1900 Left Cheek High

Date/Time: 2009-4-15 8:21:05

Electronics: DAE4 Sn771

Medium: 1900 Head

Medium parameters used: f = 1910 MHz; σ = 1.43 mho/m; ε_r = 39.1; ρ = 1000 kg/m^3

Ambient Temperature:23.3^{o}C   Liqiud Temperature: 22.5^{o}C

Communication System: GSM 1900MHz Frequency: 1909.8 MHz Duty Cycle: 1:8.3

Probe: ES3DV3 - SN3149 ConvF(5.03, 5.03, 5.03)

`Cheek High/Area Scan (51x121x1):` Measurement grid: dx=10mm, dy=10mm

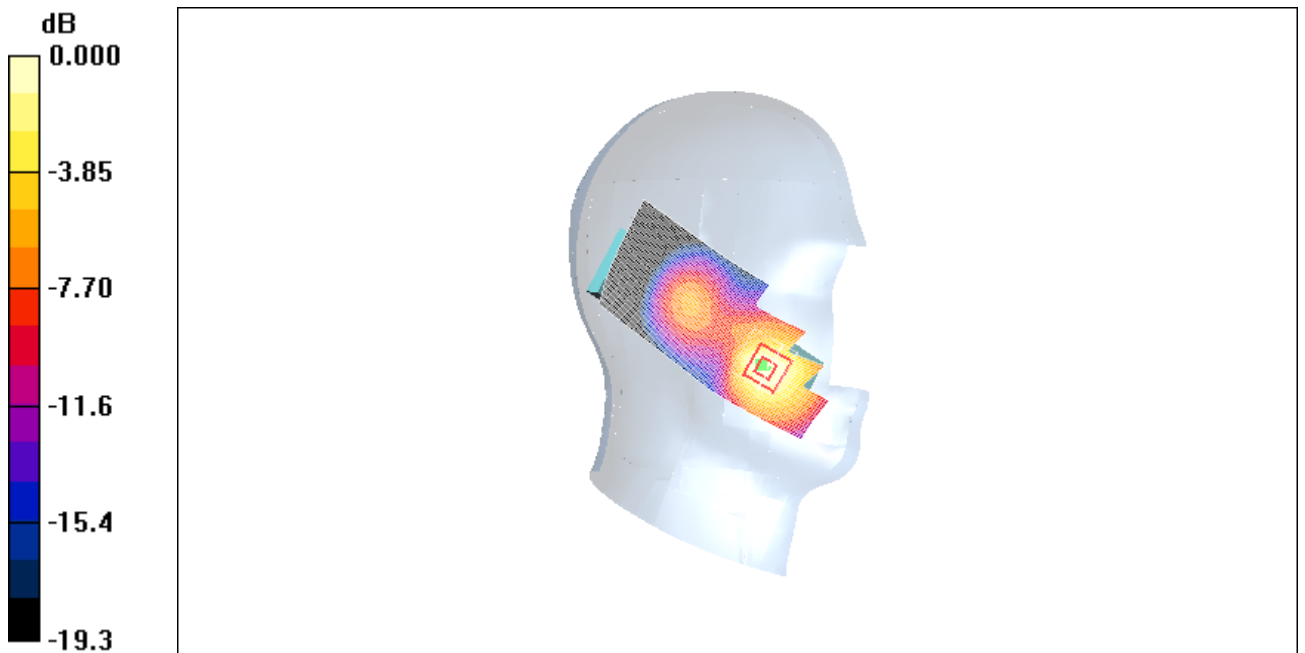Maximum value of SAR (interpolated) = 1.12 mW/g

`Cheek High/Zoom Scan (7x7x7)/Cube 0:` Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 5.81 V/m; Power Drift = -0.174 dB
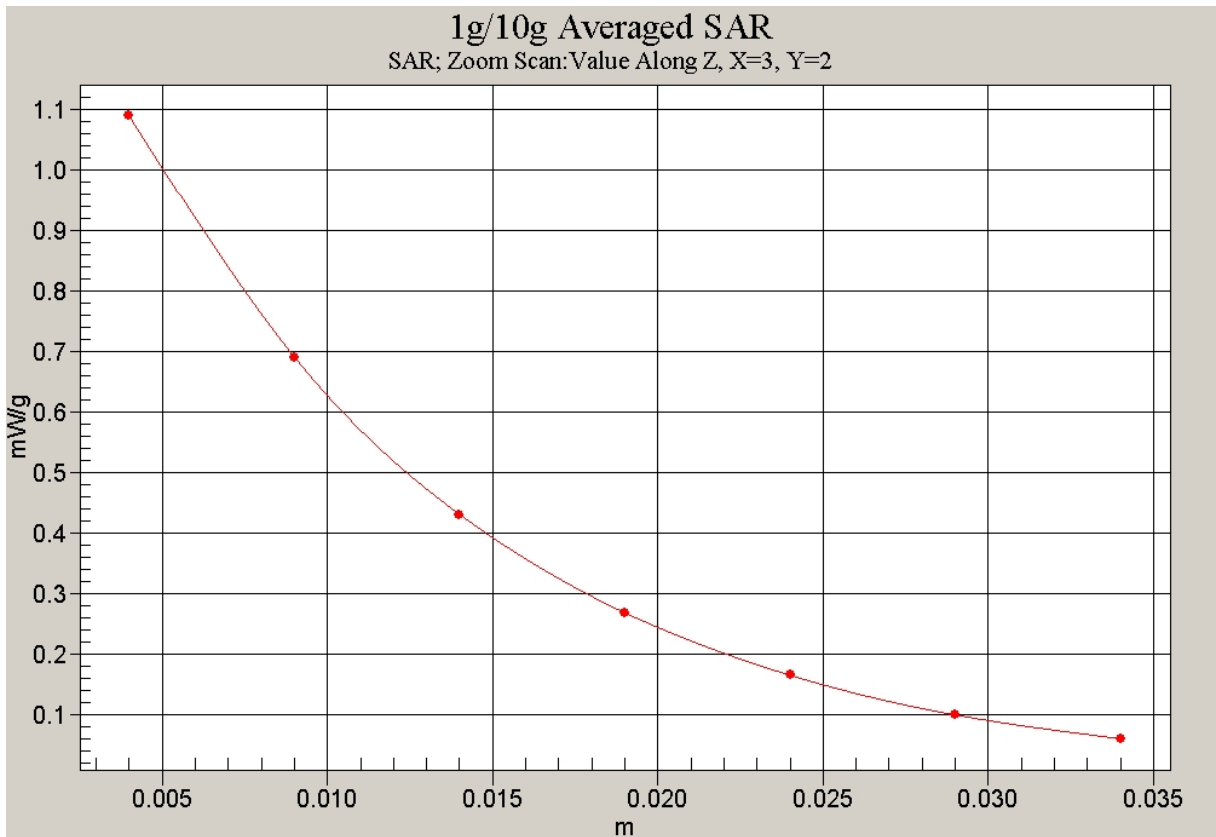
Peak SAR (extrapolated) = 1.65 W/kg

SAR(1 g) = 0.990 mW/g; SAR(10 g) = 0.553 mW/g

Maximum value of SAR (measured) = 1.09 mW/g

0 dB = 1.09mW/g

Fig. 19   1900 MHz CH810

Fig. 20 Z-Scan at power reference point (1900 MHz CH810)

1900 Left Cheek Middle

Date/Time: 2009-4-15 8:35:12

Electronics: DAE4 Sn771

Medium: Head 1900 MHz

Medium parameters used: f = 1880 MHz; σ = 1.41 mho/m; ε_r = 39.2; ρ = 1000 kg/m^3

Ambient Temperature:23.3^{o}C   Liqiud Temperature: 22.5^{o}C

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

Probe: ES3DV3 - SN3149 ConvF(5.03, 5.03, 5.03)

`Cheek Middle/Area Scan (51x121x1):` Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 1.04 mW/g

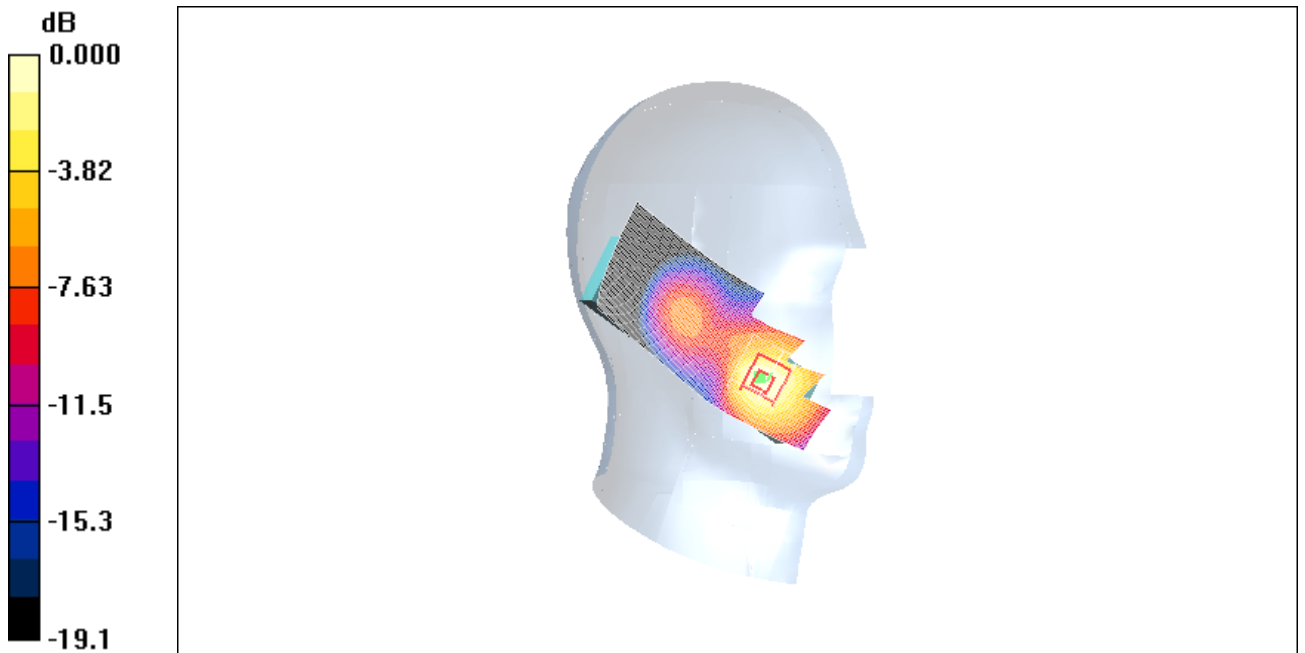`Cheek Middle/Zoom Scan (7x7x7)/Cube 0:` Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 4.99 V/m; Power Drift = 0.024 dB

Peak SAR (extrapolated) = 1.61 W/kg

SAR(1 g) = 0.939 mW/g; SAR(10 g) = 0.528 mW/g

Maximum value of SAR (measured) = 1.02 mW/g

0 dB = 1.02mW/g

Fig. 21 1900 MHz CH661

1900 Left Cheek Low

Date/Time: 2009-4-15 8:49:34

Electronics: DAE4 Sn771

Medium: 1900 Head

Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.38 mho/m; ε_r = 39.3; ρ = 1000 kg/m^3

