WCDMA Band II RMC Body Rear Side Middle Channel

Communication System: Customer System; Frequency: 1880.0 MHz;Duty Cycle:1:1

Medium parameters used (interpolated): f = 1880.0 MHz; σ = 1.48 S/m; ε_r = 55.40; ρ = 1000 kg/m^3

Phantom section : Body- worn

Probe: ES3DV3 - SN3292; ConvF(4.66, 4.66, 4.66); Calibrated: 24/02/2013;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1315; Calibrated: 27/02/2013

Phantom: SAM 1; Type: SAM;

Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Area Scan (81x101x1): Measurement grid: dx=1.50 mm, dy=1.50 mm

Maximum value of SAR (interpolated) = 0.621 W/kg

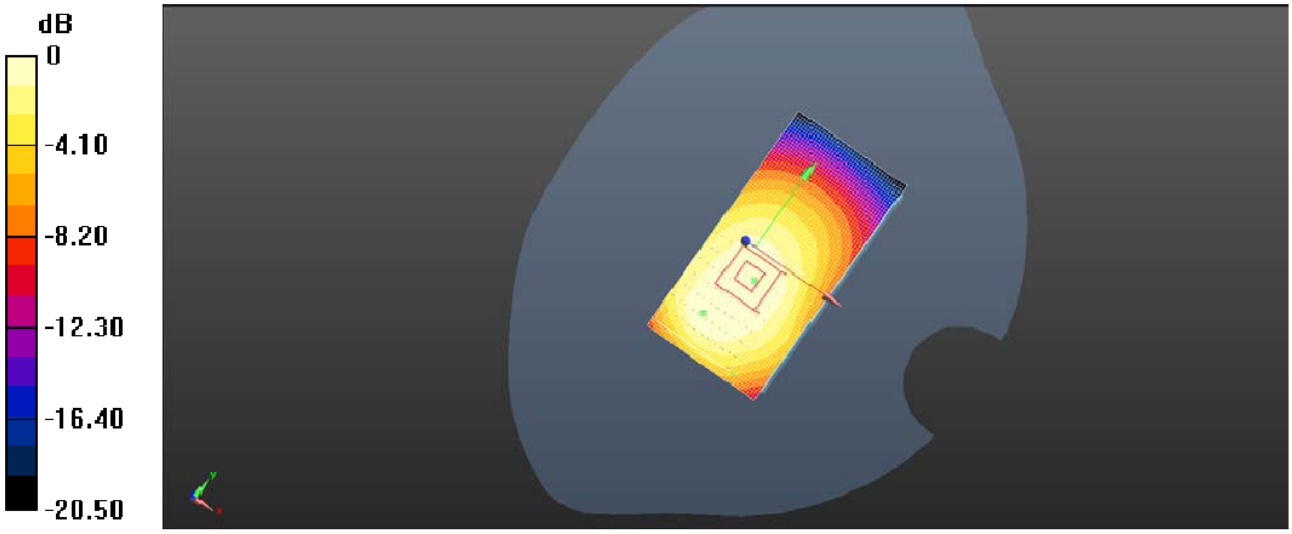
Zoom Scan (5x5x5)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 6.816 V/m; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 0.627 W/Kg

SAR(1 g) = 0.381 W/Kg; SAR(10 g) = 0.194 W/Kg

Maximum value of SAR (measured) = 0.651 W/kg



0dB = 0.651 W/kg = -4.15 dBW/kg

Plot 79: Body Rear Side (WCDMA Band II RMC Middle Channel)

WCDMA Band II RMC Body Rear Side Low Channel

Communication System: Customer System; Frequency: 1852.4 MHz;Duty Cycle:1:1

Medium parameters used (interpolated): f = 1852.4 MHz; σ =1.39 S/m; ε_r = 55.30; ρ = 1000 kg/m^3

Phantom section : Body- worn

Probe: ES3DV3 - SN3292; ConvF(4.66, 4.66, 4.66); Calibrated: 24/02/2013;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1315; Calibrated: 27/02/2013

Phantom: SAM 1; Type: SAM;

Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Area Scan (81x101x1): Measurement grid: dx=1.50 mm, dy=1.50 mm

Maximum value of SAR (interpolated) = 0.360 W/kg

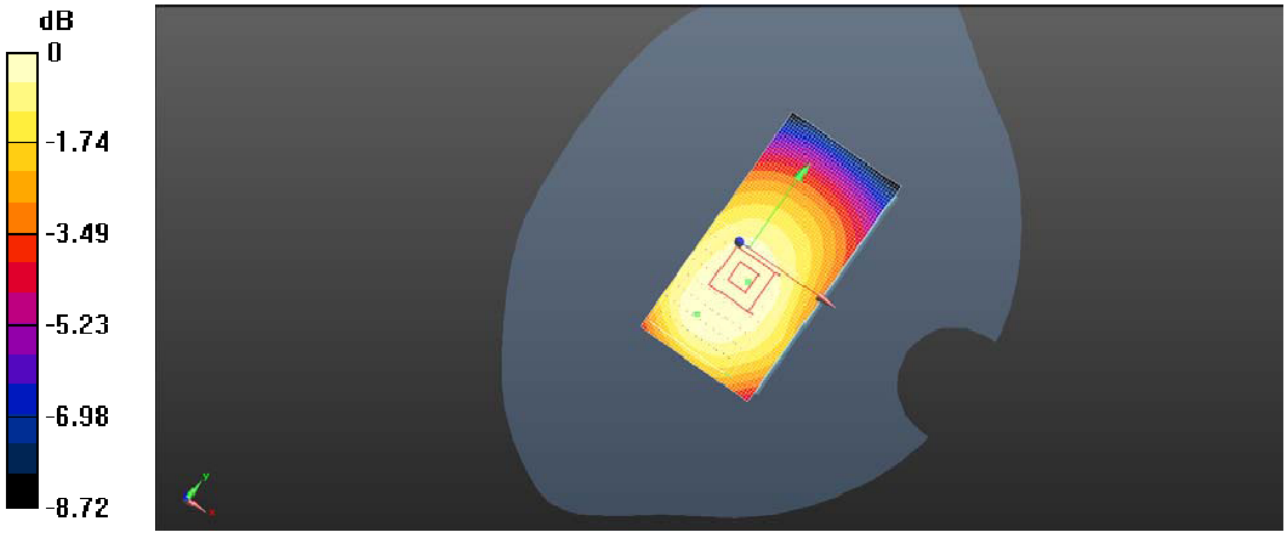
Zoom Scan (5x5x5)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 6.358 V/m; Power Drift = -0.17 dB

Peak SAR (extrapolated) = 0.493 W/Kg

SAR(1 g) = 0.334 W/Kg; SAR(10 g) = 0.187 W/Kg

Maximum value of SAR (measured) = 0.350 W/kg



0dB = 0.350 W/kg = -4.89 dBW/kg

Plot 80: Body Rear Side (WCDMA Band II RMC Low Channel)

WCDMA Band II RMC Body Rear Side High Channel

Communication System: Customer System; Frequency: 1907.6 MHz;Duty Cycle:1:2

Medium parameters used (interpolated): f = 1907.6 MHz; σ =1.49 S/m; ε_r = 52.40; ρ = 1000 kg/m^3

Phantom section : Body- worn

Probe: ES3DV3 - SN3292; ConvF(4.66, 4.66, 4.66); Calibrated: 24/02/2013;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1315; Calibrated: 27/02/2013

Phantom: SAM 1; Type: SAM;

Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Area Scan (81x101x1): Measurement grid: dx=1.50 mm, dy=1.50 mm

