

DASY5 Validation Report for Head TSL

Date: 13.06.2014

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 869

Communication System: UID 0 - CW; Frequency: 2450 MHz

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.84$ S/m; $\epsilon_r = 38.4$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.53, 4.53, 4.53); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.04.2014
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

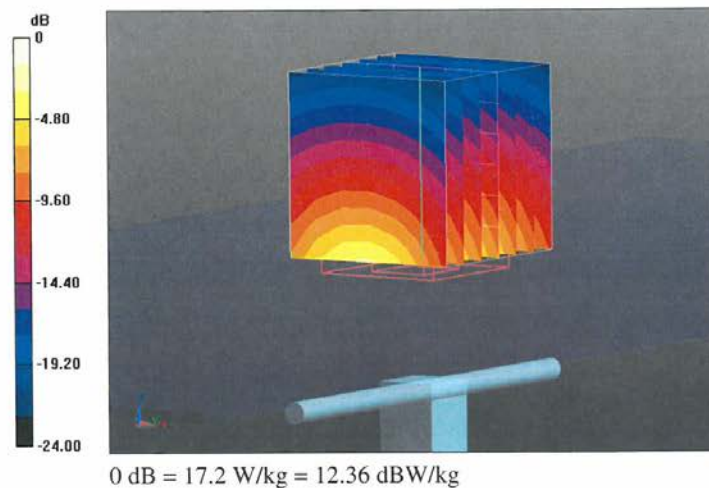
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 100.7 V/m; Power Drift = 0.03 dB

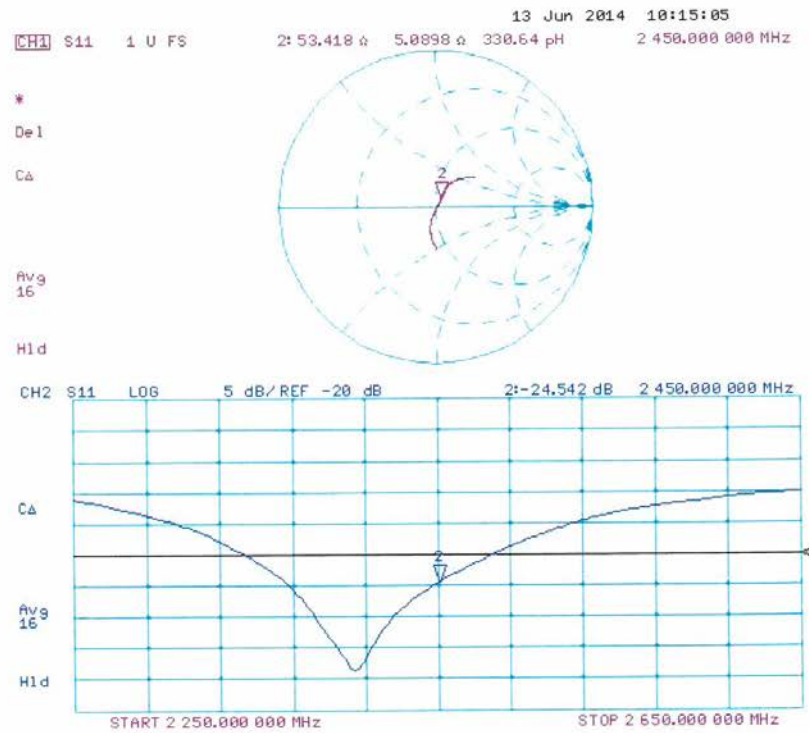
Peak SAR (extrapolated) = 27.6 W/kg

SAR(1 g) = 13.4 W/kg; SAR(10 g) = 6.25 W/kg

Maximum value of SAR (measured) = 17.2 W/kg



Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 13.06.2014

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 869

Communication System: UID 0 - CW; Frequency: 2450 MHz

Medium parameters used: $f = 2450$ MHz; $\sigma = 2.03$ S/m; $\epsilon_r = 51.1$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.35, 4.35, 4.35); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.04.2014
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

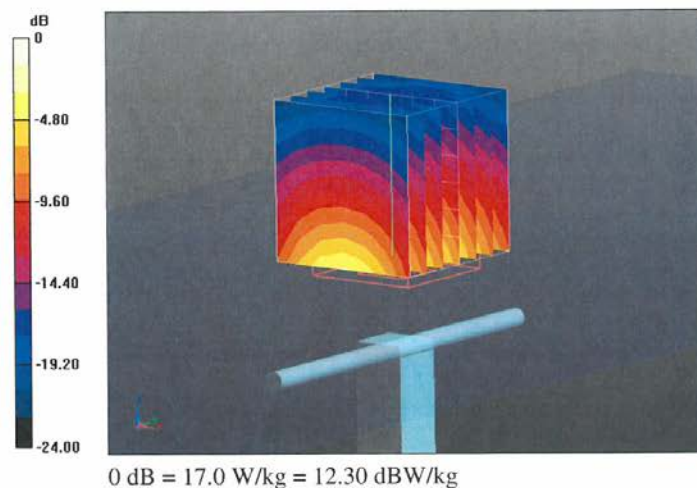
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 93.93 V/m; Power Drift = 0.04 dB

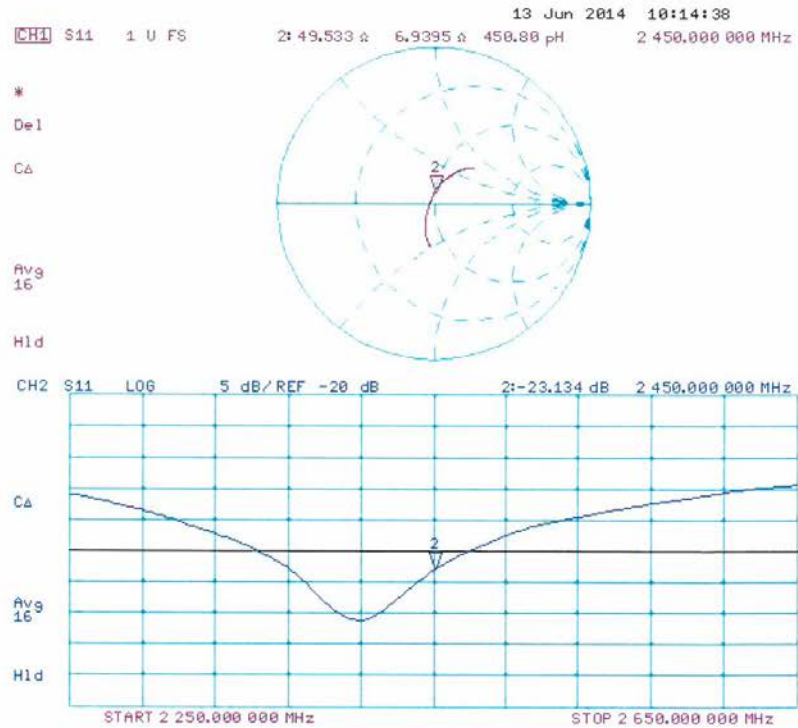
Peak SAR (extrapolated) = 26.7 W/kg

SAR(1 g) = 12.9 W/kg; SAR(10 g) = 6 W/kg

Maximum value of SAR (measured) = 17.0 W/kg



Impedance Measurement Plot for Body TSL



1900 MHz Dipole Calibration Certificate

**Calibration Laboratory of
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Zeughausstrasse 43, 8004 Zurich, Switzerland



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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client **CTTL (Auden)**

Certificate No: **D1900V2-5d101_Jul14**

CALIBRATION CERTIFICATE

Object **D1900V2 - SN: 5d101**

Calibration procedure(s) **QA CAL-05.v9
Calibration procedure for dipole validation kits above 700 MHz**


Calibration date: **July 23, 2014**

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	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	US37292783	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	MY41092317	09-Oct-13 (No. 217-01828)	Oct-14
Reference 20 dB Attenuator	SN: 5058 (20k)	03-Apr-14 (No. 217-01918)	Apr-15
Type-N mismatch combination	SN: 5047.2 / 06327	03-Apr-14 (No. 217-01921)	Apr-15
Reference Probe ES3DV3	SN: 3205	30-Dec-13 (No. ES3-3205_Dec13)	Dec-14
DAE4	SN: 601	30-Apr-14 (No. DAE4-601_Apr14)	Apr-15
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-13)	In house check: Oct-16
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-13)	In house check: Oct-14

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

Issued: July 23, 2014

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

Certificate No: D1900V2-5d101_Jul14

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Multilateral Agreement for the recognition of calibration certificates

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 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- 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
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

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	V52.8.8
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	39.5 \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	10.1 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	40.6 W/kg \pm 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.25 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	21.1 W/kg \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 %	1.51 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	10.1 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	40.4 W/kg \pm 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.35 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	21.4 W/kg \pm 16.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS108)**Antenna Parameters with Head TSL**

Impedance, transformed to feed point	$50.7 \Omega + 6.3 j\Omega$
Return Loss	- 24.1 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	$46.6 \Omega + 6.5 j\Omega$
Return Loss	- 22.4 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.203 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 28, 2008

DASY5 Validation Report for Head TSL

Date: 23.07.2014

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d101

Communication System: UID 0 - CW; Frequency: 1900 MHz

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.38$ S/m; $\epsilon_r = 39.5$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.06, 5.06, 5.06); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.04.2014
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

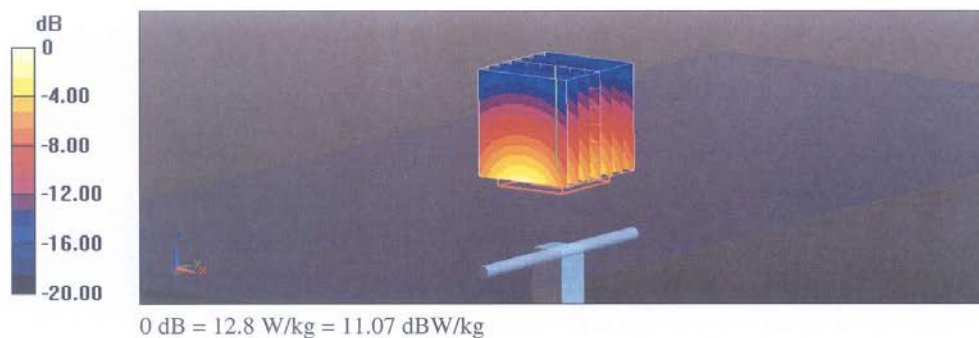
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 99.04 V/m; Power Drift = 0.01 dB

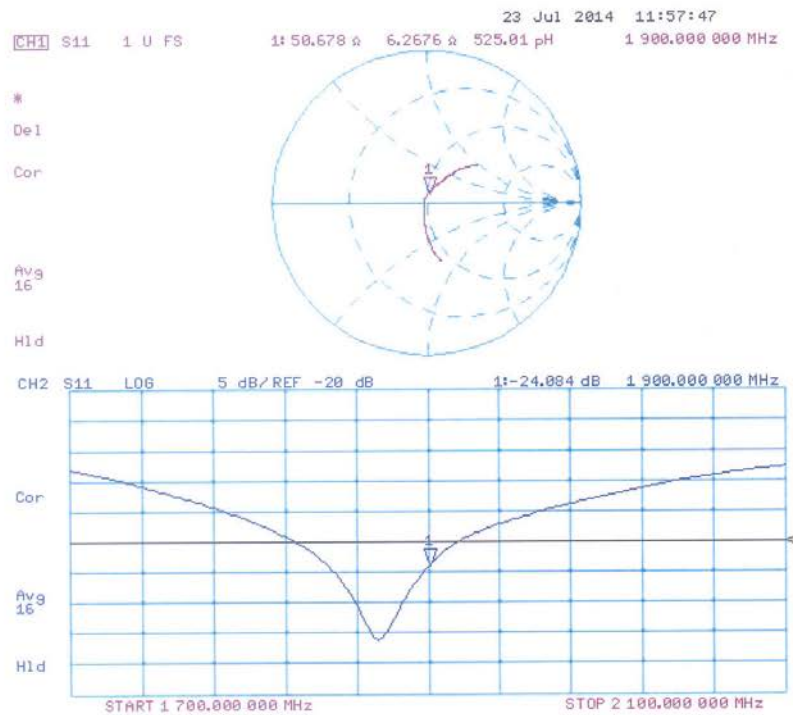
Peak SAR (extrapolated) = 18.5 W/kg

SAR(1 g) = 10.1 W/kg; SAR(10 g) = 5.25 W/kg

Maximum value of SAR (measured) = 12.8 W/kg



Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 23.07.2014

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d101

Communication System: UID 0 - CW; Frequency: 1900 MHz

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.51$ S/m; $\epsilon_r = 52.5$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.76, 4.76, 4.76); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.04.2014
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8(1222); SEMCAD X 14.6.10(7331)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