Ambient Temperature:23.3^{o}C   Liqiud Temperature: 22.5^{o}C

Communication System: GSM 1900MHz Frequency: 1850.2 MHz Duty Cycle: 1:8.3

Probe: ES3DV3 - SN3149 ConvF(5.03, 5.03, 5.03)

`Cheek Low/Area Scan (51x121x1):` Measurement grid: dx=10mm, dy=10mm
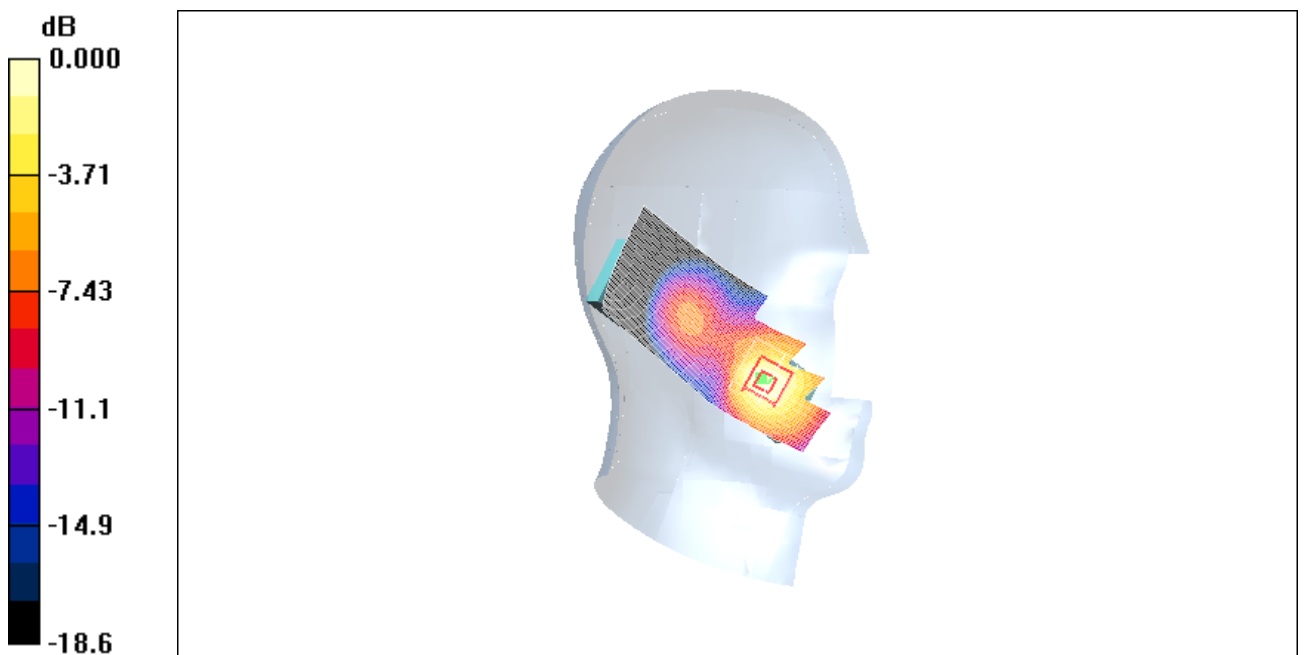Maximum value of SAR (interpolated) = 0.992 mW/g

`Cheek Low/Zoom Scan (7x7x7)/Cube 0:` Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.99 V/m; Power Drift = 0.016 dB
Peak SAR (extrapolated) = 1.51 W/kg
SAR(1 g) = 0.904 mW/g; SAR(10 g) = 0.515 mW/g
Maximum value of SAR (measured) = 0.979 mW/g

0 dB = 0.979mW/g

Fig. 22 1900 MHz CH512

1900 Left Tilt High

Date/Time: 2009-4-15 9:03:41

Electronics: DAE4 Sn771

Medium: 1900 Head

Medium parameters used: f = 1910 MHz; σ = 1.43 mho/m; $ε_r$ = 39.1; ρ = 1000 kg/m^3

Ambient Temperature:23.3^{o}C   Liqiud Temperature: 22.5^{o}C

Communication System: GSM 1900MHz Frequency: 1909.8 MHz Duty Cycle: 1:8.3

Probe: ES3DV3 - SN3149 ConvF(5.03, 5.03, 5.03)

`Tilt High/Area Scan (51x121x1):` Measurement grid: dx=10mm, dy=10mm
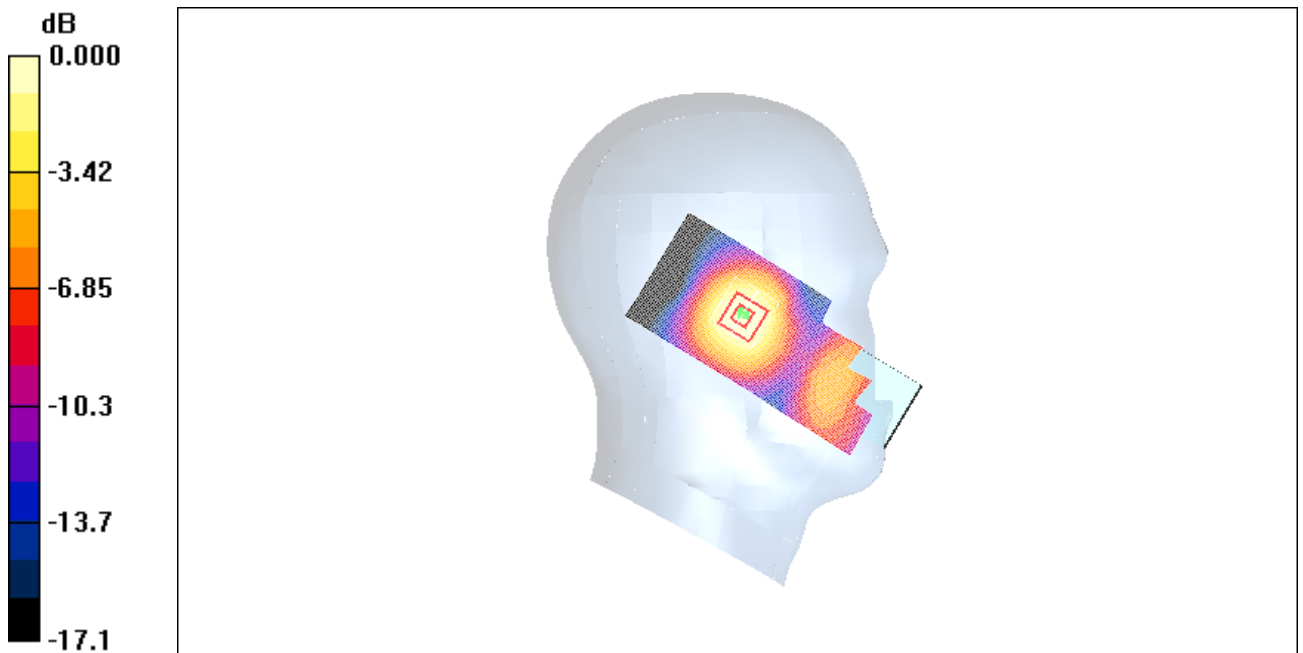
Maximum value of SAR (interpolated) = 0.330 mW/g

`Tilt High/Zoom Scan (7x7x7)/Cube 0:` Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 8.23 V/m; Power Drift = −0.179 dB

Peak SAR (extrapolated) = 0.420 W/kg

SAR(1 g) = 0.277 mW/g; SAR(10 g) = 0.168 mW/g

Maximum value of SAR (measured) = 0.300 mW/g

0 dB = 0.300mW/g

Fig.23 1900 MHz CH810

1900 Left Tilt Middle

Date/Time: 2009-4-15 9:17:28

Electronics: DAE4 Sn771

Medium: 1900 Head

Medium parameters used: f = 1880 MHz; σ = 1.41 mho/m; ε_r = 39.2; ρ = 1000 kg/m^3

Ambient Temperature:23.3^{o}C   Liqiud Temperature: 22.5^{o}C

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

Probe: ES3DV3 - SN3149 ConvF(5.03, 5.03, 5.03)

`Tilt Middle/Area Scan (51x121x1):` Measurement grid: dx=10mm, dy=10mm
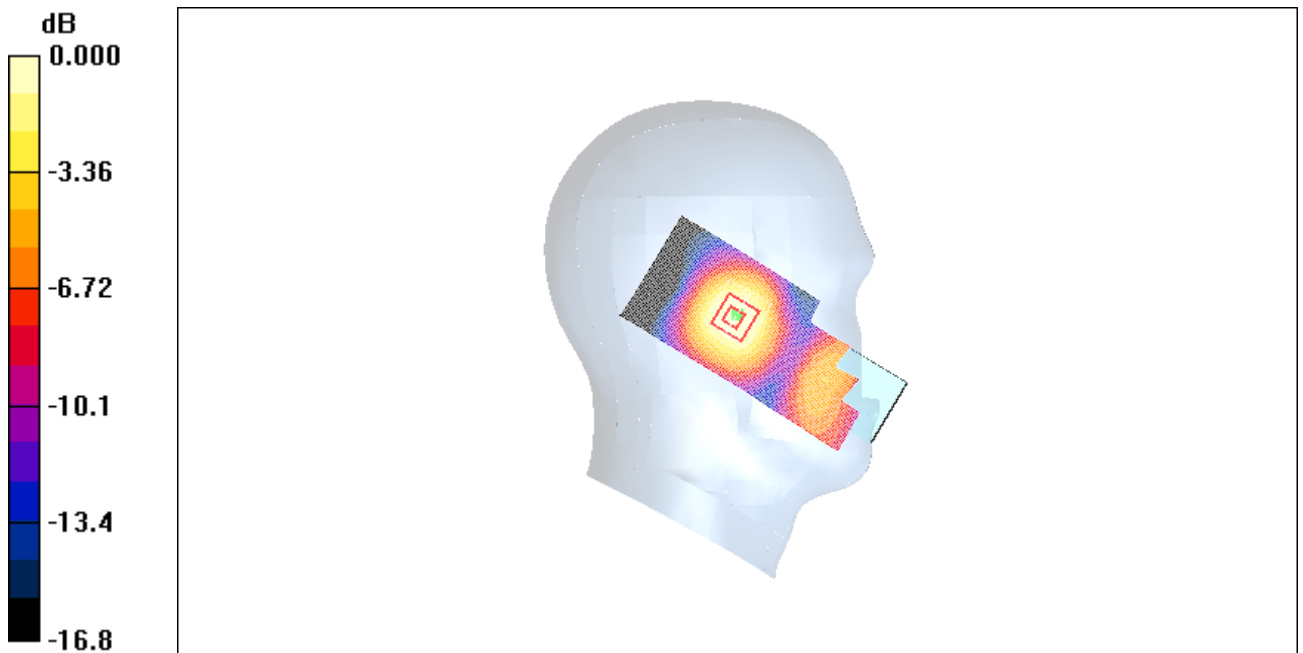
Maximum value of SAR (interpolated) = 0.301 mW/g

`Tilt Middle/Zoom Scan (7x7x7)/Cube 0:` Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 7.90 V/m; Power Drift = −0.129 dB

