

Test Laboratory: HCT CO., LTD
EUT Type: GSM/WCDMA Phone with Bluetooth3.0, WIFI802.11 b/g/n
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Apr . 02, 2013
Plot NO. 21

DUT: LG-E440f; Type: Bar; Serial: #1

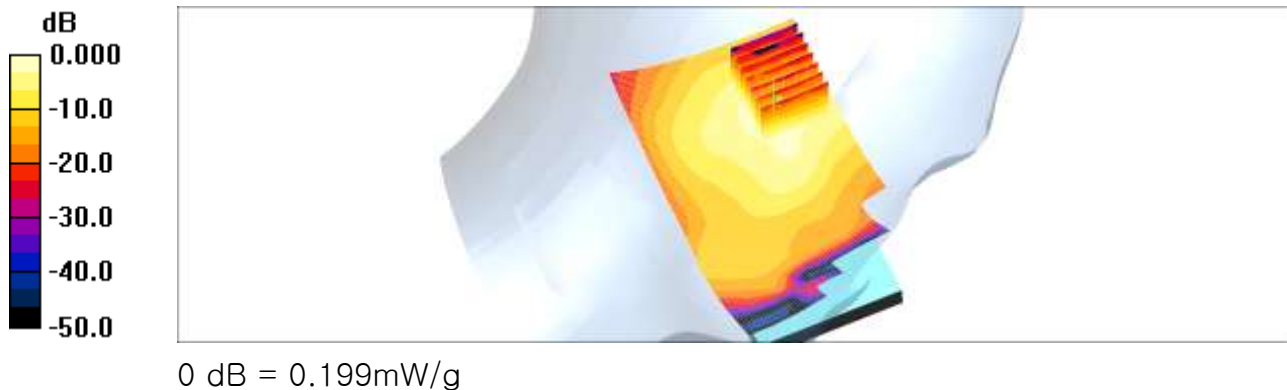
Communication System: 2450MHz FCC; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 2437 \text{ MHz}$; $\sigma = 1.85 \text{ mho/m}$; $\epsilon_r = 38.9$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: EX3DV4 - SN3797; ConvF(6.76, 6.76, 6.76); Calibrated: 2012-11-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: 1800/1900 Phantom; Type: SAM

Left touch 6ch 1Mbps/Area Scan (71x121x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$
Maximum value of SAR (interpolated) = 0.187 mW/g

Left touch 6ch 1Mbps/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$
Reference Value = 4.97 V/m; Power Drift = 0.101 dB
Peak SAR (extrapolated) = 0.399 W/kg
SAR(1 g) = 0.175 mW/g; SAR(10 g) = 0.083 mW/g
Maximum value of SAR (measured) = 0.199 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: GSM/WCDMA Phone with Bluetooth3.0, WIFI802.11 b/g/n
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Apr . 02, 2013
Plot NO. 22

DUT: LG-E440f; Type: Bar; Serial: #1

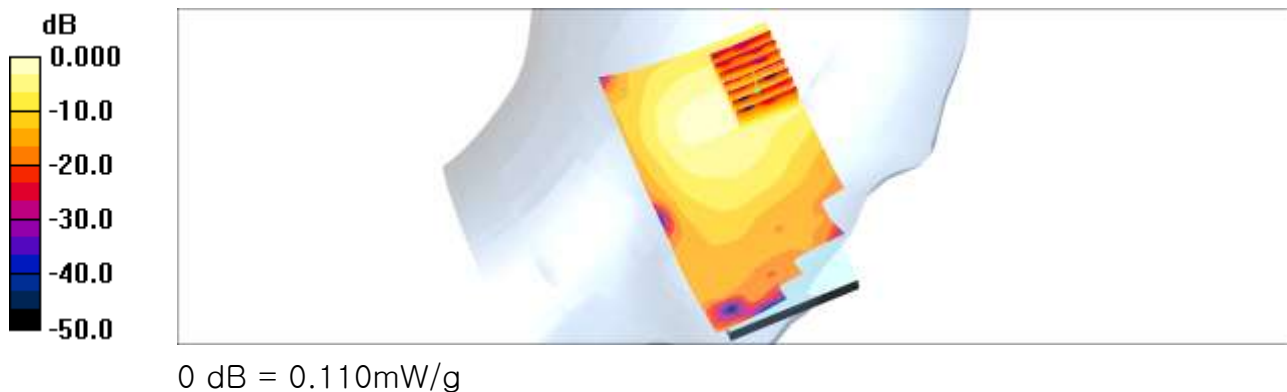
Communication System: 2450MHz FCC; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 2437 \text{ MHz}$; $\sigma = 1.85 \text{ mho/m}$; $\epsilon_r = 38.9$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: EX3DV4 - SN3797; ConvF(6.76, 6.76, 6.76); Calibrated: 2012-11-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: 1800/1900 Phantom; Type: SAM

Left tilt 6ch 1Mbps/Area Scan (71x121x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$
Maximum value of SAR (interpolated) = 0.111 mW/g

Left tilt 6ch 1Mbps/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$
Reference Value = 5.39 V/m; Power Drift = -0.107 dB
Peak SAR (extrapolated) = 0.224 W/kg
SAR(1 g) = 0.101 mW/g; SAR(10 g) = 0.046 mW/g
Maximum value of SAR (measured) = 0.110 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: GSM/WCDMA Phone with Bluetooth3.0, WIFI802.11 b/g/n
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Apr . 02, 2013
Plot NO. 23

DUT: LG-E440f; Type: Bar; Serial: #1

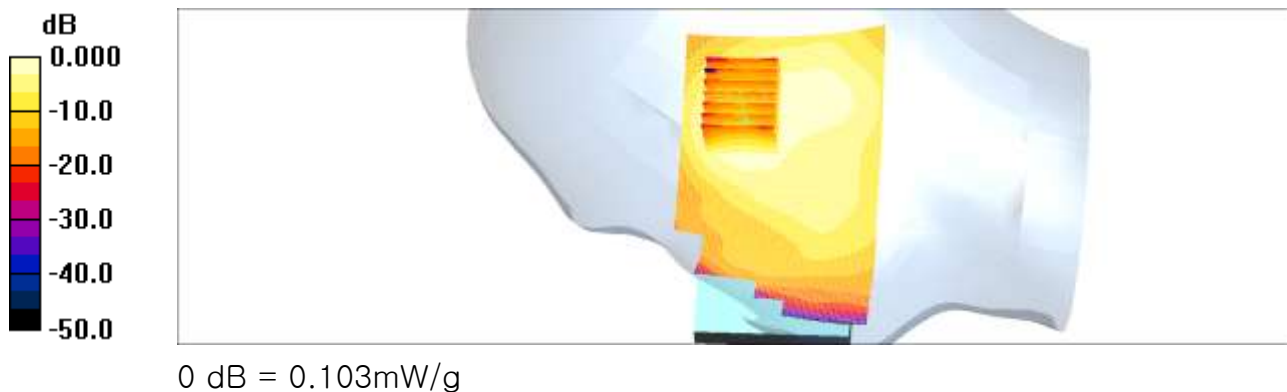
Communication System: 2450MHz FCC; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 2437$ MHz; $\sigma = 1.85$ mho/m; $\epsilon_r = 38.9$; $\rho = 1000$ kg/m³
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: EX3DV4 - SN3797; ConvF(6.76, 6.76, 6.76); Calibrated: 2012-11-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: 1800/1900 Phantom; Type: SAM

Right touch 6ch 1Mbps/Area Scan (71x121x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.109 mW/g

Right touch 6ch 1Mbps/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.30 V/m; Power Drift = 0.133 dB
Peak SAR (extrapolated) = 0.174 W/kg
SAR(1 g) = 0.095 mW/g; SAR(10 g) = 0.052 mW/g
Maximum value of SAR (measured) = 0.103 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: GSM/WCDMA Phone with Bluetooth3.0, WIFI802.11 b/g/n
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Apr . 02, 2013
Plot NO. 24

DUT: LG-E440f; Type: Bar; Serial: #1

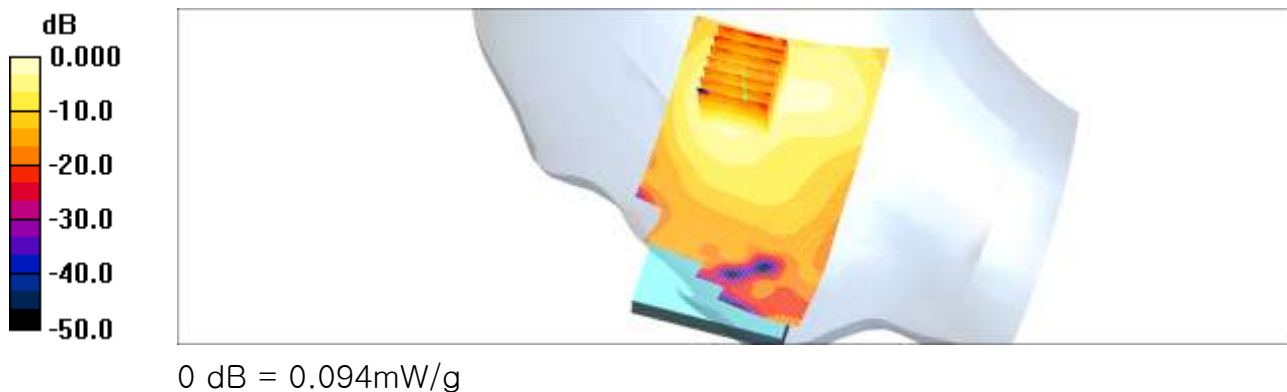
Communication System: 2450MHz FCC; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 2437$ MHz; $\sigma = 1.85$ mho/m; $\epsilon_r = 38.9$; $\rho = 1000$ kg/m³
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: EX3DV4 - SN3797; ConvF(6.76, 6.76, 6.76); Calibrated: 2012-11-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: 1800/1900 Phantom; Type: SAM

Right tilt 6ch 1Mbps/Area Scan (71x121x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.096 mW/g

Right tilt 6ch 1Mbps/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.27 V/m; Power Drift = -0.102 dB
Peak SAR (extrapolated) = 0.171 W/kg
SAR(1 g) = 0.083 mW/g; SAR(10 g) = 0.044 mW/g
Maximum value of SAR (measured) = 0.094 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: GSM/WCDMA Phone with Bluetooth3.0, WIFI802.11 b/g/n
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Mar . 30, 2013
Plot NO. 25

DUT: LG-E440F; Type: Bar; Serial: #1

Communication System: GSM 850; Frequency: 824.2 MHz; Duty Cycle: 1:2.075
Medium parameters used: $f = 825$ MHz; $\sigma = 0.979$ mho/m; $\epsilon_r = 56.9$; $\rho = 1000$ kg/m³
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

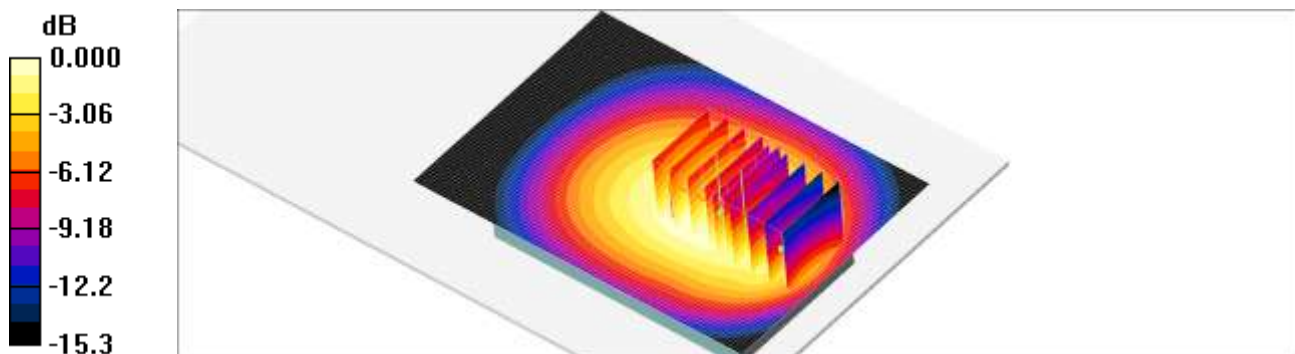
DASY4 Configuration:

- Probe: EX3DV4 - SN3797; ConvF(8.98, 8.98, 8.98); Calibrated: 2012-11-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: Triple Flat Phantom 5.1C_20120905; Type: QD 000 P51 CA

Body rear 128 4tx low/Area Scan (71x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.04 mW/g

Body rear 128 4tx low/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.91 V/m; Power Drift = -0.124 dB
Peak SAR (extrapolated) = 1.32 W/kg
SAR(1 g) = 0.977 mW/g; SAR(10 g) = 0.702 mW/g
Maximum value of SAR (measured) = 1.03 mW/g

Body rear 128 4tx low/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.91 V/m; Power Drift = -0.124 dB
Peak SAR (extrapolated) = 1.24 W/kg
SAR(1 g) = 0.755 mW/g; SAR(10 g) = 0.474 mW/g
Maximum value of SAR (measured) = 0.925 mW/g



0 dB = 0.925mW/g

Test Laboratory: HCT CO., LTD
EUT Type: GSM/WCDMA Phone with Bluetooth3.0, WIFI802.11 b/g/n
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Mar . 30, 2013
Plot NO. 26

DUT: LG-E440F; Type: Bar; Serial: #1

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:2.075
Medium parameters used (interpolated): $f = 836.6 \text{ MHz}$; $\sigma = 0.987 \text{ mho/m}$; $\epsilon_r = 56.8$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

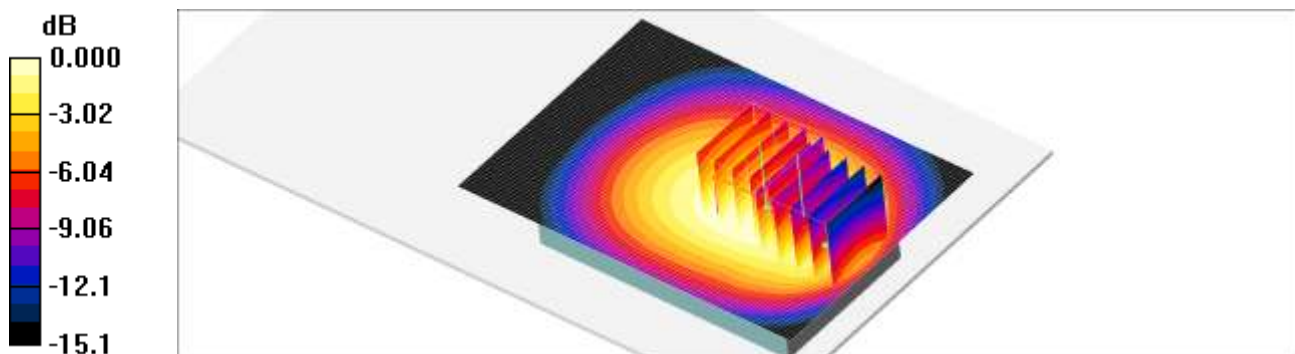
DASY4 Configuration:

- Probe: EX3DV4 - SN3797; ConvF(8.98, 8.98, 8.98); Calibrated: 2012-11-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: Triple Flat Phantom 5.1C_20120905; Type: QD 000 P51 CA

Body rear 190 4tx/Area Scan (71x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 1.03 mW/g

Body rear 190 4tx/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 6.64 V/m; Power Drift = -0.136 dB
Peak SAR (extrapolated) = 1.29 W/kg
SAR(1 g) = 0.957 mW/g; SAR(10 g) = 0.686 mW/g
Maximum value of SAR (measured) = 1.01 mW/g

Body rear 190 4tx/Zoom Scan (5x5x7)/Cube 1: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 6.64 V/m; Power Drift = -0.136 dB
Peak SAR (extrapolated) = 1.17 W/kg
SAR(1 g) = 0.702 mW/g; SAR(10 g) = 0.448 mW/g
Maximum value of SAR (measured) = 0.869 mW/g



0 dB = 0.869mW/g

Test Laboratory: HCT CO., LTD
EUT Type: GSM/WCDMA Phone with Bluetooth3.0, WIFI802.11 b/g/n
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Mar . 30, 2013
Plot NO. 27

DUT: LG-E440F; Type: Bar; Serial: #1

Communication System: GSM 850; Frequency: 848.8 MHz; Duty Cycle: 1:2.075
Medium parameters used: $f = 850$ MHz; $\sigma = 0.999$ mho/m; $\epsilon_r = 56.7$; $\rho = 1000$ kg/m³
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

