Test Laboratory:	HCT CO., LTD
EUT Type:	Dual-Band Dual-Mode GSM/WCDMA Phone with Bluetooth
Liquid Temperature:	21.3 ℃
Ambient Temperature:	21.5 ℃
Test Date:	Mar.21, 2010

DUT: P9050; Type: Bar; Serial: #1

Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.975 mho/m; ε_r = 54.3; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176

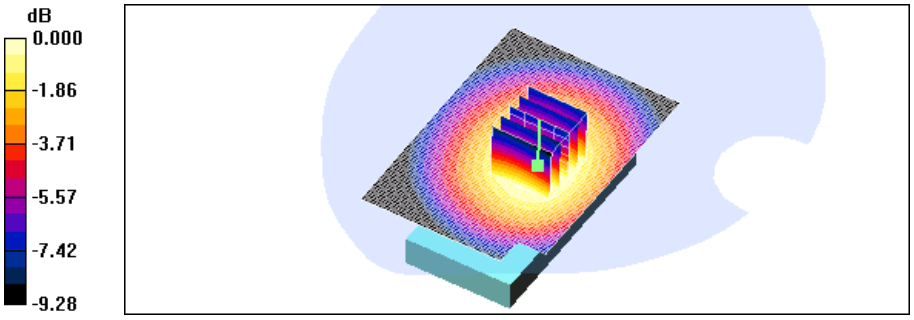
DASY4 Configuration:
- Probe: ET3DV6 - SN1798; ConvF(6.4, 6.4, 6.4); Calibrated: 2010-02-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2009-09-18
- Phantom: SAM 835/900 MHz; Type: SAM

WCDMA850 Body 4183/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.725 mW/g

WCDMA850 Body 4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.4 V/m; Power Drift = 0.007 dB
Peak SAR (extrapolated) = 0.878 W/kg
SAR(1 g) = 0.683 mW/g; SAR(10 g) = 0.501 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.725 mW/g



0 dB = 0.725mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	Dual-Band Dual-Mode GSM/WCDMA Phone with Bluetooth
Liquid Temperature:	21.3 ℃
Ambient Temperature:	21.5 ℃
Test Date:	Mar.21, 2010

DUT: P9050; Type: Bar; Serial: #1

Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.975 mho/m; ε_r = 54.3; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176

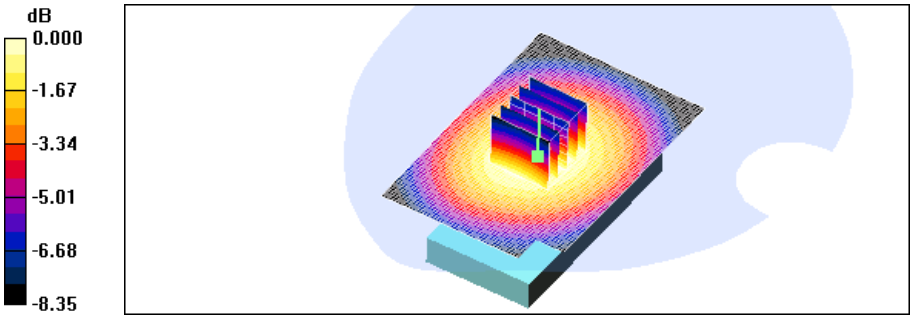
DASY4 Configuration:
- Probe: ET3DV6 - SN1798; ConvF(6.4, 6.4, 6.4); Calibrated: 2010-02-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2009-09-18
- Phantom: SAM 835/900 MHz; Type: SAM

WCDMA850 Body 4183/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.490 mW/g

WCDMA850 Body 4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.4 V/m; Power Drift = -0.045 dB
Peak SAR (extrapolated) = 0.580 W/kg
SAR(1 g) = 0.469 mW/g; SAR(10 g) = 0.352 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.494 mW/g



0 dB = 0.494mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Dual-Band Dual-Mode GSM/WCDMA Phone with Bluetooth
Liquid Temperature: 21.3 ℃
Ambient Temperature: 21.5 ℃
Test Date: Mar.22, 2010

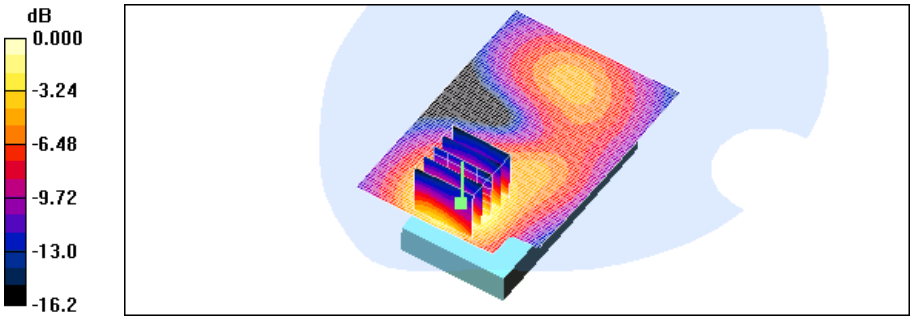
DUT: P9050; Type: Bar; Serial: #1

Communication System: WCDMA1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.47 mho/m; ε_r = 53.7; ρ = 1000 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 - SN1798; ConvF(4.65, 4.65, 4.65); Calibrated: 2010-02-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2009-09-18
- Phantom: SAM 1800/1900 MHz; Type: SAM

WCDMA1900 Body 9400/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.600 mW/g

WCDMA1900 Body 9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.1 V/m; Power Drift = 0.021 dB
Peak SAR (extrapolated) = 0.824 W/kg
SAR(1 g) = 0.548 mW/g; SAR(10 g) = 0.321 mW/g
Maximum value of SAR (measured) = 0.609 mW/g



0 dB = 0.609mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	Dual-Band Dual-Mode GSM/WCDMA Phone with Bluetooth
Liquid Temperature:	21.3 ℃
Ambient Temperature:	21.5 ℃
Test Date:	Mar.22, 2010

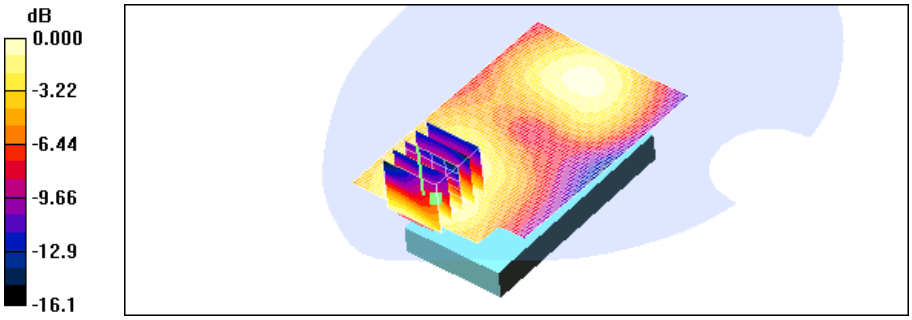
DUT: P9050; Type: Bar; Serial: #1

Communication System: WCDMA1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.47 mho/m; ε_r = 53.7; ρ = 1000 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 - SN1798; ConvF(4.65, 4.65, 4.65); Calibrated: 2010-02-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2009-09-18
- Phantom: SAM 1800/1900 MHz; Type: SAM

WCDMA1900 Body 9400/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.168 mW/g

WCDMA1900 Body 9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.8 V/m; Power Drift = 0.146 dB
Peak SAR (extrapolated) = 0.227 W/kg
SAR(1 g) = 0.160 mW/g; SAR(10 g) = 0.102 mW/g
Maximum value of SAR (measured) = 0.171 mW/g



0 dB = 0.171mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	Dual-Band Dual-Mode GSM/WCDMA Phone with Bluetooth
Liquid Temperature:	21.3 ℃
Ambient Temperature:	21.5 ℃
Test Date:	Mar.21, 2010

DUT: P9050; 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; σ = 0.89 mho/m; ε_r = 42.1; ρ = 1000 kg/m^3
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176