Peak SAR (extrapolated) = 0.385 W/kg

SAR(1 g) = 0.256 mW/g; SAR(10 g) = 0.156 mW/g

Maximum value of SAR (measured) = 0.275 mW/g

0 dB = 0.275mW/g

Fig. 24 1900 MHz CH661

1900 Left Tilt Low

Date/Time: 2009-4-15 9:31:36

Electronics: DAE4 Sn771

Medium: 1900 Head

Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.38 mho/m; ε_r = 39.3; ρ = 1000 kg/m^3

Ambient Temperature:23.3^{o}C   Liqiud Temperature: 22.5^{o}C

Communication System: GSM 1900MHz Frequency: 1850.2 MHz Duty Cycle: 1:8.3

Probe: ES3DV3 - SN3149 ConvF(5.03, 5.03, 5.03)

`Tilt Low/Area Scan (51x121x1):` Measurement grid: dx=10mm, dy=10mm
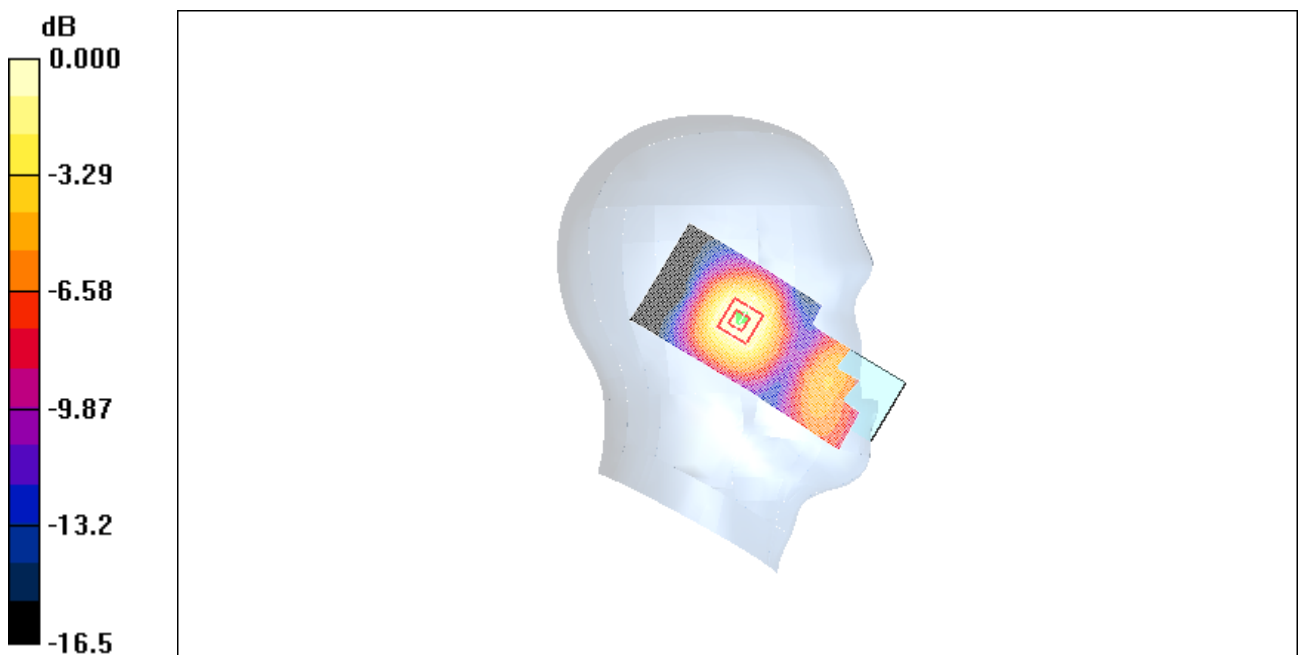
Maximum value of SAR (interpolated) = 0.293 mW/g

`Tilt Low/Zoom Scan (7x7x7)/Cube 0:` Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 7.95 V/m; Power Drift = 0.018 dB

Peak SAR (extrapolated) = 0.372 W/kg

SAR(1 g) = 0.251 mW/g; SAR(10 g) = 0.154 mW/g

Maximum value of SAR (measured) = 0.271 mW/g

0 dB = 0.271mW/g

Fig. 25 1900 MHz CH512

1900 Right Cheek High

Date/Time: 2009-4-15 9:46:03

Electronics: DAE4 Sn771

Medium: 1900 Head

Medium parameters used: f = 1910 MHz; σ = 1.43 mho/m; ε_r = 39.1; ρ = 1000 kg/m^3

Ambient Temperature:23.3^{o}C   Liqiud Temperature: 22.5^{o}C

Communication System: GSM 1900MHz Frequency: 1909.8 MHz Duty Cycle: 1:8.3

Probe: ES3DV3 - SN3149 ConvF(5.03, 5.03, 5.03)

`Cheek High/Area Scan (51x121x1):` Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.767 mW/g

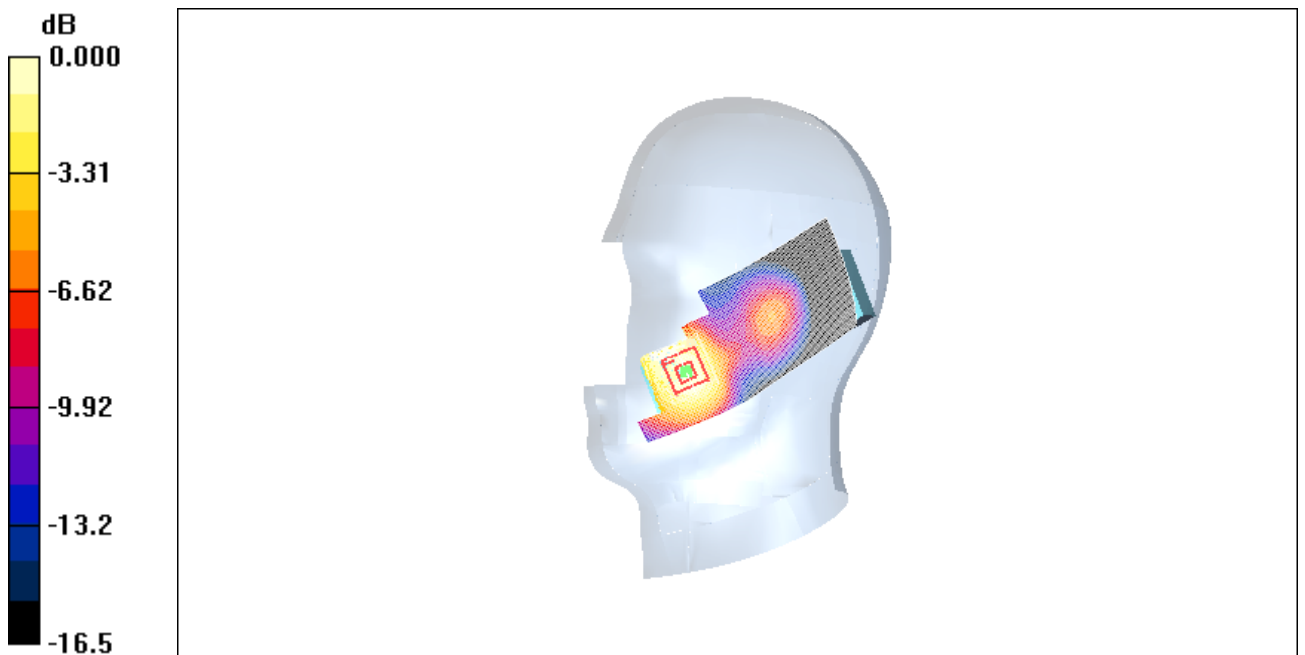`Cheek High/Zoom Scan (7x7x7)/Cube 0:` Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 4.58 V/m; Power Drift = -0.127 dB

Peak SAR (extrapolated) = 1.05 W/kg

SAR(1 g) = 0.720 mW/g; SAR(10 g) = 0.444 mW/g

Maximum value of SAR (measured) = 0.788 mW/g

0 dB = 0.788mW/g

Fig. 26 1900 MHz CH810

1900 Right Cheek Middle

Date/Time: 2009-4-15 10:00:43

Electronics: DAE4 Sn771

Medium: 1900 Head

Medium parameters used: f = 1880 MHz; σ = 1.41 mho/m; ε_r = 39.2; ρ = 1000 kg/m^3

Ambient Temperature:23.3^{o}C   Liqiud Temperature: 22.5^{o}C

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

Probe: ES3DV3 - SN3149 ConvF(5.03, 5.03, 5.03)

`Cheek Middle/Area Scan (51x121x1):` Measurement grid: dx=10mm, dy=10mm
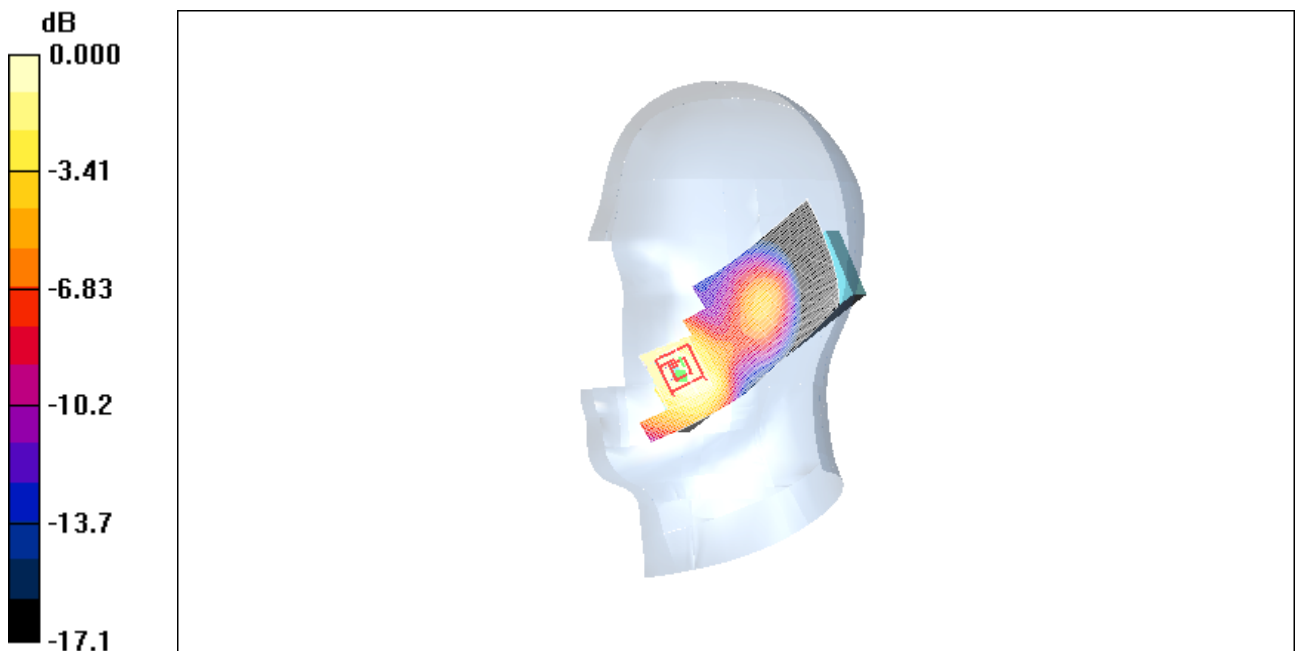
Maximum value of SAR (interpolated) = 0.760 mW/g

