



SAR Test Report

Product Name : Mobile Phone

Model No. : MP1

FCC ID : R98-MP1

Applicant : The People's Vision SARL

Address : 1 Carrefour de Rive, 1207 Geneva, Switzerland

Date of Receipt : 27/11/2012

Date of Test : 28/11/2012

Issued Date : 03/12/2012

Report No. : 12BS075R-HP-US-P03V01

Report Version : V 1.0

The test results relate only to the samples tested.

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Test Report Certification

Issued Date: 03/12/2012

Report No.: 12BS075R-HP-US-P03V01

QuieTek

Product Name : Mobile Phone
Applicant : The People's Vision SARL
Address : 1 Carrefour de Rive, 1207 Geneva, Switzerland
Manufacturer : ShenZhen KALIHO Technology Development Limited
Address : 20F, Golden Central Tower, Jintian RD., Futian CBD District.
ShenZhen. China
Model No. : MP1
FCC ID : R98-MP1
Brand Name : The People's Phone
EUT Voltage : DC 3.7V
Applicable Standard : FCC Oet65 Supplement C June 2001
IEEE Std. 1528-2003,47CFR § 2.1093
Test Result : Max. SAR Measurement (1g)
Head: **0.283** W/kg
Body: **0.214** W/kg
Performed Location : Suzhou EMC Laboratory
No.99 Hongye Rd., Suzhou Industrial Park Loufeng Hi-Tech
Development Zone., Suzhou, China
TEL: +86-512-6251-5088 / FAX: +86-512-6251-5098
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Laboratory Information

We, **QuieTek Corporation**, are an independent EMC and safety consultancy that was established the whole facility in our laboratories. The test facility has been accredited/accepted(audited or listed) by the following related bodies in compliance with ISO 17025, EN 45001 and specified testing scope:

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| Germany | : | TUV Rheinland |
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| USA | : | FCC, NVLAP |
| Japan | : | VCCI |
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1. General Information

1.1. EUT Description

| | |
|----------------------------------|---|
| Product Name | Mobile Phone |
| Model No. | MP1 |
| IMEI | 356911044969564 |
| Hardware Version | K16_MBPCB_V2.0 |
| Software Version | K16_JLK_FOR_V07_SSD1331_20121107-1727 |
| Device Category | Portable |
| RF Exposure Environment | Uncontrolled |
| Antenna Type | Internal |
| 2G | |
| Support Band | GSM850/GSM900/DCS1800/PCS1900 |
| GPRS Type | Class B |
| GPRS Class | Class 12 |
| Uplink | GSM 850: 824~849MHz PCS 1900: 1850~1910MHz |
| Downlink | GSM 850: 869~894MHz PCS 1900: 1930~1990MHz |
| Release Version | R99 |
| Type of modulation | GMSK for GSM/GPRS |
| Antenna Gain | GSM 850: 0.87dBi PCS1900: 0.68dBi |
| Max. Output Power (Conducted) | GSM850: 32.1~3dBm PCS1900: 2.1~9dBm |
| Bluetooth | |
| Bluetooth Frequency | 2402~2480MHz |
| Bluetooth Version | V2.0 |
| Type of modulation | FHSS |
| Data Rate | 1Mbps(GFSK), 2Mbps(Pi/4 DQPSK), 3Mbps (8DPSK) |
| Antenna Gain | 1dBi |

1.2. Test Procedure

| | |
|---|---|
| 1 | Setup the EUT and simulators as shown on above. |
| 2 | Turn on the power of all equipment. |
| 3 | EUT communicate with CMU 200, and test them respectively. |

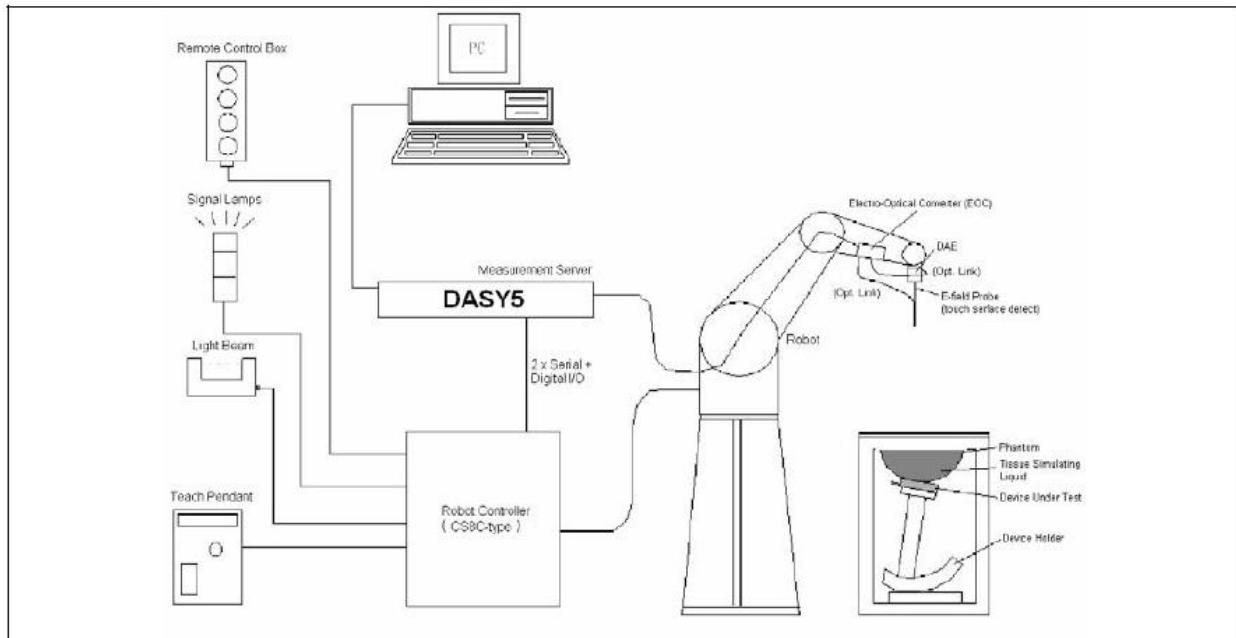
1.3. Test Environment

Ambient conditions in the laboratory:

| Items | Required | Actual |
|------------------|----------|---------|
| Temperature (°C) | 18-25 | 21.5± 2 |
| Humidity (%RH) | 30-70 | 52 |

2. SAR Measurement System

2.1. DASY5 System Description



The DASY5 system for performing compliance tests consists of the following items:

- A standard high precision 6-axis robot with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running WinXP and the DASY5 software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- The phantom, the device holder and other accessories according to the targeted measurement.

2.1.1. Applications

Predefined procedures and evaluations for automated compliance testing with all worldwide standards, e.g., IEEE 1528, OET 65, IEC 62209-1, IEC 62209-2, EN 50360, EN 50383 and others.

2.1.2. Area Scans

Area scans are defined prior to the measurement process being executed with a user defined variable spacing between each measurement point (integral) allowing low uncertainty measurements to be conducted. Scans defined for FCC applications utilize a 10mm² step integral, with 1mm interpolation used to locate the peak SAR area used for zoom scan assessments.

When an Area Scan has measured all reachable points, it computes the field maxima found in the scanned area, within a range of the global maximum. The range (in dB) is specified in the standards for compliance testing. For example, a 2 dB range is required in IEEE 1528-2003 and IEC 62209 standards, whereby 3 dB is a requirement when compliance is assessed in accordance with the ARIB standard (Japan).

2.1.3. Zoom Scan (Cube Scan Averaging)

Zoom Scans are used to assess the peak spatial SAR values within a cubic averaging volume containing 1 g and 10 g of simulated tissue. A density of 1000 kg/m³ is used to represent the head and body tissue density and not the phantom liquid density, in order to be consistent with the definition of the liquid dielectric properties, i.e. the side length of the 1 g cube is 10mm, with the side length of the 10 g cube 21,5mm.

The zoom scan integer steps can be user defined so as to reduce uncertainty, but normal practice for typical test applications utilize a physical step of 7x7x7 (5mmx5mmx5mm) providing a volume of 30mm in the X & Y axis, and 30mm in the Z axis.

2.1.4. Uncertainty of Inter-/Extrapolation and Averaging

In order to evaluate the uncertainty of the interpolation, extrapolation and averaged SAR calculation algorithms of the Postprocessor, DASY5 allows the generation of measurement grids which are artificially predefined by analytically based test functions. Therefore, the grids of area scans and zoom scans can be filled with uncertainty test data, according to the SAR benchmark functions of IEEE 1528. The three analytical functions shown in equations as below are used to describe the possible range of the expected SAR distributions for the tested handsets. The field gradients are covered by the spatially flat distribution f1, the spatially steep distribution f3 and f2 accounts for H-field cancellation on the phantom/tissue surface.

$$f_1(x, y, z) = Ae^{-\frac{z}{2a}} \cos^2 \left(\frac{\pi}{2} \frac{\sqrt{x'^2 + y'^2}}{5a} \right)$$

$$f_2(x, y, z) = Ae^{-\frac{z}{a}} \frac{a^2}{a^2 + x'^2} \left(3 - e^{-\frac{2z}{a}} \right) \cos^2 \left(\frac{\pi}{2} \frac{y'}{3a} \right)$$

$$f_3(x, y, z) = A \frac{a^2}{\frac{a^2}{4} + x'^2 + y'^2} \left(e^{-\frac{2z}{a}} + \frac{a^2}{2(a + 2z)^2} \right)$$

2.2. DASY5 E-Field Probe

The SAR measurement is conducted with the dosimetric probe manufactured by SPEAG. The probe is specially designed and calibrated for use in liquid with high permittivity. The dosimetric probe has special calibration in liquid at different frequency.

SPEAG conducts the probe calibration in compliance with international and national standards (e.g. IEEE 1528, EN 62209-1, IEC 62209, etc.) under ISO 17025. The calibration data are in Appendix D.

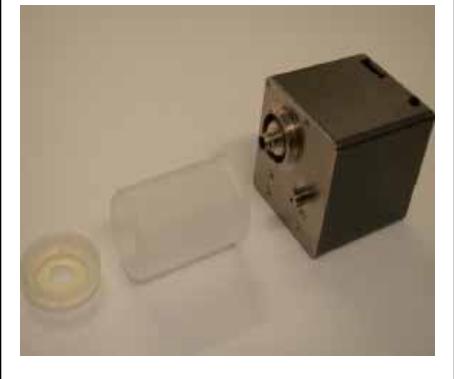
2.2.1. Isotropic E-Field Probe Specification

| | |
|----------------------|--|
| Model | EX3DV4 |
| Construction | Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE) |
| Frequency | 10 MHz to 6 GHz Linearity: ± 0.2 dB (30 MHz to 6 GHz) |
| Directivity | ± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis) |
| Dynamic Range | 10 μ W/g to 100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 μ W/g) |
| Dimensions | Overall length: 330 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm |
| Application | High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields). Only probe which enables compliance testing for frequencies up to 6 GHz with precision of better 30%. |



2.3. Boundary Detection Unit and Probe Mounting Device

The DASY5 probes use a precise connector and an additional holder for the probe, consisting of a plastic tube and a flexible silicon ring to center the probe. The connector at the DAE is flexibly mounted and held in the default position with magnets and springs. Two switching systems in the connector mount detect frontal and lateral probe collisions and trigger the necessary software response.

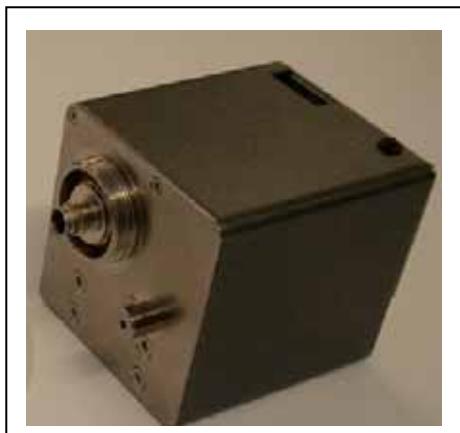


2.4. DATA Acquisition Electronics (DAE) and Measurement Server

The data acquisition electronics (DAE) consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit.

Transmission to the measurement server is accomplished through an optical downlink for data and status information as well as an optical uplink for commands and the clock.

The input impedance of the DAE4 is 200M Ohm; the inputs are symmetrical and floating. Common mode rejection is above 80dB.



The DASY5 measurement server is based on a PC/104 CPU board with a 400MHz intel ULV Celeron, 128MB chipdisk and 128MB RAM. The necessary circuits for communication with the DAE electronics box, as well as the 16 bit AD converter system for optical detection and digital I/O interface are contained on the DASY5 I/O board, which is directly connected to the PC/104 bus of the CPU board.



2.5. Robot

The DASY5 system uses the high precision robots TX90 XL type out of the newer series from Stäubli SA (France). For the 6-axis controller DASY5 system, the CS8C robot controller version from Stäubli is used.

The XL robot series have many features that are important for our application:

- High precision (repeatability 0.02 mm)
- High reliability (industrial design)
- Jerk-free straight movements
- Low ELF interference (the closed metallic construction shields against motor control fields)
- 6-axis controller



2.6. Light Beam Unit

The light beam switch allows automatic "tooling" of the probe. During the process, the actual position of the probe tip with respect to the robot arm is measured, as well as the probe length and the horizontal probe offset. The software then corrects all movements, such that the robot coordinates are valid for the probe tip.

The repeatability of this process is better than 0.1 mm. If a position has been taught with an aligned probe, the same position will be reached with another aligned probe within 0.1 mm, even if the other probe has different dimensions.

During probe rotations, the probe tip will keep its actual position.



2.7. Device Holder

The DASY5 device holder is designed to cope with different positions given in the standard. It has two scales for the device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear reference points). The rotation center for both scales is the ear reference point (EPR).

Thus the device needs no repositioning when changing the angles.

The DASY5 device holder has been made out of low-loss POM material having the following dielectric parameters: relative permittivity $\epsilon_r = 3$ and loss tangent $\delta = 0.02$. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.



2.8. SAM Twin Phantom

The SAM twin phantom is a fiberglass shell phantom with 2mm shell thickness (except the ear region where shell thickness increases to 6mm). It has three measurement areas:

- Left head
- Right head
- Flat phantom



The bottom plate contains three pair of bolts for locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections. A white cover is provided to tap the phantom during off-periods to prevent water evaporation and changes in the liquid parameters. On the phantom top, three reference markers are provided to identify the phantom position with respect to the robot.

3. Tissue Simulating Liquid

3.1. The composition of the tissue simulating liquid

| INGREDIENT (% Weight) | 835MHz Head | 835MHz Body | 1900MHz Head | 1900MHz Body |
|--------------------------|----------------|----------------|-----------------|-----------------|
| Water | 40.45 | 52.4 | 54.90 | 40.5 |
| Salt | 1.45 | 1.40 | 0.18 | 0.50 |
| Sugar | 57.6 | 45.0 | 0.00 | 58.0 |
| HEC | 0.40 | 1.00 | 0.00 | 0.50 |
| Preventol | 0.10 | 0.20 | 0.00 | 0.50 |
| DGBE | 0.00 | 0.00 | 44.92 | 0.00 |

3.2. Tissue Calibration Result

The dielectric parameters of the liquids were verified prior to the SAR evaluation using DASY5 Dielectric Probe Kit and Agilent Vector Network Analyzer E5071C

| Head Tissue Simulant Measurement | | | | |
|---|---------------------------------|-------------------------|----------------------|----------------------|
| Frequency [MHz] | Description | Dielectric Parameters | | Tissue Temp. [°C] |
| | | ϵ_r | σ [s/m] | |
| 835 MHz | Reference result ± 5% window | 41.50 39.43 to 43.58 | 0.90 0.86 to 0.95 | N/A |
| | 28-11-2012 | 42.05 | 0.88 | 21.0 |
| 1900 MHz | Reference result ± 5% window | 40.00 38.00 to 42.00 | 1.40 1.33 to 1.47 | N/A |
| | 28-11-2012 | 40.53 | 1.44 | 21.0 |

| Body Tissue Simulant Measurement | | | | |
|---|---------------------------------|------------------------|----------------------|----------------------|
| Frequency [MHz] | Description | Dielectric Parameters | | Tissue Temp. [°C] |
| | | ϵ_r | σ [s/m] | |
| 835 MHz | Reference result ± 5% window | 55.2 52.44 to 57.96 | 0.97 0.92 to 1.02 | N/A |
| | 28-11-2012 | 55.63 | 0.97 | 21.0 |
| 1900 MHz | Reference result ± 5% window | 53.3 50.64 to 55.97 | 1.52 1.44 to 1.60 | N/A |
| | 28-11-2012 | 52.99 | 1.56 | 21.0 |

3.3. Tissue Dielectric Parameters for Head and Body Phantoms

The head tissue dielectric parameters recommended by the IEEE SCC-34/SC-2 in P1528 have been incorporated in the following table. These head parameters are derived from planar layer models simulating the highest expected SAR for the dielectric properties and tissue thickness variations in a human head. Other head and body tissue parameters that have not been specified in P1528 are derived from the tissue dielectric parameters computed from the 4-Cole-Cole equations described in Reference [12] and extrapolated according to the head parameters specified in P1528.

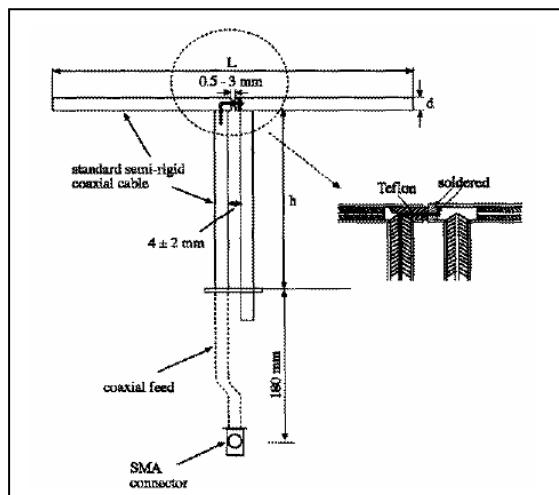
| Target Frequency (MHz) | Head | | Body | |
|---------------------------|--------------|----------------|--------------|----------------|
| | ϵ_r | σ (S/m) | ϵ_r | σ (S/m) |
| 150 | 52.3 | 0.76 | 61.9 | 0.80 |
| 300 | 45.3 | 0.87 | 58.2 | 0.92 |
| 450 | 43.5 | 0.87 | 56.7 | 0.94 |
| 835 | 41.5 | 0.90 | 55.2 | 0.97 |
| 900 | 41.5 | 0.97 | 55.0 | 1.05 |
| 915 | 41.5 | 0.98 | 55.0 | 1.06 |
| 1450 | 40.5 | 1.20 | 54.0 | 1.30 |
| 1610 | 40.3 | 1.29 | 53.8 | 1.40 |
| 1800 – 2000 | 40.0 | 1.40 | 53.3 | 1.52 |
| 2450 | 39.2 | 1.80 | 52.7 | 1.95 |
| 3000 | 38.5 | 2.40 | 52.0 | 2.73 |
| 5800 | 35.3 | 5.27 | 48.2 | 6.00 |

(ϵ_r = relative permittivity, σ = conductivity and $\rho = 1000$ kg/m³)

4. SAR Measurement Procedure

4.1. SAR System Validation

4.1.1. Validation Dipoles



The dipoles used is based on the IEEE-1528 standard, and is complied with mechanical and electrical specifications in line with the requirements of both IEEE and FCC Supplement C. the table below provides details for the mechanical and electrical specifications for the dipoles.

| Frequency | L (mm) | h (mm) | d (mm) |
|-----------|--------|--------|--------|
| 835MHz | 161.0 | 89.8 | 3.6 |
| 1900MHz | 68.0 | 39.5 | 3.6 |

4.1.2. Validation Result

System Performance Check at 835MHz &1900MHz &2450MHz for Head

Validation Kit: D835V2-SN 4d120

| Frequency [MHz] | Description | SAR [w/kg] 1g | SAR [w/kg] 10g | Tissue Temp. [°C] |
|-----------------|----------------------------------|-----------------------|----------------------|-------------------|
| 835 MHz | Reference result ± 10% window | 9.41 8.47 to 10.35 | 6.15 5.54 to 6.77 | N/A |
| | 28-11-2012 | 9.52 | 6.24 | 21.0 |

Validation Kit: D1900V2-SN 5d142

| Frequency [MHz] | Description | SAR [w/kg] 1g | SAR [w/kg] 10g | Tissue Temp. [°C] |
|-----------------|----------------------------------|------------------------|------------------------|-------------------|
| 1900 MHz | Reference result ± 10% window | 39.4 35.46 to 43.34 | 20.8 18.72 to 22.88 | N/A |
| | 28-11-2012 | 39.72 | 20.08 | 21.0 |

Note: All SAR values are normalized to 1W forward power.

System Performance Check at 835MHz &1900MHz &2450MHz for Body

Validation Kit: D835V2-SN 4d120

| Frequency [MHz] | Description | SAR [w/kg] 1g | SAR [w/kg] 10g | Tissue Temp. [°C] |
|-----------------|----------------------------------|-----------------------|----------------------|-------------------|
| 835 MHz | Reference result ± 10% window | 9.57 8.61 to 10.53 | 6.33 5.70 to 6.96 | N/A |
| | 28-11-2012 | 8.20 | 6.52 | 21.0 |

Validation Kit: D1900V2-SN 5d142

| Frequency [MHz] | Description | SAR [w/kg] 1g | SAR [w/kg] 10g | Tissue Temp. [°C] |
|-----------------|----------------------------------|------------------------|------------------------|-------------------|
| 1900 MHz | Reference result ± 10% window | 38.7 34.83 to 42.57 | 20.4 18.36 to 22.44 | N/A |
| | 28-11-2012 | 42.00 | 21.72 | 21.0 |

Note: All SAR values are normalized to 1W forward power.

4.2. SAR Measurement Procedure

The DASY5 calculates SAR using the following equation,

$$SAR = \frac{\sigma |E|^2}{\rho}$$

σ : represents the simulated tissue conductivity

ρ : represents the tissue density

The EUT is set to transmit at the required power in line with product specification, at each frequency relating to the LOW, MID, and HIGH channel settings.

Pre-scans are made on the device to establish the location for the transmitting antenna, using a large area scan in either air or tissue simulation fluid.

The EUT is placed against the Universal Phantom where the maximum area scan dimensions are larger than the physical size of the resonating antenna. When the scan size is not large enough to cover the peak SAR distribution, it is modified by either extending the area scan size in both the X and Y directions, or the device is shifted within the predefined area.

The area scan is then run to establish the peak SAR location (interpolated resolution set at 1mm²) which is then used to orient the center of the zoom scan. The zoom scan is then executed and the 1g and 10g averages are derived from the zoom scan volume (interpolated resolution set at 1mm³).

5. SAR Exposure Limits

SAR assessments have been made in line with the requirements of IEEE-1528, FCC Supplement C, and comply with ANSI/IEEE C95.1-1992 "Uncontrolled Environments" limits. These limits apply to a location which is deemed as "Uncontrolled Environment" which can be described as a situation where the general public may be exposed to an RF source with no prior knowledge or control over their exposure.

