Test Laboratory:	HCT CO., LTD
EUT Type:	850/1900 GSM/GPRS Phone with Bluetooth v3.0, 802.11b/g/n and EDGE Rx Only
Liquid Temperature:	21.1℃
Ambient Temperature:	21.3℃
Test Date:	Jan. 18, 2013
Plot No.:	11

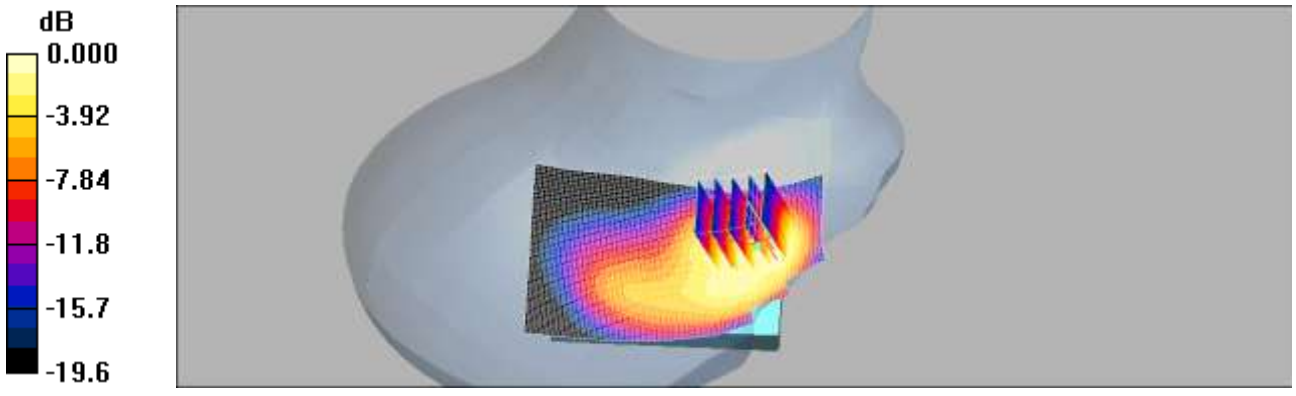
DUT: GT-S3802W; Type: bar; Serial: FK-008-A

Communication System: GSM 1900; Frequency: 1909.8 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1910 MHz; σ = 1.38 mho/m; ε_r = 40.8; ρ = 1000 kg/m^3
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(5.26, 5.26, 5.26); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2012-09-18
- Phantom: SAM 1800/1900 MHz; Type: SAM

Right touch 810/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.02 mW/g

Right touch 810/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.01 V/m; Power Drift = 0.020 dB
Peak SAR (extrapolated) = 1.54 W/kg
SAR(1 g) = 0.890 mW/g; SAR(10 g) = 0.483 mW/g
Maximum value of SAR (measured) = 0.982 mW/g



0 dB = 0.982mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	850/1900 GSM/GPRS Phone with Bluetooth v3.0, 802.11b/g/n and EDGE Rx Only
Liquid Temperature:	21.1℃
Ambient Temperature:	21.3℃
Test Date:	Jan. 18, 2013
Plot No.:	12

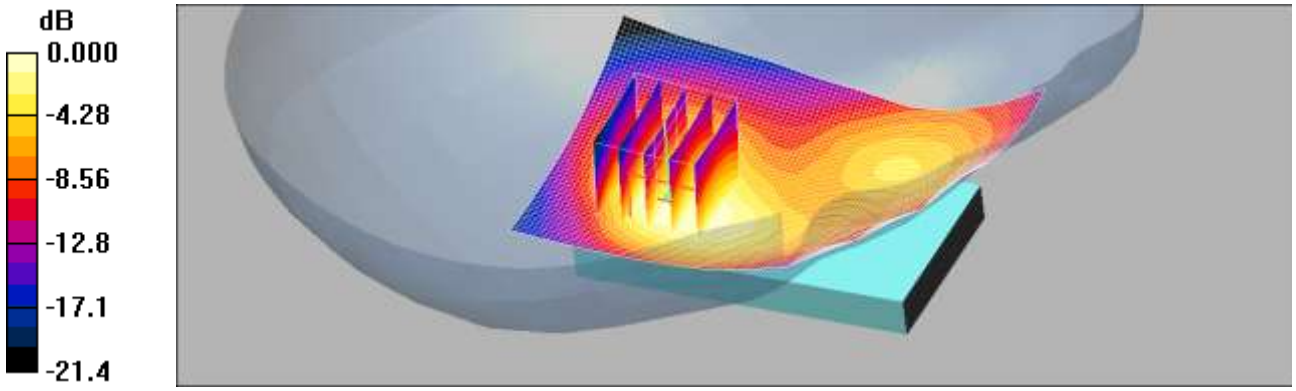
DUT: GT-S3802W; Type: bar; Serial: FK-008-A

Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1880 MHz; σ = 1.35 mho/m; ε_r = 40.9; ρ = 1000 kg/m^3
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(5.26, 5.26, 5.26); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2012-09-18
- Phantom: SAM 1800/1900 MHz; Type: SAM

Right tilt 661/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.440 mW/g

Right tilt 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.9 V/m; Power Drift = -0.058 dB
Peak SAR (extrapolated) = 0.563 W/kg
SAR(1 g) = 0.349 mW/g; SAR(10 g) = 0.203 mW/g
Maximum value of SAR (measured) = 0.378 mW/g



0 dB = 0.378mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	850/1900 GSM/GPRS Phone with Bluetooth v3.0, 802.11b/g/n and EDGE Rx Only
Liquid Temperature:	21.1℃
Ambient Temperature:	21.3℃
Test Date:	Feb. 21. 2013
Plot No.:	20

DUT: GT-S3802W; Type: bar; Serial: FK-008-A

Communication System: 2450MHz FCC; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.82 mho/m; ε_r = 38.1; ρ = 1000 kg/m^3
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

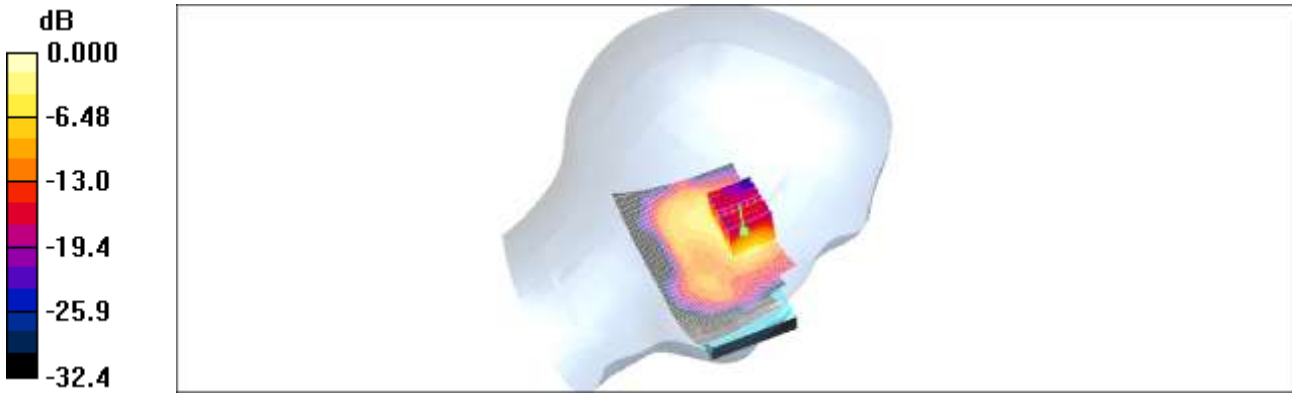
DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(4.52, 4.52, 4.52); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2012-09-18
- Phantom: 1800/1900 Phantom; Type: SAM

Left Touch ch6/Area Scan (71x111x1): Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (interpolated) = 0.065 mW/g

Left Touch ch6/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.55 V/m; Power Drift = 0.035 dB
Peak SAR (extrapolated) = 0.143 W/kg
SAR(1 g) = 0.058 mW/g; SAR(10 g) = 0.025 mW/g

Maximum value of SAR (measured) = 0.064 mW/g



0 dB = 0.064mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	850/1900 GSM/GPRS Phone with Bluetooth v3.0, 802.11b/g/n and EDGE Rx Only
Liquid Temperature:	21.1℃
Ambient Temperature:	21.3℃
Test Date:	Feb. 21. 2013
Plot No.:	21

DUT: GT-S3802W; Type: bar; Serial: FK-008-A

Communication System: 2450MHz FCC; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.82 mho/m; ε_r = 38.1; ρ = 1000 kg/m^3
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

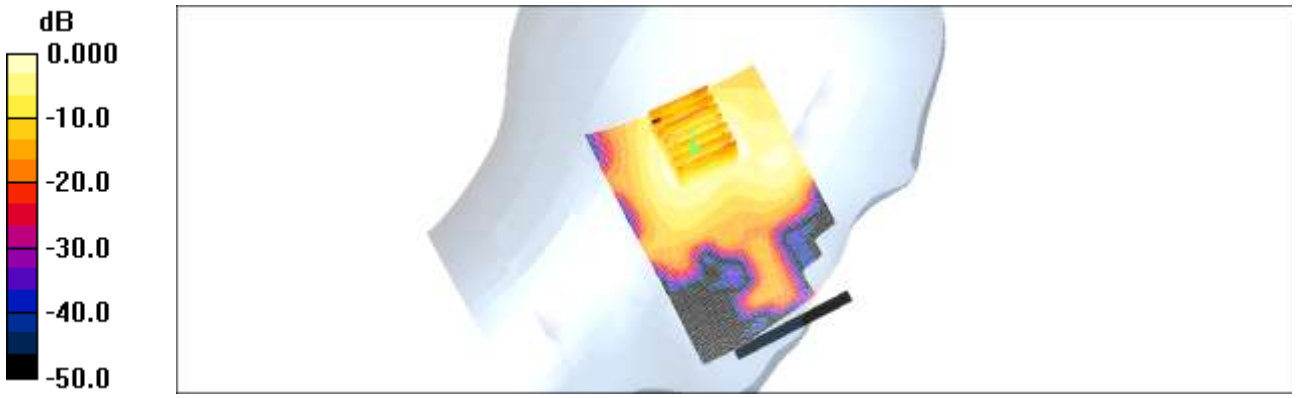
DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(4.52, 4.52, 4.52); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2012-09-18
- Phantom: 1800/1900 Phantom; Type: SAM

Left Tilt ch6/Area Scan (71x111x1): Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (interpolated) = 0.016 mW/g

Left Tilt ch6/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.00 V/m; Power Drift = -0.073 dB
Peak SAR (extrapolated) = 0.024 W/kg
SAR(1 g) = 0.014 mW/g; SAR(10 g) = 0.00812 mW/g

Maximum value of SAR (measured) = 0.016 mW/g



0 dB = 0.016mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	850/1900 GSM/GPRS Phone with Bluetooth v3.0, 802.11b/g/n and EDGE Rx Only
Liquid Temperature:	21.1℃
Ambient Temperature:	21.3℃
Test Date:	Feb. 21. 2013
Plot No.:	22

DUT: GT-S3802W; Type: bar; Serial: FK-008-A

Communication System: 2450MHz FCC; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.82 mho/m; ε_r = 38.1; ρ = 1000 kg/m^3
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

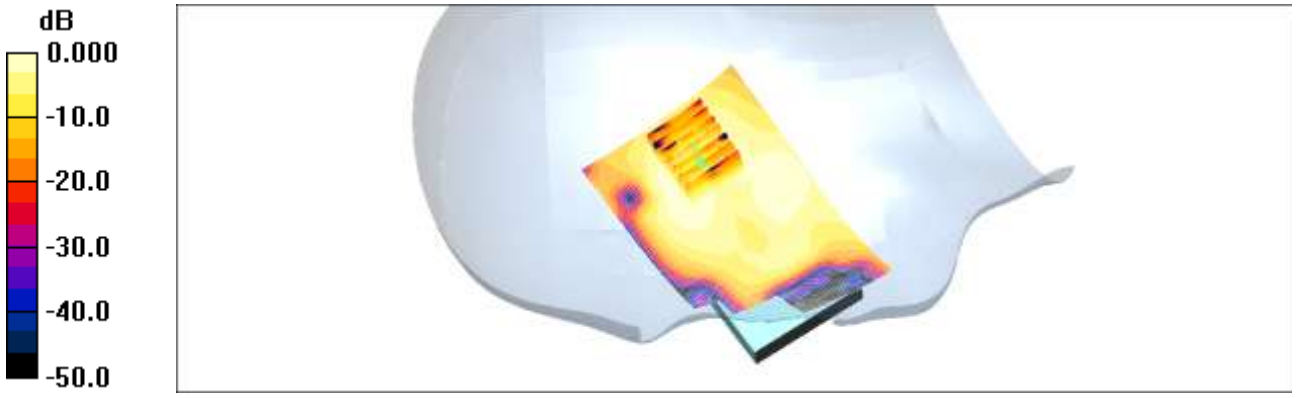
DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(4.52, 4.52, 4.52); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2012-09-18
- Phantom: 1800/1900 Phantom; Type: SAM

Right Touch ch6/Area Scan (71x111x1): Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (interpolated) = 0.017 mW/g

