14.3 SAR results for Standard procedure

There is zoom scan measurement to be added for the highest measured SAR in each exposure configuration/band.

Table 14.3-1: SAR Values (GSM 850 MHz Band - Head)

Ambient Temperature: 22.4 °C Liquid Temperature: 22.2°C											
Frequency		Side	Test Position	Figure No./Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz										
251	848.8	Right	Touch	Fig.1	32.07	33.8	0.216	**0.32**	0.283	**0.42**	0.02

Table 14.3-2: SAR Values (GSM 850 MHz Band - Body)

Ambient Temperature: 22.4 °C Liquid Temperature: 22.2°C											
Frequency		Mode (number of timeslots)	Test Position	Figure No./Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz										
251	848.8	GPRS (4)	Rear	Fig.2	28.62	30	0.385	**0.53**	0.531	**0.73**	-0.18

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

Table 14.3-3: SAR Values (GSM 1900 MHz Band - Head)

Ambient Temperature: 22.4 °C Liquid Temperature: 22.2°C											
Frequency		Side	Test Position	Figure No./Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz										
810	1909.8	Left	Touch	Fig.3	29.04	30.3	0.135	**0.18**	0.222	**0.30**	0.09

Table 14.3-4: SAR Values (GSM 1900 MHz Band - Body)

Ambient Temperature: 22.4 °C Liquid Temperature: 22.2°C											
Frequency		Mode (number of timeslots)	Test Position	Figure No./Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz										
810	1909.8	GPRS (4)	Front	Fig.4	25.71	26.5	0.386	**0.46**	0.676	**0.81**	-0.16

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

Table 14.3-5: SAR Values (WCDMA 850 MHz Band - Head)

Ambient Temperature: 22.4 °C Liquid Temperature: 22.2°C											
Frequency		Side	Test Position	Figure No./Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz										
4233	846.6	Right	Touch	Fig.5	23.29	24.5	0.173	**0.23**	0.226	**0.30**	0.14

Table 14.3-6: SAR Values (WCDMA 850 MHz Band - Body)

Ambient Temperature: 22.4 °C Liquid Temperature: 22.2°C										
Frequency		Test Position	Figure No./Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz									
4233	846.6	Rear	Fig.6	23.29	24.5	0.225	**0.30**	0.309	**0.41**	0.08

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

Table 14.3-7: SAR Values (WCDMA 1700 MHz Band - Head)

Ambient Temperature: 22.4 °C Liquid Temperature: 22.2°C											
Frequency		Side	Test Position	Figure No./Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz										
1637	1732.4	Left	Touch	Fig.7	22.60	24	0.213	**0.29**	0.333	**0.46**	0.05

Table 14.3-8: SAR Values (WCDMA 1700 MHz Band - Body)

Ambient Temperature: 22.4 °C Liquid Temperature: 22.2°C										
Frequency		Test Position	Figure No./Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz									
1637	1732.4	Rear	Fig.8	22.60	24	0.283	**0.39**	0.419	**0.58**	-0.14

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

Table 14.2-9: SAR Values(WCDMA 1900 MHz Band - Head)

Ambient Temperature: 22.4 °C Liquid Temperature: 22.2°C											
Frequency		Side	Test Position	Figure No./Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz										
9800	1880	Left	Touch	Fig.9	23.16	24	0.365	**0.44**	0.597	**0.72**	0.15

Table 14.3-10: SAR Values (WCDMA 1900 MHz Band - Body)

Ambient Temperature: 22.4 °C Liquid Temperature: 22.2°C										
Frequency		Test Position	Figure No./Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz									
9800	1880	Front	Fig.10	23.16	24	0.493	**0.60**	0.872	**1.06**	-0.06

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

Table 14.3-11: SAR Values (LTE Band2 - Head)

Ambient Temperature: 22.4 °C Liquid Temperature: 22.2°C												
Frequency		Mode	Side	Test Position	Figure No./ Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz											
18900	1880	1RB_Low	Left	Touch	Fig.11	23.49	24	0.331	**0.37**	0.540	**0.61**	0.10

Note1: The LTE mode is QPSK_20MHz.

Table 14.3-12: SAR Values (LTE Band2 - Body)

Ambient Temperature: 22.4 °C Liquid Temperature: 22.2°C												
Frequency		Mode	Test Position	Figure No./ Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)	
Ch.	MHz											
18900	1880	1RB_Low	Front	Fig.12	23.49	24	0.498	**0.56**	0.881	**0.99**	0.05	

Note1: The distance between the EUT and the phantom bottom is 10mm.
Note2: The LTE mode is QPSK_20MHz.

Table 14.3-13: SAR Values(LTE Band4 - Head)

Ambient Temperature: 22.4 °C Liquid Temperature: 22.2°C												
Frequency		Mode	Side	Test Position	Figure No./ Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz											
20300	1745	1RB_Low	Left	Touch	Fig.13	23.59	24	0.176	**0.19**	0.275	**0.30**	0.07

Note1: The LTE mode is QPSK_20MHz.

Table 14.3-14: SAR Values (LTE Band4 - Body)

Ambient Temperature: 22.4 °C Liquid Temperature: 22.2°C											
Frequency		Mode	Test Position	Figure No./Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz										
20300	1745	1RB_Low	Rear	Fig.14	23.59	24	0.313	**0.34**	0.461	**0.51**	-0.13

Note1: The distance between the EUT and the phantom bottom is 10mm.
Note2: The LTE mode is QPSK_20MHz.

Table 14.3-15: SAR Values (LTE Band5 - Head)

Ambient Temperature: 22.4°C Liquid Temperature: 22.2°C												
Frequency		Mode	Side	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz											
20600	844	1RB_Mid	Right	Touch	Fig.15	23.47	24	0.163	**0.18**	0.212	**0.24**	-0.01

Note1: The LTE mode is QPSK_10MHz.

Table 14.3-16: SAR Values (LTE Band5 - Body)

Ambient Temperature: 22.5°C Liquid Temperature: 22.0°C											
Frequency		Mode	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz										
20600	844	1RB_Mid	Rear	Fig.16	23.47	24	0.172	**0.19**	0.279	**0.32**	0.03

Note1: The distance between the EUT and the phantom bottom is 10mm.
Note2: The LTE mode is QPSK_10MHz.

Table 14.3-17: SAR Values (LTE Band7 - Head)

Ambient Temperature: 22.4°C Liquid Temperature: 22.2°C												
Frequency		Mode	Side	Test Position	Figure No./ Note	Conducted Power (dBm)	Max.tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g)(W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz											
21350	2560	1RB_High	Left	Touch	Fig.17	23.43	24	0.430	**0.49**	0.822	**0.94**	0.01

Note1: The LTE mode is QPSK_20MHz.

Table 14.3-18: SAR Values (LTE Band7 - Body)

Ambient Temperature: 22.4°C Liquid Temperature: 22.2°C											
Frequency		Mode	Test Position	Figure No./ Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz										
21350	2560	1RB_High	Rear	Fig.18	23.43	24	0.500	**0.57**	0.939	**1.07**	0.09

Note1: The distance between the EUT and the phantom bottom is 10mm. Note2: The LTE mode is QPSK_20MHz.

Table 14.3-19: SAR Values (LTE Band12 - Head)

Ambient Temperature: 22.4°C Liquid Temperature: 22.2°C												
Frequency		Mode	Side	Test Position	Figure No./ Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz											
23060	704	1RB_Low	Left	Touch	Fig.19	23.44	24	0.084	**0.10**	0.104	**0.12**	0.02

Note1: The LTE mode is QPSK_10MHz.

Table 14.3-20: SAR Values (LTE Band12 - Body)

Ambient Temperature: 22.4 °C Liquid Temperature: 22.2°C												
Frequency		Mode	Test Position	Figure No./Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz										
23060	704	1RB_Low	Rear	Fig.20	23.44	24	0.201	**0.23**	0.255	**0.29**	0.02

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

Note2: The LTE mode is QPSK_10MHz.

Table 14.3-21: SAR Values (LTE Band13 - Head)

Ambient Temperature: 22.4 °C Liquid Temperature: 22.2°C												
Frequency		Mode	Side	Test Position	Figure No./ Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz											
23230	782	1RB_High	Left	Touch	Fig.21	23.13	24	0.091	**0.11**	0.117	**0.14**	-0.04

Note1: The LTE mode is QPSK_10MHz.

Table 14.3-22: SAR Values (LTE Band13 - Body)

Ambient Temperature: 22.4 °C Liquid Temperature: 22.2°C											
Frequency		Mode	Test Position	Figure No./Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz										
23230	782	1RB_ High	Rear	Fig.22	23.13	24	0.244	**0.30**	0.310	**0.38**	0.07

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

Note2: The LTE mode is QPSK_10MHz.

14.4 WLAN Evaluation

According to the KDB248227 D01, SAR is measured for 2.4GHz 802.11b DSSS using the initial test position procedure.

Head Evaluation

Table 14.4-1: SAR Values(WLAN - Head)– 802.11b (Fast SAR)

Ambient Temperature: 22.4 °C											
Frequency		Side	Test Position	Figure No./ Note	Conducted Power (dBm)	Max. tune-up Power (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	/	18.24	19	0.152	**0.18**	0.257	**0.31**	0.04
2437	6	Left	Tilt	/	18.24	19	0.164	**0.20**	0.299	**0.36**	-0.02
2437	6	Right	Touch	/	18.24	19	0.355	**0.42**	0.711	**0.85**	-0.08
2437	6	Right	Tilt	/	18.24	19	0.267	**0.32**	0.575	**0.68**	0.15
2437	6	Right	Touch	B2	18.24	19	0.337	**0.40**	0.645	**0.77**	-0.02

As shown above table, the initial test position for head is “Right Touch”. So the head SAR of WLAN is presented as below:

Table 14.4-2: SAR Values(WLAN - Head)– 802.11b (Full SAR)

Ambient Temperature: 22.4 °C											
Frequency		Side	Test Position	Figure No./ Note	Conducted Power (dBm)	Max. tune-up Power (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	Right	Touch	Fig.23	18.24	19	0.320	**0.38**	0.653	**0.78**	-0.08
2437	6	Right	Tilt	/	18.24	19	0.231	**0.28**	0.522	**0.62**	0.15

Note1: When the reported SAR of the initial test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position using subsequent highest estimated 1-g SAR conditions determined by area scans, on the highest maximum output power channel, until the reported SAR is ≤ 0.8 W/kg.
Note2: For all positions/configurations tested using the initial test position and subsequent test positions, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.

According to the KDB248227 D01, The reported SAR must be scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit. The scaled reported SAR is presented as below.

Table 14.4-3: SAR Values (WLAN - Head) – 802.11b (Scaled Reported SAR)

Ambient Temperature: 22.4 °C							
Frequency		Side	Test Position	Actual duty factor	maximum duty factor	Reported SAR (1g)(W/kg)	Scaled reported SAR (1g)(W/kg)
MHz	Ch.						
2437	6	Right	Touch	98.14%	100%	**0.78**	**0.79**

SAR is not required for OFDM because the 802.11b adjusted SAR ≤ 1.2 W/kg.

Body Evaluation

Table 14.4-4: SAR Values(WLAN - Body)– 802.11b (Fast SAR)

Ambient Temperature: 22.4 °C					Liquid Temperature: 22.2°C					
Frequency		Test Position	Figure No./ Note	Conducted Power (dBm)	Max. tune-up Power (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	Front	/	18.24	19	0.061	**0.07**	0.110	**0.13**	0.00
2437	6	Rear	/	18.24	19	0.064	**0.08**	0.142	**0.17**	-0.12
2437	6	Left	/	18.24	19	0.028	**0.03**	0.054	**0.06**	0.14
2437	6	Top	/	18.24	19	0.033	**0.04**	0.063	**0.07**	0.12
2437	6	Rear	B2	18.24	19	0.056	**0.07**	0.114	**0.14**	-0.05

As shown above table, the initial test position for body is “Front”. So the body SAR of WLAN is presented as below:

Table 14.4-5: SAR Values(WLAN - Body)– 802.11b (Full SAR)

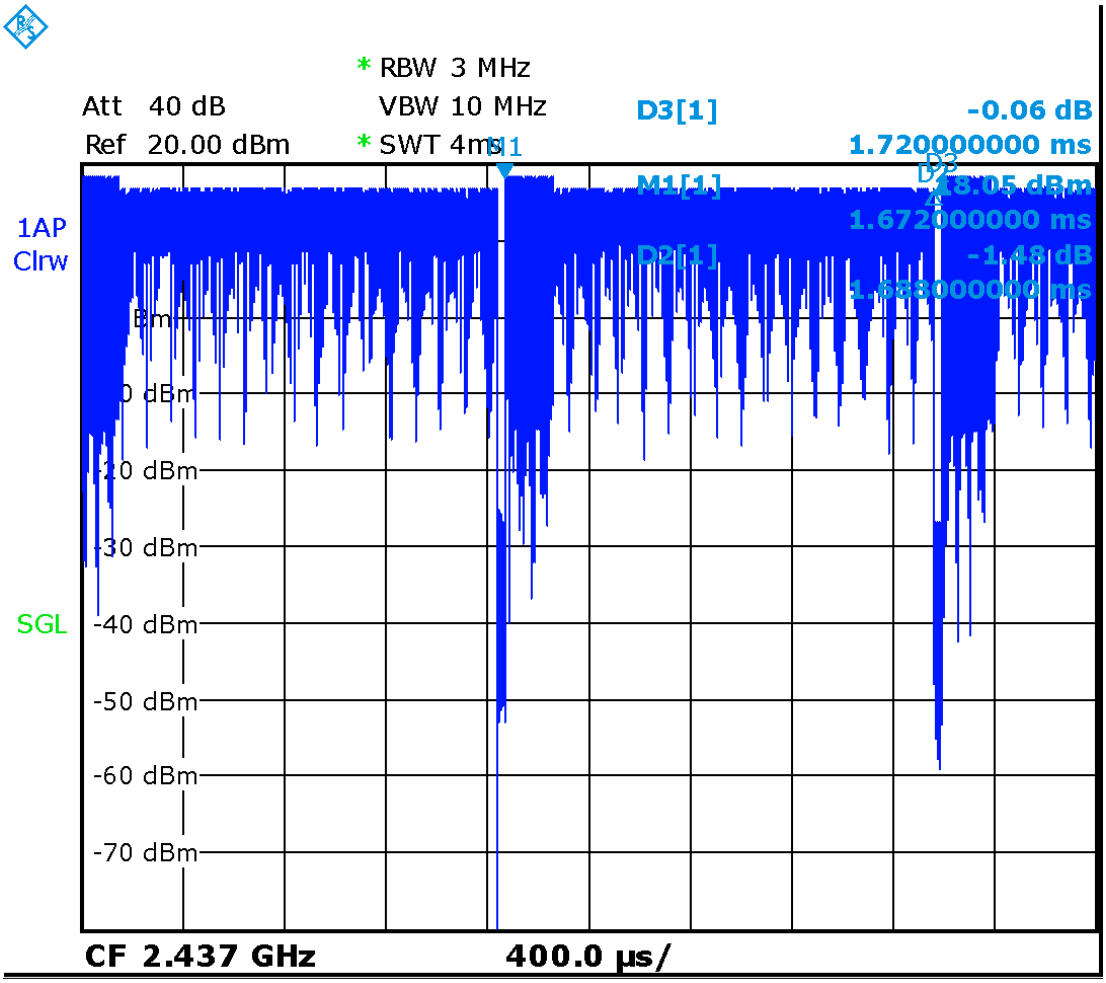
Ambient Temperature: 22.4 °C					Liquid Temperature: 22.2°C					
Frequency		Test Position	Figure No./ Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g)(W/kg)	Power Drift (dB)
MHz	Ch.									
2437	6	Rear	Fig.24	18.24	19	0.064	**0.08**	0.132	**0.16**	-0.12
Note1: When the reported SAR of the initial test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position using subsequent highest estimated 1-g SAR conditions determined by area scans, on the highest maximum output power channel, until the reported SAR is ≤ 0.8 W/kg. Note2: For all positions/configurations tested using the initial test position and subsequent test positions, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.										

According to the KDB248227 D01, The reported SAR must be scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit. The scaled reported SAR is presented as below.

Table 14.4-6: SAR Values (WLAN - Body) – 802.11b (Scaled Reported SAR)

Ambient Temperature: 22.4 °C					Liquid Temperature: 22.2°C	
Frequency		Test Position	Actual duty factor	maximum duty factor	Reported SAR (1g)(W/kg)	Scaled reported SAR (1g)(W/kg)
MHz	Ch.					
2437	6	Rear	98.14%	100%	**0.16**	**0.16**

SAR is not required for OFDM because the 802.11b adjusted SAR ≤ 1.2 W/kg.



Picture 14.1 Duty factor plot

15 SAR Measurement Variability

SAR measurement variability must be assessed for each frequency band, which is determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media are required for SAR measurements in a frequency band, the variability measurement procedures should be applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium.

The following procedures are applied to determine if repeated measurements are required.

1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps2) through 4) do not apply.

2) When the original highest measured SAR is ≥ 0.80 W/kg, repeat that measurement once.

3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45W/kg (~ 10% from the 1-g SAR limit).

4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

Table 15.1: SAR Measurement Variability for Body W1900 (1g)

Frequency		Test Position	Spacing (mm)	Original SAR (W/kg)	First Repeated SAR (W/kg)	The Ratio	Second Repeated SAR (W/kg)
Ch.	MHz						
9800	1880	Front	10	0.872	0.866	1.01	/

Table 15.2: SAR Measurement Variability for Body LTE B2 (1g)

Frequency		Mode	Test Position	Spacing (mm)	Original SAR (W/kg)	First Repeated SAR (W/kg)	The Ratio	Second Repeated SAR (W/kg)
Ch.	MHz							
18900	1880	1RB_Low	Front	10	0.881	0.876	1.01	/

Table 15.3: SAR Measurement Variability for Head LTE B7 (1g)

Frequency		Mode	Side	Test Position	Original SAR (W/kg)	First Repeated SAR (W/kg)	The Ratio	Second Repeated SAR (W/kg)
Ch.	MHz							
21350	2560	1RB_High	Left	Touch	0.822	0.813	1.01	/

Table 15.4: SAR Measurement Variability for Body LTE B7 (1g)

Frequency		Mode	Test Position	Spacing (mm)	Original SAR (W/kg)	First Repeated SAR (W/kg)	The Ratio	Second Repeated SAR (W/kg)
Ch.	MHz							
21350	2560	1RB_High	Rear	10	0.939	0.923	1.02	/

16 Measurement Uncertainty

16.1 Measurement Uncertainty for Normal 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	6.0	N	1	1	1	6.0	6.0	∞
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	N	1	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	RFambient 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	∞
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	$u_c' = \sqrt{\sum_{i=1}^{21} c_i^2 u_i^2}$					9.55	9.43	257
Expanded uncertainty (confidence interval of 95 %)	$u_e = 2u_c$					19.1	18.9	

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	6.55	N	1	1	1	6.55	6.55	∞
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	RFambient 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	B	5.0	R	$\sqrt{3}$	0.6	0.49	1.7	1.4	∞

	(target)									
21	Liquid permittivity (meas.)	A	1.6	N	1	0.6	0.49	1.0	0.8	521
Combined standard uncertainty		$u_c^{'} = \sqrt{\sum_{i=1}^{21} c_i^2 u_i^2}$						10.7	10.6	257
Expanded uncertainty (confidence interval of 95 %)		$u_e = 2u_c$						21.4	21.1	

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	6.0	N	1	1	1	6.0	6.0	∞
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	RFambient 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		$u_c^{'} = \sqrt{\sum_{i=1}^{22} c_i^2 u_i^2}$						10.4	10.3	257
Expanded uncertainty (confidence interval of 95 %)		$u_e = 2u_c$						20.8	20.6	

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	6.55	N	1	1	1	6.55	6.55	∞
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	RFambient 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	A	3.4	N	1	1	1	3.4	3.4	5

	uncertainty									
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		$u_c' = \sqrt{\sum_{i=1}^{22} c_i^2 u_i^2}$						13.5	13.4	257
Expanded uncertainty (confidence interval of 95 %)		$u_e = 2u_c$						27.0	26.8	

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	January 13, 2017	One year
02	Power meter	NRVD	102083	September 22,2016	One year
03	Power sensor	NRV-Z5	100595		
04	Signal Generator	E4438C	MY49071430	January 13,2017	One Year
05	Amplifier	60S1G4	0331848	No Calibration Requested	
06	BTS	E5515C	MY50263375	January 16, 2017	One year
07	BTS	CMW500	159890	November 25, 2016	One year
08	E-field Probe	SPEAG EX3DV4	3846	January 13,2017	One year
09	DAE	SPEAG DAE4	1331	January 19, 2017	One year
10	Dipole Validation Kit	SPEAG D750V3	1017	July 20,2016	One year
11	Dipole Validation Kit	SPEAG D835V2	4d069	July 20,2016	One year
12	Dipole Validation Kit	SPEAG D1750V2	1003	July 21,2016	One year
13	Dipole Validation Kit	SPEAG D1900V2	5d101	July 28,2016	One year
14	Dipole Validation Kit	SPEAG D2450V2	853	July 25,2016	One year
15	Dipole Validation Kit	SPEAG D2600V2	1012	July 25,2016	One year

END OF REPORT BODY

ANNEX A Graph Results

850 Right Cheek High

Date: 2017-4-19
Electronics: DAE4 Sn1331
Medium: Head 850 MHz
Medium parameters used (interpolated): f = 848.8 MHz; σ = 0.896 mho/m; εr = 41.06; ρ = 1000 kg/m^3
Ambient Temperature: 22.4°C Liquid Temperature: 22.2°C
Communication System: GSM 850 Frequency: 848.8 MHz Duty Cycle: 1:8.3
Probe: EX3DV4 – SN3846 ConvF(9.33, 9.33, 9.33)

Area Scan (71x131x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.309 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.290 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.358 W/kg
SAR(1 g) = 0.283 W/kg; SAR(10 g) = 0.216 W/kg
Maximum value of SAR (measured) = 0.306 W/kg