Maximum value of SAR (interpolated) = 0.354 W/kg

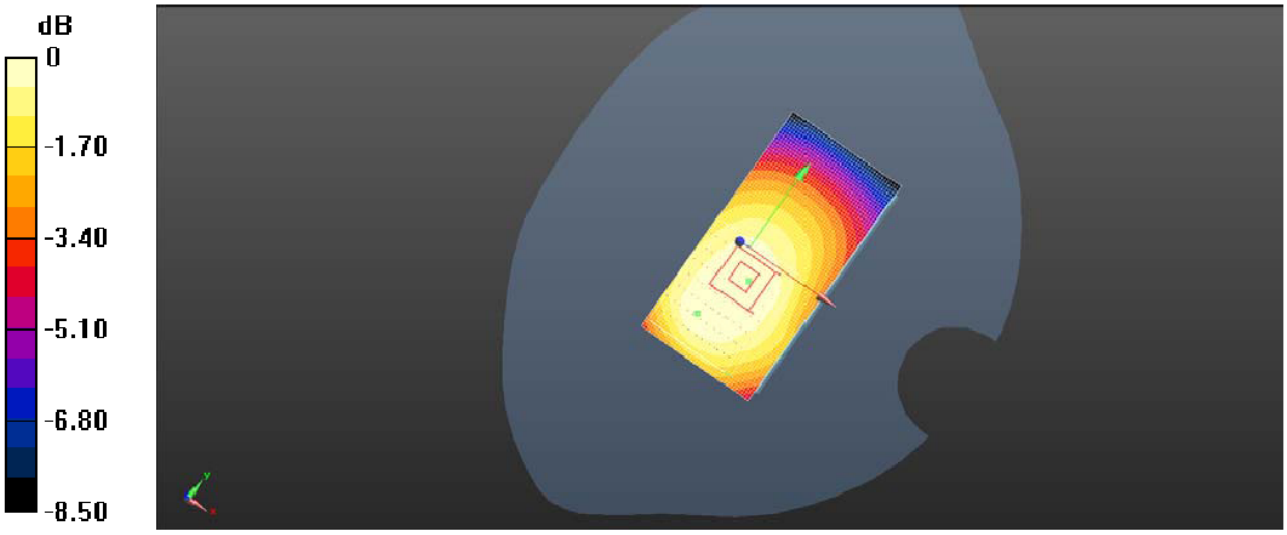
Zoom Scan (5x5x5)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 6.351 V/m; Power Drift = -0.21 dB

Peak SAR (extrapolated) = 0.504 W/Kg

SAR(1 g) = 0.301 W/Kg; SAR(10 g) = 0.154 W/Kg

Maximum value of SAR (measured) = 0.342 W/kg



0dB = 0.342 W/kg = -5.67 dBW/kg

Plot 81: Body Rear Side (WCDMA Band II RMC High Channel)

WCDMA Band II RMC Body Left Side Middle Channel

Communication System: Customer System; Frequency: 1880.0 MHz;Duty Cycle:1:1

Medium parameters used (interpolated): f = 1880.0 MHz; σ = 1.48 S/m; ε_r = 55.40; ρ = 1000 kg/m^3

Phantom section : Body- worn

Probe: ES3DV3 - SN3292; ConvF(4.66, 4.66, 4.66); Calibrated: 24/02/2013;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1315; Calibrated: 27/02/2013

Phantom: SAM 1; Type: SAM;

Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Area Scan (81x101x1): Measurement grid: dx=1.50 mm, dy=1.50 mm

Maximum value of SAR (interpolated) = 0.205 W/kg

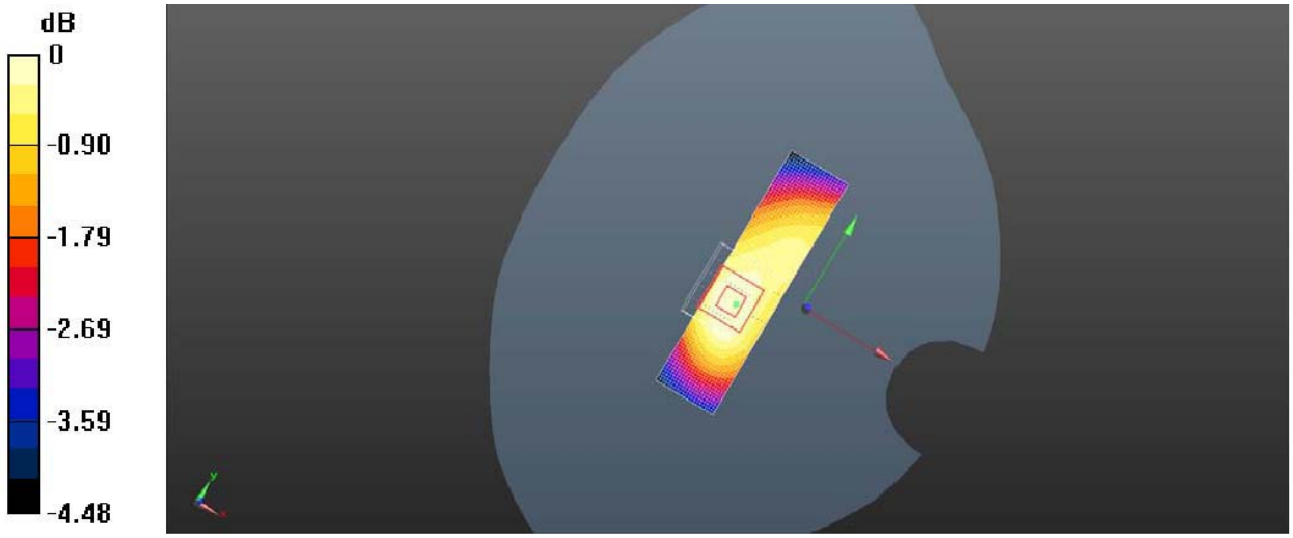
Zoom Scan (5x5x5)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 6.101 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 0.109 W/Kg

SAR(1 g) = 0.092 W/Kg; SAR(10 g) = 0.046 W/Kg

Maximum value of SAR (measured) = 0.181 W/kg



0dB = 0.181 W/kg = -14.85 dBW/kg

Plot 82: Body Left Side (WCDMA Band II RMC Middle Channel)

WCDMA Band II RMC Body Right Side Middle Channel

Communication System: Customer System; Frequency: 1880.0 MHz;Duty Cycle:1:1

Medium parameters used (interpolated): f = 1880.0 MHz; σ = 1.48 S/m; ε_r = 55.40; ρ = 1000 kg/m^3

Phantom section : Body- worn

Probe: ES3DV3 - SN3292; ConvF(4.66, 4.66, 4.66); Calibrated: 24/02/2013;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1315; Calibrated: 27/02/2013

Phantom: SAM 1; Type: SAM;

Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Area Scan (81x101x1): Measurement grid: dx=1.50 mm, dy=1.50 mm

Maximum value of SAR (interpolated) = 0.215 W/kg

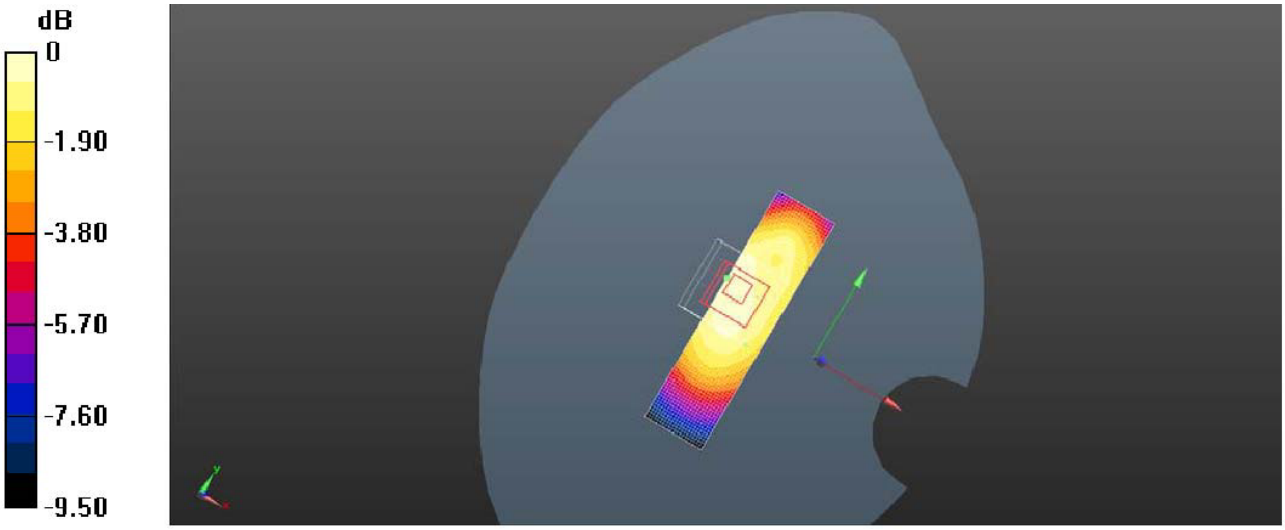
Zoom Scan (5x5x5)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 6.835 V/m; Power Drift = -0.14 dB

Peak SAR (extrapolated) = 0.117 W/Kg

SAR(1 g) = 0.083 W/Kg; SAR(10 g) = 0.061 W/Kg

Maximum value of SAR (measured) = 0.193 W/kg



0dB = 0.193 W/kg = -14.56 dBW/kg

Plot 83: Body Right Side (WCDMA Band II RMC Middle Channel)

WCDMA Band II RMC Body Top Side Middle Channel

Communication System: Customer System; Frequency: 1880.0 MHz;Duty Cycle:1:1

Medium parameters used (interpolated): f = 1880.0 MHz; σ = 1.48 S/m; ε_r = 55.40; ρ = 1000 kg/m^3

