

Combined standard uncertainty	$u_c' = \sqrt{\sum_{i=1}^{21} c_i^2 u_i^2}$					9.25	9.12	257
Expanded uncertainty (confidence interval of 95 %)	$u_e = 2u_c$					18.5	18.2	

16.2 Measurement Uncertainty for Normal SAR Tests (3~6GHz)

No.	Error Description	Type	Uncertainty value	Probably Distribution	Div.	(Ci) 1g	(Ci) 10g	Std. Unc. (1g)	Std. Unc. (10g)	Degree of freedom
Measurement system										
1	Probe calibration	B	6.5	N	1	1	1	6.5	6.5	∞
2	Isotropy	B	4.7	R	$\sqrt{3}$	0.7	0.7	1.9	1.9	∞
3	Boundary effect	B	2.0	R	$\sqrt{3}$	1	1	1.2	1.2	∞
4	Linearity	B	4.7	R	$\sqrt{3}$	1	1	2.7	2.7	∞
5	Detection limit	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
6	Readout electronics	B	0.3	R	$\sqrt{3}$	1	1	0.3	0.3	∞
7	Response time	B	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	∞
8	Integration time	B	2.6	R	$\sqrt{3}$	1	1	1.5	1.5	∞
9	RF ambient conditions-noise	B	0	R	$\sqrt{3}$	1	1	0	0	∞
10	RF ambient conditions-reflection	B	0	R	$\sqrt{3}$	1	1	0	0	∞
11	Probe positioned mech. restrictions	B	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	∞
12	Probe positioning with respect to phantom shell	B	6.7	R	$\sqrt{3}$	1	1	3.9	3.9	∞
13	Post-processing	B	4.0	R	$\sqrt{3}$	1	1	2.3	2.3	∞
Test sample related										
14	Test sample positioning	A	3.3	N	1	1	1	3.3	3.3	71
15	Device holder uncertainty	A	3.4	N	1	1	1	3.4	3.4	5
16	Drift of output power	B	5.0	R	$\sqrt{3}$	1	1	2.9	2.9	∞
Phantom and set-up										
17	Phantom uncertainty	B	4.0	R	$\sqrt{3}$	1	1	2.3	2.3	∞
18	Liquid conductivity (target)	B	5.0	R	$\sqrt{3}$	0.64	0.43	1.8	1.2	∞
19	Liquid conductivity (meas.)	A	2.06	N	1	0.64	0.43	1.32	0.89	43

20	Liquid permittivity (target)	B	5.0	R	$\sqrt{3}$	0.6	0.49	1.7	1.4	∞
21	Liquid permittivity (meas.)	A	1.6	N	1	0.6	0.49	1.0	0.8	521
Combined standard uncertainty		$u_c' = \sqrt{\sum_{i=1}^{21} c_i^2 u_i^2}$						10.8	10.7	257
Expanded uncertainty (confidence interval of 95 %)		$u_e = 2u_c$						21.6	21.4	

16.3 Measurement Uncertainty for Fast SAR Tests (300MHz~3GHz)

No.	Error Description	Type	Uncertainty value	Probably Distribution	Div.	(Ci) 1g	(Ci) 10g	Std. Unc. (1g)	Std. Unc. (10g)	Degree of freedom
Measurement system										
1	Probe calibration	B	5.5	N	1	1	1	5.5	5.5	∞
2	Isotropy	B	4.7	R	$\sqrt{3}$	0.7	0.7	1.9	1.9	∞
3	Boundary effect	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
4	Linearity	B	4.7	R	$\sqrt{3}$	1	1	2.7	2.7	∞
5	Detection limit	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
6	Readout electronics	B	0.3	R	$\sqrt{3}$	1	1	0.3	0.3	∞
7	Response time	B	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	∞
8	Integration time	B	2.6	R	$\sqrt{3}$	1	1	1.5	1.5	∞
9	RF ambient conditions-noise	B	0	R	$\sqrt{3}$	1	1	0	0	∞
10	RF ambient conditions-reflection	B	0	R	$\sqrt{3}$	1	1	0	0	∞
11	Probe positioned mech. Restrictions	B	0.4	R	$\sqrt{3}$	1	1	0.2	0.2	∞
12	Probe positioning with respect to phantom shell	B	2.9	R	$\sqrt{3}$	1	1	1.7	1.7	∞
13	Post-processing	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
14	Fast SAR z-Approximation	B	7.0	R	$\sqrt{3}$	1	1	4.0	4.0	∞
Test sample related										
15	Test sample positioning	A	3.3	N	1	1	1	3.3	3.3	71
16	Device holder uncertainty	A	3.4	N	1	1	1	3.4	3.4	5
17	Drift of output power	B	5.0	R	$\sqrt{3}$	1	1	2.9	2.9	∞

Phantom and set-up										
18	Phantom uncertainty	B	4.0	R	$\sqrt{3}$	1	1	2.3	2.3	∞
19	Liquid conductivity (target)	B	5.0	R	$\sqrt{3}$	0.64	0.43	1.8	1.2	∞
20	Liquid conductivity (meas.)	A	2.06	N	1	0.64	0.43	1.32	0.89	43
21	Liquid permittivity (target)	B	5.0	R	$\sqrt{3}$	0.6	0.49	1.7	1.4	∞
22	Liquid permittivity (meas.)	A	1.6	N	1	0.6	0.49	1.0	0.8	521
Combined standard uncertainty		$u_c' = \sqrt{\sum_{i=1}^{22} c_i^2 u_i^2}$						10.1	9.95	257
Expanded uncertainty (confidence interval of 95 %)		$u_e = 2u_c$						20.2	19.9	

16.4 Measurement Uncertainty for Fast SAR Tests (3~6GHz)

No.	Error Description	Type	Uncertainty value	Probably Distribution	Div.	(Ci) 1g	(Ci) 10g	Std. Unc. (1g)	Std. Unc. (10g)	Degree of freedom
Measurement system										
1	Probe calibration	B	6.5	N	1	1	1	6.5	6.5	∞
2	Isotropy	B	4.7	R	$\sqrt{3}$	0.7	0.7	1.9	1.9	∞
3	Boundary effect	B	2.0	R	$\sqrt{3}$	1	1	1.2	1.2	∞
4	Linearity	B	4.7	R	$\sqrt{3}$	1	1	2.7	2.7	∞
5	Detection limit	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
6	Readout electronics	B	0.3	R	$\sqrt{3}$	1	1	0.3	0.3	∞
7	Response time	B	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	∞
8	Integration time	B	2.6	R	$\sqrt{3}$	1	1	1.5	1.5	∞
9	RF ambient conditions-noise	B	0	R	$\sqrt{3}$	1	1	0	0	∞
10	RF ambient conditions-reflection	B	0	R	$\sqrt{3}$	1	1	0	0	∞
11	Probe positioned mech. Restrictions	B	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	∞
12	Probe positioning with respect to phantom shell	B	6.7	R	$\sqrt{3}$	1	1	3.9	3.9	∞
13	Post-processing	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
14	Fast SAR z-Approximation	B	14.0	R	$\sqrt{3}$	1	1	8.1	8.1	∞
Test sample related										

15	Test sample positioning	A	3.3	N	1	1	1	3.3	3.3	71
16	Device holder uncertainty	A	3.4	N	1	1	1	3.4	3.4	5
17	Drift of output power	B	5.0	R	$\sqrt{3}$	1	1	2.9	2.9	∞
Phantom and set-up										
18	Phantom uncertainty	B	4.0	R	$\sqrt{3}$	1	1	2.3	2.3	∞
19	Liquid conductivity (target)	B	5.0	R	$\sqrt{3}$	0.64	0.43	1.8	1.2	∞
20	Liquid conductivity (meas.)	A	2.06	N	1	0.64	0.43	1.32	0.89	43
21	Liquid permittivity (target)	B	5.0	R	$\sqrt{3}$	0.6	0.49	1.7	1.4	∞
22	Liquid permittivity (meas.)	A	1.6	N	1	0.6	0.49	1.0	0.8	521
Combined standard uncertainty		$u_c' = \sqrt{\sum_{i=1}^{22} c_i^2 u_i^2}$						13.3	13.2	257
Expanded uncertainty (confidence interval of 95 %)		$u_e = 2u_c$						26.6	26.4	

17 MAIN TEST INSTRUMENTS

Table 17.1: List of Main Instruments

No.	Name	Type	Serial Number	Calibration Date	Valid Period
01	Network analyzer	E5071C	MY46110673	February 03, 2015	One year
02	Power meter	NRVD	102196	March 03, 2015	One year
03	Power sensor	NRV-Z5	100596		
04	Signal Generator	E4438C	MY49071430	February 02, 2015	One Year
05	Amplifier	60S1G4	0331848	No Calibration Requested	
06	BTS	E5515C	MY50263375	January 30, 2015	One year
07	BTS	CMW500	129942	March 03, 2015	One year
08	E-field Probe	SPEAG EX3DV4	3846	September 24, 2014	One year
09	DAE	SPEAG DAE4	777	September 17, 2014	One year
10	Dipole Validation Kit	SPEAG D750V3	1017	July 23, 2015	One year
11	Dipole Validation Kit	SPEAG D835V2	4d069	July 23, 2015	One year
12	Dipole Validation Kit	SPEAG D1750V2	1003	July 16, 2015	One year
13	Dipole Validation Kit	SPEAG D1900V2	5d101	July 23, 2015	One year
14	Dipole Validation Kit	SPEAG D2450V2	853	July 24, 2014	One year
15	Dipole Validation Kit	SPEAG D2450V2	853	July 24, 2015	One year
16	Dipole Validation Kit	SPEAG D2600V2	1012	July 24, 2015	One year

END OF REPORT BODY

ANNEX A Graph Results

850 Left Cheek Middle

Date: 2015-8-31

Electronics: DAE4 Sn777

Medium: Head 850 MHz

Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.931$ mho/m; $\epsilon_r = 42.949$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C

Communication System: GSM 850 Frequency: 836.6 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) = 0.536 W/kg

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

Reference Value = 9.583 V/m; Power Drift = -0.16 dB

Peak SAR (extrapolated) = 0.647 W/kg

SAR(1 g) = 0.495 W/kg; SAR(10 g) = 0.370 W/kg

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

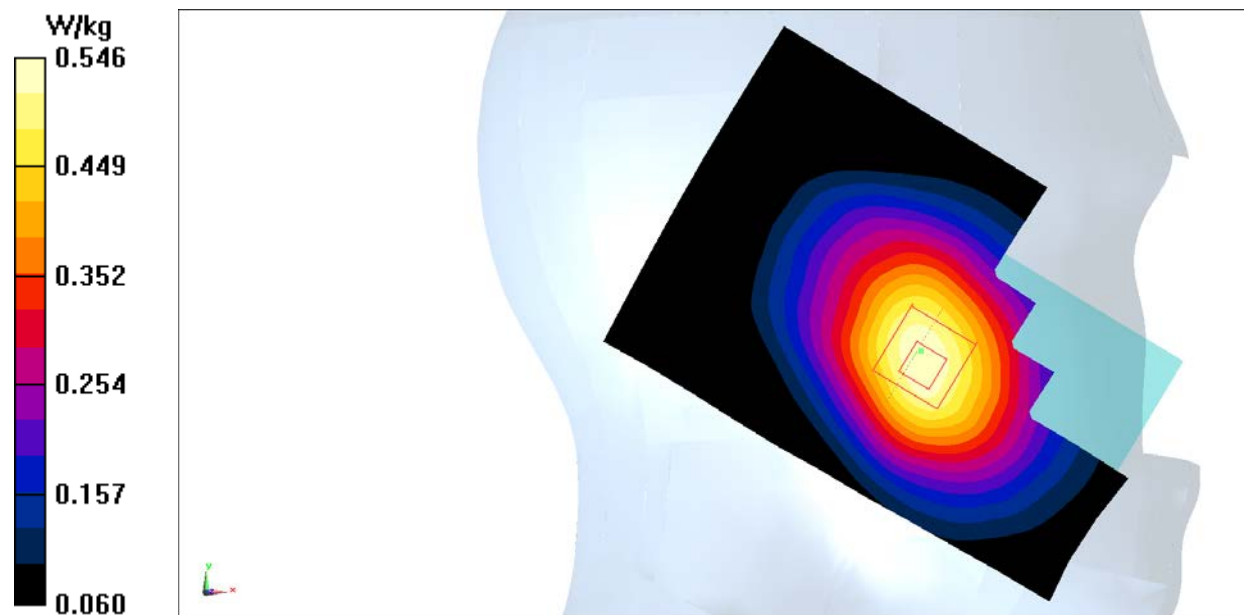


Fig.1 850MHz

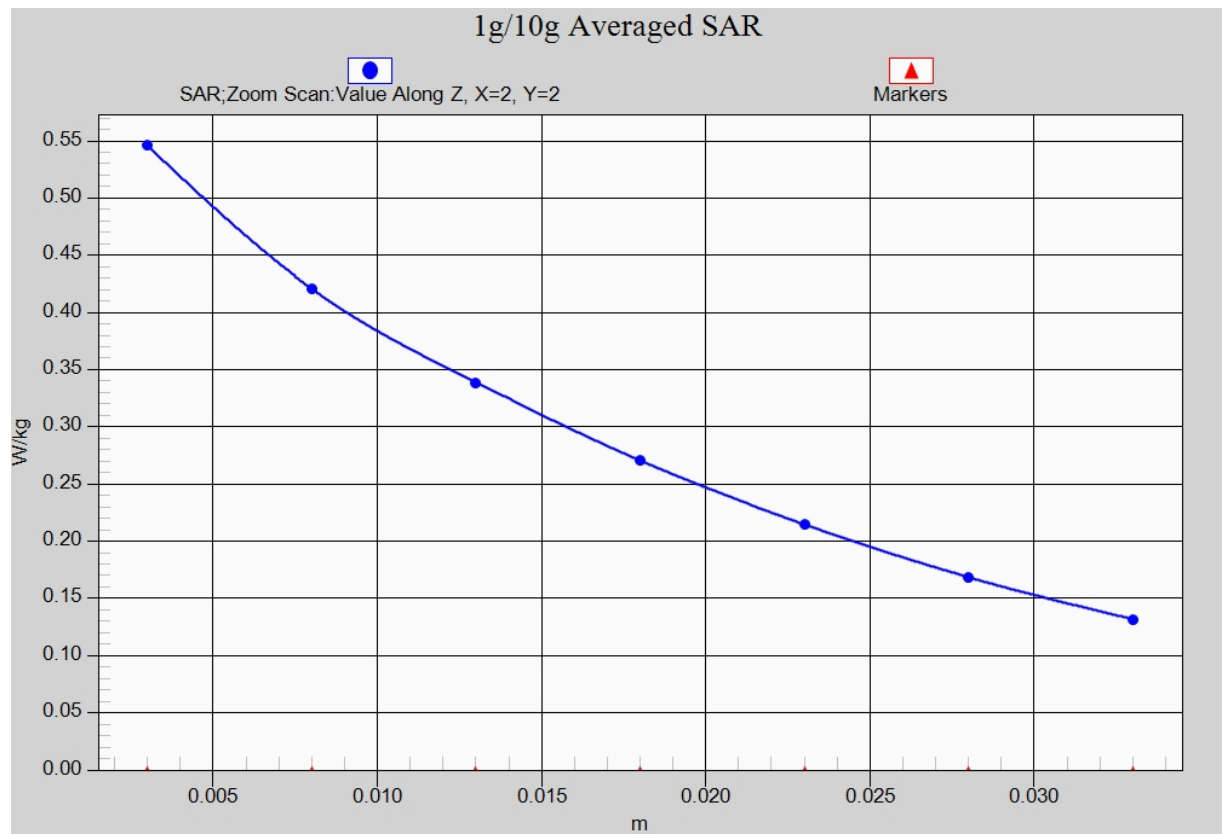


Fig. 1-1 Z-Scan at power reference point (850 MHz)

850 Body Rear Low

Date: 2015-8-31

Electronics: DAE4 Sn777

Medium: Body 850 MHz

Medium parameters used: $f = 825$ MHz; $\sigma = 0.989$ mho/m; $\epsilon_r = 53.561$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C

Communication System: GSM 850 GPRS Frequency: 824.2 MHz Duty Cycle: 1:2

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) = 0.911 W/kg

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

Reference Value = 29.91 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 1.02 W/kg

SAR(1 g) = 0.799 W/kg; SAR(10 g) = 0.603 W/kg

Maximum value of SAR (measured) = 0.836 W/kg

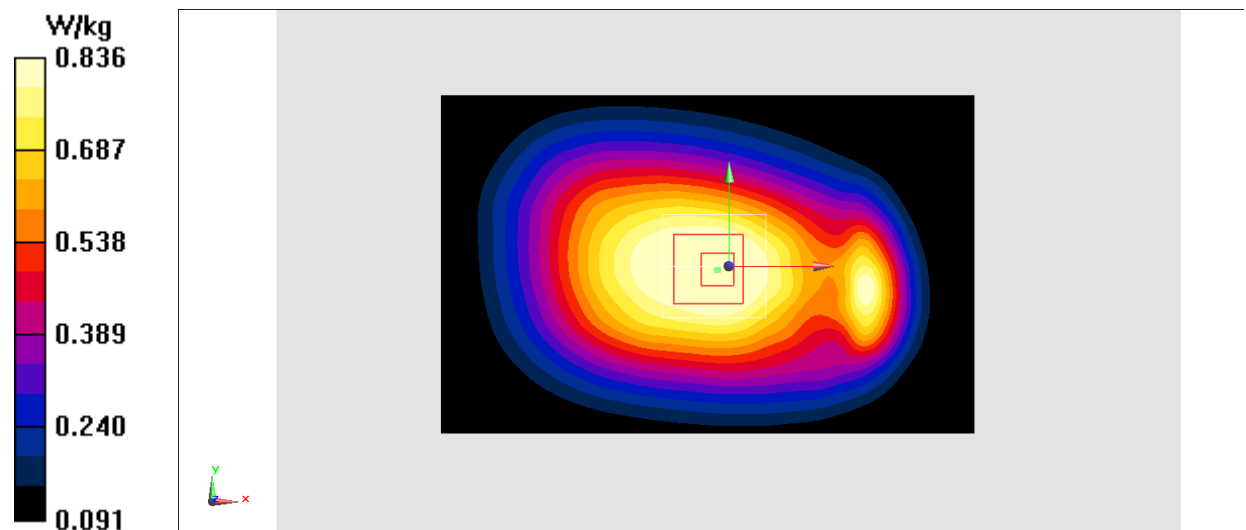


Fig.2 850 MHz

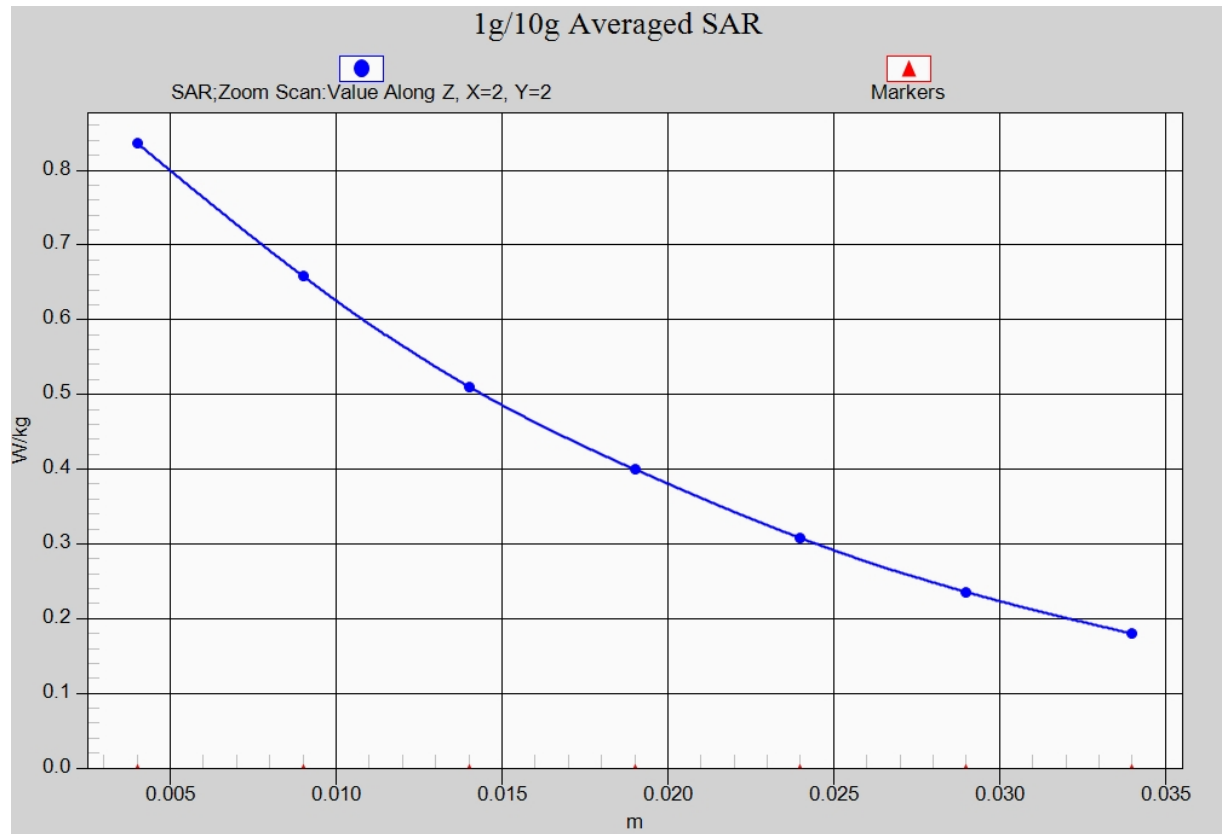


Fig. 2-1 Z-Scan at power reference point (850 MHz)

1900 Right Cheek Middle

Date: 2015-9-1

Electronics: DAE4 Sn777

Medium: Head 1900 MHz

Medium parameters use: $f = 1880$ MHz; $\sigma = 1.353$ mho/m; $\epsilon_r = 42.92$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C