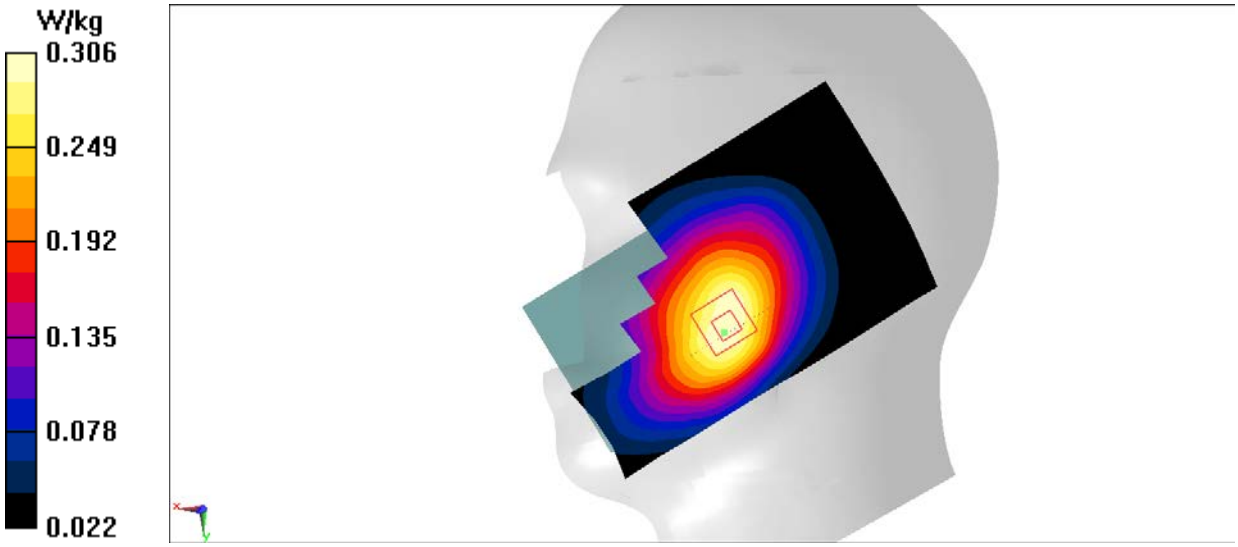


Fig.1 850MHz

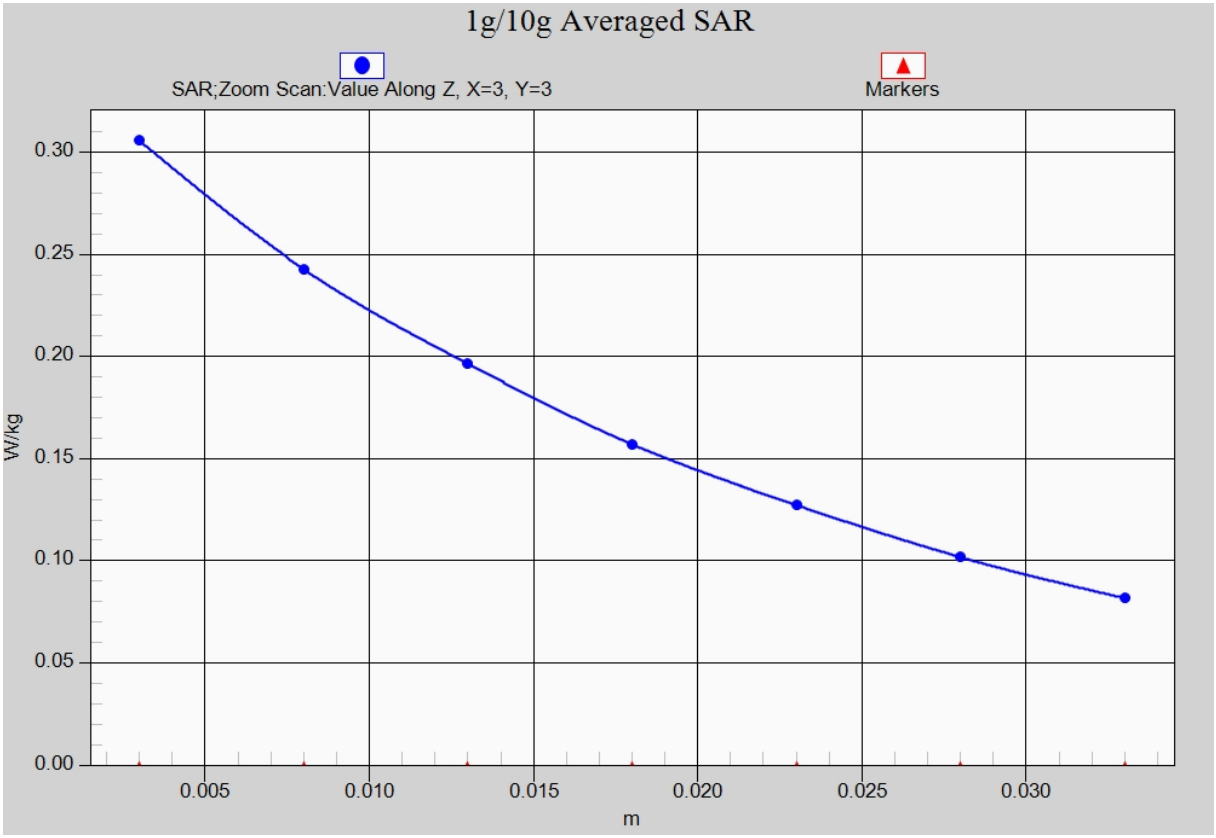


Fig. 1-1 Z-Scan at power reference point (850 MHz)

850 Body Rear High

Date: 2017-4-19
Electronics: DAE4 Sn1331
Medium: Body 850 MHz
Medium parameters used (interpolated): f = 848.8 MHz; σ = 0.982 mho/m; εr = 54.25; ρ = 1000 kg/m^3
Ambient Temperature: 22.4°C Liquid Temperature: 22.2°C
Communication System: GSM 850 GPRS Frequency: 848.8 MHz Duty Cycle: 1:2
Probe: EX3DV4 – SN3846 ConvF(9.52, 9.52, 9.52)

Area Scan (121x71x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.610 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 21.18 V/m; Power Drift = -0.18 dB
Peak SAR (extrapolated) = 0.734 W/kg
SAR(1 g) = 0.531 W/kg; SAR(10 g) = 0.385 W/kg
Maximum value of SAR (measured) = 0.592 W/kg

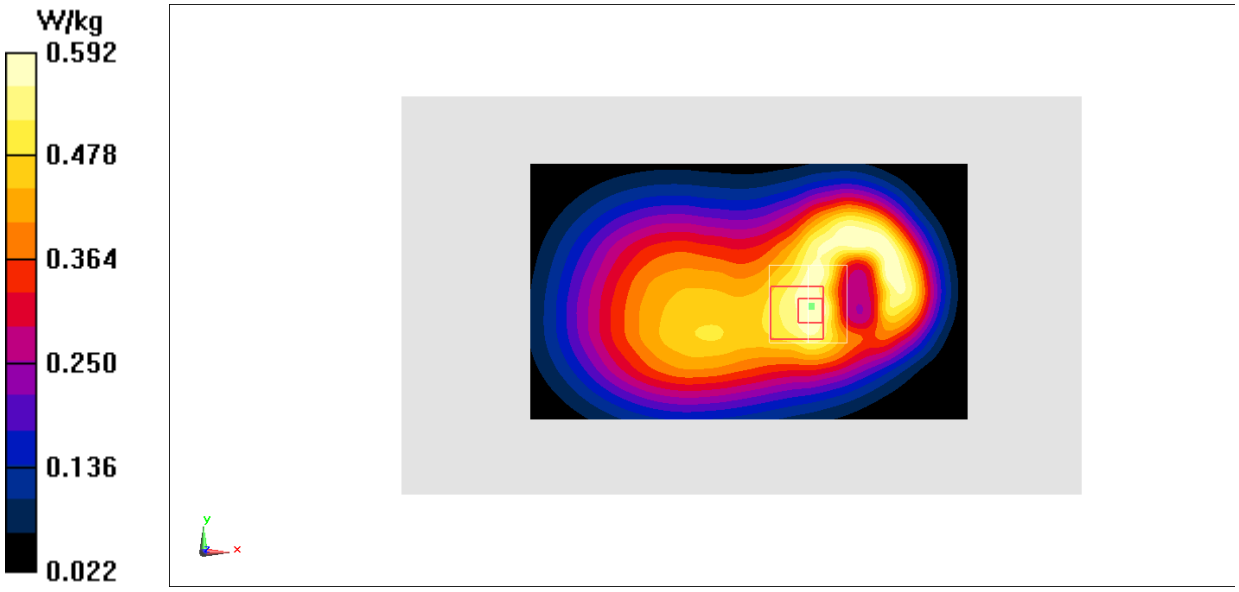


Fig.2 850 MHz

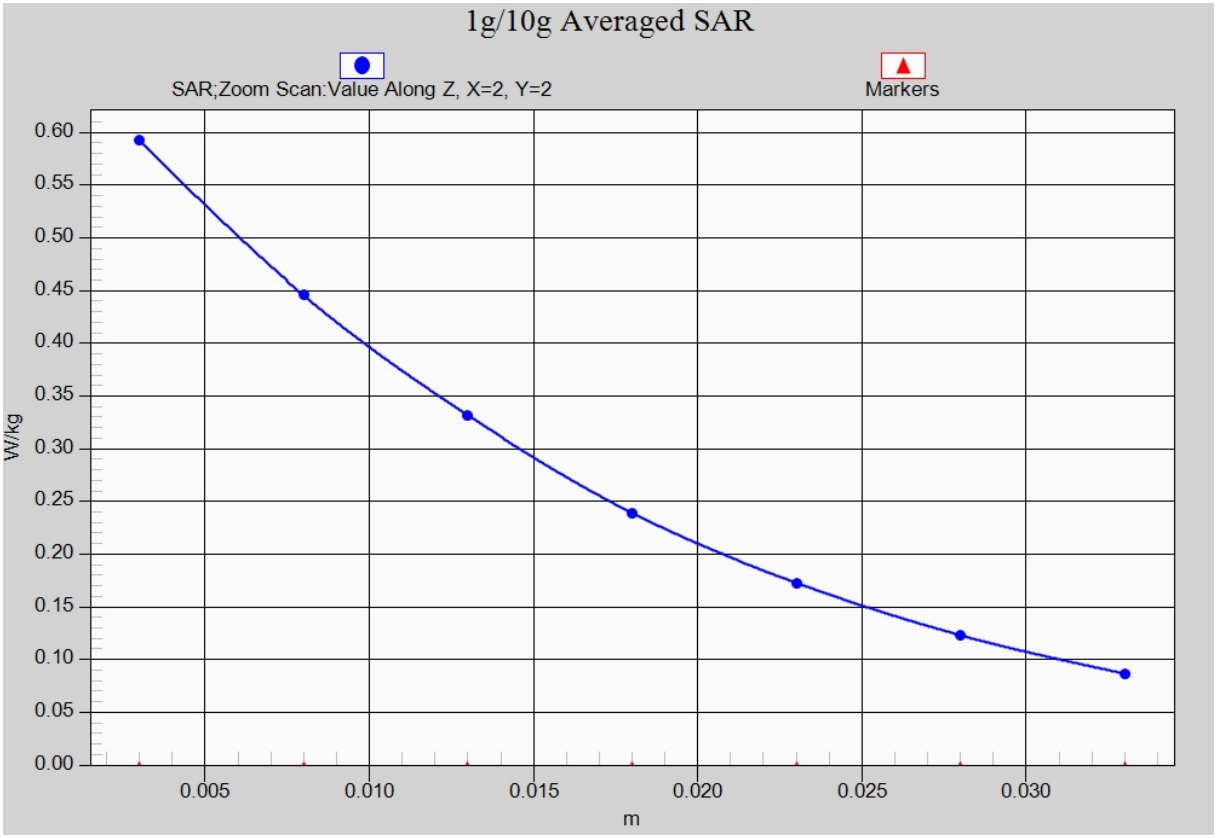


Fig. 2-1 Z-Scan at power reference point (850 MHz)

1900 Left Cheek High
Date: 2017-4-21
Electronics: DAE4 Sn1331
Medium: Head 1900 MHz
Medium parameters used: f = 1910 MHz; σ = 1.396 mho/m; εr = 41.05; ρ = 1000 kg/m^3
Ambient Temperature: 22.4°C Liquid Temperature: 22.2°C
Communication System: GSM 1900MHz Frequency: 1909.8 MHz Duty Cycle: 1:8.3
Probe: EX3DV4– SN3846 ConvF(7.89, 7.89, 7.89)

Area Scan (71x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.258 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.190 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 0.350 W/kg
SAR(1 g) = 0.222 W/kg; SAR(10 g) = 0.135 W/kg
Maximum value of SAR (measured) = 0.264 W/kg

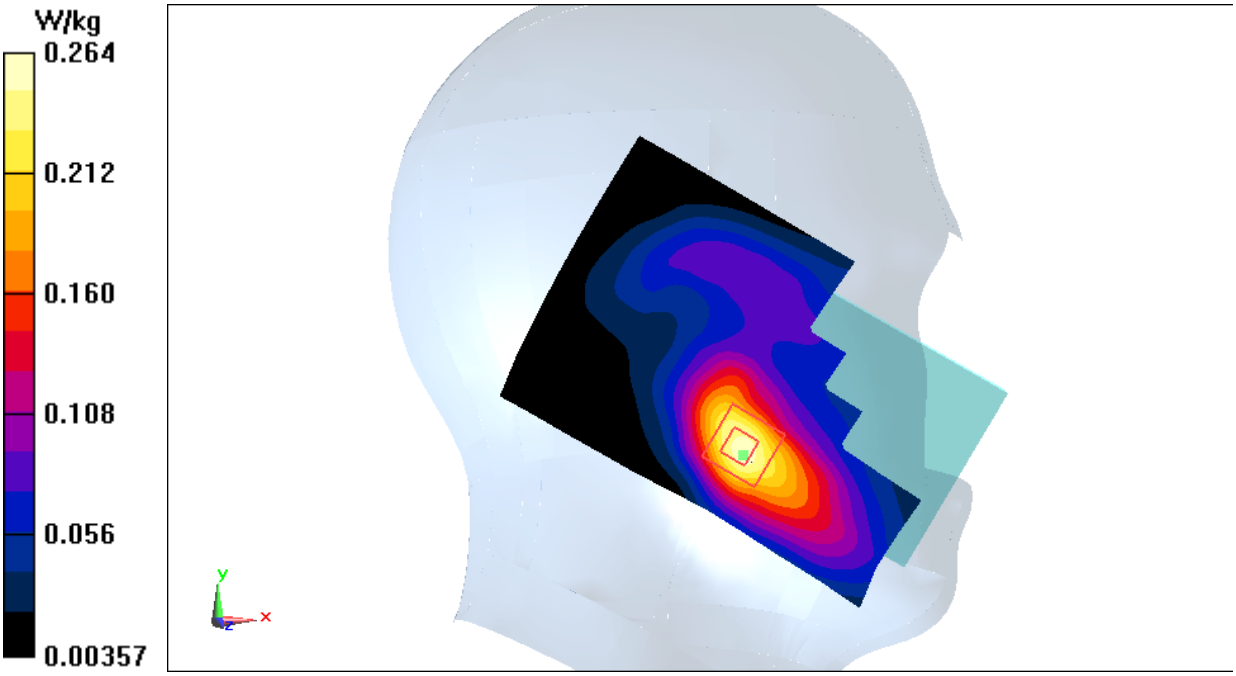


Fig.3 1900 MHz

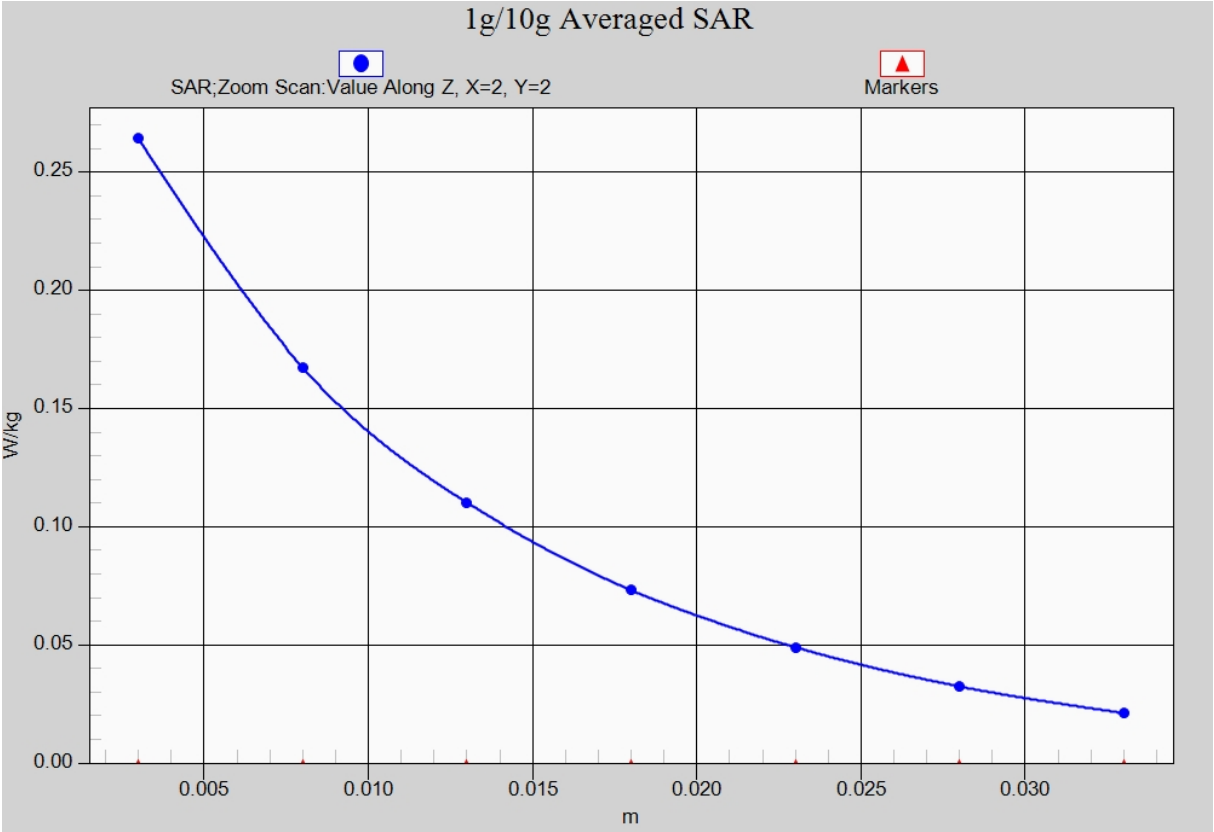


Fig. 3-1 Z-Scan at power reference point (1900 MHz)

1900 Body Front High
Date: 2017-4-21
Electronics: DAE4 Sn1331
Medium: Body 1900 MHz
Medium parameters used: f = 1910 MHz; σ =1.563 mho/m; εr = 52.42; ρ = 1000 kg/m^3
Ambient Temperature: 22.4°C Liquid Temperature: 22.2°C
Communication System: GSM 1900MHz GPRS Frequency: 1909.8 MHz Duty Cycle: 1:2
Probe: EX3DV4– SN3846 ConvF(7.57, 7.57, 7.57)

Area Scan (121x71x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.821 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 16.46 V/m; Power Drift = -0.16 dB
Peak SAR (extrapolated) = 1.14 W/kg
SAR(1 g) = 0.676 W/kg; SAR(10 g) = 0.386 W/kg
Maximum value of SAR (measured) = 0.833 W/kg

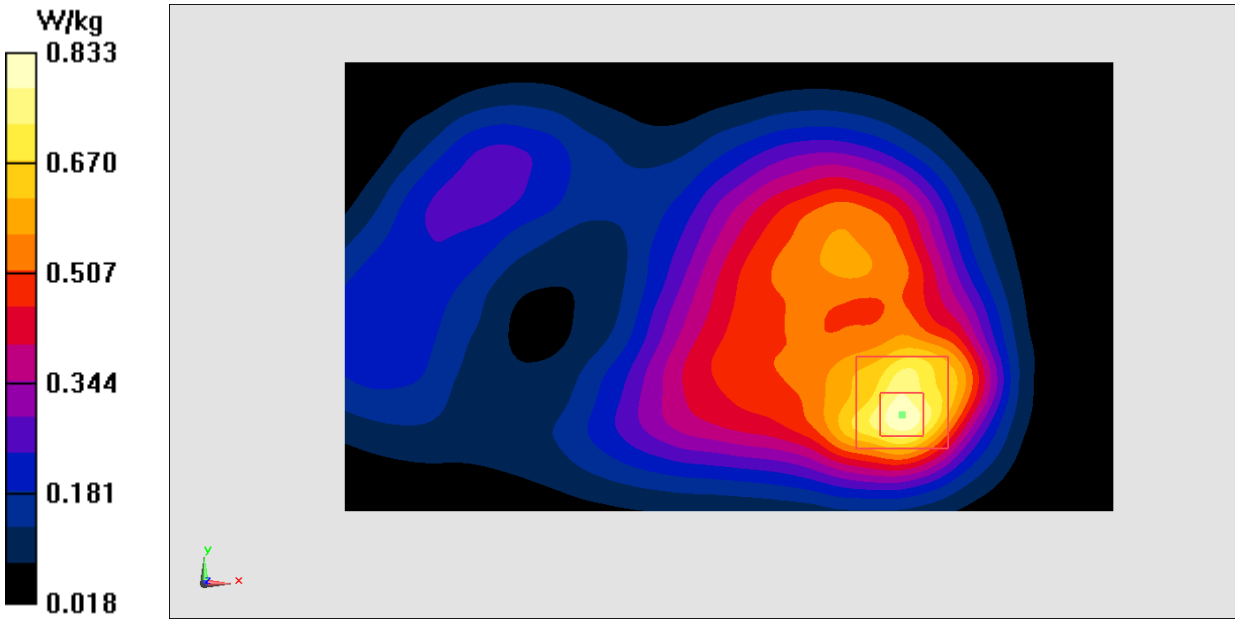


Fig.4 1900 MHz

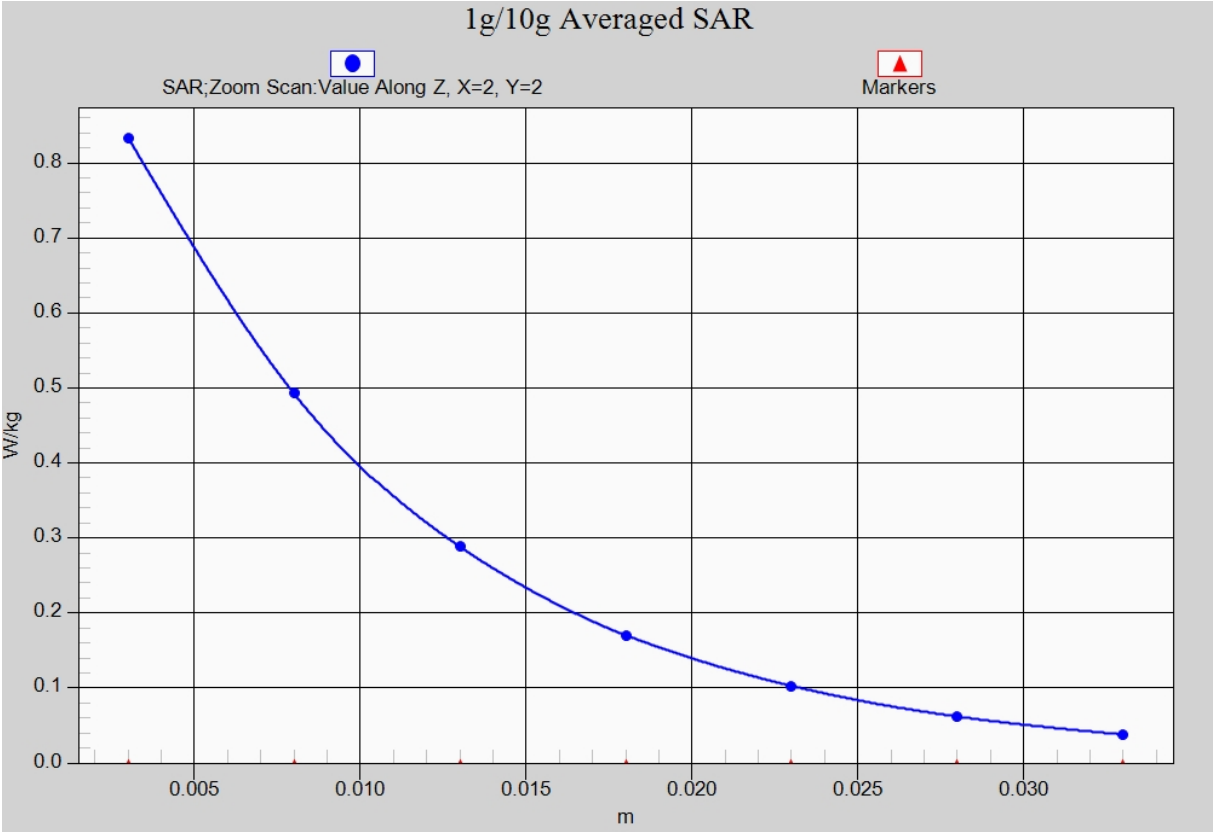


Fig. 4-1 Z-Scan at power reference point (1900 MHz)