Limits for General Population/Uncontrolled Exposure (W/kg)

| Type Exposure | Uncontrolled Environment Limit |
|--|--------------------------------|
| Spatial Peak SAR (1g cube tissue for brain or body) | 1.60 W/kg |
| Spatial Average SAR (whole body) | 0.08 W/kg |
| Spatial Peak SAR (10g for hands, feet, ankles and wrist) | 4.00 W/kg |

6. Test Equipment List

| Instrument | Manufacturer | Model No. | Serial No. | Cali. Due Date |
|--------------------------------------|--------------|---------------|-----------------|----------------|
| Stäubli Robot TX60L | Stäubli | TX60L | F10/5C90A1/A/01 | only once |
| Controller | Stäubli | SP1 | S-0034 | only once |
| Dipole Validation Kits | Speag | D835V2 | 4d094 | 2013.02.17 |
| Dipole Validation Kits | Speag | D1900V2 | 5d121 | 2013.02.22 |
| SAM Twin Phantom | Speag | SAM | TP-1561/1562 | N/A |
| Device Holder | Speag | SD 000 H01 HA | N/A | N/A |
| Data Acquisition Electronic | Speag | DAE4 | 1220 | 2013.01.23 |
| E-Field Probe | Speag | EX3DV4 | 3710 | 2013.03.12 |
| SAR Software | Speag | DASY5 | V5.2 Build 162 | N/A |
| Power Amplifier | Mini-Circuit | ZVA-183-S+ | N657400950 | N/A |
| Directional Coupler | Agilent | 778D | 20160 | N/A |
| Universal Radio Communication Tester | R&S | CMU 200 | 117088 | 2013.04.18 |
| Vector Network | Agilent | E5071C | MY48367267 | 2013.04.10 |
| Signal Generator | Agilent | E4438C | MY49070163 | 2013.04.18 |
| Power Meter | Anritsu | ML2495A | 0905006 | 2013.11.10 |
| Wide Bandwidth Sensor | Anritsu | MA2411B | 0846014 | 2013.11.10 |

7. Measurement Uncertainty

DASY5 Uncertainty

Measurement uncertainty for 300 MHz to 3 GHz averaged over 1 gram / 10 gram.

| Error Description | Uncert. value | Prob. Dist. | Div. | (c _i) 1g | (c _i) 10g | Std. Unc. (1g) | Std. Unc. (10g) | (v _i) v _{eff} |
|----------------------------------|---------------|-------------|------------|-------------------------|--------------------------|-------------------|--------------------|---------------------------------------|
| Measurement System | | | | | | | | |
| Probe Calibration | ±6.0% | N | 1 | 1 | 1 | ±6.0% | ±6.0% | ∞ |
| Axial Isotropy | ±4.7% | R | $\sqrt{3}$ | 0.7 | 0.7 | ±1.9% | ±1.9% | ∞ |
| Hemispherical Isotropy | ±9.6% | R | $\sqrt{3}$ | 0.7 | 0.7 | ±3.9% | ±3.9% | ∞ |
| Boundary Effects | ±1.0% | R | $\sqrt{3}$ | 1 | 1 | ±0.6% | ±0.6% | ∞ |
| Linearity | ±4.7% | R | $\sqrt{3}$ | 1 | 1 | ±2.7% | ±2.7% | ∞ |
| System Detection Limits | ±1.0% | R | $\sqrt{3}$ | 1 | 1 | ±0.6% | ±0.6% | ∞ |
| Readout Electronics | ±0.3% | N | 1 | 1 | 1 | ±0.3% | ±0.3% | ∞ |
| Response Time | ±0.8% | R | $\sqrt{3}$ | 1 | 1 | ±0.5% | ±0.5% | ∞ |
| Integration Time | ±2.6% | R | $\sqrt{3}$ | 1 | 1 | ±1.5% | ±1.5% | ∞ |
| RF Ambient Noise | ±3.0% | R | $\sqrt{3}$ | 1 | 1 | ±1.7% | ±1.7% | ∞ |
| RF Ambient Reflections | ±3.0% | R | $\sqrt{3}$ | 1 | 1 | ±1.7% | ±1.7% | ∞ |
| Probe Positioner | ±0.4% | R | $\sqrt{3}$ | 1 | 1 | ±0.2% | ±0.2% | ∞ |
| Probe Positioning | ±2.9% | R | $\sqrt{3}$ | 1 | 1 | ±1.7% | ±1.7% | ∞ |
| Max. SAR Eval. | ±1.0% | R | $\sqrt{3}$ | 1 | 1 | ±0.6% | ±0.6% | ∞ |
| Test Sample Related | | | | | | | | |
| Device Positioning | ±2.9% | N | 1 | 1 | 1 | ±2.9% | ±2.9% | 145 |
| Device Holder | ±3.6% | N | 1 | 1 | 1 | ±3.6% | ±3.6% | 5 |
| Power Drift | ±5.0% | R | $\sqrt{3}$ | 1 | 1 | ±2.9% | ±2.9% | ∞ |
| Phantom and Setup | | | | | | | | |
| Phantom Uncertainty | ±4.0% | R | $\sqrt{3}$ | 1 | 1 | ±2.3% | ±2.3% | ∞ |
| Liquid Conductivity (target) | ±5.0% | R | $\sqrt{3}$ | 0.64 | 0.43 | ±1.8% | ±1.2% | ∞ |
| Liquid Conductivity (meas.) | ±2.5% | N | 1 | 0.64 | 0.43 | ±1.6% | ±1.1% | ∞ |
| Liquid Permittivity (target) | ±5.0% | R | $\sqrt{3}$ | 0.6 | 0.49 | ±1.7% | ±1.4% | ∞ |
| Liquid Permittivity (meas.) | ±2.5% | N | 1 | 0.6 | 0.49 | ±1.5% | ±1.2% | ∞ |
| Combined Std. Uncertainty | | | | | | | ±11.0% | ±10.8% |
| Expanded STD Uncertainty | | | | | | | ±22.0% | ±21.5% |

8. Conducted Power Measurement

| Mode | Frequency (MHz) | Avg. Burst Power (dBm) | Duty Cycle Factor (dB) | Frame Power (dBm) |
|------------------|-----------------|------------------------|------------------------|-------------------|
| Maximum Power | | | | |
| GSM850 | 824.2 | 32.14 | -9 | 23.14 |
| | 836.4 | 32.14 | -9 | 23.14 |
| | 848.8 | 32.12 | -9 | 23.12 |
| GPRS850(1 Slot) | 824.2 | 3F.€1 | -9 | 2G.€1 |
| | 836.4 | 3F.H3 | -9 | 2G.H3 |
| | 848.8 | 3F.G8 | -9 | 2G.G8 |
| GPRS850(2 Slot) | 824.2 | 31.€7 | -6 | 25.€7 |
| | 836.4 | 31.F4 | -6 | 25.F4 |
| | 848.8 | 3€.69 | -6 | 21.69 |
| GPRS850(3 Slot) | 824.2 | 29.92 | -4.25 | 25.67 |
| | 836.4 | 30.31 | -4.25 | 26.06 |
| | 848.8 | 30.27 | -4.25 | 26.02 |
| GPRS850(4 Slot) | 824.2 | 29.22 | -3 | 26.22 |
| | 836.4 | 29.60 | -3 | 26.60 |
| | 848.8 | 29.53 | -3 | 26.53 |
| PCS1900 | 1850.2 | 2J.19 | -9 | GE.19 |
| | 1880.0 | 2J.€8 | -9 | GE.€8 |
| | 1909.8 | 2J.J5 | -9 | FJ.J5 |
| GPRS1900(1 Slot) | 1850.2 | 2J.11 | -9 | 1J.11 |
| | 1880.0 | 2J.G9 | -9 | 1J.G9 |
| | 1909.8 | 2J.F5 | -9 | 1J.F5 |
| GPRS1900(2 Slot) | 1850.2 | 2J.69 | -6 | GE.69 |
| | 1880.0 | 2J.19 | GE.19 | GE.19 |
| | 1909.8 | 2J.94 | -6 | 1J.94 |
| GPRS1900(3 Slot) | 1850.2 | 23.19 | -4.25 | 18.94 |
| | 1880.0 | 22.65 | -4.25 | 18.40 |
| | 1909.8 | 22.39 | -4.25 | 18.14 |
| GPRS1900(4 Slot) | 1850.2 | 22.48 | -3 | 19.48 |
| | 1880.0 | 22.03 | -3 | 19.03 |
| | 1909.8 | 21.59 | -3 | 18.59 |

9. Test Results

9.1. SAR Test Results Summary

9.1.1. Test position and configuration

Head SAR was performed with the device configured in the positions according to IEEE1528, and Body SAR was performed with the device 10mm from the phantom. Body SAR was also performed with the headset attached and without.

9.1.2. Body SAR with Headset

Testing with the headset was performed at the position and channels that resulted in the highest body SAR. This testing was performed with GPRS transmitting with 2/3/4 uplink timeslots. This operation mode represents the maximum SAR situation, when downloading data via GPRS and listening to music by headset.

In the Body SAR test result table, body-worn means display of device down, body-front means display of device up.

9.1.3. Operation Mode

This is a multislots class 12 device capable of 4 uplink timeslots. During the head SAR test, the device was transmitting with 1 uplink timeslot; during the body SAR test, it was transmitting with 2/3/4 uplink timeslots. Additionally, this device doesn't support dual transfer mode (DTM).

9.1.4. Co-located SAR

According to KDB 648474, the closest separation between GSM antenna and BT antenna is 3.4cm, but the Bluetooth Max peak power is lower than Pref, thus, stand-alone SAR for Bluetooth is not required. Other reference document: KDB 941225, KDB 447498.

9.1.5. Test Result

| SAR MEASUREMENT | | | | | | | | | |
|---|---------------------|-----------|-------|---------------------------|-------------------------------|------------------|--|--|--|
| Ambient Temperature (°C) : 21.5 ±2 | | | | Relative Humidity (%): 52 | | | | | |
| Liquid Temperature (°C) : 21.0 ±2 | | | | Depth of Liquid (cm):>15 | | | | | |
| Product: Mobile Phone | | | | | | | | | |
| Test Mode: GSM850 | | | | | | | | | |
| Test Position Head | Antenna Position | Frequency | | Frame Power (dBm) | Power Drift ($<\pm 0.2$) | SAR 1g (W/kg) | | | |
| | | Channel | MHz | | | Limit (W/kg) | | | |
| Left-Cheek | Fixed | 128 | 824.2 | 23.1 4 | -- | 0.048 | | | |
| Left-Cheek | Fixed | 19€ | 836.† | 23.1 4 | -0.06 | 0.027 | | | |
| Left-Cheek | Fixed | 251 | 848.8 | 23.1 2 | -- | 0.036 | | | |
| Left-Tilted | Fixed | 1J€ | 836.† | 23.1 4 | 0.17 | 0.019 | | | |
| Right-Cheek | Fixed | 128 | 824.2 | 23.1 4 | -- | 0.048 | | | |
| Right-Cheek | Fixed | 1J€ | 836.† | 23.1 4 | 0.13 | 0.027 | | | |
| Right-Cheek | Fixed | 251 | 848.8 | 23.1 2 | -- | 0.036 | | | |
| Right-Tilted | Fixed | 1J€ | 836.† | 23.1 4 | -0.15 | 0.019 | | | |
| Note: When the 1-g SAR is ≤ 0.8 W/kg, testing for low and high channel is optional, refer to KDB 941225. | | | | | | | | | |

| SAR MEASUREMENT | | | | | | | | | | | | |
|---|---------------------|-----------------|-------------------|--------------------------------|---------------------------|---------------------------|------------------|------------------|--|--|--|--|
| Ambient Temperature (°C) : 21.5 ±2 | | | | | Relative Humidity (%): 52 | | | | | | | |
| Liquid Temperature (°C) : 21.0 ±2 | | | | | Depth of Liquid (cm):>15 | | | | | | | |
| Product: Mobile Phone | | | | | | | | | | | | |
| Test Mode: GPRS850-1slot | | | | | | | | | | | | |
| Test Position Body | Antenna Position | Frequency | | Separation Distance (mm) | Frame Power (dBm) | Power Drift (<±0.2) | SAR 1g (W/kg) | Limit (W/kg) | | | | |
| | | Channel | MHz | | | | | | | | | |
| Body-worn | Fixed | 128 | 824.2 | 10 | 2G 6 | -- | 0.025 | 0.025 | | | | |
| Body-worn | Fixed | 19 6 | 836. 1 | 10 | 2G 6 | 0.08 | 0.025 | 0.025 | | | | |
| Body-worn | Fixed | 251 | 848.8 | 10 | 2G 6 | -- | 0.025 | 0.025 | | | | |
| Test Mode: GPRS850-2slot | | | | | | | | | | | | |
| Body-worn | Fixed | 1J 6 | 836. 1 | 10 | 2G 6 | -0.07 | 0.037 | 0.037 | | | | |
| Test Mode: GPRS850-3slot | | | | | | | | | | | | |
| Body-worn | Fixed | 1J 6 | 836. 1 | 10 | 2G 6 | 0.07 | 0.041 | 0.041 | | | | |
| Test Mode: GPRS850-4slot | | | | | | | | | | | | |
| Body-worn | Fixed | 128 | 824.2 | 10 | 26.22 | -- | -- | 1.6 | | | | |
| Body-worn | Fixed | 1J 6 | 836. 1 | 10 | 26.60 | -0.16 | 0.052 | 0.052 | | | | |
| Body-worn | Fixed | 251 | 848.8 | 10 | 26.53 | -- | -- | 1.6 | | | | |
| Body-front | Fixed | 251 | 848.8 | 10 | 26.60 | 0.11 | 0.004 | 1.6 | | | | |
| Body-worn (With Headset) | Fixed | 19 6 | 836. 1 | 10 | 26.60 | -0.09 | 0.039 | 0.039 | | | | |
| Note: When the 1-g SAR is ≤ 0.8 W/kg, testing for low and high channel is optional, refer to KDB 941225. | | | | | | | | | | | | |

| SAR MEASUREMENT | | | | | | | | | |
|------------------------------------|---------------------|-----------|--------|---------------------------|------------------------|------------------|-----------------|--|--|
| Ambient Temperature (°C) : 21.5 ±2 | | | | Relative Humidity (%): 52 | | | | | |
| Liquid Temperature (°C) : 21.0 ±2 | | | | Depth of Liquid (cm):>15 | | | | | |
| Product: Mobile Phone | | | | | | | | | |
| Test Mode: PCS1900 | | | | | | | | | |
| Test Position Head | Antenna Position | Frequency | | Frame Power (dBm) | Power Drift (<±0.2) | SAR 1g (W/kg) | Limit (W/kg) | | |
| | | Channel | MHz | | | | | | |
| Left-Cheek | Fixed | 512 | 1850.2 | GEJ | -- | -0.253 | | | |
| Left-Cheek | Fixed | 661 | 1880.0 | GEK | -0.17 | 0.253 | | | |
| Left-Cheek | Fixed | 810 | 1909.8 | FJBI | -- | -0.253 | | | |
| Left-Tilted | Fixed | 661 | 1880.0 | GEK | 0.01 | 0.182 | | | |
| Right-Cheek | Fixed | 512 | 1850.2 | GEJ | -- | -0.253 | | | |
| Right-Cheek | Fixed | 661 | 1880.0 | GEK | -0.13 | 0.283 | | | |
| Right-Cheek | Fixed | 810 | 1909.8 | FJBI | -- | -0.253 | | | |
| Right-Tilted | Fixed | 661 | 1880.0 | GEK | -0.16 | 0.190 | | | |

Note: When the 1-g SAR is \leq 0.8 W/kg, testing for low and high channel is optional, refer to KDB 9412225.

| SAR MEASUREMENT | | | | | | | | | | | | |
|--|---------------------|-----------|--------|--------------------------------|---------------------------|---------------------------|------------------|-----------------|--|--|--|--|
| Ambient Temperature (°C) : 21.5 ±2 | | | | | Relative Humidity (%): 52 | | | | | | | |
| Liquid Temperature (°C) : 21.0 ±2 | | | | | Depth of Liquid (cm):>15 | | | | | | | |
| Product: Mobile Phone | | | | | | | | | | | | |
| Test Mode: PCS1900 | | | | | | | | | | | | |
| Test Position Body | Antenna Position | Frequency | | Separation Distance (mm) | Frame Power (dBm) | Power Drift (<±0.2) | SAR 1g (W/kg) | Limit (W/kg) | | | | |
| | | Channel | MHz | | | | | | | | | |
| Body-worn | Fixed | 512 | 1850.2 | 10 | 0.19 | -- | 0.19 | 0.19 | | | | |
| Body-worn | Fixed | 661 | 1880.0 | 10 | 0.08 | 0.14 | 0.116 | 0.116 | | | | |
| Body-worn | Fixed | 810 | 1909.8 | 10 | FJ.J5 | -- | 0.19 | 0.19 | | | | |
| Test Mode: GPRS1900-2slot | | | | | | | | | | | | |
| Body-worn | Fixed | 661 | 1880.0 | 10 | 0.19 | -0.10 | 0.188 | 0.188 | | | | |
| Test Mode: GPRS1900-3slot | | | | | | | | | | | | |
| Body-worn | Fixed | 661 | 1880.0 | 10 | 18.40 | -0.02 | 0.196 | 1.6 | | | | |
| Test Mode: GPRS1900-4slot | | | | | | | | | | | | |
| Body-worn | Fixed | 512 | 1850.2 | 10 | 19.48 | -- | -- | 1.6 | | | | |
| Body-worn | Fixed | 661 | 1880.0 | 10 | 19.03 | 0.10 | 0.214 | 1.6 | | | | |
| Body-worn | Fixed | 810 | 1909.8 | 10 | 18.59 | -- | -- | 1.6 | | | | |
| Body-worn (With Headset) | Fixed | 661 | 1880.0 | 10 | 19.03 | -0.11 | 0.167 | 1.6 | | | | |
| Body-front | Fixed | 661 | 1880.0 | 10 | 19.03 | 0.14 | 0.096 | 1.6 | | | | |
| Note: When the 1-g SAR is ≤ 0.8 W/kg, testing for low and high channel is optional, refer to KDB 941225. | | | | | | | | | | | | |

Appendix A. SAR System Validation Data

Date/Time: 28-11-2012

Test Laboratory: QuieTek Lab

System Check Head 835MHz

DUT: Dipole 835 MHz D835V2; Type: D835V2

Communication System: CW; Communication System Band: D835(835.0MHz); Duty Cycle: 1:1; Frequency: 835 MHz; Medium parameters used: $f = 835$ MHz; $\sigma = 0.88$ mho/m; $\epsilon_r = 42.05$; $\rho = 1000$ kg/m³; Phantom section: Flat Section ; Input Power=250mW

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

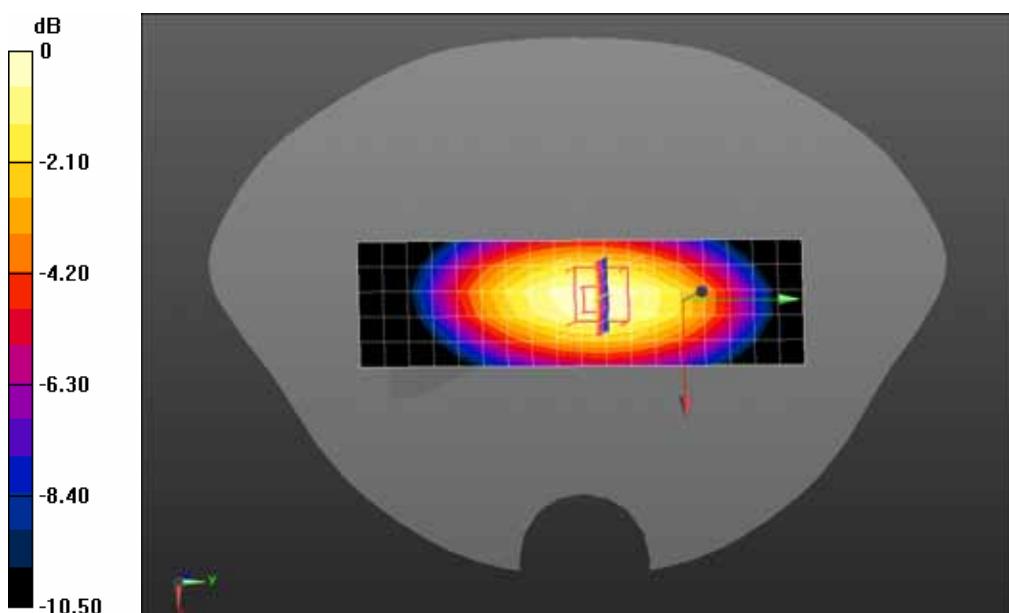
- Probe: EX3DV4 - SN3710; ConvF(9.18, 9.18, 9.18); Calibrated: 12/03/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 23/01/2012
- Phantom: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/System Check Head 835MHz/Area Scan (6x19x1): Measurement grid: dx=10mm, dy=10mm Maximum value of SAR (measured) = 2.47 mW/g

Configuration/System Check Head 835MHz/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm, Reference Value = 53.708 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 3.594 mW/g

SAR(1 g) = 2.38mW/g; SAR(10 g) = 1.56 mW/g Maximum value of SAR (measured) = 2.57 mW/g



0 dB = 2.57 mW/g = 8.20 dB mW/g

Date/Time: 28-11-2012

Test Laboratory: QuieTek Lab

System Check Body 835MHz

DUT: Dipole 835 MHz D835V2; Type: D835V2

Communication System: CW; Communication System Band: D835 (835.0 MHz); Duty Cycle: 1:1;

Frequency: 835 MHz; Medium parameters used: $f = 835$ MHz; $\sigma = 0.97$ mho/m; $\epsilon_r = 55.63$; $\rho = 1000$ kg/m³ ;

Phantom section: Flat Section ; Input Power=250mW

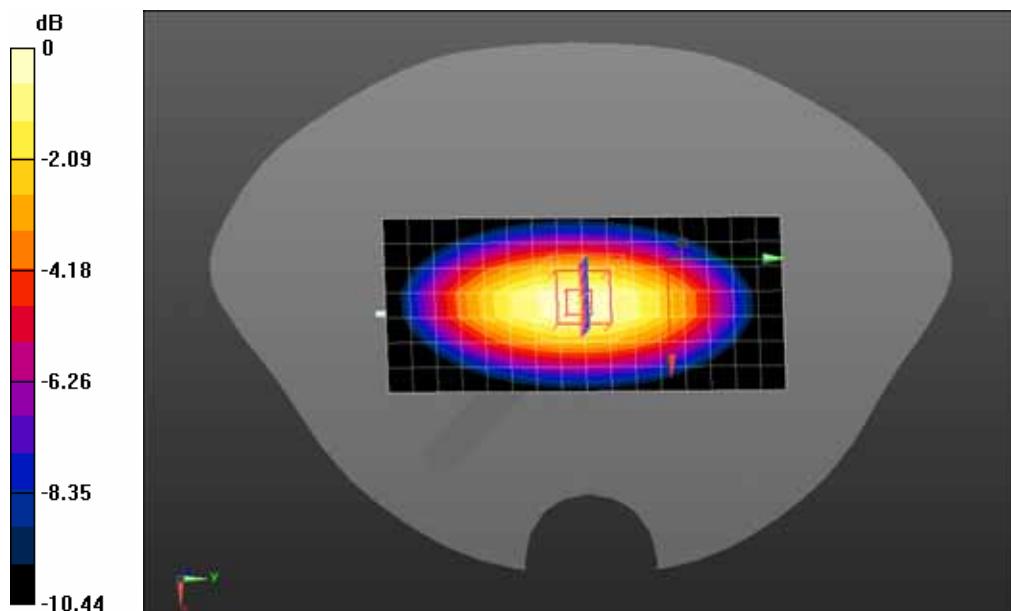
Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(9.13, 9.13, 9.13); Calibrated: 12/03/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 23/01/2012
- Phantom: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/System Check Body 835MHz/Area Scan (8x17x1): Measurement grid: dx=10mm, dy=10mm, Maximum value of SAR (measured) = 2.50 mW/g**Configuration/System Check Body 835MHz/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm, Reference Value = 52.573 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 3.778 mW/g