Right Touch ch6/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.79 V/m; Power Drift = -0.129 dB
Peak SAR (extrapolated) = 0.022 W/kg
SAR(1 g) = 0.014 mW/g; SAR(10 g) = 0.00822 mW/g

Maximum value of SAR (measured) = 0.015 mW/g



0 dB = 0.015mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	850/1900 GSM/GPRS Phone with Bluetooth v3.0, 802.11b/g/n and EDGE Rx Only
Liquid Temperature:	21.1℃
Ambient Temperature:	21.3℃
Test Date:	Feb. 21. 2013
Plot No.:	23

DUT: GT-S3802W; Type: bar; Serial: FK-008-A

Communication System: 2450MHz FCC; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.82 mho/m; ε_r = 38.1; ρ = 1000 kg/m^3
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

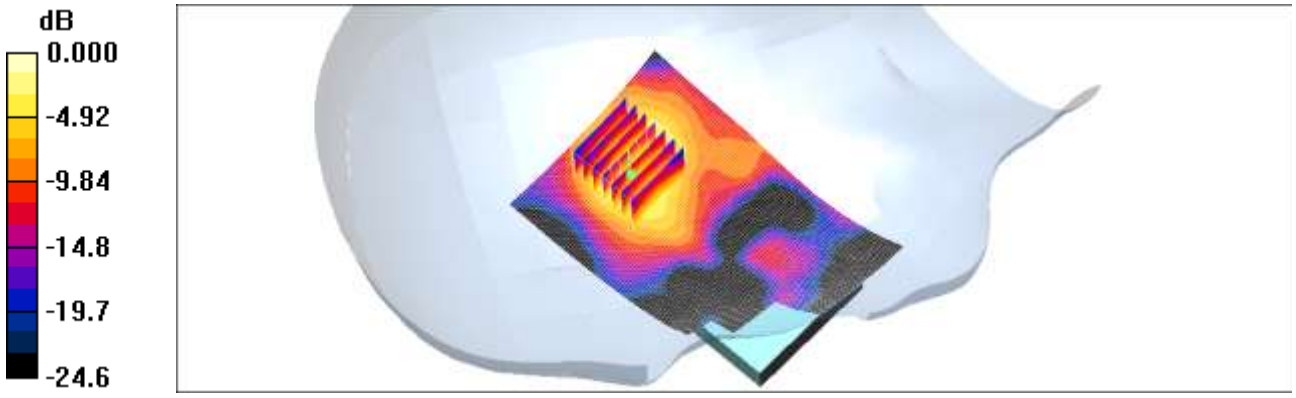
DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(4.52, 4.52, 4.52); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2012-09-18
- Phantom: 1800/1900 Phantom; Type: SAM

Right Tilt ch6/Area Scan (71x111x1): Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (interpolated) = 0.038 mW/g

Right Tilt ch6/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.62 V/m; Power Drift = 0.134 dB
Peak SAR (extrapolated) = 0.062 W/kg
SAR(1 g) = 0.036 mW/g; SAR(10 g) = 0.019 mW/g

Maximum value of SAR (measured) = 0.039 mW/g



0 dB = 0.039mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	850/1900 GSM/GPRS Phone with Bluetooth v3.0, 802.11b/g/n and EDGE Rx Only
Liquid Temperature:	21.2 ℃
Ambient Temperature:	21.4℃
Test Date:	Jan. 17 2013
Plot No.:	13

DUT: GT-S3802W; Type: bar; Serial: FK-008-A

Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.895 mho/m; ε_r = 40.9; ρ = 1000 kg/m^3
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

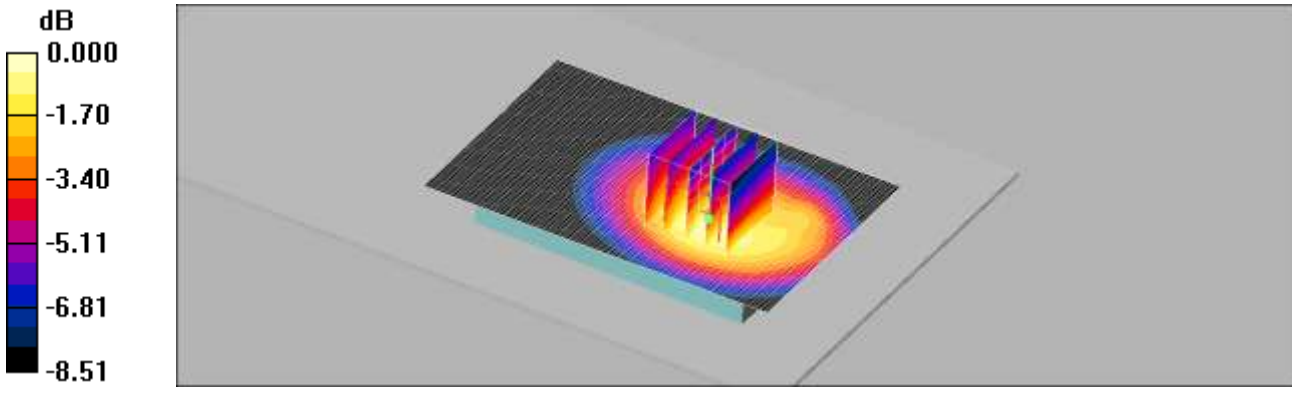
DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(6.36, 6.36, 6.36); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2012-09-18
- Phantom: Triple Flat Phantom 5.1C_20120905; Type: QD 000 P51 CA

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

Maximum value of SAR (interpolated) = 0.251 mW/g

Rear 190/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.00 V/m; Power Drift = -0.004 dB
Peak SAR (extrapolated) = 0.304 W/kg
SAR(1 g) = 0.239 mW/g; SAR(10 g) = 0.175 mW/g

Maximum value of SAR (measured) = 0.255 mW/g



0 dB = 0.255mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	850/1900 GSM/GPRS Phone with Bluetooth v3.0, 802.11b/g/n and EDGE Rx Only
Liquid Temperature:	21.2 ℃
Ambient Temperature:	21.4℃
Test Date:	Jan. 17 2013
Plot No.:	14

DUT: GT-S3802W; Type: bar; Serial: FK-008-A

Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.895 mho/m; ε_r = 40.9; ρ = 1000 kg/m^3
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

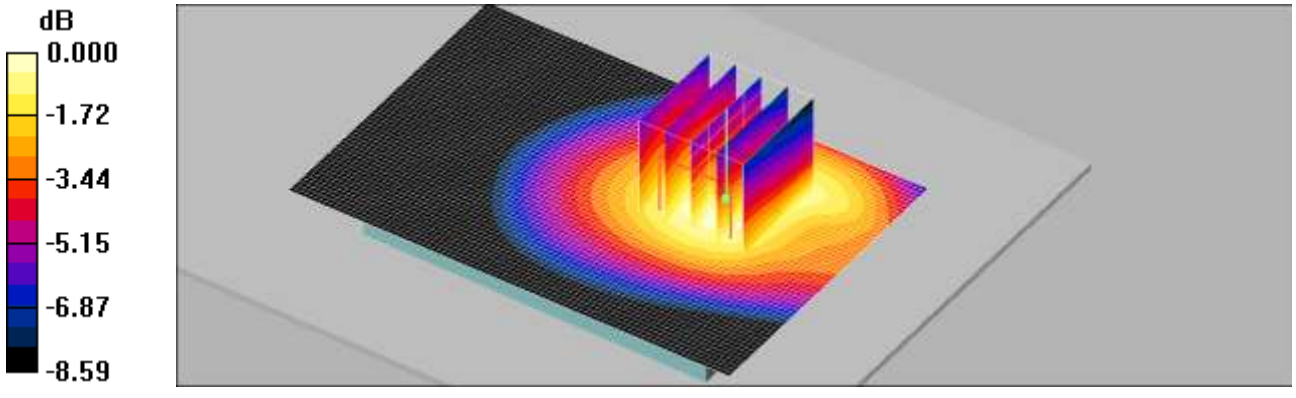
DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(6.36, 6.36, 6.36); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2012-09-18
- Phantom: Triple Flat Phantom 5.1C_20120905; Type: QD 000 P51 CA

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

Maximum value of SAR (interpolated) = 0.168 mW/g

front 190/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.98 V/m; Power Drift = 0.005 dB
Peak SAR (extrapolated) = 0.209 W/kg
SAR(1 g) = 0.162 mW/g; SAR(10 g) = 0.121 mW/g

Maximum value of SAR (measured) = 0.171 mW/g



0 dB = 0.171mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	850/1900 GSM/GPRS Phone with Bluetooth v3.0, 802.11b/g/n and EDGE Rx Only
Liquid Temperature:	21.1℃
Ambient Temperature:	21.3℃
Test Date:	Jan. 18, 2013
Plot No.:	15

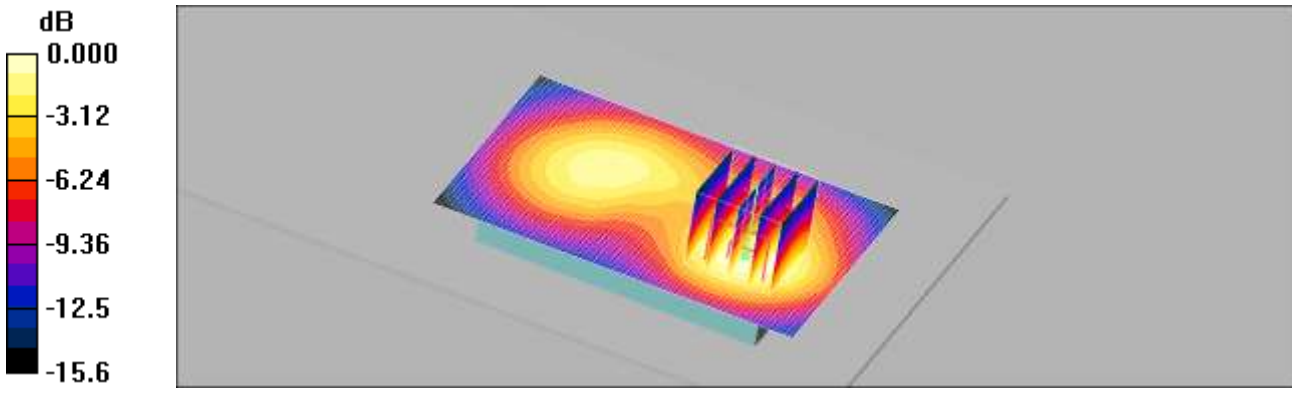
DUT: GT-S3802W; Type: bar; Serial: FK-008-A

Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1880 MHz; σ = 1.52 mho/m; ε_r = 52; ρ = 1000 kg/m^3
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(4.55, 4.55, 4.55); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2012-09-18
- Phantom: Triple Flat Phantom 5.1C_20120905; Type: QD 000 P51 CA

Rear 661/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.264 mW/g

Rear 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.31 V/m; Power Drift = -0.033 dB
Peak SAR (extrapolated) = 0.381 W/kg
SAR(1 g) = 0.237 mW/g; SAR(10 g) = 0.141 mW/g
Maximum value of SAR (measured) = 0.258 mW/g



0 dB = 0.258mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	850/1900 GSM/GPRS Phone with Bluetooth v3.0, 802.11b/g/n and EDGE Rx Only
Liquid Temperature:	21.1℃
Ambient Temperature:	21.3℃
Test Date:	Jan. 18, 2013
Plot No.:	16

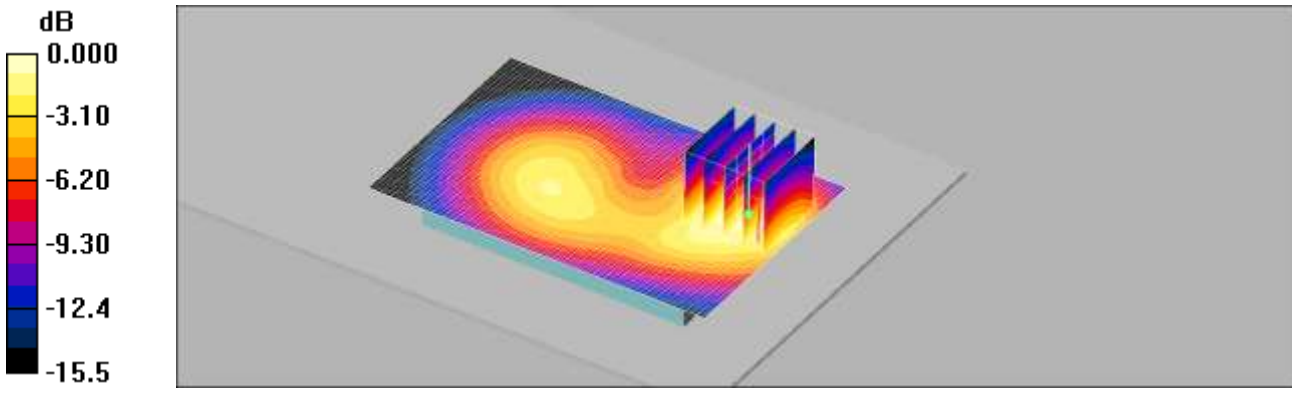
DUT: GT-S3802W; Type: bar; Serial: FK-008-A

Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1880 MHz; σ = 1.52 mho/m; ε_r = 52; ρ = 1000 kg/m^3
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(4.55, 4.55, 4.55); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2012-09-18
- Phantom: Triple Flat Phantom 5.1C_20120905; Type: QD 000 P51 CA

front 661/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.315 mW/g

front 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.48 V/m; Power Drift = 0.026 dB
Peak SAR (extrapolated) = 0.416 W/kg
SAR(1 g) = 0.276 mW/g; SAR(10 g) = 0.166 mW/g
Maximum value of SAR (measured) = 0.301 mW/g



0 dB = 0.301mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	850/1900 GSM/GPRS Phone with Bluetooth v3.0, 802.11b/g/n and EDGE Rx Only
Liquid Temperature:	21.1℃
Ambient Temperature:	21.3℃
Test Date:	Jan. 18, 2013
Plot No.:	17

DUT: GT-S3802w; Type: bar; Serial: FK-008-A

Communication System: 2450MHz FCC; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.96 mho/m; ε_r = 53.6; ρ = 1000 kg/m^3
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

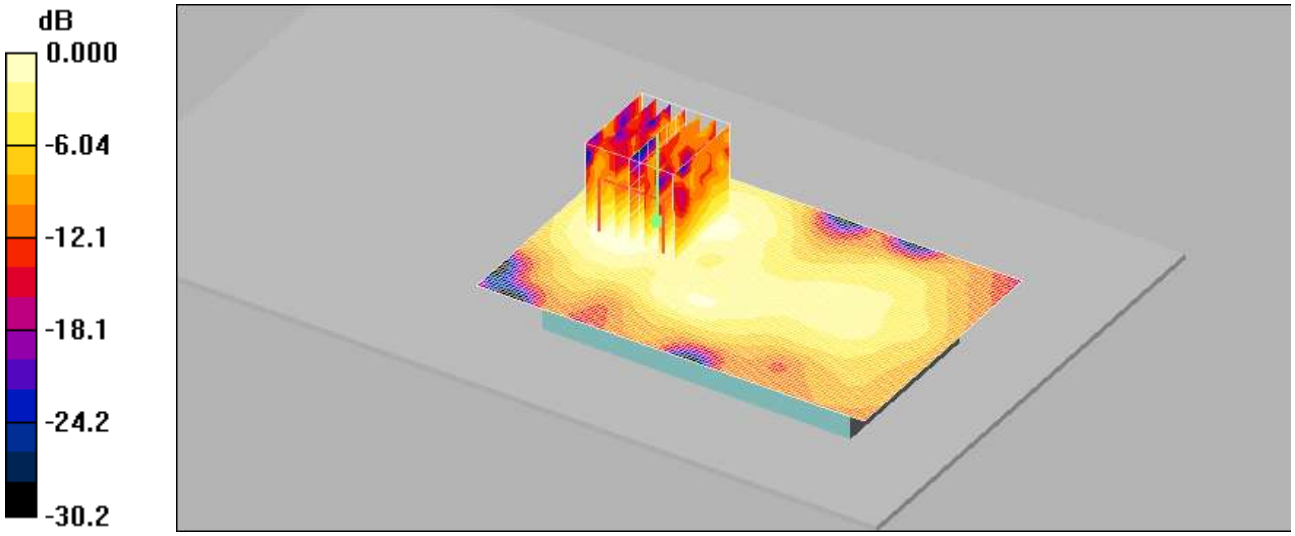
DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(4.01, 4.01, 4.01); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2012-09-18
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA

front 6ch 1Mbps/Area Scan (71x111x1): Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (interpolated) = 0.013 mW/g

front 6ch 1Mbps/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.32 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.022 W/kg
SAR(1 g) = 0.011 mW/g; SAR(10 g) = 0.00552 mW/g

Maximum value of SAR (measured) = 0.012 mW/g



0 dB = 0.012mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	850/1900 GSM/GPRS Phone with Bluetooth v3.0, 802.11b/g/n and EDGE Rx Only
Liquid Temperature:	21.1℃
Ambient Temperature:	21.3℃
Test Date:	Jan. 18, 2013
Plot No.:	18

DUT: GT-S3802w; Type: bar; Serial: FK-008-A

Communication System: 2450MHz FCC; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.96 mho/m; ε_r = 53.6; ρ = 1000 kg/m^3
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

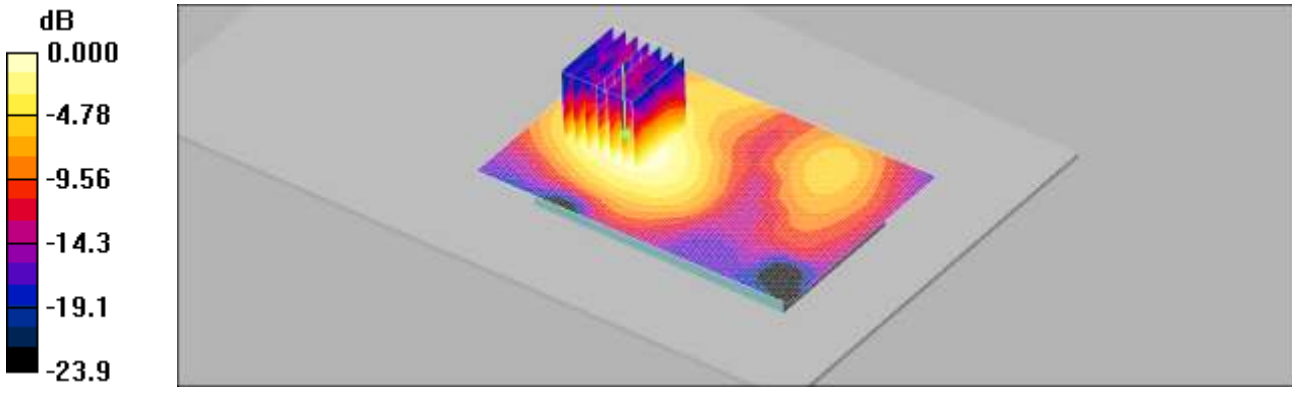
DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(4.01, 4.01, 4.01); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2012-09-18
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA

Front 6ch 1Mbps/Area Scan (71x111x1): Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (interpolated) = 0.058 mW/g

Front 6ch 1Mbps/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.87 V/m; Power Drift = -0.094 dB
Peak SAR (extrapolated) = 0.125 W/kg
SAR(1 g) = 0.054 mW/g; SAR(10 g) = 0.028 mW/g

Maximum value of SAR (measured) = 0.056 mW/g



0 dB = 0.056mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	850/1900 GSM/GPRS Phone with Bluetooth v3.0, 802.11b/g/n and EDGE Rx Only
Liquid Temperature:	21.1℃
Ambient Temperature:	21.3℃
Test Date:	Jan. 18, 2013
Plot No.:	19

DUT: GT-S3802w; Type: bar; Serial: FK-008-A

Communication System: GSM 1900; Frequency: 1909.8 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1910 MHz; σ = 1.38 mho/m; ε_r = 40.8; ρ = 1000 kg/m^3
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

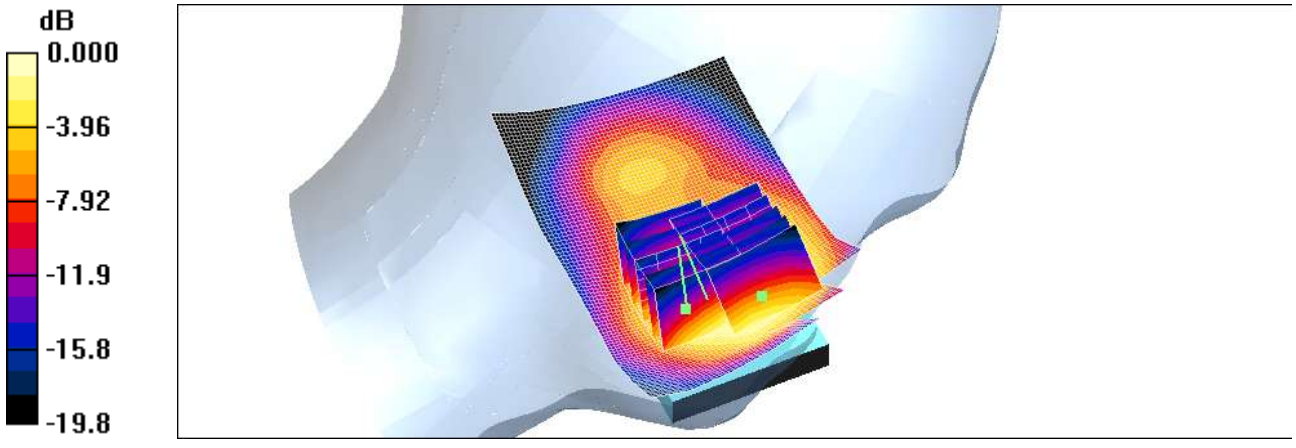
DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(5.26, 5.26, 5.26); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2012-09-18
- Phantom: SAM 1800/1900 MHz; Type: SAM

Left touch 810/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.975 mW/g

Left touch 810/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.0 V/m; Power Drift = -0.338 dB
Peak SAR (extrapolated) = 1.43 W/kg
SAR(1 g) = 0.851 mW/g; SAR(10 g) = 0.465 mW/g

Maximum value of SAR (measured) = 0.980 mW/g

Left touch 810/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.0 V/m; Power Drift = -0.338 dB
Peak SAR (extrapolated) = 1.29 W/kg
SAR(1 g) = 0.779 mW/g; SAR(10 g) = 0.452 mW/g
Maximum value of SAR (measured) = 0.876 mW/g



0 dB = 0.876mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	850/1900 GSM/GPRS Phone with Bluetooth v3.0, 802.11b/g/n and EDGE Rx Only
Liquid Temperature:	21.2 ℃
Ambient Temperature:	21.4℃
Test Date:	Jan. 17 2013

DUT: GT-S3802W; Type: bar; Serial: FK-008-A

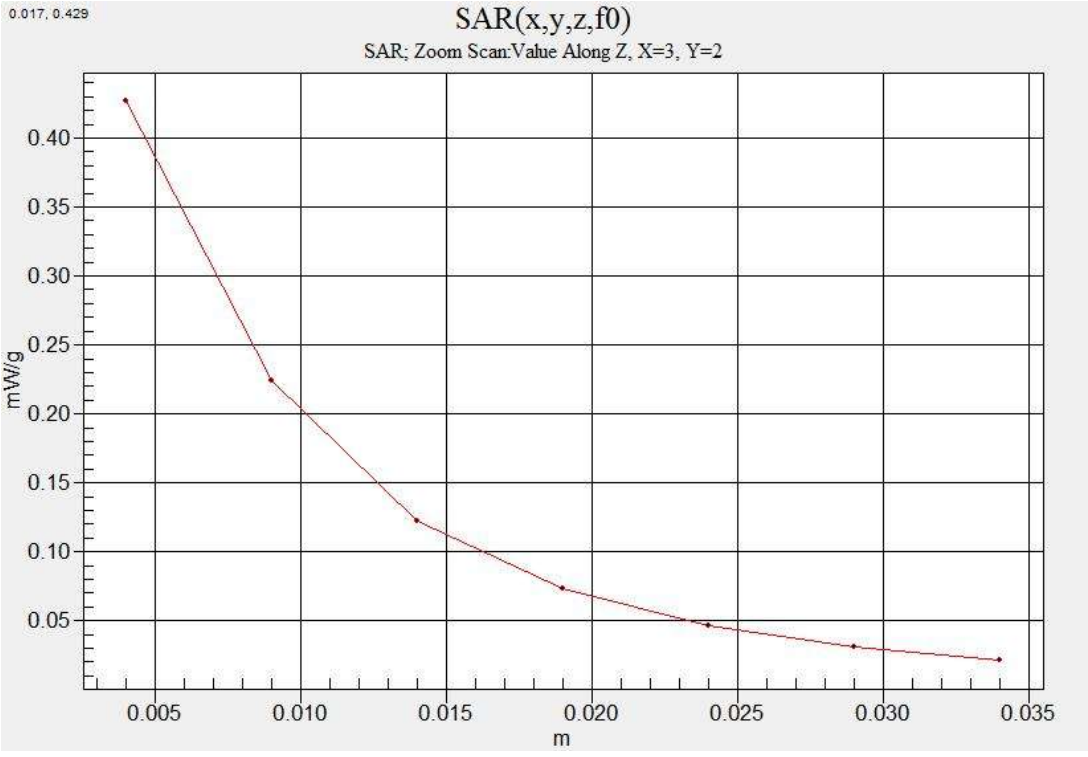
Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.895 mho/m; ε_r = 40.9; ρ = 1000 kg/m^3
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(6.36, 6.36, 6.36); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2012-09-18
- Phantom: SAM 835/900 MHz; Type: SAM

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

Maximum value of SAR (interpolated) = 0.445 mW/g

Right Touch 190/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.58 V/m; Power Drift = -0.063 dB
Peak SAR (extrapolated) = 0.773 W/kg
SAR(1 g) = 0.405 mW/g; SAR(10 g) = 0.248 mW/g
Maximum value of SAR (measured) = 0.427 mW/g