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

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

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

Maximum value of SAR (interpolated) = 0.418 W/kg

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

Reference Value = 6.815 V/m; Power Drift = 0.17 dB

Peak SAR (extrapolated) = 0.475 W/kg

SAR(1 g) = 0.307 W/kg; SAR(10 g) = 0.184 W/kg

Maximum value of SAR (measured) = 0.385 W/kg

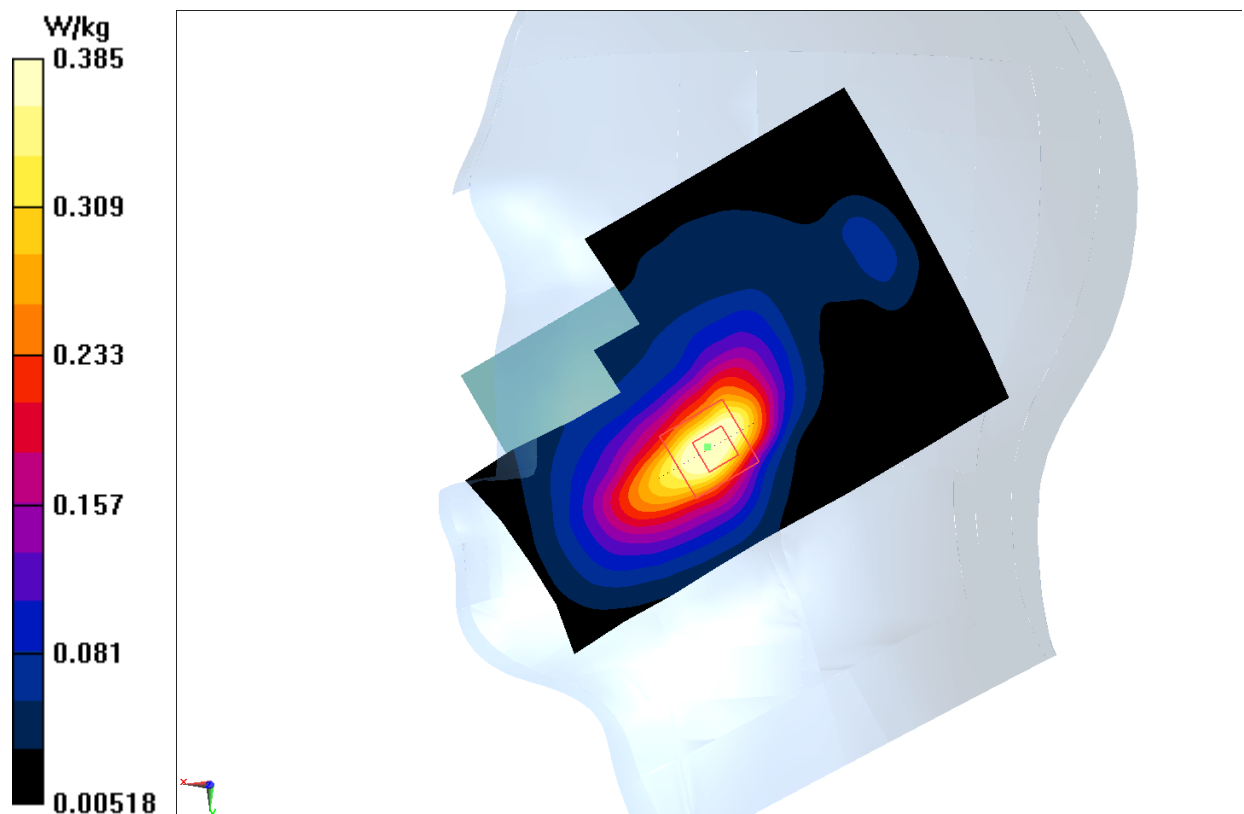


Fig.3 1900 MHz

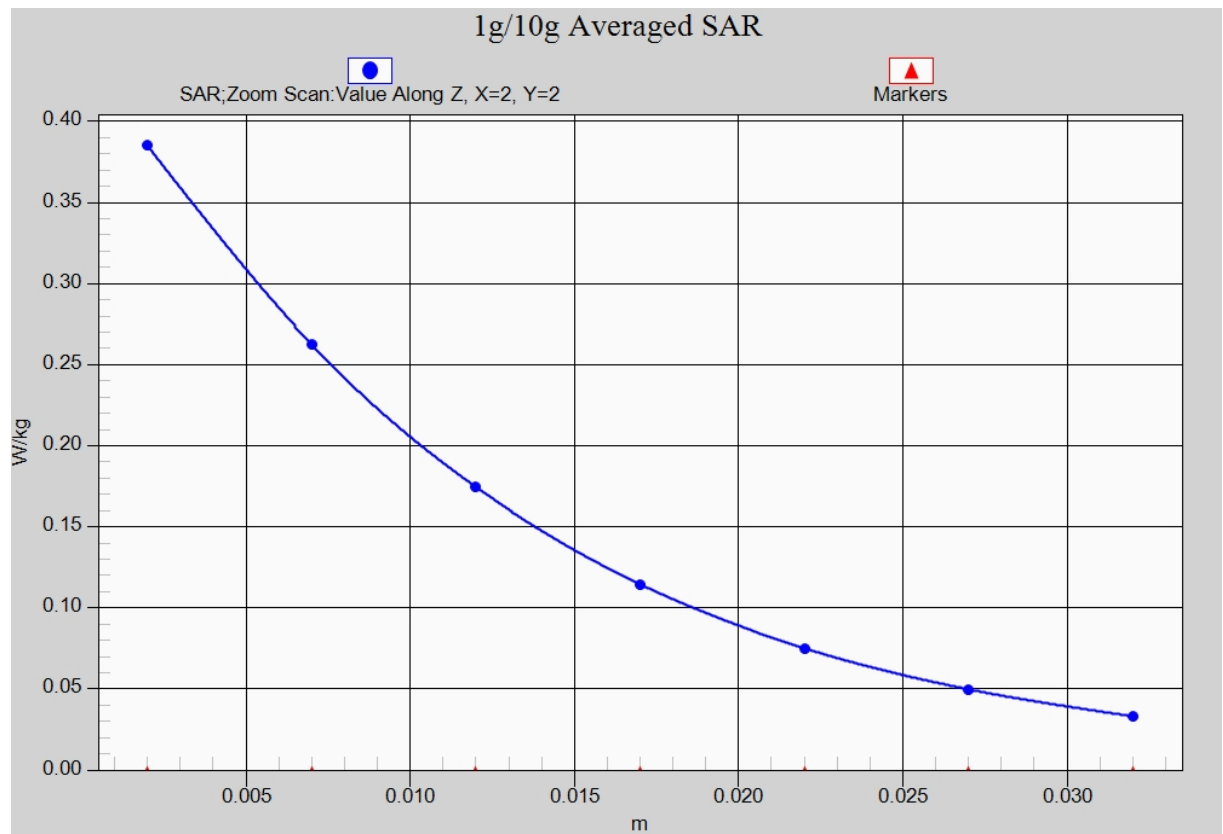


Fig. 3-1 Z-Scan at power reference point (1900 MHz)

1900 Body Rear Middle

Date: 2015-9-1

Electronics: DAE4 Sn777

Medium: Body 1900 MHz

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.52$ mho/m; $\epsilon_r = 52.837$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C

Communication System: GSM 1900MHz GPRS Frequency: 1880 MHz Duty Cycle: 1:2

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

Area Scan (121x71x1): Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm

Maximum value of SAR (interpolated) = 0.883 W/kg

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

Reference Value = 9.479 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 1.15 W/kg

SAR(1 g) = 0.712 W/kg; SAR(10 g) = 0.422 W/kg

Maximum value of SAR (measured) = 0.914 W/kg

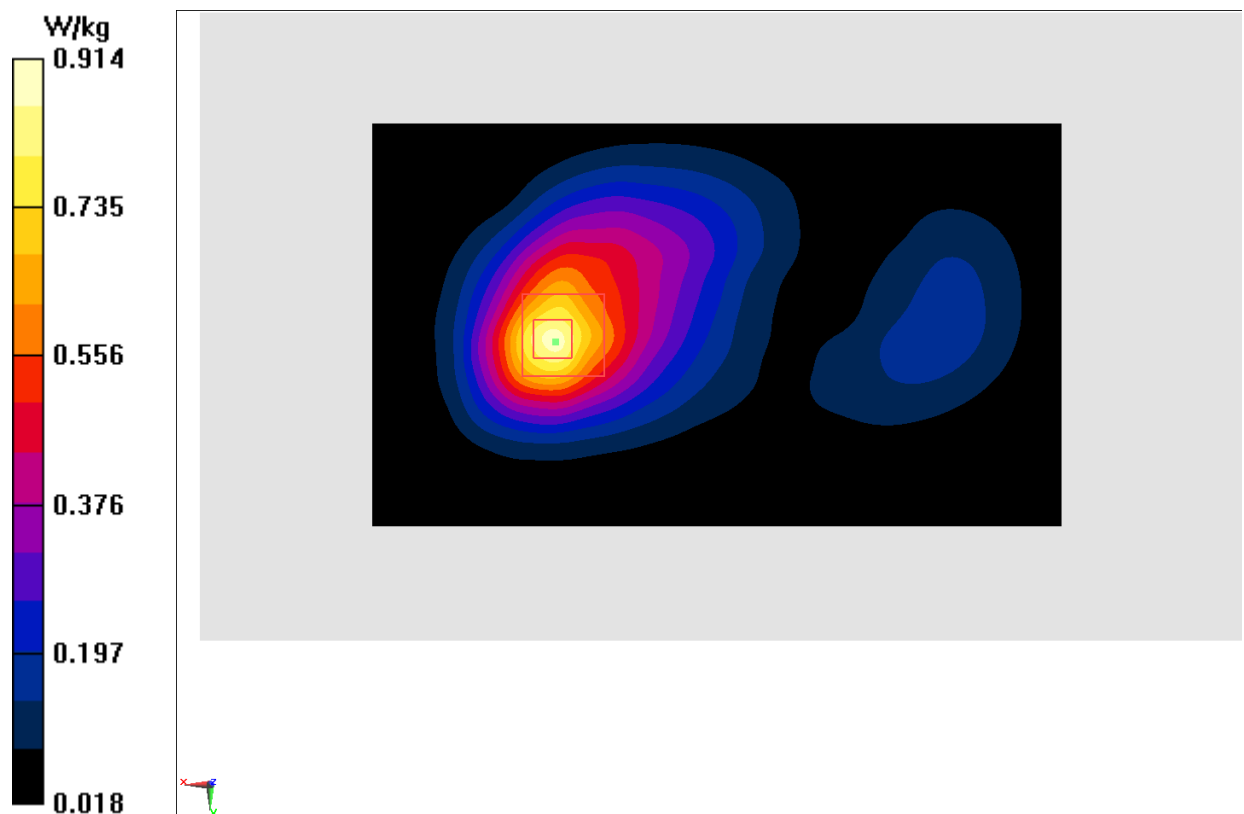


Fig.4 1900 MHz

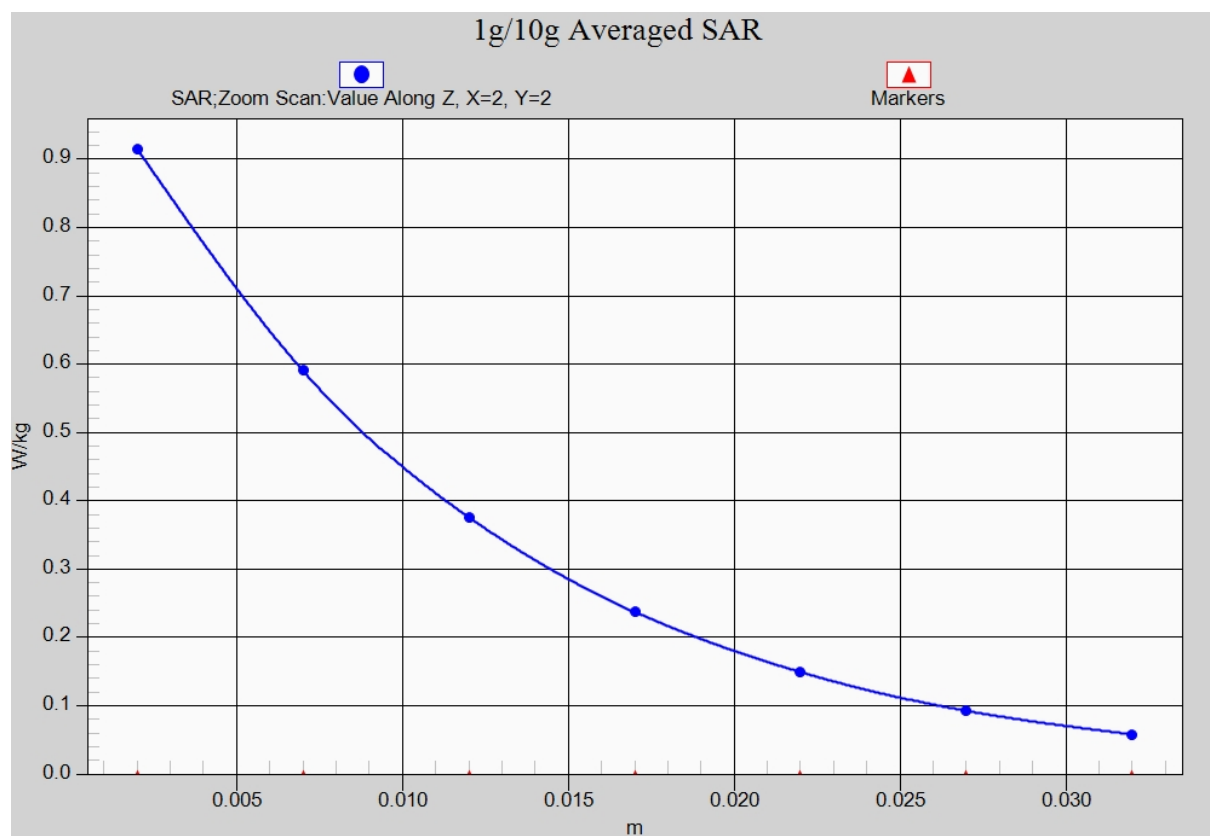


Fig.4-1 Z-Scan at power reference point (1900 MHz)

WCDMA 850 Left Cheek Low

Date: 2015-8-31

Electronics: DAE4 Sn777

Medium: Head 850 MHz

Medium parameters used (interpolated): $f = 826.4$ MHz; $\sigma = 0.924$ mho/m; $\epsilon_r = 43.028$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C

Communication System: WCDMA; Frequency: 826.4 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) = 0.599 W/kg

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

Reference Value = 9.358 V/m; Power Drift = 0.12 dB

Peak SAR (extrapolated) = 0.701 W/kg

SAR(1 g) = 0.552 W/kg; SAR(10 g) = 0.418 W/kg

Maximum value of SAR (measured) = 0.607 W/kg

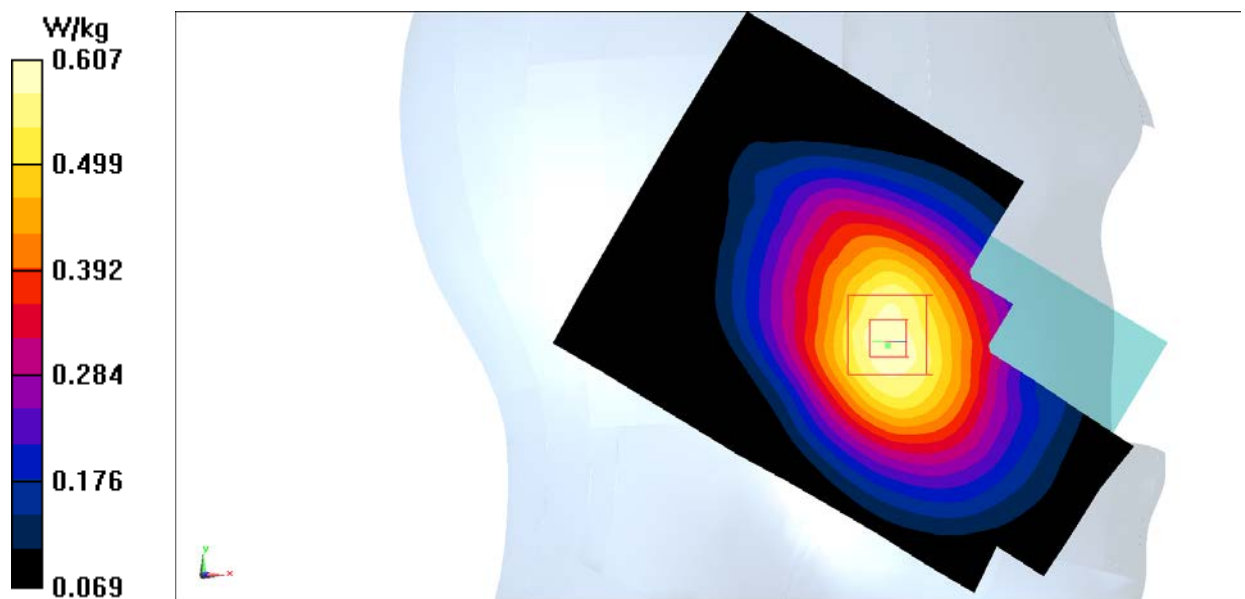


Fig.5 WCDMA 850

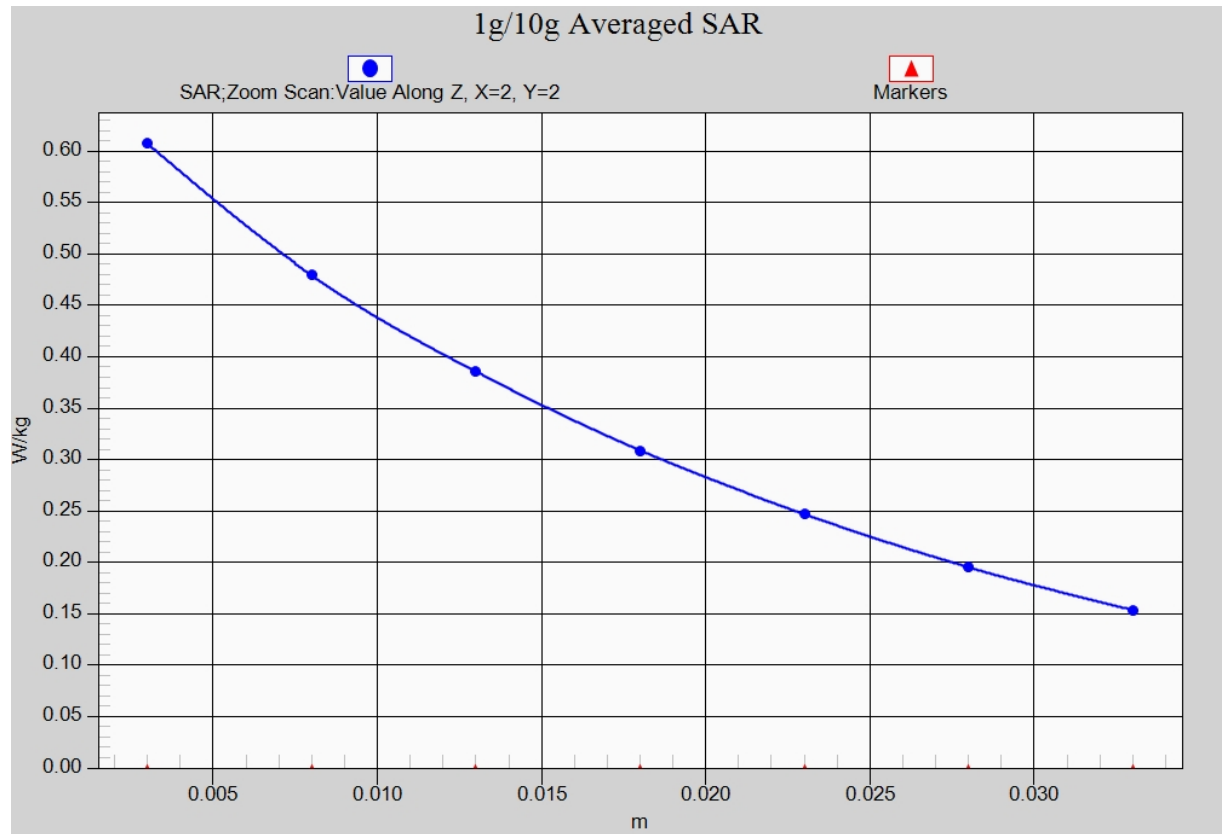


Fig. 5-1 Z-Scan at power reference point (WCDMA 850)

WCDMA 850 Body Rear Low

Date: 2015-8-31

Electronics: DAE4 Sn777

Medium: Body 850 MHz

Medium parameters used (interpolated): $f = 826.4$ MHz; $\sigma = 0.989$ mho/m; $\epsilon_r = 53.539$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C

Communication System: WCDMA; Frequency: 826.4 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) = 0.535 W/kg

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

Reference Value = 18.79 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 0.668 W/kg

