In Collaboration with
s p e a g
CALIBRATION LABORATORY

Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com Http://www.chinattl.cn

Measurement Conditions

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

DASY Version	DASY52	52.8.8.1222
Extrapolation	Advanced Extrapolation	
Phantom	Triple Flat Phantom 5.1C	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.1 ± 6 %	1.84 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.5 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**53.7 mW /g ± 20.8 % (k=2)**
SAR averaged over 10 cm^3 (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	6.34 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**25.3 mW /g ± 20.4 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	51.4 ± 6 %	1.99 mho/m ± 6 %
Body TSL temperature change during test	<1.0 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.2 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**52.0 mW /g ± 20.8 % (k=2)**
SAR averaged over 10 cm^3 (10 g) of Body TSL	Condition	
SAR measured	250 mW input power	6.19 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**24.5 mW /g ± 20.4 % (k=2)**

©Copyright. All rights reserved by CTTL.

In Collaboration with
s p e a g
CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com Http://www.chinattl.cn

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	50.7Ω+ 5.02jΩ
Return Loss	- 26.0dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.7Ω+ 5.68jΩ
Return Loss	- 24.6dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.043 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG

©Copyright. All rights reserved by CTTL.

In Collaboration with
s p e a g
CALIBRATION LABORATORY

Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com Http://www.chinattl.cn

DASY5 Validation Report for Head TSL Date: 03.11.2014

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 873

Communication System: UID 0, CW; Frequency: 2450 MHz;Duty Cycle: 1:1

Medium parameters used: f = 2450 MHz; σ = 1.842 S/m; ε_r = 40.1; ρ = 1000 kg/m^3

Phantom section: Right Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3617; ConvF(7.19, 7.19, 7.19); Calibrated: 2014-08-28;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1331; Calibrated: 2014-01-23
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1161/1
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

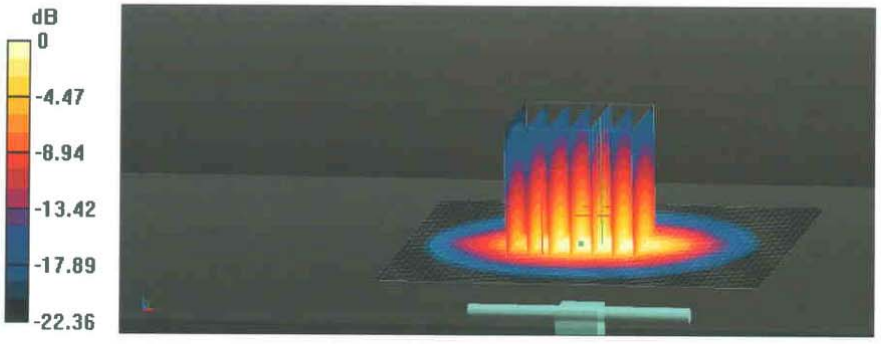
System Performance Check at Frequencies above 1 GHz/d=10mm, Pin=250 mW, dist=2.0mm (EX-Probe)/Zoom Scan (7x7x7) (8x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 103.3 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 27.3 W/kg

SAR(1 g) = 13.5 W/kg; SAR(10 g) = 6.34 W/kg

Maximum value of SAR (measured) = 20.3 W/kg

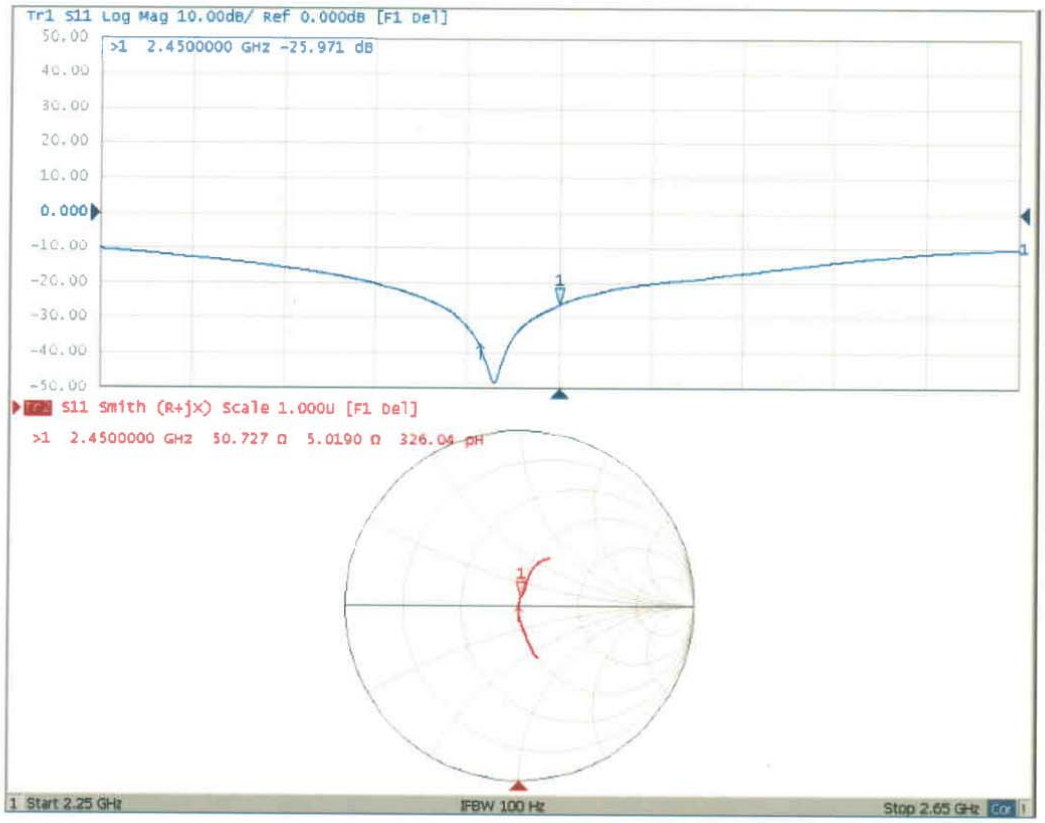


0 dB = 20.3 W/kg = 13.07 dBW/kg

©Copyright. All rights reserved by CTTL.

In Collaboration with
s p e a g
CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com Http://www.chinattl.cn

Impedance Measurement Plot for Head TSL



©Copyright. All rights reserved by CTTL.

In Collaboration with
s p e a g
CALIBRATION LABORATORY

Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com Http://www.chinattl.cn

DASY5 Validation Report for Body TSL Date: 02.11.2014

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 873

Communication System: UID 0, CW; Frequency: 2450 MHz;Duty Cycle: 1:1

Medium parameters used: f = 2450 MHz; σ = 1.991 S/m; ε_r = 51.37; ρ = 1000 kg/m^3

Phantom section: Center Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3617; ConvF(7.31, 7.31, 7.31); Calibrated: 2014-08-28;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1331; Calibrated: 2014-01-23
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1161/1
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

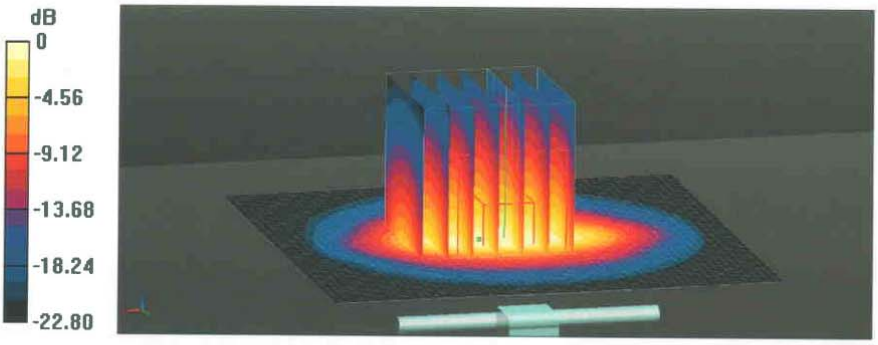
System Performance Check at Frequencies above 1 GHz/d=10mm, Pin=250 mW, dist=2.0mm (EX-Probe)/Zoom Scan (7x7x7) (8x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 100.6 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 27.1 W/kg

