

**Table 14.17: SAR Values (Wi-Fi 802.11a - Body)**

Frequency		Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Ambient Temperature: 22.5 °C		Liquid Temperature: 22.0 °C		Power Drift (dB)
MHz	Ch.					Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	
5180	36	Front	/	13.65	15	0.000584	<b>0.00</b>	0.00102	<b>0.00</b>	-0.18
5180	36	Rear	/	13.65	15	0.023	<b>0.03</b>	0.063	<b>0.09</b>	-0.14
5180	36	Right	/	13.65	15	0.026	<b>0.04</b>	0.071	<b>0.10</b>	0.15
5745	149	Front	/	15.76	15.8	$7 \times 10^{-5}$	<b>0.00</b>	0.000435	<b>0.00</b>	0.01
5745	149	Rear	/	15.76	15.8	0.025	<b>0.03</b>	0.092	<b>0.09</b>	0.12
5745	149	Right	Fig.16	15.76	15.8	0.041	<b>0.04</b>	0.119	<b>0.12</b>	0.07

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

**Table 14.18: SAR Values (Wi-Fi 802.11n - Head)**

Frequency		Side	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Ambient Temperature: 22.5 °C		Liquid Temperature: 22.0 °C		Power Drift (dB)
MHz	Ch.						Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	
5745	149	Left	Touch	/	14.86	15.4	0.013	<b>0.01</b>	0.044	<b>0.05</b>	0.11
5745	149	Left	Tilt	/	14.86	15.4	0.017	<b>0.02</b>	0.017	<b>0.02</b>	0.08
5745	149	Right	Touch	Fig.17	14.86	15.4	0.00851	<b>0.01</b>	0.075	<b>0.08</b>	-0.08
5745	149	Right	Tilt	/	14.86	15.4	0.00028	<b>0.00</b>	0.00052	<b>0.00</b>	0.06

**Table 14.19: SAR Values (Wi-Fi 802.11n - Body)**

Frequency		Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Ambient Temperature: 22.5 °C		Liquid Temperature: 22.0 °C		Power Drift (dB)
MHz	Ch.					Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	
5745	149	Front	/	14.86	15.4	0.000484	<b>0.00</b>	0.00222	<b>0.00</b>	-0.15
5745	149	Rear	Fig.18	14.86	15.4	0.040	<b>0.05</b>	0.120	<b>0.14</b>	0.07
5745	149	Right	/	14.86	15.4	0.041	<b>0.05</b>	0.109	<b>0.12</b>	-0.13

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

## 14.2 SAR results for Standard procedure

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

**Table 14.20: SAR Values (GSM 850 MHz Band - Head)**

Ambient Temperature: 22.3°C      Liquid Temperature: 21.8°C											
Frequency		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)
MHz	Ch.										
824.2	128	Right	Touch	Fig.1	32.51	33	0.329	<b>0.37</b>	0.422	<b>0.47</b>	0.07

**Table 14.21: SAR Values (GSM 850 MHz Band - Body)**

Ambient Temperature: 22.3°C      Liquid Temperature: 21.8°C											
Frequency		Mode (number of timeslots)	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)
MHz	Ch.										
836.6	190	GPRS (2)	Rear	Fig.2	32.33	32.6	0.896	<b>0.95</b>	1.16	<b>1.23</b>	-0.18

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

**Table 14.22: SAR Values (GSM 1900 MHz Band - Head)**

Ambient Temperature: 22.7°C      Liquid Temperature: 22.2°C											
Frequency		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)
MHz	Ch.										
1850.2	512	Left	Touch	Fig.3	29.80	30.2	0.187	<b>0.21</b>	0.303	<b>0.33</b>	0.18

**Table 14.23: SAR Values (GSM 1900 MHz Band - Body)**

Ambient Temperature: 22.7°C      Liquid Temperature: 22.2°C											
Frequency		Mode (number of timeslots)	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)
MHz	Ch.										
1850.2	512	GPRS (2)	Rear	Fig.4	29.75	30.2	0.664	<b>0.74</b>	1.04	<b>1.15</b>	-0.03

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

**Table 14.24: SAR Values (WCDMA 850 MHz Band - Head)**

Ambient Temperature: 22.3°C      Liquid Temperature: 21.8°C											
Frequency		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)
MHz	Ch.										
826.4	4132	Right	Touch	Fig.5	24.01	24.5	0.371	<b>0.42</b>	0.473	<b>0.53</b>	0.09

**Table 14.25: SAR Values (WCDMA 850 MHz Band - Body)**

Frequency		Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Ambient Temperature: 22.3°C		Liquid Temperature: 21.8°C		Power Drift (dB)
MHz	Ch.					Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	
826.4	4132	Rear	Fig.6	24.01	24.5	0.768	<b>0.86</b>	0.998	<b>1.12</b>	-0.02

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

**Table 14.26: SAR Values (WCDMA 1900 MHz Band - Head)**

Frequency		Side	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Ambient Temperature: 22.7°C		Liquid Temperature: 22.2°C		Power Drift (dB)
MHz	Ch.						Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	
1852.4	9262	Left	Touch	Fig.7	23.69	24.2	0.354	<b>0.40</b>	0.578	<b>0.65</b>	0.05

**Table 14.27: SAR Values (WCDMA 1900 MHz Band - Body)**

Frequency		Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Ambient Temperature: 22.7°C		Liquid Temperature: 22.2°C		Power Drift (dB)
MHz	Ch.					Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	
1852.4	9262	Rear	Fig.8	23.69	24.2	0.617	<b>0.69</b>	0.983	<b>1.11</b>	0.15

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

**Table 14.28: SAR Values (LTE Band4 - Head)**

Frequency		Mode	Side	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Ambient Temperature: 22.3°C		Liquid Temperature: 21.8°C		Power Drift (dB)
MHz	Ch.							Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	
1732.5	20175	1RB_High	Left	Touch	Fig.9	23.08	23.9	0.231	<b>0.28</b>	0.354	<b>0.43</b>	0.13

Note1: The LTE mode is QPSK\_20MHz.

**Table 14.29: SAR Values (LTE Band4 - Body)**

Frequency		Mode	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Ambient Temperature: 22.3°C		Liquid Temperature: 21.8°C		Power Drift (dB)
MHz	Ch.						Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	
1732.5	20175	1RB_High	Bottom	Fig.10	23.08	23.9	0.454	<b>0.55</b>	0.804	<b>0.97</b>	0.03

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

Note2: The LTE mode is QPSK\_20MHz.

**Table 14.30: SAR Values (LTE Band17 - Head)**

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)	
MHz	Ch.												
		Ambient Temperature: 22.6 °C						Liquid Temperature: 22.1 °C					
709	23780	1RB_Mid	Left	Touch	Fig.11	23.33	24.2	0.278	<b>0.34</b>	0.347	<b>0.42</b>	0.02	

Note1: The LTE mode is QPSK\_10MHz.

**Table 14.31: SAR Values (LTE Band17 - Body)**

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)		
MHz	Ch.												
		Ambient Temperature: 22.6 °C						Liquid Temperature: 22.1 °C					
709	23780	1RB_Mid	Rear	Fig.12	23.33	24.2	0.467	<b>0.57</b>	0.598	<b>0.73</b>	-0.12		

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

Note2: The LTE mode is QPSK\_10MHz.

**Table 14.32: SAR Values (Wi-Fi 802.11b - Head)**

Frequency		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)		
MHz	Ch.												
		Ambient Temperature: 22.4 °C						Liquid Temperature: 21.9 °C					
2412	1	Right	Touch	Fig.13	18.68	19	0.123	<b>0.13</b>	0.244	<b>0.26</b>	0.07		

**Table 14.33: SAR Values (Wi-Fi 802.11b - Body)**

Frequency		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)			
MHz	Ch.												
		Ambient Temperature: 22.4 °C						Liquid Temperature: 21.9 °C					
2412	1	Rear	Fig.14	18.68	19	0.124	<b>0.13</b>	0.287	<b>0.31</b>	0.10			

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

**Table 14.34: SAR Values (Wi-Fi 802.11a - Head)**

Frequency		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)		
MHz	Ch.												
		Ambient Temperature: 22.5 °C						Liquid Temperature: 22.0 °C					
5745	149	Right	Touch	Fig.15	15.76	15.8	0.024	<b>0.02</b>	0.088	<b>0.09</b>	-0.15		

**Table 14.35: SAR Values (Wi-Fi 802.11a - Body)**

Frequency		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)
MHz	Ch.									
		Ambient Temperature: 22.5 °C				Liquid Temperature: 22.0 °C				
5745	149	Right	Fig.16	15.76	15.8	0.041	<b>0.04</b>	0.119	<b>0.12</b>	0.07

