



RE052-12-106218-5/A Ed. 0

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| <p>SAR TEST REPORT</p> <p>According to the standard: EN 62209-1: 2006</p> <p>Equipment under test: Antenna patch for mobile phone FAZUP <i>Tested with a SAMSUNG GT-S5830</i></p> <p>Company: -</p> |
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EQUIPMENT UNDER TEST: Antenna patch for mobile phone

Reference 1: FAZUP (antenna patch)
Serial number: -

Reference 2: SAMSUNG GT-S5830 *GALAXY ACE* (mobile phone)
Serial number: RD3B621091J IMEI 357655041957747

MANUFACTURER: -

APPLICANT:

Company: -

Address: Mr. Antoine SAMAKH and Mr. Mathieu SAMAKH

FRANCE

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(*November 12 and 16, 2012*)

DATE(S) OF TEST(S): November 12, 16 and 22, 2012

TEST SITE: EMITECH laboratory at Le Mans (72) - FRANCE

TEST(S) OPERATOR(S): Emmanuel TOUTAIN

SUMMARY

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1. INTRODUCTION

In this test report, Specific Absorption Rate (SAR) measurements for the mobile phone SAMSUNG GT-S5830 used with the antenna patch FAZUP are presented.

The measurements were made according to the EN 62209-1 standard for evaluating the SAR level attenuation provided by the patch.

Full SAR testing according to the EN 62209-1 standard is not required by the applicant; the testing program is described in §7. MEASUREMENT RESULTS.

2. REFERENCE DOCUMENTS

The reference documents referred throughout this report are listed below.

These reference documents are applicable to the entire report, although extensions (version, date and amendment) are not repeated.

| Reference | Document title | Date |
|-------------|---|------|
| EN 62209-1 | Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Human models, instrumentation, and procedures Part 1: Procedure to determine the specific absorption rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz) (IEC 62209-1:2005). | 2006 |
| IEC 62209-1 | Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Human models, instrumentation, and procedures Part 1: Procedure to determine the specific absorption rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz). | 2005 |

3. PRESENTATION OF EQUIPMENT FOR TESTING PURPOSES

The photographs of the mobile phone SAMSUNG GT-S5830 and the antenna patch FAZUP are shown in Fig. 1.

The standard used by the mobile phone for this test is the GSM in the 900MHz and 1800MHz frequency band, the antenna is integrated.

The antenna patch FAZUP was placed on the rear side of the mobile phone by the applicant.



FAZUP (antenna patch)



SAMSUNG GT-S5830
(mobile phone)



SAMSUNG GT-S5830 and FAZUP



Mobile phone marking

Fig. 1: Photographs of equipment under test

4. TESTS RESULTS SUMMARY

| Configuration | SAR level attenuation | |
|--------------------------|------------------------------------|--------------------------------------|
| | GSM900 Channel 038 897.6 MHz | GSM1800 Channel 699 1747.6 MHz |
| SAMSUNG GT-S5830 + FAZUP | 84.10% | 91.63% |

This test report only relates to SAR measurements; radiated performances evaluation of the mobile phone with and without the protective device is not part of this report.

5. ENVIRONNEMENTAL CONDITIONS

| Condition | Measured Value |
|---------------------|--------------------------------------|
| Liquid Temperature | <i>See Graphical Representations</i> |
| Ambient Temperature | <i>See Graphical Representations</i> |

6. EQUIPMENT USED FOR THE TESTING

| Platform ID | Platform | Equipment | Type | Manufacturer | Internal Number | Software Version |
|-------------|-------------------|--------------------------|-------------------|-----------------------|-----------------|------------------|
| 1 | BTS Simulator | CMU200 | Radio tester | Rohde-Schwarz | 7361 | |
| | | 922 | Thermometer | Testo | 6980 | |
| 2 | DASY4 | DASY4 | Software | Speag | 7321 | V4.5 Build 19 |
| | | ES3DV3 | E-Field Probe | Speag | 9485 | |
| | | DAE3 | Data acquisition | Speag | 7192 | |
| | | D900V2 | Dipole 900MHz | Speag | 7194 | |
| | | D1800V2 | Dipole 1800MHz | Speag | 7193 | |
| | | SAM | Phantom | Speag | 7204 | |
| 3 | Liquid Measure | HP85070C | Software | Hewlett-Packard | - | C1.01 |
| | | HP8753D | Network analyzer | Hewlett-Packard | 7216 | |
| | | HP85070C | Dielectric probe | Hewlett-Packard | 7218 | |
| 4 | System Validation | 2024 | Signal generator | Marconi | 7215 | |
| | | ZHL42 | Amplifier | Mini-circuits | 7209 | |
| | | PMC18-2 | Power Supply | Kikusui | 7214 | |
| | | NRVS | Power meter | Rohde-Schwarz | 7212 | |
| | | NRV-Z31 | Probe power meter | Rohde-Schwarz | 7211 | |
| | | 3877 | Coupler | Suhner | 7208 | |
| | | RK100 | Coupler | MEB | 7210 | |
| | | 33-3-34 | Attenuator | Weinschel Engineering | 7213 | |
| | | R411810124 R411806124 | Attenuator | Radiall | 7315 | |
| 909A | 50 ohms load | HP | 7314 | | | |
| R404563000 | 50 ohms load | Radiall | 7313 | | | |

7. MEASUREMENT RESULTS

The output power and frequency are controlled using a base station simulator. The mobile phone is set to transmit at its highest output peak power level.

The mobile phone is test in the “cheek” position on right side of the phantom at the centre frequency of GSM900 and GSM1800 operating band with and without FAZUP.

Measurement results for GSM900 (SAR values averaged over a mass of 10g):

| Configuration | Phantom | Position | SAR 10g (W/kg) |
|----------------------------|------------|----------|--------------------------|
| | | | Channel 038 897.6 MHz |
| Mobile phone without FAZUP | Right Side | Cheek | 0.378 |
| Mobile phone with FAZUP | Right Side | Cheek | 0.0601 |

Measurement results for GSM1800 (SAR values averaged over a mass of 10g):

| Configuration | Phantom | Position | SAR 10g (W/kg) |
|----------------------------|------------|----------|---------------------------|
| | | | Channel 699 1747.6 MHz |
| Mobile phone without FAZUP | Right Side | Cheek | 0.416 |
| Mobile phone with FAZUP | Right Side | Cheek | 0.0348 |

8. GRAPHICAL REPRESENTATIONS OF THE COARSE SCAN

The graphical representations of the coarse scan are shown in Fig. 2 to Fig. 5.