SAR(1 g) = 13.2 W/kg; SAR(10 g) = 6.19 W/kg

Maximum value of SAR (measured) = 20.3 W/kg



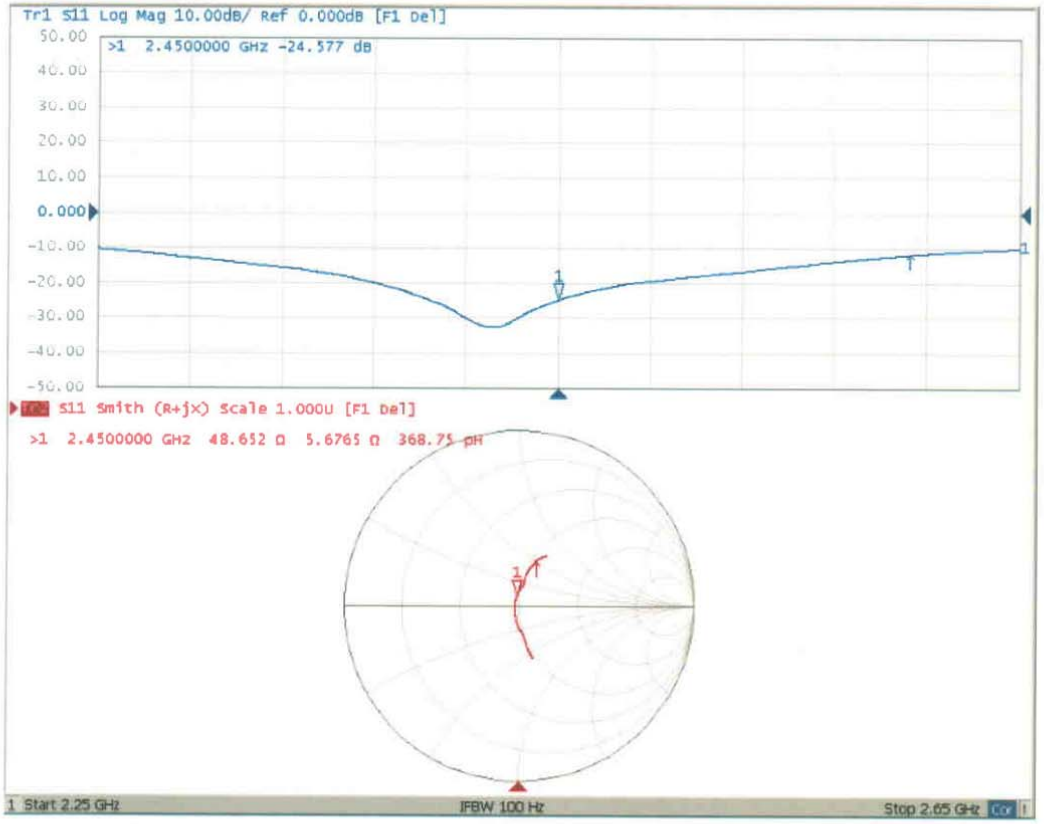
0 dB = 20.3 W/kg = 13.07 dBW/kg

©Copyright. All rights reserved by CTTL.

In Collaboration with
s p e a g
CALIBRATION LABORATORY

Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com Http://www.chinattl.cn

Impedance Measurement Plot for Body TSL



©Copyright. All rights reserved by CTTL.

ANNEX I SPOT CHECK TEST

As the test lab for 4023A from TCL Communication Ltd., we, CTTL Shenzhen, 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 Internal Identification of EUT used during the spot check test

EUT ID*	IMEI	HW Version	SW Version
EUT1	014257000100156	PIO	v7G1D

*EUT ID: is used to identify the test sample in the lab internally.

I.2 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)
	32.93	/	/
GSM 1900MHz	Conducted Power (dBm)		
	Channel 810(1909.8MHz)	Channel 661(1880MHz)	Channel 512(1850.2MHz)
	29.75	/	/

Table I.2: The conducted power results for GPRS

GSM 850 GPRS (GMSK)	Measured Power (dBm)		
	251	**190**	**128**
4 Txslots	26.99	/	/
PCS1900 GPRS (GMSK)	Measured Power (dBm)		
	810	**661**	**512**
4 Txslots	24.31	/	/

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	\	23.44	/	/
Item	**band**	**FDD II result**		
	ARFCN	**9538 (1907.6MHz)**	**9400 (1880MHz)**	**9262 (1852.4MHz)**
WCDMA	\	23.42	/	/

©Copyright. All rights reserved by CTTL.

I.3 Measurement results

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	0.793	0.766

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	0.924	0.852

SAR Values (PCS 1900 MHz Band - Head)

Frequency		Side	Test Position	Battery Type	SAR(1g) (W/kg)	
MHz	Ch.				Original data	Spot check data
1909.8	810	Left	Touch	CAB31P0000C1	0.543	0.342

SAR Values (PCS 1900 MHz Band - Body)

Frequency		Mode/Band	Test Position	Spacing (mm)	Battery Type	SAR(1g) (W/kg)	
MHz	Ch.					Original data	Spot check data
1909.8	810	GPRS	Front	10	CAB31P0000C1	0.572	0.489

SAR Values (WCDMA 850 MHz Band - Head)

Frequency		Side	Test Position	Battery Type	SAR(1g) (W/kg)	
MHz	Ch.				Original data	Spot check data
846.6	4233	Left	Touch	CAB31P0000C1	0.720	0.549

SAR Values (WCDMA 850 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	0.967	0.856

SAR Values (WCDMA 1900 MHz Band - Head)

Frequency		Side	Test Position	Battery Type	SAR(1g) (W/kg)	
MHz	Ch.				Original data	Spot check data
1907.6	9538	Right	Touch	CAB31P0000C1	0.864	0.643

SAR Values (WCDMA 1900 MHz Band - Body)

Frequency		Test Position	Spacing (mm)	Battery Type	SAR(1g) (W/kg)	
MHz	Ch.				Original data	Spot check data
1907.6	9538	Rear	10	CAB31P0000C1	1.10	0.904

©Copyright. All rights reserved by CTTL.

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	0.90	0.83
	PCS 1900	0.62	0.39
	UMTS FDD 2	0.92	0.62
	UMTS FDD 5	0.99	0.73
Body-worn (Separation Distance 10mm)	GSM 850	1.09	0.96
	PCS 1900	0.67	0.57
	UMTS FDD 2	1.23	0.97
	UMTS FDD 5	1.27	1.03

©Copyright. All rights reserved by CTTL.

850 Left Cheek High

Date/Time: 2014-12-25
Electronics: DAE4 Sn786
Medium: Head 900 MHz
Medium parameters used (interpolated): f = 848.8 MHz; σ = 0.937 S/m; ε_r = 41.723; ρ = 1000 kg/m^3
Ambient Temperature:22.7°C Liquid Temperature:22.2°C
Communication System: GSM Frequency: 848.8 MHz Duty Cycle: 1:8.3
Probe: ES3DV3 - SN3151 ConvF(6.04, 6.04, 6.04); Calibrated: 2014-9-1

Left Cheek High/Area Scan (51x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.833 W/kg

Left Cheek High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 13.922 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 0.939 W/kg
SAR(1 g) = 0.766 W/kg; SAR(10 g) = 0.584 W/kg
Maximum value of SAR (measured) = 0.804 W/kg

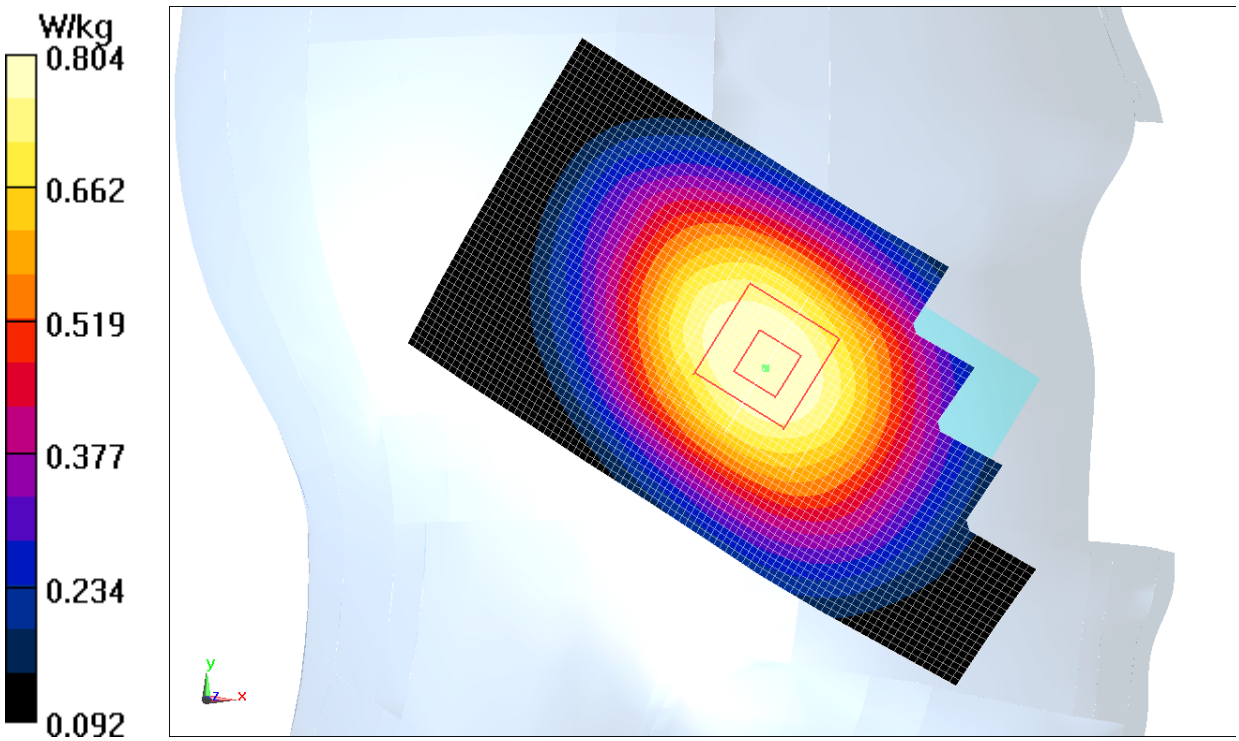


Fig.1 850MHz CH251

©Copyright. All rights reserved by CTTL.