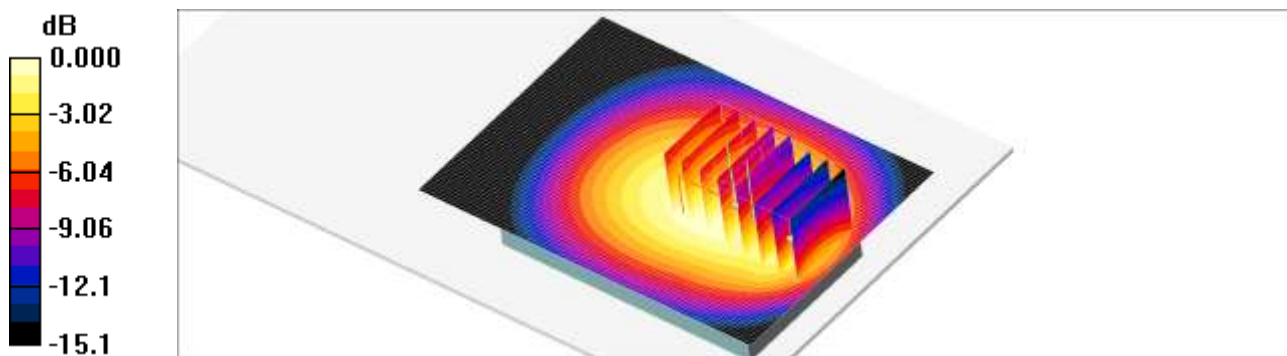
DASY4 Configuration:

- Probe: EX3DV4 - SN3797; ConvF(8.98, 8.98, 8.98); Calibrated: 2012-11-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: Triple Flat Phantom 5.1C_20120905; Type: QD 000 P51 CA

Body rear 251 4tx/Area Scan (71x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.15 mW/g

Body rear 251 4tx/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.58 V/m; Power Drift = -0.008 dB
Peak SAR (extrapolated) = 1.48 W/kg
SAR(1 g) = 1.09 mW/g; SAR(10 g) = 0.776 mW/g
Maximum value of SAR (measured) = 1.15 mW/g

Body rear 251 4tx/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.58 V/m; Power Drift = -0.008 dB
Peak SAR (extrapolated) = 1.37 W/kg
SAR(1 g) = 0.845 mW/g; SAR(10 g) = 0.534 mW/g
Maximum value of SAR (measured) = 1.03 mW/g



0 dB = 1.03mW/g

Test Laboratory: HCT CO., LTD
EUT Type: GSM/WCDMA Phone with Bluetooth3.0, WIFI802.11 b/g/n
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Mar . 30, 2013
Plot NO. 28

DUT: LG-E440F; Type: Bar; Serial: #1

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

Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.987$ mho/m; $\epsilon_r = 56.8$; $\rho = 1000$ kg/m³

Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: EX3DV4 - SN3797; ConvF(8.98, 8.98, 8.98); Calibrated: 2012-11-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: Triple Flat Phantom 5.1C_20120905; Type: QD 000 P51 CA

Body front 190 4tx/Area Scan (71x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.632 mW/g

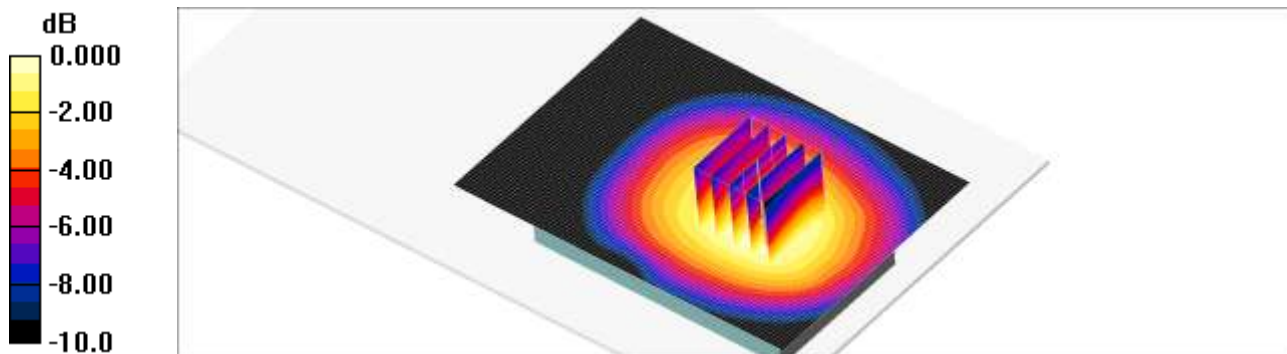
Body front 190 4tx/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 4.49 V/m; Power Drift = -0.074 dB

Peak SAR (extrapolated) = 0.761 W/kg

SAR(1 g) = 0.594 mW/g; SAR(10 g) = 0.441 mW/g

Maximum value of SAR (measured) = 0.626 mW/g



0 dB = 0.626mW/g

Test Laboratory: HCT CO., LTD
EUT Type: GSM/WCDMA Phone with Bluetooth3.0, WIFI802.11 b/g/n
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Mar . 30, 2013
Plot NO. 29

DUT: LG-E440F; Type: Bar; Serial: #1

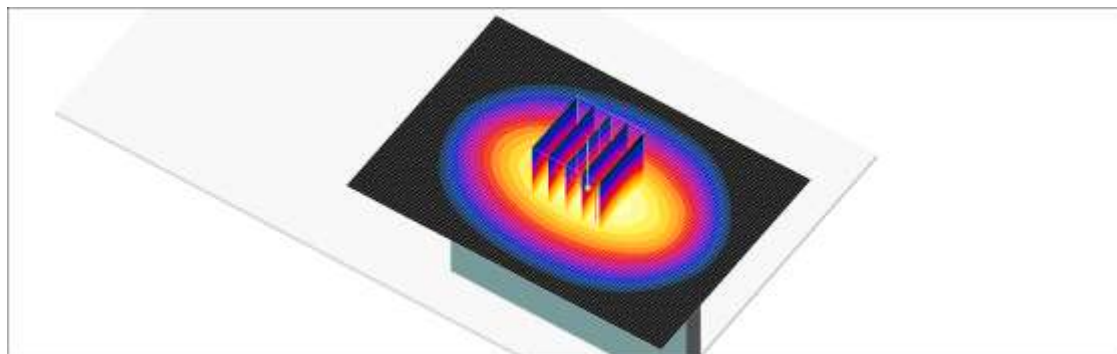
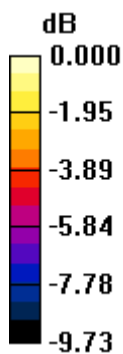
Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:2.075
Medium parameters used (interpolated): $f = 836.6 \text{ MHz}$; $\sigma = 0.987 \text{ mho/m}$; $\epsilon_r = 56.8$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: EX3DV4 - SN3797; ConvF(8.98, 8.98, 8.98); Calibrated: 2012-11-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: Triple Flat Phantom 5.1C_20120905; Type: QD 000 P51 CA

Body Left 190 4tx/Area Scan (71x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 0.417 mW/g

Body Left 190 4tx/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 8.80 V/m; Power Drift = -0.100 dB
Peak SAR (extrapolated) = 0.546 W/kg
SAR(1 g) = 0.386 mW/g; SAR(10 g) = 0.263 mW/g
Maximum value of SAR (measured) = 0.413 mW/g



0 dB = 0.413mW/g

Test Laboratory: HCT CO., LTD
EUT Type: GSM/WCDMA Phone with Bluetooth3.0, WIFI802.11 b/g/n
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Mar . 30, 2013
Plot NO. 30

DUT: LG-E440F; Type: Bar; Serial: #1

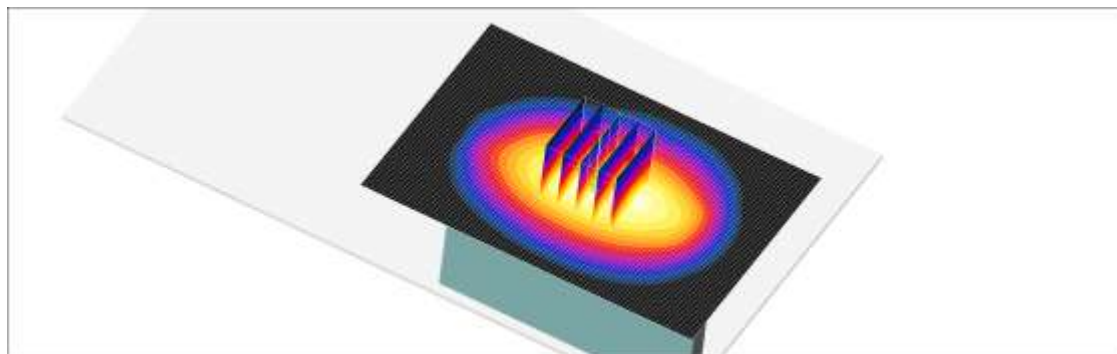
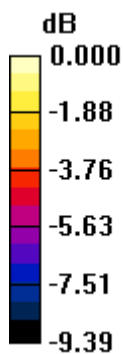
Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:2.075
Medium parameters used (interpolated): $f = 836.6 \text{ MHz}$; $\sigma = 0.987 \text{ mho/m}$; $\epsilon_r = 56.8$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: EX3DV4 - SN3797; ConvF(8.98, 8.98, 8.98); Calibrated: 2012-11-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: Triple Flat Phantom 5.1C_20120905; Type: QD 000 P51 CA

Body Right 190/Area Scan (71x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 0.666 mW/g

Body Right 190/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 11.2 V/m; Power Drift = -0.164 dB
Peak SAR (extrapolated) = 0.992 W/kg
SAR(1 g) = 0.650 mW/g; SAR(10 g) = 0.443 mW/g
Maximum value of SAR (measured) = 0.690 mW/g



0 dB = 0.690mW/g

Test Laboratory: HCT CO., LTD
EUT Type: GSM/WCDMA Phone with Bluetooth3.0, WIFI802.11 b/g/n
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Mar . 30, 2013
Plot NO. 31

DUT: LG-E440F; Type: Bar; Serial: #1

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

Medium parameters used (interpolated): $f = 836.6 \text{ MHz}$; $\sigma = 0.987 \text{ mho/m}$; $\epsilon_r = 56.8$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: EX3DV4 - SN3797; ConvF(8.98, 8.98, 8.98); Calibrated: 2012-11-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: Triple Flat Phantom 5.1C_20120905; Type: QD 000 P51 CA

Body Bottom 190 4tx/Area Scan (71x41x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.118 mW/g

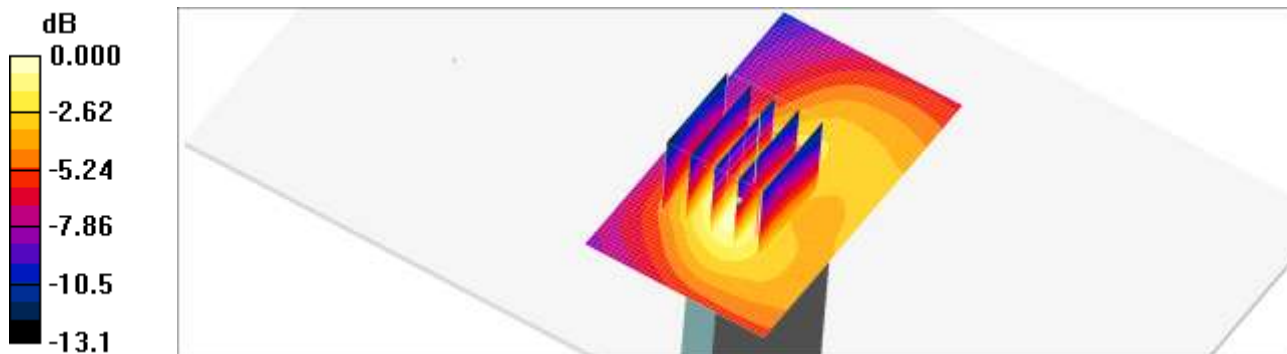
Body Bottom 190 4tx/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 10.8 V/m; Power Drift = 0.001 dB

Peak SAR (extrapolated) = 0.179 W/kg

SAR(1 g) = 0.110 mW/g; SAR(10 g) = 0.066 mW/g

Maximum value of SAR (measured) = 0.120 mW/g



0 dB = 0.120mW/g

Test Laboratory: HCT CO., LTD
EUT Type: GSM/WCDMA Phone with Bluetooth3.0, WIFI802.11 b/g/n
Liquid Temperature: 20.7 °C
Ambient Temperature: 20.9 °C
Test Date: Apr . 01, 2013
Plot NO. 32

DUT: LG-E440F; Type: Bar; Serial: #1

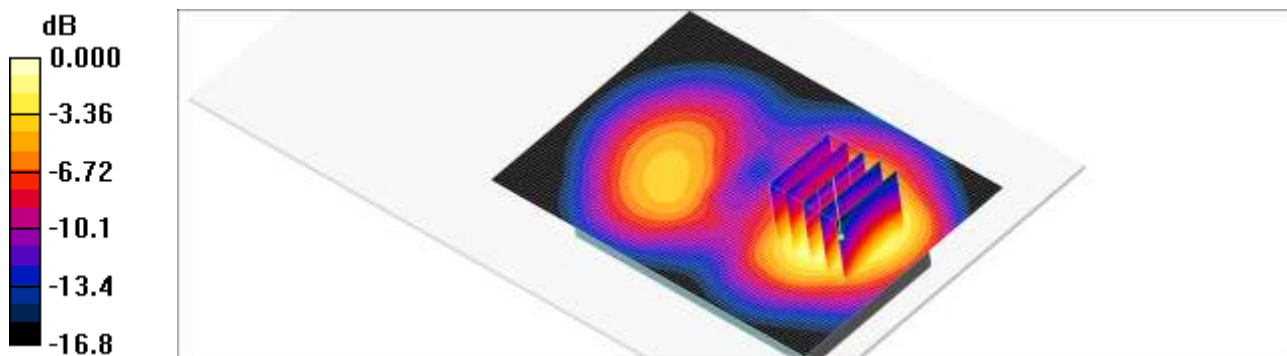
Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:2.075
Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.54 \text{ mho/m}$; $\epsilon_r = 52.3$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: EX3DV4 - SN3797; ConvF(7.28, 7.28, 7.28); Calibrated: 2012-11-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: Triple Flat Phantom 5.1C_20120905; Type: QD 000 P51 CA

Body rear 661 4Tx/Area Scan (71x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 0.598 mW/g

Body rear 661 4Tx/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 7.20 V/m; Power Drift = -0.011 dB
Peak SAR (extrapolated) = 0.874 W/kg
SAR(1 g) = 0.541 mW/g; SAR(10 g) = 0.326 mW/g
Maximum value of SAR (measured) = 0.587 mW/g



0 dB = 0.587mW/g

Test Laboratory: HCT CO., LTD
EUT Type: GSM/WCDMA Phone with Bluetooth3.0, WIFI802.11 b/g/n
Liquid Temperature: 20.7 °C
Ambient Temperature: 20.9 °C
Test Date: Apr . 01, 2013
Plot NO. 33

DUT: LG-E440F; Type: Bar; Serial: #1

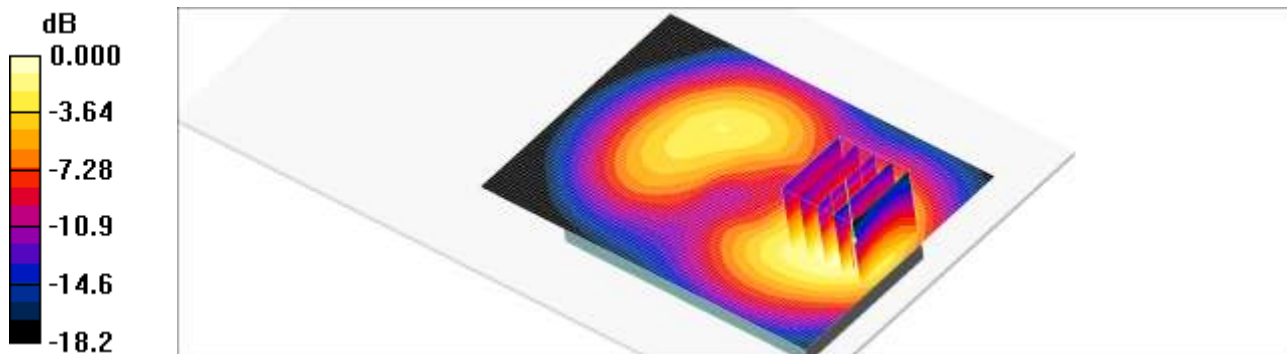
Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:2.075
Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.54 \text{ mho/m}$; $\epsilon_r = 52.3$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: EX3DV4 - SN3797; ConvF(7.28, 7.28, 7.28); Calibrated: 2012-11-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: Triple Flat Phantom 5.1C_20120905; Type: QD 000 P51 CA

