QuieTek

ilac-MRA · TAF Testing Laboratory 1596 · ilac-MRA · CNAS TESTING CNAS L5313

SAR Test Report

Product Name : GSM Mobile Phone

Model No. : HUAWEI G5520

FCC ID : QISG5520

Applicant : HUAWEI TECHNOLOGIES CO., LTD

Address : Bantian, Longgang District, Shenzhen, 518129
Guangdong, P. R. China

Date of Receipt : 12/07/2012

Date of Test : 26/07/2012~08/08/2012

Issued Date : 13/08/2012

Report No. : 127S027R-HP-US-P03V01

Report Version : V1.1

The test results relate only to the samples tested.

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Test Report Certification

Product Name	:	GSM Mobile Phone
Applicant	:	HUAWEI TECHNOLOGIES CO., LTD
Address	:	Bantian, Longgang District, Shenzhen, 518129 Guangdong, P. R. China
Manufacturer	:	HUAWEI TECHNOLOGIES CO., LTD
Address	:	Bantian, Longgang District, Shenzhen, 518129 Guangdong, P. R. China
Model No.	:	HUAWEI G5520
FCC ID	:	QISG5520
Brand Name	:	HUAWEI
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: 0.878 W/kg Body: 1.290 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 FCC Registration Number: 800392

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(Manager: Marlin Chen)

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:

Taiwan R.O.C.	:	**BSMI, NCC, TAF**
Germany	:	**TUV Rheinland**
Norway	:	**Nemko, DNV**
USA	:	**FCC, NVLAP**
Japan	:	**VCCI**
China	:	**CNAS**

The related certificate for our laboratories about the test site and management system can be downloaded from QuieTek Corporation's Web Site :http://www.quietek.com/tw/ctg/cts/accreditations.htm
The address and introduction of QuieTek Corporation's laboratories can be founded in our Web site :
http://www.quietek.com/
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TABLE OF CONTENTS

Description   **Page**

1. General Information

1.1. EUT Description

Product Name	GSM Mobile Phone
Model No.	HUAWEI G5520
IMEI 1	865630010045316
IMEI 2	865630010045324
Hardware Version	92520_1_22
	92520_1_24 (Reference the version differences)
Software Version	G5520_V100R001C00B201SP11S(UPDATE1)
Device Category	Portable
RF Exposure Environment	Uncontrolled
Antenna Type	Internal
2G	
Support Band	GSM850/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
Antenna Gain	GSM850: -1.8dBi
	PCS1900: -2.0dBi
Max. Output Power (Conducted)	GSM850: 32.42dBm
	PCS1900: 31.02dBm
Max. Output Power (Radiated)	GSM850: 30.58dBm- ERP
	PCS1900: 27.92dBm- EIRP
Bluetooth	
Bluetooth Frequency	2402~2480MHz
Bluetooth Version	V2.1 + EDR
Type of modulation	FHSS
Data Rate	1Mbps(GFSK), 2Mbps(Pi/4 DQPSK), 3Mbps (8DPSK)
Antenna Gain	-2.5dBi
Components	
Headset Model Number #1	HUAWEI/ 120+333F#3.5MM

Headset Model Number #2	HUAWEI/ MEMD1532B315000
Battery #1	Brand Name: HUAWEI M/N: HB5A2 Rated Voltage and Capacitance: 3.7V/1000mAh S/N: BDAC605K75220699
Battery #2	Brand Name: HUAWEI M/N: HB5A2 Rated Voltage and Capacitance: 3.7V/1000mAh S/N: GAGC206P75213695
Adapter #1	Brand Name: HUAWEI M/N: HS-050040U6 Input: 100-240V~50/60Hz 0.2A Output: 5Vdc, 400mA S/N: HKAC12621362
Adapter #2	Brand Name: HUAWEI M/N: HS-050040U6 Input: 100-240V~50/60Hz 0.2A Output: 5Vdc, 400mA S/N: BYAC41112580

Hardware Version differences

EUT Arrangement Diagram	HW: 92520_1_22	HW: 92520_1_24	Account for Version differences
Differences for PCB Arrangement Diagram			1: Remove the upper right compatible welding plate for LCM BTB. 2: The BBIC moves up 5mm and moves left 0.5mm, for this the other device has adjusted position. 3: The flash turns 90 degrees. 4: The BT moves up 0.6mm 5: Redesigned the shielding case.
Differences for Shielding Cover			Redesigned the shielding cover
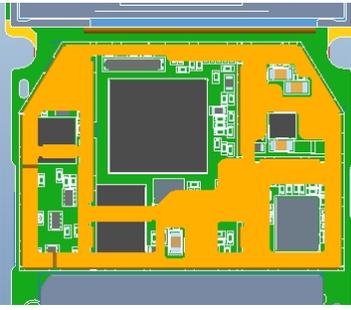
Note: This report has been evaluated the two versions, and record the results of evaluation in the report.

1.2. Test Procedure

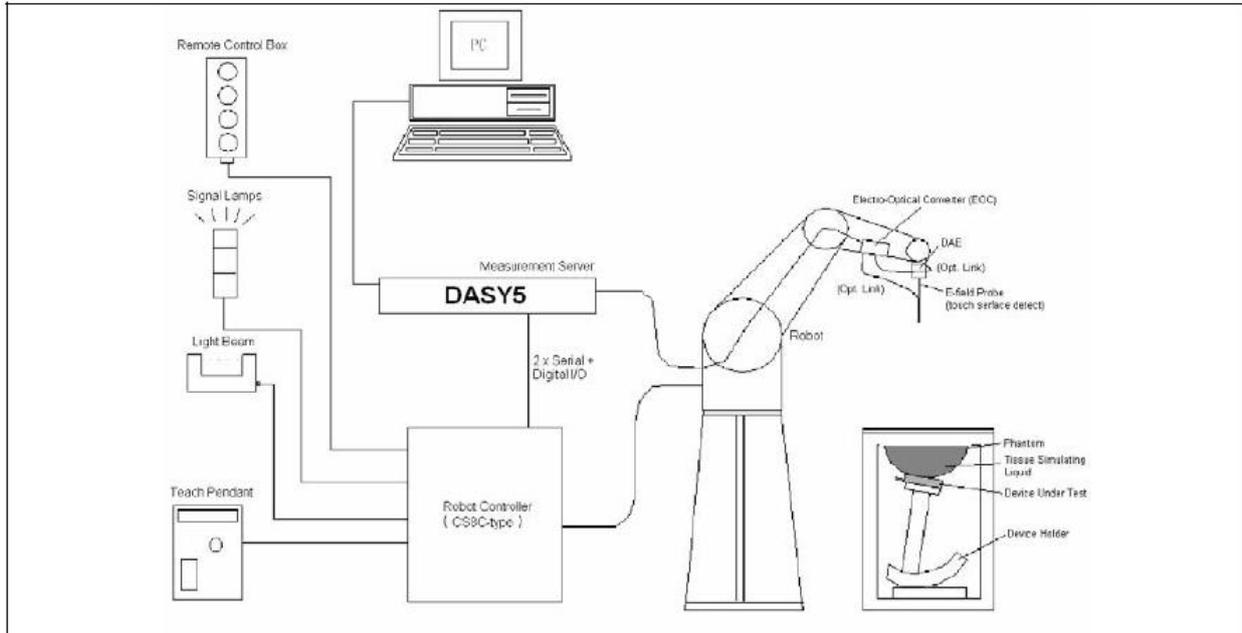|	
1	Setup the EUT and simulators as shown on above.
2	Turn on the power of all equipment.
3	EUT communicate with CMU 200, and test them respectively.

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 $10mm^2$ 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/m^3 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 µW/g to 100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 µW/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 εr =3 and loss tangent δ = 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
	26-07-2012	41.55	0.90	21.0
	08-08-2012	41.43	0.89	21.0
1900 MHz	Reference result ± 5% window	40.00 38.00 to 42.00	1.40 1.33 to 1.47	N/A
	26-07-2012	39.30	1.44	21.0
	08-08-2012	39.40	1.45	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
	26-07-2012	53.62	0.97	21.0
	08-08-2012	53.45	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
	26-07-2012	54.06	1.55	21.0
	08-08-2012	54.09	1.55	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	Head		Body	
(MHz)	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 ρ = 1000 kg/m^3)

4. SAR Measurement Procedure

4.1. SAR System Validation

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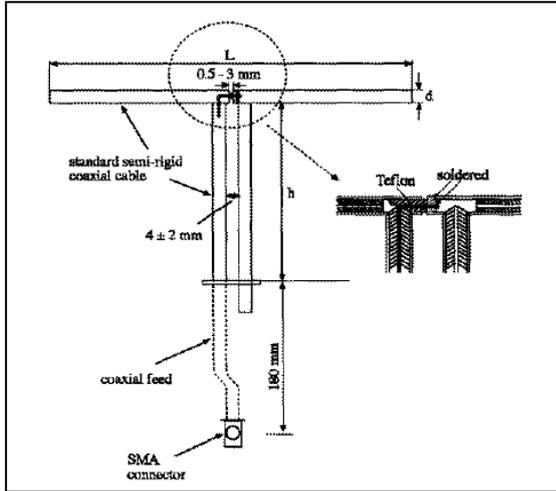
The dipoles used is based on the IEEE-1528 standard, and is complied with mechanical and electrical specifications in line with the requirements of both IEEE and FCC Supplement C. the table below provides details for the mechanical and electrical specifications for the dipoles.

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 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
	26-07-2012	9.56	6.24	21.0
	08-08-2012	9.44	6.16	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
	26-07-2012	38.28	19.44	21.0
	08-08-2012	38.56	19.60	21.0

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

System Performance Check at 835MHz &1900MHz 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
	26-07-2012	10.08	6.56	21.0
	08-08-2012	10.08	6.56	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
	26-07-2012	40.80	20.96	21.0
	08-08-2012	40.80	20.96	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 $1mm^2$) 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 $1mm^3$).

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	2013.01.12
Wide Bandwidth Sensor	Anritsu	MA2411B	0846014	2013.01.12

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%	387
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 <SIM 1>				
GSM850	824.2	32.40	-9	23.40
	836.4	32.42	-9	23.42
	848.8	32.36	-9	23.36
GPRS850(1 Slot)	824.2	32.38	-9	23.38
	836.4	32.41	-9	23.41
	848.8	32.33	-9	23.33
GPRS850(2 Slot)	824.2	29.94	-6	23.94
	836.4	29.86	-6	23.86
	848.8	29.73	-6	23.73
GPRS850(3 Slot)	824.2	28.95	-4.25	24.70
	836.4	28.89	-4.25	24.64
	848.8	28.75	-4.25	24.50
GPRS850(4 Slot)	824.2	27.57	-3	24.57
	836.4	27.50	-3	24.50
	848.8	27.37	-3	24.37
PCS1900	1850.2	31.02	-9	22.02
	1880.0	30.90	-9	21.90
	1909.8	30.87	-9	21.87
GPRS1900(1 Slot)	1850.2	30.86	-9	21.86
	1880.0	30.75	-9	21.75
	1909.8	30.74	-9	21.74
GPRS1900(2 Slot)	1850.2	28.13	-6	22.13
	1880.0	27.90	-6	21.9
	1909.8	27.87	-6	21.87
GPRS1900(3 Slot)	1850.2	27.33	-4.25	23.08
	1880.0	27.09	-4.25	22.84
	1909.8	27.02	-4.25	22.77
GPRS1900(4 Slot)	1850.2	25.33	-3	22.33
	1880.0	25.11	-3	22.11
	1909.8	25.03	-3	22.03

Mode	Frequency (MHz)	Avg. Burst Power (dBm)	Duty Cycle Factor (dB)	Frame Power (dBm)
Maximum Power <SIM 2>				
GSM850	836.4	32.39	-9	23.39
PCS1900	1880.0	30.88	-9	21.88

Note: All SAR was tested in SIM 1.

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 15mm 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. SAR without the headset attached was significantly higher than with the headset, and also was verified several times and confirmed, so the final test data shown were the worst case without 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 multislot 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

Bluetooth Max. peak power is 5.70dBm. Referring to KDB 648474

      1, The power is less than Pref (10.79dBm).

      2, 7.1cm away from GSM antenna ($\geqq$2.5cm).

Therefore, standalone SAR and simultaneous SAR for Bluetooth is not required.

9.1.5. Reference Document

KDB 941225, KDB648474

9.1.6. 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: GSM Mobile Phone (HW version: 92520_1_22)							
Test Mode: GSM850 <SIM 1>							
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	128	824.2	23.40	-0.11	0.732	1.6
Left-Cheek	Fixed	189	836.4	23.42	-0.17	0.827	1.6
Left-Cheek	Fixed	251	848.8	23.36	0.15	0.878	1.6
Left-Tilted	Fixed	189	836.4	23.42	-0.02	0.542	1.6
Right-Cheek	Fixed	128	824.2	23.40	--	--	1.6
Right-Cheek	Fixed	189	836.4	23.42	-0.03	0.779	1.6
Right-Cheek	Fixed	251	848.8	23.36	--	--	1.6
Right-Tilted	Fixed	189	836.4	23.42	0.05	0.511	1.6
Test Mode: GSM850 <SIM 2>							
Left-Cheek	Fixed	189	836.4	23.39	-0.11	0.815	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.							

SAR MEASUREMENT

Ambient Temperature (°C) : 21.5 ±2	Relative Humidity (%): 52
Liquid Temperature (°C) : 21.0 ±2	Depth of Liquid (cm):>15

Product: GSM Mobile Phone (HW version: 92520_1_22)

Test Mode: GSM850

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	15	23.40	-0.10	1.090	1.6
Body-worn	Fixed	189	836.4	15	23.42	-0.01	1.080	1.6
Body-worn	Fixed	251	848.8	15	23.36	-0.01	**1.290**	1.6
Body-front	Fixed	251	848.8	15	23.36	-0.02	0.782	1.6
Body-worn (With Headset #1)	Fixed	251	848.8	15	23.36	0.02	0.754	1.6
Body-worn (With Headset #2)	Fixed	251	848.8	15	23.36	0.05	0.633	1.6
Body-worn (With Battery #2)	Fixed	251	848.8	15	23.36	-0.01	1.180	1.6
Test Mode: GPRS850-2slot								
Body-worn	Fixed	128	824.2	15	23.94	-0.17	0.850	1.6
Body-worn	Fixed	189	836.4	15	23.86	0.01	0.920	1.6
Body-worn	Fixed	251	848.8	15	23.73	0.07	0.914	1.6
Test Mode: GPRS850-3slot								
Body-worn	Fixed	128	824.2	15	24.70	0.16	0.999	1.6
Body-worn	Fixed	189	836.4	15	24.64	-0.02	1.040	1.6
Body-worn	Fixed	251	848.8	15	24.50	0.08	1.090	1.6
Body-worn (With Headset #1)	Fixed	251	848.8	15	24.64	-0.18	0.756	1.6
Test Mode: GPRS850-4slot								
Body-worn	Fixed	128	824.2	15	24.57	0.13	0.958	1.6
Body-worn	Fixed	189	836.4	15	24.50	0.17	1.040	1.6
Body-worn	Fixed	251	848.8	15	24.37	0.16	1.020	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.

SAR MEASUREMENT

Ambient Temperature (°C) : 21.5 ±2	Relative Humidity (%): 52
Liquid Temperature (°C) : 21.0 ±2	Depth of Liquid (cm):>15

Product: GSM Mobile Phone (HW version: 92520_1_22)

Test Mode: PCS1900 <SIM 1>

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	22.02	--	--	1.6
Left-Cheek	Fixed	661	1880.0	21.90	0.01	0.358	1.6
Left-Cheek	Fixed	810	1909.8	21.87	--	--	1.6
Left-Tilted	Fixed	661	1880.0	21.90	-0.12	0.323	1.6
Right-Cheek	Fixed	512	1850.2	22.02	--	--	1.6
Right-Cheek	Fixed	661	1880.0	21.90	0.11	**0.445**	1.6
Right-Cheek	Fixed	810	1909.8	21.87	--	--	1.6
Right-Tilted	Fixed	661	1880.0	21.90	-0.02	0.335	1.6
Test Mode: PCS1900 <SIM 2>							
Right-Cheek	Fixed	661	1880.0	21.88	0.13	0.405	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.

SAR MEASUREMENT

Ambient Temperature (°C) : 21.5 ±2	Relative Humidity (%): 52
Liquid Temperature (°C) : 21.0 ±2	Depth of Liquid (cm):>15

Product: GSM Mobile Phone (HW version: 92520_1_22)

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	15	22.02	--	--	1.6
Body-worn	Fixed	661	1880.0	15	21.90	-0.08	0.444	1.6
Body-worn	Fixed	810	1909.8	15	21.87	--	--	1.6
Body-front	Fixed	661	1880.0	15	21.90	-0.17	0.249	1.6
Body-worn (With Headset #1)	Fixed	661	1880.0	15	21.90	0.13	0.347	1.6
Body-worn (With Headset #2)	Fixed	661	1880.0	15	21.90	-0.02	0.374	1.6
Body-worn (With Battery #2)	Fixed	661	1880.0	15	21.90	0.05	0.369	1.6
Test Mode: GPRS1900-2slot								
Body-worn	Fixed	661	1880.0	15	21.90	-0.14	0.352	1.6
Test Mode: GPRS1900-3slot								
Body-worn	Fixed	512	1850.2	15	23.08	--	--	1.6
Body-worn	Fixed	661	1880.0	15	22.84	0.04	0.433	1.6
Body-worn	Fixed	810	1909.8	15	22.77	--	--	1.6
Body-worn (With Headset #2)	Fixed	661	1880.0	15	22.84	0.14	0.310	1.6
Test Mode: GPRS1900-4slot								
Body-worn	Fixed	661	1880.0	15	22.11	0.05	0.369	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.

SAR MEASUREMENT

Ambient Temperature (°C) : 21.5 ±2	Relative Humidity (%): 52
Liquid Temperature (°C) : 21.0 ±2	Depth of Liquid (cm):>15

Product: GSM Mobile Phone (HW version: 92520_1_24)

Test Mode: GSM850

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	251	848.8	23.36	-0.17	0.868	1.6

Test Mode: PCS1900

Right-Cheek	Fixed	189	836.4	23.39	0.12	0.361	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.

SAR MEASUREMENT

Ambient Temperature (°C) : 21.5 ±2	Relative Humidity (%): 52
Liquid Temperature (°C) : 21.0 ±2	Depth of Liquid (cm):>15

Product: GSM Mobile Phone (HW version: 92520_1_24)

Test Mode: GSM850

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	251	848.8	15	23.36	-0.14	1.14	1.6

Test Mode: PCS1900

Body-worn	Fixed	189	836.4	15	23.86	0.09	0.348	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: 26-07-2012

Test Laboratory: QuieTek Lab

System Check Head 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; σ = 0.9 mho/m; εr = 41.55; ρ = 1000 kg/m³ ;

Phantom section: Flat Section ; Input Power=250mW

Ambient temperature (℃): 21.5, Liquid temperature (℃): 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: SAM1; Type: SAM; Serial: TP1561
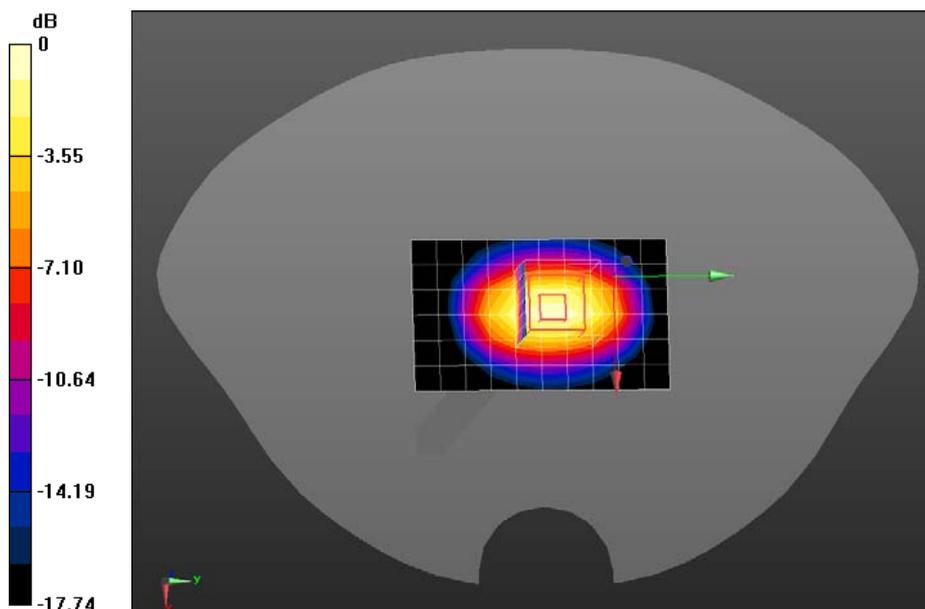- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/System Check Head 835MHz/Area Scan (6x19x1): Measurement grid: dx=10mm, dy=10mm, Maximum value of SAR (measured) = 2.54 mW/g

Configuration/System Check Head 835MHz/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm, Reference Value = 52.256 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 3.585 mW/g

SAR(1 g) = 2.39 mW/g; SAR(10 g) = 1.56 mW/g Maximum value of SAR (measured) = 2.58 mW/g
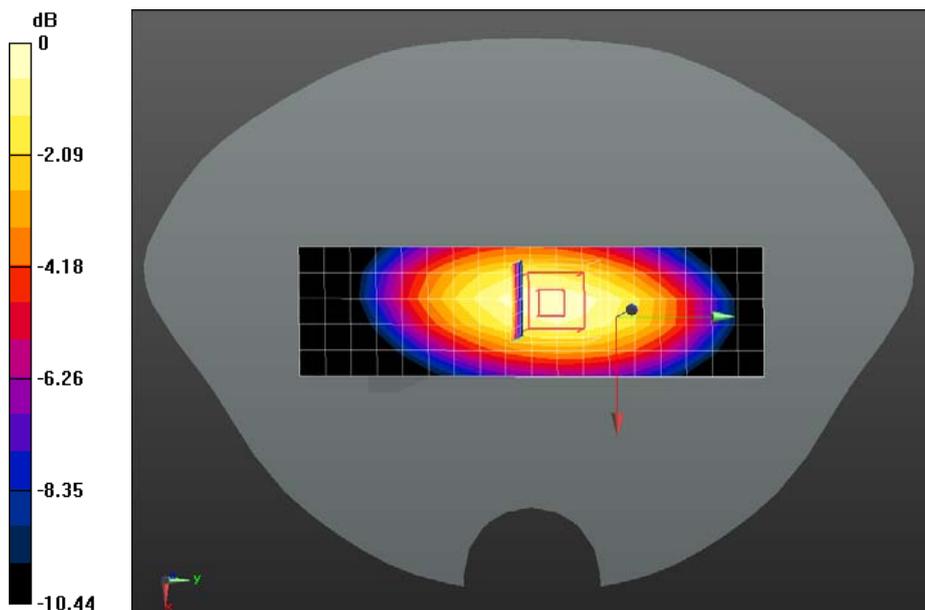
0 dB = 2.58 mW/g = 8.23 dB mW/g

Date/Time: 26-07-2012

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; σ = 0.97 mho/m; εr = 53.62; ρ = 1000 kg/m³ ;

Phantom section: Flat Section ; Input Power=250mW

Ambient temperature (℃): 21.5, Liquid temperature (℃): 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: SAM1; Type: SAM; Serial: TP1561
- 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) = 2.61 mW/g

Configuration/System Check Body 835MHz/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm, Reference Value = 52.503 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 3.821 mW/g

SAR(1 g) = 2.52 mW/g; SAR(10 g) = 1.64 mW/g Maximum value of SAR (measured) = 2.72 mW/g

0 dB = 2.72 mW/g = 8.69 dB mW/g

Date/Time: 26-07-2012

Test Laboratory: QuieTek Lab

System Check Head 1900MHz

DUT: Dipole 1900 MHz D1900V2; Type: D1900V2

Communication System: CW; Communication System Band: D1900 (1900.0 MHz); Duty Cycle: 1:1;

Frequency: 1900 MHz; Medium parameters used: f = 1900 MHz; σ = 1.44 mho/m; εr = 39.3; ρ = 1000 kg/m³ ;

Phantom section: Flat Section ; Input Power=250mW

Ambient temperature (℃): 21.5, Liquid temperature (℃): 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: SAM2; Type: SAM; Serial: TP1562

