



## SAR Test Report

Product Name : WCDMA Digital Mobile Phone  
Model No. : HUAWEI Y220-U17  
FCC ID : QISY220-U17

Applicant : HUAWEI TECHNOLOGIES CO., LTD  
Address : Administration Building, Headquarters of Huawei  
Technologies Co., Ltd., Bantian, Longgang District,  
Shenzhen, 518129, P.R.C

Date of Receipt : 15/07/2013  
Date of Test : 08/09/2013  
Issued Date : 09/09/2013  
Report No. : 136S073R-HP-US-P03V01  
Report Version : V1.1

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# Test Report Certification

Issued Date: 09/09/2013

Report No.: 136S073R-HP-US-P03V01



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Applicant : HUAWEI TECHNOLOGIES CO.,LTD

Address : Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.C

Manufacturer : HUAWEI TECHNOLOGIES CO.,LTD

Address : Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.C

Model No. : HUAWEI Y220-U17

FCC ID : QISY220-U17

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: 0.671 W/kg  
Body: 1.35 W/kg

Performed Location : Suzhou EMC Laboratory  
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## Laboratory Information

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<b>Norway</b>	<b>:</b>	<b>Nemko, DNV</b>
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## 1. General Information

### 1.1. EUT Description

Product Name	WCDMA Digital Mobile Phone
Model No.	HUAWEI Y220-U17
IMEI1	868419010001454
IMEI2	868419010005133
Hardware Version	V2
Software Version	Y220-U17V100R001C00B202
Device Category	Portable
RF Exposure Environment	Uncontrolled
Antenna Type	Internal
<b>2G</b>	
Support Band	GSM850/PCS1900
GPRS Class	Class 12
Uplink	GSM 850: 824~849MHz PCS 1900: 1850~1910MHz
Downlink	GSM 850: 869~894MHz PCS 1900: 1930~1990MHz
Release Version	R99
Type of modulation	GMSK for GPRS; 8PSK for EDGE(Only for Downlink)
Antenna Gain	GSM 850: -2.5dBi PCS1900: -3.2dBi
<b>3G</b>	
Support Band	WCDMA Band V
Uplink	WCDMA Band V: 824~849MHz
Downlink	WCDMA Band V: 869~894MHz
Release Version	Rel-7
Type of modulation	QPSK, 16QAM for Downlink QPSK for Uplink
Antenna Gain	WCDMA Band V: -3.0dBi
<b>Wi-Fi</b>	
Wi-Fi Frequency	802.11b/g/n(20MHz): 2412 ~ 2462 MHz
Type of modulation	802.11b: DSSS; 802.11g/n: OFDM
Data Rate	802.11b: 1/2/5.5/11 Mbps
	802.11g: 6/9/12/18/24/36/48/54 Mbps
	802.11n: up to 65 Mbps

Peak Antenna Gain	-3.0dBi
<b>Bluetooth</b>	
Bluetooth Frequency	2402~2480MHz
Bluetooth Version	V3.0 + HS
Type of modulation	FHSS
Data Rate	1Mbps(GFSK), 2Mbps(Pi/4 DQPSK), 3Mbps (8DPSK)
Antenna Gain	-3.0dBi
<b>Components</b>	
Battery #1	Brand Name: HUAWEI M/N: HB5N1 Rated Voltage and Capacitance: 3.7V/1350mAh S/N: GAGD410Z15801389
Battery #2	Brand Name: HUAWEI M/N: HB5N1 Rated Voltage and Capacitance: 3.7V/1350mAh S/N: BAAD316915805110
Adapter #1	Brand Name: HUAWEI M/N: HW-050055U1W Input: 100-240V~50/60Hz 0.2A Output: 5Vdc, 550mA S/N: HKAD50574030
Adapter #2	Brand Name: HUAWEI M/N: HW-050055U1W Input: 100-240V~50/60Hz 0.2A Output: 5Vdc, 550mA S/N: BYAD31910787

Note:

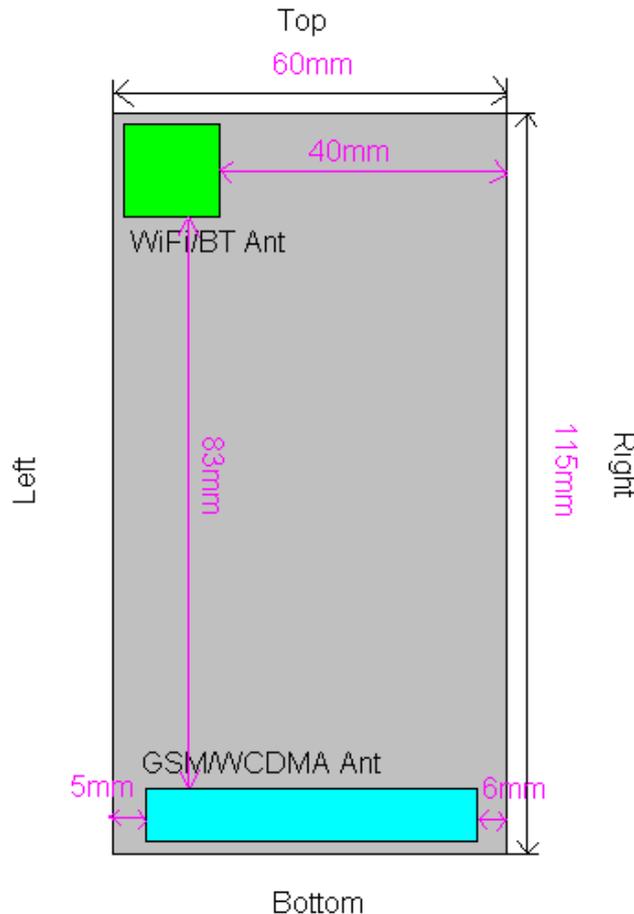
1. According to customer notification, the difference of U17 and U05 are in the 3G part.
2. The difference of two models as show below:
  - (1) 3G frequency range and matching circuit are different. Y220-U05 3G: W850/1900;  
Y220-U17 3G: W850/2100.
  - (2) Y220-U17 supports dual SIM slots and Y220-U05 supports single SIM slots.

1.2. Test Environment

Ambient conditions in the laboratory:

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

1.3. EUT Antenna Locations



Mobile Hotspot Sides for SAR Testing

Mode	Back	Front	Top	Bottom	Right	Left
GPRS850	Yes	Yes	No	Yes	Yes	Yes
GPRS1900	Yes	Yes	No	Yes	Yes	Yes
WCDMA Band V	Yes	Yes	No	Yes	Yes	Yes
2.4GHz WLAN	Yes	Yes	Yes	No	Yes	No

Note: Particular DUT edges were not required to be evaluated for Wireless Router SAR if the edges were greater than 2.5 cm from the transmitting antenna according to FCC KDB Publication 941225 D06v01 guidance, page 2. The antenna photo shows the distances between the transmit antennas and the edges of the device.

**1.4. Simultaneous Transmission Configurations**

According to FCC KDB Publication 447498 D05v01r01,transmitter are considered to be transmitting simultaneously when there is overlapping transmission, with the exception of transmissions during network hand-offs with maximum hand-off duration less than 30 seconds. This device contains multiple transmitters that may operate simultaneously, and therefore requires a simultaneously transmission analysis according to FCC KDB Publication 447498 D05v01r01 3) procedures.

**Table 1-1  
Simultaneous Transmission Scenarios**

Ref.	Simultaneous Transmit Configurations	Head	Body-Worn Accessory	Hotspot	Note
		IEEE1528 Supp C	FCC KDB447498 V05	FCC KDB941225 D06	
1	GSM850 Voice + BT	Yes	Yes	No	
2	GPRS850 Data + BT	Yes	Yes	No	
3	PCS1900 Voice + BT	Yes	Yes	No	
4	GPRS1900 Data + BT	Yes	Yes	No	
5	WCDMA Band V Voice + BT	Yes	Yes	No	
6	WCDMA Band V Data + BT	Yes	Yes	No	
7	GSM850 Voice + 2.4GHz Wi-Fi	Yes	Yes	No	
8	PCS1900 Voice + 2.4GHz Wi-Fi	Yes	Yes	No	
9	GPRS850 Data + 2.4GHz Wi-Fi	No	No	Yes	GPRS + Wi-Fi Hotspot
10	GPRS1900 Data + 2.4GHz Wi-Fi	No	No	Yes	GPRS + Wi-Fi Hotspot
11	WCDMA Band V Voice + 2.4GHz Wi-Fi	Yes	Yes	No	
12	WCDMA Band V Data + 2.4GHz Wi-Fi	No	No	Yes	WCDMA + Wi-Fi Hotspot

Note: Bluetooth and Wi-Fi share the same antenna and cannot transmit simultaneously.

## 1.5. SAR Test Exclusions Applied

### (A) Wi-Fi/Bluetooth

Per FCC KDB 447498 D05v01r01, the SAR exclusion threshold for distances < 50mm is defined by the following equation:

$$\frac{\text{Max Power of Channel (mW)}}{\text{Test Separation Dist (mm)}} * \sqrt{\text{Frequency (GHz)}} \leq 3.0$$

Based on the maximum conducted power of Bluetooth and the antenna to use separation distance, Bluetooth SAR was not required on body;

[(4.47mW / 5) \* √2.48] = 1.41 < 3.0 for Head; [(4.47mW / 10) \* √2.48] = 0.70 < 3.0 for Body.

IEEE 802.11b/n were not evaluated for SAR since the average output power was not more than 0.25 dB higher than the average output power of IEEE 802.11g.

### (B) Licensed Transmitter(s)

GSM/GPRS/EDGE DTM is not supported for US bands. Therefore, the GSM Voice modes in this report do not transmit simultaneously with GPRS/EDGE Data.

This device is only capable of QPSK HSUPA in the uplink. Therefore, no additional SAR tests are required beyond that described for devices with HSUPA in KDB 941225 D01v02.

When the user utilizes multiple services in UMTS 3G mode it uses multi-Radio Access Bearer or multi-RAB. The power control is based on a physical control channel (Dedicated Physical Control Channel [DPCCH]) and power control will be adjusted to meet the needs of both services. Therefore, the UMTS+WLAN scenario also represents the UMTS Voice/DATA + WLAN Hotspot scenario.

## 1.6. Power Reduction for SAR

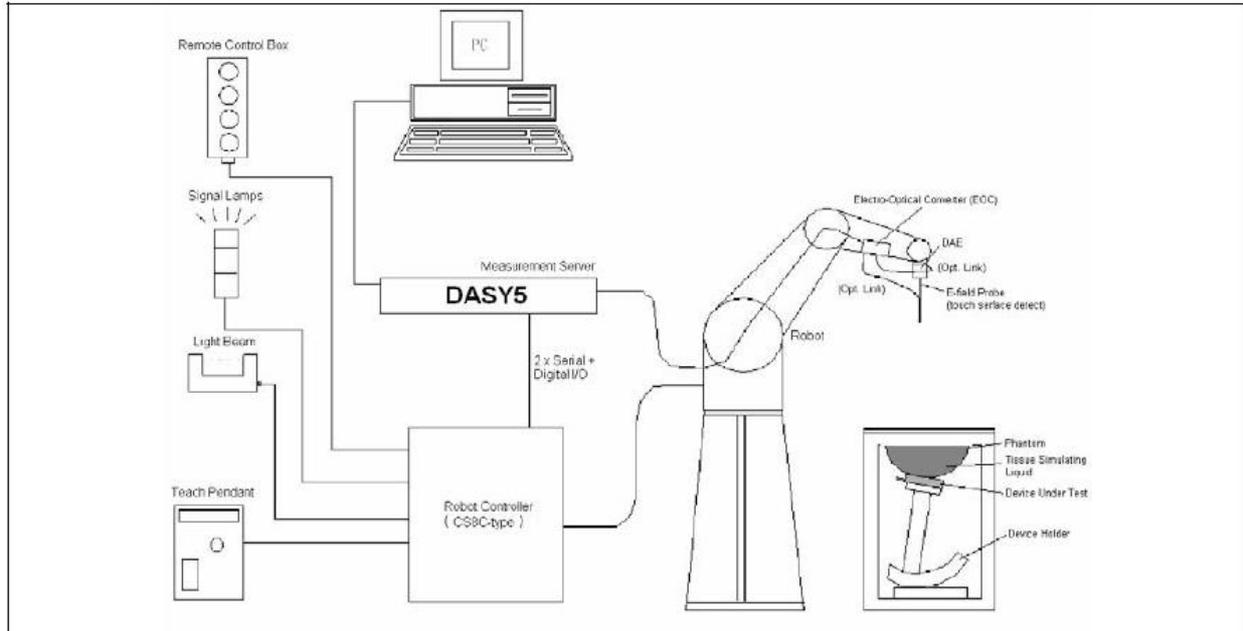
There is no power reduction used for any band/mode implemented in this device for SAR purposes.

## 1.7. Guidance Documents

- 1) FCC KDB Publication 941225 D01-D06 (2G, 3G and Hotspot)
- 2) FCC KDB Publication 447498 D05v01r01 (General SAR Guidance)
- 3) FCC KDB Publication 865664 D01v01r01 (SAR measurement 100 MHz to 6 GHz)
- 4) FCC KDB Publication 248227 D01v01r02 (SAR Considerations for 802.11 Devices)
- 5) FCC KDB Publication 648474 D04v01r01 (Handset SAR)

## 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<sup>2</sup> 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<sup>3</sup> 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.

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

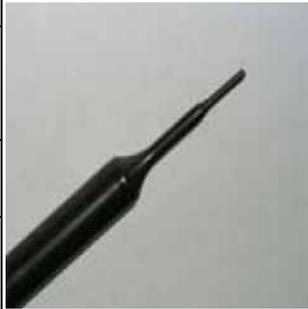
$$f_2(x, y, z) = Ae^{-\frac{z}{a}} \frac{a^2}{a^2 + x'^2} \left( 3 - e^{-\frac{2z}{a}} \right) \cos^2 \left( \frac{\pi y'}{2 \cdot 3a} \right)$$

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

**2.2. DASY5 E-Field Probe**

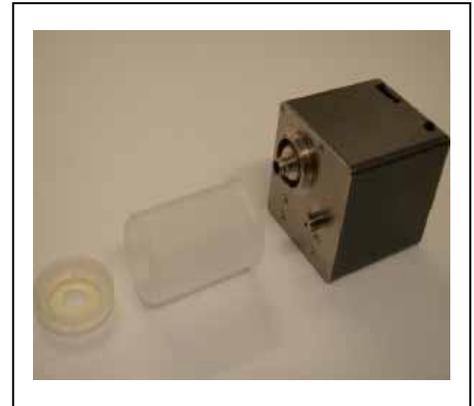
The SAR measurement is conducted with the dosimetric probe manufactured by SPEAG. The probe is specially designed and calibrated for use in liquid with high permittivity. The dosimetric probe has special calibration in liquid at different frequency. SPEAG conducts the probe calibration in compliance 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	
<b>Construction</b>	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	
<b>Frequency</b>	10 MHz to 6 GHz Linearity: ± 0.2 dB (30 MHz to 6 GHz)	
<b>Directivity</b>	± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)	
<b>Dynamic Range</b>	10 µW/g to 100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 µW/g)	
<b>Dimensions</b>	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	
<b>Application</b>	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields). Only probe which enables compliance testing for frequencies up to 6 GHz with precision of better 30%.	

**2.3. Boundary Detection Unit and Probe Mounting Device**

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



**2.4. DATA Acquisition Electronics (DAE) and Measurement Server**

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

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

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



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



**2.5. Robot**

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

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

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



**2.6. Light Beam Unit**

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

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



## 2.7. Device Holder

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

Thus the device needs no repositioning when changing the angles.

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



## 2.8. SAM Twin Phantom

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

- Left head
- Right head
- Flat phantom



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

### 3. Tissue Simulating Liquid

#### 3.1. The composition of the tissue simulating liquid

INGREDIENT (% Weight)	835MHz Head	835MHz Body	1900MHz Head	1900MHz Body	2450MHz Head	2450MHz Body
<b>Water</b>	40.45	52.4	54.90	40.5	46.7	73.2
<b>Salt</b>	1.45	1.40	0.18	0.50	0.00	0.04
<b>Sugar</b>	57.6	45.0	0.00	58.0	0.00	0.00
<b>HEC</b>	0.40	1.00	0.00	0.50	0.00	0.00
<b>Preventol</b>	0.10	0.20	0.00	0.50	0.00	0.00
<b>DGBE</b>	0.00	0.00	44.92	0.00	53.3	26.7

**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

<b>Head Tissue Simulant Measurement</b>				
Frequency [MHz]	Description	Dielectric Parameters		Tissue Temp. [°C]
		$\epsilon_r$	$\sigma$ [s/m]	
835 MHz	Reference result ± 5% window	41.50 39.43 to 43.58	0.90 0.86 to 0.95	N/A
	16-07-2013	40.94	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
	16-07-2013	38.56	1.45	21.0
2450MHz	Reference result ± 5% window	39.20 37.24to 41.16	1.80 1.62 to 1.98	N/A
	16-07-2013	38.64	1.84	21.0

<b>Body Tissue Simulant Measurement</b>				
Frequency [MHz]	Description	Dielectric Parameters		Tissue Temp. [°C]
		$\epsilon_r$	$\sigma$ [s/m]	
835 MHz	Reference result ± 5% window	55.2 52.44 to 57.96	0.97 0.92 to 1.02	N/A
	16-07-2013	53.57	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
	16-07-2013	52.42	1.55	21.0
2450MHz	Reference result ± 5% window	52.7 50.07 to 55.34	1.95 1.85 to 2.05	N/A
	16-07-2013	52.29	2.01	21.0

**3.3. Tissue Dielectric Parameters for Head and Body Phantoms**

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

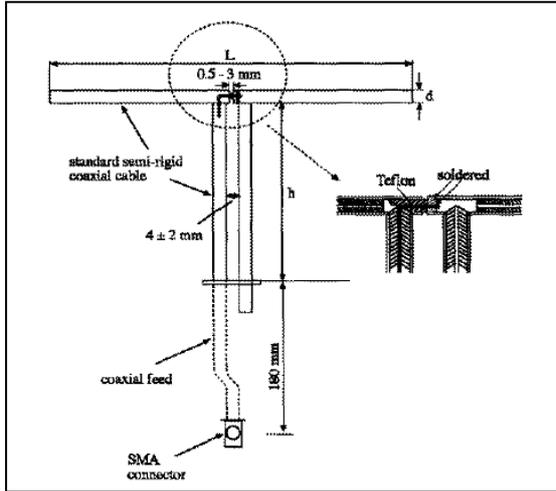
Target Frequency (MHz)	Head		Body	
	$\epsilon_r$	$\sigma$ (S/m)	$\epsilon_r$	$\sigma$ (S/m)
150	52.3	0.76	61.9	0.80
300	45.3	0.87	58.2	0.92
450	43.5	0.87	56.7	0.94
<b>835</b>	<b>41.5</b>	<b>0.90</b>	<b>55.2</b>	<b>0.97</b>
900	41.5	0.97	55.0	1.05
915	41.5	0.98	55.0	1.06
1450	40.5	1.20	54.0	1.30
1610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

( $\epsilon_r$  = relative permittivity,  $\sigma$  = conductivity and  $\rho = 1000 \text{ kg/m}^3$ )

## 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
2450MHz	51.5	30.4	3.6

**4.1.2. Validation Result**

<b>System Performance Check at 835MHz, 1900MHz, 2450MHz for Head</b>				
<b>Validation Kit: D835V2-SN 4d094</b>				
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
	16-07-2013	9.08	5.92	21.0
<b>Validation Kit: D1900V2-SN 5d121</b>				
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
	16-07-2013	41.60	21.08	21.0
<b>Validation Dipole: D2450V2-SN 839</b>				
Frequency [MHz]	Description	SAR [w/kg] 1g	SAR [w/kg] 10g	Tissue Temp. [°C]
2450 MHz	Reference result ± 10% window	51.9 46.71 to 57.09	24.1 21.69 to 26.51	N/A
	16-07-2013	53.20	23.56	21.0
Note: All SAR values are normalized to 1W forward power.				
<b>System Performance Check at 835MHz, 1900MHz, 2450MHz for Body</b>				
<b>Validation Kit: D835V2-SN 4d094</b>				
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
	16-07-2013	9.68	6.32	21.0
<b>Validation Kit: D1900V2-SN 5d121</b>				
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
	16-07-2013	40.80	21.00	21.0

**Validation Dipole: D2450V2-SN 839**

Frequency [MHz]	Description	SAR [w/kg] 1g	SAR [w/kg] 10g	Tissue Temp. [°C]
2450 MHz	Reference result ± 10% window	48.7 43.83 to 53.57	22.8 20.52 to 25.08	N/A
	16-07-2013	48.40	21.04	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,

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

$\sigma$ : represents the simulated tissue conductivity

$\rho$ : 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<sup>2</sup> ) 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<sup>3</sup> ).

### 4.3. Body-Worn Accessory Configurations

Body-worn operating configurations are tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in a normal use configuration. Per FCC KDB Publication 648474 D04\_v01, Body-worn accessory exposure is typically related to voice mode operations when handsets are carried in body-worn accessories. The body-worn accessory procedures in FCC KDB Publication 447498 D01\_v05 should be used to test for body-worn accessory SAR compliance, without a headset connected to it. This enables the test results for such configuration to be compatible with that required for hotspot mode when the body-worn accessory test separation distance is greater than or equal to that required for hotspot mode, when applicable. When the reported SAR for a body-worn accessory, measured without a headset connected to the handset, is  $> 1.2$  W/kg, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for that body-worn accessory with a headset attached to the handset.

Accessories for Body-worn operation configurations are divided into two categories: those that do not contain metallic components and those that do contain metallic components. When multiple accessories that do not contain metallic components are supplied with the device, the device is tested with only the accessory that dictates the closest spacing to the body. Then multiple accessories that contain metallic components are tested with the device with each accessory. If multiple accessories share an identical metallic component (i.e. the same metallic belt-clip used with different holsters with no other metallic components) only the accessory that dictates the closest spacing to the body is tested.

Body-worn accessories may not always be supplied or available as options for some devices intended to be authorized for body-worn use. In this case, a test configuration with a separation distance between the back of the device and the flat phantom is used. Test position spacing was documented. Transmitters that are designed to operate in front of a person's face, as in push-to-talk configurations, are tested for SAR compliance with the front of the device positioned to face the flat phantom in head fluid. For devices that are carried next to the body such as a shoulder, waist or chest-worn transmitters, SAR compliance is tested with the accessories, including headsets and microphones, attached to the device and positioned against a flat phantom in a normal use configuration.

#### 4.4. Wireless Router Configurations

Some battery-operated handsets have the capability to transmit and receive user data through simultaneous transmission of Wi-Fi simultaneously with a separate licensed transmitter. The FCC has provided guidance in FCC KDB Publication 941225 D06 v01 where SAR test considerations for handsets ( $L \times W \geq 9 \text{ cm} \times 5 \text{ cm}$ ) are based on a composite test separation distance of 10 mm from the front, back and edges of the device containing transmitting antennas within 2.5 cm of their edges, determined from general mixed use conditions for this type of devices. Since the hotspot SAR results may overlap with the body-worn accessory SAR requirements, the more conservative configurations can be considered, thus excluding some body-worn accessory SAR tests.

When the user enables the personal wireless router functions for the handset, actual operations include simultaneous transmission of both the Wi-Fi transmitter and another licensed transmitter. Both transmitters often do not transmit at the same transmitting frequency and thus cannot be evaluated for SAR under actual use conditions due to the limitations of the SAR assessment probes. Therefore, SAR must be evaluated for each frequency transmission and mode separately and spatially summed with the Wi-Fi transmitter according to FCC KDB Publication 447498 D01v05 publication procedures. The “Portable Hotspot” feature on the handset was NOT activated during SAR assessments, to ensure the SAR measurements were evaluated for a single transmission frequency RF signal at a time.

## **4.5. SAR Measurement Conditions for UMTS**

### **4.5.1. Output Power Verification**

Maximum output power is measured on the High, Middle and Low channels for each applicable transmission band according to the general descriptions in section 5.2 of 3GPP TS 34.121, using the appropriate RMC or AMR with TPC (transmit power control) set to all “1s”.

Maximum output power is verified on the High, Middle and Low channels according to the general descriptions in section 5.2 of 3GPP TS 34.121 (release 5), using the appropriate RMC with TPC (transmit power control) set to all “1s” or applying the required inner loop power control procedures to maintain maximum output power while HSUPA is active. Results for all applicable physical channel configurations (DPCCH, DPDCHn and spreading codes, HS-DPCCH etc) are tabulated in this test report. All configurations that are not supported by the DUT or cannot be measured due to technical or equipment limitations are identified.

### **4.5.2. Head SAR Measurements for Handsets**

SAR for head exposure configurations is measured using the 12.2 kbps RMC with TPC bits configured to all “1s”. SAR in AMR configurations is not required when the maximum average output of each RF channel for 12.2 kbps AMR is less than 0.25 dB higher than that measured in 12.2 kbps RMC. Otherwise, SAR is measured on the maximum output channel in 12.2 AMR with a 3.4 kbps SRB (signaling radio bearer) using the exposure configuration that resulted in the highest SAR for that RF channel in the 12.2 kbps RMC mode.

### **4.5.3. Body SAR Measurements**

SAR for body exposure configurations is measured using the 12.2 kbps RMC with the TPC bits all “1s”.

### **4.5.4. SAR Measurements for Handsets with Rel 5 HSDPA**

Body SAR for HSDPA is not required for handsets with HSDPA capabilities when the maximum average output power of each RF channel with HSDPA active is less than 0.25 dB higher than that measured without HSDPA using 12.2 kbps RMC and the maximum SAR for 12.2 kbps RMC is  $\leq 75\%$  of the SAR limit. Otherwise, SAR is measured for HSDPA, using an FRC with H-Set 1 in Sub-test 1 and a 12.2 kbps RMC configured in Test Loop Mode 1, using the highest body SAR configuration measured in 12.2 kbps RMC without HSDPA, on the maximum output channel with the body exposure configuration that resulted in the highest SAR in 12.2 kbps RMC mode for that RF channel.