Body front 661 4Tx/Area Scan (71x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 0.545 mW/g

Body front 661 4Tx/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 6.73 V/m; Power Drift = 0.011 dB
Peak SAR (extrapolated) = 0.795 W/kg
SAR(1 g) = 0.491 mW/g; SAR(10 g) = 0.294 mW/g
Maximum value of SAR (measured) = 0.541 mW/g



0 dB = 0.541mW/g

Test Laboratory: HCT CO., LTD
EUT Type: GSM/WCDMA Phone with Bluetooth3.0, WIFI802.11 b/g/n
Liquid Temperature: 20.7 °C
Ambient Temperature: 20.9 °C
Test Date: Apr . 01, 2013
Plot NO. 34

DUT: LG-E440F; Type: Bar; Serial: #1

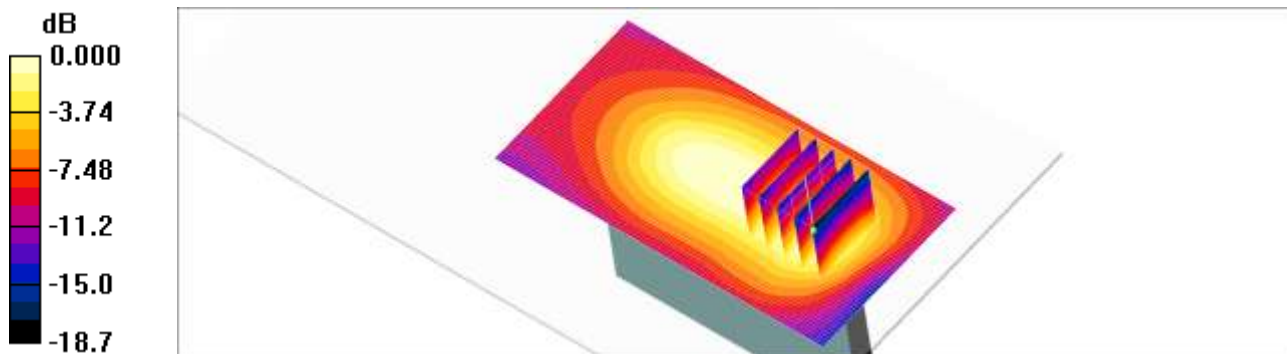
Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:2.075
Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.54 \text{ mho/m}$; $\epsilon_r = 52.3$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: EX3DV4 - SN3797; ConvF(7.28, 7.28, 7.28); Calibrated: 2012-11-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: Triple Flat Phantom 5.1C_20120905; Type: QD 000 P51 CA

Body left side 661 4Tx/Area Scan (51x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.122 mW/g

Body left side 661 4Tx/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.66 V/m; Power Drift = -0.053 dB
Peak SAR (extrapolated) = 0.176 W/kg
SAR(1 g) = 0.105 mW/g; SAR(10 g) = 0.063 mW/g
Maximum value of SAR (measured) = 0.114 mW/g



0 dB = 0.114mW/g

Test Laboratory: HCT CO., LTD
EUT Type: GSM/WCDMA Phone with Bluetooth3.0, WIFI802.11 b/g/n
Liquid Temperature: 20.7 °C
Ambient Temperature: 20.9 °C
Test Date: Apr . 01, 2013
Plot NO. 35

DUT: LG-E440F; Type: Bar; Serial: #1

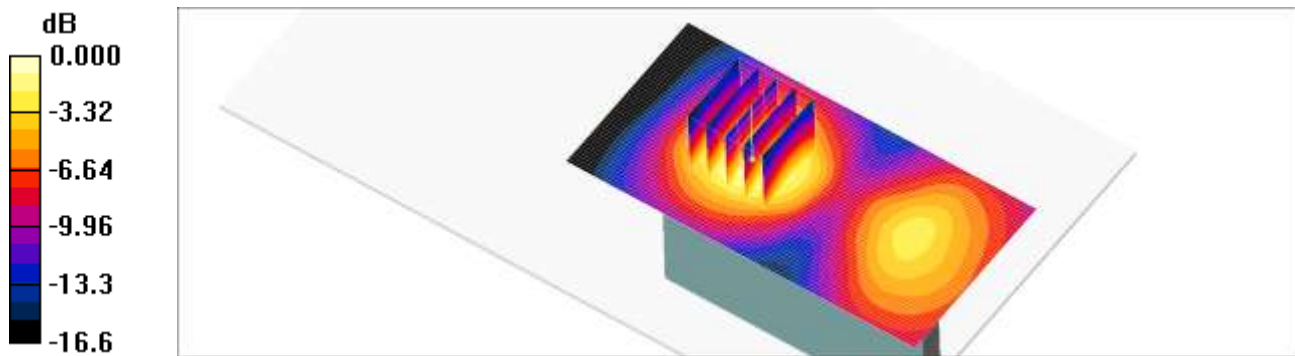
Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:2.075
Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.54 \text{ mho/m}$; $\epsilon_r = 52.3$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: EX3DV4 - SN3797; ConvF(7.28, 7.28, 7.28); Calibrated: 2012-11-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: Triple Flat Phantom 5.1C_20120905; Type: QD 000 P51 CA

Body right side 661 4Tx/Area Scan (51x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 0.129 mW/g

Body right side 661 4Tx/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 3.32 V/m; Power Drift = -0.059 dB
Peak SAR (extrapolated) = 0.190 W/kg
SAR(1 g) = 0.117 mW/g; SAR(10 g) = 0.068 mW/g
Maximum value of SAR (measured) = 0.129 mW/g



0 dB = 0.129mW/g

Test Laboratory: HCT CO., LTD
EUT Type: GSM/WCDMA Phone with Bluetooth3.0, WIFI802.11 b/g/n
Liquid Temperature: 20.7 °C
Ambient Temperature: 20.9 °C
Test Date: Apr . 01, 2013
Plot NO. 36

DUT: LG-E440F; Type: Bar; Serial: #1

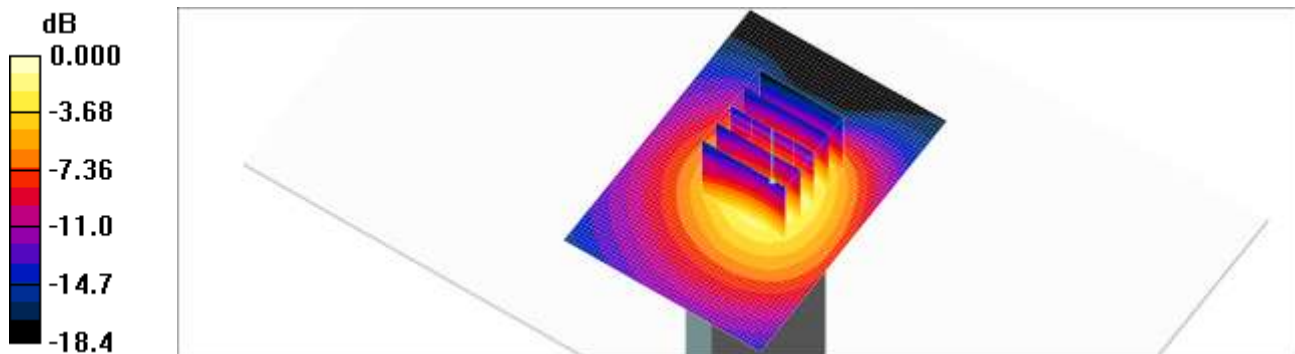
Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:2.075
Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.54 \text{ mho/m}$; $\epsilon_r = 52.3$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: EX3DV4 - SN3797; ConvF(7.28, 7.28, 7.28); Calibrated: 2012-11-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: Triple Flat Phantom 5.1C_20120905; Type: QD 000 P51 CA

Body Bottom 661 4Tx/Area Scan (51x71x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 0.453 mW/g

Body Bottom 661 4Tx/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 15.5 V/m; Power Drift = 0.041 dB
Peak SAR (extrapolated) = 0.661 W/kg
SAR(1 g) = 0.382 mW/g; SAR(10 g) = 0.215 mW/g
Maximum value of SAR (measured) = 0.419 mW/g



0 dB = 0.419mW/g

Test Laboratory: HCT CO., LTD
EUT Type: GSM/WCDMA Phone with Bluetooth3.0, WIFI802.11 b/g/n
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Mar . 30, 2013
Plot NO. 37

DUT: LG-E440F; Type: Bar; Serial: #1

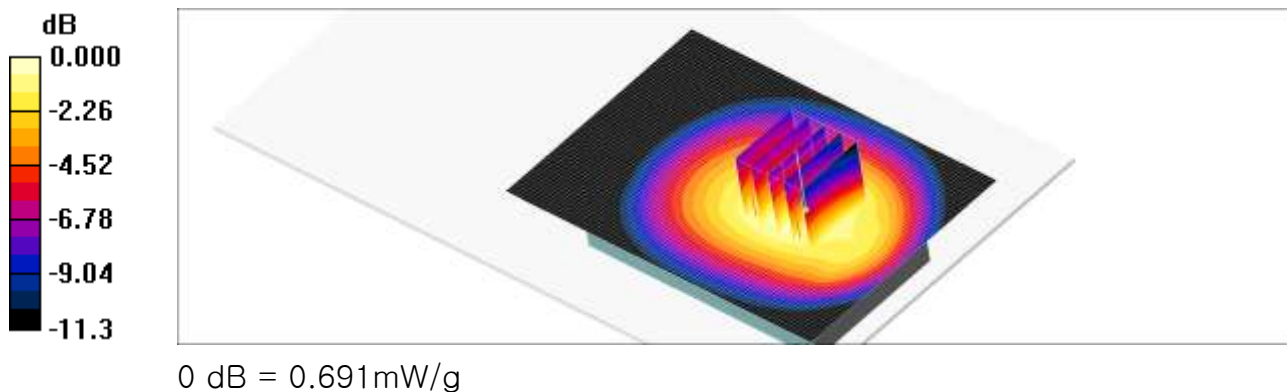
Communication System: WCDMA850; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 836.6 \text{ MHz}$; $\sigma = 0.987 \text{ mho/m}$; $\epsilon_r = 56.8$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: EX3DV4 - SN3797; ConvF(8.98, 8.98, 8.98); Calibrated: 2012-11-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: Triple Flat Phantom 5.1C_20120905; Type: QD 000 P51 CA

Body rear 4183/Area Scan (71x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 0.695 mW/g

Body rear 4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 5.38 V/m; Power Drift = -0.122 dB
Peak SAR (extrapolated) = 0.870 W/kg
SAR(1 g) = 0.653 mW/g; SAR(10 g) = 0.470 mW/g
Maximum value of SAR (measured) = 0.691 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: GSM/WCDMA Phone with Bluetooth3.0, WIFI802.11 b/g/n
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Mar . 30, 2013
Plot NO. 38

DUT: LG-E440F; Type: Bar; Serial: #1

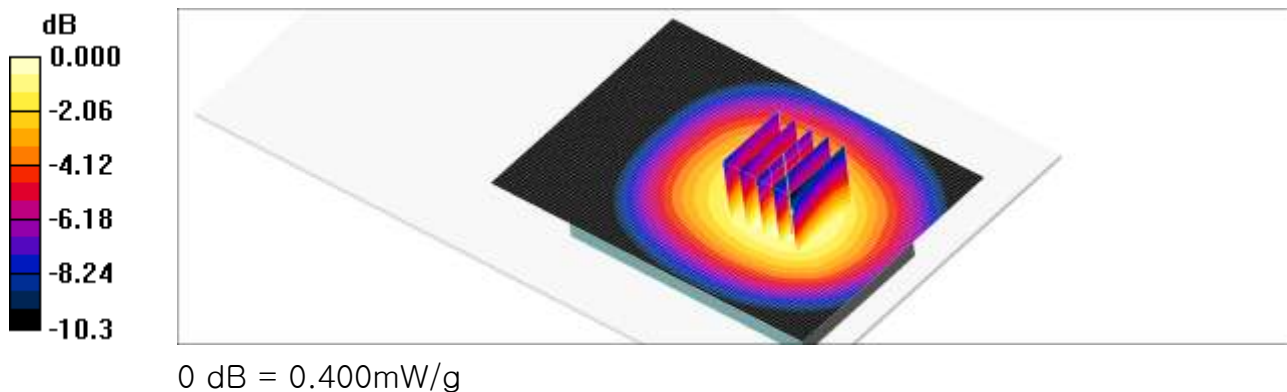
Communication System: WCDMA850; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 836.6 \text{ MHz}$; $\sigma = 0.987 \text{ mho/m}$; $\epsilon_r = 56.8$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: EX3DV4 - SN3797; ConvF(8.98, 8.98, 8.98); Calibrated: 2012-11-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: Triple Flat Phantom 5.1C_20120905; Type: QD 000 P51 CA

Body front 4183/Area Scan (71x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 0.402 mW/g

Body front 4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 3.97 V/m; Power Drift = 0.122 dB
Peak SAR (extrapolated) = 0.486 W/kg
SAR(1 g) = 0.379 mW/g; SAR(10 g) = 0.280 mW/g
Maximum value of SAR (measured) = 0.400 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: GSM/WCDMA Phone with Bluetooth3.0, WIFI802.11 b/g/n
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Mar . 30, 2013
Plot NO. 39

DUT: LG-E440F; Type: Bar; Serial: #1

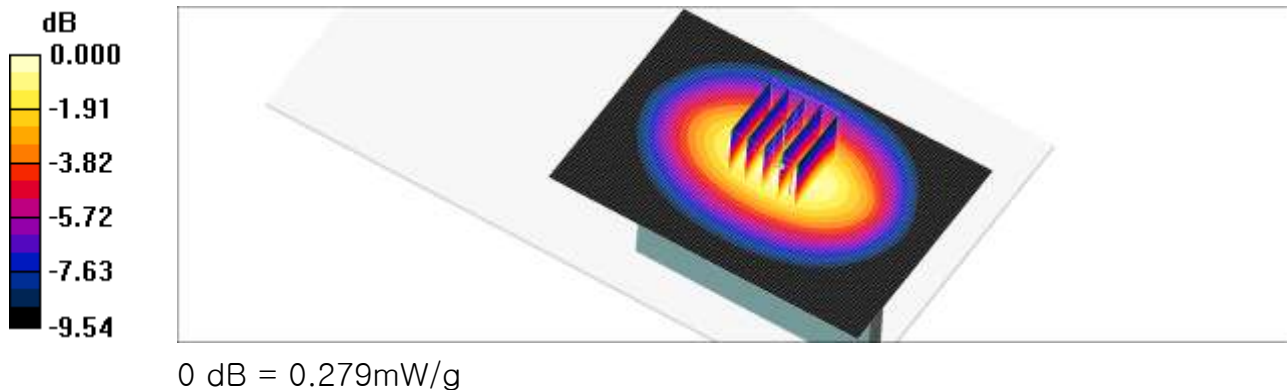
Communication System: WCDMA850; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 836.6 \text{ MHz}$; $\sigma = 0.987 \text{ mho/m}$; $\epsilon_r = 56.8$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: EX3DV4 - SN3797; ConvF(8.98, 8.98, 8.98); Calibrated: 2012-11-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: Triple Flat Phantom 5.1C_20120905; Type: QD 000 P51 CA

Body Left 4183/Area Scan (71x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 0.276 mW/g

Body Left 4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 7.92 V/m; Power Drift = -0.021 dB
Peak SAR (extrapolated) = 0.367 W/kg
SAR(1 g) = 0.261 mW/g; SAR(10 g) = 0.178 mW/g
Maximum value of SAR (measured) = 0.279 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: GSM/WCDMA Phone with Bluetooth3.0, WIFI802.11 b/g/n
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Mar . 30, 2013
Plot NO. 40