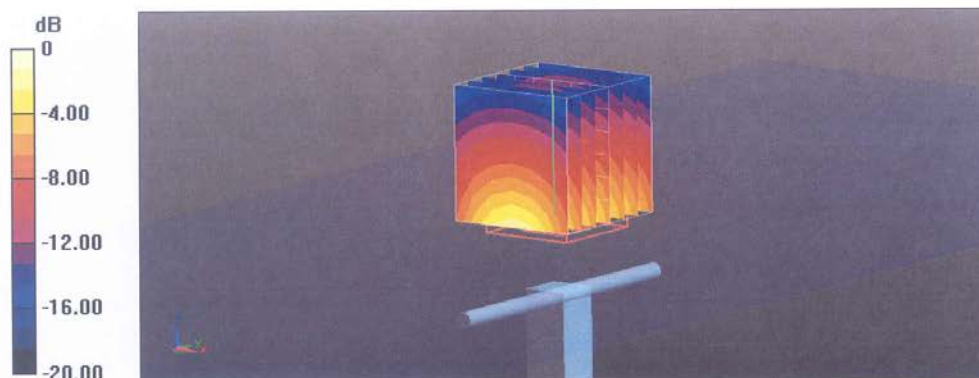
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 95.79 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 17.7 W/kg

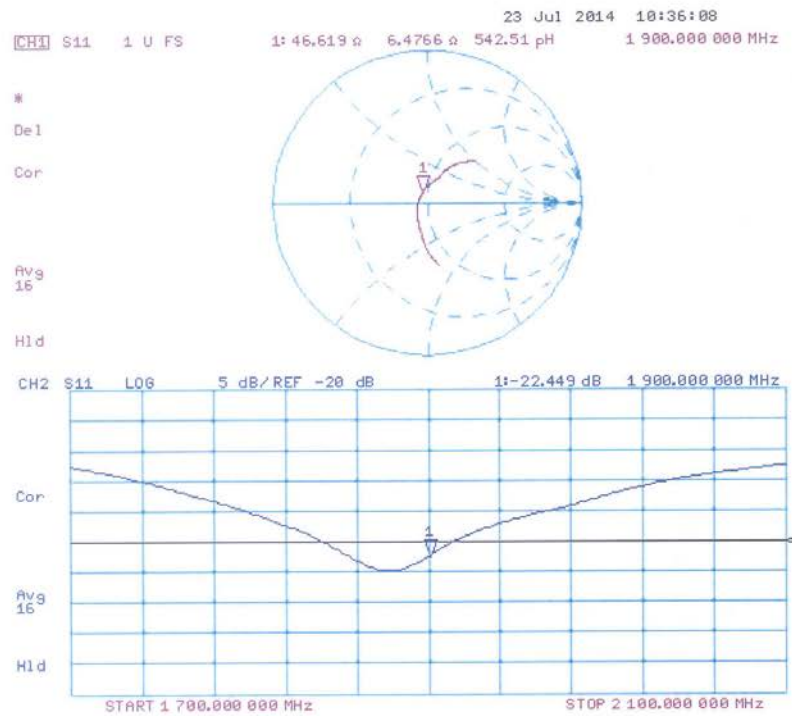
SAR(1 g) = 10.1 W/kg; SAR(10 g) = 5.35 W/kg

Maximum value of SAR (measured) = 12.8 W/kg



0 dB = 12.8 W/kg = 11.07 dBW/kg

Impedance Measurement Plot for Body TSL



2450 MHz Dipole Calibration Certificate

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Accreditation No.: **SCS 108**

Client **CTTL (Auden)**

Certificate No: **D2450V2-853_Jul14**

CALIBRATION CERTIFICATE

Object **D2450V2 - SN: 853**

Calibration procedure(s) **QA CAL-05.v9**
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: **July 24, 2014**

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	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	US37292783	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	MY41092317	09-Oct-13 (No. 217-01828)	Oct-14
Reference 20 dB Attenuator	SN: 5058 (20k)	03-Apr-14 (No. 217-01918)	Apr-15
Type-N mismatch combination	SN: 5047.2 / 06327	03-Apr-14 (No. 217-01921)	Apr-15
Reference Probe ES3DV3	SN: 3205	30-Dec-13 (No. ES3-3205_Dec13)	Dec-14
DAE4	SN: 601	30-Apr-14 (No. DAE4-601_Apr14)	Apr-15

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-13)	In house check: Oct-16
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-13)	In house check: Oct-14

Calibrated by: **Claudio Leuber** **Laboratory Technician**

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

Issued: July 24, 2014

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Certificate No: D2450V2-853_Jul14

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Multilateral Agreement for the recognition of calibration certificates

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 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- 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
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

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	V52.8.8
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	37.8 \pm 6 %	1.85 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	13.6 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	53.2 W/kg \pm 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.26 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	24.7 W/kg \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	50.6 \pm 6 %	2.03 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	13.2 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	51.3 W/kg \pm 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.08 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	23.9 W/kg \pm 16.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS108)**Antenna Parameters with Head TSL**

Impedance, transformed to feed point	$52.9 \Omega + 3.3 j\Omega$
Return Loss	- 27.3 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	$50.4 \Omega + 5.0 j\Omega$
Return Loss	- 26.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.162 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	November 10, 2009

DASY5 Validation Report for Head TSL

Date: 24.07.2014

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 853

Communication System: UID 0 - CW; Frequency: 2450 MHz

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.85$ S/m; $\epsilon_r = 37.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.53, 4.53, 4.53); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.04.2014
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

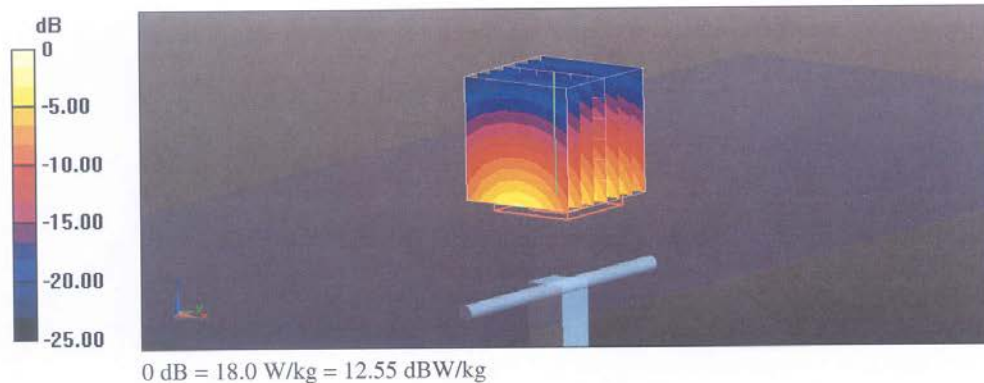
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 102.2 V/m; Power Drift = 0.03 dB

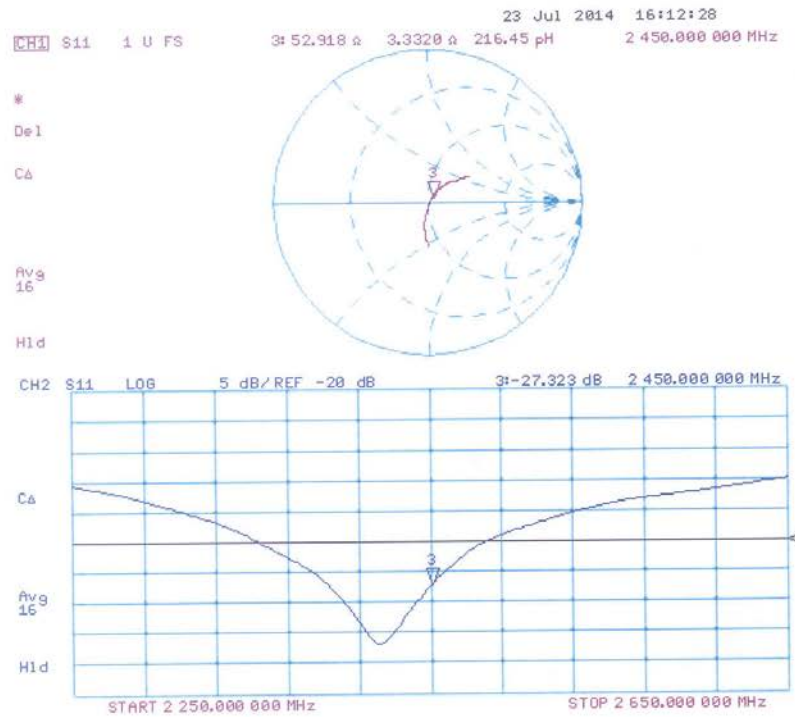
Peak SAR (extrapolated) = 28.2 W/kg

SAR(1 g) = 13.6 W/kg; SAR(10 g) = 6.26 W/kg

Maximum value of SAR (measured) = 18.0 W/kg



Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 16.07.2014

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 853

Communication System: UID 0 - CW; Frequency: 2450 MHz

Medium parameters used: $f = 2450$ MHz; $\sigma = 2.03$ S/m; $\epsilon_r = 50.6$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.35, 4.35, 4.35); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.04.2014
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

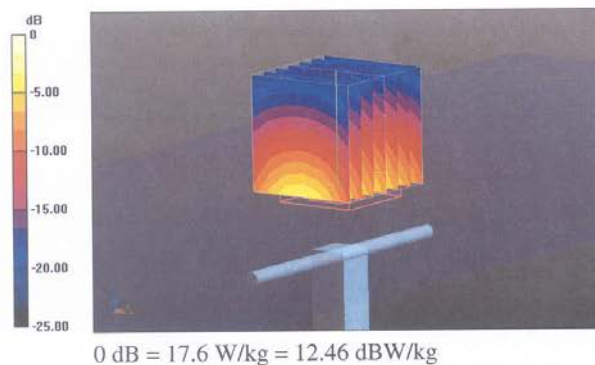
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 96.00 V/m; Power Drift = 0.00 dB

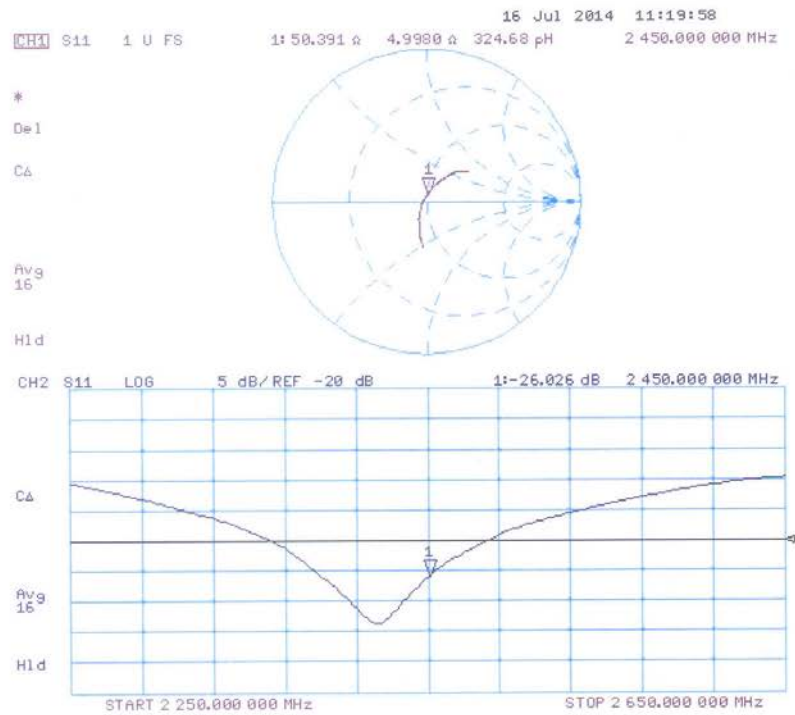
Peak SAR (extrapolated) = 27.9 W/kg

SAR(1 g) = 13.2 W/kg; SAR(10 g) = 6.08 W/kg

Maximum value of SAR (measured) = 17.6 W/kg



Impedance Measurement Plot for Body TSL



ANNEX I SPOT CHECK TEST

As the test lab for 4014E from TCL Communication Ltd., we, CTTL(Shouxiang), declare on our sole responsibility that, according to “Declaration of changes” provided by applicant, only the Spot check test should be performed. The test results are as below.