Test Laboratory:	HCT CO., LTD
EUT Type:	850/1900 GSM/GPRS Phone with Bluetooth v3.0, 802.11b/g/n and EDGE Rx Only
Liquid Temperature:	21.2 ℃
Ambient Temperature:	21.4℃
Test Date:	Jan. 17 2013

DUT: GT-S3802W; Type: bar; Serial: FK-008-A

Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.895 mho/m; ε_r = 40.9; ρ = 1000 kg/m^3
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(6.36, 6.36, 6.36); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2012-09-18
- Phantom: Triple Flat Phantom 5.1C_20120905; Type: QD 000 P51 CA

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

Maximum value of SAR (interpolated) = 0.251 mW/g

Rear 190/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.00 V/m; Power Drift = -0.004 dB
Peak SAR (extrapolated) = 0.304 W/kg
SAR(1 g) = 0.239 mW/g; SAR(10 g) = 0.175 mW/g

Maximum value of SAR (measured) = 0.255 mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	850/1900 GSM/GPRS Phone with Bluetooth v3.0, 802.11b/g/n and EDGE Rx Only
Liquid Temperature:	21.1℃
Ambient Temperature:	21.3℃
Test Date:	Jan. 18, 2013

DUT: GT-S3802W; Type: bar; Serial: FK-008-A

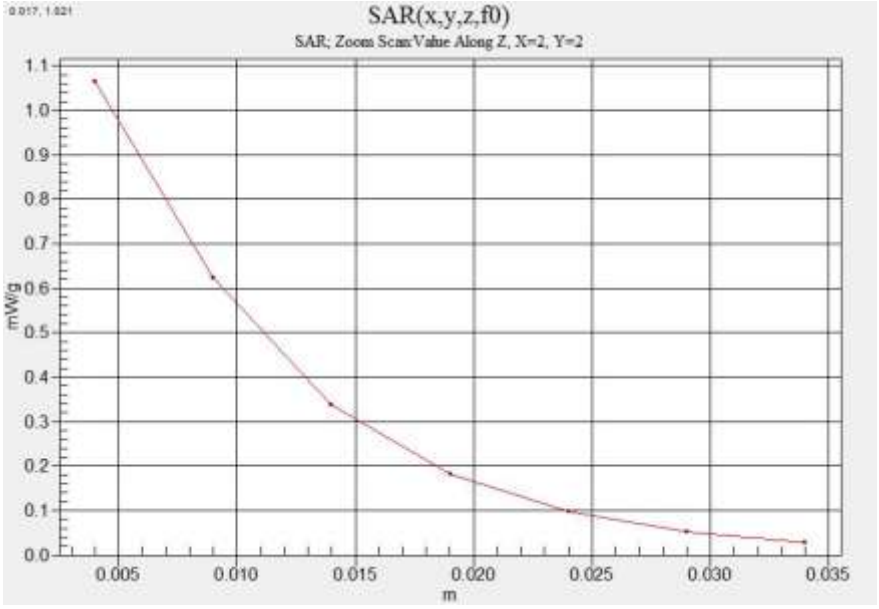
Communication System: GSM 1900; Frequency: 1909.8 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1910 MHz; σ = 1.38 mho/m; ε_r = 40.8; ρ = 1000 kg/m^3
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(5.26, 5.26, 5.26); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2012-09-18
- Phantom: SAM 1800/1900 MHz; Type: SAM

Left touch 810/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.02 mW/g

Left touch 810/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.83 V/m; Power Drift = 0.094 dB
Peak SAR (extrapolated) = 1.57 W/kg
SAR(1 g) = 0.933 mW/g; SAR(10 g) = 0.502 mW/g
Maximum value of SAR (measured) = 1.06 mW/g

Left touch 810/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.83 V/m; Power Drift = 0.094 dB
Peak SAR (extrapolated) = 1.29 W/kg
SAR(1 g) = 0.769 mW/g; SAR(10 g) = 0.454 mW/g
Maximum value of SAR (measured) = 0.951 mW/g



Test Laboratory:	HCT CO., LTD
EUT Type:	850/1900 GSM/GPRS Phone with Bluetooth v3.0, 802.11b/g/n and EDGE Rx Only
Liquid Temperature:	21.1℃
Ambient Temperature:	21.3℃
Test Date:	Jan. 18, 2013

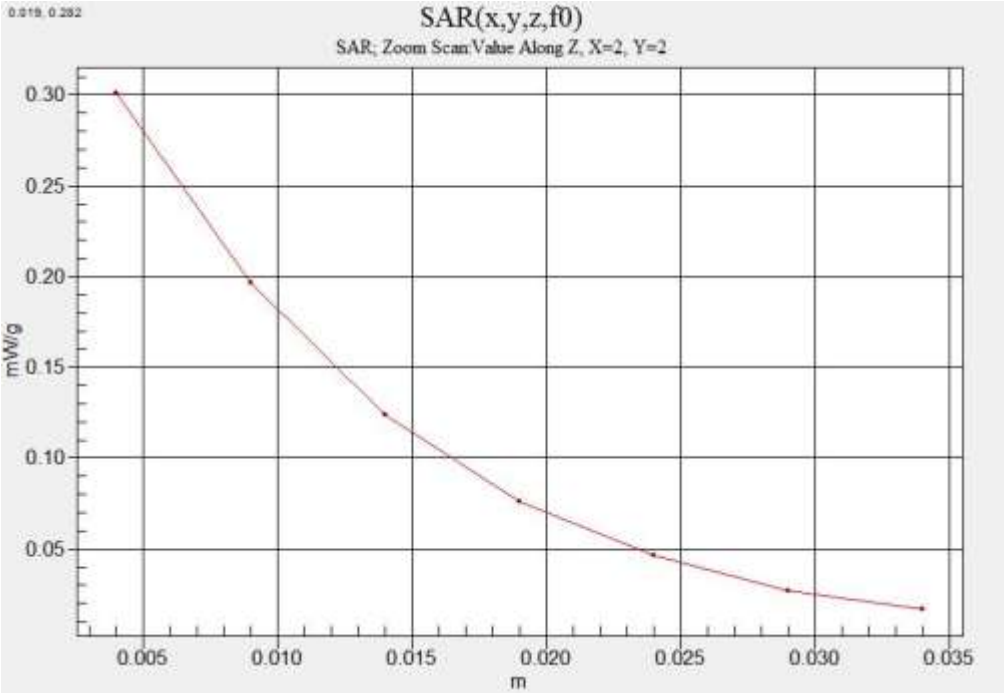
DUT: GT-S3802W; Type: bar; Serial: FK-008-A

Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1880 MHz; σ = 1.52 mho/m; ε_r = 52; ρ = 1000 kg/m^3
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(4.55, 4.55, 4.55); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2012-09-18
- Phantom: Triple Flat Phantom 5.1C_20120905; Type: QD 000 P51 CA

front 661/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.315 mW/g

front 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.48 V/m; Power Drift = 0.026 dB
Peak SAR (extrapolated) = 0.416 W/kg
SAR(1 g) = 0.276 mW/g; SAR(10 g) = 0.166 mW/g
Maximum value of SAR (measured) = 0.301 mW/g



Test Laboratory:	HCT CO., LTD
EUT Type:	850/1900 GSM/GPRS Phone with Bluetooth v3.0, 802.11b/g/n and EDGE Rx Only
Liquid Temperature:	21.1℃
Ambient Temperature:	21.3℃
Test Date:	Feb. 21. 2013

DUT: GT-S3802W; Type: bar; Serial: FK-008-A

Communication System: 2450MHz FCC; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.82 mho/m; ε_r = 38.1; ρ = 1000 kg/m^3
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(4.52, 4.52, 4.52); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2012-09-18
- Phantom: 1800/1900 Phantom; Type: SAM

Left Touch ch6/Area Scan (71x111x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.065 mW/g
Left Touch ch6/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.55 V/m; Power Drift = 0.035 dB
Peak SAR (extrapolated) = 0.143 W/kg
SAR(1 g) = 0.058 mW/g; SAR(10 g) = 0.025 mW/g

Maximum value of SAR (measured) = 0.064 mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	850/1900 GSM/GPRS Phone with Bluetooth v3.0, 802.11b/g/n and EDGE Rx Only
Liquid Temperature:	21.1℃
Ambient Temperature:	21.3℃
Test Date:	Jan. 18, 2013

DUT: GT-S3802W; Type: bar; Serial: FK-008-A

Communication System: 2450MHz FCC; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.96 mho/m; ε_r = 53.6; ρ = 1000 kg/m^3
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

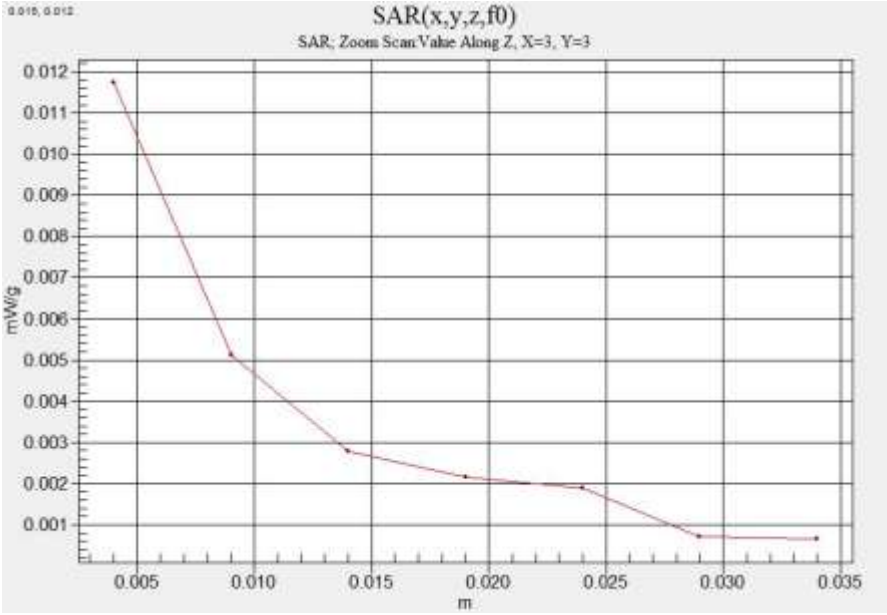
DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(4.01, 4.01, 4.01); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2012-09-18
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA

Front 6ch 1Mbps/Area Scan (71x111x1): Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (interpolated) = 0.058 mW/g

Front 6ch 1Mbps/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.87 V/m; Power Drift = -0.094 dB
Peak SAR (extrapolated) = 0.125 W/kg
SAR(1 g) = 0.054 mW/g; SAR(10 g) = 0.028 mW/g

Maximum value of SAR (measured) = 0.056 mW/g



Attachment 2. – Dipole Verification Plots

■ Verification Data (835 MHz Head)

Test Laboratory: HCT CO., LTD
Input Power 100 mW (20 dBm)
Liquid Temp: 21.2 ℃
Test Date: Jan. 17, 2013

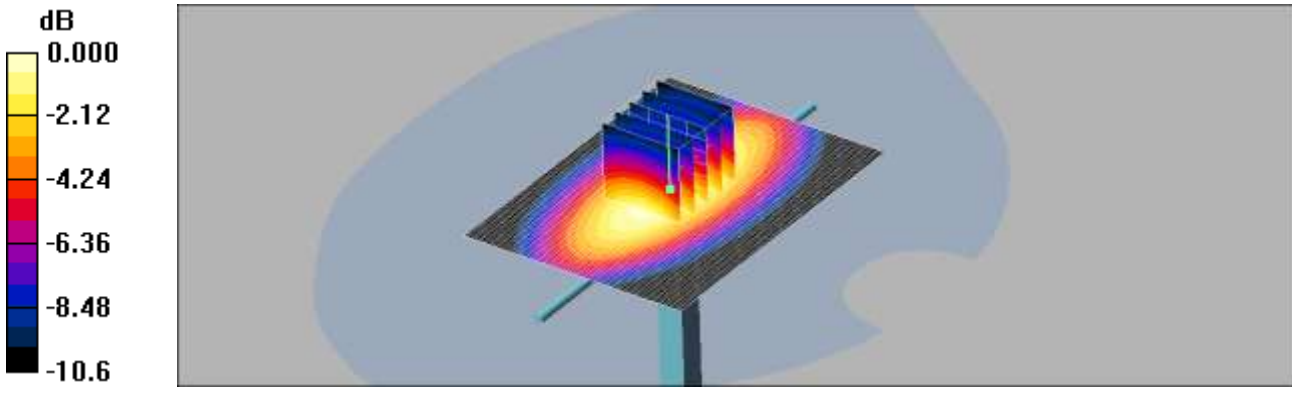
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 – SN:441

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.892 mho/m; ε_r = 40.9; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(6.36, 6.36, 6.36); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2012-09-18
- Phantom: 1800/1900 Phantom; Type: SAM

Verification 835 MHz/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.993 mW/g

Verification 835 MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 34.5 V/m; Power Drift = -0.025 dB
Peak SAR (extrapolated) = 1.32 W/kg
SAR(1 g) = 0.912 mW/g; SAR(10 g) = 0.599 mW/g
Maximum value of SAR (measured) = 0.988 mW/g



0 dB = 0.988mW/g

■ Verification Data (835 MHz Body)