Phantom section : Body- worn

Probe: ES3DV3 - SN3292; ConvF(4.66, 4.66, 4.66); Calibrated: 24/02/2013;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1315; Calibrated: 27/02/2013

Phantom: SAM 1; Type: SAM;

Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Area Scan (81x101x1): Measurement grid: dx=1.50 mm, dy=1.50 mm

Maximum value of SAR (interpolated) = 0.161 W/kg

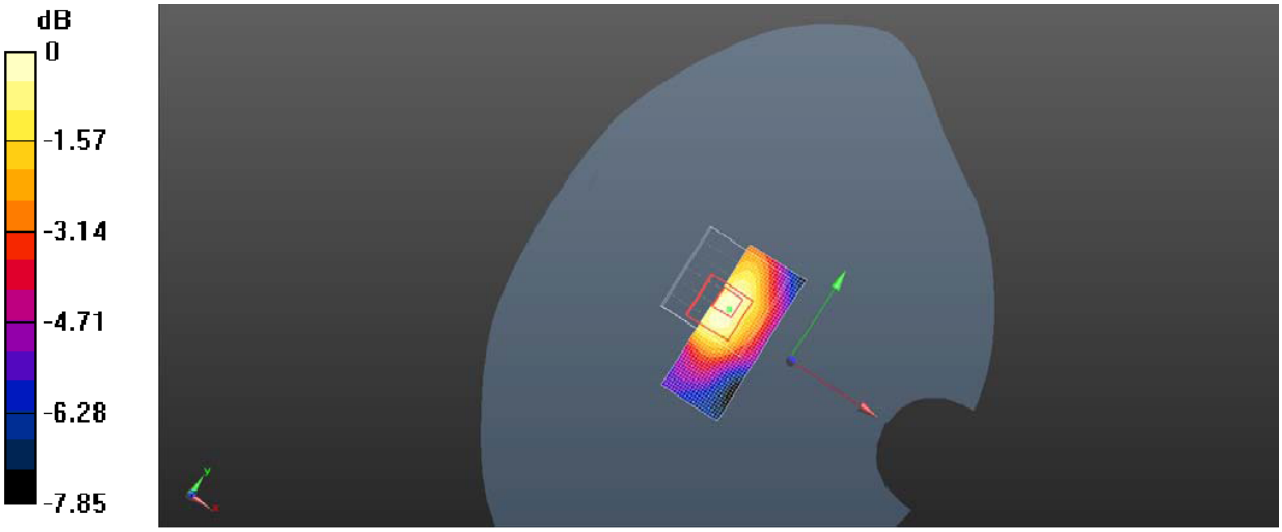
Zoom Scan (5x5x5)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 6.662 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 0.153 W/Kg

SAR(1 g) = 0.060 W/Kg; SAR(10 g) = 0.040 W/Kg

Maximum value of SAR (measured) = 0.148 W/kg



0dB = 0.161 W/kg = -15.86 dBW/kg

Plot 84: Body Top Side (WCDMA Band II RMC Middle Channel)

WCDMA Band II RMC Body Bottom Side Middle Channel

Communication System: Customer System; Frequency: 1880.0 MHz;Duty Cycle:1:1

Medium parameters used (interpolated): f = 1880.0 MHz; σ = 1.48 S/m; ε_r = 55.40; ρ = 1000 kg/m^3

Phantom section : Body- worn

Probe: ES3DV3 - SN3292; ConvF(4.66, 4.66, 4.66); Calibrated: 24/02/2013;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1315; Calibrated: 27/02/2013

Phantom: SAM 1; Type: SAM;

Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Area Scan (81x101x1): Measurement grid: dx=1.50 mm, dy=1.50 mm

Maximum value of SAR (interpolated) = 0.161 W/kg

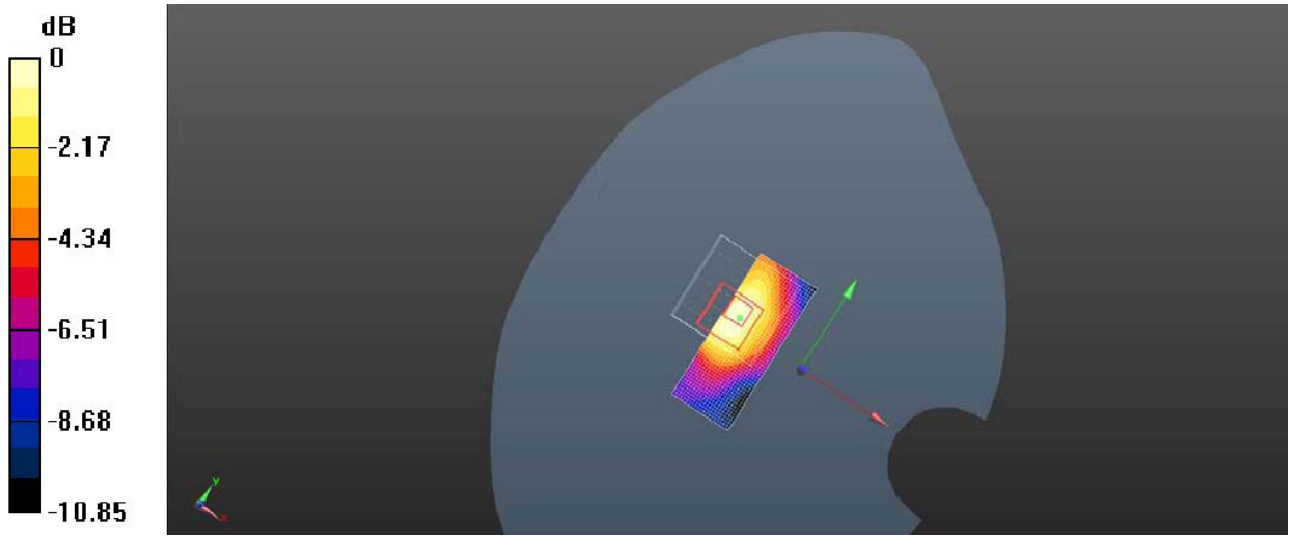
Zoom Scan (5x5x5)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 6.815 V/m; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 0.159 W/Kg

SAR(1 g) = 0.084 W/Kg; SAR(10 g) = 0.037 W/Kg

Maximum value of SAR (measured) = 0.148 W/kg



0dB = 0.161 W/kg = -15.86 dBW/kg

Plot 85: Body Bottom Side (WCDMA Band RMC Middle Channel)

WCDMA Band RMC Body (Speech) With Headset Rear Side Middle Channel

Communication System: Customer System; Frequency: 1880.0 MHz;Duty Cycle:1:1

Medium parameters used (interpolated): f = 1880.0 MHz; σ = 1.48 S/m; ε_r = 55.40; ρ = 1000 kg/m^3

Phantom section : Body- worn

Probe: ES3DV3 - SN3292; ConvF(4.66, 4.66, 4.66); Calibrated: 24/02/2013;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1315; Calibrated: 27/02/2013

Phantom: SAM 1; Type: SAM;

Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Area Scan (81x101x1): Measurement grid: dx=1.50 mm, dy=1.50 mm

Maximum value of SAR (interpolated) = 0.217 W/kg

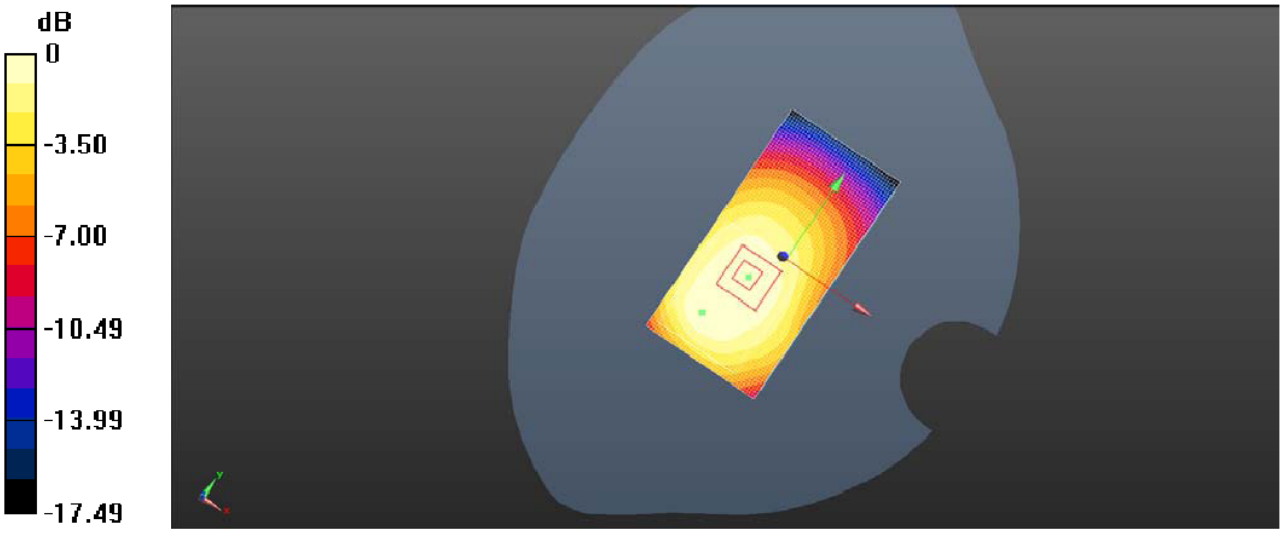
Zoom Scan (5x5x5)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 6.568 V/m; Power Drift = -0.12 dB

