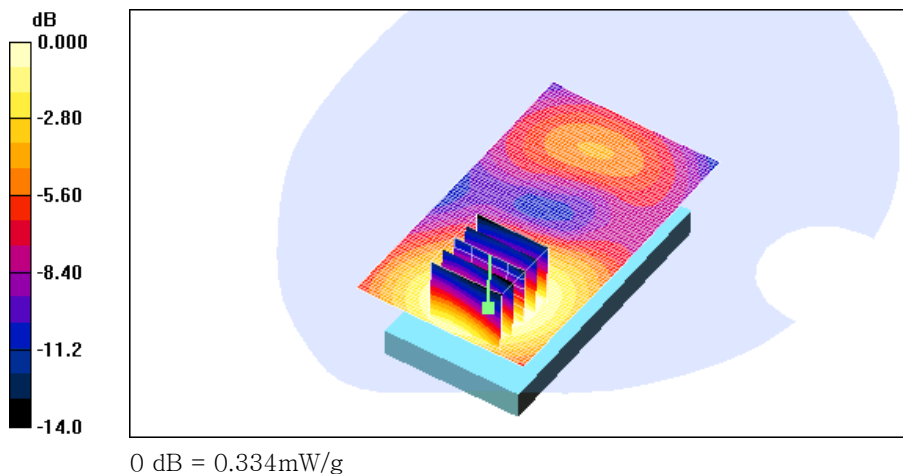
Body 9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 9.76 V/m; Power Drift = 0.078 dB

Peak SAR (extrapolated) = 0.371 W/kg

SAR(1 g) = 0.309 mW/g; SAR(10 g) = 0.203 mW/g

Maximum value of SAR (measured) = 0.334 mW/g



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GPRS Class 12 and GPRS mode class B(GPRS and GSM, but not simultaneously)

Liquid Temperature: 21.1 °C

Ambient Temperature: 21.3 °C

Test Date: Sep.12, 2009

DUT: GW550; Type: Bar; Serial: #1

Communication System: WCDMA1900(FCC); Frequency: 1880 MHz;Duty Cycle: 1:1

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.48$ mho/m; $\epsilon_r = 52$; $\rho = 1000$ kg/m³

Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(4.61, 4.61, 4.61); Calibrated: 2009-03-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: SAM 1800/1900 MHz; Type: SAM

Body 9400/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

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

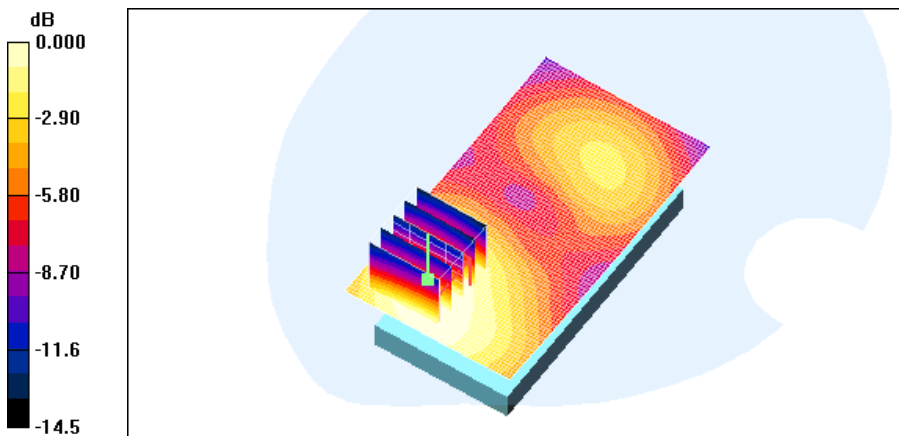
Body 9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 8.94 V/m; Power Drift = -0.073 dB

Peak SAR (extrapolated) = 0.207 W/kg

SAR(1 g) = 0.162 mW/g; SAR(10 g) = 0.106 mW/g

Maximum value of SAR (measured) = 0.177 mW/g



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GPRS Class 12 and GPRS mode class B(GPRS and GSM, but not simultaneously)
Liquid Temperature: 21.1 °C
Ambient Temperature: 21.3 °C
Test Date: Sep.12, 2009

DUT: GW550; Type: Bar; Serial: #1

Communication System: 2450MHz FCC; Frequency: 2437 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 2437 \text{ MHz}$; $\sigma = 1.94 \text{ mho/m}$; $\epsilon_r = 51.7$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(4, 4, 4); Calibrated: 2009-03-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: SAM 1800/1900 MHz; Type: SAM

802.11b 6/Area Scan (61x91x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Maximum value of SAR (interpolated) = 0.252 mW/g

802.11b 6/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

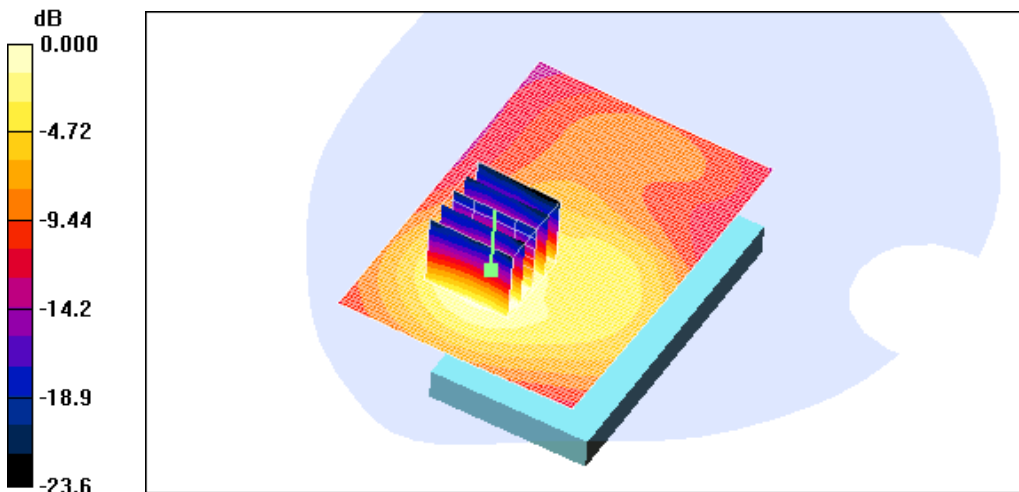
Reference Value = 4.42 V/m; Power Drift = -0.115 dB

Peak SAR (extrapolated) = 0.432 W/kg

SAR(1 g) = 0.206 mW/g; SAR(10 g) = 0.106 mW/g

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

Maximum value of SAR (measured) = 0.222 mW/g



0 dB = 0.222mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/WCDMA/EDGE Phone with Bluetooth/ WLAN
GPRS Class 12 and GPRS mode class B(GPRS and GSM, but not simultaneously)
Liquid Temperature: 21.1 °C
Ambient Temperature: 21.3 °C
Test Date: Sep.12, 2009

DUT: GW550; Type: Bar; Serial: #1

Communication System: 2450MHz FCC; Frequency: 2437 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 2437 \text{ MHz}$; $\sigma = 1.94 \text{ mho/m}$; $\epsilon_r = 51.7$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(4, 4, 4); Calibrated: 2009-03-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: SAM 1800/1900 MHz; Type: SAM

802.11b 6/Area Scan (61x91x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Maximum value of SAR (interpolated) = 0.030 mW/g

802.11b 6/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

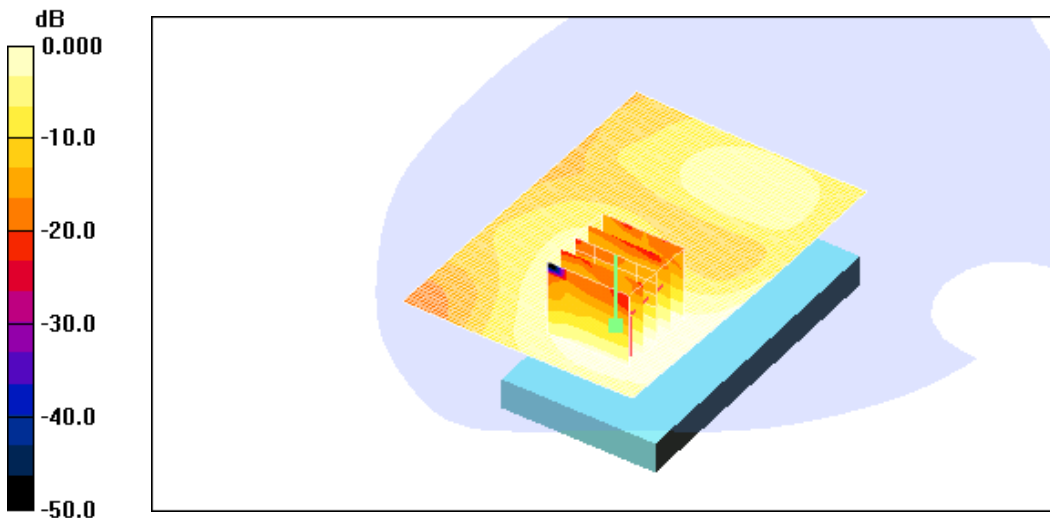
Reference Value = 2.63 V/m; Power Drift = -0.048 dB