Test Laboratory:	HCT CO., LTD
Input Power	100 mW (20 dBm)
Liquid Temp:	21.2 ℃
Test Date:	Jan. 17, 2013

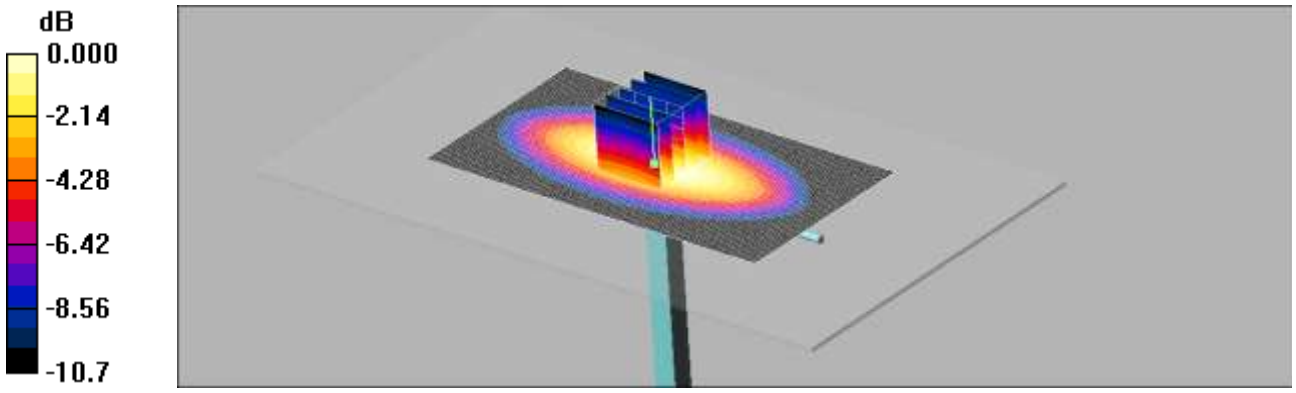
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 – SN:441

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.984 mho/m; ε_r = 57; ρ = 1000 kg/m^3
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(6.24, 6.24, 6.24); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2012-09-18
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA

Verification 835 MHz/Area Scan (111x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.08 mW/g

Verification 835 MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 34.3 V/m; Power Drift = -0.002 dB
Peak SAR (extrapolated) = 1.43 W/kg
SAR(1 g) = 0.982 mW/g; SAR(10 g) = 0.639 mW/g
Maximum value of SAR (measured) = 1.07 mW/g



0 dB = 1.07mW/g

■ Verification Data (1 900 MHz Head)

Test Laboratory: HCT CO., LTD
Input Power 100 mW (20 dBm)
Liquid Temp: 21.1 ℃
Test Date: Jan. 18, 2013

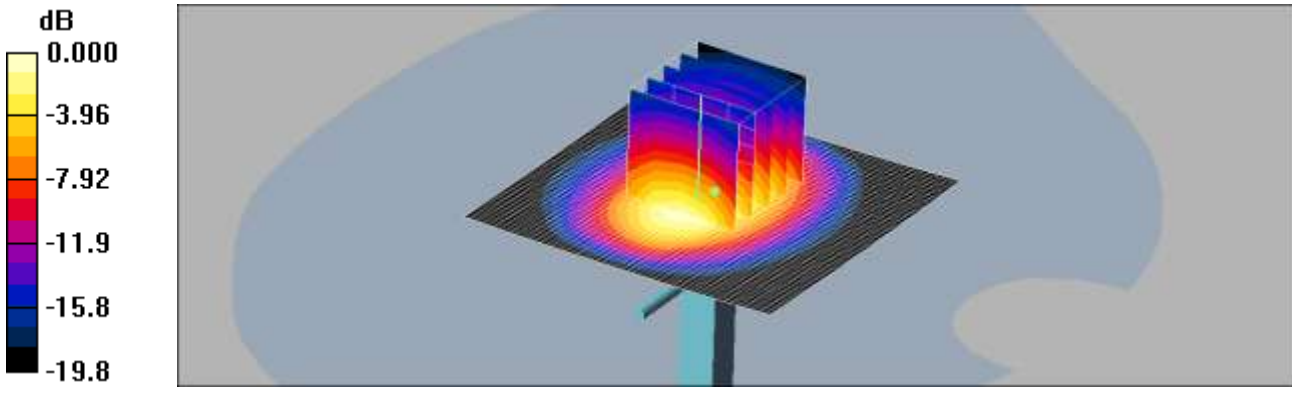
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 – SN:5d032

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.37 mho/m; ε_r = 40.9; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(5.01, 5.01, 5.01); Calibrated: 2009-03-17
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2008-09-03
- Phantom: SAM 1800/1900 MHz; Type: SAM

Dipole 1900MHz Verification/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 4.43 mW/g

Dipole 1900MHz Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 57.7 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 6.64 W/kg
SAR(1 g) = 3.79 mW/g; SAR(10 g) = 1.97 mW/g
Maximum value of SAR (measured) = 4.25 mW/g



0 dB = 4.25mW/g

■ Verification Data (1 900 MHz Body)

Test Laboratory:	HCT CO., LTD
Input Power	100 mW (20 dBm)
Liquid Temp:	21.1 ℃
Test Date:	Jan. 18, 2013

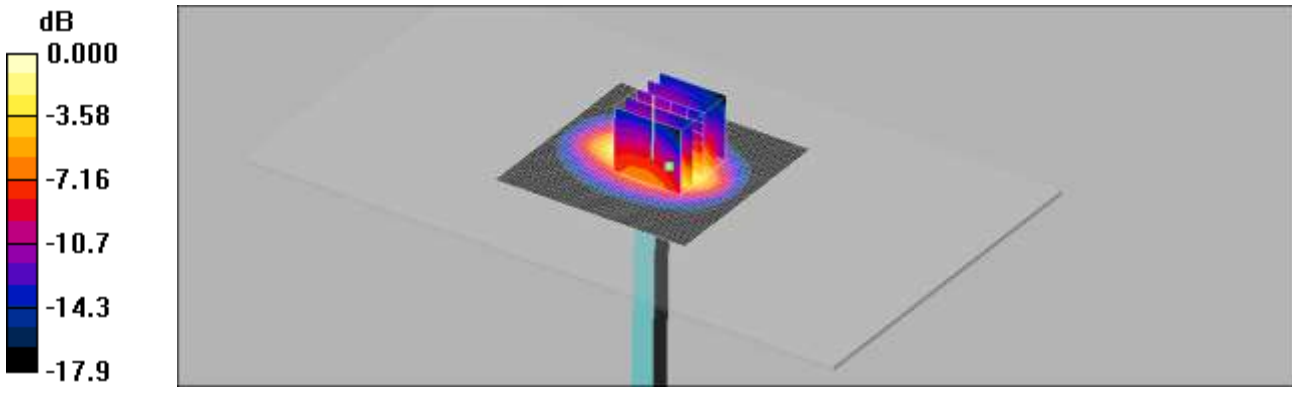
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 – SN:5d032

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.54 mho/m; ε_r = 51.9; ρ = 1000 kg/m^3
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(4.55, 4.55, 4.55); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2012-09-18
- Phantom: Triple Flat Phantom 5.1C_20120905; Type: QD 000 P51 CA

Verification1900 MHz/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 4.62 mW/g

Verification1900 MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 57.4 V/m; Power Drift = -0.029 dB
Peak SAR (extrapolated) = 6.28 W/kg
SAR(1 g) = 3.94 mW/g; SAR(10 g) = 2.15 mW/g
Maximum value of SAR (measured) = 4.43 mW/g



0 dB = 4.43mW/g

■ Verification Data (2 450 MHz Head)

Test Laboratory: HCT CO., LTD
Input Power 100 mW (20 dBm)
Liquid Temp: 21.1
Test Date: Feb. 21. 2013

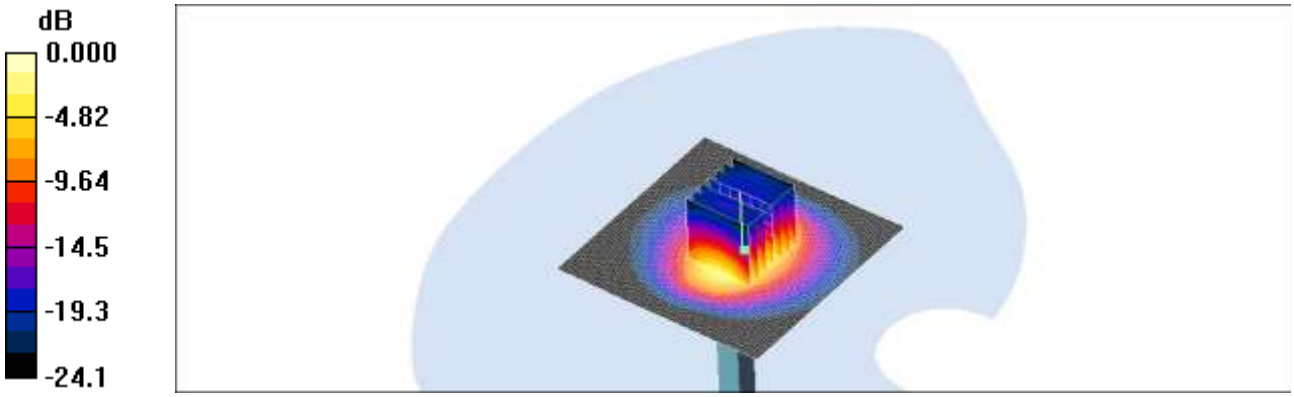
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 – SN:743

Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.83 mho/m; ε_r = 38; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(4.52, 4.52, 4.52); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2012-09-18
- Phantom: 835/900 Phamtom ; Type: SAM

Validation 2450MHz/Area Scan (81x81x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 5.98 mW/g

Validation 2450MHz/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 55.1 V/m; Power Drift = -0.076 dB
Peak SAR (extrapolated) = 12.4 W/kg
SAR(1 g) = 5.37 mW/g; SAR(10 g) = 2.41 mW/g
Maximum value of SAR (measured) = 6.03 mW/g



0 dB = 6.03mW/g

■ Verification Data (2 450 MHz Body)

Test Laboratory:	HCT CO., LTD
Input Power	100 mW (20 dBm)
Liquid Temp:	21.1 ℃
Test Date:	Jan. 18, 2013

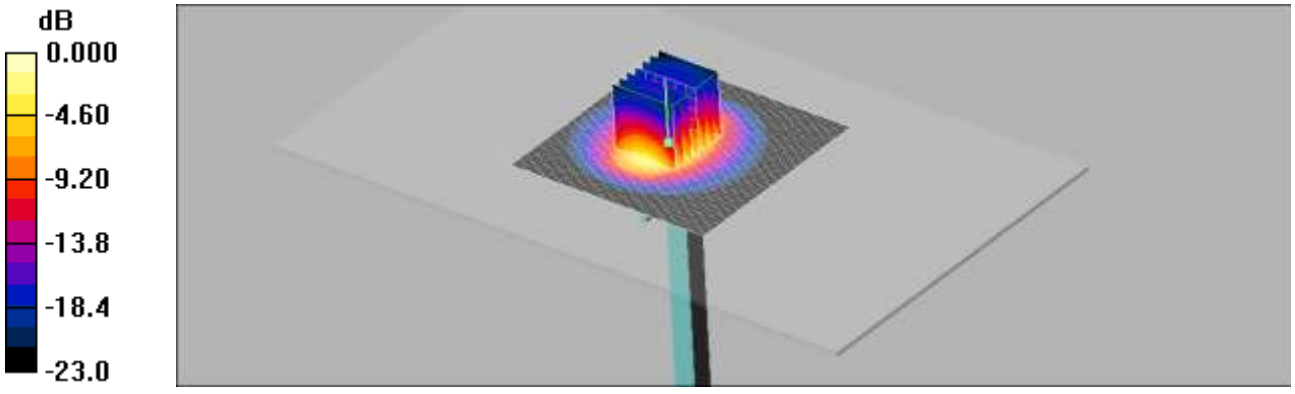
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 – SN:743

Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.98 mho/m; ε_r = 53.6; ρ = 1000 kg/m^3
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(4.01, 4.01, 4.01); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2012-09-18
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA

Verification 2450MHz/Area Scan (81x81x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 5.97 mW/g

Verification 2450MHz/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 48.3 V/m; Power Drift = 0.021 dB
Peak SAR (extrapolated) = 14.1 W/kg
SAR(1 g) = 5.34 mW/g; SAR(10 g) = 2.37 mW/g
Maximum value of SAR (measured) = 5.80 mW/g



0 dB = 5.80mW/g

■ Dielectric Parameter (835 MHz Head)

Title	GT-S3802W
SubTitle	835MHz
Test Date	Jan. 17, 2013

Frequency	e'	e''
800000000.0000	40.6722	19.0616
805000000.0000	40.6961	19.0529
810000000.0000	40.6980	19.0820
815000000.0000	40.7456	19.1198
820000000.0000	40.7883	19.1581
825000000.0000	40.8279	19.1647
830000000.0000	40.8409	19.1886
835000000.0000	40.8590	19.2107
840000000.0000	40.8338	19.2442
845000000.0000	40.8001	19.2070
850000000.0000	40.7122	19.1957
855000000.0000	40.6408	19.1287
860000000.0000	40.5499	19.0988
865000000.0000	40.3809	19.0405
870000000.0000	40.2340	18.9468
875000000.0000	40.0781	18.8874
880000000.0000	39.9374	18.7698
885000000.0000	39.7712	18.6810
890000000.0000	39.6174	18.5952
895000000.0000	39.5037	18.5240
900000000.0000	39.3772	18.5066