Peak SAR (extrapolated) = 0.461 W/Kg

SAR(1 g) = 0.281 W/Kg; SAR(10 g) = 0.180 W/Kg

Maximum value of SAR (measured) = 0.308 W/kg



0dB = 0.308 W/kg = -5.94 dBW/kg

Plot 86: Body Rear Side (WCDMA Band II Specch With Headset Middle Channel)

WLAN2450 Left Head Touch Middle Channel -Channel 6-2437MHz

Communication System: Customer System; Frequency: 2437 MHz;Duty Cycle:1:1

Medium parameters used (interpolated): f = 2437 MHz; σ =1.83 S/m; ε_r = 38.80; ρ = 1000 kg/m^3

Phantom section: Left Head Section:

Probe: ES3DV3 - SN3292; ConvF(4.47, 4.47, 4.47); Calibrated: 24/02/2013;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1315; Calibrated: 27/02/2013

Phantom: SAM 1; Type: SAM;

Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Area Scan (81x101x1): Measurement grid: dx=1.50 mm, dy=1.50 mm

Maximum value of SAR (interpolated) = 0.116 W/kg

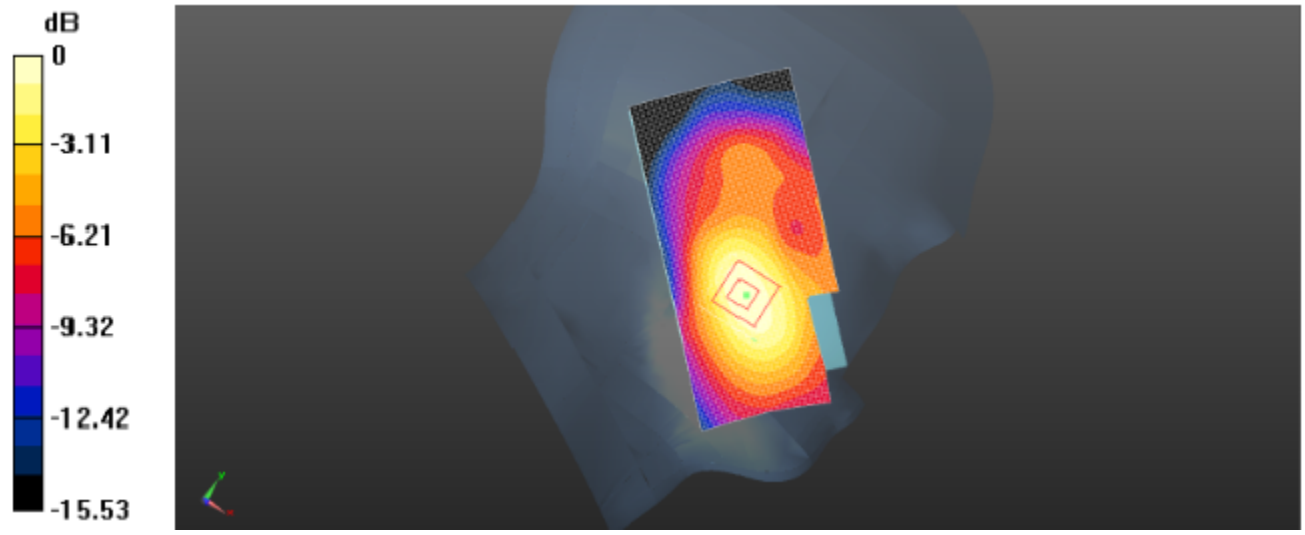
Zoom Scan (5x5x5)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value =4.715 V/m; Power Drift = -0.16 dB

Peak SAR (extrapolated) = 0.211 mW/g

SAR(1 g) = 0.189 mW/g; SAR(10 g) = 0.119 mW/g

Maximum value of SAR (measured) = 0.114 W/kg



0 dB = 0.114 W/kg = -13.49 dB W/kg

Plot 87: Left Head Touch (WLAN2450-Middle Channel-Channel 6-2437MHz)

WLAN2450 Left Head Tilt Middle Channel -Channel 6-2437MHz

Communication System: Customer System; Frequency: 2437 MHz;Duty Cycle:1:1

Medium parameters used (interpolated): f = 2437 MHz; σ =1.83 S/m; ε_r = 38.80; ρ = 1000 kg/m^3

Phantom section: Left Head Section:

Probe: ES3DV3 - SN3292; ConvF(4.47, 4.47, 4.47); Calibrated: 24/02/2013;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1315; Calibrated: 27/02/2013

Phantom: SAM 1; Type: SAM;

Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Area Scan (81x101x1): Measurement grid: dx=1.50 mm, dy=1.50 mm

Maximum value of SAR (interpolated) = 0.196 W/kg

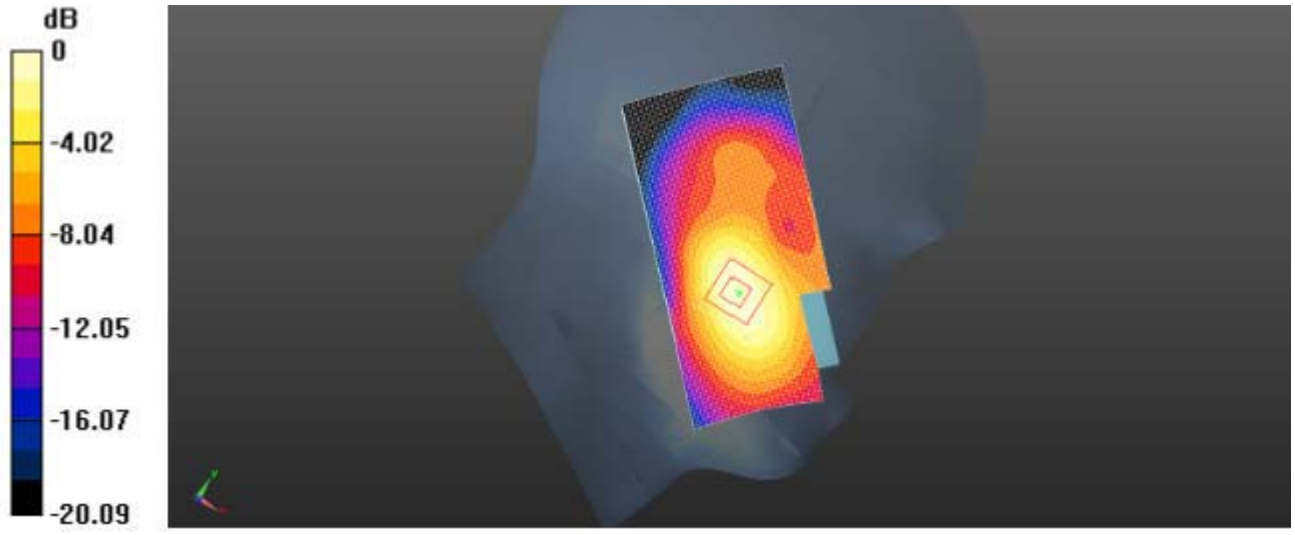
Zoom Scan (5x5x5)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 5.346 V/m; Power Drift = -0.09 dB

Peak SAR (extrapolated) = 0.145 W/g

SAR(1 g) = 0.175 W/g; SAR(10 g) = 0.132 W/g

Maximum value of SAR (measured) = 0.193 W/kg



0dB = 0.199 W/kg = -14.05 dBW/kg

Plot 88: Left Head Tilt (WLAN2450-Middle Channel-Channel 6-2437MHz)

WLAN2450 Right Head Touch Middle Channel -Channel 6-2437MHz

Communication System: Customer System; Frequency: 2437 MHz;Duty Cycle:1:1

Medium parameters used (interpolated): f = 2437 MHz; σ =1.83 S/m; ε_r = 38.80; ρ = 1000 kg/m^3