SAR(1 g) = 0.408 W/kg; SAR(10 g) = 0.239 W/kg

Maximum value of SAR (measured) = 0.451 W/kg

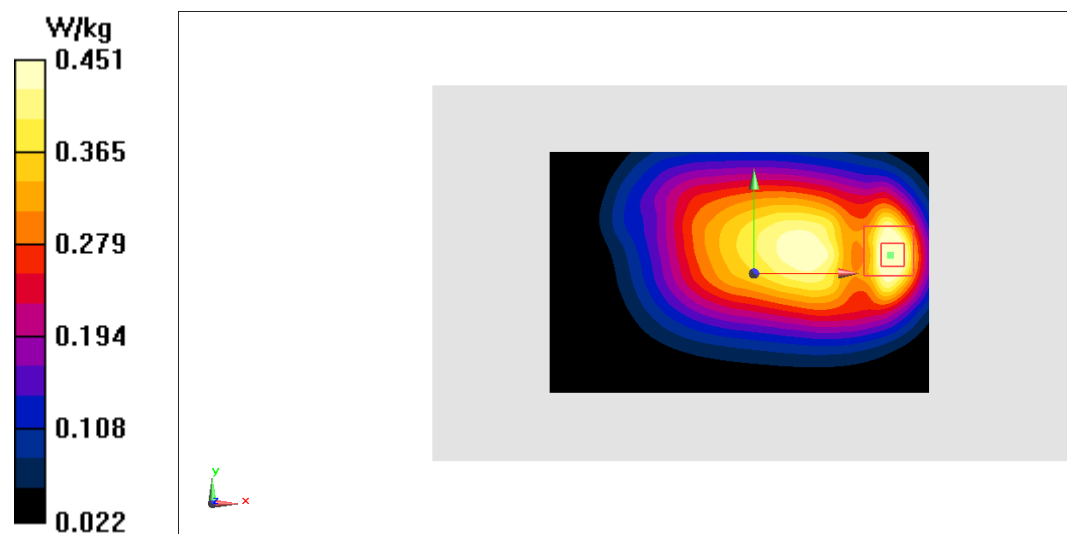


Fig.6 WCDMA 850

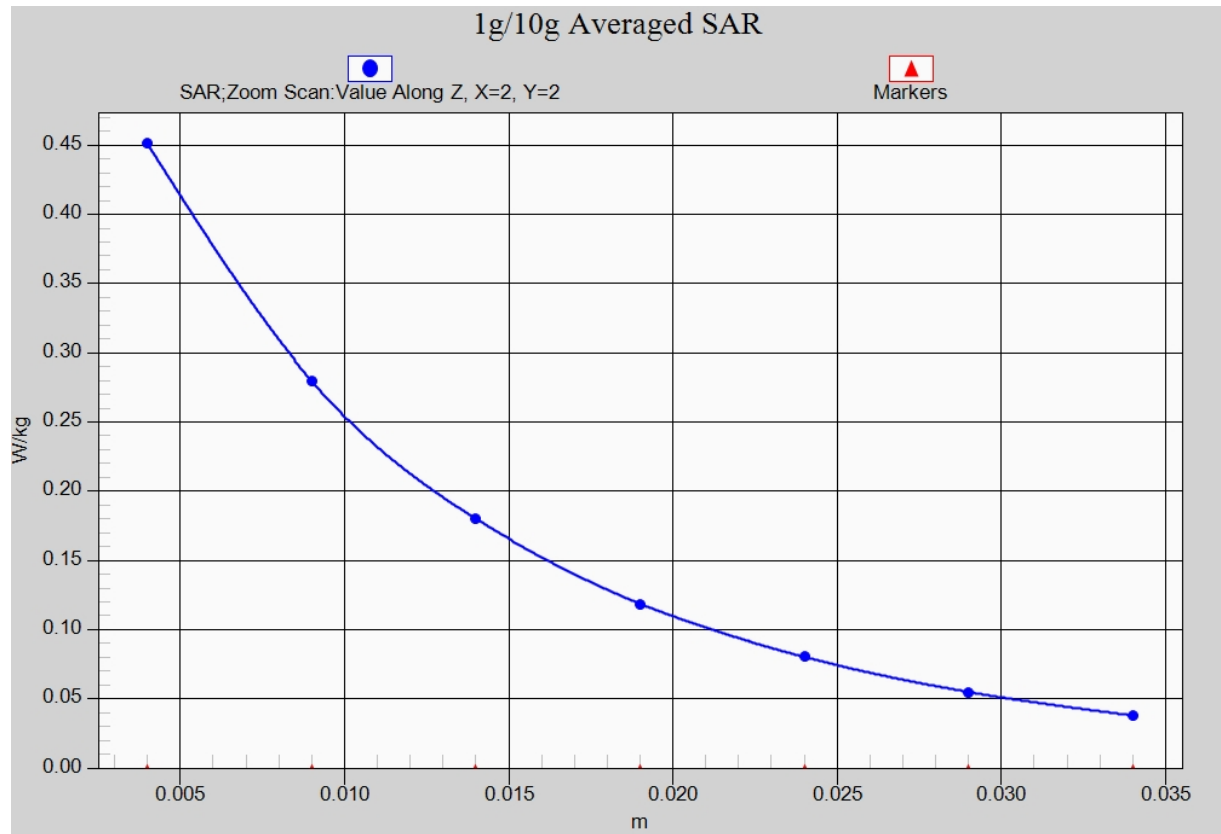


Fig. 6-1 Z-Scan at power reference point (WCDMA850)

WCDMA 1900 Right Cheek Middle

Date: 2015-9-1

Electronics: DAE4 Sn777

Medium: Head 1900 MHz

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.333$ mho/m; $\epsilon_r = 42.737$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C

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

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

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

Maximum value of SAR (interpolated) = 0.753 W/kg

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

Reference Value = 10.05 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 0.866 W/kg

SAR(1 g) = 0.562 W/kg; SAR(10 g) = 0.339 W/kg

Maximum value of SAR (measured) = 0.712 W/kg

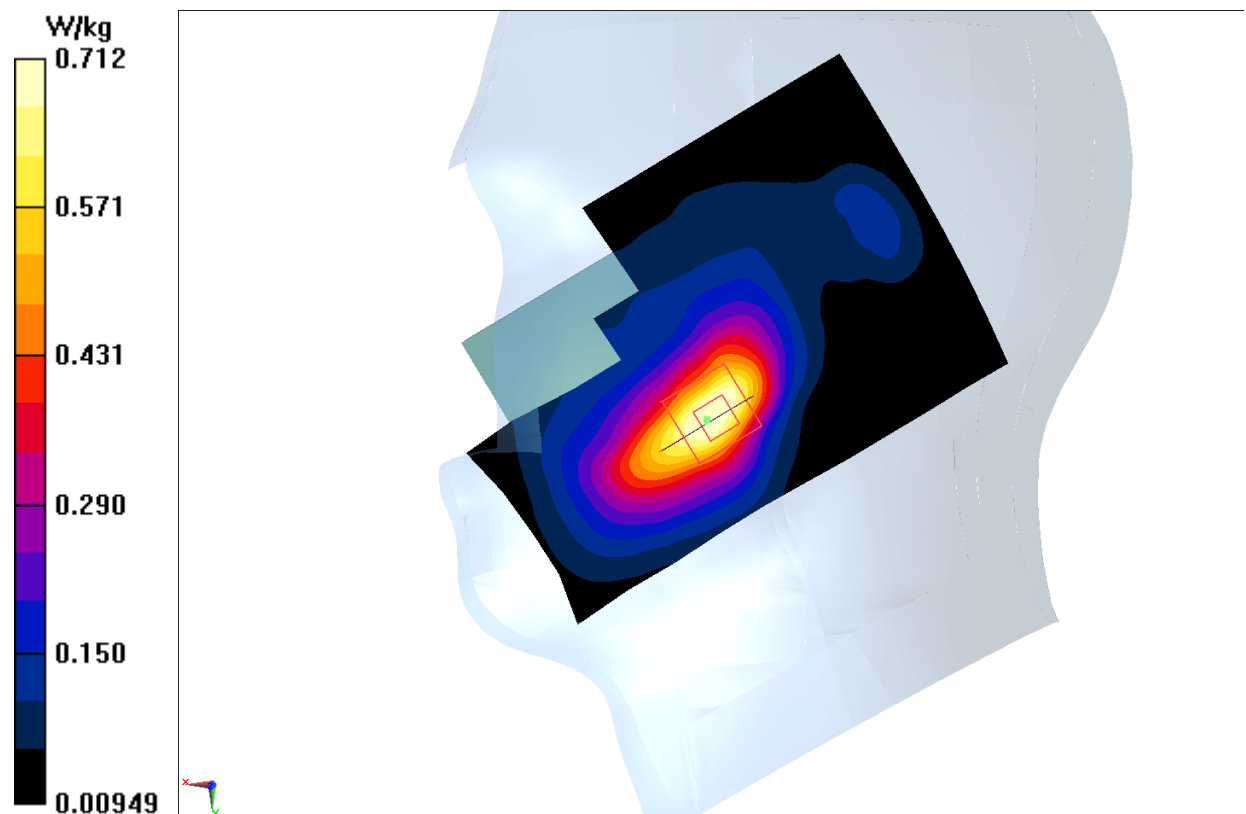


Fig.7 WCDMA1900

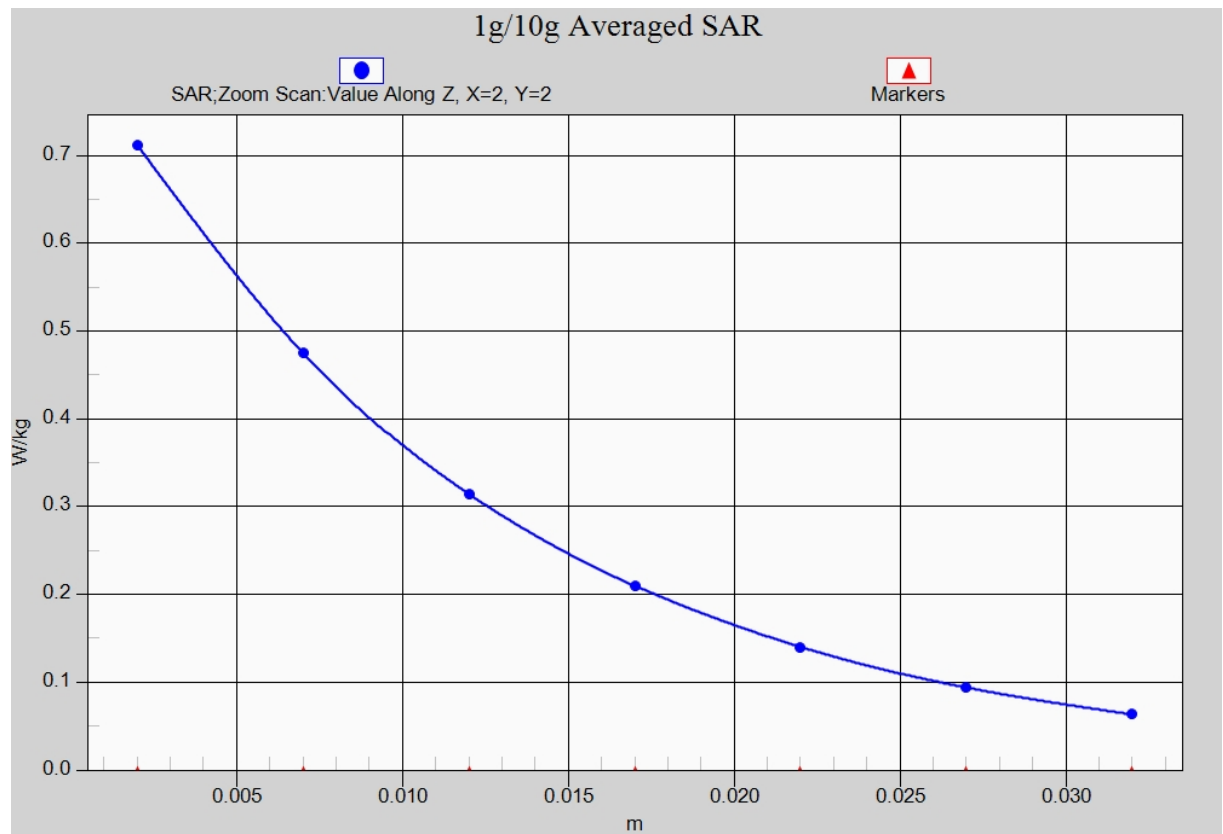


Fig. 7-1 Z-Scan at power reference point (WCDMA1900)

WCDMA 1900 Body Rear Middle

Date: 2015-9-1

Electronics: DAE4 Sn777

Medium: Body 1900 MHz

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.47$ mho/m; $\epsilon_r = 52.766$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C

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

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

Area Scan (121x71x1): Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm

Maximum value of SAR (interpolated) = 1.12 W/kg

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

Reference Value = 11.20 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 1.30 W/kg

SAR(1 g) = 0.804 W/kg; SAR(10 g) = 0.479 W/kg

Maximum value of SAR (measured) = 1.06 W/kg

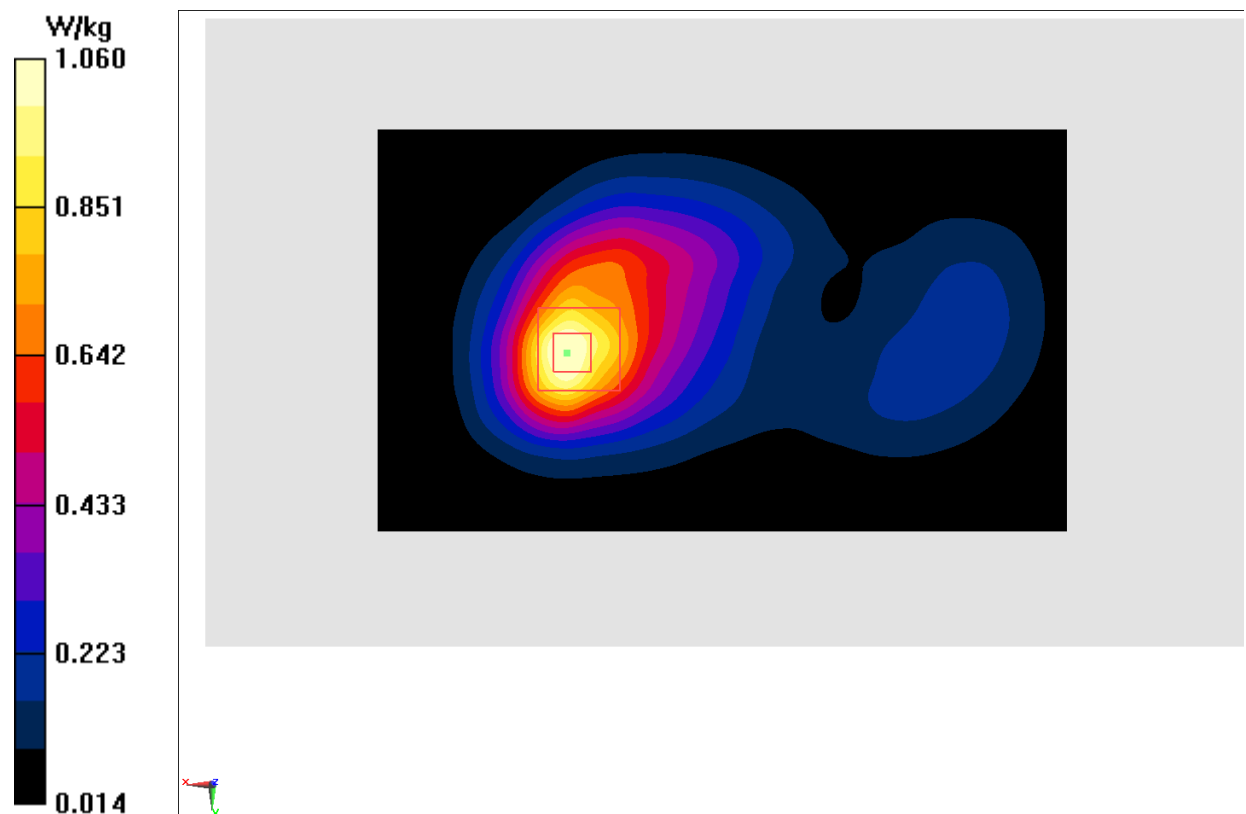


Fig.8 WCDMA1900

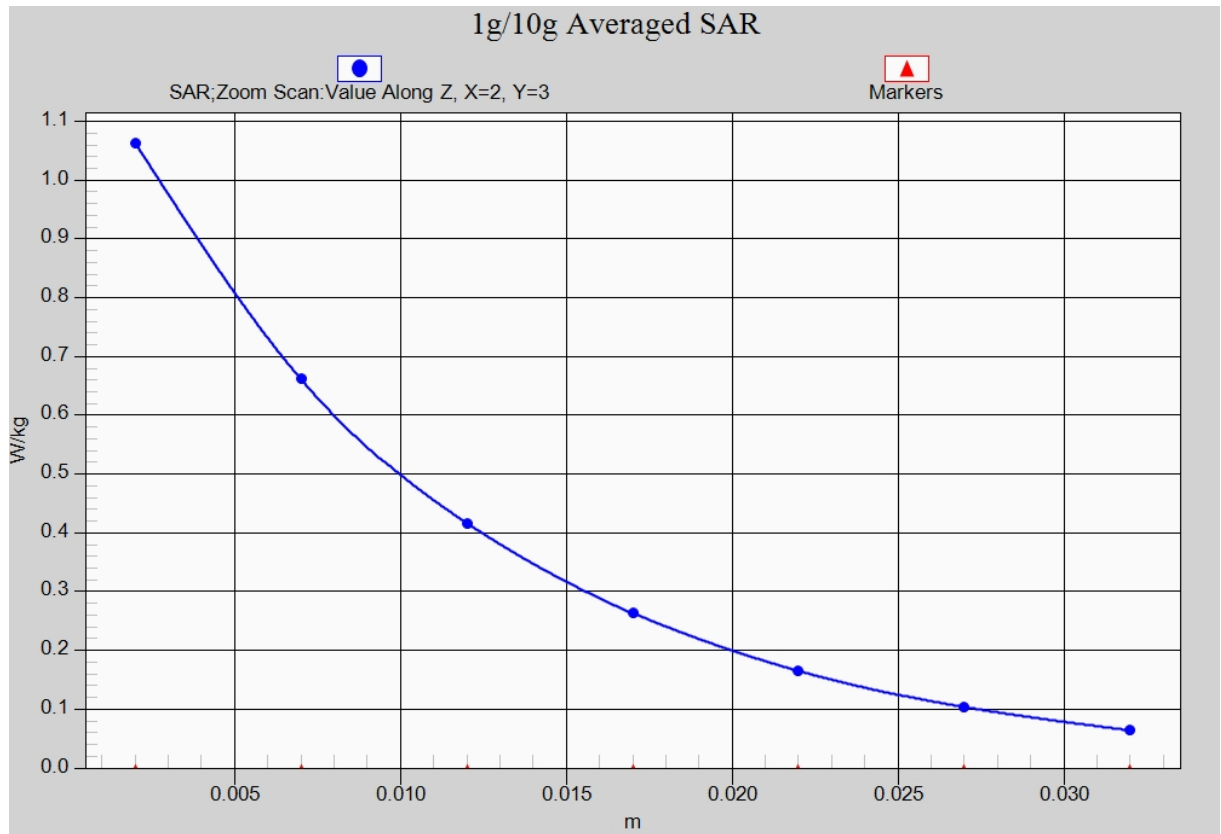


Fig. 8-1 Z-Scan at power reference point (WCDMA1900)

LTE Band2 Right Cheek High with QPSK_20M_1RB_Low

Date: 2015-9-1

Electronics: DAE4 Sn777

Medium: Head 1900 MHz

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.372$ mho/m; $\epsilon_r = 41.545$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C

Communication System: LTE Band2 Frequency: 1900 MHz Duty Cycle: 1:1

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

Area Scan (71x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.748 W/kg

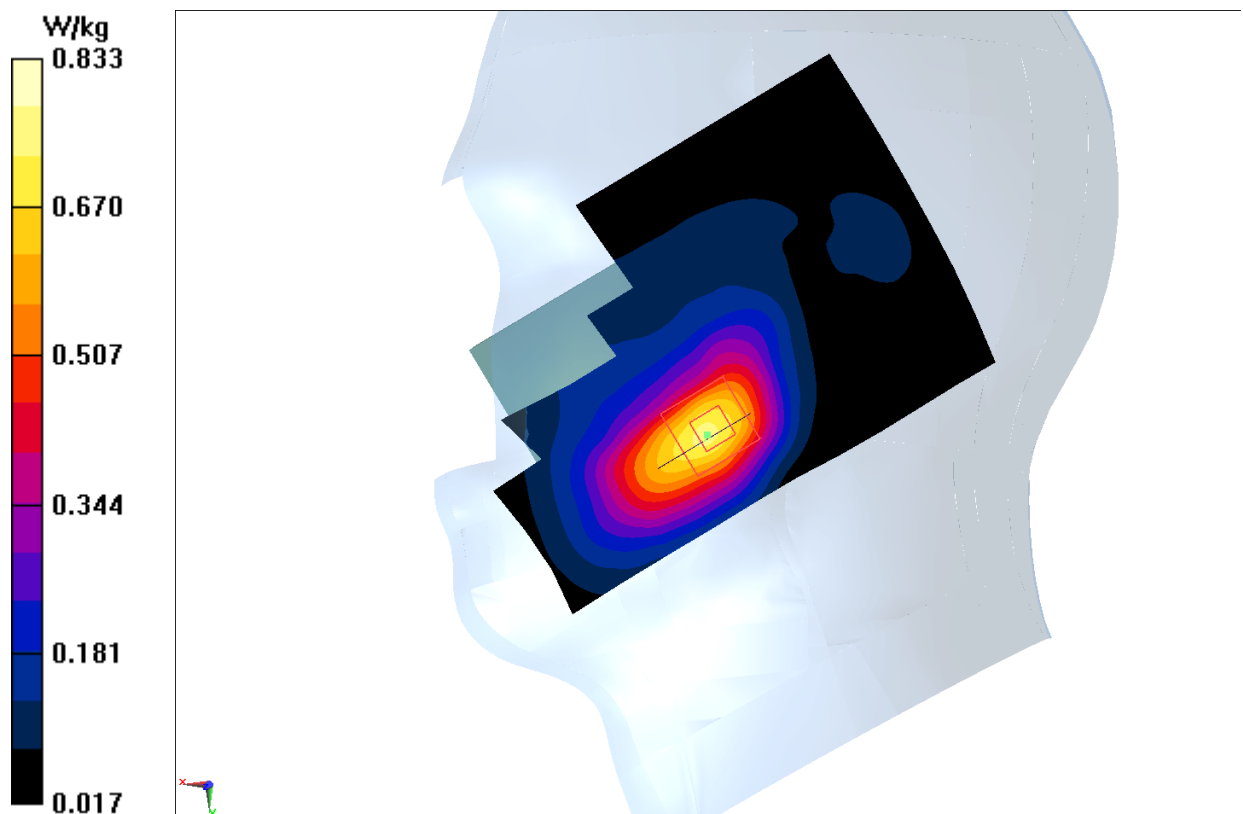
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 9.774 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 0.986 W/kg