DUT: LG-E440F; Type: Bar; Serial: #1

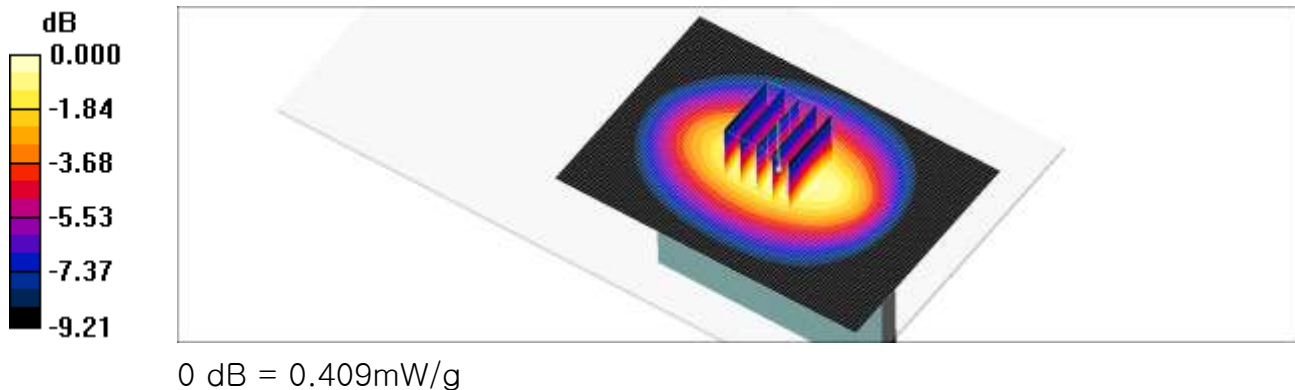
Communication System: WCDMA850; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 836.6 \text{ MHz}$; $\sigma = 0.987 \text{ mho/m}$; $\epsilon_r = 56.8$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: EX3DV4 - SN3797; ConvF(8.98, 8.98, 8.98); Calibrated: 2012-11-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: Triple Flat Phantom 5.1C_20120905; Type: QD 000 P51 CA

Body right 4183/Area Scan (71x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 0.408 mW/g

Body right 4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 10.9 V/m; Power Drift = -0.040 dB
Peak SAR (extrapolated) = 0.533 W/kg
SAR(1 g) = 0.382 mW/g; SAR(10 g) = 0.264 mW/g
Maximum value of SAR (measured) = 0.409 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: GSM/WCDMA Phone with Bluetooth3.0, WIFI802.11 b/g/n
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Mar . 30, 2013
Plot NO. 41

DUT: LG-E440F; Type: Bar; Serial: #1

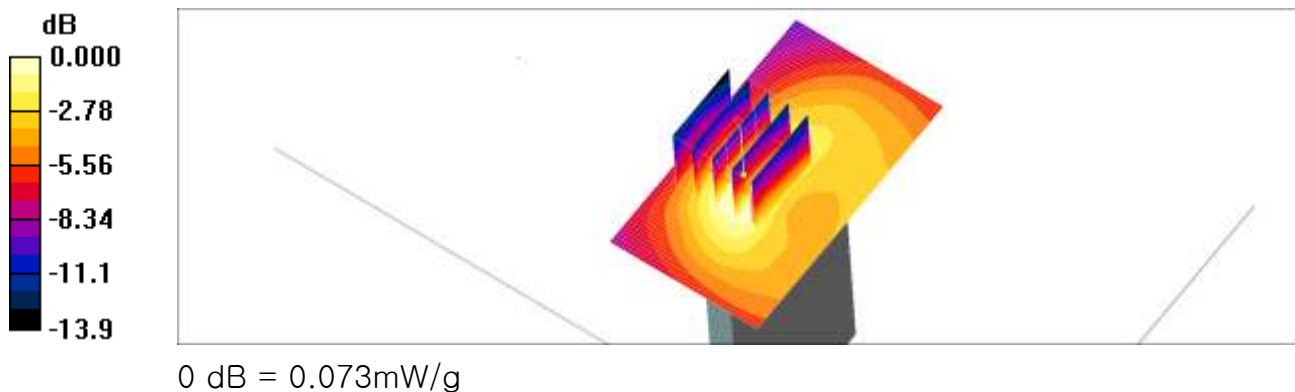
Communication System: WCDMA850; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.987$ mho/m; $\epsilon_r = 56.8$; $\rho = 1000$ kg/m³
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: EX3DV4 - SN3797; ConvF(8.98, 8.98, 8.98); Calibrated: 2012-11-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: Triple Flat Phantom 5.1C_20120905; Type: QD 000 P51 CA

Body Bottom 4183/Area Scan (71x41x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.075 mW/g

Body Bottom 4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.52 V/m; Power Drift = -0.164 dB
Peak SAR (extrapolated) = 0.106 W/kg
SAR(1 g) = 0.067 mW/g; SAR(10 g) = 0.040 mW/g
Maximum value of SAR (measured) = 0.073 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: GSM/WCDMA Phone with Bluetooth3.0, WIFI802.11 b/g/n
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Apr . 02, 2013
Plot NO. 42

DUT: LG-E440F; Type: Bar; Serial: #1

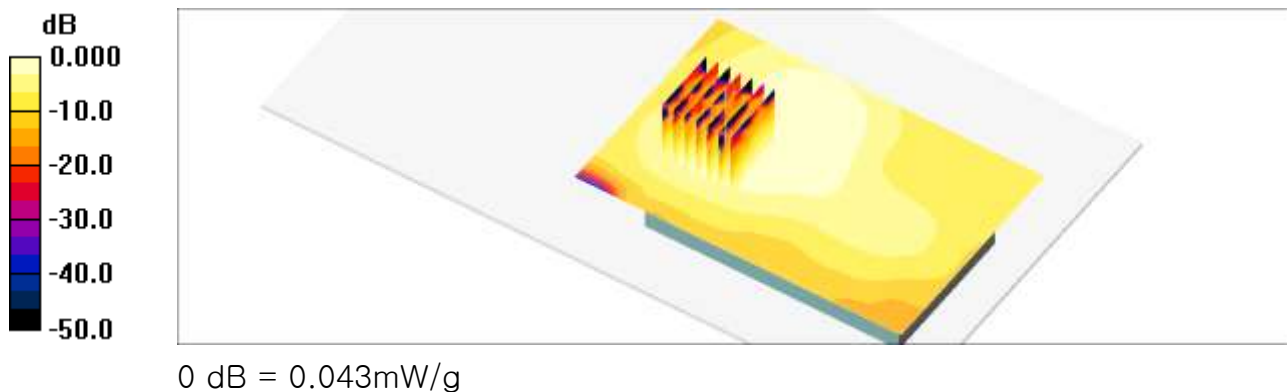
Communication System: 2450MHz FCC; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 2437 \text{ MHz}$; $\sigma = 1.97 \text{ mho/m}$; $\epsilon_r = 53.6$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: EX3DV4 - SN3797; ConvF(6.98, 6.98, 6.98); Calibrated: 2012-11-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: Triple Flat Phantom 5.1C_20120905; Type: QD 000 P51 CA

Body rear ch6/Area Scan (81x121x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.042 mW/g

Body rear ch6/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.33 V/m; Power Drift = 0.134 dB
Peak SAR (extrapolated) = 0.081 W/kg
SAR(1 g) = 0.039 mW/g; SAR(10 g) = 0.021 mW/g
Maximum value of SAR (measured) = 0.043 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: GSM/WCDMA Phone with Bluetooth3.0, WIFI802.11 b/g/n
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Apr . 02, 2013
Plot NO. 43

DUT: LG-E440F; Type: Bar; Serial: #1

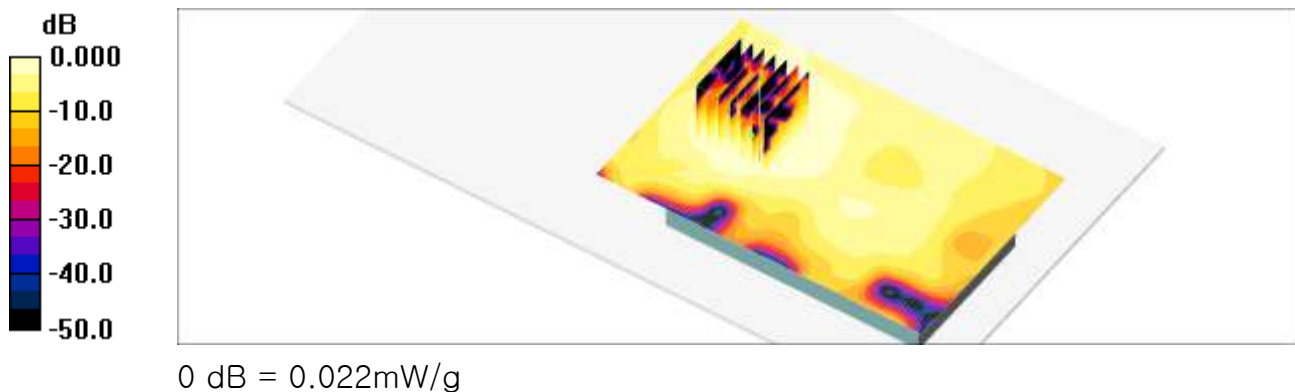
Communication System: 2450MHz FCC; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 2437$ MHz; $\sigma = 1.97$ mho/m; $\epsilon_r = 53.6$; $\rho = 1000$ kg/m³
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: EX3DV4 - SN3797; ConvF(6.98, 6.98, 6.98); Calibrated: 2012-11-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: Triple Flat Phantom 5.1C_20120905; Type: QD 000 P51 CA

Body front ch6/Area Scan (81x121x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.023 mW/g

Body front ch6/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.83 V/m; Power Drift = 0.113 dB
Peak SAR (extrapolated) = 0.040 W/kg
SAR(1 g) = 0.020 mW/g; SAR(10 g) = 0.010 mW/g
Maximum value of SAR (measured) = 0.022 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: GSM/WCDMA Phone with Bluetooth3.0, WIFI802.11 b/g/n
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Apr . 02, 2013
Plot NO. 44

DUT: LG-E440F; Type: Bar; Serial: #1

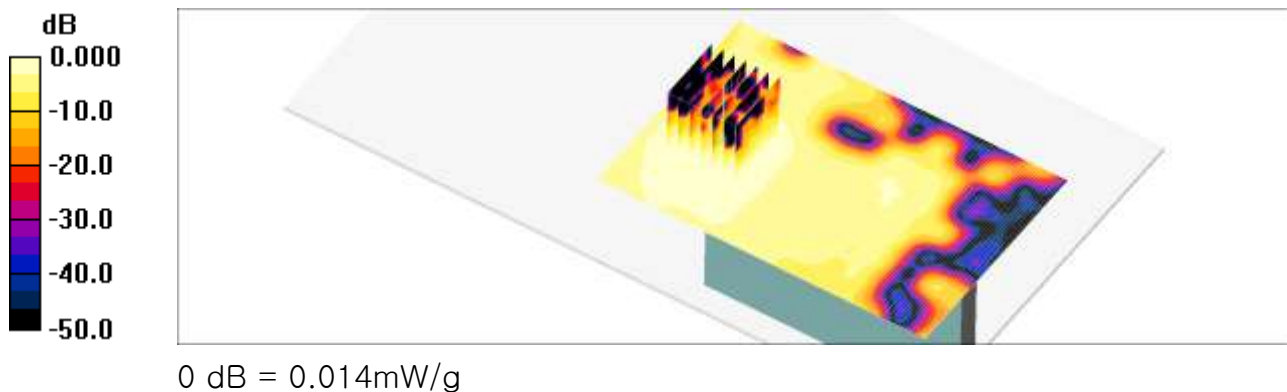
Communication System: 2450MHz FCC; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 2437$ MHz; $\sigma = 1.97$ mho/m; $\epsilon_r = 53.6$; $\rho = 1000$ kg/m³
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: EX3DV4 - SN3797; ConvF(6.98, 6.98, 6.98); Calibrated: 2012-11-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: Triple Flat Phantom 5.1C_20120905; Type: QD 000 P51 CA

Body Left ch6/Area Scan (81x121x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.013 mW/g

Body Left ch6/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.31 V/m; Power Drift = 0.011 dB
Peak SAR (extrapolated) = 0.024 W/kg
SAR(1 g) = 0.012 mW/g; SAR(10 g) = 0.00592 mW/g
Maximum value of SAR (measured) = 0.014 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: GSM/WCDMA Phone with Bluetooth3.0, WIFI802.11 b/g/n
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Apr . 02, 2013
Plot NO. 45

DUT: LG-E440F; Type: Bar; Serial: #1

Communication System: 2450MHz FCC; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 2437 \text{ MHz}$; $\sigma = 1.97 \text{ mho/m}$; $\epsilon_r = 53.6$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: EX3DV4 - SN3797; ConvF(6.98, 6.98, 6.98); Calibrated: 2012-11-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: Triple Flat Phantom 5.1C_20120905; Type: QD 000 P51 CA

Body Top ch6/Area Scan (81x61x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.035 mW/g

Body Top ch6/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.42 V/m; Power Drift = 0.179 dB
Peak SAR (extrapolated) = 0.061 W/kg
SAR(1 g) = 0.030 mW/g; SAR(10 g) = 0.015 mW/g
Maximum value of SAR (measured) = 0.032 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: GSM/WCDMA Phone with Bluetooth3.0, WIFI802.11 b/g/n
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Mar . 30, 2013
Plot NO. 46

DUT: LG-E440F; Type: Bar; Serial: #1

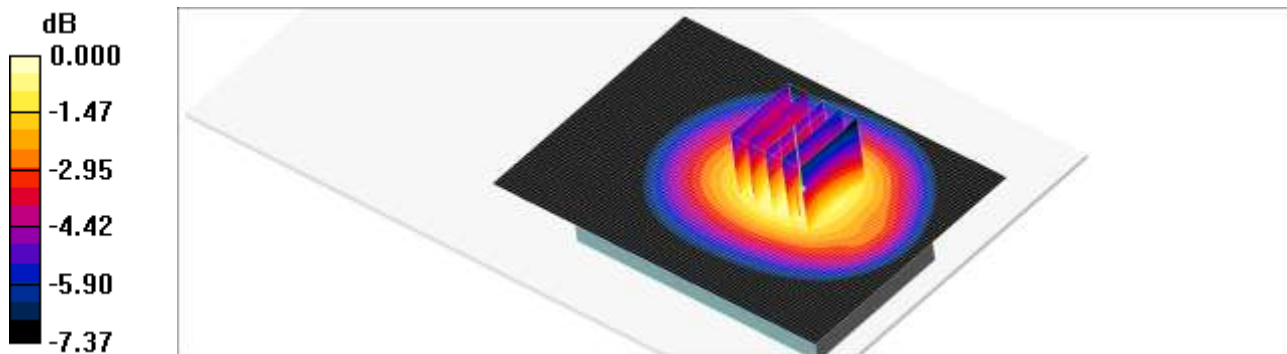
Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3
Medium parameters used (interpolated): $f = 836.6 \text{ MHz}$; $\sigma = 0.987 \text{ mho/m}$; $\epsilon_r = 56.8$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: EX3DV4 - SN3797; ConvF(8.98, 8.98, 8.98); Calibrated: 2012-11-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: Triple Flat Phantom 5.1C_20120905; Type: QD 000 P51 CA

Body-worn rear 190/Area Scan (71x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.595 mW/g

Body-worn rear 190/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.57 V/m; Power Drift = -0.096 dB
Peak SAR (extrapolated) = 0.701 W/kg
SAR(1 g) = 0.574 mW/g; SAR(10 g) = 0.455 mW/g
Maximum value of SAR (measured) = 0.598 mW/g



0 dB = 0.598mW/g

Test Laboratory: HCT CO., LTD
EUT Type: GSM/WCDMA Phone with Bluetooth3.0, WIFI802.11 b/g/n
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Mar . 30, 2013
Plot NO. 47

DUT: LG-E440F; Type: Bar; Serial: #1

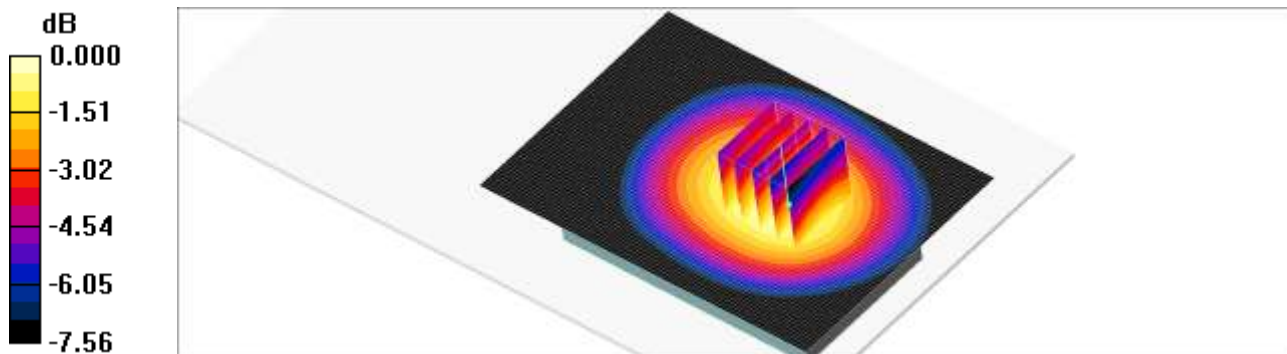
Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3
Medium parameters used (interpolated): $f = 836.6 \text{ MHz}$; $\sigma = 0.987 \text{ mho/m}$; $\epsilon_r = 56.8$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: EX3DV4 - SN3797; ConvF(8.98, 8.98, 8.98); Calibrated: 2012-11-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: Triple Flat Phantom 5.1C_20120905; Type: QD 000 P51 CA