SAR(1 g) = 2.5 mW/g; SAR(10 g) = 1.63 mW/g Maximum value of SAR (measured) = 2.70 mW/g

Date/Time: 28-11-2012

Test Laboratory: QuieTek Lab

System Check Head 1900MHz

DUT: Dipole 1900 MHz D1900V2; Type: D1900V2

Communication System: CW; Communication System Band: D1900(1900MHz); Duty Cycle: 1:1; Frequency: 1900 MHz; Medium parameters used: $f = 1900$ MHz; $\sigma = 1.44$ mho/m; $\epsilon_r = 40.53$; $\rho = 1000$ kg/m³; Phantom section: Flat Section ; Input Power=250mW

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

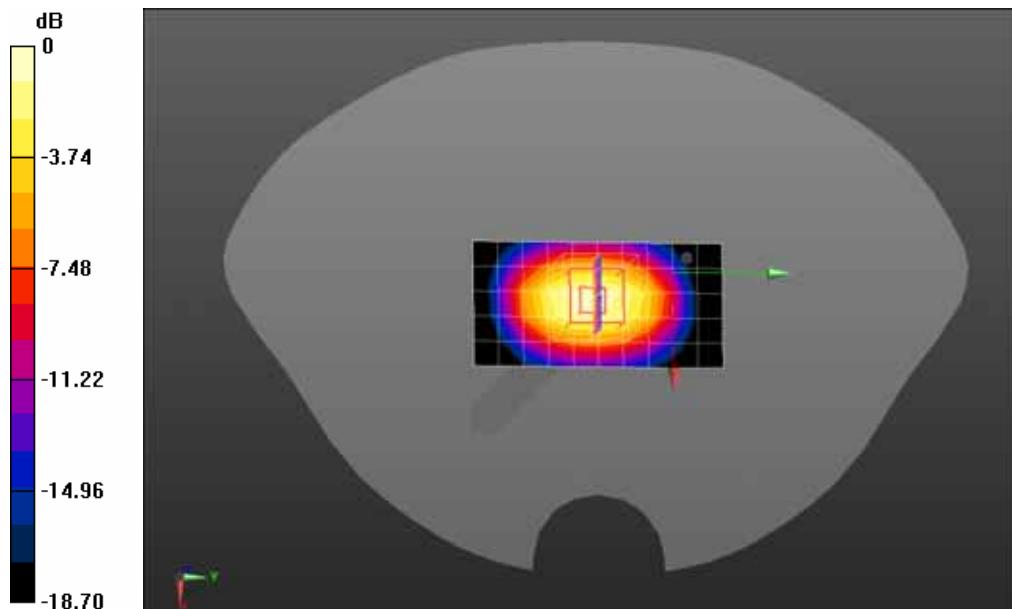
- Probe: EX3DV4 - SN3710; ConvF(8.16, 8.16, 8.16); Calibrated: 12/03/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 23/01/2012
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/System Check Head 1900MHz/Area Scan (6x11x1): Measurement grid: dx=10mm, dy=10mm, Maximum value of SAR (measured) = 10.0 mW/g

Configuration/System Check Head 1900MHz/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm, Reference Value = 86.925 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 19.256 mW/g

SAR(1 g) = 9.93 mW/g; SAR(10 g) = 5.02 mW/g Maximum value of SAR (measured) = 11.2 mW/g



Date/Time: 28-11-2012

Test Laboratory: QuieTek Lab

System Check Body 1900MHz

DUT: Dipole 1900 MHz D1900V2; Type: D1900V2

Communication System: CW; Communication System Band: D1900(1900MHz); Duty Cycle: 1:1; Frequency: 1900 MHz; Medium parameters used: $f = 1900$ MHz; $\sigma = 1.56$ mho/m; $\epsilon_r = 52.99$; $\rho = 1000$ kg/m³; Phantom section: Flat Section ; Input Power=250mW

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

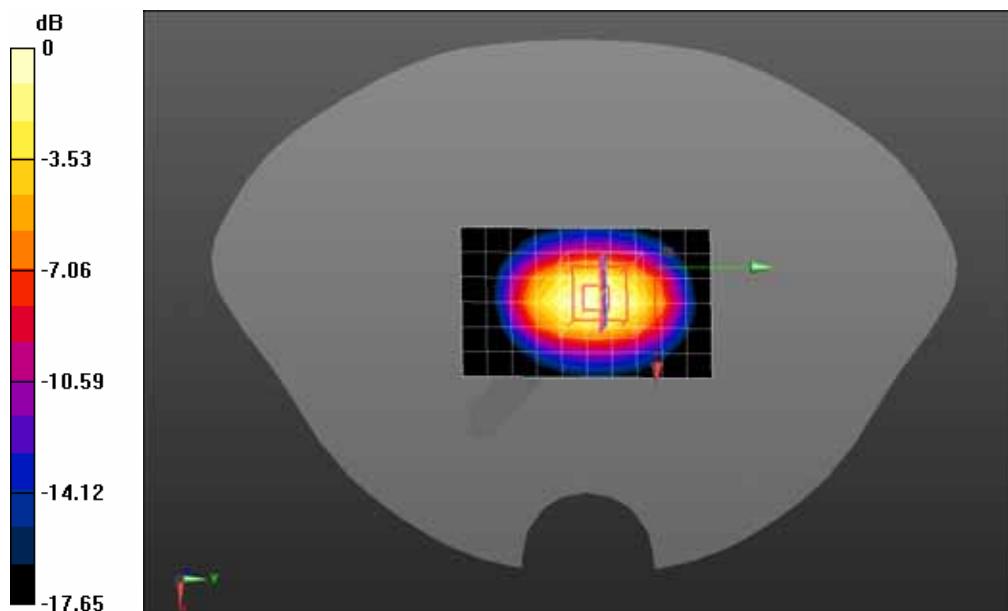
- Probe: EX3DV4 - SN3710; ConvF(7.43, 7.43, 7.43); Calibrated: 12/03/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 23/01/2012
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/System Check Body 1900MHz/Area Scan (7x11x1): Measurement grid: dx=10mm, dy=10mm Maximum value of SAR (measured) = 11.7 mW/g

Configuration/System Check Body 1900MHz/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm, Reference Value = 86.595 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 19.435 mW/g

SAR(1 g) = 10.5 mW/g; SAR(10 g) = 5.43 mW/g Maximum value of SAR (measured) = 11.9 mW/g



0 dB = 11.9 mW/g = 21.51 dB mW/g

Appendix B. SAR measurement Data

Date/Time: 28/11/2012

Test Laboratory: QuieTek Lab

GSM850 Mid Touch-Left

DUT: Mobile Phone ; Type: MP1

Communication System: Generic GSM; Communication System Band: GSM850; Duty Cycle: 1:8.3; Frequency: 836.4 MHz; Medium parameters used: $f = 836.4$ MHz; $\sigma = 0.88$ mho/m; $\epsilon_r = 42.03$; $\rho = 1000$ kg/m³; Phantom section: Left Section

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(9.18, 9.18, 9.18); Calibrated: 12/03/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 23/01/2012
- Phantom: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

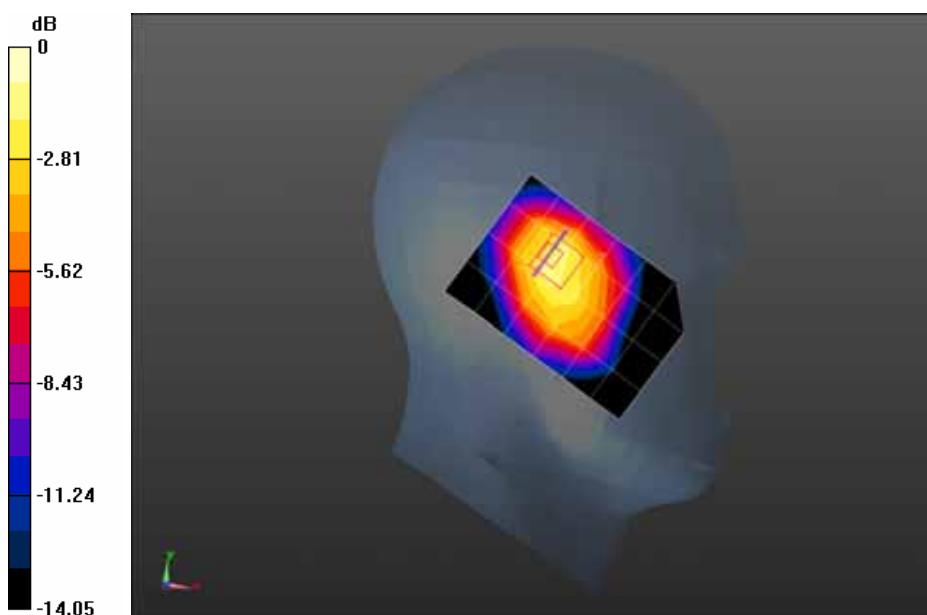
Configuration/GSM850 Mid Touch-Left/Area Scan (5x7x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 0.0382 mW/g

Configuration/GSM850 Mid Touch-Left/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 6.079 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 0.087 mW/g

SAR(1 g) = 0.048 mW/g; SAR(10 g) = 0.027 mW/g Maximum value of SAR (measured) = 0.0518 mW/g



0 dB = 0.0518 mW/g = -25.71 dB mW/g

Date/Time: 28-11-2012

Test Laboratory: QuieTek Lab

GSM850 Mid Tilt-Left

DUT: Mobile Phone ; Type: MP1

Communication System: Generic GSM; Communication System Band: GSM850; Duty Cycle: 1:8.3; Frequency: 836.4 MHz; Medium parameters used: $f = 836.4$ MHz; $\sigma = 0.88$ mho/m; $\epsilon_r = 42.03$; $\rho = 1000$ kg/m³; Phantom section: Left Section

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

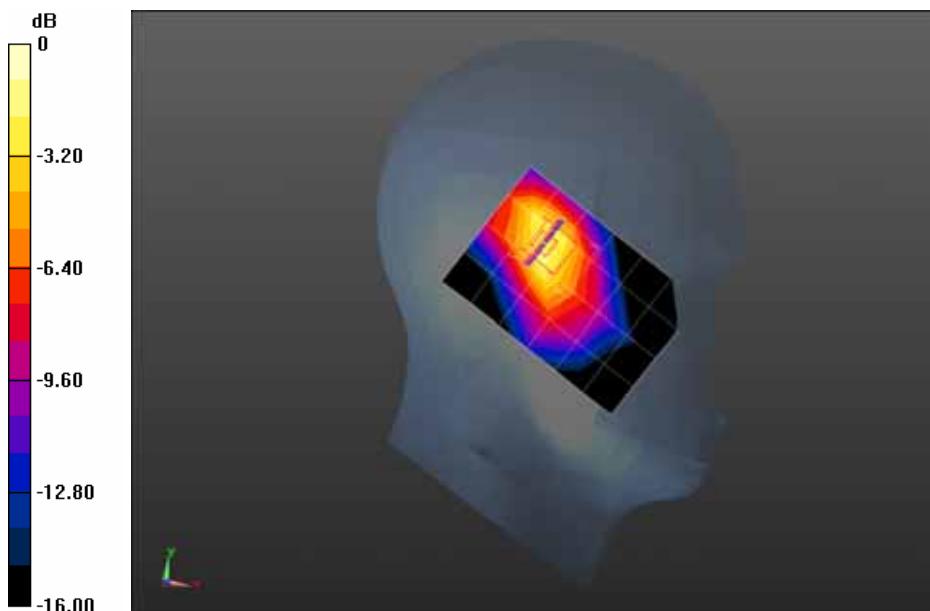
- Probe: EX3DV4 - SN3710; ConvF(9.18, 9.18, 9.18); Calibrated: 12/03/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 23/01/2012
- Phantom: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/GSM850 Mid Tilt-Left/Area Scan (5x7x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 0.0183 mW/g

Configuration/GSM850 Mid Tilt-Left/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 3.874 V/m; Power Drift = 0.17 dB

Peak SAR (extrapolated) = 0.054 mW/g

SAR(1 g) = 0.027 mW/g; SAR(10 g) = 0.014 mW/g Maximum value of SAR (measured) = 0.0280 mW/g

0 dB = 0.0280 mW/g = -31.06 dB mW/g

Date/Time: 28-11-2012

Test Laboratory: QuieTek Lab

GSM850 Mid Touch-Right

DUT: Mobile Phone ; Type: MP1

Communication System: Generic GSM; Communication System Band: GSM850; Duty Cycle: 1:8.3; Frequency: 836.4 MHz; Medium parameters used: $f = 836.4$ MHz; $\sigma = 0.88$ mho/m; $\epsilon_r = 42.03$; $\rho = 1000$ kg/m³; Phantom section: Right Section

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

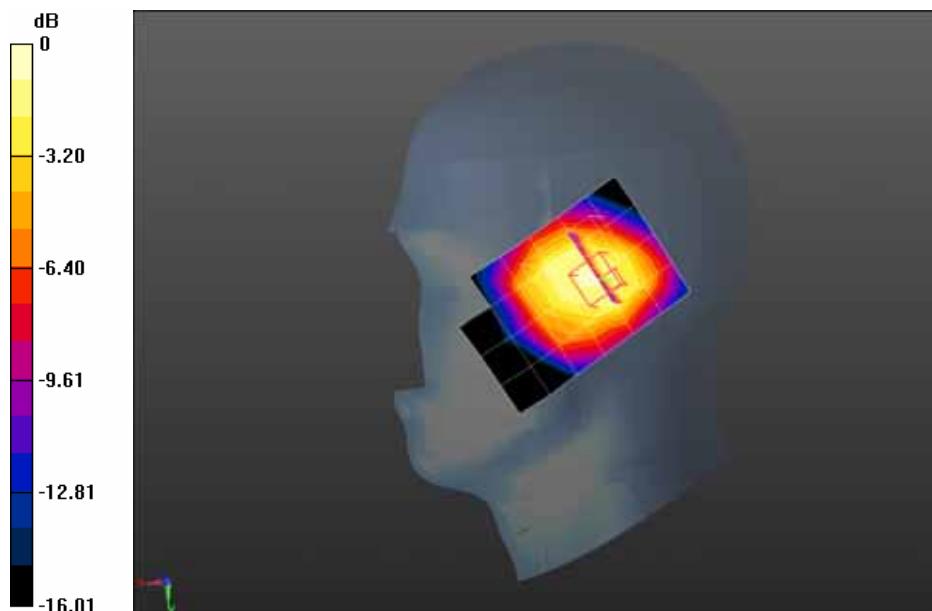
- Probe: EX3DV4 - SN3710; ConvF(9.18, 9.18, 9.18); Calibrated: 12/03/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 23/01/2012
- Phantom: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/GSM850 Mid Touch-Right/Area Scan (5x7x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (measured) = 0.0340 mW/g

Configuration/GSM850 Mid Touch-Right/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 5.939 V/m; Power Drift = 0.13 dB

Peak SAR (extrapolated) = 0.060 mW/g

SAR(1 g) = 0.036 mW/g; SAR(10 g) = 0.024 mW/g Maximum value of SAR (measured) = 0.0395 mW/g



Date/Time: 28-11-2012

Test Laboratory: QuieTek Lab

GSM850 Mid Tilt-Right

DUT: Mobile Phone ; Type: MP1

Communication System: Generic GSM; Communication System Band: GSM850; Duty Cycle: 1:8.3; Frequency: 836.4 MHz; Medium parameters used: $f = 836.4$ MHz; $\sigma = 0.88$ mho/m; $\epsilon_r = 42.03$; $\rho = 1000$ kg/m³; Phantom section: Right Section

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

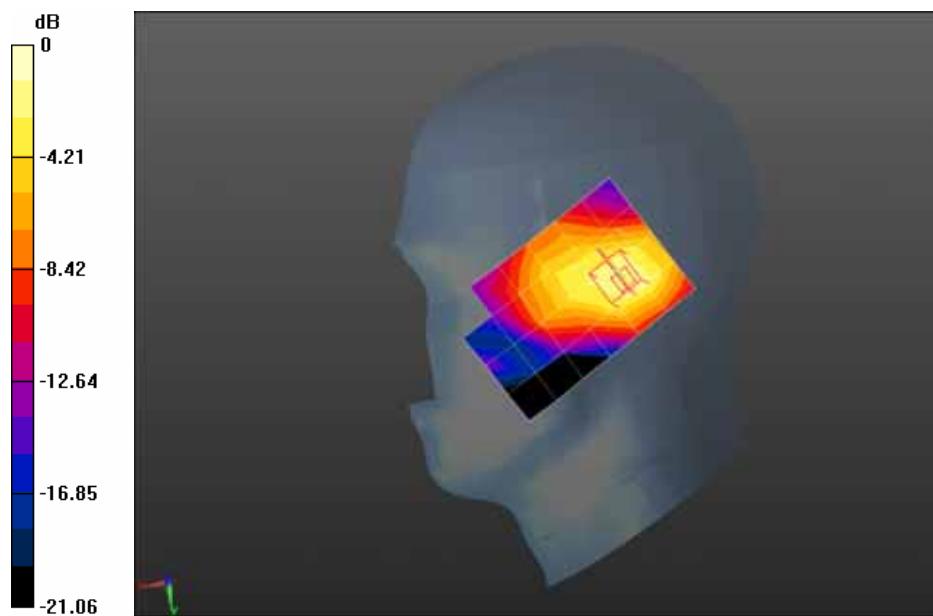
- Probe: EX3DV4 - SN3710; ConvF(9.18, 9.18, 9.18); Calibrated: 12/03/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 23/01/2012
- Phantom: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/GSM850 Mid Tilt-Right/Area Scan (5x7x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 0.0131 mW/g

Configuration/GSM850 Mid Tilt-Right/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 4.332 V/m; Power Drift = -0.15 dB

Peak SAR (extrapolated) = 0.034 mW/g

SAR(1 g) = 0.019 mW/g; SAR(10 g) = 0.011 mW/g Maximum value of SAR (measured) = 0.0205 mW/g

Date/Time: 28-11-2012

Test Laboratory: QuieTek Lab

GSM850 Mid Body-Back

DUT: Mobile Phone ; Type: MP1

Communication System: Generic GSM; Communication System Band: GSM850; Duty Cycle: 1:8.3; Frequency: 836.4 MHz; Medium parameters used: $f = 836.4$ MHz; $\sigma = 0.97$ mho/m; $\epsilon_r = 55.62$; $\rho = 1000$ kg/m³; Phantom section: Flat Section

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

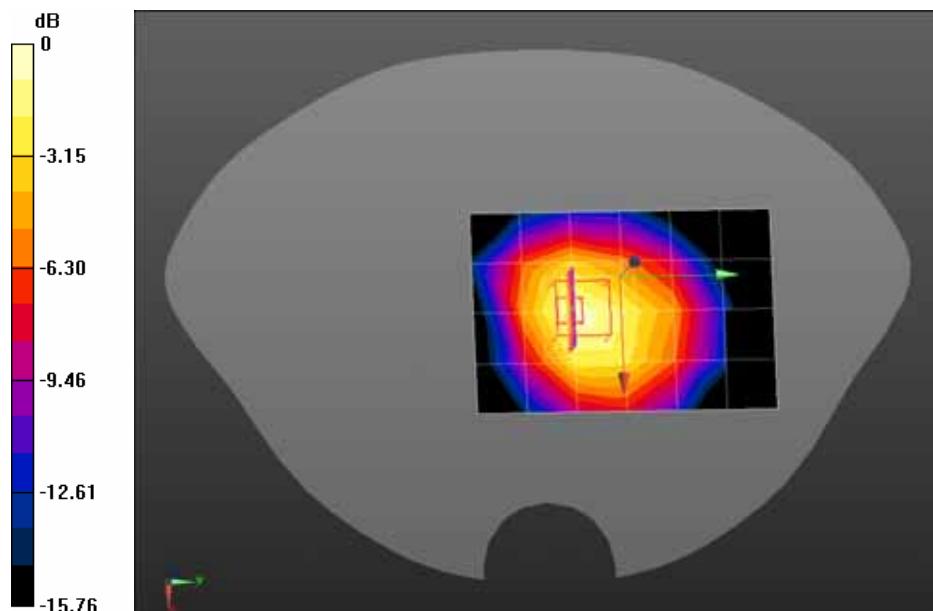
- Probe: EX3DV4 - SN3710; ConvF(9.13, 9.13, 9.13); Calibrated: 12/03/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 23/01/2012
- Phantom: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/GSM850 Mid Body-Back/Area Scan (5x7x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (measured) = 0.0266 mW/g

Configuration/GSM850 Mid Body-Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 4.464 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 0.039 mW/g

SAR(1 g) = 0.025 mW/g; SAR(10 g) = 0.016 mW/g Maximum value of SAR (measured) = 0.0276 mW/g



0 dB = 0.0276 mW/g = -31.18 dB mW/g

Date/Time: 28-11-2012

Test Laboratory: QuieTek Lab

GPRS850 Mid Body-Back(2up)

DUT: Mobile Phone ; Type: MP1

Communication System: GPRS/EGPRS-2 Slot; Communication System Band: GSM850; Duty Cycle: 1:4.2 ;

Frequency: 836.4 MHz; Medium parameters used: $f = 836.4$ MHz; $\sigma = 0.97$ mho/m; $\epsilon_r = 55.62$; $\rho = 1000$ kg/m³ ; Phantom section: Flat Section

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

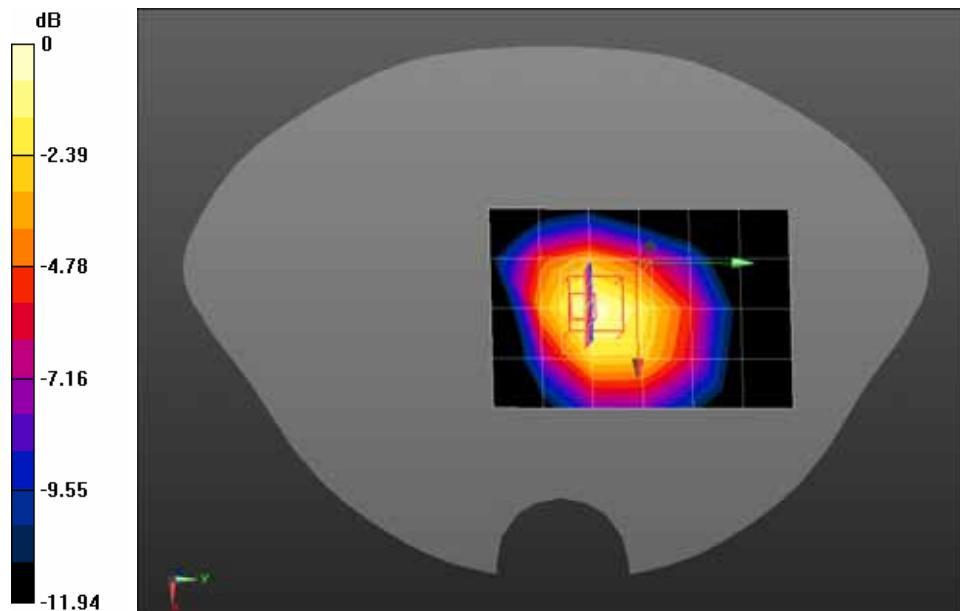
- Probe: EX3DV4 - SN3710; ConvF(9.13, 9.13, 9.13); Calibrated: 12/03/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 23/01/2012
- Phantom: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/GPRS850 Mid Body-Back/Area Scan (5x7x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 0.0390 mW/g