SAR(1 g) = 0.655 W/kg; SAR(10 g) = 0.405 W/kg

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

**Fig.9 LTE Band2**

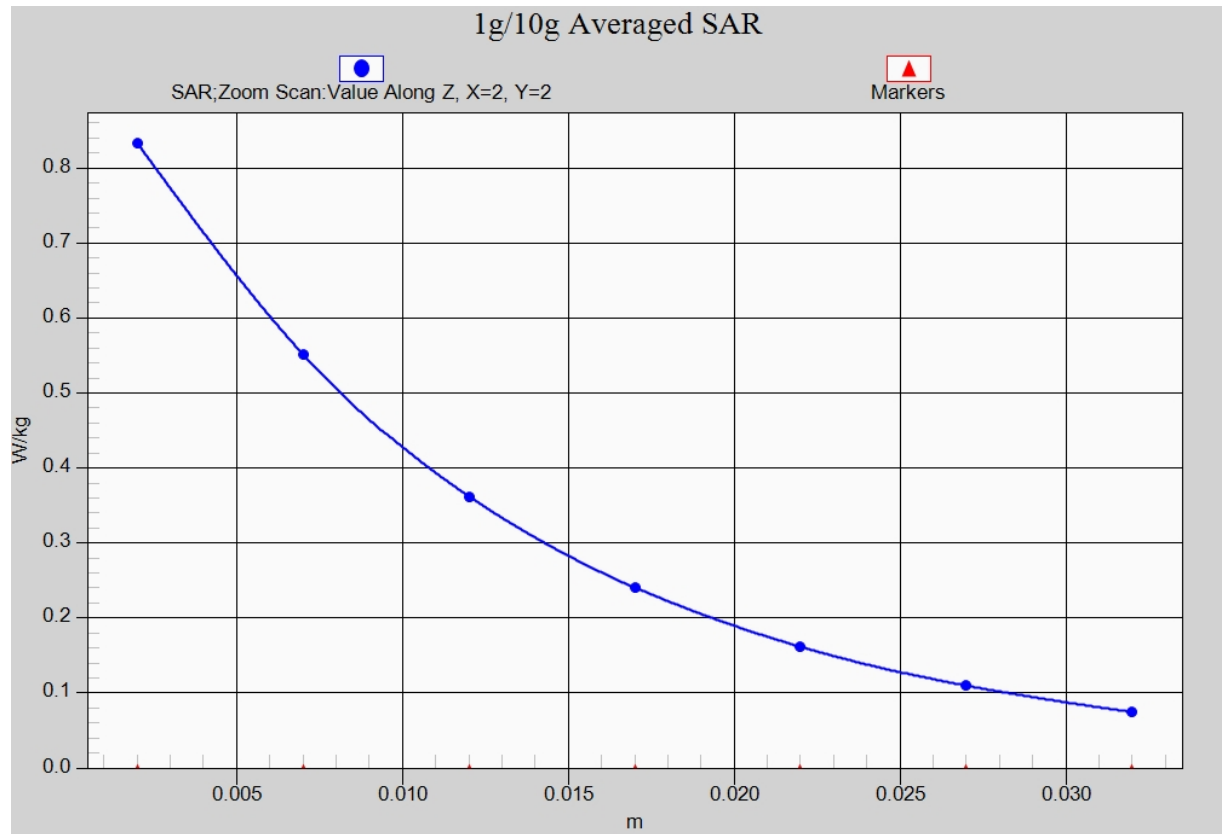


Fig. 9-1 Z-Scan at power reference point (LTE Band2)

LTE Band2 Body Rear Low with QPSK_20M_1RB_Low

Date: 2015-9-1

Electronics: DAE4 Sn777

Medium: Body 1900 MHz

Medium parameters used: $f = 1860$ MHz; $\sigma = 1.442$ mho/m; $\epsilon_r = 52.826$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C

Communication System: LTE Band2 Frequency: 1860 MHz Duty Cycle: 1:1

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

Area Scan (121x71x1): Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm

Maximum value of SAR (interpolated) = 1.30 W/kg

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

Reference Value = 13.03 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 1.73 W/kg

SAR(1 g) = 1.06 W/kg; SAR(10 g) = 0.630 W/kg

Maximum value of SAR (measured) = 1.39 W/kg

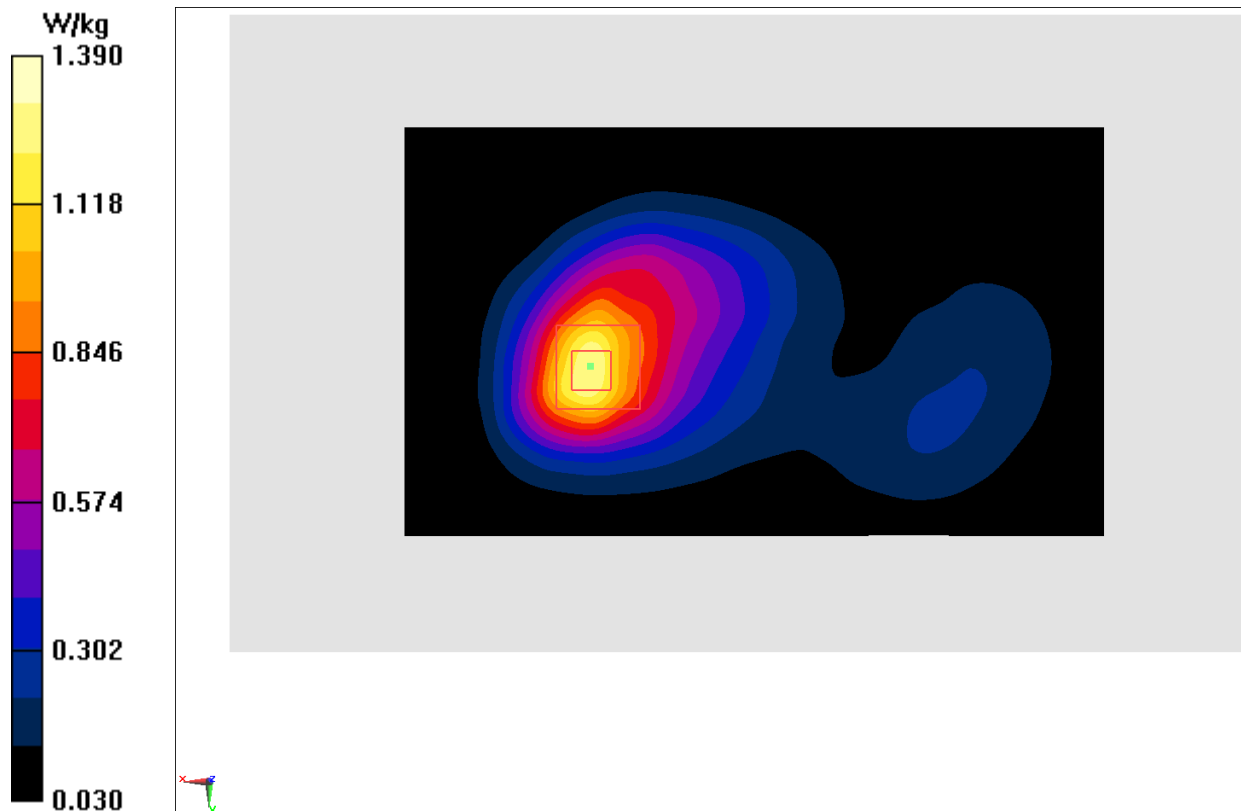


Fig.10 LTE Band2

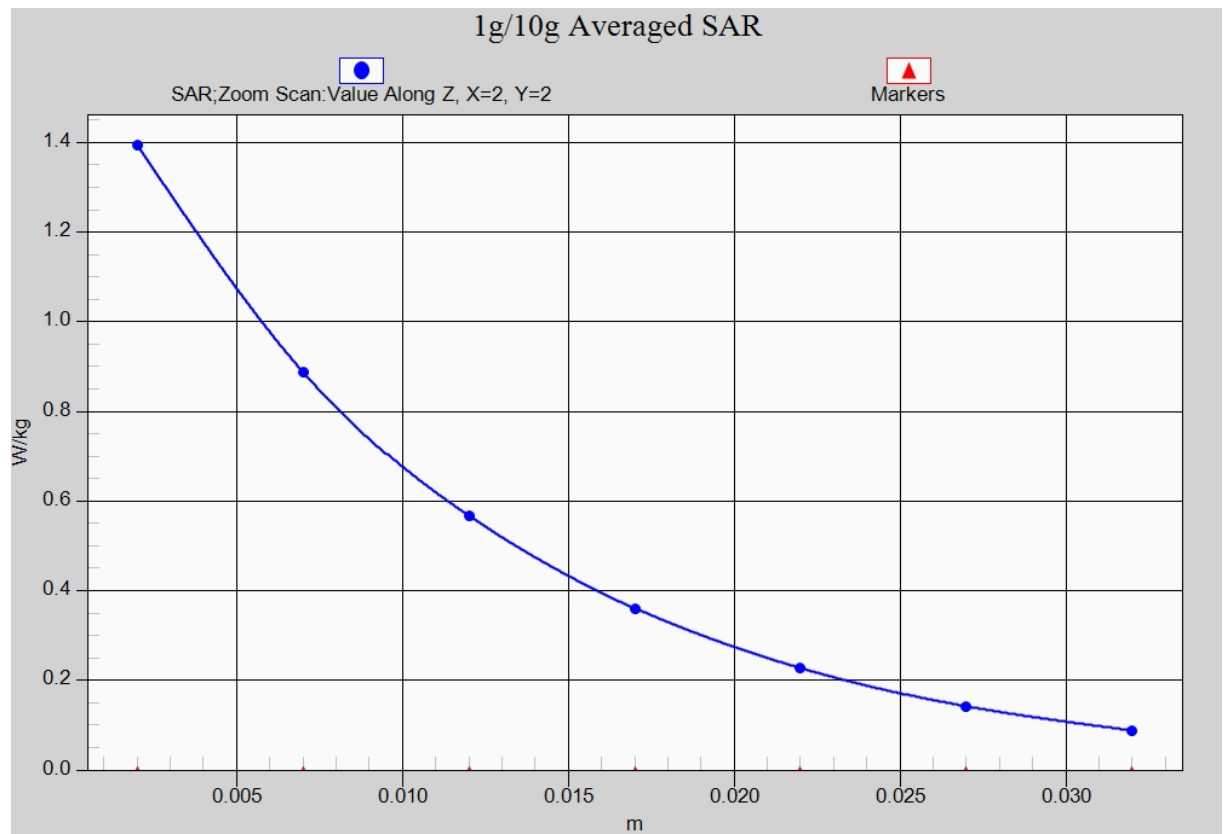


Fig. 10-1 Z-Scan at power reference point (LTE Band2)

LTE Band4 Right Cheek High with QPSK_20M_1RB_Low

Date: 2015-8-28

Electronics: DAE4 Sn777

Medium: Head 1750 MHz

Medium parameters used: $f = 1745$ MHz; $\sigma = 1.331$ mho/m; $\epsilon_r = 39.946$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C

Communication System: LTE Band4 Frequency: 1745 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN3846 ConvF(7.64, 7.64, 7.64)

Area Scan (61x111x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

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

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

Reference Value = 9.685 V/m; Power Drift = 0.16 dB

Peak SAR (extrapolated) = 0.690 W/kg

SAR(1 g) = 0.460 W/kg; SAR(10 g) = 0.297 W/kg

Maximum value of SAR (measured) = 0.578 W/kg

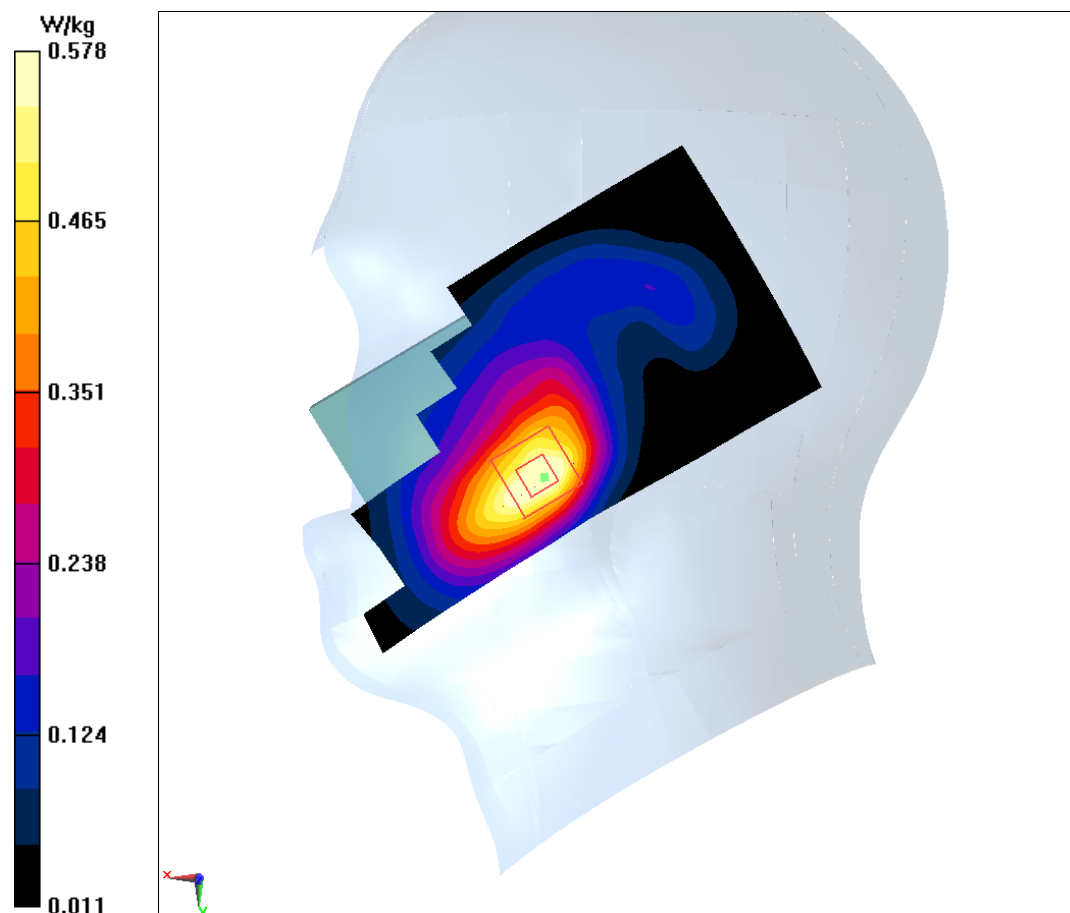


Fig.11 LTE Band4

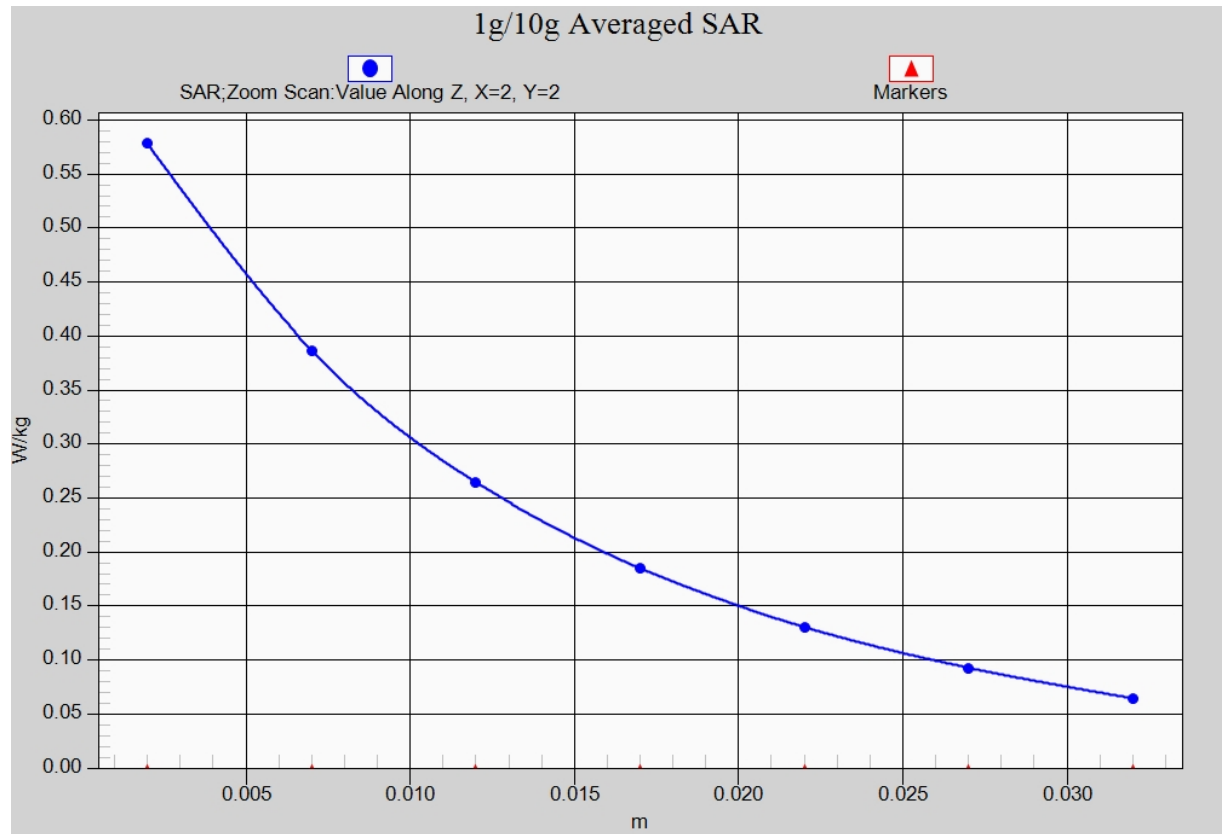


Fig. 11-1 Z-Scan at power reference point (LTE Band4)

LTE Band4 Body Rear Middle with QPSK_20M_1RB_Low

Date: 2015-8-28

Electronics: DAE4 Sn777

Medium: Body 1750 MHz

Medium parameters used (interpolated): $f = 1732.5$ MHz; $\sigma = 1.509$ mho/m; $\epsilon_r = 53.852$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C

Communication System: LTE Band4 Frequency: 1732.5 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN3846 ConvF(7.43, 7.43, 7.43)

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

Maximum value of SAR (interpolated) = 1.05 W/kg

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

Reference Value = 10.06 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 1.39 W/kg

SAR(1 g) = 0.891 W/kg; SAR(10 g) = 0.539 W/kg

Maximum value of SAR (measured) = 1.06 W/kg

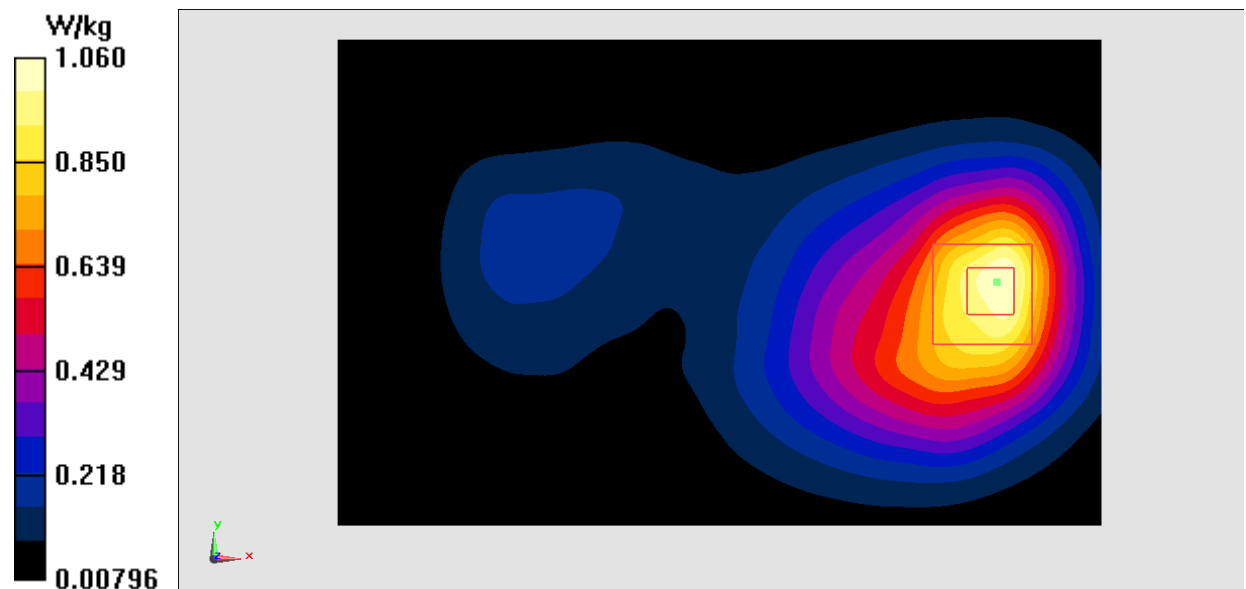


Fig.12 LTE Band4

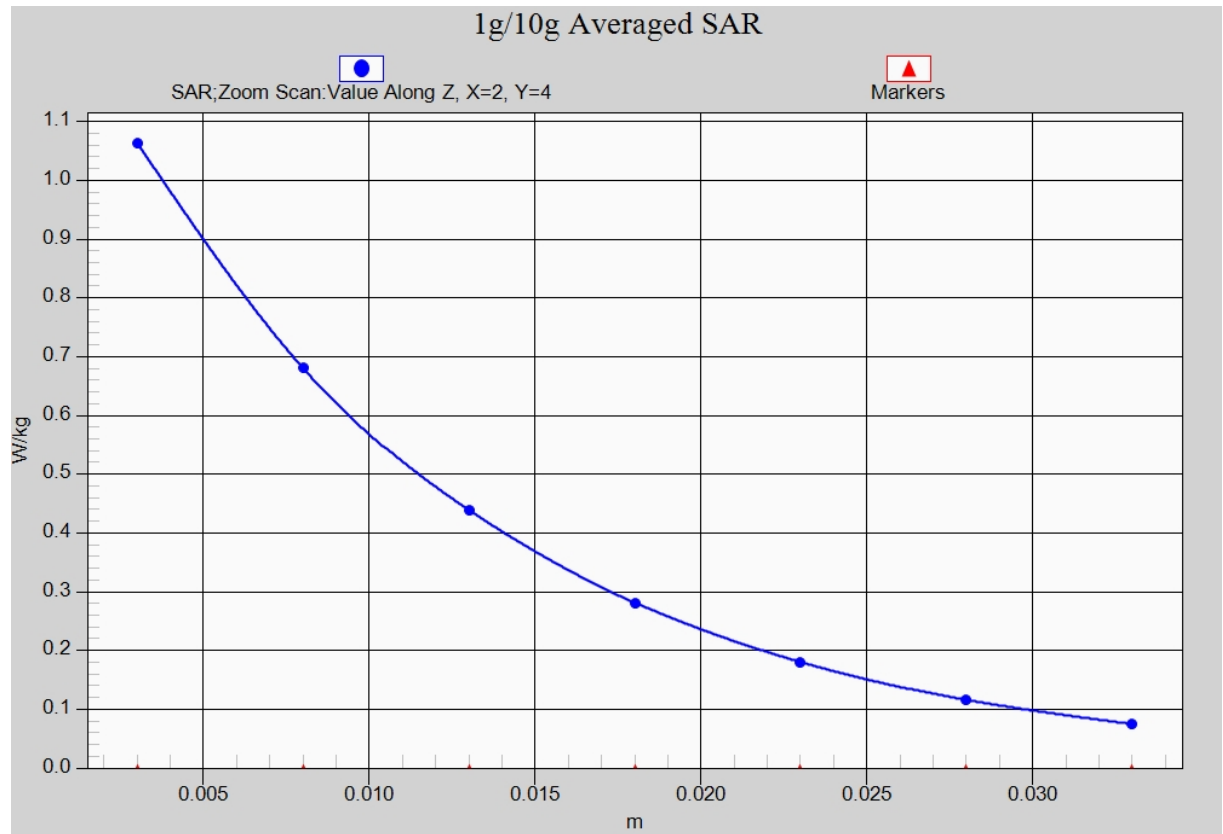


Fig. 12-1 Z-Scan at power reference point (LTE Band4)