`Cheek Middle/Zoom Scan (7x7x7)/Cube 0:` Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 4.51 V/m; Power Drift = −0.031 dB

Peak SAR (extrapolated) = 1.02 W/kg

SAR(1 g) = 0.708 mW/g; SAR(10 g) = 0.431 mW/g

Maximum value of SAR (measured) = 0.775 mW/g

0 dB = 0.775mW/g

Fig. 27 1900 MHz CH661

1900 Right Cheek Low

Date/Time: 2009-4-15 10:14:30

Electronics: DAE4 Sn771

Medium: 1900 Head

Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.38 mho/m; ε_r = 39.3; ρ = 1000 kg/m^3

Ambient Temperature:23.3^{o}C   Liqiud Temperature: 22.5^{o}C

Communication System: GSM 1900MHz Frequency: 1850.2 MHz Duty Cycle: 1:8.3

Probe: ES3DV3 - SN3149 ConvF(5.03, 5.03, 5.03)

`Cheek Low/Area Scan (51x121x1):` Measurement grid: dx=10mm, dy=10mm

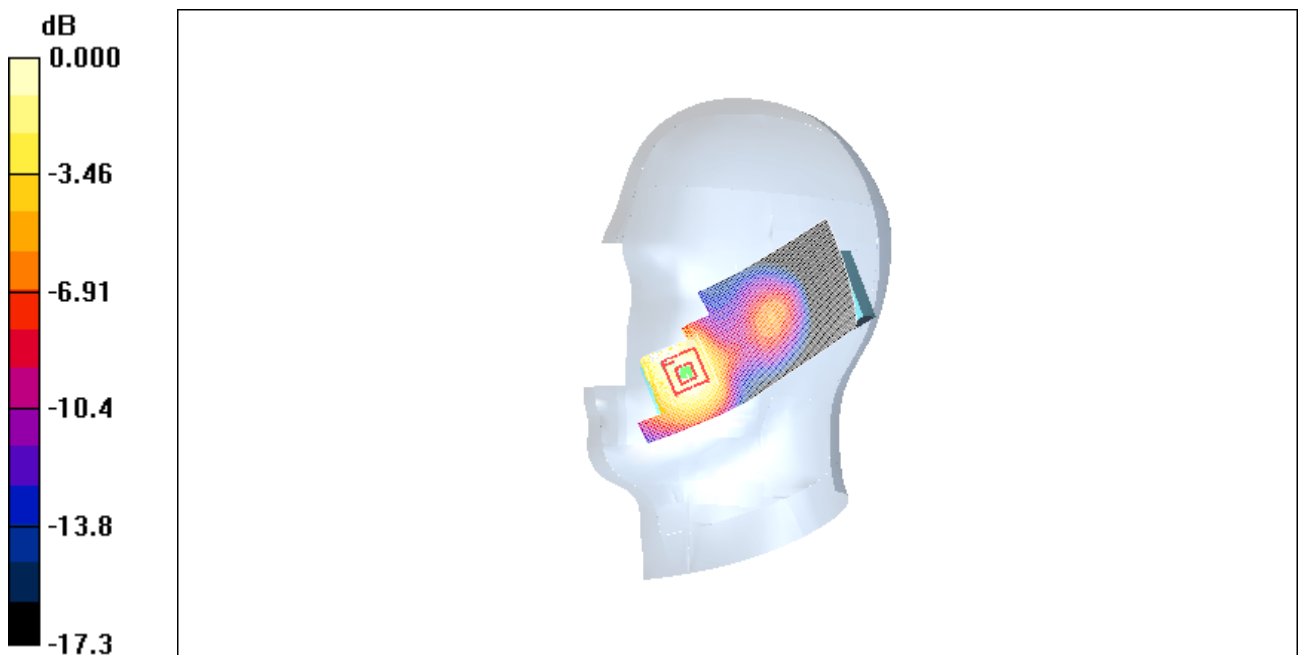Maximum value of SAR (interpolated) = 0.748 mW/g

`Cheek Low/Zoom Scan (7x7x7)/Cube 0:` Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 4.47 V/m; Power Drift = 0.101 dB

Peak SAR (extrapolated) = 1.00 W/kg

SAR(1 g) = 0.699 mW/g; SAR(10 g) = 0.421 mW/g

Maximum value of SAR (measured) = 0.766 mW/g

0 dB = 0.766mW/g

Fig. 28 1900 MHz CH512

1900 Right Tilt High

Date/Time: 2009-4-15 10:28:29

Electronics: DAE4 Sn771

Medium: 1900 Head

Medium parameters used: f = 1910 MHz; σ = 1.43 mho/m; ε_r = 39.1; ρ = 1000 kg/m^3

Ambient Temperature:23.3^{o}C   Liqiud Temperature: 22.5^{o}C

Communication System: GSM 1900MHz Frequency: 1909.8 MHz Duty Cycle: 1:8.3

Probe: ES3DV3 - SN3149 ConvF(5.03, 5.03, 5.03)

`Tilt High/Area Scan (51x121x1):` Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.309 mW/g

`Tilt High/Zoom Scan (7x7x7)/Cube 0:` Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 7.82 V/m; Power Drift = −0.083 dB

Peak SAR (extrapolated) = 0.414 W/kg

SAR(1 g) = 0.269 mW/g; SAR(10 g) = 0.160 mW/g

Maximum value of SAR (measured) = 0.294 mW/g

0 dB = 0.294mW/g

Fig. 29 1900 MHz CH810

1900 Right Tilt Middle

Date/Time: 2009-4-15 10:42:15

Electronics: DAE4 Sn771

Medium: 1900 Head

Medium parameters used: f = 1880 MHz; σ = 1.41 mho/m; ε_r = 39.2; ρ = 1000 kg/m^3

Ambient Temperature:23.3^{o}C   Liqiud Temperature: 22.5^{o}C

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

Probe: ES3DV3 - SN3149 ConvF(5.03, 5.03, 5.03)

Tilt Middle/Area Scan (51x121x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.303 mW/g

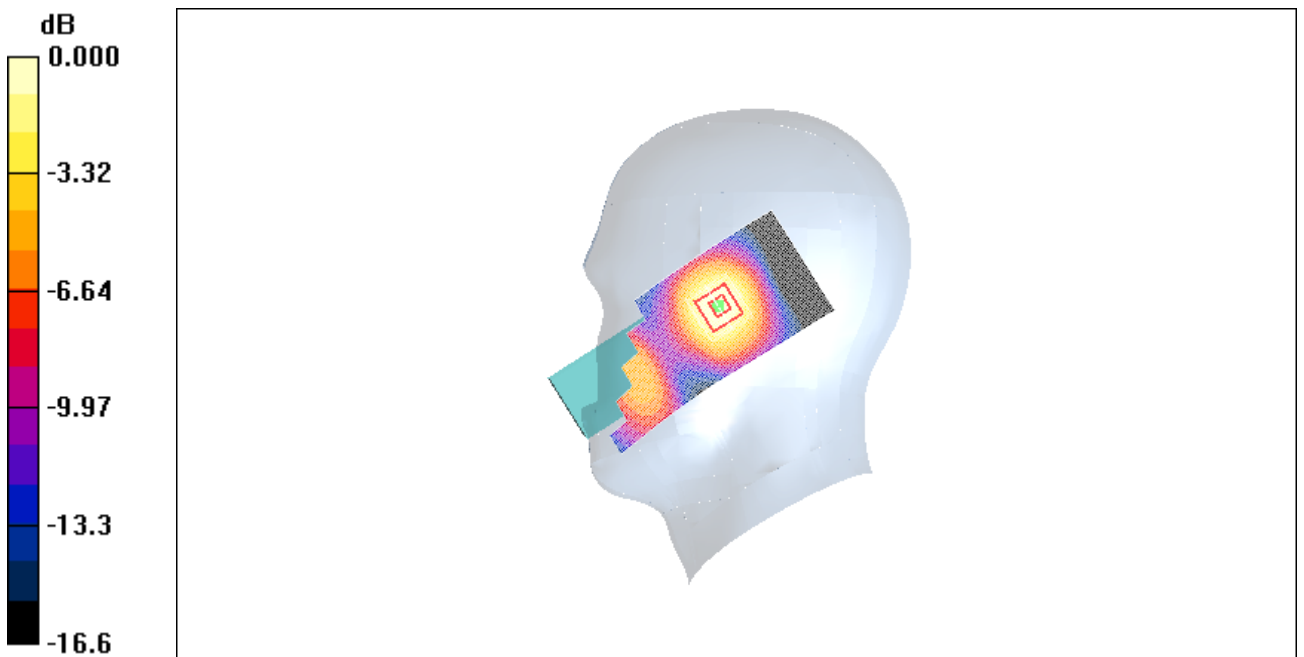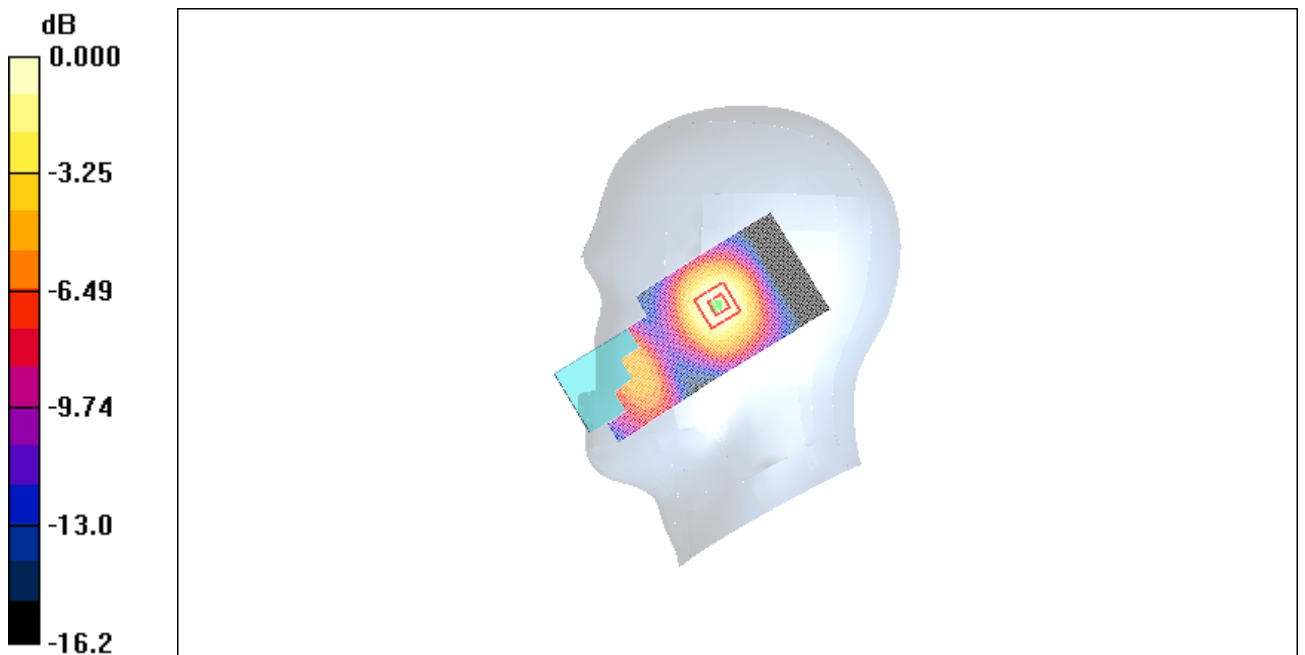Tilt Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 7.73 V/m; Power Drift = 0.032 dB