Configuration/GPRS850 Mid Body-Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 5.889 V/m; Power Drift = -0.07 dB

Peak SAR (extrapolated) = 0.055 mW/g

SAR(1 g) = 0.037 mW/g; SAR(10 g) = 0.024 mW/g, Maximum value of SAR (measured) = 0.0402 mW/g

0 dB = 0.0402 mW/g = -27.92 dB mW/g

Date/Time: 28-11-2012

Test Laboratory: QuieTek Lab

GPRS850 Mid Body-Back(3up)

DUT: Mobile Phone ; Type: MP1

Communication System: GPRS/EGPRS-3 Slot; Communication System Band: GSM 850; Duty Cycle: 1:2.8 ;

Frequency: 836.4 MHz; Medium parameters used: $f = 836.4$ MHz; $\sigma = 0.97$ mho/m; $\epsilon_r = 55.62$; $\rho = 1000$ kg/m³ ; Phantom section: Flat Section

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

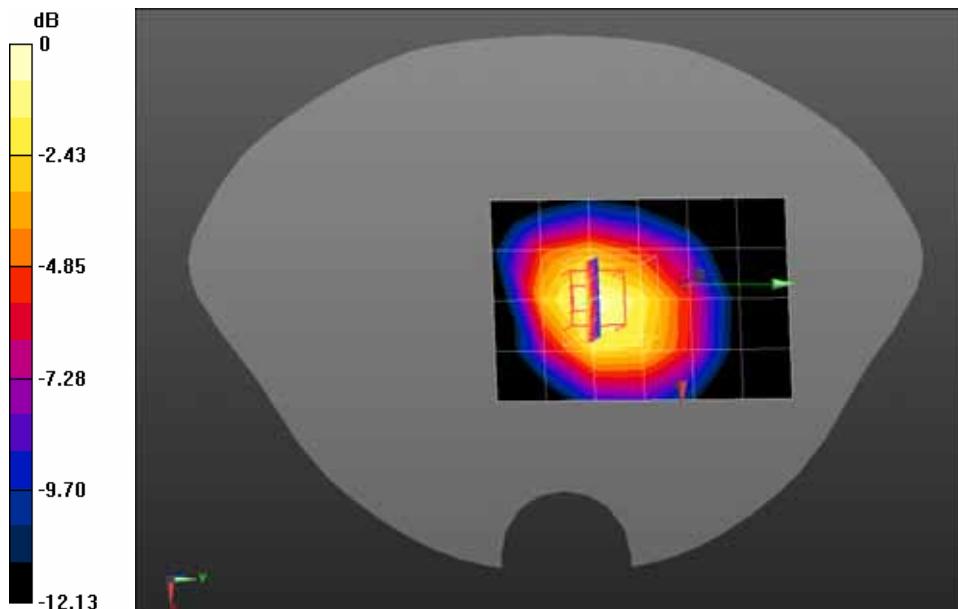
- Probe: EX3DV4 - SN3710; ConvF(9.13, 9.13, 9.13); Calibrated: 12/03/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 23/01/2012
- Phantom: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/GPRS850 Mid Body-Back/Area Scan (5x7x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 0.0431 mW/g

Configuration/GPRS850 Mid Body-Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 6.171 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 0.061 mW/g

SAR(1 g) = 0.041 mW/g; SAR(10 g) = 0.027 mW/g Maximum value of SAR (measured) = 0.0450 mW/g

Date/Time: 28-11-2012

Test Laboratory: QuieTek Lab

GPRS850 Mid Body-Back(4up)

DUT: Mobile Phone ; Type: MP1

Communication System: GPRS/EGPRS-4 Slot; Communication System Band: GSM 850; Duty Cycle: 1:2.1 ;

Frequency: 836.4 MHz; Medium parameters used: $f = 836.4$ MHz; $\sigma = 0.97$ mho/m; $\epsilon_r = 55.62$; $\rho = 1000$ kg/m³ ; Phantom section: Flat Section

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

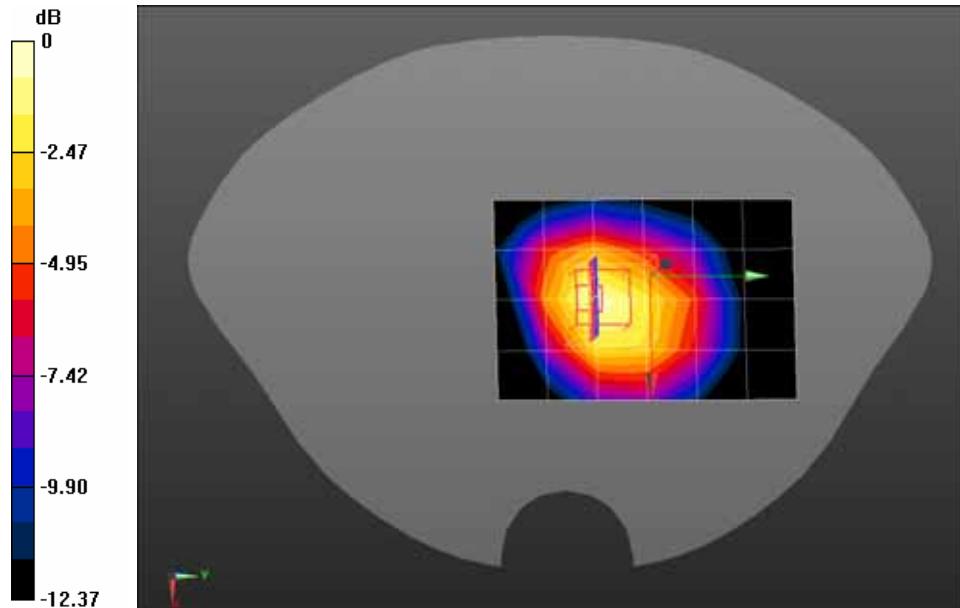
- Probe: EX3DV4 - SN3710; ConvF(9.13, 9.13, 9.13); Calibrated: 12/03/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 23/01/2012
- Phantom: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/GPRS850 Mid Body-Back/Area Scan (5x7x1): Measurement grid: dx=20mm, dy=20mm

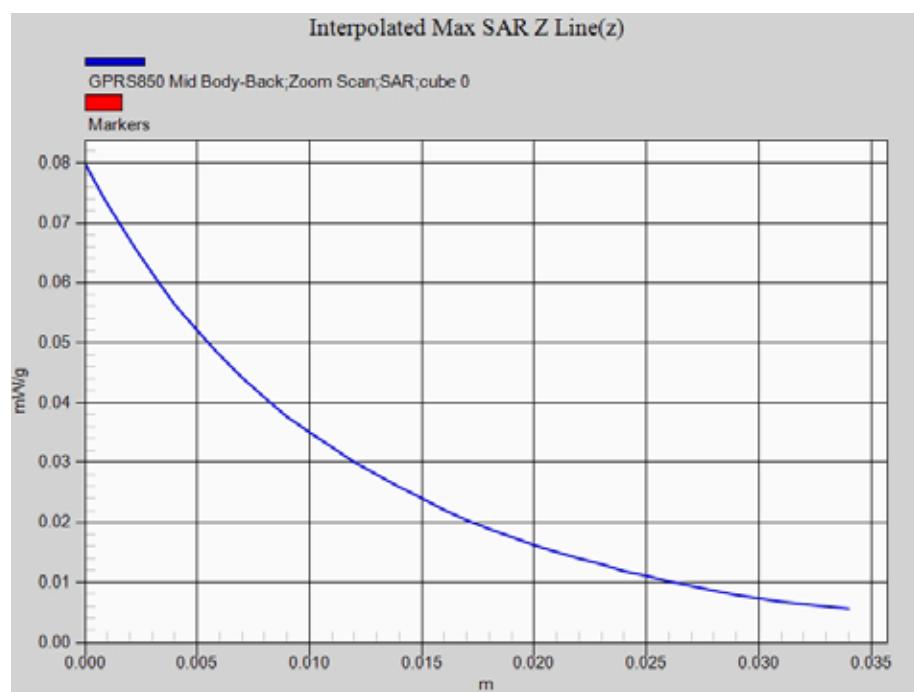
Maximum value of SAR (measured) = 0.0553 mW/g

Configuration/GPRS850 Mid Body-Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 6.805 V/m; Power Drift = -0.16 dB

Peak SAR (extrapolated) = 0.080 mW/g

SAR(1 g) = 0.052 mW/g; SAR(10 g) = 0.033 mW/g Maximum value of SAR (measured) = 0.0569 mW/g

0 dB = 0.0569 mW/g = -24.90 dB mW/g

Z-Axis Plot

Date/Time: 28-11-2012

Test Laboratory: QuieTek Lab

GPRS850 Mid Body-Front(4up)

DUT: Mobile Phone ; Type: MP1

Communication System: GPRS/EGPRS-4 Slot; Communication System Band: GSM 850; Duty Cycle: 1:2.1 ;

Frequency: 836.4 MHz; Medium parameters used: $f = 836.4$ MHz; $\sigma = 0.97$ mho/m; $\epsilon_r = 55.62$; $\rho = 1000$ kg/m³ ; Phantom section: Flat Section

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

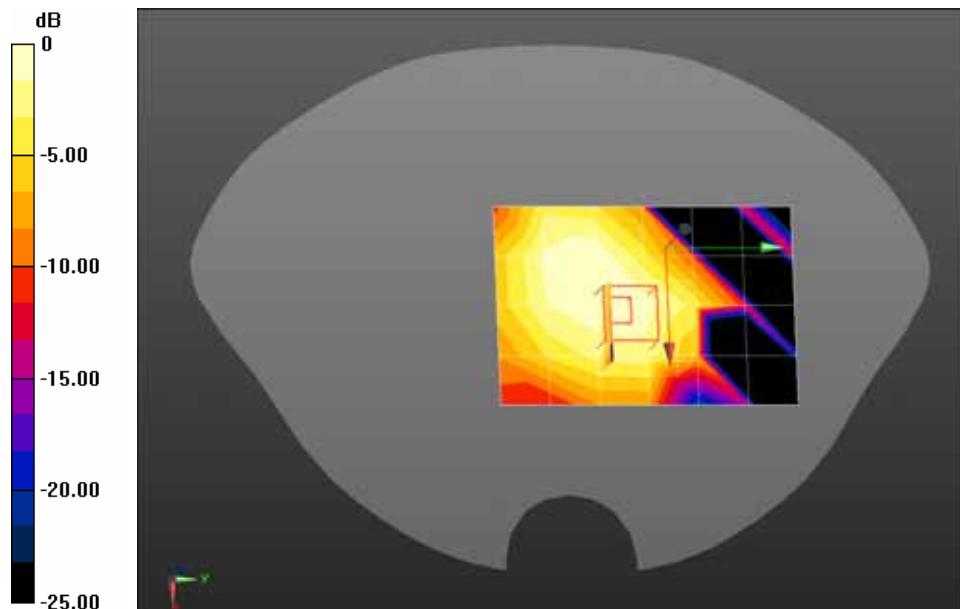
- Probe: EX3DV4 - SN3710; ConvF(9.13, 9.13, 9.13); Calibrated: 12/03/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 23/01/2012
- Phantom: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/GPRS850 Mid Body-Front/Area Scan (5x7x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 0.00521 mW/g

Configuration/GPRS850 Mid Body-Front/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 2.132 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 0.00635 mW/g

SAR(1 g) = 0.004 mW/g; SAR(10 g) = 0.00314 mW/g Maximum value of SAR (measured) = 0.00522 mW/g

0 dB = 0.00522 mW/g = -45.65 dB mW/g

Date/Time: 28-11-2012

Test Laboratory: QuieTek Lab

GPRS850 Mid Body-Back(4up)(with headset)

DUT: Mobile Phone ; Type: MP1

Communication System: GPRS/EGPRS-4 Slot; Communication System Band: GSM 850; Duty Cycle: 1:2.1 ;

Frequency: 836.4 MHz; Medium parameters used: $f = 836.4$ MHz; $\sigma = 0.97$ mho/m; $\epsilon_r = 55.62$; $\rho = 1000$ kg/m³ ; Phantom section: Flat Section

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

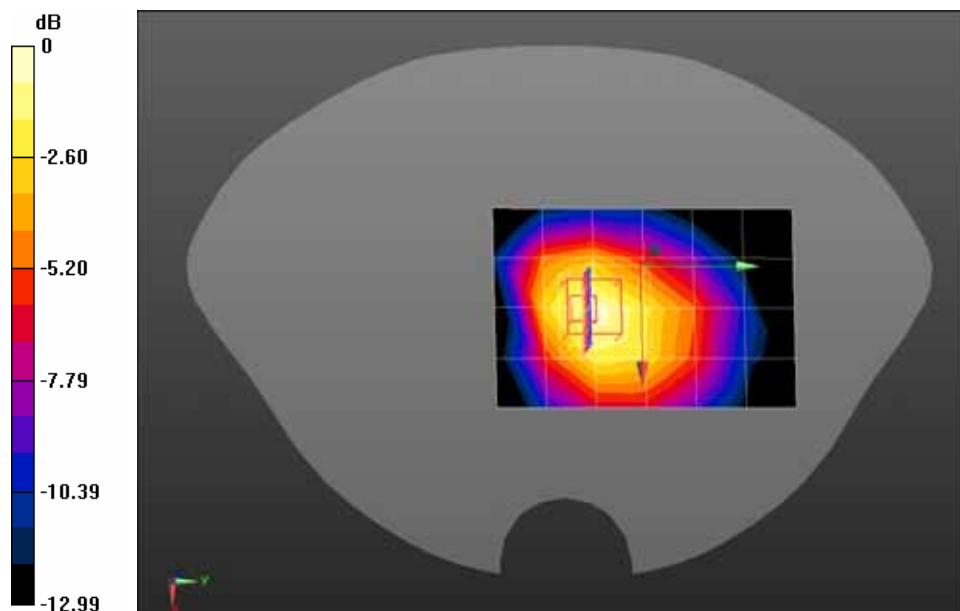
- Probe: EX3DV4 - SN3710; ConvF(9.13, 9.13, 9.13); Calibrated: 12/03/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 23/01/2012
- Phantom: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/GPRS850 Mid Body-Back/Area Scan (5x7x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 0.0402 mW/g

Configuration/GPRS850 Mid Body-Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 6.263 V/m; Power Drift = -0.09 dB

Peak SAR (extrapolated) = 0.061 mW/g

SAR(1 g) = 0.039 mW/g; SAR(10 g) = 0.024 mW/g Maximum value of SAR (measured) = 0.0420 mW/g

$$0 \text{ dB} = 0.0420 \text{ mW/g} = -27.54 \text{ dB mW/g}$$

Date/Time: 28-11-2012

Test Laboratory: QuieTek Lab

PCS1900 Mid Touch-Left

DUT: Mobile Phone ; Type: MP1

Communication System: Generic GSM; Communication System Band: PCS1900; Duty Cycle: 1:8.3;

Frequency: 1880 MHz; Medium parameters used: $f = 1880$ MHz; $\sigma = 1.43$ mho/m; $\epsilon_r = 40.6$; $\rho = 1000$ kg/m³ ;

Phantom section: Left Section

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

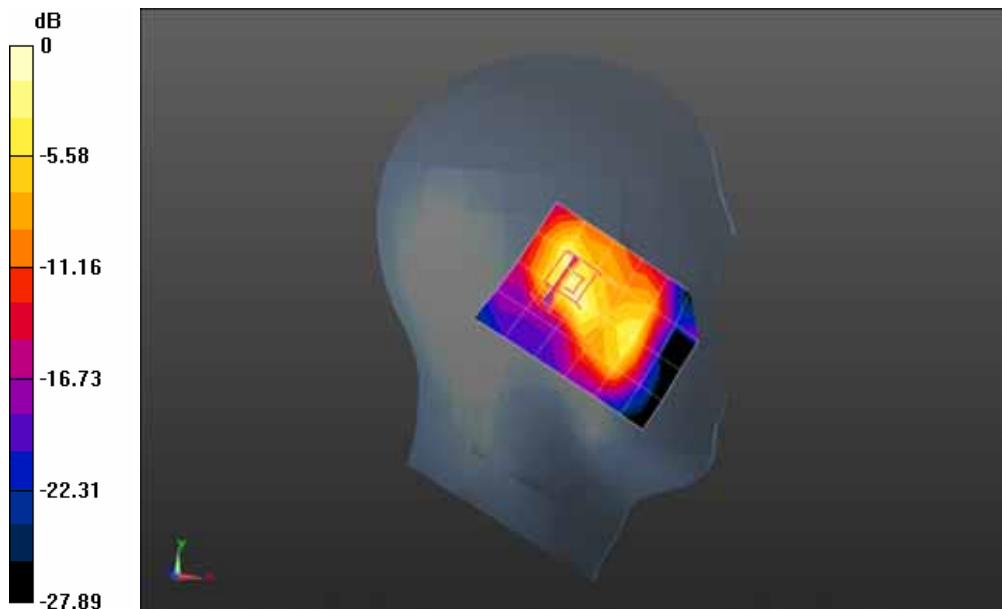
- Probe: EX3DV4 - SN3710; ConvF(8.16, 8.16, 8.16); Calibrated: 12/03/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 23/01/2012
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/PCS1900 Mid Touch-Left/Area Scan (5x7x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 0.198 mW/g

Configuration/PCS1900 Mid Touch-Left/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 9.981 V/m; Power Drift = -0.17 dB

Peak SAR (extrapolated) = 0.499 mW/g

SAR(1 g) = 0.253 mW/g; SAR(10 g) = 0.111 mW/g Maximum value of SAR (measured) = 0.262 mW/g

Date/Time: 28-11-2012

Test Laboratory: QuieTek Lab

PCS1900 Mid Tilt-Left

DUT: Mobile Phone ; Type: MP1

Communication System: Generic GSM; Communication System Band: PCS1900; Duty Cycle: 1:8.3;

Frequency: 1880 MHz; Medium parameters used: $f = 1880$ MHz; $\sigma = 1.43$ mho/m; $\epsilon_r = 40.6$; $\rho = 1000$ kg/m³ ;

Phantom section: Left Section

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

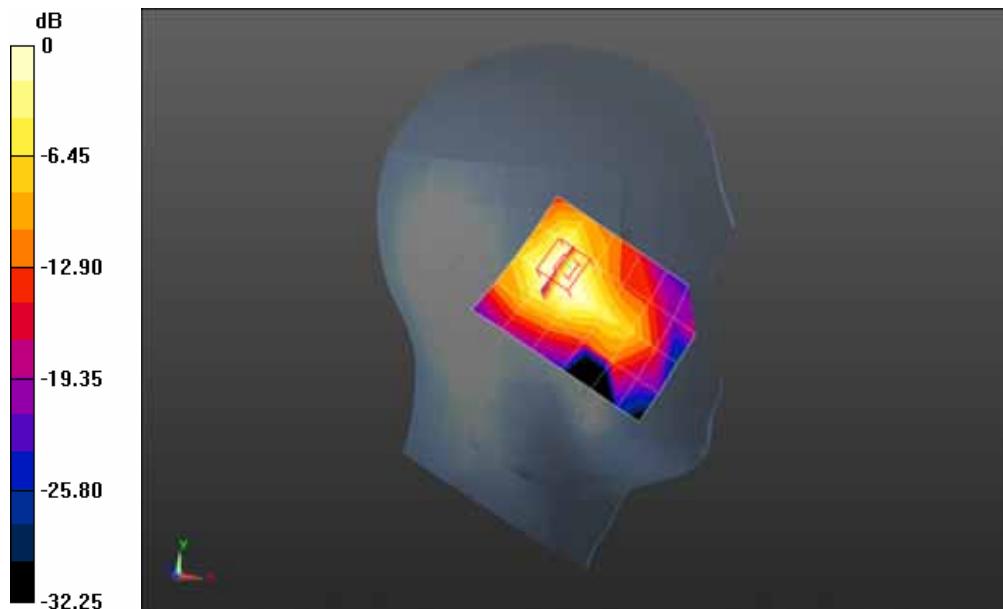
- Probe: EX3DV4 - SN3710; ConvF(8.16, 8.16, 8.16); Calibrated: 12/03/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 23/01/2012
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/PCS1900 Mid Tilt-Left/Area Scan (5x7x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 0.236 mW/g

Configuration/PCS1900 Mid Tilt-Left/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 9.612 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 0.367 mW/g

SAR(1 g) = 0.182 mW/g; SAR(10 g) = 0.083 mW/g Maximum value of SAR (measured) = 0.197 mW/g

Date/Time: 28-11-2012

Test Laboratory: QuieTek Lab

PCS1900 Mid Touch-Right

DUT: Mobile Phone ; Type: MP1

Communication System: Generic GSM; Communication System Band: PCS1900; Duty Cycle: 1:8.3;

Frequency: 1880 MHz; Medium parameters used: $f = 1880$ MHz; $\sigma = 1.43$ mho/m; $\epsilon_r = 40.6$; $\rho = 1000$ kg/m³ ;

Phantom section: Right Section

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

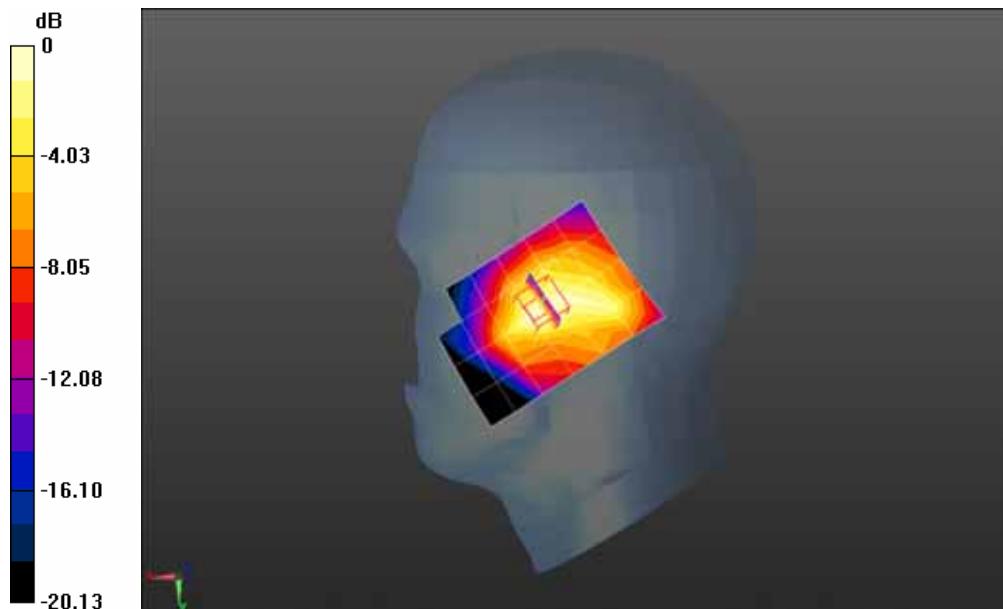
- Probe: EX3DV4 - SN3710; ConvF(8.16, 8.16, 8.16); Calibrated: 12/03/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 23/01/2012
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/PCS1900 Mid Touch-Right/Area Scan (5x7x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 0.211 mW/g