LTE Band5 Left Cheek Low with QPSK_10M_1RB_Low

Date: 2015-8-31

Electronics: DAE4 Sn777

Medium: Head 850 MHz

Medium parameters used (interpolated): $f = 829$ MHz; $\sigma = 0.926$ mho/m; $\epsilon_r = 43.041$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C

Communication System: LTE Band5 Frequency: 829 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) = 0.107 W/kg

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

Reference Value = 6.476 V/m; Power Drift = -0.15 dB

Peak SAR (extrapolated) = 0.625 W/kg

SAR(1 g) = 0.467 W/kg; SAR(10 g) = 0.346 W/kg

Maximum value of SAR (measured) = 0.110 W/kg

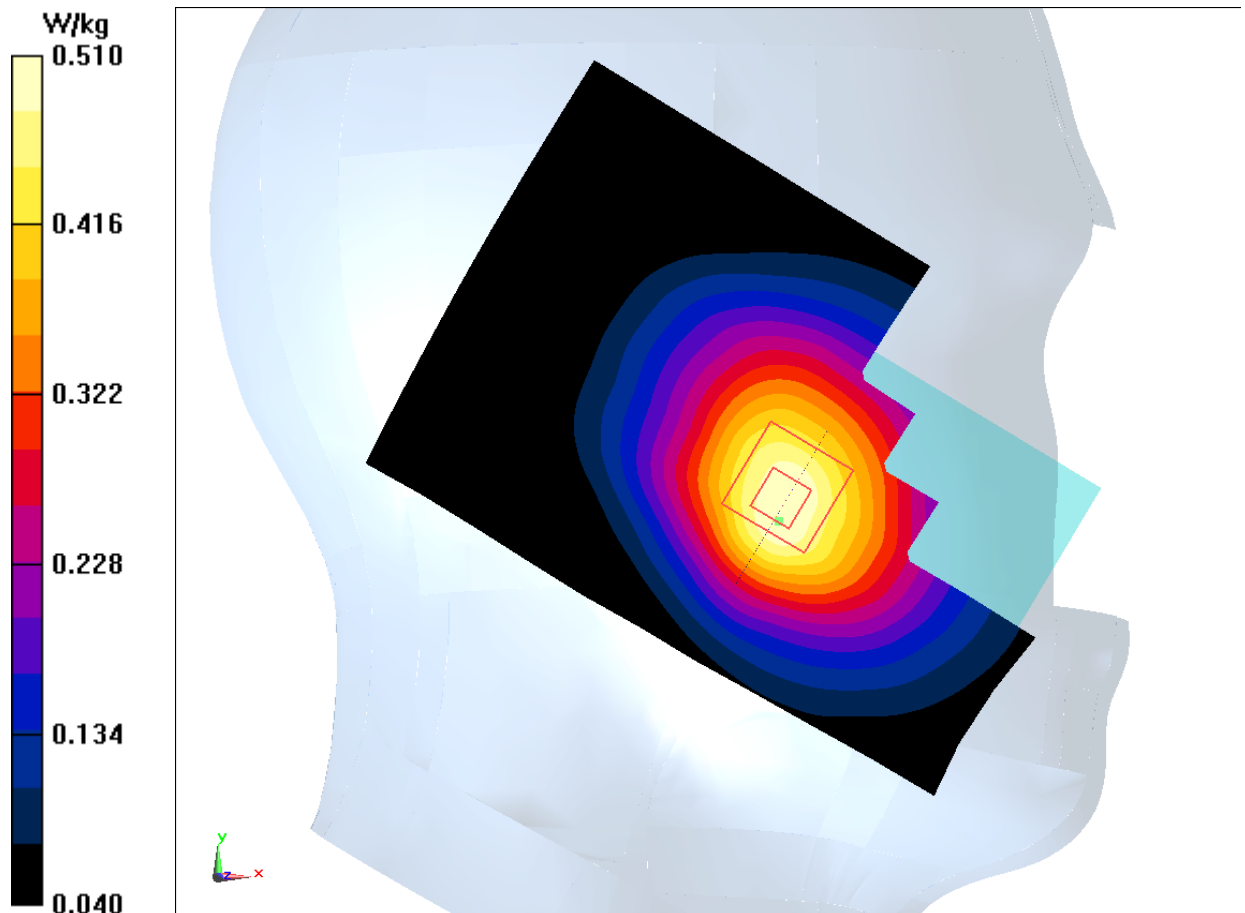


Fig.13 LTE Band5

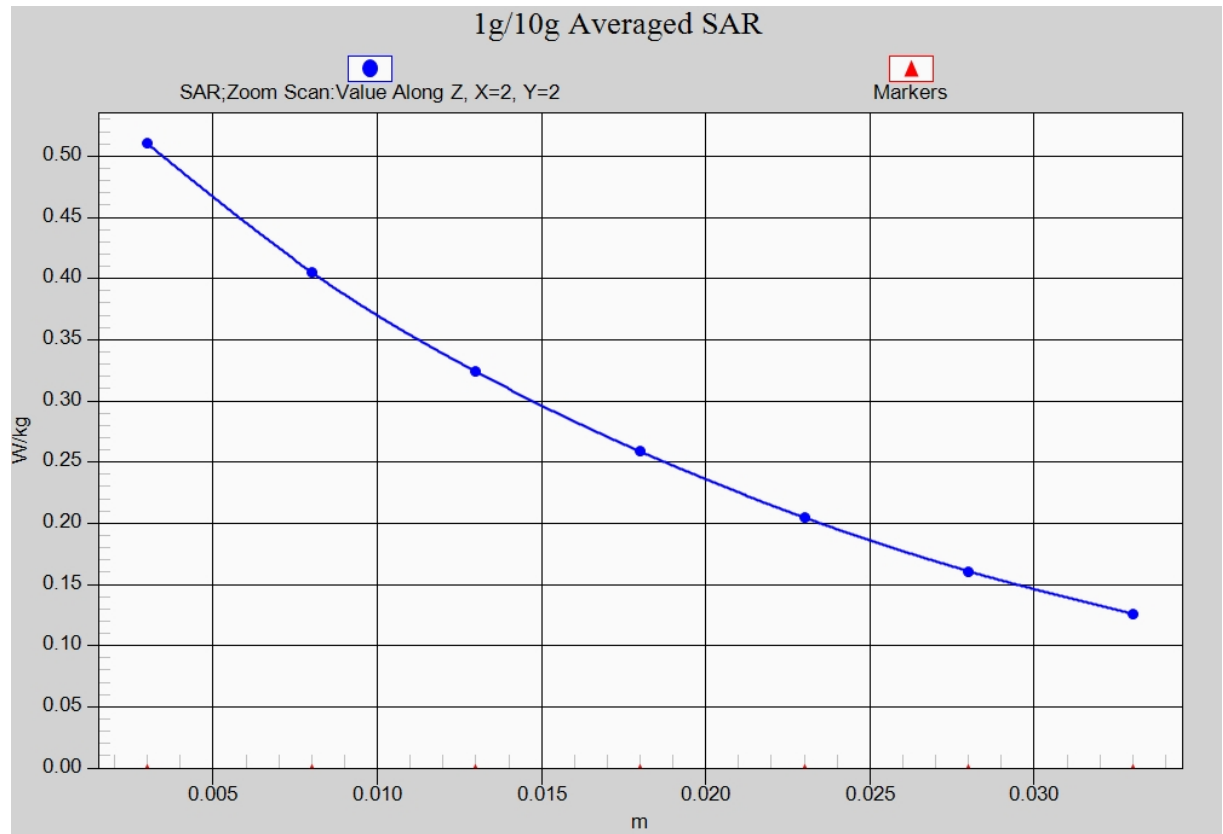


Fig. 13-1 Z-Scan at power reference point (LTE Band5)

LTE Band5 Body Rear Low with QPSK_10M_1RB_Low

Date: 2015-8-31

Electronics: DAE4 Sn777

Medium: Body 850 MHz

Medium parameters used (interpolated): $f = 829$ MHz; $\sigma = 0.992$ mho/m; $\epsilon_r = 53.531$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C

Communication System: LTE Band5 Frequency: 829 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) = 0.599 W/kg

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

Reference Value = 22.19 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 0.694 W/kg

SAR(1 g) = 0.540 W/kg; SAR(10 g) = 0.402 W/kg

Maximum value of SAR (measured) = 0.597 W/kg

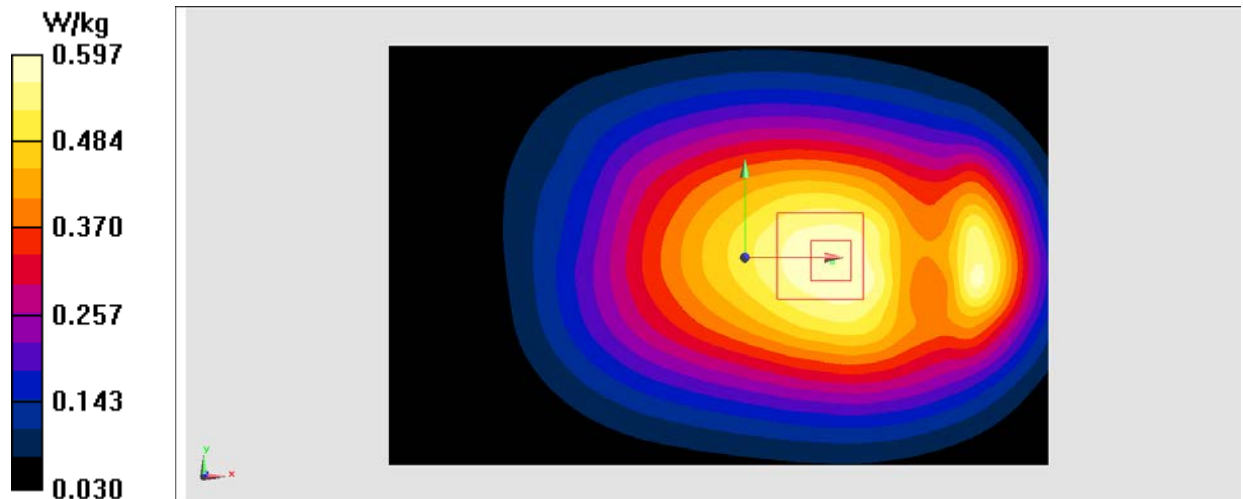


Fig.14 LTE Band5

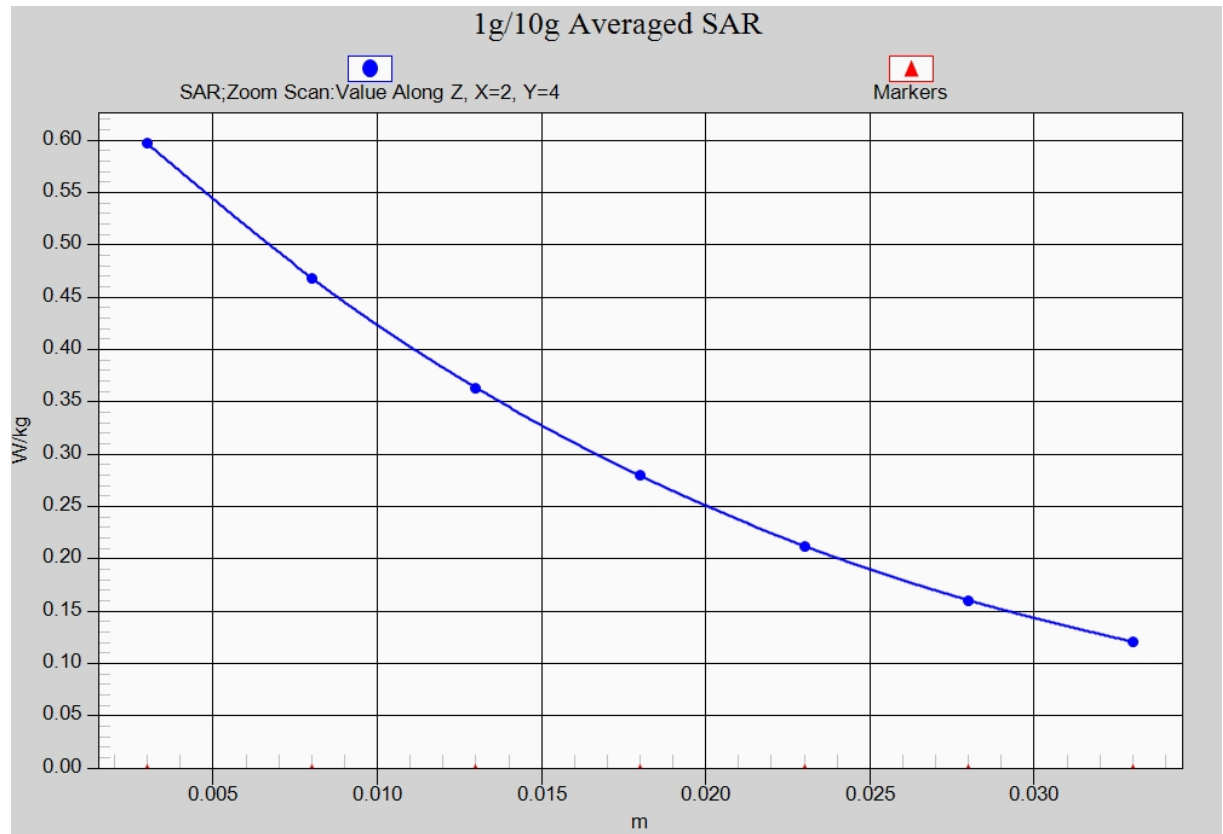


Fig. 14-1 Z-Scan at power reference point (LTE Band5)

LTE Band7 Right Cheek Middle with QPSK_20M_1RB_Low

Date: 2015-8-29

Electronics: DAE4 Sn777

Medium: Head 2600 MHz

Medium parameters used: $f = 2535$ MHz; $\sigma = 1.826$ mho/m; $\epsilon_r = 39.231$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C

Communication System: LTE Band7 Frequency: 2535 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN3846 ConvF(6.50, 6.50, 6.50)

Area Scan (81x141x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 1.39 W/kg

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

Reference Value = 6.811 V/m; Power Drift = 0.10 dB

Peak SAR (extrapolated) = 1.70 W/kg

SAR(1 g) = 0.939 W/kg; SAR(10 g) = 0.498 W/kg

Maximum value of SAR (measured) = 1.34 W/kg

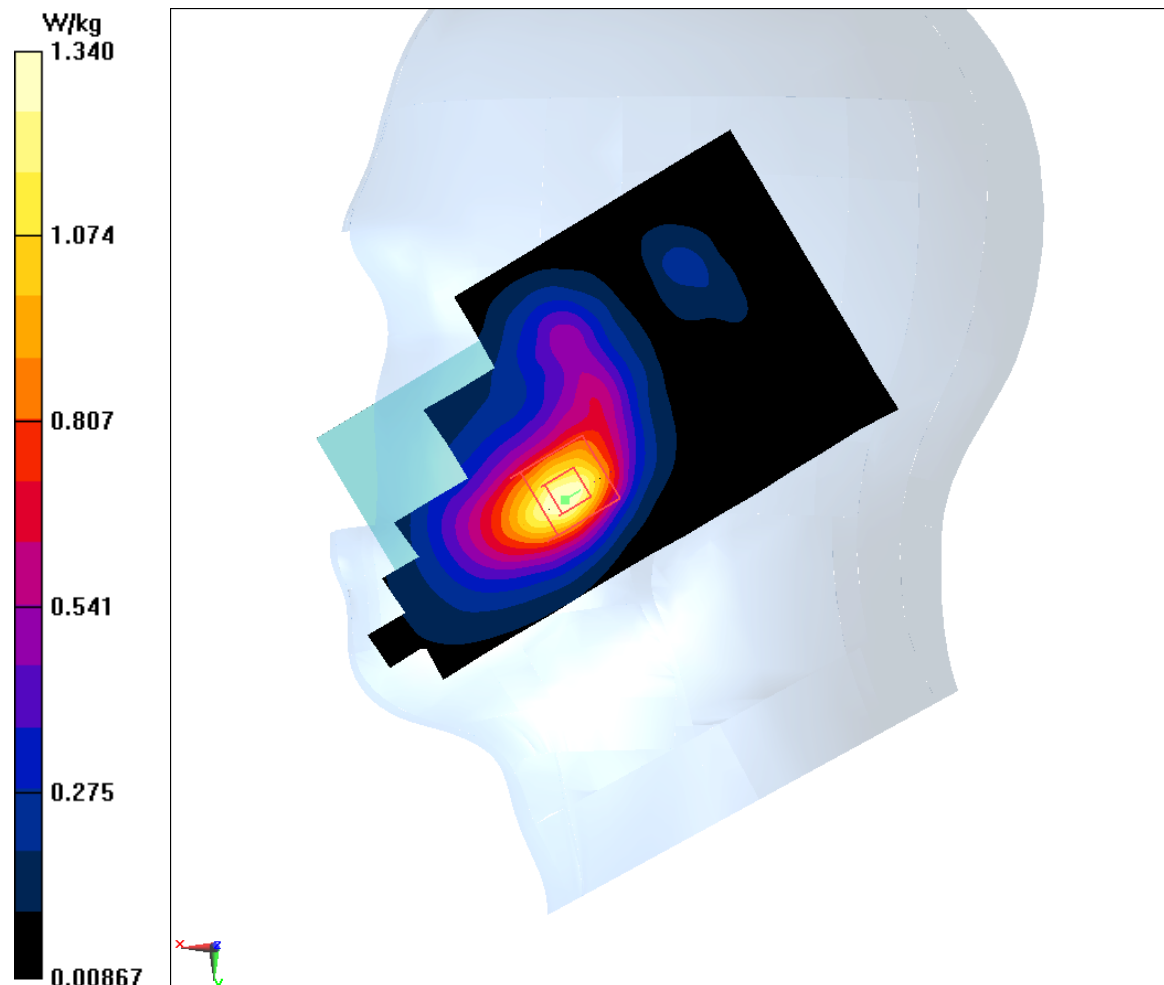


Fig.15 LTE Band7

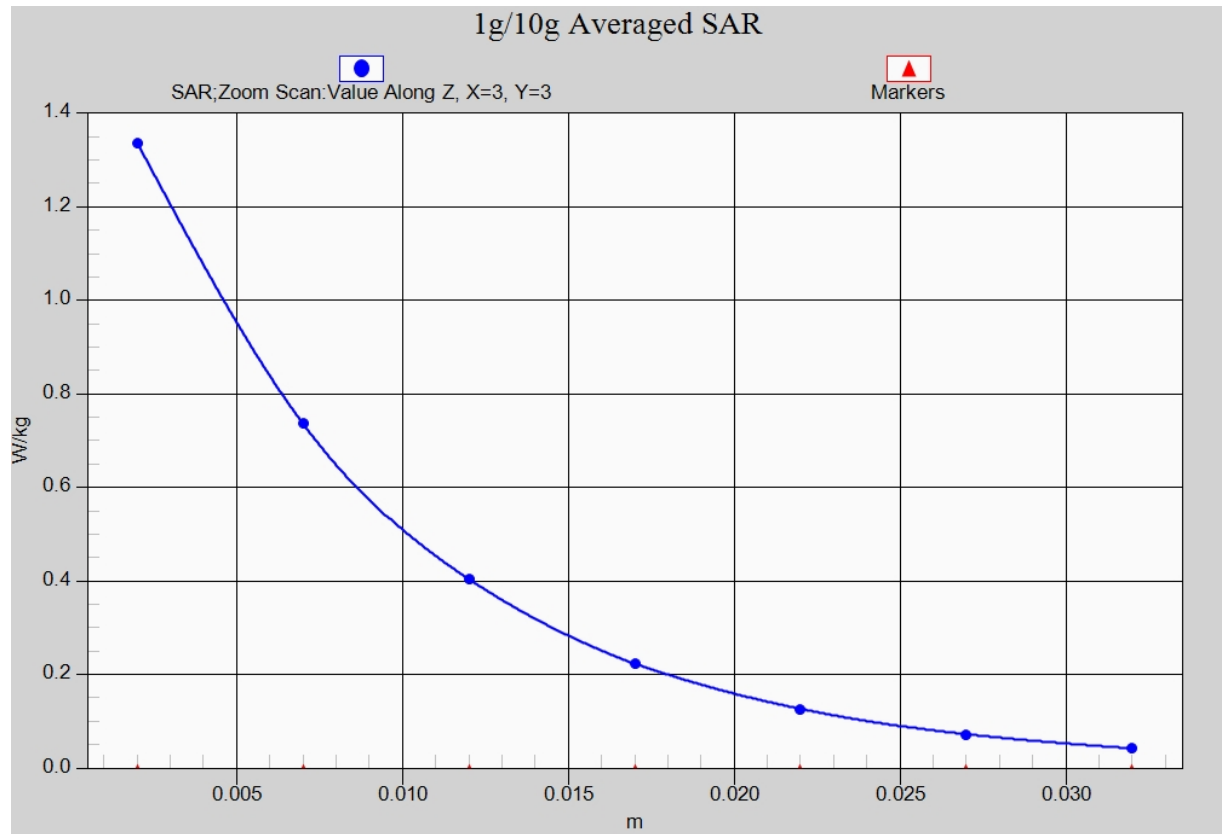


Fig. 15-1 Z-Scan at power reference point (LTE Band7)