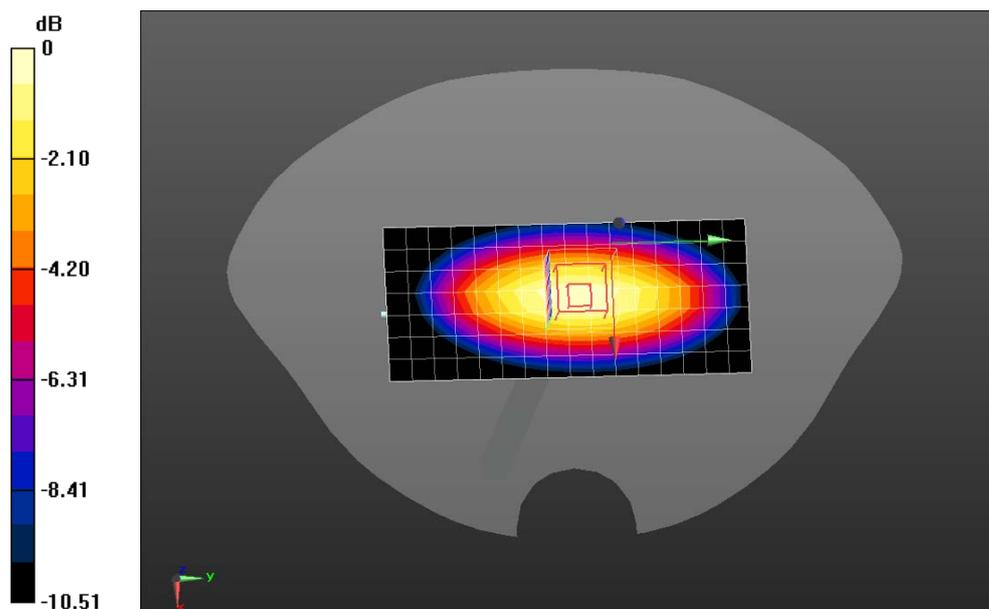- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/System Check Head 1900MHz/Area Scan (6x11x1): Measurement grid: dx=10mm,

dy=10mm

Maximum value of SAR (measured) = 9.95 mW/g

Configuration/System Check Head 1900MHz/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm,

dy=5mm, dz=5mm, Reference Value = 85.550 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 18.493 mW/g

SAR(1 g) = 9.57 mW/g; SAR(10 g) = 4.86 mW/g Maximum value of SAR (measured) = 10.8 mW/g

0 dB = 10.8 mW/g = 20.67 dB mW/g

Date/Time: 26-07-2012

Test Laboratory: QuieTek Lab

System Check Body 1900MHz

DUT: Dipole 1900 MHz D1900V2; Type: D1900V2

Communication System: CW; Communication System Band: D1900 (1900.0 MHz); Duty Cycle: 1:1;

Frequency: 1900 MHz; Medium parameters used: f = 1900 MHz; σ = 1.55 mho/m; εr = 54.06; ρ = 1000

kg/m³ ; Phantom section: Flat Section ; Input Power=250mW

Ambient temperature (℃): 21.5, Liquid temperature (℃): 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: SAM2; Type: SAM; Serial: TP1562
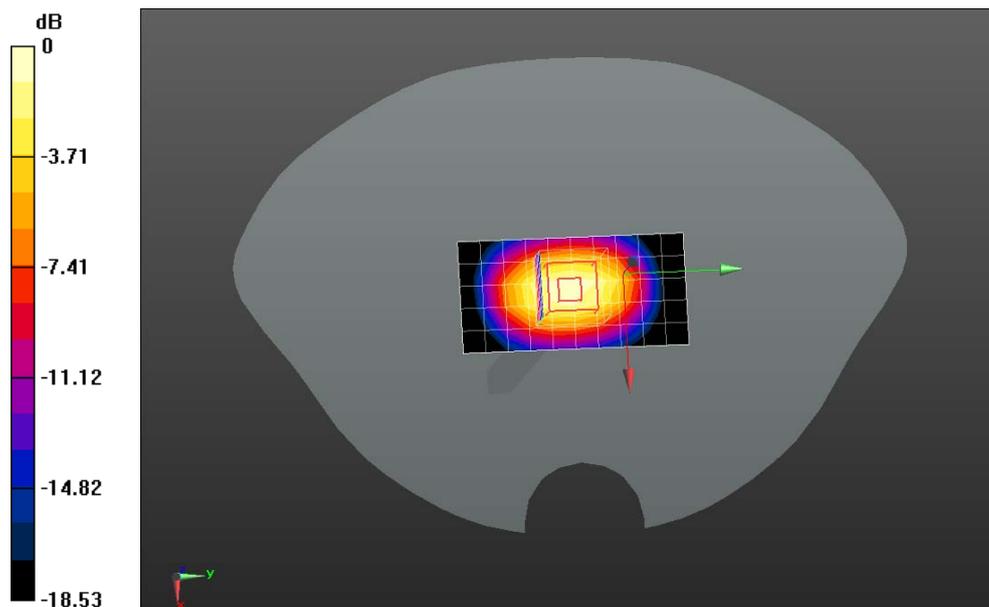- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/System Check Body 1900MHz/Area Scan (7x11x1): Measurement grid: dx=10mm,

dy=10mm

Maximum value of SAR (measured) = 11.0 mW/g

Configuration/System Check Body 1900MHz/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm,

dy=5mm, dz=5mm, Reference Value = 84.582 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 19.026 mW/g

SAR(1 g) = 10.2 mW/g; SAR(10 g) = 5.24 mW/g Maximum value of SAR (measured) = 11.6 mW/g

0 dB = 11.6 mW/g = 21.29 dB mW/g

Date/Time: 08-08-2012

Test Laboratory: QuieTek Lab

System Check Head 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; σ = 0.89 mho/m; εr = 41.43; ρ = 1000 kg/m³ ;

Phantom section: Flat Section ; Input Power=250mW

Ambient temperature (℃): 21.5, Liquid temperature (℃): 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: SAM1; Type: SAM; Serial: TP1561
- 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) = 2.51 mW/g

Configuration/System Check Head 835MHz/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm, Reference Value = 52.256 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 3.546 mW/g

SAR(1 g) = 2.36 mW/g; SAR(10 g) = 1.54 mW/g Maximum value of SAR (measured) = 2.55 mW/g
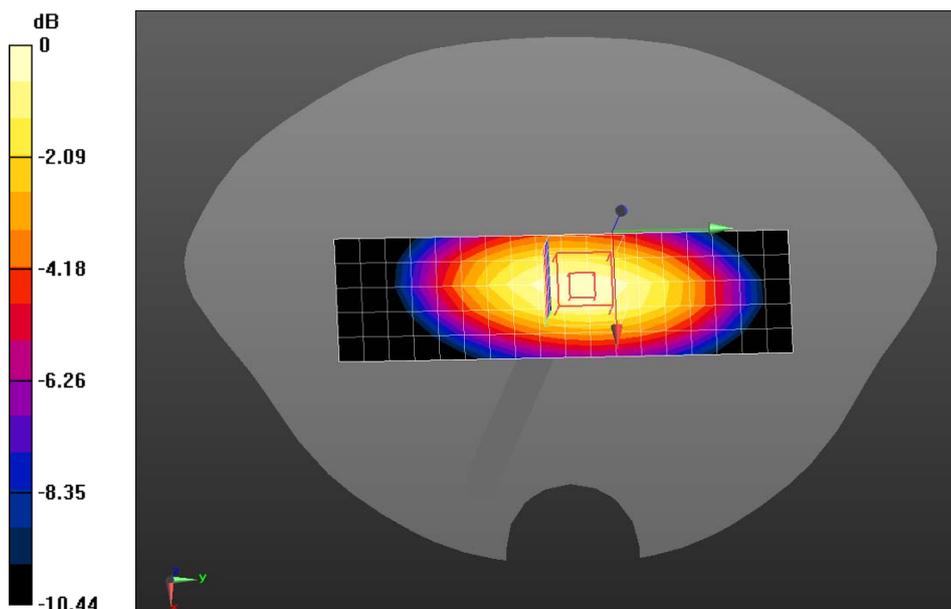
0 dB = 2.55 mW/g = 8.13 dB mW/g

Date/Time: 08-08-2012

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; σ = 0.97 mho/m; εr = 53.45; ρ = 1000 kg/m³ ;

Phantom section: Flat Section ; Input Power=250mW

Ambient temperature (℃): 21.5, Liquid temperature (℃): 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

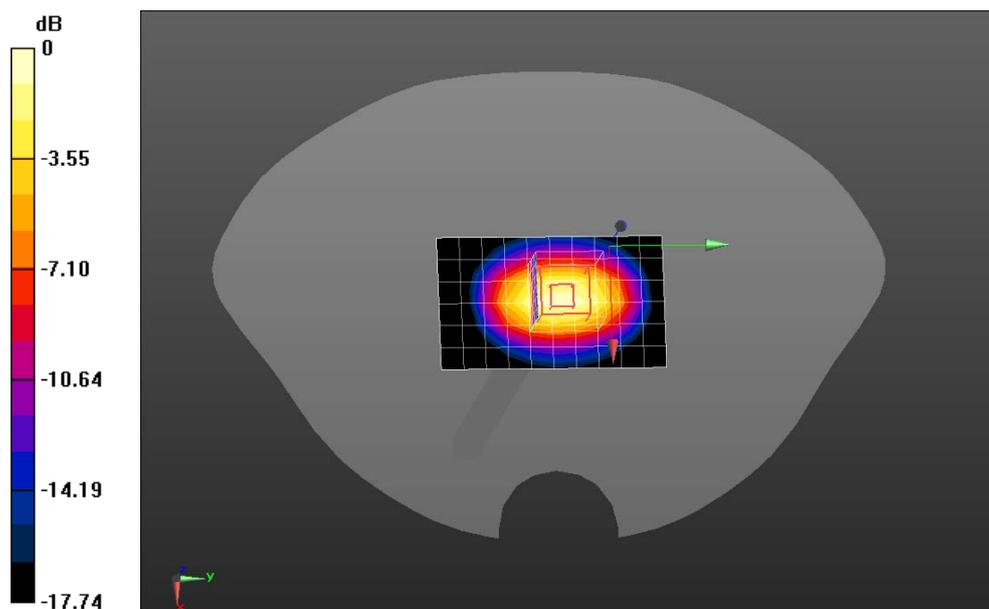- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/System Check Body 835MHz/Area Scan (8x17x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 2.61 mW/g

Configuration/System Check Body 835MHz/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm, Reference Value = 52.503 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 3.821 mW/g

SAR(1 g) = 2.52 mW/g; SAR(10 g) = 1.64 mW/g Maximum value of SAR (measured) = 2.72 mW/g

0 dB = 2.72 mW/g = 8.69 dB mW/g

Date/Time: 08-08-2012

Test Laboratory: QuieTek Lab

System Check Head 1900MHz

DUT: Dipole 1900 MHz D1900V2; Type: D1900V2

Communication System: CW; Communication System Band: D1900 (1900.0 MHz); Duty Cycle: 1:1;

Frequency: 1900 MHz; Medium parameters used: f = 1900 MHz; σ = 1.45 mho/m; εr = 39.4; ρ = 1000 kg/m³ ;

Phantom section: Flat Section ; Input Power=250mW

Ambient temperature (℃): 21.5, Liquid temperature (℃): 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: SAM2; Type: SAM; Serial: TP1562

- 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 = 85.550 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 18.621 mW/g

SAR(1 g) = 9.64 mW/g; SAR(10 g) = 4.9 mW/g Maximum value of SAR (measured) = 10.8 mW/g

0 dB = 10.8 mW/g = 20.67 dB mW/g

Date/Time: 08-08-2012

Test Laboratory: QuieTek Lab

System Check Body 1900MHz

DUT: Dipole 1900 MHz D1900V2; Type: D1900V2

Communication System: CW; Communication System Band: D1900 (1900.0 MHz); Duty Cycle: 1:1;

Frequency: 1900 MHz; Medium parameters used: f = 1900 MHz; σ = 1.55 mho/m; εr = 54.09; ρ = 1000

kg/m³ ; Phantom section: Flat Section ; Input Power=250mW

Ambient temperature (℃): 21.5, Liquid temperature (℃): 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: SAM2; Type: SAM; Serial: TP1562
- 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) = 11.0 mW/g

Configuration/System Check Body 1900MHz/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm, Reference Value = 84.582 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 19.026 mW/g

SAR(1 g) = 10.2 mW/g; SAR(10 g) = 5.24 mW/g Maximum value of SAR (measured) = 11.6 mW/g

0 dB = 11.6 mW/g = 21.29 dB mW/g

Appendix B. SAR measurement Data

Date/Time: 26-07-2012

Test Laboratory: QuieTek Lab

GSM850 Low Touch-Left

DUT: GSM Mobile Phone ; Type: G5520

Communication System: Generic GSM; Communication System Band: GSM850; Duty Cycle: 1:8.3;

Frequency: 824.2 MHz; Medium parameters used: f = 824.2 MHz; σ = 0.89 mho/m; εr = 41.7; ρ = 1000 kg/m³ ; Phantom section: Left Section

Ambient temperature (℃): 21.5, Liquid temperature (℃): 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: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/GSM850 Low Touch-Left/Area Scan (6x9x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 0.704 mW/g

Configuration/GSM850 Low Touch-Left/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 10.731 V/m; Power Drift = -0.11 dB

Peak SAR (extrapolated) = 0.947 mW/g

SAR(1 g) = 0.732 mW/g; SAR(10 g) = 0.529 mW/g Maximum value of SAR (measured) = 0.764 mW/g
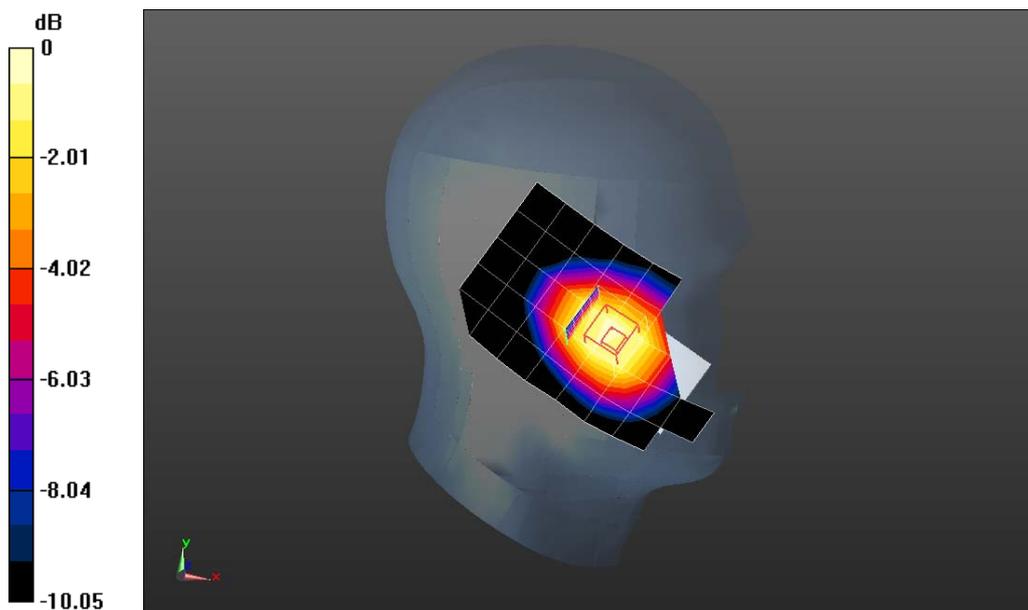
0 dB = 0.764 mW/g = -2.34 dB mW/g

Date/Time: 26-07-2012

Test Laboratory: QuieTek Lab

GSM850 Mid Touch-Left

DUT: GSM Mobile Phone ; Type: G5520

Communication System: Generic GSM; Communication System Band: GSM850; Duty Cycle: 1:8.3;

Frequency: 836.4 MHz; Medium parameters used: f = 836.4 MHz; σ = 0.9 mho/m; εr = 41.53; ρ = 1000

kg/m³ ; Phantom section: Left Section

Ambient temperature (℃): 21.5, Liquid temperature (℃): 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: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/GSM850 Mid Touch-Left/Area Scan (6x9x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 0.799 mW/g

Configuration/GSM850 Mid Touch-Left/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mmK, Reference Value = 11.060 V/m; Power Drift = -0.17 dB

Peak SAR (extrapolated) = 1.064 mW/g

SAR(1 g) = 0.827 mW/g; SAR(10 g) = 0.597 mW/g Maximum value of SAR (measured) = 0.870 mW/g
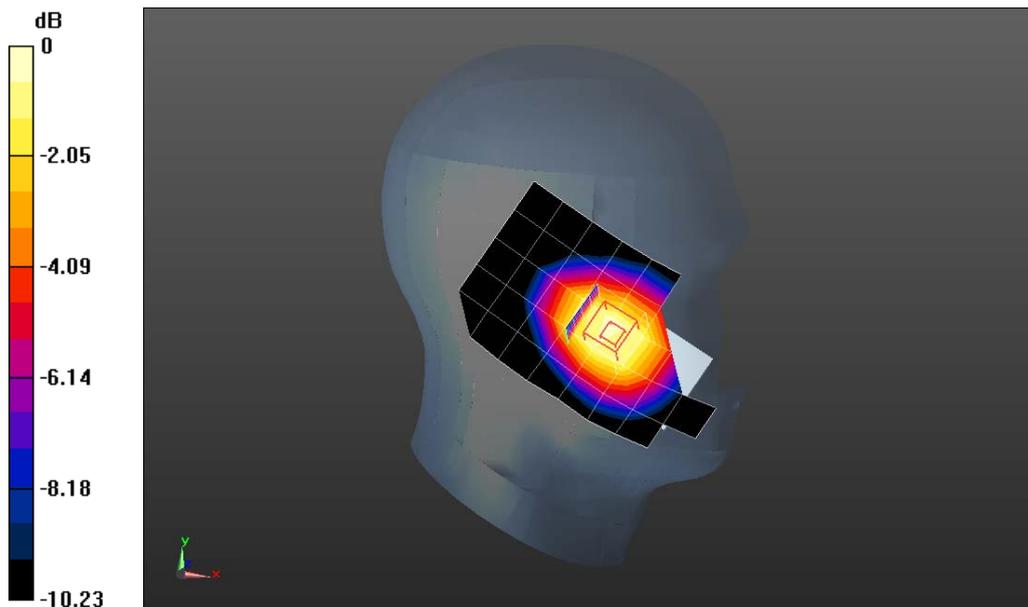
0 dB = 0.870 mW/g = -1.21 dB mW/g

Date/Time: 26-07-2012

Test Laboratory: QuieTek Lab

GSM850 High Touch-Left

DUT: GSM Mobile Phone ; Type: G5520

Communication System: Generic GSM; Communication System Band: GSM850; Duty Cycle: 1:8.3;

Frequency: 848.8 MHz; Medium parameters used: f = 848.8 MHz; σ = 0.91 mho/m; εr = 41.36; ρ = 1000

kg/m³ ; Phantom section: Left Section

Ambient temperature (℃): 21.5, Liquid temperature (℃): 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: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/GSM850 High Touch-Left/Area Scan (6x9x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 0.841 mW/g

Configuration/GSM850 High Touch-Left/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm, Reference Value = 10.211 V/m; Power Drift = 0.15 dB

Peak SAR (extrapolated) = 1.134 mW/g

SAR(1 g) = 0.878 mW/g; SAR(10 g) = 0.634 mW/g Maximum value of SAR (measured) = 0.928 mW/g
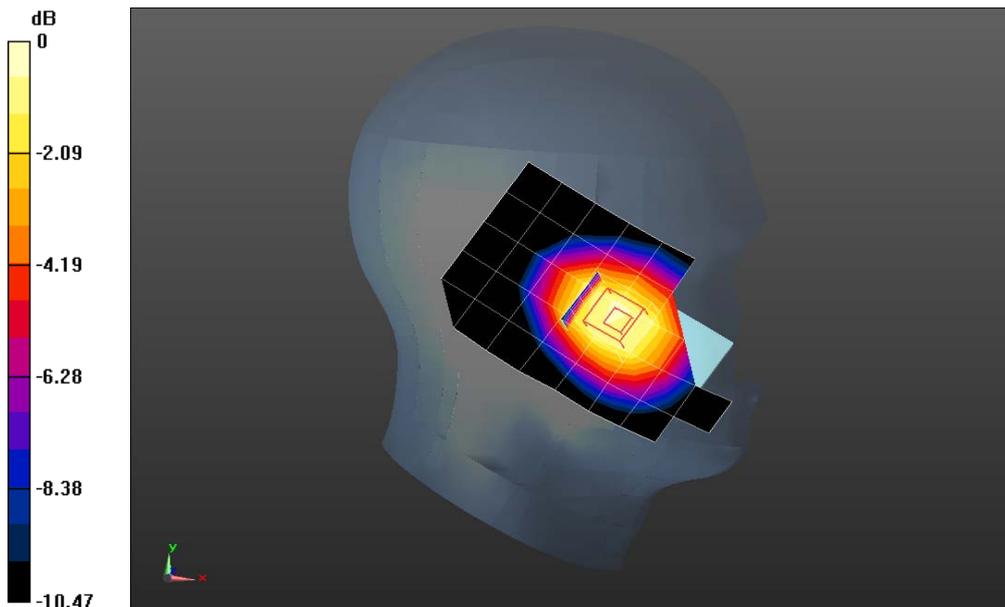
0 dB = 0.928 mW/g = -0.65 dB mW/g

Test Laboratory: QuieTek Lab

GSM850 Mid Tilt-Left

DUT: GSM Mobile Phone ; Type: G5520

Communication System: Generic GSM; Communication System Band: GSM850; Duty Cycle: 1:8.3;

Frequency: 836.4 MHz; Medium parameters used: f = 836.4 MHz; σ = 0.9 mho/m; εr = 41.53; ρ = 1000 kg/m³ ; Phantom section: Left Section

Ambient temperature (℃): 21.5, Liquid temperature (℃): 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: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/GSM850 Mid Tilt-Left/Area Scan (6x9x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 0.530 mW/g

Configuration/GSM850 Mid Tilt-Left/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 16.379 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 0.693 mW/g

SAR(1 g) = 0.542 mW/g; SAR(10 g) = 0.397 mW/g Maximum value of SAR (measured) = 0.570 mW/g
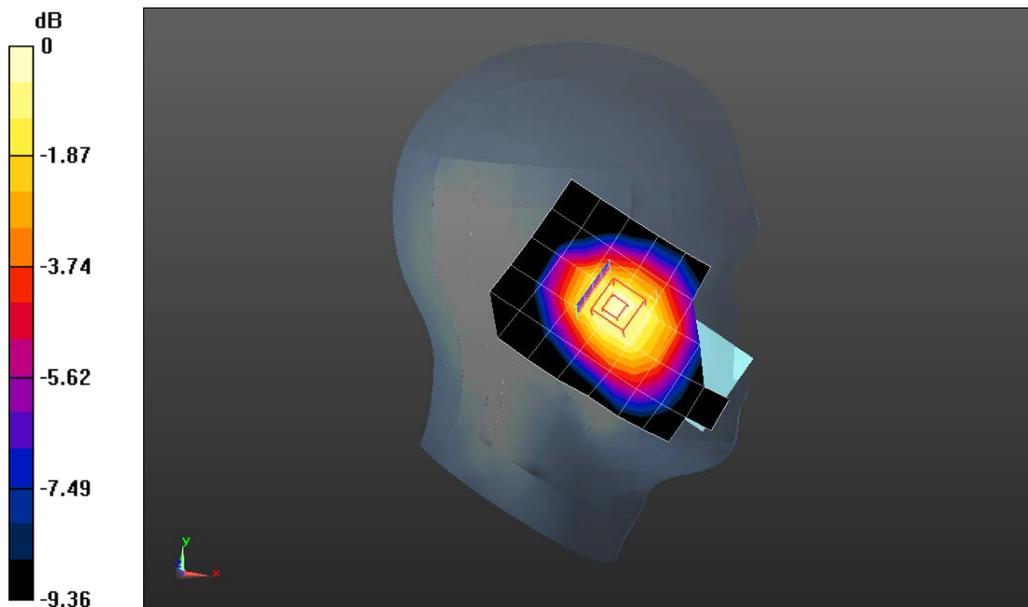
0 dB = 0.570 mW/g = -4.88 dB mW/g

Date/Time: 26-07-2012

Test Laboratory: QuieTek Lab

GSM850 Mid Touch-Right

DUT: GSM Mobile Phone ; Type: G5520

Communication System: Generic GSM; Communication System Band: GSM850; Duty Cycle: 1:8.3;

Frequency: 836.4 MHz; Medium parameters used: f = 836.4 MHz; σ = 0.9 mho/m; εr = 41.53; ρ = 1000

kg/m³ ; Phantom section: Right Section

Ambient temperature (℃): 21.5, Liquid temperature (℃): 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: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/GSM850 Mid Touch-Right/Area Scan (6x9x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 0.793 mW/g