Configuration/PCS1900 Mid Touch-Right/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 10.286 V/m; Power Drift = -0.16 dB

Peak SAR (extrapolated) = 0.338 mW/g

SAR(1 g) = 0.190 mW/g; SAR(10 g) = 0.103 mW/g Maximum value of SAR (measured) = 0.205 mW/g

0 dB = 0.205 mW/g = -13.76 dB mW/g

Date/Time: 28-11-2012

Test Laboratory: QuieTek Lab

PCS1900 Mid Tilt-Right

DUT: Mobile Phone ; Type: MP1

Communication System: Generic GSM; Communication System Band: PCS1900; Duty Cycle: 1:8.3;

Frequency: 1880 MHz; Medium parameters used: $f = 1880$ MHz; $\sigma = 1.43$ mho/m; $\epsilon_r = 40.6$; $\rho = 1000$ kg/m³ ;

Phantom section: Right Section

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

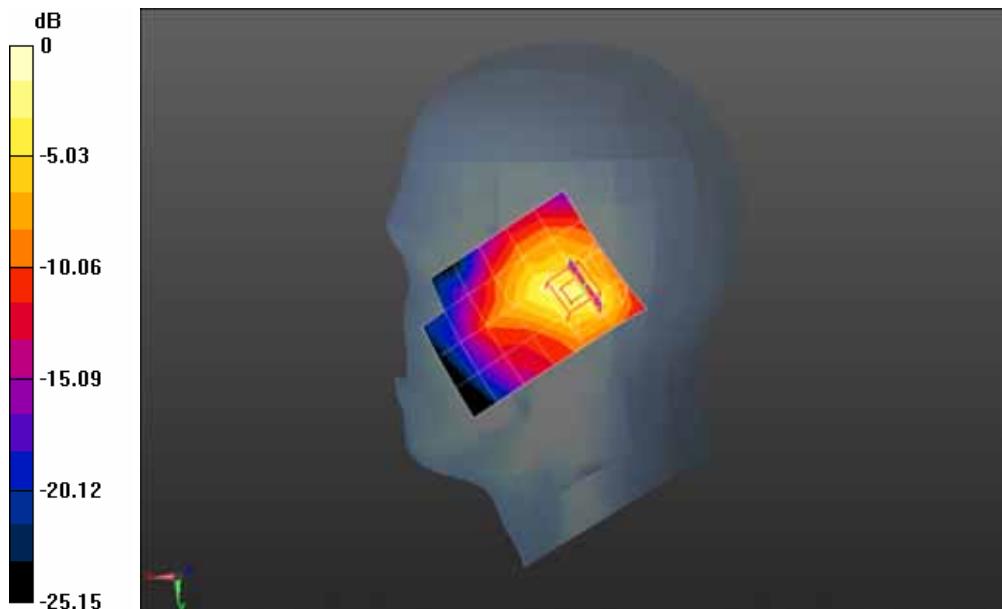
- Probe: EX3DV4 - SN3710; ConvF(8.16, 8.16, 8.16); Calibrated: 12/03/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 23/01/2012
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/PCS1900 Mid Tilt-Right/Area Scan (5x7x1): Measurement grid: dx=20mm, dy=20mm

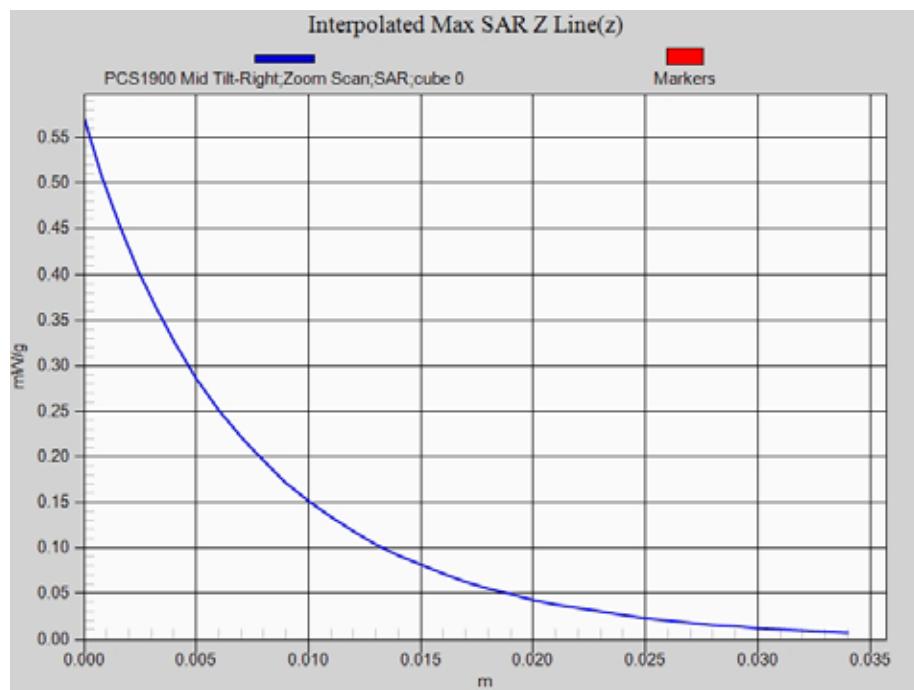
Maximum value of SAR (measured) = 0.173 mW/g

Configuration/PCS1900 Mid Tilt-Right/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 12.142 V/m; Power Drift = -0.13 dB

Peak SAR (extrapolated) = 0.570 mW/g

SAR(1 g) = 0.283 mW/g; SAR(10 g) = 0.135 mW/g Maximum value of SAR (measured) = 0.303 mW/g

0 dB = 0.303 mW/g = -10.37 dB mW/g

Z-Axis Plot

Date/Time: 28-11-2012

Test Laboratory: QuieTek Lab

PCS1900 Mid Body-Back

DUT: Mobile Phone ; Type: MP1

Communication System: Generic GSM; Communication System Band: PCS1900; Duty Cycle: 1:8.3;
Frequency: 1880 MHz; Medium parameters used: $f = 1880$ MHz; $\sigma = 1.53$ mho/m; $\epsilon_r = 53.21$; $\rho = 1000$ kg/m³ ; Phantom section: Flat Section

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

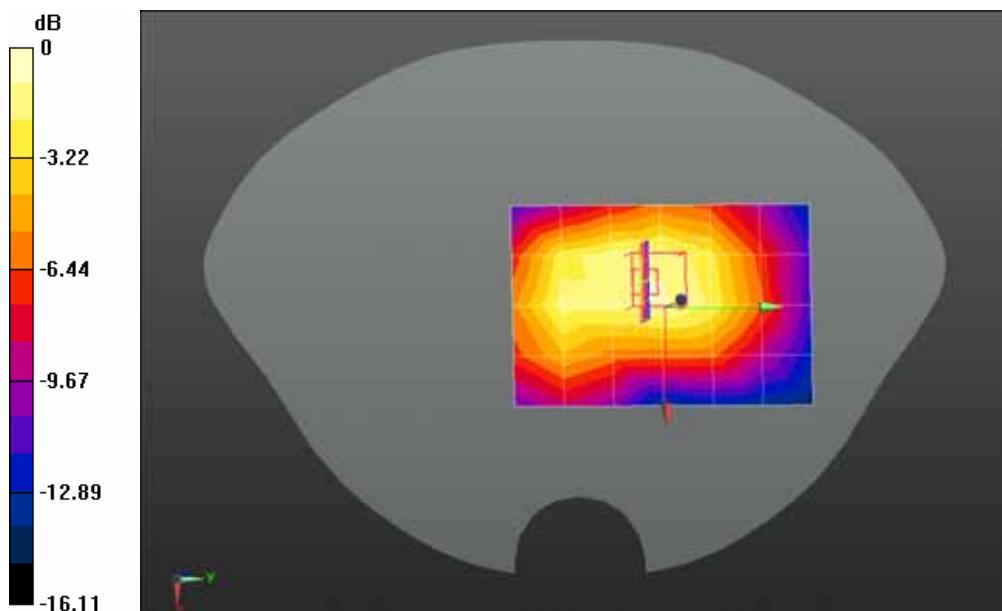
- Probe: EX3DV4 - SN3710; ConvF(7.43, 7.43, 7.43); Calibrated: 12/03/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 23/01/2012
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/PCS1900 Mid Body-Back/Area Scan (5x7x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (measured) = 0.105 mW/g

Configuration/PCS1900 Mid Body-Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 7.552 V/m; Power Drift = 0.14 dB

Peak SAR (extrapolated) = 0.178 mW/g

SAR(1 g) = 0.116 mW/g; SAR(10 g) = 0.073 mW/g Maximum value of SAR (measured) = 0.126 mW/g



0 dB = 0.126 mW/g = -17.99 dB mW/g

Date/Time: 28-11-2012

Test Laboratory: QuieTek Lab

GPRS1900 Mid Body-Back(2up)

DUT: Mobile Phone ; Type: MP1

Communication System: GPRS/EGPRS-2 Slot; Communication System Band: PCS1900; Duty Cycle: 1:4.2 ;

Frequency: 1880 MHz; Medium parameters used: $f = 1880$ MHz; $\sigma = 1.53$ mho/m; $\epsilon_r = 53.21$; $\rho = 1000$ kg/m³ ; Phantom section: Flat Section

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

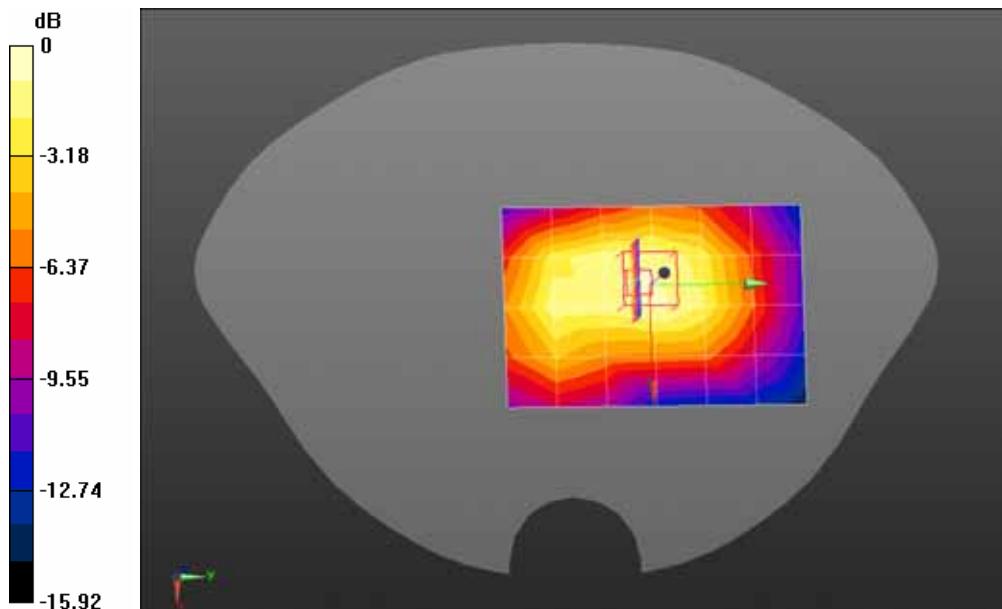
- Probe: EX3DV4 - SN3710; ConvF(7.43, 7.43, 7.43); Calibrated: 12/03/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 23/01/2012
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/GPRS1900 Mid Body-Back/Area Scan (5x7x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 0.178 mW/g

Configuration/GPRS1900 Mid Body-Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 10.013 V/m; Power Drift = -0.10 dB

Peak SAR (extrapolated) = 0.289 mW/g

SAR(1 g) = 0.188 mW/g; SAR(10 g) = 0.118 mW/g Maximum value of SAR (measured) = 0.203 mW/g

0 dB = 0.203 mW/g = -13.85 dB mW/g

Date/Time: 28-11-2012

Test Laboratory: QuieTek Lab

GPRS1900 Mid Body-Back(3up)

DUT: Mobile Phone ; Type: MP1

Communication System: GPRS/EGPRS-3 Slot; Communication System Band: PCS 1900; Duty Cycle: 1:2.8 ; Frequency: 1880 MHz; Medium parameters used: $f = 1880$ MHz; $\sigma = 1.53$ mho/m; $\epsilon_r = 53.21$; $\rho = 1000$ kg/m³ ; Phantom section: Flat Section

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

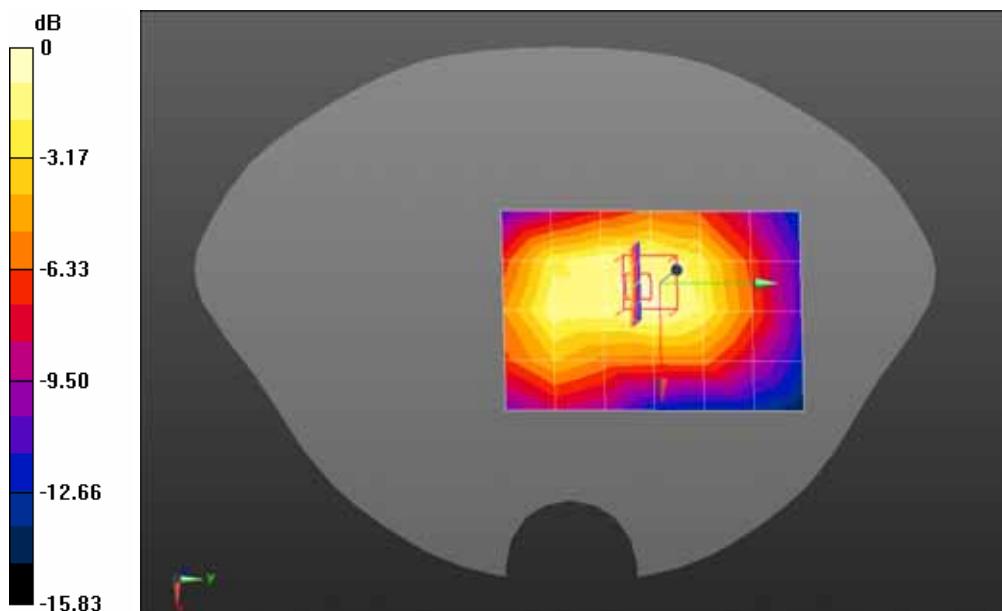
- Probe: EX3DV4 - SN3710; ConvF(7.43, 7.43, 7.43); Calibrated: 12/03/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 23/01/2012
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/GPRS1900 Mid Body-Back/Area Scan (5x7x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 0.185 mW/g

Configuration/GPRS1900 Mid Body-Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 10.156 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 0.299 mW/g

SAR(1 g) = 0.196 mW/g; SAR(10 g) = 0.123 mW/g Maximum value of SAR (measured) = 0.212 mW/g

0 dB = 0.212 mW/g = -13.47 dB mW/g

Date/Time: 28-11-2012

Test Laboratory: QuieTek Lab

GPRS1900 Mid Body-Back(4up)

DUT: Mobile Phone ; Type: MP1

Communication System: GPRS/EGPRS-4 Slot; Communication System Band: PCS 1900; Duty Cycle: 1:2.1 ; Frequency: 1880 MHz; Medium parameters used: $f = 1880$ MHz; $\sigma = 1.53$ mho/m; $\epsilon_r = 53.21$; $\rho = 1000$ kg/m³ ; Phantom section: Flat Section

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

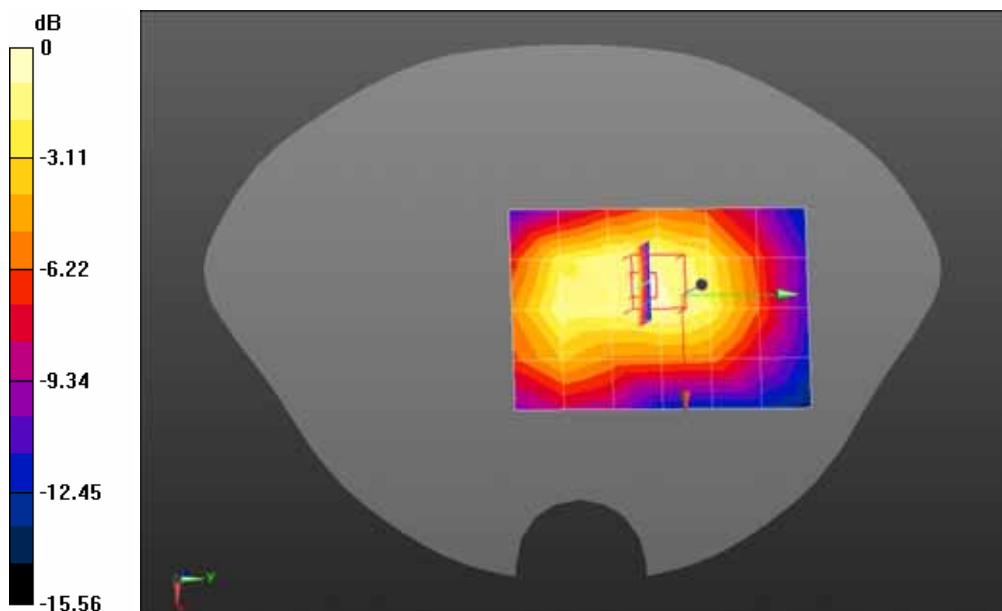
- Probe: EX3DV4 - SN3710; ConvF(7.43, 7.43, 7.43); Calibrated: 12/03/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 23/01/2012
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/GPRS1900 Mid Body-Back/Area Scan (5x7x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 0.199 mW/g

Configuration/GPRS1900 Mid Body-Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 6.652 V/m; Power Drift = 0.10 dB

Peak SAR (extrapolated) = 0.337 mW/g

SAR(1 g) = 0.214 mW/g; SAR(10 g) = 0.135 mW/g Maximum value of SAR (measured) = 0.230 mW/g

0 dB = 0.230 mW/g = -12.77 dB mW/g

Date/Time: 28-11-2012

Test Laboratory: QuieTek Lab

GPRS1900 Mid Body-Front(4up)

DUT: Mobile Phone ; Type: MP1

Communication System: GPRS/EGPRS-4 Slot; Communication System Band: PCS 1900; Duty Cycle: 1:2.1 ; Frequency: 1880 MHz; Medium parameters used: $f = 1880$ MHz; $\sigma = 1.53$ mho/m; $\epsilon_r = 53.21$; $\rho = 1000$ kg/m³ ; Phantom section: Flat Section

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

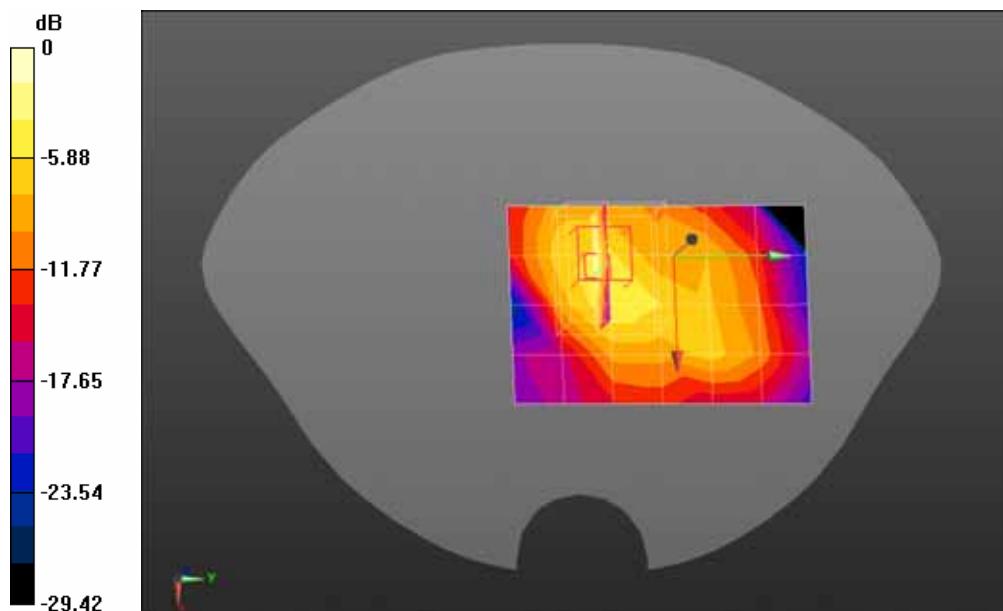
- Probe: EX3DV4 - SN3710; ConvF(7.43, 7.43, 7.43); Calibrated: 12/03/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 23/01/2012
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/GPRS1900 Mid Body-Front/Area Scan (5x7x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 0.0434 mW/g

Configuration/GPRS1900 Mid Body-Front/Zoom Scan (7x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 4.272 V/m; Power Drift = 0.14 dB

Peak SAR (extrapolated) = 0.166 mW/g

SAR(1 g) = 0.096 mW/g; SAR(10 g) = 0.051 mW/g Maximum value of SAR (measured) = 0.108 mW/g

0 dB = 0.108 mW/g = -19.33 dB mW/g

Date/Time: 28-11-2012

Test Laboratory: QuieTek Lab

GPRS1900 Mid Body-Back(4up)(with headset)

DUT: Mobile Phone ; Type: MP1

Communication System: GPRS/EGPRS-4 Slot; Communication System Band: PCS 1900; Duty Cycle: 1:2.1 ; Frequency: 1880 MHz; Medium parameters used: $f = 1880$ MHz; $\sigma = 1.53$ mho/m; $\epsilon_r = 53.21$; $\rho = 1000$ kg/m³ ; Phantom section: Flat Section

Ambient temperature (°C): 21.5, Liquid temperature (°C): 21.0

DASY5 Configuration:

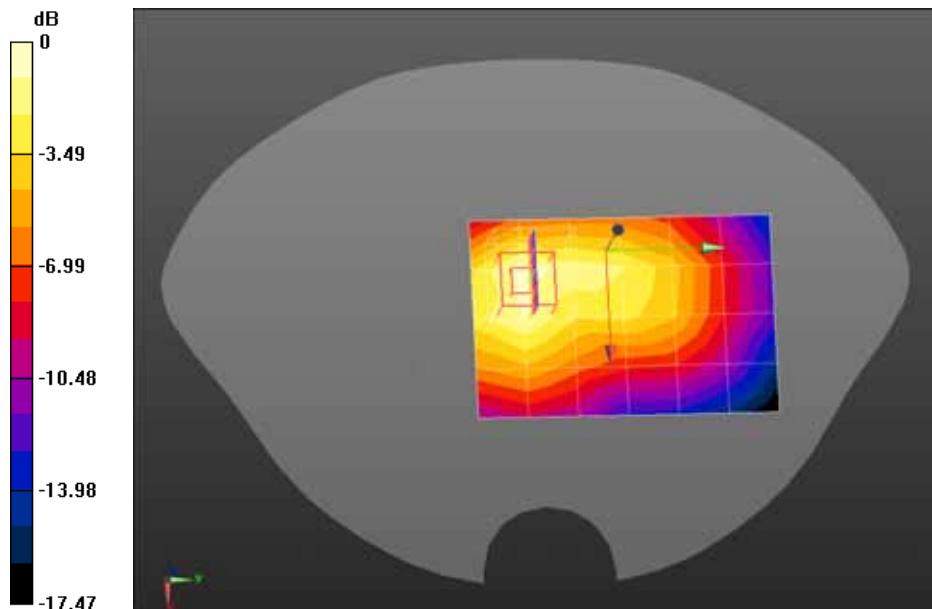
- Probe: EX3DV4 - SN3710; ConvF(7.43, 7.43, 7.43); Calibrated: 12/03/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 23/01/2012
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/GPRS1900 Mid Body-Back/Area Scan (5x7x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 0.168 mW/g