Peak SAR (extrapolated) = 0.406 W/kg

SAR(1 g) = 0.267 mW/g; SAR(10 g) = 0.161 mW/g

Maximum value of SAR (measured) = 0.291 mW/g

0 dB = 0.291mW/g

Fig.30 1900 MHz CH661

1900 Right Tilt Low

Date/Time: 2009-4-15 10:56:20

Electronics: DAE4 Sn771

Medium: 1900 Head

Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.38 mho/m; $ε_r$ = 39.3; ρ = 1000 kg/m^3

Ambient Temperature:23.3^{o}C   Liqiud Temperature: 22.5^{o}C

Communication System: GSM 1900MHz Frequency: 1850.2 MHz Duty Cycle: 1:8.3

Probe: ES3DV3 - SN3149 ConvF(5.03, 5.03, 5.03)

`Tilt Low/Area Scan (51x121x1):` Measurement grid: dx=10mm, dy=10mm
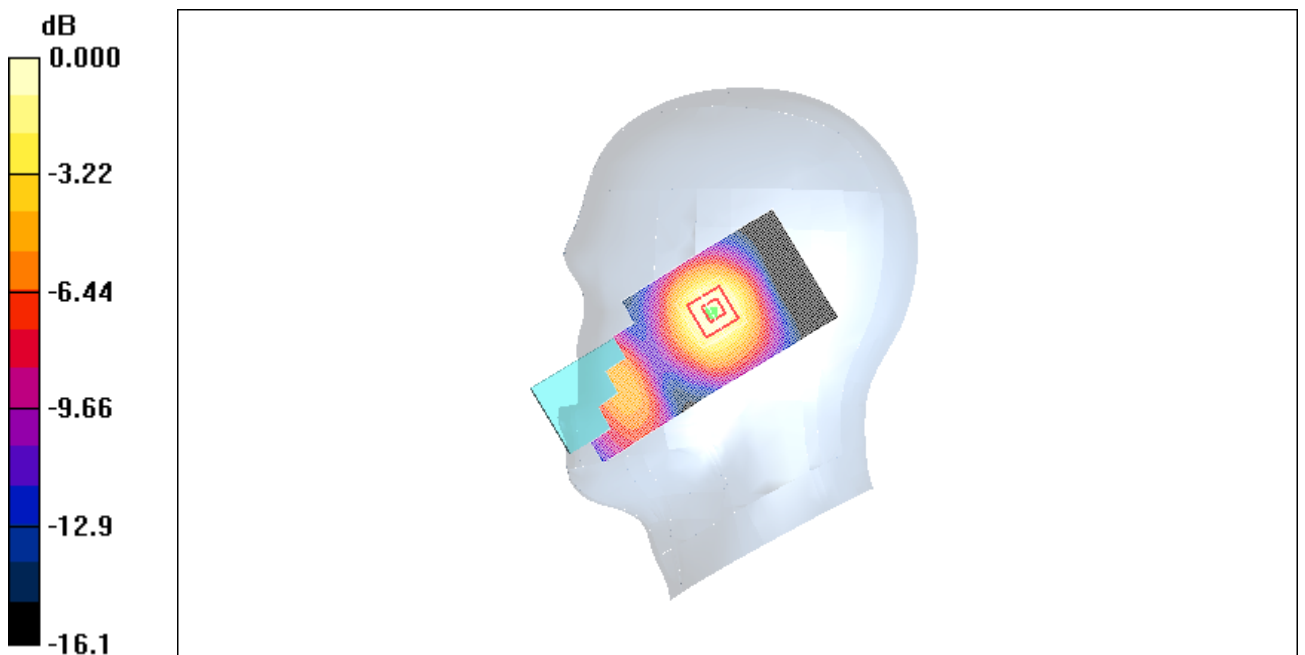
Maximum value of SAR (interpolated) = 0.301 mW/g

`Tilt Low/Zoom Scan (7x7x7)/Cube 0:` Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 7.49 V/m; Power Drift = 0.136 dB

Peak SAR (extrapolated) = 0.407 W/kg

SAR(1 g) = 0.268 mW/g; SAR(10 g) = 0.162 mW/g

Maximum value of SAR (measured) = 0.292 mW/g

0 dB = 0.292mW/g

Fig.31 1900 MHz CH512

1900 Body Towards Ground High With GPRS

Date/Time: 2009-4-15 11:13:58

Electronics: DAE4 Sn771

Medium: Body 1900 MHz

Medium parameters used: f = 1910 MHz; σ = 1.57 mho/m; ε_r = 52.3; ρ = 1000 kg/m^3

Ambient Temperature:23.3^{o}C   Liqiud Temperature: 22.5^{o}C

Communication System: GSM 1900MHz GPRS Frequency: 1909.8 MHz Duty Cycle: 1:4

Probe: ES3DV3 - SN3149 ConvF(4.68, 4.68, 4.68)

`Toward Ground High/Area Scan (61x131x1):` Measurement grid: dx=10mm, dy=10mm

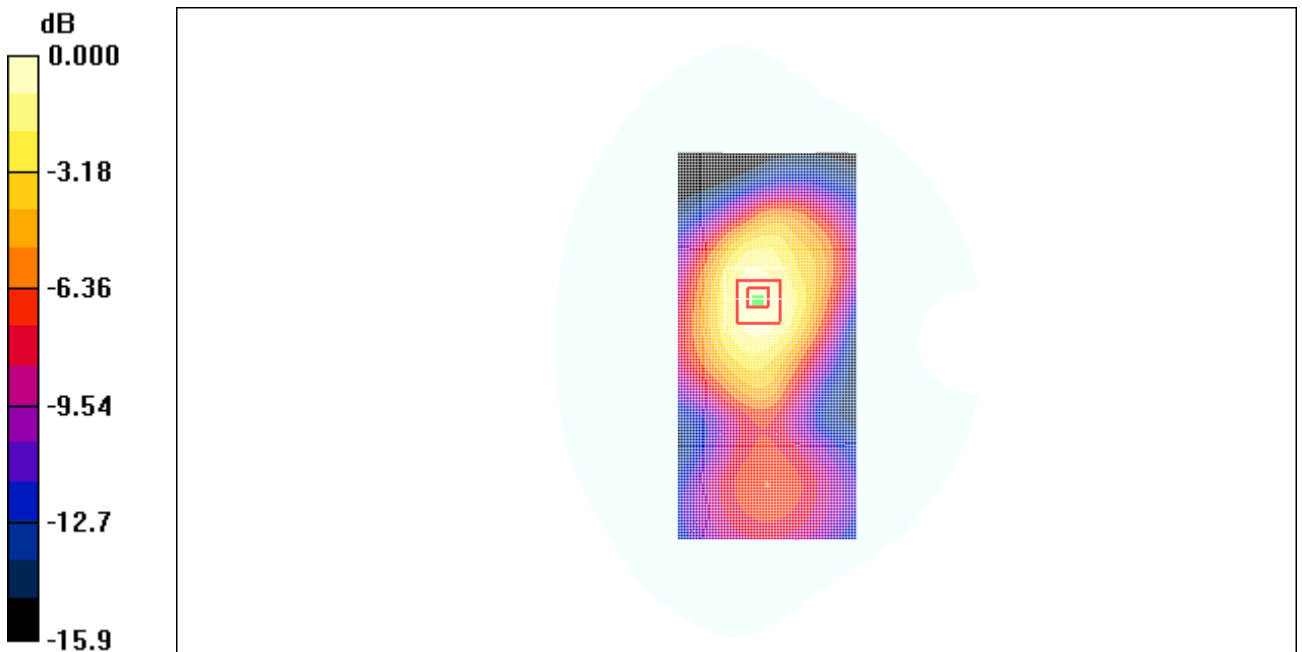Maximum value of SAR (interpolated) = 0.485 mW/g

`Toward Ground High/Zoom Scan (7x7x7)/Cube 0:` Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 15.1 V/m; Power Drift = −0.090 dB

Peak SAR (extrapolated) = 0.701 W/kg

SAR(1 g) = 0.451 mW/g; SAR(10 g) = 0.282 mW/g

Maximum value of SAR (measured) = 0.485 mW/g

0 dB = 0.485mW/g

Fig. 32 1900 MHz CH810

1900 Body Towards Ground Middle With GPRS

Date/Time: 2009-4-15 11:27:40

Electronics: DAE4 Sn771

Medium: Body 1900 MHz

Medium parameters used: f = 1880 MHz; σ = 1.54 mho/m; ε_r = 52.4; ρ = 1000 kg/m^3

Ambient Temperature:23.3^{o}C   Liqiud Temperature: 22.5^{o}C

Communication System: GSM 1900MHz GPRS Frequency: 1880 MHz Duty Cycle: 1:4

Probe: ES3DV3 - SN3149 ConvF(4.68, 4.68, 4.68)

`Toward Ground Middle/Area Scan (61x131x1):` Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.487 mW/g
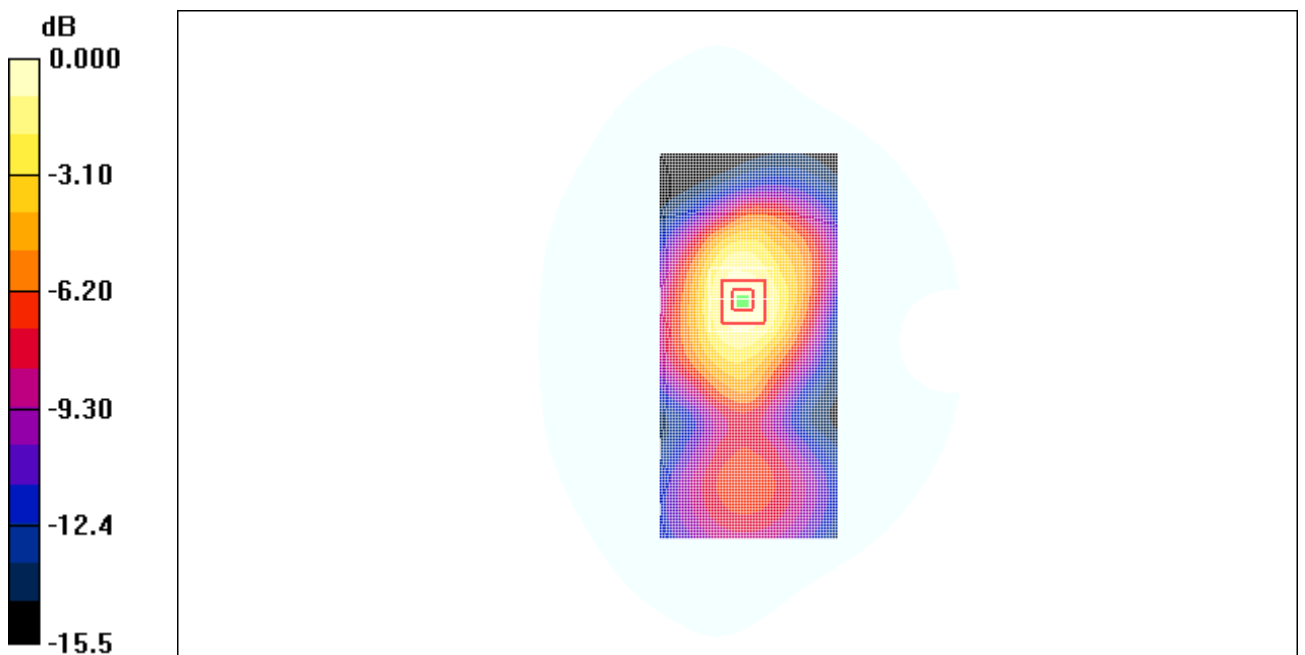