Body-worn front 190/Area Scan (71x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 0.401 mW/g

Body-worn front 190/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 6.39 V/m; Power Drift = -0.084 dB
Peak SAR (extrapolated) = 0.451 W/kg
SAR(1 g) = 0.384 mW/g; SAR(10 g) = 0.313 mW/g
Maximum value of SAR (measured) = 0.398 mW/g



0 dB = 0.398mW/g

Test Laboratory: HCT CO., LTD
EUT Type: GSM/WCDMA Phone with Bluetooth3.0, WIFI802.11 b/g/n
Liquid Temperature: 20.7 °C
Ambient Temperature: 20.9 °C
Test Date: Apr . 01, 2013
Plot NO. 48

DUT: LG-E440F; Type: Bar; Serial: #1

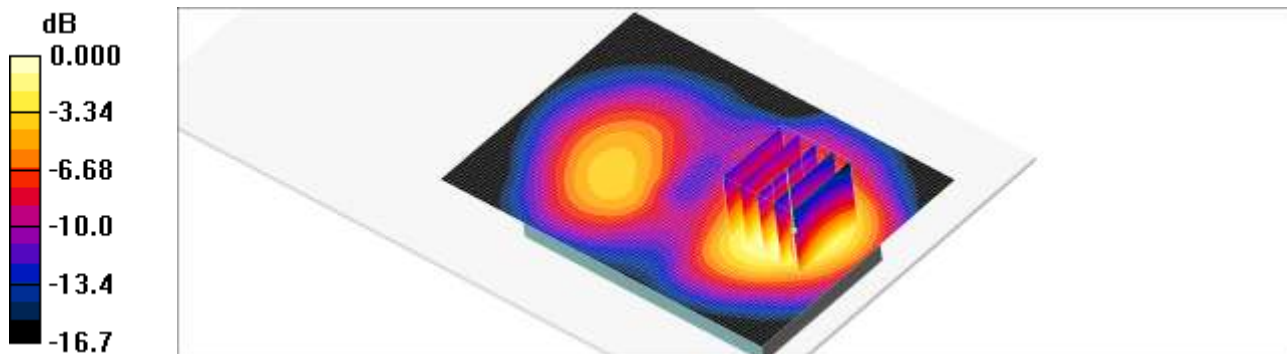
Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.54$ mho/m; $\epsilon_r = 52.3$; $\rho = 1000$ kg/m³
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: EX3DV4 - SN3797; ConvF(7.28, 7.28, 7.28); Calibrated: 2012-11-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA

Body-worn Rear 661/Area Scan (71x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.441 mW/g

Body-worn Rear 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.87 V/m; Power Drift = -0.141 dB
Peak SAR (extrapolated) = 0.638 W/kg
SAR(1 g) = 0.403 mW/g; SAR(10 g) = 0.247 mW/g
Maximum value of SAR (measured) = 0.436 mW/g



0 dB = 0.436mW/g

Test Laboratory: HCT CO., LTD
EUT Type: GSM/WCDMA Phone with Bluetooth3.0, WIFI802.11 b/g/n
Liquid Temperature: 20.7 °C
Ambient Temperature: 20.9 °C
Test Date: Apr . 01, 2013
Plot NO. 49

DUT: LG-E440F; Type: Bar; Serial: #1

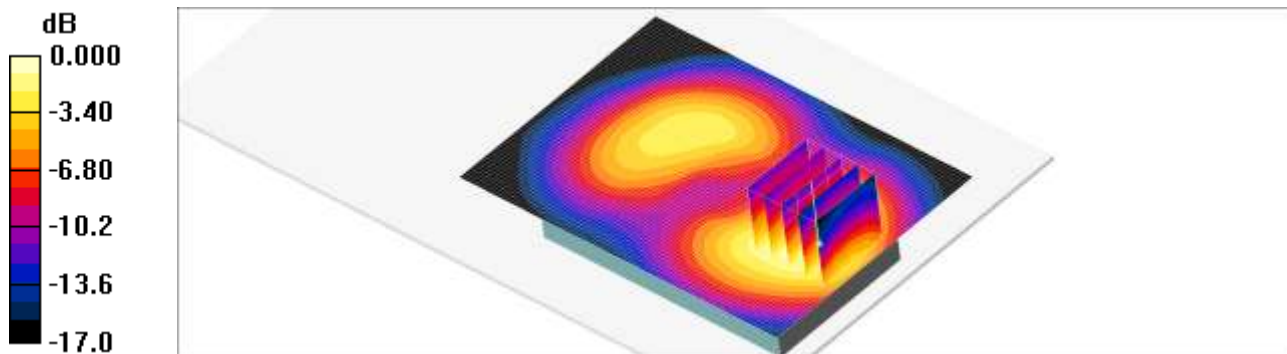
Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.54 \text{ mho/m}$; $\epsilon_r = 52.3$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: EX3DV4 - SN3797; ConvF(7.28, 7.28, 7.28); Calibrated: 2012-11-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA

Body-worn Front 661/Area Scan (71x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 0.421 mW/g

Body-worn Front 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 6.61 V/m; Power Drift = -0.154 dB
Peak SAR (extrapolated) = 0.607 W/kg
SAR(1 g) = 0.380 mW/g; SAR(10 g) = 0.231 mW/g
Maximum value of SAR (measured) = 0.413 mW/g



0 dB = 0.413mW/g

Test Laboratory: HCT CO., LTD
EUT Type: GSM/WCDMA Phone with Bluetooth3.0, WIFI802.11 b/g/n
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Mar . 30, 2013
Plot NO. 50

DUT: LG-E440F; Type: Bar; Serial: #1

Communication System: GSM 850; Frequency: 848.8 MHz; Duty Cycle: 1:2.075
Medium parameters used: $f = 850$ MHz; $\sigma = 0.999$ mho/m; $\epsilon_r = 56.7$; $\rho = 1000$ kg/m³
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

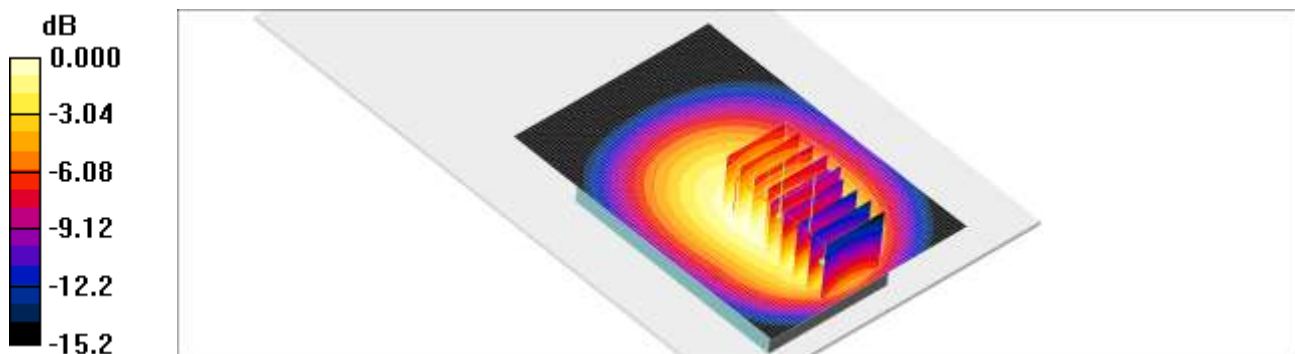
DASY4 Configuration:

- Probe: EX3DV4 - SN3797; ConvF(8.98, 8.98, 8.98); Calibrated: 2012-11-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: Triple Flat Phantom 5.1C_20120905; Type: QD 000 P51 CA

Body rear 251 4tx/Area Scan (71x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.15 mW/g

Body rear 251 4tx/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.78 V/m; Power Drift = -0.073 dB
Peak SAR (extrapolated) = 1.44 W/kg
SAR(1 g) = 1.07 mW/g; SAR(10 g) = 0.768 mW/g
Maximum value of SAR (measured) = 1.14 mW/g

Body rear 251 4tx/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.78 V/m; Power Drift = -0.073 dB
Peak SAR (extrapolated) = 1.31 W/kg
SAR(1 g) = 0.778 mW/g; SAR(10 g) = 0.496 mW/g
Maximum value of SAR (measured) = 0.963 mW/g



0 dB = 0.963mW/g

Test Laboratory: HCT CO., LTD
EUT Type: GSM/WCDMA Phone with Bluetooth3.0, WIFI802.11 b/g/n
Liquid Temperature: 21.1 °C
Ambient Temperature: 21.3 °C
Test Date: Mar . 29, 2013
Plot NO. 7

DUT: LG-E440F; Type: Bar; Serial: #1

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

Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.921$ mho/m; $\epsilon_r = 40.4$; $\rho = 1000$ kg/m³

Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: EX3DV4 - SN3797; ConvF(8.94, 8.94, 8.94); Calibrated: 2012-11-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: SAM 835/900 MHz; Type: SAM

Right touch 190/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.616 mW/g

Right touch 190/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.82 V/m; Power Drift = 0.167 dB
Peak SAR (extrapolated) = 0.693 W/kg
SAR(1 g) = 0.581 mW/g; SAR(10 g) = 0.442 mW/g
Maximum value of SAR (measured) = 0.614 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: GSM/WCDMA Phone with Bluetooth3.0, WIFI802.11 b/g/n
Liquid Temperature: 20.7 °C
Ambient Temperature: 20.9 °C
Test Date: Apr . 01, 2013
Plot NO. 13

DUT: LG-E440F; Type: Bar; Serial: #1

Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:2.075
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.35$ mho/m; $\epsilon_r = 40.9$; $\rho = 1000$ kg/m³
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: EX3DV4 - SN3797; ConvF(7.47, 7.47, 7.47); Calibrated: 2012-11-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: SAM 1800/1900 MHz; Type: SAM

Left Touch 661 GPRS 4Tx/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.499 mW/g

Left Touch 661 GPRS 4Tx/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.41 V/m; Power Drift = -0.082 dB
Peak SAR (extrapolated) = 0.774 W/kg
SAR(1 g) = 0.477 mW/g; SAR(10 g) = 0.283 mW/g
Maximum value of SAR (measured) = 0.512 mW/g



Test Laboratory: HCT CO., LTD
 EUT Type: GSM/WCDMA Phone with Bluetooth3.0, WIFI802.11 b/g/n
 Liquid Temperature: 21.1 °C
 Ambient Temperature: 21.3 °C
 Test Date: Mar . 29, 2013
 Plot NO. 19

DUT: LG-E440F; Type: Bar; Serial: #1

Communication System: WCDMA850; Frequency: 836.6 MHz; Duty Cycle: 1:1
 Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.921$ mho/m; $\epsilon_r = 40.4$; $\rho = 1000$ kg/m³
 Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: EX3DV4 - SN3797; ConvF(8.94, 8.94, 8.94); Calibrated: 2012-11-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: SAM 835/900 MHz; Type: SAM

Right touch 4183/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
 Maximum value of SAR (interpolated) = 0.461 mW/g

Right touch 4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
 Reference Value = 5.34 V/m; Power Drift = -0.116 dB
 Peak SAR (extrapolated) = 0.538 W/kg
SAR(1 g) = 0.438 mW/g; SAR(10 g) = 0.327 mW/g
 Maximum value of SAR (measured) = 0.461 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: GSM/WCDMA Phone with Bluetooth3.0, WIFI802.11 b/g/n
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Apr . 02, 2013
Plot NO. 21

DUT: LG-E440f; Type: Bar; Serial: #1

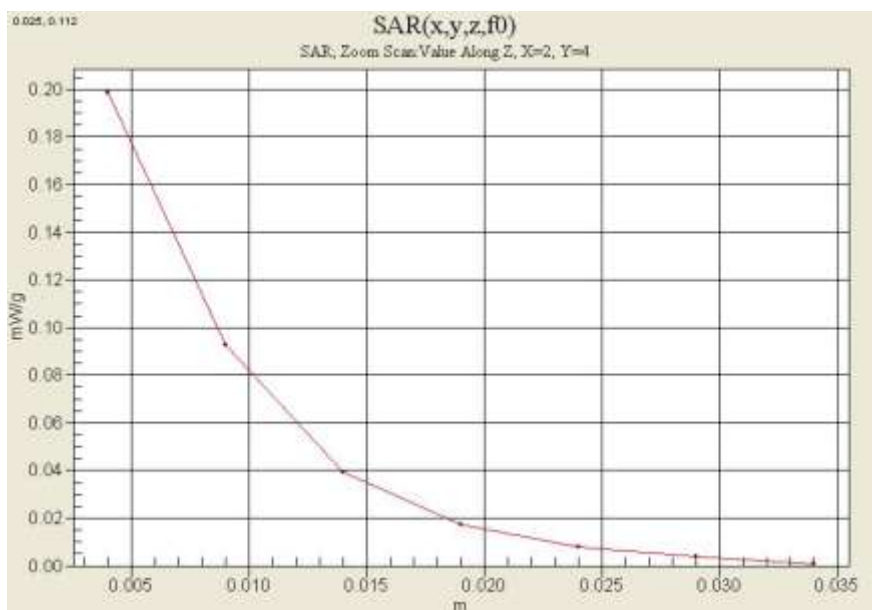
Communication System: 2450MHz FCC; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 2437$ MHz; $\sigma = 1.85$ mho/m; $\epsilon_r = 38.9$; $\rho = 1000$ kg/m³
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: EX3DV4 - SN3797; ConvF(6.76, 6.76, 6.76); Calibrated: 2012-11-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: 1800/1900 Phantom; Type: SAM

Left touch 6ch 1Mbps/Area Scan (71x121x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.187 mW/g

Left touch 6ch 1Mbps/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.97 V/m; Power Drift = 0.101 dB
Peak SAR (extrapolated) = 0.399 W/kg
SAR(1 g) = 0.175 mW/g; SAR(10 g) = 0.083 mW/g
Maximum value of SAR (measured) = 0.199 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: GSM/WCDMA Phone with Bluetooth3.0, WIFI802.11 b/g/n
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Mar . 30, 2013
Plot NO. 27

DUT: LG-E440F; Type: Bar; Serial: #1

Communication System: GSM 850; Frequency: 848.8 MHz; Duty Cycle: 1:2.075
Medium parameters used: $f = 850$ MHz; $\sigma = 0.999$ mho/m; $\epsilon_r = 56.7$; $\rho = 1000$ kg/m³
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: EX3DV4 - SN3797; ConvF(8.98, 8.98, 8.98); Calibrated: 2012-11-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: Triple Flat Phantom 5.1C_20120905; Type: QD 000 P51 CA

Body rear 251 4tx/Area Scan (71x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.15 mW/g

Body rear 251 4tx/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.58 V/m; Power Drift = -0.008 dB
Peak SAR (extrapolated) = 1.48 W/kg
SAR(1 g) = 1.09 mW/g; SAR(10 g) = 0.776 mW/g
Maximum value of SAR (measured) = 1.15 mW/g

Body rear 251 4tx/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.58 V/m; Power Drift = -0.008 dB
Peak SAR (extrapolated) = 1.37 W/kg
SAR(1 g) = 0.845 mW/g; SAR(10 g) = 0.534 mW/g
Maximum value of SAR (measured) = 1.03 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: GSM/WCDMA Phone with Bluetooth3.0, WIFI802.11 b/g/n
Liquid Temperature: 20.7 °C
Ambient Temperature: 20.9 °C
Test Date: Apr . 01, 2013
Plot NO. 32

DUT: LG-E440F; Type: Bar; Serial: #1

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

Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.54 \text{ mho/m}$; $\epsilon_r = 52.3$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: EX3DV4 - SN3797; ConvF(7.28, 7.28, 7.28); Calibrated: 2012-11-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: Triple Flat Phantom 5.1C_20120905; Type: QD 000 P51 CA

Body rear 661 4Tx/Area Scan (71x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.598 mW/g

Body rear 661 4Tx/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.20 V/m; Power Drift = -0.011 dB
Peak SAR (extrapolated) = 0.874 W/kg
SAR(1 g) = 0.541 mW/g; SAR(10 g) = 0.326 mW/g
Maximum value of SAR (measured) = 0.587 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: GSM/WCDMA Phone with Bluetooth3.0, WIFI802.11 b/g/n
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Mar . 30, 2013
Plot NO. 37