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

**Table 14.36: SAR Values (Wi-Fi 802.11n - Head)**

Frequency		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)
MHz	Ch.										
		Ambient Temperature: 22.5 °C				Liquid Temperature: 22.0 °C					
5745	149	Right	Touch	Fig.17	14.86	15.4	0.00851	<b>0.01</b>	0.075	<b>0.08</b>	-0.08

**Table 14.37: SAR Values (Wi-Fi 802.11n - Body)**

Frequency		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)
MHz	Ch.									
		Ambient Temperature: 22.5 °C				Liquid Temperature: 22.0 °C				
5745	149	Rear	Fig.18	14.86	15.4	0.040	<b>0.05</b>	0.120	<b>0.14</b>	0.07

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

## 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; steps 2) through 4) do not apply.
- 2) When the original highest measured SAR is  $\geq 0.80$  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  $\geq 1.45$  W/kg (~ 10% from the 1-g SAR limit).
- 4) Perform a third repeated measurement only if the original, first or second repeated measurement is  $\geq 1.5$  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 GSM 850 (1g)**

Frequency		Test Position	Spacing (mm)	Original SAR (W/kg)	First Repeated SAR (W/kg)	The Ratio	Second Repeated SAR (W/kg)
MHz	Ch.						
836.6	190	Rear	10	1.16	1.15	1.01	/

**Table 15.2: SAR Measurement Variability for Body WCDMA 850 (1g)**

Frequency		Test Position	Spacing (mm)	Original SAR (W/kg)	First Repeated SAR (W/kg)	The Ratio	Second Repeated SAR (W/kg)
MHz	Ch.						
826.4	4132	Rear	10	0.998	0.992	1.01	/

**Table 15.3: SAR Measurement Variability for Body GSM 1900 (1g)**

Frequency		Test Position	Spacing (mm)	Original SAR (W/kg)	First Repeated SAR (W/kg)	The Ratio	Second Repeated SAR (W/kg)
MHz	Ch.						
1850.2	512	Rear	10	1.04	1.03	1.01	/

**Table 15.4: SAR Measurement Variability for Body WCDMA 1900 (1g)**

Frequency		Test Position	Spacing (mm)	Original SAR (W/kg)	First Repeated SAR (W/kg)	The Ratio	Second Repeated SAR (W/kg)
MHz	Ch.						
1852.4	9262	Rear	10	0.983	0.976	1.01	/

**Table 15.5: SAR Measurement Variability for Body LTE Band4 (1g)**

Frequency		Mode	Test Position	Spacing (mm)	Original SAR (W/kg)	First Repeated SAR (W/kg)	The Ratio	Second Repeated SAR (W/kg)
MHz	Ch.							
1732.5	20175	1RB_High	Bottom	10	0.804	0.799	1.01	/

## 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
<b>Measurement system</b>										
1	Probe calibration	B	5.5	N	1	1	1	5.5	5.5	$\infty$
2	Isotropy	B	4.7	R	$\sqrt{3}$	0.7	0.7	1.9	1.9	$\infty$
3	Boundary effect	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	$\infty$
4	Linearity	B	4.7	R	$\sqrt{3}$	1	1	2.7	2.7	$\infty$
5	Detection limit	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	$\infty$
6	Readout electronics	B	0.3	R	$\sqrt{3}$	1	1	0.3	0.3	$\infty$
7	Response time	B	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	$\infty$
8	Integration time	B	2.6	R	$\sqrt{3}$	1	1	1.5	1.5	$\infty$
9	RF ambient conditions-noise	B	0	R	$\sqrt{3}$	1	1	0	0	$\infty$
10	RF ambient conditions-reflection	B	0	R	$\sqrt{3}$	1	1	0	0	$\infty$
11	Probe positioned mech. restrictions	B	0.4	R	$\sqrt{3}$	1	1	0.2	0.2	$\infty$
12	Probe positioning with respect to phantom shell	B	2.9	R	$\sqrt{3}$	1	1	1.7	1.7	$\infty$
13	Post-processing	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	$\infty$
<b>Test sample related</b>										
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	$\infty$
<b>Phantom and set-up</b>										
17	Phantom uncertainty	B	4.0	R	$\sqrt{3}$	1	1	2.3	2.3	$\infty$
18	Liquid conductivity (target)	B	5.0	R	$\sqrt{3}$	0.64	0.43	1.8	1.2	$\infty$
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	$\infty$
21	Liquid permittivity (meas.)	A	1.6	N	1	0.6	0.49	1.0	0.8	521

Combined standard uncertainty	$u_c = \sqrt{\sum_{i=1}^{21} c_i^2 u_i^2}$							9.25	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
<b>Measurement system</b>										
1	Probe calibration	B	6.5	N	1	1	1	6.5	6.5	$\infty$
2	Isotropy	B	4.7	R	$\sqrt{3}$	0.7	0.7	1.9	1.9	$\infty$
3	Boundary effect	B	2.0	R	$\sqrt{3}$	1	1	1.2	1.2	$\infty$
4	Linearity	B	4.7	R	$\sqrt{3}$	1	1	2.7	2.7	$\infty$
5	Detection limit	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	$\infty$
6	Readout electronics	B	0.3	R	$\sqrt{3}$	1	1	0.3	0.3	$\infty$
7	Response time	B	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	$\infty$
8	Integration time	B	2.6	R	$\sqrt{3}$	1	1	1.5	1.5	$\infty$
9	RF ambient conditions-noise	B	0	R	$\sqrt{3}$	1	1	0	0	$\infty$
10	RF ambient conditions-reflection	B	0	R	$\sqrt{3}$	1	1	0	0	$\infty$
11	Probe positioned mech. restrictions	B	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	$\infty$
12	Probe positioning with respect to phantom shell	B	6.7	R	$\sqrt{3}$	1	1	3.9	3.9	$\infty$
13	Post-processing	B	4.0	R	$\sqrt{3}$	1	1	2.3	2.3	$\infty$
<b>Test sample related</b>										
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	$\infty$
<b>Phantom and set-up</b>										
17	Phantom uncertainty	B	4.0	R	$\sqrt{3}$	1	1	2.3	2.3	$\infty$
18	Liquid conductivity (target)	B	5.0	R	$\sqrt{3}$	0.64	0.43	1.8	1.2	$\infty$
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	$\infty$
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
<b>Measurement system</b>										
1	Probe calibration	B	5.5	N	1	1	1	5.5	5.5	$\infty$
2	Isotropy	B	4.7	R	$\sqrt{3}$	0.7	0.7	1.9	1.9	$\infty$
3	Boundary effect	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	$\infty$
4	Linearity	B	4.7	R	$\sqrt{3}$	1	1	2.7	2.7	$\infty$
5	Detection limit	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	$\infty$
6	Readout electronics	B	0.3	R	$\sqrt{3}$	1	1	0.3	0.3	$\infty$
7	Response time	B	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	$\infty$
8	Integration time	B	2.6	R	$\sqrt{3}$	1	1	1.5	1.5	$\infty$
9	RF ambient conditions-noise	B	0	R	$\sqrt{3}$	1	1	0	0	$\infty$
10	RF ambient conditions-reflection	B	0	R	$\sqrt{3}$	1	1	0	0	$\infty$
11	Probe positioned mech. Restrictions	B	0.4	R	$\sqrt{3}$	1	1	0.2	0.2	$\infty$
12	Probe positioning with respect to phantom shell	B	2.9	R	$\sqrt{3}$	1	1	1.7	1.7	$\infty$
13	Post-processing	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	$\infty$
14	Fast SAR z-Approximation	B	7.0	R	$\sqrt{3}$	1	1	4.0	4.0	$\infty$
<b>Test sample related</b>										
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	$\infty$
<b>Phantom and set-up</b>										