The H-set used in FRC for HSDPA should be configured according to the UE category of a test device. The number of HS-DSCH/HSPDSCHs, HARQ processes, minimum inter-TTI interval, transport block sizes and RV coding sequence are defined by the applicable H-set. To maintain a consistent test configuration and stable transmission conditions, QPSK is used in the FRC for SAR testing. HS-DPCCH should be configured with a CQI feedback cycle of 2 ms to maintain a constant rate of active CQI slots. DPCCH and DPDCH gain factors of  $\beta_c=9$  and  $\beta_d=15$ , and power offset parameters of  $\Delta_{ACK}=\Delta_{NACK}=5$  and  $\Delta_{CQI}=2$  is used. The CQI value is determined by the UE category, transport block size, number of HS-PDSCHs and modulation used in the FRC.

#### 4.5.5. SAR Measurements for Handsets with Rel 6 HSUPA

Body SAR for HSUPA is not required when the maximum average output of each RF channel with HSUPA/HSDPA active is less than 0.25 dB higher than as measured without HSUPA/HSDPA using 12.2 kbps RMC and maximum SAR for 12.2 kbps RMC is  $\leq 75\%$  of the SAR limit. Otherwise SAR is measured on the maximum output channel for the body exposure configuration produced highest SAR in 12.2 kbps RMC for that RF channel, using the additional procedures under “Release 6 HSPA data devices”

Head SAR for VOIP operations under HSPA is not required when maximum average output of each RF channel with HSPA is less than 0.25 dB higher than as measured using 12.2 kbps RMC. Otherwise SAR is measured using same HSPA configuration as used for body SAR.

Sub-test	$\beta_c$	$\beta_d$	$\beta_d$ (SF)	$\beta_c/\beta_d$	$\beta_{1w}^{(1)}$	$\beta_{ec}$	$\beta_{ed}$	$\beta_{ed}$ (SF)	$\beta_{ed}$ (codes)	CM <sup>(2)</sup> (dB)	MPR (dB)	AG <sup>(4)</sup> Index	E-TFCI
1	11/15 <sup>(3)</sup>	15/15 <sup>(3)</sup>	64	11/15 <sup>(3)</sup>	22/15	209/225	1039/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	$\beta_{ed1}: 47/15$ $\beta_{ed2}: 47/15$	4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15 <sup>(4)</sup>	15/15 <sup>(4)</sup>	64	15/15 <sup>(4)</sup>	30/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1:  $\Delta_{ACK}, \Delta_{NACK}$  and  $\Delta_{CQI} = 8 \Leftrightarrow A_{1w} = \beta_{1w}/\beta_c = 30/15 \Leftrightarrow \beta_{1w} = 30/15 * \beta_c$ .

Note 2: CM = 1 for  $\beta_c/\beta_d = 12/15, \beta_{1w}/\beta_c = 24/15$ . For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.

Note 3: For subtest 1 the  $\beta_c/\beta_d$  ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to  $\beta_c = 10/15$  and  $\beta_d = 15/15$ .

Note 4: For subtest 5 the  $\beta_c/\beta_d$  ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to  $\beta_c = 14/15$  and  $\beta_d = 15/15$ .

Note 5: Testing UE using E-DPDCH Physical Layer category 1 Sub-test 3 is not required according to TS 25.306 Table 5.1g.

Note 6:  $\beta_{ed}$  can not be set directly; it is set by Absolute Grant Value.

**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	2014.02.17
Dipole Validation Kits	Speag	D1900V2	5d121	2014.02.22
Dipole Validation Kits	Speag	D2450V2	839	2014.02.23
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	Sn1220	2014.01.24
E-Field Probe	Speag	EX3DV4	3710	2014.03.27
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	2014.03.30
Vector Network	Agilent	E5071C	MY48367267	2014.03.30
Signal Generator	Agilent	E4438C	MY49070163	2014.03.30
Power Meter	Anritsu	ML2495A	0905006	2013.11.10
Wide Bandwidth Sensor	Anritsu	MA2411B	0846014	2013.11.10

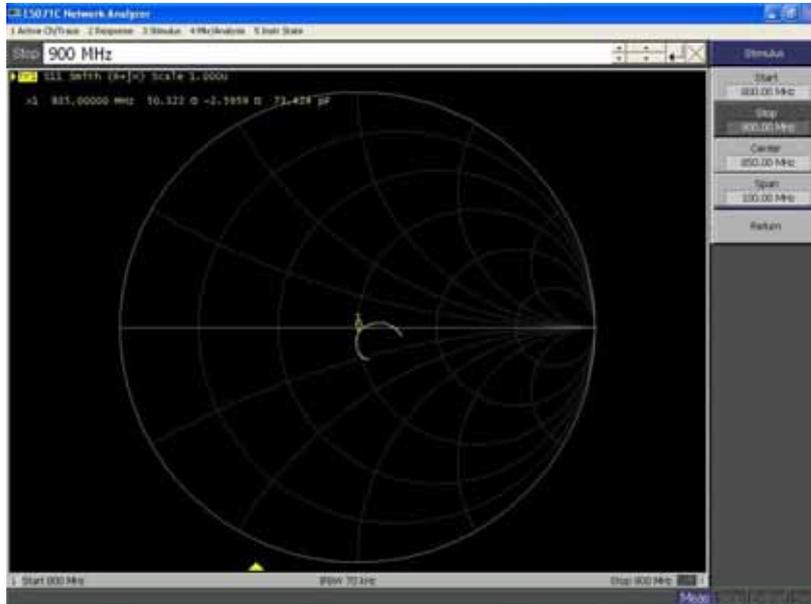
Note: Per KDB 450824 D02 requirements for dipole calibration, Quietek Lab has adopted two years calibration intervals. On annual basis, every measurement dipole has been evaluated and is in compliance with the following criteria:

1. There is no physical damage on the dipole;
2. System validation with specific dipole is within 10% of calibrated value;
3. Return-loss is within 20% of calibrated measurement (Show below);
4. Impedance is within 5Ω of calibrated measurement (Show below).

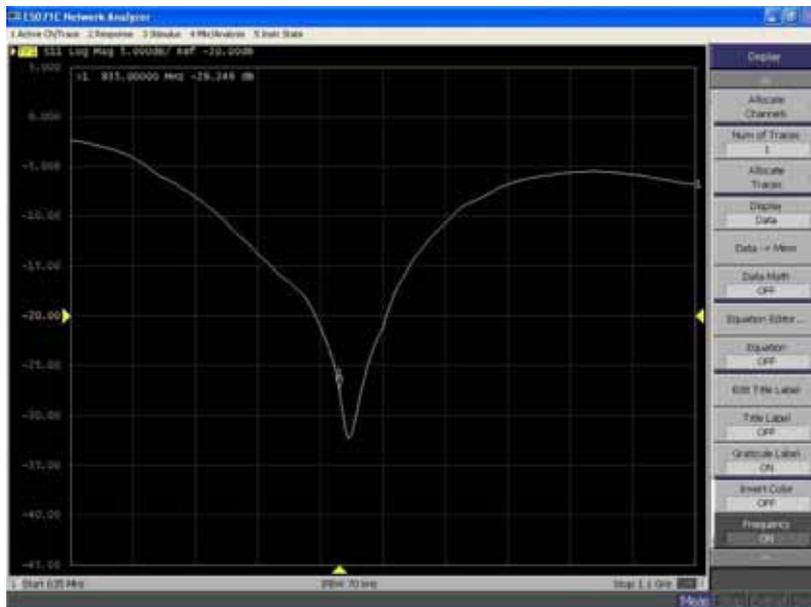
Impedance Plot for D835V2

835 Head

Calibrated impedance: 53.5 Ω; Measured impedance: 50.322 Ω (within 5Ω)

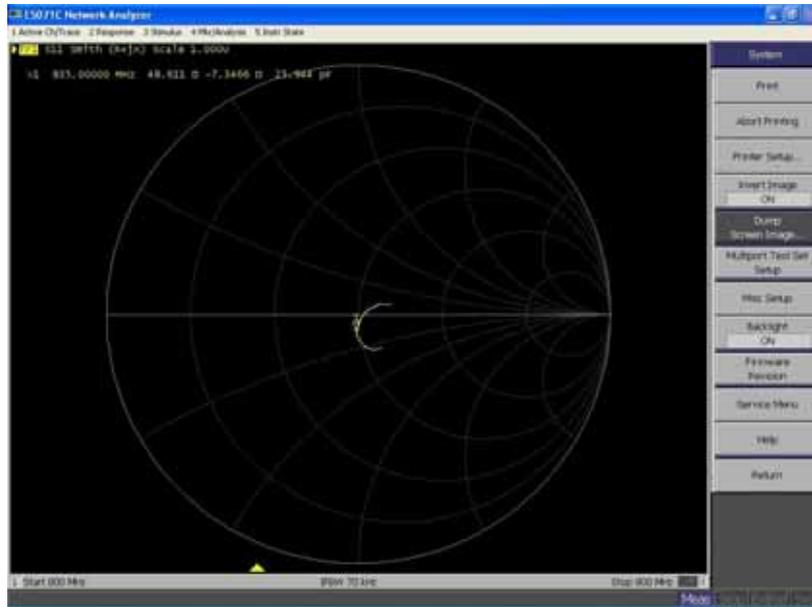


Calibrated return loss: -28.1 dB; Measured impedance: -28.246 dB (within 20%)

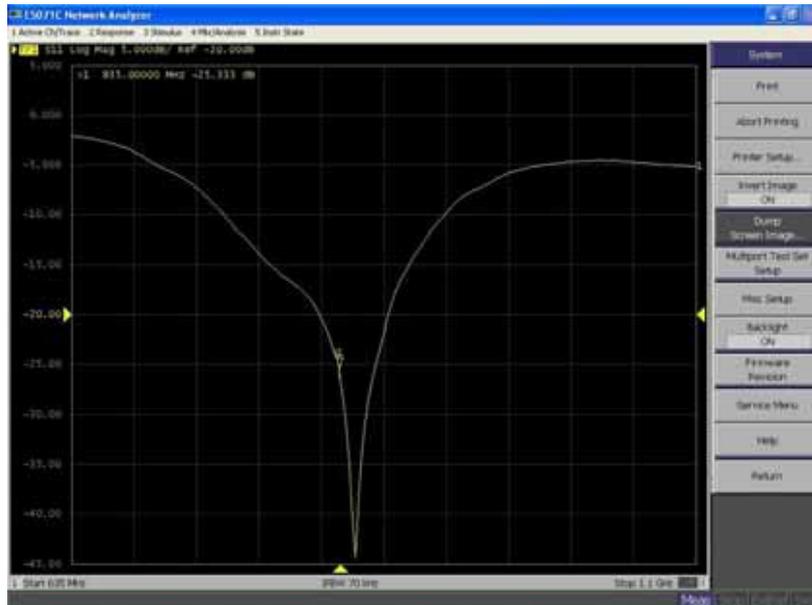


835 Body

Calibrated impedance: 47.7 Ω; Measured impedance: 48.611 Ω (within 5Ω)



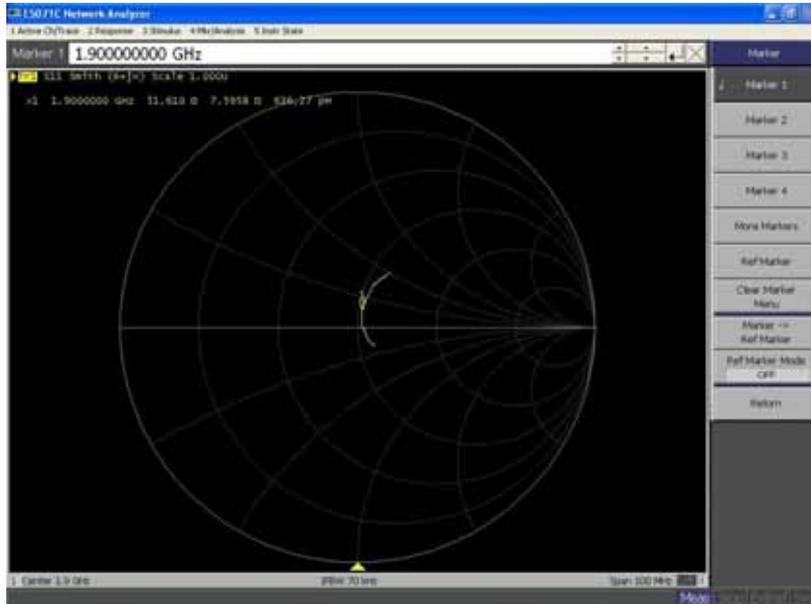
Calibrated return loss: -24.5 dB; Measured impedance: -25.333 dB (within 20%)



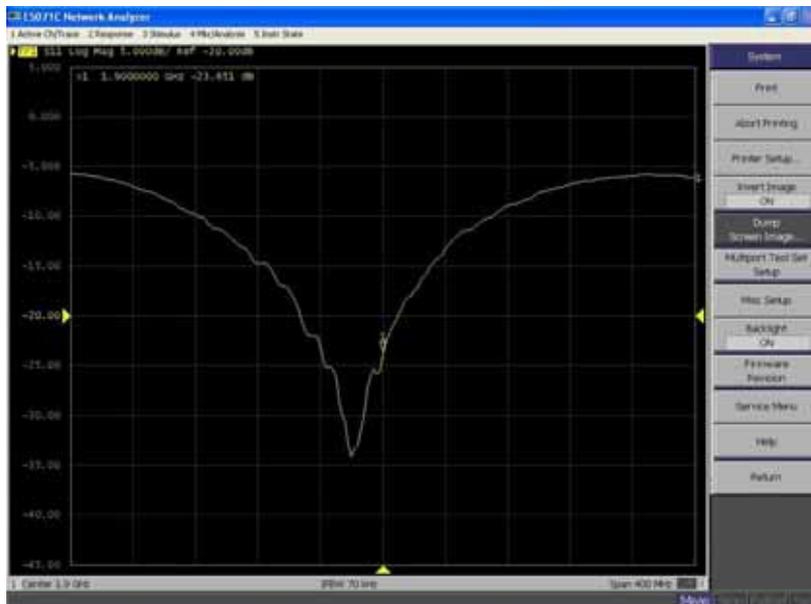
Impedance Plot for D1900V2

1900 Head

Calibrated impedance: 51.6 Ω; Measured impedance: 51.610 Ω (within 5Ω)

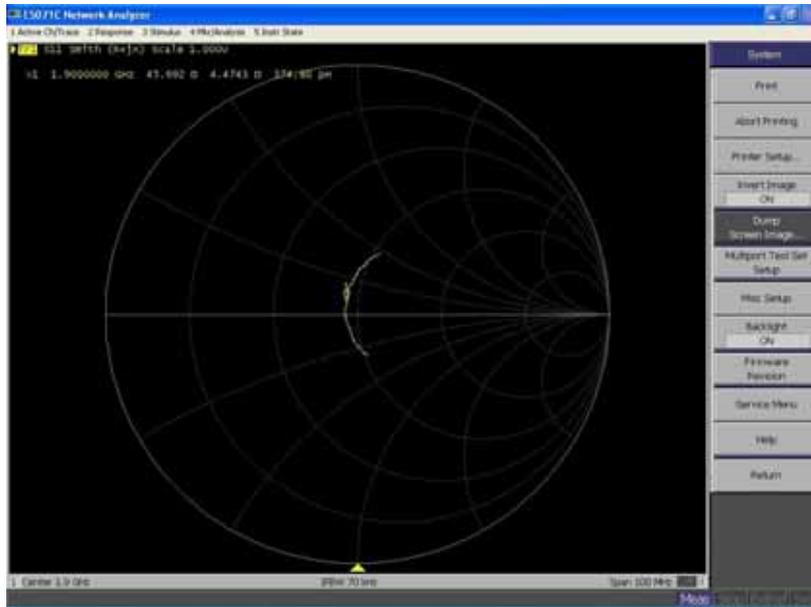


Calibrated return loss: -22.8 dB; Measured impedance: -23.651 dB (within 20%)

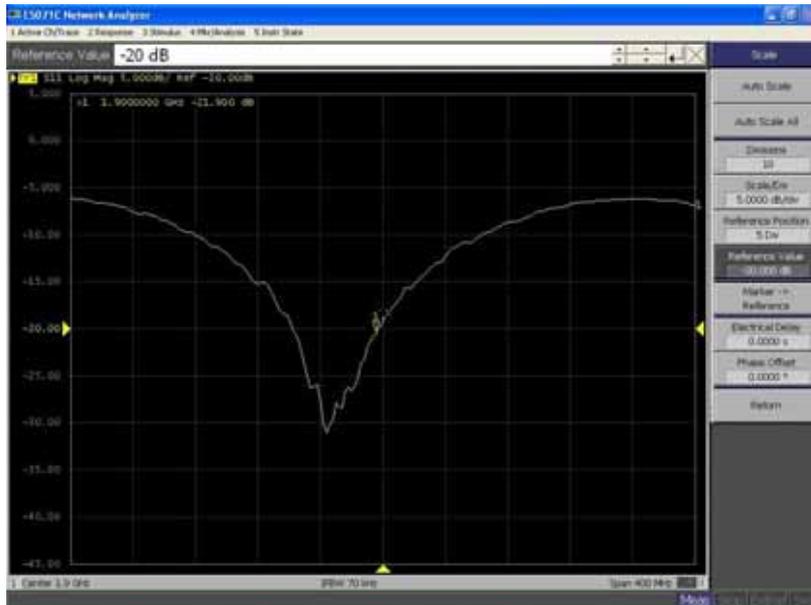


1900 Body

Calibrated impedance: 47.4 Ω; Measured impedance: 45.692 Ω (within 5Ω)



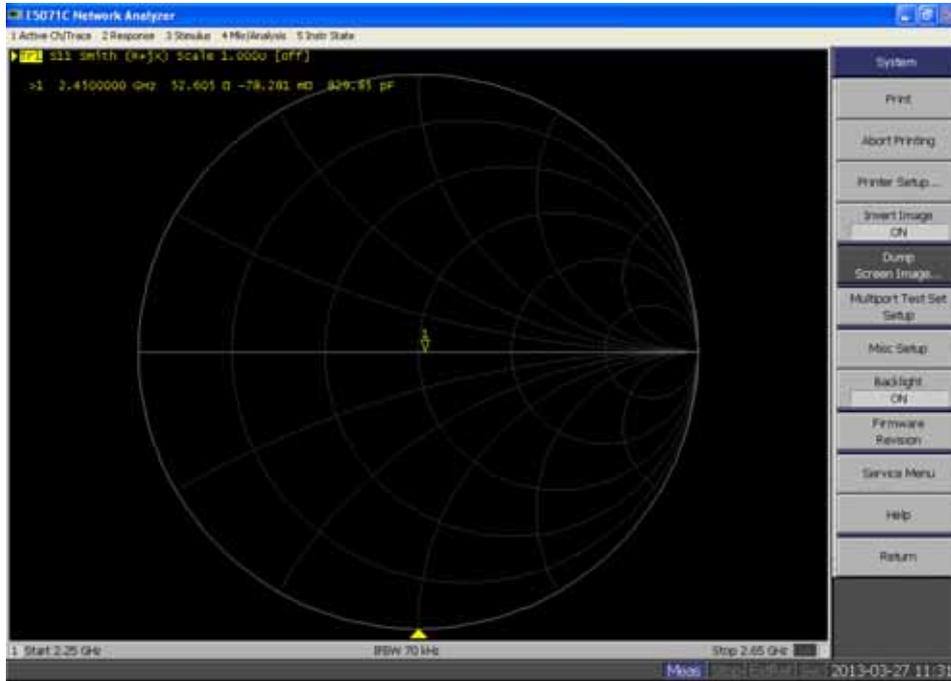
Calibrated return loss: -21.9 dB; Measured impedance: -21.900 dB (within 20%)



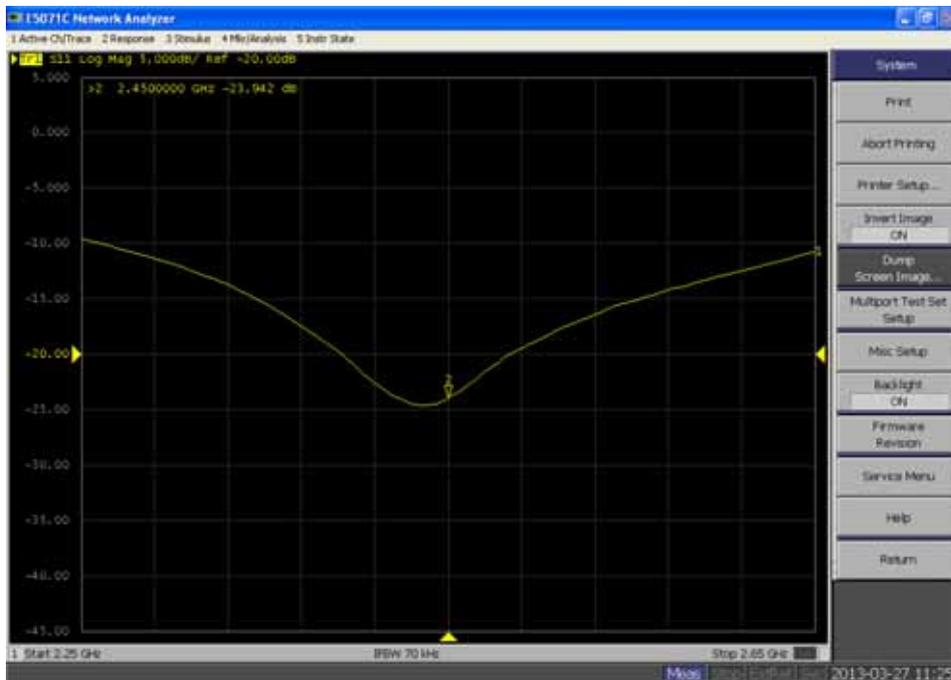
Impedance Plot for D2450V2

2450 Head

Calibrated impedance: 55.7  $\Omega$ ; Measured impedance: 52.6  $\Omega$  (within 5 $\Omega$ )

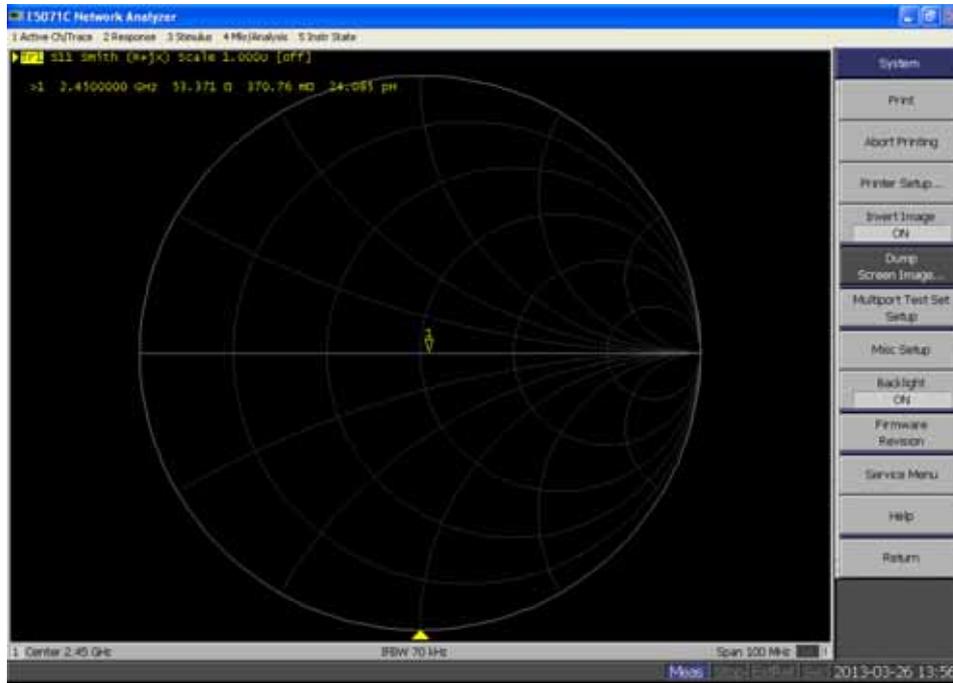


Calibrated return loss: -25.2 dB; Measured impedance: -23.9 dB (within 20%)

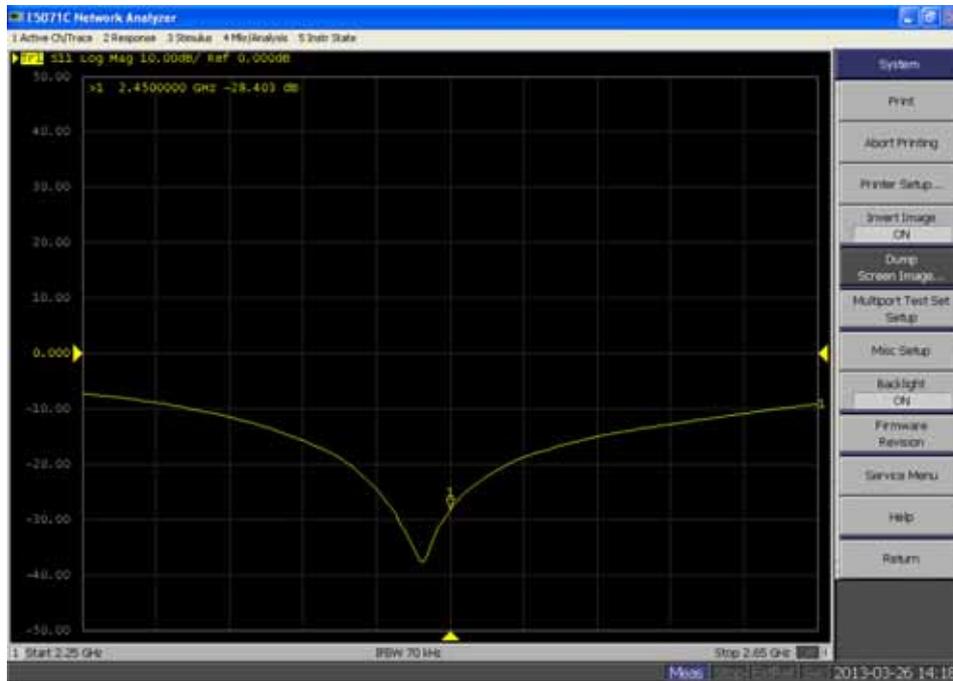


2450 Body

Calibrated impedance: 52.1 Ω; Measured impedance: 53.4 Ω (within 5Ω)