WCDMA 850 Right Cheek High

Date: 2017-4-19
Electronics: DAE4 Sn1331
Medium: Head 850 MHz
Medium parameters used (interpolated): f = 846.6 MHz; σ = 0.893 mho/m; εr = 41.065; ρ = 1000 kg/m^3
Ambient Temperature: 22.4°C Liquid Temperature: 22.2°C
Communication System: WCDMA; Frequency: 846.6 MHz; Duty Cycle: 1:1
Probe: EX3DV4 – SN3846 ConvF(9.33, 9.33, 9.33)

Area Scan (71x131x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.245 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.505 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 0.285 W/kg
SAR(1 g) = 0.226 W/kg; SAR(10 g) = 0.173 W/kg
Maximum value of SAR (measured) = 0.245 W/kg

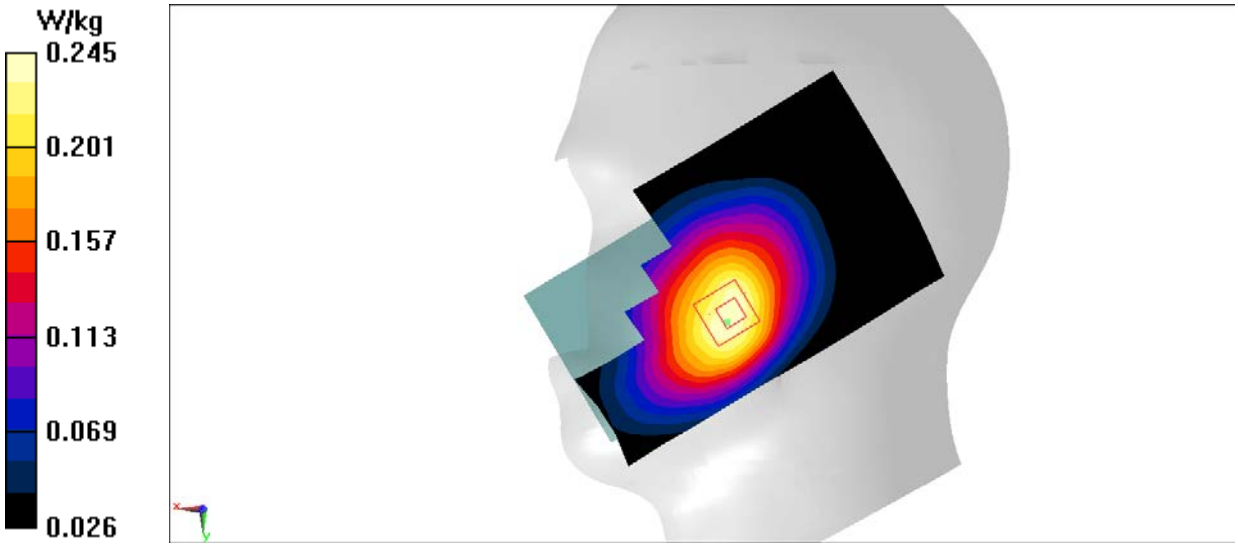


Fig.5 WCDMA 850

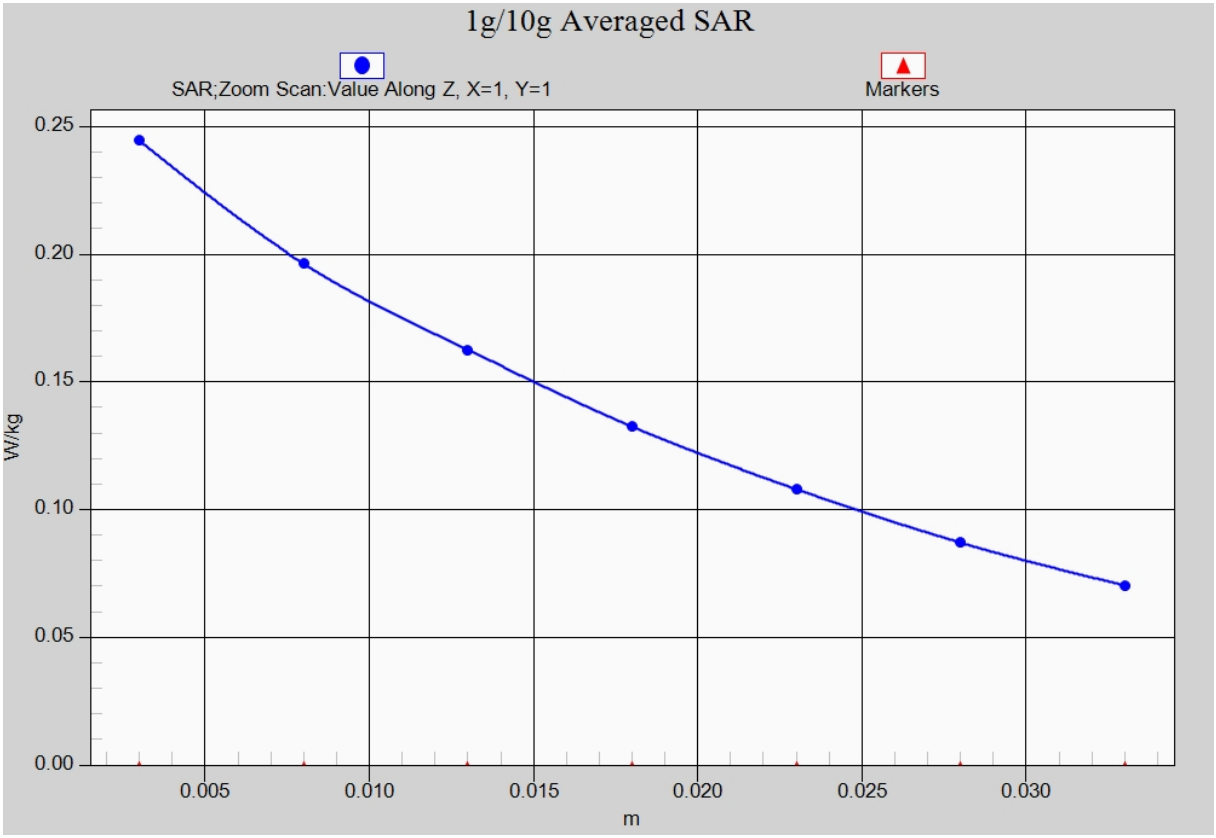


Fig. 5-1 Z-Scan at power reference point (850 MHz)

WCDMA 850 Body Rear High

Date: 2017-4-19
Electronics: DAE4 Sn1331
Medium: Body 850 MHz
Medium parameters used (interpolated): f = 846.6 MHz; σ = 0.979 mho/m; εr = 54.256; ρ = 1000 kg/m^3
Ambient Temperature: 22.4°C Liquid Temperature: 22.2°C
Communication System: WCDMA; Frequency: 846.6 MHz; Duty Cycle: 1:1
Probe: EX3DV4 – SN3846 ConvF(9.52, 9.52, 9.52)

Area Scan (121x71x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.352 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 15.98 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 0.423 W/kg
SAR(1 g) = 0.309 W/kg; SAR(10 g) = 0.225 W/kg
Maximum value of SAR (measured) = 0.345 W/kg

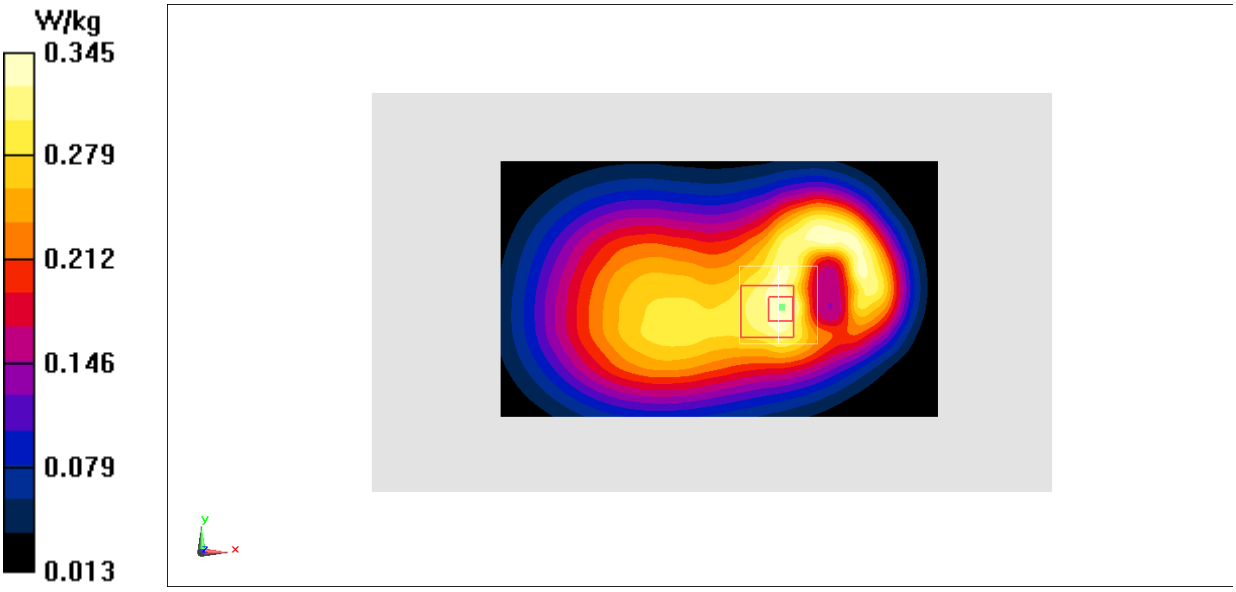


Fig.6 WCDMA 850

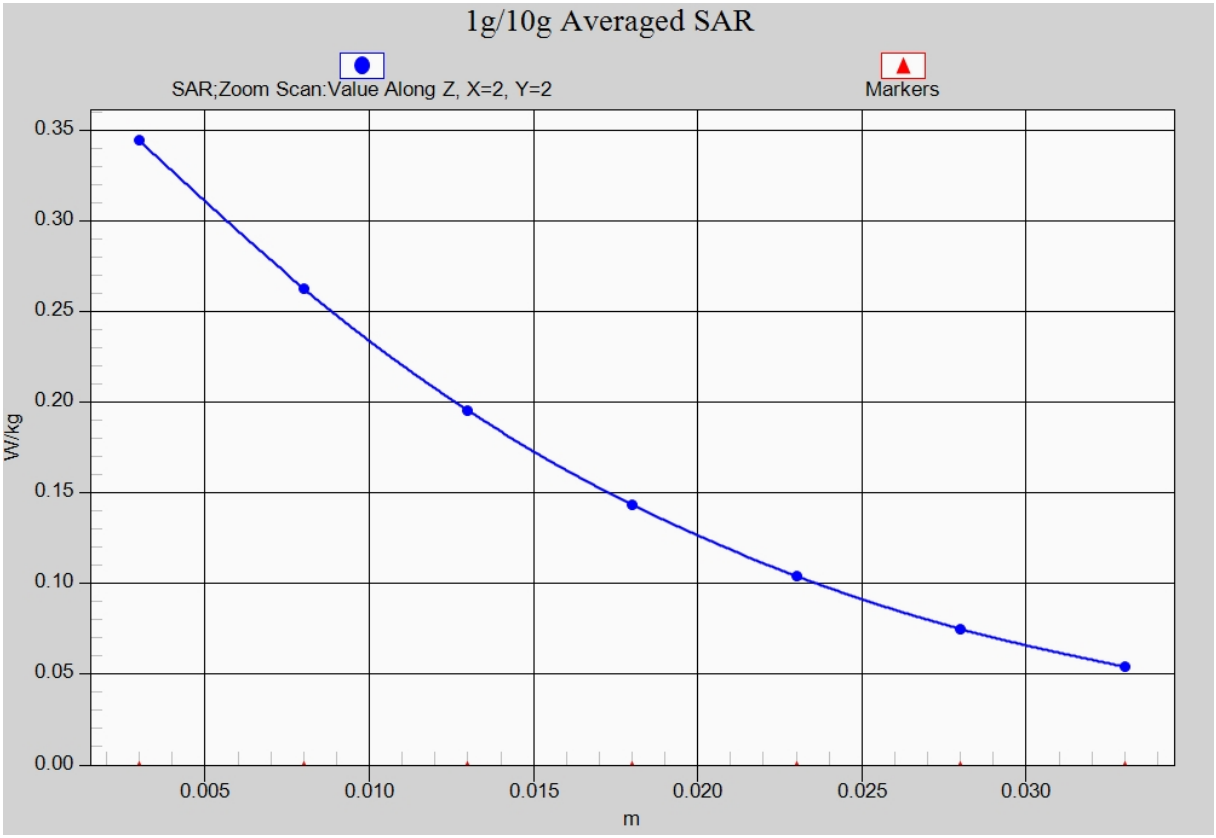


Fig. 6-1 Z-Scan at power reference point (WCDMA850)

WCDMA 1700 Left Cheek Middle

Date: 2017-4-20
Electronics: DAE4 Sn1331
Medium: Head 1750 MHz
Medium parameters used (interpolated): f = 1732.4 MHz; σ = 1.361 mho/m; εr = 39.257; ρ = 1000 kg/m^3
Ambient Temperature: 22.4°C Liquid Temperature: 22.2°C
Communication System: WCDMA 1750 Frequency: 1732.4 MHz Duty Cycle: 1:1
Probe: EX3DV4– SN3846 ConvF(8.16, 8.16, 8.16)

Area Scan (71x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.379 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.518 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.483 W/kg
SAR(1 g) = 0.333 W/kg; SAR(10 g) = 0.213 W/kg
Maximum value of SAR (measured) = 0.389 W/kg

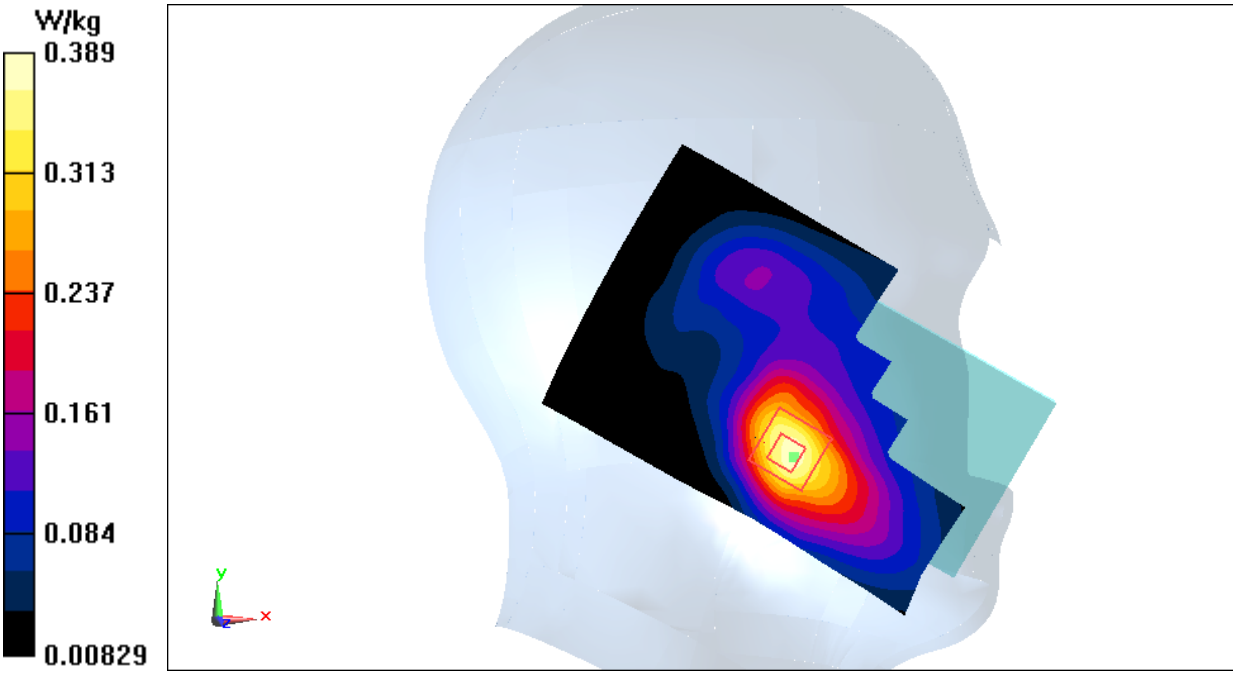


Fig.7 WCDMA1700

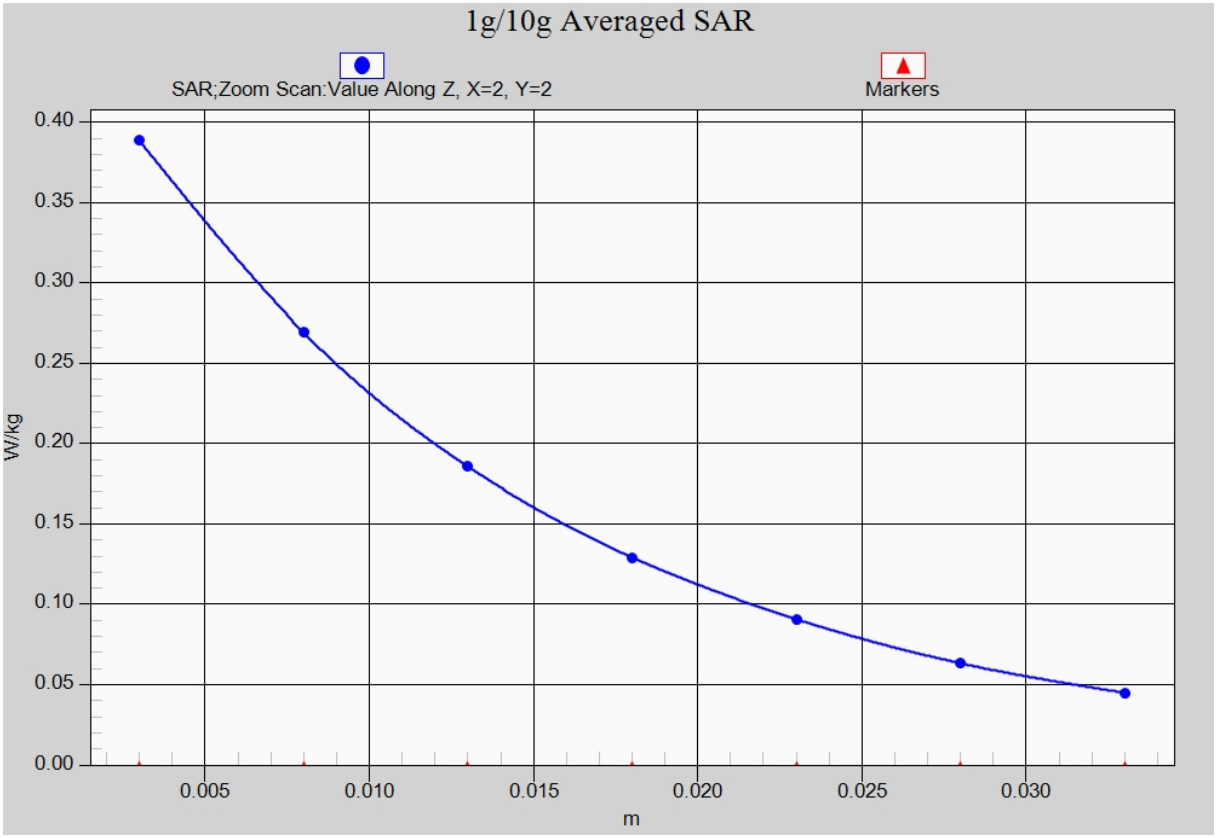


Fig. 7-1 Z-Scan at power reference point (WCDMA1700)

WCDMA 1700 Body Rear Middle

Date: 2017-4-20
Electronics: DAE4 Sn1331
Medium: Body 1750 MHz
Medium parameters used (interpolated): f = 1732.4 MHz; σ = 1.478 mho/m; εr = 52.328; ρ = 1000 kg/m^3
Ambient Temperature: 22.4°C Liquid Temperature: 22.2°C
Communication System: WCDMA 1900 Frequency: 1732.4 MHz Duty Cycle: 1:1
Probe: EX3DV4– SN3846 ConvF(7.90, 7.90, 7.90)

Area Scan (121x71x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.475 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.34 V/m; Power Drift = -0.14 dB
Peak SAR (extrapolated) = 0.595 W/kg
SAR(1 g) = 0.419 W/kg; SAR(10 g) = 0.283 W/kg
Maximum value of SAR (measured) = 0.475 W/kg

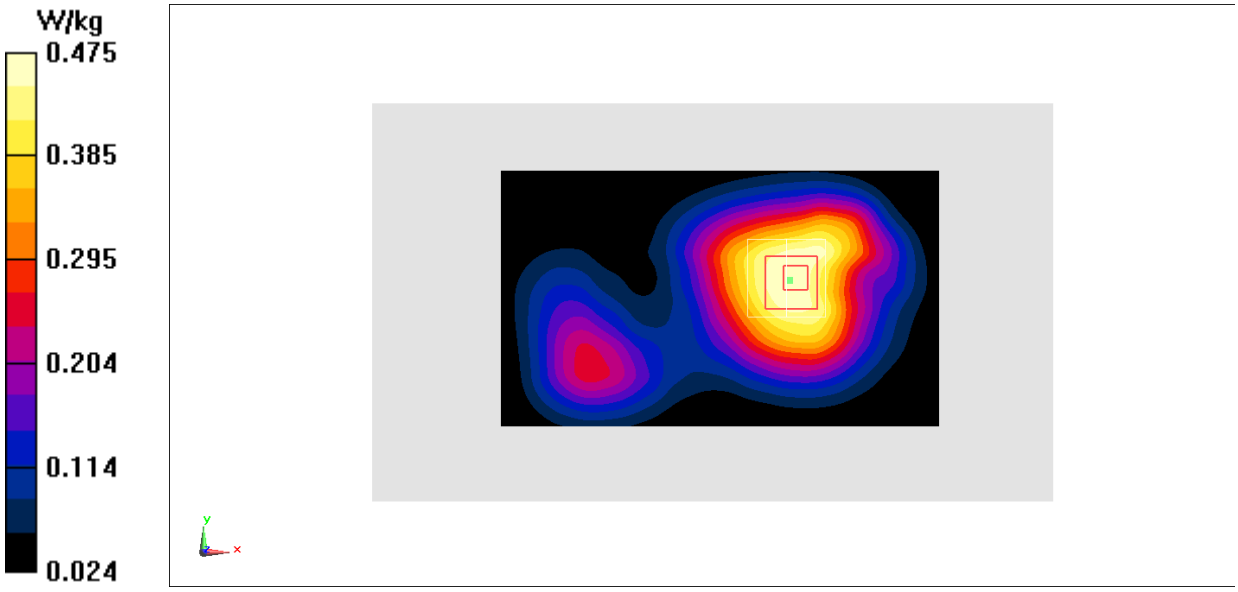


Fig.8 WCDMA1700

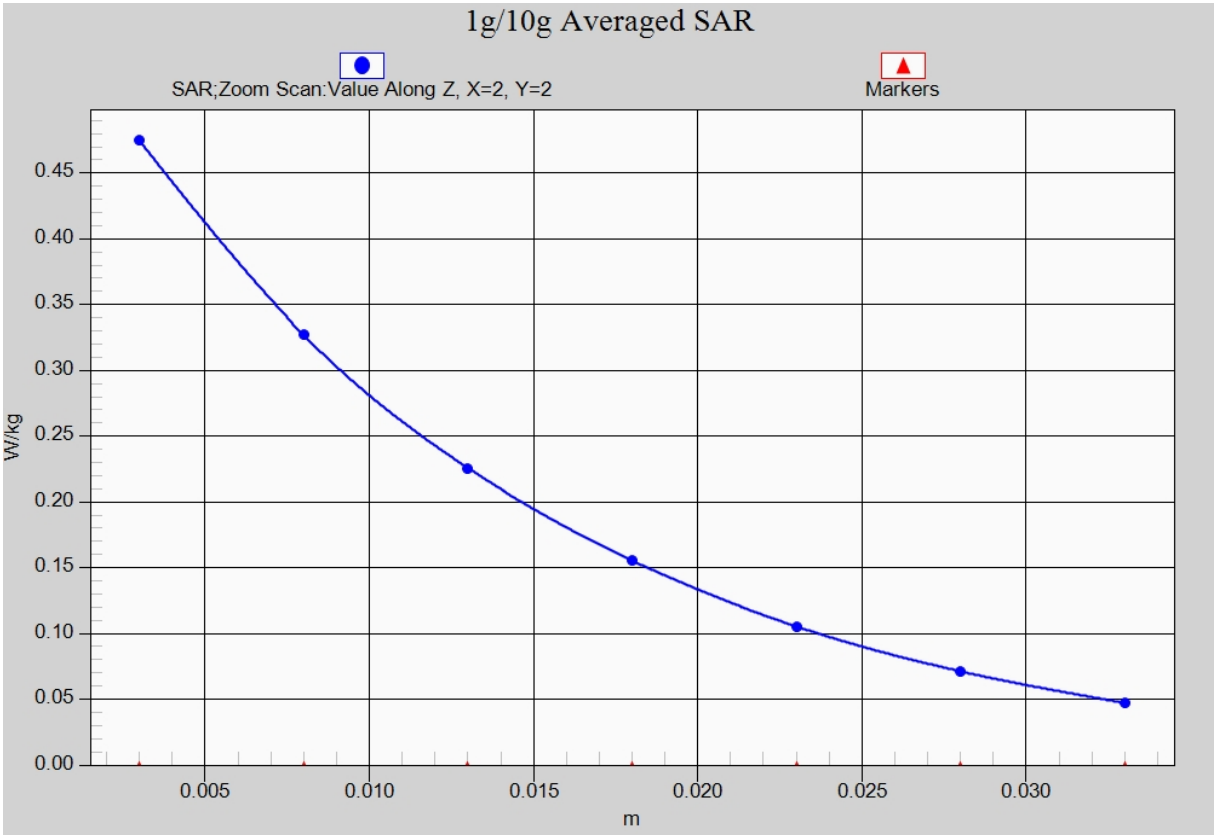


Fig. 8-1 Z-Scan at power reference point (WCDMA1700)