DUT: SAMSUNG GT-S5830

Communication System: E-GSM 900; Frequency: 897.6 MHz; Duty Cycle: 1:8.3

Medium parameters used: $\sigma = 0.95$ mho/m, $\epsilon_r = 40.7$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Program Notes: Ambient temperature: 22.6°C, Liquid temperature: 20.9°C

DASY4 Configuration:

- Probe: ES3DV3 - SN3303; ConvF(5.97, 5.97, 5.97); Calibrated: 7/17/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn402; Calibrated: 3/9/2012
- Phantom: SAM 12; Type: QD; Serial: TP-1111
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Cheek Position - Middle/Area Scan (51x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.556 mW/g

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

Reference Value = 9.63 V/m; Power Drift = -0.171 dB

Peak SAR (extrapolated) = 0.744 W/kg

SAR(1 g) = 0.523 mW/g; SAR(10 g) = 0.378 mW/g

Maximum value of SAR (measured) = 0.555 mW/g

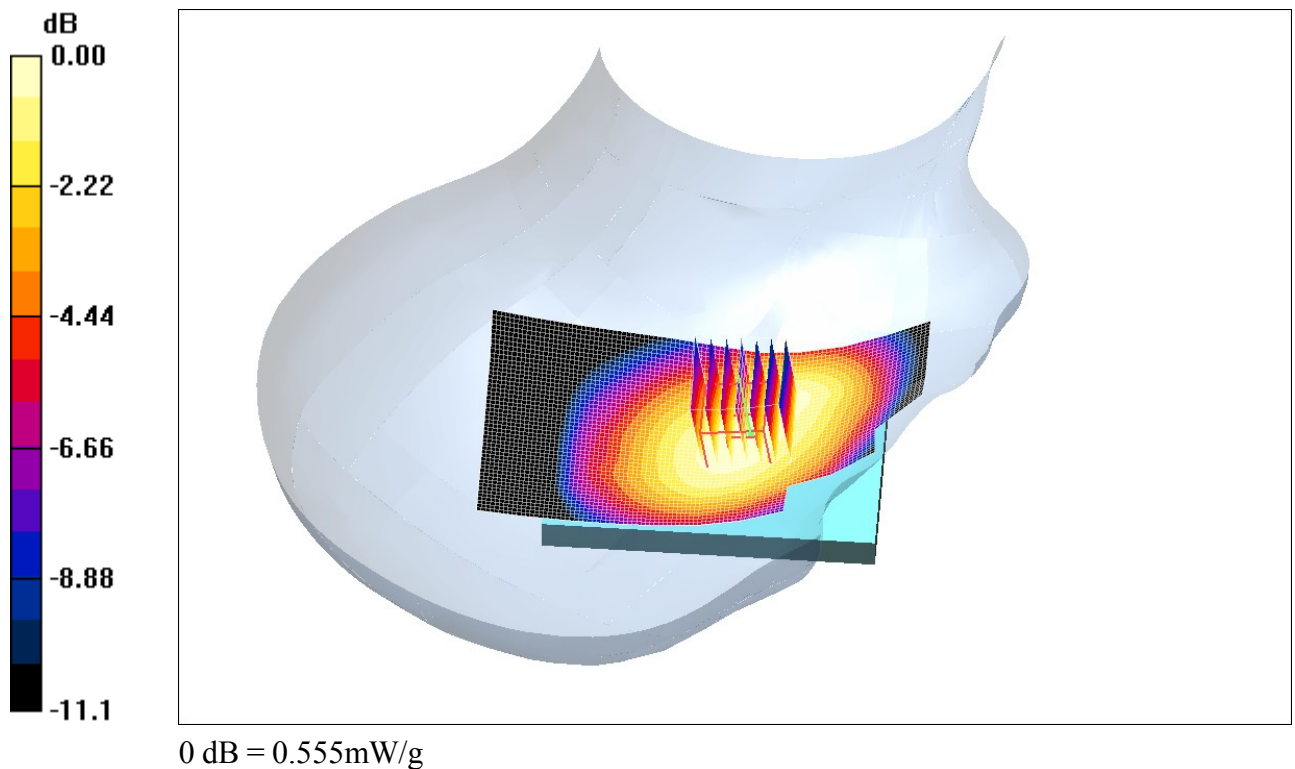


Fig. 2: SAR distribution for GSM900 of the mobile phone alone: channel 38 (897.6 MHz), cheek position, right side

DUT: SAMSUNG GT-S5830 + FAZUP

Communication System: E-GSM 900; Frequency: 897.6 MHz; Duty Cycle: 1:8.3

Medium parameters used: $\sigma = 0.93$ mho/m, $\epsilon_r = 39.8$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Program Notes: Ambient temperature: 20.6°C, Liquid temperature: 19.9°C

DASY4 Configuration:

- Probe: ES3DV3 - SN3303; ConvF(5.97, 5.97, 5.97); Calibrated: 7/17/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn402; Calibrated: 3/9/2012
- Phantom: SAM 12; Type: QD; Serial: TP-1111
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Cheek Position - Middle/Area Scan (51x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.113 mW/g