Configuration/GSM850 Mid Touch-Right/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm, Reference Value = 9.195 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 1.046 mW/g

SAR(1 g) = 0.779 mW/g; SAR(10 g) = 0.560 mW/g Maximum value of SAR (measured) = 0.828 mW/g
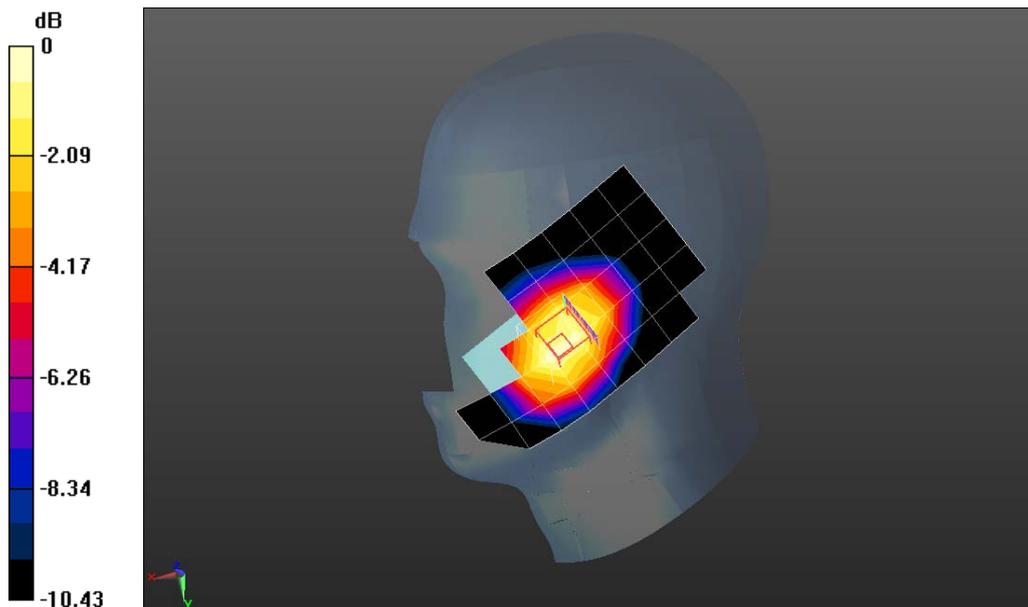
0 dB = 0.828 mW/g = -1.64 dB mW/g

Date/Time: 26-07-2012

Test Laboratory: QuieTek Lab

GSM850 Mid Tilt-Right

DUT: GSM Mobile Phone ; Type: G5520

Communication System: Generic GSM; Communication System Band: GSM850; Duty Cycle: 1:8.3;

Frequency: 836.4 MHz; Medium parameters used: f = 836.4 MHz; σ = 0.9 mho/m; εr = 41.53; ρ = 1000

kg/m³ ; Phantom section: Right Section

Ambient temperature (℃): 21.5, Liquid temperature (℃): 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: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/GSM850 Mid Tilt-Right/Area Scan (6x9x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 0.515 mW/g

Configuration/GSM850 Mid Tilt-Right/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm, Reference Value = 12.770 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 0.655 mW/g

SAR(1 g) = 0.511 mW/g; SAR(10 g) = 0.375 mW/g Maximum value of SAR (measured) = 0.533 mW/g
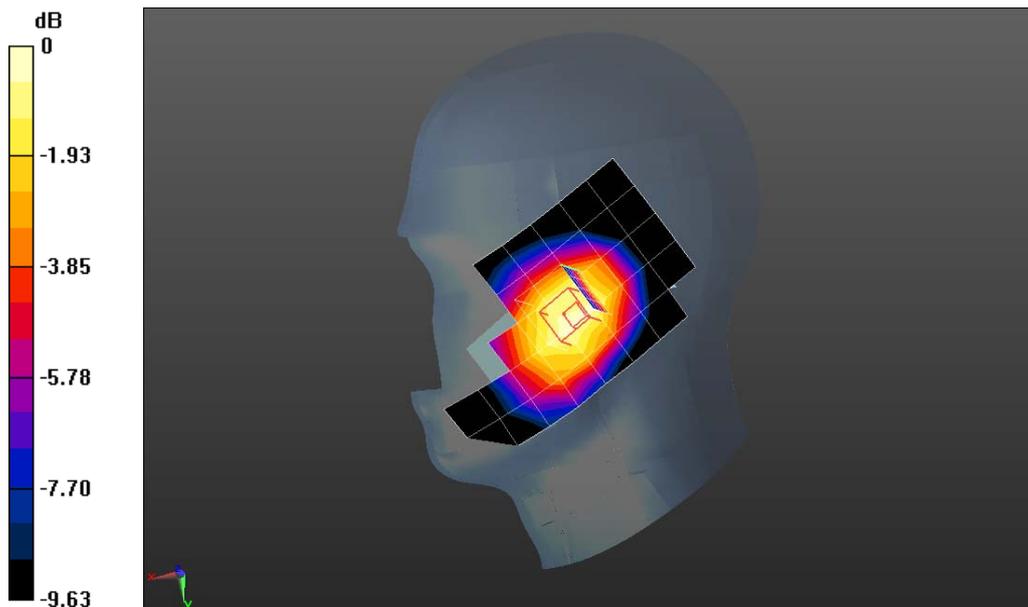
0 dB = 0.533 mW/g = -5.47 dB mW/g

Date/Time: 26-07-2012

Test Laboratory: QuieTek Lab

GSM850 Mid Touch-Left <SIM 2>

DUT: GSM Mobile Phone ; Type: G5520

Communication System: Generic GSM; Communication System Band: GSM850; Duty Cycle: 1:8.3;

Frequency: 836.4 MHz; Medium parameters used: f = 836.4 MHz; σ = 0.9 mho/m; εr = 41.53; ρ = 1000

kg/m³ ; Phantom section: Left Section

Ambient temperature (℃): 21.5, Liquid temperature (℃): 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: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/GSM850 Mid Touch-Left/Area Scan (6x9x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 0.792 mW/g

Configuration/GSM850 Mid Touch-Left/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm, Reference Value = 10.891 V/m; Power Drift = -0.11 dB

Peak SAR (extrapolated) = 1.047 mW/g

SAR(1 g) = 0.815 mW/g; SAR(10 g) = 0.590 mW/g Maximum value of SAR (measured) = 0.861 mW/g
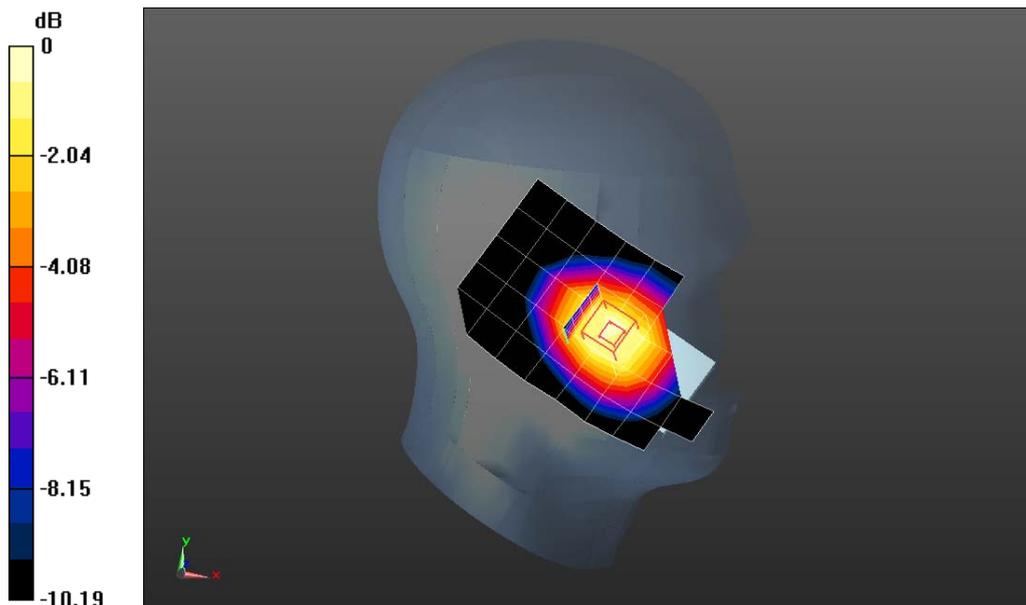
0 dB = 0.861 mW/g = -1.30 dB mW/g

Date/Time: 26-07-2012

Test Laboratory: QuieTek Lab

GSM850 Low Body-Back

DUT: GSM Mobile Phone ; Type: G5520

Communication System: Generic GSM; Communication System Band: GSM850; Duty Cycle: 1:8.3;

Frequency: 824.2 MHz; Medium parameters used: f = 824.2 MHz; σ = 0.96 mho/m; εr = 53.74; ρ = 1000 kg/m³ ; Phantom section: Flat Section

Ambient temperature (℃): 21.5, Liquid temperature (℃): 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: SAM1; Type: SAM; Serial: TP1561
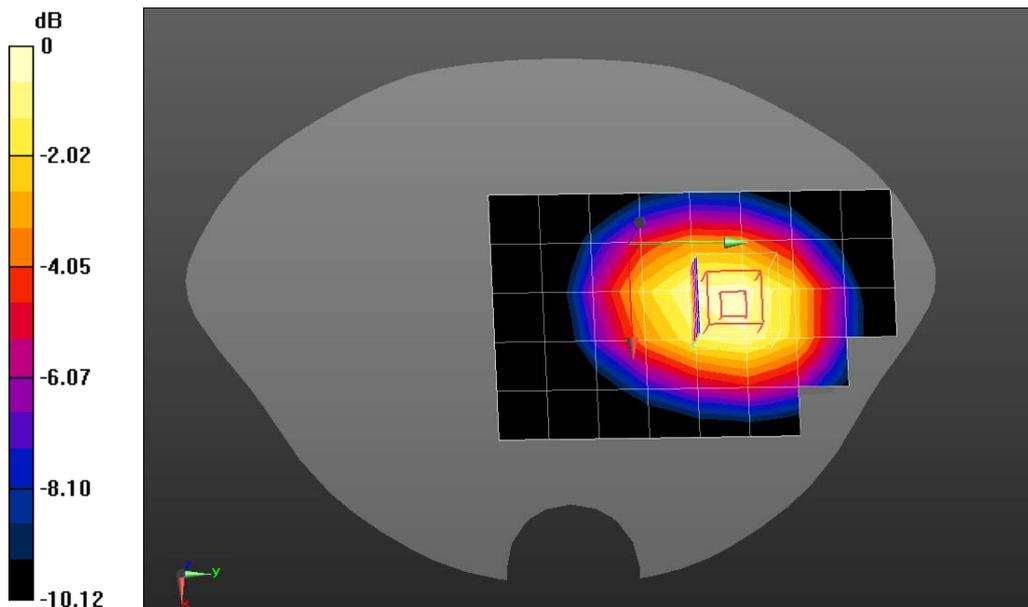- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/GSM850 Low Body-Back/Area Scan (6x9x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 1.09 mW/g

Configuration/GSM850 Low Body-Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 13.824 V/m; Power Drift = -0.10 dB

Peak SAR (extrapolated) = 1.466 mW/g

SAR(1 g) = 1.09 mW/g; SAR(10 g) = 0.773 mW/g Maximum value of SAR (measured) = 1.15 mW/g
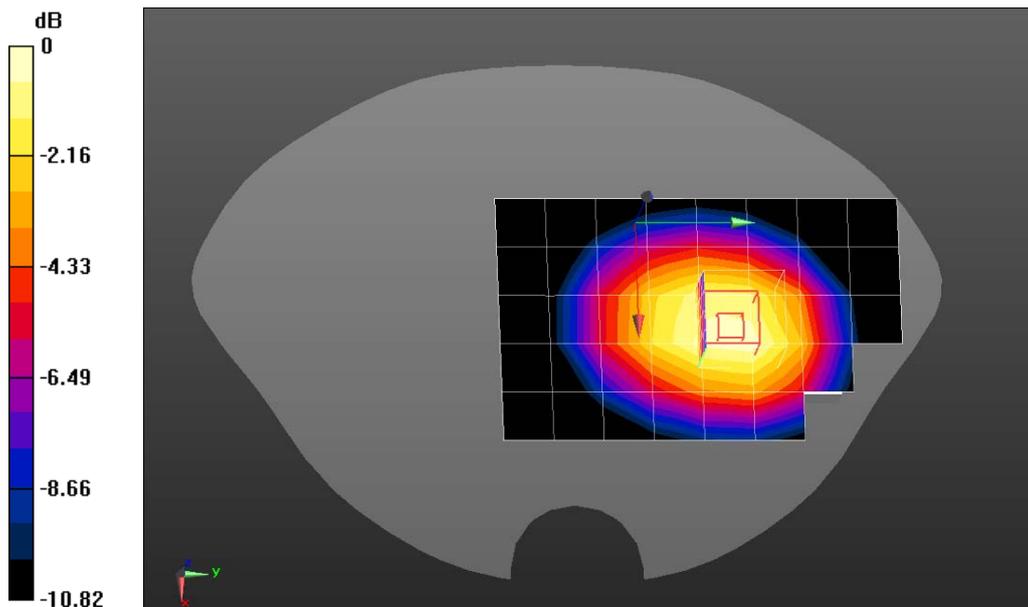
0 dB = 1.15 mW/g = 1.21 dB mW/g

Date/Time: 26-07-2012

Test Laboratory: QuieTek Lab

GSM850 Mid Body-Back

DUT: GSM Mobile Phone ; Type: G5520

Communication System: Generic GSM; Communication System Band: GSM850; Duty Cycle: 1:8.3;

Frequency: 836.4 MHz; Medium parameters used: f = 836.4 MHz; σ = 0.97 mho/m; εr = 53.61; ρ = 1000

kg/m³ ; Phantom section: Flat Section

Ambient temperature (℃): 21.5, Liquid temperature (℃): 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: SAM1; Type: SAM; Serial: TP1561
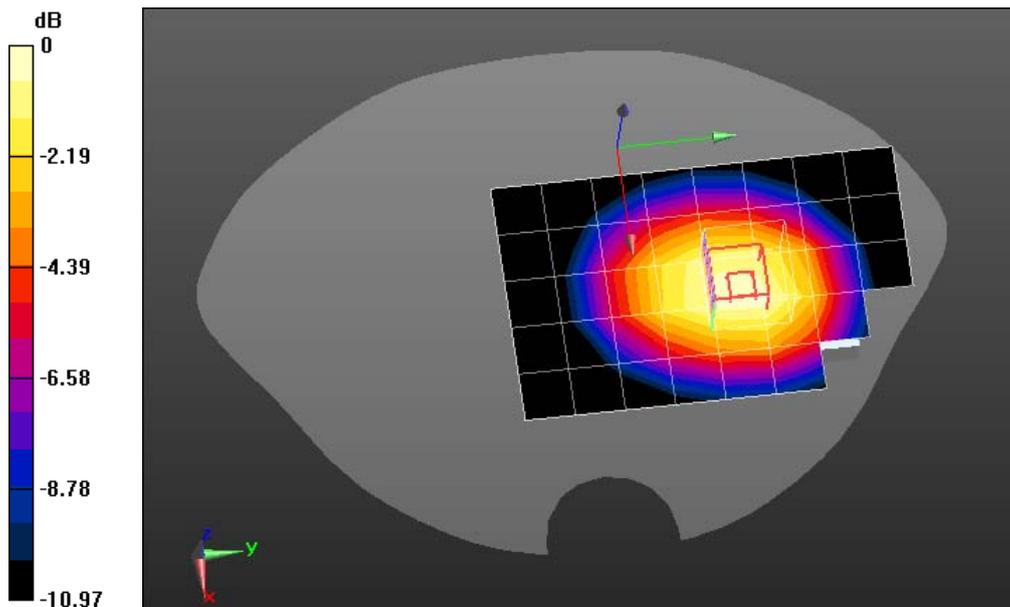- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/GSM850 Mid Body-Back/Area Scan (6x9x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 1.06 mW/g

Configuration/GSM850 Mid Body-Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm, Reference Value = 11.468 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 1.437 mW/g

SAR(1 g) = 1.08 mW/g; SAR(10 g) = 0.770 mW/g Maximum value of SAR (measured) = 1.14 mW/g

0 dB = 1.14 mW/g = 1.14 dB mW/g

Date/Time: 26-07-2012

Test Laboratory: QuieTek Lab

GSM850 High Body-Back

DUT: GSM Mobile Phone ; Type: G5520

Communication System: Generic GSM; Communication System Band: GSM850; Duty Cycle: 1:8.3;

Frequency: 848.8 MHz; Medium parameters used: f = 848.8 MHz; σ = 0.98 mho/m; εr = 53.49; ρ = 1000

kg/m³ ; Phantom section: Flat Section

Ambient temperature (℃): 21.5, Liquid temperature (℃): 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: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/GSM850 High Body-Back/Area Scan (6x9x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 1.29 mW/g

Configuration/GSM850 High Body-Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm, Reference Value = 14.259 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 1.731 mW/g

SAR(1 g) = 1.29 mW/g; SAR(10 g) = 0.913 mW/g Maximum value of SAR (measured) = 1.36 mW/g

0 dB = 1.36 mW/g = 2.67 dB mW/g

Z-Axis Plot

Interpolated Max SAR Z Line(z)

GSM850 High Body-Back;Zoom Scan;SAR;cube 0

Markers
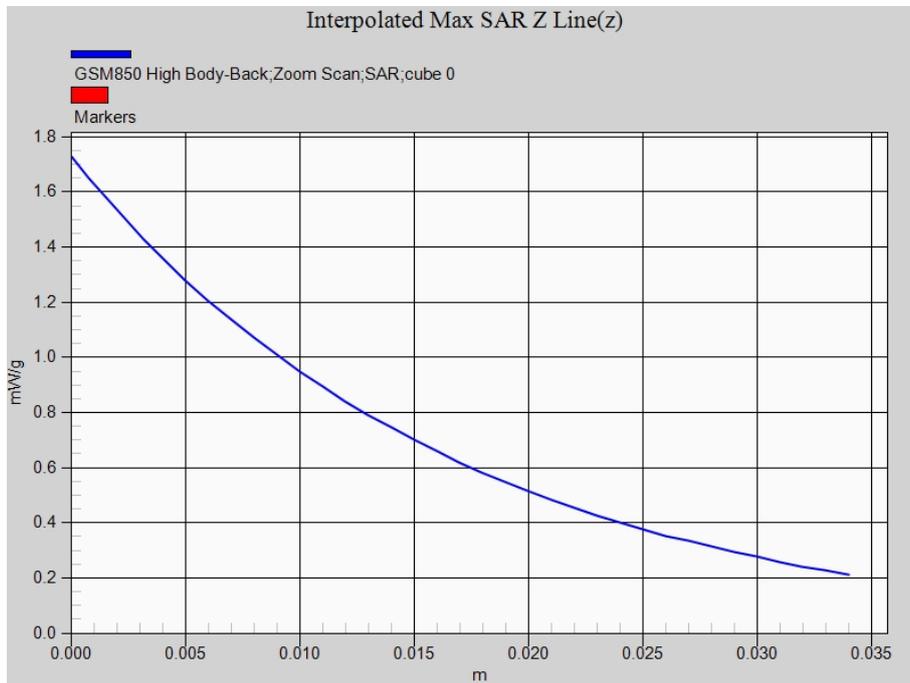
Date/Time: 26-07-2012

Test Laboratory: QuieTek Lab

GSM850 High Body-Front

DUT: GSM Mobile Phone ; Type: G5520

Communication System: Generic GSM; Communication System Band: GSM850; Duty Cycle: 1:8.3;

Frequency: 848.8 MHz; Medium parameters used: f = 848.8 MHz; σ = 0.97 mho/m; εr = 53.49; ρ = 1000

kg/m³ ; Phantom section: Flat Section

Ambient temperature (℃): 21.5, Liquid temperature (℃): 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: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/GSM850 High Body-Front/Area Scan (6x9x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 0.747 mW/g

Configuration/GSM850 High Body-Front/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm, Reference Value = 12.583 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 1.050 mW/g

SAR(1 g) = 0.782 mW/g; SAR(10 g) = 0.562 mW/g Maximum value of SAR (measured) = 0.826 mW/g
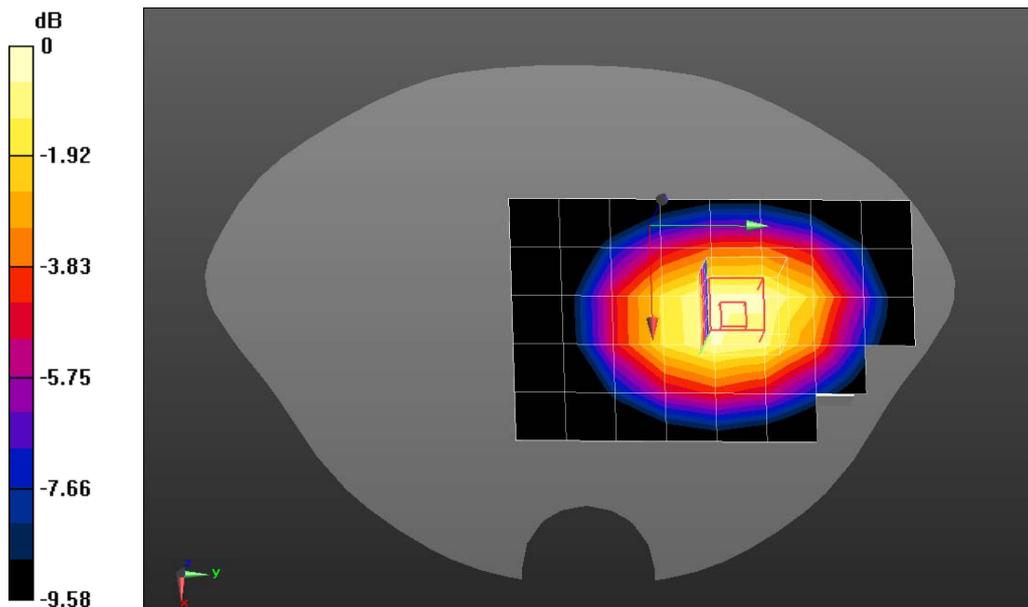
0 dB = 0.826 mW/g = -1.66 dB mW/g

Date/Time: 26-07-2012

Test Laboratory: QuieTek Lab

GSM850 High Body-Back(with headset #1)

DUT: GSM Mobile Phone ; Type: G5520

Communication System: Generic GSM; Communication System Band: GSM850; Duty Cycle: 1:8.3;

Frequency: 848.8 MHz; Medium parameters used: f = 848.8 MHz; σ = 0.97 mho/m; εr = 53.49; ρ = 1000

kg/m³ ; Phantom section: Flat Section

Ambient temperature (℃): 21.5, Liquid temperature (℃): 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: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/GSM850 High Body-Back/Area Scan (6x9x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 0.721 mW/g

Configuration/GSM850 High Body-Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm, Reference Value = 13.930 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 1.010 mW/g

SAR(1 g) = 0.754 mW/g; SAR(10 g) = 0.539 mW/g Maximum value of SAR (measured) = 0.795 mW/g
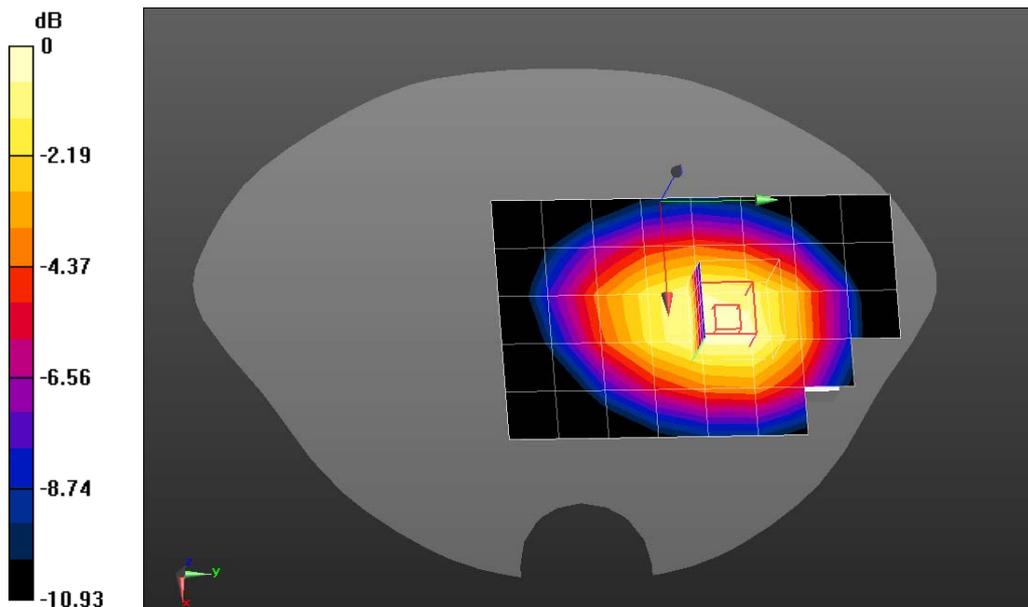
0 dB = 0.795 mW/g = -1.99 dB mW/g