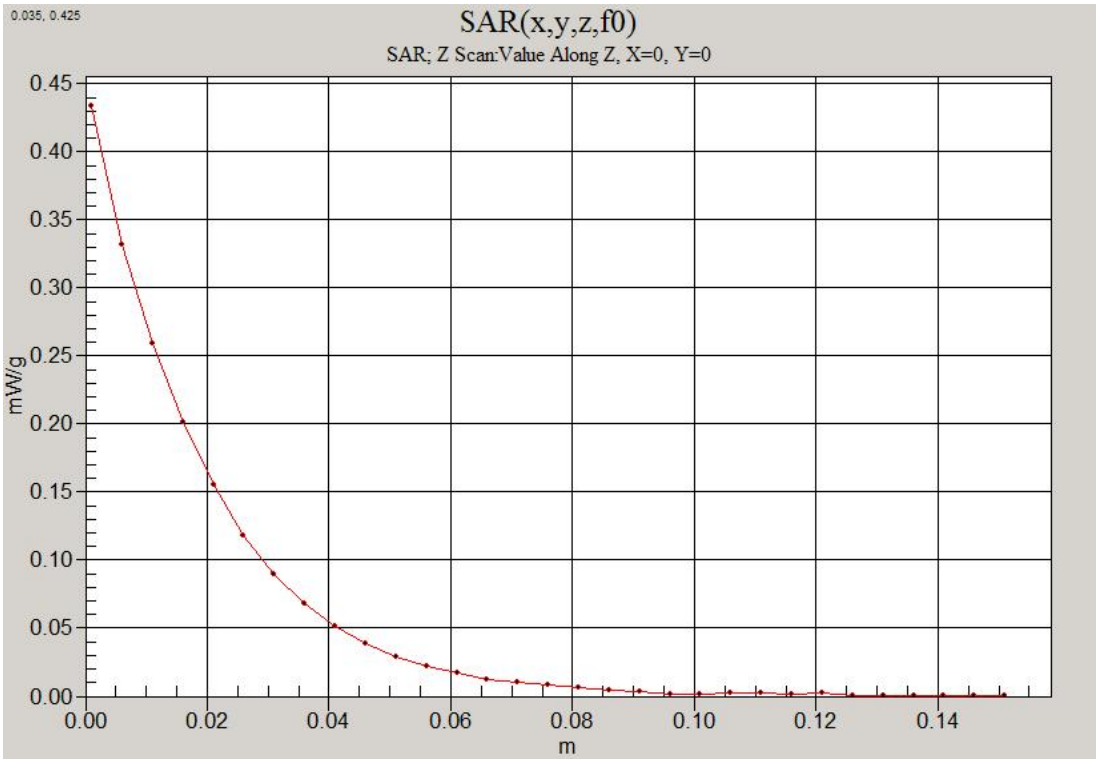
DASY4 Configuration:
- Probe: ET3DV6 - SN1798; ConvF(6.37, 6.37, 6.37); Calibrated: 2010-02-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2009-09-18
- Phantom: SAM 835/900 MHz; Type: SAM

Left touch 190/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.442 mW/g

Left touch 190/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.8 V/m; Power Drift = -0.124 dB
Peak SAR (extrapolated) = 0.518 W/kg
SAR(1 g) = 0.412 mW/g; SAR(10 g) = 0.307 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.433 mW/g



Test Laboratory:	HCT CO., LTD
EUT Type:	Dual-Band Dual-Mode GSM/WCDMA Phone with Bluetooth
Liquid Temperature:	21.3 ℃
Ambient Temperature:	21.5 ℃
Test Date:	Mar.21, 2010

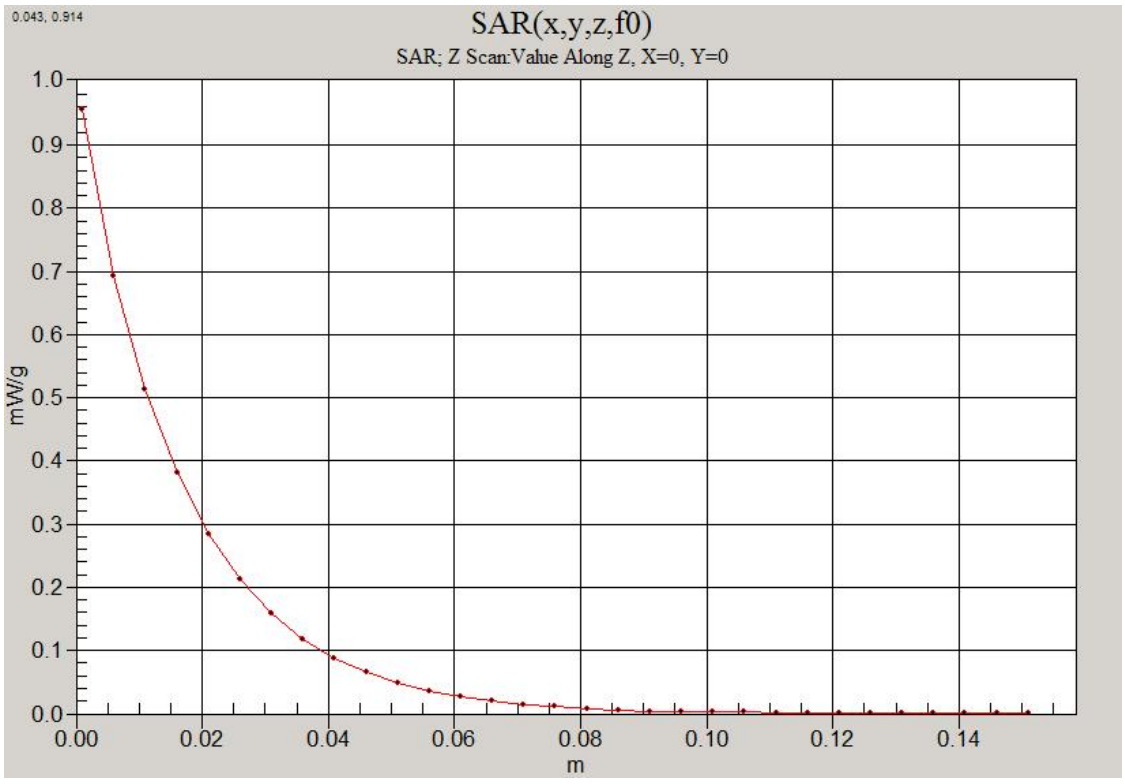
DUT: P9050; Type: Bar; Serial: #1

Communication System: GSM 850; Frequency: 824.2 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 825 MHz; σ = 0.88 mho/m; ε_r = 42.2; ρ = 1000 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 - SN1798; ConvF(6.37, 6.37, 6.37); Calibrated: 2010-02-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2009-09-18
- Phantom: SAM 835/900 MHz; Type: SAM

GSM850 Body 128/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.01 mW/g

GSM850 Body 128/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.2 V/m; Power Drift = -0.017 dB
Peak SAR (extrapolated) = 1.22 W/kg
SAR(1 g) = 0.931 mW/g; SAR(10 g) = 0.680 mW/g
Maximum value of SAR (measured) = 0.983 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: Dual-Band Dual-Mode GSM/WCDMA Phone with Bluetooth
Liquid Temperature: 21.3 ℃
Ambient Temperature: 21.5 ℃
Test Date: Mar.22, 2010