18	Phantom uncertainty	B	4.0	R	$\sqrt{3}$	1	1	2.3	2.3	$\infty$
19	Liquid conductivity (target)	B	5.0	R	$\sqrt{3}$	0.64	0.43	1.8	1.2	$\infty$
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	$\infty$
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
<b>Measurement system</b>										
1	Probe calibration	B	6.5	N	1	1	1	6.5	6.5	$\infty$
2	Isotropy	B	4.7	R	$\sqrt{3}$	0.7	0.7	1.9	1.9	$\infty$
3	Boundary effect	B	2.0	R	$\sqrt{3}$	1	1	1.2	1.2	$\infty$
4	Linearity	B	4.7	R	$\sqrt{3}$	1	1	2.7	2.7	$\infty$
5	Detection limit	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	$\infty$
6	Readout electronics	B	0.3	R	$\sqrt{3}$	1	1	0.3	0.3	$\infty$
7	Response time	B	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	$\infty$
8	Integration time	B	2.6	R	$\sqrt{3}$	1	1	1.5	1.5	$\infty$
9	RF ambient conditions-noise	B	0	R	$\sqrt{3}$	1	1	0	0	$\infty$
10	RF ambient conditions-reflection	B	0	R	$\sqrt{3}$	1	1	0	0	$\infty$
11	Probe positioned mech. Restrictions	B	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	$\infty$
12	Probe positioning with respect to phantom shell	B	6.7	R	$\sqrt{3}$	1	1	3.9	3.9	$\infty$
13	Post-processing	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	$\infty$
14	Fast SAR z-Approximation	B	14.0	R	$\sqrt{3}$	1	1	8.1	8.1	$\infty$
<b>Test sample related</b>										
15	Test sample	A	3.3	N	1	1	1	3.3	3.3	71

	positioning									
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	$\infty$
<b>Phantom and set-up</b>										
18	Phantom uncertainty	B	4.0	R	$\sqrt{3}$	1	1	2.3	2.3	$\infty$
19	Liquid conductivity (target)	B	5.0	R	$\sqrt{3}$	0.64	0.43	1.8	1.2	$\infty$
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	$\infty$
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 15, 2013	One year
02	Power meter	NRVD	102083	September 11, 2013	One year
03	Power sensor	NRV-Z5	100542		
04	Signal Generator	E4438C	MY49070393	November 13, 2012	One Year
05	Amplifier	60S1G4	0331848	No Calibration Requested	
06	BTS	E5515C	MY50263375	January 30, 2013	One year
07	BTS	CMW500	129942	March 12, 2013	One year
08	E-field Probe	SPEAG ES3DV3	3149	April 24, 2012	One year
09	E-field Probe	SPEAG EX3DV4	3846	December 20, 2012	One year
10	DAE	SPEAG DAE4	771	November 20, 2012	One year
11	Dipole Validation Kit	SPEAG D750V3	1045	September 29, 2011	Two years
12	Dipole Validation Kit	SPEAG D835V2	443	August 29, 2013	One year
13	Dipole Validation Kit	SPEAG D1750V2	1003	September 03, 2013	One year
14	Dipole Validation Kit	SPEAG D1900V2	541	May 09, 2012	One year
15	Dipole Validation Kit	SPEAG D2450V2	853	May 02, 2012	One year
16	Dipole Validation Kit	SPEAG D5GHzV2	1040	June 19, 2012	One year

\*\*\*END OF REPORT BODY\*\*\*

## ANNEX A Graph Results

### 850 Right Cheek Low

Date: 2013-11-1

Electronics: DAE4 Sn771

Medium: Head 850 MHz

Medium parameters used:  $f = 825$  MHz;  $\sigma = 0.911$  mho/m;  $\epsilon_r = 42.251$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3°C      Liquid Temperature: 21.8°C

Communication System: GSM 850 Frequency: 824.2 MHz Duty Cycle: 1:8.3

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

**Cheek Low/Area Scan (61x101x1):** Interpolated grid: dx=1.000 mm, dy=1.000 mm  
Maximum value of SAR (interpolated) = 0.451 W/kg

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

Reference Value = 6.300 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 0.518 W/kg

**SAR(1 g) = 0.422 W/kg; SAR(10 g) = 0.329 W/kg**

Maximum value of SAR (measured) = 0.444 W/kg

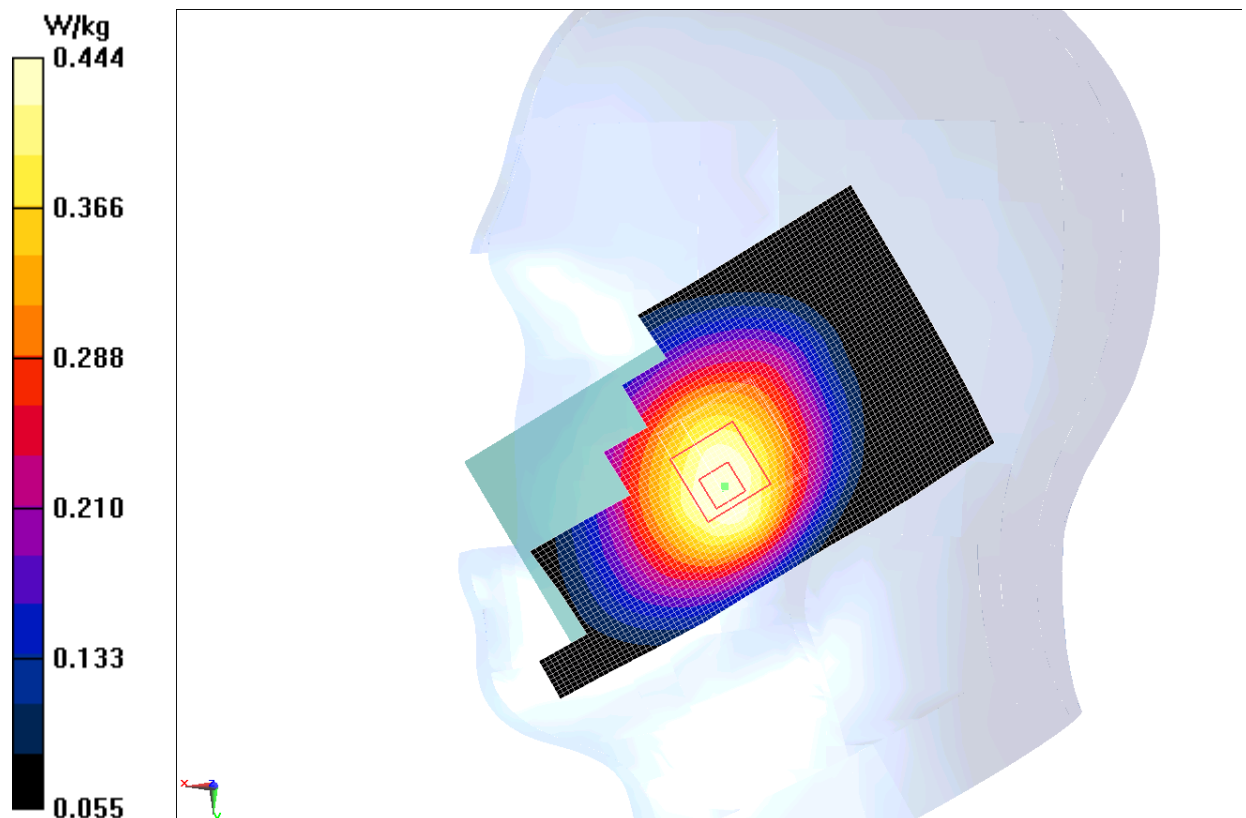
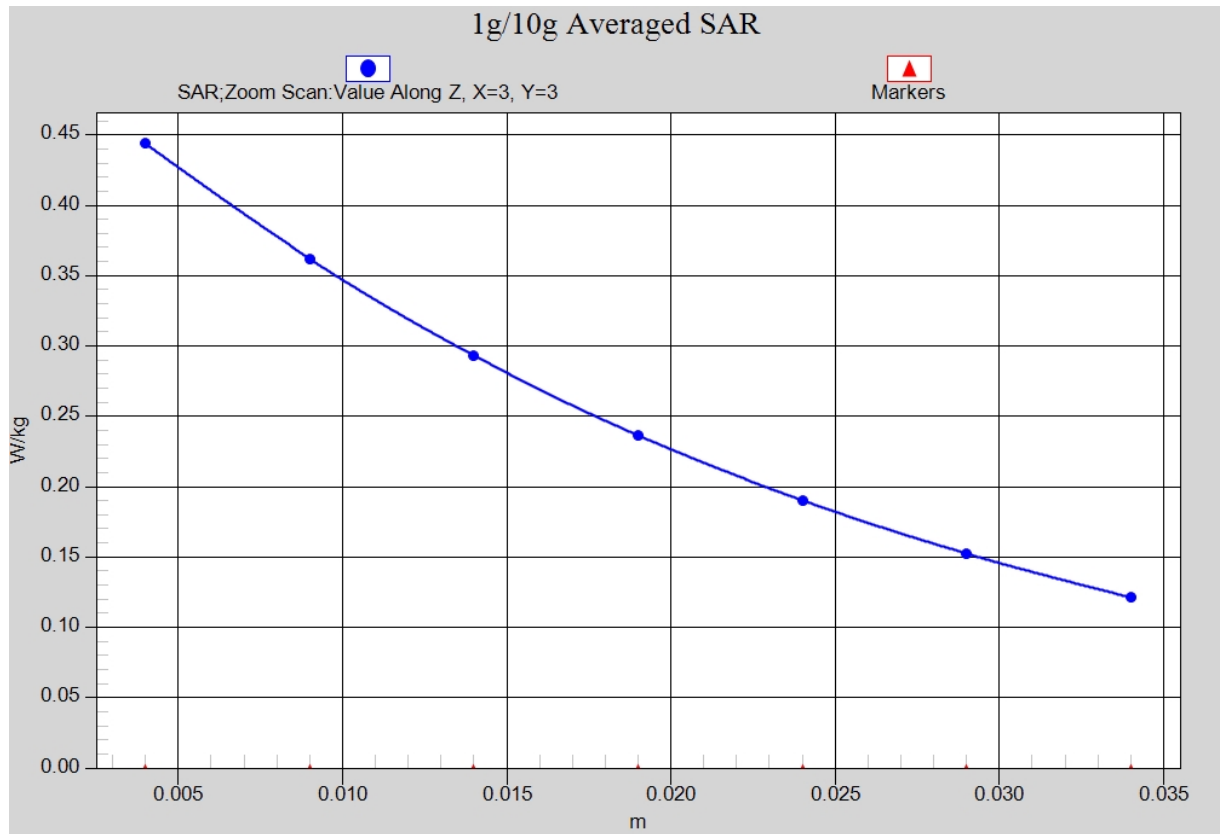