I.1 Conducted power of selected case

Table I.1: The conducted power results for GSM850/1900

GSM 850MHz	Conducted Power (dBm)		
	Channel 251(848.8MHz)	Channel 190(836.6MHz)	Channel 128(824.2MHz)
	33.24	/	/
GSM 1900MHz	Conducted Power(dBm)		
	Channel 810(1909.8MHz)	Channel 661(1880MHz)	Channel 512(1850.2MHz)
	/	/	29.22

Table I.2: The conducted power results for GPRS

GSM 850 GPRS (GMSK)	Measured Power (dBm)		
	251	190	128
2 Txslot	29.52	/	/
PCS1900 GPRS (GMSK)	Measured Power (dBm)		
	810	661	512
4 Txslots	/	/	24.41

Table I.3: The conducted power results for WCDMA

Item	band	FDD V result		
	ARFCN	4233 (846.6MHz)	4182 (836.4MHz)	4132 (826.4MHz)
WCDMA	\	23.50	23.30	/
Item	band	FDD II result		
	ARFCN	9538 (1907.6MHz)	9400 (1880MHz)	9262 (1852.4MHz)
WCDMA	\	/	23.18	/

Table I.4: The conducted power results for WLAN

802.11b(dBm)				
Channel\data rate	1Mbps	2Mbps	5.5Mbps	11Mbps
1(2412MHz)	/	/	/	/
6(2437MHz)	15.79	/	/	/
11(2462MHz)	/	/	/	/

I.2 Spot Check test results

Table I.5: SAR Values (GSM 850 MHz Band - Head)– CAB31P0000C1

Ambient Temperature: 22.0 °C						Liquid Temperature: 21.8 °C					
Frequency		Side	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-upPower (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.										
848.8	251	Left	Touch	Fig.1	33.24	33.3	0.323	0.33	0.429	0.43	-0.13

Table I.6: SAR Values (GSM 850 MHz Band-Body)– CAB31P0000C1

Ambient Temperature: 22.0 °C						Liquid Temperature: 21.8 °C					
Frequency		Mode (number of timeslots)	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-upPower (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.										
848.8	251	GPRS (2)	Rear	Fig.2	29.52	30	0.377	0.42	0.505	0.56	-0.02

Note1: The distance between the EUT and the phantom bottom is 10mm.

Table I.7: SAR Values (GSM 1900 MHz Band - Head)– CAB31P0000C1

Ambient Temperature: 22.0 °C						Liquid Temperature: 21.8 °C					
Frequency		Side	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-upPower (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.										
1850.2	512	Left	Touch	Fig.3	29.22	30.3	0.158	0.20	0.258	0.33	0.13

Table I.8: SAR Values (GSM 1900 MHz Band-Body)– CAB31P0000C1

Ambient Temperature: 22.0 °C						Liquid Temperature: 21.8 °C					
Frequency		Mode (number of timeslots)	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-upPower (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.										
1850.2	512	GPRS (4)	Rear	Fig.4	24.41	25.0	0.266	0.30	0.421	0.48	-0.01

Note1: The distance between the EUT and the phantom bottom is 10mm.

Table I.9: SAR Values (WCDMA 850 MHz Band - Head)– CAB31P0000C1

Ambient Temperature: 22.0 °C						Liquid Temperature: 21.8 °C					
Frequency		Side	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-upPower (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.										
836.4	4182	Left	Touch	Fig.5	22.86	24.0	0.331	0.43	0.441	0.57	0.04

Table I.10: SAR Values (WCDMA 850 MHz Band-Body) – CAB31P0000C1

Ambient Temperature: 22.0 °C					Liquid Temperature: 21.8 °C					
Frequency		Test Position	Figure No.	Conducted Power (dBm)	Max. tune-upPower (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g)(W/kg)	Power Drift (dB)
MHz	Ch.									
846.6	4233	Rear	Fig.6	23.23	24	0.387	0.46	0.519	0.62	-0.05

Note1: The distance between the EUT and the phantom bottom is 10mm.

Table I.11: SAR Values (WCDMA1900 MHz Band - Head)– CAB31P0000C1

Ambient Temperature: 22.0 °C Liquid Temperature: 21.8 °C											
Frequency		Side	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-upPower (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.										
1880	9400	Left	Touch	Fig.7	22.91	23.8	0.287	0.35	0.476	0.58	0.13

Table I.12: SAR Values (WCDMA1900 MHz Band-Body)– CAB31P0000C1

Ambient Temperature: 22.0 °C Liquid Temperature: 21.8 °C										
Frequency		Test Position	Figure No.	Conducted Power (dBm)	Max. tune-upPower (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.									
1880	9400	Rear	Fig.8	22.91	23.8	0.372	0.46	0.618	0.76	-0.06

Note1: The distance between the EUT and the phantom bottom is 10mm.

Table I.13: SAR Values (Wi-Fi 802.11b- Head)– CAB31P0000C1

Ambient Temperature: 22.0 °C Liquid Temperature: 21.8 °C											
Frequency		Side	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-upPower (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.										
2437	6	Left	Touch	Fig.9	15.79	16.2	0.190	0.21	0.380	0.42	-0.13

Table I.14: SAR Values (Wi-Fi 802.11b - Body)– CAB31P0000C1

Ambient Temperature: 22.0 °C Liquid Temperature: 21.8 °C										
Frequency		Test Position	Figure No.	Conducted Power (dBm)	Max. tune-upPower (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.									
2437	6	Rear	Fig.10	15.79	16.2	0.206	0.23	0.448	0.49	0.09

Note1: The distance between the EUT and the phantom bottom is 10mm.

I.3 Measured SAR Comparison

SAR Values (GSM 850 MHz Band - Head)

Frequency		Side	Test Position	Battery Type	SAR(1g) (W/kg)	
MHz	Ch.				Original data	Spot check data
848.8	251	Left	Touch	CAB31P0000C1	0.602	0.429

SAR Values (GSM 850 MHz Band - Body)

Frequency		Mode/Band	Test Position	Spacing (mm)	Battery Type	SAR(1g) (W/kg)	
MHz	Ch.					Original data	Spot check data
848.8	251	GPRS	Rear	10	CAB31P0000C1	0.687	0.505

SAR Values (PCS1900 MHz Band - Head)

Frequency		Side	Test Position	Battery Type	SAR(1g) (W/kg)	
MHz	Ch.				Original data	Spot check data
1850.2	512	Left	Touch	CAB31P0000C1	0.474	0.258

SAR Values (PCS1900 MHz Band - Body)

Frequency		Mode/Band	Test Position	Spacing (mm)	Battery Type	SAR(1g) (W/kg)	
MHz	Ch.					Original data	Spot check data
1850.2	512	GPRS	Rear	10	CAB31P0000C1	0.703	0.421

SAR Values (WCDMA850 MHz Band - Head)

Frequency		Side	Test Position	Battery Type	SAR(1g) (W/kg)	
MHz	Ch.				Original data	Spot check data
836.4	4182	Left	Touch	CAB31P0000C1	0.652	0.441

SAR Values (WCDMA850 MHz Band - Body)

Frequency		Test Position	Spacing (mm)	Battery Type	SAR(1g) (W/kg)	
MHz	Ch.				Original data	Spot check data
846.6	4233	Rear	10	CAB31P0000C1	0.640	0.519

SAR Values (WCDMA1900 MHz Band - Head)

Frequency		Side	Test Position	Battery Type	SAR(1g) (W/kg)	
MHz	Ch.				Original data	Spot check data
1880	9800	Left	Touch	CAB31P0000C1	0.906	0.476

SAR Values (WCDMA1900 MHz Band - Body)

Frequency		Test Position	Spacing (mm)	Battery Type	SAR(1g) (W/kg)	
MHz	Ch.				Original data	Spot check data
1880	9800	Rear	10	CAB31P0000C1	0.737	0.618

SAR Values (Wi-Fi 802.11b - Head)

Frequency		Side	Test Position	Battery Type	SAR(1g) (W/kg)	
MHz	Ch.				Original data	Spot check data
2437	6	Left	Touch	CAB31P0000C1	0.418	0.380

SAR Values (Wi-Fi 802.11b - Body)

Frequency		Test Position	Spacing (mm)	Battery Type	SAR(1g) (W/kg)	
MHz	Ch.				Original data	Spot check data
2437	6	Rear	10	CAB31P0000C1	0.507	0.448

I.4 Reported SAR Comparison

Exposure Configuration	Technology Band	Reported SAR 1g (W/Kg): original	Reported SAR 1g (W/Kg): spot check
Head (Separation Distance 0mm)	GSM 850	0.73	0.43
	PCS 1900	0.65	0.33
	UMTS FDD 5	0.73	0.57
	UMTS FDD 2	1.09	0.58
	WLAN	0.47	0.42
Body-worn (Separation Distance 10mm)	GSM 850	0.76	0.56
	PCS 1900	0.96	0.48
	UMTS FDD 5	0.68	0.62
	UMTS FDD 2	0.88	0.76
	WLAN	0.57	0.49

GSM850 Left Cheek High

Date: 2015-06-13

Electronics: DAE4 Sn777

Medium: Head 850 MHz

Medium parameters used (interpolated): $f = 848.8$ MHz; $\sigma = 0.916$ S/m; $\epsilon_r = 41.077$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.0°C Liquid Temperature: 21.8°C

Communication System: GSM 850 Frequency: 848.8 MHz Duty Cycle: 1:8.3

Probe: EX3DV4 - SN3846 ConvF(9.18, 9.18, 9.18)