DUT: LG-E440F; Type: Bar; Serial: #1

Communication System: WCDMA850; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.987$ mho/m; $\epsilon_r = 56.8$; $\rho = 1000$ kg/m³
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: EX3DV4 - SN3797; ConvF(8.98, 8.98, 8.98); Calibrated: 2012-11-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: Triple Flat Phantom 5.1C_20120905; Type: QD 000 P51 CA

Body rear 4183/Area Scan (71x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.695 mW/g

Body rear 4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.38 V/m; Power Drift = -0.122 dB
Peak SAR (extrapolated) = 0.870 W/kg
SAR(1 g) = 0.653 mW/g; SAR(10 g) = 0.470 mW/g
Maximum value of SAR (measured) = 0.691 mW/g



Test Laboratory: HCT CO., LTD
 EUT Type: GSM/WCDMA Phone with Bluetooth3.0, WIFI802.11 b/g/n
 Liquid Temperature: 21.3 °C
 Ambient Temperature: 21.5 °C
 Test Date: Apr . 02, 2013
 Plot NO. 42

DUT: LG-E440F; Type: Bar; Serial: #1

Communication System: 2450MHz FCC; Frequency: 2437 MHz;Duty Cycle: 1:1
 Medium parameters used (interpolated): $f = 2437$ MHz; $\sigma = 1.97$ mho/m; $\epsilon_r = 53.6$; $\rho = 1000$ kg/m³
 Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: EX3DV4 - SN3797; ConvF(6.98, 6.98, 6.98); Calibrated: 2012-11-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: Triple Flat Phantom 5.1C_20120905; Type: QD 000 P51 CA

Body rear ch6/Area Scan (81x121x1): Measurement grid: dx=12mm, dy=12mm
 Maximum value of SAR (interpolated) = 0.042 mW/g

Body rear ch6/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
 Reference Value = 3.33 V/m; Power Drift = 0.134 dB
 Peak SAR (extrapolated) = 0.081 W/kg
SAR(1 g) = 0.039 mW/g; SAR(10 g) = 0.021 mW/g
 Maximum value of SAR (measured) = 0.043 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: 21.1 °C
Test Date: Mar. 29, 2013

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

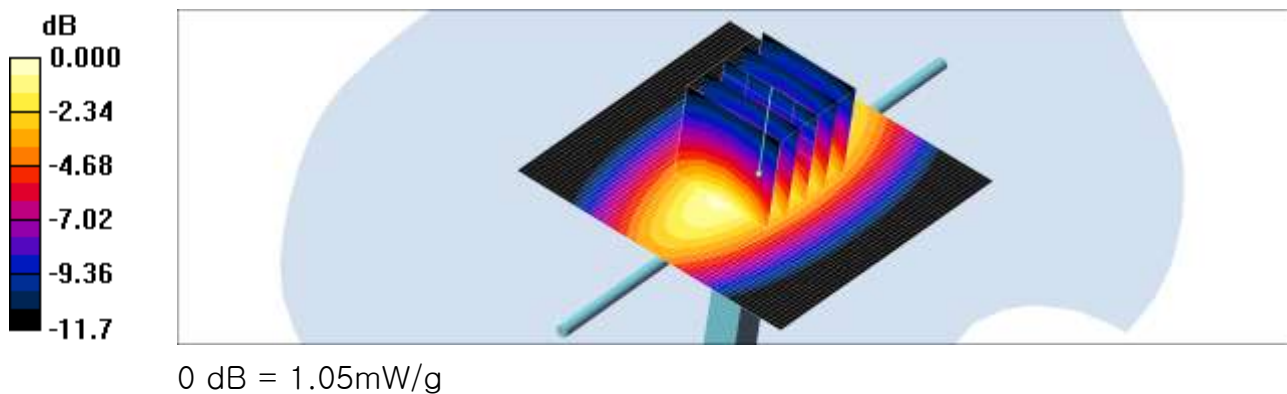
Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.919 \text{ mho/m}$; $\epsilon_r = 40.5$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: EX3DV4 – SN3797; ConvF(8.94, 8.94, 8.94); Calibrated: 2012-11-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: 1800/1900 Phantom; Type: SAM

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

Validation 835MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 33.8 V/m; Power Drift = 0.003 dB
Peak SAR (extrapolated) = 1.57 W/kg
SAR(1 g) = 0.953 mW/g; SAR(10 g) = 0.580 mW/g
Maximum value of SAR (measured) = 1.05 mW/g



■ Verification Data (835 MHz Body)

Test Laboratory: HCT CO., LTD
Input Power 100 mW (20 dBm)
Liquid Temp: 21.2 °C
Test Date: Mar. 30, 2013

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

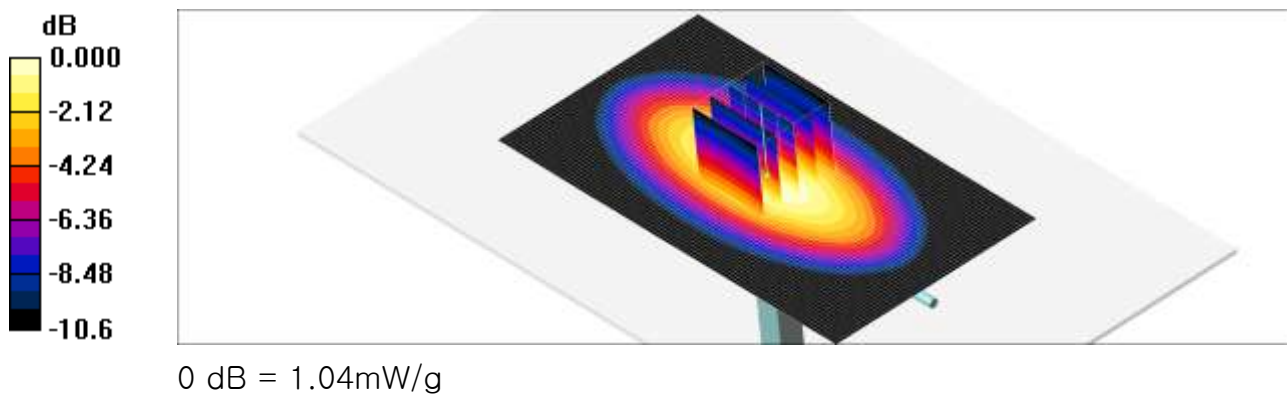
Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.985 \text{ mho/m}$; $\epsilon_r = 56.8$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: EX3DV4 – SN3797; ConvF(8.98, 8.98, 8.98); Calibrated: 2012-11-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA

Validation 835 MHz/Area Scan (111x61x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 1.04 mW/g

Validation 835 MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 32.4 V/m; Power Drift = -0.008 dB
Peak SAR (extrapolated) = 1.45 W/kg
SAR(1 g) = 0.962 mW/g; SAR(10 g) = 0.624 mW/g
Maximum value of SAR (measured) = 1.04 mW/g



■ Verification Data (1 900 MHz Head)

Test Laboratory: HCT CO., LTD
Input Power: 100 mW (20 dBm)
Liquid Temp: 20.7 °C
Test Date: Apr. 01, 2013

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

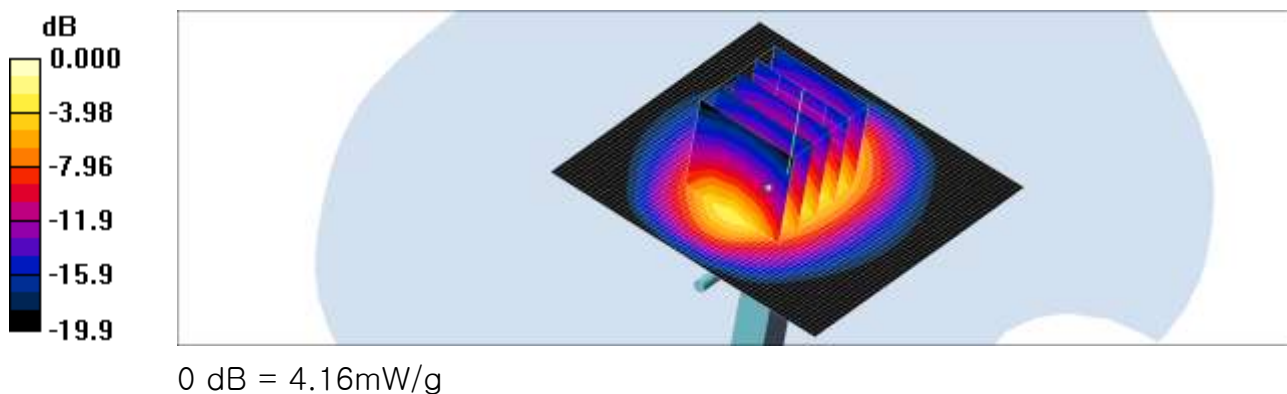
Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1900$ MHz; $\sigma = 1.37$ mho/m; $\epsilon_r = 40.8$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: EX3DV4 – SN3797; ConvF(7.47, 7.47, 7.47); Calibrated: 2012-11-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: 1800/1900 Phantom; Type: SAM

Dipole 1900MHz Validation/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 4.45 mW/g

Dipole 1900MHz Validation/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 55.2 V/m; Power Drift = 0.002 dB
Peak SAR (extrapolated) = 7.33 W/kg
SAR(1 g) = 3.78 mW/g; SAR(10 g) = 1.93 mW/g
Maximum value of SAR (measured) = 4.16 mW/g



■ Verification Data (1 900 MHz Body)

Test Laboratory: HCT CO., LTD
Input Power: 100 mW (20 dBm)
Liquid Temp: 20.7 °C
Test Date: Apr. 01, 2013

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

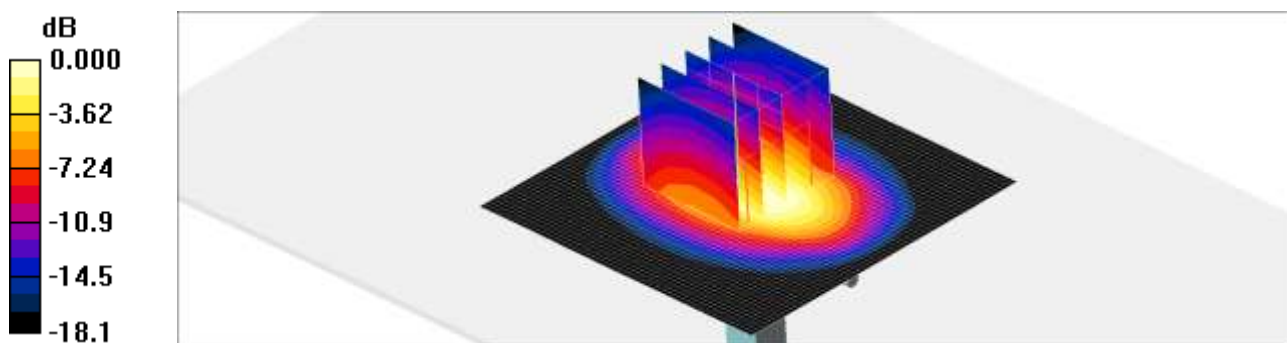
Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1900 \text{ MHz}$; $\sigma = 1.56 \text{ mho/m}$; $\epsilon_r = 52.3$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: EX3DV4 – SN3797; ConvF(7.28, 7.28, 7.28); Calibrated: 2012-11-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA

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

Validation 1900 MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 52.8 V/m; Power Drift = -0.010 dB
Peak SAR (extrapolated) = 7.25 W/kg
SAR(1 g) = 4 mW/g; SAR(10 g) = 2.1 mW/g
Maximum value of SAR (measured) = 4.39 mW/g



0 dB = 4.39mW/g

■ Verification Data (2 450 MHz Head)

Test Laboratory: HCT CO., LTD
Input Power 100 mW (20 dBm)
Liquid Temp: 21.3 °C
Test Date: Apr. 02, 2013

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

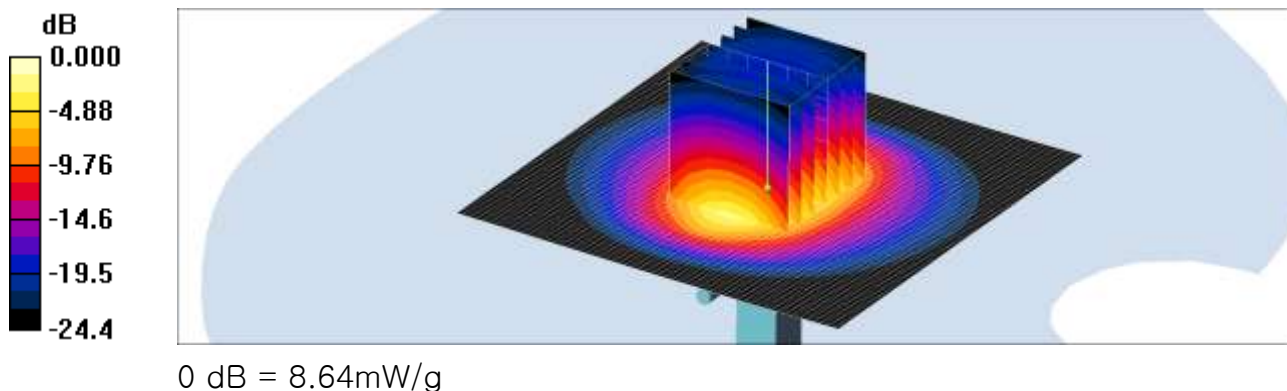
Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 2450$ MHz; $\sigma = 1.86$ mho/m; $\epsilon_r = 38.9$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: EX3DV4 – SN3797; ConvF(6.76, 6.76, 6.76); Calibrated: 2012-11-22
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: 835/900 Phantom ; Type: SAM

Validation 2450MHz/Area Scan (81x81x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 8.65 mW/g

Validation 2450MHz/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 57.9 V/m; Power Drift = -0.013 dB
Peak SAR (extrapolated) = 12.2 W/kg
SAR(1 g) = 5.48 mW/g; SAR(10 g) = 2.43 mW/g
Maximum value of SAR (measured) = 8.64 mW/g



■ Verification Data (2 450 MHz Body)

Test Laboratory: HCT CO., LTD
Input Power 100 mW (20 dBm)
Liquid Temp: 21.3 °C
Test Date: Apr. 02, 2013

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

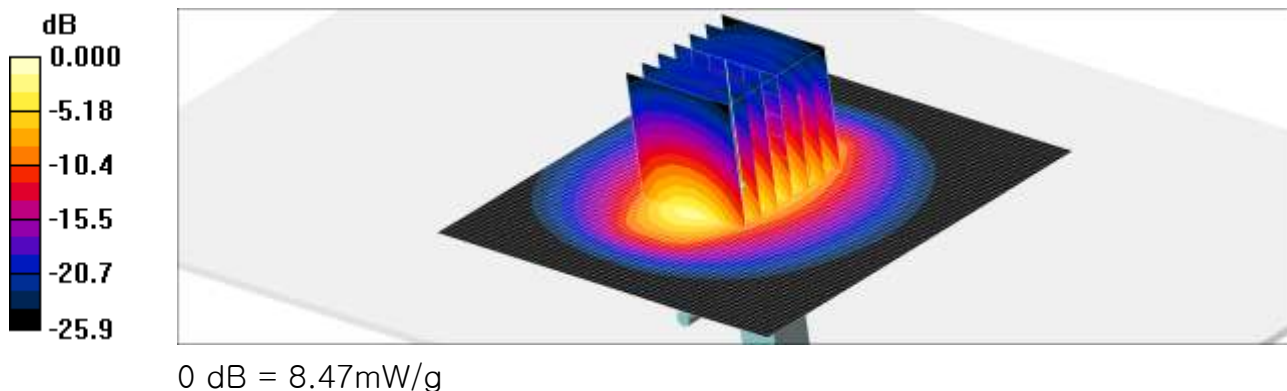
Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 2450$ MHz; $\sigma = 1.99$ mho/m; $\epsilon_r = 53.6$; $\rho = 1000$ kg/m³
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: EX3DV4 – SN3797; ConvF(6.98, 6.98, 6.98); Calibrated: 2012-11-22
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA

Validation 2450MHz/Area Scan (81x81x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 8.19 mW/g

Validation 2450MHz/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 48.8 V/m; Power Drift = 0.139 dB
Peak SAR (extrapolated) = 12.2 W/kg
SAR(1 g) = 5.22 mW/g; SAR(10 g) = 2.25 mW/g
Maximum value of SAR (measured) = 8.47 mW/g



Attachment 3. – Probe Calibration Data

**Calibration Laboratory of
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Accreditation No.: **SCS 108**

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Multilateral Agreement for the recognition of calibration certificates