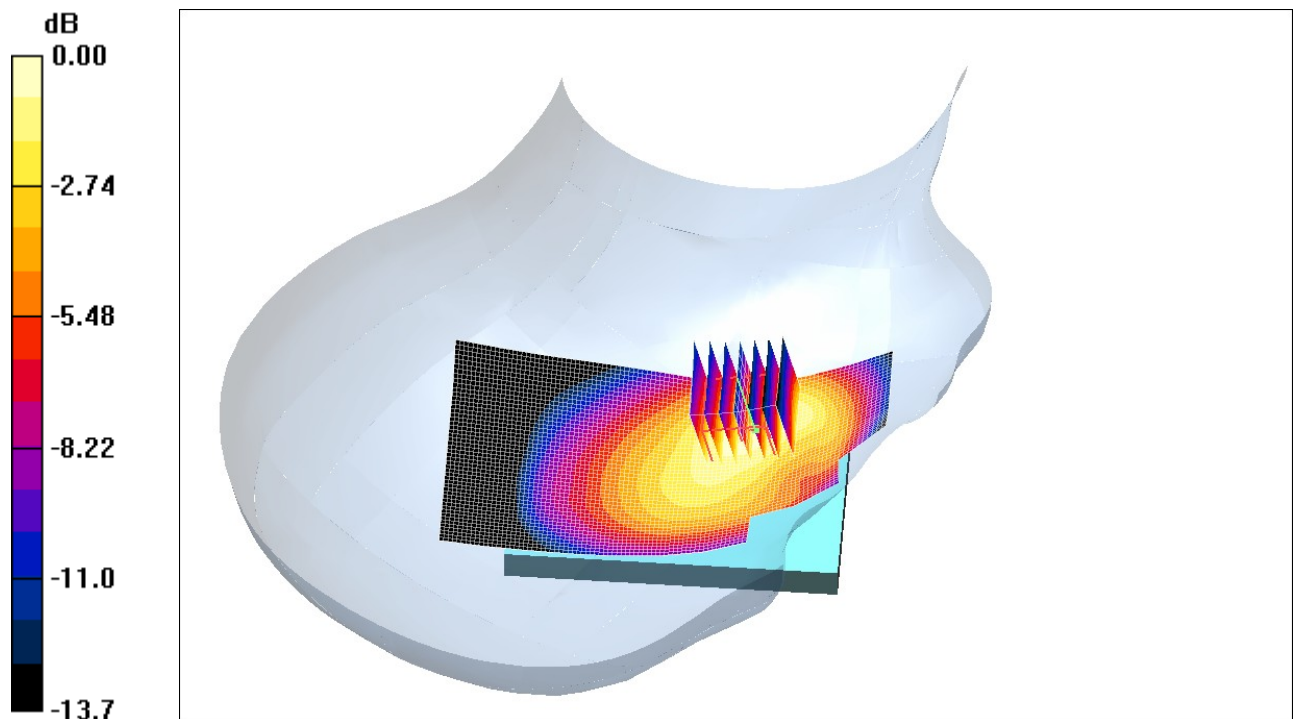
Cheek Position - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 3.37 V/m; Power Drift = 0.035 dB

Peak SAR (extrapolated) = 0.163 W/kg

SAR(1 g) = 0.100 mW/g; SAR(10 g) = 0.060 mW/g

Maximum value of SAR (measured) = 0.110 mW/g



0 dB = 0.110mW/g

Fig. 3: SAR distribution for GSM900 of the mobile phone with FAZUP: channel 38 (897.6 MHz), cheek position, right side

DUT: SAMSUNG GT-S5830

Communication System: GSM 1800; Frequency: 1747.6 MHz; Duty Cycle: 1:8.3
 Medium parameters used: $\sigma = 1.36 \text{ mho/m}$, $\epsilon_r = 38.3$; $\rho = 1000 \text{ kg/m}^3$
 Phantom section: Right Section

Program Notes: Ambient temperature: 20.7°C, Liquid temperature: 19.5°C

DASY4 Configuration:

- Probe: ES3DV3 - SN3303; ConvF(5.22, 5.22, 5.22); Calibrated: 7/17/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn402; Calibrated: 3/9/2012
- Phantom: SAM 12; Type: QD; Serial: TP-1111
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Cheek Position - Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
 Maximum value of SAR (interpolated) = 0.859 mW/g

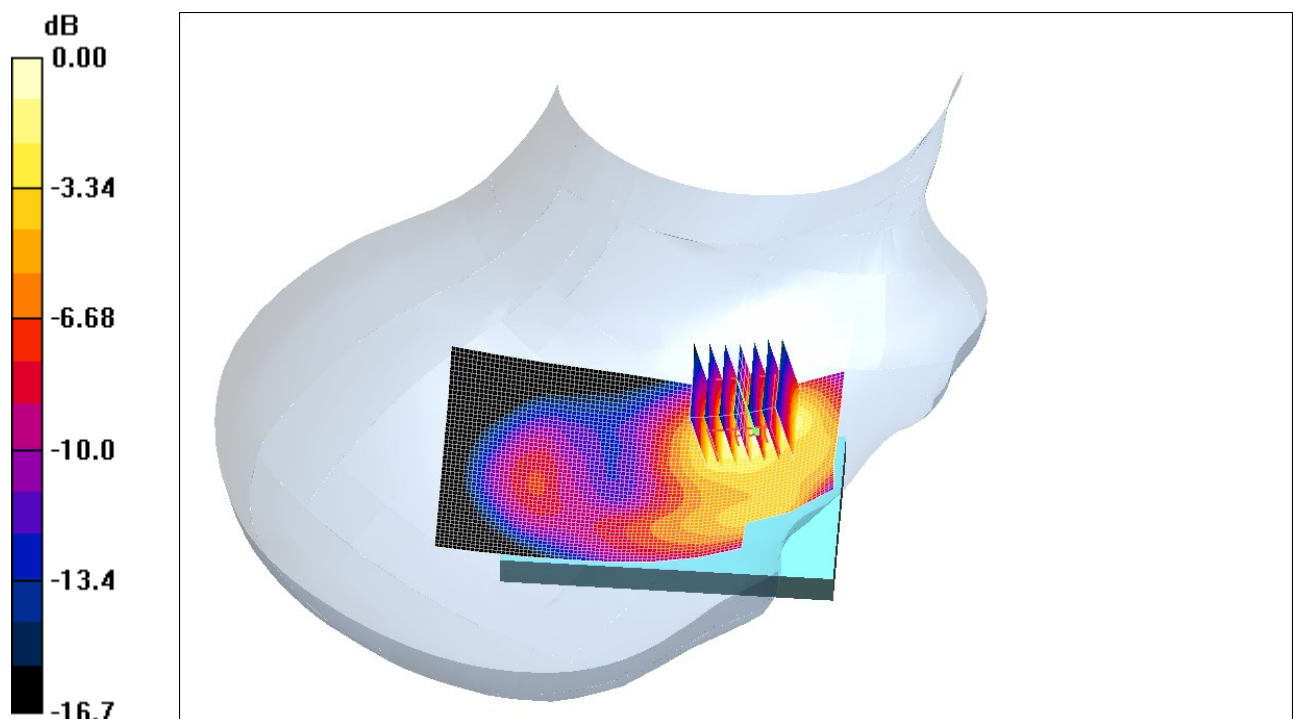
Cheek Position - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 10.6 V/m; Power Drift = 0.052 dB