Calibrated return loss: -32.9 dB; Measured impedance: -28.4 dB (within 20%)



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.	(ci) 1g	(ci) 10g	Std.Unc. (1g)	Std. nc. (10g)	(vi) V <sub>eff</sub>
<b>Measurement System</b>								
Probe Calibration	±6.0%	N	1	1	1	±6.0%	±6.0%	∞
Axial Isotropy	±4.7%	R	√3	0.7	0.7	±1.9%	±1.9%	∞
Hemispherical Isotropy	±9.6%	R	√3	0.7	0.7	±3.9%	±3.9%	∞
Boundary Effects	±1.0%	R	√3	1	1	±0.6%	±0.6%	∞
Linearity	±4.7%	R	√3	1	1	±2.7%	±2.7%	∞
System Detection Limits	±1.0%	R	√3	1	1	±0.6%	±0.6%	∞
Readout Electronics	±0.3%	N	1	1	1	±0.3%	±0.3%	∞
Response Time	±0.8%	R	√3	1	1	±0.5%	±0.5%	∞
Integration Time	±2.6%	R	√3	1	1	±1.5%	±1.5%	∞
RF Ambient Noise	±3.0%	R	√3	1	1	±1.7%	±1.7%	∞
RF Ambient Reflections	±3.0%	R	√3	1	1	±1.7%	±1.7%	∞
Probe Positioner	±0.4%	R	√3	1	1	±0.2%	±0.2%	∞
Probe Positioning	±2.9%	R	√3	1	1	±1.7%	±1.7%	∞
Max. SAR Eval.	±1.0%	R	√3	1	1	±0.6%	±0.6%	∞
<b>Test Sample Related</b>								
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	√3	1	1	±2.9%	±2.9%	∞
<b>Phantom and Setup</b>								
Phantom Uncertainty	±4.0%	R	√3	1	1	±2.3%	±2.3%	∞
Liquid Conductivity (target)	±5.0%	R	√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	√3	0.6	0.49	±1.7%	±1.4%	∞
Liquid Permittivity (meas.)	±2.5%	N	1	0.6	0.49	±1.5%	±1.2%	∞
<b>Combined Std. Uncertainty</b>						±11.0%	±10.8%	387
<b>Expanded STD Uncertainty</b>						±22.0%	±21.5%	

## 8. Conducted Power Measurement

Mode	Frequency (MHz)	Avg. Burst Power (dBm)	Duty Cycle Factor (dB)	Frame Power (dBm)	Max. Power (dBm)	Scaling Factor
GSM850	824.2	32.77	-9	23.77	33.1	1.079
	836.4	32.71	-9	23.71	33.1	1.094
	848.8	32.61	-9	23.61	33.1	1.119
GPRS850(1 Slot)	824.2	32.33	-9	23.33	33.1	1.194
	836.4	32.24	-9	23.24	33.1	1.219
	848.8	32.21	-9	23.21	33.1	1.227
GPRS850(2 Slot)	824.2	31.59	-6	25.59	31.7	1.026
	836.4	31.54	-6	25.54	31.7	1.038
	848.8	31.49	-6	25.49	31.7	1.050
GPRS850(3 Slot)	824.2	29.87	-4.25	25.62	30.0	1.030
	836.4	29.85	-4.25	25.60	30.0	1.035
	848.8	29.79	-4.25	25.54	30.0	1.050
GPRS850(4 Slot)	824.2	29.00	-3	26.00	29.1	1.023
	836.4	29.01	-3	26.01	29.1	1.021
	848.8	28.97	-3	25.97	29.1	1.030
PCS1900	1850.2	29.53	-9	20.53	30.2	1.167
	1880.0	29.78	-9	20.78	30.2	1.102
	1909.8	29.84	-9	20.84	30.2	1.086
GPRS1900(1 Slot)	1850.2	29.52	-9	20.52	30.2	1.169
	1880.0	29.64	-9	20.64	30.2	1.138
	1909.8	29.78	-9	20.78	30.2	1.102
GPRS1900(2 Slot)	1850.2	28.98	-6	22.98	29.2	1.052
	1880.0	28.98	-6	22.98	29.2	1.052
	1909.8	29.05	-6	23.05	29.2	1.035
GPRS1900(3 Slot)	1850.2	27.23	-4.25	22.98	27.5	1.064
	1880.0	27.24	-4.25	22.99	27.5	1.062
	1909.8	27.30	-4.25	23.05	27.5	1.047
GPRS1900(4 Slot)	1850.2	26.42	-3	23.42	26.6	1.042
	1880.0	26.42	-3	23.42	26.6	1.042
	1909.8	26.49	-3	23.49	26.6	1.026

Note 1: Scaling Factor = Max. Power(mW) / Avg. Burst Power(mW)

2: This device operates using the following maximum and nominal output power specifications. SAR values were scaled to the maximum allowed power to determine compliance per KDB Publication 447498 D01v05.

3: Both burst-averaged and calculated frame-averaged powers are included. Frame-averaged powers were calculated from the measured burst-averaged power by converting the slot powers into linear units and calculating the energy over 8 timeslots.

4: The bolded GPRS modes were selected for SAR testing according to the highest frame-averaged output power table per KDB 941225 D03v01.

5: GPRS/EDGE(GMSK) output powers were measured with coding scheme setting of 1 (CS1) on the base station simulator. CS1 was configured to measure GPRS output power measurements and SAR to ensure GMSK modulation in the signal. Our Investigation has shown that CS1 - CS4 settings do not have any impact on the output levels or modulation in the GPRS modes.

6: EDGE (8-PSK) output powers were measured with MCS7 on the base station simulator. MCS7 coding scheme was used to measure the output powers for EDGE since investigation has shown that choosing MCS7 coding scheme will ensure 8-PSK modulation. It has been shown that MCS levels that produce 8PSK modulation do not have an impact on output power.

**WCDMA/HSDPA/HSUPA/HSPA+**

Mode	3GPP Subtest	Band V (850MHz) Channel			MPR
		Conducted Power (dBm)			
		4132	4182	4233	
<b>WCDMA R99</b>	<b>1</b>	<b>23.42</b>	<b>23.12</b>	<b>22.96</b>	<b>N/A</b>
<b>Rel5 HSDPA</b>	<b>1</b>	<b>22.34</b>	<b>22.29</b>	<b>22.23</b>	<b>0</b>
	<b>2</b>	<b>22.31</b>	<b>22.27</b>	<b>22.21</b>	<b>0</b>
	<b>3</b>	<b>21.85</b>	<b>21.76</b>	<b>21.71</b>	<b>0.5</b>
	<b>4</b>	<b>21.83</b>	<b>21.75</b>	<b>21.69</b>	<b>0.5</b>
<b>Rel6 HSUPA</b>	<b>1</b>	<b>22.31</b>	<b>22.27</b>	<b>22.21</b>	<b>0.0</b>
	<b>2</b>	<b>20.29</b>	<b>20.26</b>	<b>20.20</b>	<b>2.0</b>
	<b>3</b>	<b>21.28</b>	<b>21.25</b>	<b>21.21</b>	<b>1.0</b>
	<b>4</b>	<b>20.28</b>	<b>20.23</b>	<b>20.19</b>	<b>2.0</b>
	<b>5</b>	<b>22.29</b>	<b>22.26</b>	<b>22.18</b>	<b>0.0</b>
<b>Rel7 HSPA+</b>	<b>1</b>	<b>22.31</b>	<b>22.27</b>	<b>22.21</b>	<b>N/A</b>

Note: UMTS SAR was tested under RMC 12.2 kbps with HSPA Inactive per KDB Publication 941225 D01v02. HSPA SAR was not required since the average output power of the HSPA subtests was not more than 0.25 dB higher than the RMC level and SAR was less than 1.2 W/kg.

Mode	Band V (850MHz) Channel	Normal Power (dBm)	Max. Power (dBm)	Scaling Factor
WCDMA R99	4132	23.42	23.5	1.019
	4182	23.12	23.5	1.091
	4233	22.96	23.5	1.132

**WLAN output power**

Test Mode	Channel No.	Frequency (MHz)	Average Power (dBm)	Max. Power (dBm)	Scaling Factor
802.11b	01	2412	18.01	18.5	1.119
	06	2437	18.28	18.5	1.052
	11	2462	18.47	18.5	1.007
802.11g	01	2412	15.15	15.7	1.135
	06	2437	15.36	15.7	1.081
	11	2462	15.51	15.7	1.045
802.11n (20MHz)	01	2412	14.34	15.0	1.164
	06	2437	14.55	15.0	1.109
	11	2462	14.73	15.0	1.064

Note 1: Justification for reduced test configurations for Wi-Fi channels per KDB Publication 248227 D01v01r02 and KDB 447498 D01v05.

2: For 2.4 GHz, highest average RF output power channel for the lowest data rate for IEEE 802.11g were selected for SAR evaluation. Other IEEE 802.11 modes (including 802.11b/n) were not investigated since the average output powers over all channels and data rates were not more than 0.25 dB higher than the tested channel in the lowest data rate of IEEE 802.11g mode.

3: When the maximum extrapolated peak SAR of the zoom scan for the maximum output channel is <1.6 W/kg and the reported 1g averaged SAR is <0.8 W/kg, SAR testing on other channels is not required. Otherwise, the other default (or corresponding required) test channels were additionally tested using the lowest data rate.

4: The bolded channel above was tested for SAR.

**BT output power**

Test Mode	Channel No.	Frequency (MHz)	Average Power (dBm)	Max. Power (dBm)	Scaling Factor
DH5	01	2402	6.16	6.7	1.132
	40	2441	6.41	6.7	1.069
	79	2480	6.51	6.7	1.045
2DH5	01	2402	3.68	4.5	1.208
	40	2441	4.04	4.5	1.112
	79	2480	4.4	4.5	1.023
3DH5	01	2402	4.05	4.5	1.109
	40	2441	4.42	4.5	1.019
	79	2480	4.71	4.5	0.953

**9. Test Results**

**9.1. SAR Test Results Summary**

<b>SAR MEASUREMENT</b>									
Ambient Temperature (°C) : 21.5 ± 2					Relative Humidity (%): 52				
Liquid Temperature (°C) : 21.0 ± 2					Depth of Liquid (cm):>15				
Product: WCDMA Digital Mobile Phone									
Test Mode: GSM850<SIM1>									
Test Position Head	Antenna Position	Frequency		Frame Power (dBm)	Power Drift (<±0.2)	SAR 1g (W/kg)	Scaling Factor	Scaled SAR 1g (W/kg)	Limit (W/kg)
		Channel	MHz						
Left-Cheek	Fixed	128	824.2	23.77	--	--	1.079	--	1.6
Left-Cheek	Fixed	189	836.4	23.71	-0.03	0.556	1.094	0.608	1.6
Left-Cheek	Fixed	251	848.8	23.61	--	--	1.119	--	1.6
Left-Tilted	Fixed	189	836.4	23.71	-0.09	0.361	1.094	0.395	1.6
Right-Cheek	Fixed	128	824.2	23.77	--	--	1.079	--	1.6
Right-Cheek	Fixed	189	836.4	23.71	0.04	0.526	1.094	0.575	1.6
Right-Cheek	Fixed	251	848.8	23.61	--	--	1.119	--	1.6
Right-Tilted	Fixed	189	836.4	23.71	0.11	0.385	1.094	0.421	1.6
Test Mode: GSM850<SIM2>									
Left-Cheek	Fixed	189	836.4	23.71	-0.11	0.499	1.094	0.546	1.6
Note: when the 1-g SAR is ≤ 0.8 W/kg, testing for low and high channel is optional, refer to KDB 447498.									

SAR MEASUREMENT									
Ambient Temperature (°C) : 21.5 ± 2					Relative Humidity (%): 52				
Liquid Temperature (°C) : 21.0 ± 2					Depth of Liquid (cm):>15				
Product: WCDMA Digital Mobile Phone									
Body-worn Accessory SAR Configurations									
Test Mode: GSM850									
Test Position Body (10mm gap)	Antenna Position	Frequency		Frame Power (dBm)	Power Drift (<±0.2)	SAR 1g (W/kg)	Scaling Factor	Scaled SAR 1g (W/kg)	Limit (W/kg)
		Channel	MHz						
Body-worn	Fixed	128	824.2	23.77	--	--	1.079	--	1.6
Body-worn	Fixed	189	836.4	23.71	-0.10	0.647	1.094	0.708	1.6
Body-worn	Fixed	251	848.8	23.61	--	--	1.119	--	1.6
Body-worn (with headset #1)	Fixed	189	836.4	23.71	0.09	0.535	1.094	0.585	1.6
Hotspot SAR Configurations									
Test Mode: GPRS850-4slot									
Body-worn	Fixed	128	824.2	26.00	0.03	1.32	1.023	1.35	1.6
Body-worn*	Fixed	128	824.2	26.00	0.08	1.30	1.023	1.33	1.6
Body-worn (with battery #1)	Fixed	128	824.2	26.00	0.01	1.25	1.023	1.28	1.6
Body-worn	Fixed	189	836.4	26.01	0.06	1.17	1.021	1.19	1.6
Body-worn	Fixed	251	848.8	25.97	0.03	1.05	1.030	1.08	1.6
Body-front	Fixed	189	836.4	26.01	0.09	1.02	1.021	1.04	1.6
Body-worn (with headset #1)	Fixed	189	836.4	26.01	0.13	0.941	1.021	0.961	1.6
Body-worn (with headset #2)	Fixed	189	836.4	26.01	0.03	0.883	1.021	0.902	1.6
Body-right side	Fixed	189	836.4	26.01	0.06	0.795	1.021	0.812	1.6
Body-left side	Fixed	189	836.4	26.01	-0.19	0.665	1.021	0.679	1.6
Body-bottom	Fixed	189	836.4	26.01	0.06	0.101	1.021	0.103	1.6
Note 1: when the 1-g SAR is ≤ 0.8 W/kg, testing for low and high channel is optional, refer to KDB 447498.									
2: * - repeated at the highest SAR measurement according to the FCC KDB 865664									

SAR MEASUREMENT									
Ambient Temperature (°C) : 21.5 ± 2					Relative Humidity (%): 52				
Liquid Temperature (°C) : 21.0 ± 2					Depth of Liquid (cm):>15				
Product: WCDMA Digital Mobile Phone									
Test Mode: PCS1900<SIM1>									
Test Position Head	Antenna Position	Frequency		Frame Power (dBm)	Power Drift (<±0.2)	SAR 1g (W/kg)	Scaling Factor	Scaled SAR 1g (W/kg)	Limit (W/kg)
		Channel	MHz						
Left-Cheek	Fixed	512	1850.2	20.53	--	--	1.167	--	1.6
Left-Cheek	Fixed	661	1880	20.78	-0.09	0.436	1.102	0.480	1.6
Left-Cheek	Fixed	810	1909.8	20.84	--	--	1.086	--	1.6
Left-Tilted	Fixed	661	1880.0	20.78	0.01	0.122	1.102	0.134	1.6
Right-Cheek	Fixed	512	1850.2	20.53	--	--	1.167	--	1.6
Right-Cheek	Fixed	661	1880	20.78	0.18	0.609	1.102	0.671	1.6
Right-Cheek	Fixed	810	1909.8	20.84	--	--	1.086	--	1.6
Right-Tilted	Fixed	661	1880.0	20.78	0.01	0.176	1.102	0.194	1.6
Test Mode: PCS1900<SIM2>									
Right-Cheek	Fixed	661	1880	20.78	0.01	0.607	1.102	0.669	1.6
Note: when the 1-g SAR is ≤ 0.8 W/kg, testing for low and high channel is optional, refer to KDB 447498.									

SAR MEASUREMENT									
Ambient Temperature (°C) : 21.5 ± 2					Relative Humidity (%): 52				
Liquid Temperature (°C) : 21.0 ± 2					Depth of Liquid (cm):>15				
Product: WCDMA Digital Mobile Phone									
Body-worn Accessory SAR Configurations									
Test Mode: PCS1900									
Test Position Body (10mm gap)	Antenna Position	Frequency		Frame Power (dBm)	Power Drift (<±0.2)	SAR 1g (W/kg)	Scaling Factor	Scaled SAR 1g (W/kg)	Limit (W/kg)
		Channel	MHz						
Body-worn	Fixed	512	1850.2	20.53	--	--	1.167	--	1.6
Body-worn	Fixed	661	1880	20.78	0.03	0.505	1.102	0.557	1.6
Body-worn	Fixed	810	1909.8	20.84	--	--	1.086	--	1.6
Hotspot SAR Configurations									
Test Mode: GPRS1900-4slot									
Body-worn	Fixed	512	1850.2	23.42	-0.03	0.87	1.042	0.907	1.6
Body-worn	Fixed	661	1880	23.42	0.01	0.894	1.042	0.932	1.6
Body-worn	Fixed	810	1909.8	23.49	-0.09	0.974	1.026	0.999	1.6
Body-worn*	Fixed	810	1909.8	23.49	-0.02	0.960	1.026	0.985	1.6
Body-worn (with battery#1)	Fixed	810	1909.8	23.49	0.05	0.956	1.026	0.981	1.6
Body-front	Fixed	661	1880	23.42	-0.01	0.803	1.042	0.837	1.6
Body-right side	Fixed	661	1880	23.42	-0.04	0.317	1.042	0.330	1.6
Body-left side	Fixed	661	1880	23.42	-0.02	0.151	1.042	0.157	1.6
Body-bottom	Fixed	661	1880	23.42	0.06	0.468	1.042	0.488	1.6
Note 1: when the 1-g SAR is ≤ 0.8 W/kg, testing for low and high channel is optional, refer to KDB 447498.									
2: * - repeated at the highest SAR measurement according to the FCC KDB 865664									

SAR MEASUREMENT									
Ambient Temperature (°C) : 21.5 ± 2					Relative Humidity (%): 52				
Liquid Temperature (°C) : 21.0 ± 2					Depth of Liquid (cm):>15				
Product: WCDMA Digital Mobile Phone									
Test Mode: WCDMA Band V									
Test Position Head	Antenna Position	Frequency		Conducted Power (dBm)	Power Drift (<±0.2)	SAR 1g (W/kg)	Scaling Factor	Scaled SAR 1g (W/kg)	Limit (W/kg)
		Channel	MHz						
Left-Cheek	Fixed	4132	826.4	23.42	--	--	1.019	--	1.6
Left-Cheek	Fixed	4182	836.4	23.12	-0.02	0.507	1.091	0.553	1.6
Left-Cheek	Fixed	4233	846.6	22.96	--	--	1.132	--	1.6
Left-Tilt	Fixed	4182	836.4	23.12	-0.14	0.417	1.091	0.455	1.6
Right-Cheek	Fixed	4132	826.4	23.42	--	--	1.019	--	1.6
Right-Cheek	Fixed	4182	836.4	23.12	0.20	0.549	1.091	0.599	1.6
Right-Cheek	Fixed	4233	846.6	22.96	--	--	1.132	--	1.6
Right-Tilt	Fixed	4182	836.4	23.12	-0.02	0.408	1.091	0.445	1.6

Note: when the 1-g SAR is ≤ 0.8 W/kg, testing for low and high channel is optional, refer to KDB 447498.

SAR MEASUREMENT									
Ambient Temperature (°C): 21.5 ± 2					Relative Humidity (%): 52				
Liquid Temperature (°C): 21.0 ± 2					Depth of Liquid (cm):>15				
Product: WCDMA Digital Mobile Phone									
Body-worn Accessory SAR Configurations									
Test Mode: WCDMA Band V									
Test Position Body (10mm gap)	Antenna Position	Frequency		Conducted Power (dBm)	Power Drift (<±0.2)	SAR 1g (W/kg)	Scaling Factor	Scaled SAR 1g (W/kg)	Limit (W/kg)
		Channel	MHz						
Body-worn	Fixed	4132	826.4	23.42	0.03	0.88	1.019	0.897	1.6
Body-worn	Fixed	4182	836.4	23.12	0.04	0.825	1.091	0.90	1.6
Body-worn	Fixed	4233	846.6	22.96	0.04	0.773	1.132	0.875	1.6
Hotspot SAR Configurations									
Test Mode: WCDMA Band V									
Body-worn	Fixed	4132	826.4	23.42	0.03	0.88	1.019	0.897	1.6
Body-worn*	Fixed	4132	826.4	23.42	0.05	0.876	1.019	0.893	1.6
Body-worn (with battery#1)	Fixed	4132	826.4	23.42	0.01	0.869	1.019	0.886	1.6
Body-worn	Fixed	4182	836.4	23.12	0.04	0.825	1.091	0.90	1.6
Body-worn	Fixed	4233	846.6	22.96	0.04	0.773	1.132	0.875	1.6
Body-front	Fixed	4182	836.4	23.12	0.08	0.629	1.091	0.686	1.6
Body-right side	Fixed	4182	836.4	23.12	-0.01	0.411	1.091	0.448	1.6
Body-left side	Fixed	4182	836.4	23.12	-0.04	0.387	1.091	0.422	1.6
Body-bottom	Fixed	4182	836.4	23.12	0.06	0.048	1.091	0.052	1.6
Note1: when the 1-g SAR is ≤ 0.8 W/kg, testing for low and high channel is optional, refer to KDB 447498.									
2: * - repeated at the highest SAR measurement according to the FCC KDB 865664									

SAR MEASUREMENT									
Ambient Temperature (°C) : 21.5 ± 2					Relative Humidity (%): 52				
Liquid Temperature (°C) : 21.0 ± 2					Depth of Liquid (cm):>15				
Product: WCDMA Digital Mobile Phone									
Test Mode: 802.11b									
Test Position Head	Antenna Position	Frequency		Average Power (dBm)	Power Drift (<±0.2)	SAR 1g (W/kg)	Scaling Factor	Scaled SAR 1g (W/kg)	Limit (W/kg)
		Channel	MHz						
Left-Cheek	Fixed	1	2412	18.01	--	--	1.119	--	1.6
Left-Cheek	Fixed	6	2437	18.28	--	--	1.052	--	1.6
Left-Cheek	Fixed	11	2462	18.47	0.09	0.452	1.007	0.455	1.6
Left-Cheek (with battery#1)	Fixed	11	2462	18.47	0.08	0.346	1.007	0.348	1.6
Left-Tilt	Fixed	11	2462	18.47	0.02	0.234	1.007	0.236	1.6
Right-Cheek	Fixed	1	2412	18.01	--	--	1.119	--	1.6
Right-Cheek	Fixed	6	2437	18.28	--	--	1.052	--	1.6
Right-Cheek	Fixed	11	2462	18.47	0.07	0.267	1.007	0.269	1.6
Right-Tilt	Fixed	11	2462	18.47	-0.04	0.246	1.007	0.248	1.6
Note: when the 1-g SAR is ≤ 0.8 W/kg, testing for low and mid channel is optional, refer to KDB 447498.									

SAR MEASUREMENT									
Ambient Temperature (°C): 21.5 ± 2					Relative Humidity (%): 52				
Liquid Temperature (°C): 21.0 ± 2					Depth of Liquid (cm): >15				
Product: WCDMA Digital Mobile Phone									
Body-worn Accessory SAR Configurations									
Test Mode: 802.11b									
Test Position Body (10mm gap)	Antenna Position	Frequency		Average Power (dBm)	Power Drift (<±0.2)	SAR 1g (W/kg)	Scaling Factor	Scaled SAR 1g (W/kg)	Limit (W/kg)
		Channel	MHz						
Body-worn	Fixed	1	2412	18.01	--	--	1.119	--	1.6
Body-worn	Fixed	6	2437	18.28	--	--	1.052	--	1.6
Body-worn	Fixed	11	2462	18.47	0.04	0.275	1.007	0.277	1.6
Hotspot SAR Configurations									
Test Mode: 802.11b									
Body-worn	Fixed	1	2412	18.01	--	--	1.119	--	1.6
Body-worn	Fixed	6	2437	18.28	--	--	1.052	--	1.6
Body-worn	Fixed	11	2462	18.47	0.04	0.275	1.007	0.277	1.6
Body-front	Fixed	11	2462	18.47	-0.02	0.104	1.007	0.105	1.6
Body- right side	Fixed	11	2462	18.47	-0.13	0.168	1.007	0.169	1.6
Body-top	Fixed	11	2462	18.47	-0.05	0.147	1.007	0.148	1.6
Note: when the 1-g SAR is ≤ 0.8 W/kg, testing for low and mid channel is optional, refer to KDB 447498.									

**9.2. SAR Test Notes**

**9.2.1. Test position and configuration**

Head SAR was performed with the device configured in the positions according to IEEE1528. Device was tested using a fixed spacing for body-worn accessory testing. A separation distance of 10 mm was considered because the manufacturer has determined that there will be body-worn accessories available in the marketplace for users to support this separation distance.

**9.2.2. Body SAR with Headset**

Per FCC KDB Publication 648474 D04v01, SAR was evaluated without a headset connected to the device. Since the standalone reported SAR was ≤ 1.2 W/kg, no additional SAR evaluations using a headset cable were required.

**9.2.3. Hotspot Operation Mode**

During SAR Testing for the Wireless Router conditions per FCC KDB Publication 941225 D06v01, the actual Portable Hotspot operation (with actual simultaneous transmission of a transmitter with Wi-Fi) was not activated.

**9.2.4. Simultaneous Transmission Procedures**

This device contains transmitters that may operate simultaneously. Therefore simultaneous transmission analysis is required. Per FCC KDB 447498 D01v05 IV.C.1.iii, simultaneous transmission SAR test exclusion may be applied when the sum of the 1-g SAR for all the simultaneous transmitting antennas in a specific a physical test configuration is ≤ 1.6W/kg. When standalone SAR is not required to be measured, per FCC KDB 447498 D01v05 4.3.2 2, the following equation must be used to estimate the standalone 1g SAR for simultaneous transmission assessment involving that transmitter.

$$\text{Estimated SAR} = \frac{\sqrt{f(\text{GHz})}}{7.5} * \frac{(\text{Max Power of channel, mW})}{\text{Min. Separation Distance, mm}}$$

**Estimated SAR for Bluetooth**

Mode	Frequency	Maximum Allowed Power	Separation Distance (Head)	Estimated SAR (Head)	Separation Distance (Body)	Estimated SAR (Body)
	[MHz]	[dBm]	[mm]	[W/kg]	[mm]	[W/kg]
Bluetooth	2480	6.7	5	0.196	10	0.098

**9.2.5. Simultaneous Transmission Analysis**

Simultaneous Transmission Scenario with Wi-Fi

Configuration	Mode	Max. Scaled SAR (W/kg)	Wi-Fi SAR (W/kg)	$\Sigma$ SAR (W/kg)
Head	GSM850	0.608	0.455	1.063
Head	PCS1900	0.671	0.455	1.126
Head	WCDMA Band V	0.599	0.455	1.054
Body-Worn	GSM850	0.708	0.277	0.985
Body-Worn	PCS1900	0.557	0.277	0.834
Body-Worn	WCDMA Band V	0.90	0.277	1.177

Note: Body worn at 10mm.