Area Scan (71x111x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.486 W/kg

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

Reference Value = 8.504 V/m; Power Drift = -0.13 dB

Peak SAR (extrapolated) = 0.542 W/kg

SAR(1 g) = 0.429 W/kg; SAR(10 g) = 0.323 W/kg

Maximum value of SAR (measured) = 0.483 W/kg

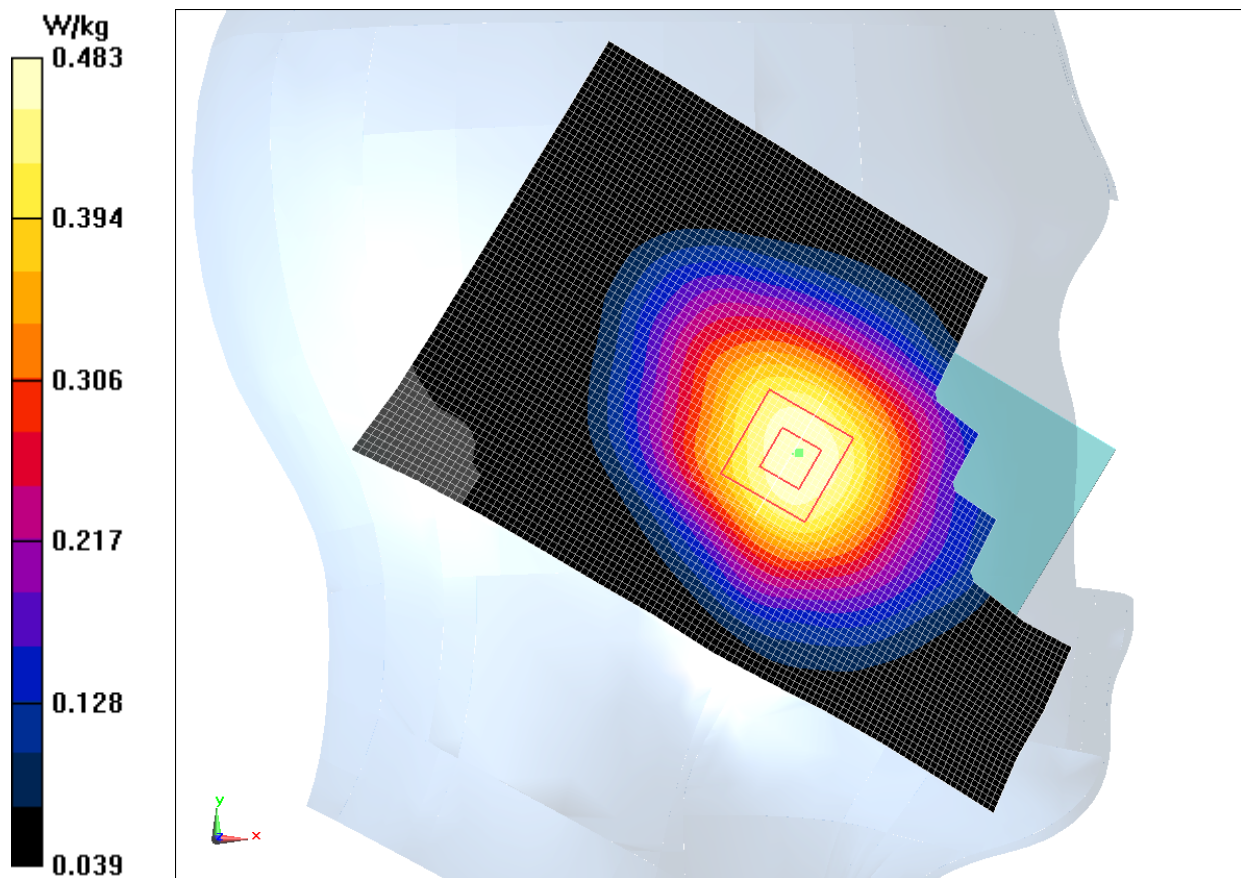


Fig.1 850MHz

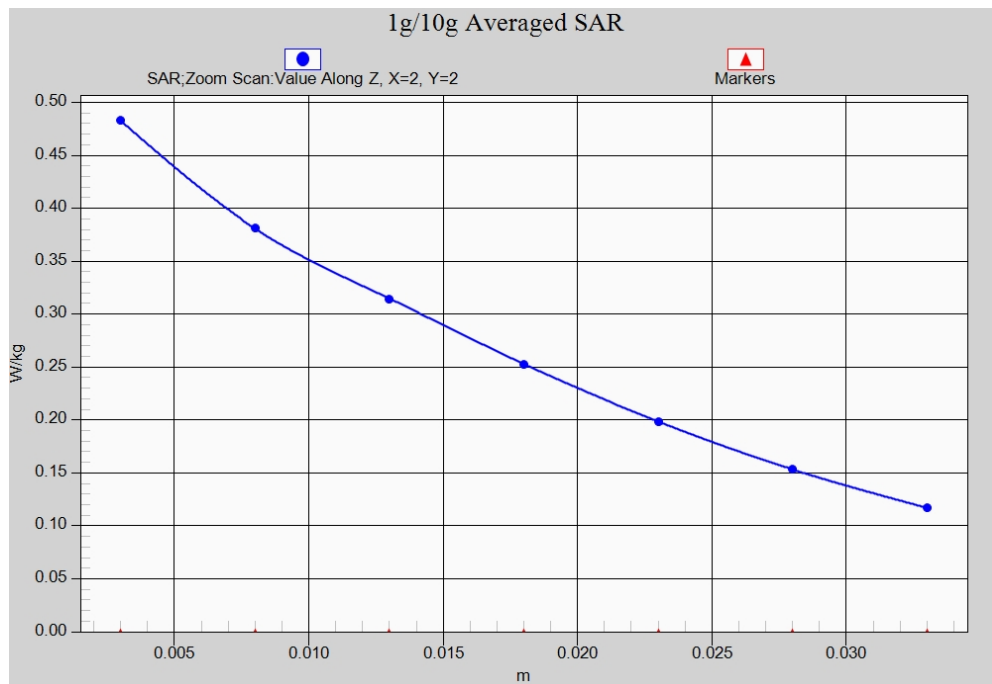


Fig. 1-1 Z-Scan at power reference point (850 MHz)

GSM850 Body Rear High with GPRS

Date: 2015-06-13

Electronics: DAE4 Sn777

Medium: Body 850 MHz

Medium parameters used(interpolated): $f = 848.8$ MHz; $\sigma = 9.998$ S/m; $\epsilon_r = 53.283$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.0°C Liquid Temperature: 21.8°C

Communication System: GSM 850 GPRS Frequency: 848.8 MHz Duty Cycle: 1:4

Probe: EX3DV4 - SN3846 ConvF(9.09, 9.09, 9.09)

Area Scan (111x71x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.556 W/kg

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

Reference Value = 22.10 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 0.656 W/kg

SAR(1 g) = 0.505 W/kg; SAR(10 g) = 0.377 W/kg

Maximum value of SAR (measured) = 0.531 W/kg

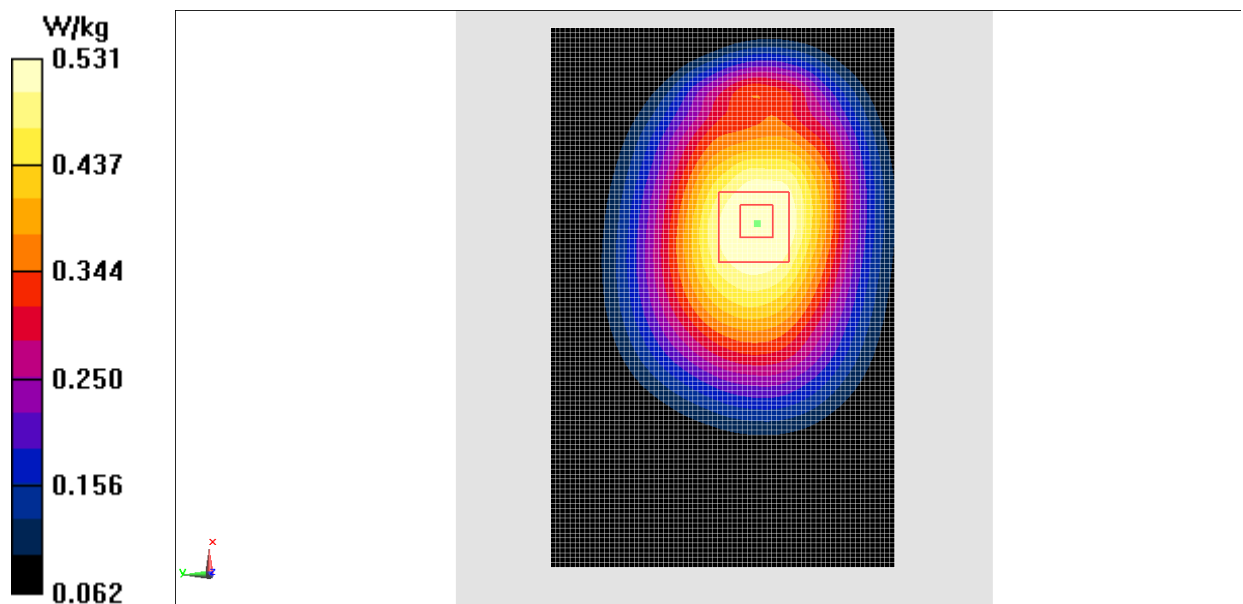


Fig.2 850 MHz

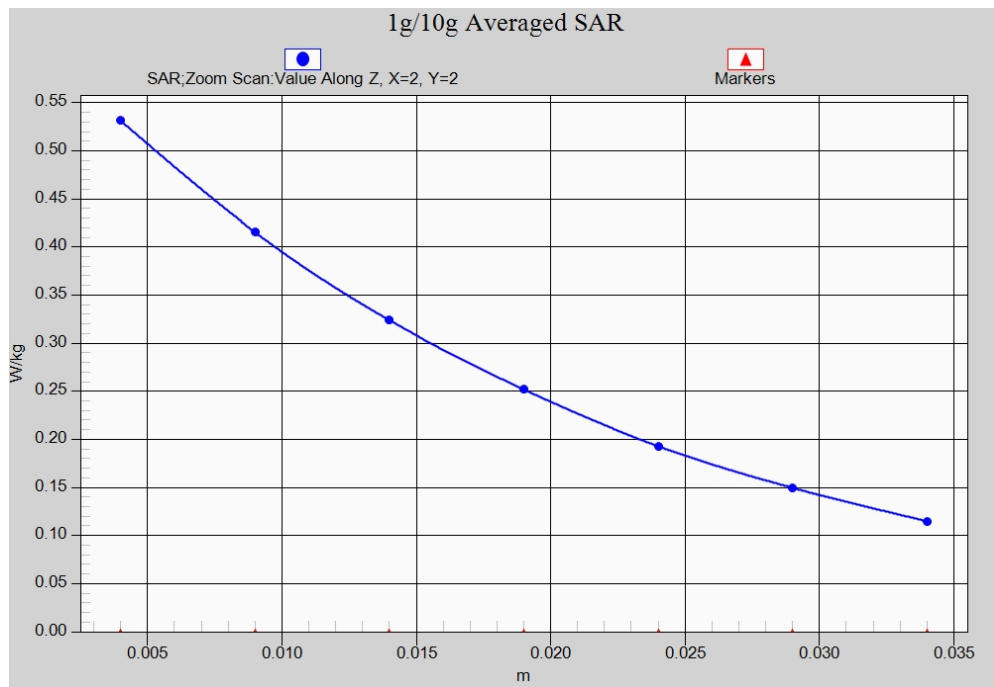


Fig. 2-1 Z-Scan at power reference point (850 MHz)

GSM1900 Left Cheek Low

Date: 2015-06-14

Electronics: DAE4 Sn777

Medium: Head 1900 MHz

Medium parameters used(interpolated): $f = 1850.2$ MHz; $\sigma = 1.382$ S/m; $\epsilon_r = 40.631$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.0°C Liquid Temperature: 21.8°C

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

Probe: EX3DV4 - SN3846 ConvF(7.26, 7.26, 7.26)

