TTI-P-G 158

Appendix for the Reports:

Dasy Test-Report, Siemens_6575_113a

Dasy Test-Report, Siemens_6575_113b

(Date: July 21, 2000)

Dosimetric Assessment of the Mobile Telephones Siemens S40 and S42 According to the American FCC Requirements

October 04, 2000

IMST GmbH
Carl-Friedrich-Gauß-Str. 2
D-47475 Kamp-Lintfort

customer
Siemens Mobile Phones A/S
Industrivej 30
DK-9490-Pandrup

1. Probe Data:

Schmid & Partner
Engineering AG

Staffelstrasse 8, 8045 Zurich, Switzerland, Telefon +41 1 280 08 60, Fax +41 1 280 08 64

Calibration Certificate

Dosimetric E-Field Probe

Type:	**ET3DV5**
Serial Number:	**1332**
Place of Calibration:	**Zurich**
Date of Calibration:	**December 18, 1999**
Calibration Interval:	**12 months**

Schmid & Partner Engineering AG hereby certifies, that this device has been calibrated on the date indicated above. The calibration was performed in accordance with specifications and procedures of Schmid & Partner Engineering AG.

Whereever applicable, the standards used in the calibration process are traceable to international standards. In all other cases the standards of the Laboratory for EMF and Microwave Electronics at the Swiss Federal Institute of Technology (ETH) in Zurich, Switzerland have been applied.

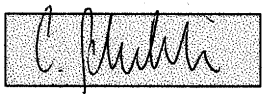
Calibrated by:	
Approved by:	

Figure 1: Probe Calibration Certificate

Schmid & Partner
Engineering AG

Staffelstrasse 8, 8045 Zurich, Switzerland, Telefon +41 1 280 08 60, Fax +41 1 280 08 64

Probe ET3DV5

SN:1332

Manufactured:	December 20, 1997
Last calibration:	January 12, 1999
Recalibrated:	December 18, 1999

Calibrated for System DASY2

Figure 2: Probe Data

ET3DV5 SN:1332

DASY2 - Parameters of Probe: ET3DV5 SN:1332

Sensitivity in Free Space

NormX	0.89 μV/(V/m)^2
NormY	0.82 μV/(V/m)^2
NormZ	0.87 μV/(V/m)^2

Diode Compression

DCP X	37500 μV
DCP Y	37500 μV
DCP Z	37500 μV

Sensitivity in Tissue Simulating Liquid

Brain **450 MHz** ε_r = 48 ± 5% σ = 0.50 ± 10% mho/m

ConvF X	5.08 extrapolated	Boundary effect:	
ConvF Y	5.08 extrapolated	Alpha	0.81
ConvF Z	5.08 extrapolated	Depth	1.38

Brain **900 MHz** ε_r = 42.5 ± 5% σ = 0.86 ± 10% mho/m

ConvF X	4.78 ± 7% (k=2)	Boundary effect:	
ConvF Y	4.78 ± 7% (k=2)	Alpha	0.77
ConvF Z	4.78 ± 7% (k=2)	Depth	1.62

Brain **1500 MHz** ε_r = 41 ± 5% σ = 1.32 ± 10% mho/m

ConvF X	4.39 interpolated	Boundary effect:	
ConvF Y	4.39 interpolated	Alpha	0.71
ConvF Z	4.39 interpolated	Depth	1.93

Brain **1800 MHz** ε_r = 41 ± 5% σ = 1.69 ± 10% mho/m

ConvF X	4.19 ± 7% (k=2)	Boundary effect:	
ConvF Y	4.19 ± 7% (k=2)	Alpha	0.68
ConvF Z	4.19 ± 7% (k=2)	Depth	2.08

Sensor Offset

Probe Tip to Sensor Center	2.7	mm
Optical Surface Detection	1.9 ± 0.2	mm

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Figure 3: Probe Parameters

2. Dipole Data:

Schmid & Partner
Engineering AG

Staffelstrasse 8, 8045 Zurich, Switzerland, Telefon +41 1 280 08 60, Fax +41 1 280 08 64

Calibration Certificate

1800 MHz System Validation Dipole

Type:	**D1800V2**
Serial Number:	**206**
Place of Calibration:	**Zurich**
Date of Calibration:	**December 23, 1999**
Calibration Interval:	**24 months**

Schmid & Partner Engineering AG hereby certifies, that this device has been calibrated on the date indicated above. The calibration was performed in accordance with specifications and procedures of Schmid & Partner Engineering AG.