WCDMA 1900 Left Cheek Middle

Date: 2017-4-21
Electronics: DAE4 Sn1331
Medium: Head 1900 MHz
Medium parameters used: f = 1880 MHz; σ = 1.445 mho/m; εr = 41.056; ρ = 1000 kg/m^3
Ambient Temperature: 22.4°C Liquid Temperature: 22.2°C
Communication System: WCDMA 1900 Frequency: 1880 MHz Duty Cycle: 1:1
Probe: EX3DV4– SN3846 ConvF(7.89, 7.89, 7.89)

Area Scan (71x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.694 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 7.516 V/m; Power Drift = 0.15 dB
Peak SAR (extrapolated) = 0.919 W/kg
SAR(1 g) = 0.597 W/kg; SAR(10 g) = 0.365 W/kg
Maximum value of SAR (measured) = 0.712 W/kg

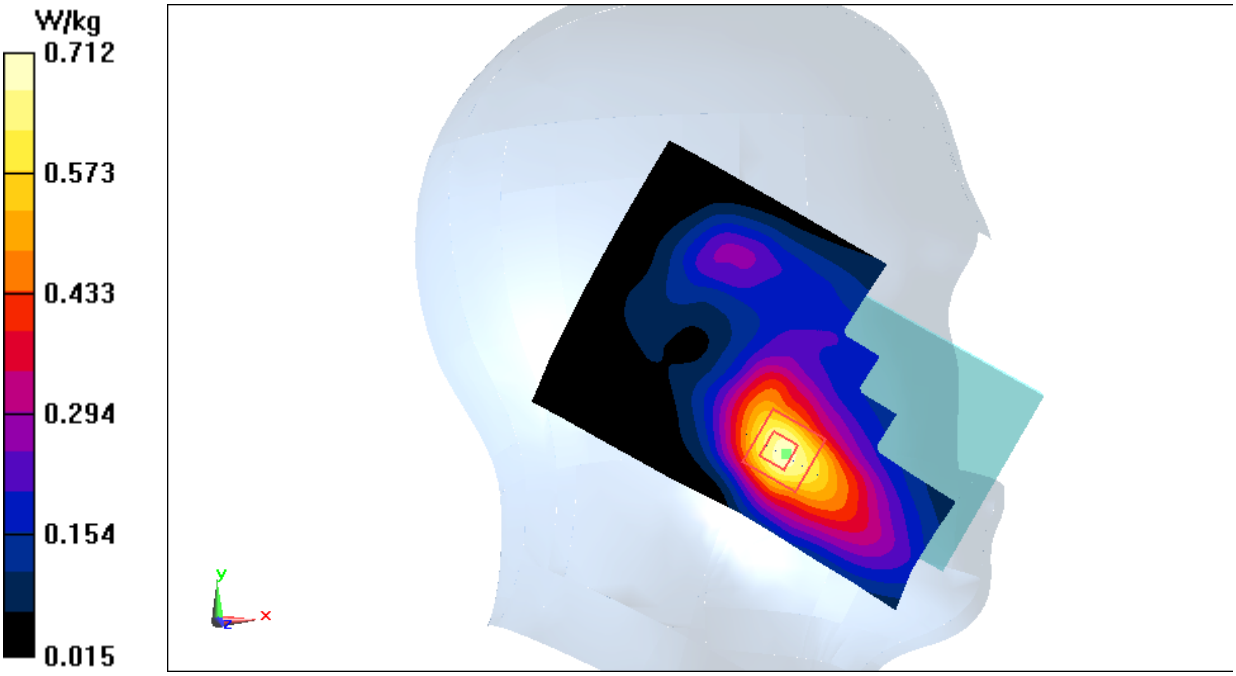


Fig.9 WCDMA1900

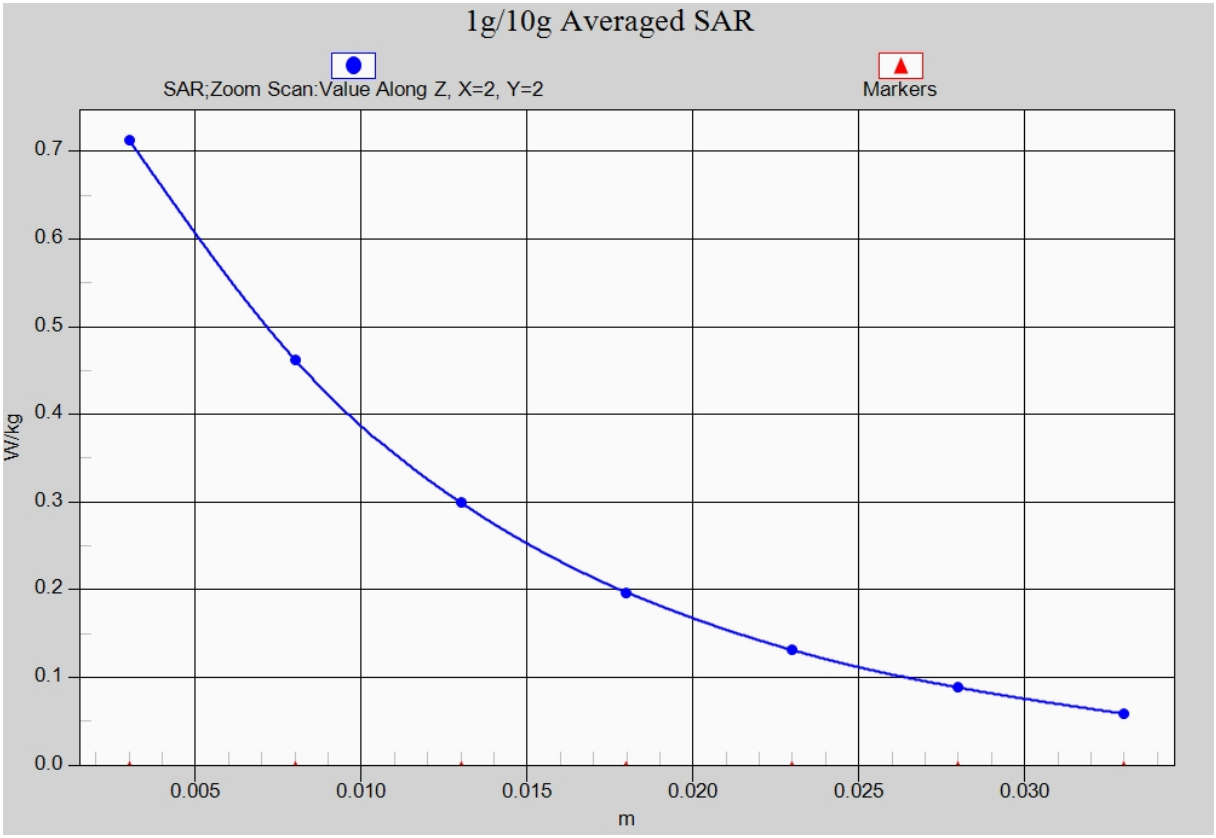


Fig. 9-1 Z-Scan at power reference point (WCDMA1900)

WCDMA 1900 Body Front Middle

Date: 2017-4-21
Electronics: DAE4 Sn1331
Medium: Body 1900 MHz
Medium parameters used: f = 1880 MHz; σ = 1.519 mho/m; εr = 52.85; ρ = 1000 kg/m^3
Ambient Temperature: 22.4°C Liquid Temperature: 22.2°C
Communication System: WCDMA 1900 Frequency: 1880 MHz Duty Cycle: 1:1
Probe: EX3DV4– SN3846 ConvF(7.57, 7.57, 7.57)

Area Scan (121x71x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 1.06 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 16.37 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 1.45 W/kg
SAR(1 g) = 0.872 W/kg; SAR(10 g) = 0.493 W/kg
Maximum value of SAR (measured) = 1.09 W/kg

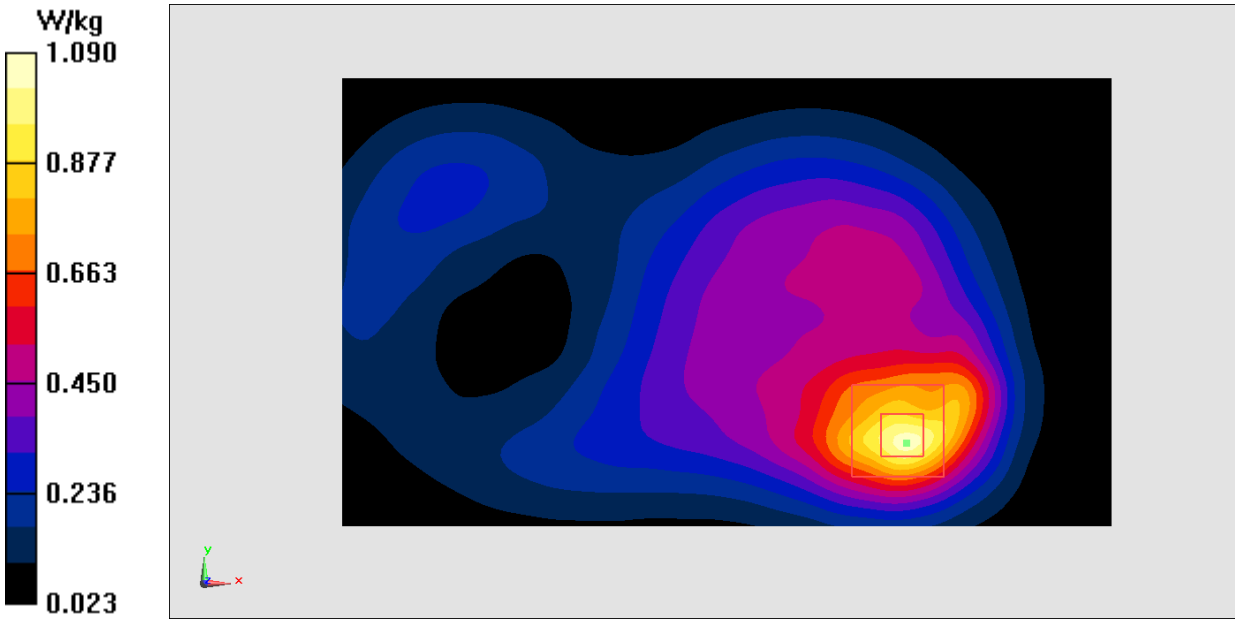


Fig.10 WCDMA1900

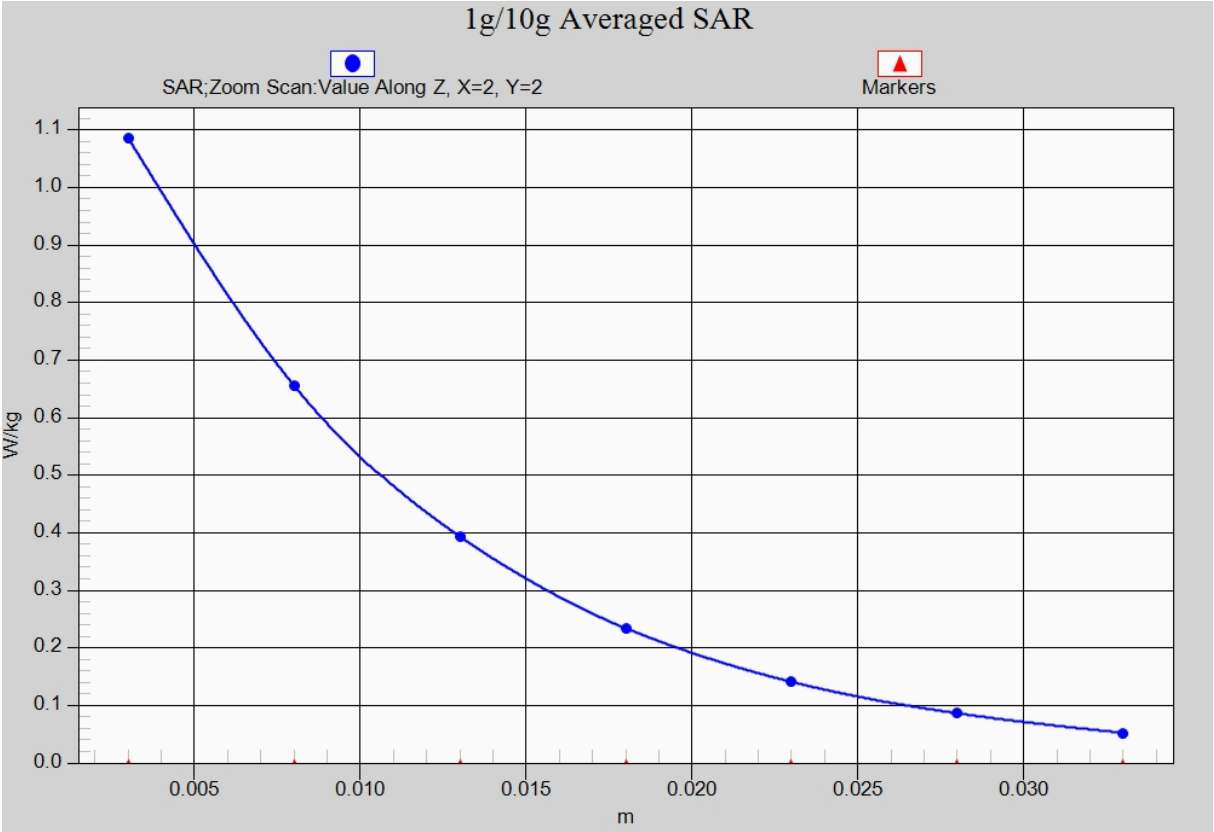


Fig. 10-1 Z-Scan at power reference point (WCDMA1900)

LTE Band2 Left Cheek Middle with QPSK_20M_1RB_Low
Date: 2017-4-21
Electronics: DAE4 Sn1331
Medium: Head 1900 MHz
Medium parameters used: f = 1880 MHz; σ =1.478. mho/m; εr = 40.134; ρ = 1000 kg/m^3
Ambient Temperature: 22.4°C Liquid Temperature: 22.2°C
Communication System: LTE Band2 Frequency: 1880 MHz Duty Cycle: 1:1
Probe: EX3DV4– SN3846 ConvF(7.89, 7.89, 7.89)

Area Scan (71x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.618 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 7.822 V/m; Power Drift = 0.10 dB
Peak SAR (extrapolated) = 0.823 W/kg
SAR(1 g) = 0.540 W/kg; SAR(10 g) = 0.331 W/kg
Maximum value of SAR (measured) = 0.640 W/kg

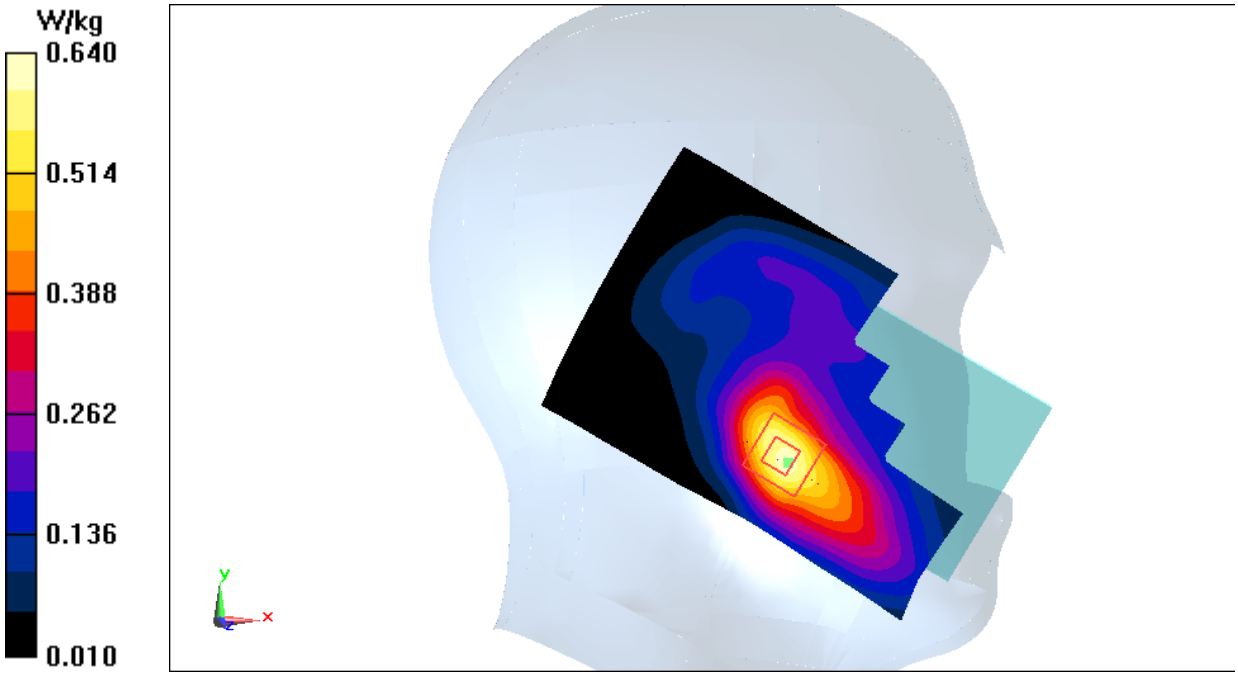


Fig.11 LTE Band2

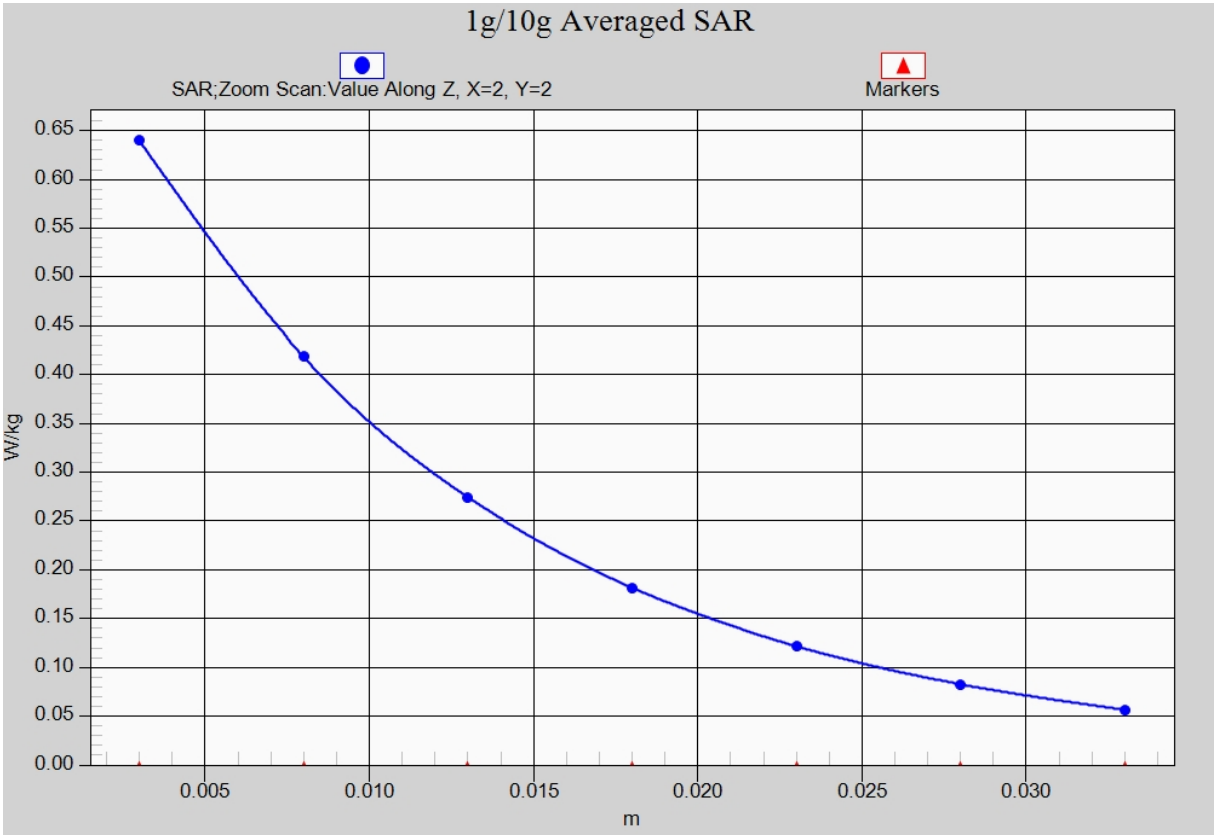


Fig. 11-1 Z-Scan at power reference point (LTE Band2)

LTE Band2 Body Front Middle with QPSK_20M_1RB_Low
Date: 2017-4-21
Electronics: DAE4 Sn1331
Medium: Body 1900 MHz
Medium parameters used: f = 1880 MHz; σ = 1.519 mho/m; εr = 52.85; ρ = 1000 kg/m^3
Ambient Temperature: 22.4°C Liquid Temperature: 22.2°C
Communication System: LTE Band2 Frequency: 1880 MHz Duty Cycle: 1:1
Probe: EX3DV4– SN3846 ConvF(7.57, 7.57, 7.57)