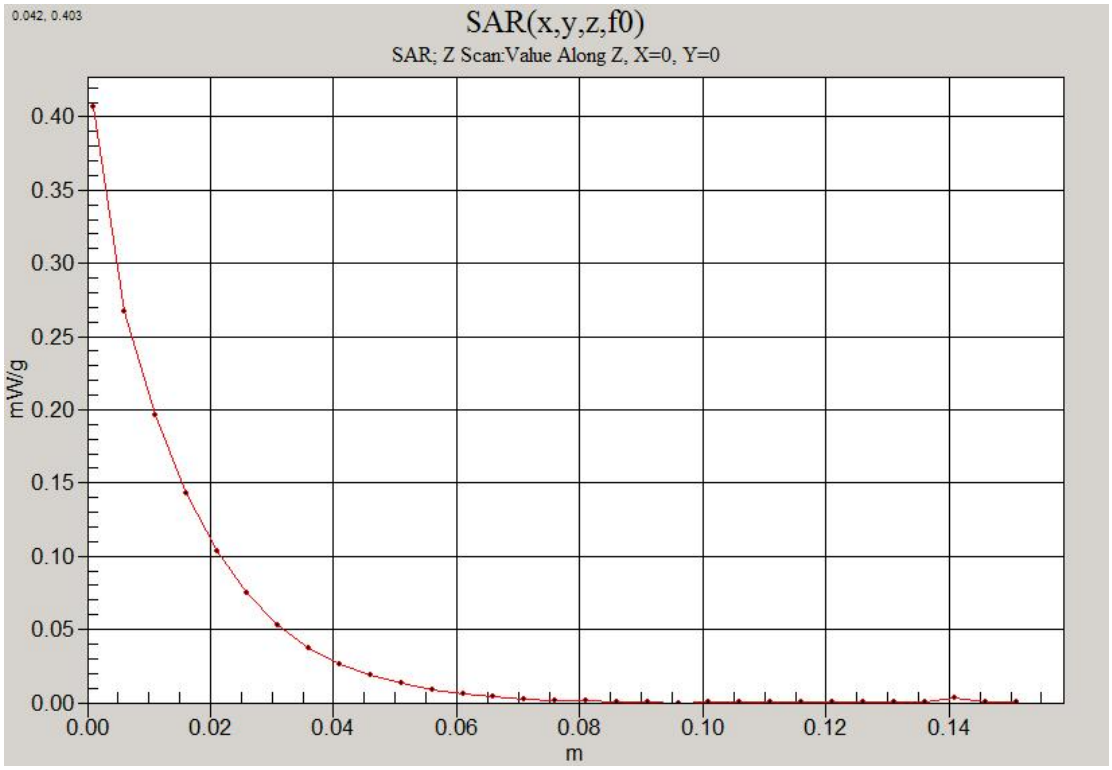
DUT: P9050; Type: Bar; Serial: #1

Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1880 MHz; σ = 1.38 mho/m; ε_r = 41.7; ρ = 1000 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 - SN1798; ConvF(5.3, 5.3, 5.3); Calibrated: 2010-02-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2009-09-18
- Phantom: SAM 1800/1900 MHz; Type: SAM

Left touch 661/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.413 mW/g

Left touch 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.08 V/m; Power Drift = -0.021 dB
Peak SAR (extrapolated) = 0.514 W/kg
SAR(1 g) = 0.371 mW/g; SAR(10 g) = 0.236 mW/g
Maximum value of SAR (measured) = 0.401 mW/g



Test Laboratory:	HCT CO., LTD
EUT Type:	Dual-Band Dual-Mode GSM/WCDMA Phone with Bluetooth
Liquid Temperature:	21.3 ℃
Ambient Temperature:	21.5 ℃
Test Date:	Mar.22, 2010

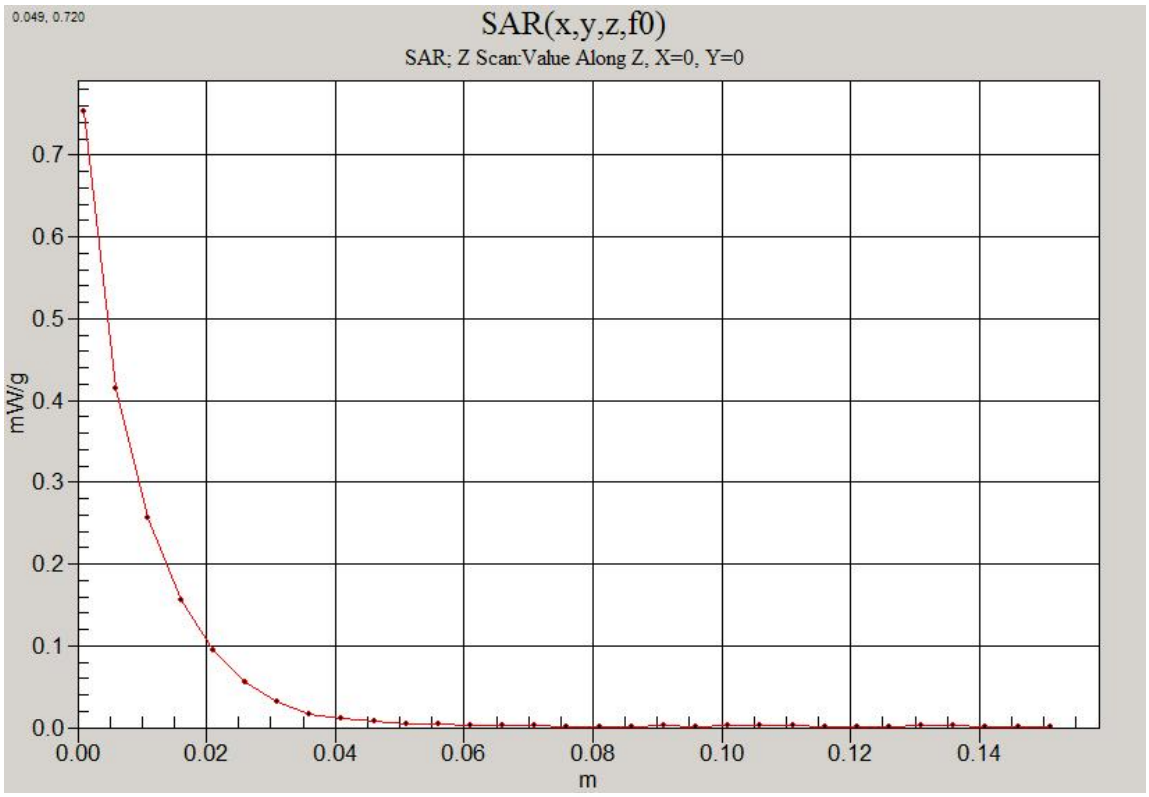
DUT: P9050; Type: Bar; Serial: #1

Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 1880 MHz; σ = 1.47 mho/m; ε_r = 53.7; ρ = 1000 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 - SN1798; ConvF(4.65, 4.65, 4.65); Calibrated: 2010-02-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2009-09-18
- Phantom: SAM 1800/1900 MHz; Type: SAM

GSM1900 Body 661/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.719 mW/g

GSM1900 Body 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.6 V/m; Power Drift = 0.097 dB
Peak SAR (extrapolated) = 0.952 W/kg
SAR(1 g) = 0.650 mW/g; SAR(10 g) = 0.379 mW/g
Maximum value of SAR (measured) = 0.729 mW/g



Test Laboratory:	HCT CO., LTD
EUT Type:	Dual-Band Dual-Mode GSM/WCDMA Phone with Bluetooth
Liquid Temperature:	21.3 ℃
Ambient Temperature:	21.5 ℃
Test Date:	Mar.21, 2010

DUT: P9050; Type: Bar; Serial: #1

Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.89 mho/m; ε_r = 42.1; ρ = 1000 kg/m^3
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176

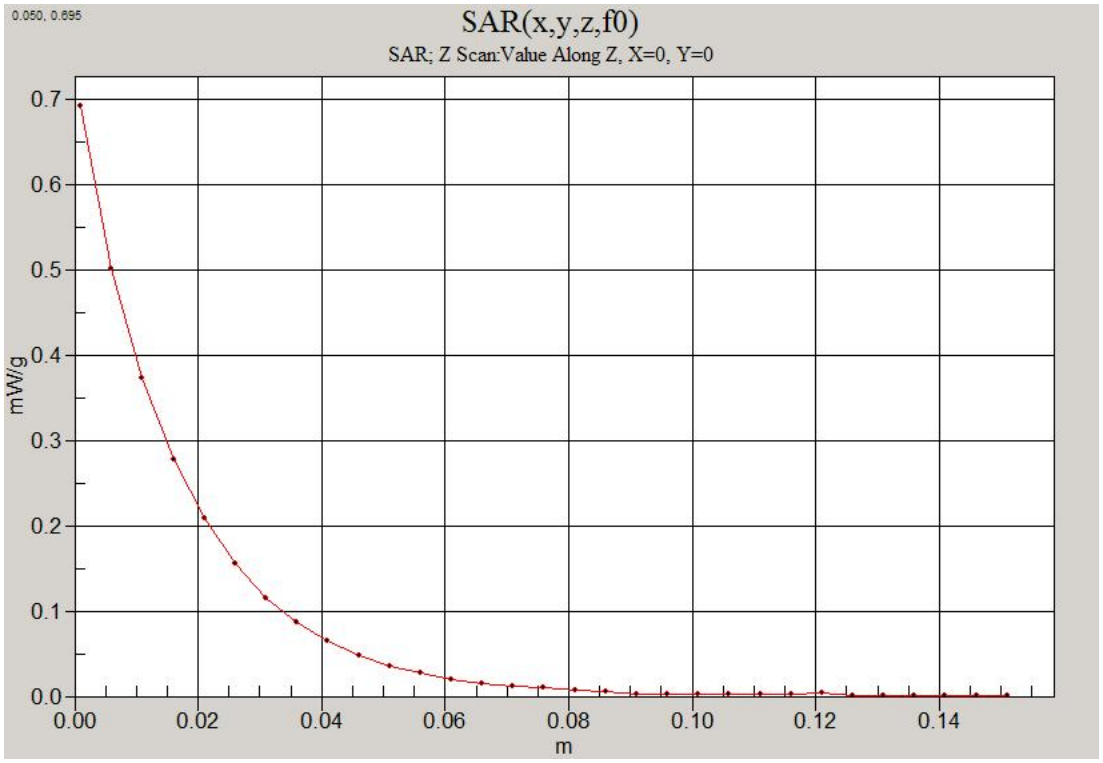
DASY4 Configuration:
- Probe: ET3DV6 - SN1798; ConvF(6.37, 6.37, 6.37); Calibrated: 2010-02-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2009-09-18
- Phantom: SAM 835/900 MHz; Type: SAM