Whereever applicable, the standards used in the calibration process are traceable to international standards. In all other cases the standards of the Laboratory for EMF and Microwave Electronics at the Swiss Federal Institute of Technology (ETH) in Zurich, Switzerland have been applied.

Calibrated by:	C. Bürkli
Approved by:	Thomas Schmid

Figure 4: Dipole Calibration Certificate

1. Measurement Conditions

The measurements were performed in the flat section of the new generic twin phantom (shell thickness 2mm) filled with brain simulating sugar solution of the following electrical parameters at 1800 MHz:

Relative Dielectricity	**39.5**	± 5%
Conductivity	**1.70 mho/m**	± 10%

The DASY3 System (Software version 3.0b) with a dosimetric E-field probe ET3DV4 (SN:1302, conversion factor 4.6) was used for the measurements.

The dipole feedpoint was positioned below the centre marking and oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 10mm from dipole centre to the solution surface. The included distance holder was used during measurements for accurate distance positioning.

The coarse grid with a grid spacing of 15mm was aligned with the dipole. The 5x5x7 fine cube was chosen for cube integration. Probe isotropy errors were cancelled by measuring the SAR with normal and 90° turned probe orientations and averaging. The dipole input power (forward power) was 250mW ± 3 %. The results are normalised to 1W input power.

2. SAR Measurement

Standard SAR-measurements were performed with the head phantom according to the measurement conditions described in section 1. The results (see figure) have been normalised to a dipole input power of 1W (forward power). The resulting averaged SAR-values are:

averaged over 1 cm^3 (1 g) of tissue:	**39.3 mW/g**
averaged over 10 cm^3 (10 g) of tissue:	**19.9 mW/g**

Note: If the liquid parameters for validation are slightly different from the ones used for initial calibration, the SAR-values will be different as well. The estimated sensitivities of SAR-values and penetration depths to the liquid parameters are listed in the DASY Application Note 4: 'SAR Sensitivities'.

Figure 5: Dipole Parameters

3. Dipole Impedanc and return loss

The impedance was measured at the SMA-connector with a network analyser and numerically transformed to the dipole feedpoint. The transformation parameters from the SMA-connector to the dipole feedpoint are:

Electrical delay:	**1.247 ns**	(one direction)
Transmission factor:	**0.986**	(voltage transmission, one direction)

The dipole was positioned at the flat phantom sections according to section 1 and the distance holder was in place during impedance measurements.

Feedpoint impedance at 1800 MHz:	Re{Z} = **48.5 Ω**
	Im {Z} = **-1.2 Ω**
Return Loss at 1800 MHz	**- 34.1 dB**

4. Handling

The dipole is made of standard semirigid coaxial cable. The centre conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.

Do not apply excessive force to the dipole arms, because they might bend. If the dipole arms have to be bent back, take care to release stress to the soldered connections near the feedpoint; they might come off.

After prolonged use with 40W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