Area Scan (61x101x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.323 W/kg

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

Reference Value = 3.017 V/m; Power Drift = 0.13dB

Peak SAR (extrapolated) = 0.383 W/kg

SAR(1 g) = 0.258 W/kg; SAR(10 g) = 0.158 W/kg

Maximum value of SAR (measured) = 0.331 W/kg

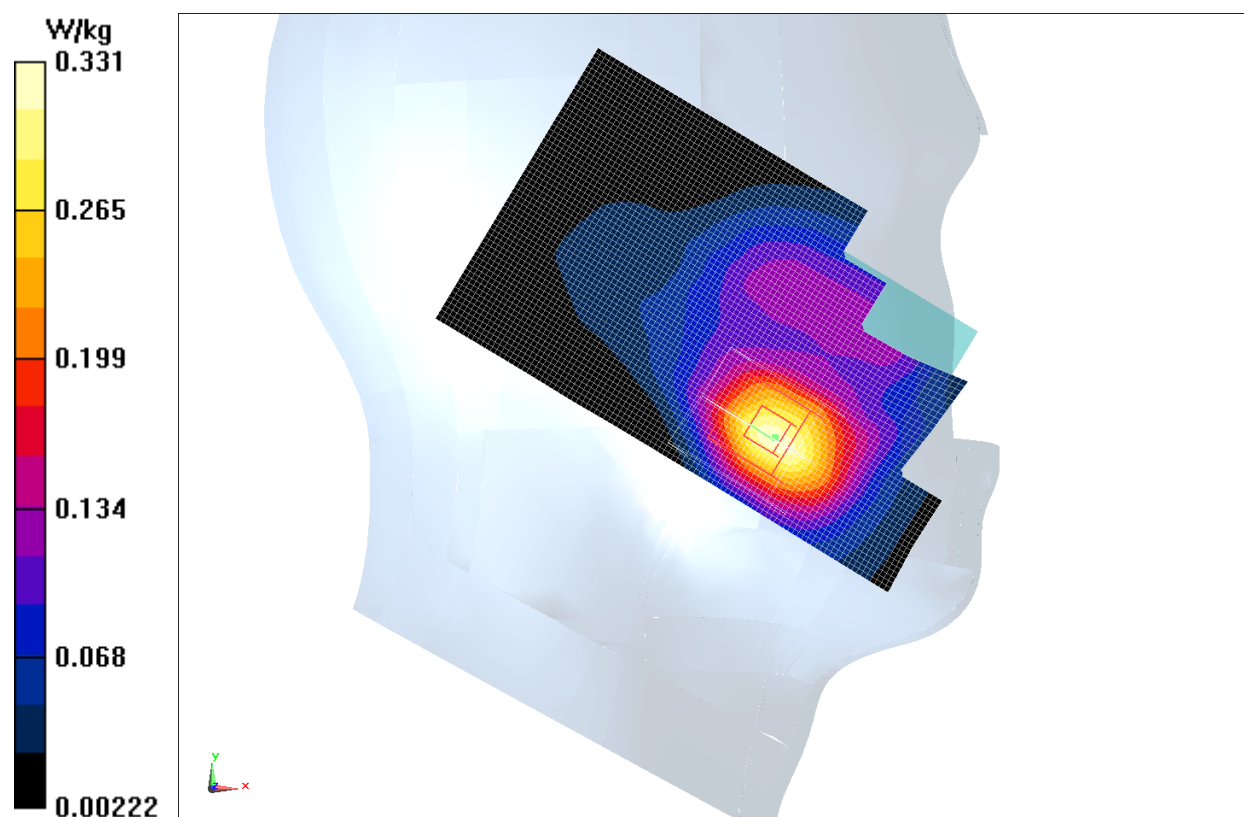


Fig.3 1900 MHz

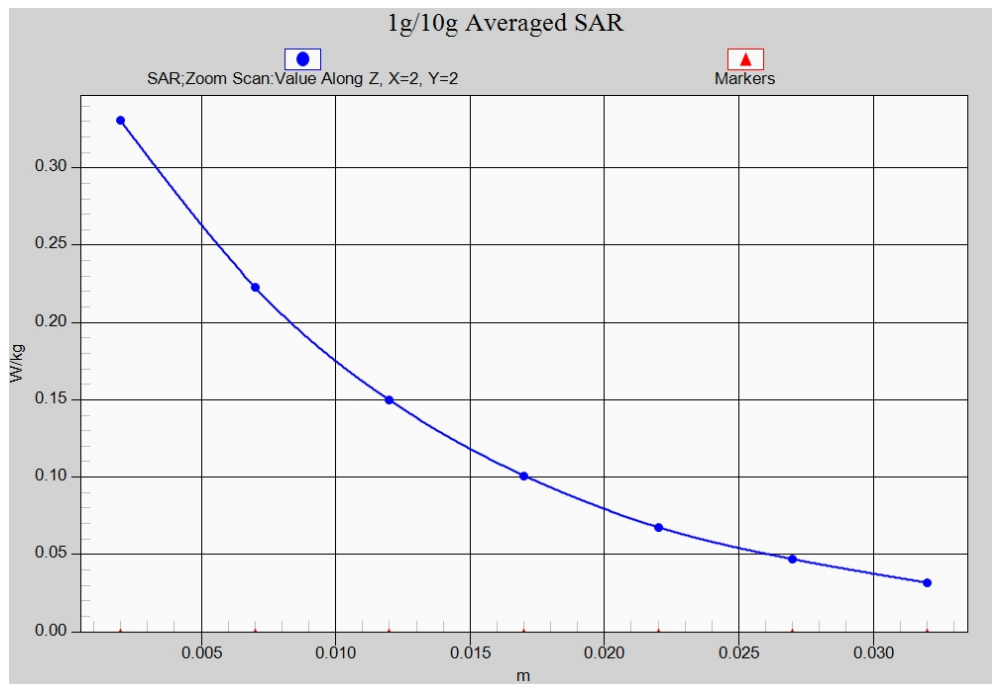


Fig. 3-1 Z-Scan at power reference point (1900 MHz)

GSM1900 Body Rear Low with GPRS

Date: 2015-06-14

Electronics: DAE4 Sn777

Medium: Body 1900 MHz

Medium parameters used (interpolated): $f = 1850.2$ MHz; $\sigma = 1.588$ S/m; $\epsilon_r = 53.116$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.0°C Liquid Temperature: 21.8°C

Communication System: GSM 1900MHz GPRS Frequency: 1850.2 MHz Duty Cycle: 1:2

Probe: EX3DV4 - SN3846 ConvF(7.15, 7.15, 7.15)

Area Scan (111x71x1): Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm

Maximum value of SAR (interpolated) = 0.512 W/kg

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

Reference Value = 8.796 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 0.655 W/kg

SAR(1 g) = 0.421 W/kg; SAR(10 g) = 0.266 W/kg

Maximum value of SAR (measured) = 0.449 W/kg

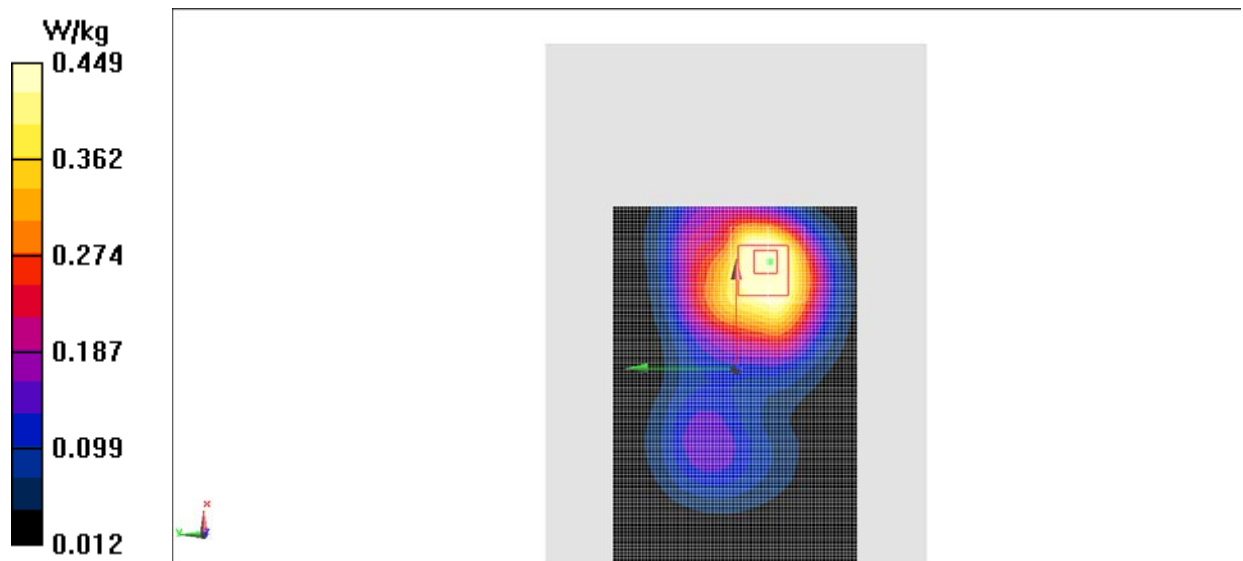


Fig.4 1900 MHz

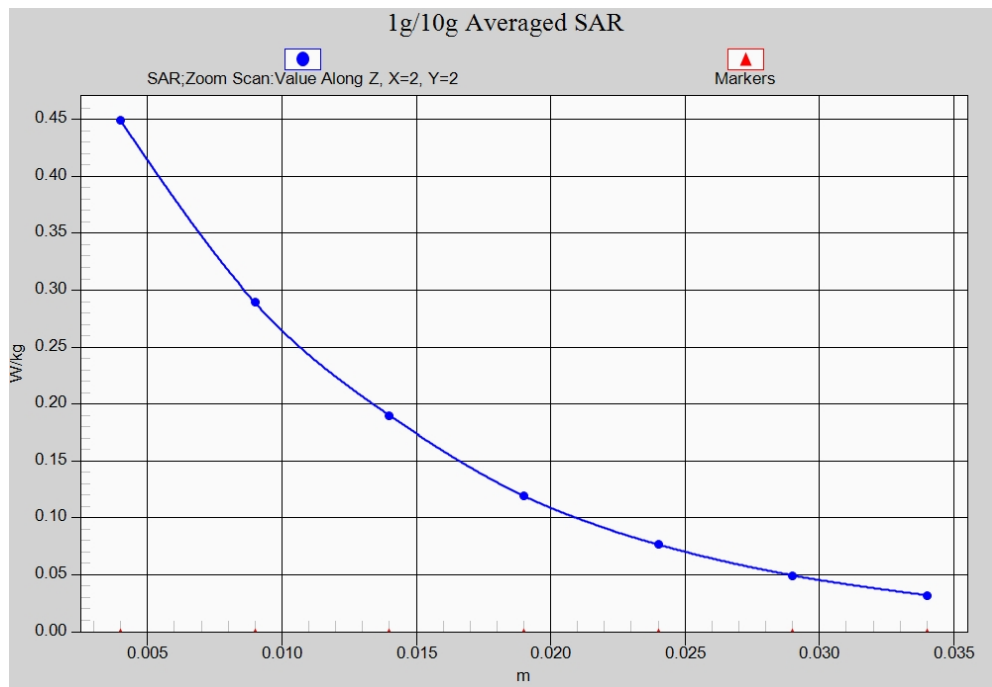


Fig.4-1 Z-Scan at power reference point (1900 MHz)

WCDMA 850 Left Cheek Middle

Date: 2015-06-13

Electronics: DAE4 Sn777

Medium: Head 850 MHz

Medium parameters used (interpolated): $f = 836.4$ MHz; $\sigma = 0.814$ S/m; $\epsilon_r = 41.46$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.0°C Liquid Temperature: 21.8°C

Communication System: WCDMA; Frequency: 836.4 MHz; Duty Cycle: 1:1

Probe: EX3DV4 - SN3846 ConvF(9.18, 9.18, 9.18)

Area Scan (71x111x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.471 W/kg

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

Reference Value = 8.734 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 0.559 W/kg