Peak SAR (extrapolated) = 1.25 W/kg

SAR(1 g) = 0.772 mW/g; SAR(10 g) = 0.416 mW/g

Maximum value of SAR (measured) = 0.867 mW/g



0 dB = 0.867mW/g

Fig. 4: SAR distribution for GSM1800 of the mobile phone alone:
 channel 699 (1747.6MHz), cheek position, right side

DUT: SAMSUNG GT-S5830 + FAZUP

Communication System: GSM 1800; Frequency: 1747.6 MHz; Duty Cycle: 1:8.3

Medium parameters used: $\sigma = 1.36$ mho/m, $\epsilon_r = 38.3$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Program Notes: Ambient temperature: 21.0°C, Liquid temperature: 19.8°C

DASY4 Configuration:

- Probe: ES3DV3 - SN3303; ConvF(5.22, 5.22, 5.22); Calibrated: 7/17/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn402; Calibrated: 3/9/2012
- Phantom: SAM 12; Type: QD; Serial: TP-1111
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Cheek Position - Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.061 mW/g

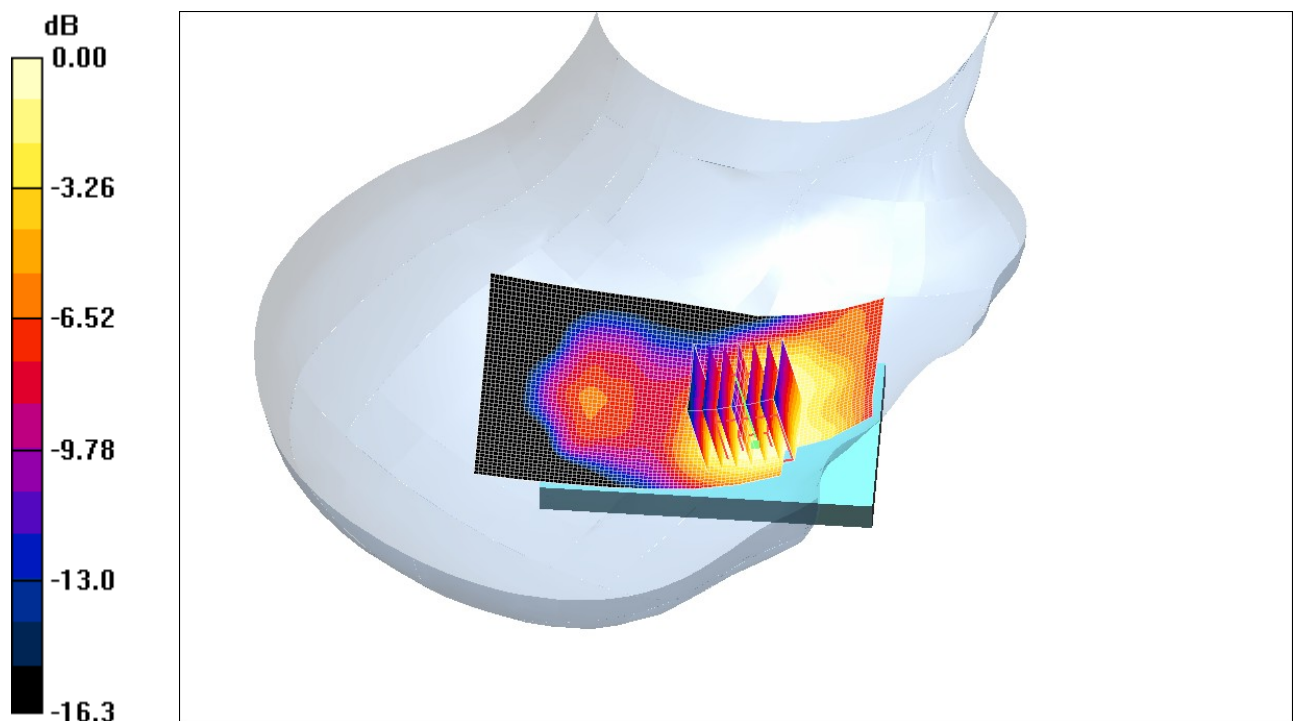
Cheek Position - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 2.83 V/m; Power Drift = 0.131 dB

Peak SAR (extrapolated) = 0.078 W/kg

SAR(1 g) = 0.055 mW/g; SAR(10 g) = 0.035 mW/g

Maximum value of SAR (measured) = 0.060 mW/g



0 dB = 0.060mW/g

Fig. 5: SAR distribution for GSM1800 of the mobile phone with FAZUP: channel 699 (1747.6MHz), cheek position, right side

9. PHOTOGRAPH OF THE MOBILE PHONE UNDER TEST

The photograph of the mobile phone under test is shown in Fig. 6.



Fig. 6: Mobile phone in cheek position on right side

10. MEASUREMENT UNCERTAINTY

The expanded uncertainty with a confidence interval of 95 % shall not exceed 30 % for averaged SAR values in the range from 0.4 to 10 W/kg.