Peak SAR (extrapolated) = 0.058 W/kg

SAR(1 g) = 0.028 mW/g; SAR(10 g) = 0.015 mW/g

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

Maximum value of SAR (measured) = 0.030 mW/g



0 dB = 0.030mW/g

Test Laboratory: HCT CO., LTD

EUT Type: Cellular/PCS GSM/WCDMA/EDGE Phone with Bluetooth/ WLAN

GPRS Class 12 and GPRS mode class B(GPRS and GSM, but not simultaneously)

Liquid Temperature: 21.2 °C

Ambient Temperature: 21.4 °C

Test Date: Sep.11, 2009

DUT: GW550; Type: Bar; Serial: #1

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.897$ mho/m; $\epsilon_r = 42.8$; $\rho = 1000$ kg/m³

Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(6.25, 6.25, 6.25); Calibrated: 2009-03-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: SAM 835/900 MHz; Type: SAM

Right touch 190/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.558 mW/g

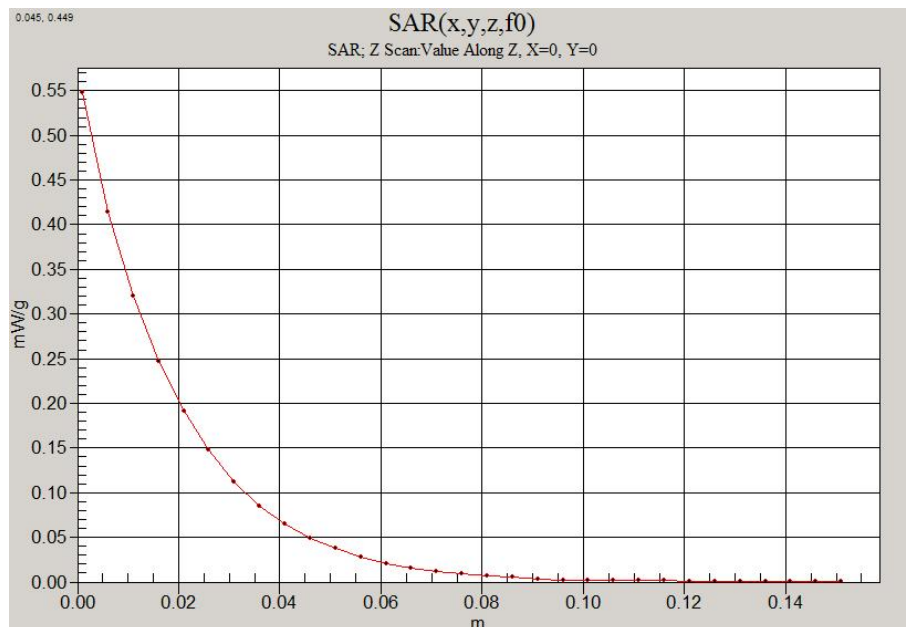
Right touch 190/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 11.9 V/m; Power Drift = 0.038 dB

Peak SAR (extrapolated) = 0.694 W/kg

SAR(1 g) = 0.541 mW/g; SAR(10 g) = 0.399 mW/g[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.564 mW/g



Test Laboratory: HCT CO., LTD

EUT Type: Cellular/PCS GSM/WCDMA/EDGE Phone with Bluetooth/ WLAN

GPRS Class 12 and GPRS mode class B(GPRS and GSM, but not simultaneously)

Liquid Temperature: 21.2 °C

Ambient Temperature: 21.4 °C

Test Date: Sep.11, 2009

DUT: GW550; Type: Bar; Serial: #1

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:2.77

Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.996$ mho/m; $\epsilon_r = 54.1$; $\rho = 1000$ kg/m³

Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(6.08, 6.08, 6.08); Calibrated: 2009-03-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: SAM 835/900 MHz; Type: SAM

Body 190/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.813 mW/g

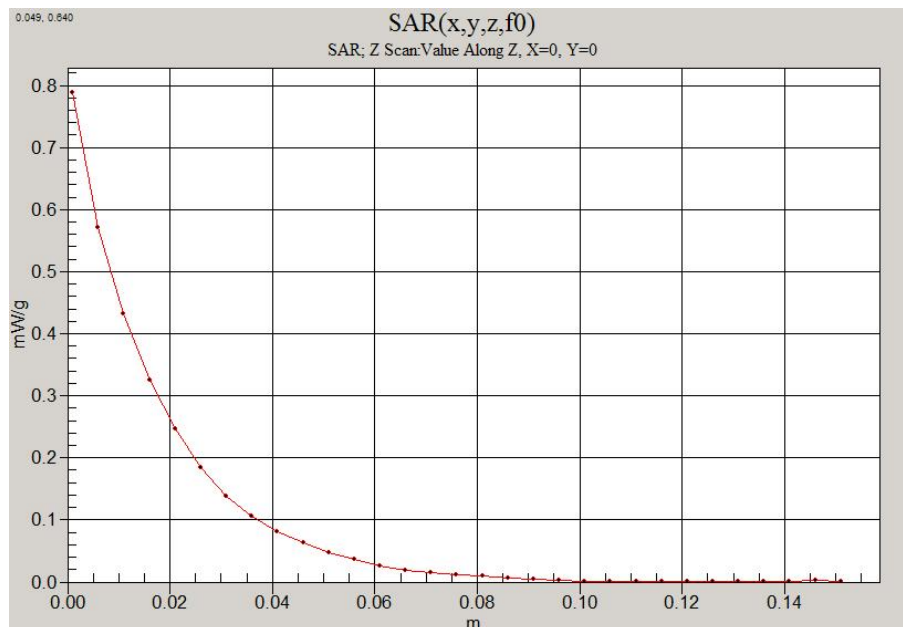
Body 190/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 19.3 V/m; Power Drift = 0.106 dB

Peak SAR (extrapolated) = 1.62 W/kg

SAR(1 g) = 0.780 mW/g; SAR(10 g) = 0.560 mW/g[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.812 mW/g



Test Laboratory: HCT CO., LTD

EUT Type: Cellular/PCS GSM/WCDMA/EDGE Phone with Bluetooth/ WLAN

GPRS Class 12 and GPRS mode class B(GPRS and GSM, but not simultaneously)

Liquid Temperature: 21.1 °C

Ambient Temperature: 21.3 °C

Test Date: Sep.12, 2009

DUT: GW550; Type: Bar; Serial: #1

Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.39$ mho/m; $\epsilon_r = 39.4$; $\rho = 1000$ kg/m³

Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(5.12, 5.12, 5.12); Calibrated: 2009-03-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: SAM 1800/1900 MHz; Type: SAM

Left touch 661/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.446 mW/g

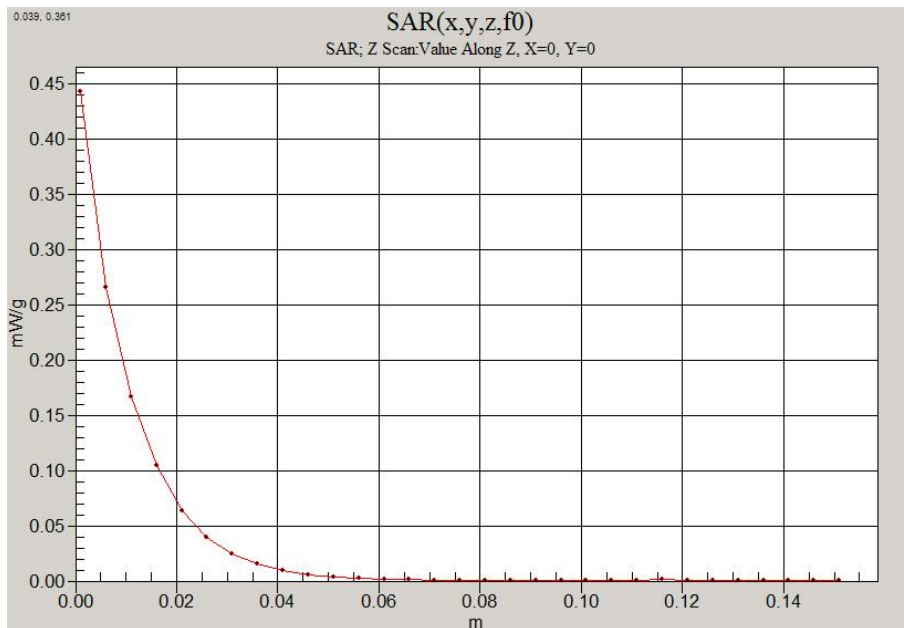
Left touch 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 8.02 V/m; Power Drift = -0.083 dB

Peak SAR (extrapolated) = 0.601 W/kg

SAR(1 g) = 0.402 mW/g; SAR(10 g) = 0.231 mW/g

Maximum value of SAR (measured) = 0.446 mW/g



Test Laboratory: HCT CO., LTD

EUT Type: Cellular/PCS GSM/WCDMA/EDGE Phone with Bluetooth/ WLAN

GPRS Class 12 and GPRS mode class B(GPRS and GSM, but not simultaneously)