Fig.1 850MHz CH128



**Fig. 1-1 Z-Scan at power reference point (850 MHz CH128)**

### 850 Body Rear Middle

Date: 2013-11-1

Electronics: DAE4 Sn771

Medium: Body 850 MHz

Medium parameters used (interpolated):  $f = 836.6$  MHz;  $\sigma = 0.981$  mho/m;  $\epsilon_r = 56.329$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3°C      Liquid Temperature: 21.8°C

Communication System: GSM 850 GPRS Frequency: 836.6 MHz Duty Cycle: 1:4

Probe: EX3DV4 - SN3846 ConvF(9.04, 9.04, 9.04)

**Rear Middle/Area Scan (61x101x1):** Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 1.25 W/kg

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

Reference Value = 36.847 V/m; Power Drift = -0.18 dB

Peak SAR (extrapolated) = 1.42 W/kg

**SAR(1 g) = 1.16 W/kg; SAR(10 g) = 0.896 W/kg**

Maximum value of SAR (measured) = 1.21 W/kg

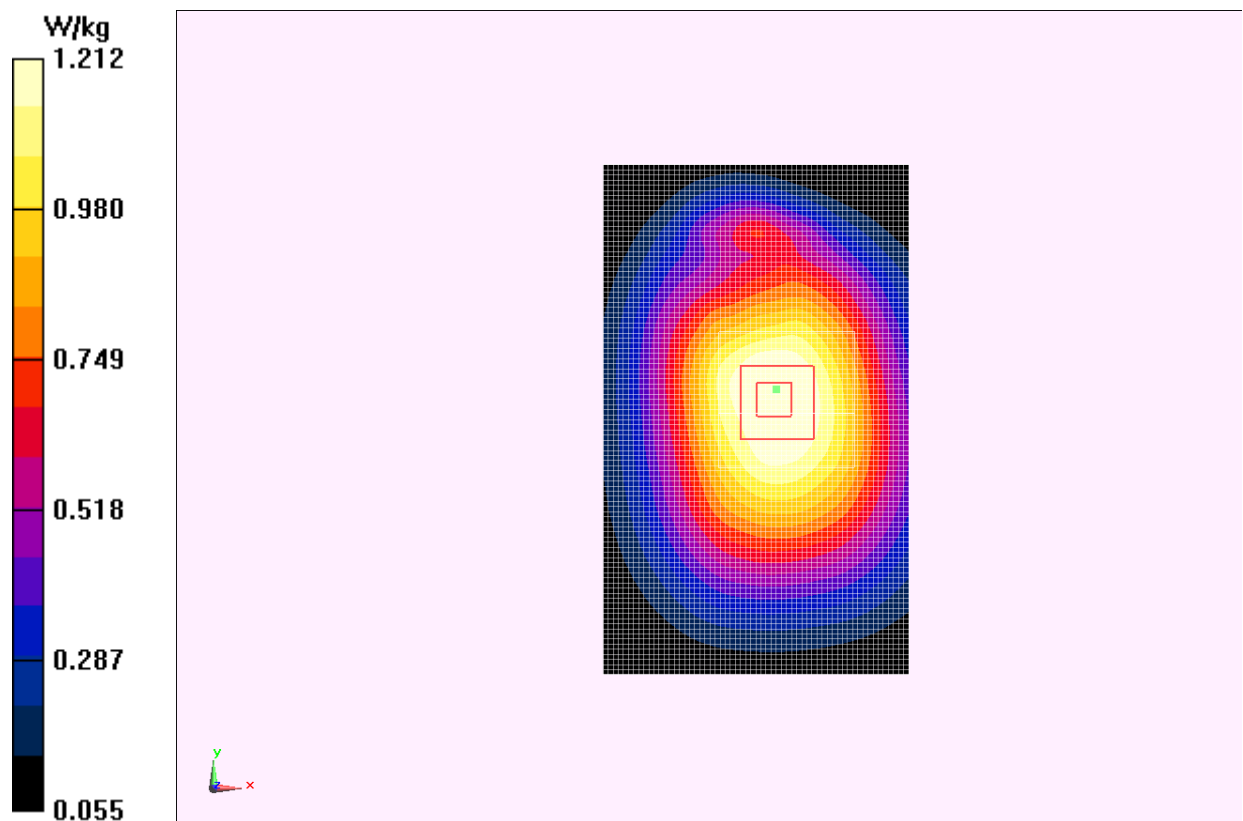


Fig.2 850 MHz CH190

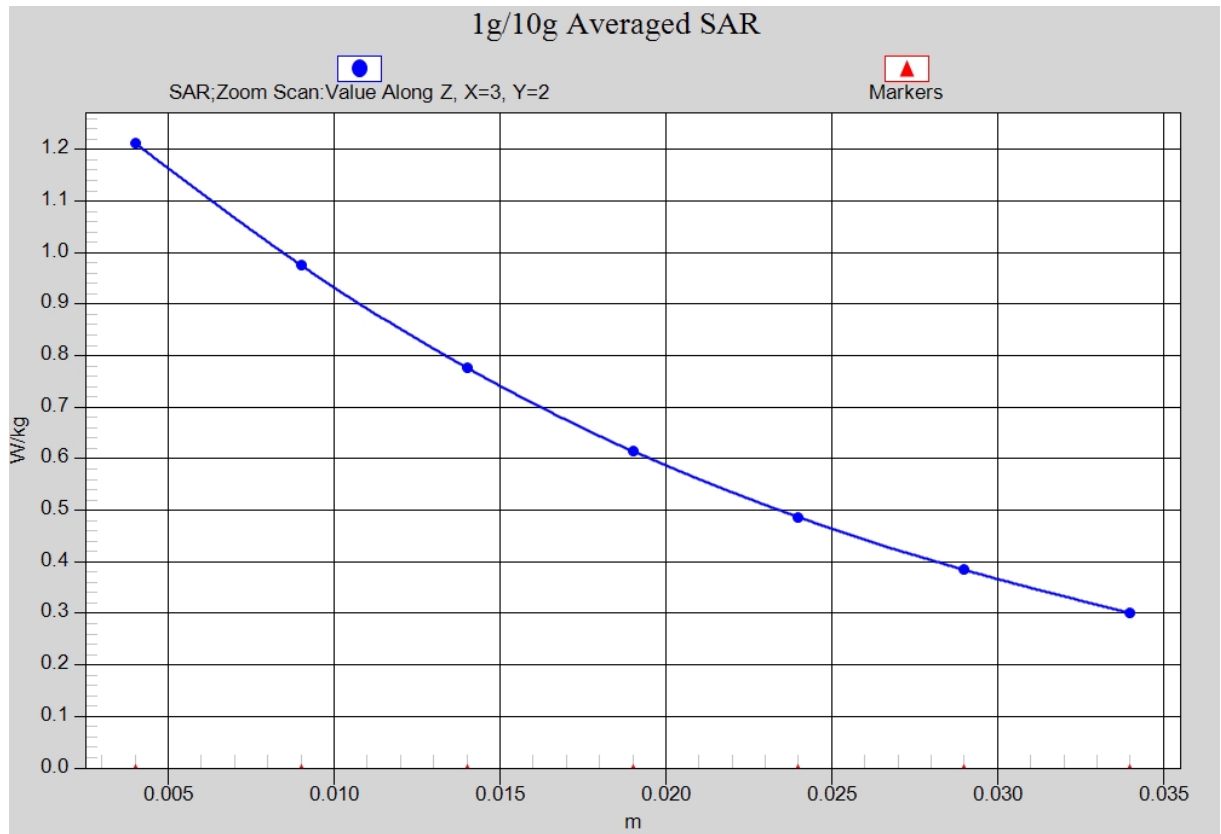


Fig. 2-1 Z-Scan at power reference point (850 MHz CH190)