Simultaneous Transmission Scenario with Bluetooth

Configuration	Mode	Max. Scaled SAR (W/kg)	Bluetooth SAR (W/kg)	$\Sigma$ SAR (W/kg)
Head	GSM850	0.608	0.196	0.804
Head	PCS1900	0.671	0.196	0.867
Head	WCDMA Band V	0.599	0.196	0.795
Body-Worn	GSM850	0.708	0.098	0.806
Body-Worn	PCS1900	0.557	0.098	0.655
Body-Worn	WCDMA Band V	0.90	0.098	0.998

Simultaneous Transmission Scenario (Hotspot)

Simult Tx	Configuration	GPRS850 SAR (W/kg)	Wi-Fi SAR (W/kg)	$\Sigma$ SAR (W/kg)
Body	Back	1.35	0.277	<b>1.627</b>
	Front	1.04	0.105	1.145
	Top	--	0.148	0.148
	Bottom	0.103	--	0.103
	Left	0.679	--	0.679
	Right	0.812	0.169	0.981
Simult Tx	Configuration	GPRS1900 SAR (W/kg)	Wi-Fi SAR (W/kg)	$\Sigma$ SAR (W/kg)
Body	Back	0.999	0.277	1.276
	Front	0.837	0.105	0.942
	Top	--	0.148	0.148
	Bottom	0.488	--	0.488
	Left	0.157	--	0.157
	Right	0.330	0.169	0.499
Simult Tx	Configuration	WCDMA Band V SAR (W/kg)	Wi-Fi SAR (W/kg)	$\Sigma$ SAR (W/kg)
Body	Back	0.90	0.277	1.177
	Front	0.686	0.105	0.791
	Top	--	0.148	0.148
	Bottom	0.052	--	0.052
	Left	0.422	--	0.422
	Right	0.448	0.169	0.617

Simultaneous transmission SAR test exclusion

Configuration	Max. Scaled SAR (W/kg)	$\Sigma$ SAR (W/kg)	Distance Of the peak SAR locations (mm)	Peak location separation ratio
Body-Worn				
Wifi	0.277	1.627	91	0.0179
GPRS850	1.35			

Find distance of maxima	
Maxima   associated 1g averages	
Zoom Scan (D:\Report data\2013-06\FCC\136S073R-Y220-U17\body\wifi\802.11b 2437MHz Body-Back.da52:0/802.11b ...)	
Max. 1 at (0.42, -1.48, -20.92)	0.27 W/kg
Zoom Scan (D:\Report data\2013-06\FCC\136S073R-Y220-U17\body\850\GPRS850 Low Body-Back(4up).da52:0/GPRS8...)	
Max. 2 at (-0.93, 7.52, -20.78)	1.32 W/kg
Distances and Separation Ratios	
Max. 1 - Max. 2	Distance [cm]: 9.10 / Separation ratio [W/kg/cm]: 0.17

Note 1: Bluetooth SAR was not required to be measured per FCC KDB 447498. Estimated SAR results were used in the above table to determine simultaneous transmission SAR test exclusion.

2: Body worn at 10mm.

3: Simultaneous transmission is not need to be considered when the sum of the 1-g SAR is < 1.6 W/kg. When the sum of SAR is larger than the limit, SAR test exclusion is determined by the SAR to peak location separation ratio. The simultaneous transmitting antennas in each operating mode and exposure condition combination must be considered one pair at a time to determine the SAR to peak location separation ratio to qualify for test exclusion. The ratio is determined by  $(SAR1 + SAR2)^{1.5} / R_i$ , rounded to two decimal digits, and must be  $\leq 0.04$  for all antenna pairs in the configuration to qualify for 1-g SAR test exclusion. SAR1 and SAR2 are the highest reported or estimated SAR for each antenna in the pair, and  $R_i$  is the separation distance between the peak SAR locations for the antenna pair in mm.

**9.2.6. Simultaneous Transmission Conclusion**

The above numerical summed SAR results for all the worst-case simultaneous transmission conditions were below the SAR limit. Therefore, the above analysis is sufficient to determine that simultaneous transmission cases will not exceed the SAR limit and therefore no measured volumetric simultaneous SAR summation is required per FCC KDB Publication 447498 D05v01r01.

## Appendix A. SAR System Validation Data

Date/Time: 16-07-2013

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;  $\sigma = 0.89$  mho/m;  $\epsilon_r = 40.94$ ;  $\rho = 1000$  kg/m<sup>3</sup> ;

Phantom section: Flat Section ; Input Power=250mW

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

DASY5 Configuration:

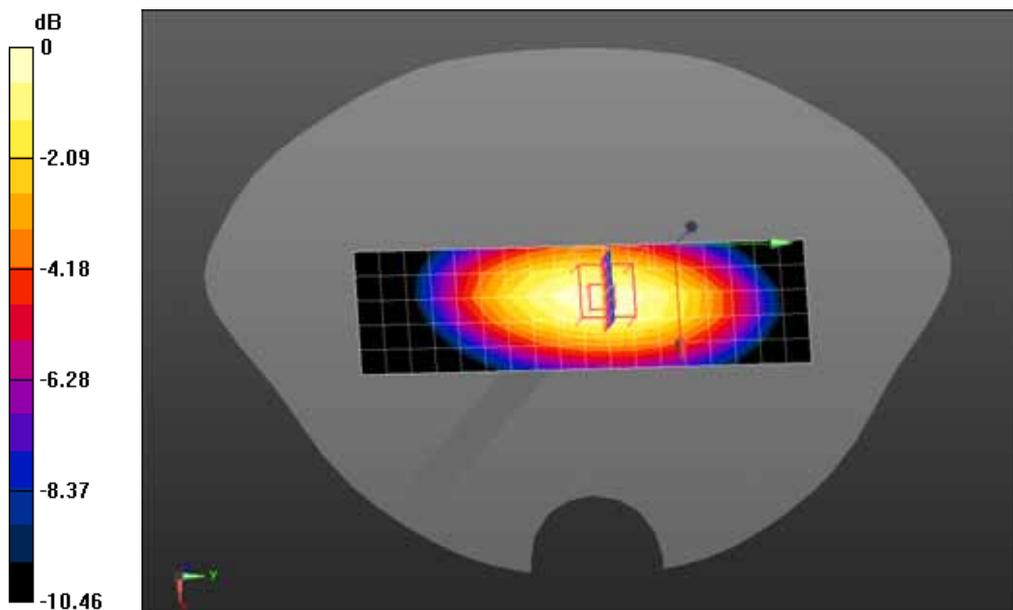
- Probe: EX3DV4 - SN3710; ConvF(9.52, 9.52, 9.52); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

**Configuration/System Check Head 835MHz/Area Scan (6x19x1):** Measurement grid: dx=10mm, dy=10mm, Maximum value of SAR (measured) = 2.41 mW/g

**Configuration/System Check Head 835MHz/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm, Reference Value = 51.151 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 3.435 mW/g

**SAR(1 g) = 2.27 mW/g; SAR(10 g) = 1.48 mW/g** Maximum value of SAR (measured) = 2.45 mW/g



0 dB = 2.45 mW/g = 7.78 dB mW/g

Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

System Check Body 835MHz

**DUT: Dipole 835 MHz D835V2; Type: D835V2**

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

Frequency: 835 MHz; Medium parameters used:  $f = 835$  MHz;  $\sigma = 0.97$  mho/m;  $\epsilon_r = 53.57$ ;  $\rho = 1000$  kg/m<sup>3</sup> ;

Phantom section: Flat Section ; Input Power=250mW

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(9.41, 9.41, 9.41); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

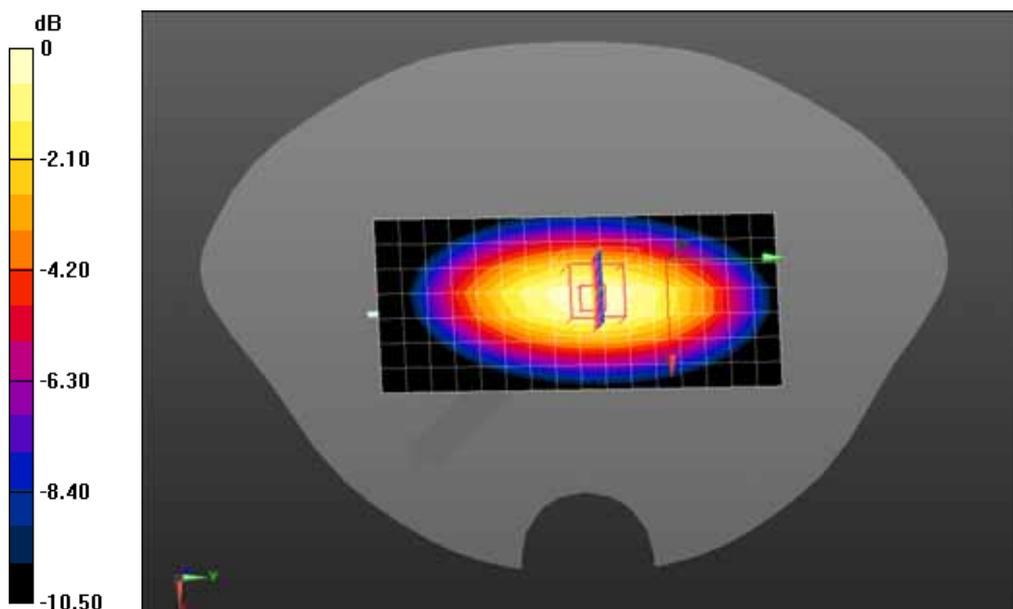
**Configuration/System Check Body 835MHz/Area Scan (8x17x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 2.51 mW/g

**Configuration/System Check Body 835MHz/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm, Reference Value = 51.529 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 3.654 mW/g

**SAR(1 g) = 2.42 mW/g; SAR(10 g) = 1.58 mW/g** Maximum value of SAR (measured) = 2.62 mW/g



0 dB = 2.62 mW/g = 8.37 dB mW/g

Date/Time: 16-07-2013

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;  $\sigma = 1.45$  mho/m;  $\epsilon_r = 38.56$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Phantom section: Flat Section ; Input Power=250mW

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(7.75, 7.75, 7.75); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

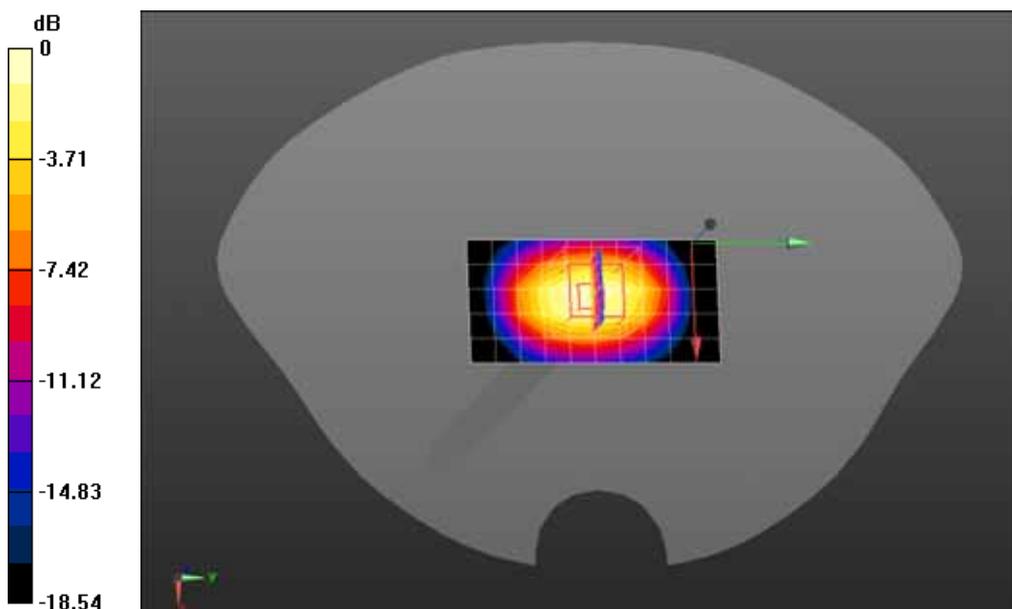
**Configuration/System Check Head 1900MHz/Area Scan (6x11x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 10.8 mW/g

**Configuration/System Check Head 1900MHz/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm, Reference Value = 88.756 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 20.074 mW/g

**SAR(1 g) = 10.4 mW/g; SAR(10 g) = 5.27 mW/g** Maximum value of SAR (measured) = 11.7 mW/g



0 dB = 11.7 mW/g = 21.36 dB mW/g

Date/Time: 16-07-2013

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;  $\sigma = 1.55$  mho/m;  $\epsilon_r = 52.42$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Phantom section: Flat Section ; Input Power=250mW

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(7.6, 7.6, 7.6); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

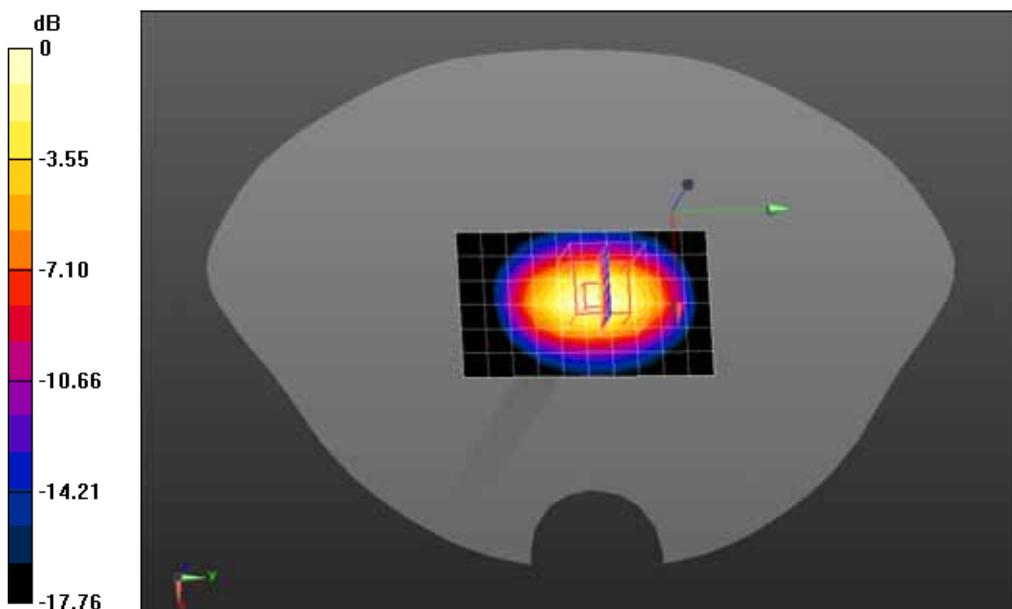
**Configuration/System Check Body 1900MHz/Area Scan (7x11x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 11.1 mW/g

**Configuration/System Check Body 1900MHz/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm, Reference Value = 84.553 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 19.127 mW/g

**SAR(1 g) = 10.2 mW/g; SAR(10 g) = 5.25 mW/g** Maximum value of SAR (measured) = 11.6 mW/g



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

Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

System Check Head 2450MHz

**DUT: Dipole 2450 MHz D2450V2; Type: D2450V2**

Communication System: CW; Communication System Band: D2450(2450MHz); Duty Cycle: 1:1; Frequency: 2450 MHz; Medium parameters used:  $f = 2450$  MHz;  $\sigma = 1.84$  mho/m;  $\epsilon_r = 38.64$ ;  $\rho = 1000$  kg/m<sup>3</sup>; Phantom section: Flat Section; Input Power=250mW

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(7.03, 7.03, 7.03); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

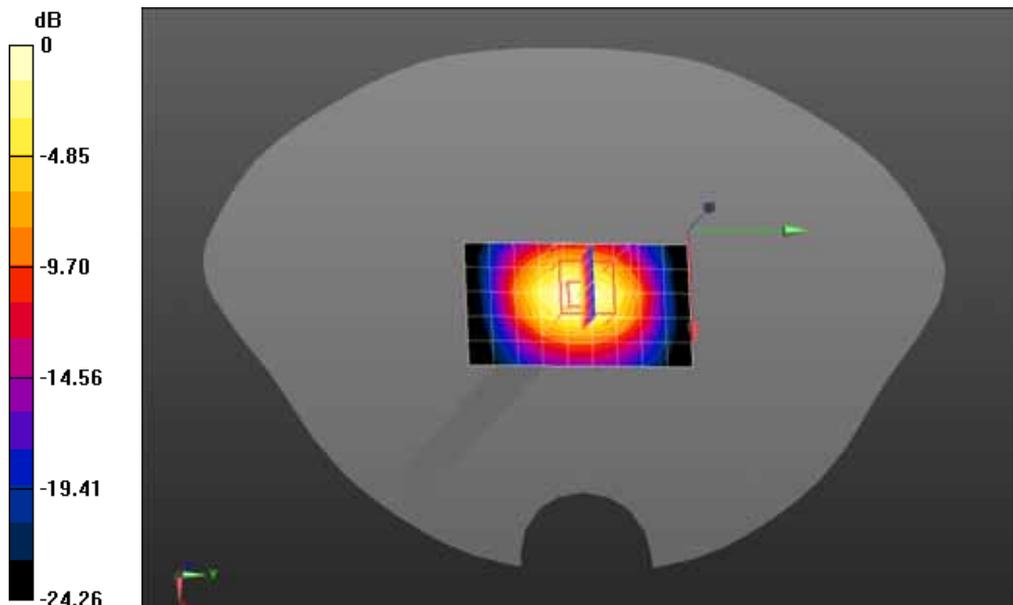
**Configuration/System Check Head 2450MHz/Area Scan (6x10x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 13.8 mW/g

**Configuration/System Check Head 2450MHz/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm, Reference Value = 86.605 V/m; Power Drift = 0.12 dB

Peak SAR (extrapolated) = 29.942 mW/g

**SAR(1 g) = 13.3 mW/g; SAR(10 g) = 5.89 mW/g** Maximum value of SAR (measured) = 15.0 mW/g



0 dB = 15.0 mW/g = 23.52 dB mW/g

Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

System Check Body 2450MHz

**DUT: Dipole 2450 MHz D2450V2; Type: D2450V2**

Communication System: CW; Communication System Band: D2450(2450MHz); Duty Cycle: 1:1; Frequency: 2450 MHz; Medium parameters used:  $f = 2450$  MHz;  $\sigma = 2.01$  mho/m;  $\epsilon_r = 52.29$ ;  $\rho = 1000$  kg/m<sup>3</sup>; Phantom section: Flat Section; Input Power=250mW

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(7.08, 7.08, 7.08); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

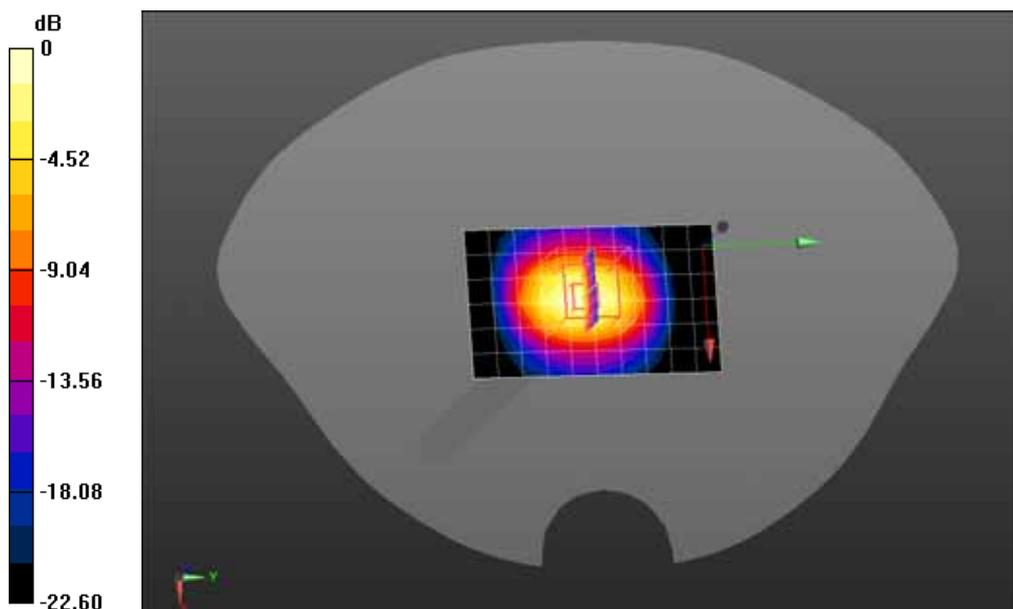
**Configuration/System Check Body 2450MHz/Area Scan (7x11x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 13.1 mW/g

**Configuration/System Check Body 2450MHz/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm, Reference Value = 80.669 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 25.615 mW/g

**SAR(1 g) = 12.1 mW/g; SAR(10 g) = 5.51 mW/g** Maximum value of SAR (measured) = 13.9 mW/g



0 dB = 13.9 mW/g = 22.86 dB mW/g

**Appendix B. SAR measurement Data**

**Date/Time: 16-07-2013**

Test Laboratory: QuieTek Lab

GSM850 Mid Touch-Left

**DUT: WCDMA Digital Mobile Phone; Type: Y220-U17**

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

Frequency: 836.4 MHz; Medium parameters used:  $f = 836.4$  MHz;  $\sigma = 0.9$  mho/m;  $\epsilon_r = 40.92$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Phantom section: Left Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(9.52, 9.52, 9.52); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

**Configuration/GSM850 Mid Touch-Left/Area Scan (7x11x1):** Measurement grid: dx=15mm, dy=15mm

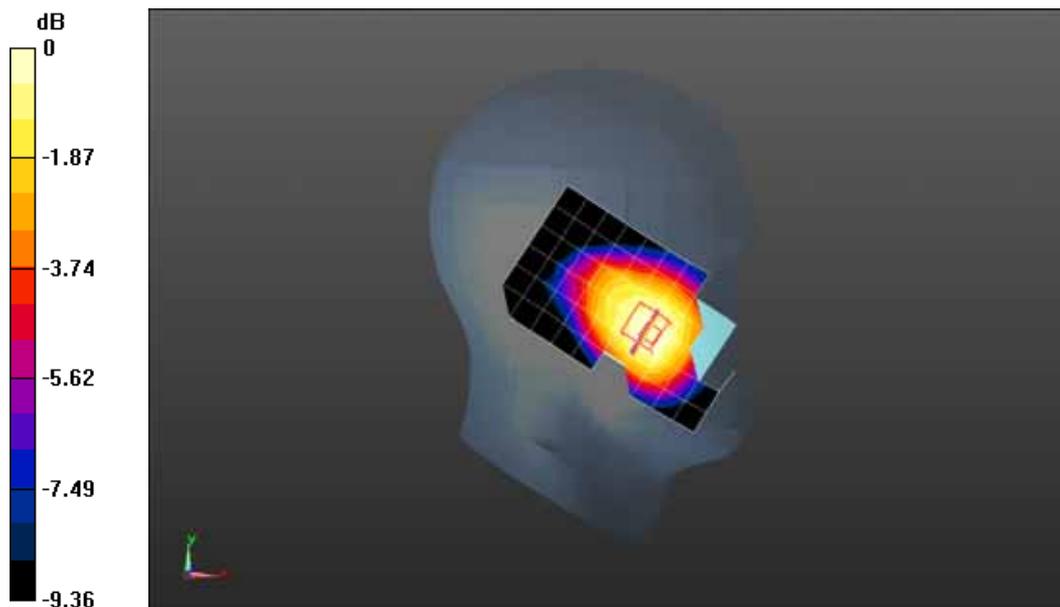
Maximum value of SAR (measured) = 0.580 mW/g

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

dy=8mm, dz=5mm, Reference Value = 13.386 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 0.649 mW/g

**SAR(1 g) = 0.556 mW/g; SAR(10 g) = 0.436 mW/g** Maximum value of SAR (measured) = 0.580 mW/g



0 dB = 0.580 mW/g = -4.73 dB mW/g

Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

GSM850 Mid Tilt-Left

**DUT: WCDMA Digital Mobile Phone; Type: Y220-U17**

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

Frequency: 836.4 MHz; Medium parameters used:  $f = 836.4$  MHz;  $\sigma = 0.9$  mho/m;  $\epsilon_r = 40.92$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Phantom section: Left Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(9.52, 9.52, 9.52); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