Phantom section: Right Head Section:

Probe: ES3DV3 - SN3292; ConvF(4.47, 4.47, 4.47); Calibrated: 24/02/2013;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1315; Calibrated: 27/02/2013

Phantom: SAM 1; Type: SAM;

Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Area Scan (81x101x1): Measurement grid: dx=1.50 mm, dy=1.50 mm

Maximum value of SAR (interpolated) = 0.197 W/kg

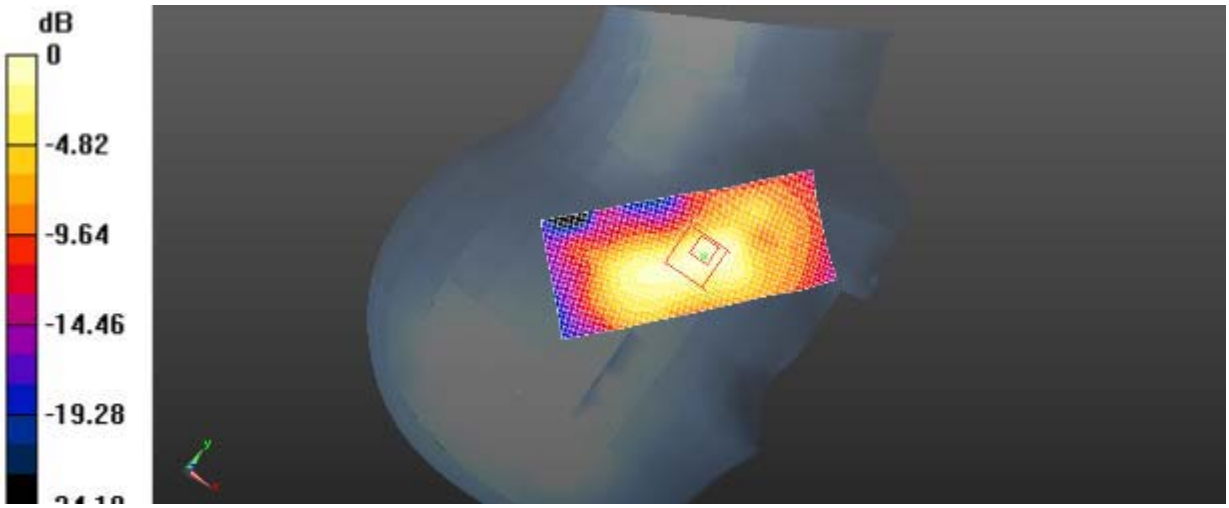
Zoom Scan (5x5x5)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 6.935 V/m; Power Drift = -0.11 dB

Peak SAR (extrapolated) = 0.244 W/g

SAR(1 g) = 0.177 W/g; SAR(10 g) = 0.139 W/g

Maximum value of SAR (measured) = 0.192 W/kg



0dB = 0.192 W/kg = -14.21 dBW/kg

Plot 89: Right Head Touch (WLAN2450-Middle Channel-Channel 6-2437MHz)

WLAN2450 Right Head Tilt Middle Channel -Channel 6-2437MHz

Communication System: Customer System; Frequency: 2437 MHz;Duty Cycle:1:1

Medium parameters used (interpolated): f = 2437 MHz; σ =1.83 S/m; ε_r = 38.80; ρ = 1000 kg/m^3

Phantom section: Right Head Section:

Probe: ES3DV3 - SN3292; ConvF(4.47, 4.47, 4.47); Calibrated: 24/02/2013;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1315; Calibrated: 27/02/2013

Phantom: SAM 1; Type: SAM;

Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Area Scan (81x101x1): Measurement grid: dx=1.50 mm, dy=1.50 mm

Maximum value of SAR (interpolated) = 0.153 W/kg

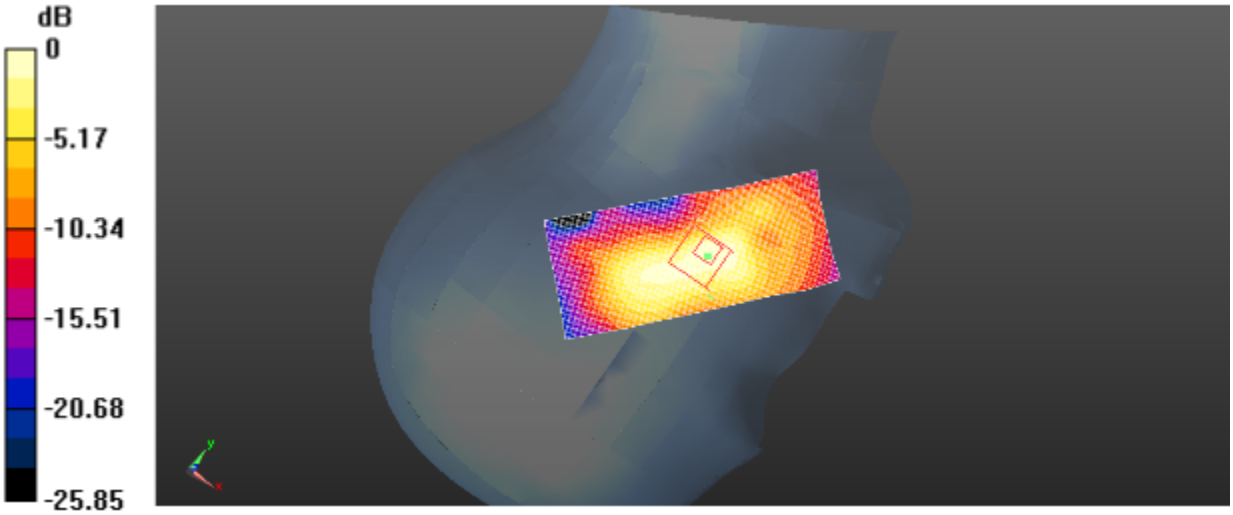
Zoom Scan (5x5x5)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 4.200 V/m; Power Drift = -0.07 dB

Peak SAR (extrapolated) = 0.180 W/g

SAR(1 g) = 0.148 W/g; SAR(10 g) = 0.110 W/g

Maximum value of SAR (measured) = 0.158 W/kg



0dB = 0.158 W/kg = -18.24 dBW/kg

Plot 90: Right Head Tilt (WLAN2450-Middle Channel-Channel 6-2437MHz)

WLAN2450 Front Side Middle Channel -Channel 6-2437MHz

Communication System: Customer System; Frequency: 2437 MHz;Duty Cycle:1:1

Medium parameters used (interpolated): f = 2437 MHz; σ =2.00 S/m; ε_r = 53.30; ρ = 1000 kg/m^3

Phantom section: Body- worn

Probe: ES3DV3 - SN3292; ConvF(4.25, 4.25, 4.25); Calibrated: 24/02/2013;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1315; Calibrated: 27/02/2013

Phantom: SAM 1; Type: SAM;

Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Area Scan (81x101x1): Measurement grid: dx=1.50 mm, dy=1.50 mm

Maximum value of SAR (interpolated) =0.351 W/kg

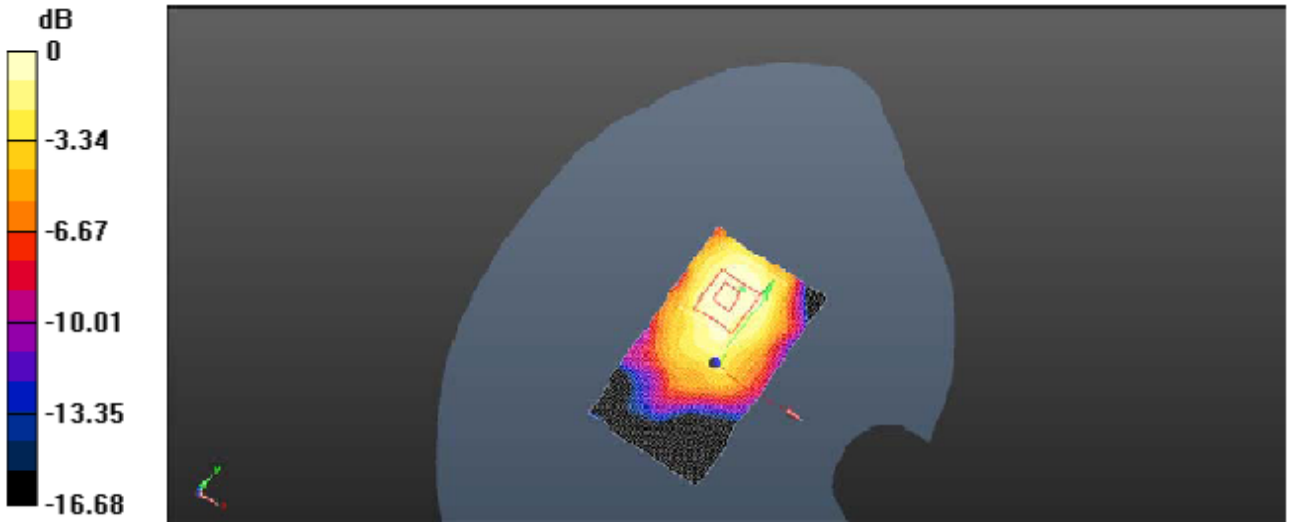
Zoom Scan (5x5x5)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 9.285 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 0.284 mW/g