Figure 6: Dipole Parameters

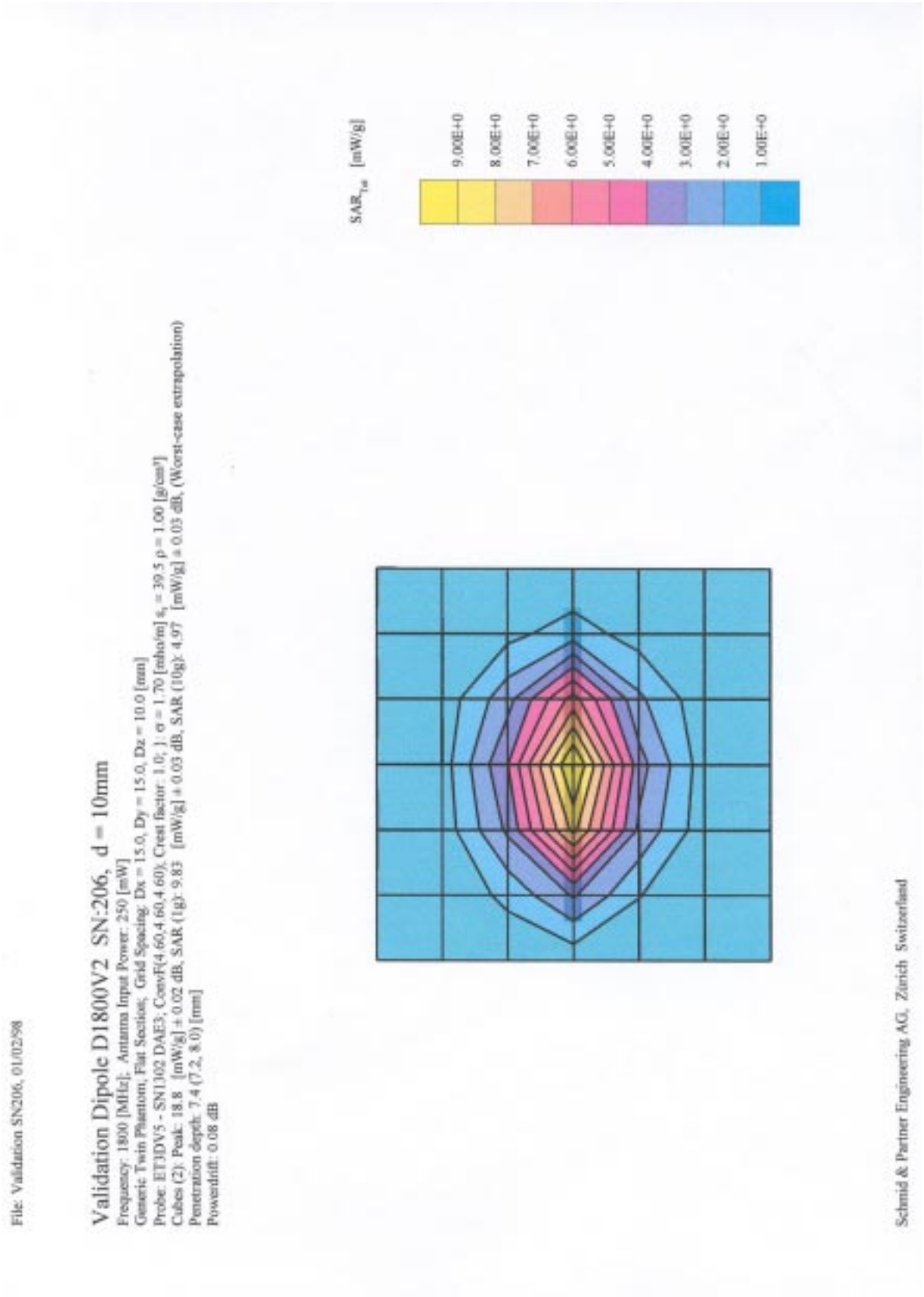

Figure 7: Dipole Parameters

3. Validation Measurement

DASY-Validation

Department Antennen/EMVU

Performed by: G. Henne

Signature:

Date: 19.07.2000

Institut für Mobil- und Satellitenfunktechnik
Carl-Friedrich-Gauß-Straße 2
47475 Kamp-Lintfort