Area Scan (121x71x1): 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 = 16.95 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 1.46 W/kg
SAR(1 g) = 0.881 W/kg; SAR(10 g) = 0.498 W/kg
Maximum value of SAR (measured) = 1.02 W/kg

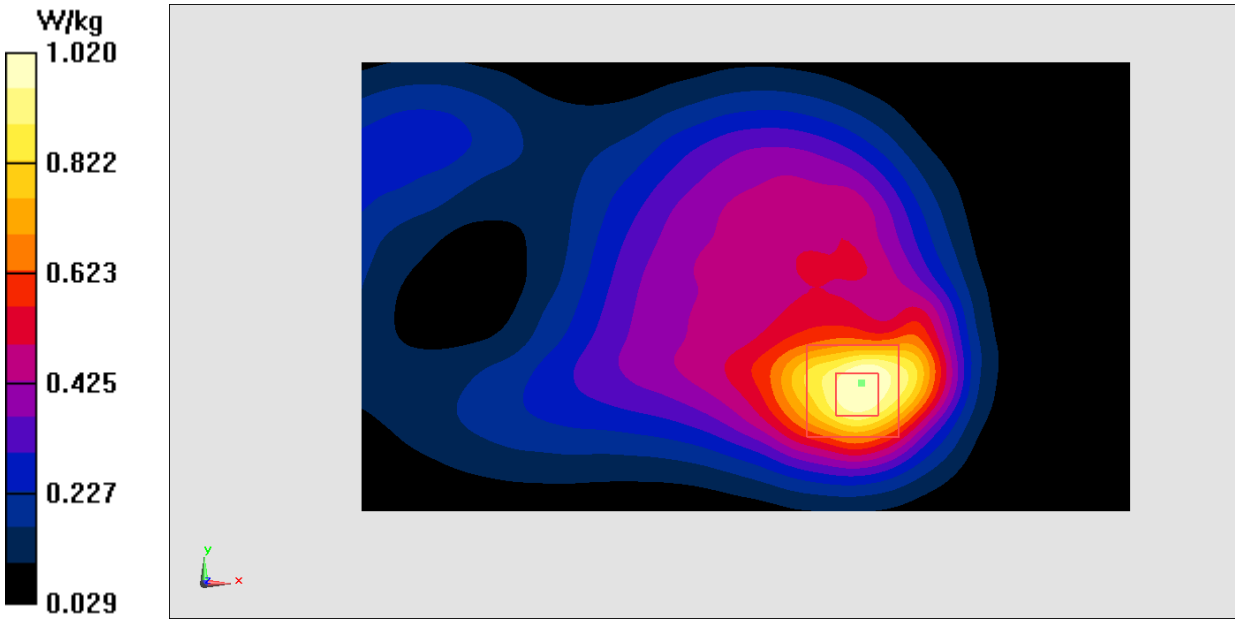


Fig.12 LTE Band2

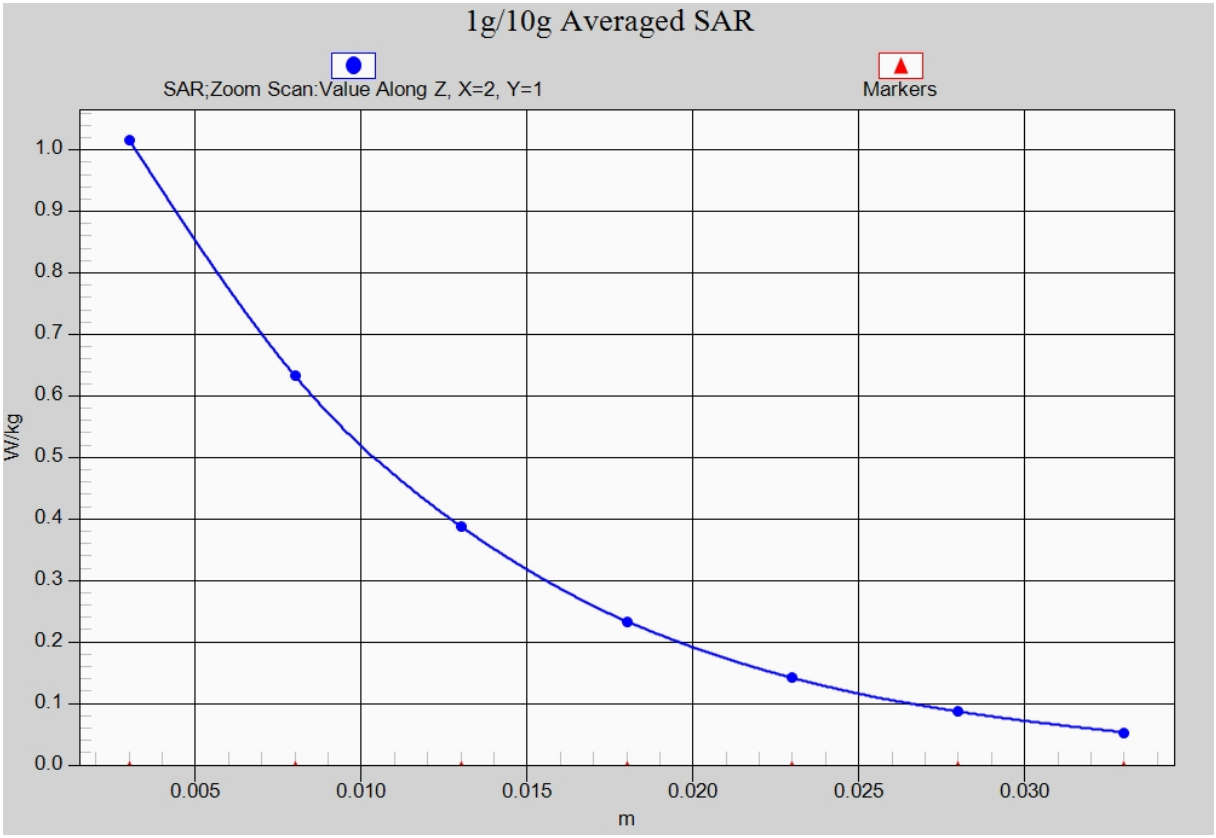


Fig. 12-1 Z-Scan at power reference point (LTE Band2)

LTE Band4 Left Cheek High with QPSK_20M_1RB_Low
Date: 2017-4-20
Electronics: DAE4 Sn1331
Medium: Head 1750 MHz
Medium parameters used f = 1745 MHz; σ = 1.364 mho/m; εr = 39.117; ρ = 1000 kg/m^3
Ambient Temperature: 22.4°C Liquid Temperature: 22.2°C
Communication System: LTE Band4 Frequency: 174MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN3846 ConvF(8.16, 8.16, 8.16)

Area Scan (71x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.316 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.670 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.397 W/kg
SAR(1 g) = 0.275 W/kg; SAR(10 g) = 0.176 W/kg
Maximum value of SAR (measured) = 0.320 W/kg

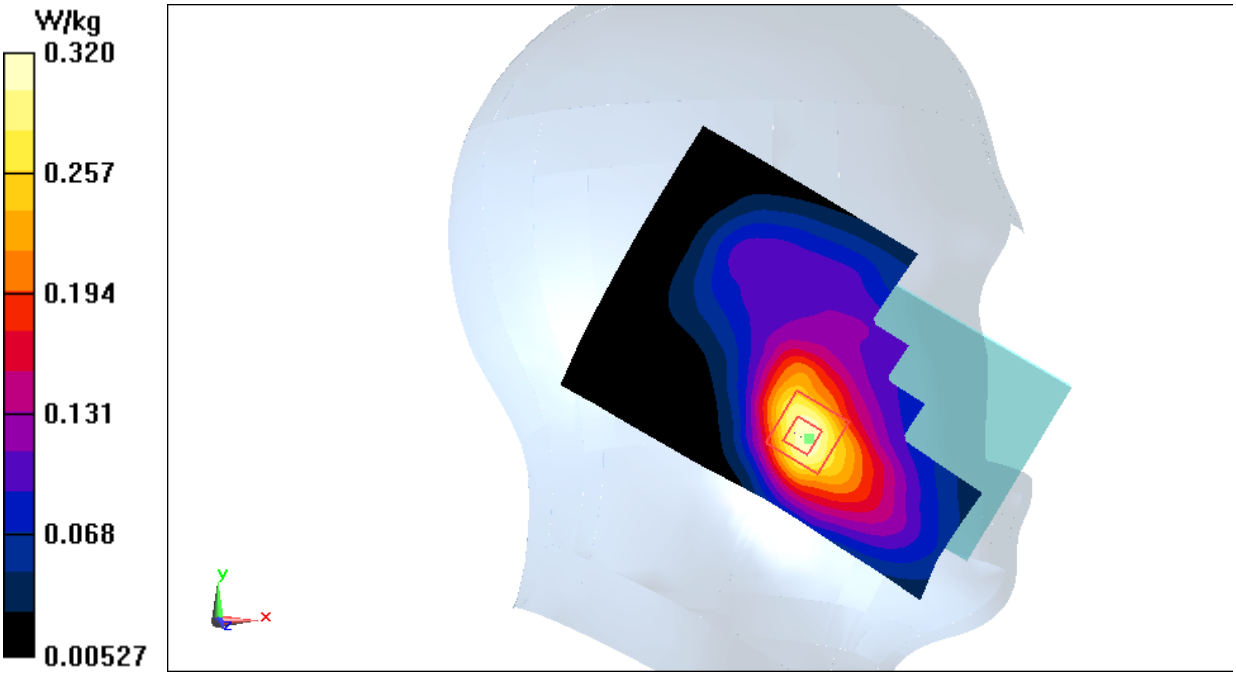


Fig.13 LTE Band4

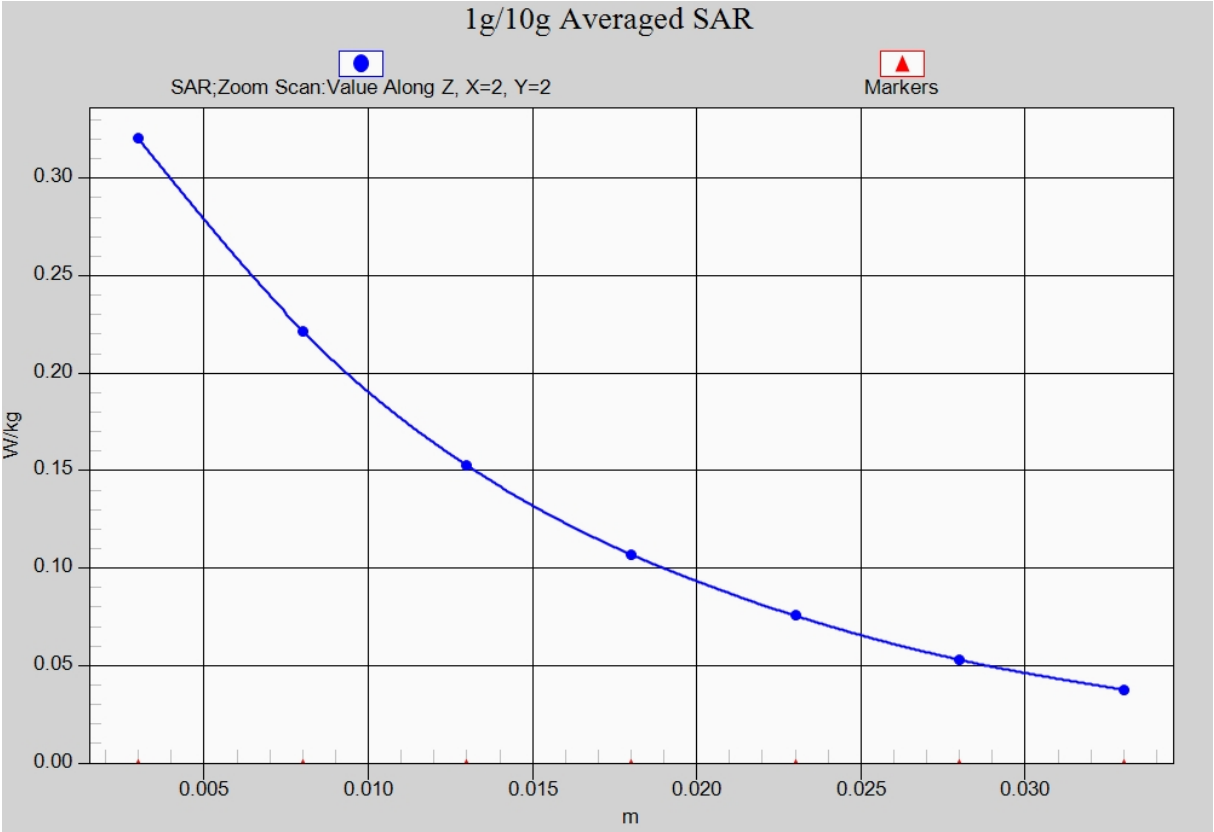


Fig. 13-1 Z-Scan at power reference point (LTE Band4)

LTE Band4 Body Rear High with QPSK_20M_1RB_Low

Date: 2017-4-20
Electronics: DAE4 Sn1331
Medium: Body 1750 MHz
Medium parameters used: f = 1745 MHz; σ =1.52 mho/m; εr = 52.159; ρ = 1000 kg/m^3
Ambient Temperature: 22.4°C Liquid Temperature: 22.2°C
Communication System: LTE Band4 Frequency: 1745 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN3846 ConvF(7.90, 7.90, 7.90)

Area Scan (121x71x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.525 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 13.04 V/m; Power Drift = -0.13 dB
Peak SAR (extrapolated) = 0.653 W/kg
SAR(1 g) = 0.461 W/kg; SAR(10 g) = 0.313 W/kg
Maximum value of SAR (measured) = 0.525 W/kg

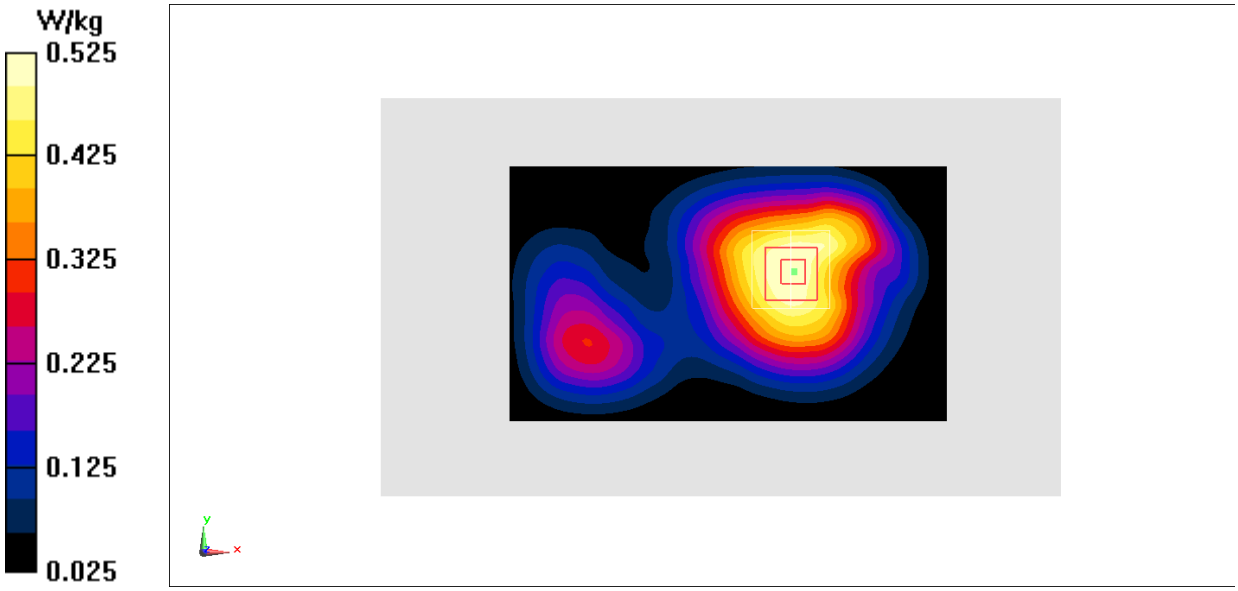


Fig.14 LTE Band4

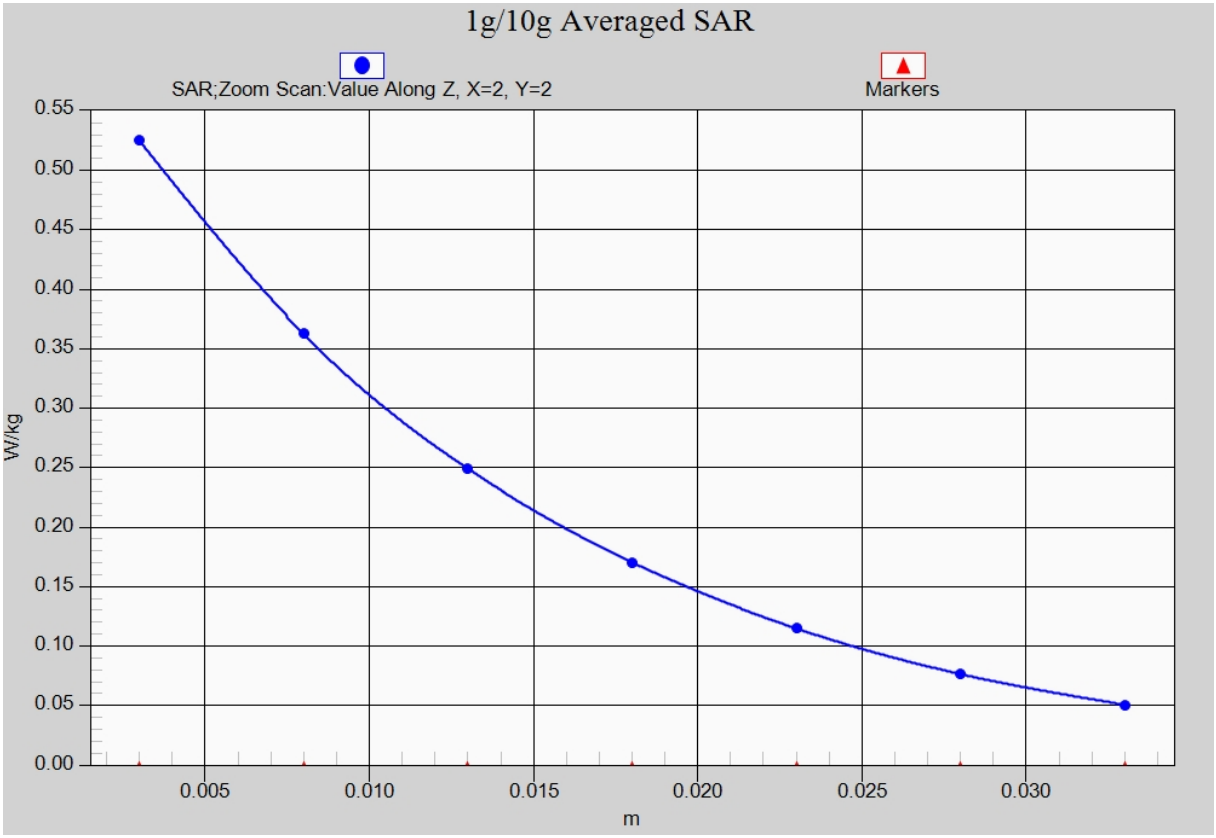


Fig. 14-1 Z-Scan at power reference point (LTE Band4)

LTE Band5 Right Cheek High with QPSK_10M_1RB_Middle

Date: 2017-4-19
Electronics: DAE4 Sn1331
Medium: Head 850 MHz
Medium parameters used (interpolated): f = 844 MHz; σ = 0.902 mho/m; εr = 40.971; ρ = 1000 kg/m^3
Ambient Temperature: 22.4°C Liquid Temperature: 22.2°C
Communication System: LTE Band5 Frequency: 844 MHz Duty Cycle: 1:1
Probe: EX3DV4 - SN3846 ConvF(9.33, 9.33, 9.33)

Area Scan (71x131x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.234 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.684 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.266 W/kg
SAR(1 g) = 0.212 W/kg; SAR(10 g) = 0.163 W/kg
Maximum value of SAR (measured) = 0.230 W/kg

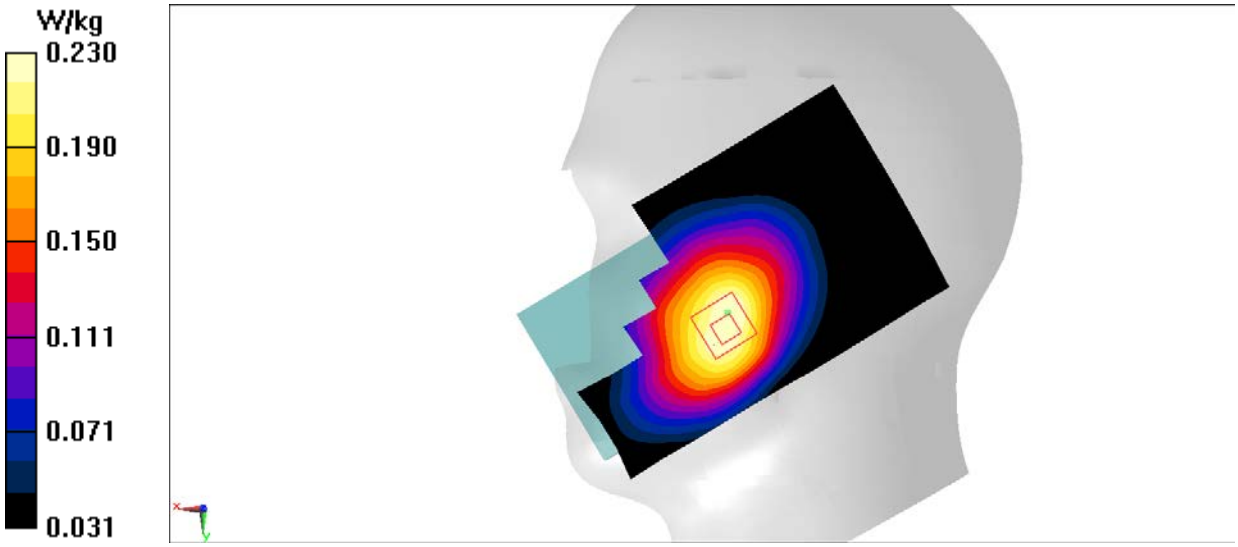


Fig.15 LTE Band5

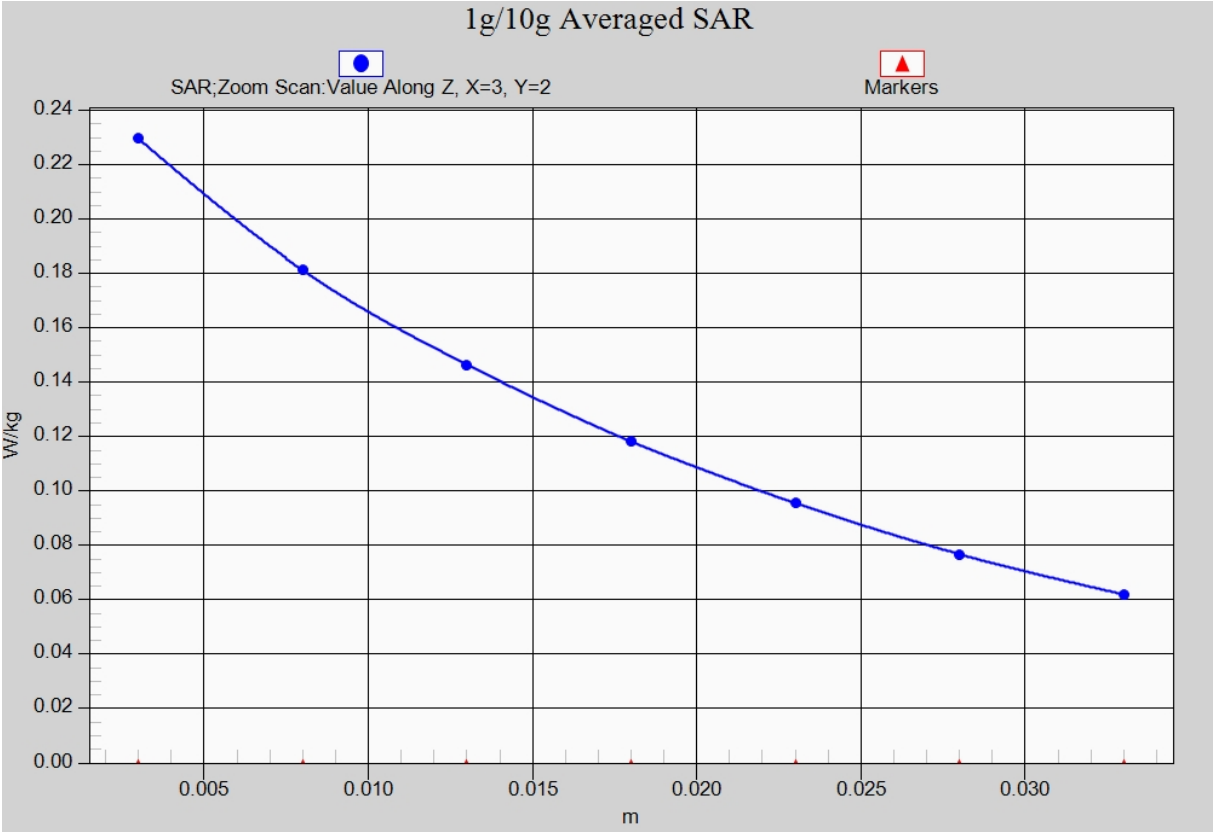


Fig. 15-1 Z-Scan at power reference point (LTE Band5)