SAR(1 g) = 0.441 W/kg; SAR(10 g) = 0.331 W/kg

Maximum value of SAR (measured) = 0.497 W/kg

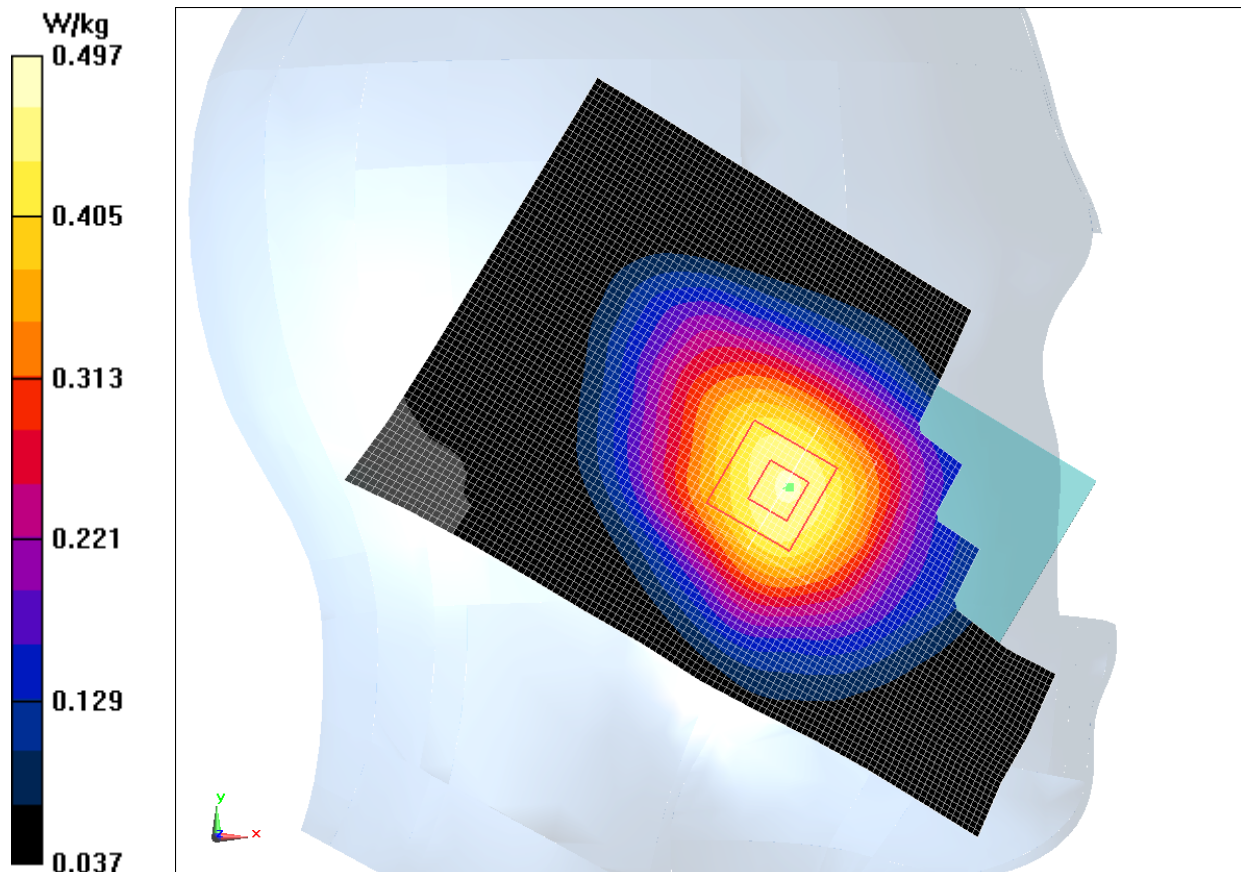


Fig.5 WCDMA 850

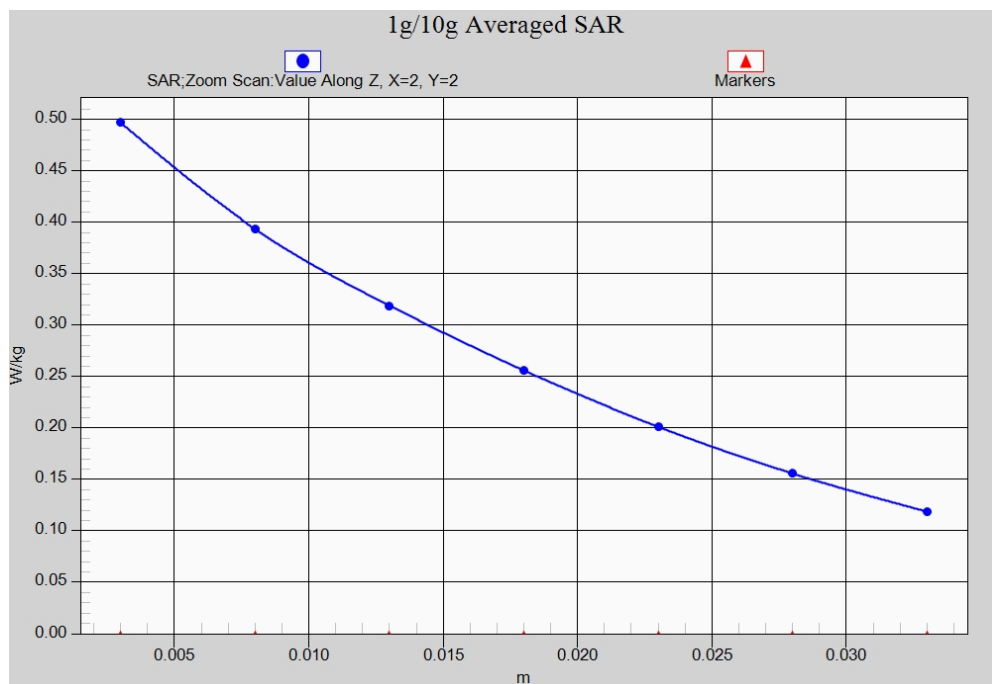


Fig. 5-1 Z-Scan at power reference point (WCDMA 850)

WCDMA 850 Body Rear High

Date: 2015-06-13

Electronics: DAE4 Sn777

Medium: Body 850 MHz

Medium parameters used (interpolated): $f = 846.6$ MHz; $\sigma = 9.989$ S/m; $\epsilon_r = 53.317$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.0°C Liquid Temperature: 21.8°C

Communication System: WCDMA; Frequency: 846.6 MHz; Duty Cycle: 1:1

Probe: EX3DV4 - SN3846 ConvF(9.09, 9.09, 9.09)

Area Scan (111x71x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.576 W/kg

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

Reference Value = 22.31 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 0.667 W/kg

SAR(1 g) = 0.519 W/kg; SAR(10 g) = 0.387 W/kg

Maximum value of SAR (measured) = 0.546 W/kg

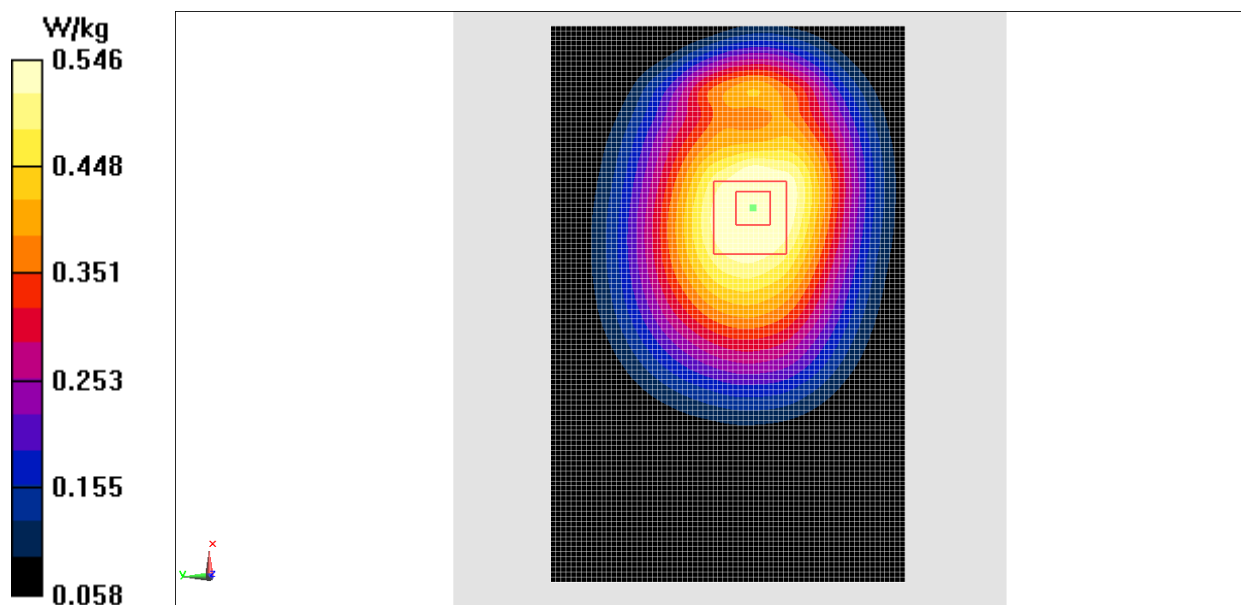


Fig.6 WCDMA 850

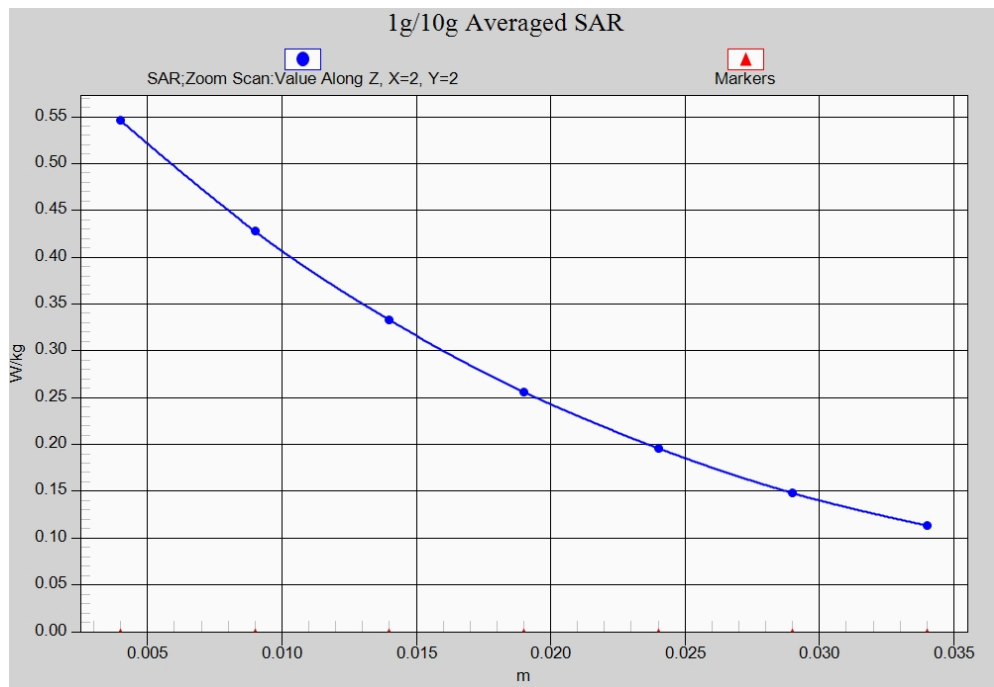


Fig. 6-1 Z-Scan at power reference point (WCDMA850)

WCDMA 1900 Left Cheek Middle

Date: 2015-06-14

Electronics: DAE4 Sn777

Medium: Head 1900 MHz

Medium parameters used (interpolated): $f = 1880$ MHz; $\sigma = 1.399$ S/m; $\epsilon_r = 40.62$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.0°C Liquid Temperature: 21.8°C

Communication System: WCDMA 1900 Frequency: 1880 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN3846 ConvF(7.26, 7.26, 7.26)