Configuration/GPRS1900 Mid Body-Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 9.418 V/m; Power Drift = -0.11 dB

Peak SAR (extrapolated) = 0.276 mW/g

SAR(1 g) = 0.167 mW/g; SAR(10 g) = 0.098 mW/g Maximum value of SAR (measured) = 0.183 mW/g

0 dB = 0.183 mW/g = -14.75 dB mW/g

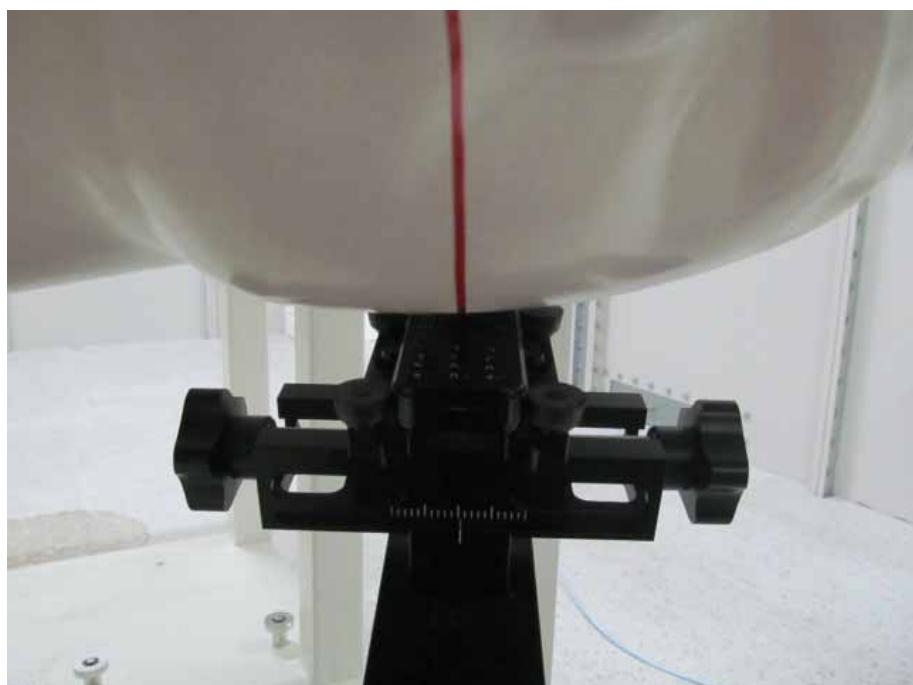
Appendix C. Test Setup Photographs & EUT Photographs

Test Setup Photographs

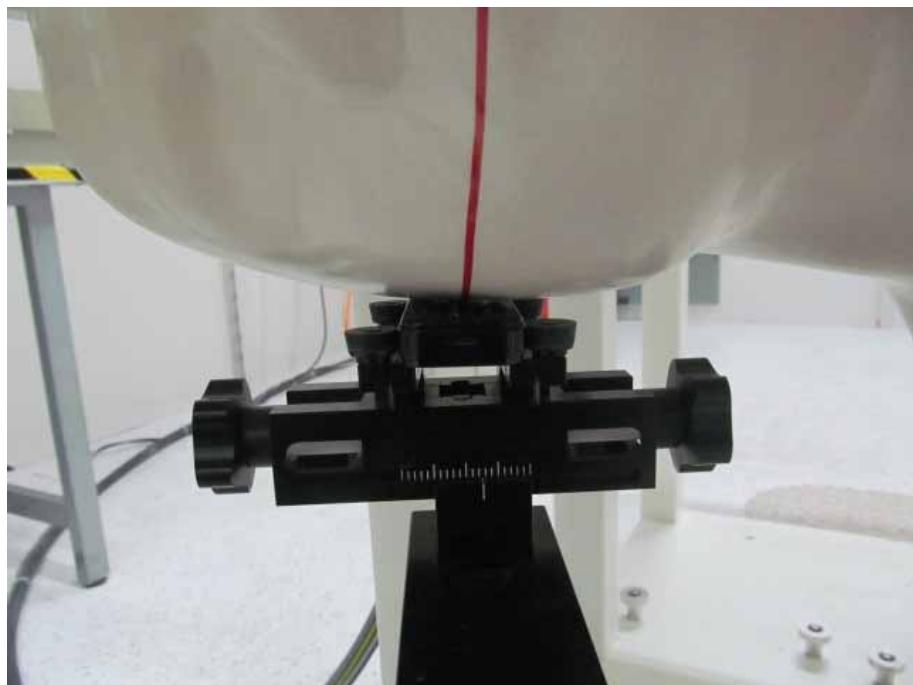
Left Head (EUT Cheek)



Left Head (EUT Tilted)



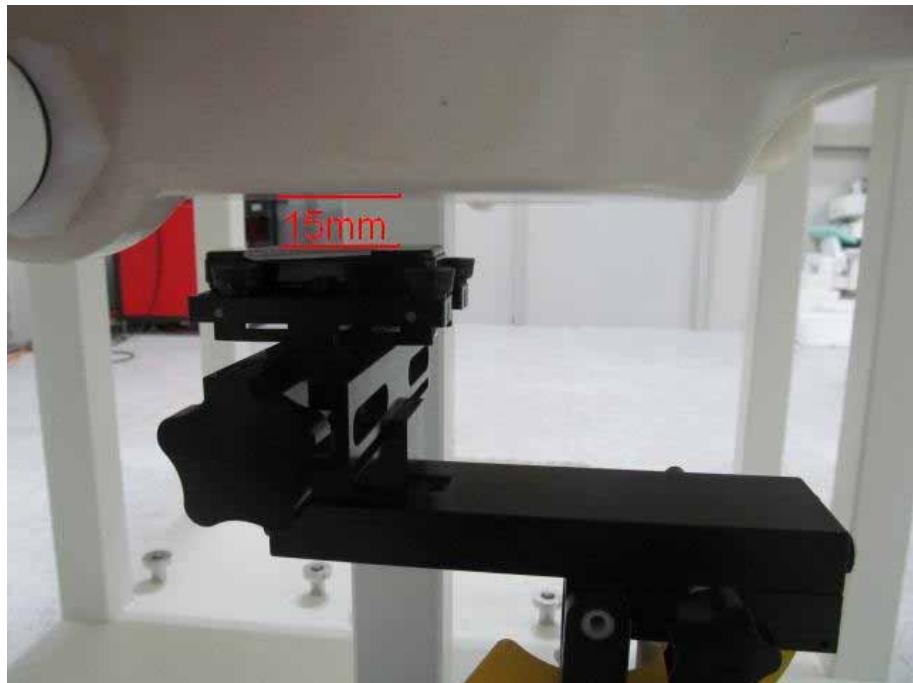
Right Head (EUT Cheek)



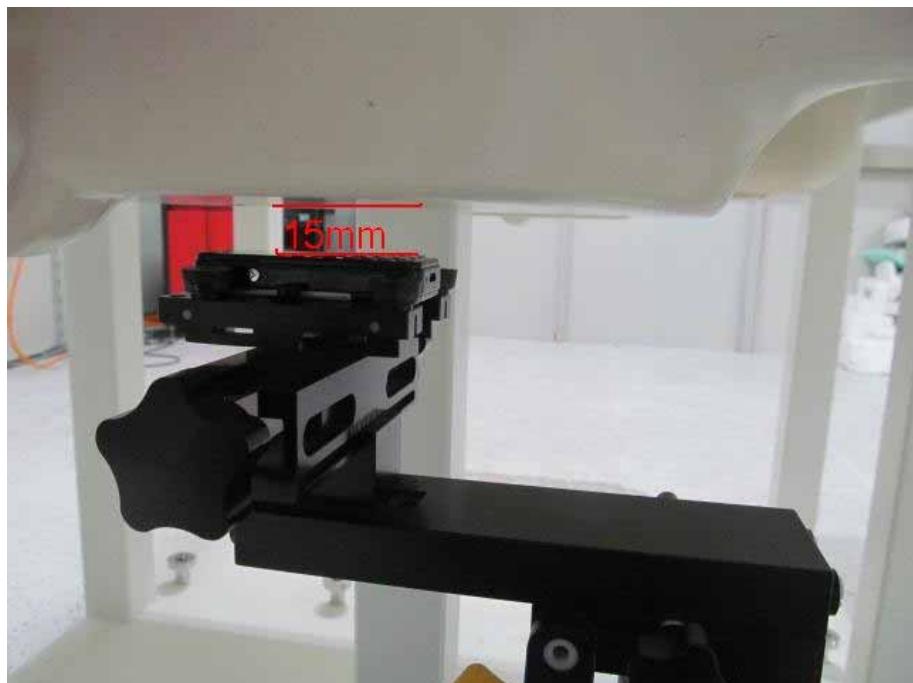
Right Head (EUT Tilted)



Body SAR Back 15mm



Body SAR Front 15mm

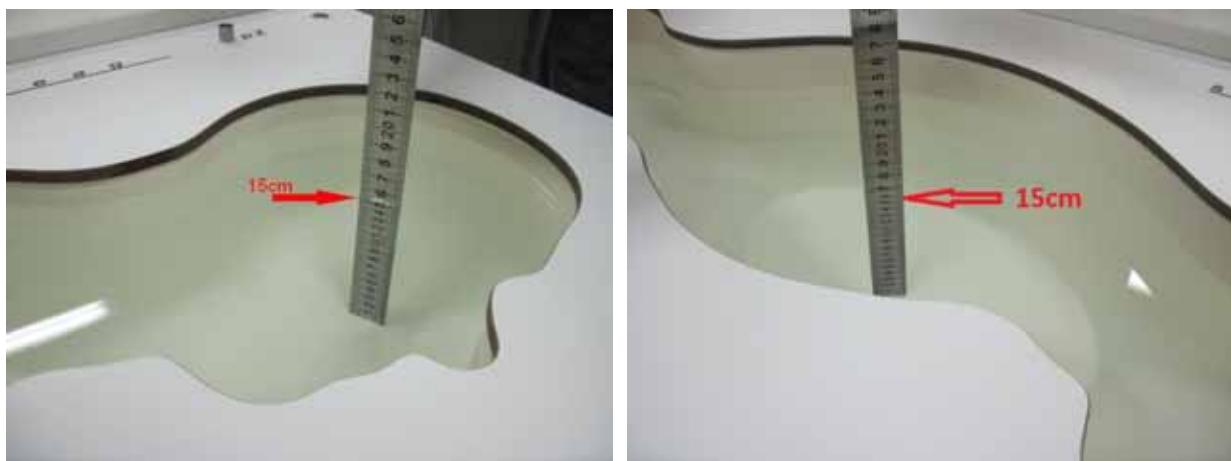


Body SAR Back 15mm with Headset



Depth of the liquid in the phantom – Zoom in

Note: The position used in the measurements were according to IEEE 1528 - 2003



EUT Photographs

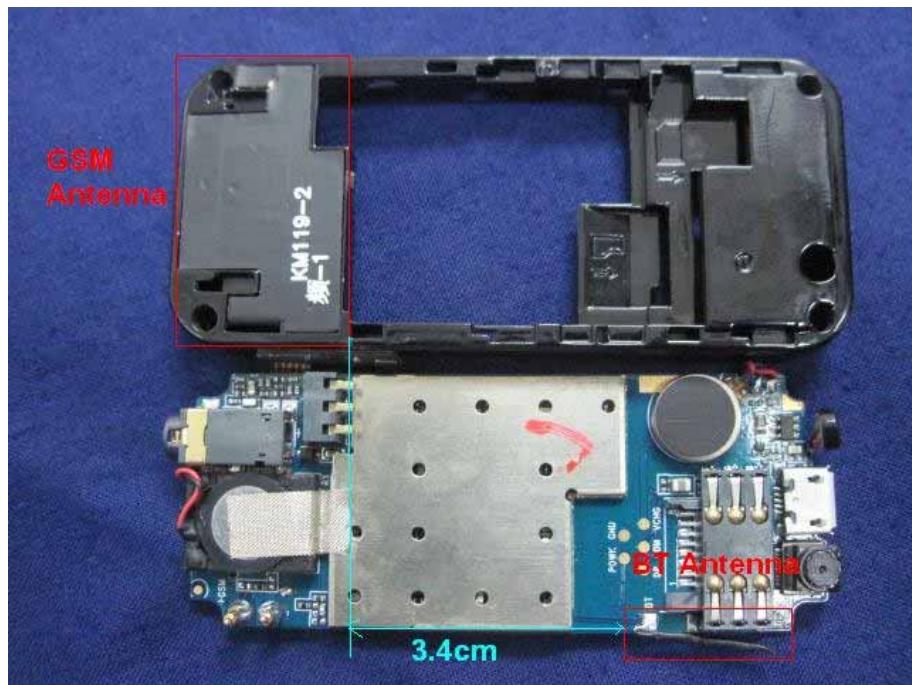
(1) EUT Photo



(2) EUT Photo



(3) EUT Photo



Appendix D. Probe Calibration Data

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland



S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Client: Quietek-CN (Auden)

Certificate No: EX3-3710_Mar12

CALIBRATION CERTIFICATE

Object: EX3DV4 - SN:3710

Calibration procedure(s): QA CAL-01.v8, QA CAL-12.v7, QA CAL-14.v3, QA CAL-23.v4,
QA CAL-25.v4
Calibration procedure for dosimetric E-field probes

Calibration date: March 12, 2012

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature $(22 \pm 3)^\circ\text{C}$ and humidity $< 70\%$.

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards | ID | Cal Date (Certificate No.) | Scheduled Calibration |
|----------------------------|-----------------|-----------------------------------|------------------------|
| Power meter E4419B | GB41293874 | 31-Mar-11 (No. 217-01372) | Apr-12 |
| Power sensor E4412A | NY41498087 | 31-Mar-11 (No. 217-01372) | Apr-12 |
| Reference 3 dB Attenuator | SN: S5054 (3c) | 29-Mar-11 (No. 217-01369) | Apr-12 |
| Reference 20 dB Attenuator | SN: S5086 (20b) | 29-Mar-11 (No. 217-01367) | Apr-12 |
| Reference 30 dB Attenuator | SN: S5129 (30b) | 29-Mar-11 (No. 217-01370) | Apr-12 |
| Reference Probe ES3DV2 | SN: 3013 | 29-Dec-11 (No. ES3-3013_Dec11) | Dec-12 |
| DAE4 | SN: 654 | 3-May-11 (No. DAE4-654_May11) | May-12 |
| Secondary Standards | ID | Check Date (in house) | Scheduled Check |
| RF generator HP 8648C | US3642U01700 | 4-Aug-99 (in house check Apr-11) | In house check: Apr-13 |
| Network Analyzer HP 8753E | US37390585 | 18-Oct-01 (in house check Oct-11) | In house check: Oct-12 |

| | | |
|----------------|---|------------|
| Calibrated by: | Name: Jeton Kastrati Function: Laboratory Technician | Signature: |
| Approved by: | Name: Katja Pokovic Function: Technical Manager | Signature: |

Issued: March 13, 2012

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Calibration Laboratory of
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Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland



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Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Glossary:

| | |
|--------------------------|--|
| TSL | tissue simulating liquid |
| NORM x,y,z | sensitivity in free space |
| ConvF | sensitivity in TSL / NORM x,y,z |
| DCP | diode compression point |
| CF | crest factor (1/duty_cycle) of the RF signal |
| A, B, C | modulation dependent linearization parameters |
| Polarization φ | φ rotation around probe axis |
| Polarization ϑ | ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\vartheta = 0$ is normal to probe axis |

Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

Methods Applied and Interpretation of Parameters:

- $NORM_{x,y,z}$: Assessed for E-field polarization $\vartheta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). $NORM_{x,y,z}$ are only intermediate values, i.e., the uncertainties of $NORM_{x,y,z}$ does not affect the E^2 -field uncertainty inside TSL (see below ConvF).
- $NORM(f)x,y,z = NORM_{x,y,z} * frequency_response$ (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConvF.
- $DCPx,y,z$: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- PAR : PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- $A_{x,y,z}; B_{x,y,z}; C_{x,y,z}$; $VR_{x,y,z}$: A, B, C are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- ConvF and Boundary Effect Parameters*: Assessed in flat phantom using E-field (or Temperature Transfer Standard for $f \leq 800$ MHz) and inside waveguide using analytical field distributions based on power measurements for $f > 800$ MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to $NORM_{x,y,z} * ConvF$ whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

EX3DV4 – SN:3710

March 12, 2012

Probe EX3DV4

SN:3710

Manufactured: July 21, 2009
Repaired: February 21, 2012
Calibrated: March 12, 2012

Calibrated for DASY/EASY Systems
(Note: non-compatible with DASY2 system!)

EX3DV4- SN:3710

March 12, 2012

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3710**Basic Calibration Parameters**

| | Sensor X | Sensor Y | Sensor Z | Unc (k=2) |
|---|----------|----------|----------|--------------|
| Norm ($\mu\text{V}/(\text{V}/\text{m})^2$) ^A | 0.51 | 0.56 | 0.44 | $\pm 10.1\%$ |
| DCP (mV) ^B | 101.3 | 98.9 | 100.9 | |

Modulation Calibration Parameters

| UID | Communication System Name | PAR | | A dB | B dB | C dB | VR mV | Unc ^E (k=2) |
|-------|---------------------------|------|---|---------|---------|---------|----------|---------------------------|
| 10000 | CW | 0.00 | X | 0.00 | 0.00 | 1.00 | 114.4 | $\pm 2.2\%$ |
| | | | Y | 0.00 | 0.00 | 1.00 | 94.4 | |
| | | | Z | 0.00 | 0.00 | 1.00 | 114.2 | |

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

^A The uncertainties of NormX,Y,Z do not affect the E^2 -field uncertainty inside TSL (see Pages 5 and 6).

^B Numerical linearization parameter: uncertainty not required.

^E Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

EX3DV4- SN:3710

March 12, 2012

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3710

Calibration Parameter Determined in Head Tissue Simulating Media

| f (MHz) ^c | Relative Permittivity ^f | Conductivity (S/m) ^f | ConvF X | ConvF Y | ConvF Z | Alpha | Depth (mm) | Unct. (k=2) |
|----------------------|------------------------------------|---------------------------------|---------|---------|---------|-------|------------|-------------|
| 450 | 43.5 | 0.87 | 9.61 | 9.61 | 9.61 | 0.12 | 1.00 | ± 13.4 % |
| 750 | 41.9 | 0.89 | 9.51 | 9.51 | 9.51 | 0.24 | 1.16 | ± 12.0 % |
| 835 | 41.5 | 0.90 | 9.18 | 9.18 | 9.18 | 0.22 | 1.15 | ± 12.0 % |
| 900 | 41.5 | 0.97 | 8.97 | 8.97 | 8.97 | 0.19 | 1.35 | ± 12.0 % |
| 1810 | 40.0 | 1.40 | 8.32 | 8.32 | 8.32 | 0.79 | 0.60 | ± 12.0 % |
| 1900 | 40.0 | 1.40 | 8.16 | 8.16 | 8.16 | 0.72 | 0.66 | ± 12.0 % |
| 2450 | 39.2 | 1.80 | 7.25 | 7.25 | 7.25 | 0.36 | 0.91 | ± 12.0 % |
| 2600 | 39.0 | 1.96 | 6.96 | 6.96 | 6.96 | 0.39 | 0.95 | ± 12.0 % |
| 3500 | 37.9 | 2.91 | 6.80 | 6.80 | 6.80 | 0.33 | 1.09 | ± 13.1 % |
| 5200 | 36.0 | 4.66 | 5.21 | 5.21 | 5.21 | 0.35 | 1.80 | ± 13.1 % |
| 5500 | 35.6 | 4.96 | 4.95 | 4.95 | 4.95 | 0.35 | 1.80 | ± 13.1 % |
| 5800 | 35.3 | 5.27 | 4.56 | 4.56 | 4.56 | 0.45 | 1.80 | ± 13.1 % |

^c Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

^f At frequencies below 3 GHz, the validity of tissue parameters (ϵ and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ϵ and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

EX3DV4- SN:3710

March 12, 2012

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3710**Calibration Parameter Determined in Body Tissue Simulating Media**

| f (MHz) ^c | Relative Permittivity ^f | Conductivity (S/m) ^f | ConvF X | ConvF Y | ConvF Z | Alpha | Depth (mm) | Unct. (k=2) |
|----------------------|------------------------------------|---------------------------------|---------|---------|---------|-------|------------|-------------|
| 450 | 56.7 | 0.94 | 10.69 | 10.69 | 10.69 | 0.06 | 1.00 | ± 13.4 % |
| 750 | 55.5 | 0.96 | 9.33 | 9.33 | 9.33 | 0.43 | 0.86 | ± 12.0 % |
| 835 | 55.2 | 0.97 | 9.13 | 9.13 | 9.13 | 0.63 | 0.70 | ± 12.0 % |
| 900 | 55.0 | 1.05 | 9.04 | 9.04 | 9.04 | 0.39 | 0.88 | ± 12.0 % |
| 1810 | 53.3 | 1.52 | 7.73 | 7.73 | 7.73 | 0.33 | 1.10 | ± 12.0 % |
| 1900 | 53.3 | 1.52 | 7.43 | 7.43 | 7.43 | 0.42 | 0.90 | ± 12.0 % |
| 2450 | 52.7 | 1.95 | 6.98 | 6.98 | 6.98 | 0.79 | 0.59 | ± 12.0 % |
| 2600 | 52.5 | 2.16 | 6.68 | 6.68 | 6.68 | 0.79 | 0.52 | ± 12.0 % |
| 3500 | 51.3 | 3.31 | 6.23 | 6.23 | 6.23 | 0.36 | 1.13 | ± 13.1 % |
| 5200 | 49.0 | 5.30 | 4.20 | 4.20 | 4.20 | 0.50 | 1.90 | ± 13.1 % |
| 5500 | 48.6 | 5.65 | 3.82 | 3.82 | 3.82 | 0.50 | 1.90 | ± 13.1 % |
| 5800 | 48.2 | 6.00 | 3.89 | 3.89 | 3.89 | 0.60 | 1.90 | ± 13.1 % |