Frequency	○ 900 MHz	☒ 1800 MHz	
Phantom	☒ Generic Twin (flat section)		
Validation Dipole			
Type	○ Schmid & P.: D900V2 #006	☒ Schmid & P.: D1800V2 #206	
Distance	○ 15 mm to surface	☒ 10 mm to surface	
Orientation	☒ parallel to body axis (long side of the phantom)		
Probe			
Dosimetric Probe	○ ET3DV4 #1114	☒ ET3DV5 #1332	
Software: Convf-coefficient		○ 4, 78	☒ 4, 19
Software: Sensor Offset.		☒ 4,6 mm	○
Brain simulating tissue			
Target 900	ε_r = 42,5	σ = 0,86 S/m	f = 900 MHz
Target 1800	ε_r = 41	σ = 1,69 S/m	f = 1800 MHz
Measured	ε_r = 37,9 ± 6,2	σ = 1,7 ± 0,25 S/m	f = 1800 MHz
Measurement			
Power	○ 250 mW	☒ 510,6 mW	
Powermeter	☒ Gigatronics 8541B	○	
Power Sensor	☒ Gigatronics 80401A	○	
Attenuation	○ 10 dB PE7005-10	☒ 11,64 dB	
Coarse Grid	☒ grid spacing : 1,5 cm		
Cube	○ cube 4x4x7	☒ cube 5x5x7	

SAR-values	(1g)	(10g)
Target 900 MHz (P=1W, ε_r=42.3, σ =0.85 S/m, ρ=1.0 g/cm^3)	9.32 W/kg	6.08 W/kg
Target 1800 MHz (P=1W, ε_r=39.5, σ =1.7 S/m, ρ=1.0 g/cm^3)	39.3 W/kg	19.9 W/kg

SAR measured(1g), ρ=1.04 g/cm^3	19,0 W/kg	Target:	19,7 W/kg
SAR measured (10g), ρ=1.04 g/cm^3	9,66 W/kg	Target:	9,94 W/kg
Data file	cal_1800_c190700.mea		
Remark			