Left touch 4183/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.671 mW/g

Left touch 4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.4 V/m; Power Drift = 0.039 dB
Peak SAR (extrapolated) = 0.890 W/kg
SAR(1 g) = 0.649 mW/g; SAR(10 g) = 0.468 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.695 mW/g



Test Laboratory:	HCT CO., LTD
EUT Type:	Dual-Band Dual-Mode GSM/WCDMA Phone with Bluetooth
Liquid Temperature:	21.3 ℃
Ambient Temperature:	21.5 ℃
Test Date:	Mar.21, 2010

DUT: P9050; Type: Bar; Serial: #1

Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.975 mho/m; ε_r = 54.3; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176

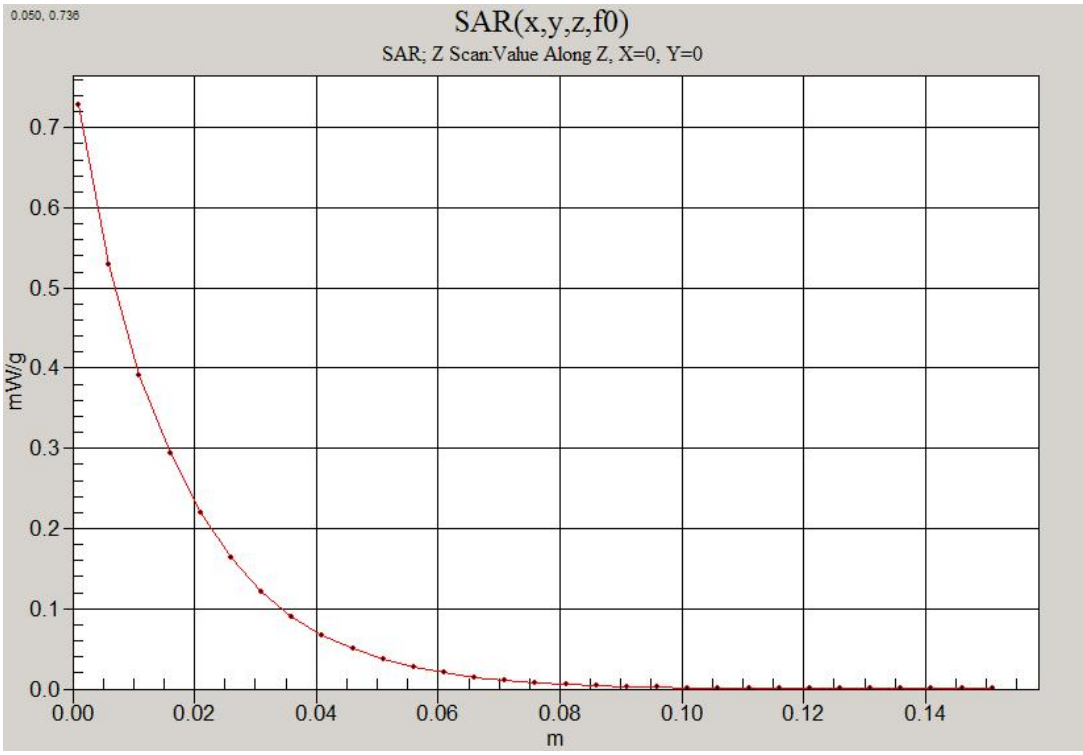
DASY4 Configuration:
- Probe: ET3DV6 - SN1798; ConvF(6.4, 6.4, 6.4); Calibrated: 2010-02-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2009-09-18
- Phantom: SAM 835/900 MHz; Type: SAM

WCDMA850 Body 4183/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.725 mW/g

WCDMA850 Body 4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.4 V/m; Power Drift = 0.007 dB
Peak SAR (extrapolated) = 0.878 W/kg
SAR(1 g) = 0.683 mW/g; SAR(10 g) = 0.501 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.725 mW/g



Test Laboratory:	HCT CO., LTD
EUT Type:	Dual-Band Dual-Mode GSM/WCDMA Phone with Bluetooth
Liquid Temperature:	21.3 ℃
Ambient Temperature:	21.5 ℃
Test Date:	Mar.22, 2010

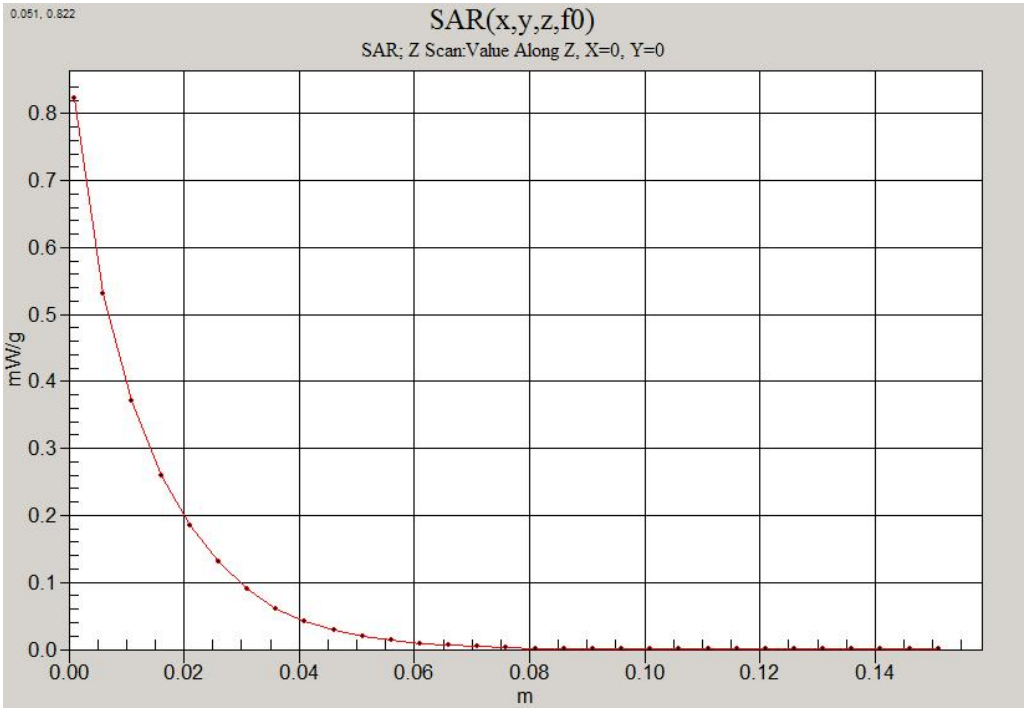
DUT: P9050; Type: Bar; Serial: #1

Communication System: WCDMA1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.38 mho/m; ε_r = 41.7; ρ = 1000 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 - SN1798; ConvF(5.3, 5.3, 5.3); Calibrated: 2010-02-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2009-09-18
- Phantom: SAM 1800/1900 MHz; Type: SAM

Left touch 9400/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.836 mW/g

Left touch 9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.5 V/m; Power Drift = 0.167 dB
Peak SAR (extrapolated) = 1.07 W/kg
SAR(1 g) = 0.746 mW/g; SAR(10 g) = 0.458 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: Dual-Band Dual-Mode GSM/WCDMA Phone with Bluetooth
Liquid Temperature: 21.3 ℃
Ambient Temperature: 21.5 ℃
Test Date: Mar.22, 2010