Date/Time: 26-07-2012

Test Laboratory: QuieTek Lab

GSM850 High Body-Back(with headset #2)

DUT: GSM Mobile Phone ; Type: G5520

Communication System: Generic GSM; Communication System Band: GSM850; Duty Cycle: 1:8.3;

Frequency: 848.8 MHz; Medium parameters used: f = 848.8 MHz; σ = 0.97 mho/m; εr = 53.49; ρ = 1000 kg/m³ ; Phantom section: Flat Section

Ambient temperature (℃): 21.5, Liquid temperature (℃): 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: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/GSM850 High Body-Back/Area Scan (6x9x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 0.639 mW/g

Configuration/GSM850 High Body-Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 10.456 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 0.855 mW/g

SAR(1 g) = 0.633 mW/g; SAR(10 g) = 0.448 mW/g Maximum value of SAR (measured) = 0.670 mW/g
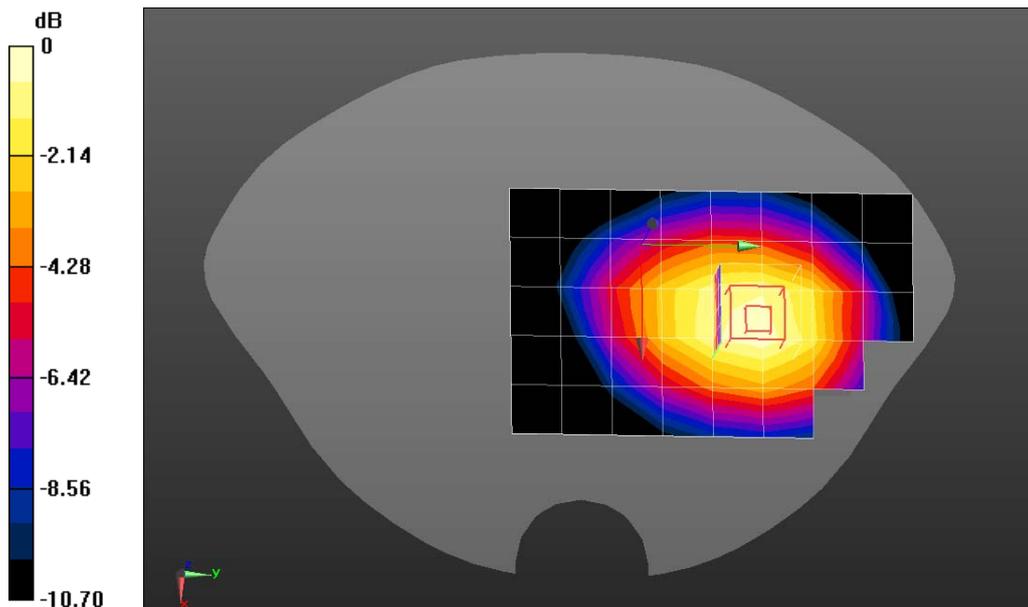
0 dB = 0.670 mW/g = -3.48 dB mW/g

Date/Time: 26-07-2012

Test Laboratory: QuieTek Lab

GSM850 High Body-Back(with battery #2)

DUT: GSM Mobile Phone ; Type: G5520

Communication System: Generic GSM; Communication System Band: GSM850; Duty Cycle: 1:8.3;

Frequency: 848.8 MHz; Medium parameters used: f = 848.8 MHz; σ = 0.97 mho/m; εr = 53.49; ρ = 1000

kg/m³ ; Phantom section: Flat Section

Ambient temperature (℃): 21.5, Liquid temperature (℃): 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: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/GSM850 High Body-Back/Area Scan (6x9x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 1.20 mW/g

Configuration/GSM850 High Body-Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm, Reference Value = 11.464 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 1.593 mW/g

SAR(1 g) = 1.18 mW/g; SAR(10 g) = 0.841 mW/g Maximum value of SAR (measured) = 1.26 mW/g
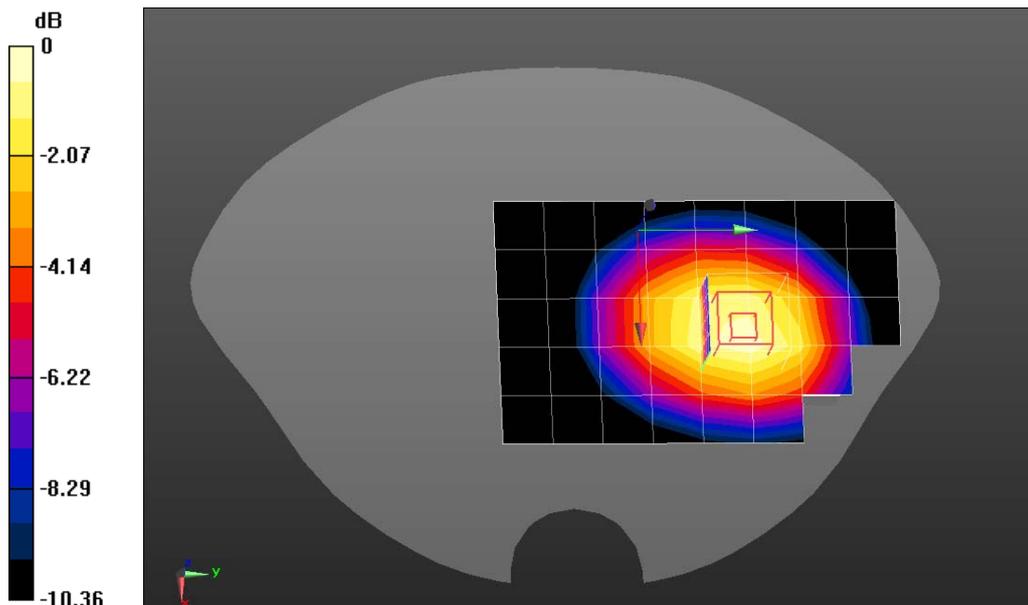
0 dB = 1.26 mW/g = 2.01 dB mW/g

Date/Time: 26-07-2012

Test Laboratory: QuieTek Lab

GPRS850 Low Body-Back(2up)

DUT: GSM Mobile Phone ; Type: G5520

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

Frequency: 824.2 MHz; Medium parameters used: f = 824.2 MHz; σ = 0.96 mho/m; εr = 53.74; ρ = 1000

kg/m³ ; Phantom section: Flat Section

Ambient temperature (℃): 21.5, Liquid temperature (℃): 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: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/GPRS850 Low Body-Back/Area Scan (6x9x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 0.888 mW/g

Configuration/GPRS850 Low Body-Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm, Reference Value = 9.148 V/m; Power Drift = -0.17 dB

Peak SAR (extrapolated) = 1.166 mW/g

SAR(1 g) = 0.850 mW/g; SAR(10 g) = 0.601 mW/g Maximum value of SAR (measured) = 0.906 mW/g
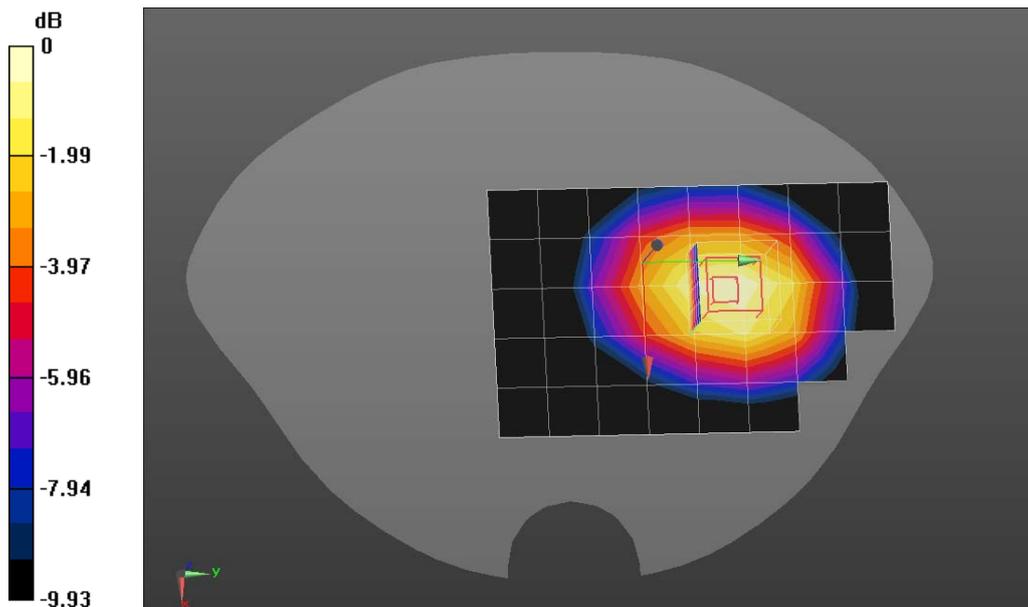
0 dB = 0.906 mW/g = -0.86 dB mW/g

Date/Time: 26-07-2012

Test Laboratory: QuieTek Lab

GPRS850 Mid Body-Back(2up)

DUT: GSM Mobile Phone ; Type: G5520

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; σ = 0.97 mho/m; εr = 53.61; ρ = 1000

kg/m³ ; Phantom section: Flat Section

Ambient temperature (℃): 21.5, Liquid temperature (℃): 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: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/GPRS850 Mid Body-Back/Area Scan (6x9x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 0.908 mW/g

Configuration/GPRS850 Mid Body-Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm, Reference Value = 9.729 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 1.278 mW/g

SAR(1 g) = 0.920 mW/g; SAR(10 g) = 0.644 mW/g Maximum value of SAR (measured) = 0.975 mW/g
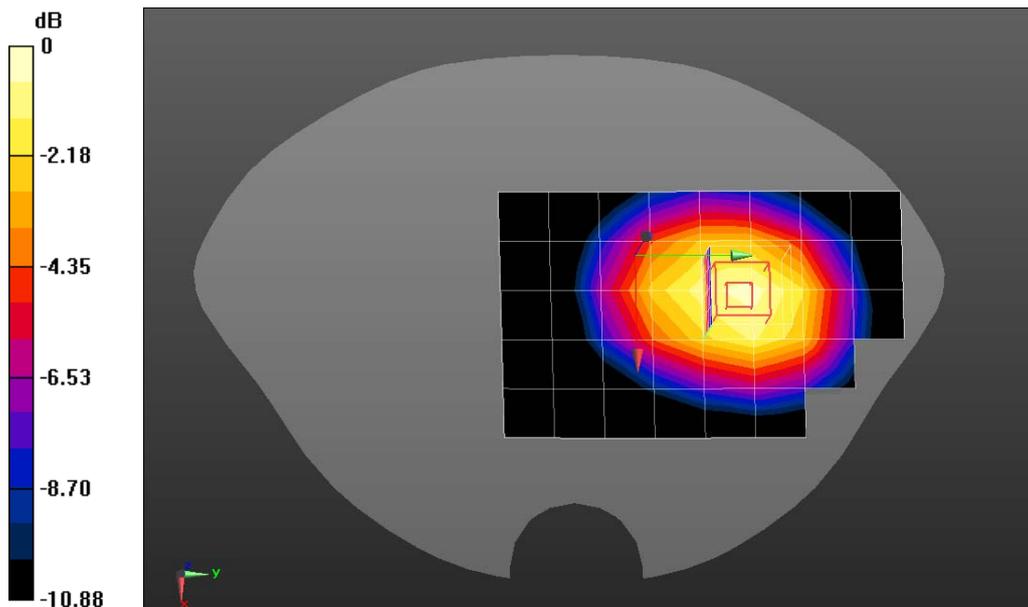
0 dB = 0.975 mW/g = -0.22 dB mW/g

Date/Time: 26-07-2012

Test Laboratory: QuieTek Lab

GPRS850 High Body-Back(2up)

DUT: GSM Mobile Phone ; Type: G5520

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

Frequency: 848.8 MHz; Medium parameters used: f = 848.8 MHz; σ = 0.98 mho/m; εr = 53.49; ρ = 1000

kg/m³ ; Phantom section: Flat Section

Ambient temperature (℃): 21.5, Liquid temperature (℃): 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: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/GPRS850 High Body-Back/Area Scan (6x9x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 0.984 mW/g

Configuration/GPRS850 High Body-Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm, Reference Value = 9.736 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 1.212 mW/g

SAR(1 g) = 0.914 mW/g; SAR(10 g) = 0.657 mW/g Maximum value of SAR (measured) = 0.966 mW/g
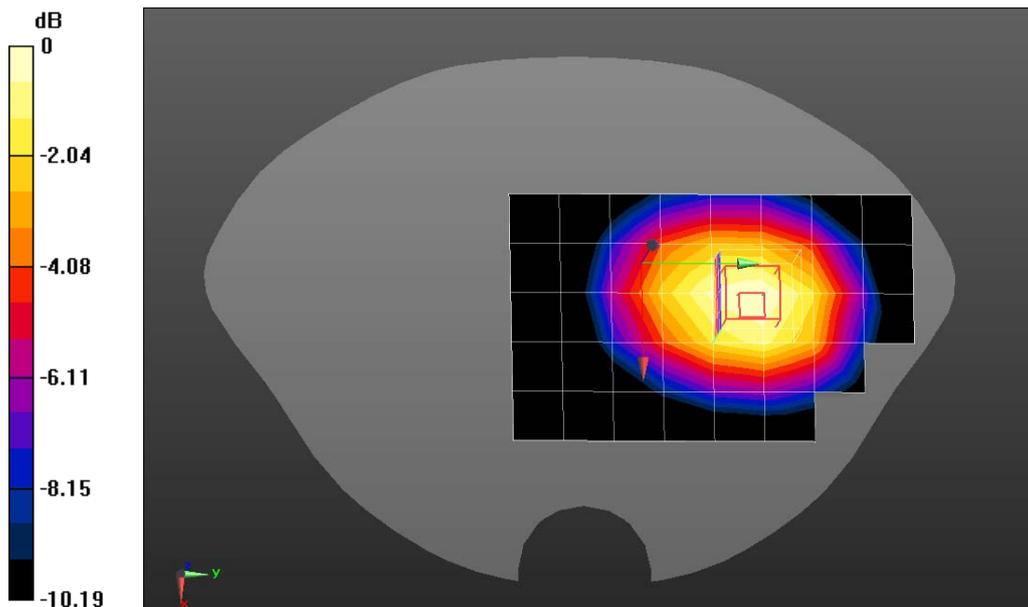
0 dB = 0.966 mW/g = -0.30 dB mW/g

Date/Time: 26-07-2012

Test Laboratory: QuieTek Lab

GPRS850 Low Body-Back(3up)

DUT: GSM Mobile Phone ; Type: G5520

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

Frequency: 824.2 MHz; Medium parameters used: f = 824.2 MHz; σ = 0.96 mho/m; εr = 53.74; ρ = 1000

kg/m³ ; Phantom section: Flat Section

Ambient temperature (℃): 21.5, Liquid temperature (℃): 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: SAM1; Type: SAM; Serial: TP1561

- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)
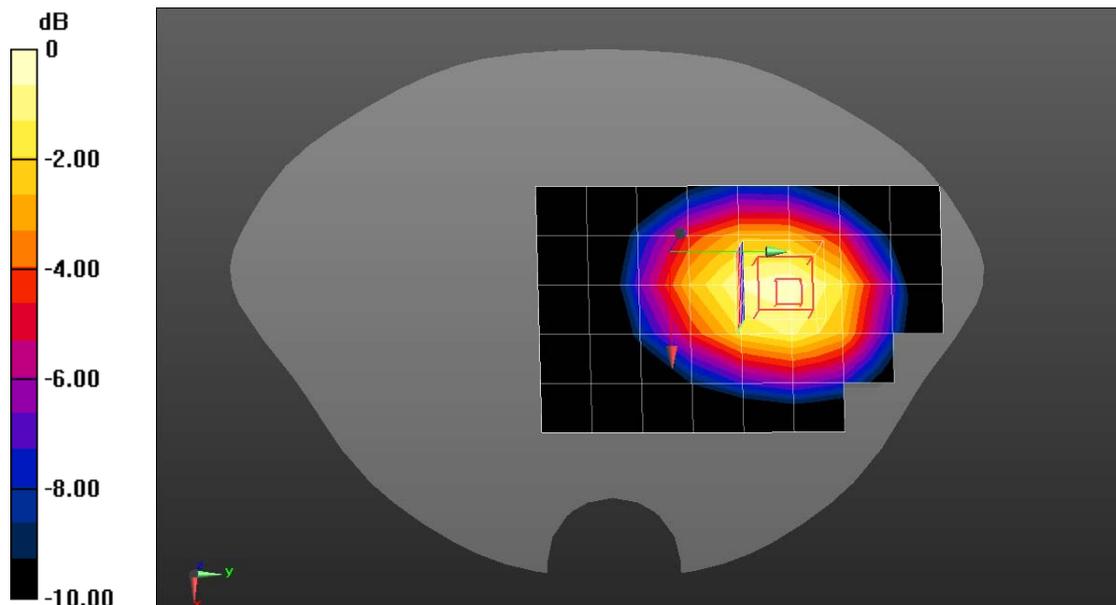
Configuration/GPRS850 Low Body-Back/Area Scan (6x9x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 1.06 mW/g

Configuration/GPRS850 Low Body-Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm, Reference Value = 9.657 V/m; Power Drift = 0.16 dB

Peak SAR (extrapolated) = 1.360 mW/g

SAR(1 g) = 0.999 mW/g; SAR(10 g) = 0.713 mW/g Maximum value of SAR (measured) = 1.08 mW/g

0 dB = 1.08 mW/g = 0.67 dB mW/g

Date/Time: 26-07-2012

Test Laboratory: QuieTek Lab

GPRS850 Mid Body-Back(3up)

DUT: GSM Mobile Phone ; Type: G5520

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; σ = 0.97 mho/m; εr = 53.61; ρ = 1000 kg/m³ ; Phantom section: Flat Section

Ambient temperature (℃): 21.5, Liquid temperature (℃): 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: SAM1; Type: SAM; Serial: TP1561
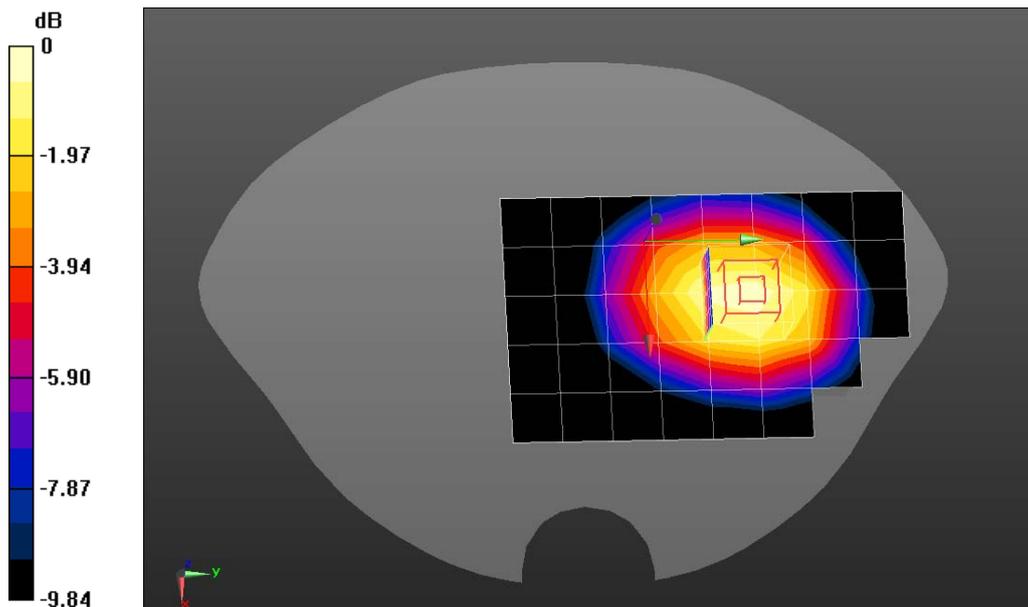- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/GPRS850 Mid Body-Back/Area Scan (6x9x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 1.07 mW/g

Configuration/GPRS850 Mid Body-Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 10.532 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 1.438 mW/g

SAR(1 g) = 1.04 mW/g; SAR(10 g) = 0.744 mW/g Maximum value of SAR (measured) = 1.10 mW/g

0 dB = 1.10 mW/g = 0.83 dB mW/g

Date/Time: 26-07-2012

Test Laboratory: QuieTek Lab

GPRS850 High Body-Back(3up)

DUT: GSM Mobile Phone ; Type: G5520

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

Frequency: 848.8 MHz; Medium parameters used: f = 848.8 MHz; σ = 0.98 mho/m; εr = 53.49; ρ = 1000

kg/m³ ; Phantom section: Flat Section

Ambient temperature (℃): 21.5, Liquid temperature (℃): 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: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)
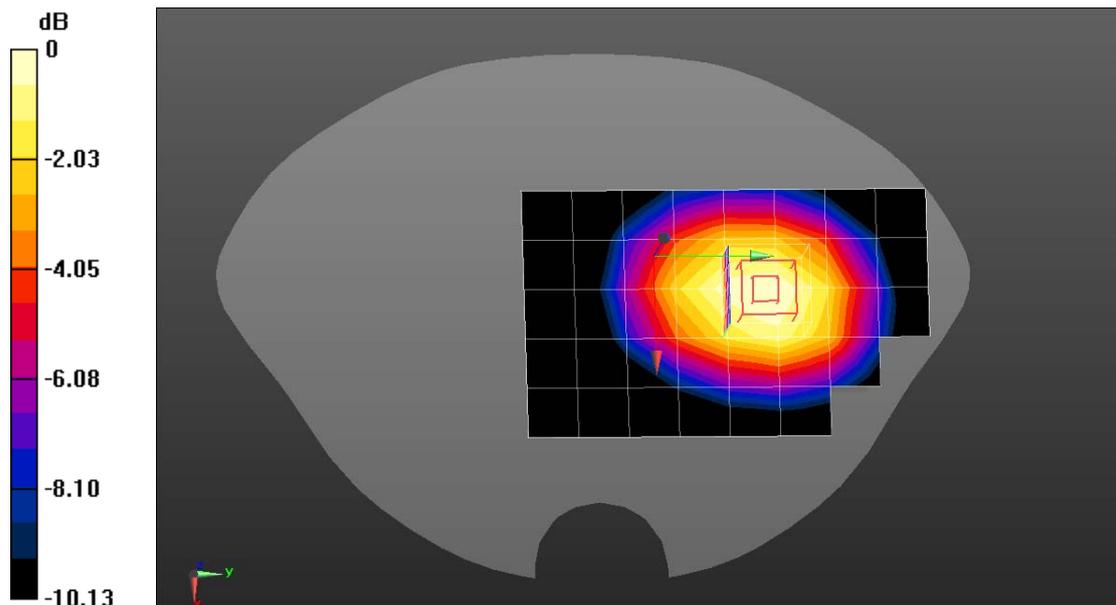
Configuration/GPRS850 High Body-Back/Area Scan (6x9x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 1.17 mW/g

Configuration/GPRS850 High Body-Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm, Reference Value = 10.798 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 1.453 mW/g

SAR(1 g) = 1.09 mW/g; SAR(10 g) = 0.783 mW/g Maximum value of SAR (measured) = 1.14 mW/g

0 dB = 1.14 mW/g = 1.14 dB mW/g

Date/Time: 26-07-2012

Test Laboratory: QuieTek Lab

GPRS850 High Body-Back(3up)(with headset #1)

DUT: GSM Mobile Phone ; Type: G5520

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

Frequency: 848.8 MHz; Medium parameters used: f = 848.8 MHz; σ = 0.98 mho/m; εr = 53.49; ρ = 1000 kg/m³ ; Phantom section: Flat Section

Ambient temperature (℃): 21.5, Liquid temperature (℃): 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: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/GPRS850 High Body-Back/Area Scan (6x9x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 0.749 mW/g

Configuration/GPRS850 High Body-Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 9.557 V/m; Power Drift = -0.18 dB