SAR(1 g) = 0.227 mW/g; SAR(10 g) = 0.189 mW/g

Maximum value of SAR (measured) = 0.282 W/kg



0 dB = 0.282 W/kg = -9.56 dB W/kg

Plot 91: Front Side (WLAN2450-Middle Channel-Channel 6-2437MHz)

WLAN2450 Rear Side Middle Channel -Channel 11-2462MHz

Communication System: Customer System; Frequency: 2437 MHz;Duty Cycle:1:1

Medium parameters used (interpolated): f = 2437 MHz; σ =2.00 S/m; ε_r = 53.30; ρ = 1000 kg/m^3

Phantom section: Body- worn

Probe: ES3DV3 - SN3292; ConvF(4.25, 4.25, 4.25); Calibrated: 24/02/2013;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1315; Calibrated: 27/02/2013

Phantom: SAM 1; Type: SAM;

Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Area Scan (81x101x1): Measurement grid: dx=1.50 mm, dy=1.50 mm

Maximum value of SAR (interpolated) = 0.218 W/kg

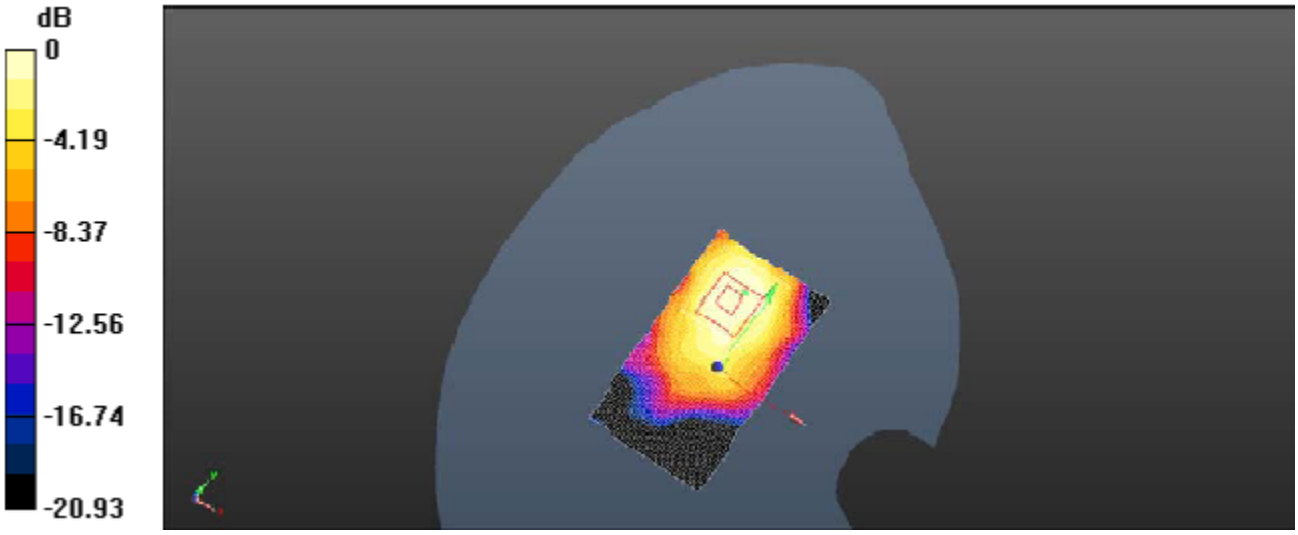
Zoom Scan (5x5x5)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 5.825 V/m; Power Drift = -0.17 dB

Peak SAR (extrapolated) = 0.231 mW/g

SAR(1 g) = 0.235 mW/g; SAR(10 g) = 0.203 mW/g

Maximum value of SAR (measured) = 0.236 W/kg



0 dB = 0.247 W/kg = -12.56 dB W/kg

Plot 92: Rear Side (WLAN2450-Middle Channel-Channel 6-2437MHz)

WLAN2450 Left Side Middle Channel -Channel 6-2437MHz

Communication System: Customer System; Frequency: 2437 MHz;Duty Cycle:1:1

Medium parameters used (interpolated): f = 2437 MHz; σ =2.00 S/m; ε_r = 53.30; ρ = 1000 kg/m^3

Phantom section: Body- worn

Probe: ES3DV3 - SN3292; ConvF(4.25, 4.25, 4.25); Calibrated: 24/02/2013;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1315; Calibrated: 27/02/2013

Phantom: SAM 1; Type: SAM;

Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Area Scan (81x101x1): Measurement grid: dx=1.50 mm, dy=1.50 mm

Maximum value of SAR (interpolated) =0.106 W/kg

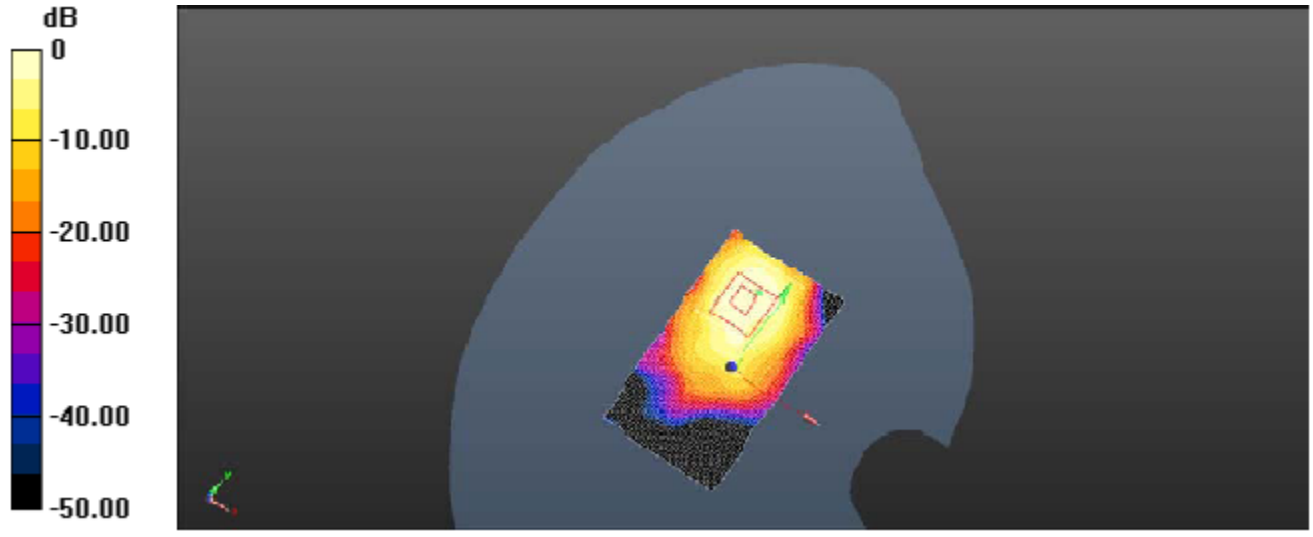
Zoom Scan (5x5x5)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 6.584 V/m; Power Drift = -0.13 dB

Peak SAR (extrapolated) = 0.218mW/g

SAR(1 g) = 0.162 mW/g; SAR(10 g) = 0.132 mW/g

Maximum value of SAR (measured) = 0.231 W/kg



0 dB = 0.230 W/kg = -11.87 dB W/kg

Plot 93: Left Side (WLAN2450-Middle Channel-Channel 6-2437MHz)

WLAN2450 Top Side Middle Channel -Channel 6-2437MHz

Communication System: Customer System; Frequency: 2437 MHz;Duty Cycle:1:1

Medium parameters used (interpolated): f = 2437 MHz; σ =2.00 S/m; ε_r = 53.30; ρ = 1000 kg/m^3

Phantom section: Body- worn

Probe: ES3DV3 - SN3292; ConvF(4.25, 4.25, 4.25); Calibrated: 24/02/2013;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1315; Calibrated: 27/02/2013

Phantom: SAM 1; Type: SAM;

Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Area Scan (81x101x1): Measurement grid: dx=1.50 mm, dy=1.50 mm