Client **HCT (Dymstec)**

Certificate No: **EX3-3797_Nov12**

CALIBRATION CERTIFICATE

Object **EX3DV4 - SN:3797**

Calibration procedure(s) **QA CAL-01.v8, QA CAL-12.v7, QA CAL-14.v3, QA CAL-23.v4,
QA CAL-25.v4
Calibration procedure for dosimetric E-field probes**

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	29-Mar-12 (No. 217-01508)	Apr-13
Power sensor E4412A	MY41488067	29-Mar-12 (No. 217-01508)	Apr-13
Reference 3 dB Attenuator	SN: 55054 (3c)	27-Mar-12 (No. 217-01531)	Apr-13
Reference 20 dB Attenuator	SN: 55086 (20b)	27-Mar-12 (No. 217-01529)	Apr-13
Reference 30 dB Attenuator	SN: 55129 (30b)	27-Mar-12 (No. 217-01532)	Apr-13
Reference Probe ES3DV2	SN: 3013	29-Dec-11 (No. ES3-3013_Dec11)	Dec-12
DAE4	SN: 660	20-Jun-12 (No. DAE4-660_Jun12)	Jun-13
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-12)	In house check: Oct-13

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

Issued: November 22, 2012

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

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Glossary:

TSL	tissue simulating liquid
NORM _{x,y,z}	sensitivity in free space
ConvF	sensitivity in TSL / NORM _{x,y,z}
DCP	diode compression point
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., $\theta = 0$ is normal to probe axis

Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

Methods Applied and Interpretation of Parameters:

- NORM_{x,y,z}:** Assessed for E-field polarization $\theta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORM_{x,y,z} are only intermediate values, i.e., the uncertainties of NORM_{x,y,z} does not affect the E²-field uncertainty inside TSL (see below ConvF).
- NORM(f)_{x,y,z} = NORM_{x,y,z} * frequency_response** (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConvF.
- DCP_{x,y,z}:** DCP are numerical linearization parameters assessed based on the data of power sweep 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
- A_{x,y,z}; B_{x,y,z}; C_{x,y,z}; VR_{x,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 $f \leq 800$ MHz) and inside waveguide using analytical field distributions based on power measurements for $f > 800$ MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORM_{x,y,z} * ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- Spherical isotropy (3D deviation from isotropy):** in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset:** The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

EX3DV4 – SN:3797

November 22, 2012

Probe EX3DV4

SN:3797

Manufactured: April 5, 2011
Calibrated: November 22, 2012

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

EX3DV4- SN:3797

November 22, 2012

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3797

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^{1/2}$) ^A	0.63	0.59	0.57	$\pm 10.1 \%$
DCP (mV) ^B	97.5	94.8	93.7	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc ^C (k=2)
0	CW	0.00	X	0.0	0.0	1.0	134.7	$\pm 3.0 \%$
			Y	0.0	0.0	1.0	130.7	
			Z	0.0	0.0	1.0	130.3	

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

^A The uncertainties of NormX,Y,Z do not affect the E²-field uncertainty inside TSL (see Pages 5 and 6).

^B Numerical linearization parameter: uncertainty not required.

^C Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

EX3DV4-- SN:3797

November 22, 2012

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3797

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	9.30	9.30	9.30	0.15	3.00	± 13.4 %
835	41.5	0.90	8.94	8.94	8.94	0.44	0.78	± 12.0 %
900	41.5	0.97	8.83	8.83	8.83	0.37	0.88	± 12.0 %
1450	40.5	1.20	7.89	7.89	7.89	0.24	1.28	± 12.0 %
1750	40.1	1.37	7.77	7.77	7.77	0.75	0.60	± 12.0 %
1900	40.0	1.40	7.47	7.47	7.47	0.44	0.82	± 12.0 %
1950	40.0	1.40	7.27	7.27	7.27	0.80	0.59	± 12.0 %
2450	39.2	1.80	6.76	6.76	6.76	0.41	0.83	± 12.0 %
2600	39.0	1.96	6.68	6.68	6.68	0.46	0.81	± 12.0 %
5200	36.0	4.66	4.84	4.84	4.84	0.34	1.80	± 13.1 %
5300	35.9	4.76	4.61	4.61	4.61	0.34	1.80	± 13.1 %
5500	35.6	4.96	4.58	4.58	4.58	0.34	1.80	± 13.1 %
5600	35.5	5.07	4.45	4.45	4.45	0.31	1.80	± 13.1 %
5800	35.3	5.27	4.50	4.50	4.50	0.34	1.80	± 13.1 %

^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.

EX3DV4- SN:3797

November 22, 2012

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3797

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	10.22	10.22	10.22	0.07	3.31	± 13.4 %
835	55.2	0.97	8.98	8.98	8.98	0.44	0.85	± 12.0 %
1750	53.4	1.49	7.58	7.58	7.58	0.68	0.66	± 12.0 %
1900	53.3	1.52	7.28	7.28	7.28	0.49	0.79	± 12.0 %
2450	52.7	1.95	6.98	6.98	6.98	0.80	0.58	± 12.0 %
2600	52.5	2.16	6.73	6.73	6.73	0.80	0.50	± 12.0 %
5200	49.0	5.30	4.17	4.17	4.17	0.46	1.90	± 13.1 %
5300	48.9	5.42	4.20	4.20	4.20	0.42	1.90	± 13.1 %
5500	48.6	5.65	4.05	4.05	4.05	0.41	1.90	± 13.1 %
5600	48.5	5.77	4.06	4.06	4.06	0.30	1.90	± 13.1 %
5800	48.2	6.00	4.19	4.19	4.19	0.42	1.90	± 13.1 %

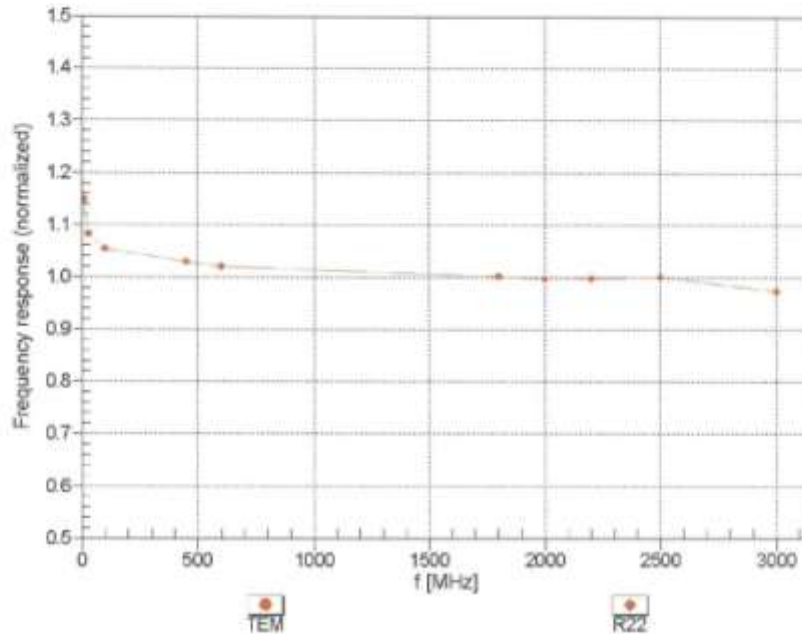
^C Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

^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.

EX30V4- SN:3797

November 22, 2012

Frequency Response of E-Field (TEM-Cell: ifi110 EXX, Waveguide: R22)



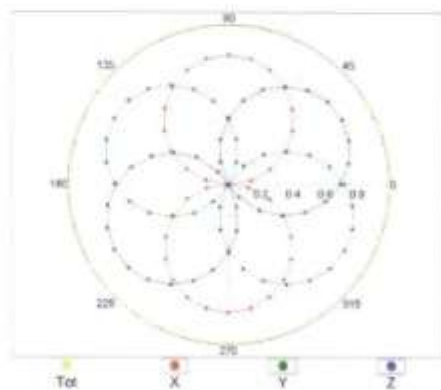
Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ (k=2)

EX3DV4- SN:3797

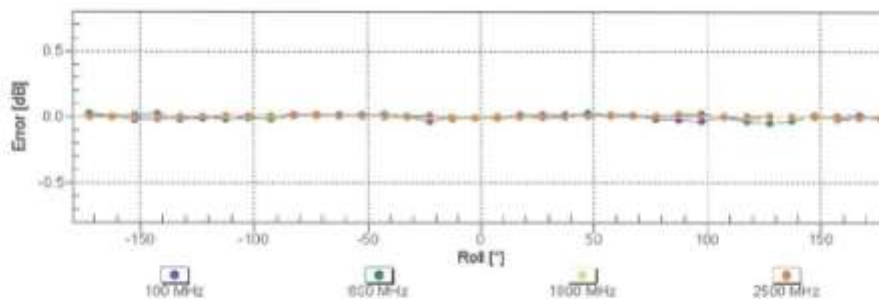
November 22, 2012

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

f=600 MHz,TEM



f=1800 MHz,R22

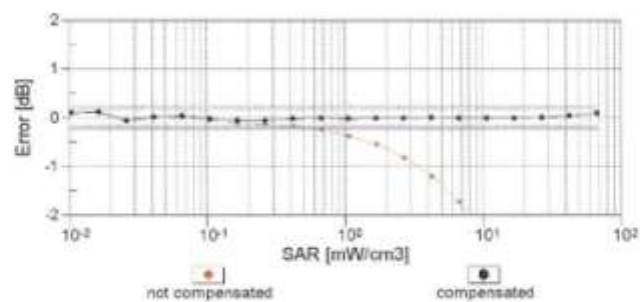
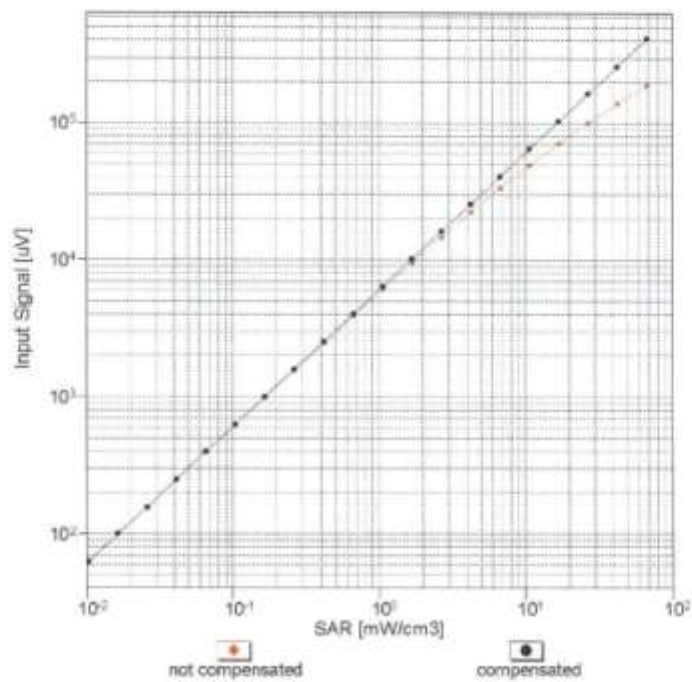


Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ (k=2)

EX3DV4-SN:3797

November 22, 2012

Dynamic Range $f(\text{SAR}_{\text{head}})$ (TEM cell, $f = 900 \text{ MHz}$)

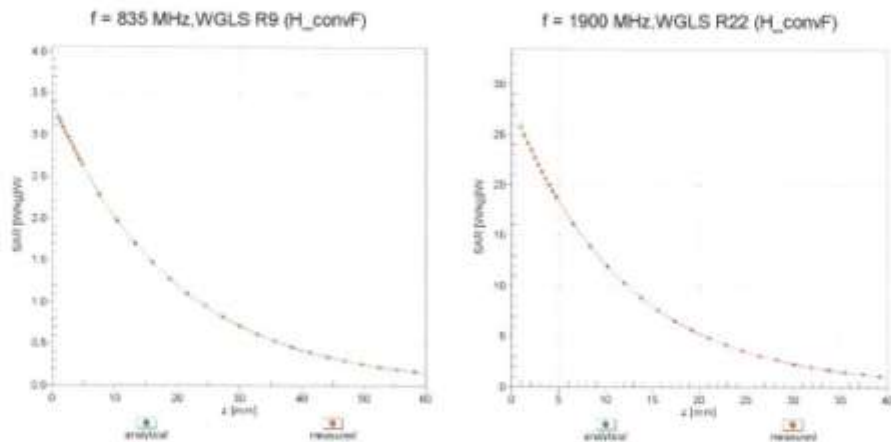


Uncertainty of Linearity Assessment: $\pm 0.6\%$ ($k=2$)

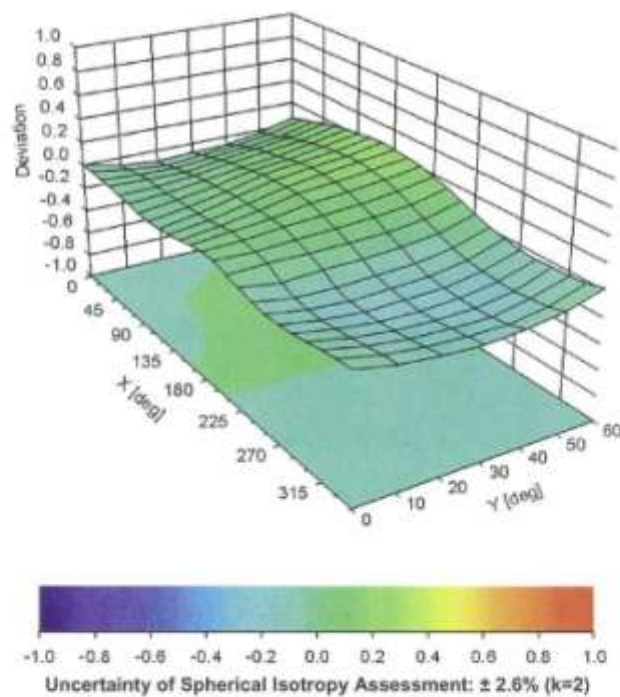
EX3DV4- SN:3797

November 22, 2012

Conversion Factor Assessment



Deviation from Isotropy in Liquid Error (ϕ , θ), f = 900 MHz



EX3DV4 - SN:3797

November 22, 2012

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3797**Other Probe Parameters**

Sensor Arrangement	Triangular
Connector Angle (°)	67.5
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	2 mm

Attachment 4. – Dipole Calibration Data

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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 $(22 \pm 3)^{\circ}\text{C}$ and humidity $< 70\%$.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	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	MY41002317	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:	Israa El-Naouq	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: May 16, 2012

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Certificate No: D835V2-441_May12

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Accreditation No.: **SCS 108**

Glossary:

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

Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

- DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- Measurement Conditions:** Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL:** The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- Feed Point Impedance and Return Loss:** These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- Electrical Delay:** One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- SAR measured:** SAR measured at the stated antenna input power.
- SAR normalized:** SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters:** The measured TSL parameters are used to calculate the nominal SAR result.