LTE Band5 Body Rear High with QPSK_10M_1RB_Middle

Date: 2017-4-19
Electronics: DAE4 Sn1331
Medium: Body 850 MHz
Medium parameters used (interpolated): f = 844 MHz; σ = 1.034 mho/m; εr = 53.914; ρ = 1000 kg/m^3
Ambient Temperature: 22.4°C Liquid Temperature: 22.2°C
Communication System: LTE Band5 Frequency: 844 MHz Duty Cycle: 1:1
Probe: EX3DV4 - SN3846 ConvF(9.52, 9.52, 9.52)

Area Scan (121x71x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.342 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 15.49 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.460 W/kg
SAR(1 g) = 0.279 W/kg; SAR(10 g) = 0.172 W/kg
Maximum value of SAR (measured) = 0.331 W/kg

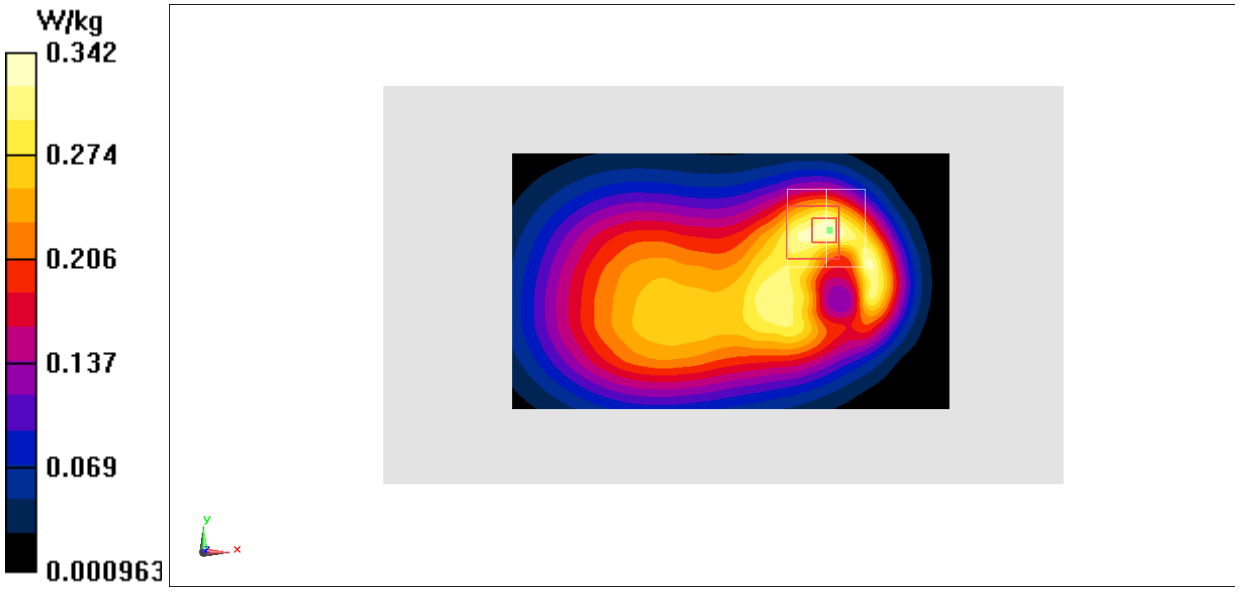


Fig.16 LTE Band5

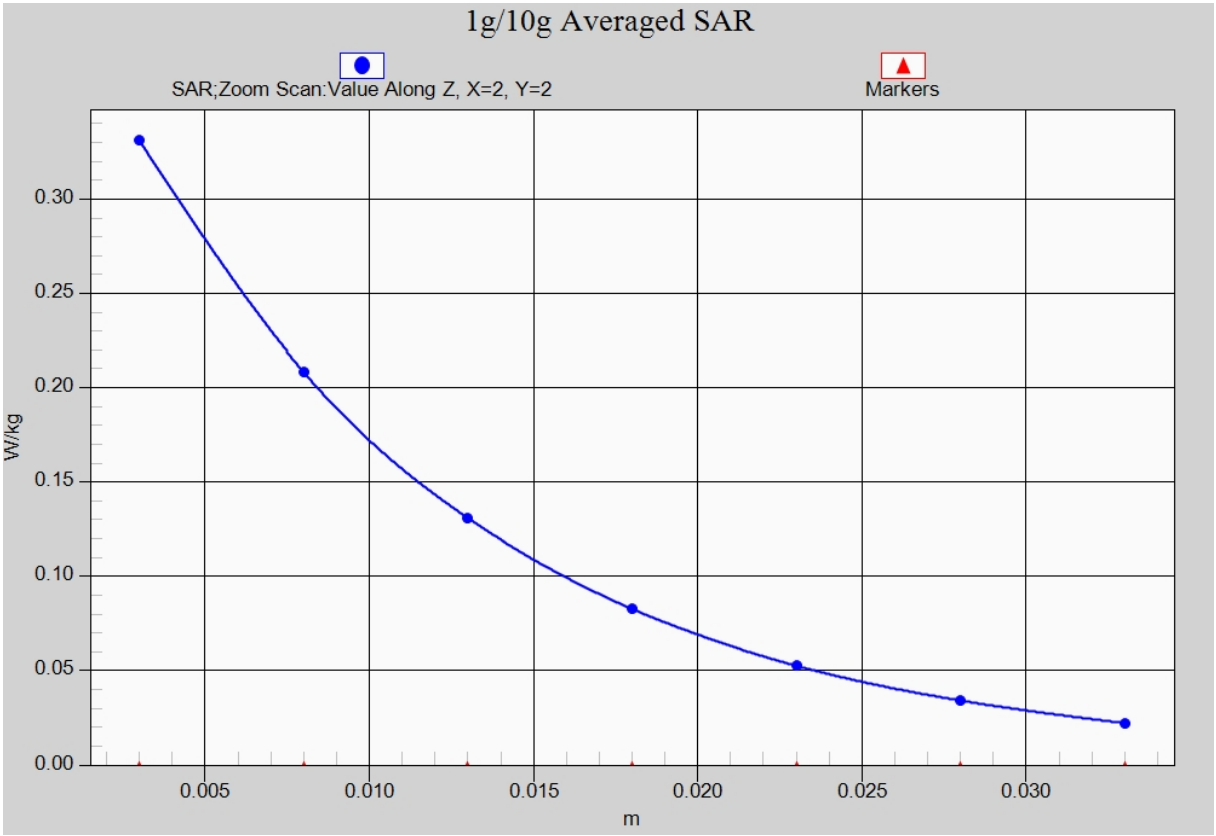


Fig. 16-1 Z-Scan at power reference point (LTE Band5)

LTE Band7 Left Cheek High with QPSK_20M_1RB_High

Date: 2017-4-22
Electronics: DAE4 Sn1331
Medium: Head2600 MHz
Medium parameters used: f = 2560 MHz; σ = 1.962 mho/m; εr = 38.66; ρ = 1000 kg/m^3
Ambient Temperature: 22.4^{o}C Liquid Temperature: 22.2^{o}C
Communication System: LTE Band7Frequency: 2560 MHz Duty Cycle: 1:1
Probe: EX3DV4– SN3846 ConvF(7.12, 7.12, 7.12)

Area Scan (71x131x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.935 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.403 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 1.53 W/kg
SAR(1 g) = 0.822 W/kg; SAR(10 g) = 0.430 W/kg
Maximum value of SAR (measured) = 0.951 W/kg

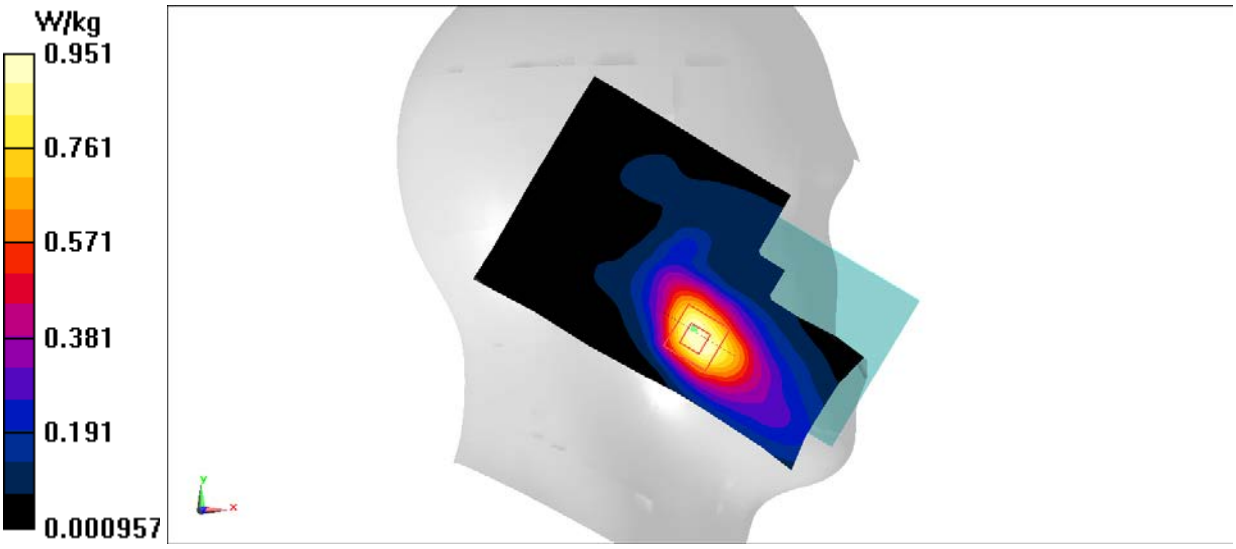


Fig.17 LTE Band7

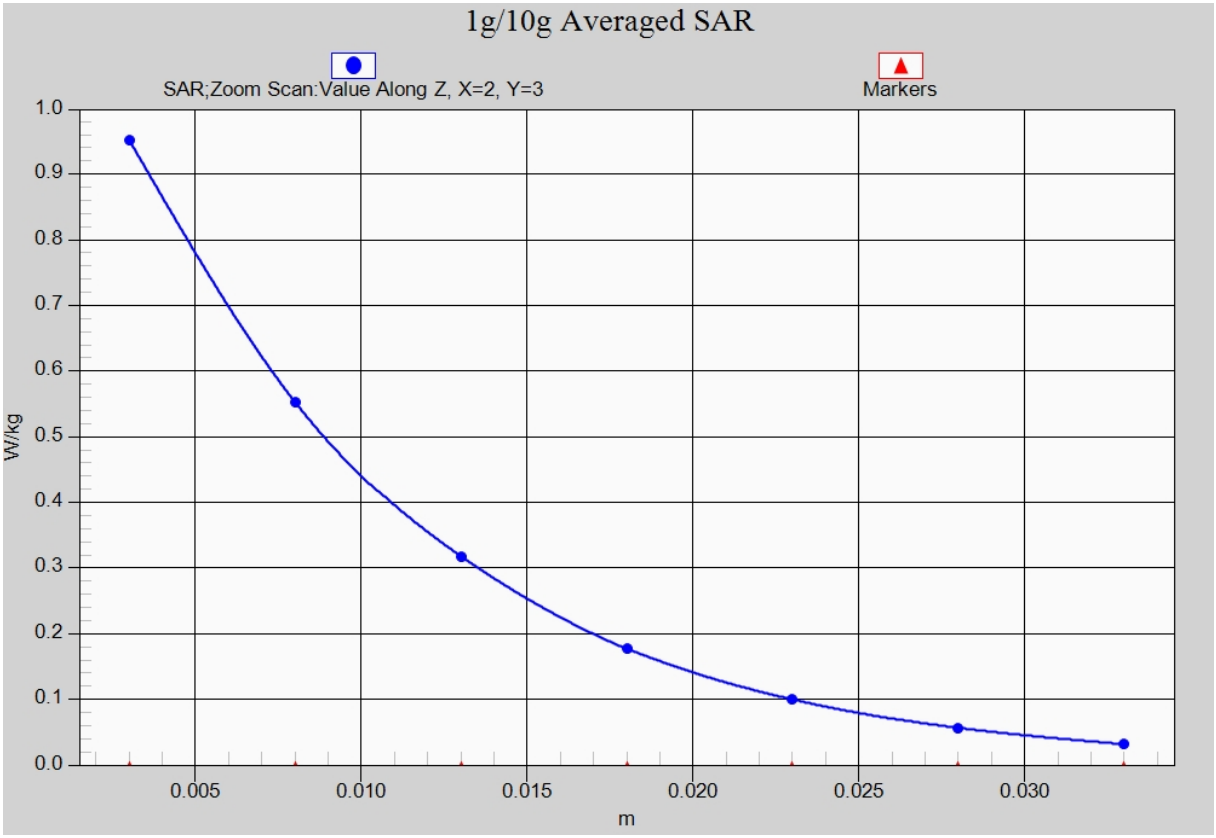


Fig. 17-1 Z-Scan at power reference point (LTE Band7)

LTE Band7 Body Rear High with QPSK_20M_1RB_High
Date: 2017-4-22
Electronics: DAE4 Sn1331
Medium: Body2600 MHz
Medium parameters used: f = 2560 MHz; σ = 2.176 mho/m; εr = 53.22; ρ = 1000 kg/m^3
Ambient Temperature: 22.4°C Liquid Temperature: 22.2°C
Communication System: LTE Band7 Frequency: 2560 MHz Duty Cycle: 1:1
Probe: EX3DV4– SN3846 ConvF(7.25, 7.25, 7.25)

Area Scan (121x71x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 1.35 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.34 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 1.80 W/kg
SAR(1 g) = 0.939 W/kg; SAR(10 g) = 0.500 W/kg
Maximum value of SAR (measured) = 1.18 W/kg

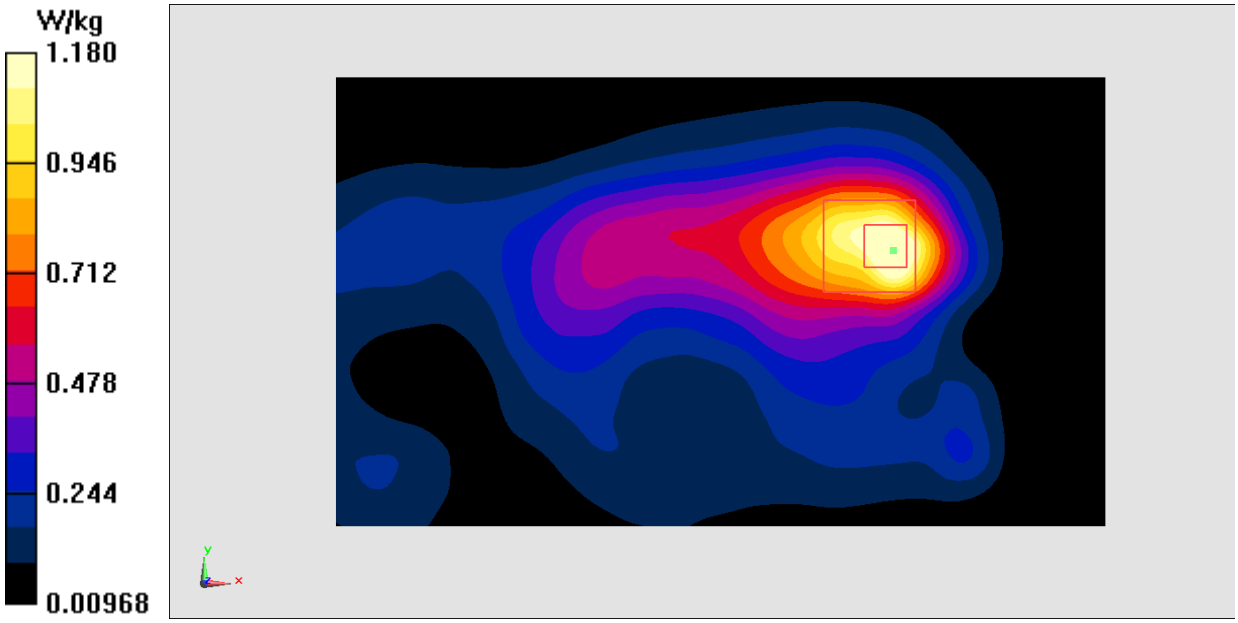


Fig.18 LTE Band7

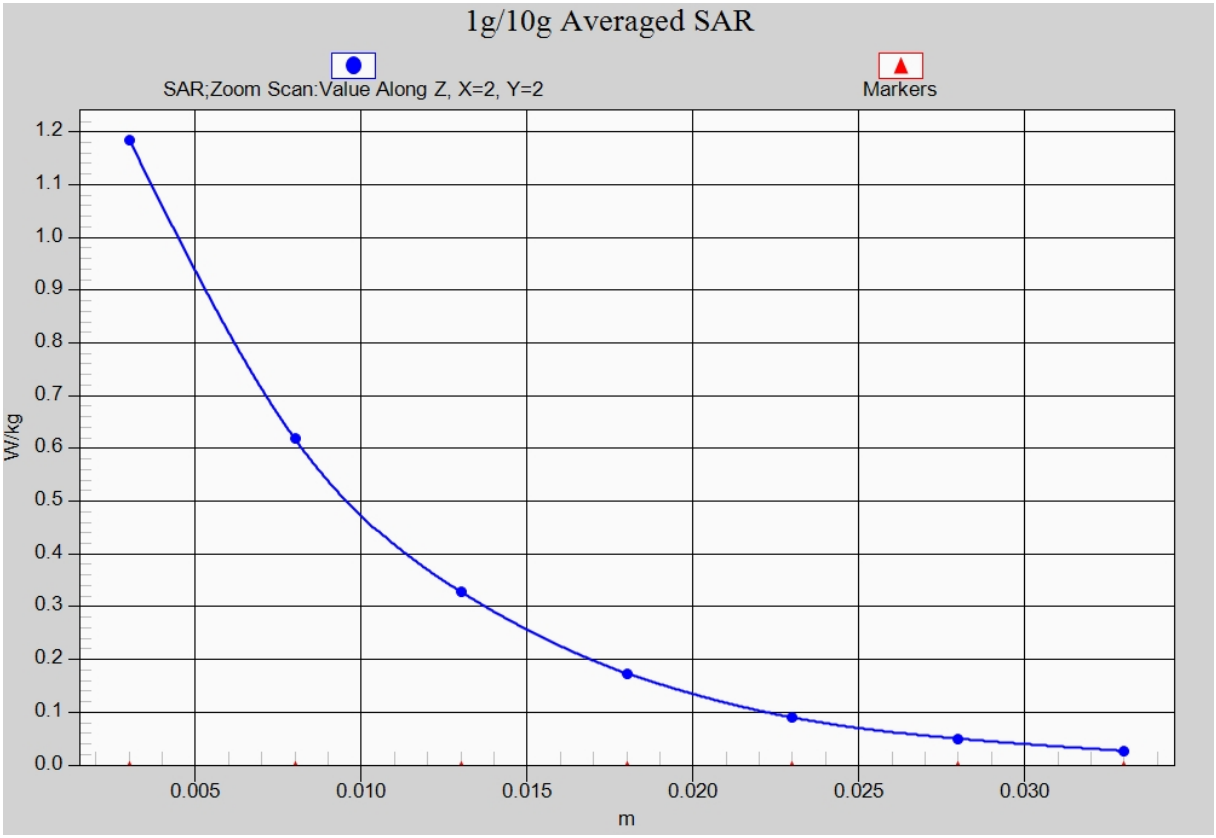


Fig. 18-1 Z-Scan at power reference point (LTE Band7)

LTE Band12 Left Cheek Low with QPSK_10M_1RB_Low

Date: 2017-4-23
Electronics: DAE4 Sn1331
Medium: Head750 MHz
Medium parameters used (interpolated): f = 704 MHz; σ = 0.856 mho/m; εr = 42.83; ρ = 1000 kg/m^3
Ambient Temperature: 22.4°C Liquid Temperature: 22.2°C
Communication System: LTE Band12Frequency: 704 MHz Duty Cycle: 1:1
Probe: EX3DV4– SN3846 ConvF(9.65, 9.65, 9.65)

Area Scan (71x131x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.112 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.878 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.123 W/kg
SAR(1 g) = 0.104 W/kg; SAR(10 g) = 0.084 W/kg
Maximum value of SAR (measured) = 0.110 W/kg