`Toward Ground Middle/Zoom Scan (7x7x7)/Cube 0:` Measurement grid: dx=5mm, dy=5mm,

dz=5mm

Reference Value = 14.8 V/m; Power Drift = 0.017 dB
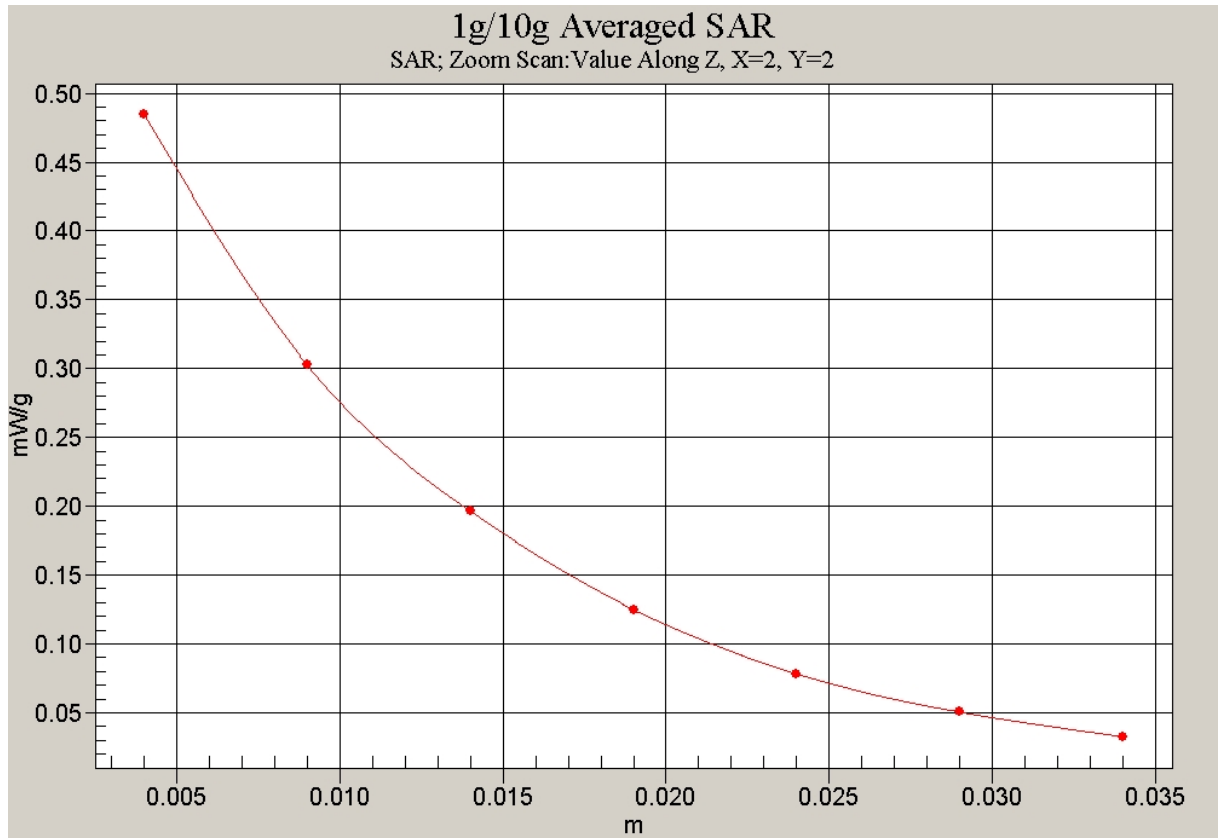
Peak SAR (extrapolated) = 0.702 W/kg

SAR(1 g) = 0.457 mW/g; SAR(10 g) = 0.287 mW/g

Maximum value of SAR (measured) = 0.491 mW/g

0 dB = 0.491mW/g

Fig. 33 1900 MHz CH661

Fig. 34 Z-Scan at power reference point (1900 MHz CH661)

1900 Body Towards Ground Low With GPRS

Date/Time: 2009-4-15 11:41:33

Electronics: DAE4 Sn771

Medium: Body 1900 MHz

Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.52 mho/m; ε_r = 52.4; ρ = 1000 kg/m^3

Ambient Temperature:23.3^{o}C   Liqiud Temperature: 22.5^{o}C

Communication System: GSM 1900MHz GPRS Frequency: 1850.2 MHz Duty Cycle: 1:4

Probe: ES3DV3 - SN3149 ConvF(4.68, 4.68, 4.68)

`Toward Ground Low/Area Scan (61x131x1):` Measurement grid: dx=10mm, dy=10mm

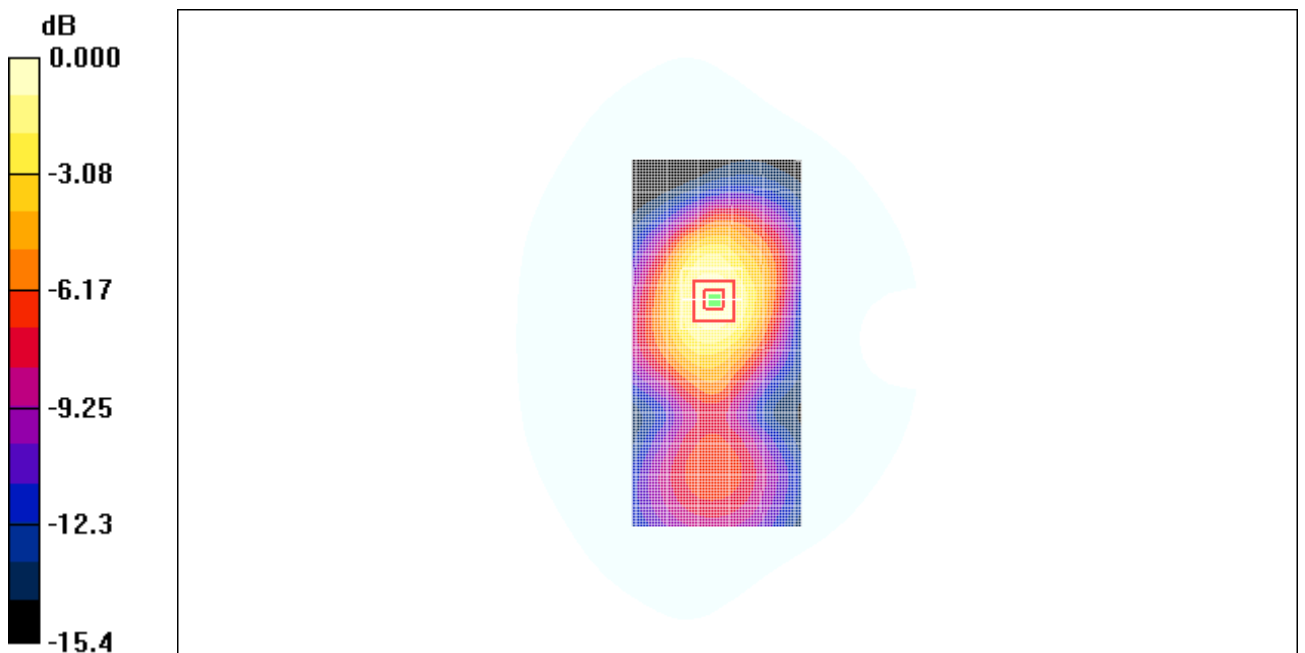Maximum value of SAR (interpolated) = 0.463 mW/g

`Toward Ground Low/Zoom Scan (7x7x7)/Cube 0:` Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 14.4 V/m; Power Drift = 0.043 dB

Peak SAR (extrapolated) = 0.657 W/kg

SAR(1 g) = 0.429 mW/g; SAR(10 g) = 0.271 mW/g

Maximum value of SAR (measured) = 0.463 mW/g

0 dB = 0.463mW/g

Fig. 35 1900 MHz CH512

1900 Body Towards Ground Middlw with Headset

Date/Time: 2009-4-15 12:01:19

Electronics: DAE4 Sn771

Medium: Body 1900 MHz

Medium parameters used: f = 1880 MHz; σ = 1.54 mho/m; ε_r = 52.4; ρ = 1000 kg/m^3

Ambient Temperature:23.3^{o}C   Liqiud Temperature: 22.5^{o}C

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

Probe: ES3DV3 - SN3149 ConvF(4.68, 4.68, 4.68)

`Toward Ground Middle/Area Scan (61x131x1):` Measurement grid: dx=10mm, dy=10mm

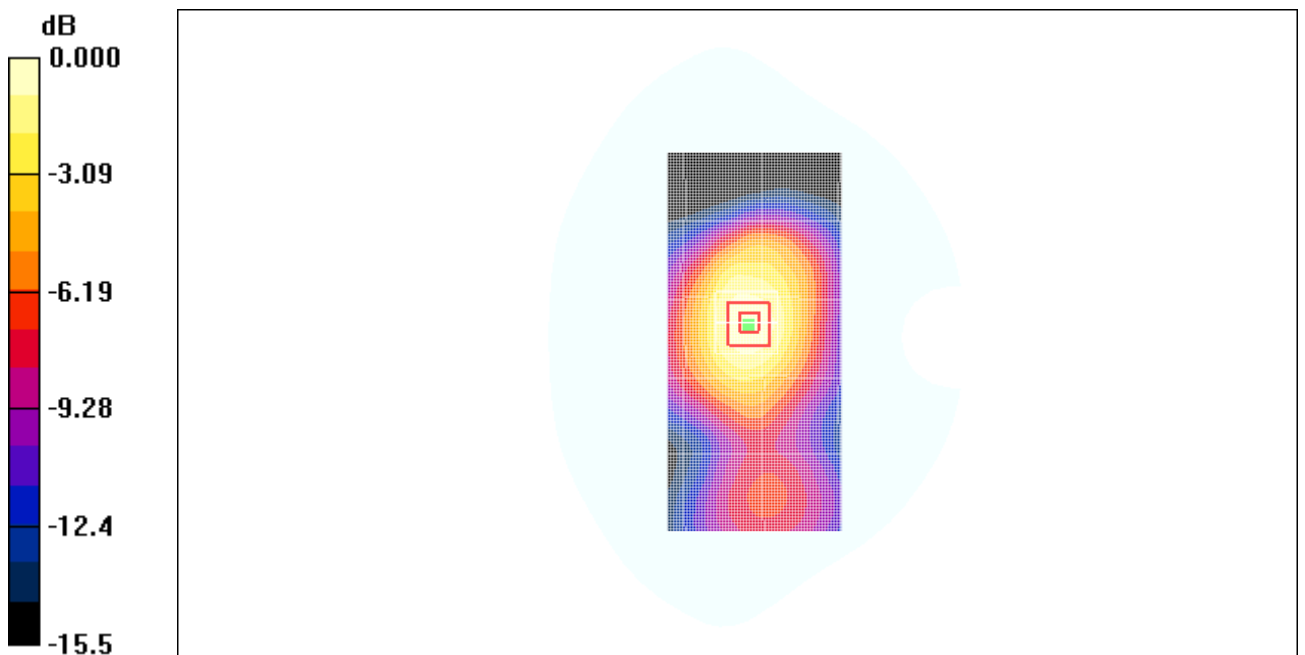Maximum value of SAR (interpolated) = 0.231 mW/g