The uncertainty of the measurements was evaluated according to the EN 62209-1 and determined by Schmid & Partner Engineering AG. The expanded uncertainty is $\pm 21.4\%$.

| ERROR SOURCES | Uncertainty Value (%) | Probability Distribution | Divisor | Ci | Standard Uncertainty (%) |
|--|-----------------------|--------------------------|------------|------|--------------------------|
| Measurement System | | | | | |
| Probe Calibration | ± 5.9 | Normal | 1 | 1 | ± 5.9 |
| Axial Isotropy | ± 4.7 | Rectangular | $\sqrt{3}$ | 0.7 | ± 1.9 |
| Hemispherical Isotropy | ± 9.6 | Rectangular | $\sqrt{3}$ | 0.7 | ± 3.9 |
| Boundary Effect | ± 1.0 | Rectangular | $\sqrt{3}$ | 1 | ± 0.6 |
| Linearity | ± 4.7 | Rectangular | $\sqrt{3}$ | 1 | ± 2.7 |
| Detection Limits | ± 1.0 | Rectangular | $\sqrt{3}$ | 1 | ± 0.6 |
| Readout Electronics | ± 0.3 | Normal | 1 | 1 | ± 0.3 |
| Response Time | ± 0.8 | Rectangular | $\sqrt{3}$ | 1 | ± 0.5 |
| Integration Time | ± 2.6 | Rectangular | $\sqrt{3}$ | 1 | ± 1.5 |
| RF Ambient Conditions-Noise | ± 3.0 | Rectangular | $\sqrt{3}$ | 1 | ± 1.7 |
| RF Ambient Conditions-Reflections | ± 3.0 | Rectangular | $\sqrt{3}$ | 1 | ± 1.7 |
| Probe Positioner Mechanical Restrictions | ± 0.4 | Rectangular | $\sqrt{3}$ | 1 | ± 0.2 |
| Probe Positioning with respect to Phantom Shell | ± 2.9 | Rectangular | $\sqrt{3}$ | 1 | ± 1.7 |
| Post-Processing | ± 1.0 | Rectangular | $\sqrt{3}$ | 1 | ± 0.6 |
| Test Sample Related | | | | | |
| Test Sample Positioning | ± 2.9 | Normal | 1 | 1 | ± 2.9 |
| Device Holder Uncertainty | ± 3.6 | Normal | 1 | 1 | ± 3.6 |
| Drift of Output Power | ± 5.0 | Rectangular | $\sqrt{3}$ | 1 | ± 2.9 |
| Phantom and Set-Up | | | | | |
| Phantom Uncertainty (shape and thickness tolerances) | ± 4.0 | Rectangular | $\sqrt{3}$ | 1 | ± 2.3 |
| Liquid Conductivity (Target) | ± 5.0 | Rectangular | $\sqrt{3}$ | 0.43 | ± 1.2 |
| Liquid Conductivity (Measurement) | ± 2.5 | Normal | 1 | 0.43 | ± 1.1 |
| Liquid Permittivity (Target) | ± 5.0 | Rectangular | $\sqrt{3}$ | 0.49 | ± 1.4 |
| Liquid Permittivity (Measurement) | ± 2.5 | Normal | 1 | 0.49 | ± 1.2 |
| Combined standard uncertainty | | | | | ± 10.7 |
| Expanded uncertainty (confidence interval of 95%) | | | | | ± 21.4 |

11. SPATIAL PEAK SAR EVALUATION

From Schmid & Partner Engineering AG, [DASY4 Manual, March 2003, Application Note: Spatial Peak SAR Evaluation].

Spatial Peak SAR

The DASY4 software includes all numerical procedures necessary to evaluate the spatial peak SAR values.

The spatial-peak SAR can be computed over any required mass.

The base for the evaluation is a “cube” measurement in a volume of 30mm³ (7x7x7 points). The measured volume includes the 1g and 10g cubes with the highest averaged SAR values. For that purpose, the center of the measured volume is aligned to the interpolated peak SAR value of a previously performed area scan. The entire evaluation of the spatial peak values is performed within the post-processing engine (SEMCAD). The system always gives the maximum values for the 1g and 10g cubes. The algorithm to find the cube with highest averaged SAR is divided into the following stages:

1. Extraction of the measured data (grid and values) from the Zoom Scan,
2. Calculation of the SAR value at every measurement point based on all stored data (A/D values and measurement parameters),
3. Generation of a high-resolution mesh within the measured volume,
4. Interpolation of all measured values from the measurement grid to the high-resolution grid,
5. Extrapolation of the entire 3-D field distribution to the phantom surface over the distance from sensor to surface,
6. Calculation of the averaged SAR within masses of 1g and 10g.

Interpolation, Extrapolation and Detection of Maxima

The probe is calibrated at the center of the dipole sensors which is located at 2.7mm away from the probe tip. During measurements, the dipole sensors are 4mm above the phantom surface. Both distances are included as parameters in the probe configuration file. The software always knows exactly how far away the measured point is from the surface. As the probe cannot directly measure at the surface, the values between the deepest measured point and the surface must be extrapolated.

The interpolation, extrapolation and maximum search routines are all based on the modified Quadratic Shepard’s method [Robert J. Renka, “Multivariate Interpolation Of Large Sets Of Scattered Data”, University of North Texas ACM Transactions on Mathematical Software, vol. 14, no. 2, June 1988, pp. 139-148.].

Averaging and Determination of Spatial Peak SAR

The interpolated data is used to average the SAR over the 1g and 10g cubes by spatially discretizing the entire measured volume. The resolution of this spatial grid used to calculate the averaged SAR is 1mm or about 42875 interpolated points. The resulting volumes are defined as cubical volumes containing the appropriate tissue parameters that are centered at the location. The location is defined as the center of the incremental volume (voxel).

12. TEST CONDITIONS

The equipment is controlled during test using platform n° 1 (BTS simulator) referenced in paragraph 6 of this test report. The following test conditions are given for information; the maximum output powers were not measured.

| | |
|-----------------------|---|
| Standard: | GSM (900 & 1800 MHz) |
| Crest factor: | 8 |
| Modulation: | GMSK |
| Traffic Channel: | GSM 900: middle channel = 38 GSM 1800: middle channel = 699 |
| Maximum output power: | GSM 900 Class 4: Tx level 5 = 33 dBm (\pm 2dB) GSM 1800 Class 1: Tx level 0 = 30 dBm (\pm 2dB) |

13. MEASUREMENT SYSTEM DESCRIPTION

The automated near-field scanning system Dosimetric Assessment System DASY4 from Schmid & Partner Engineering AG was used. The measurement is performed using platform n° 2 referenced in paragraph 6 (“Equipment used for the testing”) of this report. The system consists of a computer controlled, high precision robotics system, robot controller, extreme near-field probes and the phantom containing the liquid. The six axis robot precisely positions the probe at the points of maximum electromagnetic field. A device holder made of low-loss dielectric material is used to maintain the test position of the equipment under test against the phantom. The measurements were conducted in an RF controlled environment (i.e. anechoic room). Fig. 7 shows the system.