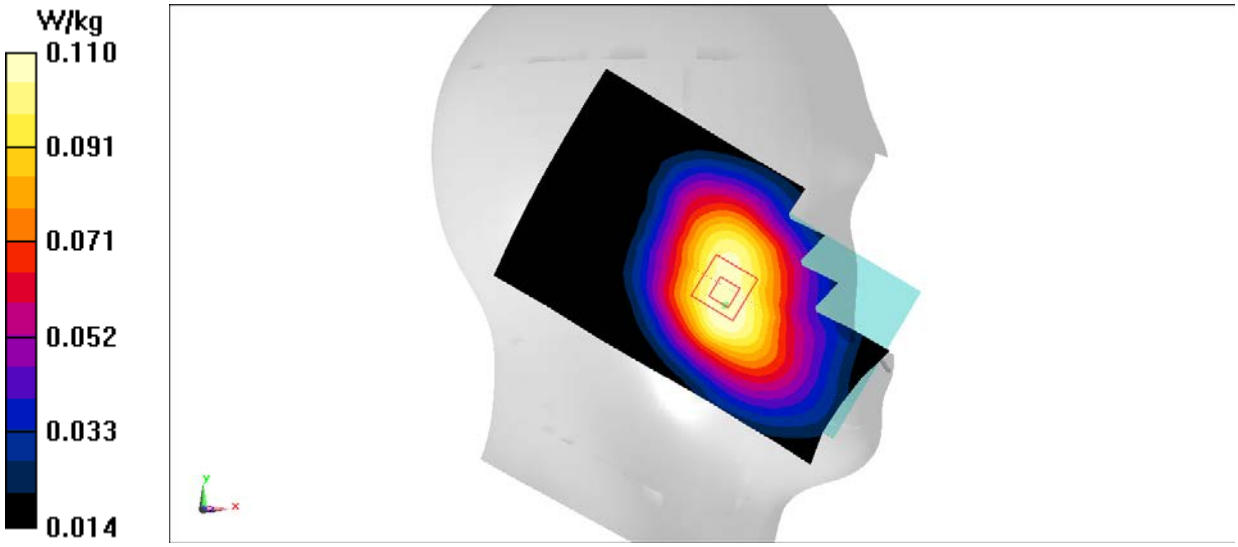


Fig.19 LTE Band12

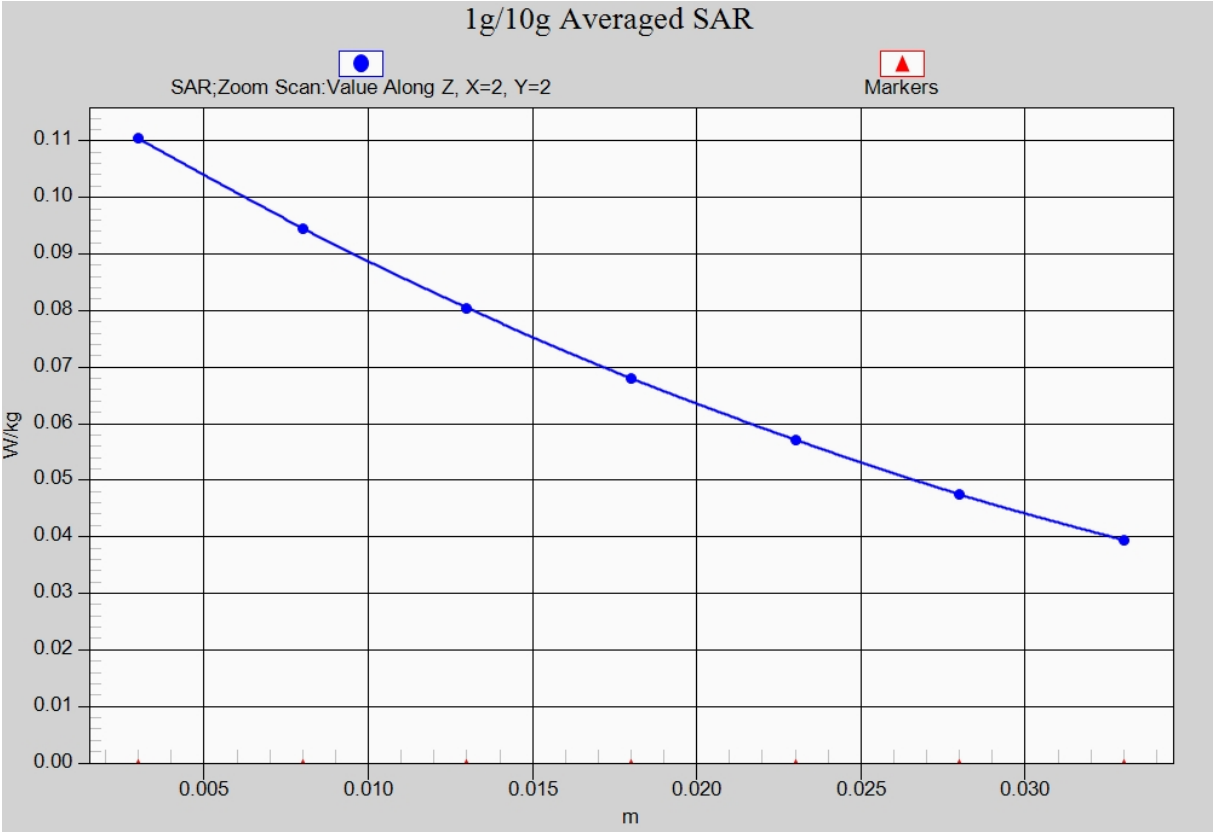


Fig. 19-1 Z-Scan at power reference point (LTE Band12)

LTE Band12 Body Rear Low with QPSK_10M_1RB_Low

Date: 2017-4-23
Electronics: DAE4 Sn1331
Medium: Body750 MHz
Medium parameters used (interpolated): f = 704 MHz; σ = 0.929 mho/m; εr = 54.43; ρ = 1000 kg/m^3
Ambient Temperature: 22.4°C Liquid Temperature: 22.2°C
Communication System: LTE Band12Frequency: 704 MHz Duty Cycle: 1:1
Probe: EX3DV4– SN3846 ConvF(9.96, 9.96, 9.96)

Area Scan (121x71x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.277 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 17.39 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.316 W/kg
SAR(1 g) = 0.255 W/kg; SAR(10 g) = 0.201 W/kg
Maximum value of SAR (measured) = 0.276 W/kg

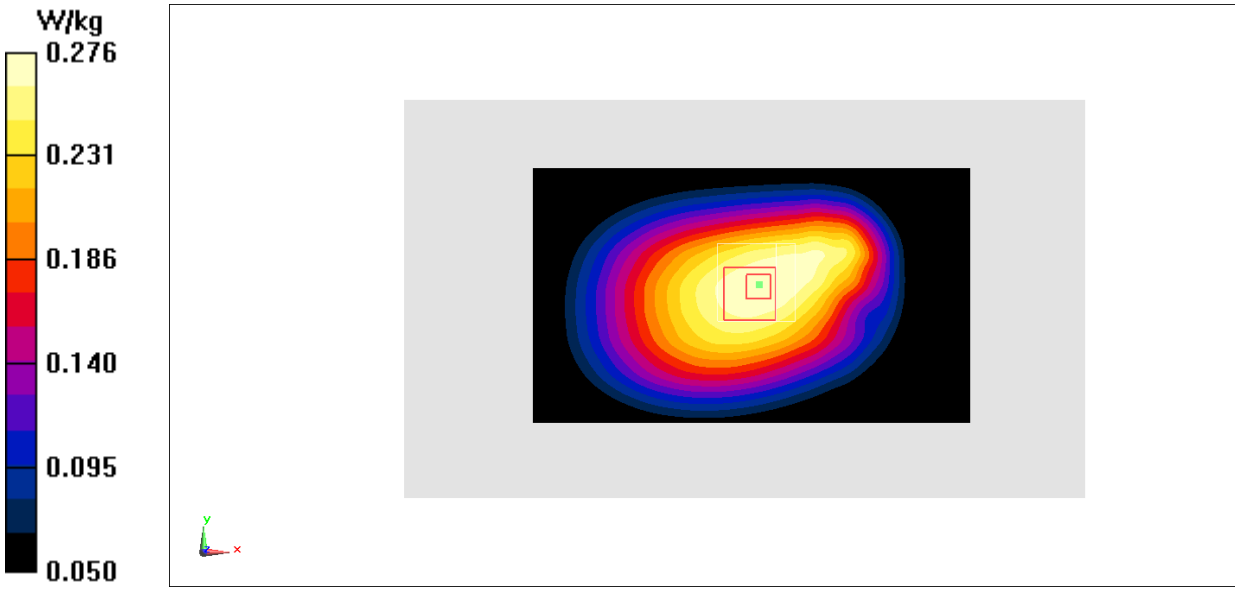


Fig.20 LTE Band12

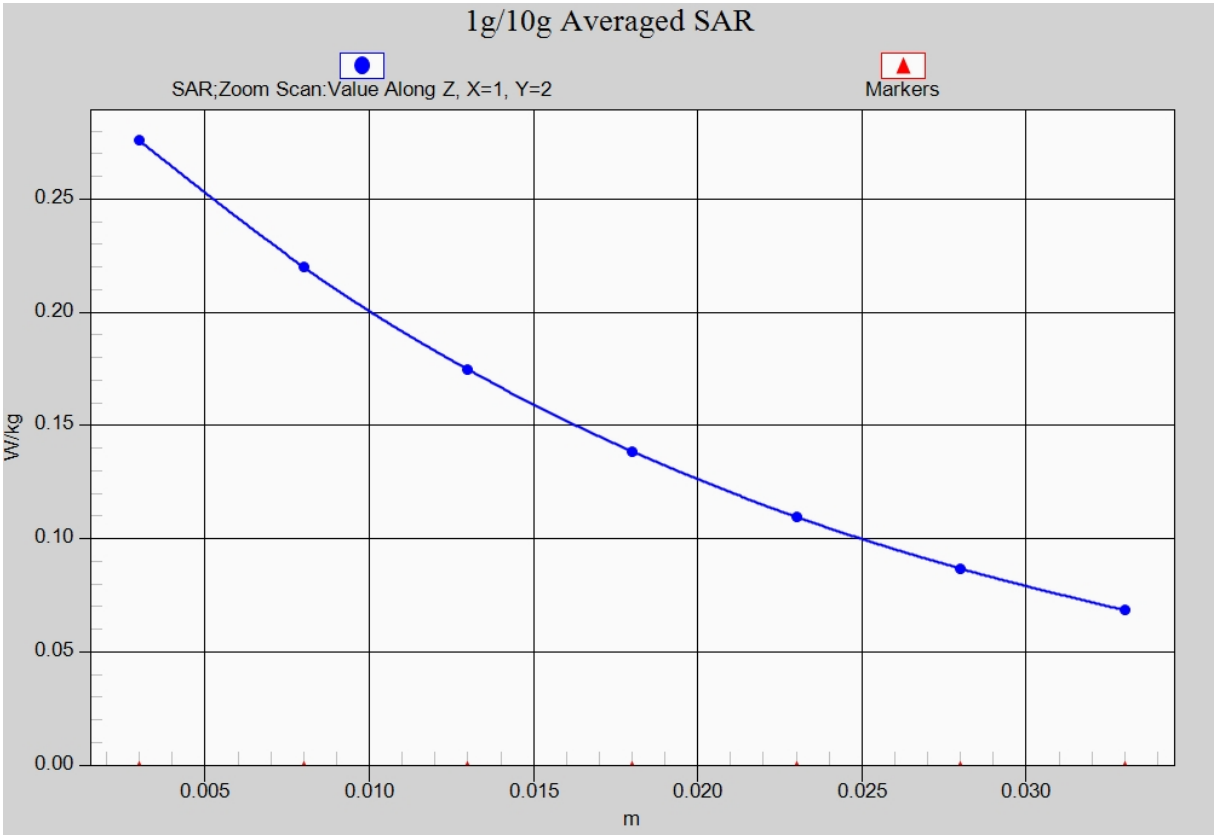


Fig. 20-1 Z-Scan at power reference point (LTE Band12)

LTE Band13 Left Cheek with QPSK_10M_1RB_High

Date: 2017-4-23
Electronics: DAE4 Sn1331
Medium: Head750 MHz
Medium parameters used (interpolated): f = 782 MHz; σ = 0.899 mho/m; εr = 42.77; ρ = 1000 kg/m^3
Ambient Temperature: 22.4°C Liquid Temperature: 22.2°C
Communication System: LTE Band13Frequency: 782 MHz Duty Cycle: 1:1
Probe: EX3DV4– SN3846 ConvF(9.65, 9.65, 9.65)

Area Scan (71x131x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.131 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.136 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.145 W/kg
SAR(1 g) = 0.117 W/kg; SAR(10 g) = 0.091 W/kg
Maximum value of SAR (measured) = 0.127 W/kg

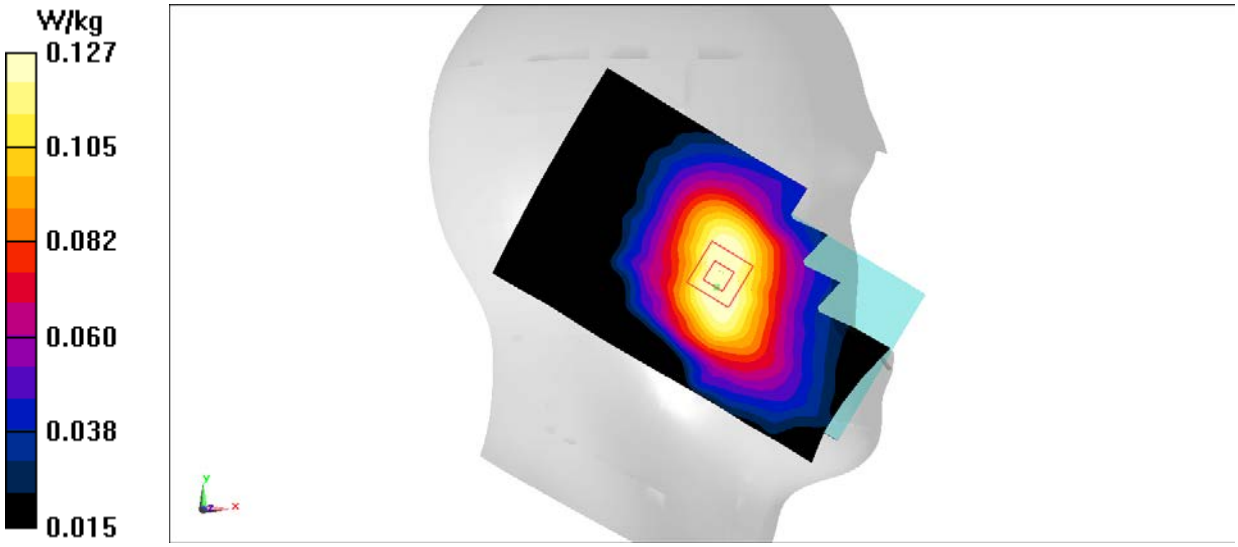


Fig.21 LTE Band13

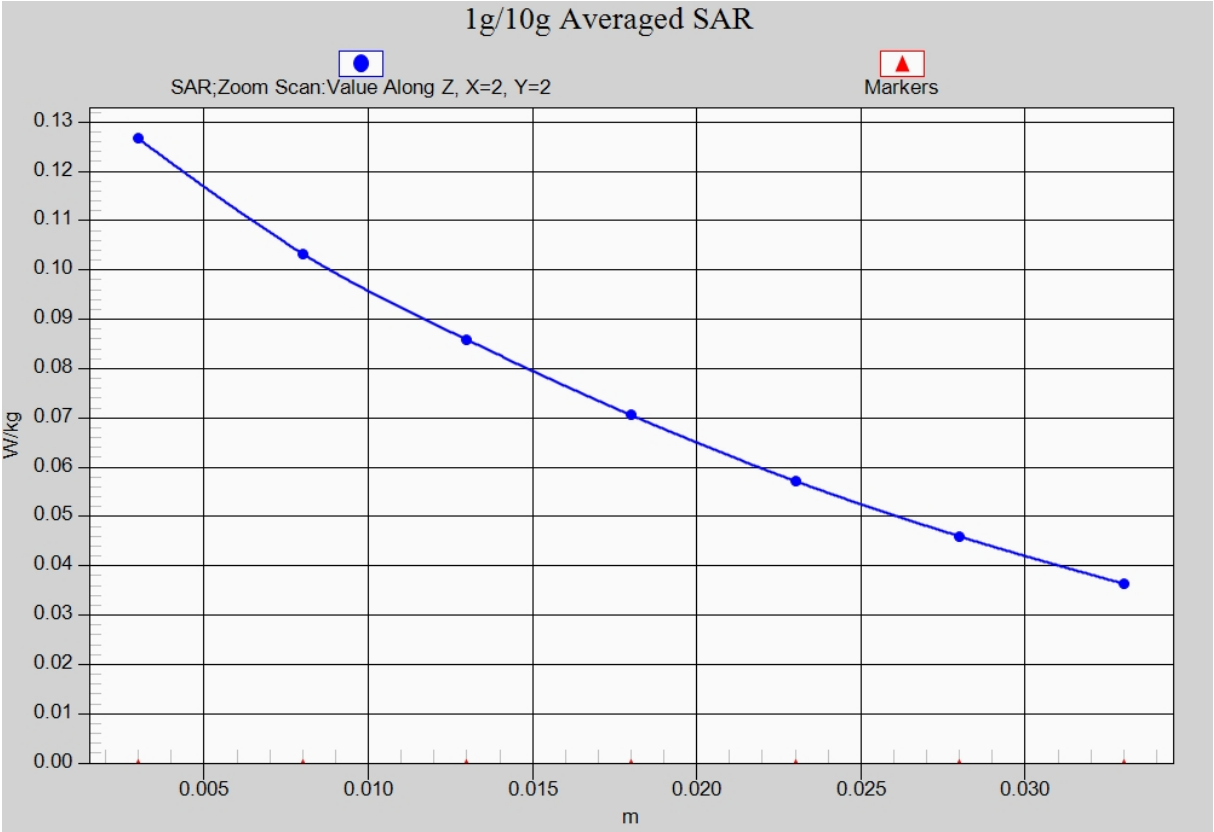


Fig. 21-1 Z-Scan at power reference point (LTE Band13)

LTE Band13 Body Rear with QPSK_10M_1RB_High

Date: 2017-4-23
Electronics: DAE4 Sn1331
Medium: Body750 MHz
Medium parameters used (interpolated): f = 782 MHz; σ = 0.958 mho/m; εr = 54.28; ρ = 1000 kg/m^3
Ambient Temperature: 22.4°C Liquid Temperature: 22.2°C
Communication System: LTE Band13Frequency: 782 MHz Duty Cycle: 1:1
Probe: EX3DV4– SN3846 ConvF(9.96, 9.96, 9.96)

Area Scan (121x71x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.335 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 18.07 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.381 W/kg
SAR(1 g) = 0.310 W/kg; SAR(10 g) = 0.244 W/kg
Maximum value of SAR (measured) = 0.336 W/kg

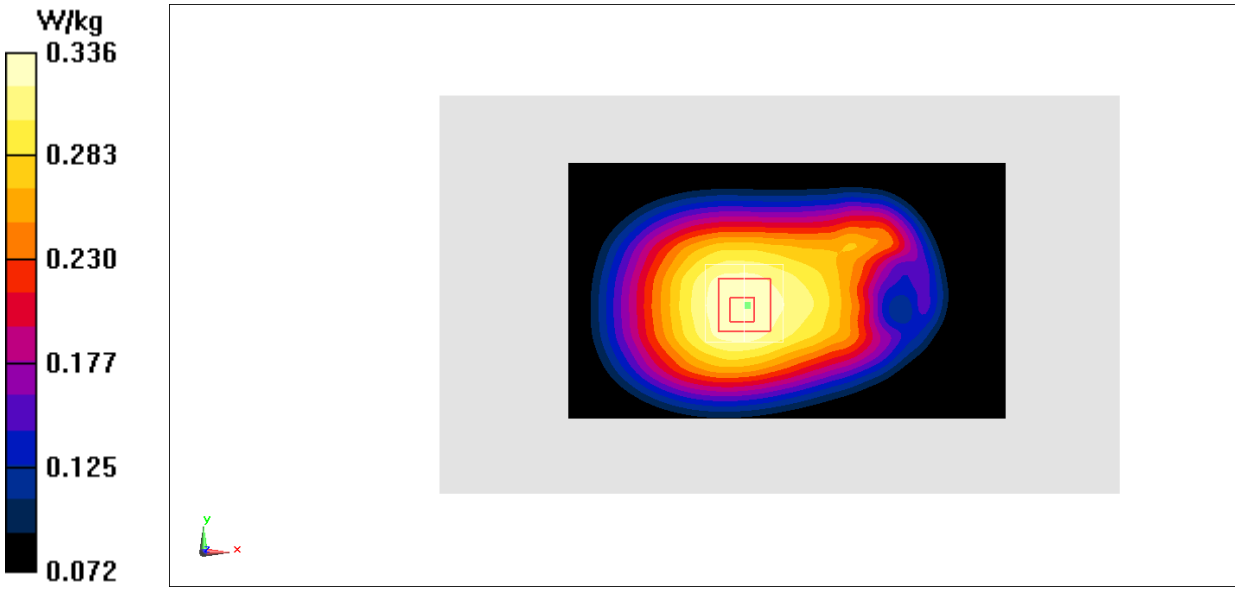


Fig.22 LTE Band13

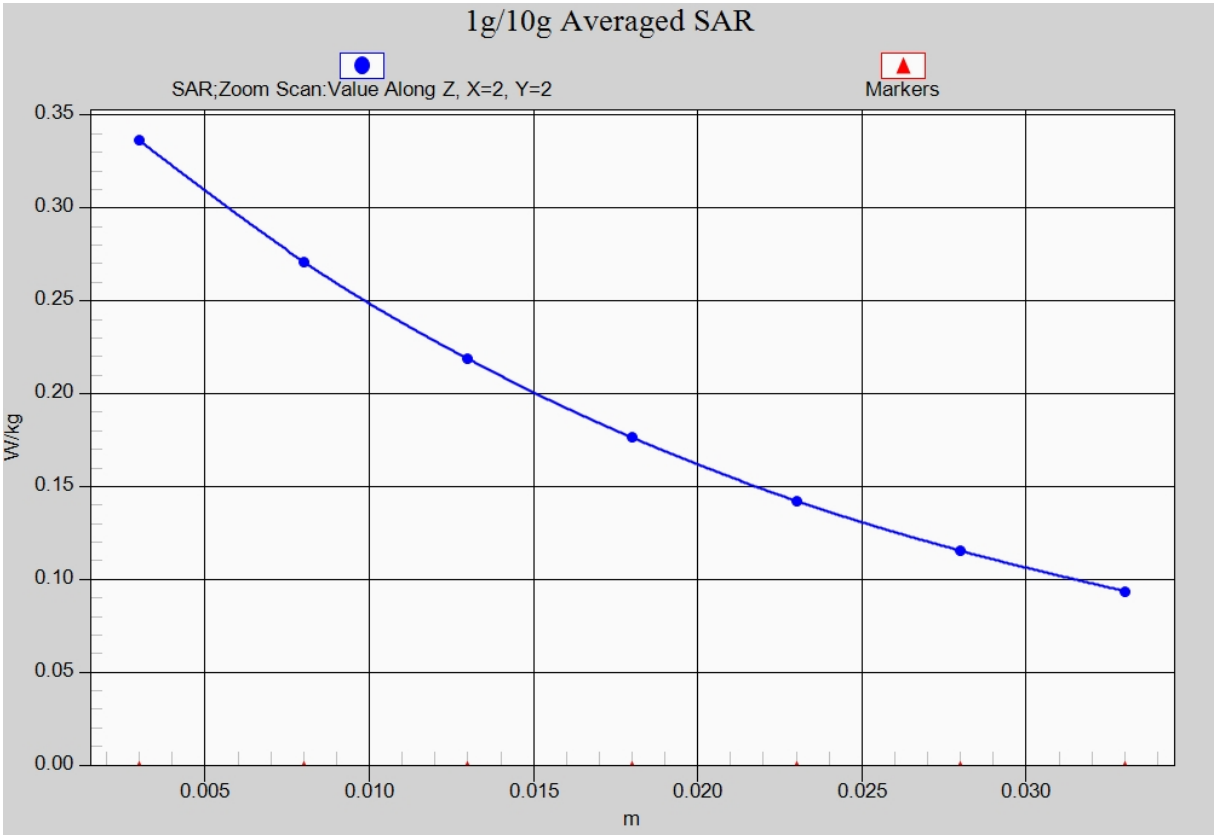


Fig. 22-1 Z-Scan at power reference point (LTE Band13)

Wifi 802.11b Right Cheek Channel 6

Date: 2017-4-24
Electronics: DAE4 Sn1331
Medium: Head 2450 MHz
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.824 mho/m; ε_r = 39.25; ρ = 1000 kg/m^3
Ambient Temperature: 22.4°C Liquid Temperature: 22.2°C
Communication System: WLan 2450 Frequency: 2437 MHz Duty Cycle: 1:1
Probe: EX3DV4– SN3846 ConvF(7.22, 7.22, 7.22)