Figure 8: Validation Data

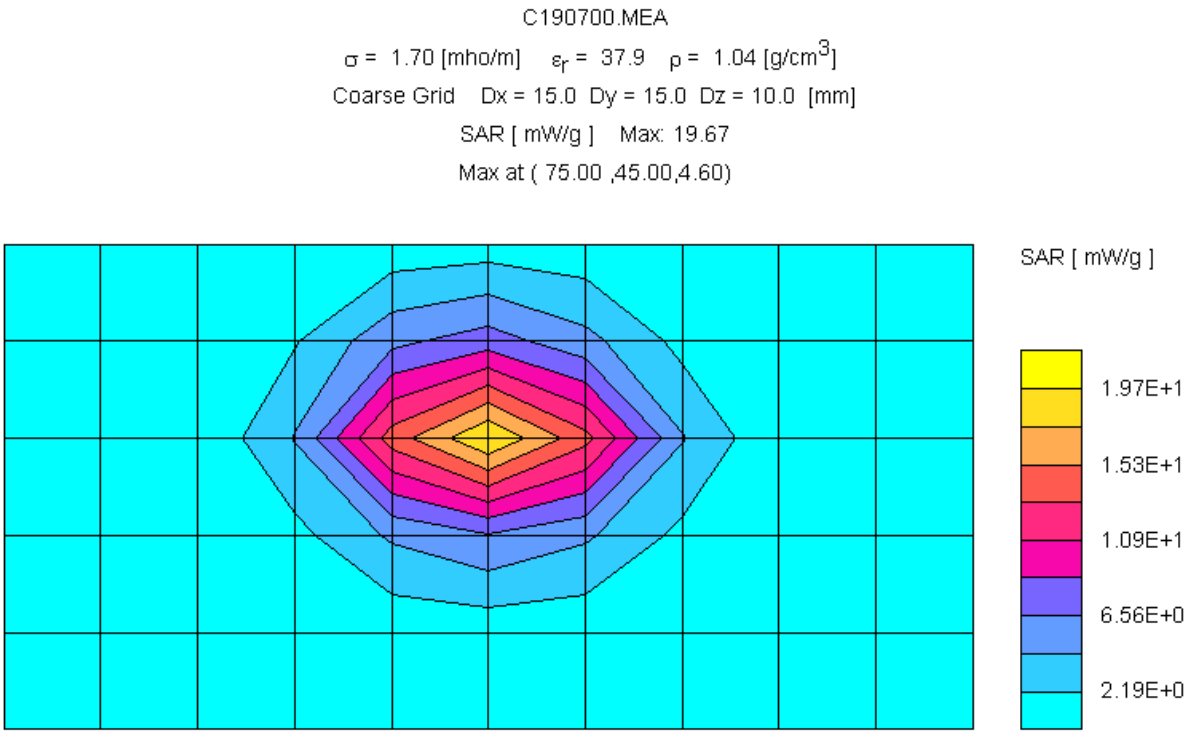

Figure 9: Validation Results (Coarse Grid)

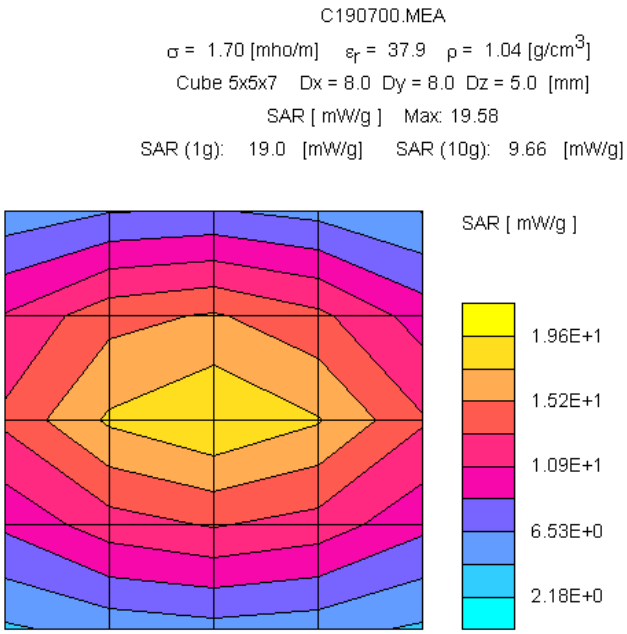

Figure 10: Validation Results (Cube)

4. Distribution plot S40:

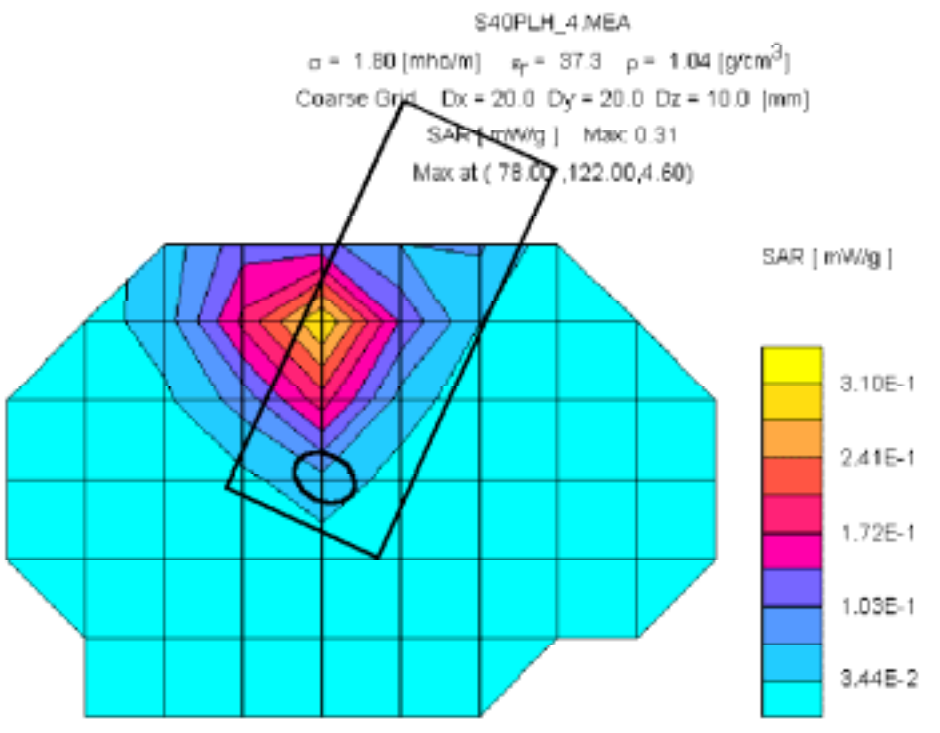

Figure 11: SAR distribution plot with maximum local SAR value for PCS 1900 (Siemens S40, channel 0810, left hand position).