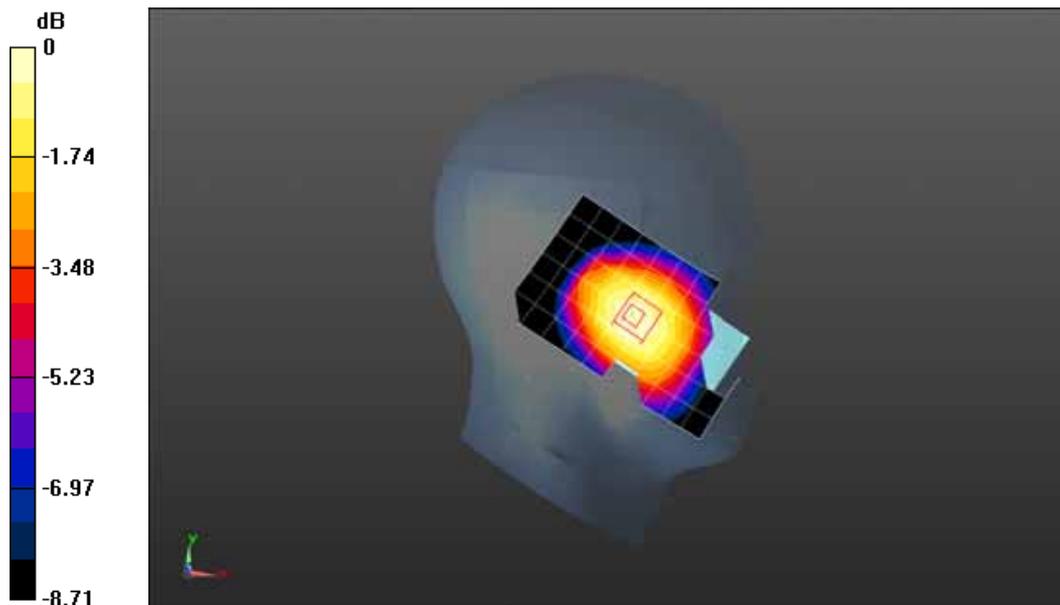
**Configuration/GSM850 Mid Tilt-Left/Area Scan (7x11x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.369 mW/g

**Configuration/GSM850 Mid Tilt-Left/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 13.912 V/m; Power Drift = -0.09 dB

Peak SAR (extrapolated) = 0.439 mW/g

**SAR(1 g) = 0.361 mW/g; SAR(10 g) = 0.278 mW/g** Maximum value of SAR (measured) = 0.379 mW/g



0 dB = 0.379 mW/g = -8.43 dB mW/g

Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

GSM850 Mid Touch-Right

**DUT: WCDMA Digital Mobile Phone; Type: Y220-U17**

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

Frequency: 836.4 MHz; Medium parameters used:  $f = 836.4$  MHz;  $\sigma = 0.9$  mho/m;  $\epsilon_r = 40.92$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Phantom section: Right Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(9.52, 9.52, 9.52); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

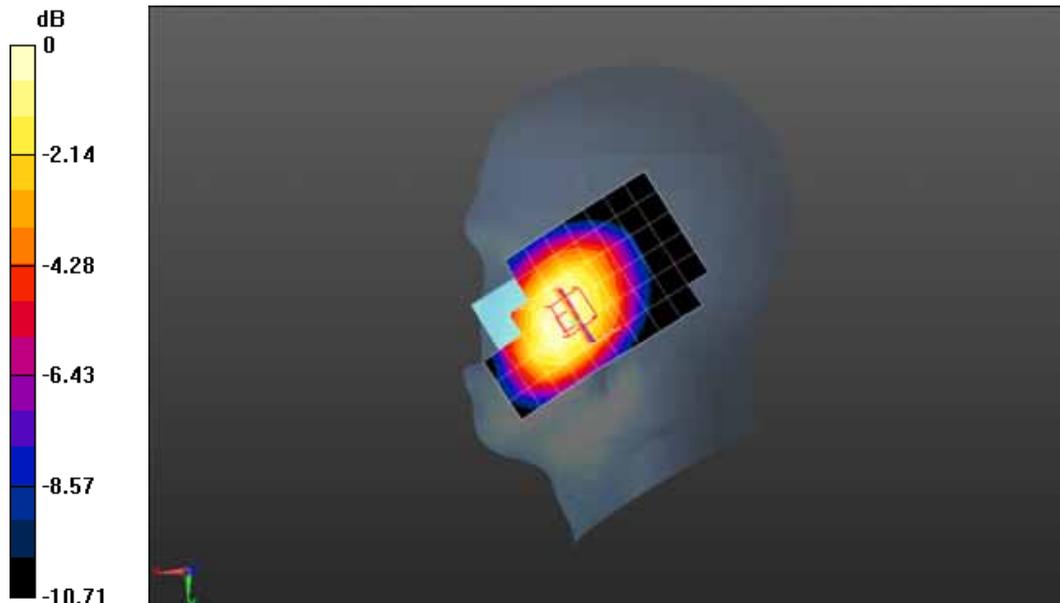
**Configuration/GSM850 Mid Touch-Right/Area Scan (7x11x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.544 mW/g

**Configuration/GSM850 Mid Touch-Right/Zoom Scan (6x6x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 9.070 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 0.696 mW/g

**SAR(1 g) = 0.526 mW/g; SAR(10 g) = 0.396 mW/g** Maximum value of SAR (measured) = 0.550 mW/g



0 dB = 0.550 mW/g = -5.19 dB mW/g

Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

GSM850 Mid Tilt-Right

**DUT: WCDMA Digital Mobile Phone; Type: Y220-U17**

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

Frequency: 836.4 MHz; Medium parameters used:  $f = 836.4$  MHz;  $\sigma = 0.9$  mho/m;  $\epsilon_r = 40.92$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Phantom section: Right Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(9.52, 9.52, 9.52); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

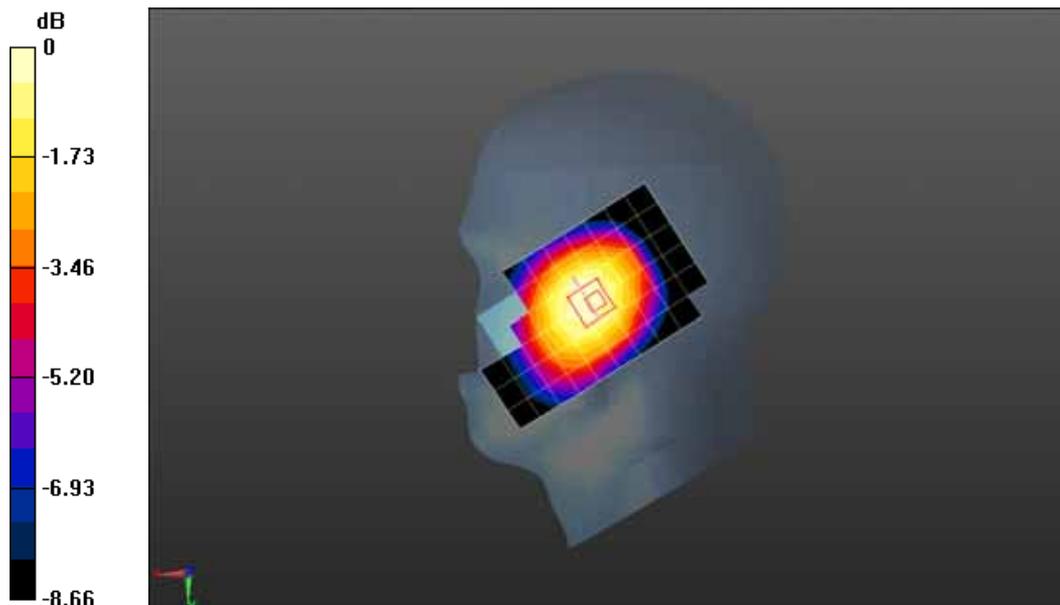
**Configuration/GSM850 Mid Tilt-Right/Area Scan (7x11x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.396 mW/g

**Configuration/GSM850 Mid Tilt-Right/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 13.497 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 0.473 mW/g

**SAR(1 g) = 0.385 mW/g; SAR(10 g) = 0.295 mW/g** Maximum value of SAR (measured) = 0.398 mW/g



0 dB = 0.398 mW/g = -8.00 dB mW/g

Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

GSM850 Mid Touch-Left<SIM2>

**DUT: WCDMA Digital Mobile Phone; Type: Y220-U17**

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

Frequency: 836.4 MHz; Medium parameters used:  $f = 836.4$  MHz;  $\sigma = 0.9$  mho/m;  $\epsilon_r = 40.92$ ;  $\rho = 1000$

kg/m<sup>3</sup> ; Phantom section: Left Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(9.52, 9.52, 9.52); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

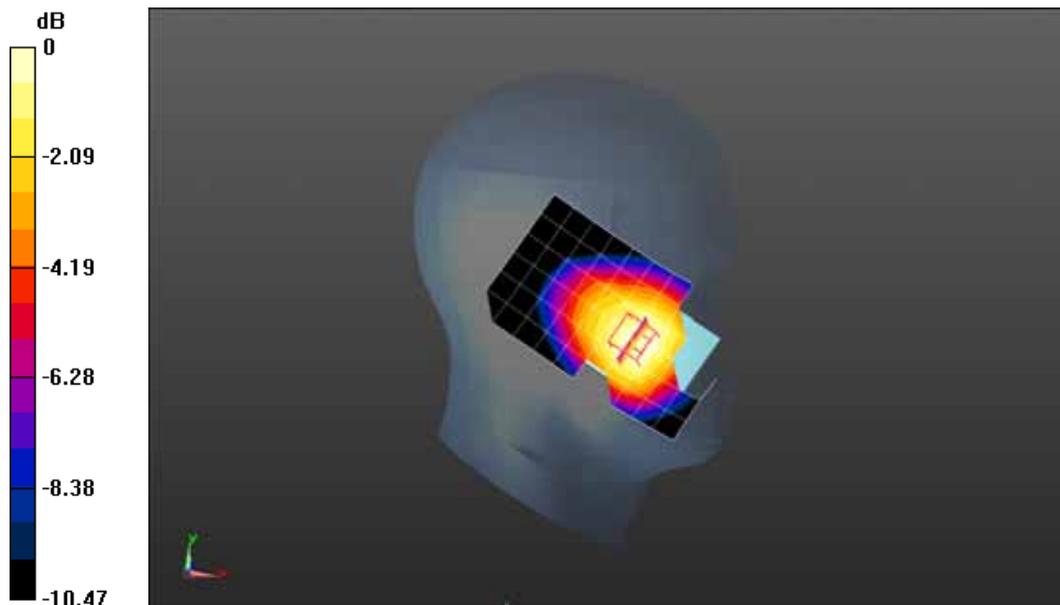
**Configuration/GSM850 Mid Touch-Left/Area Scan (7x11x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.505 mW/g

**Configuration/GSM850 Mid Touch-Left/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 10.752 V/m; Power Drift = -0.11 dB

Peak SAR (extrapolated) = 0.622 mW/g

**SAR(1 g) = 0.499 mW/g; SAR(10 g) = 0.381 mW/g** Maximum value of SAR (measured) = 0.520 mW/g



0 dB = 0.520 mW/g = -5.68 dB mW/g

Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

GSM850 Mid Body-Back

**DUT: WCDMA Digital Mobile Phone; Type: Y220-U17**

Communication System: Generic GSM; Communication System Band: GSM850; Duty Cycle: 1:8.3;  
 Frequency: 836.4 MHz; Medium parameters used:  $f = 836.4$  MHz;  $\sigma = 0.97$  mho/m;  $\epsilon_r = 53.58$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(9.41, 9.41, 9.41); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

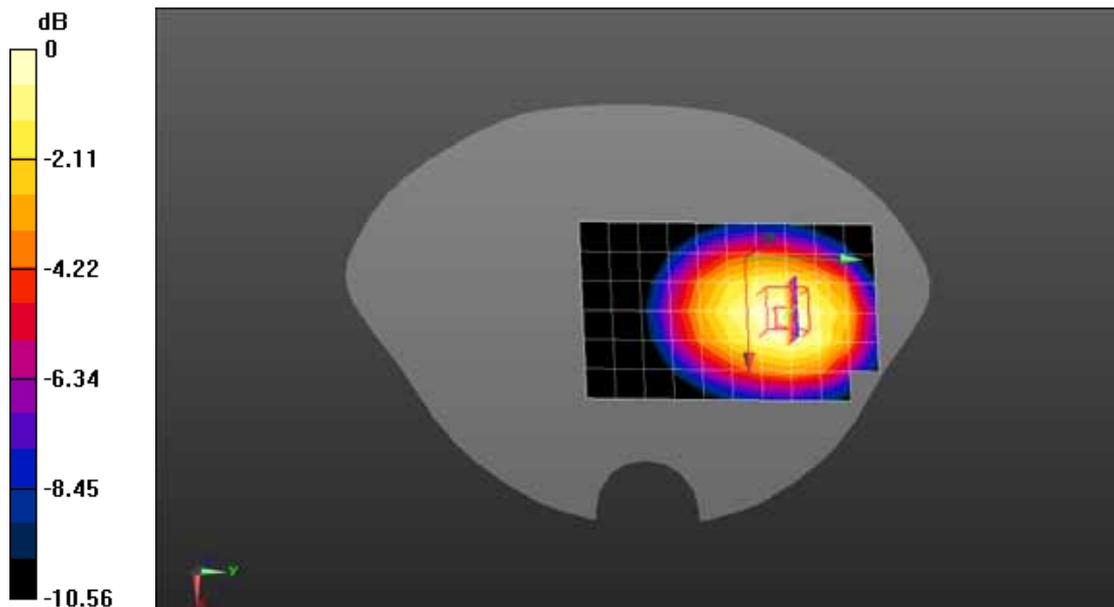
**Configuration/GSM850 Mid Body-Back/Area Scan (7x11x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.678 mW/g

**Configuration/GSM850 Mid Body-Back/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 8.148 V/m; Power Drift = -0.10 dB

Peak SAR (extrapolated) = 0.840 mW/g

**SAR(1 g) = 0.647 mW/g; SAR(10 g) = 0.471 mW/g** Maximum value of SAR (measured) = 0.684 mW/g



0 dB = 0.684 mW/g = -3.30 dB mW/g

Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

GSM850 Mid Body-Back(with headset quancheng)

**DUT: WCDMA Digital Mobile Phone; Type: Y220-U17**

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

Frequency: 836.4 MHz; Medium parameters used:  $f = 836.4$  MHz;  $\sigma = 0.97$  mho/m;  $\epsilon_r = 53.58$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(9.41, 9.41, 9.41); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

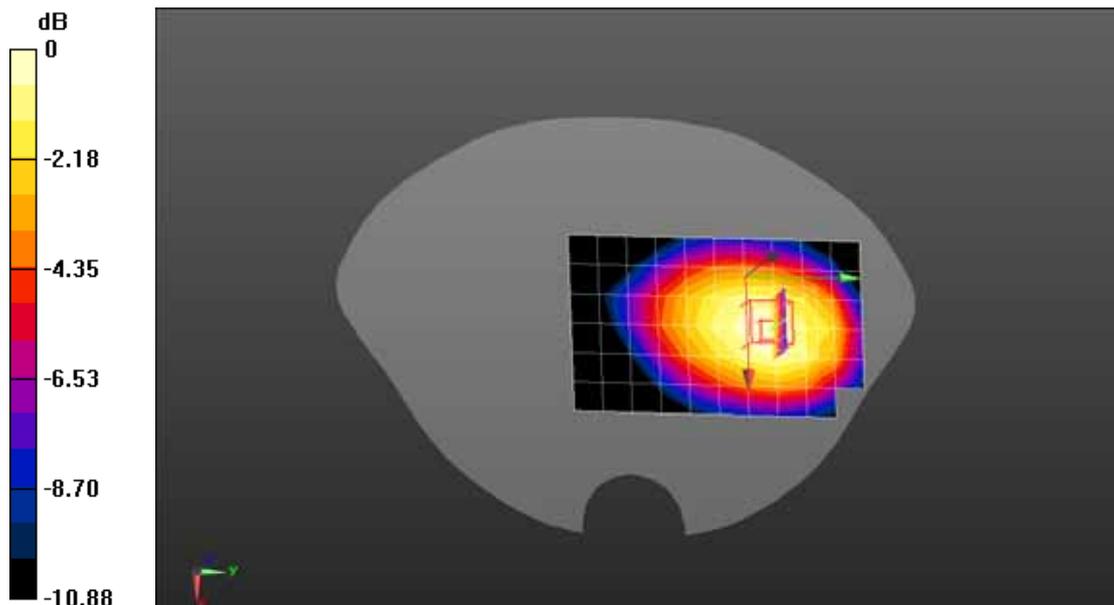
**Configuration/GSM850 Mid Body-Back/Area Scan (7x11x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.559 mW/g

**Configuration/GSM850 Mid Body-Back/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 10.087 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 0.707 mW/g

**SAR(1 g) = 0.535 mW/g; SAR(10 g) = 0.391 mW/g** Maximum value of SAR (measured) = 0.568 mW/g



0 dB = 0.568 mW/g = -4.91 dB mW/g

Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

GPRS850 Low Body-Back(4up)

**DUT: WCDMA Digital Mobile Phone; Type: Y220-U17**

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;  $\sigma = 0.96$  mho/m;  $\epsilon_r = 53.68$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(9.41, 9.41, 9.41); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

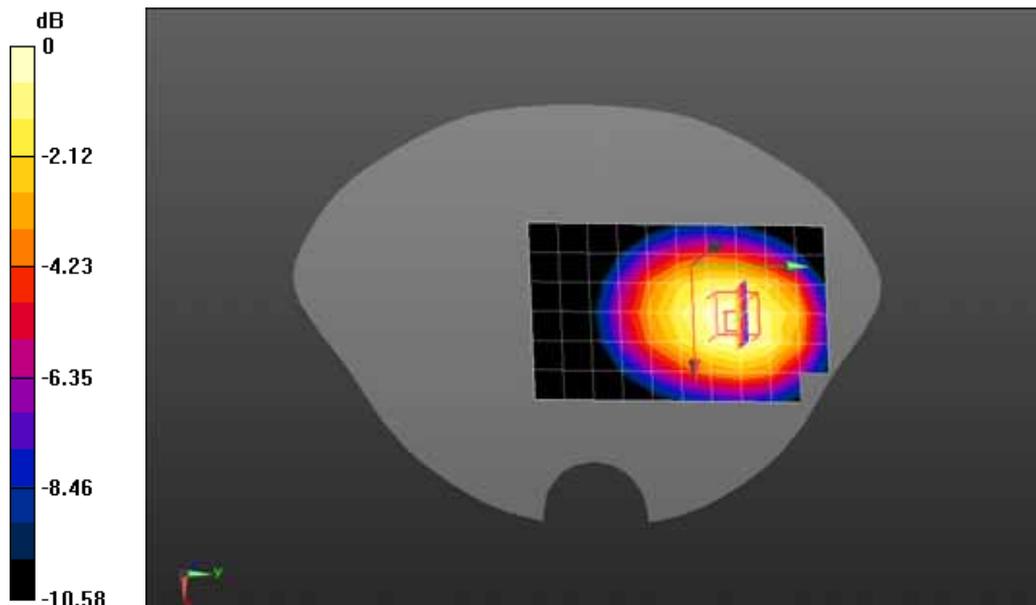
**Configuration/GPRS850 Low Body-Back/Area Scan (7x11x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 1.36 mW/g

**Configuration/GPRS850 Low Body-Back/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 11.466 V/m; Power Drift = 0.03 dB

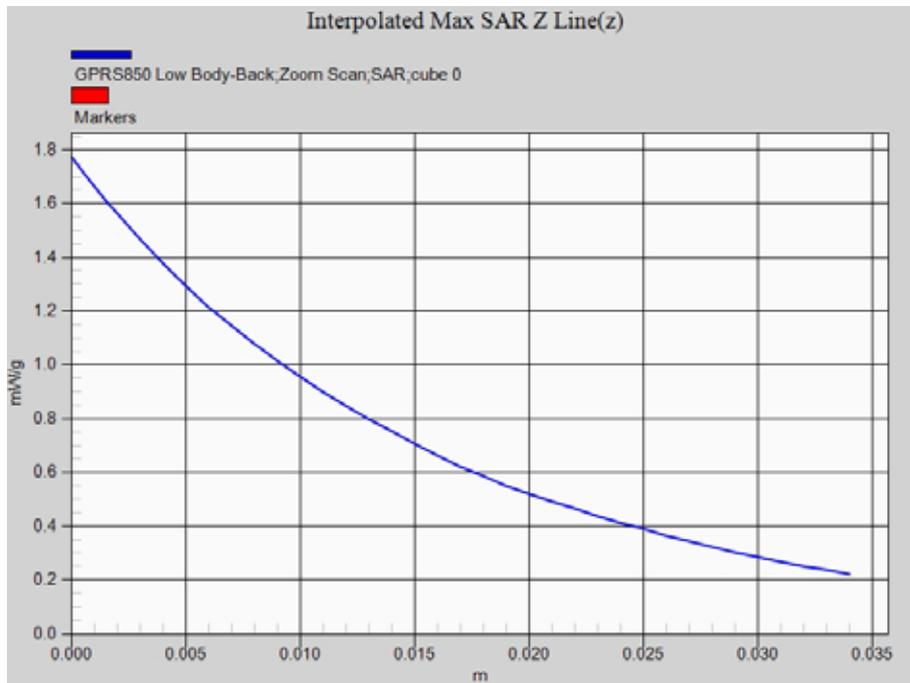
Peak SAR (extrapolated) = 1.776 mW/g

**SAR(1 g) = 1.32 mW/g; SAR(10 g) = 0.955 mW/g** Maximum value of SAR (measured) = 1.39 mW/g



0 dB = 1.39 mW/g = 2.86 dB mW/g

Z-Axis Plot



Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

GPRS850 Low Body-Back(4up)\*

**DUT: WCDMA Digital Mobile Phone; Type: Y220-U17**

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;  $\sigma = 0.96$  mho/m;  $\epsilon_r = 53.68$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(9.41, 9.41, 9.41); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

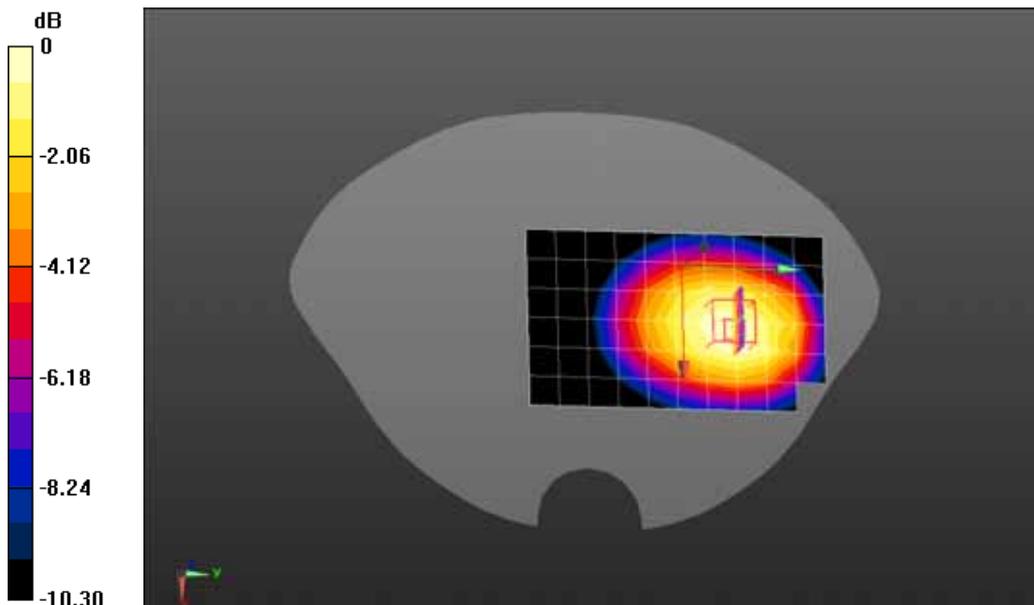
**Configuration/GPRS850 Low Body-Back/Area Scan (7x11x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 1.35 mW/g

**Configuration/GPRS850 Low Body-Back/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 11.423 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 1.685 mW/g

**SAR(1 g) = 1.3 mW/g; SAR(10 g) = 0.948 mW/g** Maximum value of SAR (measured) = 1.37 mW/g



0 dB = 1.37 mW/g = 2.73 dB mW/g

Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

GPRS850 Low Body-Back(4up)(with battery BYD)

**DUT: WCDMA Digital Mobile Phone; Type: Y220-U17**

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;  $\sigma = 0.96$  mho/m;  $\epsilon_r = 53.68$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(9.41, 9.41, 9.41); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

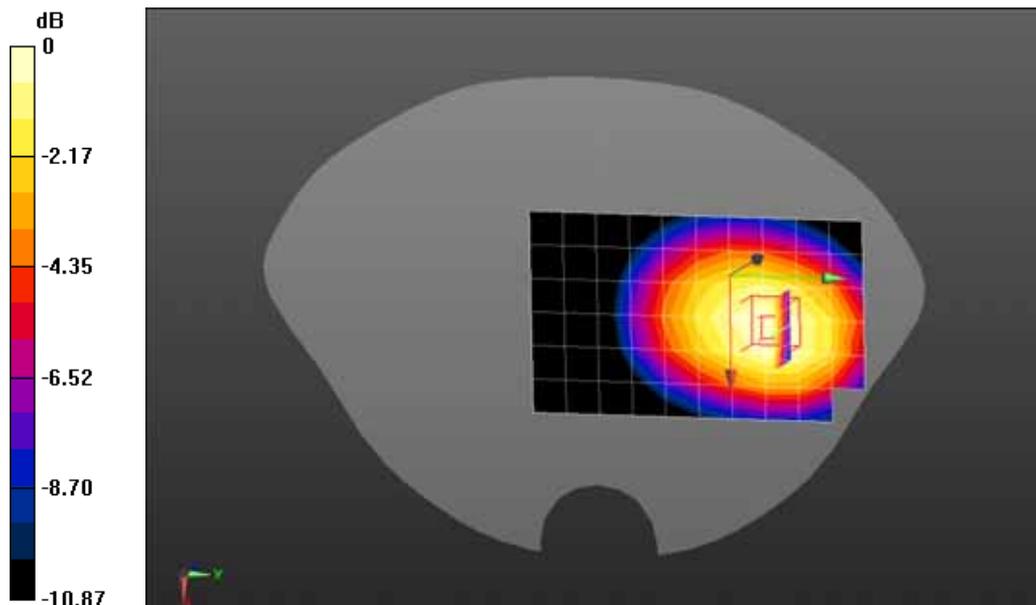
**Configuration/GPRS850 Low Body-Back/Area Scan (7x11x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 1.28 mW/g

**Configuration/GPRS850 Low Body-Back/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 8.593 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 1.639 mW/g

**SAR(1 g) = 1.25 mW/g; SAR(10 g) = 0.907 mW/g** Maximum value of SAR (measured) = 1.32 mW/g



0 dB = 1.32 mW/g = 2.41 dB mW/g

Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

GPRS850 Mid Body-Back(4up)