Area Scan (91x161x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 1.05 W/kg

Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 13.56 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 1.45 W/kg
SAR(1 g) = 0.653 W/kg; SAR(10 g) = 0.320 W/kg
Maximum value of SAR (measured) = 0.847 W/kg

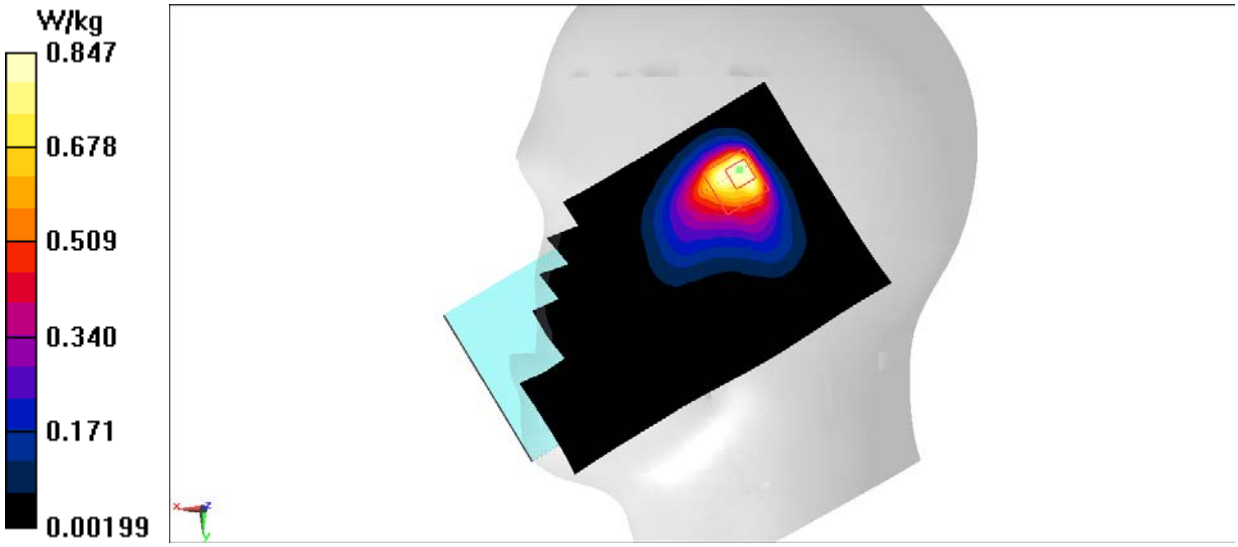


Fig.23 2450 MHz

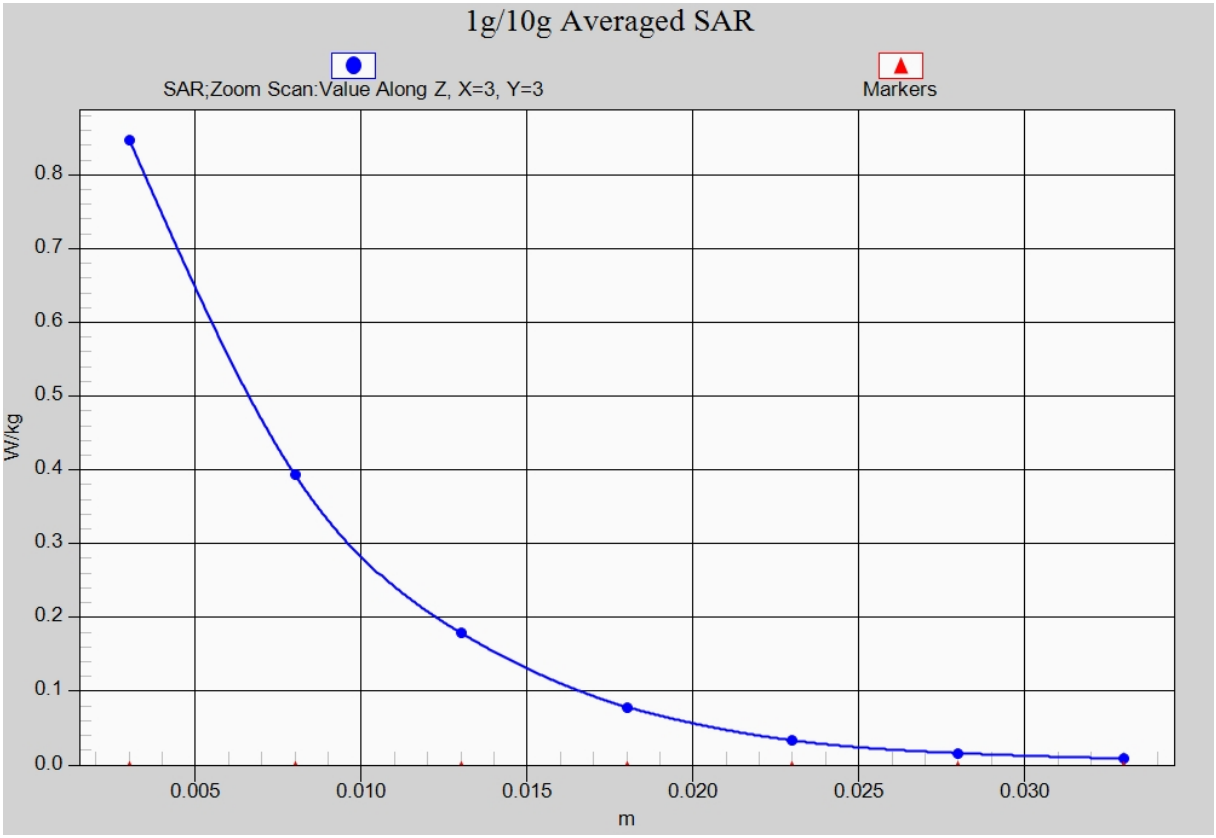


Fig. 23-1 Z-Scan at power reference point (2450 MHz)

Wifi 802.11b Body Rear Channel 6

Date: 2017-4-24
Electronics: DAE4 Sn1331
Medium: Body 2450 MHz
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.922 mho/m; ε_r = 52.55; ρ = 1000 kg/m^3
Ambient Temperature: 22.4°C Liquid Temperature: 22.2°C
Communication System: WLan 2450 Frequency: 2437 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN3846 ConvF(7.31, 7.31, 7.31)

Area Scan (121x71x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.242 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.319 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 0.264 W/kg
SAR(1 g) = 0.132 W/kg; SAR(10 g) = 0.064 W/kg
Maximum value of SAR (measured) = 0.156 W/kg

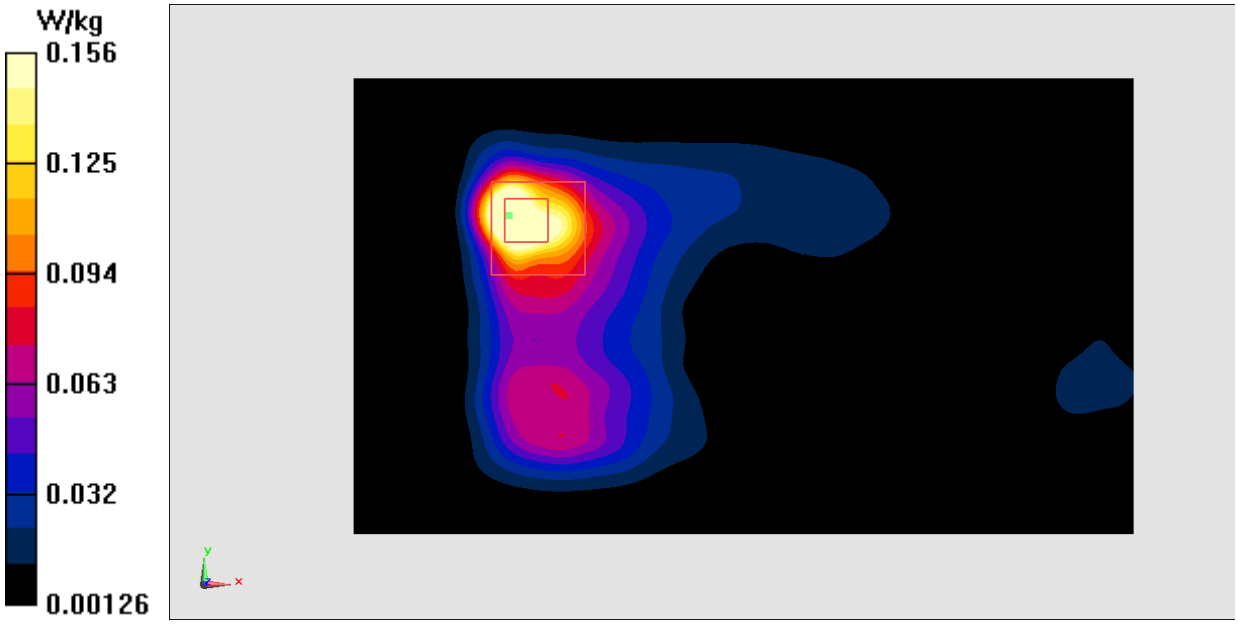


Fig.24 2450 MHz

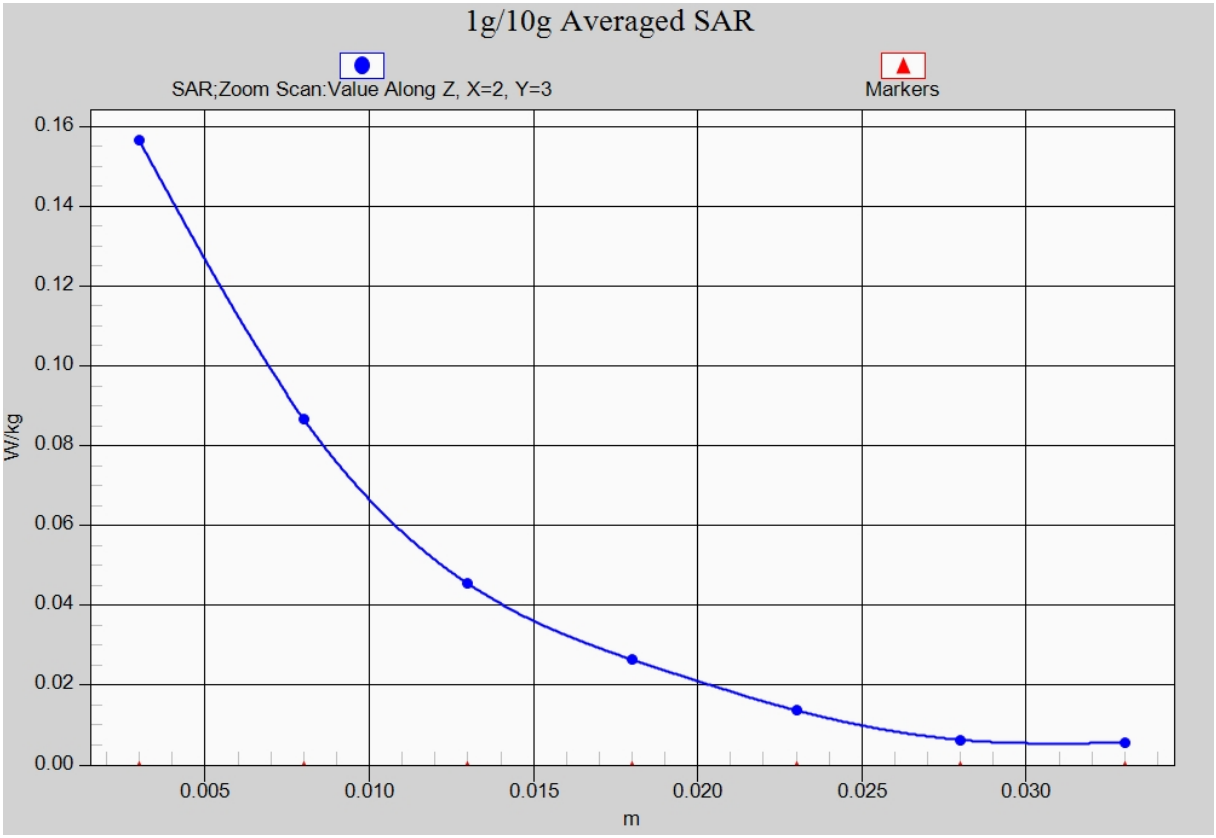


Fig. 24-1 Z-Scan at power reference point (2450 MHz)

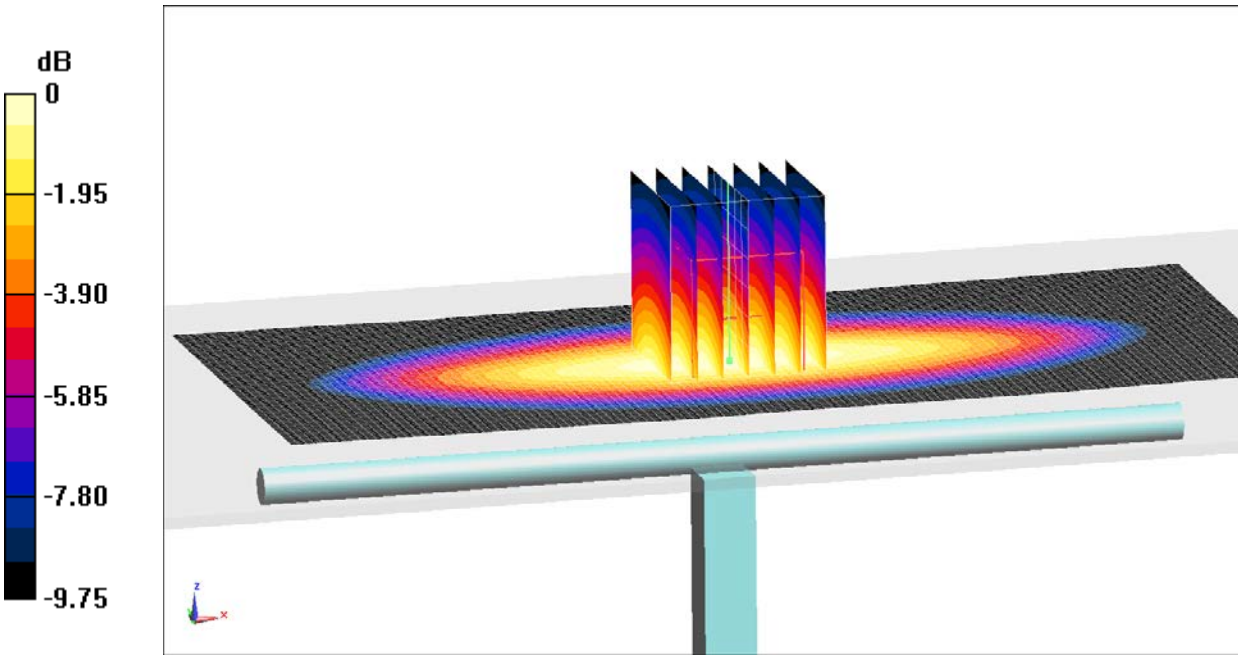
ANNEX B System Verification Results

750MHz

Date: 2017-4-23
Electronics: DAE4 Sn1331
Medium: Head 750 MHz
Medium parameters used: f = 750 MHz; σ = 0.886 mho/m; ε_r = 42.8; ρ = 1000 kg/m^3
Ambient Temperature: 22.4°C Liquid Temperature: 22.2°C
Communication System: CW Frequency: 750 MHz Duty Cycle: 1:1
Probe: EX3DV4– SN3846 ConvF(9.65, 9.65, 9.65)

System Validation /Area Scan (81x191x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Reference Value = 51.372 V/m; Power Drift = -0.08 dB
Fast SAR: SAR(1 g) = 2.21 W/kg; SAR(10 g) = 1.44 W/kg
Maximum value of SAR (interpolated) = 2.35 W/kg

System Validation /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 51.372 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 3.02 W/kg
SAR(1 g) = 2.16 W/kg; SAR(10 g) = 1.41 W/kg
Maximum value of SAR (measured) = 2.32 W/kg



0 dB = 2.32 W/kg = 3.65 dB W/kg

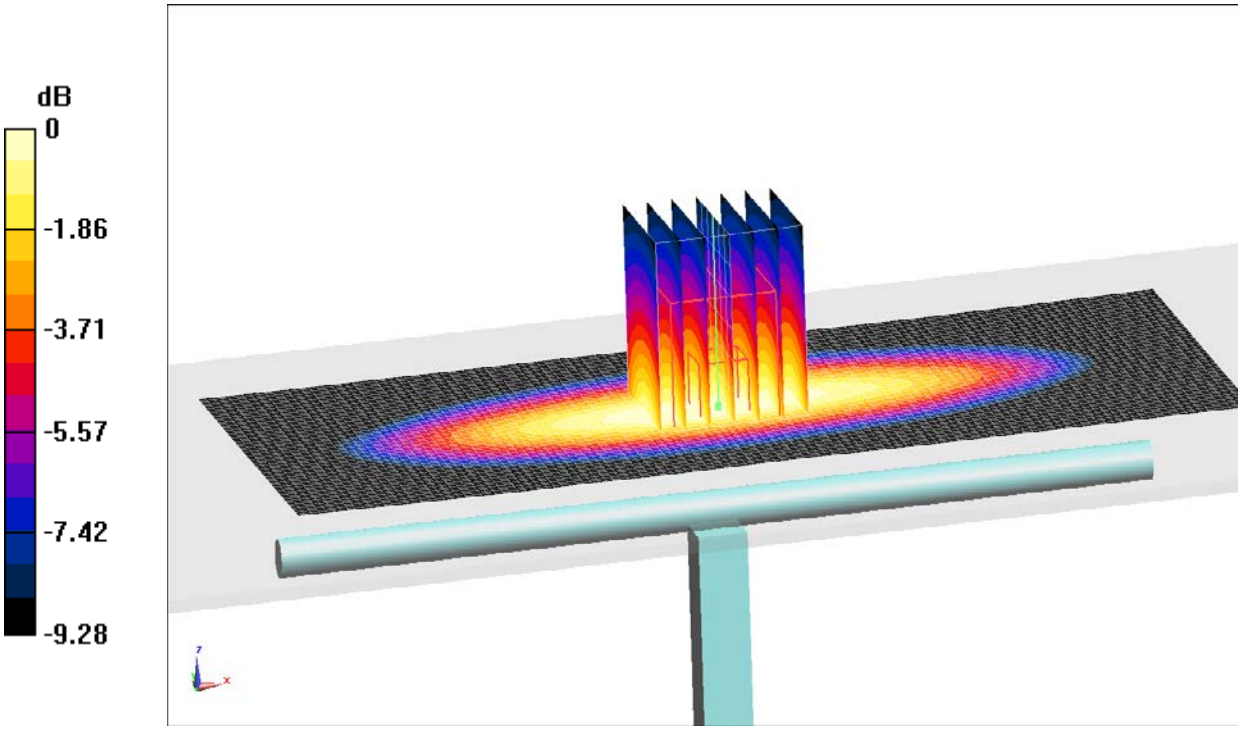
Fig.B.1 validation 750MHz 250mW

750MHz

Date: 2017-4-23
Electronics: DAE4 Sn1331
Medium: Body750 MHz
Medium parameters used: f = 750 MHz; σ = 0.942 mho/m; ε_r = 54.34; ρ = 1000 kg/m^3
Ambient Temperature: 22.4°C Liquid Temperature: 22.2°C
Communication System: CW Frequency: 750 MHz Duty Cycle: 1:1
Probe: EX3DV4– SN3846 ConvF(9.96, 9.96, 9.96)

System Validation/Area Scan (81x191x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Reference Value = 50.936 V/m; Power Drift = 0.09 dB
Fast SAR: SAR(1 g) = 2.26 W/kg; SAR(10 g) = 1.47 W/kg
Maximum value of SAR (interpolated) = 2.32 W/kg

System Validation/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 50.936 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 2.98 W/kg
SAR(1 g) = 2.21 W/kg; SAR(10 g) = 1.45 W/kg
Maximum value of SAR (measured) = 2.30 W/kg



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

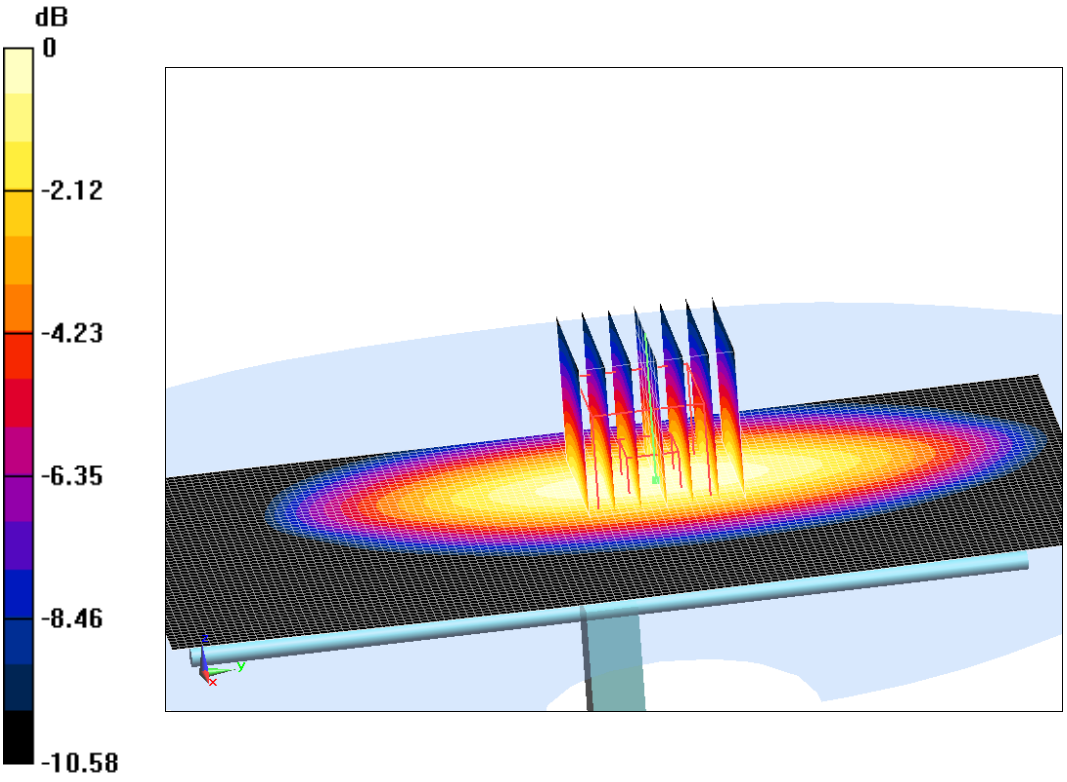
Fig.B.2 validation 750MHz 250mW

835 MHz

Date: 2017-4-19
Electronics: DAE4 Sn1331
Medium: Head835 MHz
Medium parameters used: f = 835 MHz; σ =0.892 mho/m; ε_r = 41.1; ρ = 1000 kg/m^3
Ambient Temperature: 22.4°C Liquid Temperature: 22.2°C
Communication System: CW Frequency: 835 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN3846 ConvF(9.33, 9.33, 9.33)

System Validation /Area Scan (81x191x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Reference Value = 59.5 V/m; Power Drift = 0.02
Fast SAR: SAR(1 g) = 2.34W/kg; SAR(10 g) = 1.52 W/kg
Maximum value of SAR (interpolated) = 3.22 W/kg

System Validation /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value =59.5 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 3.64 W/kg
SAR(1 g) = 2.33W/kg; SAR(10 g) = 1.55 W/kg
Maximum value of SAR (measured) = 3.37 W/kg



0 dB = 3.37W/kg = 5.28 dB W/kg

Fig.B.3 validation 835 MHz 250mW