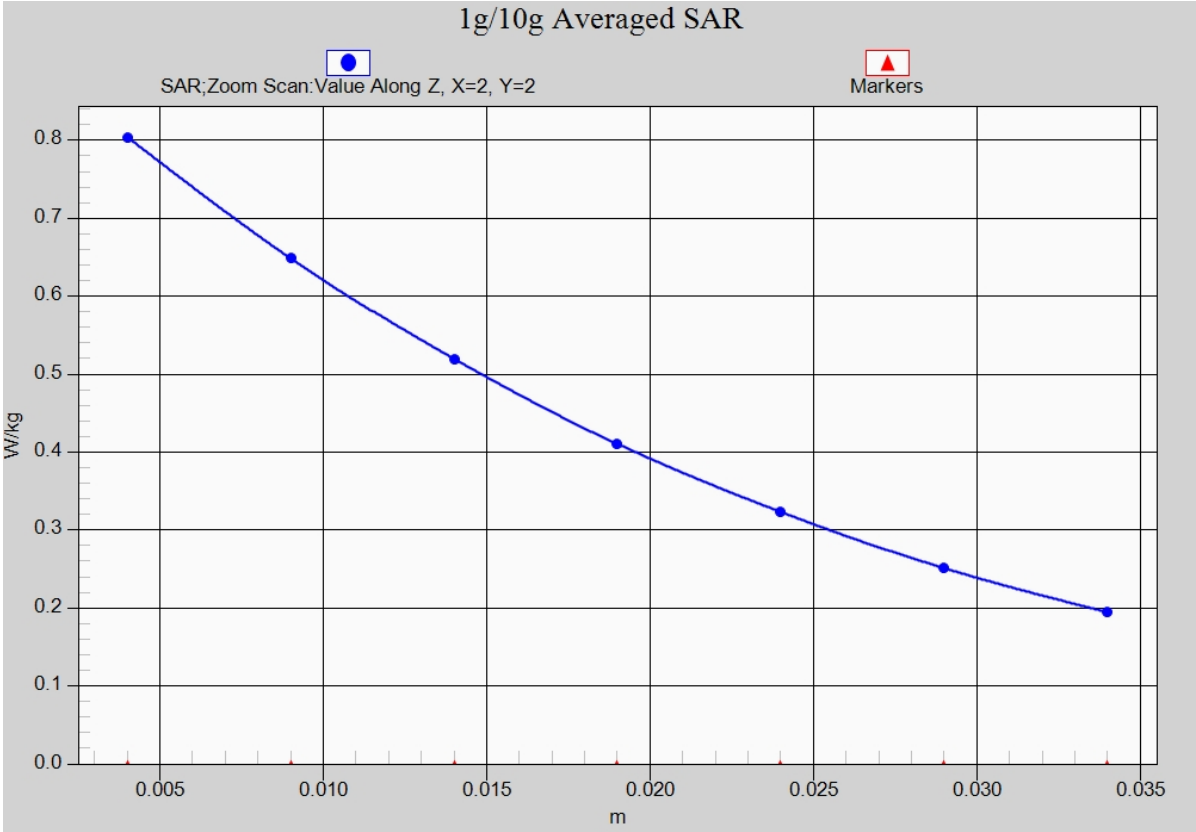


Fig. 1-1 Z-Scan at power reference point (850 MHz CH251)

©Copyright. All rights reserved by CTTL.

850 Body Rear High

Date/Time: 2014-12-25
Electronics: DAE4 Sn786
Medium: Body 900 MHz
Medium parameters used (interpolated): f = 848.8 MHz; σ = 0.987 S/m; ε_r = 52.246; ρ = 1000 kg/m^3
Ambient Temperature:22.9°C Liquid Temperature:22.4°C
Communication System: 4 slot GPRS Frequency: 848.8 MHz Duty Cycle: 1:2.08018
Probe: ES3DV3 - SN3151 ConvF(6.14, 6.14, 6.14); Calibrated: 2014-9-1

Rear side High/Area Scan (51x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.891 W/kg

Rear side High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 28.134 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 1.11 W/kg
SAR(1 g) = 0.852 W/kg; SAR(10 g) = 0.620 W/kg
Maximum value of SAR (measured) = 0.902 W/kg

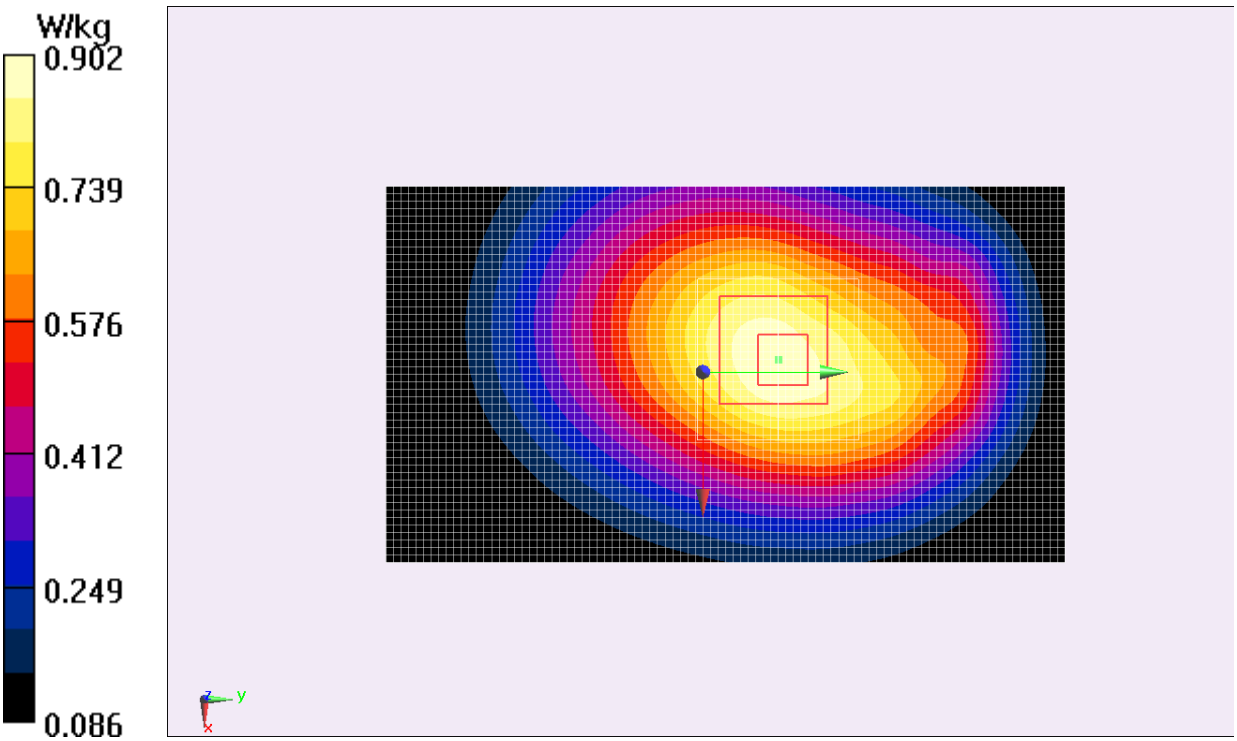


Fig.2 850 MHz CH251

©Copyright. All rights reserved by CTTL.