Area Scan (61x101x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.592 W/kg

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

Reference Value = 4.858 V/m; Power Drift = 0.13 dB

Peak SAR (extrapolated) = 0.721 W/kg

SAR(1 g) = 0.476 W/kg; SAR(10 g) = 0.287 W/kg

Maximum value of SAR (measured) = 0.616 W/kg

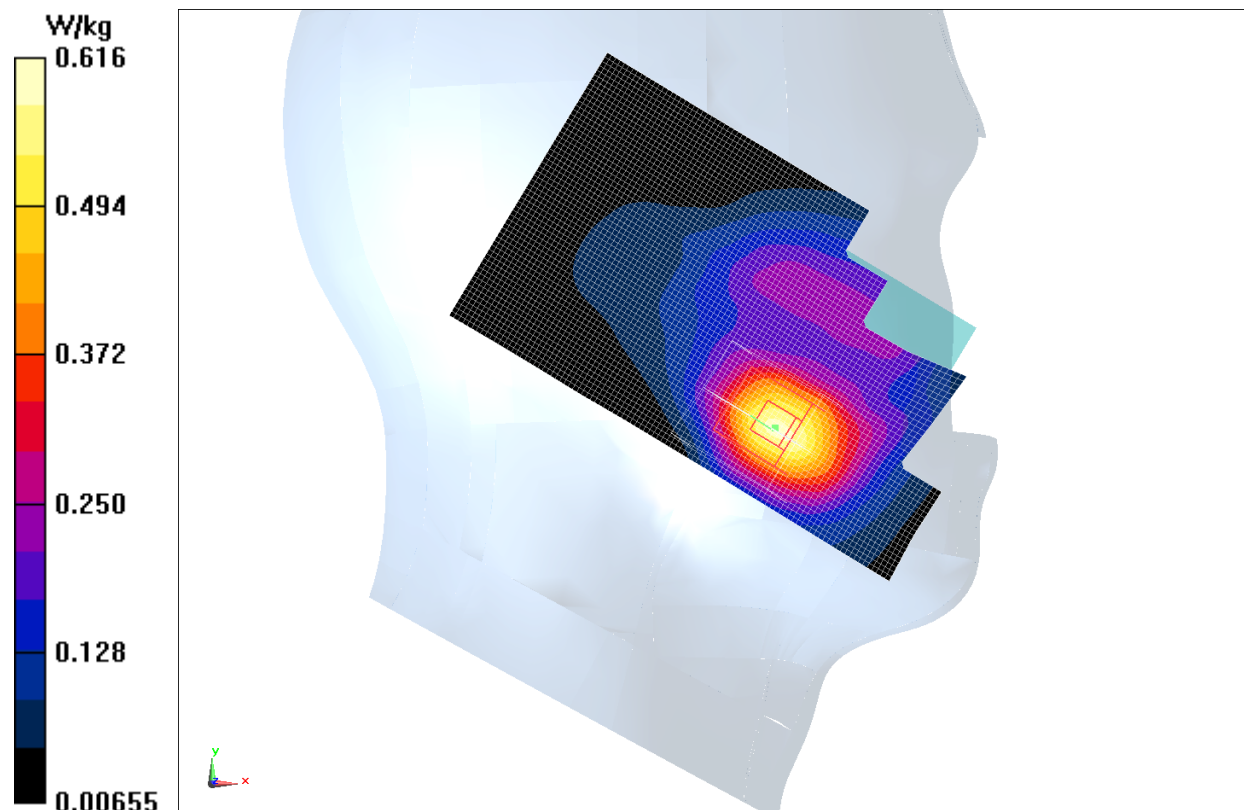


Fig.7 WCDMA1900

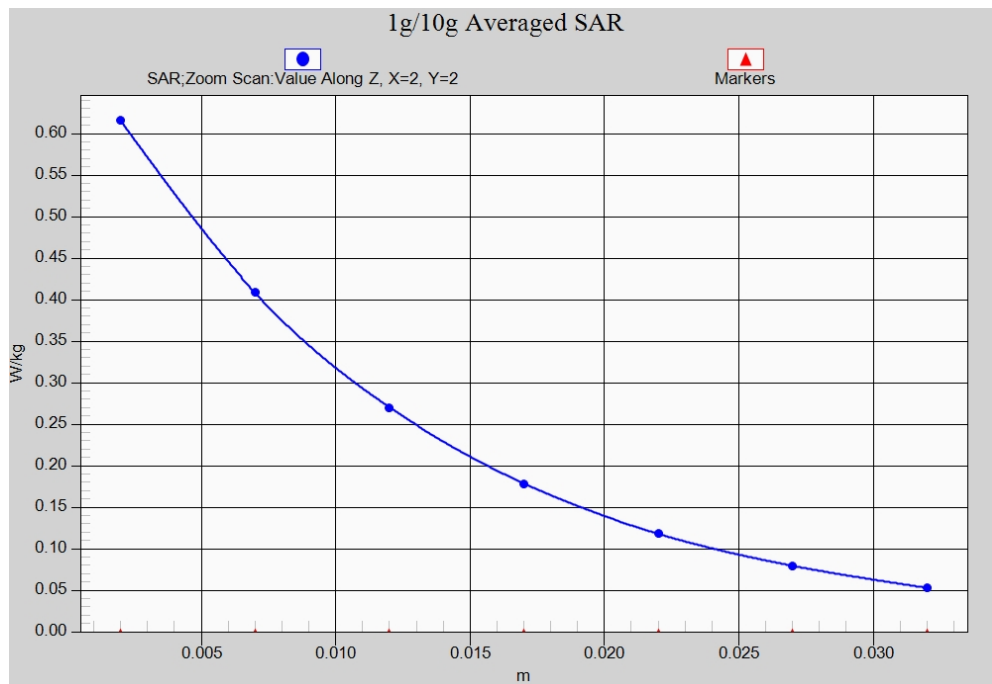


Fig. 7-1 Z-Scan at power reference point (WCDMA1900)

WCDMA 1900 Body Rear Middle

Date: 2015-06-14

Electronics: DAE4 Sn777

Medium: Body 1900 MHz

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.564$ S/m; $\epsilon_r = 52.878$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.0°C Liquid Temperature: 21.8°C

Communication System: WCDMA 1900 Frequency: 1880 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN3846 ConvF(7.15, 7.15, 7.15)

Area Scan (111x71x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.773 W/kg

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

Reference Value = 8.875 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 1.01 W/kg

SAR(1 g) = 0.618 W/kg; SAR(10 g) = 0.372 W/kg

Maximum value of SAR (measured) = 0.663 W/kg

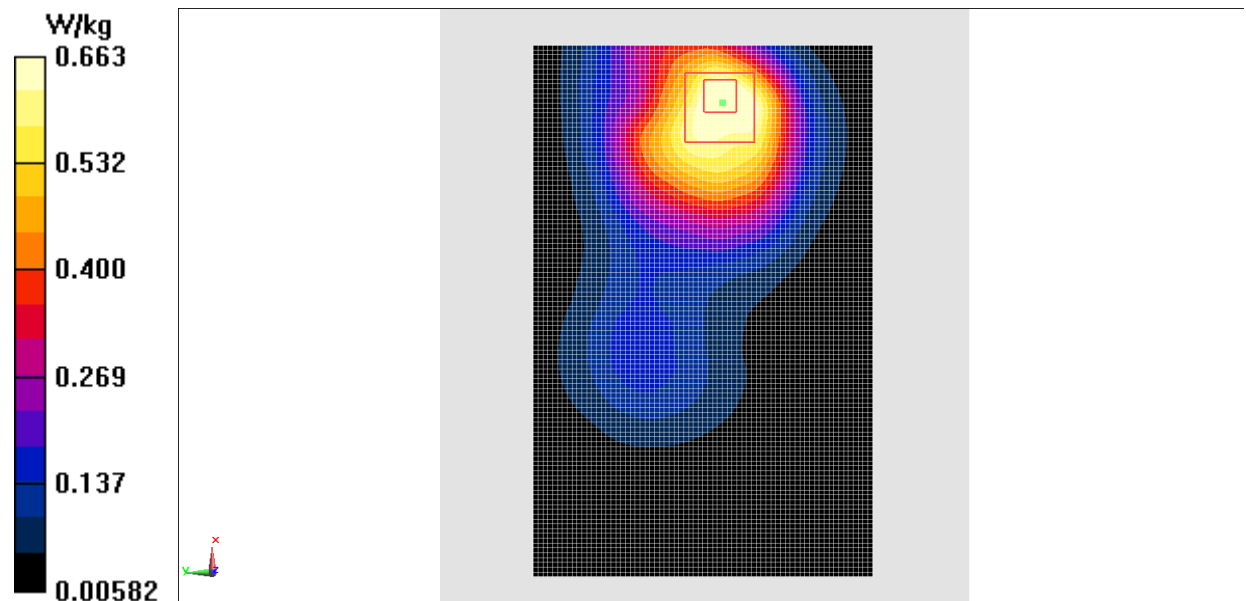


Fig.8 WCDMA1900

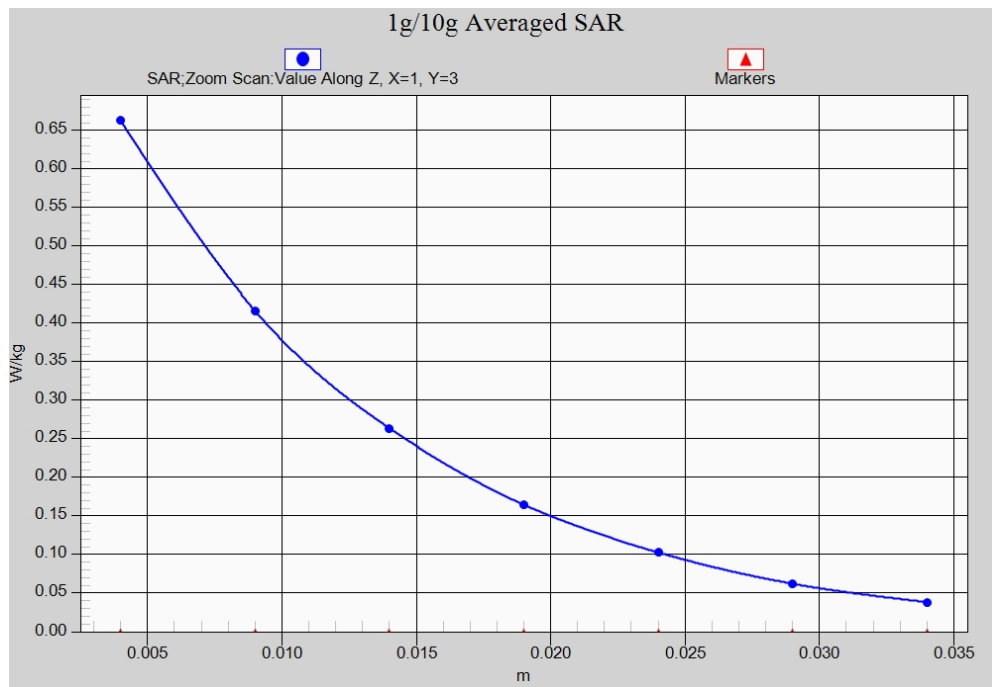


Fig. 8-1 Z-Scan at power reference point (WCDMA1900)

Wifi 802.11b Left Cheek Channel 6

Date: 2015-06-15

Electronics: DAE4 Sn777

Medium: Head 2450 MHz

Medium parameters used (interpolated): $f = 2437$ MHz; $\sigma = 1.873$ S/m; $\epsilon_r = 38.65$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.0°C Liquid Temperature: 21.8°C

Communication System: Wlan 2450 Frequency: 2437 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN3846 ConvF(6.56, 6.56, 6.56)