**1900 Left Cheek Low**

Date: 2013-4-6

Electronics: DAE4 Sn771

Medium: Head 1900 MHz

Medium parameters used (interpolated):  $f = 1850.2$  MHz;  $\sigma = 1.347$  mho/m;  $\epsilon_r = 39.507$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.7°C      Liquid Temperature: 22.2°C

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

Probe: ES3DV3 - SN3149 ConvF(5.19, 5.19, 5.19)

**Cheek Low/Area Scan (61x101x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.332 W/kg

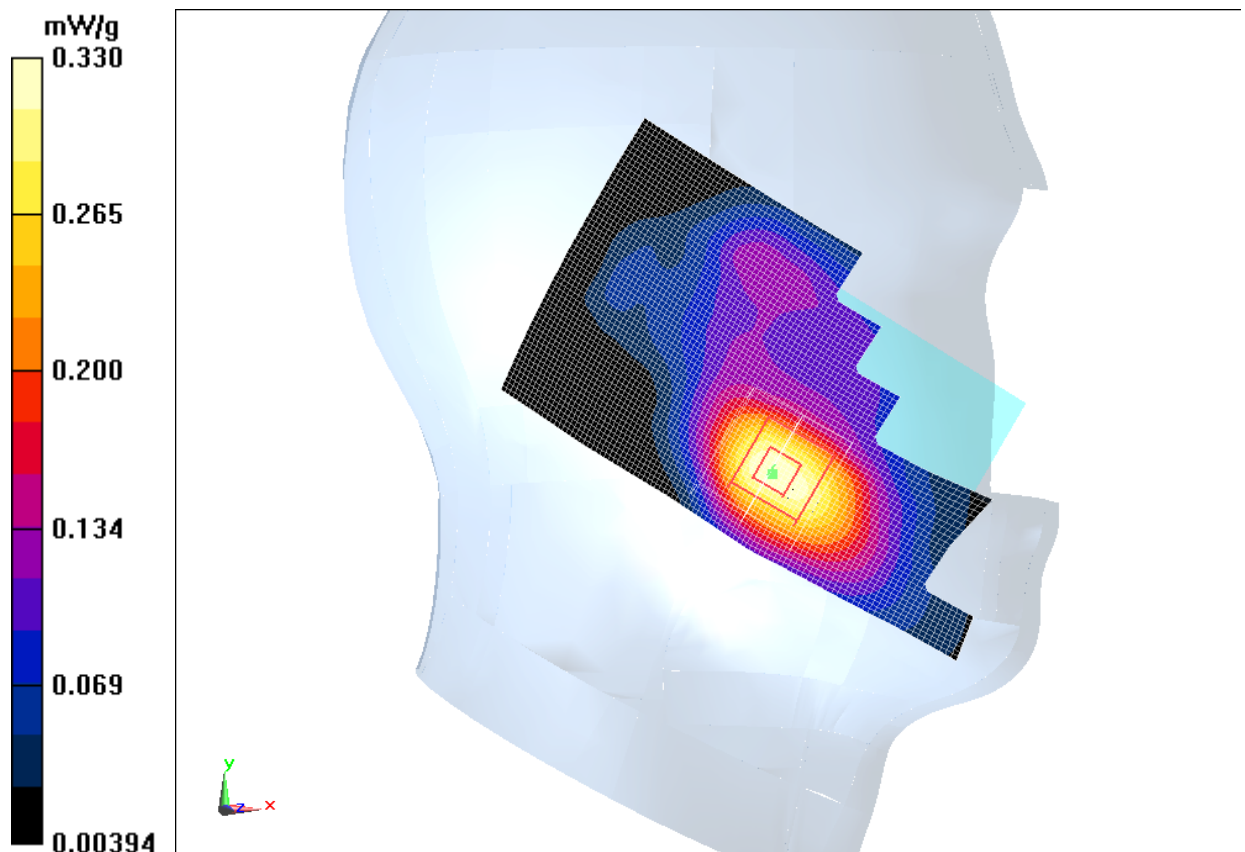
**Cheek Low/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 5.410 V/m; Power Drift = 0.18 dB

Peak SAR (extrapolated) = 0.480 W/kg

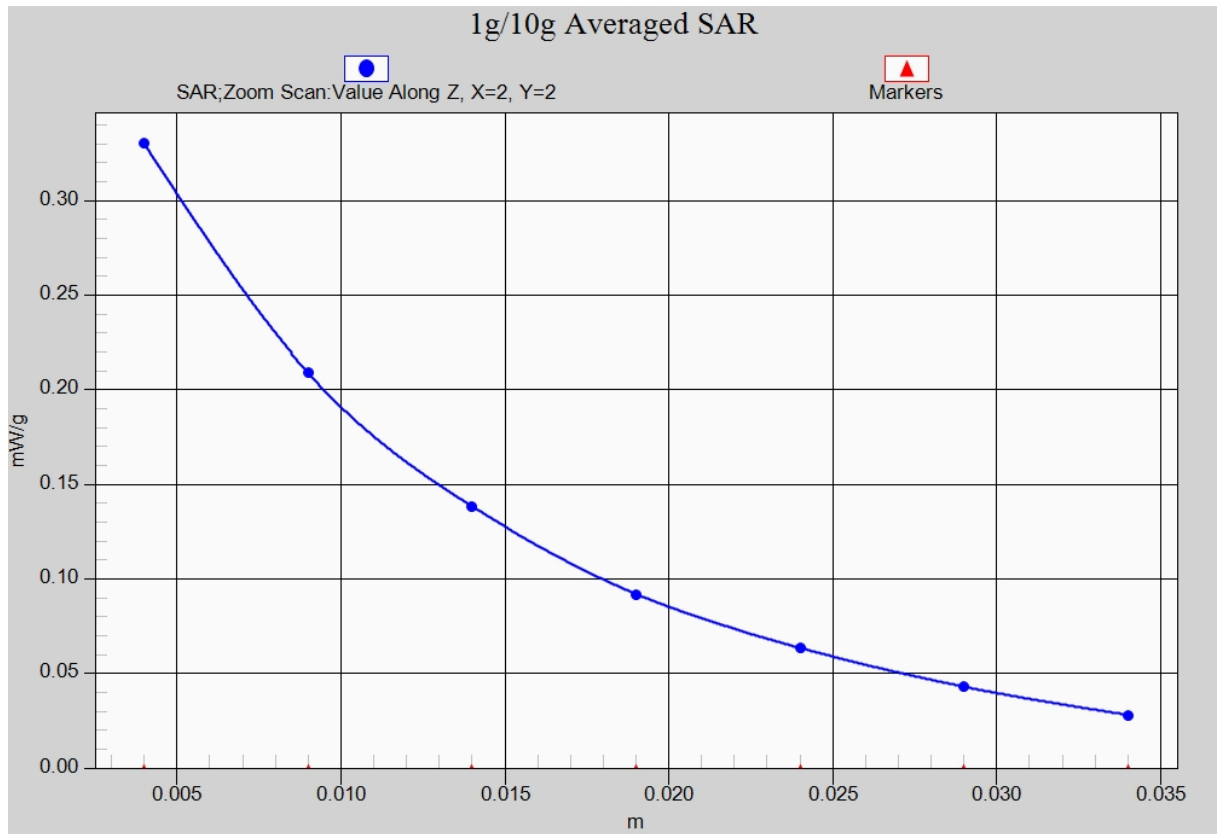
**SAR(1 g) = 0.303 W/kg; SAR(10 g) = 0.187 W/kg**

Maximum value of SAR (measured) = 0.330 W/kg



**Fig.3 1900 MHz CH512**





**Fig. 3-1 Z-Scan at power reference point (1900 MHz CH512)**

### 1900 Body Rear Low

Date: 2013-4-6

Electronics: DAE4 Sn771

Medium: Body 1900 MHz

Medium parameters used (interpolated):  $f = 1850.2$  MHz;  $\sigma = 1.463$  mho/m;  $\epsilon_r = 52.99$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.7°C      Liquid Temperature: 22.2°C

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

Probe: ES3DV3 - SN3149 ConvF(4.64, 4.64, 4.64)

**Rear Low/Area Scan (61x111x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 1.07 W/kg

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

Reference Value = 12.613 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 1.784 W/kg