LTE Band7 Body Rear High with QPSK_20M_1RB_Low

Date: 2015-8-29

Electronics: DAE4 Sn777

Medium: Body 2600 MHz

Medium parameters used: $f = 2560$ MHz; $\sigma = 2.097$ mho/m; $\epsilon_r = 54.251$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C

Communication System: LTE Band7 Frequency: 2560 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN3846 ConvF(6.68, 6.68, 6.68)

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

Maximum value of SAR (interpolated) = 0.890 W/kg

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

Reference Value = 12.42 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 1.40 W/kg

SAR(1 g) = 0.747 W/kg; SAR(10 g) = 0.404 W/kg

Maximum value of SAR (measured) = 0.919 W/kg

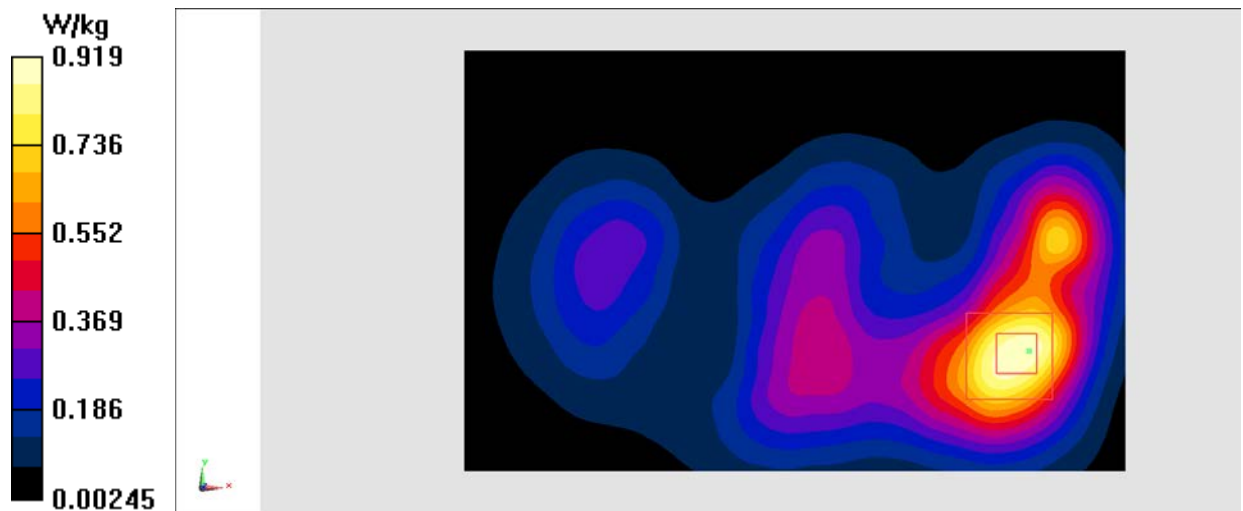


Fig.16 LTE Band7

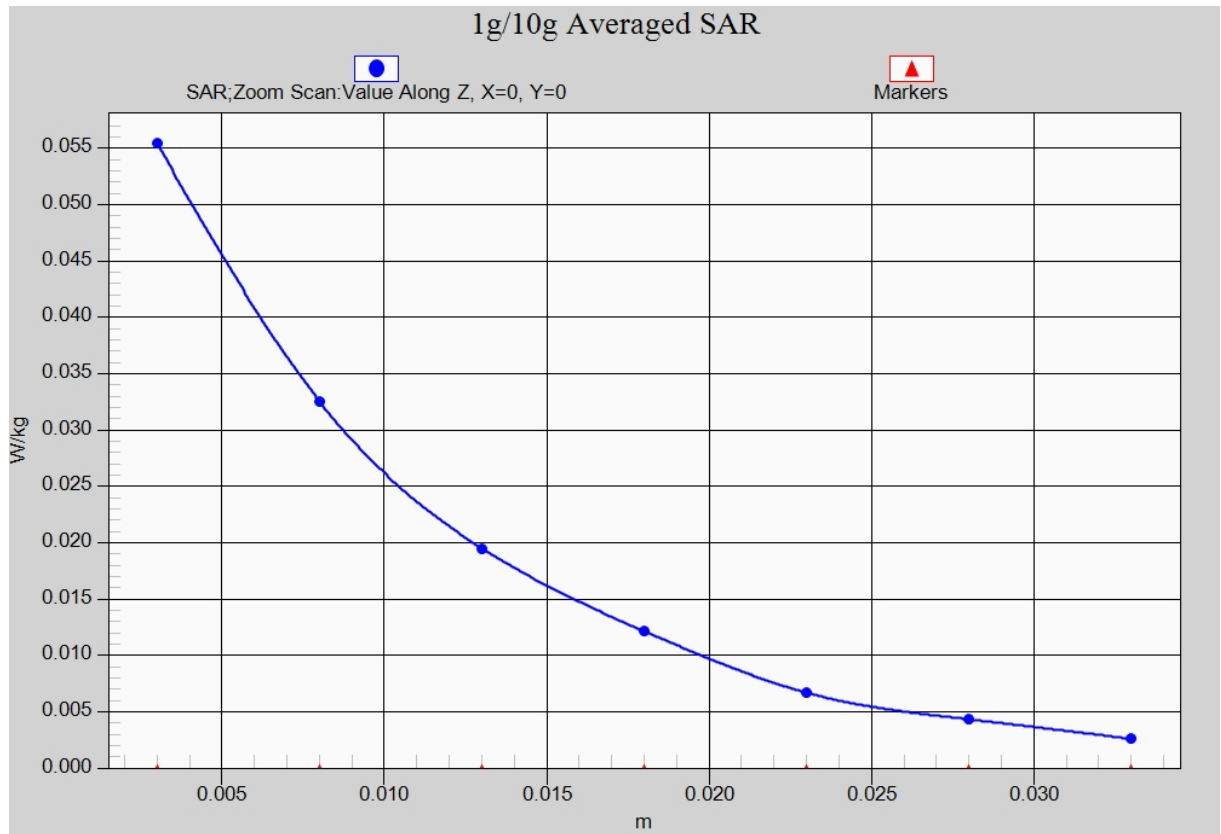


Fig. 16-1 Z-Scan at power reference point (LTE Band7)

LTE Band17 Left Cheek High with QPSK_10M_1RB_Low

Date: 2015-8-30

Electronics: DAE4 Sn777

Medium: Head 750 MHz

Medium parameters used (interpolated): $f = 711$ MHz; $\sigma = 0.841$ mho/m; $\epsilon_r = 40.449$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C

Communication System: LTE Band17 Frequency: 711 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN3846 ConvF(9.53, 9.53, 9.53)

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

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

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

Reference Value = 6.745 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 0.167 W/kg

SAR(1 g) = 0.137 W/kg; SAR(10 g) = 0.107 W/kg

Maximum value of SAR (measured) = 0.149 W/kg

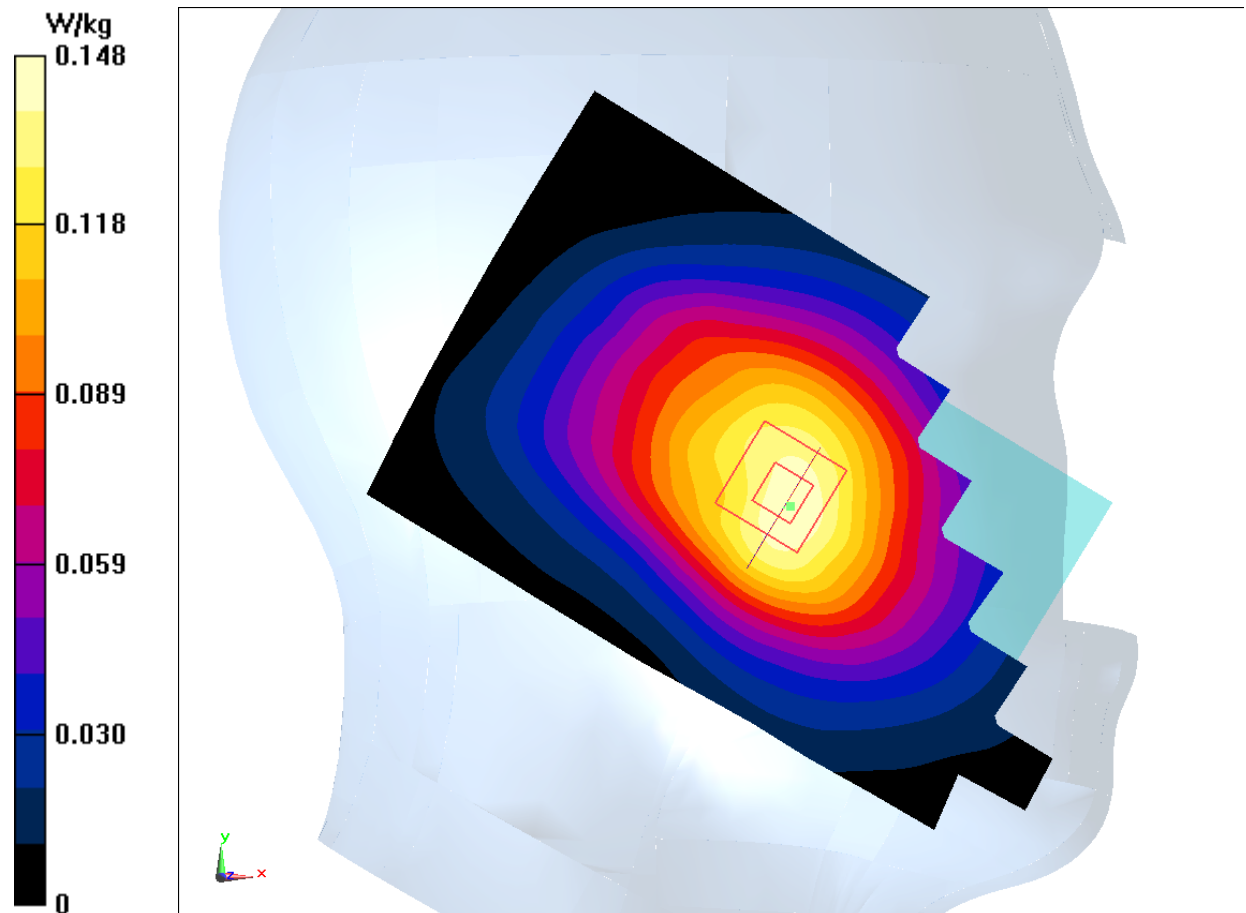


Fig.17 LTE Band17

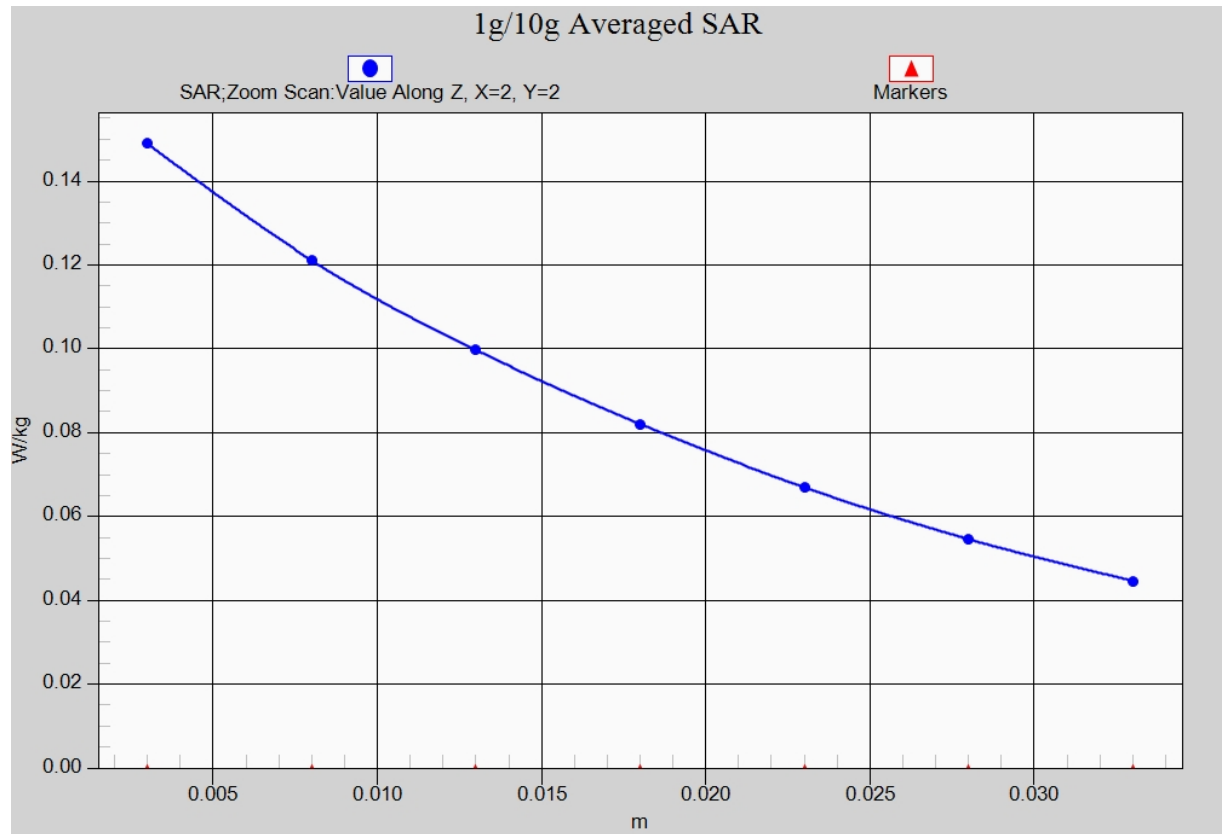


Fig. 17-1 Z-Scan at power reference point (LTE Band17)

LTE Band17 Body Rear High with QPSK_10M_1RB_Low

Date: 2015-8-30

Electronics: DAE4 Sn777

Medium: Body 750 MHz

Medium parameters used (interpolated): $f = 711$ MHz; $\sigma = 0.93$ mho/m; $\epsilon_r = 57.694$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C

Communication System: LTE Band17 Frequency: 711 MHz Duty Cycle: 1:1

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

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

Maximum value of SAR (interpolated) = 0.371 W/kg

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

Reference Value = 18.47 V/m; Power Drift = -0.16 dB

Peak SAR (extrapolated) = 0.440 W/kg

SAR(1 g) = 0.334 W/kg; SAR(10 g) = 0.248 W/kg

Maximum value of SAR (measured) = 0.369 W/kg

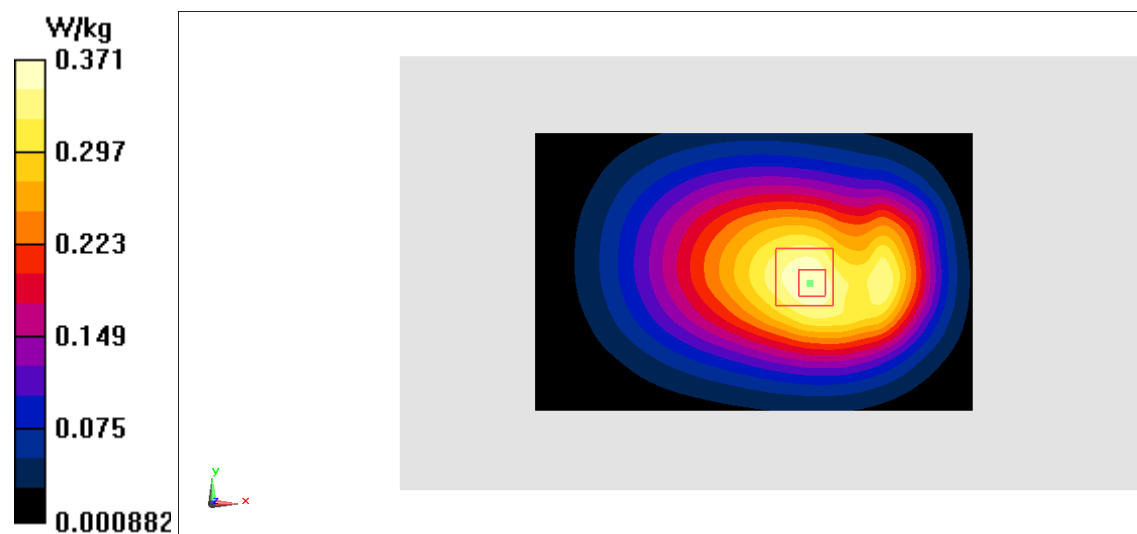


Fig.18 LTE Band17

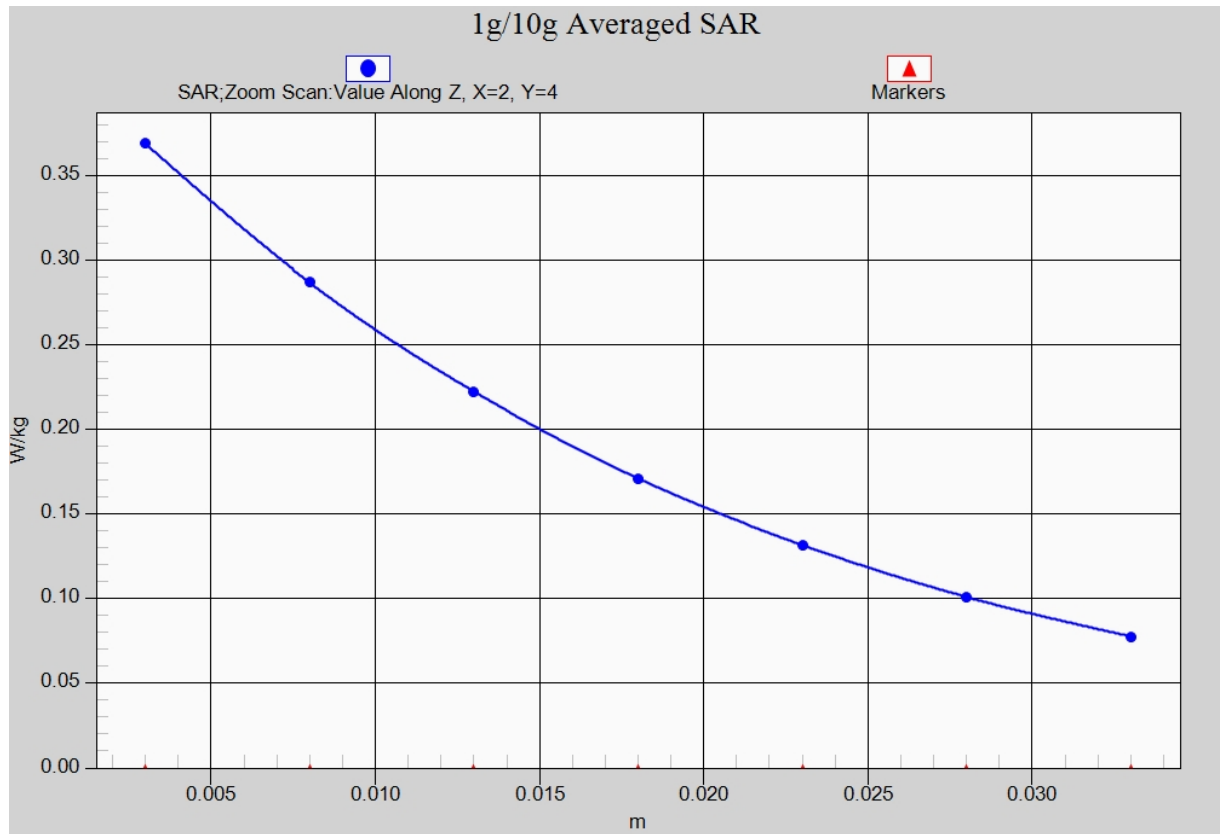


Fig. 18-1 Z-Scan at power reference point (LTE Band17)

Wifi 802.11b Left Cheek Channel 1

Date: 2015-5-18

Electronics: DAE4 Sn777

Medium: Head 2450 MHz

Medium parameters used (interpolated): $f = 2412$ MHz; $\sigma = 1.776$ mho/m; $\epsilon_r = 38.392$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.5°C Liquid Temperature: 22.0°C