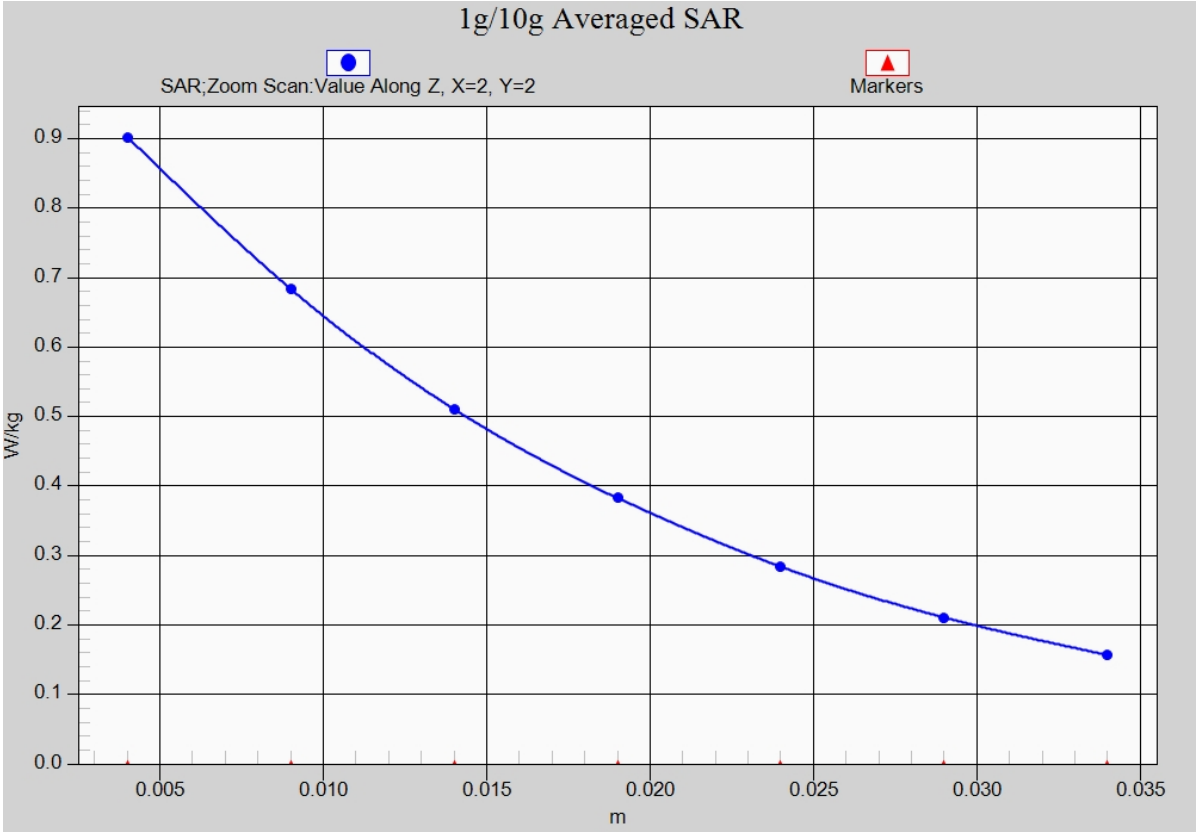


Fig. 2-1 Z-Scan at power reference point (850 MHz CH251)

©Copyright. All rights reserved by CTTL.

GSM1900 Right Cheek High

Date/Time: 2014-12-25
Electronics: DAE4 Sn786
Medium: Head 1900 MHz
Medium parameters used: f = 1910 MHz; σ = 1.45 S/m; ε_r = 41.032; ρ = 1000 kg/m^3
Ambient Temperature:21.7°C Liquid Temperature:21.2°C
Communication System: GSM Frequency: 1910 MHz Duty Cycle: 1:8.3
Probe: ES3DV3 - SN3151 ConvF(5.16, 5.16, 5.16); Calibrated: 2014-9-1

Right Cheek High /Area Scan (51x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.391 W/kg

Right Cheek High /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.889 V/m; Power Drift = 0.19 dB
Peak SAR (extrapolated) = 0.575 W/kg
SAR(1 g) = 0.342 W/kg; SAR(10 g) = 0.191 W/kg
Maximum value of SAR (measured) = 0.377 W/kg

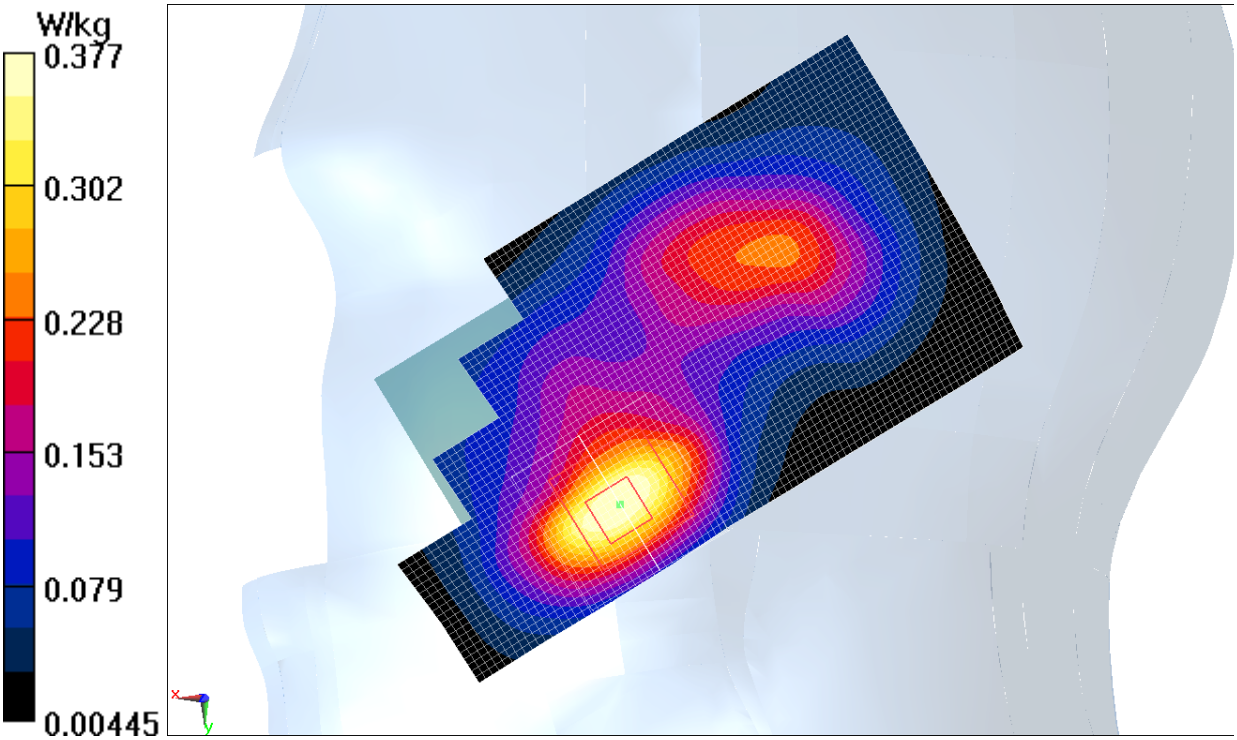


Fig.3 1900 MHz CH810

©Copyright. All rights reserved by CTTL.

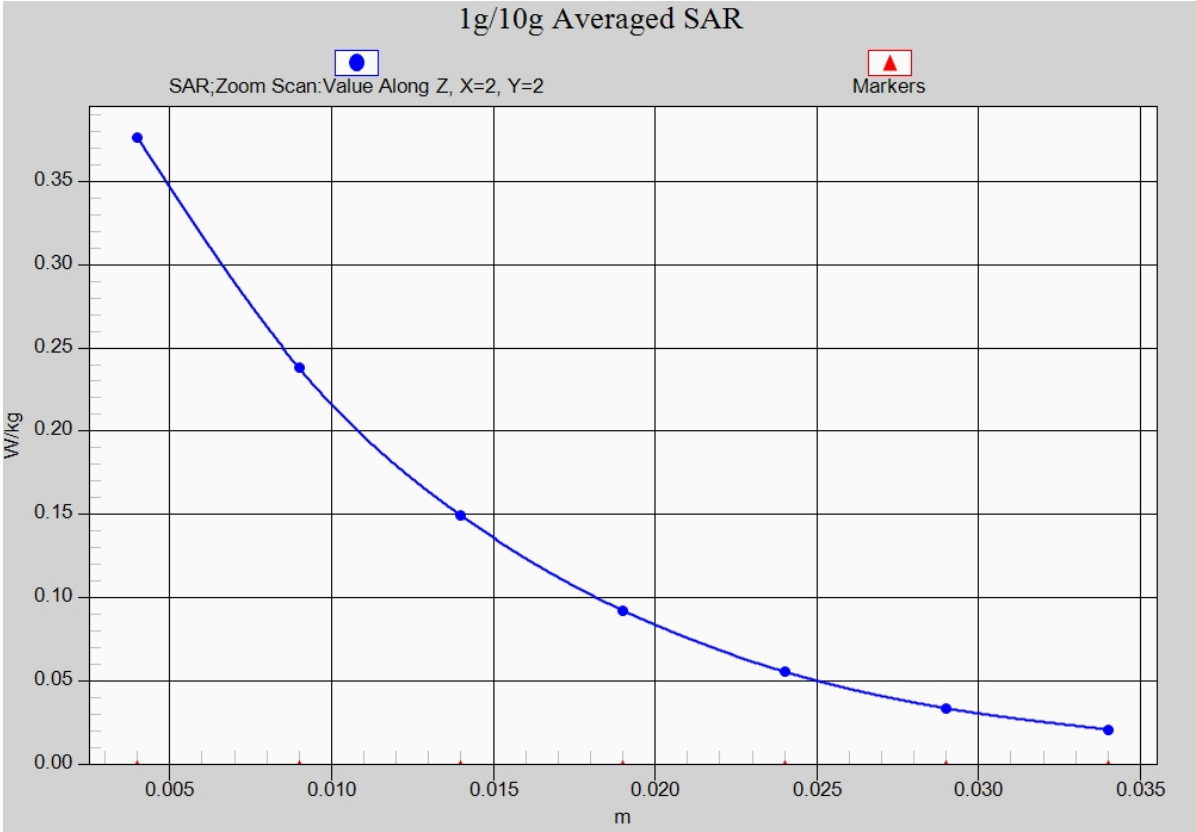


Fig. 3-1 Z-Scan at power reference point (1900 MHz CH810)

©Copyright. All rights reserved by CTTL.