Liquid Temperature: 21.1 °C

Ambient Temperature: 21.3 °C

Test Date: Sep.12, 2009

DUT: GW550; Type: Bar; Serial: #1

Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:2.075

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.48$ mho/m; $\epsilon_r = 52$; $\rho = 1000$ kg/m³

Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(4.61, 4.61, 4.61); Calibrated: 2009-03-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: SAM 1800/1900 MHz; Type: SAM

Body 661/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.554 mW/g

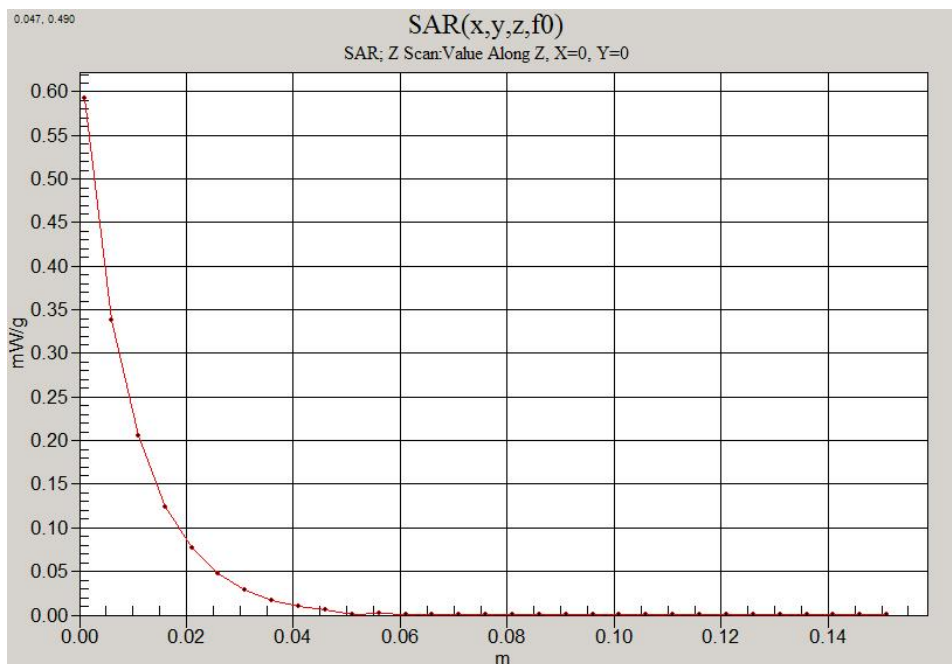
Body 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 11.9 V/m; Power Drift = -0.009 dB

Peak SAR (extrapolated) = 0.623 W/kg

SAR(1 g) = 0.498 mW/g; SAR(10 g) = 0.317 mW/g

Maximum value of SAR (measured) = 0.541 mW/g



Test Laboratory: HCT CO., LTD

EUT Type: Cellular/PCS GSM/WCDMA/EDGE Phone with Bluetooth/ WLAN

GPRS Class 12 and GPRS mode class B(GPRS and GSM, but not simultaneously)

Liquid Temperature: 21.2 °C

Ambient Temperature: 21.4 °C

Test Date: Sep.11, 2009

DUT: GW550; Type: Bar; Serial: #1

Communication System: WCDMA850; Frequency: 836.6 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.897$ mho/m; $\epsilon_r = 42.8$; $\rho = 1000$ kg/m³

Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(6.25, 6.25, 6.25); Calibrated: 2009-03-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: SAM 835/900 MHz; Type: SAM

Right touch4183/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.551 mW/g

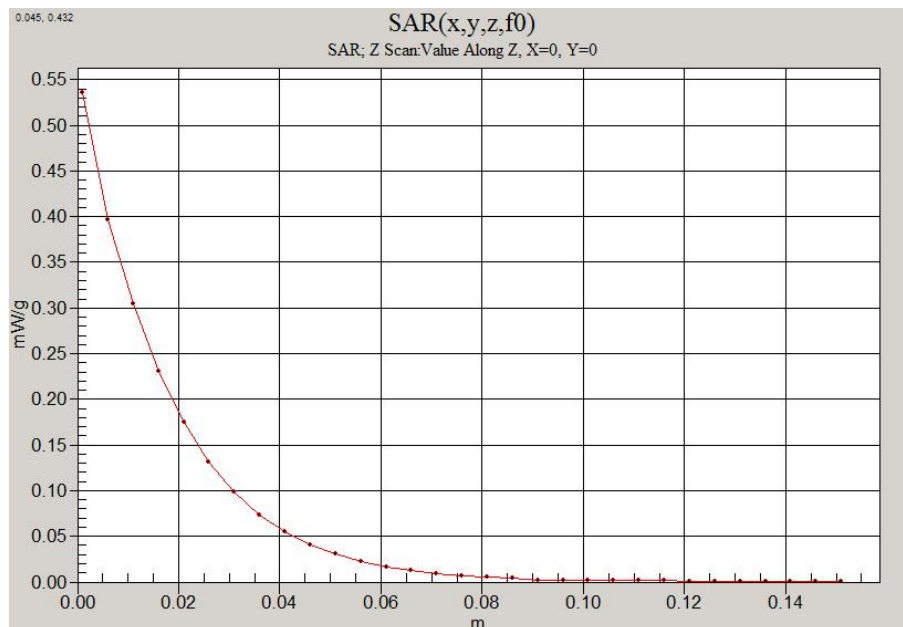
Right touch4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 10.3 V/m; Power Drift = -0.160 dB

Peak SAR (extrapolated) = 0.659 W/kg

SAR(1 g) = 0.508 mW/g; SAR(10 g) = 0.366 mW/g[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.548 mW/g



Test Laboratory: HCT CO., LTD

EUT Type: Cellular/PCS GSM/WCDMA/EDGE Phone with Bluetooth/ WLAN

GPRS Class 12 and GPRS mode class B(GPRS and GSM, but not simultaneously)

Liquid Temperature: 21.2 °C

Ambient Temperature: 21.4 °C

Test Date: Sep.11, 2009

DUT: GW550; Type: Bar; Serial: #1

Communication System: WCDMA850; Frequency: 836.6 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.996$ mho/m; $\epsilon_r = 54.1$; $\rho = 1000$ kg/m³

Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(6.08, 6.08, 6.08); Calibrated: 2009-03-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: SAM 835/900 MHz; Type: SAM

Body 4183/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.356 mW/g

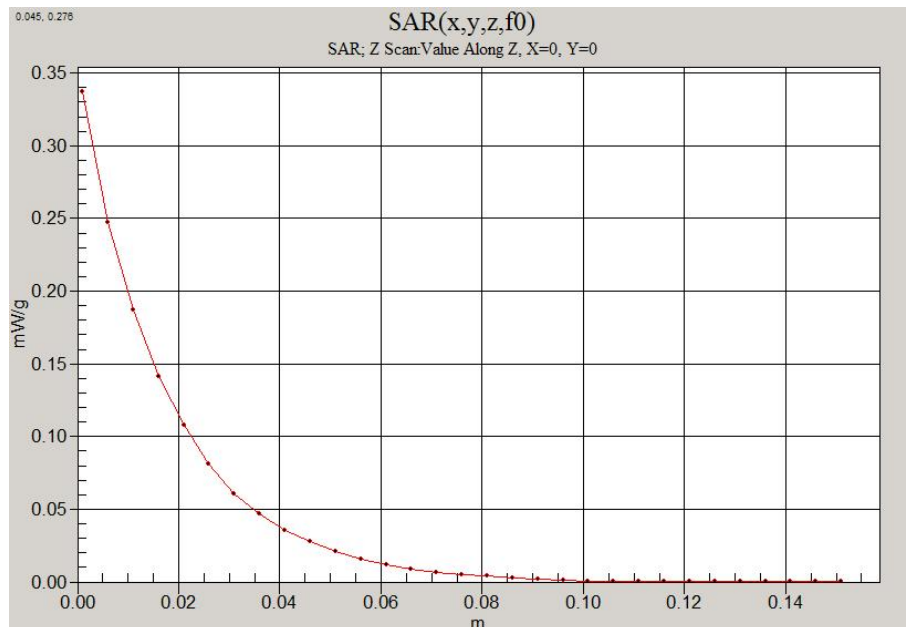
Body 4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 13.1 V/m; Power Drift = -0.116 dB

Peak SAR (extrapolated) = 0.442 W/kg

SAR(1 g) = 0.334 mW/g; SAR(10 g) = 0.246 mW/g[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.350 mW/g



Test Laboratory: HCT CO., LTD

EUT Type: Cellular/PCS GSM/WCDMA/EDGE Phone with Bluetooth/ WLAN

GPRS Class 12 and GPRS mode class B(GPRS and GSM, but not simultaneously)

Liquid Temperature: 21.1 °C

Ambient Temperature: 21.3 °C

Test Date: Sep.12, 2009

DUT: GW550; Type: Bar; Serial: #1

Communication System: WCDMA1900(FCC); Frequency: 1907.6 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated): $f = 1907.6 \text{ MHz}$; $\sigma = 1.42 \text{ mho/m}$; $\epsilon_r = 39.4$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(5.12, 5.12, 5.12); Calibrated: 2009-03-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: SAM 1800/1900 MHz; Type: SAM