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 $\pm$ 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	40.6 $\pm$ 6 %	0.89 mho/m $\pm$ 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	2.35 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	9.43 mW / g $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.54 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	6.18 mW / g $\pm$ 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 $\pm$ 0.2) °C	54.3 $\pm$ 6 %	1.00 mho/m $\pm$ 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	2.44 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	9.50 mW / g $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (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 $\pm$ 16.5 % (k=2)

Appendix

Antenna Parameters with Head TSL

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

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.0 Ω - 8.1 j Ω
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; $\sigma = 0.89$ mho/m; $\epsilon_r = 40.6$; $\rho = 1000$ kg/m³

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

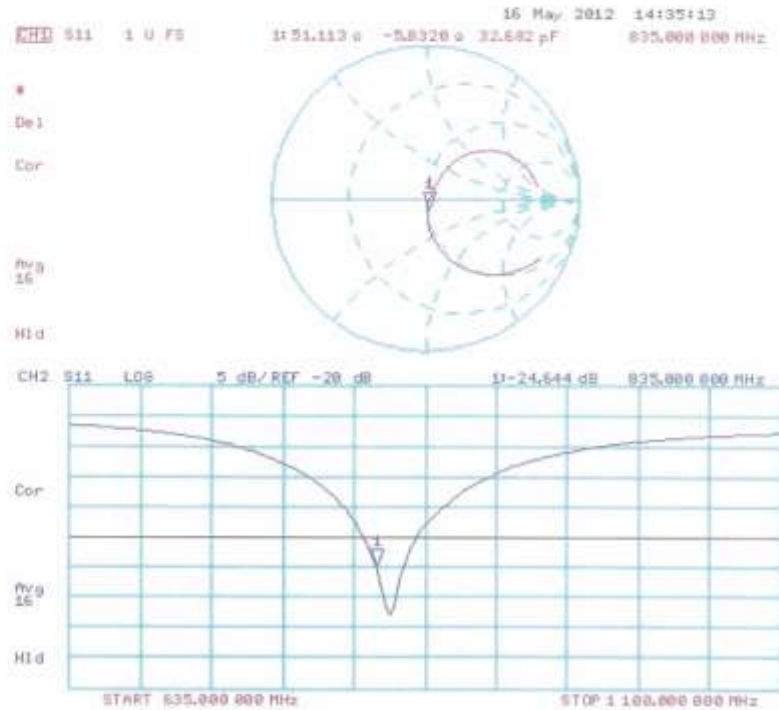
Peak SAR (extrapolated) = 3.474 mW/g

SAR(1 g) = 2.35 mW/g; SAR(10 g) = 1.54 mW/g

Maximum value of SAR (measured) = 2.73 mW/g



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; $\sigma = 1$ mho/m; $\epsilon_r = 54.3$; $\rho = 1000$ kg/m³

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:

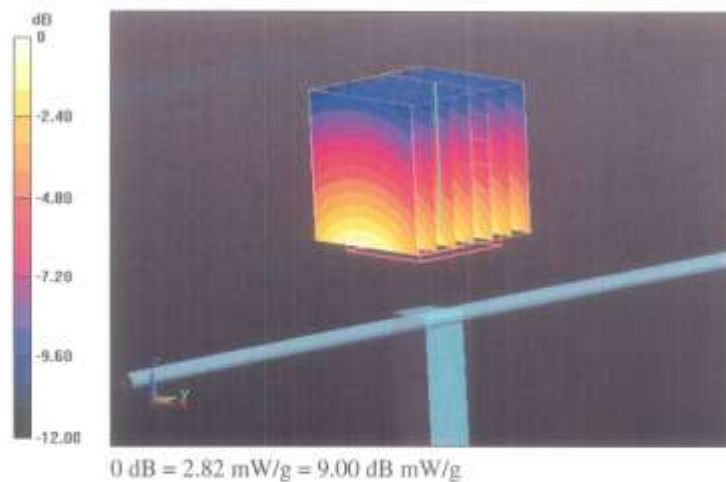
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 55.054 V/m; Power Drift = 0.03 dB

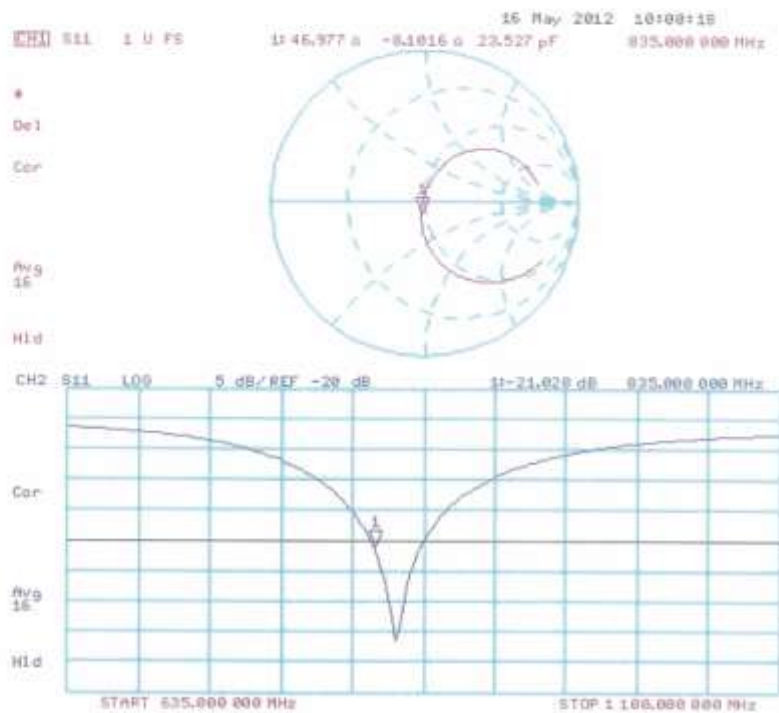
Peak SAR (extrapolated) = 3.533 mW/g

SAR(1 g) = 2.44 mW/g; SAR(10 g) = 1.6 mW/g

Maximum value of SAR (measured) = 2.82 mW/g



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 B481A	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 B481A	MY41002317	18-Oct-02 (in house check Oct-11)	In house check: Oct-13
RF generator R&S SMT-06	100005	04-Aug-09 (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

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

Issued: July 20, 2012

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Certificate No: D1900V2-5d032_Jul12

Page 1 of 8

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Accreditation No.: **SCS 108**

Glossary:

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

Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices; Measurement Techniques", December 2003
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

- DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- Measurement Conditions:** Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL:** The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- Feed Point Impedance and Return Loss:** These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- Electrical Delay:** One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- SAR measured:** SAR measured at the stated antenna input power.
- SAR normalized:** SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters:** The measured TSL parameters are used to calculate the nominal SAR result.

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 $\pm$ 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	39.9 $\pm$ 6 %	1.38 mho/m $\pm$ 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 $\pm$ 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 $\pm$ 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 $\pm$ 0.2) °C	52.5 $\pm$ 6 %	1.52 mho/m $\pm$ 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 $\pm$ 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 $\pm$ 16.5 % (k=2)

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	$50.0 \Omega + 3.1 j\Omega$
Return Loss	- 30.1 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	$46.2 \Omega + 3.7 j\Omega$
Return Loss	- 25.2 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.194 ns
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After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. 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; $\sigma = 1.38$ mho/m; $\epsilon_r = 39.9$; $\rho = 1000$ kg/m³

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:

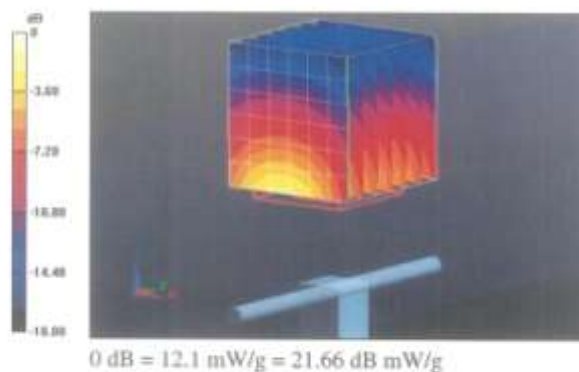
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 96.864 V/m; Power Drift = 0.03 dB

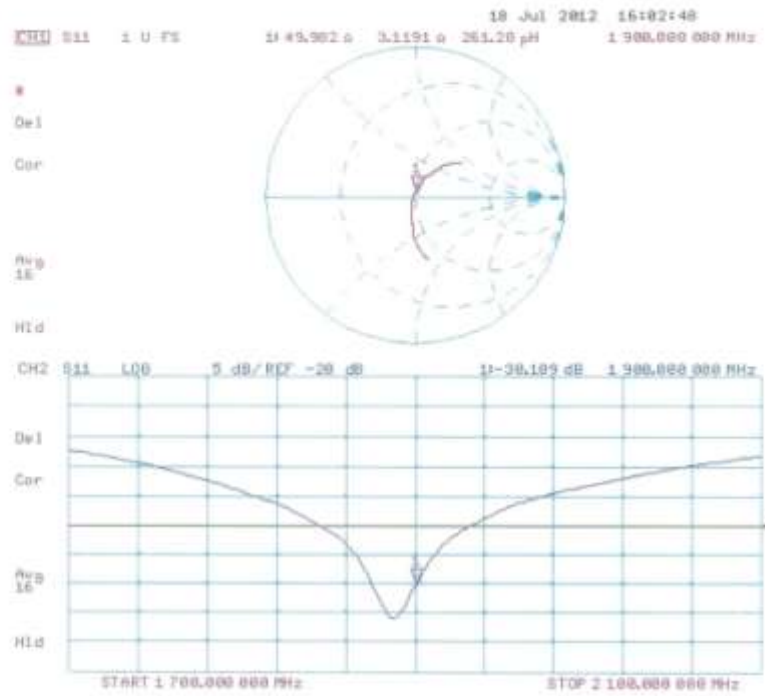
Peak SAR (extrapolated) = 17.209 mW/g

SAR(1 g) = 9.68 mW/g; SAR(10 g) = 5.11 mW/g

Maximum value of SAR (measured) = 12.1 mW/g



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; $\sigma = 1.52$ mho/m; $\epsilon_r = 52.6$; $\rho = 1000$ kg/m³

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:

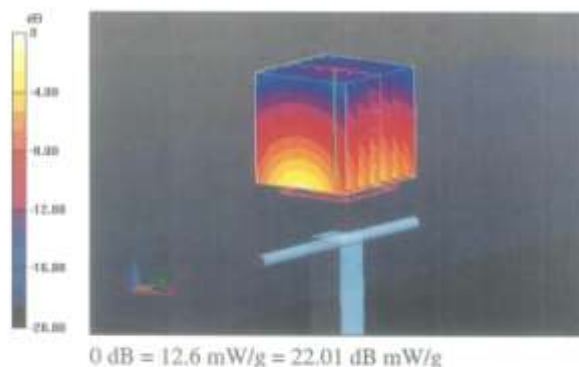
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 95.470 V/m; Power Drift = -0.00 dB

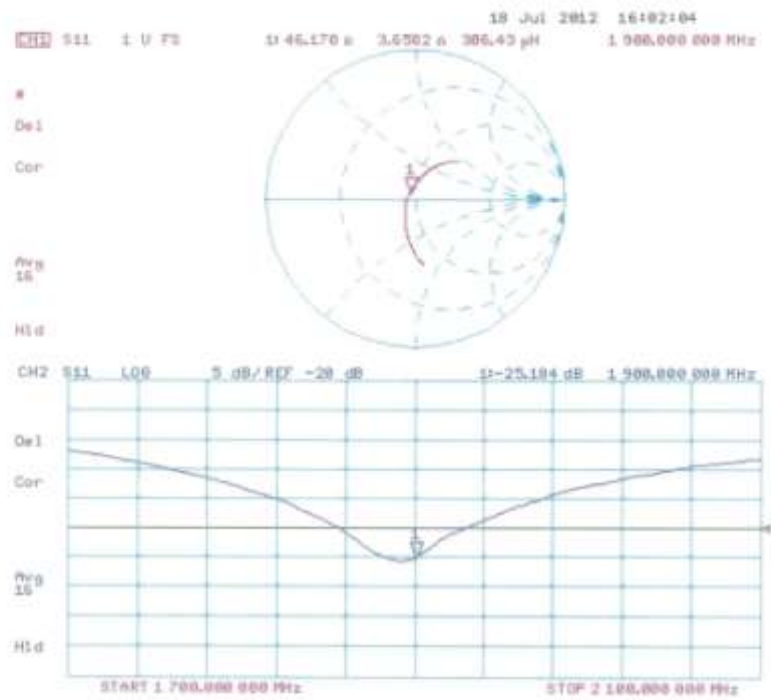
Peak SAR (extrapolated) = 17.332 mW/g

SAR(1 g) = 10 mW/g; SAR(10 g) = 5.3 mW/g

Maximum value of SAR (measured) = 12.6 mW/g



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&E 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-96 (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

Calibrated by: **Name** **Israa El-Nasouq** **Function** **Laboratory Technician**

Approved by: **Katja Pokovic** **Technical Manager**

Signature

Israa El-Nasouq
Katja Pokovic

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:

- IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

- DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- Measurement Conditions:** Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL:** The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- Feed Point Impedance and Return Loss:** These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- Electrical Delay:** One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- SAR measured:** SAR measured at the stated antenna input power.
- SAR normalized:** SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters:** The measured TSL parameters are used to calculate the nominal SAR result.

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 $\pm$ 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	39.2 $\pm$ 6 %	1.81 mho/m $\pm$ 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 $\pm$ 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 $\pm$ 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 $\pm$ 0.2) °C	51.3 $\pm$ 6 %	1.99 mho/m $\pm$ 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 $\pm$ 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 $\pm$ 16.5 % (k=2)

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	$54.0 \Omega + 4.7 j\Omega$
Return Loss	-24.6 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	$50.9 \Omega + 6.5 j\Omega$
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; $\sigma = 1.81$ mho/m; $\epsilon_r = 39.2$; $\rho = 1000$ kg/m³

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:

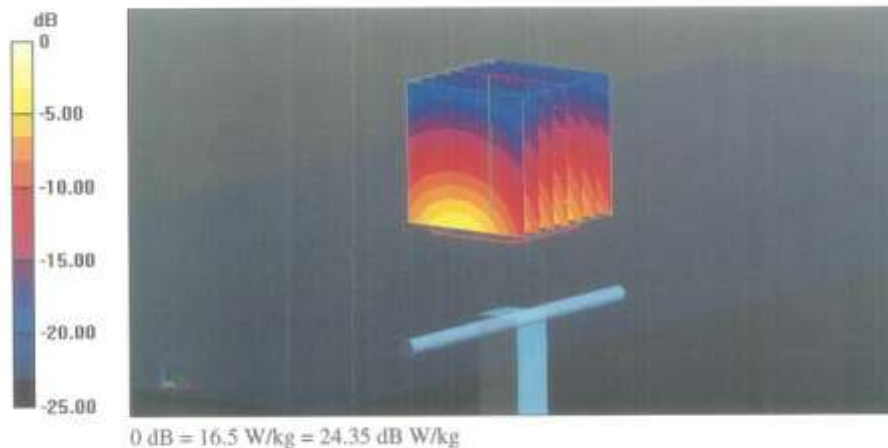
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 98.554 V/m; Power Drift = 0.01 dB

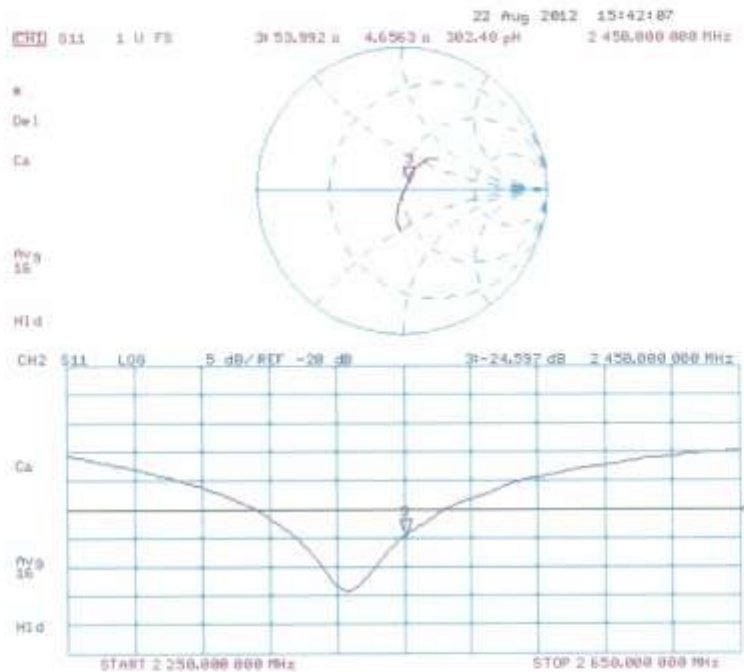
Peak SAR (extrapolated) = 26.584 mW/g

SAR(1 g) = 13.2 mW/g; SAR(10 g) = 6.18 mW/g

Maximum value of SAR (measured) = 16.5 W/kg



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; $\sigma = 1.99$ mho/m; $\epsilon_r = 51.3$; $\rho = 1000$ kg/m³

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:

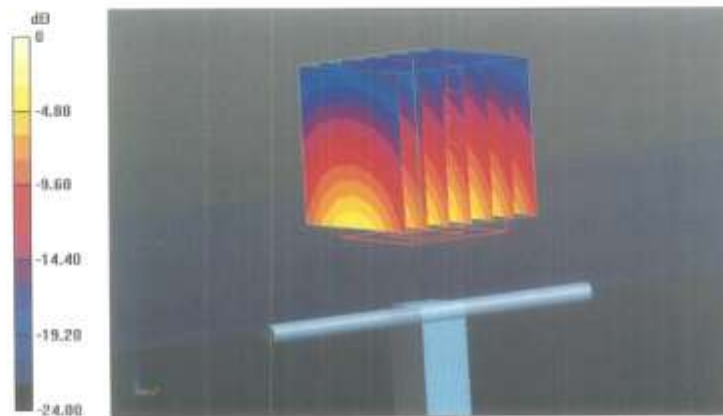
Measurement grid: dx=5mm, dy=5mm, dz=5mm

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