Maximum value of SAR (interpolated) =0.105 W/kg

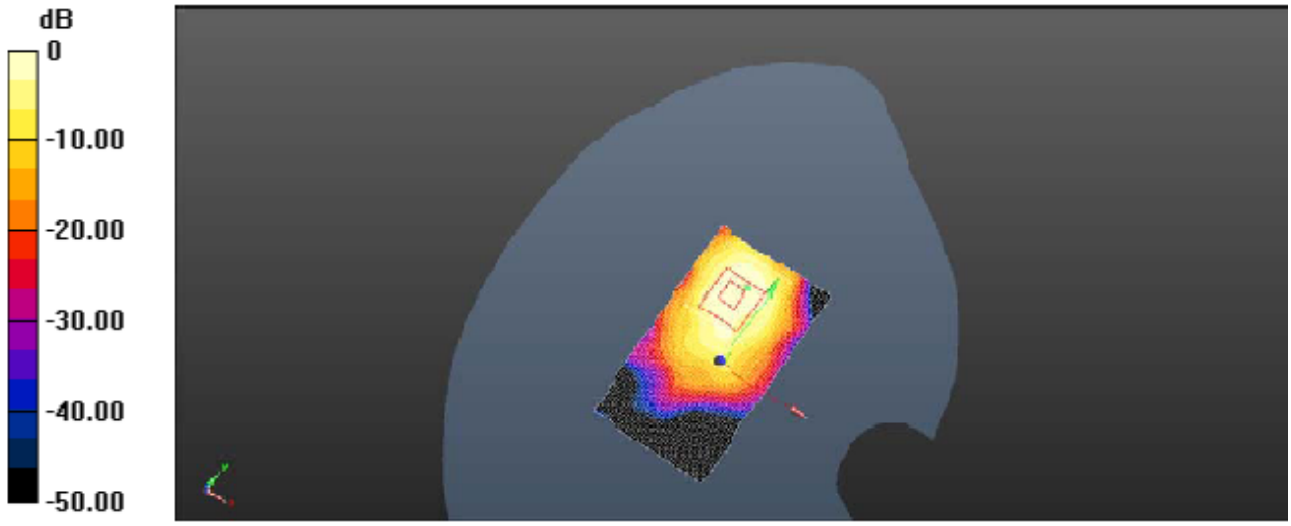
Zoom Scan (5x5x5)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 7.107 V/m; Power Drift = 0.13 dB

Peak SAR (extrapolated) = 0.214 mW/g

SAR(1 g) = 0.158 mW/g; SAR(10 g) = 0.133 mW/g

Maximum value of SAR (measured) = 0.235 W/kg



0 dB = 0.102W/kg = -18.22 dB W/kg

Plot 94: Top Side (WLAN2450-Middle Channel-Channel 6-2437MHz)

6. Calibration Certificate

6.1. Probe Calibration Ceriticate

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

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The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Client CIQ SZ (Auden)

Certificate No: ES3-3292_Feb13

CALIBRATION CERTIFICATE

Object: ES3DV3 - SN:3292

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

Calibration date: February 24, 2013

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	31-Mar-12 (No. 217-01372)	Apr-13
Power sensor E4412A	MY41498087	31-Mar-12 (No. 217-01372)	Apr-13
Reference 3 dB Attenuator	SN: S5054 (3c)	29-Mar-12 (No. 217-01369)	Apr-13
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-12 (No. 217-01367)	Apr-13
Reference 30 dB Attenuator	SN: S5129 (30b)	29-Mar-12 (No. 217-01370)	Apr-13
Reference Probe ES3DV2	SN: 3013	29-Dec-12 (No. ES3-3013_Dec12)	Dec-13
DAE4	SN: 654	3-May-12 (No. DAE4-654_May12)	May-13
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-12)	In house check: Apr-13
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-12)	In house check: Oct-13

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

Issued: February 27, 2013

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

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Accreditation No.: SCS 108

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C	modulation dependent linearization parameters
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., ϑ = 0 is normal to probe axis

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization ϑ = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- *PAR:* PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- *Ax,y,z; Bx,y z; Cx,y,z, VRx,y,z: A, B, C* are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. *VR* is the maximum calibration range expressed in RMS voltage across the diode.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

Probe ES3DV3

SN:3292

Manufactured: July 6, 2010
Calibrated: February 24, 2013

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

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3292

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.81	0.90	1.18	± 10.1 %
DCP (mV)[B]	105.9	104.7	102.0	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc[E] (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	117.3	±2.2 %
			Y	0.00	0.00	1.00	94.2	
			Z	0.00	0.00	1.00	108.2	

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

[A] The uncertainties of NormX,Y,Z do not affect the E^2-field uncertainty inside TSL (see Pages 5 and 6).
[B] Numerical linearization parameter: uncertainty not required.
[E] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3292

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	6.71	6.71	6.71	0.15	1.80	± 13.4 %
835	41.5	0.90	6.06	6.06	6.06	0.26	2.19	± 12.0 %
900	41.5	0.97	6.03	6.03	6.03	0.29	2.00	± 12.0 %
1810	40.0	1.40	5.25	5.25	5.25	0.80	1.17	± 12.0 %
1900	40.0	1.40	5.21	5.21	5.21	0.63	1.38	± 12.0 %
2100	39.8	1.49	5.15	5.15	5.15	0.80	1.20	± 12.0 %
2450	39.2	1.80	4.47	4.47	4.47	0.63	1.50	± 12.0 %

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

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3292

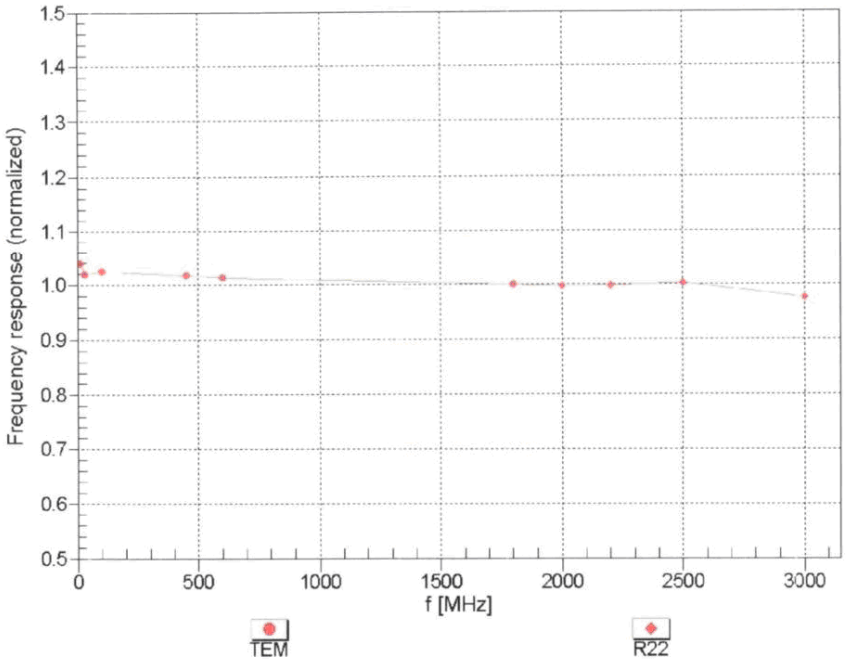
Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
450	56.7	0.94	7.10	7.10	7.10	0.09	1.00	± 13.4 %
835	55.2	0.97	6.14	6.14	6.14	0.42	1.57	± 12.0 %
900	55.0	1.05	6.07	6.07	6.07	0.48	1.49	± 12.0 %
1810	53.3	1.52	4.86	4.86	4.86	0.62	1.42	± 12.0 %
1900	53.3	1.52	4.66	4.66	4.66	0.47	1.75	± 12.0 %
2100	53.2	1.62	4.76	4.76	4.76	0.70	1.39	± 12.0 %
2450	52.7	1.95	4.25	4.25	4.25	0.80	1.03	± 12.0 %

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

Frequency Response of E-Field

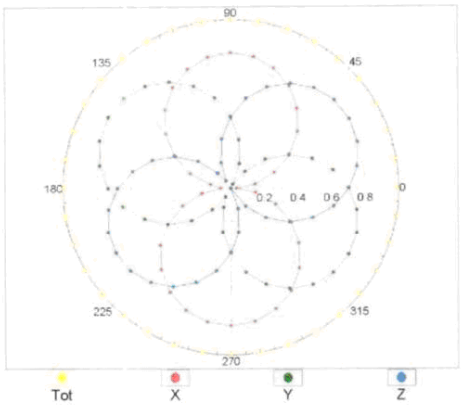
(TEM-Cell:ifi110 EXX, Waveguide: R22)