**SAR(1 g) = 1.04 W/kg; SAR(10 g) = 0.664 W/kg**

Maximum value of SAR (measured) = 1.10 W/kg

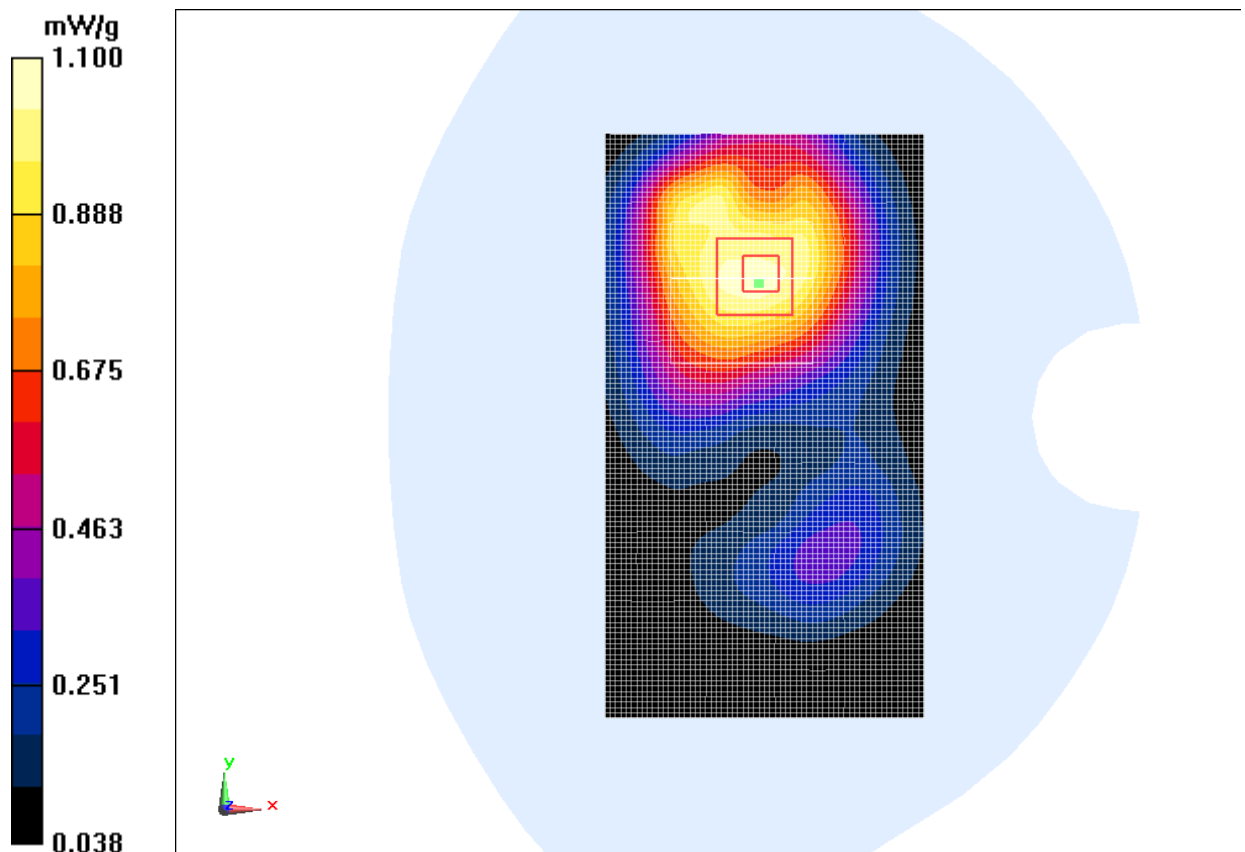
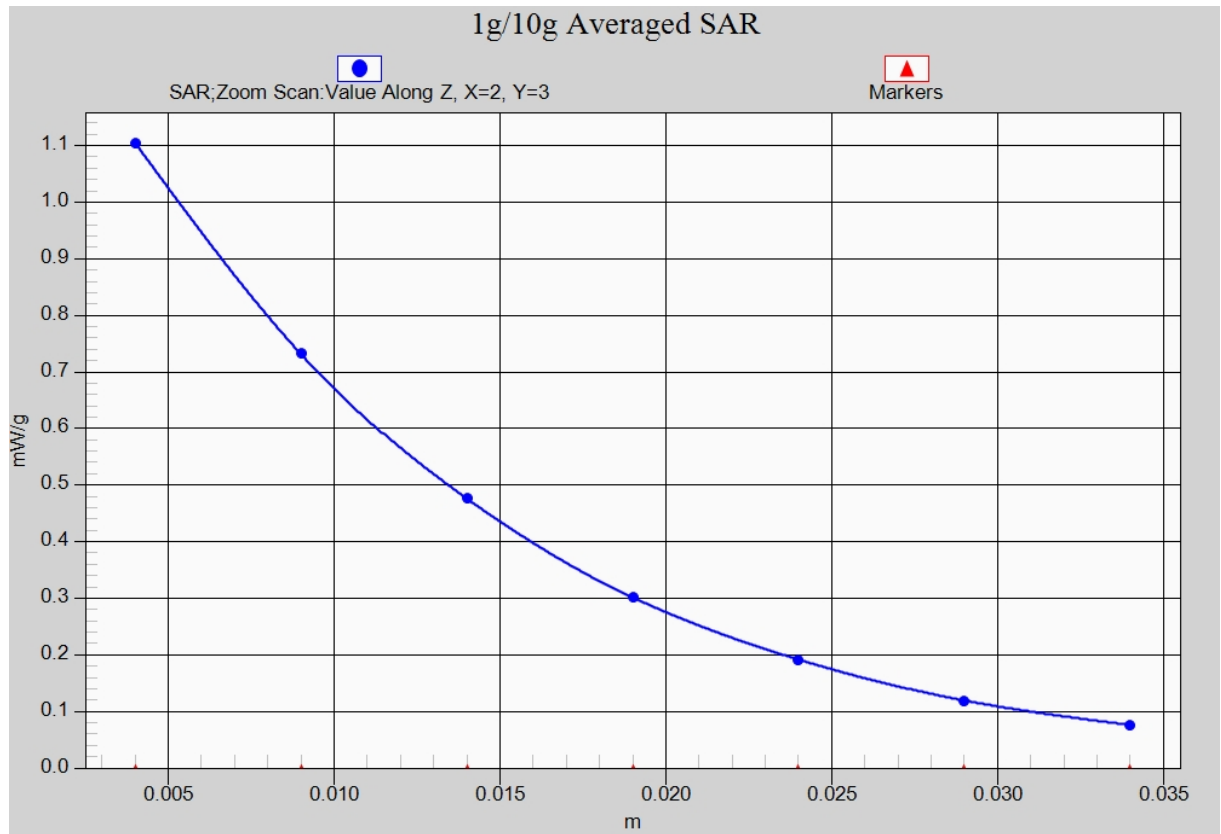


Fig.4 1900 MHz CH512



**Fig.4-1 Z-Scan at power reference point (1900 MHz CH512)**

### WCDMA 850 Right Cheek Low

Date: 2013-11-1

Electronics: DAE4 Sn771

Medium: Head 850 MHz

Medium parameters used (interpolated):  $f = 826.4$  MHz;  $\sigma = 0.902$  mho/m;  $\epsilon_r = 42.231$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3°C      Liquid Temperature: 21.8°C

Communication System: WCDMA; Frequency: 826.4 MHz; Duty Cycle: 1:1

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

**Cheek Low/Area Scan (61x101x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.511 W/kg

**Cheek Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 7.563 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 0.574 W/kg