Left touch 9538/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm[Info: Interpolated medium parameters used for SAR evaluation.](#)

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

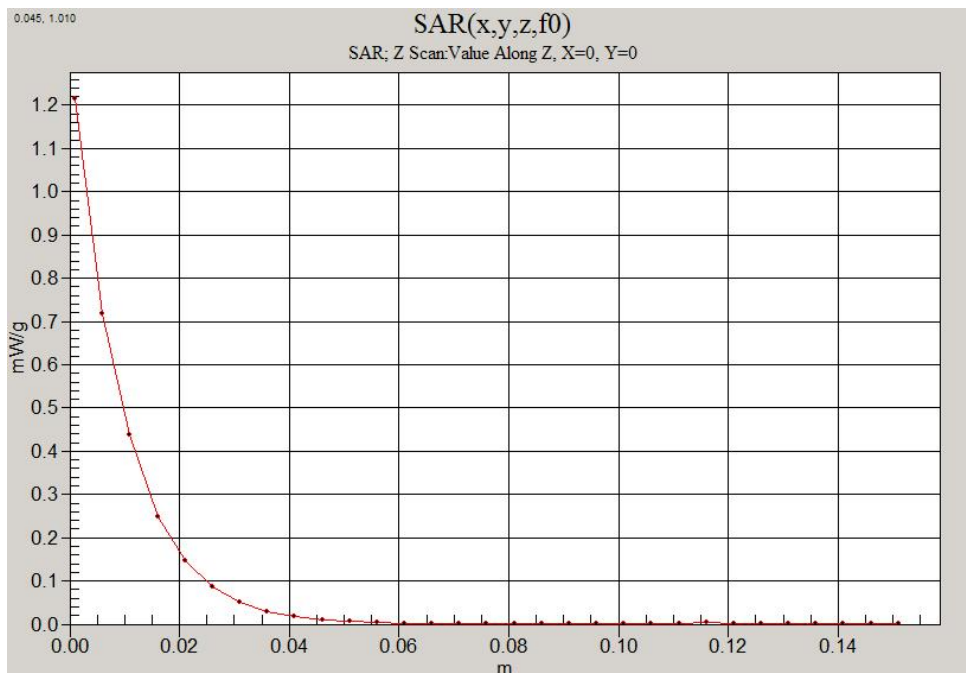
Left touch 9538/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 12.6 V/m; Power Drift = -0.179 dB

Peak SAR (extrapolated) = 1.76 W/kg

SAR(1 g) = 1.12 mW/g; SAR(10 g) = 0.629 mW/g[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.24 mW/g



Test Laboratory: HCT CO., LTD

EUT Type: Cellular/PCS GSM/WCDMA/EDGE Phone with Bluetooth/ WLAN

GPRS Class 12 and GPRS mode class B(GPRS and GSM, but not simultaneously)

Liquid Temperature: 21.1 °C

Ambient Temperature: 21.3 °C

Test Date: Sep.12, 2009

DUT: GW550; Type: Bar; Serial: #1

Communication System: WCDMA1900(FCC); Frequency: 1880 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.48$ mho/m; $\epsilon_r = 52$; $\rho = 1000$ kg/m³

Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(4.61, 4.61, 4.61); Calibrated: 2009-03-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: SAM 1800/1900 MHz; Type: SAM

Body 9400/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

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

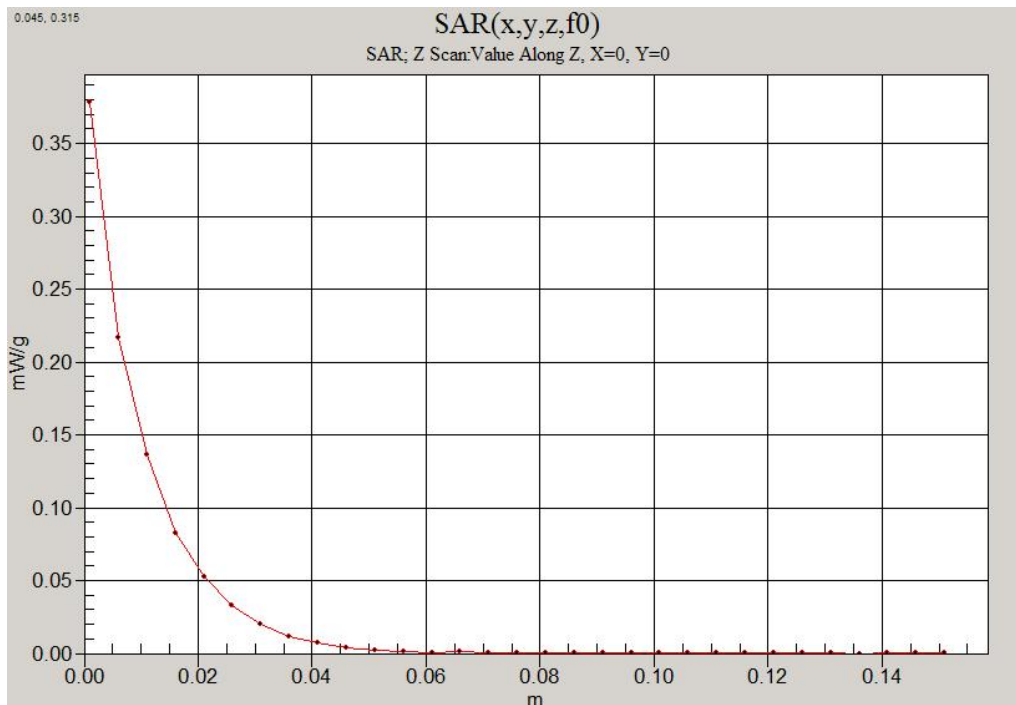
Body 9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 9.76 V/m; Power Drift = 0.078 dB

Peak SAR (extrapolated) = 0.371 W/kg

SAR(1 g) = 0.309 mW/g; SAR(10 g) = 0.203 mW/g

Maximum value of SAR (measured) = 0.334 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: Sep.11, 2009

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

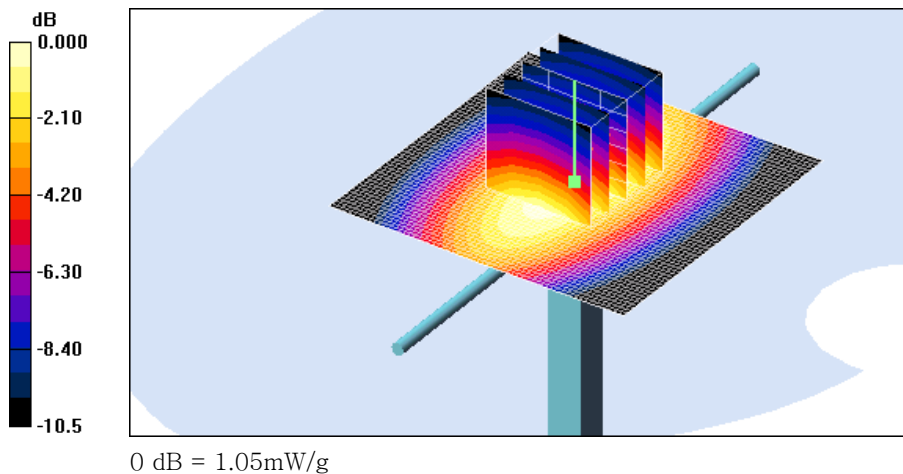
Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 835$ MHz; $\sigma = 0.896$ mho/m; $\epsilon_r = 42.8$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 – SN1609; ConvF(6.25, 6.25, 6.25); Calibrated: 2009-03-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: SAM 835/900 MHz; Type: SAM

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

Validation 835MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 35.2 V/m; Power Drift = -0.011 dB
Peak SAR (extrapolated) = 1.44 W/kg
SAR(1 g) = 0.967 mW/g; SAR(10 g) = 0.633 mW/g
Maximum value of SAR (measured) = 1.05 mW/g



■ Validation Data (1900 MHz Head)

Test Laboratory: HCT CO., LTD
Input Power 100 mW (20 dBm)
Liquid Temp: 21.2 °C
Test Date: Sep.12, 2009