GSM1900 Body Rear High

Date/Time: 2014-12-26
Electronics: DAE4 Sn786
Medium: Body 1900MHz
Medium parameters used: f = 1910 MHz; σ = 1.557 S/m; ε_r = 51.433; ρ = 1000 kg/m^3
Ambient Temperature:21.5°C Liquid Temperature:21.0°C
Communication System: 4 slot GPRS Frequency: 1909.8 MHz Duty Cycle: 1:2.08018
Probe: ES3DV3 - SN3151 ConvF(4.77, 4.77, 4.77); Calibrated: 2014-9-1

Rear side High/Area Scan (51x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.542 W/kg

Rear side High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 8.461 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.789 W/kg
SAR(1 g) = 0.489 W/kg; SAR(10 g) = 0.292 W/kg
Maximum value of SAR (measured) = 0.528 W/kg

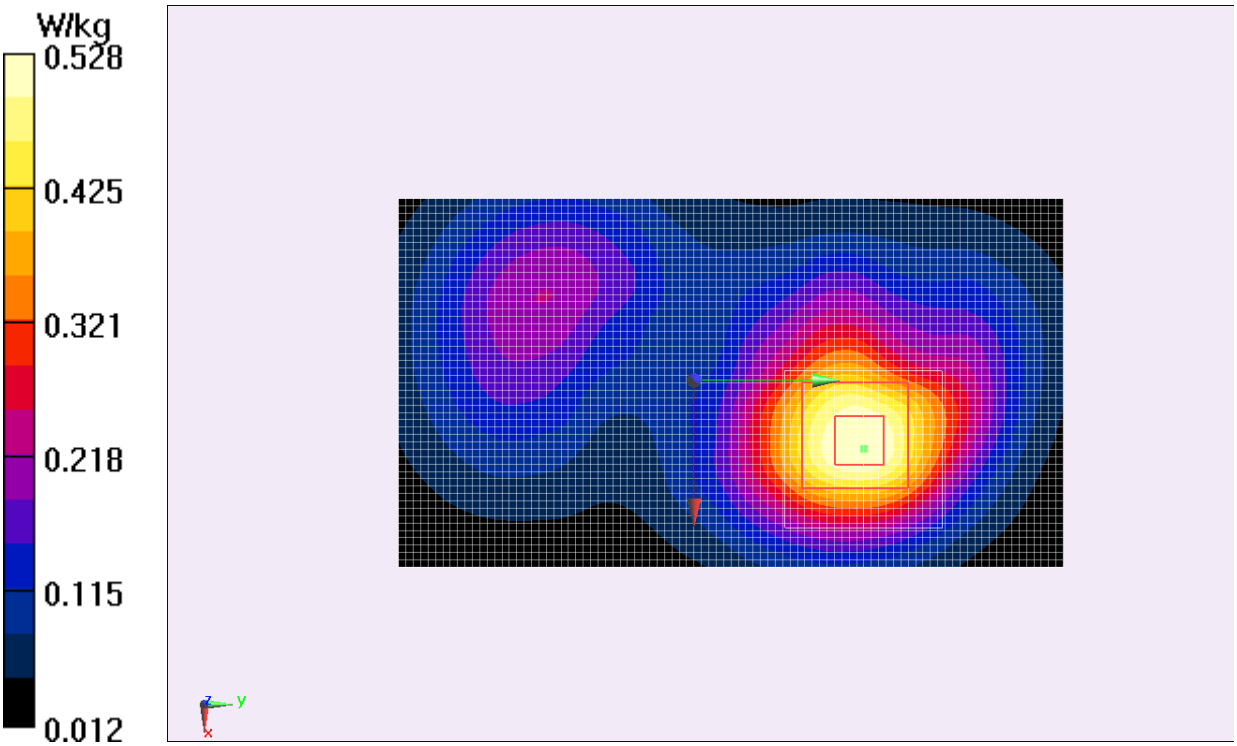


Fig.4 1900 MHz CH810

©Copyright. All rights reserved by CTTL.

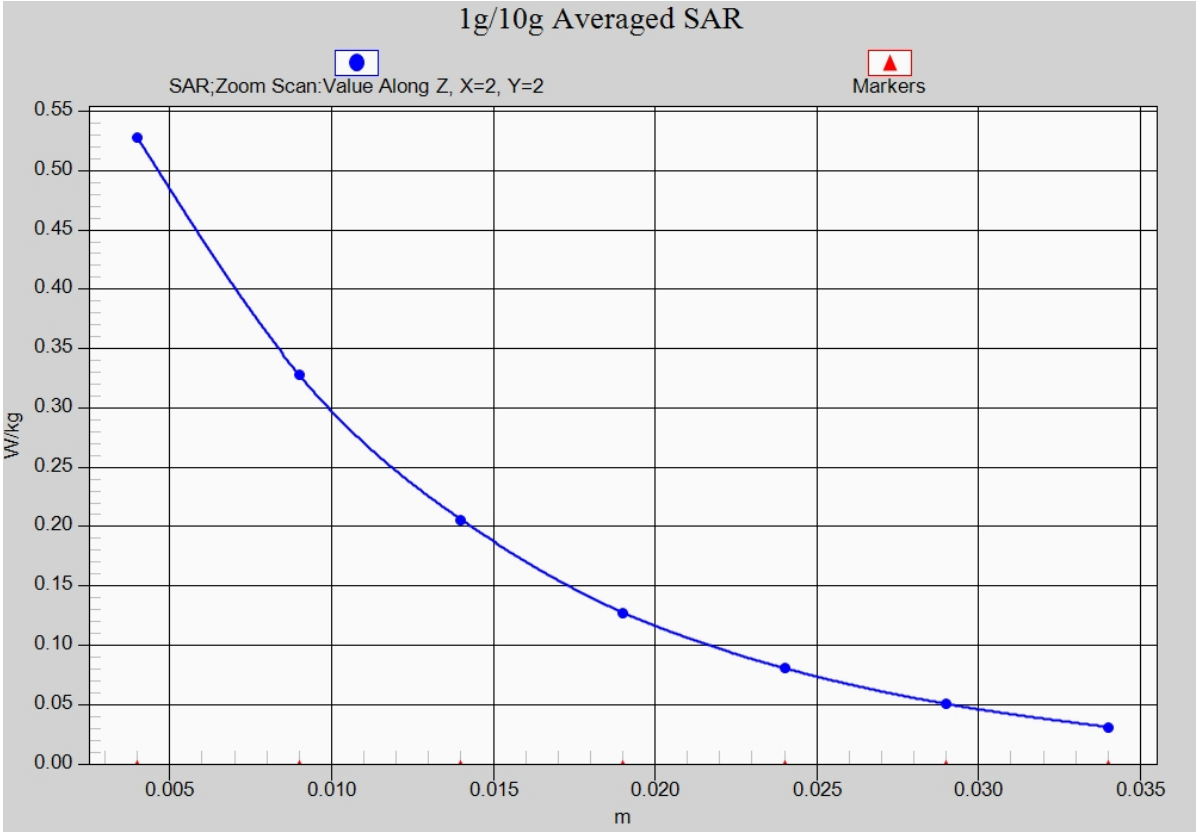


Fig.4-1 Z-Scan at power reference point (1900 MHz CH810)

©Copyright. All rights reserved by CTTL.

WCDMA 850 Left Cheek High

Date/Time: 2014-12-25
Electronics: DAE4 Sn786
Medium: Head 900 MHz
Medium parameters used (interpolated): f = 846.6 MHz; σ = 0.937S/m; ε_r = 41.741; ρ = 1000 kg/m^3
Ambient Temperature:21.6°C Liquid Temperature:21.1°C
Communication System: WCDMA Frequency: 846.6 MHz Duty Cycle: 1:1
Probe: ES3DV3 - SN3151 ConvF(6.04, 6.04, 6.04); Calibrated: 2014-9-1

Left Cheek High/Area Scan (51x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.547 W/kg

Left Cheek High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.863 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 0.695 W/kg
SAR(1 g) = 0.549 W/kg; SAR(10 g) = 0.401 W/kg
Maximum value of SAR (measured) = 0.579 W/kg