`Toward Ground Middle/Zoom Scan (7x7x7)/Cube 0:` Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 12.0 V/m; Power Drift = 0.028 dB

Peak SAR (extrapolated) = 0.335 W/kg

SAR(1 g) = 0.219 mW/g; SAR(10 g) = 0.136 mW/g

Maximum value of SAR (measured) = 0.233 mW/g

0 dB = 0.233mW/g

Fig. 36 1900 MHz CH512

ANNEX D   SYSTEM VALIDATION RESULTS

835MHz

Date/Time: 2009-4-14 7:22:19
Electronics: DAE4 Sn771
Medium: Head 835
Medium parameters used: f = 835 MHz; σ = 0.90 mho/m; $ε_r$ = 40.4; ρ = 1000 kg/m^3
Ambient Temperature:23.3^{o}C   Liqiud Temperature: 22.5^{o}C
Communication System: CW Frequency: 835 MHz Duty Cycle: 1:1
Probe: ES3DV3 - SN3149 ConvF(6.56, 6.56, 6.56)

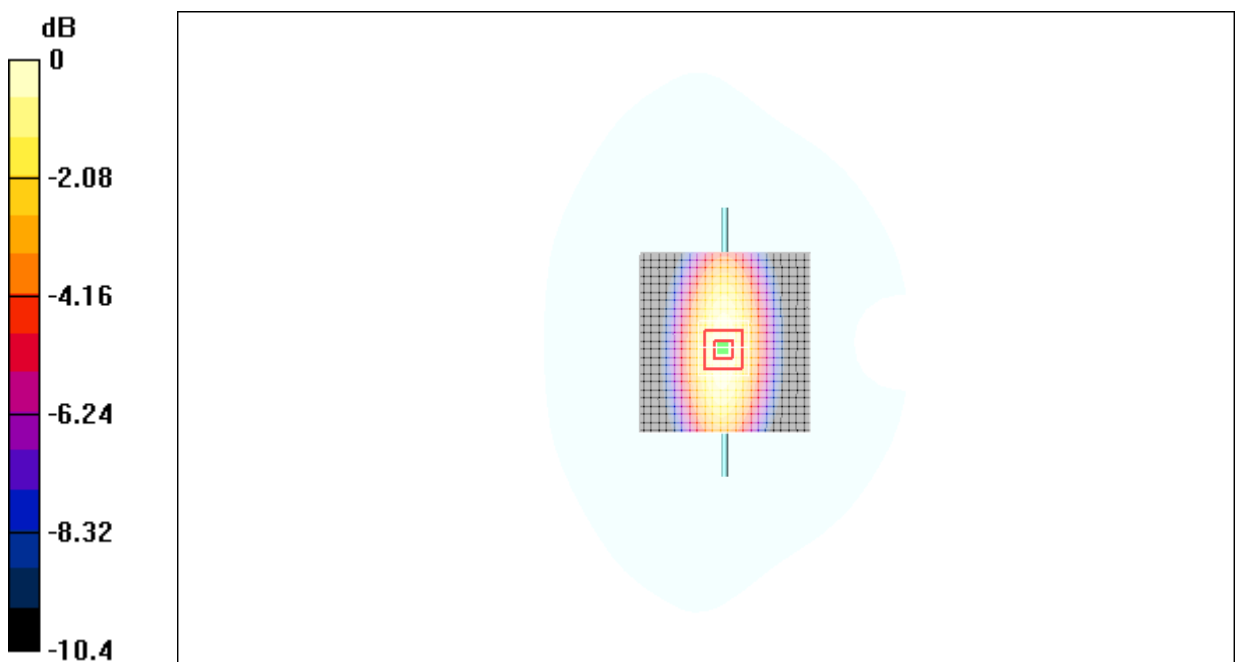**835MHz/Area Scan (101x101x1):** Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 2.68 mW/g

835MHz/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.8 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 3.67 W/kg
SAR(1 g) = 2.50 mW/g; SAR(10 g) = 1.62 mW/g
Maximum value of SAR (measured) = 2.69 mW/g

0 dB = 2.69mW/g

Fig.37 validation 835MHz 250mW

1900MHz

Date/Time: 2009-4-15 7:30:24
Electronics: DAE4 Sn771
Medium: 1900 Head
Medium parameters used: f = 1900 MHz; σ = 1.42 mho/m; ε_r = 39.2; ρ = 1000 kg/m^3
Ambient Temperature:23.3^{o}C   Liqiud Temperature: 22.5^{o}C
Communication System: CW Frequency: 1900 MHz Duty Cycle: 1:1
Probe: ES3DV3 - SN3149 ConvF(5.03, 5.03, 5.03)

System Validation/Area Scan (101x101x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 11.2 mW/g

System Validation/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 92.1 V/m; Power Drift = 0.1 dB
Peak SAR (extrapolated) = 16.9 W/kg
SAR(1 g) = 9.91 mW/g; SAR(10 g) = 5.27 mW/g
Maximum value of SAR (measured) = 11.3 mW/g
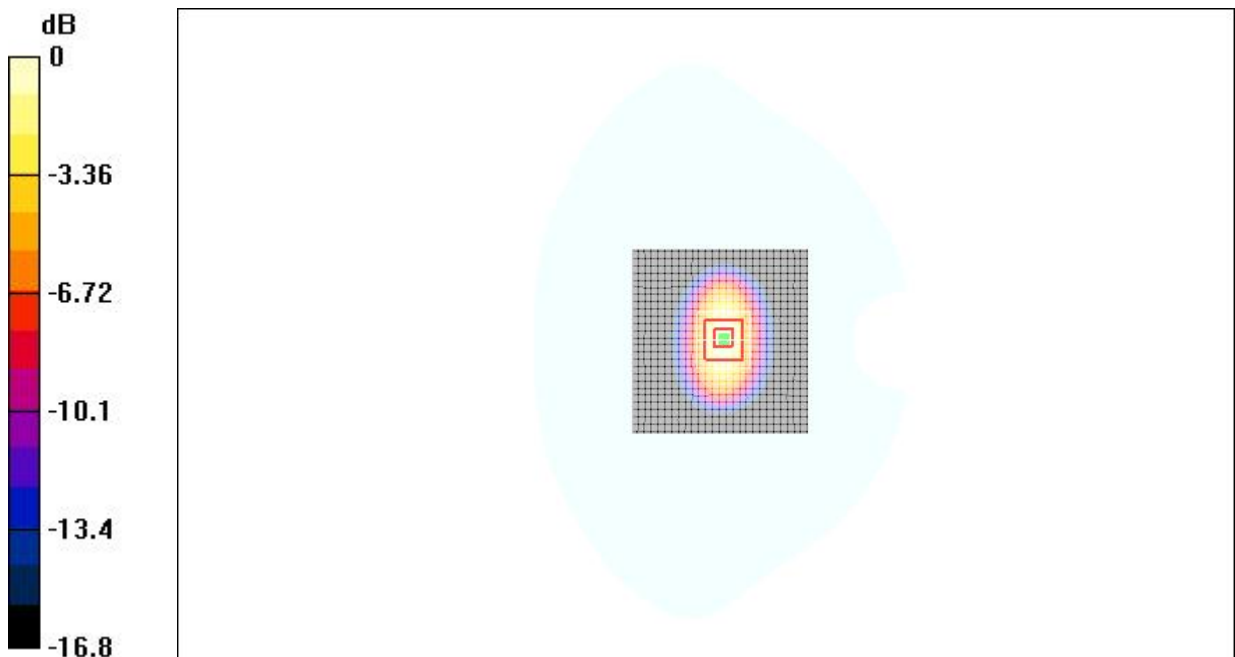
0 dB = 11.3mW/g

Fig.38 validation 1900MHz 250mW

ANNEX E   PROBE CALIBRATION CERTIFICATE

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

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
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 **TMC China**

Certificate No: ES3DV3-3149_Oct08

CALIBRATION CERTIFICATE

Object	**ES3DV3-SN: 3149**
Calibration procedure(s)	**QA CAL-01.v6** **Calibration procedure for dosimetric E-field probes**
Calibration date:	**October 1, 2008**
Condition of the calibrated item	**In Tolerance**

This calibration certify 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 at an environment temperature $(22\pm3)^{\circ}$C and humidity<70%

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID#	Cal Data (Calibrated by, Certification NO.)	Scheduled Calibration
Power meter E4419B	GB41293874	6-May-08 (METAS, NO. 251-00388)	May-09
Power sensor E4412A	MY41495277	6-May-08 (METAS, NO. 251-00388)	May-09
Reference 3 dB Attenuator	SN:S5054 (3c)	11-Aug-08 (METAS, NO. 251-00403)	Aug-09
Reference 20 dB Attenuator	SN:S5086 (20b)	4-May-08 (METAS, NO. 251-00389)	May-09
Reference 30 dB Attenuator	SN:S5129 (30b)	11-Aug-08 (METAS, NO. 251-00404)	Aug-09
DAE4	SN:617	11-Jun-08 (SPEAG, NO.DAE4-907_Jun08)	Jun-09
Reference Probe ES3DV2	SN: 3013	13-Jan-08 (SPEAG, NO. ES3-3013_Jan08)	Jan-09

Secondary Standards	ID#	Check Data (in house)	Scheduled Calibration
RF generator HP8648C	US3642U01700	4-Aug-99(SPEAG, in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585	18-Oct-01(SPEAG, in house check Nov-07)	In house check: Nov-09

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

Issued: October 1, 2008

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

Certificate No: ES3DV3-3149_Oct08   Page 1 of 9

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

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accreditation No.: **SCS 108**

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., ϑ = 0 is normal to probe axis

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

Methods Applied and Interpretation of Parameters:
- *NORMx,y,z*: Assessed for E-field polarization $\vartheta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not effect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- *DCPx,y,z*: DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). DCP does not depend on frequency nor media.
- *ConvF and Boundary Effect Parameters*: Assessed in flat phantom using E-field (or Temperature Transfer Standard for $f \leq 800$ MHz) and inside waveguide using analytical field distributions based on power measurements for $f > 800$ MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to 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.