Area Scan (81x131x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.462 W/kg

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

Reference Value = 8.269 V/m; Power Drift = -0.13 dB

Peak SAR (extrapolated) = 0.837 W/kg

SAR(1 g) = 0.380 W/kg; SAR(10 g) = 0.190 W/kg

Maximum value of SAR (measured) = 0.417 W/kg

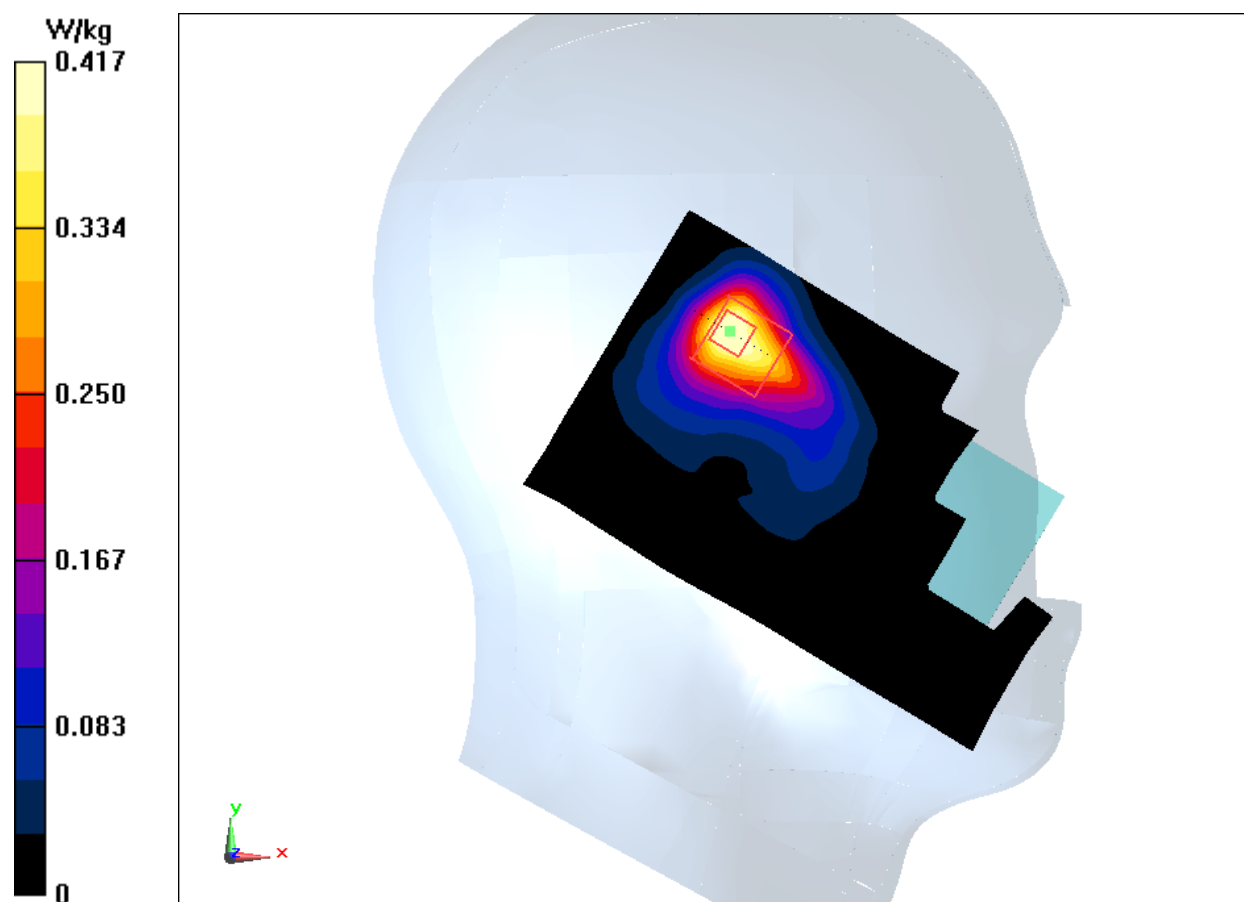


Fig.9 2450 MHz

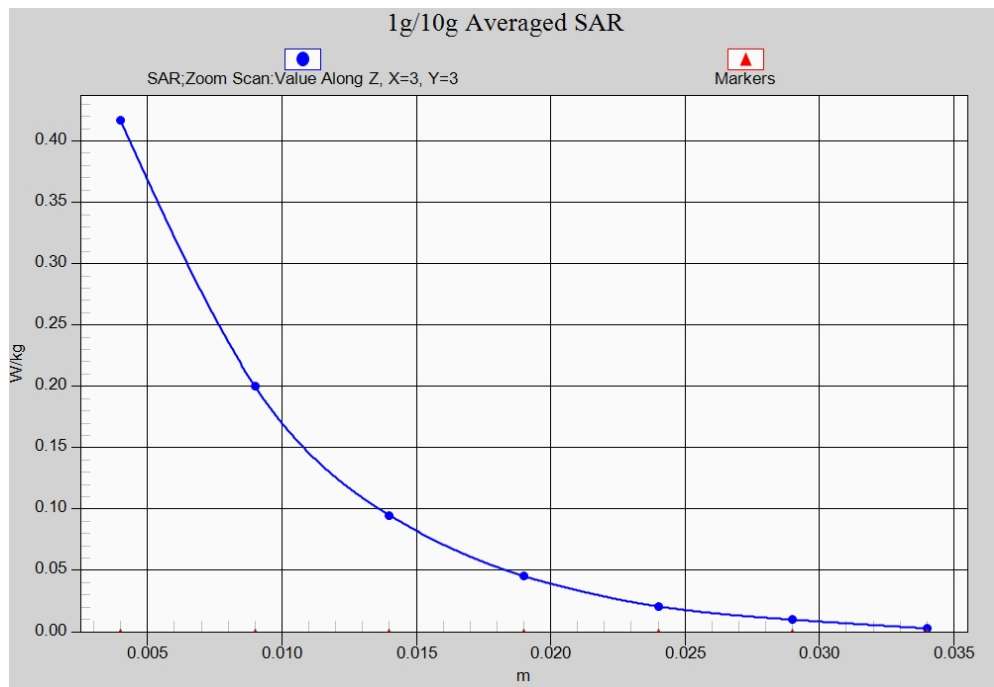


Fig. 9-1 Z-Scan at power reference point (2450 MHz)

Wifi 802.11b Body Rear Channel 6

Date: 2015-06-15

Electronics: DAE4 Sn777

Medium: Body 2450 MHz

Medium parameters used (interpolated): $f = 2437$ MHz; $\sigma = 1.937$ S/m; $\epsilon_r = 53.132$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.0°C Liquid Temperature: 21.8°C

Communication System: WLan 2450 Frequency: 2437 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN3846 ConvF(6.90, 6.90, 6.90)

Area Scan (111x71x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.565 W/kg

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

Reference Value = 1.761 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 0.919 W/kg

SAR(1 g) = 0.448 W/kg; SAR(10 g) = 0.206 W/kg

Maximum value of SAR (measured) = 0.491 W/kg

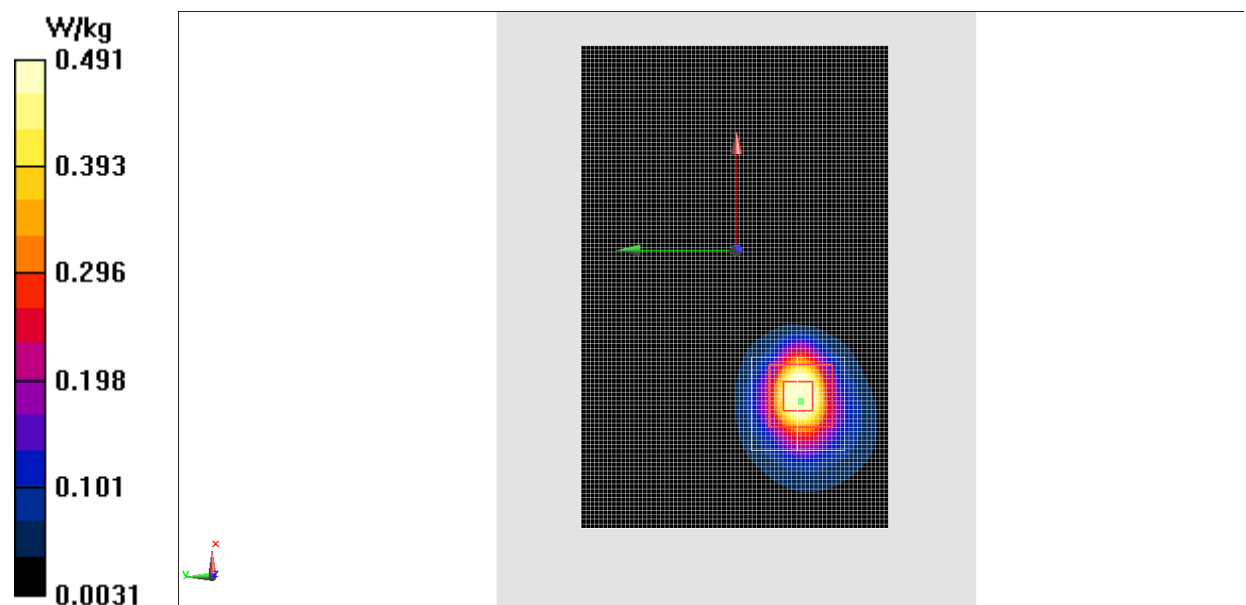


Fig.10 2450 MHz

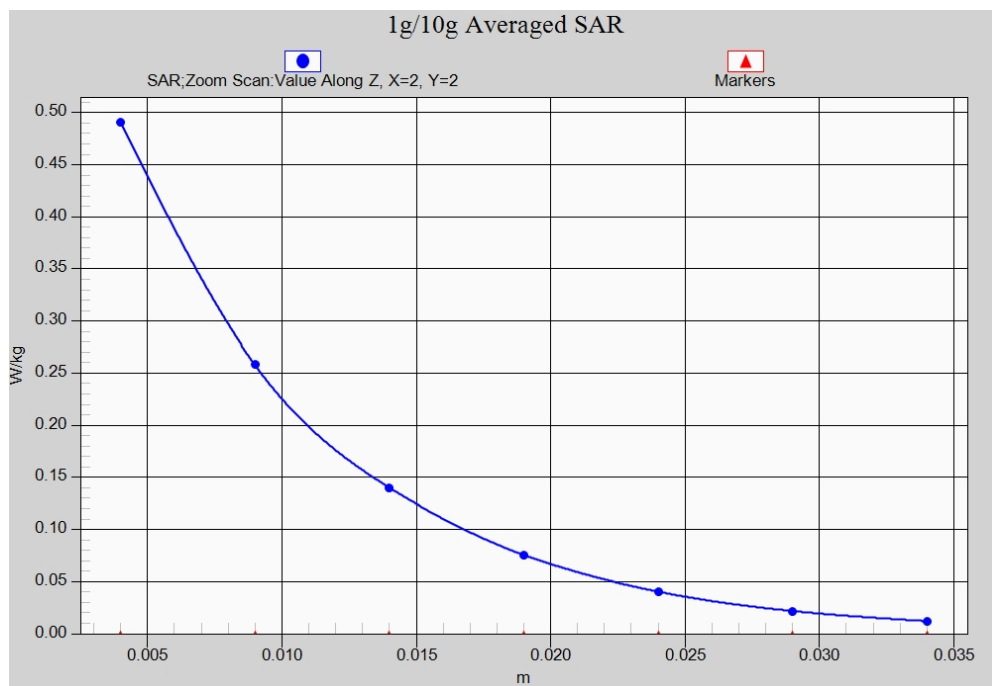


Fig. 10-1 Z-Scan at power reference point (2450 MHz)

ANNEX J Accreditation Certificate

 
China National Accreditation Service for Conformity Assessment
LABORATORY ACCREDITATION CERTIFICATE
(Registration No. CNAS L0570)
China Academy of Telecommunication Research of MIIT <u>No.52, Huayuan North Road, Haidian District, Beijing, China</u>
<i>is accredited to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories(CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence of testing and calibration.</i>
<i>The scope of accreditation is detailed in the attached appendices bearing the same registration number as above. The appendices form an integral part of this certificate.</i>
Date of Issue: 2014-06-20 Date of Expiry: 2017-06-19 Date of Initial Accreditation: 1998-07-03 Date of Update: 2014-06-20

Signed on behalf of China National Accreditation Service for Conformity Assessment
<small>China National Accreditation Service for Conformity Assessment (CNAS) is authorized by Certification and Accreditation Administration of the People's Republic of China (CNCA) to operate the national accreditation schemes for conformity assessment. CNAS is the signatory to International Laboratory Accreditation Cooperation Multilateral Recognition Arrangement (ILAC MRA) and Asia Pacific Laboratory Accreditation Cooperation Multilateral Recognition Arrangement (APLAC MRA).</small>
No.CNAS AL 2 0010037