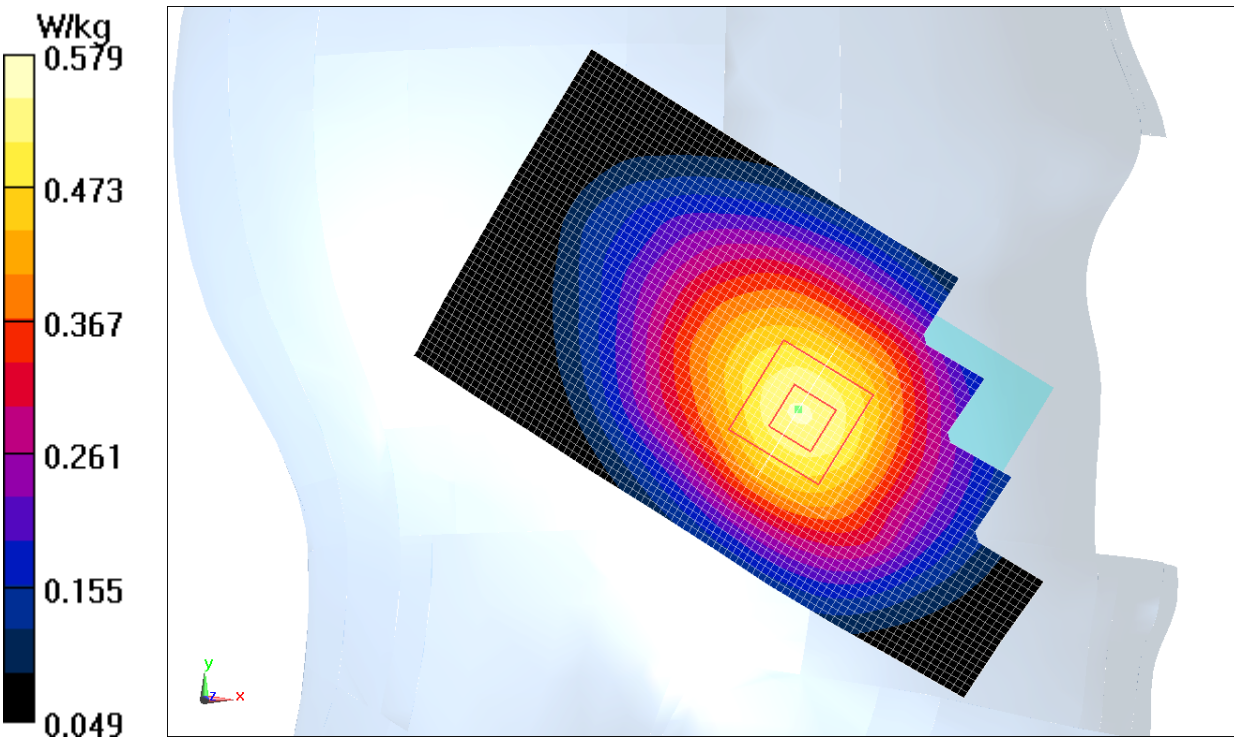


Fig.5 WCDMA 850 CH4233

©Copyright. All rights reserved by CTTL.

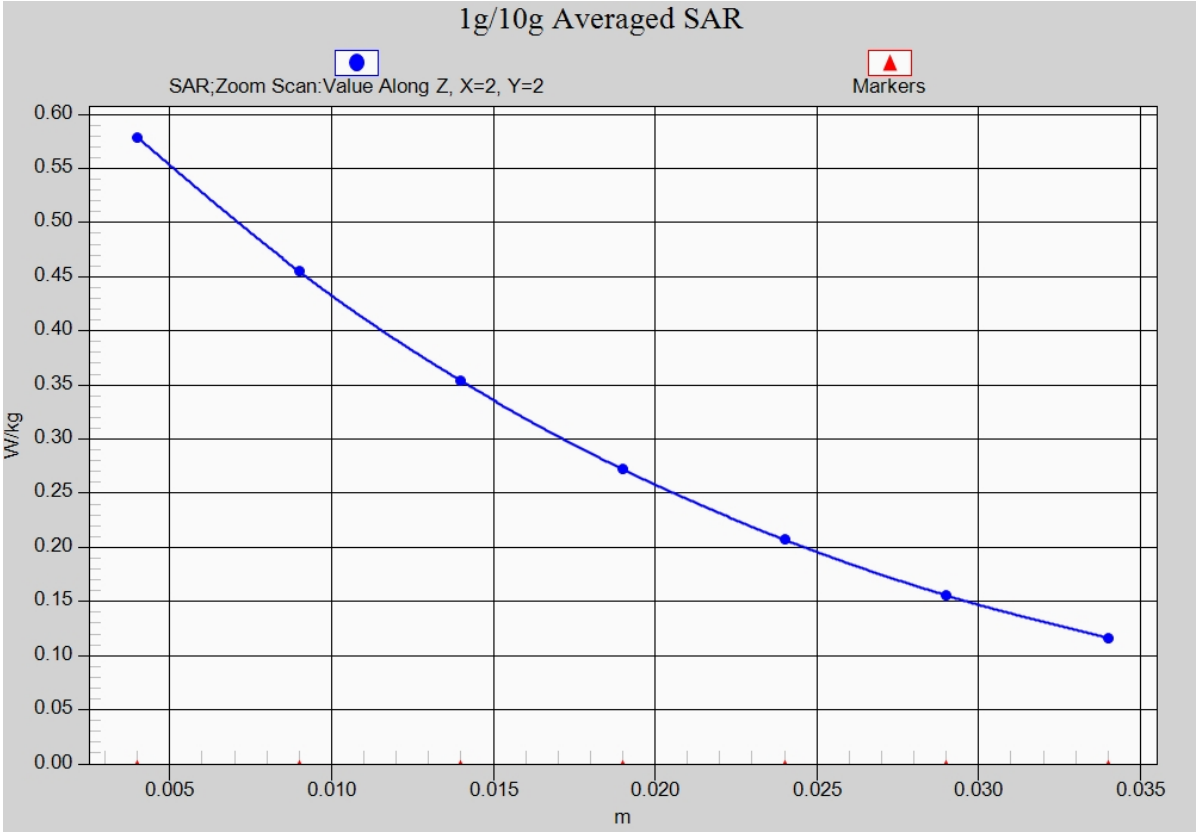


Fig. 5-1 Z-Scan at power reference point (WCDMA 850 CH4233)

©Copyright. All rights reserved by CTTL.

WCDMA 850 Body Rear High

Date/Time: 2014-12-25
Electronics: DAE4 Sn786
Medium: Body 900 MHz
Medium parameters used (interpolated): f = 846.6 MHz; σ = 0.996 S/m; ε_r = 52.245; ρ = 1000 kg/m^3
Ambient Temperature:21.9°C Liquid Temperature:21.4°C
Communication System: WCDMA Frequency: 846.6 MHz Duty Cycle: 1:1
Probe: ES3DV3 - SN3151 ConvF(6.14, 6.14, 6.14); Calibrated: 2014-9-1

Rear side High/Area Scan (51x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.899 W/kg

Rear side High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 28.262 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 1.13 W/kg
SAR(1 g) = 0.856 W/kg; SAR(10 g) = 0.618 W/kg

Maximum value of SAR (measured) = 0.902 W/kg

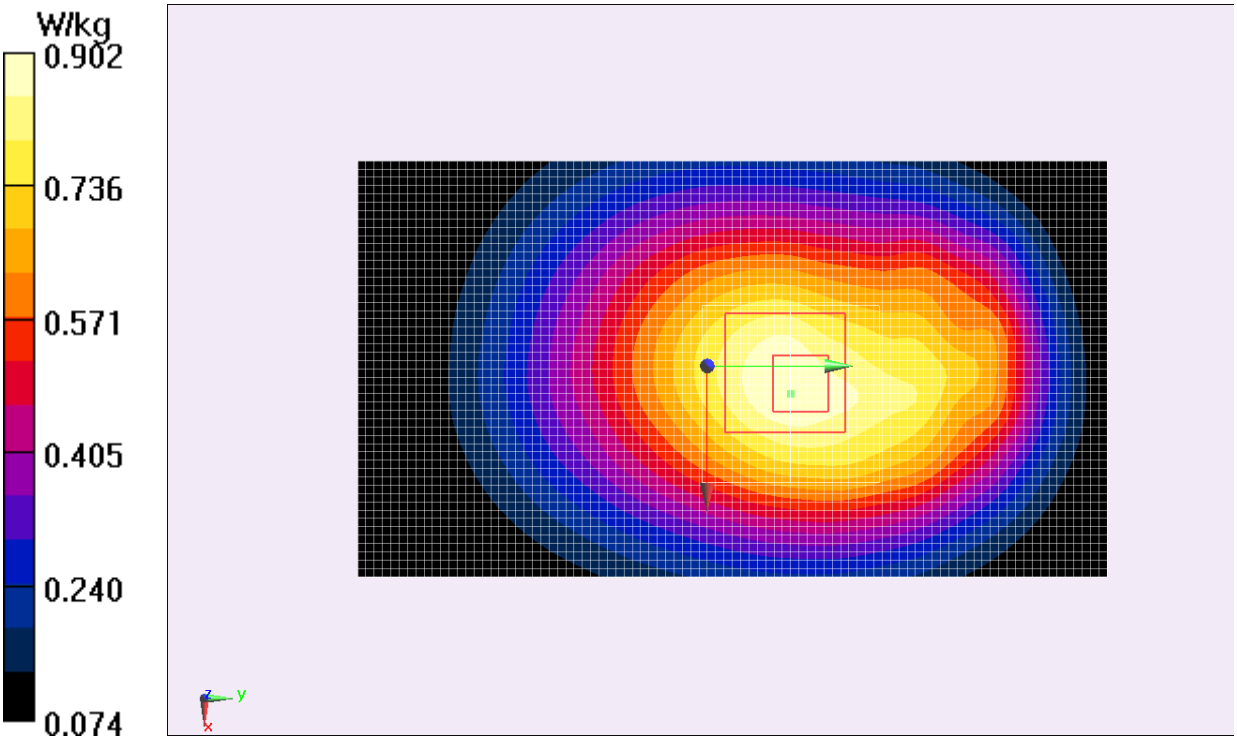


Fig.6 WCDMA 850 CH4233

©Copyright. All rights reserved by CTTL.