ES3DV3 SN: 3149

October 1, 2008

Probe ES3DV3

SN: 3149

Manufactured:	June 12, 2007
Calibrated:	October 1, 2008

Calibrated for DASY4 System

ES3DV3 SN: 3149

October 1, 2008

DASY – Parameters of Probe: ES3DV3 SN:3149

Sensitivity in Free Space[A]

Diode Compression[B]

NormX	1.14±10.1%	$\mu V/(V/m)^2$	DCP X	94mV
NormY	1.23±10.1%	$\mu V/(V/m)^2$	DCP Y	95mV
NormZ	1.29±10.1%	$\mu V/(V/m)^2$	DCP Z	91mV

Sensitivity in Tissue Simulating Liquid (Conversion Factors)
Please see Page 8

Boundary Effect

TSL   900MHz   Typical SAR gradient: 5% per mm

Sensor Center to Phantom Surface Distance		3.0 mm	4.0 mm
SARbe[%]	Without Correction Algorithm	3.8	1.6
SARbe[%]	With Correction Algorithm	0.8	0.7

TSL   1810MHz   Typical SAR gradient: 10% per mm

Sensor Center to Phantom Surface Distance		3.0 mm	4.0 mm
SARbe[%]	Without Correction Algorithm	6.8	3.6
SARbe[%]	With Correction Algorithm	0.4	0.2

Sensor Offset

Probe Tip to Sensor Center   2.0 mm

The reported uncertainty of measurement is stated as the standard uncertainty of
Measurement multiplied by the coverage factor k=2,which for a normal distributio
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 Page 8).
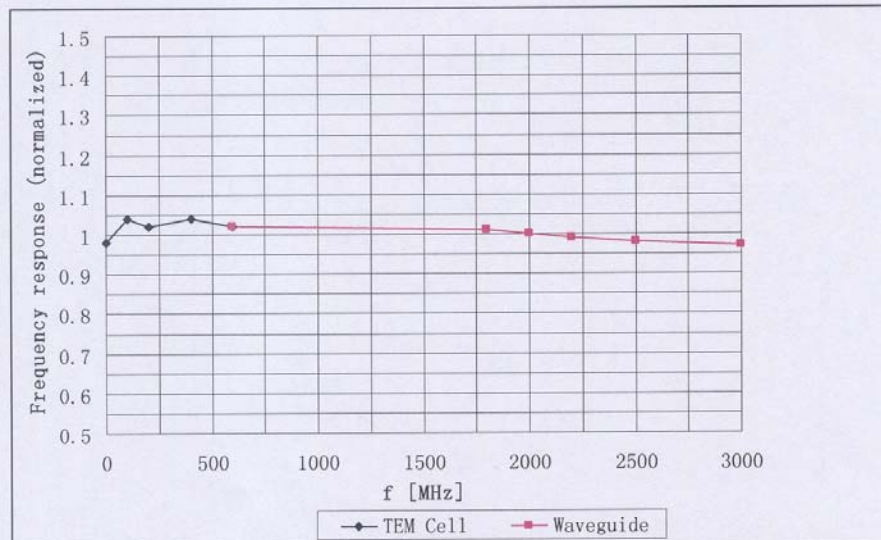[B] Numerical linearization parameter: uncertainty not required.

ES3DV3 SN: 3149
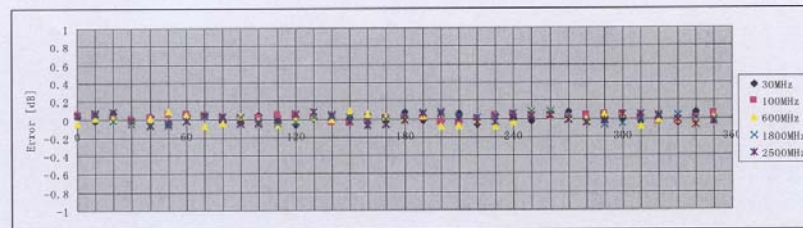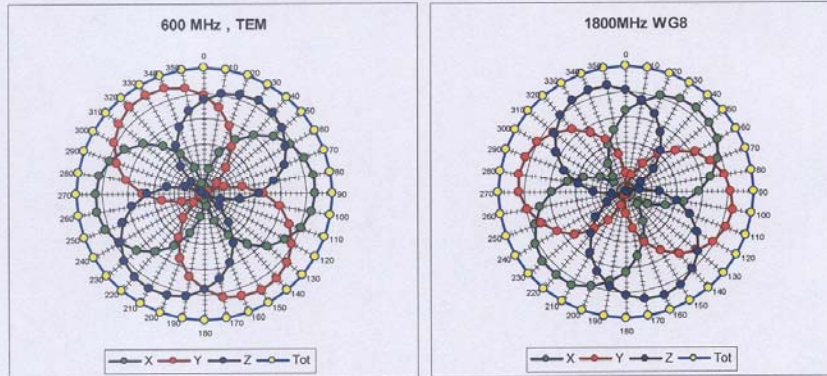
October 1, 2008

Frequency Response of E-Field

Uncertainty of Frequency Response of E-field: ±5.0% (k=2)

ES3DV3 SN: 3149

October 1, 2008

Receiving Pattern (Φ), θ =0°

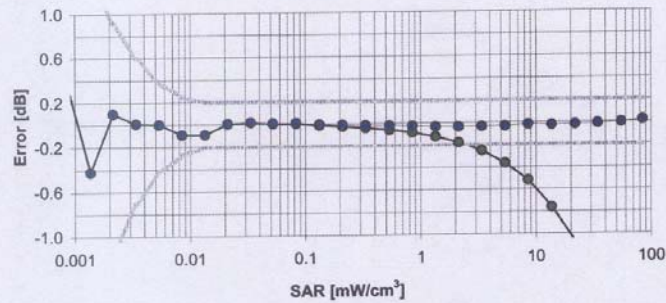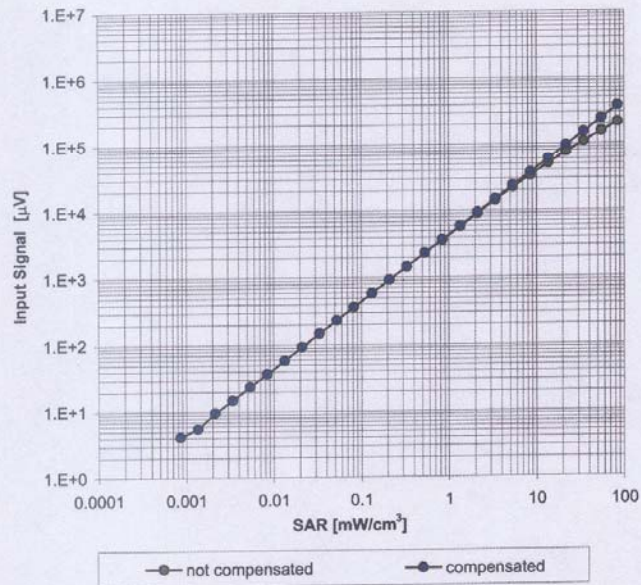600 MHz , TEM

1800MHz WG8

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

ES3DV3 SN: 3149   October 1, 2008

Dynamic Range f(SAR$_{head}$)
(Waveguide: WG8, f = 1800 MHz)

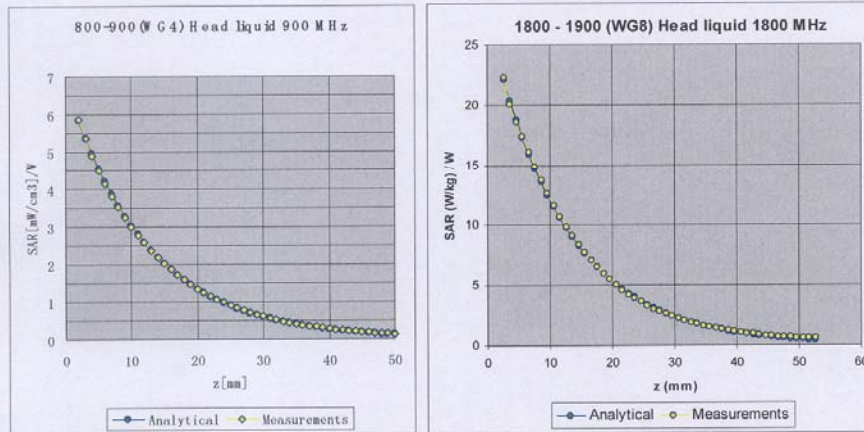**Uncertainty of Linearity Assessment:** $\pm 0.5\%$ (k=2)

ES3DV3 SN: 3149   October 1, 2008

Conversion Factor Assessment

| f[MHz]	Validity[MHz]^C	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF	Uncertainty
850	±50 /±100	Head	41.5±5%	0.90±5%	0.91	1.13	6.56	±11.0% (k=2)
900	±50 /±100	Head	41.5±5%	0.97±5%	0.83	1.26	6.34	±11.0% (k=2)
1800	±50 /±100	Head	40.0±5%	1.40±5%	0.69	1.47	5.18	±11.0% (k=2)
1900	±50 /±100	Head	40.0±5%	1.40±5%	0.72	1.38	5.03	±11.0% (k=2)
850	±50 /±100	Body	55.2±5%	0.97±5%	0.76	1.26	6.22	±11.0% (k=2)
900	±50 /±100	Body	55.0±5%	1.05±5%	0.99	1.06	6.02	±11.0% (k=2)
1800	±50 /±100	Body	53.3±5%	1.52±5%	0.75	1.34	4.97	±11.0% (k=2)
1900	±50 /±100	Body	53.3±5%	1.52±5%	0.62	1.33	4.68	±11.0% (k=2)

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

ES3DV3 SN: 3149   October 1, 2008

Deviation from Isotropy
Error (φ , θ), f = 900 MHz
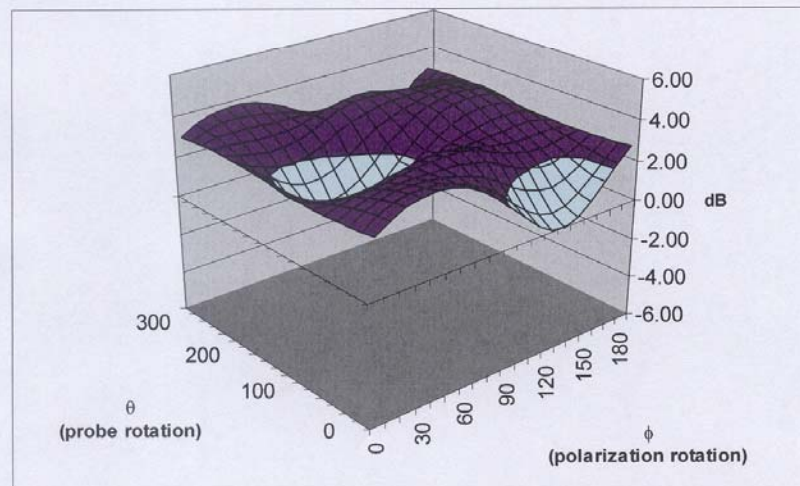
Uncertainty of Spherical Isotropy Assessment: ±2.5% (k=2)