■ Dielectric Parameter (835 MHz Body)

Title	GT-S3802W
SubTitle	835MHz
Test Date	Jan. 17, 2013

Frequency	e'	e''
800000000.0000	57.3493	21.5793
805000000.0000	57.3111	21.5312
810000000.0000	57.2540	21.4907
815000000.0000	57.2170	21.4260
820000000.0000	57.1821	21.3497
825000000.0000	57.1154	21.2918
830000000.0000	57.0682	21.2383
835000000.0000	57.0181	21.1753
840000000.0000	56.9800	21.1693
845000000.0000	56.9079	21.1159
850000000.0000	56.8842	21.0990
855000000.0000	56.8234	21.0969
860000000.0000	56.7892	21.0898
865000000.0000	56.7606	21.1077
870000000.0000	56.7115	21.1120
875000000.0000	56.6987	21.1231
880000000.0000	56.6721	21.1504
885000000.0000	56.6296	21.1625
890000000.0000	56.6119	21.1537
895000000.0000	56.5620	21.1421
900000000.0000	56.5676	21.1341

■ Dielectric Parameter (1 900 MHz Head)

Title	GT-S3802W
SubTitle	1 900MHz
Test Date	Jan. 18, 2013

Frequency	e'	e''
1800000000.0000	41.2191	12.6636
1810000000.0000	41.1888	12.6915
1820000000.0000	41.1537	12.7274
1830000000.0000	41.0967	12.7478
1840000000.0000	41.0626	12.7810
1850000000.0000	41.0355	12.8108
1860000000.0000	40.9907	12.8500
1870000000.0000	40.9673	12.8915
1880000000.0000	40.9163	12.9094
1890000000.0000	40.8923	12.9353
1900000000.0000	40.8637	12.9607
1910000000.0000	40.8205	12.9928
1920000000.0000	40.7698	13.0160
1930000000.0000	40.7475	13.0539
1940000000.0000	40.7061	13.0718
1950000000.0000	40.6692	13.1146
1960000000.0000	40.6471	13.1368
1970000000.0000	40.5950	13.1621
1980000000.0000	40.5680	13.1848
1990000000.0000	40.5249	13.1992
2000000000.0000	40.4783	13.2469

■ Dielectric Parameter (1 900 MHz Body)

Title	GT-S3802W
SubTitle	1 900MHz
Test Date	Jan. 18, 2013

Frequency	e'	e''
1850000000.0000	52.0562	14.5183
1855000000.0000	52.0405	14.5344
1860000000.0000	52.0199	14.5575
1865000000.0000	52.0139	14.5683
1870000000.0000	51.9983	14.5774
1875000000.0000	51.9935	14.5714
1880000000.0000	51.9786	14.5801
1885000000.0000	51.9752	14.5964
1890000000.0000	51.9636	14.6009
1895000000.0000	51.9403	14.6107
1900000000.0000	51.9244	14.6142
1905000000.0000	51.9193	14.6301
1910000000.0000	51.9004	14.6307
1915000000.0000	51.8885	14.6412
1920000000.0000	51.8602	14.6563
1925000000.0000	51.8527	14.6769
1930000000.0000	51.8351	14.6849
1935000000.0000	51.8303	14.6903
1940000000.0000	51.7998	14.6942
1945000000.0000	51.7709	14.7202
1950000000.0000	51.7733	14.7238

■ Dielectric Parameter (2 450 MHz Head)

Title	GT-S3802W
SubTitle	2450MHz
Test Date	Feb. 21, 2013

Frequency	e'	e''
2400000000.0000	38.2192	13.3497
2405000000.0000	38.2103	13.3617
2410000000.0000	38.1835	13.3717
2415000000.0000	38.1674	13.3675
2420000000.0000	38.1336	13.3751
2425000000.0000	38.1265	13.3748
2430000000.0000	38.1012	13.3922
2435000000.0000	38.0818	13.3965
2440000000.0000	38.0549	13.4181
2445000000.0000	38.0293	13.4277
2450000000.0000	38.0087	13.4497
2455000000.0000	37.9748	13.4553
2460000000.0000	37.9567	13.4863
2465000000.0000	37.9437	13.4968
2470000000.0000	37.9270	13.5158
2475000000.0000	37.9035	13.5461
2480000000.0000	37.8920	13.5773
2485000000.0000	37.8753	13.6019
2490000000.0000	37.8583	13.6160
2495000000.0000	37.8476	13.6440
2500000000.0000	37.8304	13.6475

■ Dielectric Parameter (2 450 MHz Body)

Title	GT-S3802W
SubTitle	2450MHz
Test Date	Jan. 18, 2013

Frequency	e'	e''
2400000000.0000	53.7416	14.3347
2405000000.0000	53.7327	14.3530
2410000000.0000	53.7165	14.3653
2415000000.0000	53.6992	14.3794
2420000000.0000	53.6683	14.3919
2425000000.0000	53.6608	14.4128
2430000000.0000	53.6541	14.4370
2435000000.0000	53.6381	14.4421
2440000000.0000	53.5913	14.4650
2445000000.0000	53.5636	14.5019
2450000000.0000	53.5531	14.5160
2455000000.0000	53.5353	14.5244
2460000000.0000	53.5113	14.5572
2465000000.0000	53.4818	14.5739
2470000000.0000	53.4725	14.6110
2475000000.0000	53.4586	14.6387
2480000000.0000	53.4376	14.6724
2485000000.0000	53.4251	14.6945
2490000000.0000	53.4092	14.7138
2495000000.0000	53.4026	14.7483
2500000000.0000	53.3795	14.7618

Attachment 3. – Probe Calibration Data

Calibration Laboratory of
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Zeughausstrasse 43, 8004 Zurich, Switzerland

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Client HCT (Dymstec) Certificate No: ET3-1609_Mar12

CALIBRATION CERTIFICATE

Object ET3DV6 - SN:1609

Calibration procedure(s) QA CAL-01.v8, QA CAL-12.v7, QA CAL-23.v4, QA CAL-25.v4
Calibration procedure for dosimetric E-field probes

Calibration date: March 19, 2012

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	31-Mar-11 (No. 217-01372)	Apr-12
Power sensor E4412A	MY41498087	31-Mar-11 (No. 217-01372)	Apr-12
Reference 3 dB Attenuator	SN: S5054 (3c)	29-Mar-11 (No. 217-01369)	Apr-12
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-11 (No. 217-01367)	Apr-12
Reference 30 dB Attenuator	SN: S5129 (30b)	29-Mar-11 (No. 217-01370)	Apr-12
Reference Probe ES3DV2	SN: 3013	29-Dec-11 (No. ES3-3013_Dec11)	Dec-12
DAE4	SN: 654	3-May-11 (No. DAE4-654_May11)	May-12
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-11)	In house check: Apr-13
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-11)	In house check: Oct-12

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

Issued: March 19, 2012

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

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Engineering AG
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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 affect 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.
- *PAR:* PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- *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:1609

Manufactured: July 27, 2001
Calibrated: March 19, 2012

Calibrated for DASY/EASY Systems
(Note: non-compatible with DASY2 system!)

DASY/EASY - Parameters of Probe: ET3DV6 - SN:1609

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	2.01	1.81	1.82	± 10.1 %
DCP (mV)[B]	97.7	97.4	98.1	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc[E] (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	112.2	±2.2 %
			Y	0.00	0.00	1.00	107.9	
			Z	0.00	0.00	1.00	109.9	

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 max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

DASY/EASY - Parameters of Probe: ET3DV6 - SN:1609

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
450	43.5	0.87	7.32	7.32	7.32	0.21	2.26	± 13.4 %
750	41.9	0.89	6.68	6.68	6.68	0.39	2.46	± 12.0 %
835	41.5	0.90	6.36	6.36	6.36	0.32	2.79	± 12.0 %
900	41.5	0.97	6.25	6.25	6.25	0.33	3.00	± 12.0 %
1450	40.5	1.20	5.48	5.48	5.48	0.44	3.00	± 12.0 %
1750	40.1	1.37	5.50	5.50	5.50	0.74	2.42	± 12.0 %
1900	40.0	1.40	5.26	5.26	5.26	0.80	2.18	± 12.0 %
1950	40.0	1.40	5.04	5.04	5.04	0.80	2.09	± 12.0 %
2450	39.2	1.80	4.52	4.52	4.52	0.80	1.90	± 12.0 %

[C] Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

DASY/EASY - Parameters of Probe: ET3DV6 - SN:1609

Calibration Parameter Determined in Body Tissue Simulating Media

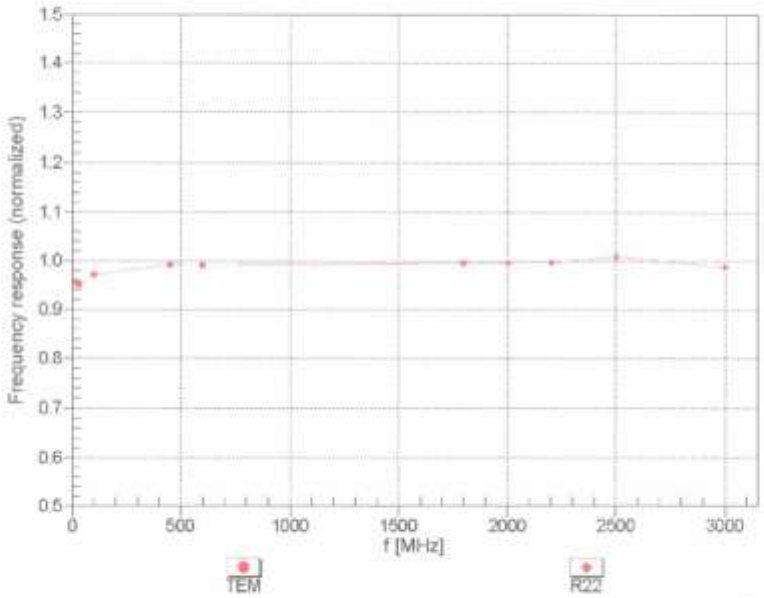
f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
450	56.7	0.94	7.73	7.73	7.73	0.15	2.32	± 13.4 %
750	55.5	0.96	6.38	6.38	6.38	0.29	3.00	± 12.0 %
835	55.2	0.97	6.24	6.24	6.24	0.39	2.51	± 12.0 %
1750	53.4	1.49	4.80	4.80	4.80	0.80	2.57	± 12.0 %
1900	53.3	1.52	4.55	4.55	4.55	0.80	2.50	± 12.0 %
2450	52.7	1.95	4.01	4.01	4.01	0.70	1.23	± 12.0 %

[C] Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

ET3DV6– SN:1609 March 19, 2012

Frequency Response of E-Field

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



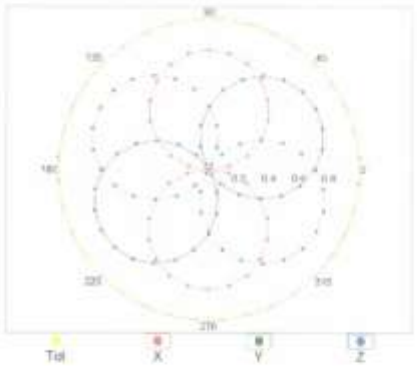
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

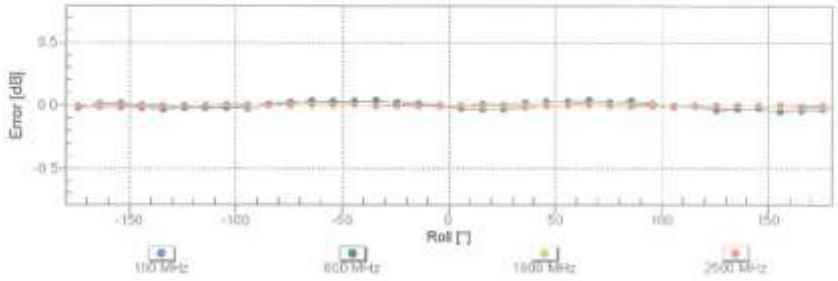
ET3DV6– SN:1609 March 19, 2012

Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM

f=1800 MHz,R22

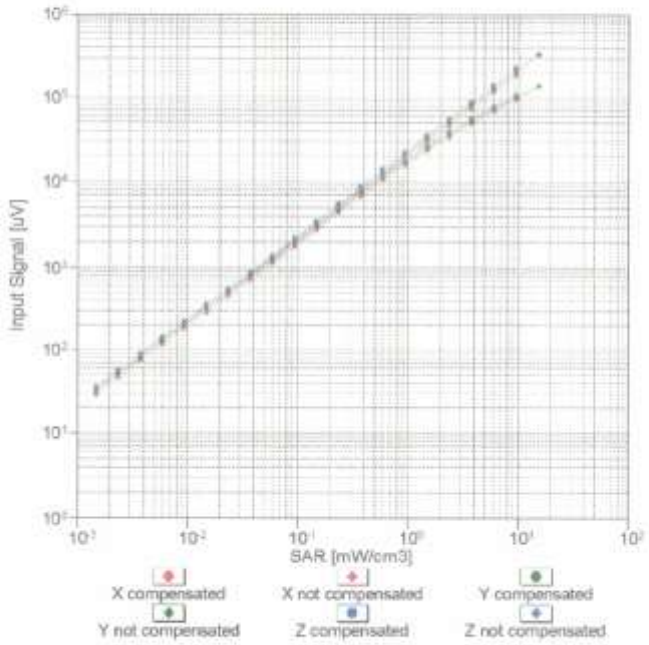


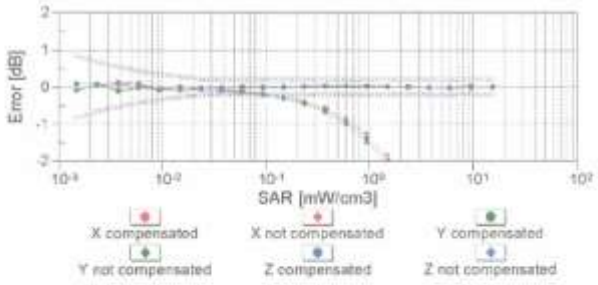


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

ET3DV6– SN:1609 March 19, 2012

Dynamic Range f(SAR_{head})
(TEM cell , f = 900 MHz)