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

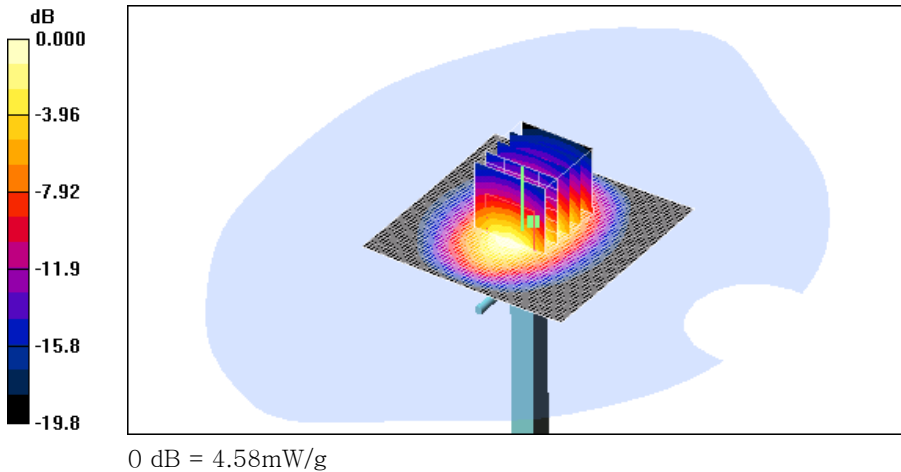
Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1900$ MHz; $\sigma = 1.42$ mho/m; $\epsilon_r = 39.4$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 – SN1609; ConvF(5.12, 5.12, 5.12); Calibrated: 2009-03-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: SAM 1800/1900 MHz; Type: SAM

Dipole 1900MHz Validation/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 4.89 mW/g

Dipole 1900MHz Validation/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 60.4 V/m; Power Drift = 0.008 dB
Peak SAR (extrapolated) = 7.09 W/kg
SAR(1 g) = 4.08 mW/g; SAR(10 g) = 2.13 mW/g
Maximum value of SAR (measured) = 4.58 mW/g



■ Validation Data (2450 MHz Head)

Test Laboratory: HCT CO., LTD
Input Power 100 mW (20 dBm)
Liquid Temp: 21.1 °C
Test Date: Sep.12, 2009

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 – SN:743

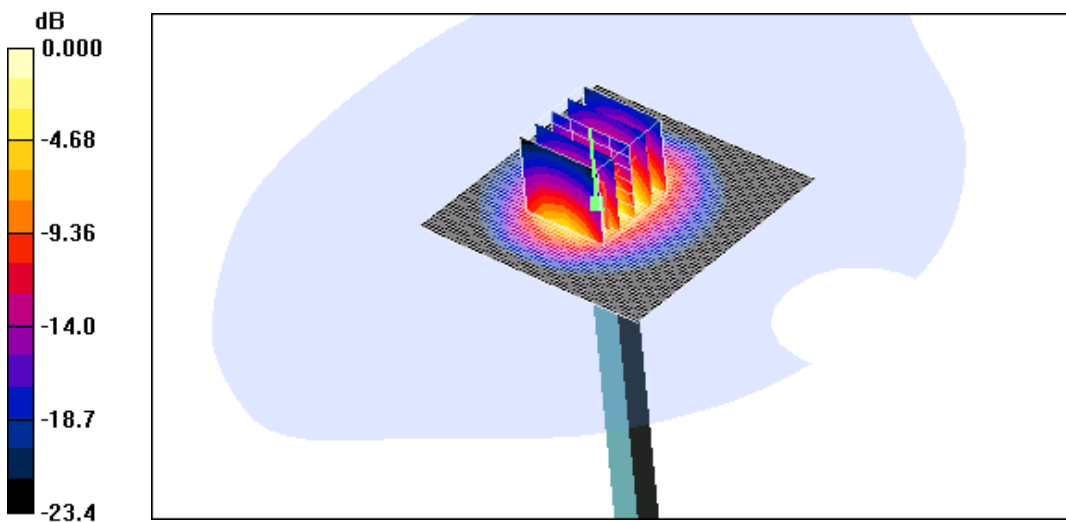
Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 2450 \text{ MHz}$; $\sigma = 1.84 \text{ mho/m}$; $\epsilon_r = 39.6$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 – SN1609; ConvF(4.54, 4.54, 4.54); Calibrated: 2009-03-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: SAM 1800/1900 MHz; Type: SAM

Validation 2450MHz/Area Scan (61x61x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 6.12 mW/g

Validation 2450MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 58.6 V/m; Power Drift = 0.005 dB
Peak SAR (extrapolated) = 11.7 W/kg
SAR(1 g) = 5.1 mW/g; SAR(10 g) = 2.32 mW/g
Maximum value of SAR (measured) = 5.60 mW/g



0 dB = 5.60mW/g

■ Validation Data (2450 MHz Head)

Test Laboratory: HCT CO., LTD
Input Power 100 mW (20 dBm)
Liquid Temp: 21.1 °C
Test Date: Sep.12, 2009

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 – SN:743

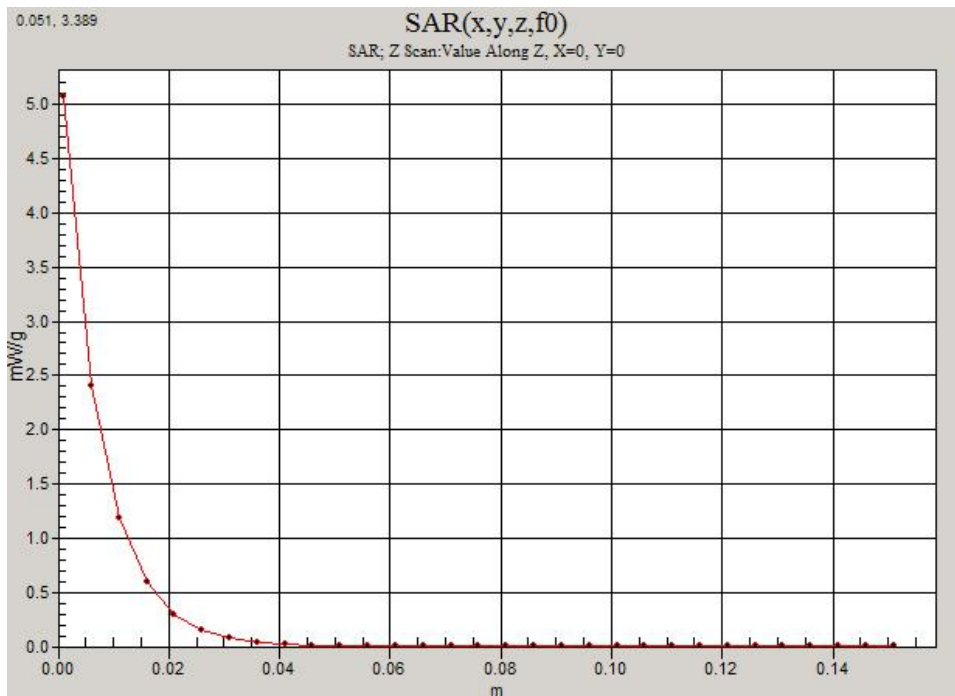
Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 2450$ MHz; $\sigma = 1.84$ mho/m; $\epsilon_r = 39.6$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 – SN1609; ConvF(4.54, 4.54, 4.54); Calibrated: 2009-03-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: SAM 1800/1900 MHz; Type: SAM

Validation 2450MHz/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 6.12 mW/g

Validation 2450MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 58.6 V/m; Power Drift = 0.005 dB
Peak SAR (extrapolated) = 11.7 W/kg
SAR(1 g) = 5.1 mW/g; SAR(10 g) = 2.32 mW/g
Maximum value of SAR (measured) = 5.60 mW/g



■ Dielectric Parameter (835 MHz Head)

Title GW550
 SubTitle GSM850(Head)
 Test Date Sep.11, 2009

Frequency	e'	e''
800000000	43.2818	19.6891
805000000	43.2355	19.5854
810000000	43.1604	19.5125
815000000	43.1154	19.5237
820000000	43.0048	19.4141
825000000	42.9301	19.4077
830000000	42.8264	19.3517
835000000	42.8077	19.2932
840000000	42.7022	19.2603
845000000	42.6843	19.2549
850000000	42.6296	19.2810
855000000	42.5898	19.2664
860000000	42.5322	19.2934
865000000	42.4850	19.3171
870000000	42.4795	19.3743
875000000	42.4830	19.3570
880000000	42.3940	19.4181
885000000	42.3954	19.4063
890000000	42.3550	19.4373
895000000	42.3451	19.4338
900000000	42.2824	19.4514

■ Dielectric Parameter (835 MHz Body)

Title GW550
 SubTitle GSM850(Body)
 Test Date Sep.11, 2009

Frequency	e'	e''
800000000	54.3719	21.4782
805000000	54.3863	21.4914
810000000	54.2949	21.4910
815000000	54.2306	21.5149
820000000	54.2106	21.5172
825000000	54.1363	21.5055
830000000	54.1230	21.5053
835000000	54.1014	21.4195
840000000	54.0849	21.3765
845000000	54.0015	21.3585
850000000	53.9991	21.3489
855000000	53.9400	21.3605
860000000	53.8382	21.3124
865000000	53.7803	21.2916
870000000	53.6978	21.3020
875000000	53.6011	21.2432
880000000	53.4750	21.2019
885000000	53.4003	21.1524
890000000	53.3467	21.1007
895000000	53.2875	21.1409
900000000	53.2384	21.1091

■ Dielectric Parameter (1900 MHz Head)