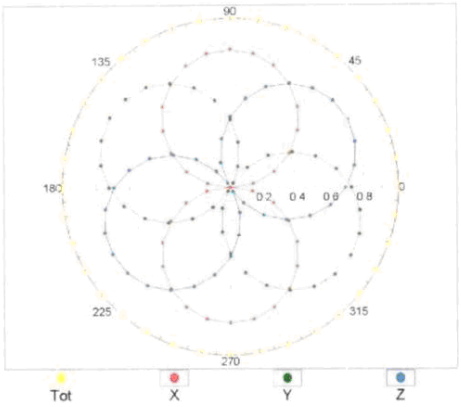
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

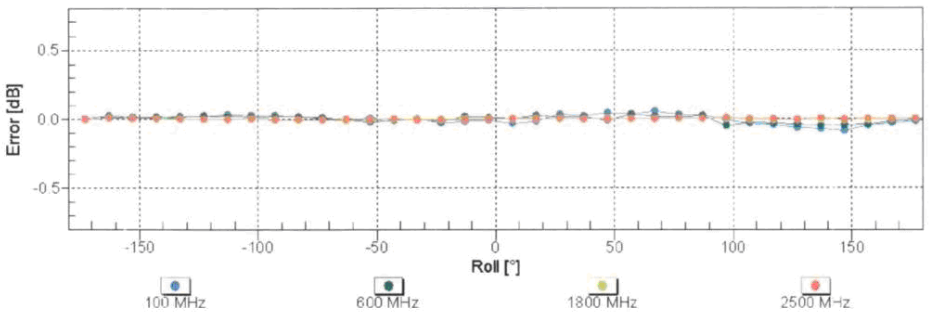
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



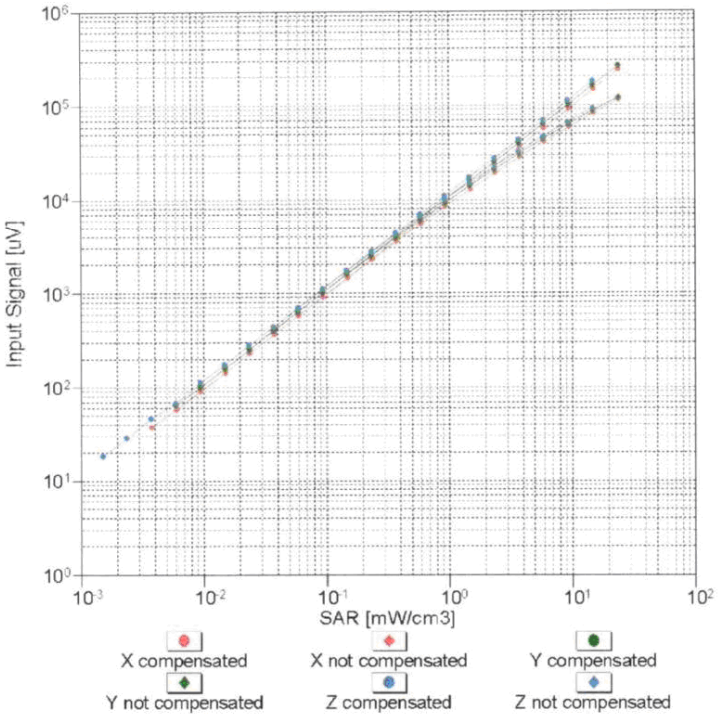
f=1800 MHz,R22

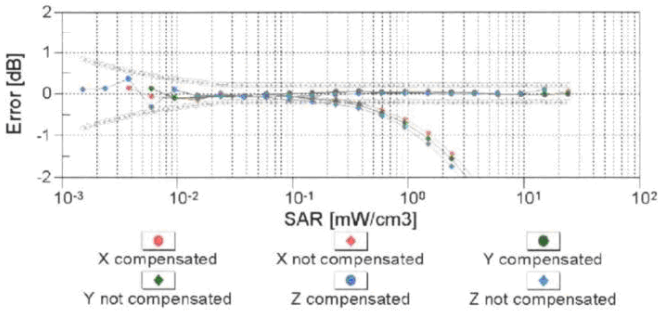




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

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

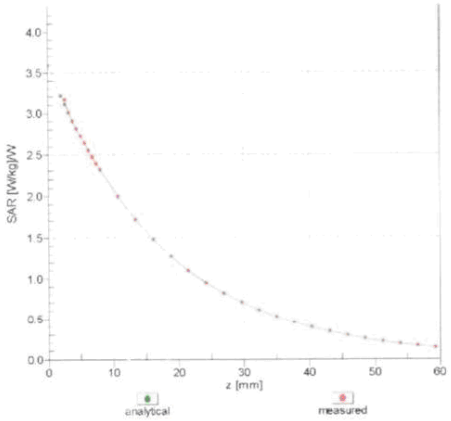




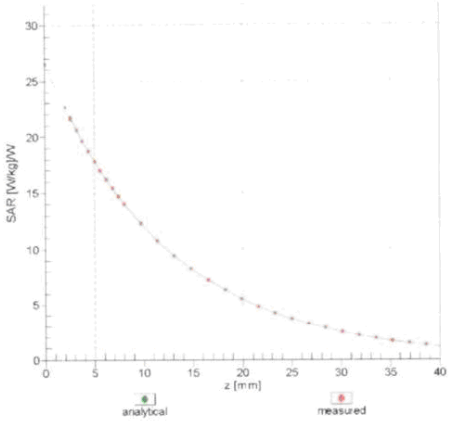
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment

f = 900 MHz,WGLS R9 (H_convF)

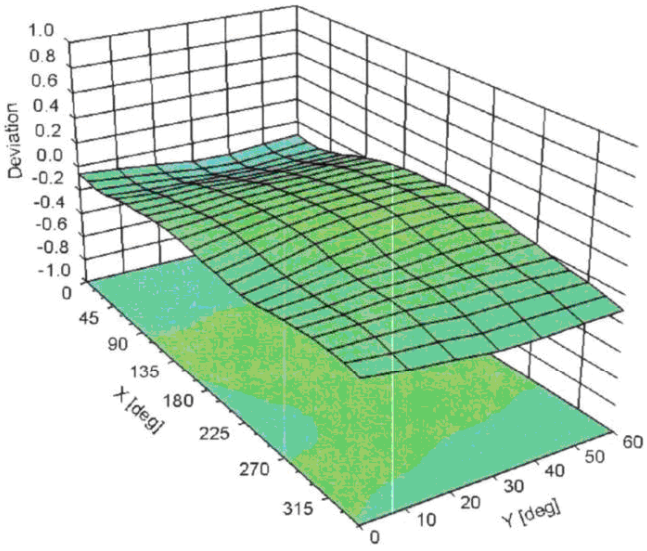


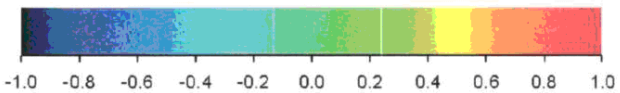
f = 1810 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz





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

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3292

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	Not applicable
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	10 mm
Tip Diameter	4 mm
Probe Tip to Sensor X Calibration Point	2 mm
Probe Tip to Sensor Y Calibration Point	2 mm
Probe Tip to Sensor Z Calibration Point	2 mm
Recommended Measurement Distance from Surface	3 mm

6.2. D835V2 Dipole Calibration Ceriticate

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

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Accreditation No.: SCS 108

Client CIQ SZ (Auden)

Certificate No: D835V2-4d134_Feb13

CALIBRATION CERTIFICATE

Object	D835V2 - SN: 4d134
Calibration procedure(s)	QA CAL-05.v8 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	February 27, 2013

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-12 (No. 217-01451)	Oct-13
Power sensor HP 8481A	US37292783	05-Oct-12 (No. 217-01451)	Oct-13
Reference 20 dB Attenuator	SN: 5086 (20g)	29-Mar-12 (No. 217-01368)	Apr-13
Type-N mismatch combination	SN: 5047.2 / 06327	29-Mar-12 (No. 217-01371)	Apr-13
Reference Probe ES3DV3	SN: 3205	30-Dec-12 (No. ES3-3205_Dec11)	Dec-13
DAE4	SN: 601	04-Jul-12 (No. DAE4-601_Jul11)	Jul-13

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

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

Issued: February 27, 2013

Calibration Laboratory of
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Accreditation No.: SCS 108

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

Measurement Conditions

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

DASY Version	DASY5	V52.8.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 = 0.2) °C	41.0 ± 6 %	0.89 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.33 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**9.37 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.52 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**6.11 mW /g ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	55.7 ± 6 %	1.01 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.44 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**9.49 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	concition	
SAR measured	250 mW input power	1.60 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**6.26 mW / g ± 16.5 % (k=2)**