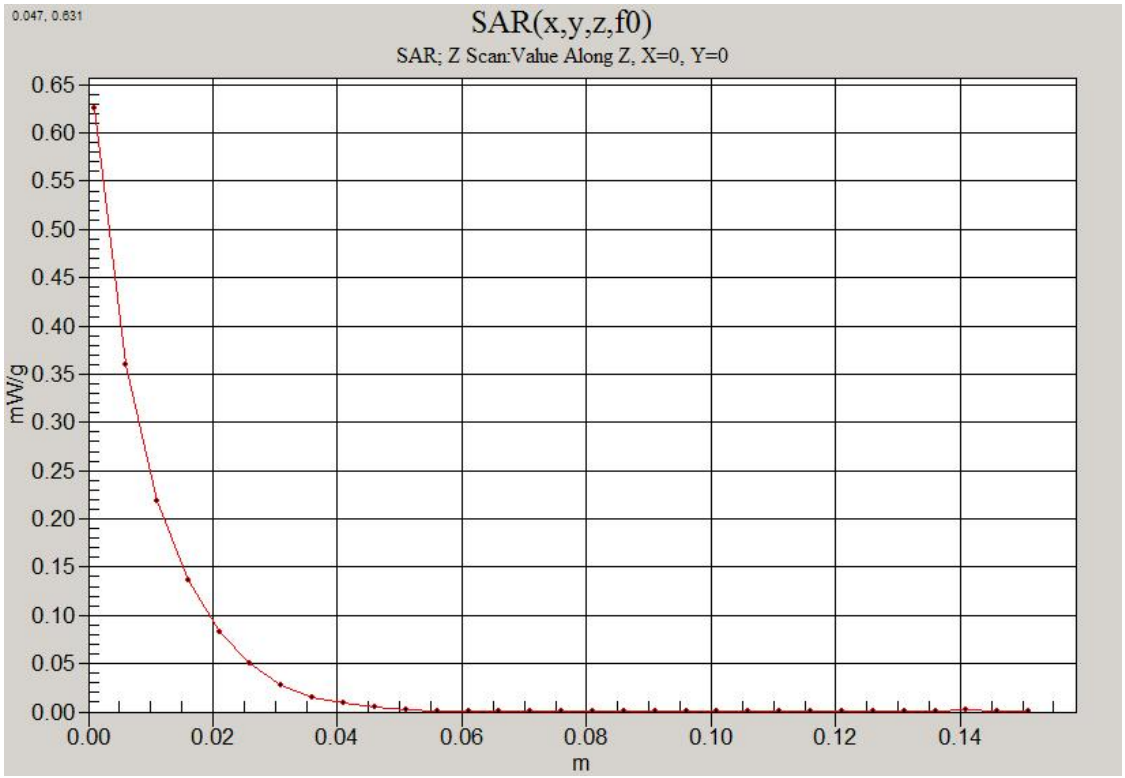
DUT: P9050; Type: Bar; Serial: #1

Communication System: WCDMA1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.47 mho/m; ε_r = 53.7; ρ = 1000 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 - SN1798; ConvF(4.65, 4.65, 4.65); Calibrated: 2010-02-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2009-09-18
- Phantom: SAM 1800/1900 MHz; Type: SAM

WCDMA1900 Body 9400/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.600 mW/g

WCDMA1900 Body 9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.1 V/m; Power Drift = 0.021 dB
Peak SAR (extrapolated) = 0.824 W/kg
SAR(1 g) = 0.548 mW/g; SAR(10 g) = 0.321 mW/g
Maximum value of SAR (measured) = 0.609 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: 21.3 ℃

Test Date: Mar.21, 2010

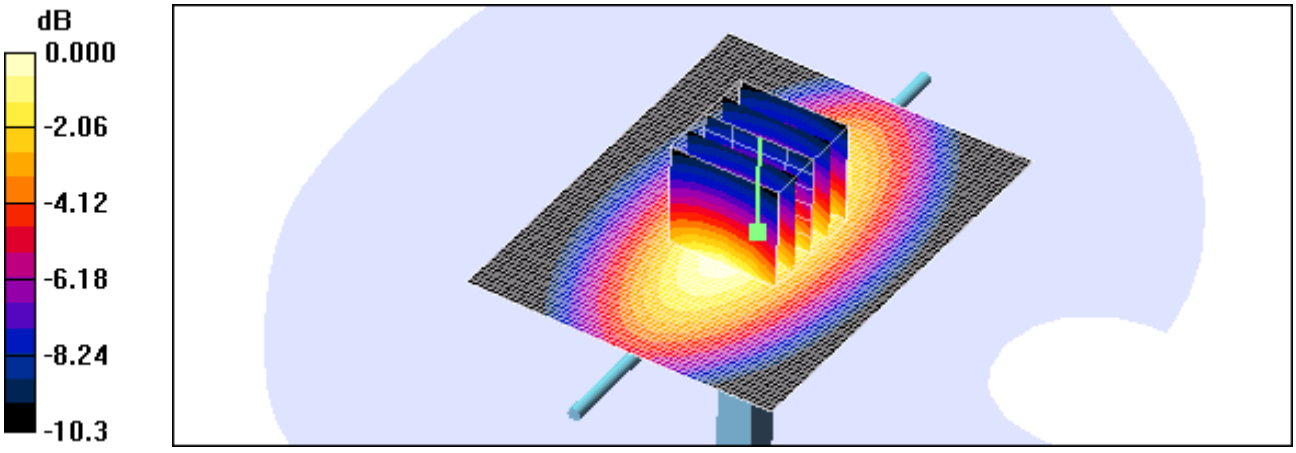
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 – SN:441

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.889 mho/m; ε_r = 42.1; ρ = 1000 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 - SN1798; ConvF(6.37, 6.37, 6.37); Calibrated: 2010-02-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2009-09-18
- Phantom: SAM 835/900 MHz; Type: SAM

Validation 835 MHz/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 10.9 mW/g

Validation 835 MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 114.5 V/m; Power Drift = -0.021 dB
Peak SAR (extrapolated) = 14.4 W/kg
SAR(1 g) = 9.86 mW/g; SAR(10 g) = 6.5 mW/g
Maximum value of SAR (measured) = 10.7 mW/g



0 dB = 10.7mW/g

■ Validation Data (1900 MHz Head)

Test Laboratory: HCT CO., LTD

Input Power 100 mW (20 dBm)

Liquid Temp: 21.3 ℃

Test Date: Mar.22, 2010

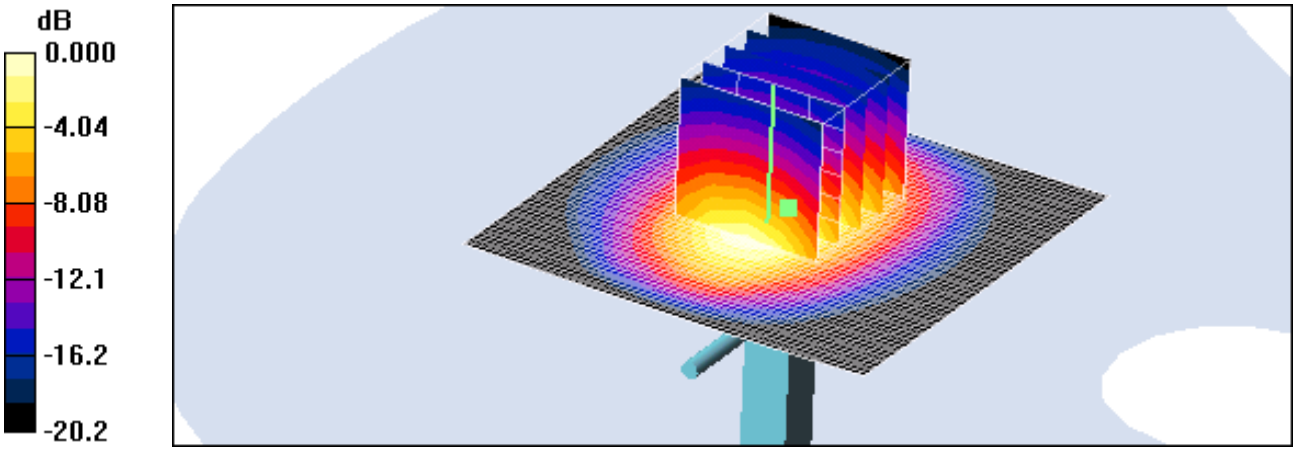
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 – SN:5d032