Peak SAR (extrapolated) = 1.129 mW/g

SAR(1 g) = 0.756 mW/g; SAR(10 g) = 0.526 mW/g Maximum value of SAR (measured) = 0.802 mW/g
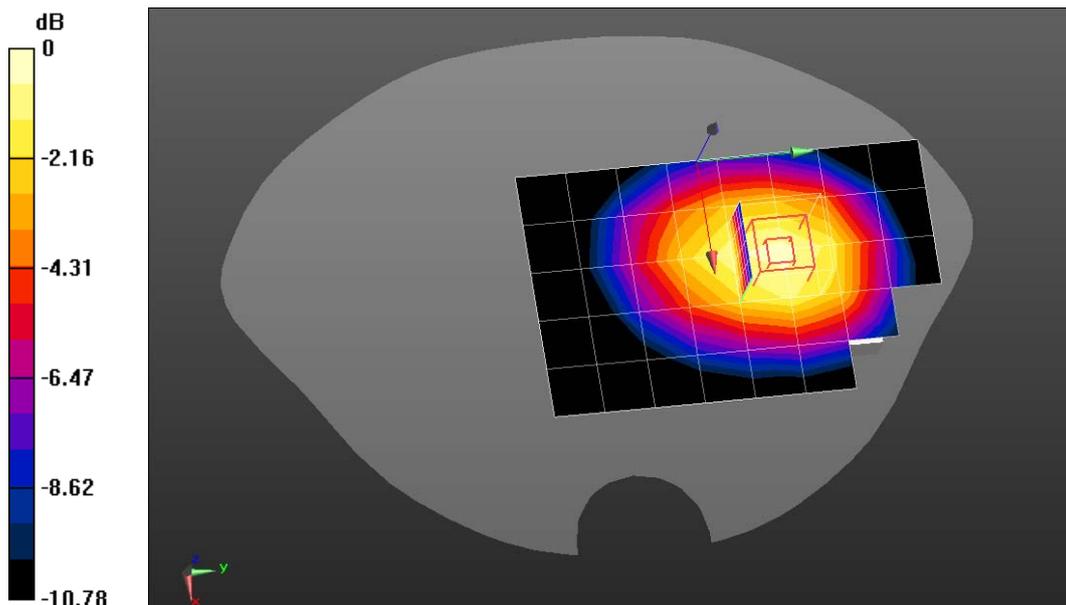
0 dB = 0.802 mW/g = -1.92 dB mW/g

Date/Time: 26-07-2012

Test Laboratory: QuieTek Lab

GPRS850 Low Body-Back(4up)

DUT: GSM Mobile Phone ; Type: G5520

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

Frequency: 824.2 MHz; Medium parameters used: f = 824.2 MHz; σ = 0.96 mho/m; εr = 53.74; ρ = 1000 kg/m³ ; Phantom section: Flat Section

Ambient temperature (℃): 21.5, Liquid temperature (℃): 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: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/GPRS850 Low Body-Back/Area Scan (6x9x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 0.966 mW/g

Configuration/GPRS850 Low Body-Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 8.902 V/m; Power Drift = 0.13 dB

Peak SAR (extrapolated) = 1.241 mW/g

SAR(1 g) = 0.958 mW/g; SAR(10 g) = 0.679 mW/g Maximum value of SAR (measured) = 1.03 mW/g
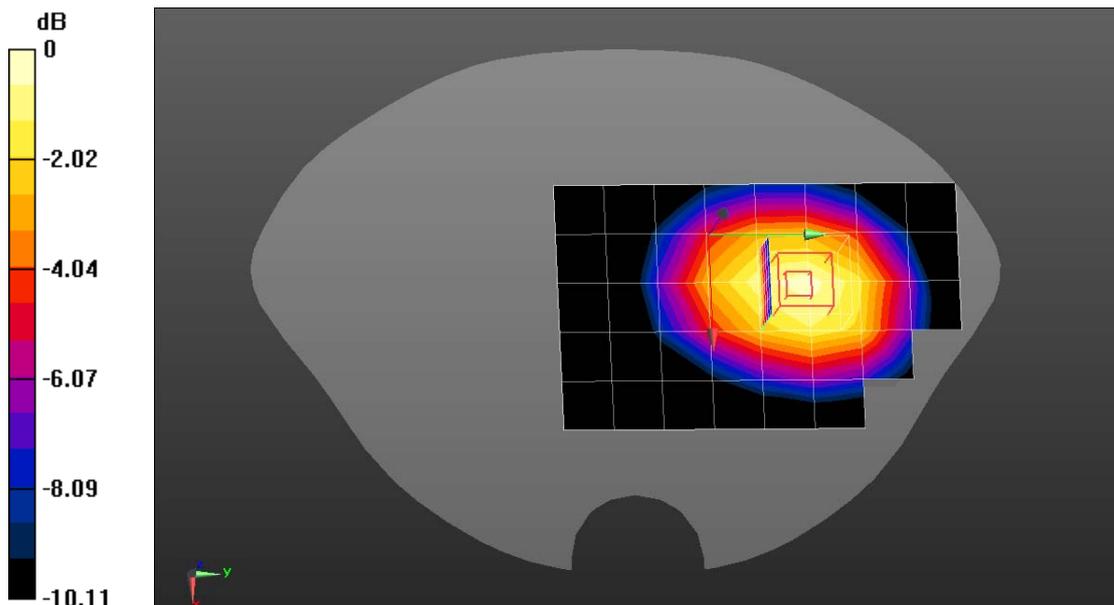
0 dB = 1.03 mW/g = 0.26 dB mW/g

Date/Time: 26-07-2012

Test Laboratory: QuieTek Lab

GPRS850 Mid Body-Back(4up)

DUT: GSM Mobile Phone ; Type: G5520

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; σ = 0.97 mho/m; εr = 53.61; ρ = 1000

kg/m³ ; Phantom section: Flat Section

Ambient temperature (℃): 21.5, Liquid temperature (℃): 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: SAM1; Type: SAM; Serial: TP1561

- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)
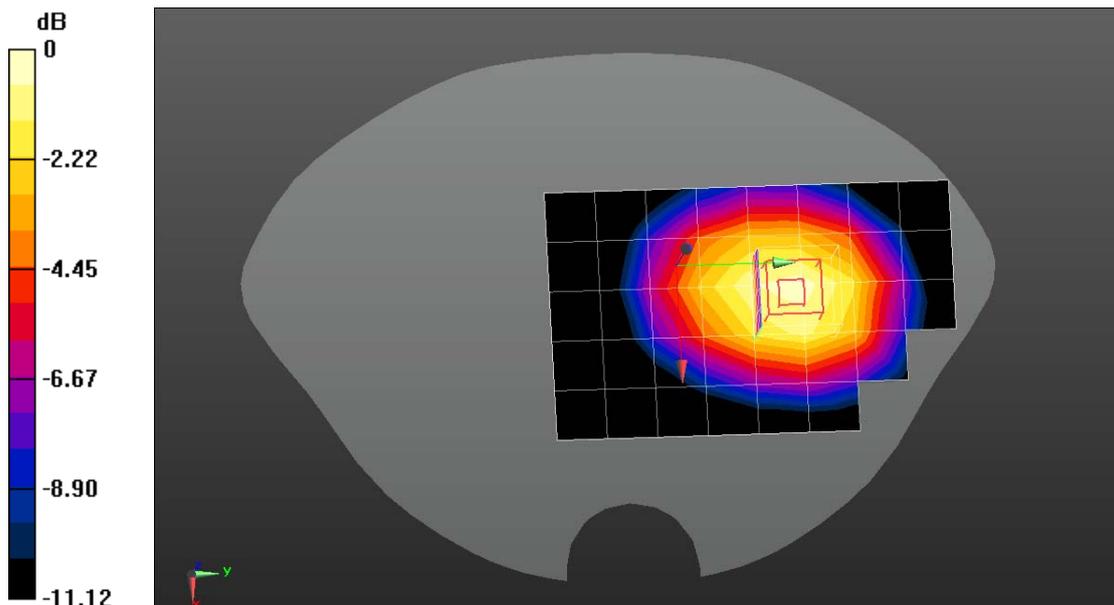
Configuration/GPRS850 Mid Body-Back/Area Scan (6x9x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 1.02 mW/g

Configuration/GPRS850 Mid Body-Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm, Reference Value = 10.025 V/m; Power Drift = 0.17 dB

Peak SAR (extrapolated) = 1.544 mW/g

SAR(1 g) = 1.04 mW/g; SAR(10 g) = 0.731 mW/g Maximum value of SAR (measured) = 1.09 mW/g

0 dB = 1.09 mW/g = 0.75 dB mW/g

Date/Time: 26-07-2012

Test Laboratory: QuieTek Lab

GPRS850 High Body-Back(4up)

DUT: GSM Mobile Phone ; Type: G5520

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

Frequency: 848.8 MHz; Medium parameters used: f = 848.8 MHz; σ = 0.98 mho/m; εr = 53.49; ρ = 1000

kg/m³ ; Phantom section: Flat Section

Ambient temperature (℃): 21.5, Liquid temperature (℃): 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: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)
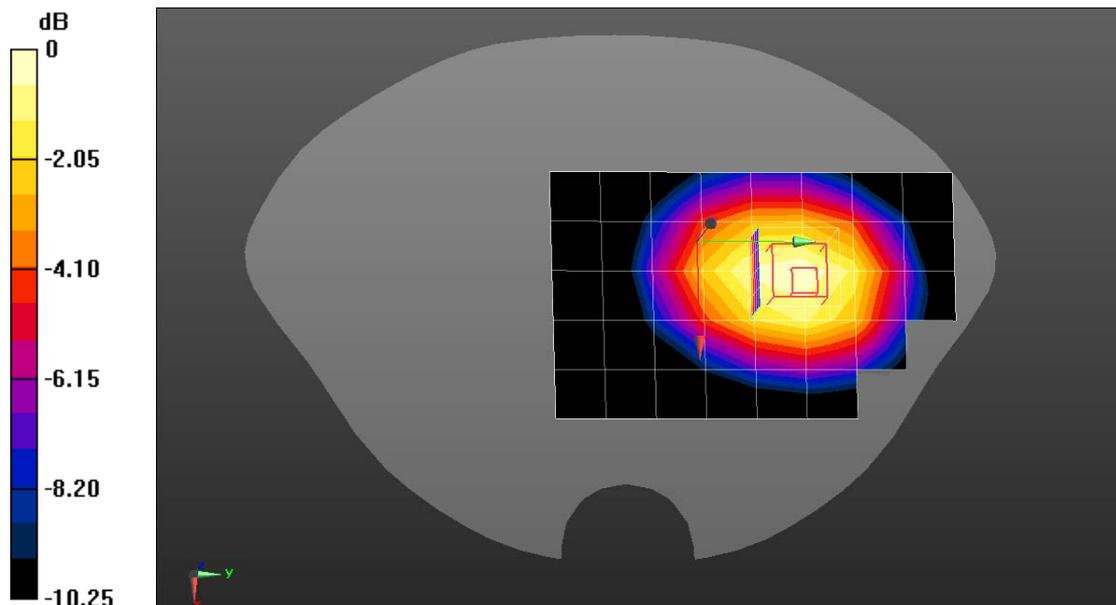
Configuration/GPRS850 High Body-Back/Area Scan (6x9x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 1.10 mW/g

Configuration/GPRS850 High Body-Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm, Reference Value = 9.703 V/m; Power Drift = 0.16 dB

Peak SAR (extrapolated) = 1.369 mW/g

SAR(1 g) = 1.02 mW/g; SAR(10 g) = 0.731 mW/g Maximum value of SAR (measured) = 1.10 mW/g

0 dB = 1.10 mW/g = 0.83 dB mW/g

Date/Time: 26-07-2012

Test Laboratory: QuieTek Lab

PCS 1900 Mid Touch-Leftt

DUT: GSM Mobile Phone ; Type: G5520

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

Frequency: 1880 MHz; Medium parameters used: f = 1880 MHz; σ = 1.43 mho/m; εr = 39.38; ρ = 1000

kg/m³ ; Phantom section: Left Section

Ambient temperature (℃): 21.5, Liquid temperature (℃): 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: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/PCS 1900 Mid Touch-Left/Area Scan (6x9x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 0.379 mW/g

Configuration/PCS 1900 Mid Touch-Left/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm, Reference Value = 4.976 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 0.549 mW/g

SAR(1 g) = 0.358 mW/g; SAR(10 g) = 0.219 mW/g Maximum value of SAR (measured) = 0.388 mW/g
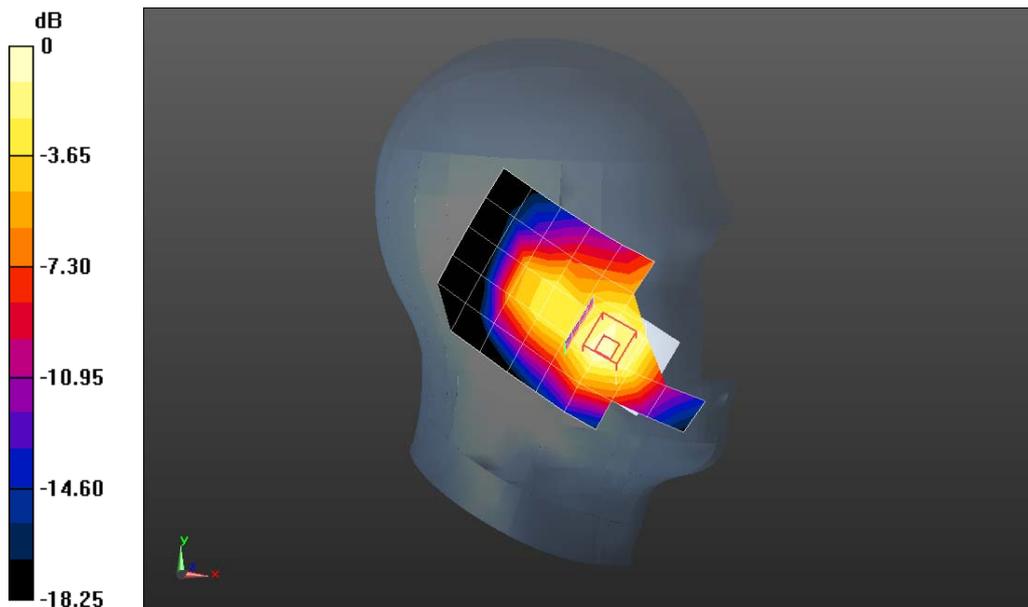
0 dB = 0.388 mW/g = -8.22 dB mW/g

Date/Time: 26-07-2012

Test Laboratory: QuieTek Lab

PCS 1900 Mid Tilt-Leftt

DUT: GSM Mobile Phone ; Type: G5520

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

Frequency: 1880 MHz; Medium parameters used: f = 1880 MHz; σ = 1.43 mho/m; εr = 39.38; ρ = 1000

kg/m³ ; Phantom section: Left Section

Ambient temperature (℃): 21.5, Liquid temperature (℃): 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: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/PCS 1900 Mid Tilt-Left/Area Scan (6x9x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 0.312 mW/g

Configuration/PCS 1900 Mid Tilt-Left/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm, Reference Value = 12.771 V/m; Power Drift = -0.12 dB

Peak SAR (extrapolated) = 0.508 mW/g

SAR(1 g) = 0.323 mW/g; SAR(10 g) = 0.193 mW/g Maximum value of SAR (measured) = 0.345 mW/g
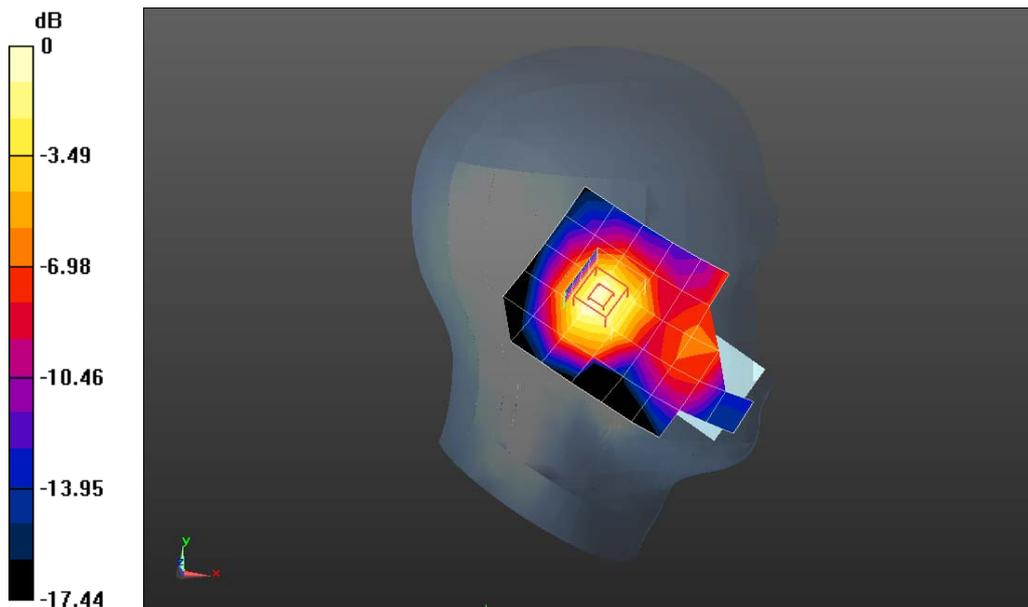
0 dB = 0.345 mW/g = -9.24 dB mW/g

Date/Time: 26-07-2012

Test Laboratory: QuieTek Lab

PCS 1900 Mid Touch-Right

DUT: GSM Mobile Phone ; Type: G5520

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

Frequency: 1880 MHz; Medium parameters used: f = 1880 MHz; σ = 1.43 mho/m; εr = 39.38; ρ = 1000

kg/m³ ; Phantom section: Right Section

Ambient temperature (℃): 21.5, Liquid temperature (℃): 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: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/PCS 1900 Mid Touch-Right/Area Scan (6x9x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 0.424 mW/g

Configuration/PCS 1900 Mid Touch-Right/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm, Reference Value = 5.462 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 0.723 mW/g

SAR(1 g) = 0.445 mW/g; SAR(10 g) = 0.267 mW/g Maximum value of SAR (measured) = 0.469 mW/g
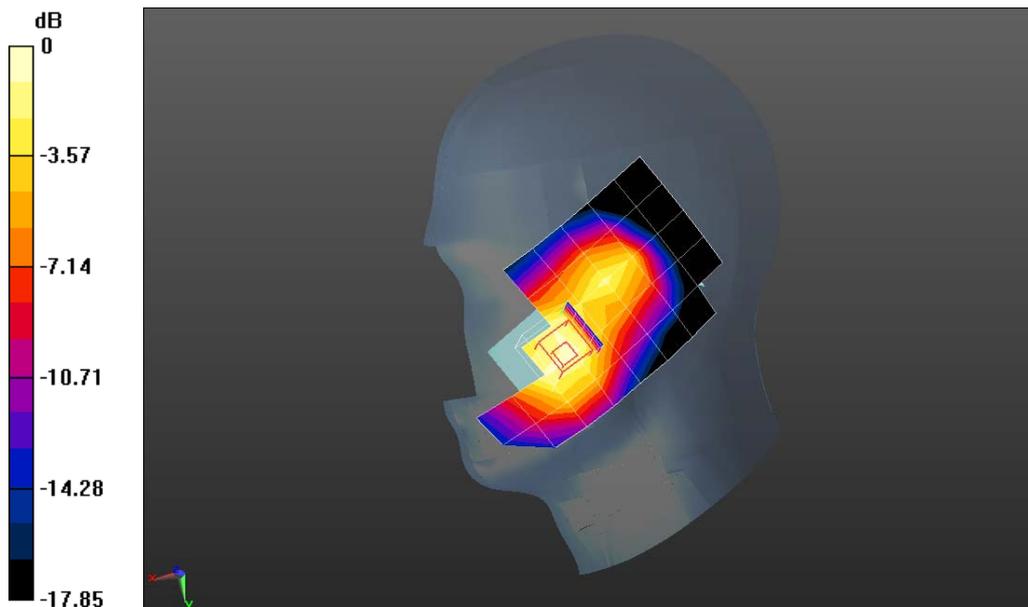
0 dB = 0.469 mW/g = -6.58 dB mW/g

Z-Axis Plot

Date/Time: 26-07-2012

Test Laboratory: QuieTek Lab

PCS 1900 Mid Tilt-Right

DUT: GSM Mobile Phone ; Type: G5520

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

Frequency: 1880 MHz; Medium parameters used: f = 1880 MHz; σ = 1.43 mho/m; εr = 39.38; ρ = 1000

kg/m³ ; Phantom section: Right Section

Ambient temperature (℃): 21.5, Liquid temperature (℃): 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: SAM2; Type: SAM; Serial: TP1562
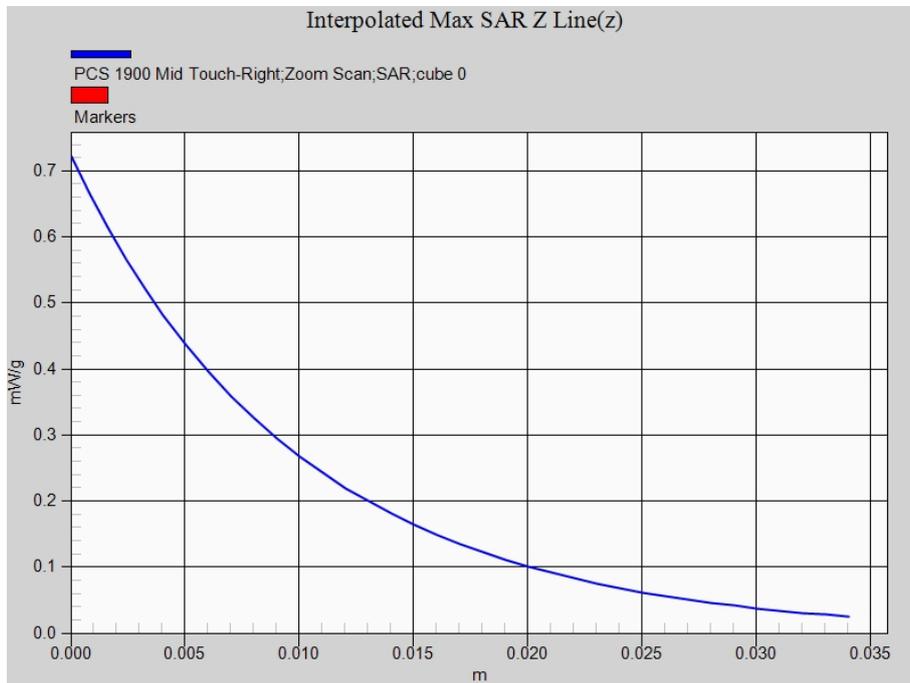- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/PCS 1900 Mid Tilt-Right/Area Scan (6x9x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 0.295 mW/g

Configuration/PCS 1900 Mid Tilt-Right/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm, Reference Value = 10.936 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 0.509 mW/g

SAR(1 g) = 0.335 mW/g; SAR(10 g) = 0.207 mW/g Maximum value of SAR (measured) = 0.360 mW/g
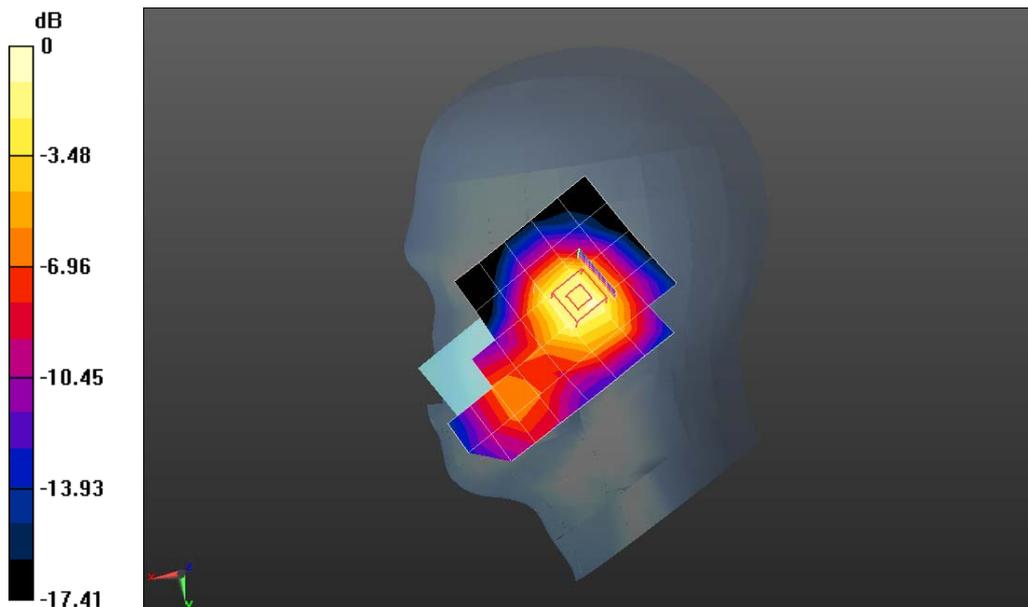
0 dB = 0.360 mW/g = -8.87 dB mW/g