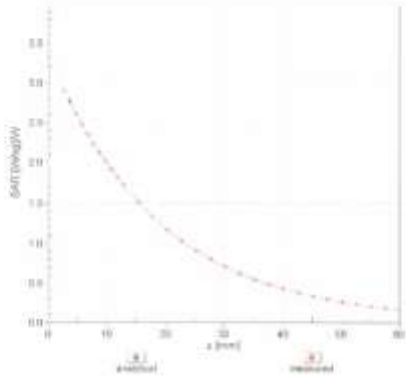


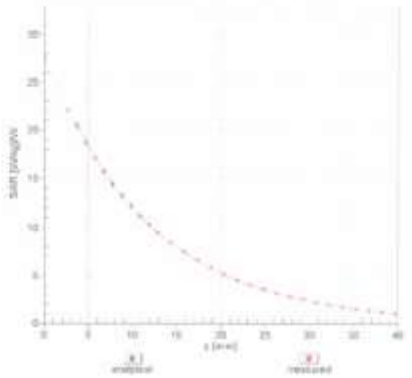
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

ET3DV6– SN:1609 March 19, 2012

Conversion Factor Assessment

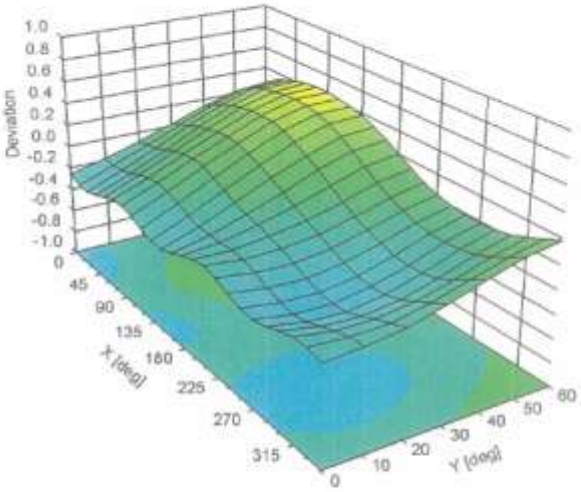
f = 835 MHz,WGLS R9 (H_convF) f = 1900 MHz,WGLS R22 (H_convF)





Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz



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

Certificate No: ET3-1609_Mar12 Page 10 of 11

DASY/EASY - Parameters of Probe: ET3DV6 - SN:1609

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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Zeughausstrasse 43, 8004 Zurich, Switzerland

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Accreditation No.: SCS 108

Client HCT (Dymstec) Certificate No: D835V2-441_May12

CALIBRATION CERTIFICATE

Object D835V2 - SN: 441

Calibration procedure(s) QA CAL-05.v8
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: May 16, 2012

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	05-Oct-11 (No. 217-01451)	Oct-12
Power sensor HP 8481A	US37292783	05-Oct-11 (No. 217-01451)	Oct-12
Reference 20 dB Attenuator	SN: 5058 (20k)	27-Mar-12 (No. 217-01530)	Apr-13
Type-N mismatch combination	SN: 5047.2 / 06327	27-Mar-12 (No. 217-01533)	Apr-13
Reference Probe ES3DV3	SN: 3205	30-Dec-11 (No. ES3-3205_Dec11)	Dec-12
DAE4	SN: 601	04-Jul-11 (No. DAE4-601_Jul11)	Jul-12

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-11)	In house check: Oct-13
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-11)	In house check: Oct-13
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-11)	In house check: Oct-12

	Name	Function	Signature
Calibrated by:	Israe El-Naouq	Laboratory Technician	Israa El-Naouq
Approved by:	Katja Pokovic	Technical Manager	

Issued: May 16, 2012

Calibration Laboratory of
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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.

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%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.1
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
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	40.6 ± 6 %	0.89 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.35 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**9.43 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.54 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**6.18 mW /g ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	54.3 ± 6 %	1.00 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.44 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**9.50 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.60 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**6.27 mW / g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.1 Ω - 5.8 jΩ
Return Loss	- 24.6 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.0 Ω - 8.1 jΩ
Return Loss	- 21.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.372 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. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
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: 16.05.2012

Test Laboratory: SPEAG, Zurich, Switzerland

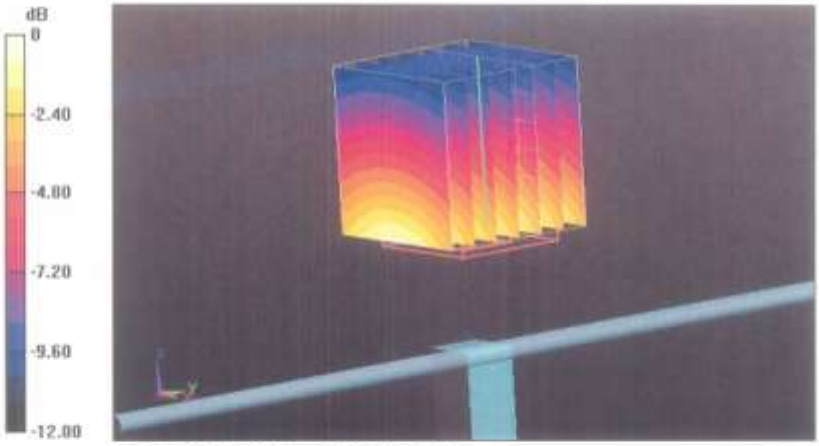
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 441

Communication System: CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.89 mho/m; ε_r = 40.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

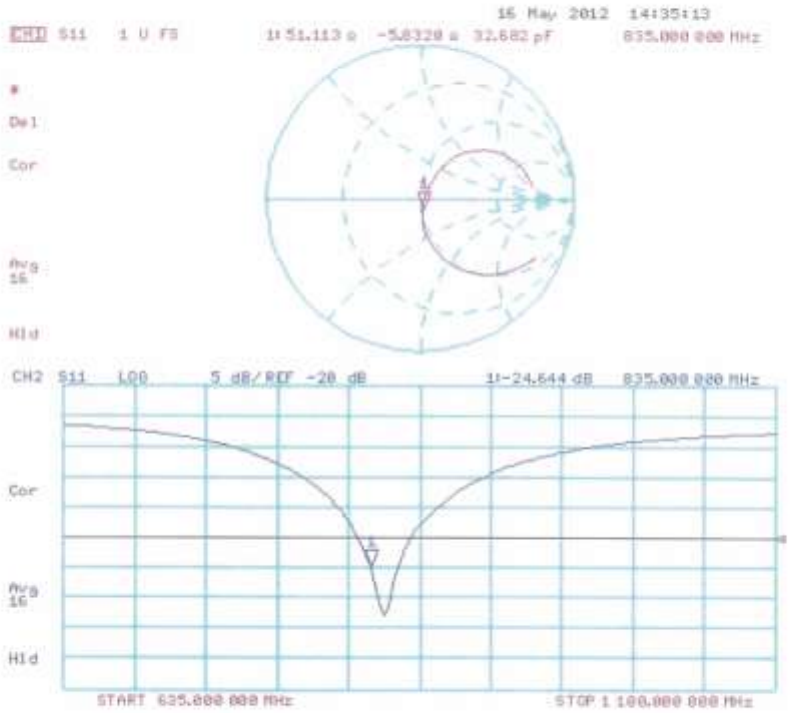
- Probe: ES3DV3 - SN3205; ConvF(6.07, 6.07, 6.07); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm 2/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 57.129 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 3.474 mW/g
SAR(1 g) = 2.35 mW/g; SAR(10 g) = 1.54 mW/g
Maximum value of SAR (measured) = 2.73 mW/g



0 dB = 2.73 mW/g = 8.72 dB mW/g

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 16.05.2012

Test Laboratory: SPEAG, Zurich, Switzerland

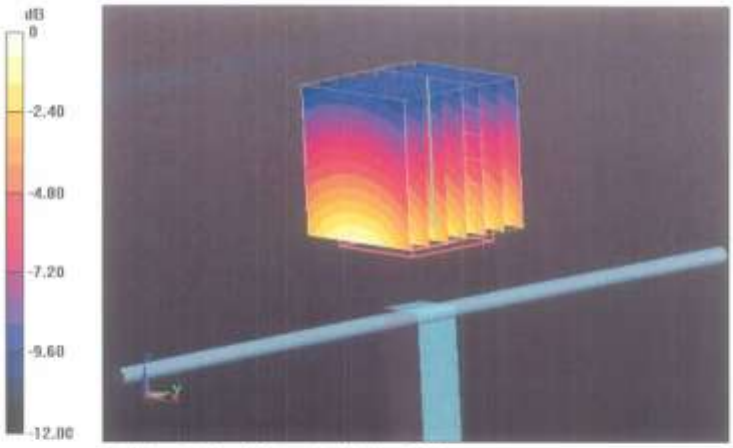
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 441

Communication System: CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 1 mho/m; ε_r = 54.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

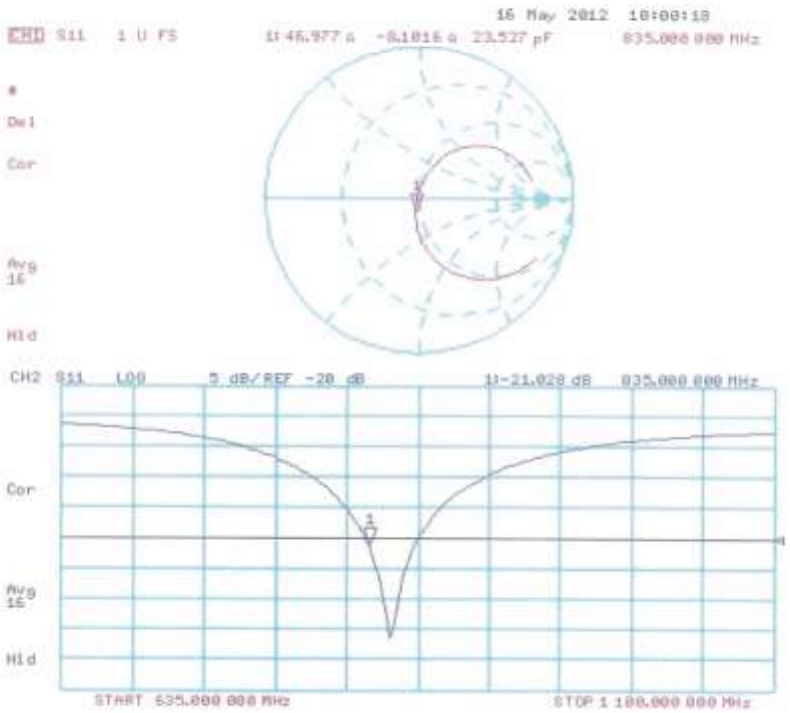
- Probe: ES3DV3 - SN3205; ConvF(6.02, 6.02, 6.02); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 55.054 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 3.533 mW/g
SAR(1 g) = 2.44 mW/g; SAR(10 g) = 1.6 mW/g
Maximum value of SAR (measured) = 2.82 mW/g



0 dB = 2.82 mW/g = 9.00 dB mW/g

Impedance Measurement Plot for Body TSL



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Accreditation No.: SCS 108

Client HCT (Dymstec)

Certificate No: D1900V2-5d032_Jul12

CALIBRATION CERTIFICATE

Object	D1900V2 - SN: 5d032
Calibration procedure(s)	QA CAL-05.v8 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	July 20, 2012

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	05-Oct-11 (No. 217-01451)	Oct-12
Power sensor HP 8481A	US37292783	05-Oct-11 (No. 217-01451)	Oct-12
Reference 20 dB Attenuator	SN: 5058 (20k)	27-Mar-12 (No. 217-01530)	Apr-13
Type-N mismatch combination	SN: 5047.2 / 06327	27-Mar-12 (No. 217-01533)	Apr-13
Reference Probe ES3DV3	SN: 3205	30-Dec-11 (No. ES3-3205_Dec11)	Dec-12
DAE4	SN: 601	27-Jun-12 (No. DAE4-601_Jun12)	Jun-13

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-11)	In house check: Oct-13
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-11)	In house check: Oct-13
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-11)	In house check: Oct-12

	Name	Function	Signature
Calibrated by:	Dimce Iliev	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: July 20, 2012

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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.