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.4 mho/m; ε_r = 41.5; ρ = 1000 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 - SN1798; ConvF(5.3, 5.3, 5.3); Calibrated: 2010-02-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2009-09-18
- Phantom: SAM 1800/1900 MHz; Type: SAM

Dipole 1900MHz Validation/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 4.90 mW/g

Dipole 1900MHz Validation/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 59.5 V/m; Power Drift = -0.008 dB
Peak SAR (extrapolated) = 7.50 W/kg
SAR(1 g) = 4.1 mW/g; SAR(10 g) = 2.09 mW/g
Maximum value of SAR (measured) = 4.53 mW/g



0 dB = 4.53mW/g

■ Dielectric Parameter (835 MHz Head)

Title	P9050
SubTitle	GSM850(Head)
Test Date	Mar.22, 2010

Frequency	e'	e''
800000000.0000	42.4259	19.2597
805000000.0000	42.3552	19.1730
810000000.0000	42.3150	19.1545
815000000.0000	42.2739	19.1686
820000000.0000	42.2330	19.1611
825000000.0000	42.1824	19.1725
830000000.0000	42.0937	19.1577
835000000.0000	42.0771	19.1333
840000000.0000	42.0535	19.1006
845000000.0000	41.9610	19.0619
850000000.0000	41.9020	19.1179
855000000.0000	41.8588	19.0813
860000000.0000	41.7976	19.0863
865000000.0000	41.7366	19.0709
870000000.0000	41.6564	19.0563
875000000.0000	41.6015	19.0549
880000000.0000	41.5125	19.0033
885000000.0000	41.5018	19.0095
890000000.0000	41.4122	19.0341
895000000.0000	41.3555	19.0142
900000000.0000	41.2846	18.9938

■ Dielectric Parameter (835 MHz Body)

Title	P9050
SubTitle	GSM850(Body)
Test Date	Mar.22, 2010

Frequency	e'	e''
800000000.0000	54.8323	21.1745
805000000.0000	54.7703	21.1082
810000000.0000	54.7103	21.1052
815000000.0000	54.5990	21.0524
820000000.0000	54.5361	21.0205
825000000.0000	54.4457	21.0620
830000000.0000	54.4117	21.0026
835000000.0000	54.3033	20.9609
840000000.0000	54.2618	20.9335
845000000.0000	54.2119	20.9464
850000000.0000	54.2227	20.9623
855000000.0000	54.1576	20.9659
860000000.0000	54.1482	20.9398
865000000.0000	54.1954	20.9353
870000000.0000	54.1545	20.9438
875000000.0000	54.1732	20.9629
880000000.0000	54.1459	20.9596
885000000.0000	54.1610	20.9369
890000000.0000	54.1325	20.9042
895000000.0000	54.1265	20.9020
900000000.0000	54.0371	20.8871

■ Dielectric Parameter (1900 MHz Head)

Title	P9050
SubTitle	GSM1900(Head)
Test Date	Mar.22, 2010

Frequency	e'	e''
1800000000.0000	41.9553	12.9126
1810000000.0000	41.9145	12.9458
1820000000.0000	41.8880	13.0128
1830000000.0000	41.9044	13.0392
1840000000.0000	41.8493	13.0817
1850000000.0000	41.7990	13.0965
1860000000.0000	41.7624	13.1392
1870000000.0000	41.7177	13.1629
1880000000.0000	41.6669	13.1848
1890000000.0000	41.6065	13.1951
1900000000.0000	41.5434	13.2441
1910000000.0000	41.4975	13.2938
1920000000.0000	41.4453	13.3146
1930000000.0000	41.4301	13.3344
1940000000.0000	41.4246	13.3534
1950000000.0000	41.4257	13.3889
1960000000.0000	41.4214	13.3978
1970000000.0000	41.4113	13.4227
1980000000.0000	41.3540	13.4389
1990000000.0000	41.3193	13.4723
2000000000.0000	41.2566	13.4690

■ Dielectric Parameter (1900 MHz Body)

Title	P9050
SubTitle	GSM1900(Body)
Test Date	Mar.22, 2010

Frequency	e'	e''
1850000000.0000	53.8856	13.9662
1855000000.0000	53.8913	13.9765
1860000000.0000	53.8961	13.9720
1865000000.0000	53.8609	14.0117
1870000000.0000	53.8681	13.9914
1875000000.0000	53.7997	14.0247
1880000000.0000	53.7486	14.0443
1885000000.0000	53.7138	14.0605
1890000000.0000	53.6756	14.0741
1895000000.0000	53.6076	14.0842
1900000000.0000	53.5967	14.0983
1905000000.0000	53.5508	14.1381
1910000000.0000	53.5212	14.1528
1915000000.0000	53.4476	14.1658
1920000000.0000	53.4518	14.1959
1925000000.0000	53.4533	14.2265
1930000000.0000	53.4237	14.2476
1935000000.0000	53.4258	14.2909
1940000000.0000	53.4405	14.3017
1945000000.0000	53.4494	14.3561
1950000000.0000	53.4510	14.3630

Attachment 3. – Probe Calibration Data

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Accreditation No.: SCS 108

Client HCT (Dymstec) **Certificate No: ET3-1789_Feb10**

CALIBRATION CERTIFICATE

Object	ET3DV6 - SN:1789
Calibration procedure(s)	QA CAL-01.v6, QA CAL-12.v6, QA CAL-23.v3 and QA CAL-25.v2 Calibration procedure for dosimetric E-field probes
Calibration date:	February 23, 2010

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-09 (No. 217-01030)	Apr-10
Power sensor E4412A	MY41495277	1-Apr-09 (No. 217-01030)	Apr-10
Power sensor E4412A	MY41498087	1-Apr-09 (No. 217-01030)	Apr-10
Reference 3 dB Attenuator	SN: S5054 (3c)	31-Mar-09 (No. 217-01026)	Mar-10
Reference 20 dB Attenuator	SN: S5086 (20b)	31-Mar-09 (No. 217-01028)	Mar-10
Reference 30 dB Attenuator	SN: S5129 (30b)	31-Mar-09 (No. 217-01027)	Mar-10
Reference Probe ES3DV2	SN: 3013	30-Dec-09 (No. ES3-3013_Dec09)	Dec-10
DAE4	SN: 660	29-Sep-09 (No. DAE4-660_Sep09)	Sep-10

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-09)	In house check: Oct10

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

Issued: February 24, 2010

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

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Accreditation No.: SCS 108

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C	modulation dependent linearization parameters
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., ϑ = 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:

- *NORMx,y,z:* Assessed for E-field polarization ϑ = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not effect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,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*.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- *Ax,y,z; Bx,y,z; Cx,y,z, VRx,y,z: A, B, C* are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. *VR* is the maximum calibration range expressed in RMS voltage across the diode.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 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 *NORMx,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.

Probe ET3DV6

SN:1798

Manufactured:	August 14, 2003
Last calibrated:	March 20, 2008
Recalibrated:	February 23, 2010

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

ET3DV6 SN:1798 February 23, 2010

DASY - Parameters of Probe: ET3DV6 SN:1798

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	2.00	1.87	2.04	± 10.1%
DCP (mV)[B]	94.5	89.8	89.8	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dBuV	C	VR mV	Unc[E] (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	300.0	± 1.5%
			Y	0.00	0.00	1.00	300.0	
			Z	0.00	0.00	1.00	300.0	

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 E^2-field uncertainty inside TSL (see Pages 5 and 6).

[B] Numerical linearization parameter: uncertainty not required.

[E] Uncertainty is determined using the maximum deviation from linear response applying recatangular distribution and is expressed for the square of the field value.