**DUT: WCDMA Digital Mobile Phone; Type: Y220-U17**

Communication System: GPRS/EGPRS-4 Slot; Communication System Band: GSM 850; Duty Cycle: 1:2.1 ;  
 Frequency: 836.4 MHz; Medium parameters used:  $f = 836.4$  MHz;  $\sigma = 0.97$  mho/m;  $\epsilon_r = 53.58$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(9.41, 9.41, 9.41); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

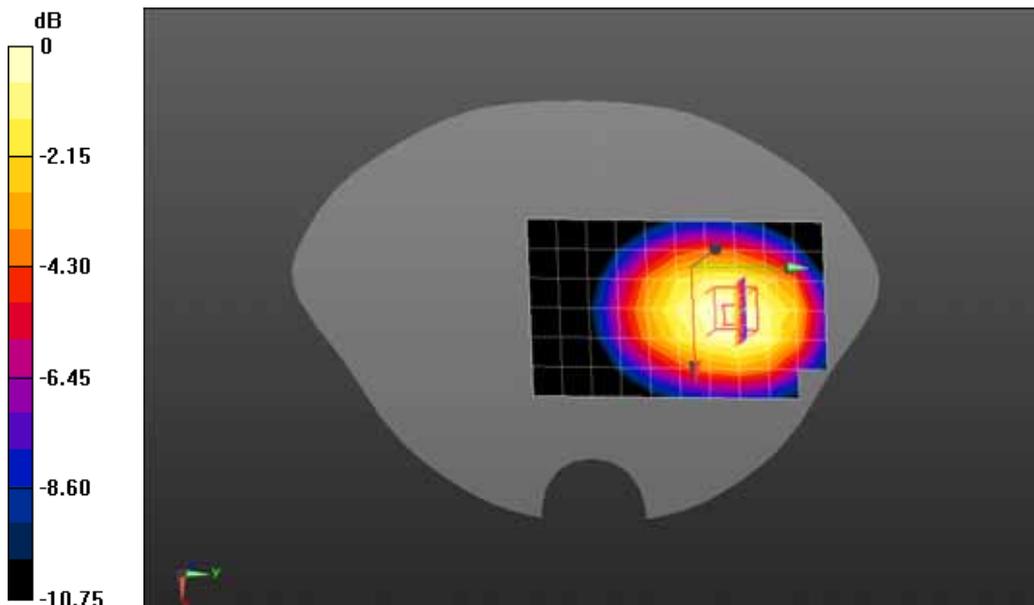
**Configuration/GPRS850 Mid Body-Back/Area Scan (7x11x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 1.23 mW/g

**Configuration/GPRS850 Mid Body-Back/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 10.857 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 1.533 mW/g

**SAR(1 g) = 1.17 mW/g; SAR(10 g) = 0.855 mW/g** Maximum value of SAR (measured) = 1.23 mW/g



0 dB = 1.23 mW/g = 1.80 dB mW/g

Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

GPRS850 High Body-Back(4up)

**DUT: WCDMA Digital Mobile Phone; Type: Y220-U17**

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;  $\sigma = 0.98$  mho/m;  $\epsilon_r = 53.42$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(9.41, 9.41, 9.41); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

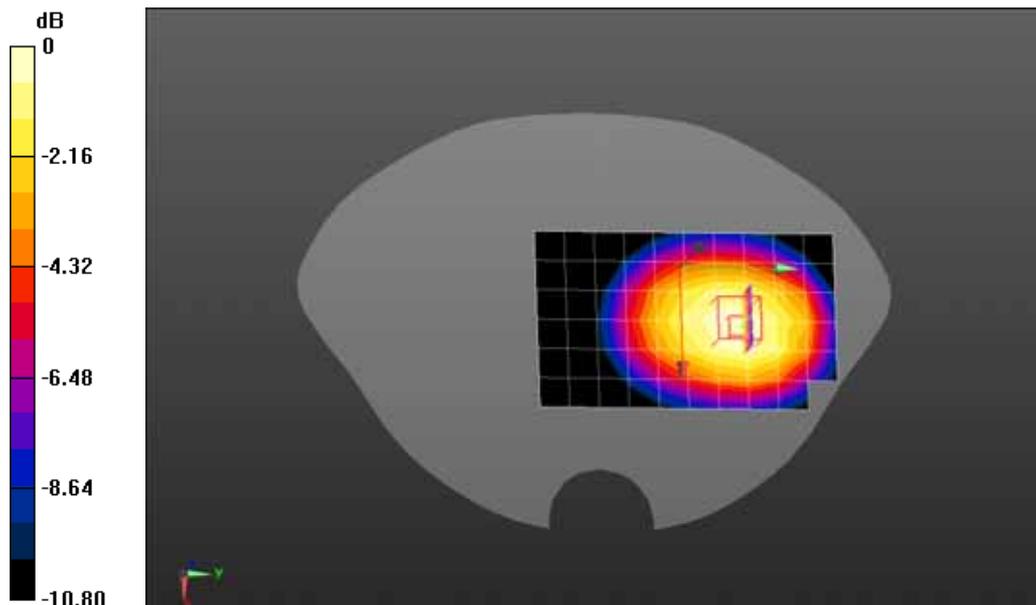
**Configuration/GPRS850 High Body-Back/Area Scan (7x11x1):** Measurement grid: dx=15mm, dy=15mm

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

**Configuration/GPRS850 High Body-Back/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 10.677 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 1.361 mW/g

**SAR(1 g) = 1.05 mW/g; SAR(10 g) = 0.766 mW/g** Maximum value of SAR (measured) = 1.11 mW/g



0 dB = 1.11 mW/g = 0.91 dB mW/g

Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

GPRS850 Mid Body-Front(4up)

**DUT: WCDMA Digital Mobile Phone; Type: Y220-U17**

Communication System: GPRS/EGPRS-4 Slot; Communication System Band: GSM 850; Duty Cycle: 1:2.1 ;  
 Frequency: 836.4 MHz; Medium parameters used:  $f = 836.4$  MHz;  $\sigma = 0.97$  mho/m;  $\epsilon_r = 53.58$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(9.41, 9.41, 9.41); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

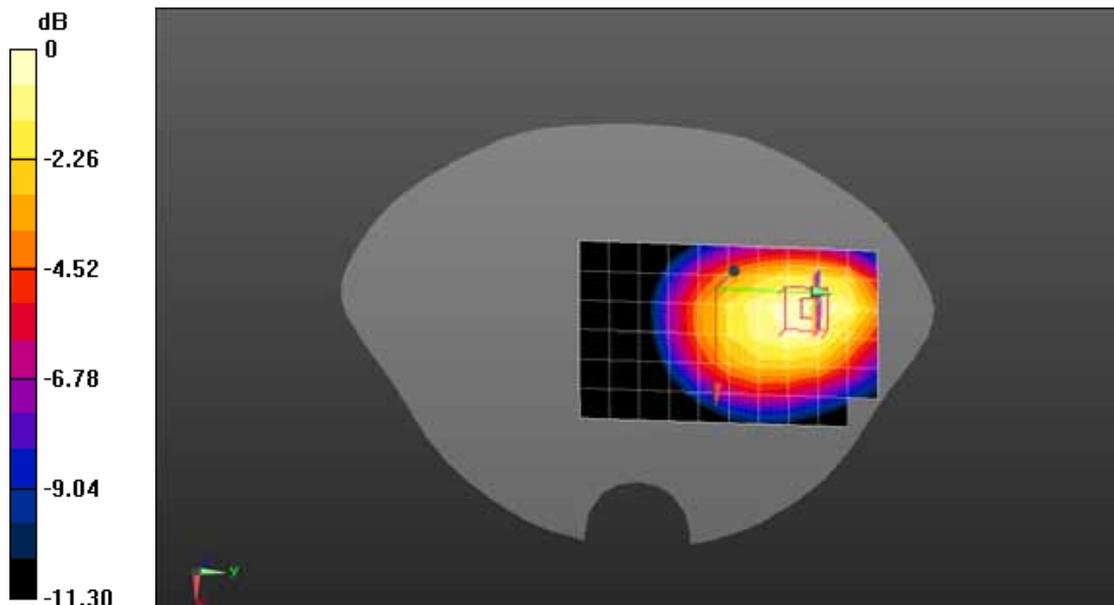
**Configuration/GPRS850 Mid Body-Front/Area Scan (7x11x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 1.08 mW/g

**Configuration/GPRS850 Mid Body-Front/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 7.509 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 1.445 mW/g

**SAR(1 g) = 1.02 mW/g; SAR(10 g) = 0.730 mW/g** Maximum value of SAR (measured) = 1.08 mW/g



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

Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

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

**DUT: WCDMA Digital Mobile Phone; Type: Y220-U17**

Communication System: GPRS/EGPRS-4 Slot; Communication System Band: GSM 850; Duty Cycle: 1:2.1 ;  
 Frequency: 836.4 MHz; Medium parameters used:  $f = 836.4$  MHz;  $\sigma = 0.97$  mho/m;  $\epsilon_r = 53.58$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(9.41, 9.41, 9.41); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- 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 (7x11x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.991 mW/g

**Configuration/GPRS850 Mid Body-Back/Zoom Scan (5x5x7)/Cube 1:** Measurement grid: dx=8mm,

dy=8mm, dz=5mm, Reference Value = 12.662 V/m; Power Drift = 0.13 dB

Peak SAR (extrapolated) = 1.211 mW/g

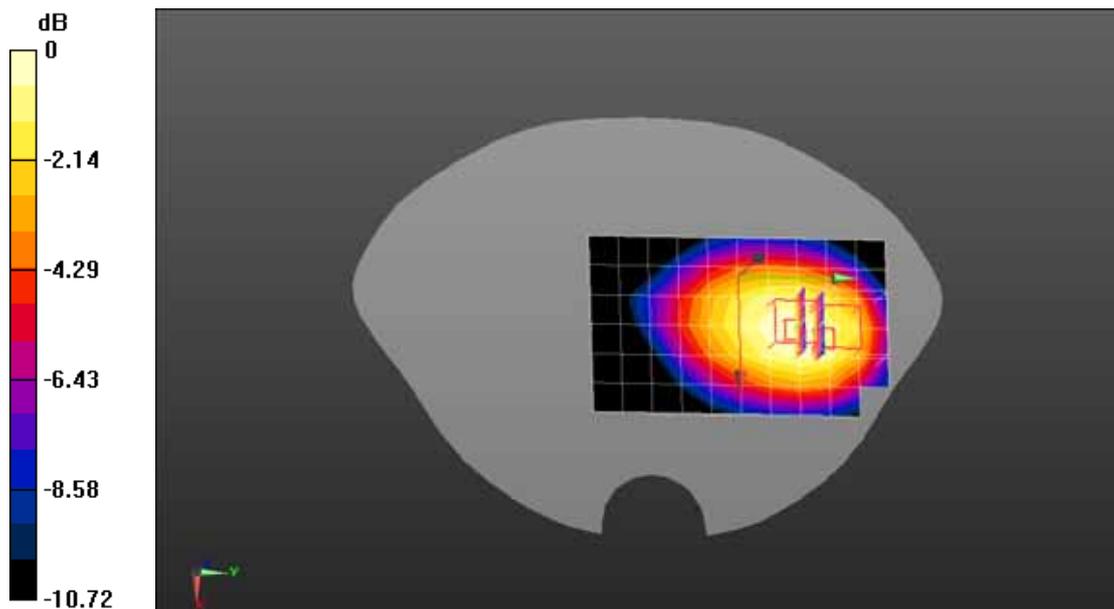
**SAR(1 g) = 0.810 mW/g; SAR(10 g) = 0.518 mW/g** Maximum value of SAR (measured) = 0.940 mW/g

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

dy=8mm, dz=5mm, Reference Value = 12.662 V/m; Power Drift = 0.13 dB

Peak SAR (extrapolated) = 1.283 mW/g

**SAR(1 g) = 0.941 mW/g; SAR(10 g) = 0.684 mW/g** Maximum value of SAR (measured) = 0.988 mW/g



0 dB = 0.988 mW/g = -0.10 dB mW/g

Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

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

**DUT: WCDMA Digital Mobile Phone; Type: Y220-U17**

Communication System: GPRS/EGPRS-4 Slot; Communication System Band: GSM 850; Duty Cycle: 1:2.1 ;  
 Frequency: 836.4 MHz; Medium parameters used:  $f = 836.4$  MHz;  $\sigma = 0.97$  mho/m;  $\epsilon_r = 53.58$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(9.41, 9.41, 9.41); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

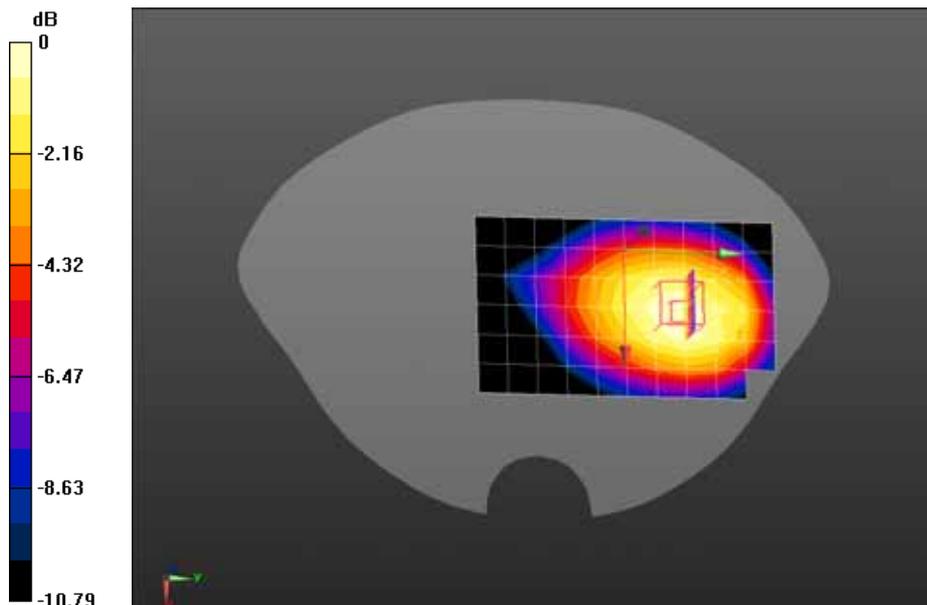
**Configuration/GPRS850 Mid Body-Back/Area Scan (7x11x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.923 mW/g

**Configuration/GPRS850 Mid Body-Back/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 12.628 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 1.178 mW/g

**SAR(1 g) = 0.883 mW/g; SAR(10 g) = 0.638 mW/g** Maximum value of SAR (measured) = 0.925 mW/g



0 dB = 0.925 mW/g = -0.68 dB mW/g

Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

GPRS850 Mid Body-Right side(4up)

**DUT: WCDMA Digital Mobile Phone; Type: Y220-U17**

Communication System: GPRS/EGPRS-4 Slot; Communication System Band: GSM 850; Duty Cycle: 1:2.1 ;  
 Frequency: 836.4 MHz; Medium parameters used:  $f = 836.4$  MHz;  $\sigma = 0.97$  mho/m;  $\epsilon_r = 53.58$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(9.41, 9.41, 9.41); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

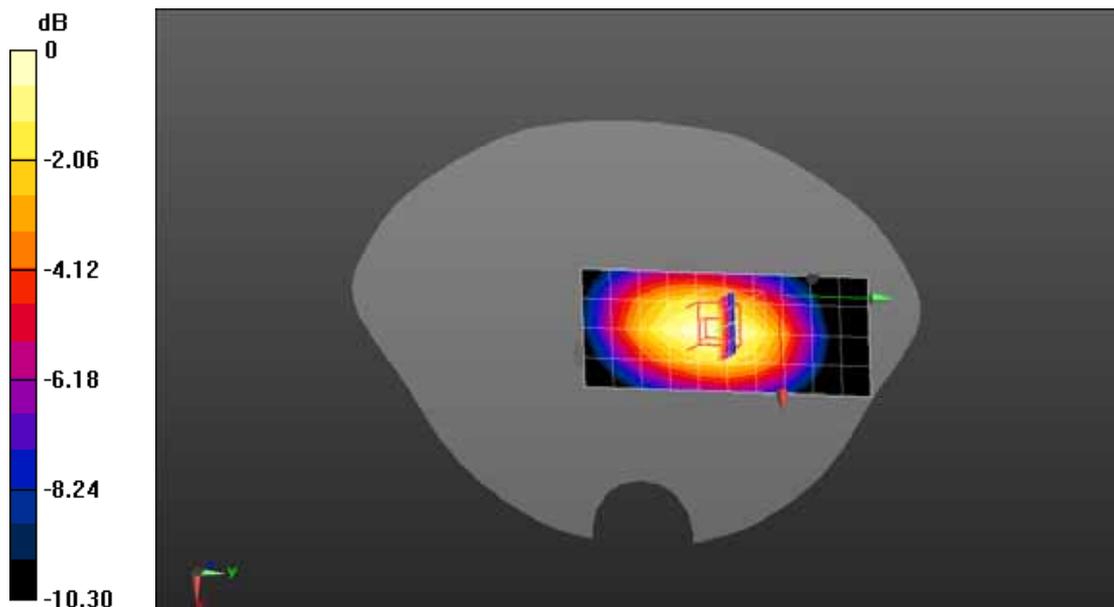
**Configuration/GPRS850 Mid Body-Right side/Area Scan (5x11x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.827 mW/g

**Configuration/GPRS850 Mid Body-Right side/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 22.094 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 1.133 mW/g

**SAR(1 g) = 0.795 mW/g; SAR(10 g) = 0.540 mW/g** Maximum value of SAR (measured) = 0.856 mW/g



0 dB = 0.856 mW/g = -1.35 dB mW/g

Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

GPRS850 Mid Body-Left side(4up)

**DUT: WCDMA Digital Mobile Phone; Type: Y220-U17**

Communication System: GPRS/EGPRS-4 Slot; Communication System Band: GSM 850; Duty Cycle: 1:2.1 ;  
 Frequency: 836.4 MHz; Medium parameters used:  $f = 836.4$  MHz;  $\sigma = 0.97$  mho/m;  $\epsilon_r = 53.58$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(9.41, 9.41, 9.41); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

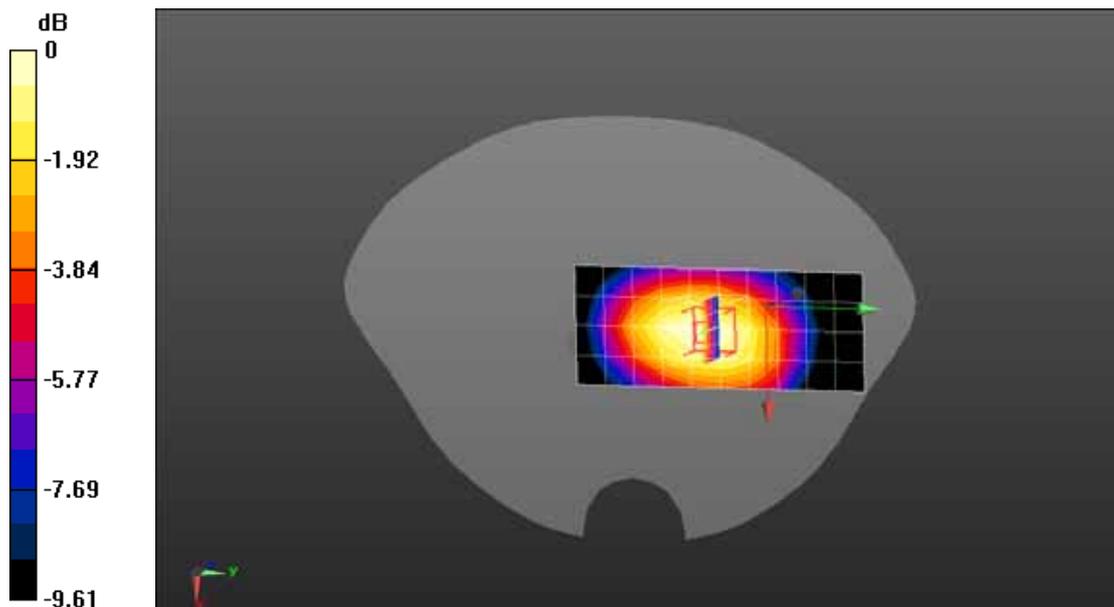
**Configuration/GPRS850 Mid Body-Left side/Area Scan (5x11x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.726 mW/g

**Configuration/GPRS850 Mid Body-Left side/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 20.367 V/m; Power Drift = -0.19 dB

Peak SAR (extrapolated) = 0.918 mW/g

**SAR(1 g) = 0.665 mW/g; SAR(10 g) = 0.461 mW/g** Maximum value of SAR (measured) = 0.715 mW/g



0 dB = 0.715 mW/g = -2.91 dB mW/g

Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

GPRS850 Mid Body-Bottom(4up)

**DUT: WCDMA Digital Mobile Phone; Type: Y220-U17**

Communication System: GPRS/EGPRS-4 Slot; Communication System Band: GSM 850; Duty Cycle: 1:2.1 ;  
 Frequency: 836.4 MHz; Medium parameters used:  $f = 836.4$  MHz;  $\sigma = 0.97$  mho/m;  $\epsilon_r = 53.58$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(9.41, 9.41, 9.41); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

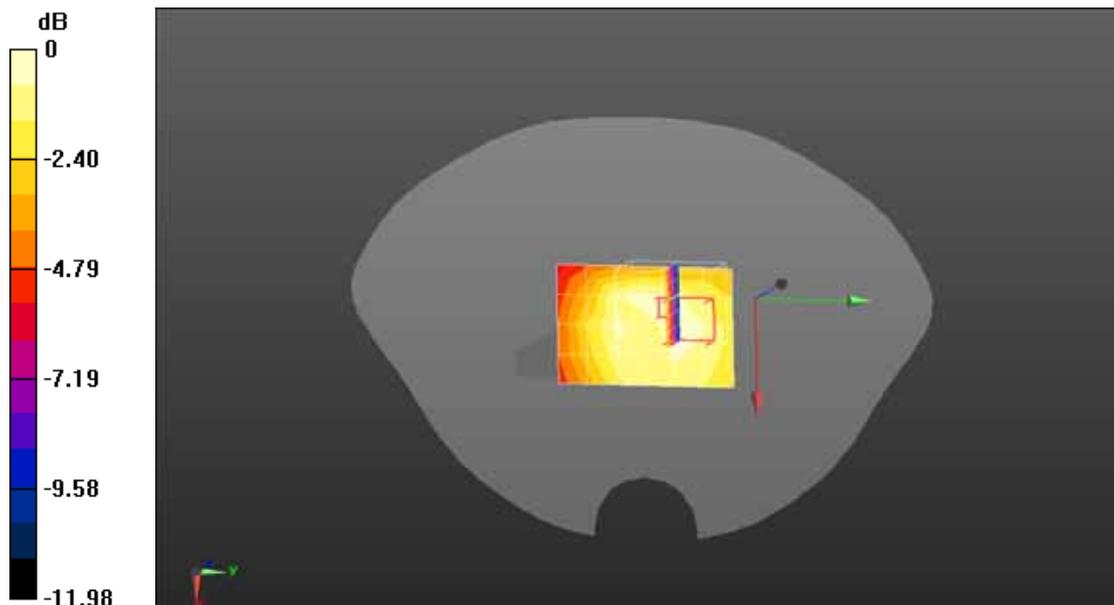
**Configuration/GPRS850 Mid Body-Bottom/Area Scan (5x7x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.101 mW/g

**Configuration/GPRS850 Mid Body-Bottom/Zoom Scan (6x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 9.016 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 0.173 mW/g

**SAR(1 g) = 0.101 mW/g; SAR(10 g) = 0.064 mW/g** Maximum value of SAR (measured) = 0.108 mW/g



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

Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

PCS1900 Mid Touch-Left

**DUT: WCDMA Digital Mobile Phone; Type: Y220-U17**

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

Frequency: 1880 MHz; Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.43$  mho/m;  $\epsilon_r = 38.64$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Phantom section: Left Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(7.75, 7.75, 7.75); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

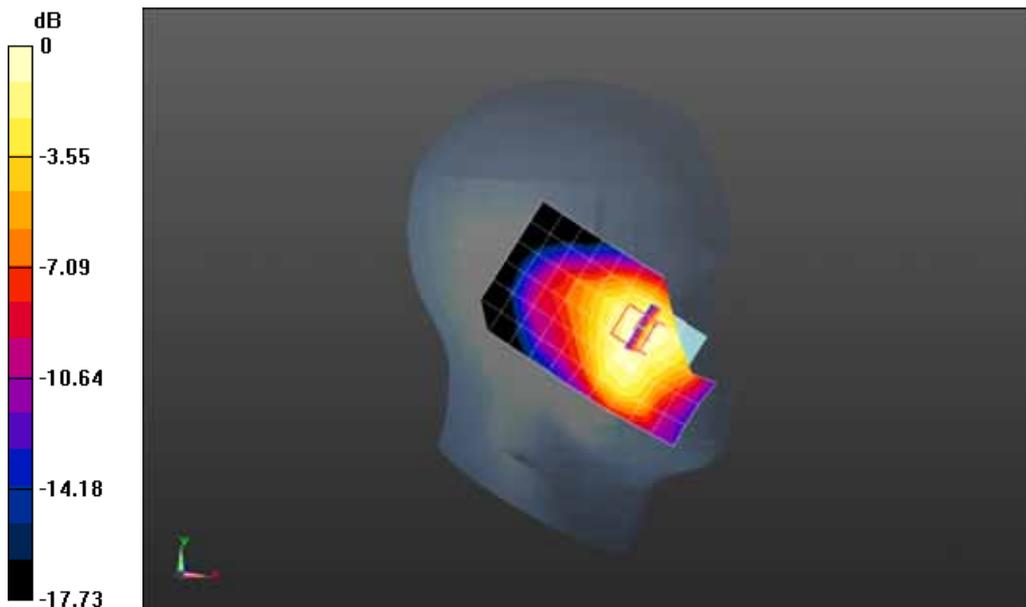
**Configuration/PCS1900 Mid Touch-Left/Area Scan (7x11x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.458 mW/g

**Configuration/PCS1900 Mid Touch-Left/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 6.580 V/m; Power Drift = -0.09 dB