Title GW550
SubTitle WCDMA1900(Head)
Test Date Sep.12, 2009

Frequency	e'	e''
1800000000	39.8815	13.1030
1810000000	39.8351	13.1180
1820000000	39.7771	13.1221
1830000000	39.7410	13.1402
1840000000	39.6485	13.1333
1850000000	39.5553	13.1185
1860000000	39.5031	13.1386
1870000000	39.4532	13.1843
1880000000	39.4028	13.2691
1890000000	39.3997	13.3090
1900000000	39.3918	13.3904
1910000000	39.3590	13.4074
1920000000	39.3443	13.4601
1930000000	39.3035	13.4794
1940000000	39.2623	13.4873
1950000000	39.1772	13.4623
1960000000	39.1202	13.4607
1970000000	39.0417	13.4561
1980000000	38.9863	13.5069
1990000000	38.9246	13.5067
2000000000	38.8739	13.5519

■ Dielectric Parameter (1900 MHz Body)

Title GW550
 SubTitle WCDMA1900(Body)
 Test Date Sep.12, 2009

Frequency	e'	e''
1800000000	52.2894	13.5918
1810000000	52.2467	13.6765
1820000000	52.2022	13.7521
1830000000	52.1447	13.8429
1840000000	52.1516	13.9389
1850000000	52.1117	13.9825
1860000000	52.0814	14.0467
1870000000	52.0695	14.1090
1880000000	52.0388	14.1918
1890000000	52.0163	14.2852
1900000000	52.0647	14.3510
1910000000	52.0824	14.4119
1920000000	51.9672	14.4465
1930000000	52.0093	14.4706
1940000000	52.1249	14.4985
1950000000	52.1642	14.5350
1960000000	52.1110	14.5819
1970000000	52.1072	14.6332
1980000000	52.0946	14.6390
1990000000	52.0684	14.7155
2000000000	52.0012	14.7056

■ Dielectric Parameter (2450 MHz Head)

Title GW550
SubTitle 2450 MHz(Head)
Test Date Sep.12, 2009

Frequency	e'	e''
2400000000.0000	39.9477	13.3988
2405000000.0000	39.9386	13.3877
2410000000.0000	39.9067	13.3961
2415000000.0000	39.8232	13.4035
2420000000.0000	39.7975	13.4153
2425000000.0000	39.7497	13.4011
2430000000.0000	39.7436	13.4415
2435000000.0000	39.7013	13.4595
2440000000.0000	39.6804	13.4790
2445000000.0000	39.6307	13.4811
2450000000.0000	39.6072	13.5002
2455000000.0000	39.6293	13.5390
2460000000.0000	39.5999	13.5606
2465000000.0000	39.5805	13.5706
2470000000.0000	39.5472	13.5901
2475000000.0000	39.5148	13.5976
2480000000.0000	39.4703	13.6102
2485000000.0000	39.3416	13.5842
2490000000.0000	39.3126	13.5752
2495000000.0000	39.2068	13.5329
2500000000.0000	39.0677	13.4839

■ Dielectric Parameter (2450 MHz Body)

Title GW550
 SubTitle 2450 MHz (Body)
 Test Date Sep.12, 2009

Frequency	e'	e''
2400000000	51.9435	14.1205
2405000000	51.9513	14.1478
2410000000	51.8882	14.1779
2415000000	51.8582	14.1741
2420000000	51.8161	14.2083
2425000000	51.7909	14.2139
2430000000	51.7786	14.2860
2435000000	51.7521	14.2900
2440000000	51.7124	14.3336
2445000000	51.6764	14.3650
2450000000	51.6789	14.4117
2455000000	51.6551	14.4432
2460000000	51.6285	14.4484
2465000000	51.6793	14.4905
2470000000	51.6421	14.5135
2475000000	51.6080	14.5326
2480000000	51.6656	14.5699
2485000000	51.6157	14.5645
2490000000	51.6312	14.6034
2495000000	51.6344	14.5976
2500000000	51.6141	14.6113

Attachment 3. – Probe Calibration Data

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Accreditation No.: SCS 108

Client **HCT (Dymstec)**

Certificate No: ET3-1609_Mar09

CALIBRATION CERTIFICATE

Object **ET3DV6 - SN:1609**

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: **March 17, 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 E4419B	GB41293874	1-Apr-08 (No. 217-00788)	Apr-09
Power sensor E4412A	MY41495277	1-Apr-08 (No. 217-00788)	Apr-09
Power sensor E4412A	MY41498087	1-Apr-08 (No. 217-00788)	Apr-09
Reference 3 dB Attenuator	SN: S5054 (3c)	1-Jul-08 (No. 217-00865)	Jul-09
Reference 20 dB Attenuator	SN: S5086 (20b)	31-Mar-08 (No. 217-00787)	Apr-09
Reference 30 dB Attenuator	SN: S5129 (30b)	1-Jul-08 (No. 217-00866)	Jul-09
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

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

Issued: March 17, 2009

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

Certificate No: ET3-1609_Mar09

Page 1 of 9

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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:

- 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 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:1609

March 17, 2009

Probe ET3DV6

SN:1609

Manufactured:	July 21, 2001
Last calibrated:	August 30, 2007
Recalibrated:	March 17, 2009

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

ET3DV6 SN:1609

March 17, 2009

DASY - Parameters of Probe: ET3DV6 SN:1609

Sensitivity in Free Space^A

NormX	1.97 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$
NormY	1.87 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$
NormZ	1.82 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$

Diode Compression^B

DCP X	93 mV
DCP Y	90 mV
DCP Z	93 mV

Sensitivity in Tissue Simulating Liquid (Conversion Factors)

Please see Page 8.

Boundary Effect

TSL 900 MHz Typical SAR gradient: 5 % per mm

Sensor Center to Phantom Surface Distance	3.7 mm	4.7 mm
SAR _{be} [%] Without Correction Algorithm	11.4	7.0
SAR _{be} [%] With Correction Algorithm	0.9	0.5

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	13.8	9.5
SAR _{be} [%] With Correction Algorithm	0.9	0.6

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).

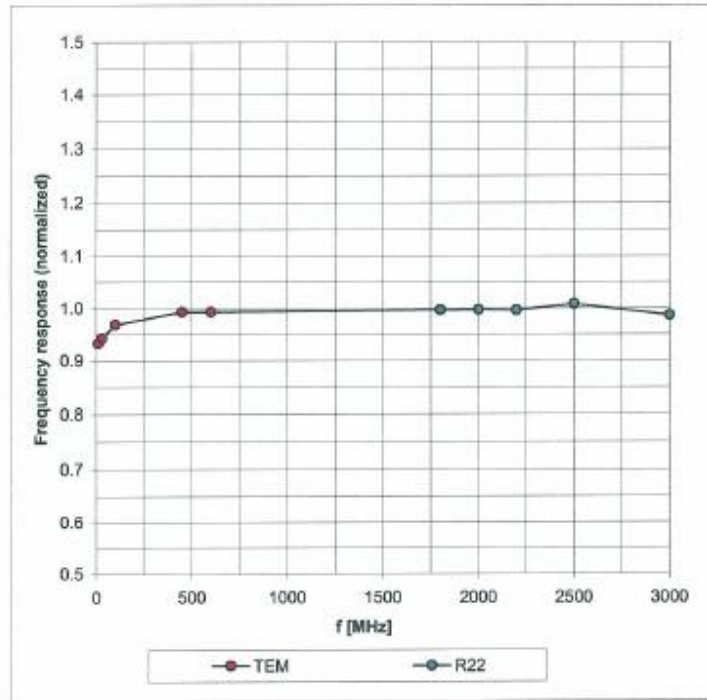
^B Numerical linearization parameter: uncertainty not required

ET3DV6 SN:1609

March 17, 2009

Frequency Response of E-Field

(TEM-Cell: Ifi110 EXX, Waveguide: R22)

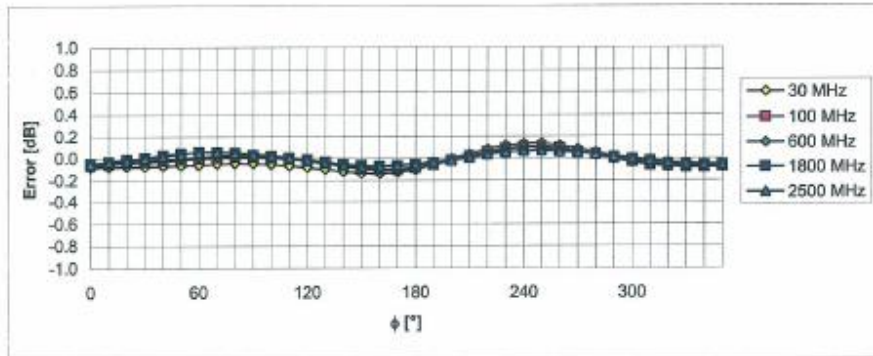
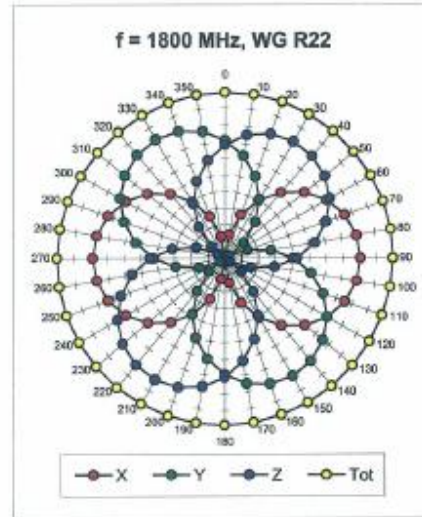
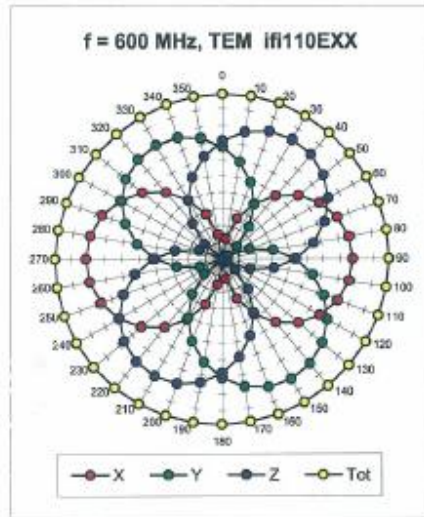


Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ (k=2)

ET3DV6 SN:1609

March 17, 2009

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

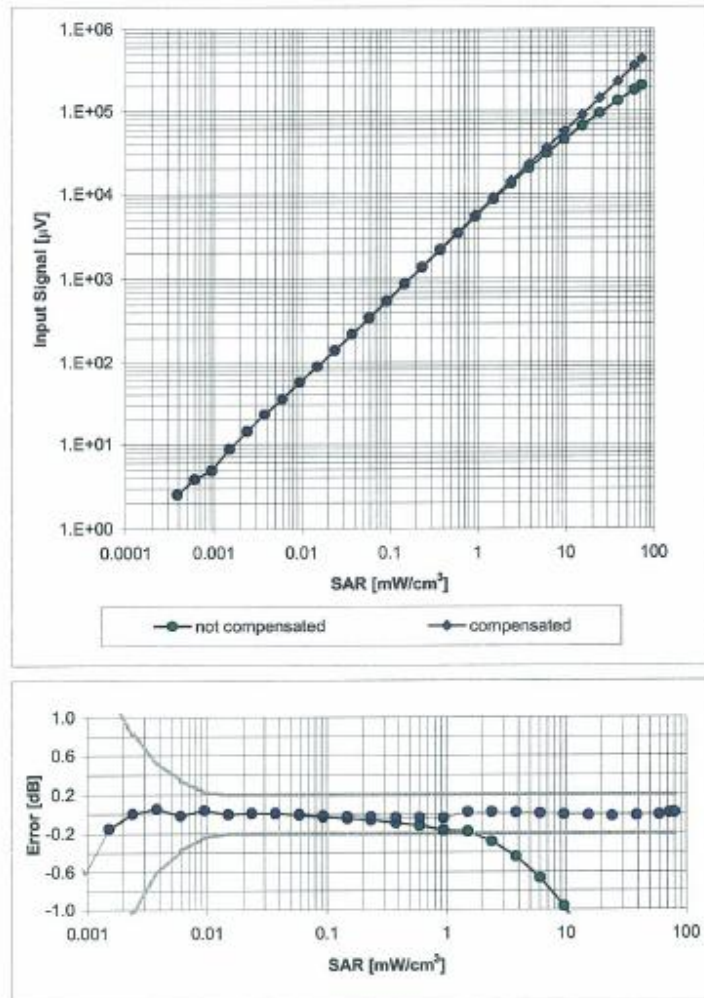


Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ ($k=2$)

ET3DV6 SN:1609

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

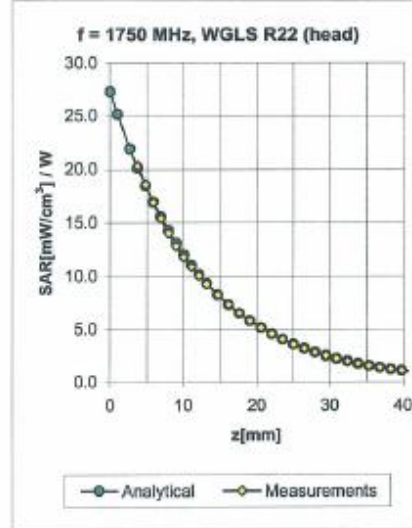
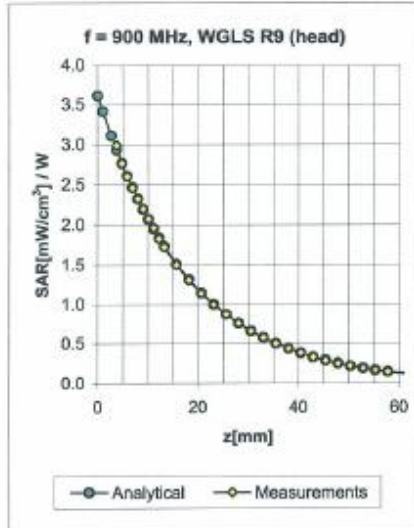


Uncertainty of Linearity Assessment: $\pm 0.6\%$ (k=2)

ET3DV6 SN:1609

March 17, 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%	0.38	1.91	6.91 ± 13.3% (k=2)
835	± 50 / ± 100	Head	41.5 ± 5%	0.90 ± 5%	0.25	2.80	6.25 ± 11.0% (k=2)
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.25	2.80	6.11 ± 11.0% (k=2)
1750	± 50 / ± 100	Head	40.1 ± 5%	1.37 ± 5%	0.39	3.57	5.39 ± 11.0% (k=2)
1900	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.50	2.75	5.12 ± 11.0% (k=2)
1950	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.55	2.52	5.01 ± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.99	1.76	4.54 ± 11.0% (k=2)
450	± 50 / ± 100	Body	56.7 ± 5%	0.94 ± 5%	0.30	1.92	7.48 ± 13.3% (k=2)
835	± 50 / ± 100	Body	55.2 ± 5%	0.97 ± 5%	0.25	2.85	6.08 ± 11.0% (k=2)
1750	± 50 / ± 100	Body	53.4 ± 5%	1.49 ± 5%	0.77	3.05	4.89 ± 11.0% (k=2)
1900	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.99	2.60	4.61 ± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.99	1.78	4.00 ± 11.0% (k=2)

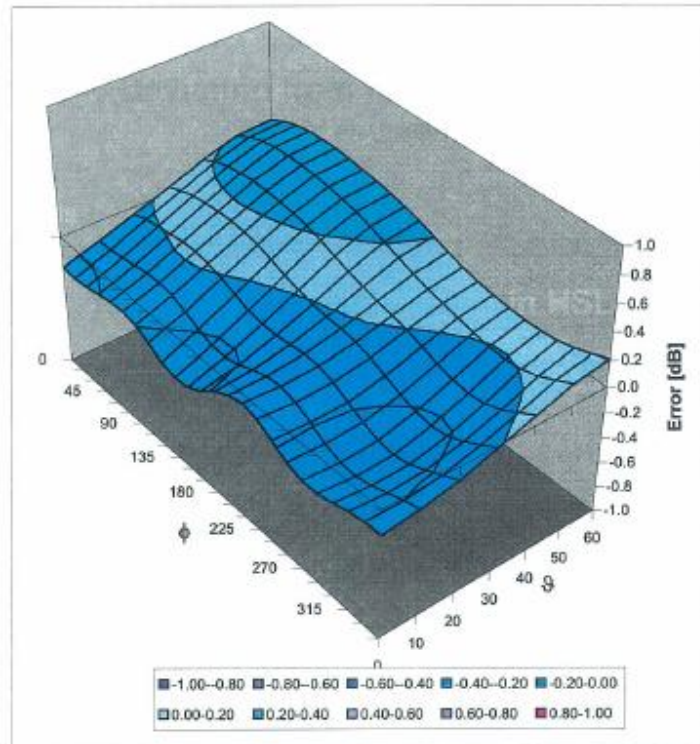
^c The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

ET3DV6 SN:1609

March 17, 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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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 cm³ (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 cm³ (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: $f = 835$ MHz; $\sigma = 0.89$ mho/m; $\epsilon_r = 40.7$; $\rho = 1000$ kg/m³

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

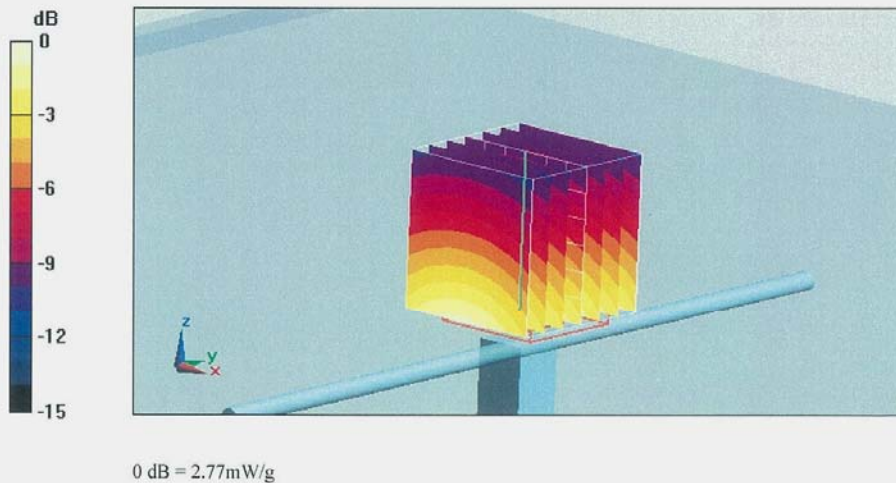
Pin=250mW; dip=15mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