Date/Time: 26-07-2012

Test Laboratory: QuieTek Lab

PCS 1900 Mid Touch-Right <SIM 2>

DUT: GSM Mobile Phone ; Type: G5520

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

Frequency: 1880 MHz; Medium parameters used: f = 1880 MHz; σ = 1.43 mho/m; εr = 39.38; ρ = 1000

kg/m³ ; Phantom section: Right Section

Ambient temperature (℃): 21.5, Liquid temperature (℃): 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: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/PCS 1900 Mid Touch-Right/Area Scan (6x9x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 0.362 mW/g

Configuration/PCS 1900 Mid Touch-Right/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm, Reference Value = 4.497 V/m; Power Drift = 0.13 dB

Peak SAR (extrapolated) = 0.648 mW/g

SAR(1 g) = 0.405 mW/g; SAR(10 g) = 0.245 mW/g Maximum value of SAR (measured) = 0.436 mW/g
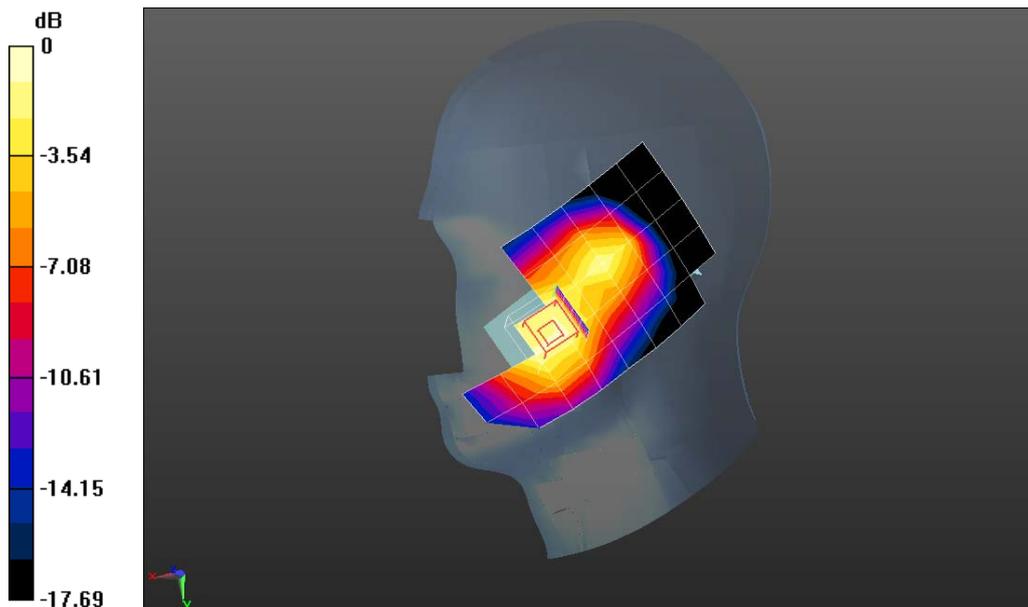
0 dB = 0.436 mW/g = -7.21 dB mW/g

Date/Time: 26-07-2012

Test Laboratory: QuieTek Lab

PCS1900 Mid Body-Back

DUT: GSM Mobile Phone ; Type: G5520

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

Frequency: 1880 MHz; Medium parameters used: f = 1880 MHz; σ = 1.53 mho/m; εr = 54.13; ρ = 1000 kg/m³ ; Phantom section: Flat Section

Ambient temperature (℃): 21.5, Liquid temperature (℃): 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: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/PCS1900 Mid Body-Back/Area Scan (6x9x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 0.482 mW/g

Configuration/PCS1900 Mid Body-Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 12.902 V/m; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 0.733 mW/g

SAR(1 g) = 0.444 mW/g; SAR(10 g) = 0.270 mW/g Maximum value of SAR (measured) = 0.481 mW/g
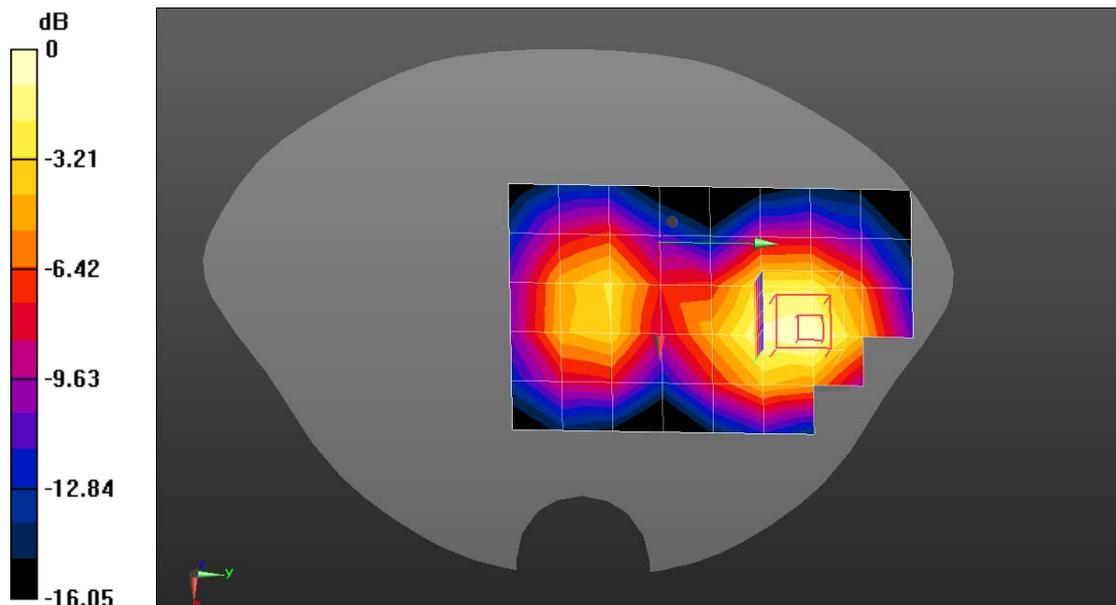
0 dB = 0.481 mW/g = -6.36 dB mW/g

Date/Time: 26-07-2012

Test Laboratory: QuieTek Lab

PCS1900 Mid Body-Front

DUT: GSM Mobile Phone ; Type: G5520

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

Frequency: 1880 MHz; Medium parameters used: f = 1880 MHz; σ = 1.53 mho/m; εr = 54.13; ρ = 1000

kg/m³ ; Phantom section: Flat Section

Ambient temperature (℃): 21.5, Liquid temperature (℃): 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: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/PCS1900 Mid Body-Front/Area Scan (6x9x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 0.225 mW/g

Configuration/PCS1900 Mid Body-Front/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm, Reference Value = 10.289 V/m; Power Drift = -0.17 dB

Peak SAR (extrapolated) = 0.395 mW/g

SAR(1 g) = 0.249 mW/g; SAR(10 g) = 0.152 mW/g Maximum value of SAR (measured) = 0.269 mW/g
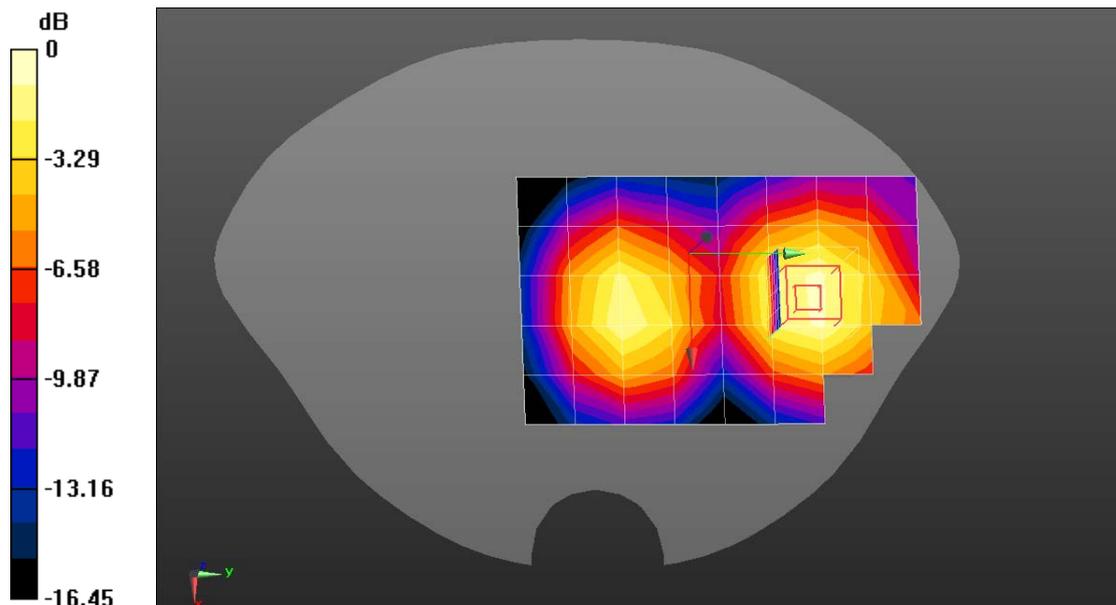
0 dB = 0.269 mW/g = -11.40 dB mW/g

Date/Time: 26-07-2012

Test Laboratory: QuieTek Lab

PCS1900 Mid Body-Back(with headset #1)

DUT: GSM Mobile Phone ; Type: G5520

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

Frequency: 1880 MHz; Medium parameters used: f = 1880 MHz; σ = 1.53 mho/m; εr = 54.13; ρ = 1000

kg/m³ ; Phantom section: Flat Section

Ambient temperature (℃): 21.5, Liquid temperature (℃): 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: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/PCS1900 Mid Body-Back/Area Scan (6x9x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 0.346 mW/g

Configuration/PCS1900 Mid Body-Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm, Reference Value = 8.009 V/m; Power Drift = 0.13 dB

Peak SAR (extrapolated) = 0.588 mW/g

SAR(1 g) = 0.347 mW/g; SAR(10 g) = 0.201 mW/g Maximum value of SAR (measured) = 0.377 mW/g

0 dB = 0.377 mW/g = -8.47 dB mW/g

Date/Time: 26-07-2012

Test Laboratory: QuieTek Lab

PCS1900 Mid Body-Back(with headset #2)

DUT: GSM Mobile Phone ; Type: G5520

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

Frequency: 1880 MHz; Medium parameters used: f = 1880 MHz; σ = 1.53 mho/m; εr = 54.13; ρ = 1000

kg/m³ ; Phantom section: Flat Section

Ambient temperature (℃): 21.5, Liquid temperature (℃): 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: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)
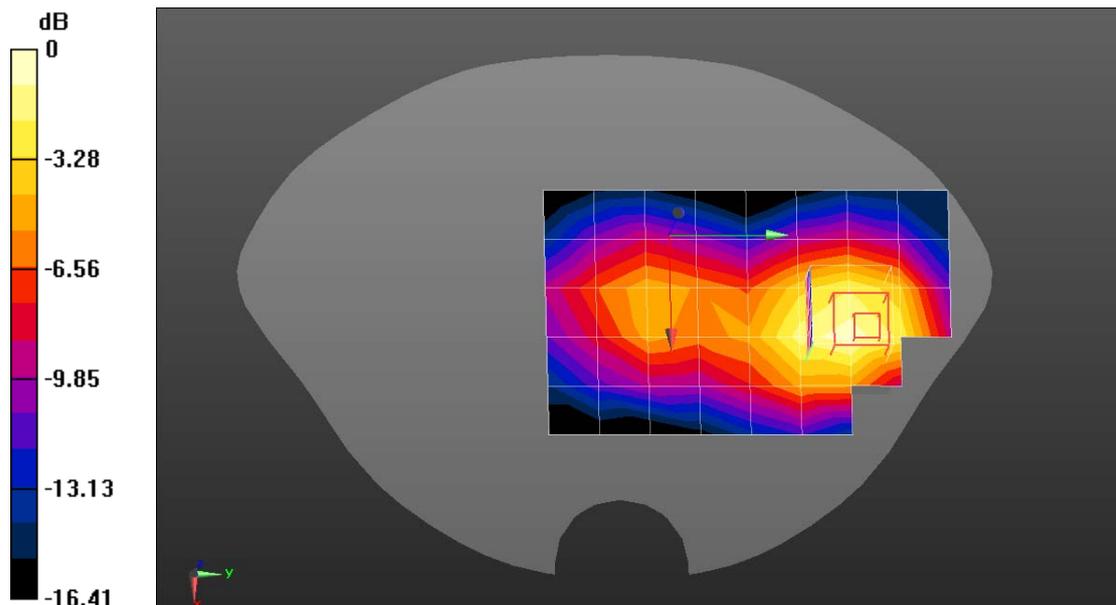
Configuration/PCS1900 Mid Body-Back/Area Scan (6x9x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 0.385 mW/g

Configuration/PCS1900 Mid Body-Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm, Reference Value = 8.788 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 0.643 mW/g

SAR(1 g) = 0.374 mW/g; SAR(10 g) = 0.220 mW/g Maximum value of SAR (measured) = 0.400 mW/g
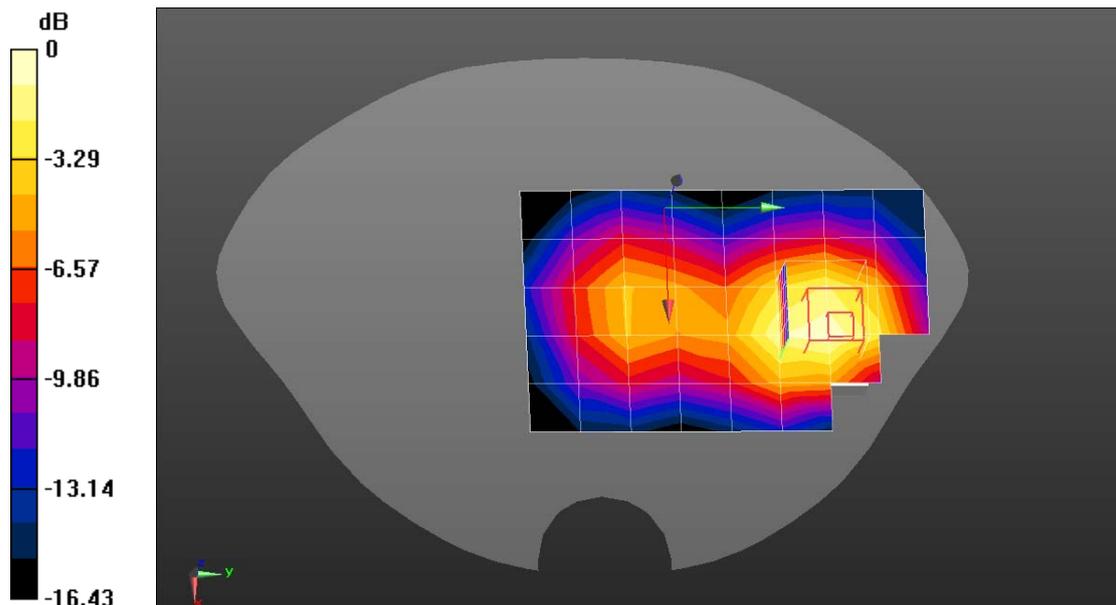
0 dB = 0.400 mW/g = -7.96 dB mW/g

Date/Time: 26-07-2012

Test Laboratory: QuieTek Lab

PCS1900 Mid Body-Back(with battery #2)

DUT: GSM Mobile Phone ; Type: G5520

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

Frequency: 1880 MHz; Medium parameters used: f = 1880 MHz; σ = 1.53 mho/m; εr = 54.13; ρ = 1000

kg/m³ ; Phantom section: Flat Section

Ambient temperature (℃): 21.5, Liquid temperature (℃): 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: SAM2; Type: SAM; Serial: TP1562

- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/PCS1900 Mid Body-Back/Area Scan (6x9x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 0.399 mW/g

Configuration/PCS1900 Mid Body-Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm, Reference Value = 12.221 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 0.587 mW/g

SAR(1 g) = 0.369 mW/g; SAR(10 g) = 0.229 mW/g Maximum value of SAR (measured) = 0.390 mW/g
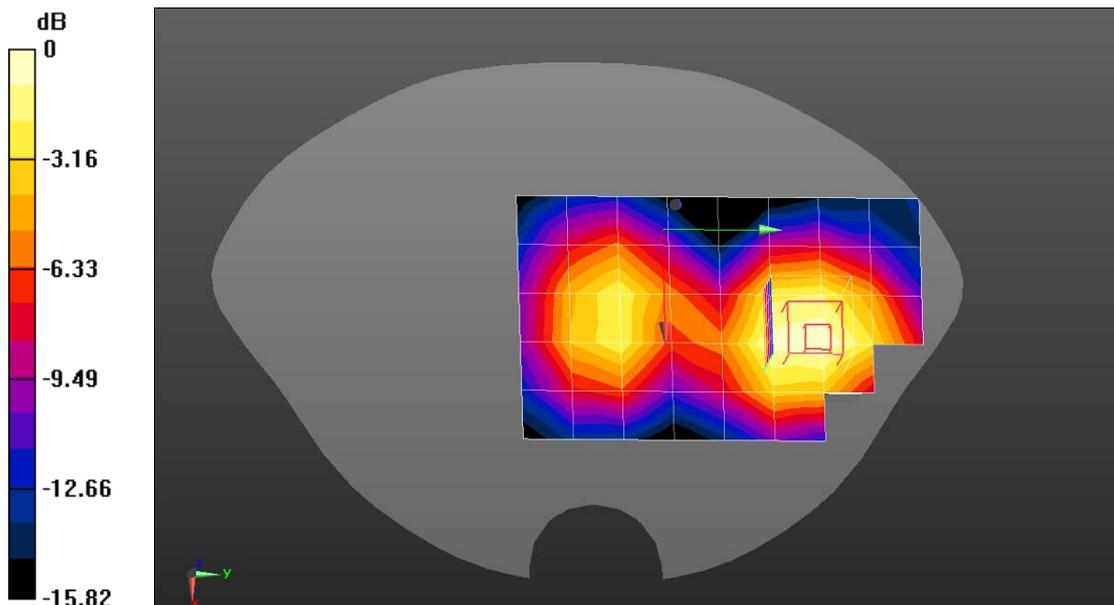
0 dB = 0.390 mW/g = -8.18 dB mW/g

Date/Time: 26-07-2012

Test Laboratory: QuieTek Lab

GPRS1900 Mid Body-Back(2up)

DUT: GSM Mobile Phone ; Type: G5520

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

Frequency: 1880 MHz; Medium parameters used: f = 1880 MHz; σ = 1.53 mho/m; εr = 54.13; ρ = 1000

kg/m³ ; Phantom section: Flat Section

Ambient temperature (℃): 21.5, Liquid temperature (℃): 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: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/GPRS1900 Mid Body-Back/Area Scan (6x9x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 0.361 mW/g

Configuration/GPRS1900 Mid Body-Back/Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm, Reference Value = 11.112 V/m; Power Drift = -0.14 dB

Peak SAR (extrapolated) = 0.575 mW/g

SAR(1 g) = 0.352 mW/g; SAR(10 g) = 0.218 mW/g Maximum value of SAR (measured) = 0.377 mW/g

0 dB = 0.377 mW/g = -8.47 dB mW/g

Date/Time: 26-07-2012

Test Laboratory: QuieTek Lab

GPRS1900 Mid Body-Back(3up)

DUT: GSM Mobile Phone ; Type: G5520

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; σ = 1.53 mho/m; εr = 54.13; ρ = 1000 kg/m³ ; Phantom section: Flat Section

Ambient temperature (℃): 21.5, Liquid temperature (℃): 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: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/GPRS1900 Mid Body-Back/Area Scan (6x9x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 0.446 mW/g

Configuration/GPRS1900 Mid Body-Back/Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 12.437 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 0.693 mW/g

SAR(1 g) = 0.433 mW/g; SAR(10 g) = 0.270 mW/g Maximum value of SAR (measured) = 0.458 mW/g
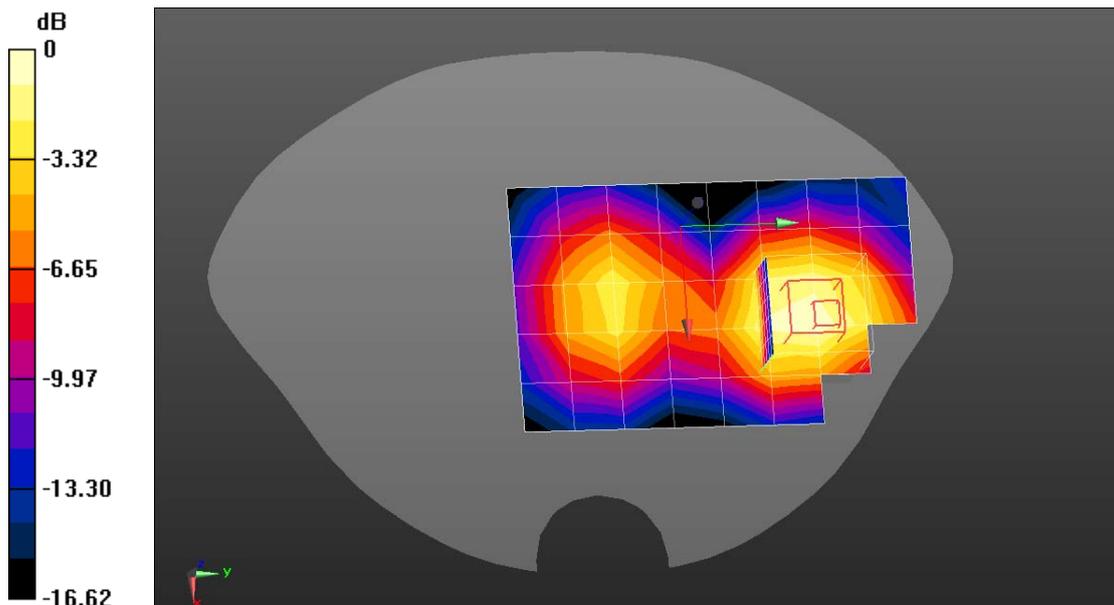
0 dB = 0.458 mW/g = -6.78 dB mW/g

Date/Time: 26-07-2012

Test Laboratory: QuieTek Lab

GPRS1900 Mid Body-Back(3up)(with headset lianchuang)

DUT: GSM Mobile Phone ; Type: G5520

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; σ = 1.53 mho/m; εr = 54.13; ρ =
1000 kg/m³ ; Phantom section: Flat Section

Ambient temperature (℃): 21.5, Liquid temperature (℃): 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: SAM2; Type: SAM; Serial: TP1562
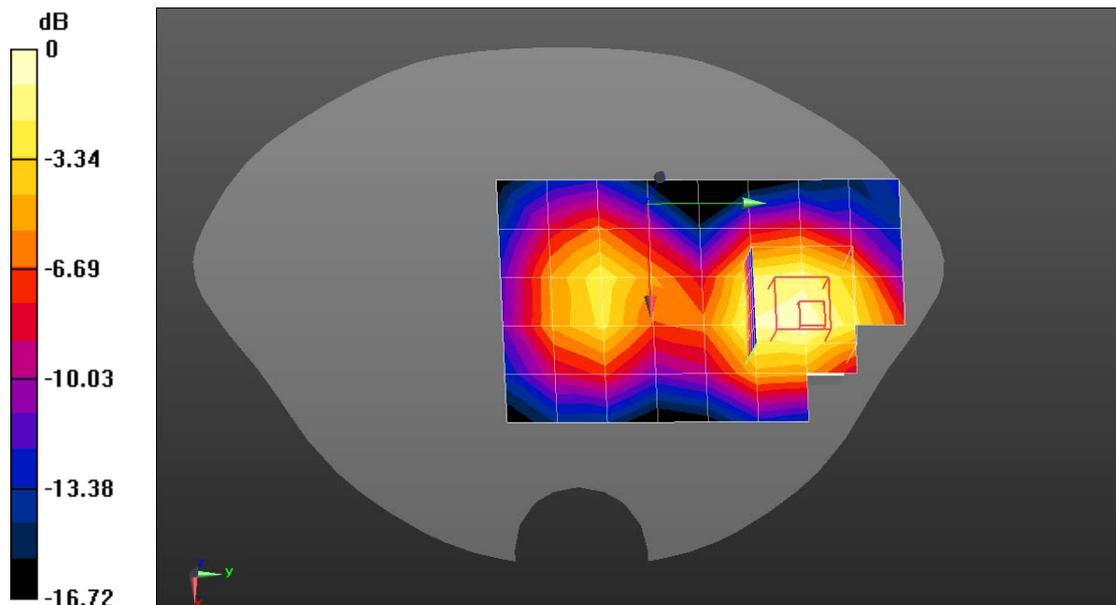- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/GPRS1900 Mid Body-Back/Area Scan (6x9x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 0.268 mW/g