Peak SAR (extrapolated) = 0.702 mW/g

**SAR(1 g) = 0.436 mW/g; SAR(10 g) = 0.266 mW/g, Maximum value of SAR (measured) = 0.469 mW/g**



0 dB = 0.469 mW/g = -6.58 dB mW/g

Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

PCS1900 Mid Tilt-Left

**DUT: WCDMA Digital Mobile Phone; Type: Y220-U17**

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

Frequency: 1880 MHz; Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.43$  mho/m;  $\epsilon_r = 38.64$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Phantom section: Left Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(7.75, 7.75, 7.75); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

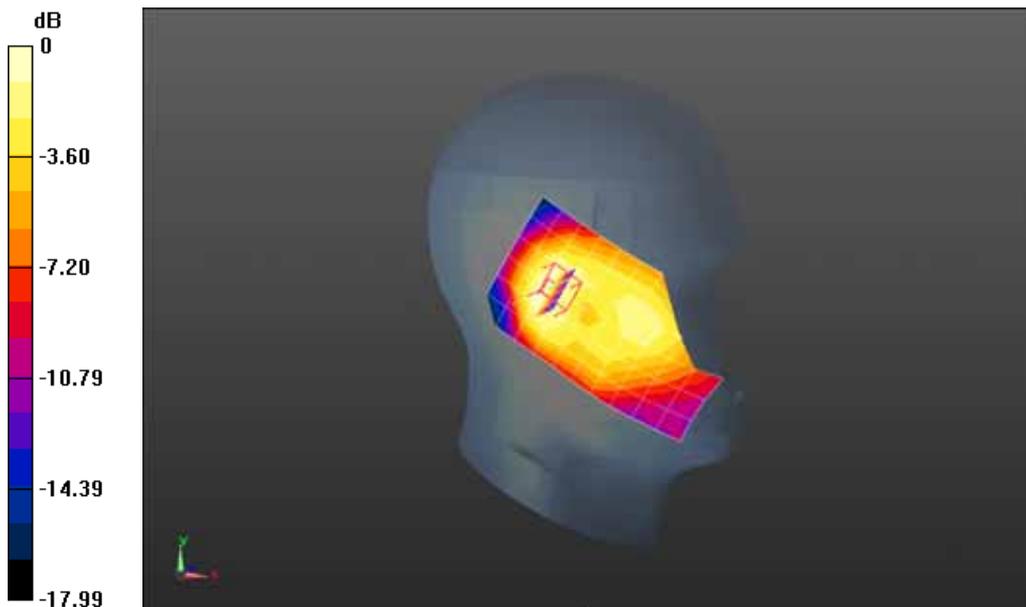
**Configuration/PCS1900 Mid Tilt-Left/Area Scan (7x11x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.126 mW/g

**Configuration/PCS1900 Mid Tilt-Left/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 8.740 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 0.204 mW/g

**SAR(1 g) = 0.122 mW/g; SAR(10 g) = 0.072 mW/g** Maximum value of SAR (measured) = 0.132 mW/g



0 dB = 0.132 mW/g = -17.59 dB mW/g

Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

PCS1900 Mid Touch-Right

**DUT: WCDMA Digital Mobile Phone; Type: Y220-U17**

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

Frequency: 1880 MHz; Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.43$  mho/m;  $\epsilon_r = 38.64$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Phantom section: Right Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(7.75, 7.75, 7.75); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

**Configuration/PCS1900 Mid Touch-Right/Area Scan (7x11x1):** Measurement grid: dx=15mm, dy=15mm

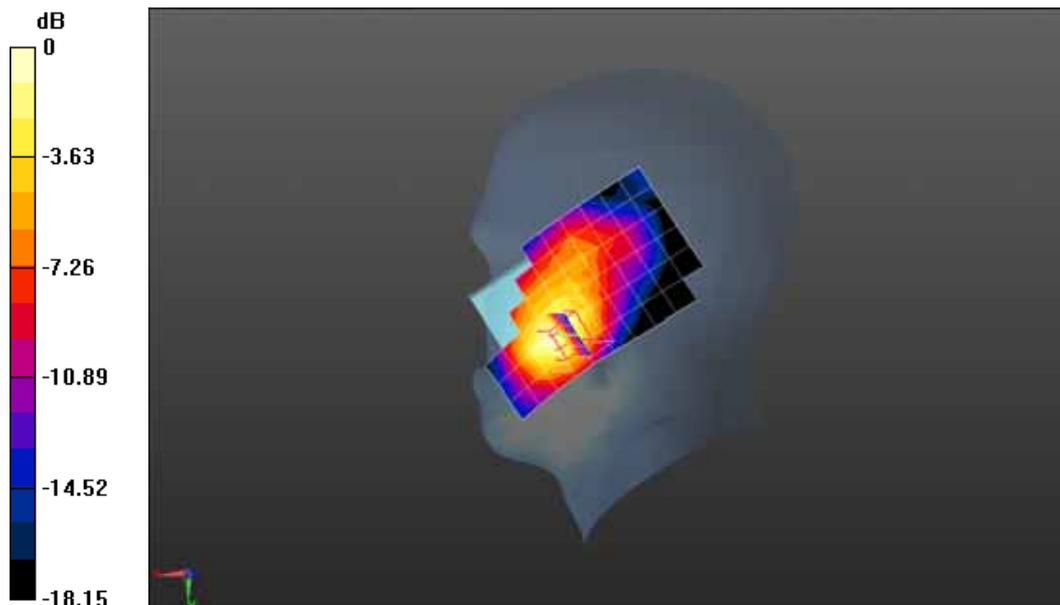
Maximum value of SAR (measured) = 0.658 mW/g

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

dy=8mm, dz=5mm, Reference Value = 6.500 V/m; Power Drift = 0.18 dB

Peak SAR (extrapolated) = 1.031 mW/g

**SAR(1 g) = 0.609 mW/g; SAR(10 g) = 0.342 mW/g** Maximum value of SAR (measured) = 0.664 mW/g



0 dB = 0.664 mW/g = -3.56 dB mW/g

Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

PCS1900 Mid Tilt-Right

**DUT: WCDMA Digital Mobile Phone; Type: Y220-U17**

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

Frequency: 1880 MHz; Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.43$  mho/m;  $\epsilon_r = 38.64$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Phantom section: Right Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(7.75, 7.75, 7.75); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

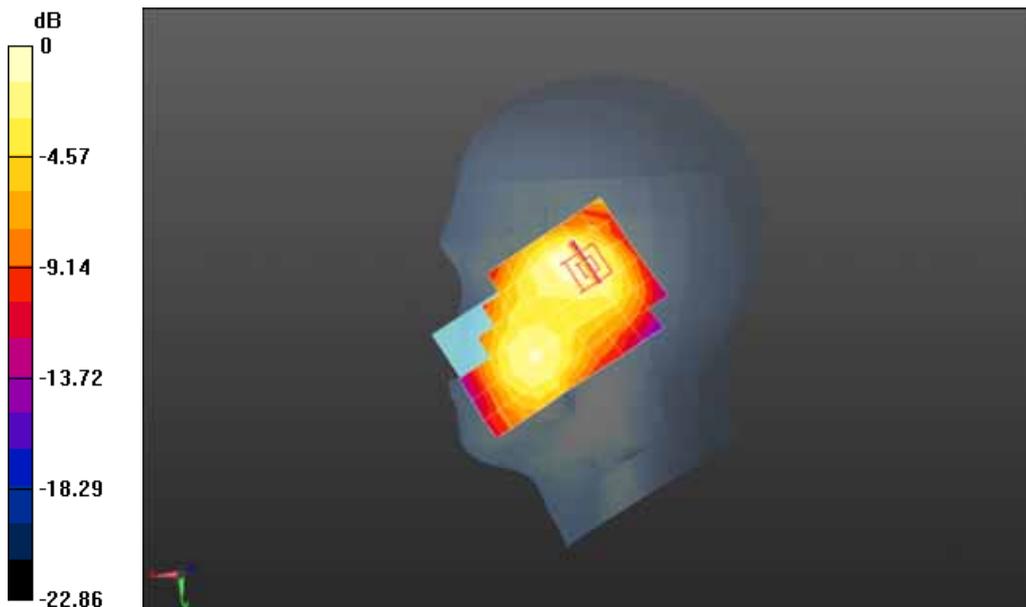
**Configuration/PCS1900 Mid Tilt-Right/Area Scan (7x11x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.189 mW/g

**Configuration/PCS1900 Mid Tilt-Right/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 9.342 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 0.287 mW/g

**SAR(1 g) = 0.176 mW/g; SAR(10 g) = 0.104 mW/g** Maximum value of SAR (measured) = 0.184 mW/g



0 dB = 0.184 mW/g = -14.70 dB mW/g

Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

PCS1900 Mid Touch-Right<SIM2>

**DUT: WCDMA Digital Mobile Phone; Type: Y220-U17**

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

Frequency: 1880 MHz; Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.43$  mho/m;  $\epsilon_r = 38.64$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Phantom section: Right Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(7.75, 7.75, 7.75); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

**Configuration/PCS1900 Mid Touch-Right/Area Scan (7x11x1):** Measurement grid: dx=15mm, dy=15mm

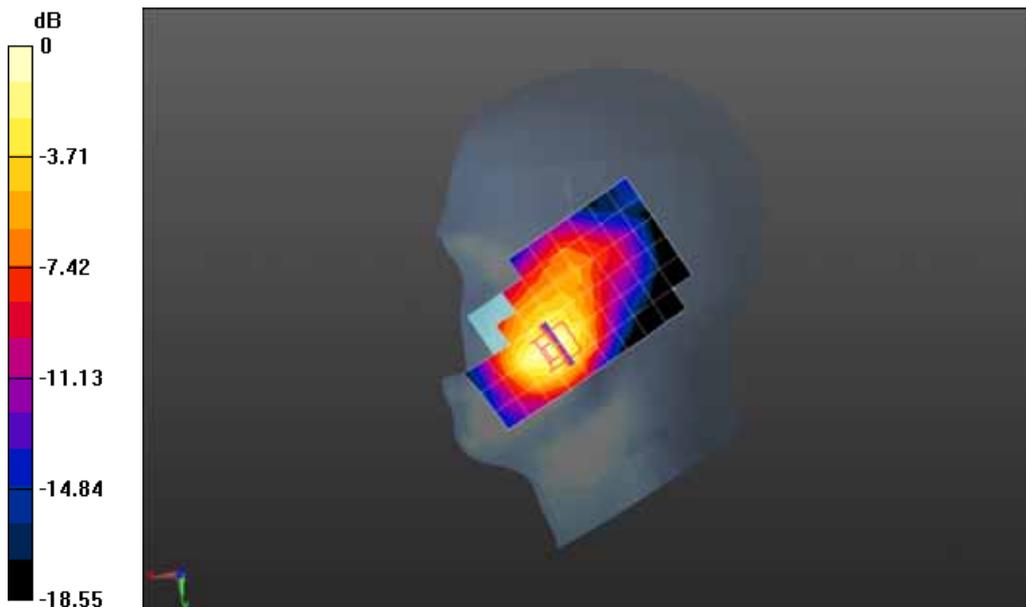
Maximum value of SAR (measured) = 0.658 mW/g

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

dy=8mm, dz=5mm, Reference Value = 6.505 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 1.016 mW/g

**SAR(1 g) = 0.607 mW/g; SAR(10 g) = 0.342 mW/g** Maximum value of SAR (measured) = 0.666 mW/g



0 dB = 0.666 mW/g = -3.53 dB mW/g

Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

PCS1900 Mid Body-Back

**DUT: WCDMA Digital Mobile Phone; Type: Y220-U17**

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

Frequency: 1880 MHz; Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.52$  mho/m;  $\epsilon_r = 52.45$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(7.6, 7.6, 7.6); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

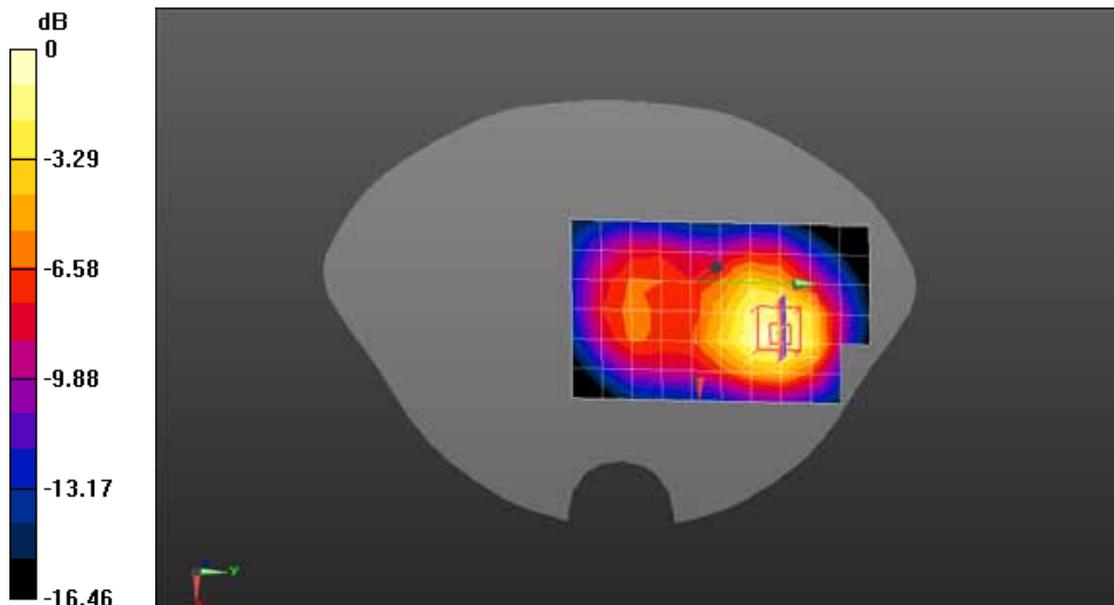
**Configuration/PCS1900 Mid Body-Back/Area Scan (7x11x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.533 mW/g

**Configuration/PCS1900 Mid Body-Back/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 9.364 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 0.839 mW/g

**SAR(1 g) = 0.505 mW/g; SAR(10 g) = 0.294 mW/g** Maximum value of SAR (measured) = 0.550 mW/g



0 dB = 0.550 mW/g = -5.19 dB mW/g

Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

GPRS1900 Low Body-Back(4up)

**DUT: WCDMA Digital Mobile Phone; Type: Y220-U17**

Communication System: GPRS/EGPRS-4 Slot; Communication System Band: PCS 1900; Duty Cycle:

1:2.1 ; Frequency: 1850.2 MHz; Medium parameters used:  $f = 1850.2$  MHz;  $\sigma = 1.49$  mho/m;  $\epsilon_r = 52.48$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(7.6, 7.6, 7.6); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

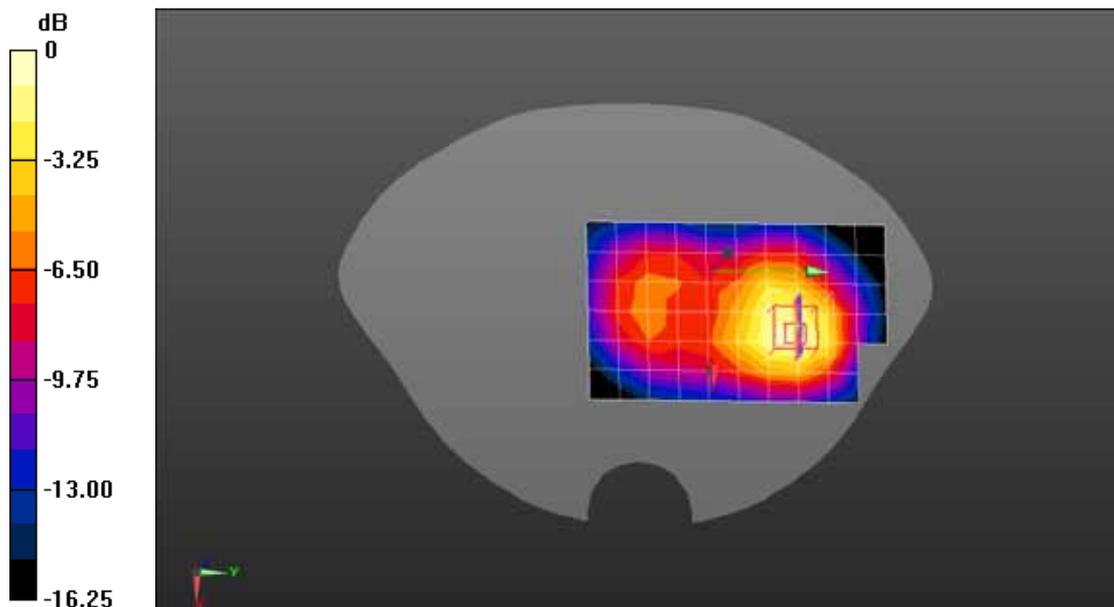
**Configuration/GPRS1900 Low Body-Back/Area Scan (7x11x1):** Measurement grid: dx=15mm, dy=15mm

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

**Configuration/GPRS1900 Low Body-Back/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 12.993 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 1.439 mW/g

**SAR(1 g) = 0.870 mW/g; SAR(10 g) = 0.508 mW/g** Maximum value of SAR (measured) = 0.950 mW/g



0 dB = 0.950 mW/g = -0.45 dB mW/g

Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

GPRS1900 Mid Body-Back(4up)

**DUT: WCDMA Digital Mobile Phone; Type: Y220-U17**

Communication System: GPRS/EGPRS-4 Slot; Communication System Band: PCS 1900; Duty Cycle: 1:2.1 ; Frequency: 1880 MHz; Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.52$  mho/m;  $\epsilon_r = 52.45$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(7.6, 7.6, 7.6); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

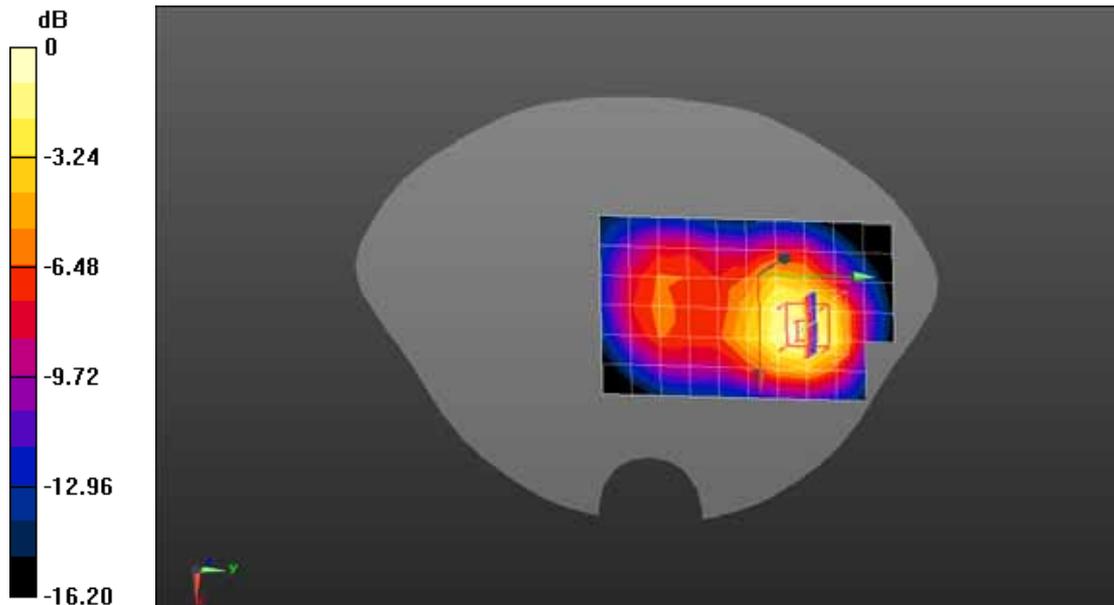
**Configuration/GPRS1900 Mid Body-Back/Area Scan (7x11x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.932 mW/g

**Configuration/GPRS1900 Mid Body-Back/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 12.489 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 1.489 mW/g

**SAR(1 g) = 0.894 mW/g; SAR(10 g) = 0.519 mW/g** Maximum value of SAR (measured) = 0.970 mW/g



0 dB = 0.970 mW/g = -0.26 dB mW/g

Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

GPRS1900 High Body-Back(4up)

**DUT: WCDMA Digital Mobile Phone; Type: Y220-U17**

Communication System: GPRS/EGPRS-4 Slot; Communication System Band: PCS 1900; Duty Cycle:

1:2.1 ; Frequency: 1909.8 MHz; Medium parameters used:  $f = 1909.8$  MHz;  $\sigma = 1.56$  mho/m;  $\epsilon_r = 52.38$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(7.6, 7.6, 7.6); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

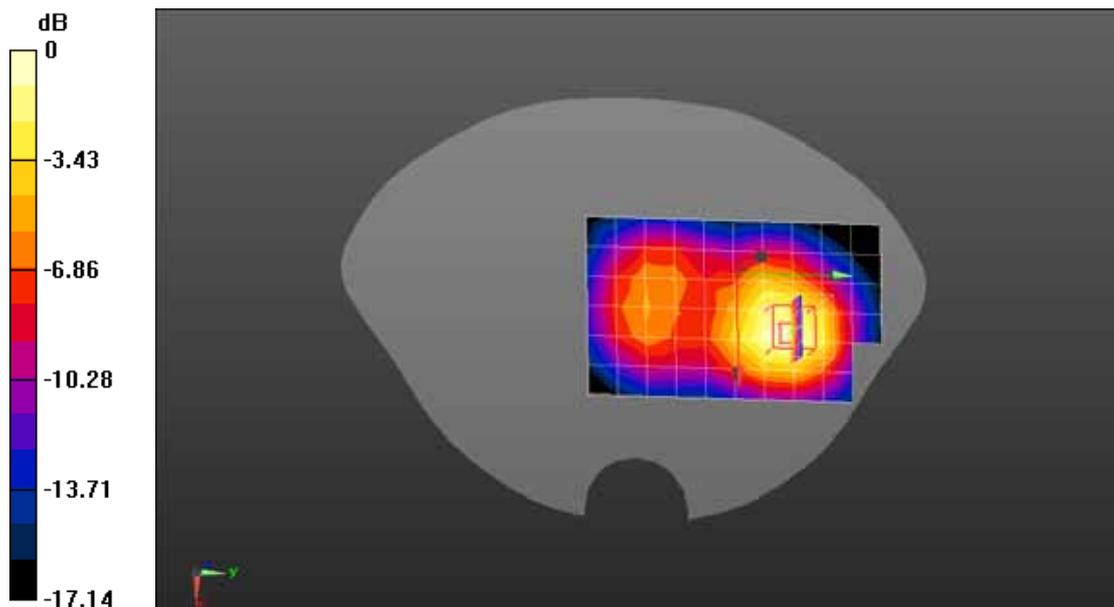
**Configuration/GPRS1900 High Body-Back/Area Scan (7x11x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 1.04 mW/g

**Configuration/GPRS1900 High Body-Back/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 13.851 V/m; Power Drift = -0.09 dB

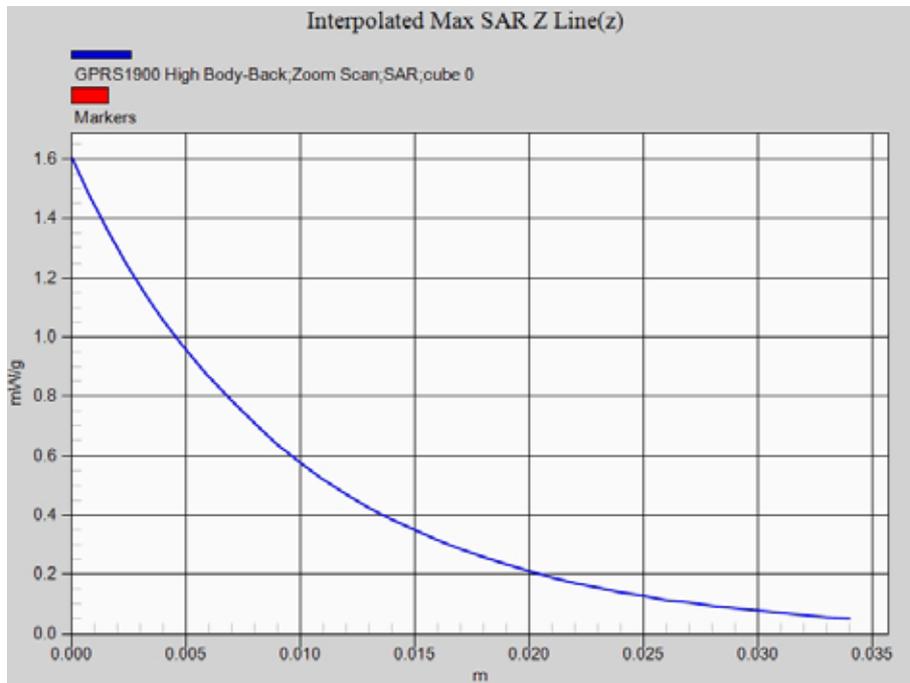
Peak SAR (extrapolated) = 1.609 mW/g

**SAR(1 g) = 0.974 mW/g; SAR(10 g) = 0.566 mW/g** Maximum value of SAR (measured) = 1.07 mW/g



0 dB = 1.07 mW/g = 0.59 dB mW/g

Z-Axis Plot



Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

GPRS1900 High Body-Back(4up)\*

**DUT: WCDMA Digital Mobile Phone; Type: Y220-U17**

Communication System: GPRS/EGPRS-4 Slot; Communication System Band: PCS 1900; Duty Cycle:

1:2.1 ; Frequency: 1909.8 MHz; Medium parameters used:  $f = 1909.8 \text{ MHz}$ ;  $\sigma = 1.56 \text{ mho/m}$ ;  $\epsilon_r = 52.38$ ;  $\rho = 1000 \text{ kg/m}^3$  ; Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(7.6, 7.6, 7.6); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