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

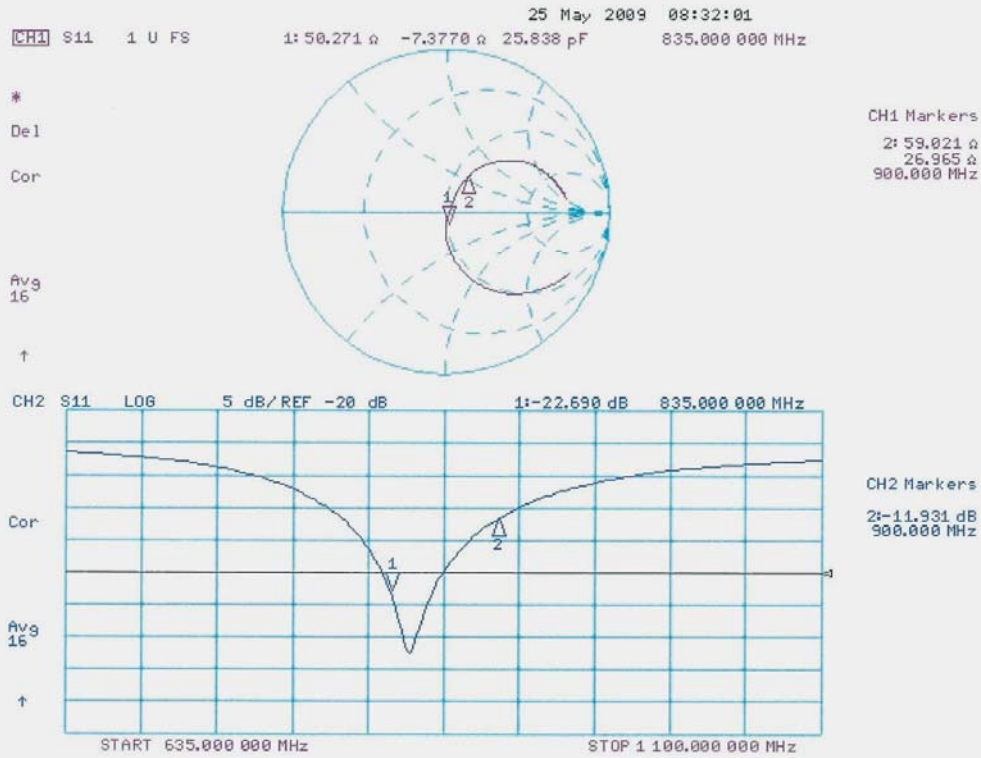
Peak SAR (extrapolated) = 3.53 W/kg

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

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

Issued: July 22, 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
- 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

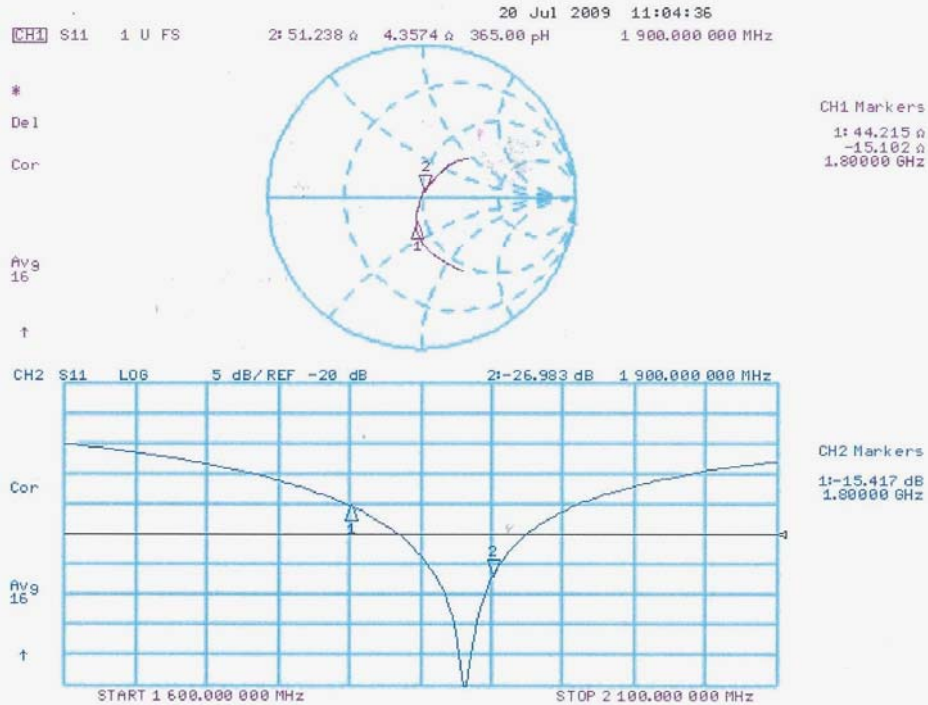
SAR(1 g) = 10.2 mW/g; SAR(10 g) = 5.36 mW/g

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



0 dB = 12.8mW/g

Impedance Measurement Plot for Head TSL



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Accreditation No.: **SCS 108**

Client **H-CT (Dymstec)**

Certificate No: **D2450V2-743_Aug08**

CALIBRATION CERTIFICATE

Object **D2450V2 - SN: 743**

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

Calibration date: **August 27, 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 $(22 \pm 3)^{\circ}\text{C}$ and humidity $< 70\%$.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	04-Oct-07 (No. 217-00736)	Oct-08
Power sensor HP 8481A	US37292783	04-Oct-07 (No. 217-00736)	Oct-08
Reference 20 dB Attenuator	SN: S5086 (20g)	01-Jul-08 (No. 217-00864)	Jul-09
Type-N mismatch combination	SN: 5047.2 / 06327	01-Jul-08 (No. 217-00867)	Jul-09
Reference Probe ES3DV2	SN: 3025	28-Apr-08 (No. ES3-3025_Apr08)	Apr-09
DAE4	SN: 601	14-Mar-08 (No. DAE4-601_Mar08)	Mar-09
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-07)	In house check: Oct-08

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

Issued: August 27, 2008

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Certificate No: D2450V2-743_Aug08

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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 V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz $\pm$ 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	38.1 $\pm$ 6 %	1.80 mho/m $\pm$ 6 %
Head TSL temperature during test	(22.0 $\pm$ 0.2) °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.3 mW / g
SAR normalized	normalized to 1W	53.2 mW / g
SAR for nominal Head TSL parameters ¹	normalized to 1W	52.4 mW / g $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.17 mW / g
SAR normalized	normalized to 1W	24.7 mW / g
SAR for nominal Head TSL parameters ¹	normalized to 1W	24.4 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	53.8 Ω + 3.8 j Ω
Return Loss	- 25.8 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.162 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	December 01, 2003

DASY5 Validation Report for Head TSL

Date/Time: 27.08.2008 11:29:32

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN743

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: HSL U10 BB

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.8$ mho/m; $\epsilon_r = 38.1$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Probe: ES3DV2 - SN3025; ConvF(4.4, 4.4, 4.4); Calibrated: 28.04.2008
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 14.03.2008
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- Measurement SW: DASY5, V5.0 Build 119; SEMCAD X Version 13.2 Build 87

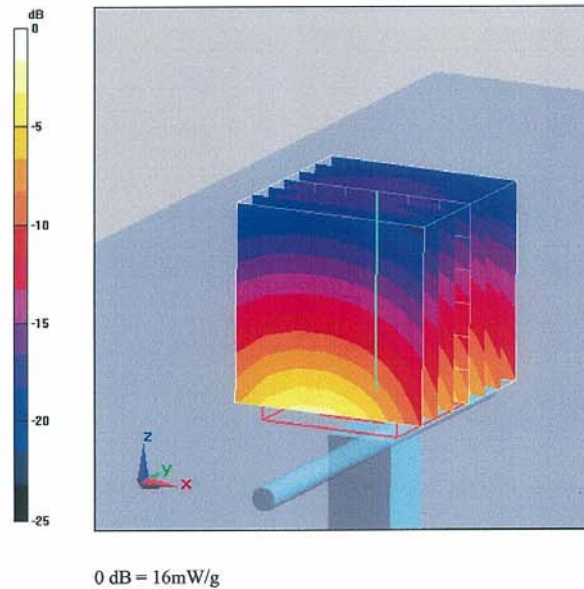
Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 96.6 V/m; Power Drift = 0.054 dB

Peak SAR (extrapolated) = 28.2 W/kg

SAR(1 g) = 13.3 mW/g; SAR(10 g) = 6.17 mW/g

Maximum value of SAR (measured) = 16 mW/g



Impedance Measurement Plot for Head TSL