Communication System: WLan 2450 Frequency: 2412 MHz Duty Cycle: 1:1

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

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

Maximum value of SAR (interpolated) = 0.275 W/kg

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

Reference Value = 1.762 V/m; Power Drift = -0.10 dB

Peak SAR (extrapolated) = 0.831 W/kg

SAR(1 g) = 0.244 W/kg; SAR(10 g) = 0.110 W/kg

Maximum value of SAR (measured) = 0.269 W/kg

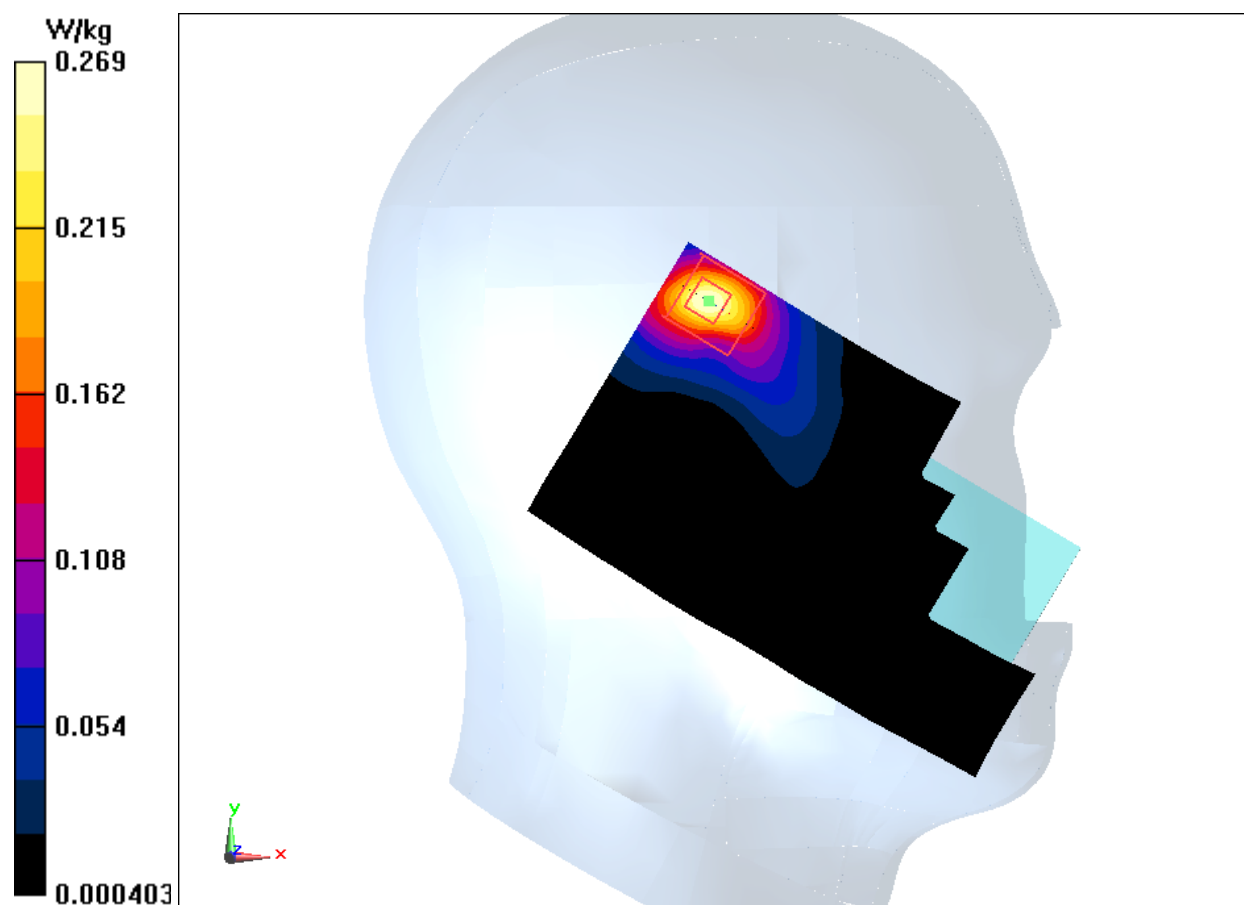


Fig.19 2450 MHz

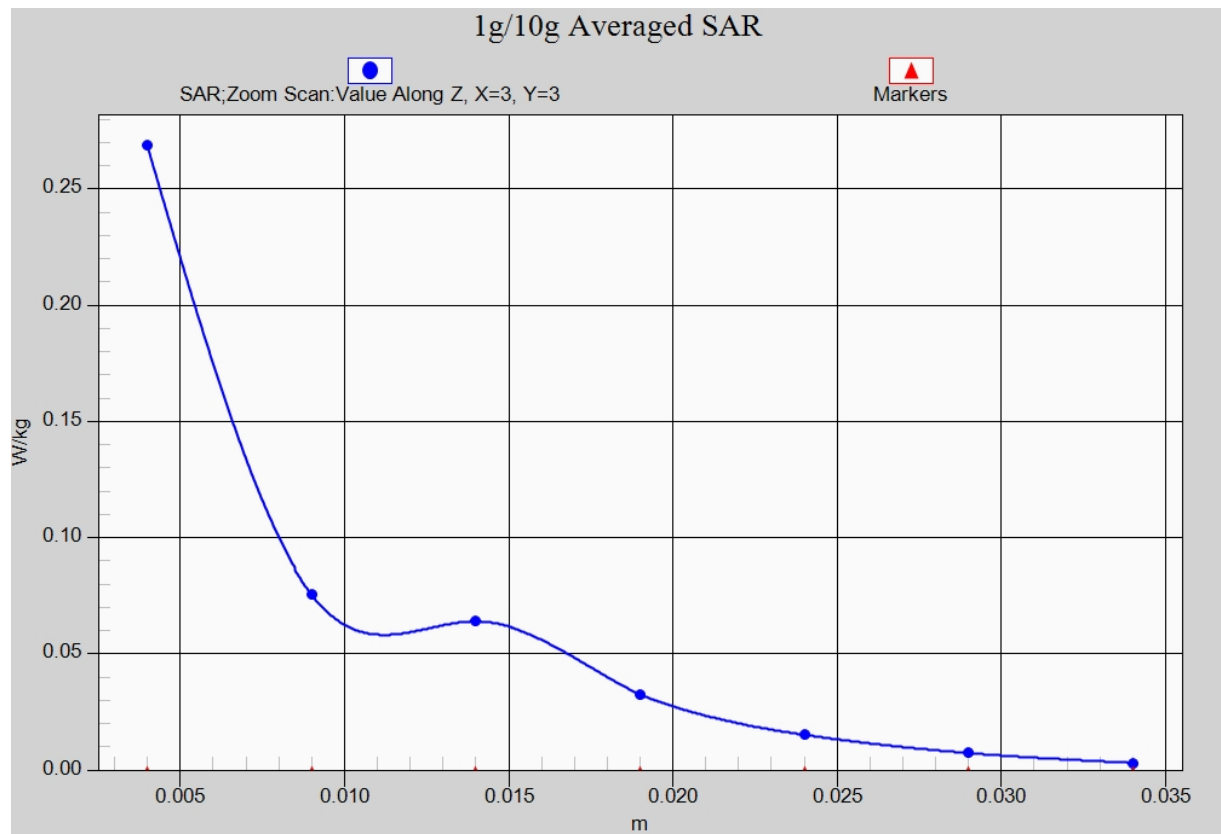


Fig. 19-1 Z-Scan at power reference point (2450 MHz)

Wifi 802.11b Body Rear Channel 1

Date: 2015-5-18

Electronics: DAE4 Sn777

Medium: Body 2450 MHz

Medium parameters used (interpolated): $f = 2412$ MHz; $\sigma = 1.908$ mho/m; $\epsilon_r = 52.853$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.5°C Liquid Temperature: 22.0°C

Communication System: Wlan 2450 Frequency: 2412 MHz Duty Cycle: 1:1

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

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

Maximum value of SAR (interpolated) = 0.437 W/kg

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

Reference Value = 3.925 V/m; Power Drift = -0.03dB

Peak SAR (extrapolated) = 0.688 W/kg

SAR(1 g) = 0.324 W/kg; SAR(10 g) = 0.139 W/kg

Maximum value of SAR (measured) = 0.446 W/kg

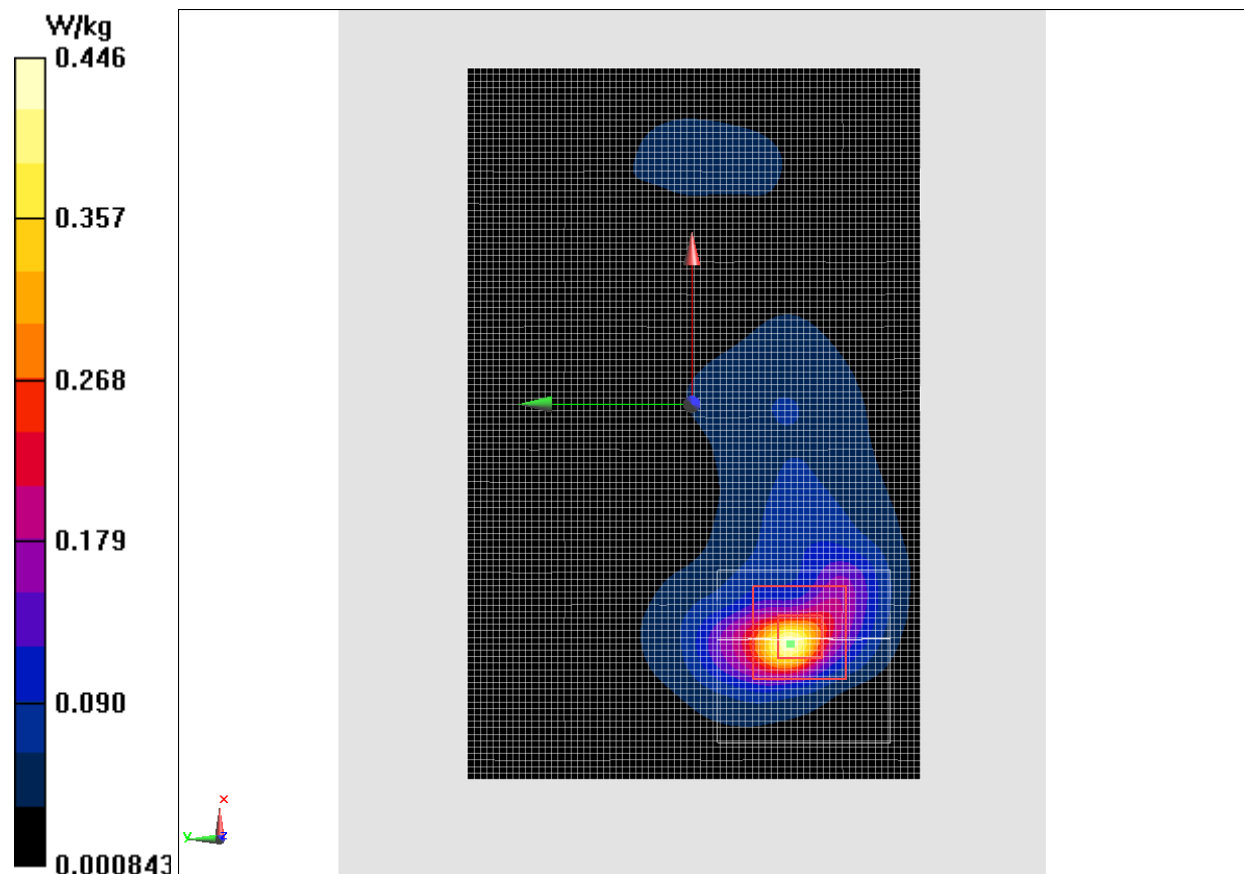


Fig.20 2450 MHz

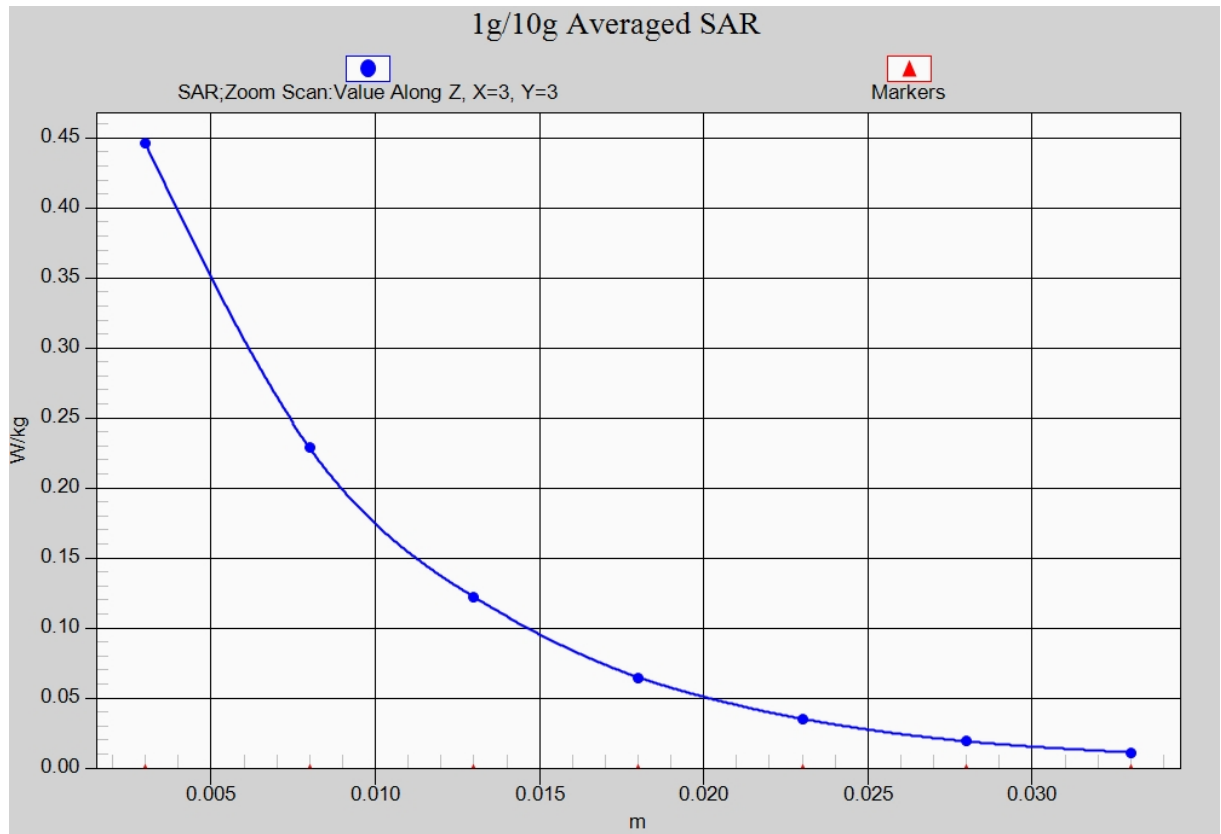


Fig. 20-1 Z-Scan at power reference point (2450 MHz)

ANNEX B System Verification Results

750MHz

Date: 2015-8-30

Electronics: DAE4 Sn777

Medium: Head 750 MHz

Medium parameters used: $f = 750 \text{ MHz}$; $\sigma = 0.882 \text{ mho/m}$; $\epsilon_r = 40.59$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C

Communication System: CW Frequency: 750 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN3846 ConvF(9.53, 9.53, 9.53)

System Validation /Area Scan (81x191x1): Interpolated grid: $dx=1.000 \text{ mm}$, $dy=1.000 \text{ mm}$

Reference Value = 49.912 V/m ; Power Drift = -0.08 dB

Fast SAR: SAR(1 g) = 2.11 W/kg ; SAR(10 g) = 1.38 W/kg

Maximum value of SAR (interpolated) = 2.25 W/kg

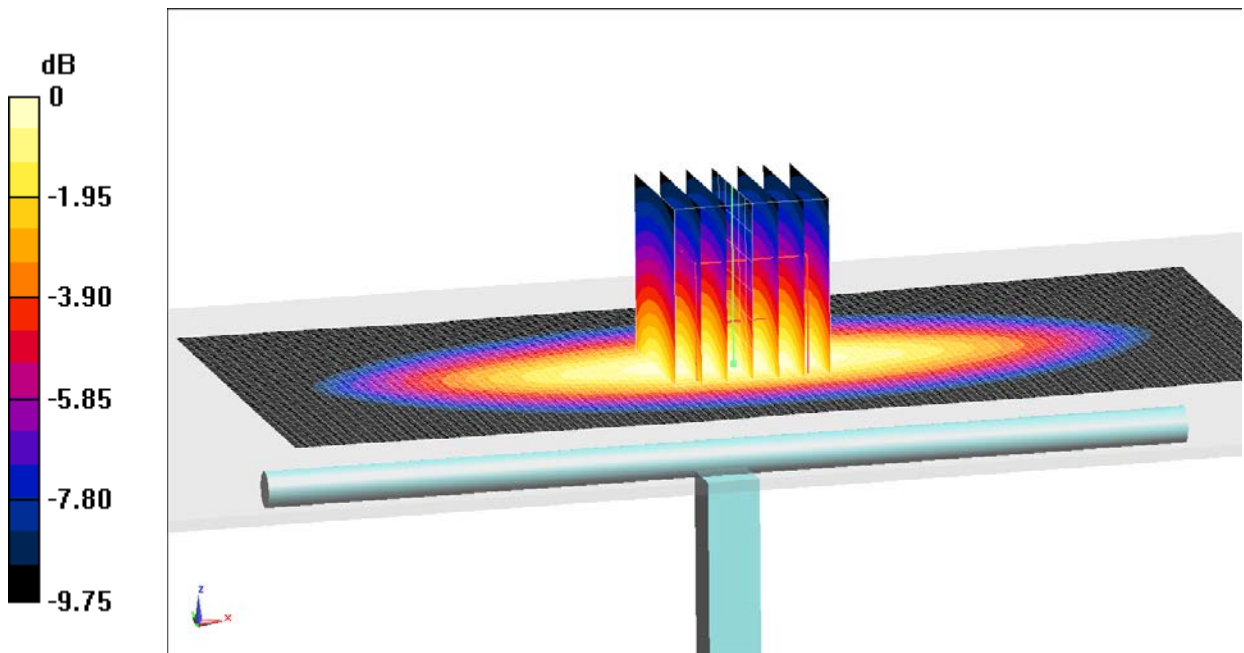
System Validation /Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 49.912 V/m ; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 2.93 W/kg

SAR(1 g) = 2.07 W/kg ; SAR(10 g) = 1.36 W/kg

Maximum value of SAR (measured) = 2.23 W/kg



0 dB = 2.23 W/kg = 3.48 dB W/kg

Fig.B.1 validation 750MHz 250mW

750MHz

Date: 2015-8-30

Electronics: DAE4 Sn777

Medium: Body750 MHz

Medium parameters used: $f = 750 \text{ MHz}$; $\sigma = 0.967 \text{ mho/m}$; $\epsilon_r = 57.31$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C

Communication System: CW Frequency: 750 MHz Duty Cycle: 1:1

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

System Validation/Area Scan (81x191x1): Interpolated grid: $dx=1.000 \text{ mm}$, $dy=1.000 \text{ mm}$

Reference Value = 51.088 V/m ; Power Drift = 0.10 dB

Fast SAR: SAR(1 g) = 2.18 W/kg ; SAR(10 g) = 1.41 W/kg

Maximum value of SAR (interpolated) = 2.32 W/kg

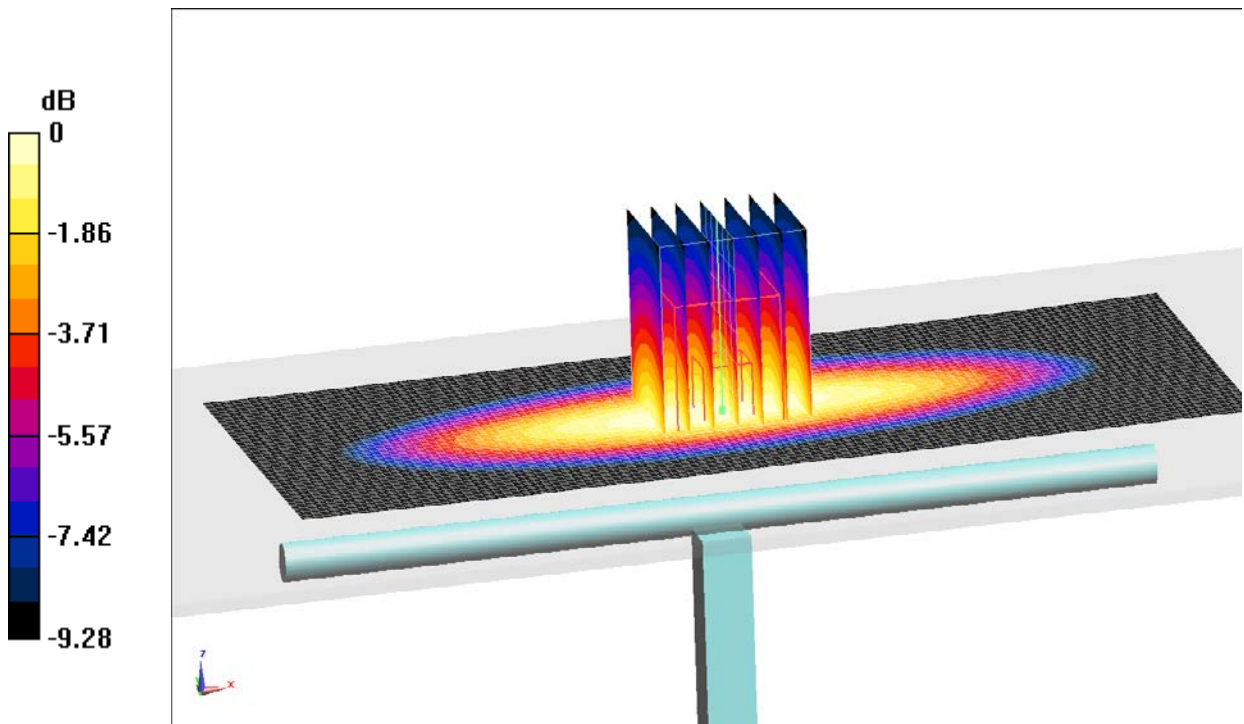
System Validation/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 51.088 V/m ; Power Drift = 0.10 dB

Peak SAR (extrapolated) = 3.05 W/kg

SAR(1 g) = 2.15 W/kg ; SAR(10 g) = 1.39 W/kg

Maximum value of SAR (measured) = 2.30 W/kg



0 dB = 2.30 W/kg = 3.62 dB W/kg

Fig.B.2 validation 750MHz 250mW

835MHz

Date: 2015-8-31

Electronics: DAE4 Sn777

Medium: Head 850 MHz

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.93 \text{ S/m}$; $\epsilon_r = 42.95$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C

Communication System: CW Frequency: 835 MHz Duty Cycle: 1:1

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

System Validation /Area Scan (81x161x1): Interpolated grid: $dx=1.000 \text{ mm}$, $dy=1.000 \text{ mm}$