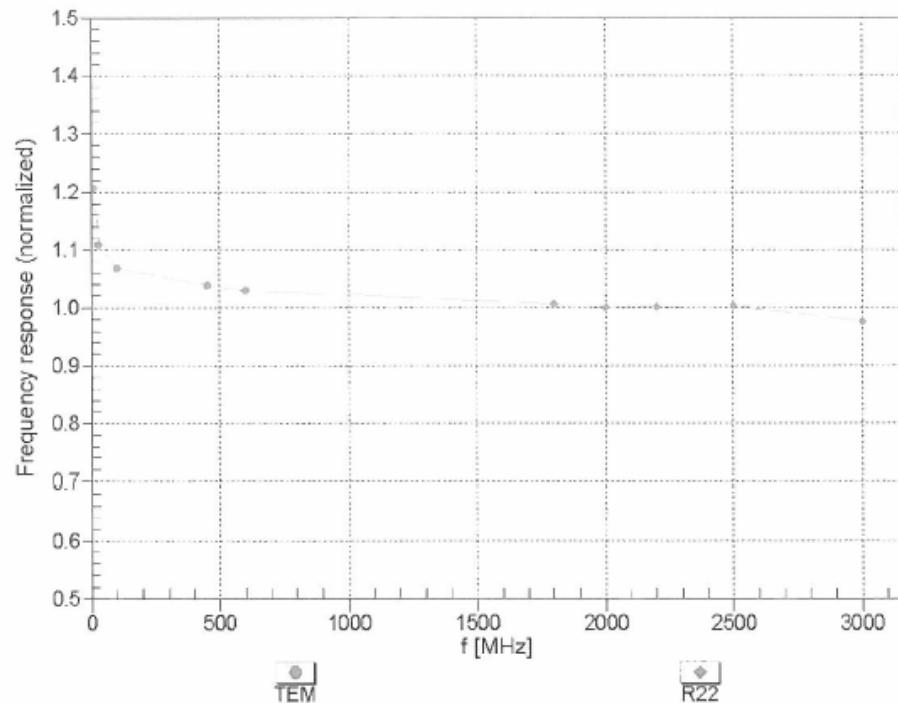
^c Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.^f At frequencies below 3 GHz, the validity of tissue parameters (ϵ and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ϵ and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

EX3DV4– SN:3710

March 12, 2012

Frequency Response of E-Field

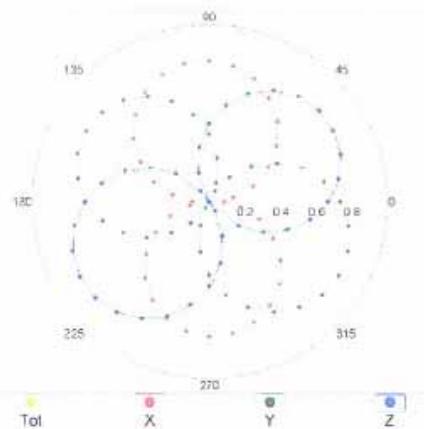
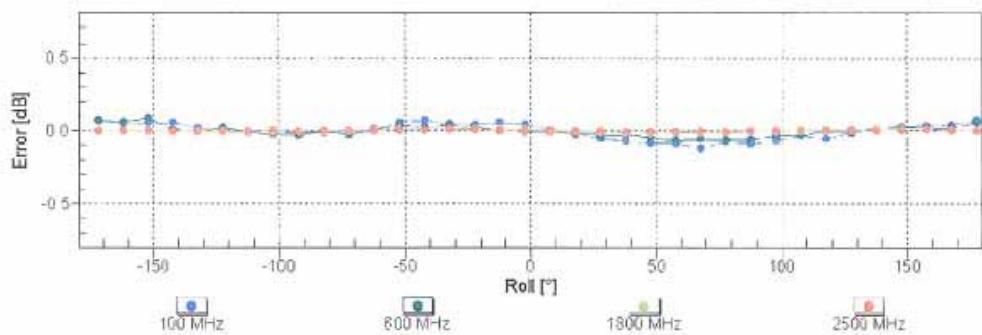
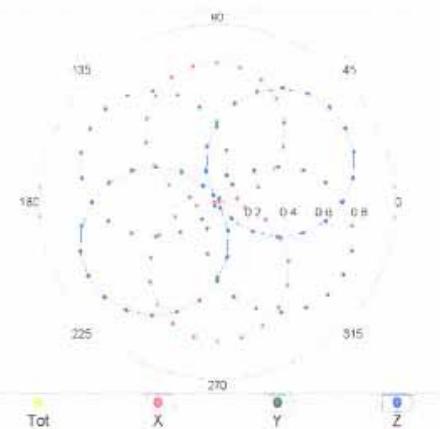
(TEM-Cell:ifi110 EXX, Waveguide: R22)



Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ ($k=2$)

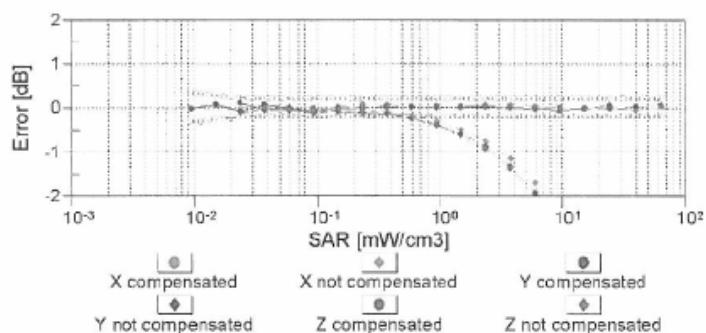
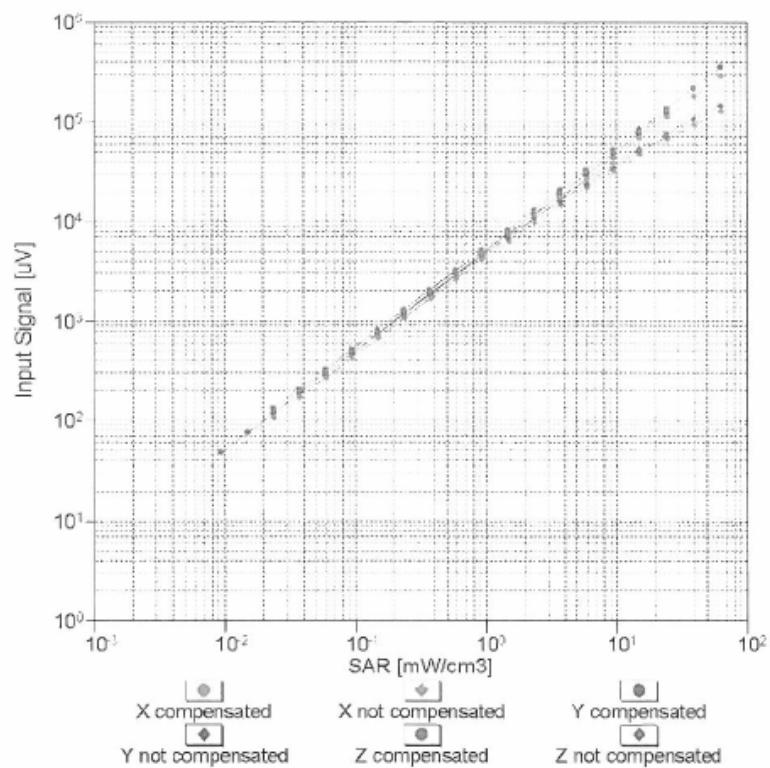
EX3DV4- SN.3710

March 12, 2012

Receiving Pattern (ϕ), $\theta = 0^\circ$ $f=600$ MHz, TEM $f=1800$ MHz, R22Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ ($k=2$)

EX3DV4- SN:3710

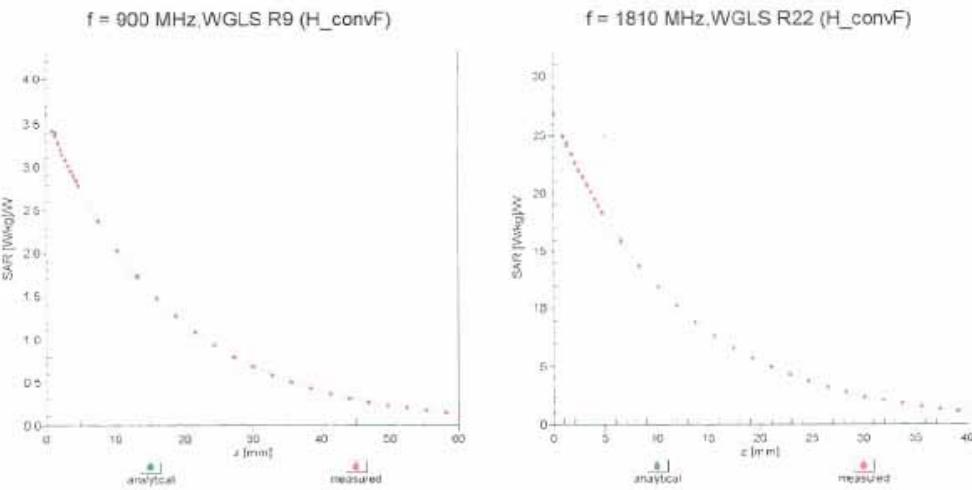
March 12, 2012

Dynamic Range f(SAR_{head})
(TEM cell , f = 900 MHz)**Uncertainty of Linearity Assessment: ± 0.6% (k=2)**

EX3DV4- SN:3710

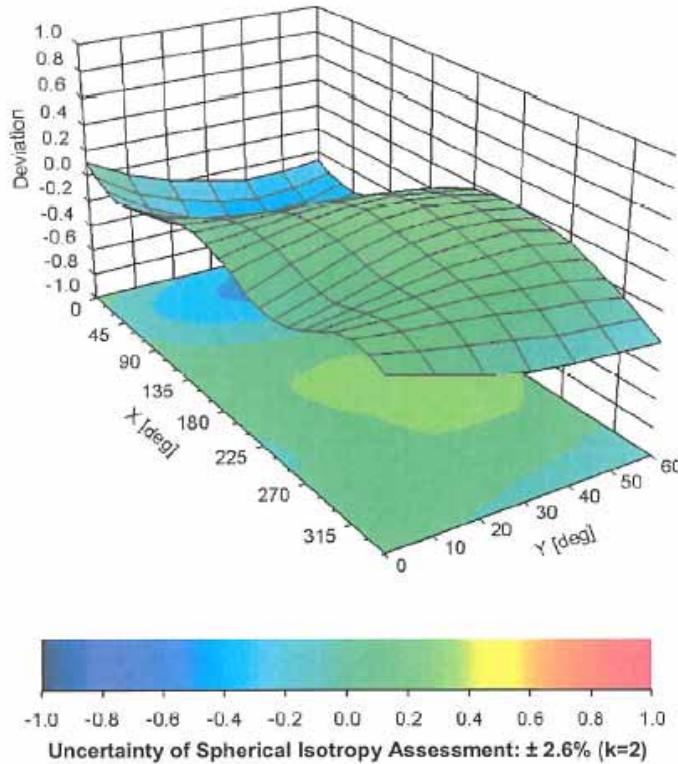
March 12, 2012

Conversion Factor Assessment



Deviation from Isotropy in Liquid

Error (ϕ, θ), $f = 900 \text{ MHz}$



EX3DV4- SN:3710

March 12, 2012

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3710**Other Probe Parameters**

| | |
|---|----------------|
| Sensor Arrangement | Triangular |
| Connector Angle (°) | Not applicable |
| Mechanical Surface Detection Mode | enabled |
| Optical Surface Detection Mode | disabled |
| Probe Overall Length | 337 mm |
| Probe Body Diameter | 10 mm |
| Tip Length | 9 mm |
| Tip Diameter | 2.5 mm |
| Probe Tip to Sensor X Calibration Point | 1 mm |
| Probe Tip to Sensor Y Calibration Point | 1 mm |
| Probe Tip to Sensor Z Calibration Point | 1 mm |
| Recommended Measurement Distance from Surface | 2 mm |

Appendix E. Dipole Calibration Data

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland



S Schweizerischer Kalibrierdienst
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S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Client: Quietek-CN (Auden)

Certificate No: D835V2-4d094_Feb12

CALIBRATION CERTIFICATE

| | | | |
|---|--|-----------------------------------|------------------------|
| Object | D835V2 - SN: 4d094 | | |
| Calibration procedure(s) | QA CAL-05.v8 Calibration procedure for dipole validation kits above 700 MHz | | |
| Calibration date: | February 17, 2012 | | |
| <p>This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.</p> <p>All calibrations have been conducted in the closed laboratory facility; environment temperature $(22 \pm 3)^\circ\text{C}$ and humidity $< 70\%$.</p> <p>Calibration Equipment used (M&TE critical for calibration)</p> | | | |
| Primary Standards | ID # | Cal Date (Certificate No.) | Scheduled Calibration |
| Power meter EPM-442A | GB37480704 | 05-Oct-11 (No. 217-01451) | Oct-12 |
| Power sensor HP 8481A | US37292783 | 05-Oct-11 (No. 217-01451) | Oct-12 |
| Reference 20 dB Attenuator | SN: 5086 (20g) | 29-Mar-11 (No. 217-01368) | Apr-12 |
| Type-N mismatch combination | SN: 5047.2 / 06327 | 29-Mar-11 (No. 217-01371) | Apr-12 |
| Reference Probe ES3DV3 | SN: 3205 | 30-Dec-11 (No. ES3-3205_Dec11) | Dec-12 |
| DAE4 | SN: 601 | 04-Jul-11 (No. DAE4-601_Jul11) | Jul-12 |
| Secondary Standards | ID # | Check Date (in house) | Scheduled Check |
| Power sensor HP 8481A | MY41092317 | 18-Oct-02 (in house check Oct-11) | In house check: Oct-13 |
| RF generator R&S SMT-06 | 100005 | 04-Aug-99 (in house check Oct-11) | In house check: Oct-13 |
| Network Analyzer HP 8753E | US37390585 S4206 | 18-Oct-01 (in house check Oct-11) | In house check: Oct-12 |
| Calibrated by: | Name Israe El-Naouq | Function Laboratory Technician | Signature |
| Approved by: | Katja Pokovic | Technical Manager | |
| Issued: February 17, 2012 | | | |
| This calibration certificate shall not be reproduced except in full without written approval of the laboratory. | | | |

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Accreditation No.: SCS 108

Glossary:

| | |
|-------|---------------------------------|
| TSL | tissue simulating liquid |
| ConvF | sensitivity in TSL / NORM x,y,z |
| N/A | not applicable or not measured |

Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

- d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

| | | |
|------------------------------|------------------------|-------------|
| DASY Version | DASY5 | V52.8.0 |
| Extrapolation | Advanced Extrapolation | |
| Phantom | Modular Flat Phantom | |
| Distance Dipole Center - TSL | 15 mm | with Spacer |
| Zoom Scan Resolution | dx, dy, dz = 5 mm | |
| Frequency | 835 MHz ± 1 MHz | |

Head TSL parameters

The following parameters and calculations were applied.

| | Temperature | Permittivity | Conductivity |
|---|-----------------|--------------|------------------|
| Nominal Head TSL parameters | 22.0 °C | 41.5 | 0.90 mho/m |
| Measured Head TSL parameters | (22.0 ± 0.2) °C | 41.0 ± 6 % | 0.89 mho/m ± 6 % |
| Head TSL temperature change during test | < 0.5 °C | ---- | ---- |

SAR result with Head TSL

| | | |
|---|--------------------|----------------------------|
| SAR averaged over 1 cm ³ (1 g) of Head TSL | Condition | |
| SAR measured | 250 mW input power | 2.34 mW / g |
| SAR for nominal Head TSL parameters | normalized to 1W | 9.41 mW / g ± 17.0 % (k=2) |

| | | |
|---|--------------------|----------------------------|
| SAR averaged over 10 cm ³ (10 g) of Head TSL | condition | |
| SAR measured | 250 mW input power | 1.53 mW / g |
| SAR for nominal Head TSL parameters | normalized to 1W | 6.15 mW / g ± 16.5 % (k=2) |

Body TSL parameters

The following parameters and calculations were applied.

| | Temperature | Permittivity | Conductivity |
|---|-----------------|--------------|------------------|
| Nominal Body TSL parameters | 22.0 °C | 55.2 | 0.97 mho/m |
| Measured Body TSL parameters | (22.0 ± 0.2) °C | 55.7 ± 6 % | 1.01 mho/m ± 6 % |
| Body TSL temperature change during test | < 0.5 °C | ---- | ---- |

SAR result with Body TSL

| | | |
|---|--------------------|----------------------------|
| SAR averaged over 1 cm ³ (1 g) of Body TSL | Condition | |
| SAR measured | 250 mW input power | 2.46 mW / g |
| SAR for nominal Body TSL parameters | normalized to 1W | 9.57 mW / g ± 17.0 % (k=2) |

| | | |
|---|--------------------|----------------------------|
| SAR averaged over 10 cm ³ (10 g) of Body TSL | condition | |
| SAR measured | 250 mW input power | 1.62 mW / g |
| SAR for nominal Body TSL parameters | normalized to 1W | 6.33 mW / g ± 16.5 % (k=2) |

Appendix

Antenna Parameters with Head TSL

| | |
|--------------------------------------|-------------------------------|
| Impedance, transformed to feed point | 53.5 Ω - 2.0 $j\Omega$ |
| Return Loss | - 28.1 dB |

Antenna Parameters with Body TSL

| | |
|--------------------------------------|-------------------------------|
| Impedance, transformed to feed point | 47.7 Ω - 5.3 $j\Omega$ |
| Return Loss | - 24.5 dB |

General Antenna Parameters and Design

| | |
|----------------------------------|----------|
| Electrical Delay (one direction) | 1.387 ns |
|----------------------------------|----------|

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

| | |
|-----------------|--------------------|
| Manufactured by | SPEAG |
| Manufactured on | September 15, 2009 |

DASY5 Validation Report for Head TSL

Date: 17.02.2012

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d094

Communication System: CW; Frequency: 835 MHz

Medium parameters used: $f = 835$ MHz; $\sigma = 0.89$ mho/m; $\epsilon_r = 41$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.07, 6.07, 6.07); Calibrated: 30.12.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.0(692); SEMCAD X 14.6.4(4989)

Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

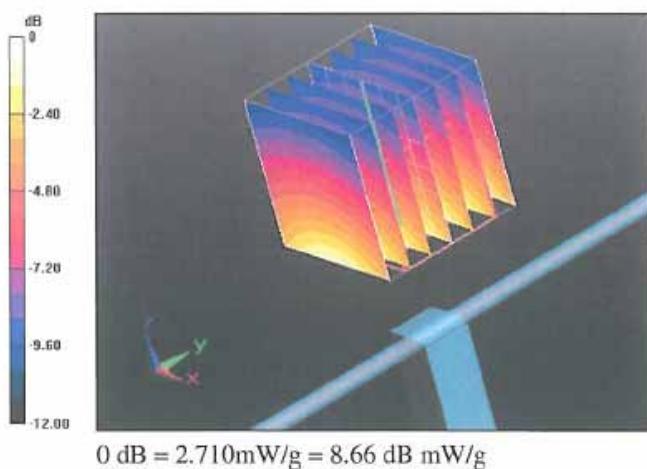
Measurement grid: dx=5mm, dy=5mm, dz=5mm

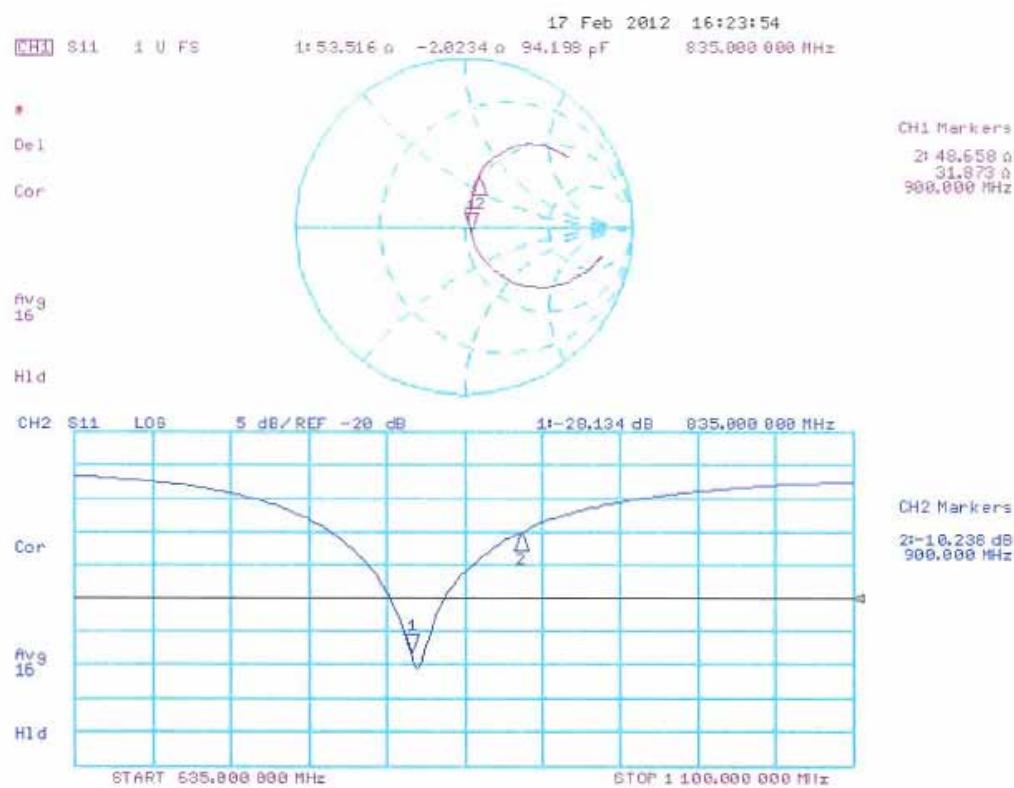
Reference Value = 57.027 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 3.4380

SAR(1 g) = 2.34 mW/g; SAR(10 g) = 1.53 mW/g

Maximum value of SAR (measured) = 2.712 mW/g



Impedance Measurement Plot for Head TSL

DASY5 Validation Report for Body TSL

Date: 17.02.2012

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d094

Communication System: CW; Frequency: 835 MHz

Medium parameters used: $f = 835$ MHz; $\sigma = 1.01$ mho/m; $\epsilon_r = 55.7$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.02, 6.02, 6.02); Calibrated: 30.12.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.0(692); SEMCAD X 14.6.4(4989)

Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

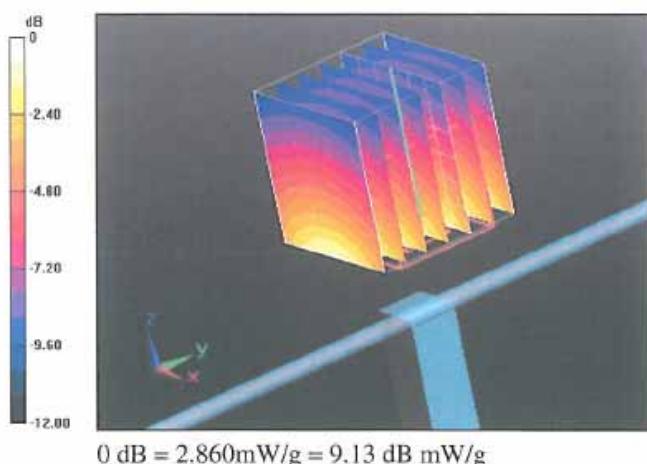
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 55.114 V/m; Power Drift = 0.0041 dB

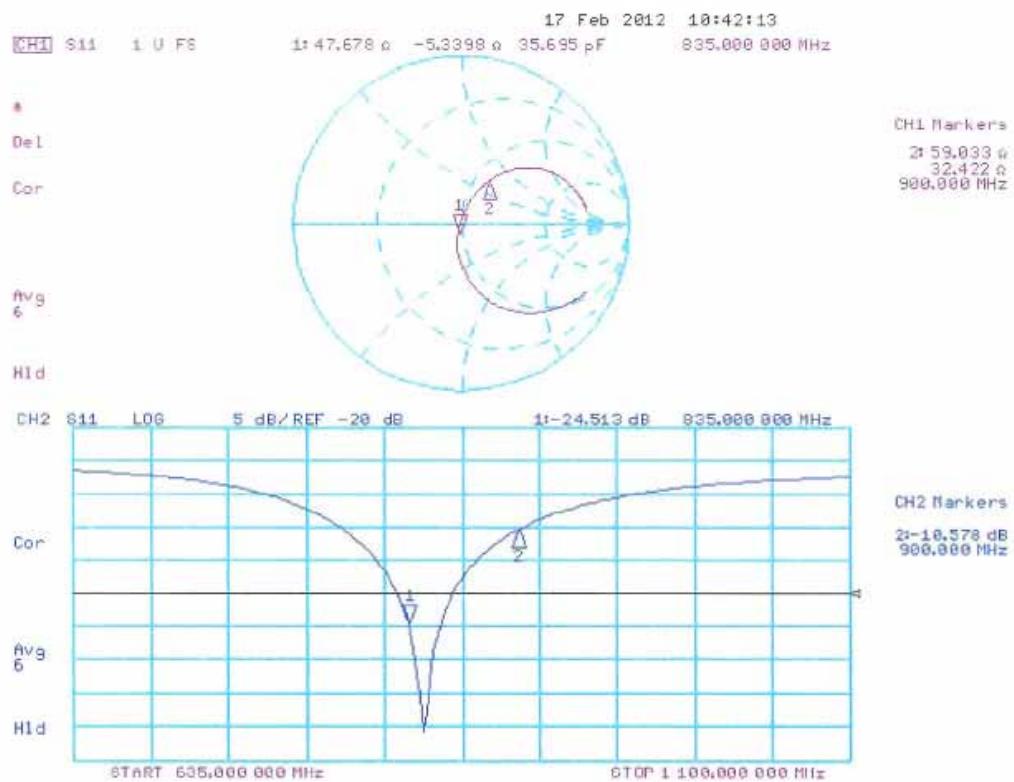
Peak SAR (extrapolated) = 3.5590

SAR(1 g) = 2.46 mW/g; SAR(10 g) = 1.62 mW/g

Maximum value of SAR (measured) = 2.861 mW/g



Impedance Measurement Plot for Body TSL



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Accreditation No.: **SCS 108**Client **Quietek-CN (Auden)**Certificate No: **D1900V2-5d121_Feb12**

CALIBRATION CERTIFICATE

Object **D1900V2 - SN: 5d121**Calibration procedure(s) **QA CAL-05.v8**
Calibration procedure for dipole validation kits above 700 MHzCalibration date: **February 22, 2012**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility, environment temperature $(22 \pm 3)^\circ\text{C}$ and humidity $< 70\%$.