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%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.1
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
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	39.9 ± 6 %	1.38 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	---	---

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.68 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**39.0 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.11 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**20.5 mW /g ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.6 ± 6 %	1.52 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	---	---

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	10.0 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**39.9 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.30 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**21.2 mW / g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	50.0 Ω + 3.1 jΩ
Return Loss	- 30.1 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.2 Ω + 3.7 jΩ
Return Loss	- 25.2 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.194 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. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
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: 20.07.2012

Test Laboratory: SPEAG, Zurich, Switzerland

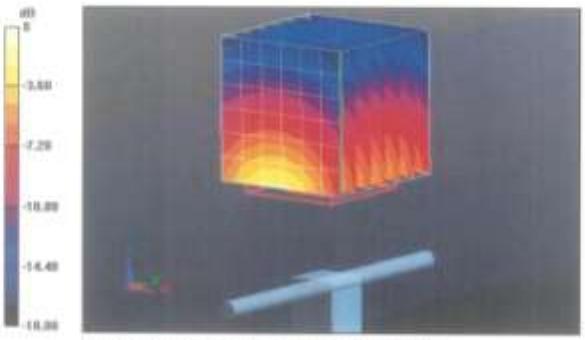
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d032

Communication System: CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.38 mho/m; ε_r = 39.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

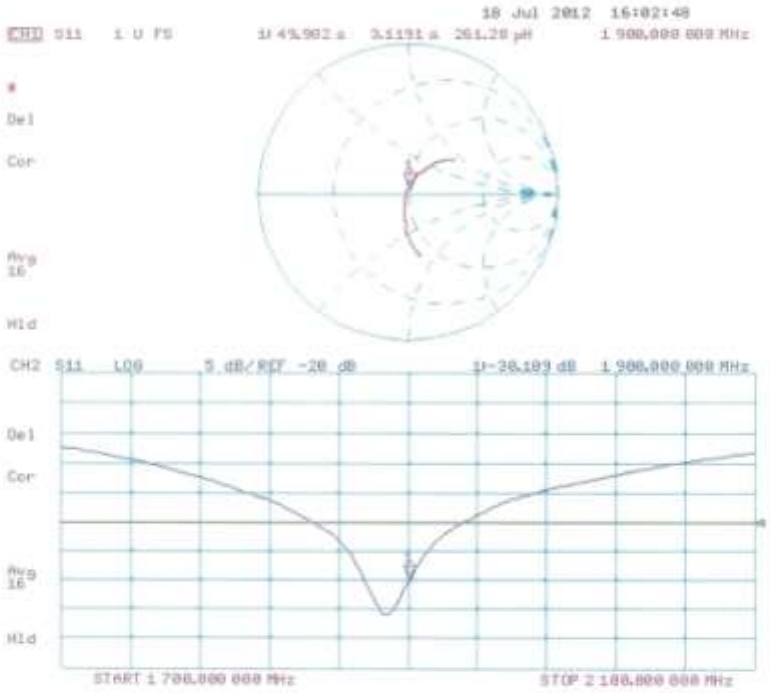
- Probe: ES3DV3 - SN3205; ConvF(5.01, 5.01, 5.01); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 96.864 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 17.209 mW/g
SAR(1 g) = 9.68 mW/g; SAR(10 g) = 5.11 mW/g
Maximum value of SAR (measured) = 12.1 mW/g



0 dB = 12.1 mW/g = 21.66 dB mW/g

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 20.07.2012

Test Laboratory: SPEAG, Zurich, Switzerland

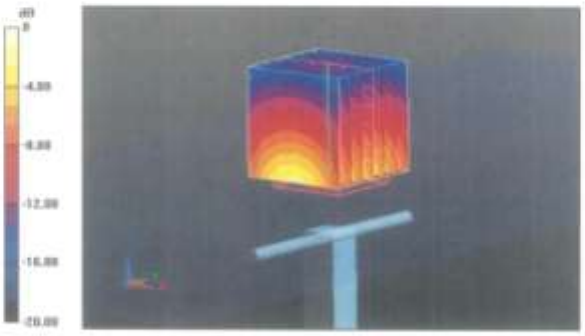
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d032

Communication System: CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.52 mho/m; ε_r = 52.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

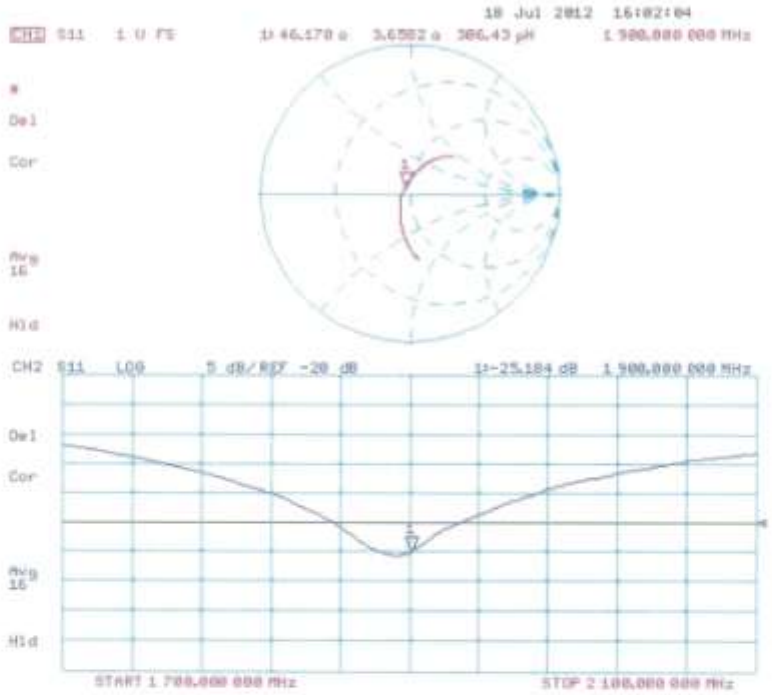
- Probe: ES3DV3 - SN3205; ConvF(4.62, 4.62, 4.62); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 95.470 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 17.332 mW/g
SAR(1 g) = 10 mW/g; SAR(10 g) = 5.3 mW/g
Maximum value of SAR (measured) = 12.6 mW/g



0 dB = 12.6 mW/g = 22.01 dB mW/g

Impedance Measurement Plot for Body TSL



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Accreditation No.: SCS 108

Client HCT (Dymstec)

Certificate No: D2450V2-743_Aug12

CALIBRATION CERTIFICATE

Object	D2450V2 - SN: 743
Calibration procedure(s)	QA CAL-05.v8 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	August 23, 2012

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	05-Oct-11 (No. 217-01451)	Oct-12
Power sensor HP 8481A	US37292783	05-Oct-11 (No. 217-01451)	Oct-12
Reference 20 dB Attenuator	SN: 5058 (20k)	27-Mar-12 (No. 217-01530)	Apr-13
Type-N mismatch combination	SN: 5047.2 / 06327	27-Mar-12 (No. 217-01533)	Apr-13
Reference Probe ES3DV3	SN: 3205	30-Dec-11 (No. ES3-3205_Dec11)	Dec-12
DAE4	SN: 601	27-Jun-12 (No. DAE4-601_Jun12)	Jun-13

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-11)	In house check: Oct-13
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-11)	In house check: Oct-13
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-11)	In house check: Oct-12

	Name	Function	Signature
Calibrated by:	Israe El-Naouq	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: August 23, 2012

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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.

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%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 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 ± 0.2) °C	39.2 ± 6 %	1.81 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	---	---

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.2 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**52.7 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.18 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**24.7 mW /g ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	51.3 ± 6 %	1.99 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	---	---

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.0 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**51.2 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.10 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**24.2 mW / g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	54.0 Ω + 4.7 jΩ
Return Loss	- 24.6 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	50.9 Ω + 6.5 jΩ
Return Loss	- 23.7 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.158 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. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
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: 23.08.2012

Test Laboratory: SPEAG, Zurich, Switzerland

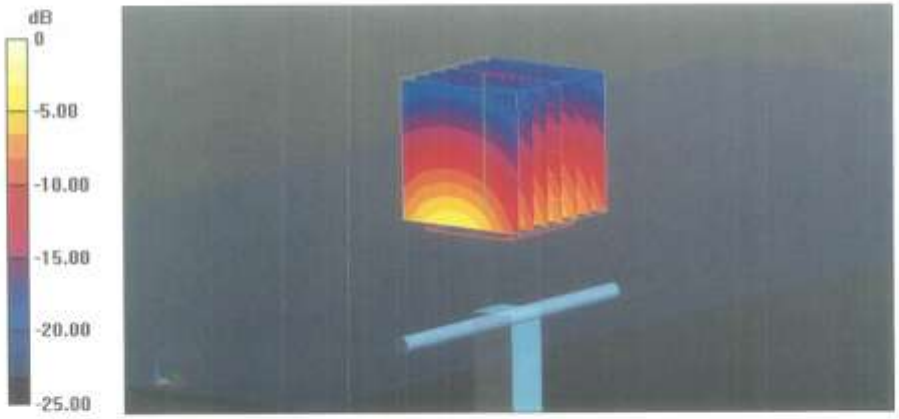
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 743

Communication System: CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.81 mho/m; ε_r = 39.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

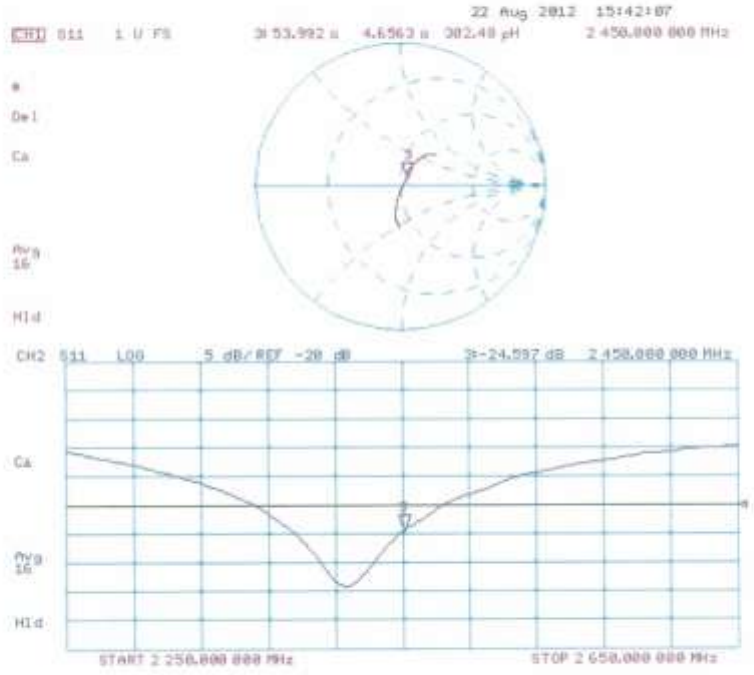
- Probe: ES3DV3 - SN3205; ConvF(4.45, 4.45, 4.45); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.2(969); SEMCAD X 14.6.6(6824)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 98.554 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 26.584 mW/g
SAR(1 g) = 13.2 mW/g; SAR(10 g) = 6.18 mW/g
Maximum value of SAR (measured) = 16.5 W/kg



0 dB = 16.5 W/kg = 24.35 dB W/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 22.08.2012

Test Laboratory: SPEAG, Zurich, Switzerland

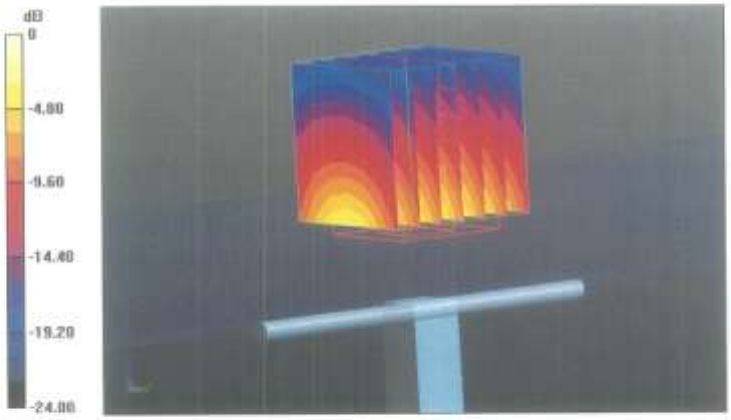
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 743

Communication System: CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.99 mho/m; ε_r = 51.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.26, 4.26, 4.26); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.2(969); SEMCAD X 14.6.6(6824)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 95.699 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 26.489 mW/g
SAR(1 g) = 13 mW/g; SAR(10 g) = 6.1 mW/g
Maximum value of SAR (measured) = 16.9 W/kg



0 dB = 16.9 W/kg = 24.56 dB W/kg

Impedance Measurement Plot for Body TSL