Reference Value = 52.994 V/m ; Power Drift = 0.09 dB

Fast SAR: SAR(1 g) = 2.26 W/kg ; SAR(10 g) = 1.48 W/kg

Maximum value of SAR (interpolated) = 2.47 W/kg

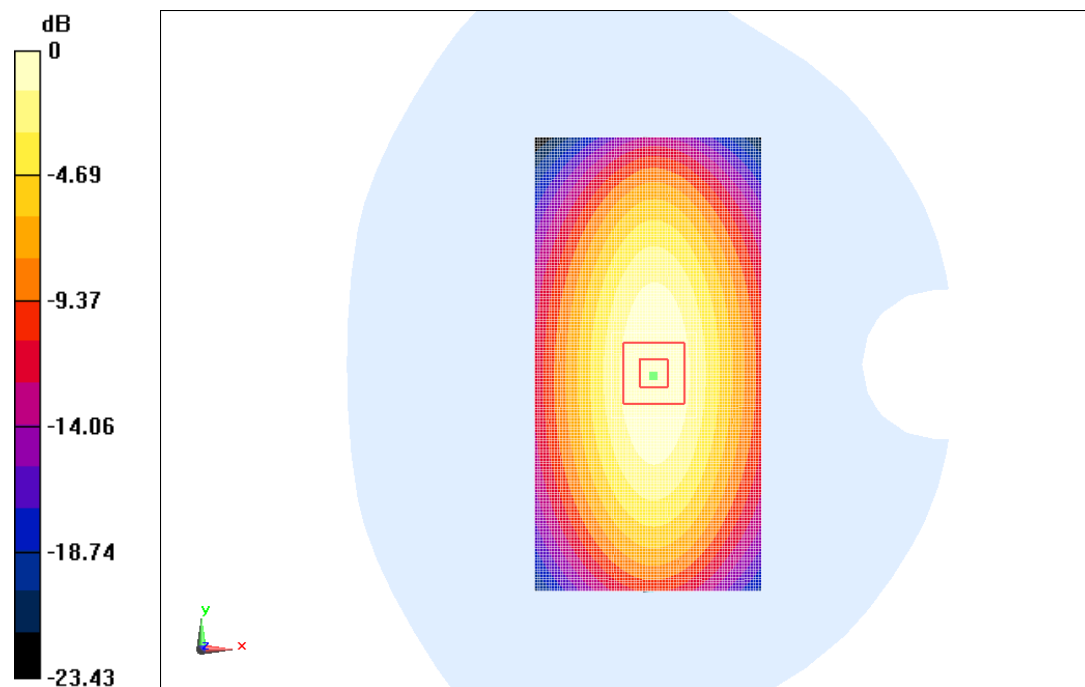
System Validation /Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 52.994 V/m ; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 3.55 W/kg

SAR(1 g) = 2.29 W/kg ; SAR(10 g) = 1.50 W/kg

Maximum value of SAR (measured) = 2.49 W/kg



$0 \text{ dB} = 2.49 \text{ W/kg} = 3.96 \text{ dBW/kg}$

Fig.B.3 validation 835MHz 250mW

835MHz

Date: 2015-8-31

Electronics: DAE4 Sn777

Medium: Body 850 MHz

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.997 \text{ S/m}$; $\epsilon_r = 53.49$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C

Communication System: CW Frequency: 835 MHz Duty Cycle: 1:1

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

System Validation /Area Scan (81x171x1): Interpolated grid: $dx=1.000 \text{ mm}$, $dy=1.000 \text{ mm}$

Reference Value = 52.742 V/m ; Power Drift = -0.05 dB

Fast SAR: SAR(1 g) = 2.31 W/kg ; SAR(10 g) = 1.53 W/kg

Maximum value of SAR (interpolated) = 2.52 W/kg

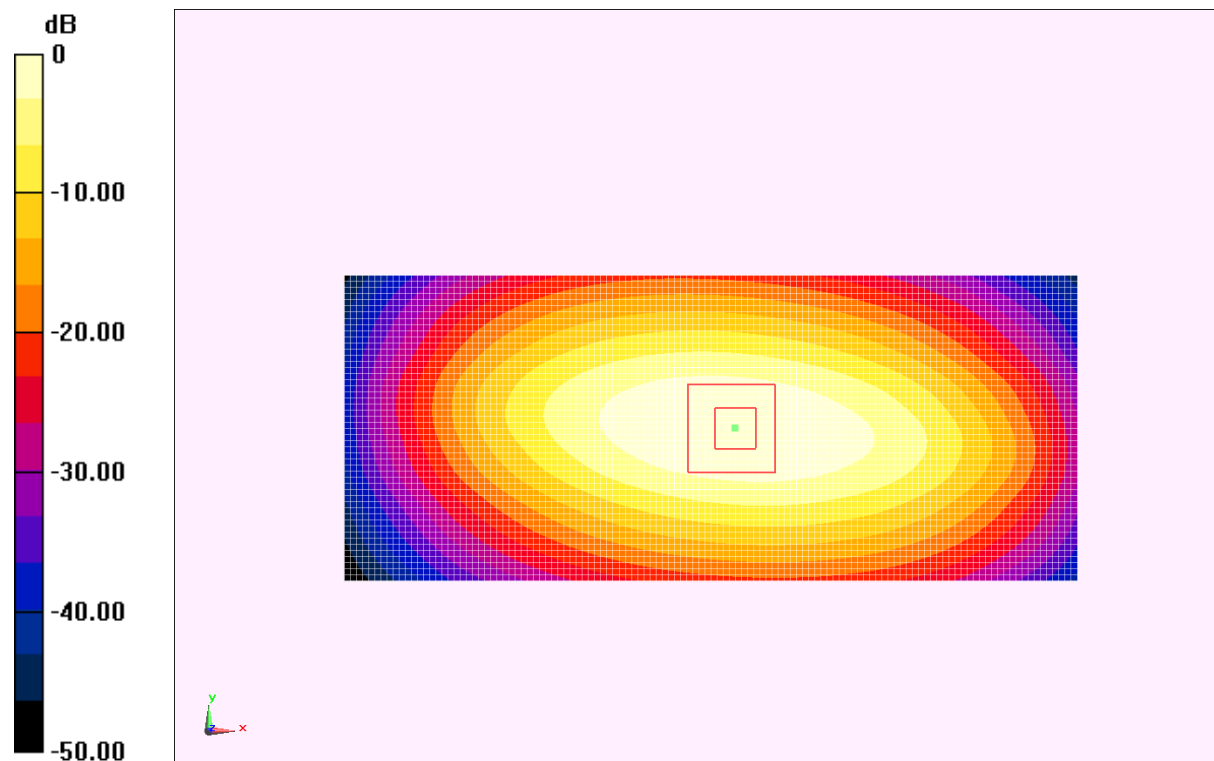
System Validation /Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 52.742 V/m ; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 3.52 W/kg

SAR(1 g) = 2.34 W/kg ; SAR(10 g) = 1.55 W/kg

Maximum value of SAR (measured) = 2.54 W/kg



0 dB = 2.54 W/kg = 4.05 dBW/kg

Fig.B.4 validation 835MHz 250mW

1750MHz

Date: 2015-8-28

Electronics: DAE4 Sn777

Medium: Head 1750 MHz

Medium parameters used: $f=1750$ MHz; $\sigma = 1.338$ mho/m; $\epsilon_r = 39.9$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C

Communication System: CW Frequency: 1750 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN3846 ConvF(7.64, 7.64, 7.64)

System Validation/Area Scan (81x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Reference Value = 88.256 V/m; Power Drift = 0.06 dB

Fast SAR: SAR(1 g) = 8.98 W/kg; SAR(10 g) = 4.76 W/kg

Maximum value of SAR (interpolated) = 10.1 W/kg

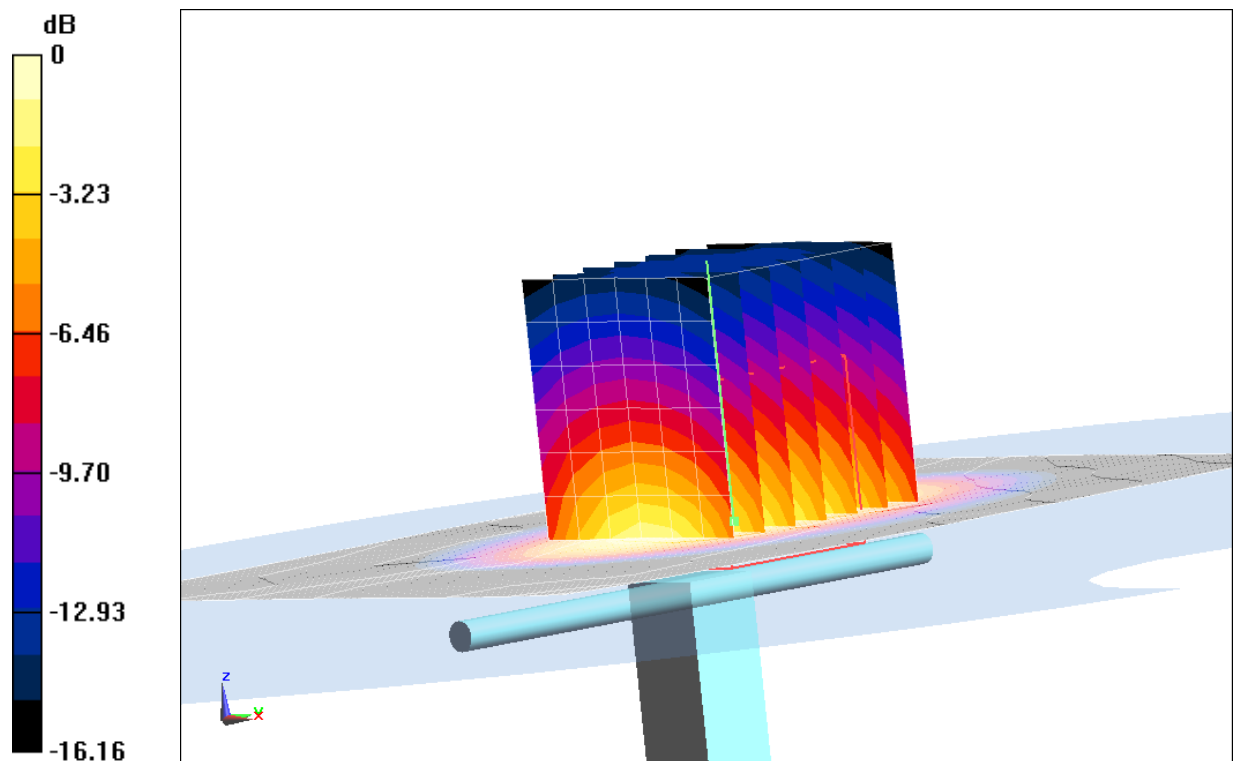
System Validation/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 88.256 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 15.64 W/kg

SAR(1 g) = 9.08 W/kg; SAR(10 g) = 4.84 W/kg

Maximum value of SAR (measured) = 10.2 W/kg



0 dB = 10.2 W/kg = 10.09 dB W/kg

Fig.B.5 validation 1750MHz 250mW

1750MHz

Date: 2015-8-28

Electronics: DAE4 Sn777

Medium: Body 1750 MHz

Medium parameters used: $f=1750$ MHz; $\sigma = 1.529$ mho/m; $\epsilon_r = 53.77$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C

Communication System: CW Frequency: 1750 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN3846 ConvF(7.43, 7.43, 7.43)

System Validation/Area Scan (81x121x1): Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm

Reference Value = 93.709 V/m; Power Drift = 0.04 dB

Fast SAR: SAR(1 g) = 9.31 W/kg; SAR(10 g) = 5.02 W/kg

Maximum value of SAR (interpolated) = 10.2 W/kg

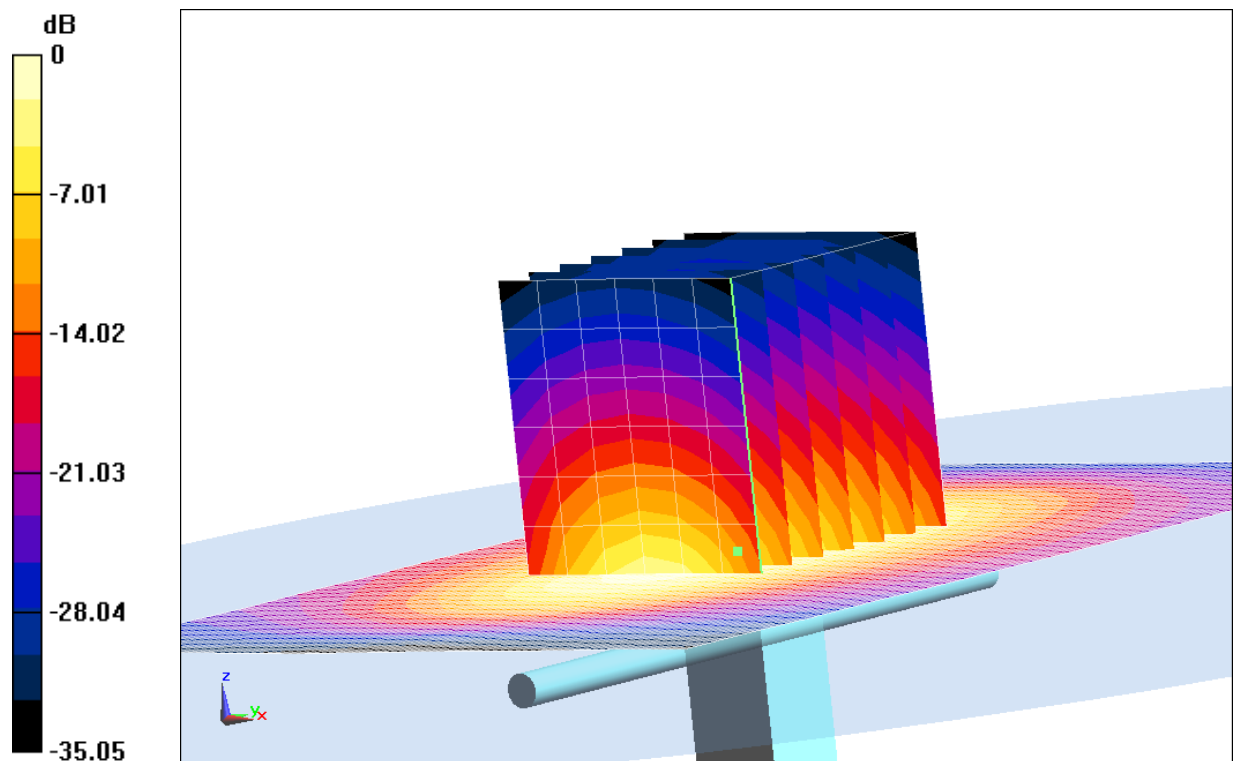
System Validation/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 93.709 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 16.18 W/kg

SAR(1 g) = 9.21 W/kg; SAR(10 g) = 4.93 W/kg

Maximum value of SAR (measured) = 10.1 W/kg



0 dB = 10.1 W/kg = 10.04 dB W/kg

Fig.B.6 validation 1750MHz 250mW

1900MHz

Date: 2015-9-1

Electronics: DAE4 Sn777

Medium: Head 1900 MHz

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.372$ S/m; $\epsilon_r = 41.54$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C

Communication System: CW Frequency: 1900 MHz Duty Cycle: 1:1

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

System Validation /Area Scan (81x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Reference Value = 91.211 V/m; Power Drift = -0.04 dB

Fast SAR: SAR(1 g) = 10.6 W/kg; SAR(10 g) = 5.61 W/kg

Maximum value of SAR (interpolated) = 12.1 W/kg

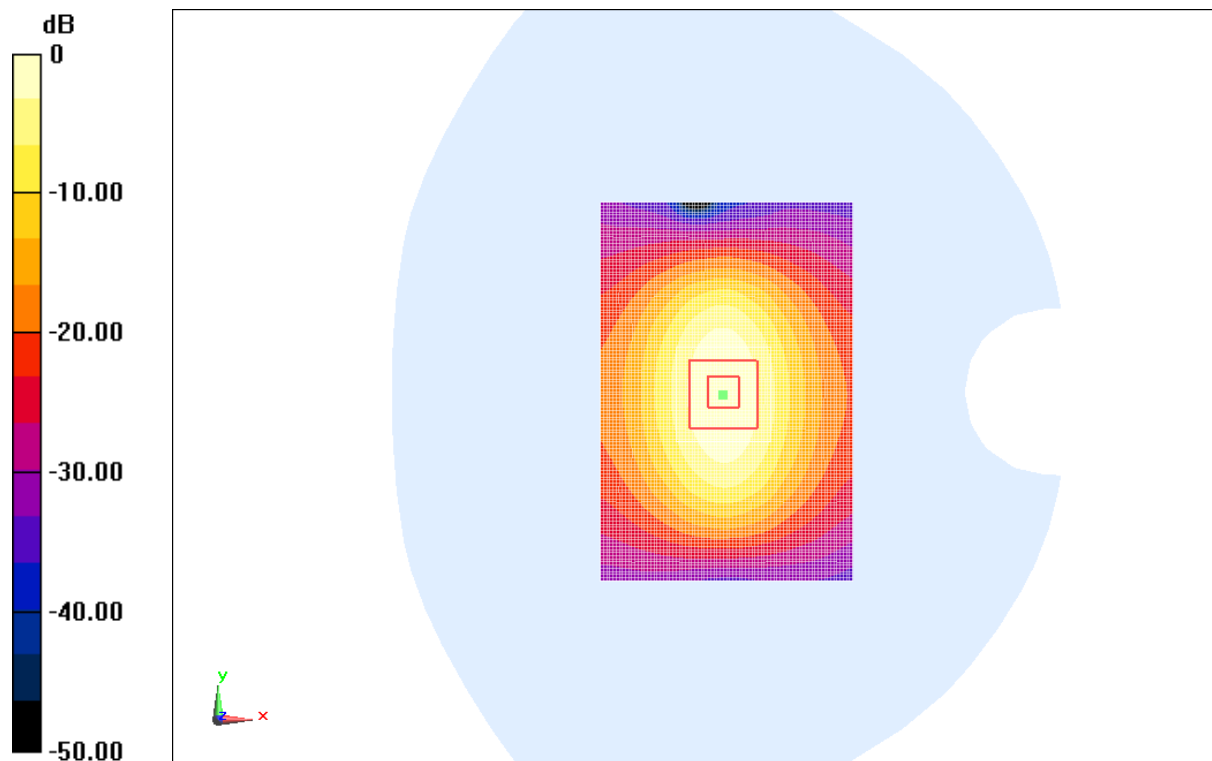
System Validation /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 91.211 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 18.9 W/kg

SAR(1 g) = 10.4 W/kg; SAR(10 g) = 5.49 W/kg

Maximum value of SAR (measured) = 11.8 W/kg



0 dB = 11.8 W/kg = 10.72 dBW/kg

Fig.B.7 validation 1900MHz 250mW

1900MHz

Date: 2015-9-1

Electronics: DAE4 Sn777

Medium: Body 1900 MHz

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.481$ S/m; $\epsilon_r = 52.71$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C

Communication System: CW Frequency: 1900 MHz Duty Cycle: 1:1

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

System validation /Area Scan (81x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Reference Value = 61.41 V/m; Power Drift = -0.01 dB

Fast SAR: SAR(1 g) = 10.5 W/kg; SAR(10 g) = 5.6 W/kg

Maximum value of SAR (interpolated) = 12.5 W/kg

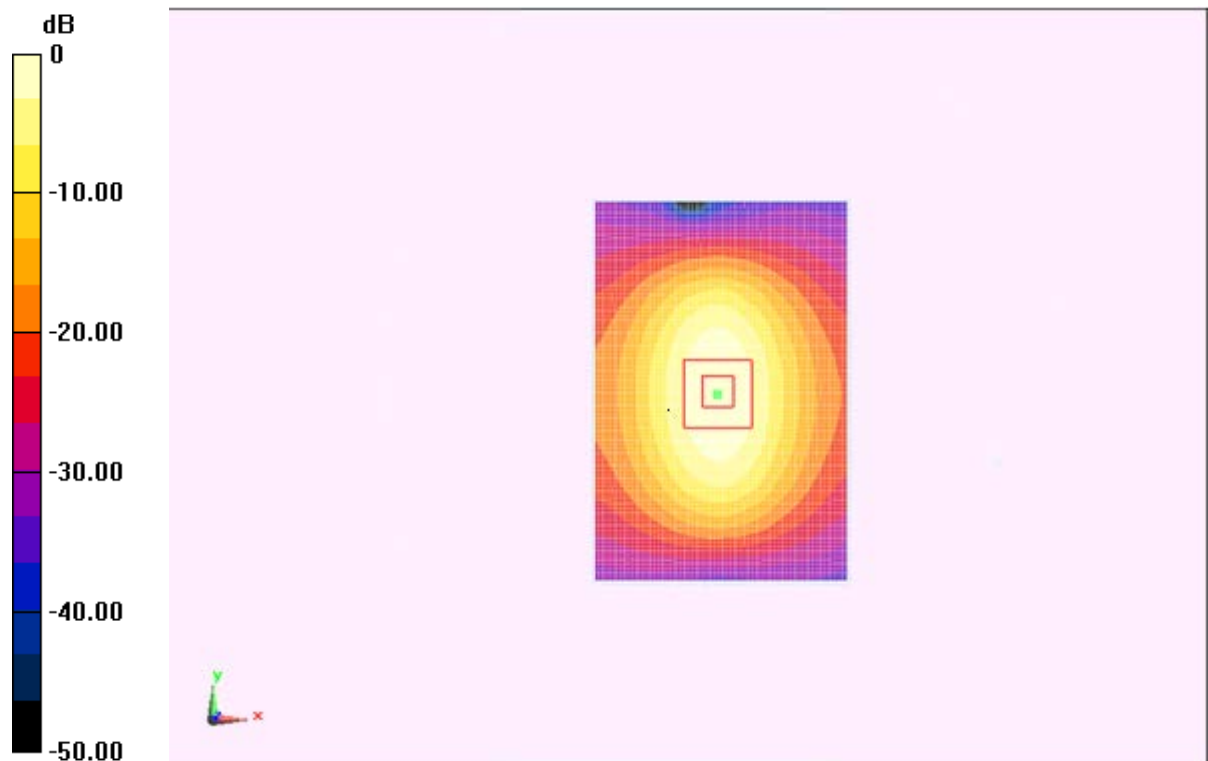
System validation /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 61.41 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 19.4 W/kg

SAR(1 g) = 10.3 W/kg; SAR(10 g) = 5.42 W/kg

Maximum value of SAR (measured) = 12.3 W/kg



0 dB = 12.3 W/kg = 10.90 dBW/kg

Fig.B.8 validation 1900MHz 250mW