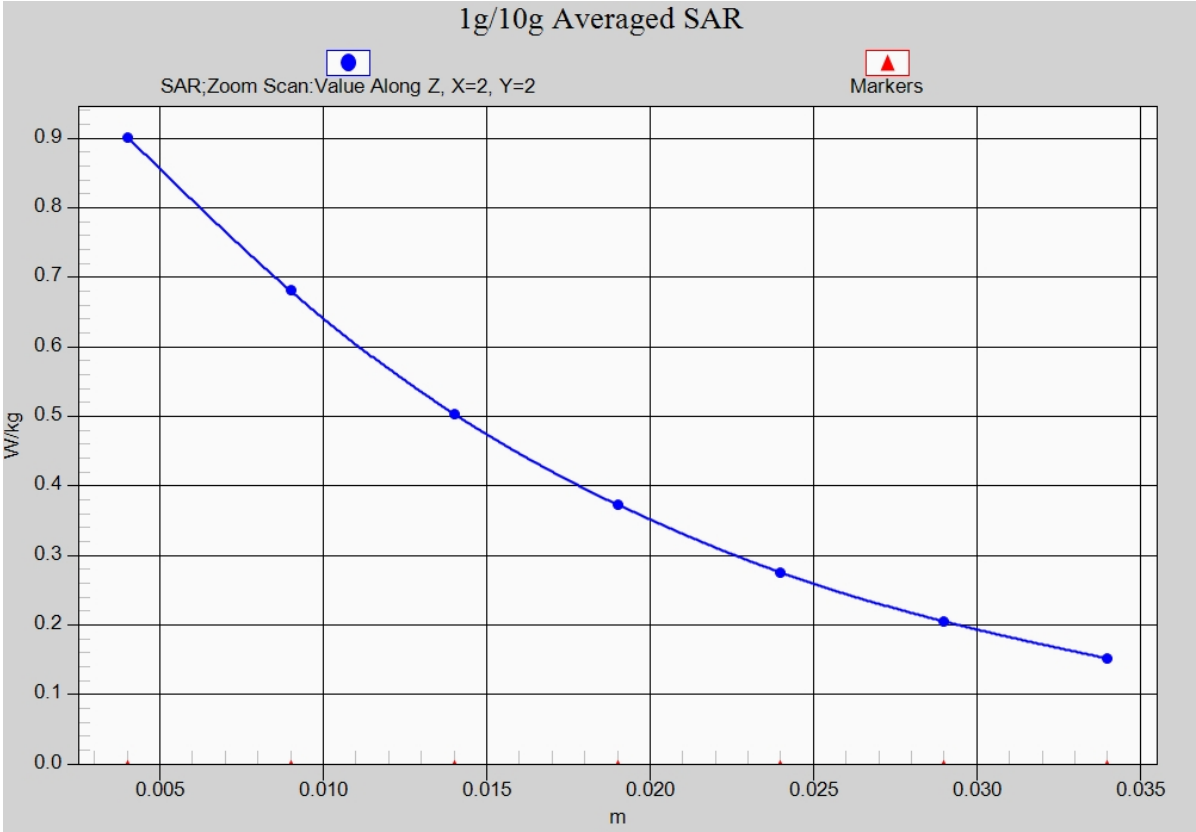


Fig. 6-1 Z-Scan at power reference point (WCDMA850 CH4233)

©Copyright. All rights reserved by CTTL.

WCDMA 1900 Right Cheek High

Date/Time: 2014-12-25
Electronics: DAE4 Sn786
Medium: Head 1900
Medium parameters used: f = 1908 MHz; σ = 1.452 S/m; ε_r = 41.035; ρ = 1000 kg/m^3
Ambient Temperature:21.8°C Liquid Temperature:21.3°C
Communication System: WCDMA Frequency: 1908 MHz Duty Cycle: 1:1
Probe: ES3DV3 - SN3151 ConvF(5.16, 5.16, 5.16); Calibrated: 2014-9-1

Right Cheek High /Area Scan (51x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.718 W/kg

Right Cheek High /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.907 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 1.04 W/kg
SAR(1 g) = 0.643 W/kg; SAR(10 g) = 0.376 W/kg
Maximum value of SAR (measured) = 0.688 W/kg

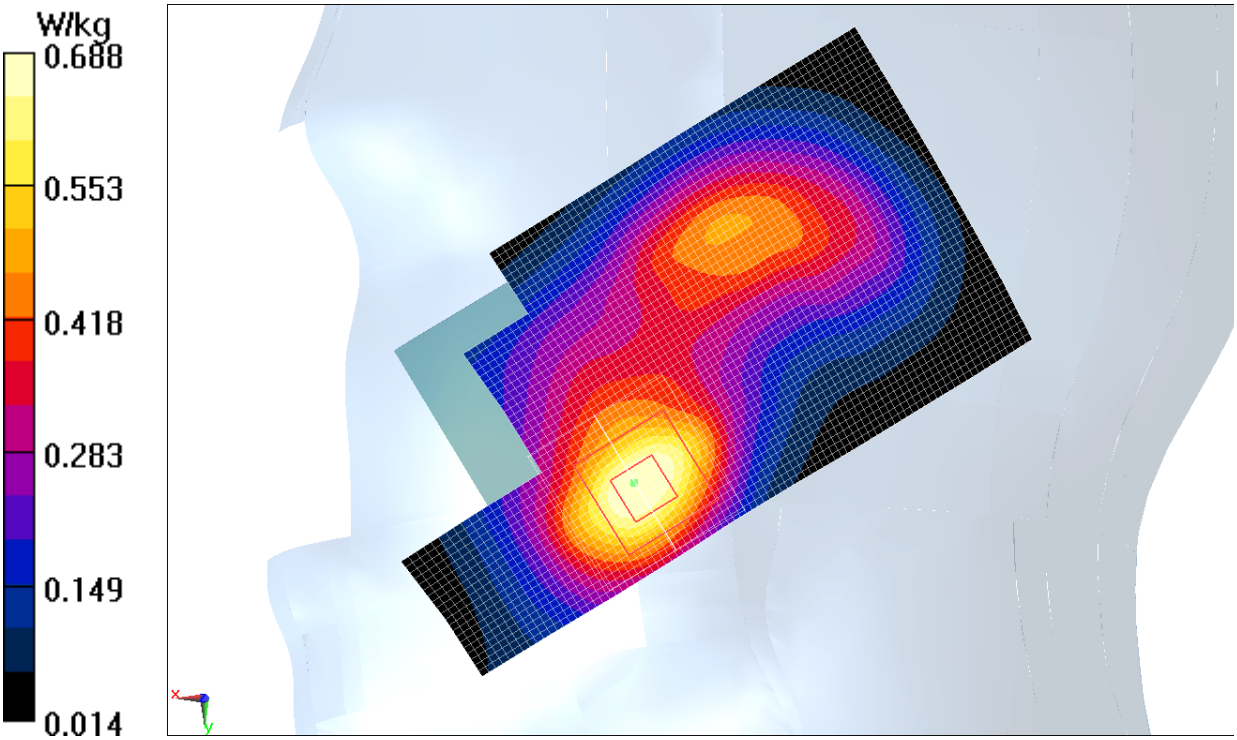


Fig.7 WCDMA1900 CH9538

©Copyright. All rights reserved by CTTL.