ET3DV6 SN:1798 February 23, 2010

DASY - Parameters of Probe: ET3DV6 SN:1798

Calibration Parameter Determined in Head Tissue Simulating Media

f [MHz]	Validity [MHz][C]	Permittivity	Conductivity	ConvF X	ConvF Y	ConvF Z	Alpha	Depth	Unc (k=2)
450	± 50 / ± 100	43.5 ± 5%	0.87 ± 5%	7.51	7.51	7.51	0.27	1.87	± 13.3%
900	± 50 / ± 100	41.5 ± 5%	0.97 ± 5%	6.37	6.37	6.37	0.26	3.11	± 11.0%
1750	± 50 / ± 100	40.1 ± 5%	1.37 ± 5%	5.53	5.53	5.53	0.60	2.15	± 11.0%
1900	± 50 / ± 100	40.0 ± 5%	1.40 ± 5%	5.30	5.30	5.30	0.67	2.16	± 11.0%
1950	± 50 / ± 100	40.0 ± 5%	1.40 ± 5%	5.12	5.12	5.12	0.74	2.12	± 11.0%
2450	± 50 / ± 100	39.2 ± 5%	1.80 ± 5%	4.64	4.64	4.64	0.99	1.75	± 11.0%

[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 February 23, 2010

DASY - Parameters of Probe: ET3DV6 SN:1798

Calibration Parameter Determined in Body Tissue Simulating Media

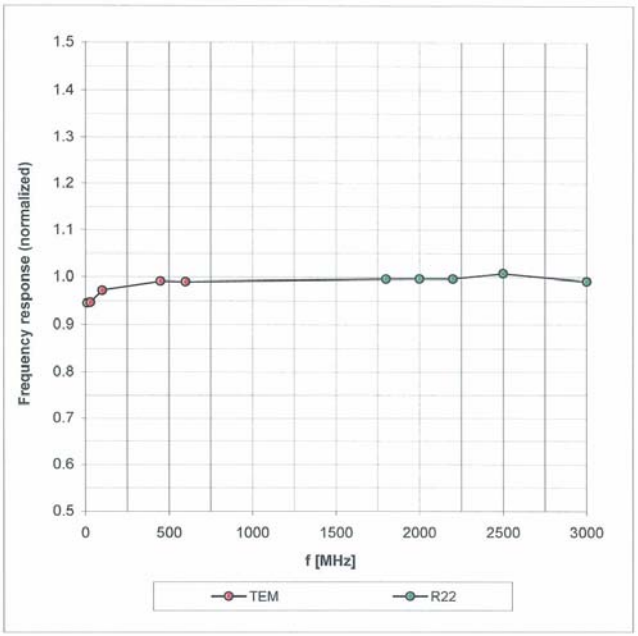
f [MHz]	Validity [MHz][C]	Permittivity	Conductivity	ConvF X	ConvF Y	ConvF Z	Alpha	Depth	Unc (k=2)
450	± 50 / ± 100	56.7 ± 5%	0.94 ± 5%	7.98	7.98	7.98	0.21	1.90	± 13.3%
835	± 50 / ± 100	55.2 ± 5%	0.97 ± 5%	6.40	6.40	6.40	0.33	2.71	± 11.0%
1750	± 50 / ± 100	53.4 ± 5%	1.49 ± 5%	4.98	4.98	4.98	0.63	2.93	± 11.0%
1900	± 50 / ± 100	53.3 ± 5%	1.52 ± 5%	4.65	4.65	4.65	0.87	2.38	± 11.0%
1950	± 50 / ± 100	53.3 ± 5%	1.52 ± 5%	4.76	4.76	4.76	0.97	2.21	± 11.0%
2450	± 50 / ± 100	52.7 ± 5%	1.95 ± 5%	4.22	4.22	4.22	0.99	1.73	± 11.0%

[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 February 23, 2010

Frequency Response of E-Field

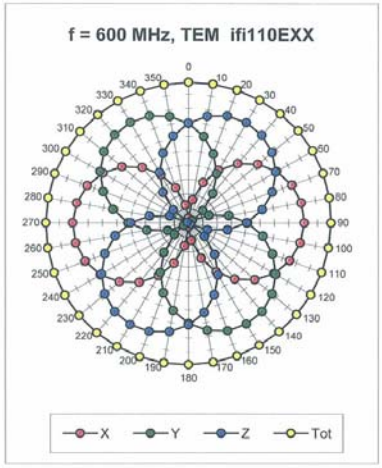
(TEM-Cell:ifi110 EXX, Waveguide: R22)

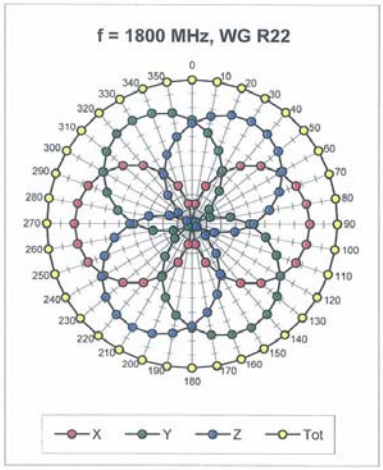


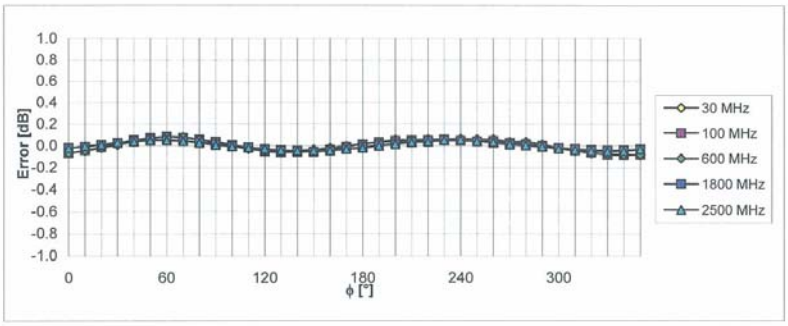
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

ET3DV6 SN:1798 February 23, 2010

Receiving Pattern (ϕ), ϑ = 0°





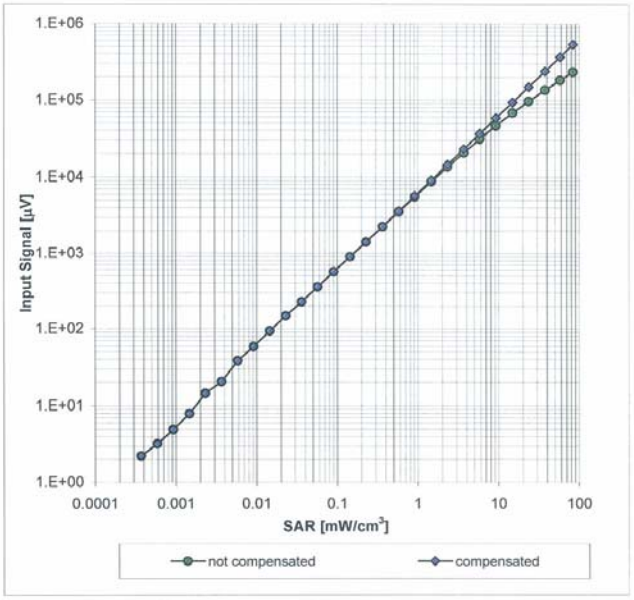


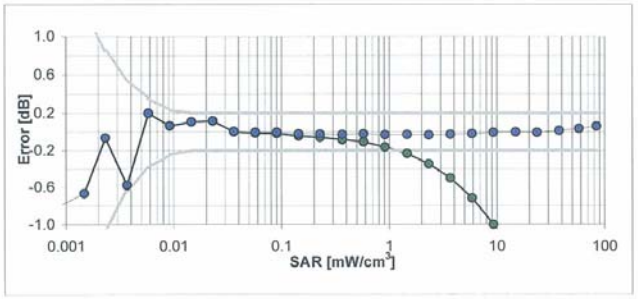
Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

ET3DV6 SN:1798 February 23, 2010

Dynamic Range f(SAR_{head})

(Waveguide R22, f = 1800 MHz)

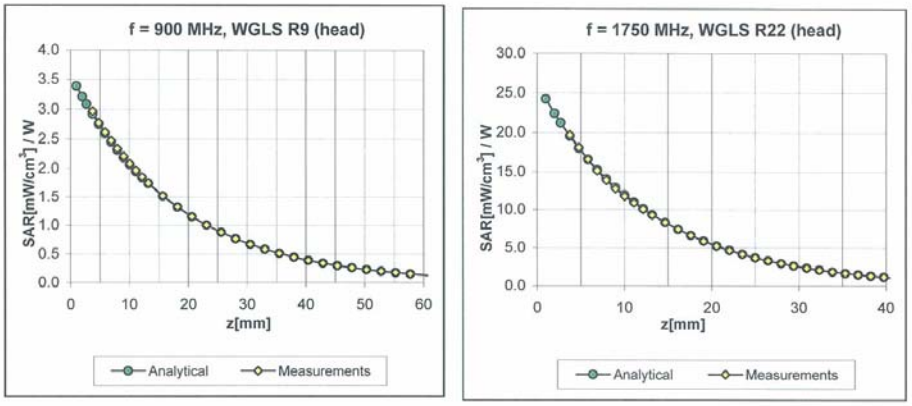




Uncertainty of Linearity Assessment: ± 0.6% (k=2)