Configuration/GPRS1900 Mid Body-Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,
dy=8mm, dz=5mm, Reference Value = 6.530 V/m; Power Drift = 0.14 dB

Peak SAR (extrapolated) = 0.494 mW/g

SAR(1 g) = 0.310 mW/g; SAR(10 g) = 0.177 mW/g Maximum value of SAR (measured) = 0.339 mW/g
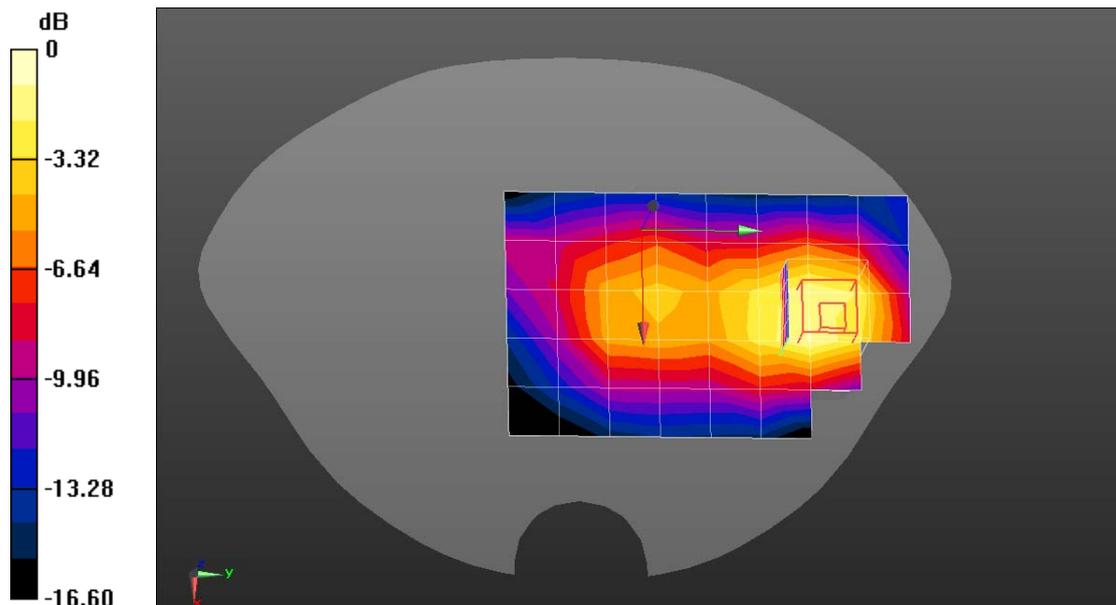
0 dB = 0.339 mW/g = -9.40 dB mW/g

Date/Time: 26-07-2012

Test Laboratory: QuieTek Lab

GPRS1900 Mid Body-Back(4up)

DUT: GSM Mobile Phone ; Type: G5520

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; σ = 1.53 mho/m; εr = 54.13; ρ = 1000 kg/m³ ; Phantom section: Flat Section

Ambient temperature (℃): 21.5, Liquid temperature (℃): 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: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/GPRS1900 Mid Body-Back/Area Scan (6x9x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 0.406 mW/g

Configuration/GPRS1900 Mid Body-Back/Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 11.056 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 0.641 mW/g

SAR(1 g) = 0.369 mW/g; SAR(10 g) = 0.226 mW/g Maximum value of SAR (measured) = 0.397 mW/g
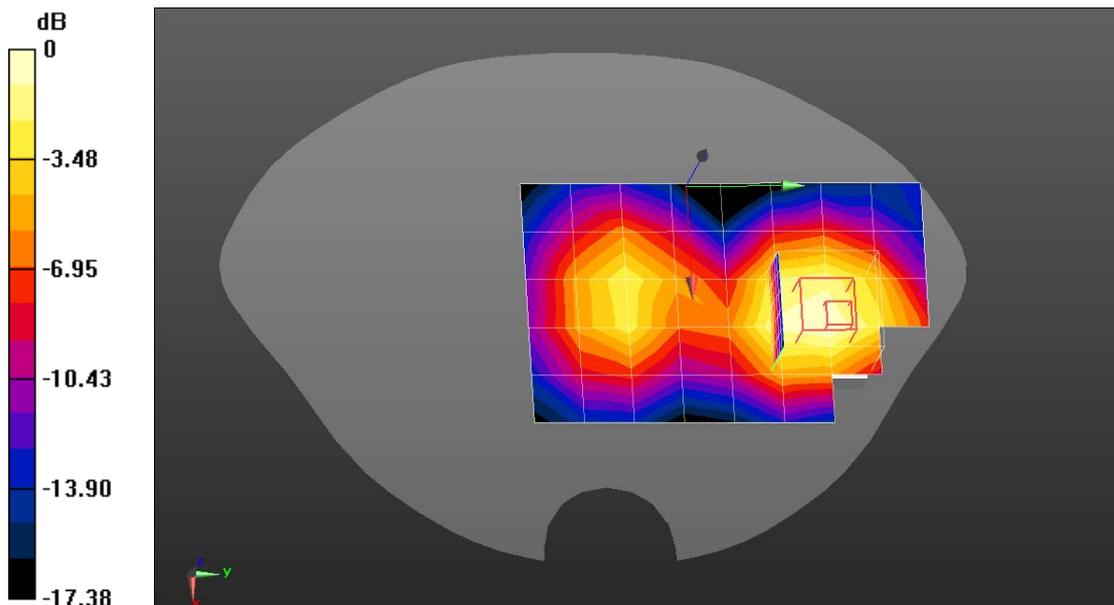
0 dB = 0.397 mW/g = -8.02 dB mW/g

Date/Time: 08-08-2012

Test Laboratory: QuieTek Lab

GSM850 High Touch-Left

DUT: GSM Mobile Phone ; Type: G5520

Communication System: Generic GSM; Communication System Band: GSM850; Duty Cycle: 1:8.3;

Frequency: 848.8 MHz; Medium parameters used: f = 848.8 MHz; σ = 0.9 mho/m; εr = 41.24; ρ = 1000

kg/m³ ; Phantom section: Left Section

Ambient temperature (℃): 21.5, Liquid temperature (℃): 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: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/GSM850 High Touch-Left/Area Scan (6x9x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 0.856 mW/g

Configuration/GSM850 High Touch-Left/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm, Reference Value = 13.986 V/m; Power Drift = -0.17 dB

Peak SAR (extrapolated) = 1.157 mW/g

SAR(1 g) = 0.868 mW/g; SAR(10 g) = 0.624 mW/g Maximum value of SAR (measured) = 0.912 mW/g
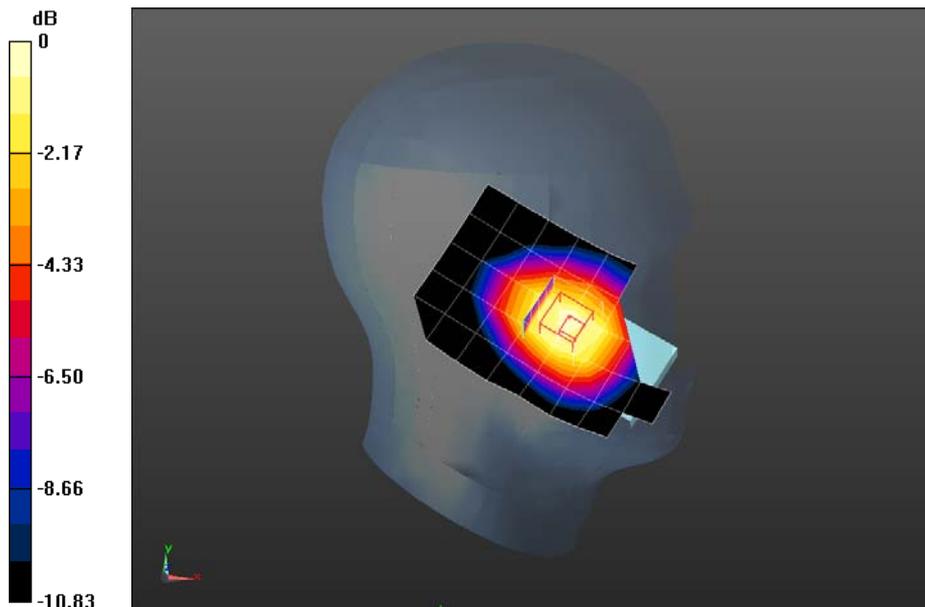
0 dB = 0.912 mW/g = -0.80 dB mW/g

Date/Time: 08-08-2012

Test Laboratory: QuieTek Lab

GSM850 High Body-Back

DUT: GSM Mobile Phone ; Type: G5520

Communication System: Generic GSM; Communication System Band: GSM850; Duty Cycle: 1:8.3;

Frequency: 848.8 MHz; Medium parameters used: f = 848.8 MHz; σ = 0.98 mho/m; εr = 53.28; ρ = 1000

kg/m³ ; Phantom section: Flat Section

Ambient temperature (℃): 21.5, Liquid temperature (℃): 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 High Body-Back/Area Scan (6x9x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 1.14 mW/g

Configuration/GSM850 High Body-Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm, Reference Value = 16.083 V/m; Power Drift = -0.14 dB

Peak SAR (extrapolated) = 1.530 mW/g

SAR(1 g) = 1.14 mW/g; SAR(10 g) = 0.807 mW/g Maximum value of SAR (measured) = 1.19 mW/g
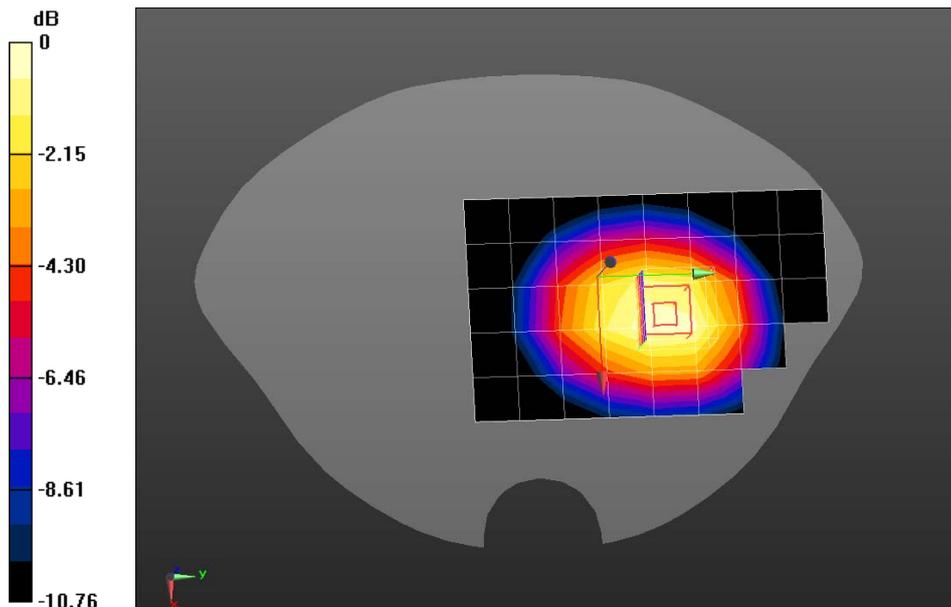
0 dB = 1.19 mW/g = 1.51 dB mW/g

Date/Time: 08-08-2012

Test Laboratory: QuieTek Lab

PCS 1900 Mid Touch-Right

DUT: GSM Mobile Phone ; Type: G5520

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

Frequency: 1880 MHz; Medium parameters used: f = 1880 MHz; σ = 1.44 mho/m; εr = 39.52; ρ = 1000 kg/m³ ; Phantom section: Right Section

Ambient temperature (℃): 21.5, Liquid temperature (℃): 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: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/PCS 1900 Mid Touch-Right/Area Scan (6x9x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 0.348 mW/g

Configuration/PCS 1900 Mid Touch-Right/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 5.095 V/m; Power Drift = 0.12 dB

Peak SAR (extrapolated) = 0.579 mW/g

SAR(1 g) = 0.361 mW/g; SAR(10 g) = 0.220 mW/g Maximum value of SAR (measured) = 0.382 mW/g
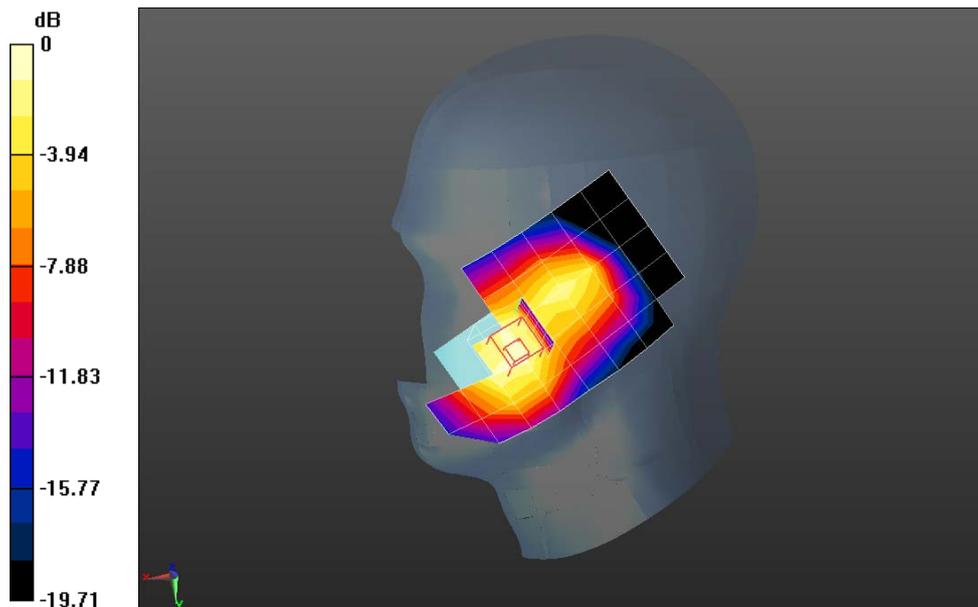
0 dB = 0.382 mW/g = -8.36 dB mW/g

Date/Time: 08-08-2012

Test Laboratory: QuieTek Lab

PCS1900 Mid Body-Back

DUT: GSM Mobile Phone ; Type: G5520

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

Frequency: 1880 MHz; Medium parameters used: f = 1880 MHz; σ = 1.53 mho/m; εr = 54.15; ρ = 1000 kg/m³ ; Phantom section: Flat Section

Ambient temperature (℃): 21.5, Liquid temperature (℃): 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: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/PCS1900 Mid Body-Back/Area Scan (6x9x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 0.363 mW/g

Configuration/PCS1900 Mid Body-Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 10.691 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 0.571 mW/g

SAR(1 g) = 0.348 mW/g; SAR(10 g) = 0.212 mW/g Maximum value of SAR (measured) = 0.372 mW/g
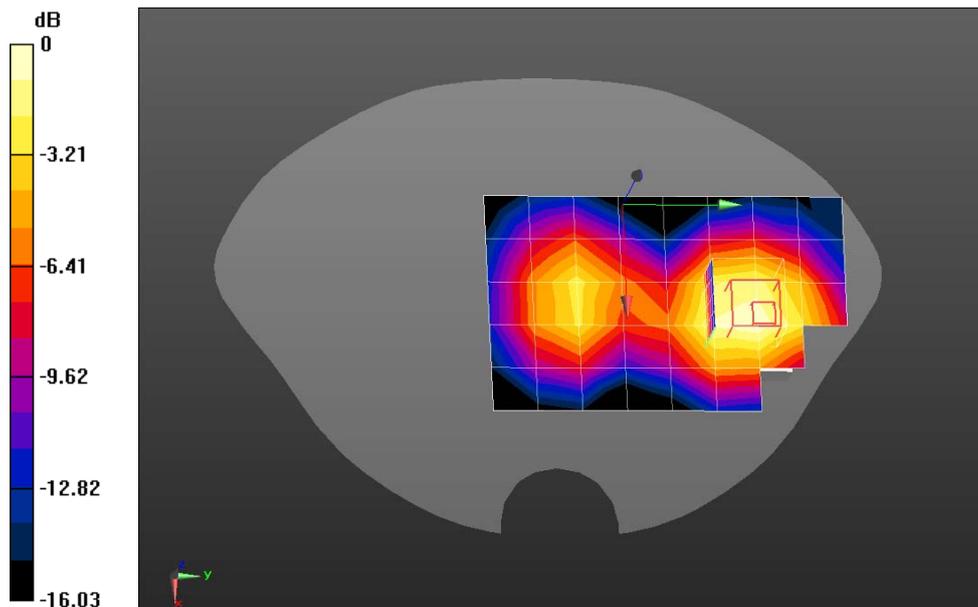
0 dB = 0.372 mW/g = -8.59 dB mW/g

Appendix D. Probe Calibration Data

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

ilac-MRA

SWISS CALIBRATION

S
C
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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 ± 3)°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	MY41498087	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

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

Issued: March 13, 2012

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

Certificate No: EX3-3710_Mar12   Page 1 of 11

Calibration Laboratory of
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 Engineering AG
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Accreditation No.: **SCS 108**

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,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., ϑ = 0 is normal to probe axis

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

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z*: Assessed for E-field polarization $\vartheta = 0$ (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,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
- *Ax,y,z; Bx,y,z; Cx,y,z; VRx,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 ≤ 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 *NORMx,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.

Certificate No: EX3-3710_Mar12   Page 2 of 11

QuieTek

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 $(\mu V/(V/m)^2)^A$	0.51	0.56	0.44	± 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	±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.

Certificate No: EX3-3710_Mar12   Page 4 of 11

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	4.9.5	4.9.5	4.9.5	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.

Certificate No: EX3-3710_Mar12   Page 6 of 11

March 12, 2012

Frequency Response of E-Field
(TEM-Cell:ifi110 EXX, Waveguide: R22)
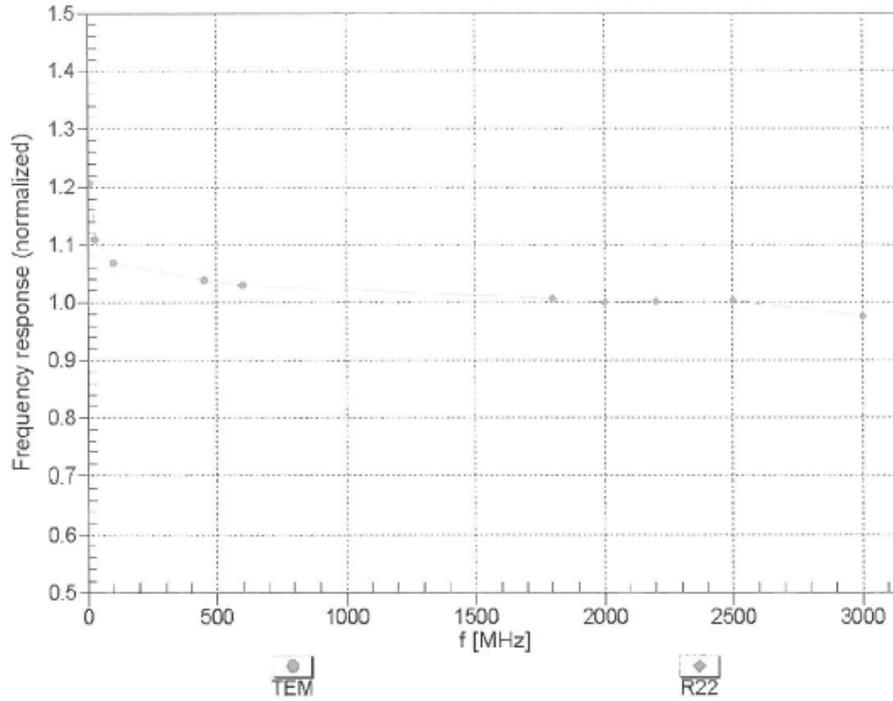
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (φ), ϑ = 0°

f=600 MHz,TEM
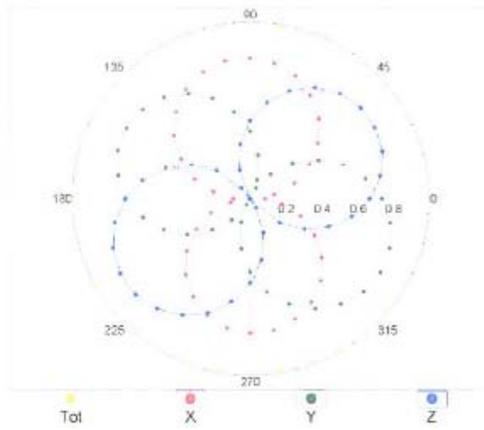
f=1800 MHz,R22
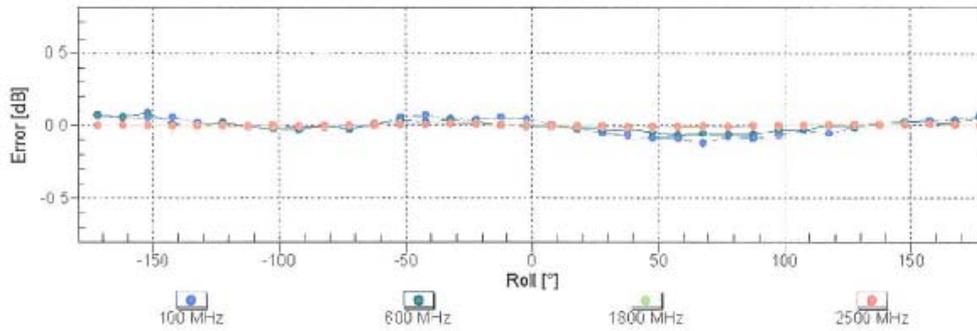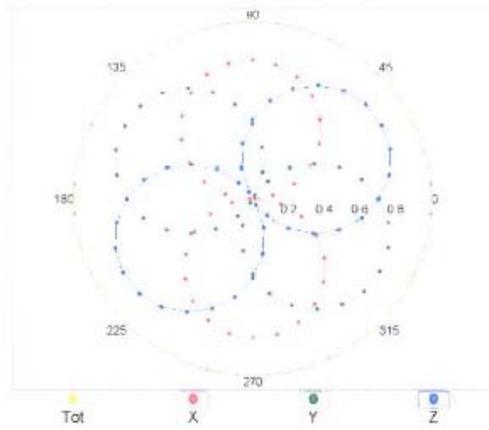
Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

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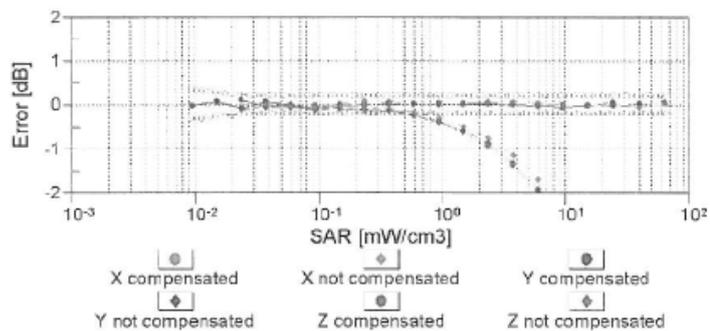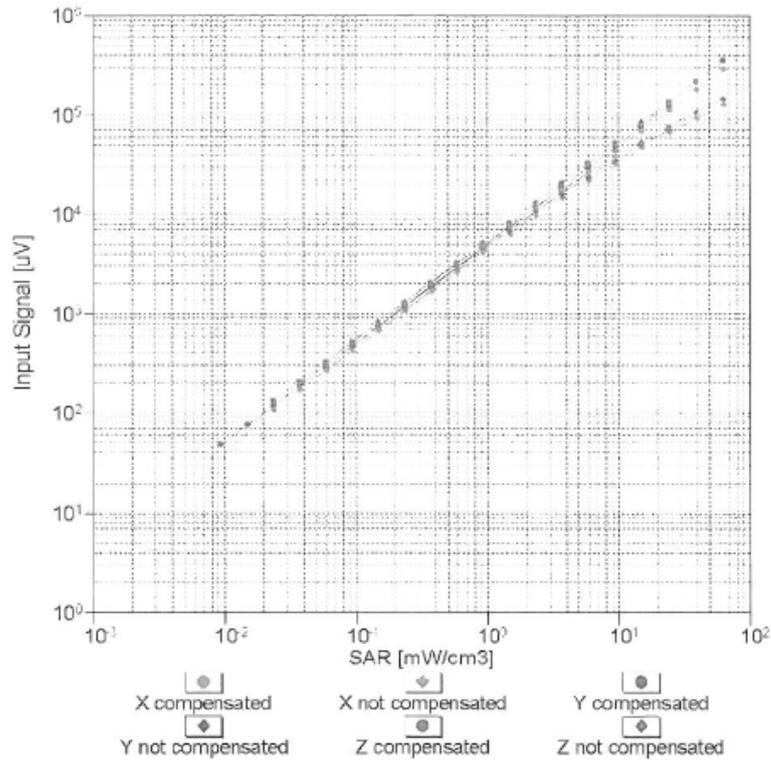
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