**SAR(1 g) = 0.473 W/kg; SAR(10 g) = 0.371 W/kg**

Maximum value of SAR (measured) = 0.495 W/kg

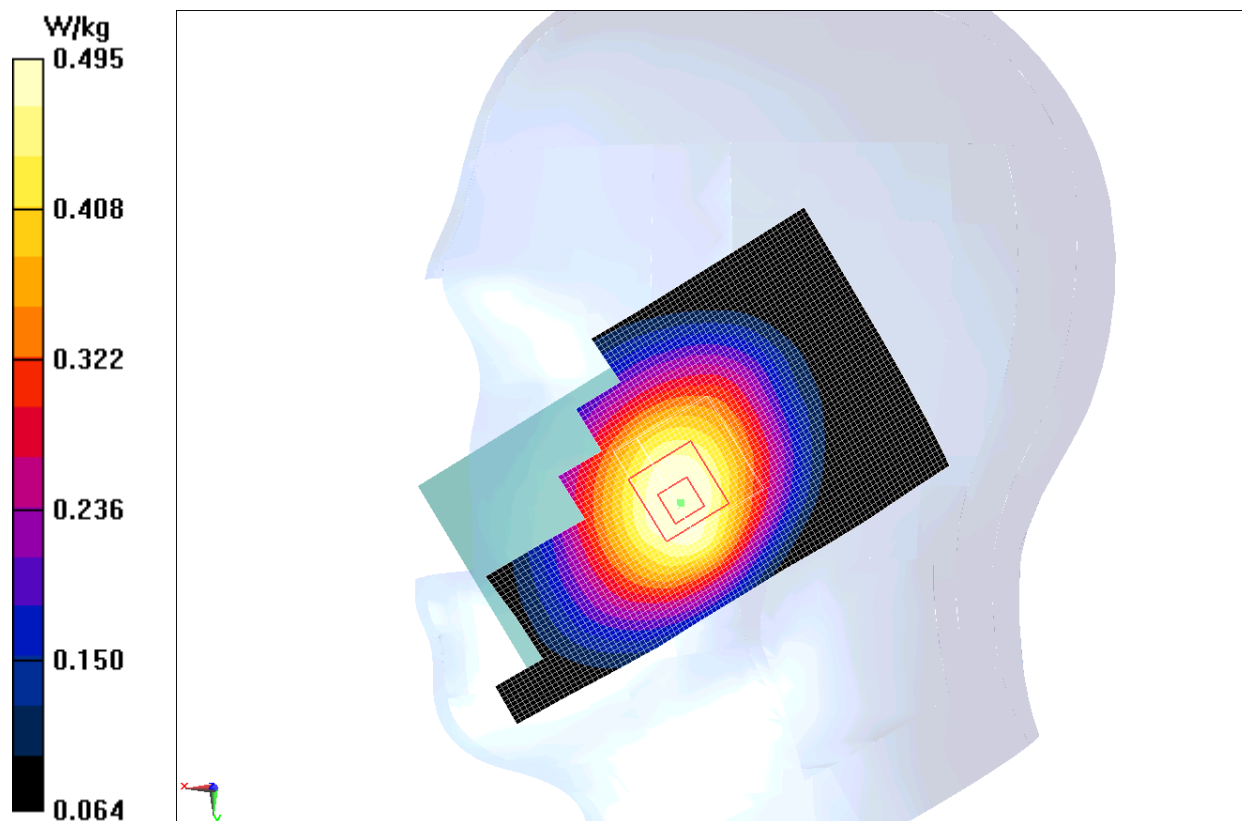
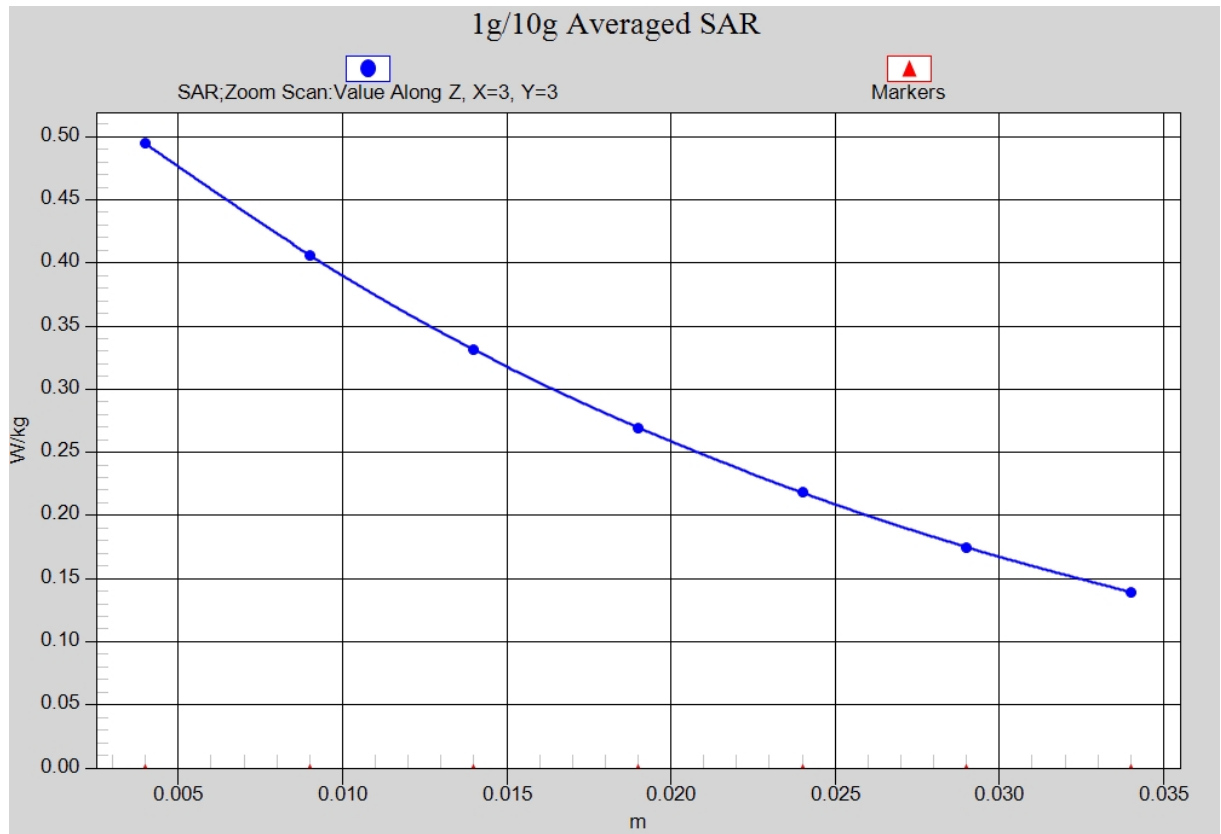


Fig.5 WCDMA 850 CH4132



**Fig. 5-1 Z-Scan at power reference point (WCDMA 850 CH4132)**

**WCDMA 850 Body Rear Low**

Date: 2013-11-1

Electronics: DAE4 Sn771

Medium: Body 850 MHz

Medium parameters used (interpolated):  $f = 826.4$  MHz;  $\sigma = 0.97$  mho/m;  $\epsilon_r = 56.446$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3°C      Liquid Temperature: 21.8°C

Communication System: WCDMA; Frequency: 826.4 MHz; Duty Cycle: 1:1

Probe: EX3DV4 - SN3846 ConvF(9.04, 9.04, 9.04)

**Rear Low/Area Scan (61x101x1):** Interpolated grid: dx=1.000 mm, dy=1.000 mm

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

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

Reference Value = 30.118 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 1.21 W/kg