5. Distribution plot S42:

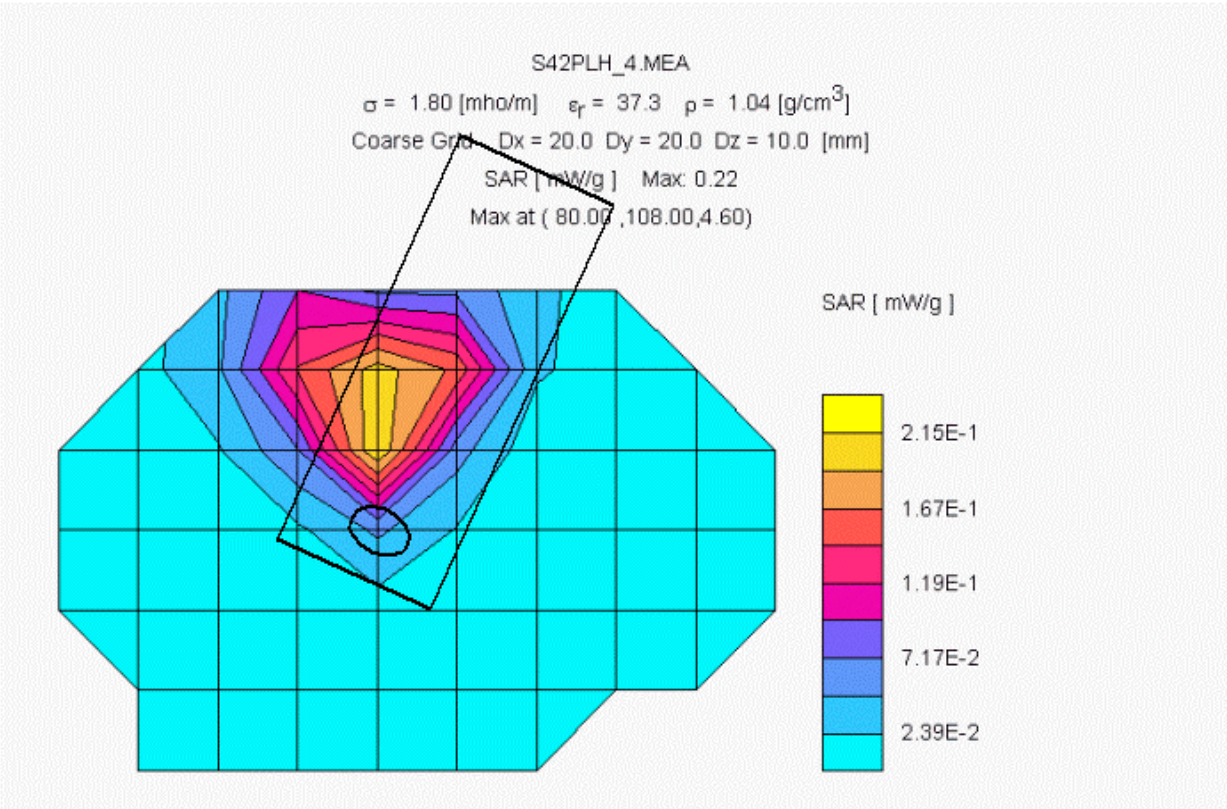

Figure 12: SAR distribution plot with maximum local SAR value for PCS 1900 (Siemens S42, channel 0810, left hand position).

prepared by: .....

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