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards | ID # | Cal Date (Certificate No.) | Scheduled Calibration |
|-----------------------------|--------------------|-----------------------------------|------------------------|
| Power meter EPM-442A | GB37480704 | 05-Oct-11 (No. 217-01451) | Oct-12 |
| Power sensor HP 8481A | US37292783 | 05-Oct-11 (No. 217-01451) | Oct-12 |
| Reference 20 dB Attenuator | SN: 5086 (20g) | 29-Mar-11 (No. 217-01368) | Apr-12 |
| Type-N mismatch combination | SN: 5017.2 / 06327 | 29-Mar-11 (No. 217-01371) | Apr-12 |
| Reference Probe ES3DV3 | SN: 3205 | 30-Dec-11 (No. ES3-3205_Dec11) | Dec-12 |
| DAE4 | SN: 601 | 04-Jul-11 (No. DAE4-601_Jul11) | Jul-12 |
| Secondary Standards | ID # | Check Date (in house) | Scheduled Check |
| Power sensor HP 8481A | MY41092317 | 18-Oct-02 (in house check Oct-11) | In house check: Oct-13 |
| RF generator R&S SMT-06 | 100005 | 04-Aug-99 (in house check Oct-11) | In house check: Oct-13 |
| Network Analyzer HP 8753E | US37390585 S4206 | 18-Oct-01 (in house check Oct-11) | In house check: Oct-12 |

Calibrated by: Name **Israe El-Naouq** Function **Laboratory Technician**Approved by: Name **Katja Pokovic** Function **Technical Manager**

Issued: February 22, 2012

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Accreditation No.: **SCS 108**

Glossary:

| | |
|-------|---------------------------------|
| TSL | tissue simulating liquid |
| ConvF | sensitivity in TSL / NORM x,y,z |
| N/A | not applicable or not measured |

Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

- d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

| | | |
|-------------------------------------|------------------------|-------------|
| DASY Version | DASY5 | V52.8.0 |
| Extrapolation | Advanced Extrapolation | |
| Phantom | Modular Flat Phantom | |
| Distance Dipole Center - TSL | 10 mm | with Spacer |
| Zoom Scan Resolution | dx, dy, dz = 5 mm | |
| Frequency | 1900 MHz ± 1 MHz | |

Head TSL parameters

The following parameters and calculations were applied.

| | Temperature | Permittivity | Conductivity |
|--|-----------------|--------------|------------------|
| Nominal Head TSL parameters | 22.0 °C | 40.0 | 1.40 mho/m |
| Measured Head TSL parameters | (22.0 ± 0.2) °C | 40.4 ± 6 % | 1.40 mho/m ± 6 % |
| Head TSL temperature change during test | < 0.5 °C | ---- | ---- |

SAR result with Head TSL

| | | |
|---|--------------------|----------------------------|
| SAR averaged over 1 cm³ (1 g) of Head TSL | Condition | |
| SAR measured | 250 mW input power | 9.84 mW / g |
| SAR for nominal Head TSL parameters | normalized to 1W | 39.4 mW / g ± 17.0 % (k=2) |
| SAR averaged over 10 cm³ (10 g) of Head TSL | condition | |
| SAR measured | 250 mW input power | 5.19 mW / g |
| SAR for nominal Head TSL parameters | normalized to 1W | 20.8 mW / g ± 16.5 % (k=2) |

Body TSL parameters

The following parameters and calculations were applied.

| | Temperature | Permittivity | Conductivity |
|--|-----------------|--------------|------------------|
| Nominal Body TSL parameters | 22.0 °C | 53.3 | 1.52 mho/m |
| Measured Body TSL parameters | (22.0 ± 0.2) °C | 53.0 ± 6 % | 1.56 mho/m ± 6 % |
| Body TSL temperature change during test | < 0.5 °C | ---- | ---- |

SAR result with Body TSL

| | | |
|---|--------------------|----------------------------|
| SAR averaged over 1 cm³ (1 g) of Body TSL | Condition | |
| SAR measured | 250 mW input power | 9.84 mW / g |
| SAR for nominal Body TSL parameters | normalized to 1W | 38.7 mW / g ± 17.0 % (k=2) |
| SAR averaged over 10 cm³ (10 g) of Body TSL | condition | |
| SAR measured | 250 mW input power | 5.15 mW / g |
| SAR for nominal Body TSL parameters | normalized to 1W | 20.4 mW / g ± 16.5 % (k=2) |

Appendix

Antenna Parameters with Head TSL

| | |
|--------------------------------------|-------------------------------|
| Impedance, transformed to feed point | 51.6 Ω + 7.2 $j\Omega$ |
| Return Loss | - 22.8 dB |

Antenna Parameters with Body TSL

| | |
|--------------------------------------|-------------------------------|
| Impedance, transformed to feed point | 47.4 Ω + 7.4 $j\Omega$ |
| Return Loss | - 21.9 dB |

General Antenna Parameters and Design

| | |
|----------------------------------|----------|
| Electrical Delay (one direction) | 1.205 ns |
|----------------------------------|----------|

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

| | |
|-----------------|-----------------|
| Manufactured by | SPEAG |
| Manufactured on | August 25, 2009 |

DASY5 Validation Report for Head TSL

Date: 22.02.2012

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d121

Communication System: CW; Frequency: 1900 MHz

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.4$ mho/m; $\epsilon_r = 40.4$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.01, 5.01, 5.01); Calibrated: 30.12.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.0(692); SEMCAD X 14.6.4(4989)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

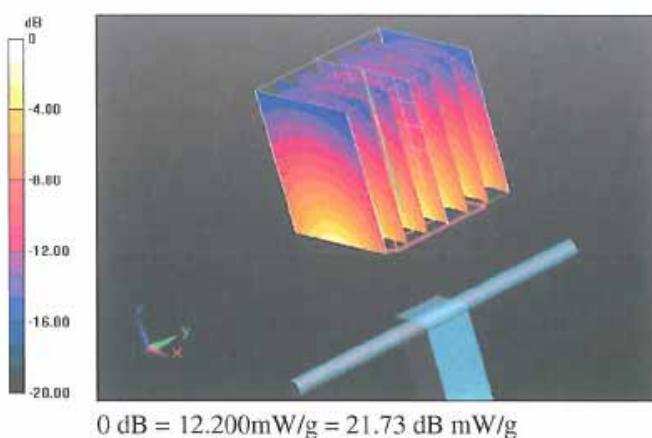
Measurement grid: dx=5mm, dy=5mm, dz=5mm

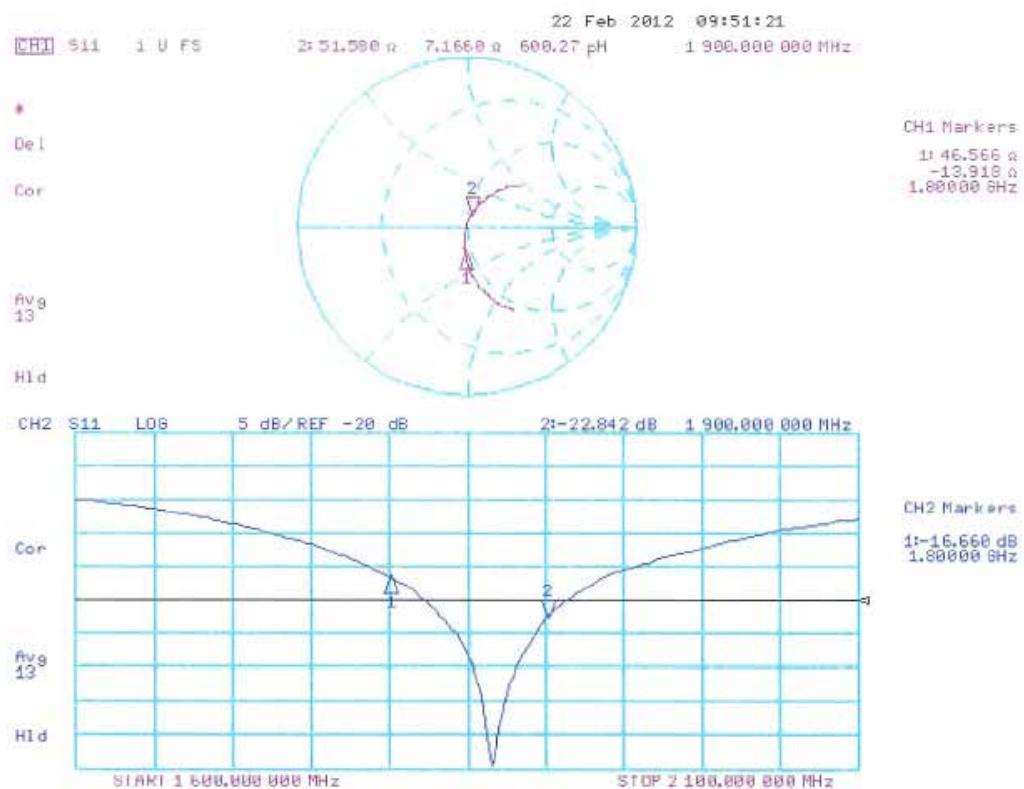
Reference Value = 96.900 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 17.5160

SAR(1 g) = 9.84 mW/g; SAR(10 g) = 5.19 mW/g

Maximum value of SAR (measured) = 12.195 mW/g



Impedance Measurement Plot for Head TSL

DASY5 Validation Report for Body TSL

Date: 22.02.2012

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d121

Communication System: CW; Frequency: 1900 MHz

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.56$ mho/m; $\epsilon_r = 53$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.62, 4.62, 4.62); Calibrated: 30.12.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.0(692); SEMCAD X 14.6.4(4989)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

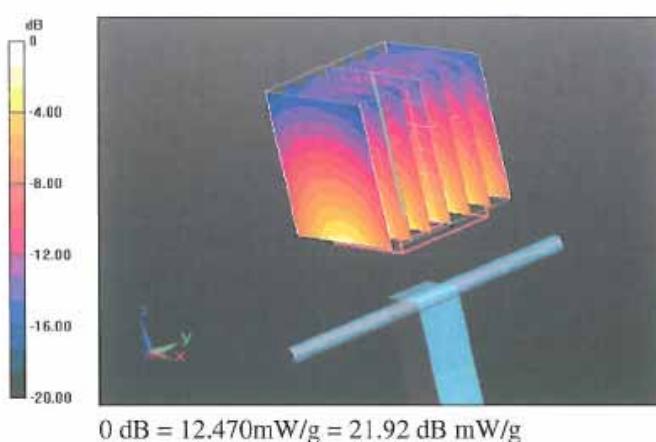
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 93.537 V/m; Power Drift = 0.0039 dB

Peak SAR (extrapolated) = 17.3450

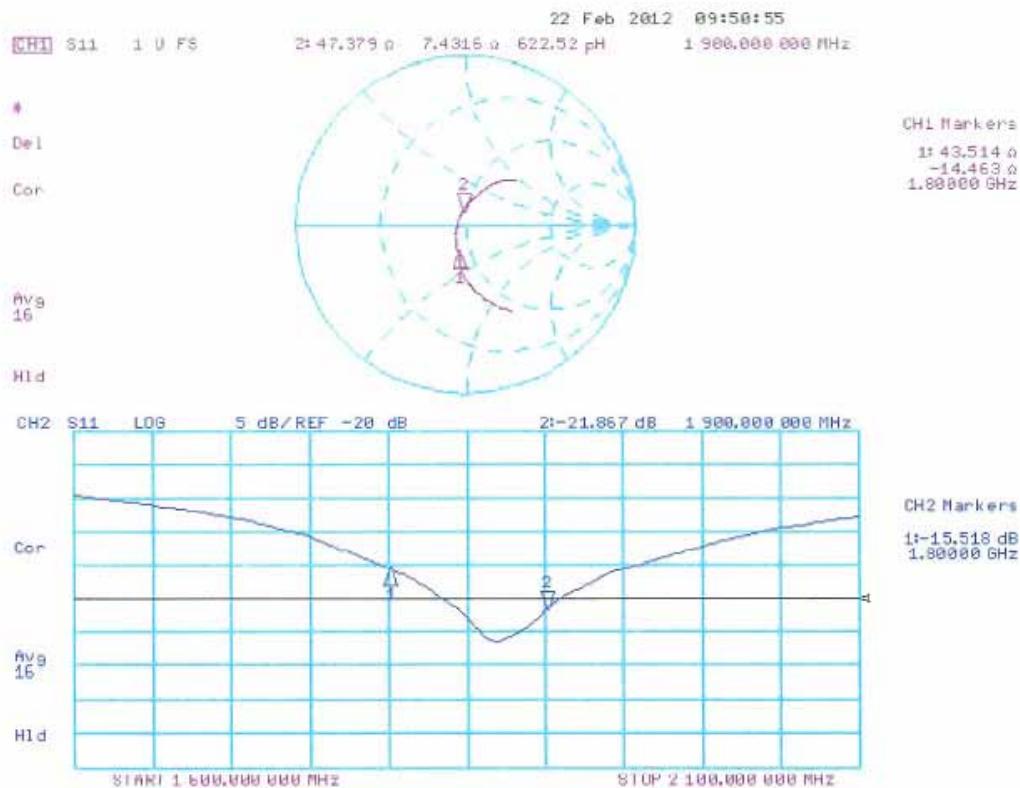
SAR(1 g) = 9.84 mW/g; SAR(10 g) = 5.15 mW/g

Maximum value of SAR (measured) = 12.473 mW/g



0 dB = 12.470 mW/g = 21.92 dB mW/g

Impedance Measurement Plot for Body TSL



Appendix F. DAE Calibration Data

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Accreditation No.: SCS 108

Client Quietek-CN (Auden)

Certificate No: DAE4-1220_Jan12

CALIBRATION CERTIFICATE

Object DAE4 - SD 000 D04 BJ - SN: 1220

Calibration procedure(s) QA CAL-06.v24
Calibration procedure for the data acquisition electronics (DAE)

Calibration date: January 23, 2012

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature $(22 \pm 3)^\circ\text{C}$ and humidity $< 70\%$.

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards | ID # | Cal Date (Certificate No.) | Scheduled Calibration |
|-------------------------------|--------------------|----------------------------|------------------------|
| Keithley Multimeter Type 2001 | SN: 0610278 | 28-Sep-11 (No:11450) | Sep-12 |
| Secondary Standards | ID # | Check Date (in house) | Scheduled Check |
| Calibrator Box V2.1 | SE UWS 053 AA 1001 | 05-Jan-12 (in house check) | In house check: Jan-13 |

| | | | |
|----------------|---------------------------|------------------------|---------------|
| Calibrated by: | Name Dominique Steffen | Function Technician | Signature |
| Approved by: | Fin Bomholt | R&D Director | |

Issued: January 23, 2012

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Accreditation No.: **SCS 108**

Glossary

| | |
|-----------------|---|
| DAE | data acquisition electronics |
| Connector angle | information used in DASY system to align probe sensor X to the robot coordinate system. |

Methods Applied and Interpretation of Parameters

- *DC Voltage Measurement*: Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.
- *Connector angle*: The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.
- The following parameters as documented in the Appendix contain technical information as a result from the performance test and require no uncertainty.
 - *DC Voltage Measurement Linearity*: Verification of the Linearity at +10% and -10% of the nominal calibration voltage. Influence of offset voltage is included in this measurement.
 - *Common mode sensitivity*: Influence of a positive or negative common mode voltage on the differential measurement.
 - *Channel separation*: Influence of a voltage on the neighbor channels not subject to an input voltage.
 - *AD Converter Values with inputs shorted*: Values on the internal AD converter corresponding to zero input voltage
 - *Input Offset Measurement*: Output voltage and statistical results over a large number of zero voltage measurements.
 - *Input Offset Current*: Typical value for information; Maximum channel input offset current, not considering the input resistance.
 - *Input resistance*: Typical value for information: DAE input resistance at the connector, during internal auto-zeroing and during measurement.
 - *Low Battery Alarm Voltage*: Typical value for information. Below this voltage, a battery alarm signal is generated.
 - *Power consumption*: Typical value for information. Supply currents in various operating modes.

DC Voltage Measurement

A/D - Converter Resolution nominal

High Range: 1LSB = $6.1\mu\text{V}$, full range = $-100...+300\text{ mV}$ Low Range: 1LSB = 61nV , full range = $-1.....+3\text{mV}$

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

| Calibration Factors | X | Y | Z |
|---------------------|----------------------------------|----------------------------------|----------------------------------|
| High Range | $405.267 \pm 0.1\% (\text{k=2})$ | $404.990 \pm 0.1\% (\text{k=2})$ | $404.221 \pm 0.1\% (\text{k=2})$ |
| Low Range | $3.97762 \pm 0.7\% (\text{k=2})$ | $3.99629 \pm 0.7\% (\text{k=2})$ | $3.98707 \pm 0.7\% (\text{k=2})$ |

Connector Angle

| | |
|---|---------------------------|
| Connector Angle to be used in DASY system | $176.5^\circ \pm 1^\circ$ |
|---|---------------------------|

Appendix**1. DC Voltage Linearity**

| High Range | | Reading (µV) | Difference (µV) | Error (%) |
|------------|---------|--------------|-----------------|-----------|
| Channel X | + Input | 199991.77 | -2.52 | -0.00 |
| Channel X | + Input | 20001.19 | 1.01 | 0.01 |
| Channel X | - Input | -19996.52 | 3.93 | -0.02 |
| Channel Y | + Input | 199992.70 | -2.15 | -0.00 |
| Channel Y | + Input | 19999.00 | -1.14 | -0.01 |
| Channel Y | - Input | -19999.75 | 0.71 | -0.00 |
| Channel Z | + Input | 199991.55 | -3.11 | -0.00 |
| Channel Z | + Input | 19999.33 | -0.76 | -0.00 |
| Channel Z | - Input | -20001.23 | -0.67 | 0.00 |

| Low Range | | Reading (µV) | Difference (µV) | Error (%) |
|-----------|---------|--------------|-----------------|-----------|
| Channel X | + Input | 1999.14 | -1.60 | -0.08 |
| Channel X | + Input | 201.79 | 0.59 | 0.29 |
| Channel X | - Input | -198.19 | 0.48 | -0.24 |
| Channel Y | + Input | 1999.56 | -0.99 | -0.05 |
| Channel Y | + Input | 200.20 | -0.96 | -0.48 |
| Channel Y | - Input | -199.38 | -0.54 | 0.27 |
| Channel Z | + Input | 2000.07 | -0.52 | -0.03 |
| Channel Z | + Input | 200.32 | -0.83 | -0.41 |
| Channel Z | - Input | -199.60 | -0.78 | 0.39 |

2. Common mode sensitivity

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

| | Common mode Input Voltage (mV) | High Range Average Reading (µV) | Low Range Average Reading (µV) |
|-----------|-----------------------------------|------------------------------------|-----------------------------------|
| Channel X | 200 | 10.22 | 8.65 |
| | -200 | -6.99 | -8.91 |
| Channel Y | 200 | -10.43 | -11.02 |
| | -200 | 7.95 | 9.22 |
| Channel Z | 200 | 14.25 | 13.66 |
| | -200 | -15.77 | -14.99 |

3. Channel separation

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

| | Input Voltage (mV) | Channel X (µV) | Channel Y (µV) | Channel Z (µV) |
|-----------|--------------------|----------------|----------------|----------------|
| Channel X | 200 | - | -1.62 | -2.79 |
| Channel Y | 200 | 8.07 | - | -2.95 |
| Channel Z | 200 | 7.90 | 6.93 | - |

4. AD-Converter Values with inputs shorted

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

| | High Range (LSB) | Low Range (LSB) |
|-----------|------------------|-----------------|
| Channel X | 15896 | 16218 |
| Channel Y | 16012 | 15924 |
| Channel Z | 15702 | 15710 |

5. Input Offset Measurement

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

Input 10MΩ

| | Average (µV) | min. Offset (µV) | max. Offset (µV) | Std. Deviation (µV) |
|-----------|--------------|------------------|------------------|---------------------|
| Channel X | 0.67 | -0.77 | 1.84 | 0.43 |
| Channel Y | -1.44 | -2.35 | -0.02 | 0.39 |
| Channel Z | -0.81 | -1.60 | 0.01 | 0.37 |

6. Input Offset Current

Nominal Input circuitry offset current on all channels: <25fA

7. Input Resistance (Typical values for information)

| | Zeroing (kOhm) | Measuring (MOhm) |
|-----------|----------------|------------------|
| Channel X | 200 | 200 |
| Channel Y | 200 | 200 |
| Channel Z | 200 | 200 |

8. Low Battery Alarm Voltage (Typical values for information)

| Typical values | Alarm Level (VDC) |
|----------------|-------------------|
| Supply (+ Vcc) | +7.9 |
| Supply (- Vcc) | -7.6 |

9. Power Consumption (Typical values for information)

| Typical values | Switched off (mA) | Stand by (mA) | Transmitting (mA) |
|----------------|-------------------|---------------|-------------------|
| Supply (+ Vcc) | +0.01 | +6 | +14 |
| Supply (- Vcc) | -0.01 | -8 | -9 |