**SAR(1 g) = 0.998 W/kg; SAR(10 g) = 0.768 W/kg**

Maximum value of SAR (measured) = 1.04 W/kg

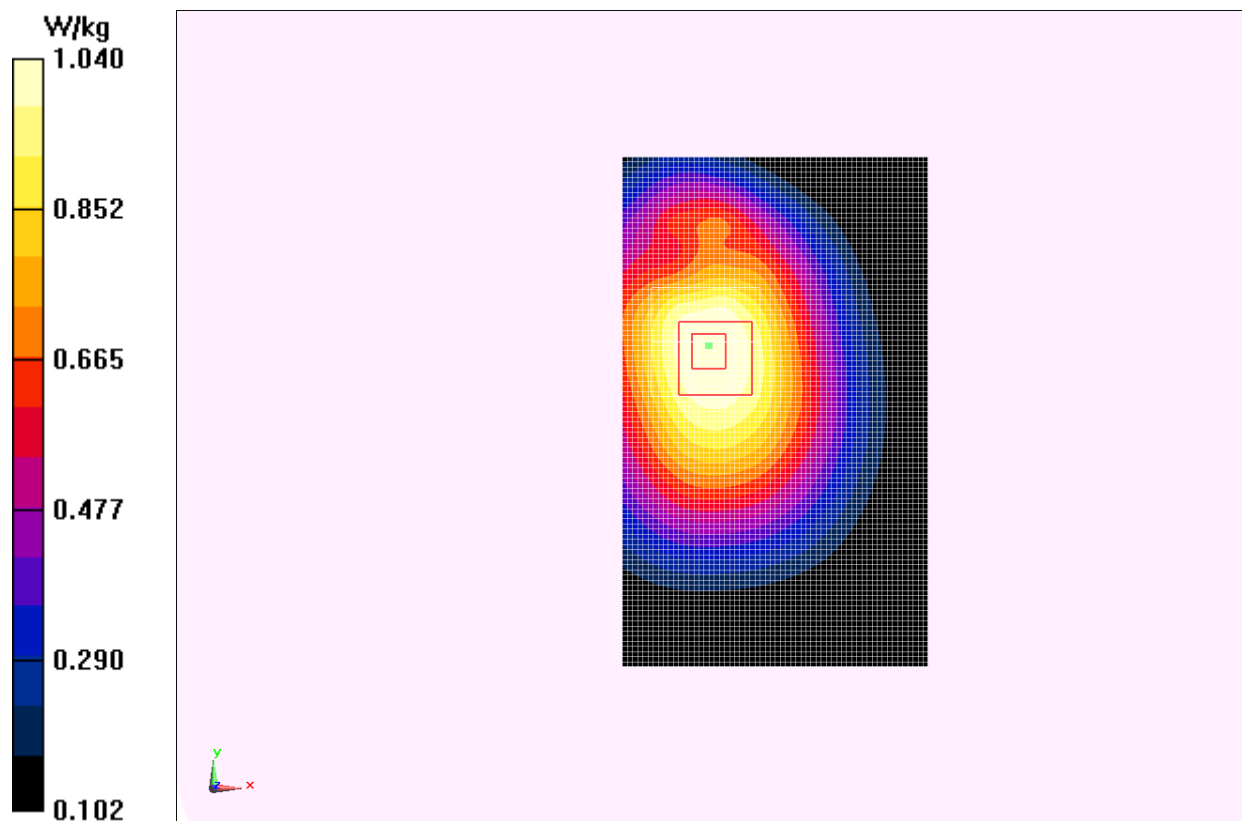


Fig.6 WCDMA 850 CH4132

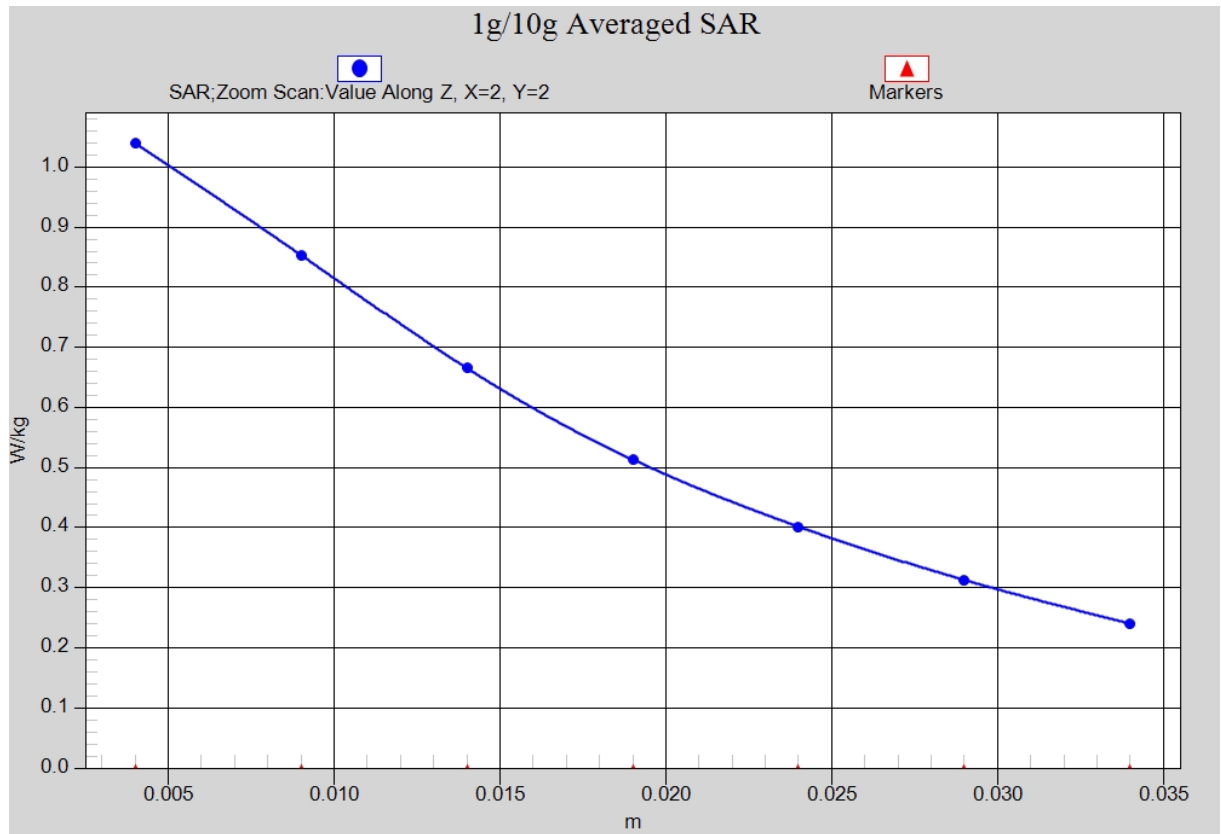


Fig. 6-1 Z-Scan at power reference point (WCDMA850 CH4132)

### WCDMA 1900 Left Cheek Low

Date: 2013-4-6

Electronics: DAE4 Sn771

Medium: Head 1900 MHz

Medium parameters used (interpolated):  $f = 1852.4$  MHz;  $\sigma = 1.348$  mho/m;  $\epsilon_r = 39.495$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.7°C      Liquid Temperature: 22.2°C

Communication System: WCDMA 1900 Frequency: 1852.4 MHz Duty Cycle: 1:1

Probe: ES3DV3 - SN3149 ConvF(5.19, 5.19, 5.19)

**Cheek Low/Area Scan (61x101x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.634 W/kg

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

Reference Value = 6.712 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 0.912 W/kg

**SAR(1 g) = 0.578 W/kg; SAR(10 g) = 0.354 W/kg**

Maximum value of SAR (measured) = 0.624 W/kg

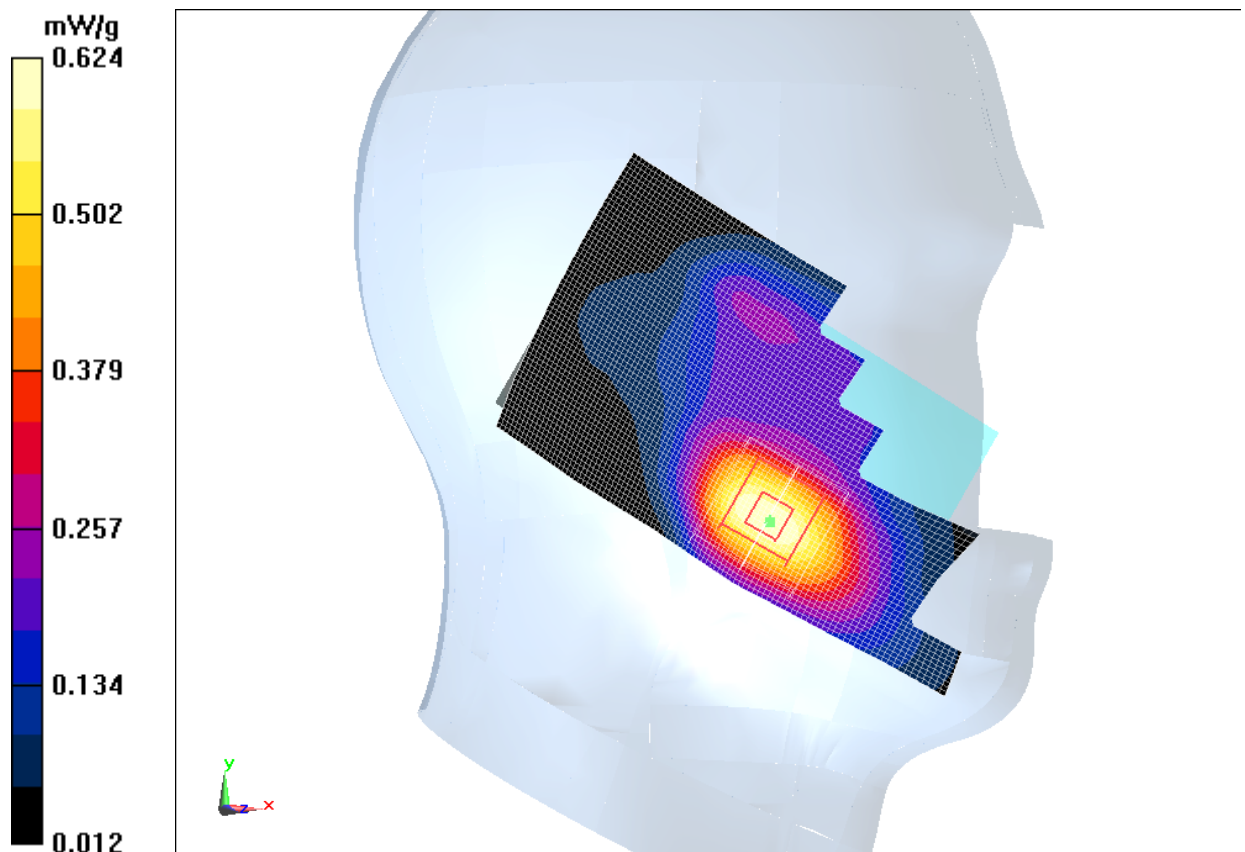


Fig.7 WCDMA1900 CH9262