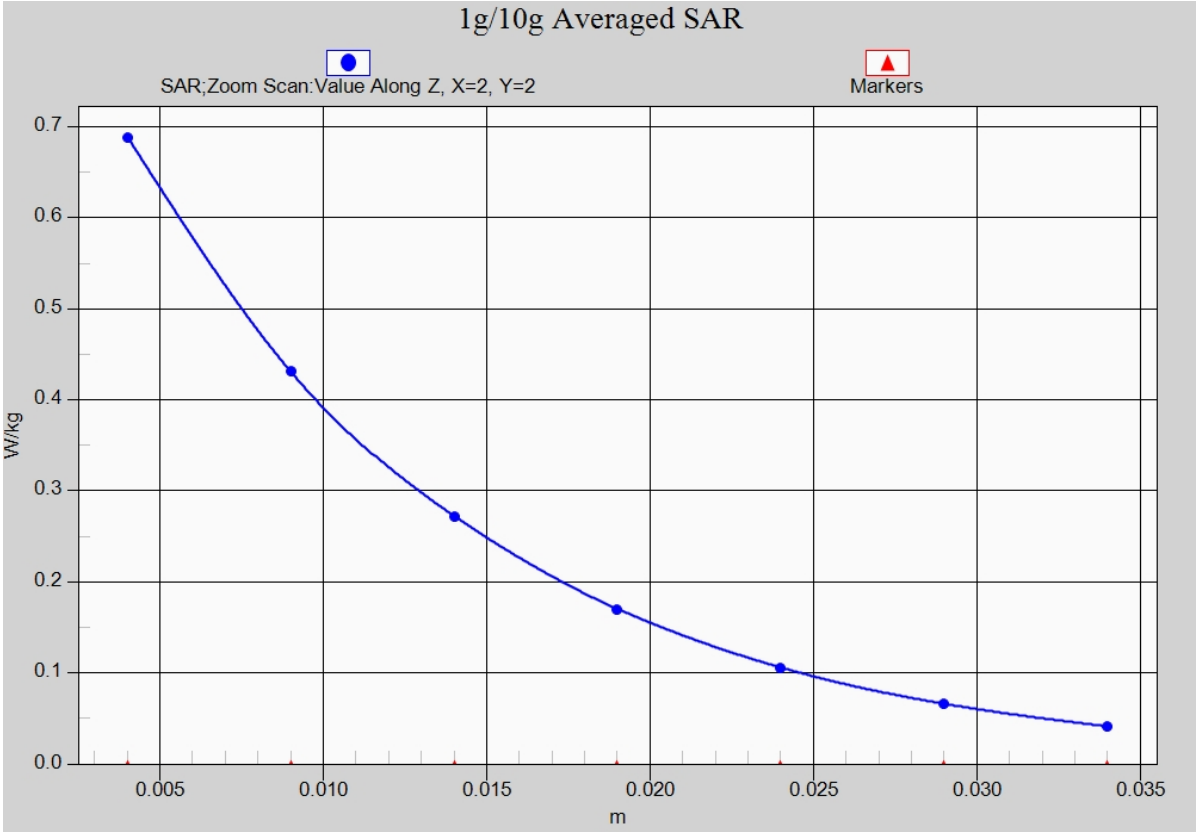


Fig. 7-1 Z-Scan at power reference point (WCDMA1900 CH9538)

©Copyright. All rights reserved by CTTL.

WCDMA 1900 Body Rear High

Date/Time: 2014-12-26
Electronics: DAE4 Sn786
Medium: Body 1900MHz
Medium parameters used: f = 1908 MHz; σ = 1.557 S/m; ε_r = 51. 431; ρ = 1000 kg/m^3
Ambient Temperature:21.5°C Liquid Temperature:21.0°C
Communication System: WCDMA Frequency: 1908 MHz Duty Cycle: 1:1
Probe: ES3DV3 - SN3151 ConvF(4.77, 4.77, 4.77); Calibrated: 2014-9-1

Rear side Middle High/Area Scan (51x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 1.02 W/kg

Rear side Middle High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.133 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 1.48 W/kg
SAR(1 g) = 0.904 W/kg; SAR(10 g) = 0.540 W/kg
Maximum value of SAR (measured) = 0.974 W/kg

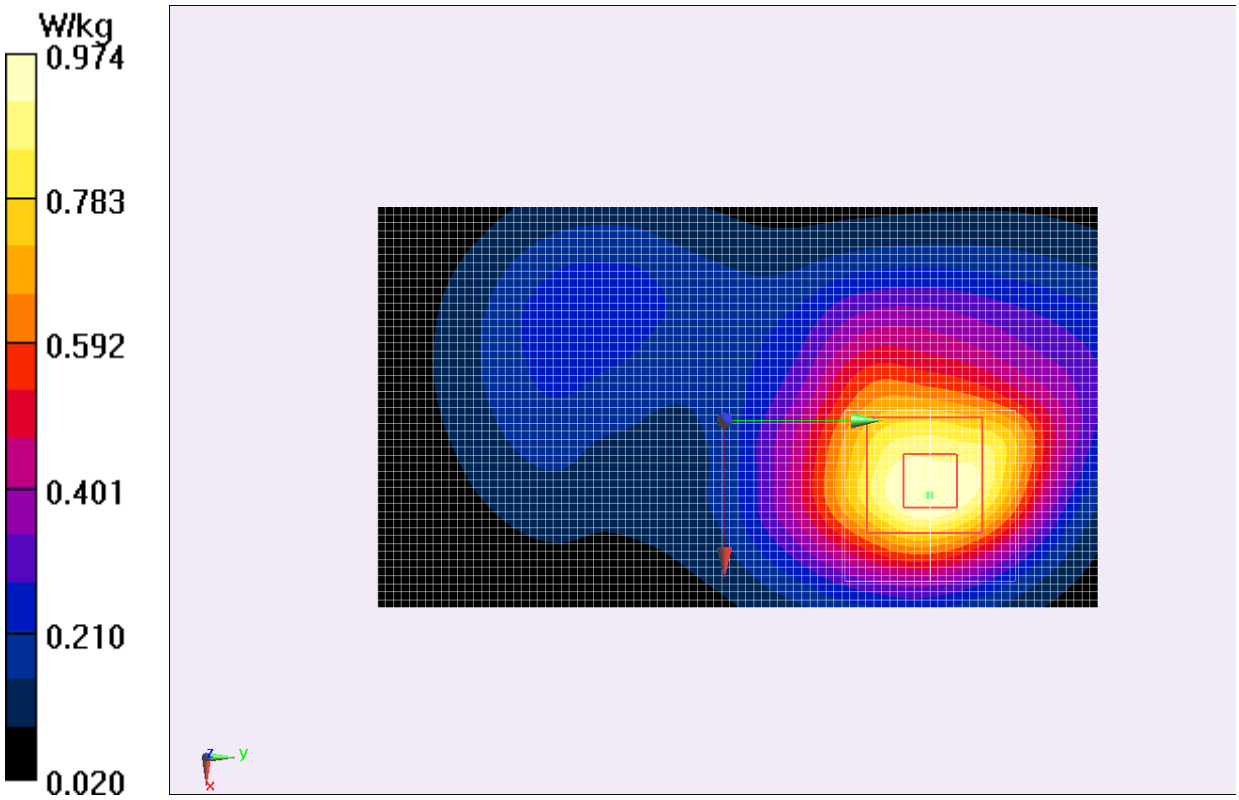


Fig.8 WCDMA1900 CH9538

©Copyright. All rights reserved by CTTL.

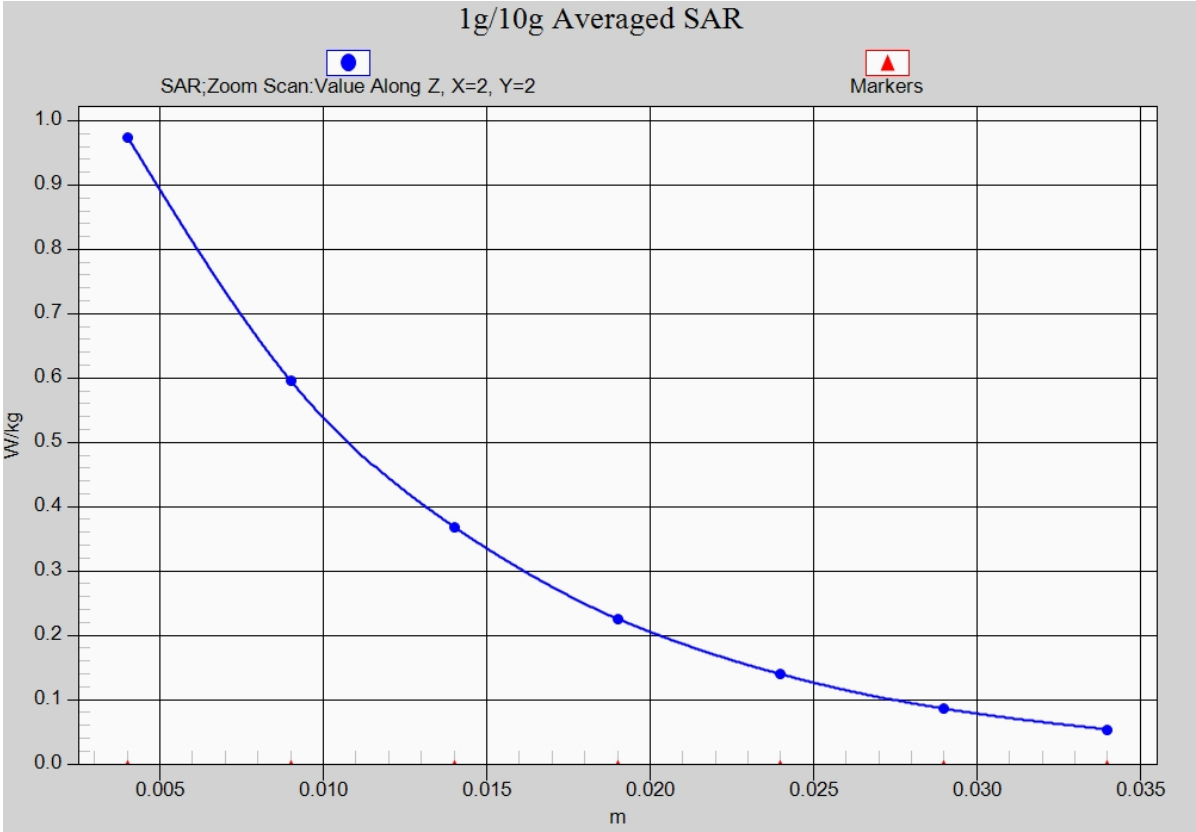


Fig. 8-1 Z-Scan at power reference point (WCDMA1900 CH9538)

©Copyright. All rights reserved by CTTL.