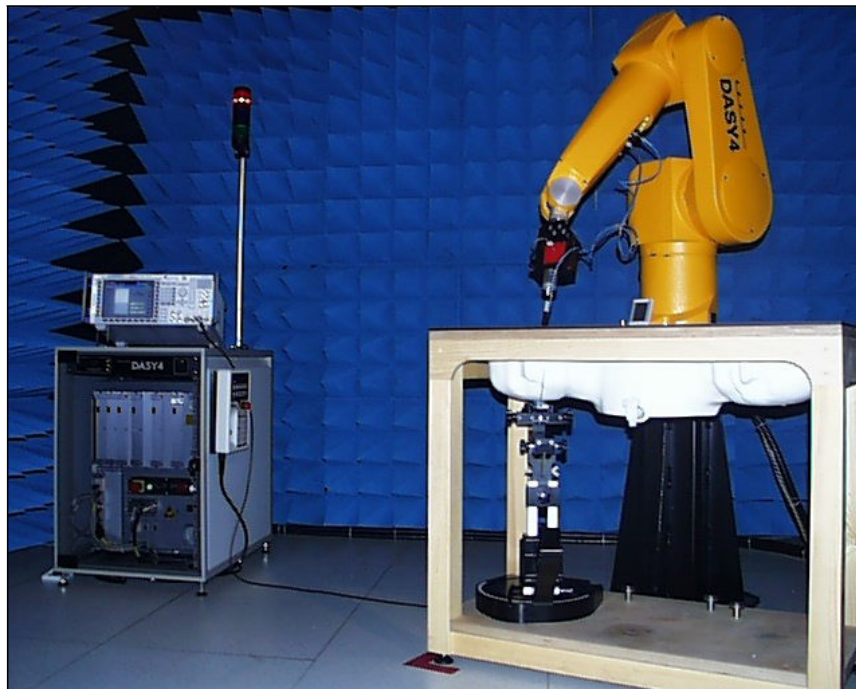


Fig. 7: The measurement setup with equipment under test

14. LIQUID MEASUREMENT: TEST CONDITIONS & RESULTS

The measurement is performed using platform n° 3 referenced in paragraph 6 (“Equipment used for the testing”) of this report. The following ingredients (in % by weight) are theoretical and given for information.

900 MHz liquid: Sucrose 56.50 %
De-ionised water 40.92 %
NaCl salt 1.48 % - HEC 1.00 % - Bactericide 0.10 %

1800 MHz liquid: Diethylenglykol-monobutylether 44.92 %
De-ionised water 54.90 %
NaCl salt 0.18 %

The dielectric parameters of the brain simulating liquid were controlled prior to assessment (contact probe method). Dielectric properties measured:

| Frequency (MHz) | ϵ_r Targeted value | ϵ_r Measured value | σ (S/m) Targeted value | σ (S/m) Measured value | Liquid temperature (°C) | Ambient temperature (°C) |
|---|--------------------------------|--------------------------------|----------------------------------|----------------------------------|-------------------------|--------------------------|
| <i>Meas. Date: Nov. 12, 2012 (mobile phone + FAZUP)</i> | | | | | | |
| 880 | 41.5 ± 5 % | 40.2 | 0.95 ± 5 % | 0.92 | 19.2 | 20.1 |
| 895 | 41.5 ± 5 % | 39.9 | 0.96 ± 5 % | 0.93 | | |
| 900 | 41.5 ± 5 % | 39.8 | 0.97 ± 5 % | 0.93 | | |
| 915 | 41.5 ± 5 % | 39.7 | 0.97 ± 5 % | 0.94 | | |
| <i>Meas. Date: Nov. 22, 2012 (mobile phone alone)</i> | | | | | | |
| 880 | 41.5 ± 5 % | 41.0 | 0.95 ± 5 % | 0.93 | 20.9 | 21.4 |
| 895 | 41.5 ± 5 % | 40.8 | 0.96 ± 5 % | 0.94 | | |
| 900 | 41.5 ± 5 % | 40.7 | 0.97 ± 5 % | 0.95 | | |
| 915 | 41.5 ± 5 % | 40.5 | 0.97 ± 5 % | 0.96 | | |
| <i>Meas. Date: Nov. 16, 2012</i> | | | | | | |
| 1710 | 40.1 ± 5 % | 38.4 | 1.34 ± 5 % | 1.33 | 19.5 | 20.2 |
| 1750 | 40.1 ± 5 % | 38.3 | 1.37 ± 5 % | 1.36 | | |
| 1785 | 40.0 ± 5 % | 38.1 | 1.39 ± 5 % | 1.39 | | |
| 1800 | 40.0 ± 5 % | 38.1 | 1.40 ± 5 % | 1.41 | | |

15. SYSTEM VALIDATION: TEST CONDITIONS & RESULTS

The measurement is performed using platform n° 4 referenced in paragraph 6 (“Equipment used for the testing”) of this report.

Measurement conditions: The measurements were performed in the flat section of the SAM phantom filled with liquids simulating tissue. The validation dipole input power was 250mW.

Prior to the assessment, the validation dipole were used to check whether the system was operating within its specification of ± 10 %.

Measurement results: The results are hereafter below and shown in Fig. 8 to Fig. 10.

| Frequency (MHz) | SAR 1g (W/kg) Targeted value | SAR 1g (W/kg) Measured value |
|----------------------------------|---|---|
| <i>Meas. Date: Nov. 12, 2012</i> | | |
| 900 | 1.725 ± 10 % | 1.72 |
| <i>Meas. Date: Nov. 22, 2012</i> | | |
| 900 | 1.725 ± 10 % | 1.71 |
| 1800 | 4.95 ± 10 % | 5.01 |

DUT: Dipole 900 MHz

Communication System: CW; Frequency: 900 MHz; Duty Cycle: 1:1
 Medium parameters used: $\sigma = 0.93$ mho/m, $\epsilon_r = 39.8$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

Program Notes: Ambient temperature: 21.8°C, Liquid temperature: 20.1°C

DASY4 Configuration:

- Probe: ES3DV3 - SN3303; ConvF(5.97, 5.97, 5.97); Calibrated: 7/17/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn402; Calibrated: 3/9/2012
- Phantom: SAM 12; Type: QD; Serial: TP-1111
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

d=15mm, Pin=250mW/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm
 Maximum value of SAR (interpolated) = 2.84 mW/g

d=15mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 55.8 V/m; Power Drift = -0.031 dB

Peak SAR (extrapolated) = 4.11 W/kg

SAR(1 g) = 2.68 mW/g; SAR(10 g) = 1.72 mW/g

Maximum value of SAR (measured) = 2.91 mW/g

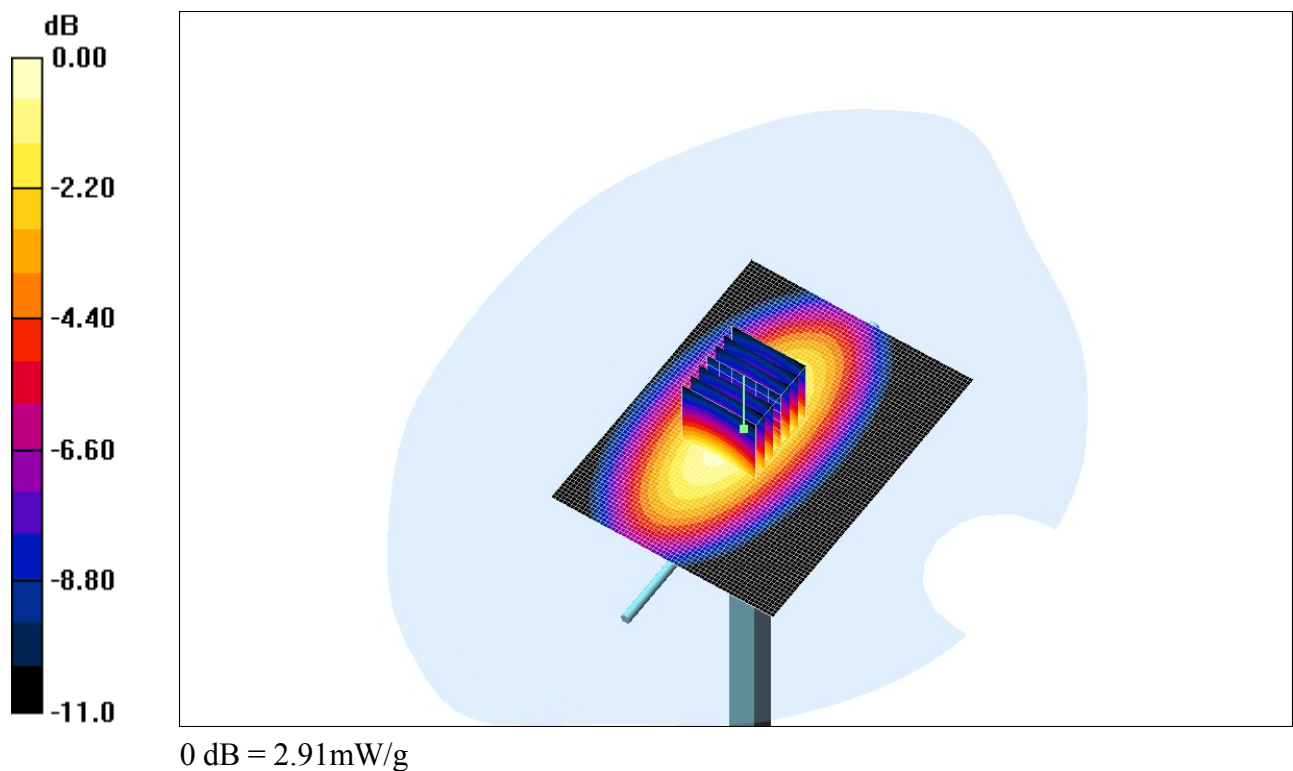


Fig. 8: 900 MHz validation result
Meas. Date: Nov. 12, 2012

DUT: Dipole 900 MHz

Communication System: CW; Frequency: 900 MHz; Duty Cycle: 1:1
 Medium parameters used: $\sigma = 0.95$ mho/m, $\epsilon_r = 40.7$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

Program Notes: Ambient temperature: 22.8°C, Liquid temperature: 21.5°C

DASY4 Configuration:

- Probe: ES3DV3 - SN3303; ConvF(5.97, 5.97, 5.97); Calibrated: 7/17/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn402; Calibrated: 3/9/2012
- Phantom: SAM 12; Type: QD; Serial: TP-1111
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

d=15mm, Pin=250mW/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm
 Maximum value of SAR (interpolated) = 2.85 mW/g

d=15mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 55.7 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 4.06 W/kg