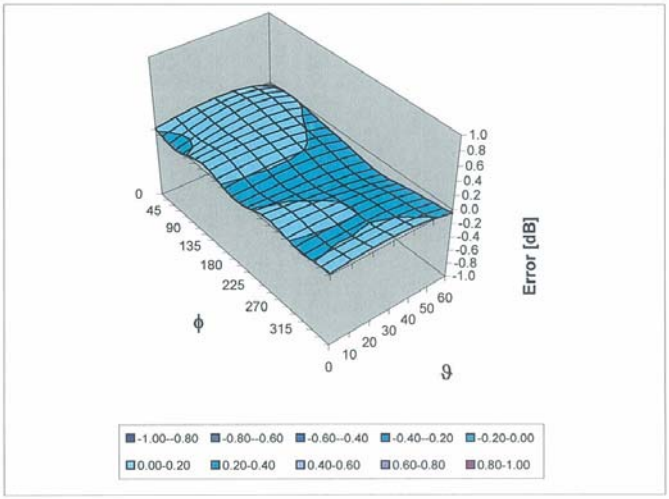
ET3DV6 SN:1798 February 23, 2010

Conversion Factor Assessment



Deviation from Isotropy in HSL

Error (ϕ, ϑ), f = 900 MHz



Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

Certificate No: ET3-1798_Feb10 Page 10 of 11

ET3DV6 SN:1798 February 23, 2010

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	Not applicable
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	10 mm
Tip Diameter	6.8 mm
Probe Tip to Sensor X Calibration Point	2.7 mm
Probe Tip to Sensor Y Calibration Point	2.7 mm
Probe Tip to Sensor Z Calibration Point	2.7 mm
Recommended Measurement Distance from Surface	4 mm

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

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
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:

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) DASY4/5 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 ± 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	40.8 ± 6 %	0.89 mho/m ± 6 %
Head TSL temperature during test	(21.6 ± 0.2) °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.38 mW / g
SAR normalized	normalized to 1W	9.52 mW / g
SAR for nominal Head TSL parameters [1]	normalized to 1W	**9.56 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.56 mW / g
SAR normalized	normalized to 1W	6.24 mW / g
SAR for nominal Head TSL parameters [1]	normalized to 1W	**6.26 mW /g ± 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 jΩ
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

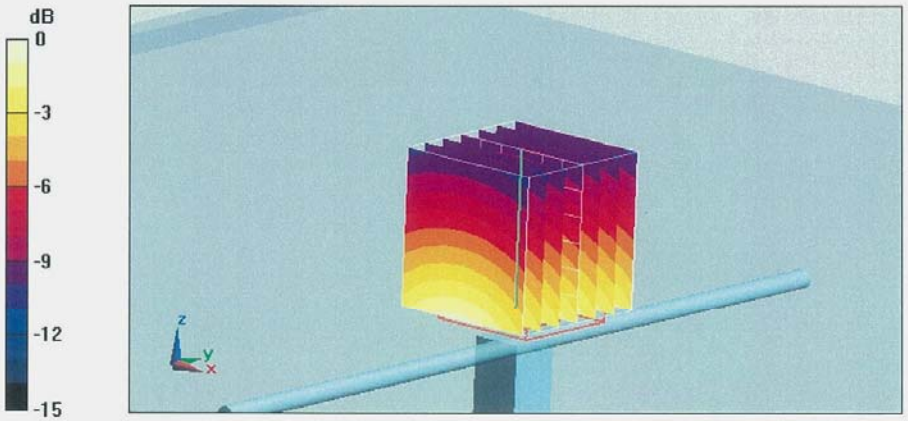
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:441

Communication System: CW-835; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: HSL 900 MHz
Medium parameters used: f = 835 MHz; σ = 0.89 mho/m; ε_r = 40.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

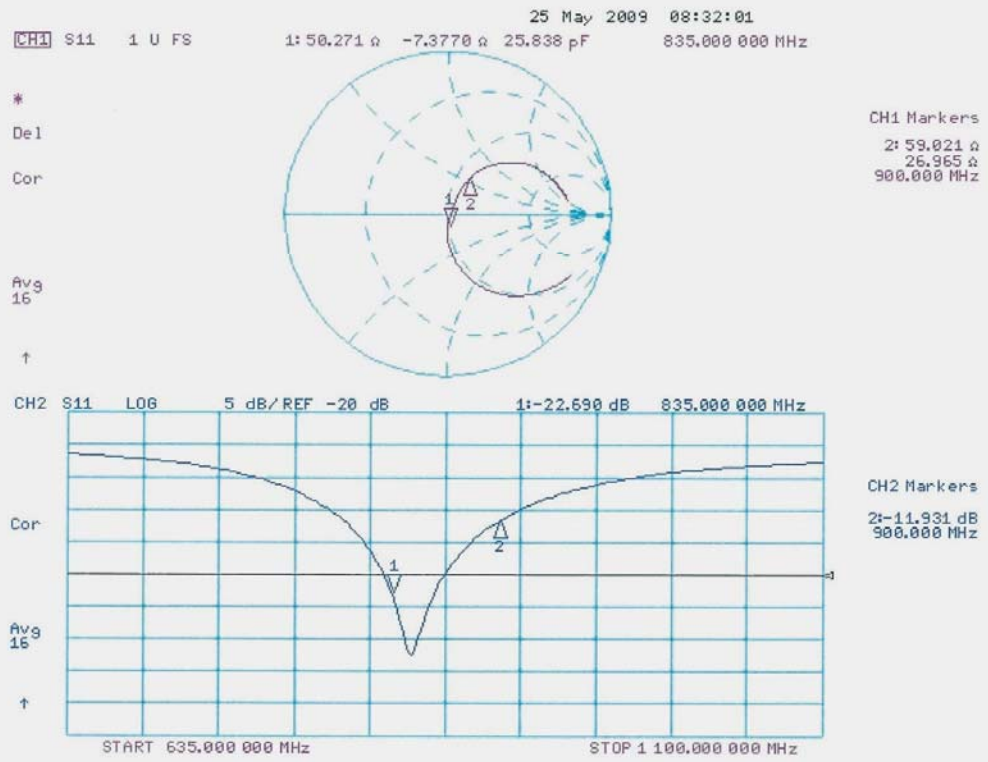
- Probe: ES3DV2 - SN3025; ConvF(5.86, 5.86, 5.86); Calibrated: 30.04.2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 07.03.2009
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4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

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



0 dB = 2.77mW/g

Impedance Measurement Plot for Head TSL



Calibration Laboratory of
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Accreditation No.: SCS 108

Client HCT (Dymstec) **Certificate No:** D1900V2-5d032_Jul09

CALIBRATION CERTIFICATE

Object	D1900V2 - SN: 5d032
Calibration procedure(s)	QA CAL-05.v7 Calibration procedure for dipole validation kits
Calibration date:	July 20, 2009
Condition of the calibrated item	In Tolerance

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	08-Oct-08 (No. 217-00898)	Oct-09
Power sensor HP 8481A	US37292783	08-Oct-08 (No. 217-00898)	Oct-09
Reference 20 dB Attenuator	SN: 5086 (20g)	31-Mar-09 (No. 217-01025)	Mar-10
Type-N mismatch combination	SN: 5047.2 / 06327	31-Mar-09 (No. 217-01029)	Mar-10
Reference Probe ES3DV2	SN: 3025	30-Apr-09 (No. ES3-3025_Apr09)	Apr-10
DAE4	SN: 601	07-Mar-09 (No. DAE4-601_Mar09)	Mar-10

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-07)	In house check: Oct-09
RF generator R&S SMT-06	100005	4-Aug-99 (in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-08)	In house check: Oct-09

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

Issued: July 22, 2009

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Accreditation No.: SCS 108

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) CENELEC EN 50361, "Basic standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones (300 MHz - 3 GHz), July 2001
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) DASY4/5 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 ± 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	40.9 ± 6 %	1.43 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	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 ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (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 ± 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 jΩ
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; σ = 1.43 mho/m; ε_r = 40.9; ρ = 1000 kg/m^3
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