EX3DV4– SN:3710

March 12, 2012

Conversion Factor Assessment

f = 900 MHz,WGLS R9 (H_convF)

f = 1810 MHz,WGLS R22 (H_convF)

analytical   measured

analytical   measured
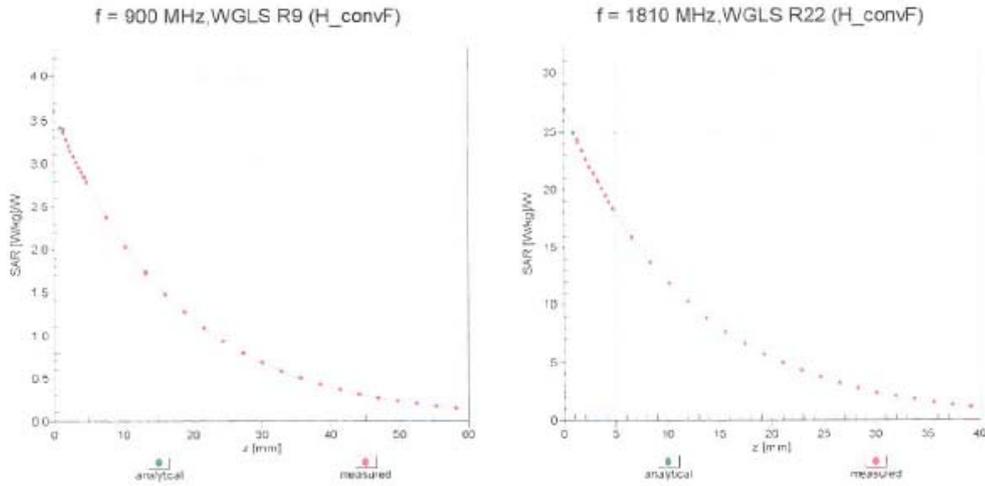
Deviation from Isotropy in Liquid
Error (φ, ϑ), f = 900 MHz

-1.0   -0.8   -0.6   -0.4   -0.2   0.0   0.2   0.4   0.6   0.8   1.0

Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

Certificate No: EX3-3710_Mar12

Page 10 of 11
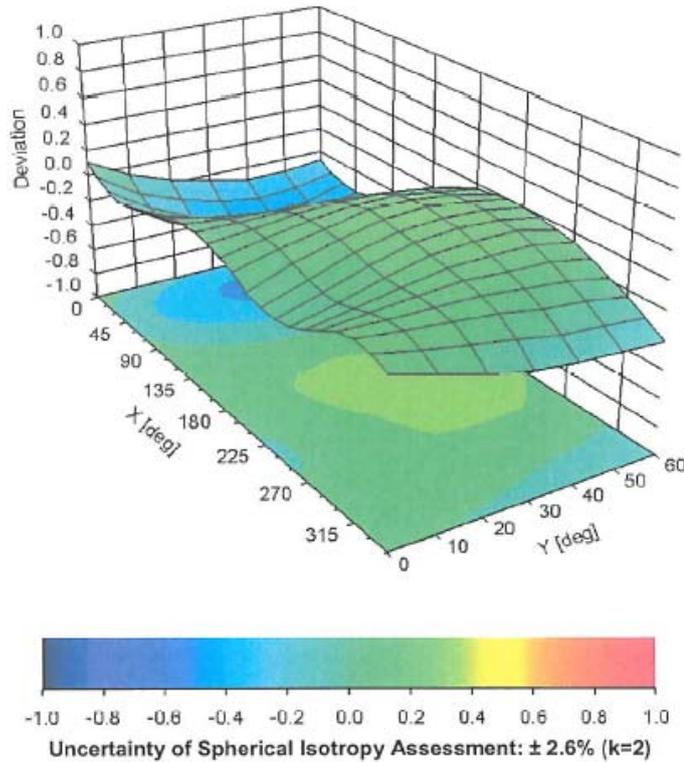
DASY/EASY - Parameters of Probe: EX3DV4 - SN:3710

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

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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

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 ± 3)°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: 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

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

Issued: February 17, 2012

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

Certificate No: D835V2-4d094_Feb12   Page 1 of 8

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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.

Certificate No: D835V2-4d094_Feb12   Page 2 of 8

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 cm³ (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 cm³ (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 cm³ (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 cm³ (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 jΩ
Return Loss	- 28.1 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.7 Ω - 5.3 jΩ
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; σ = 0.89 mho/m; ε_r = 41; ρ = 1000 kg/m^3
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

0 dB = 2.710mW/g = 8.66 dB mW/g

Certificate No: D835V2-4d094_Feb12   Page 5 of 8

QuieTek

Impedance Measurement Plot for Head TSL

17 Feb 2012 16:23:54

CHI S11   1 U FS   1:53.516 Ω   -2.0234 Ω 94.198 pF   835.000 000 MHz

#

Del

Cor

CH1 Markers

2: 48.658 Ω
31.873 Ω
900.000 MHz

Avg
16

Hld

CH2 S11   LOG   5 dB/REF -20 dB   1:-29.134 dB   835.000 000 MHz

Cor

CH2 Markers

2:-10.238 dB
900.000 MHz

Avg
16

Hld

START 635.000 000 MHz   STOP 1 100.000 000 MHz

QuieTek

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; σ = 1.01 mho/m; ε_r = 55.7; ρ = 1000 kg/m^3
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)

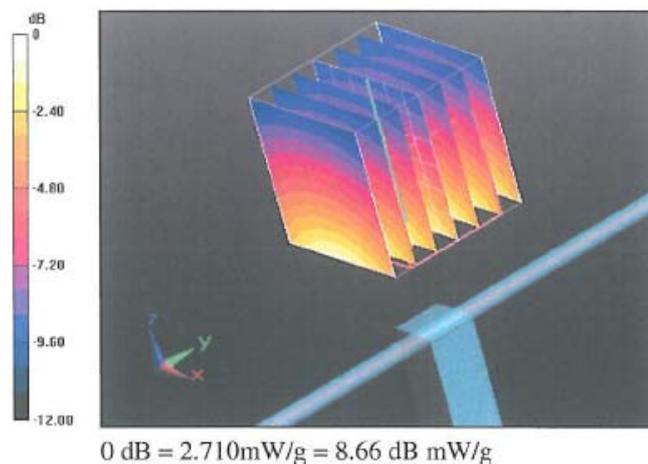### Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
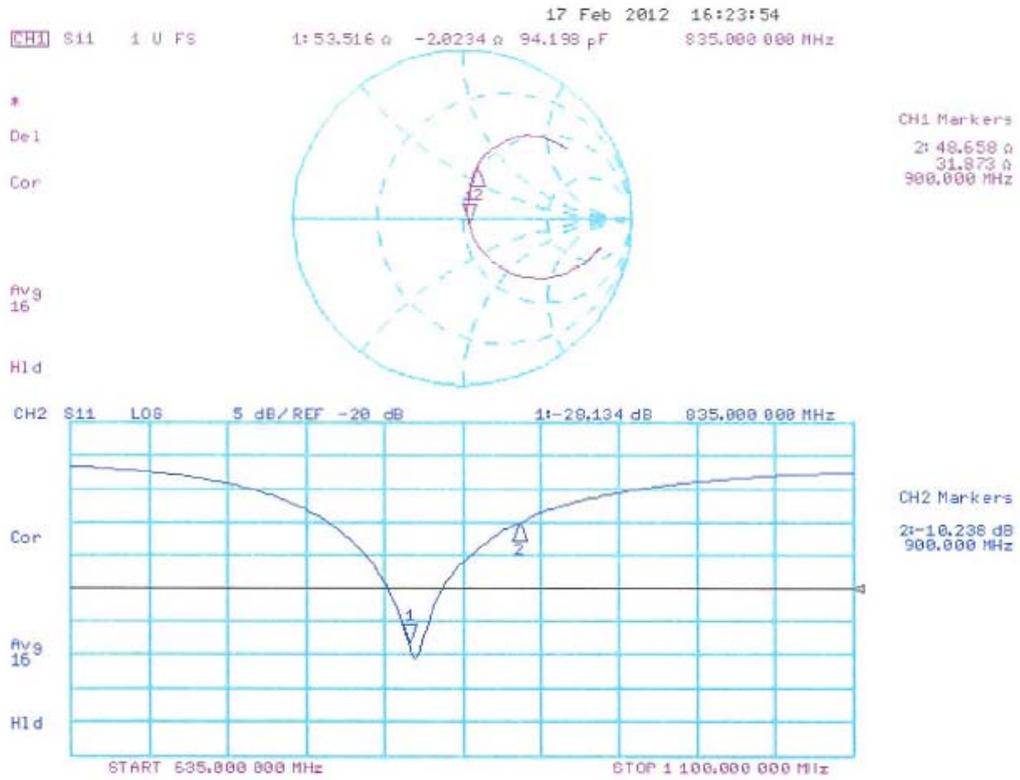Reference Value = 55.114 V/m; Power Drift = 0.0041 dB
Peak SAR (extrapolated) = 3.5590
SAR(1 g) = 2.46 mW/g; SAR(10 g) = 1.62 mW/g
Maximum value of SAR (measured) = 2.861 mW/g
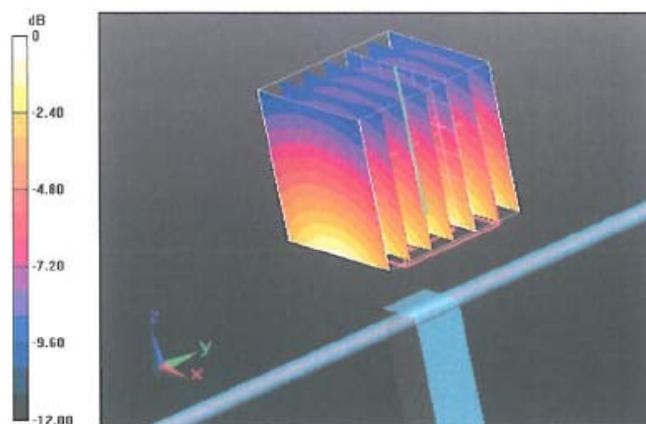
0 dB = 2.860mW/g = 9.13 dB mW/g
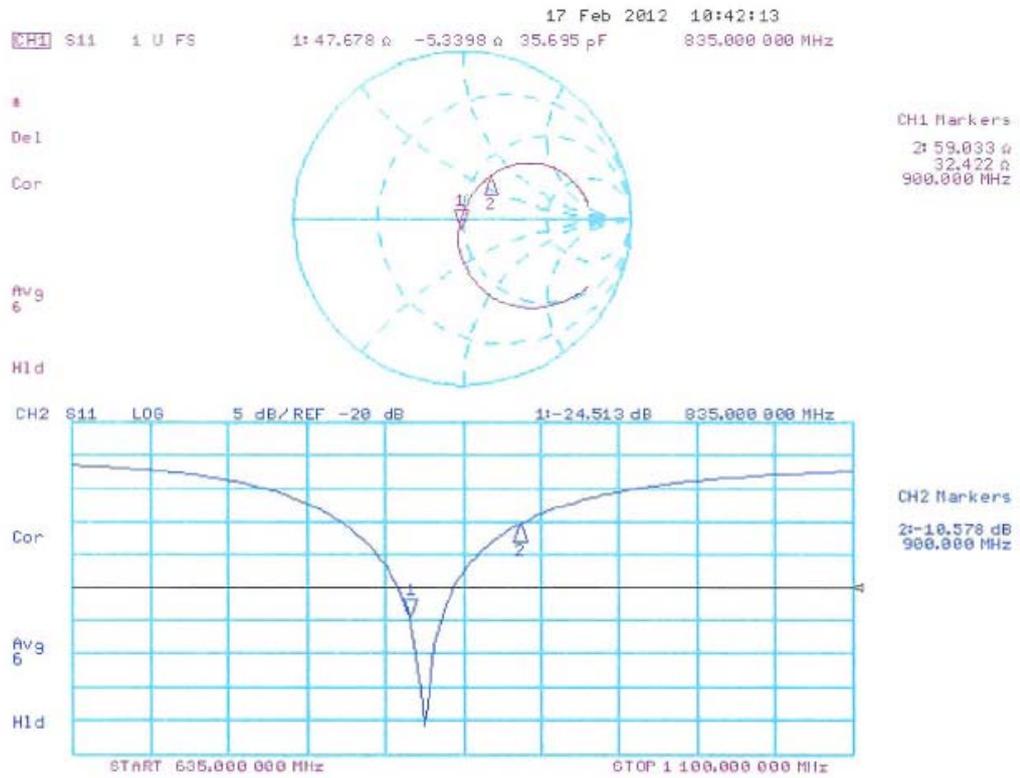
QuieTek

Impedance Measurement Plot for Body TSL

17 Feb 2012 10:42:13

CH1 S11 1 U FS   1: 47.678 Ω   -5.3398 Ω 35.695 pF   835.000 000 MHz

CH1 Markers
2: 59.033 Ω
32.422 Ω
900.000 MHz

CH2 S11 LOG   5 dB/REF -20 dB   1:-24.513 dB 835.000 000 MHz

CH2 Markers
2:-10.578 dB
900.000 MHz

START 635.000 000 MHz   STOP 1 100.000 000 MHz

Certificate No: D835V2-4d094_Feb12   Page 8 of 8

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

	S	Schweizerischer Kalibrierdienst
	C	Service suisse d'étalonnage
		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: **D1900V2-5d121_Feb12**

CALIBRATION CERTIFICATE

Object	D1900V2 - SN: 5d121
Calibration procedure(s)	QA CAL-05.v8 Calibration procedure for dipole validation kits above 700 MHz
Calibration 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 ± 3)°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: 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

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

Issued: February 22, 2012

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

Certificate No: D1900V2-5d121_Feb12   Page 1 of 8

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  Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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

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Multilateral Agreement for the recognition of calibration certificates

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.

Certificate No: D1900V2-5d121_Feb12   Page 2 of 8

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 cm^3 (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 cm^3 (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 cm^3 (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 cm^3 (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 jΩ
Return Loss	- 22.8 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.4 Ω + 7.4 jΩ
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; σ = 1.4 mho/m; ε_r = 40.4; ρ = 1000 kg/m^3
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)

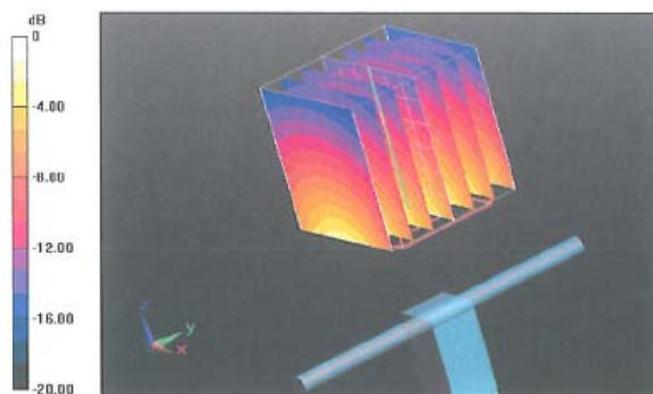## Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 96.900 V/m; Power Drift = 0.04 dB
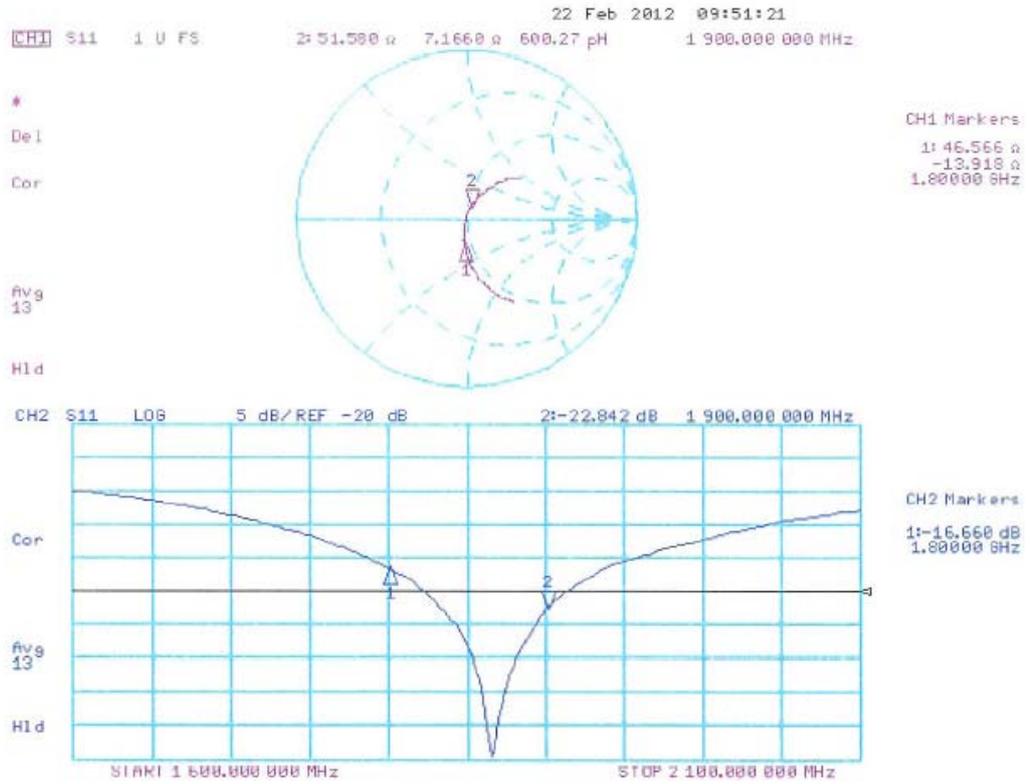Peak SAR (extrapolated) = 17.5160
SAR(1 g) = 9.84 mW/g; SAR(10 g) = 5.19 mW/g
Maximum value of SAR (measured) = 12.195 mW/g

0 dB = 12.200mW/g = 21.73 dB mW/g

Certificate No: D1900V2-5d121_Feb12   Page 5 of 8

QuieTek

Impedance Measurement Plot for Head TSL

22 Feb 2012 09:51:21

CH1 S11 1 U FS   2: 51.580 Ω 7.1660 Ω 600.27 pH   1 900.000 000 MHz

#

Del

Cor

CH1 Markers
1: 46.566 Ω
-13.918 Ω
1.80000 GHz

Avg
13

Hld

CH2 S11 LOG   5 dB/REF -20 dB   2:-22.842 dB 1 900.000 000 MHz

Cor

CH2 Markers
1:-16.660 dB
1.80000 GHz

Avg
13

Hld

START 1 600.000 000 MHz   STOP 2 100.000 000 MHz

QuieTek

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; σ = 1.56 mho/m; ε_r = 53; ρ = 1000 kg/m^3
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)

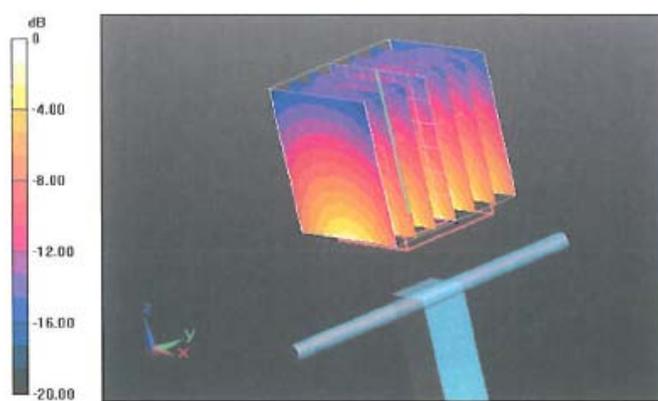**Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:**
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 93.537 V/m; Power Drift = 0.0039 dB
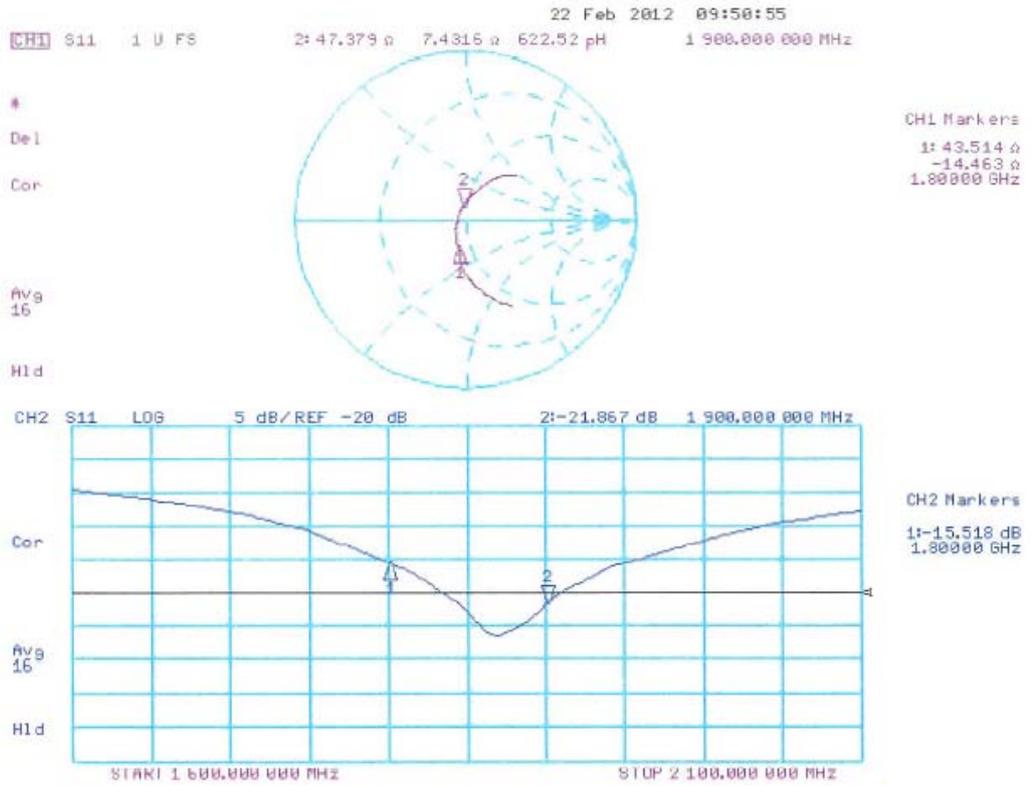Peak SAR (extrapolated) = 17.3450
SAR(1 g) = 9.84 mW/g; SAR(10 g) = 5.15 mW/g
Maximum value of SAR (measured) = 12.473 mW/g

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

Certificate No: D1900V2-5d121_Feb12   Page 7 of 8

QuieTek

Impedance Measurement Plot for Body TSL

22 Feb 2012 09:50:55

CH1 S11 1 U FS   2: 47.379 Ω   7.4316 Ω   622.52 pH   1 900.000 000 MHz

#

Del

Cor

CH1 Markers

1: 43.514 Ω
-14.463 Ω
1.80000 GHz

Avg
16

Hld

CH2 S11 LOG   5 dB/REF -20 dB   2: -21.867 dB   1 900.000 000 MHz

Cor

CH2 Markers

1: -15.518 dB
1.80000 GHz

Avg
16

Hld

START 1 600.000 000 MHz   STOP 2 100.000 000 MHz

Appendix F. DAE 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
   Swiss Calibration Service

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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: **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 $(22 \pm 3)°C$ 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: 0810278	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

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

Issued: January 23, 2012

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

Certificate No: DAE4-1220_Jan12   Page 1 of 5

QuieTek

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.

Certificate No: DAE4-1220_Jan12   Page 2 of 5

DC Voltage Measurement

A/D - Converter Resolution nominal

High Range:	1LSB =	6.1µV ,	full range =	-100...+300 mV
Low Range:	1LSB =	61nV ,	full range =	-1.......+3mV

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

Calibration Factors	X	Y	Z
High Range	405.267 ± 0.1% (k=2)	404.990 ± 0.1% (k=2)	404.221 ± 0.1% (k=2)
Low Range	3.97762 ± 0.7% (k=2)	3.99629 ± 0.7% (k=2)	3.98707 ± 0.7% (k=2)

Connector Angle

Connector Angle to be used in DASY system	176.5 ° ± 1 °

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	-

Certificate No: DAE4-1220_Jan12   Page 4 of 5

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