SAR(1 g) = 2.66 mW/g; SAR(10 g) = 1.71 mW/g

Maximum value of SAR (measured) = 2.88 mW/g

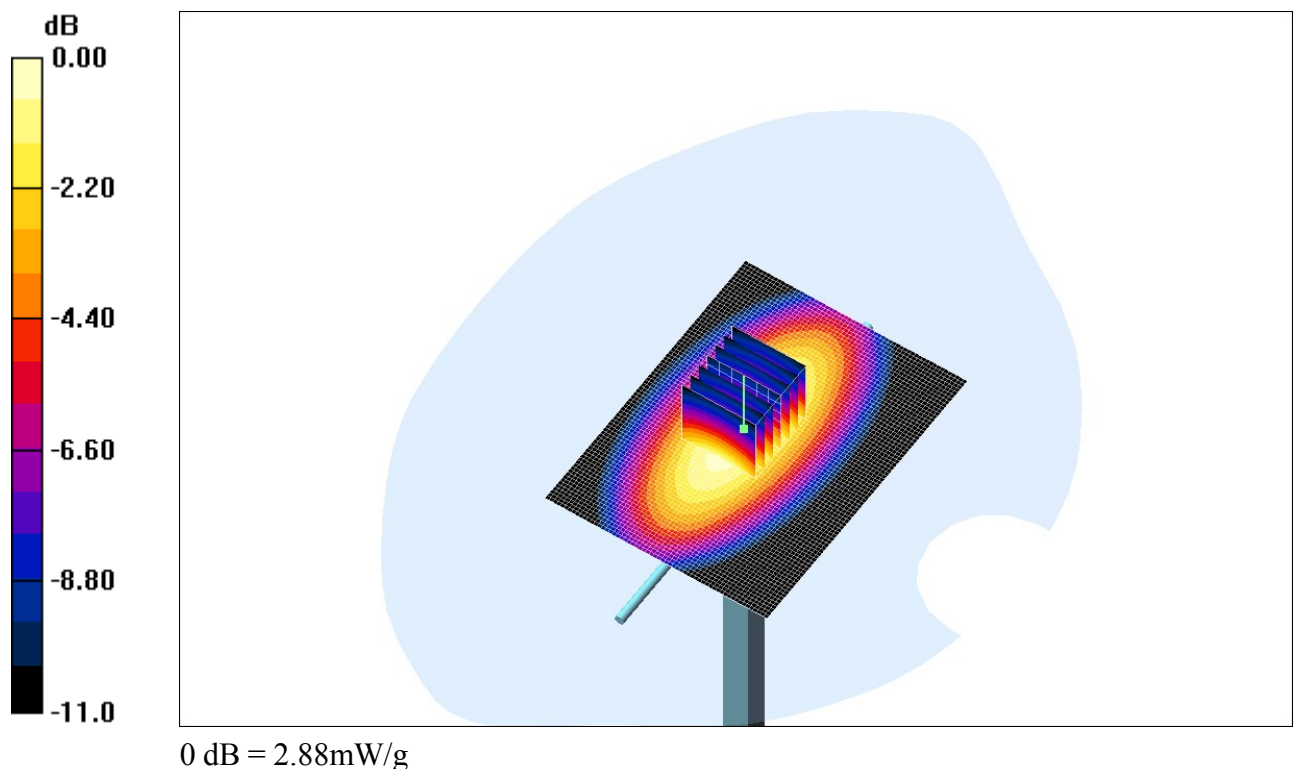


Fig. 9: 900 MHz validation result
Meas. Date: Nov. 22, 2012

DUT: Dipole 1800 MHz

Communication System: CW; Frequency: 1800 MHz; Duty Cycle: 1:1
 Medium parameters used: $\sigma = 1.41$ mho/m, $\epsilon_r = 38.1$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

Program Notes: Ambient temperature: 21.6°C, Liquid temperature: 19.9°C

DASY4 Configuration:

- Probe: ES3DV3 - SN3303; ConvF(5.22, 5.22, 5.22); Calibrated: 7/17/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn402; Calibrated: 3/9/2012
- Phantom: SAM 12; Type: QD; Serial: TP-1111
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

d=10mm, Pin=250mW/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
 Maximum value of SAR (interpolated) = 11.3 mW/g

d=10mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 89.2 V/m; Power Drift = -0.022 dB

Peak SAR (extrapolated) = 17.6 W/kg

SAR(1 g) = 9.62 mW/g; SAR(10 g) = 5.01 mW/g

Maximum value of SAR (measured) = 10.9 mW/g

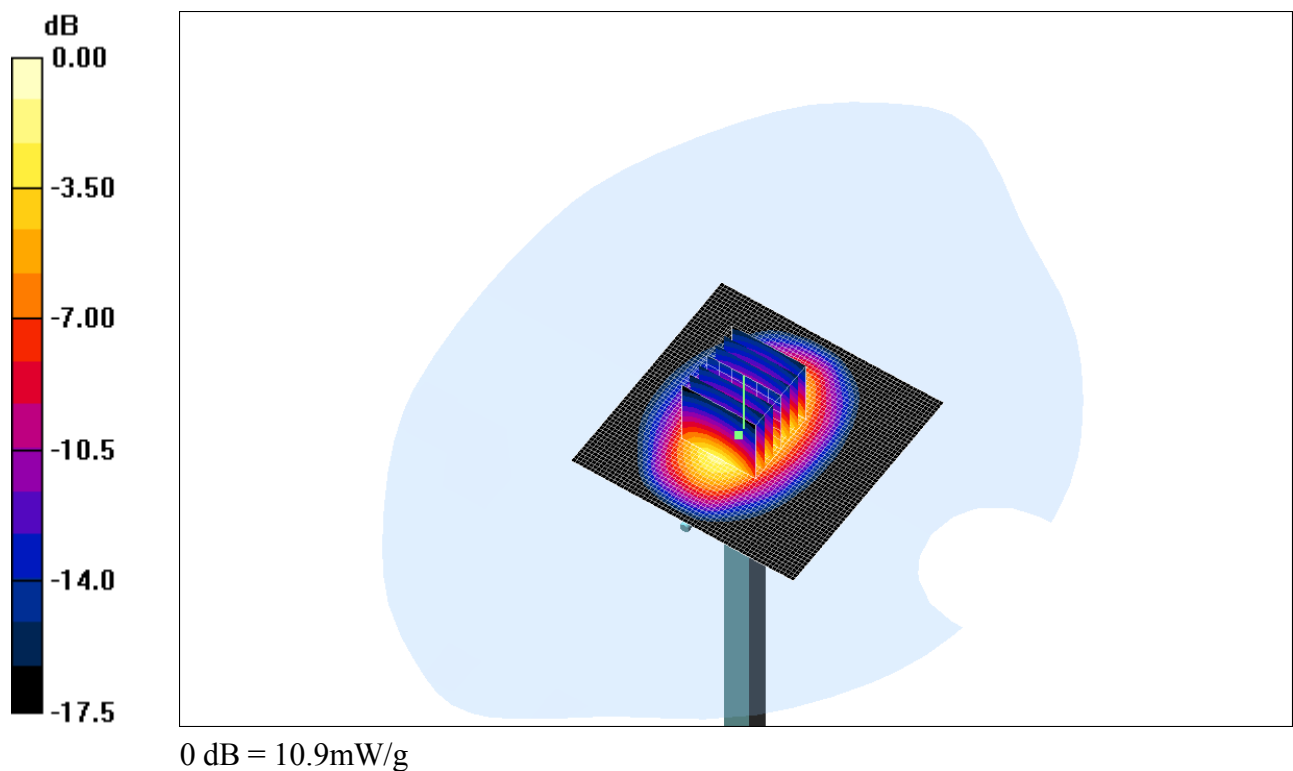


Fig. 10: 1800 MHz validation result

DDD End of report DDD