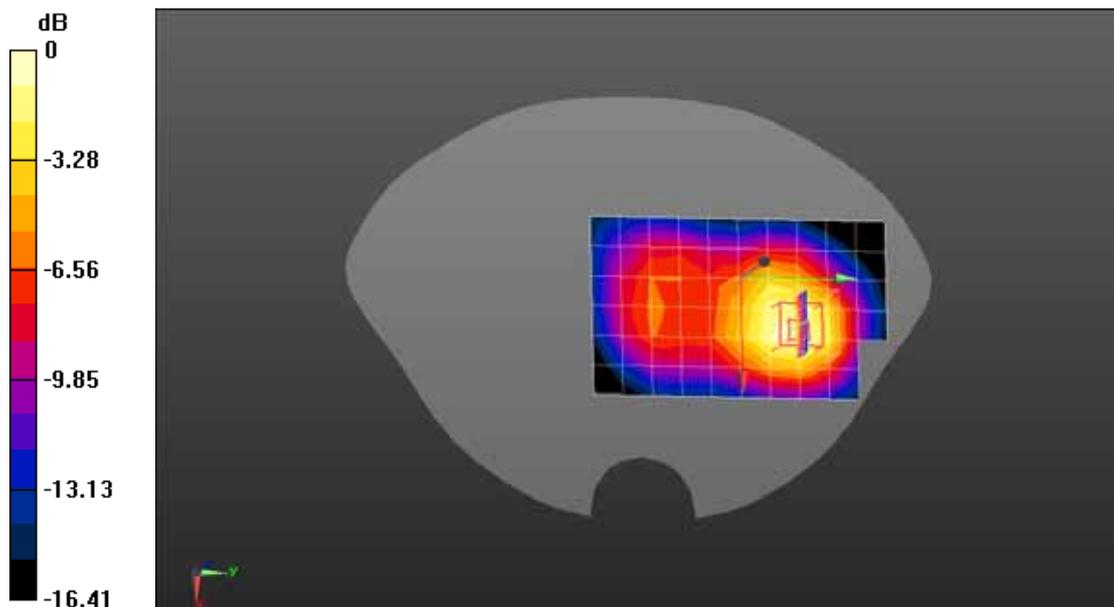
**Configuration/GPRS1900 High Body-Back/Area Scan (7x11x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 1.00 mW/g

**Configuration/GPRS1900 High Body-Back/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 12.192 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 1.646 mW/g

**SAR(1 g) = 0.960 mW/g; SAR(10 g) = 0.555 mW/g** Maximum value of SAR (measured) = 1.04 mW/g



0 dB = 1.04 mW/g = 0.34 dB mW/g

Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

GPRS1900 High Body-Back(4up)(with battery BYD)

**DUT: WCDMA Digital Mobile Phone; Type: Y220-U17**

Communication System: GPRS/EGPRS-4 Slot; Communication System Band: PCS 1900; Duty Cycle:

1:2.1 ; Frequency: 1909.8 MHz; Medium parameters used:  $f = 1909.8 \text{ MHz}$ ;  $\sigma = 1.56 \text{ mho/m}$ ;  $\epsilon_r = 52.38$ ;  $\rho = 1000 \text{ kg/m}^3$  ; Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(7.6, 7.6, 7.6); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

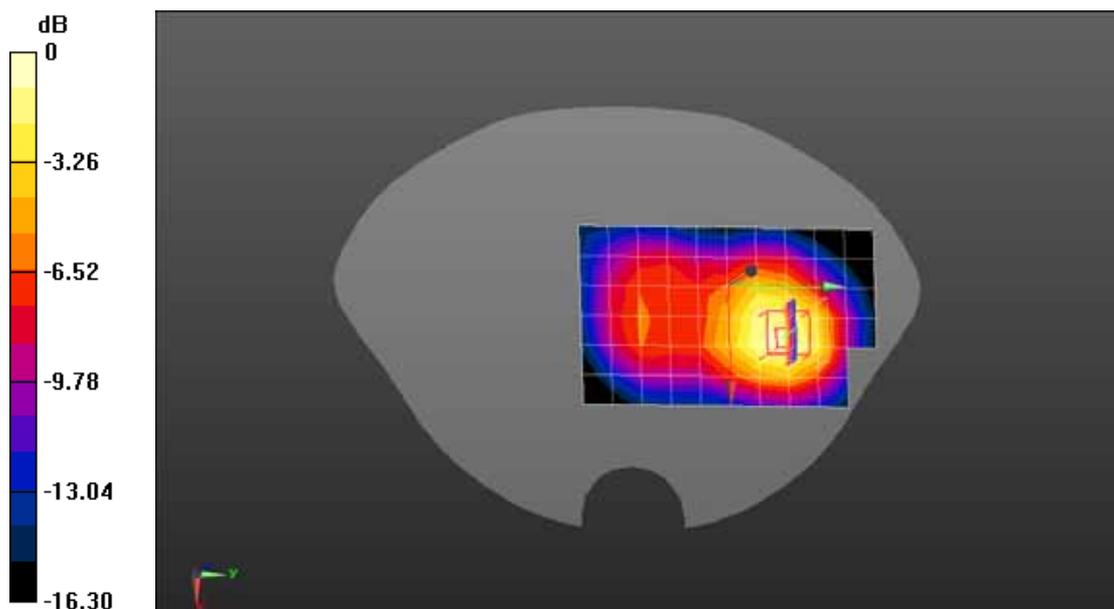
**Configuration/GPRS1900 High Body-Back/Area Scan (7x11x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.997 mW/g

**Configuration/GPRS1900 High Body-Back/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 12.140 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 1.629 mW/g

**SAR(1 g) = 0.956 mW/g; SAR(10 g) = 0.553 mW/g** Maximum value of SAR (measured) = 1.04 mW/g



0 dB = 1.04 mW/g = 0.34 dB mW/g

Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

GPRS1900 Mid Body-Front(4up)

**DUT: WCDMA Digital Mobile Phone; Type: Y220-U17**

Communication System: GPRS/EGPRS-4 Slot; Communication System Band: PCS 1900; Duty Cycle: 1:2.1 ; Frequency: 1880 MHz; Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.52$  mho/m;  $\epsilon_r = 52.45$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(7.6, 7.6, 7.6); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

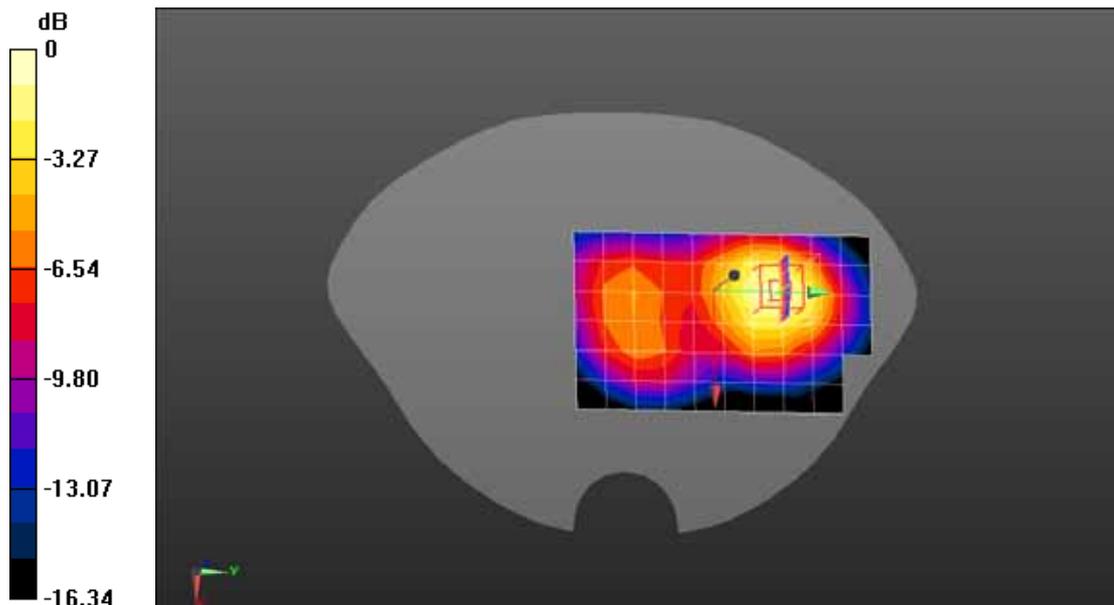
**Configuration/GPRS1900 Mid Body-Front/Area Scan (7x11x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.865 mW/g

**Configuration/GPRS1900 Mid Body-Front/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 12.909 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 1.364 mW/g

**SAR(1 g) = 0.803 mW/g; SAR(10 g) = 0.468 mW/g** Maximum value of SAR (measured) = 0.870 mW/g



0 dB = 0.870 mW/g = -1.21 dB mW/g

Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

GPRS1900 Mid Body(4up)-Right side

**DUT: WCDMA Digital Mobile Phone; Type: Y220-U17**

Communication System: GPRS/EGPRS-4 Slot; Communication System Band: PCS 1900; Duty Cycle: 1:2.1 ; Frequency: 1880 MHz; Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.52$  mho/m;  $\epsilon_r = 52.45$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(7.6, 7.6, 7.6); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

**Configuration/GPRS1900 Mid Body-Right side/Area Scan (5x11x1):** Measurement grid: dx=15mm, dy=15mm

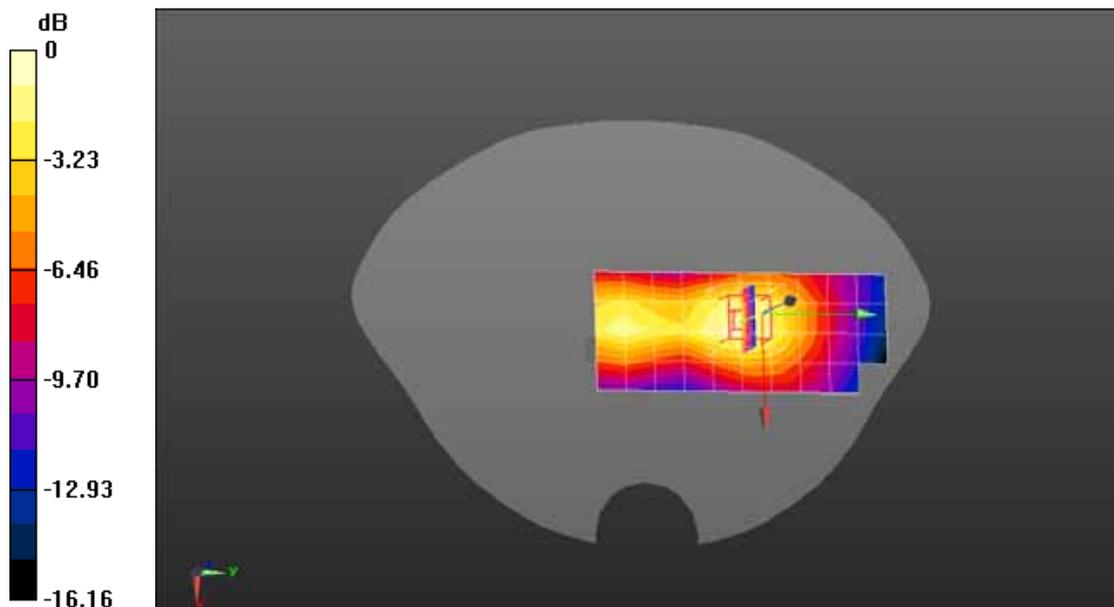
Maximum value of SAR (measured) = 0.321 mW/g

**Configuration/GPRS1900 Mid Body-Right side/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:

dx=8mm, dy=8mm, dz=5mm, Reference Value = 12.344 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 0.541 mW/g

**SAR(1 g) = 0.317 mW/g; SAR(10 g) = 0.182 mW/g** Maximum value of SAR (measured) = 0.348 mW/g



0 dB = 0.348 mW/g = -9.17 dB mW/g

Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

GPRS1900 Mid Body(4up)-Left side

**DUT: WCDMA Digital Mobile Phone; Type: Y220-U17**

Communication System: GPRS/EGPRS-4 Slot; Communication System Band: PCS 1900; Duty Cycle: 1:2.1 ; Frequency: 1880 MHz; Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.52$  mho/m;  $\epsilon_r = 52.45$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(7.6, 7.6, 7.6); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

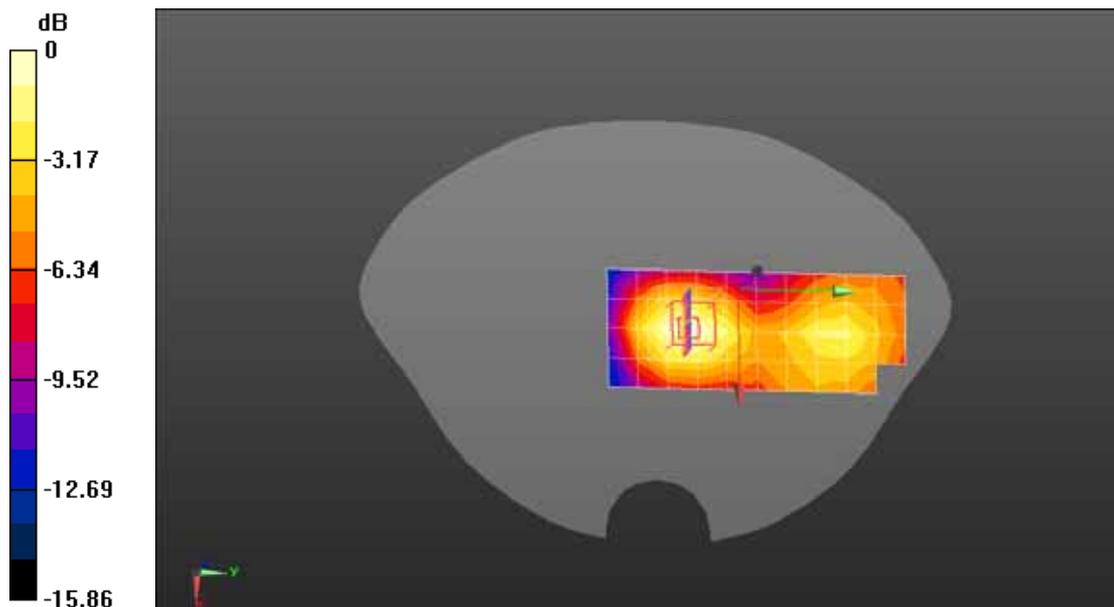
**Configuration/GPRS1900 Mid Body-Left side/Area Scan (5x11x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.158 mW/g

**Configuration/GPRS1900 Mid Body-Left side/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 9.219 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 0.253 mW/g

**SAR(1 g) = 0.151 mW/g; SAR(10 g) = 0.089 mW/g** Maximum value of SAR (measured) = 0.164 mW/g



0 dB = 0.164 mW/g = -15.70 dB mW/g

Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

GPRS1900 Mid Body(4up)-Bottom

**DUT: WCDMA Digital Mobile Phone; Type: Y220-U17**

Communication System: GPRS/EGPRS-4 Slot; Communication System Band: PCS 1900; Duty Cycle: 1:2.1 ; Frequency: 1880 MHz; Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.52$  mho/m;  $\epsilon_r = 52.45$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(7.6, 7.6, 7.6); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

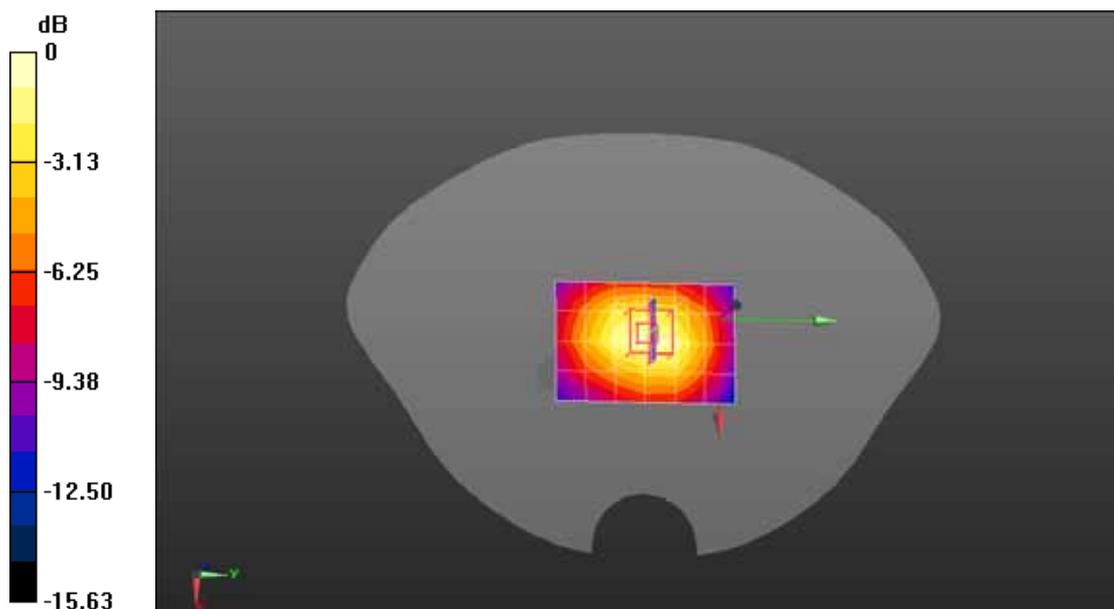
**Configuration/GPRS1900 Mid Body-Bottom/Area Scan (5x7x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.491 mW/g

**Configuration/GPRS1900 Mid Body-Bottom/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 17.967 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 0.777 mW/g

**SAR(1 g) = 0.468 mW/g; SAR(10 g) = 0.268 mW/g** Maximum value of SAR (measured) = 0.521 mW/g



0 dB = 0.521 mW/g = -5.66 dB mW/g

Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

WCDMA Band V Mid Touch-Left

**DUT: WCDMA Digital Mobile Phone; Type: Y220-U17**

Communication System: UMTS; Communication System Band: Band V UTRA/FDD; Duty Cycle: 1:1.0; Frequency: 836.4 MHz; Medium parameters used:  $f = 836.4$  MHz;  $\sigma = 0.9$  mho/m;  $\epsilon_r = 40.92$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Phantom section: Left Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(9.52, 9.52, 9.52); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

**Configuration/WCDMA Band V Mid Touch-Left/Area Scan (7x10x1):** Measurement grid: dx=15mm, dy=15mm

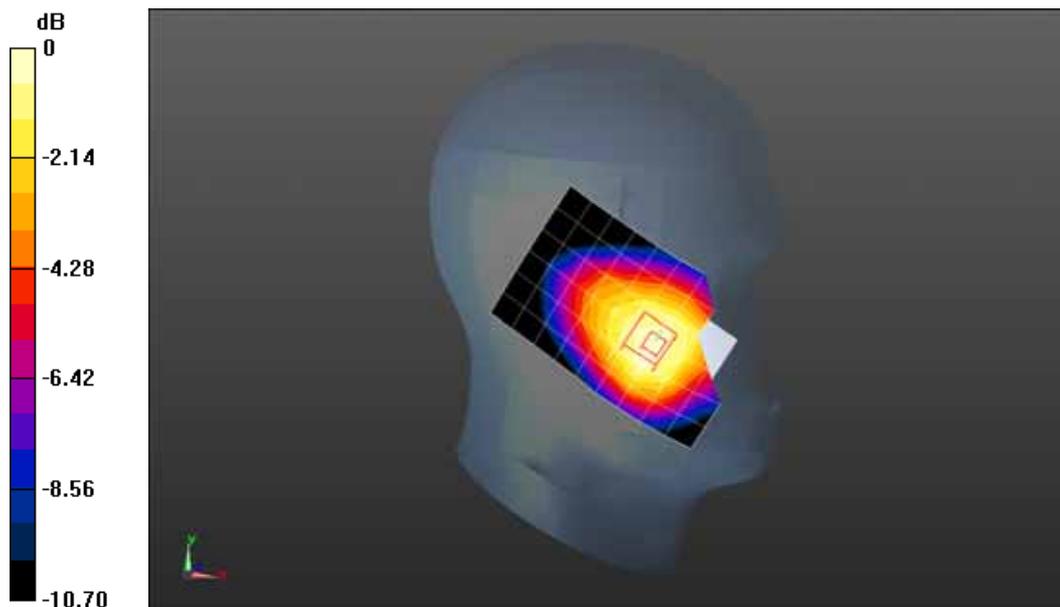
Maximum value of SAR (measured) = 0.532 mW/g

**Configuration/WCDMA Band V Mid Touch-Left/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:

dx=8mm, dy=8mm, dz=5mm, Reference Value = 10.545 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 0.638 mW/g

**SAR(1 g) = 0.507 mW/g; SAR(10 g) = 0.382 mW/g** Maximum value of SAR (measured) = 0.531 mW/g



0 dB = 0.531 mW/g = -5.50 dB mW/g

Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

WCDMA Band V Mid Tilt-Left

**DUT: WCDMA Digital Mobile Phone; Type: Y220-U17**

Communication System: UMTS; Communication System Band: Band V UTRA/FDD; Duty Cycle: 1:1.0; Frequency: 836.4 MHz; Medium parameters used:  $f = 836.4$  MHz;  $\sigma = 0.9$  mho/m;  $\epsilon_r = 40.92$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Phantom section: Left Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(9.52, 9.52, 9.52); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

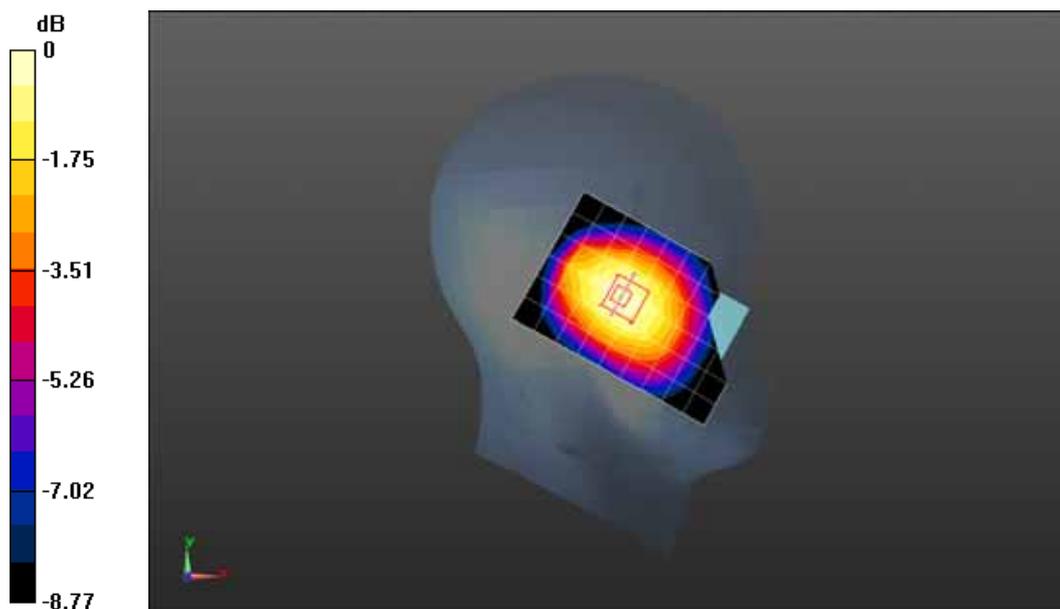
**Configuration/WCDMA Band V Mid Tilt-Left/Area Scan (7x10x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.430 mW/g

**Configuration/WCDMA Band V Mid Tilt-Left/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 18.673 V/m; Power Drift = -0.14 dB

Peak SAR (extrapolated) = 0.520 mW/g

**SAR(1 g) = 0.417 mW/g; SAR(10 g) = 0.317 mW/g** Maximum value of SAR (measured) = 0.439 mW/g



0 dB = 0.439 mW/g = -7.15 dB mW/g

Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

WCDMA Band V Mid Touch-Right

**DUT: WCDMA Digital Mobile Phone; Type: Y220-U17**

Communication System: UMTS; Communication System Band: Band V UTRA/FDD; Duty Cycle: 1:1.0; Frequency: 836.4 MHz; Medium parameters used:  $f = 836.4$  MHz;  $\sigma = 0.9$  mho/m;  $\epsilon_r = 40.92$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Phantom section: Right Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(9.52, 9.52, 9.52); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

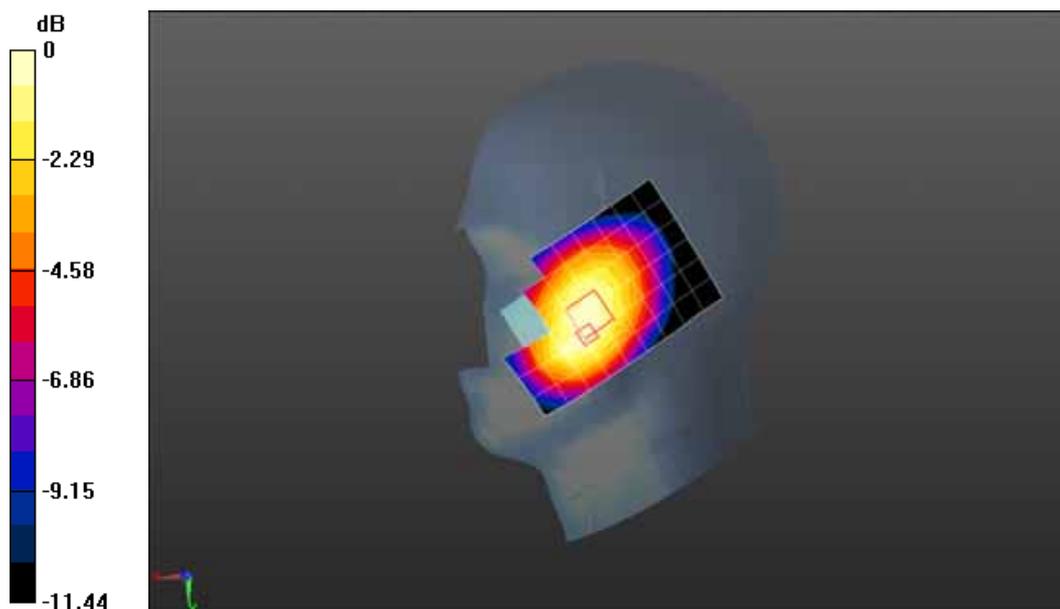
**Configuration/WCDMA Band V Mid Touch-Right/Area Scan (7x10x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.582 mW/g

**Configuration/WCDMA Band V Mid Touch-Right/Zoom Scan (5x6x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 10.539 V/m; Power Drift = 0.20 dB

Peak SAR (extrapolated) = 0.800 mW/g

**SAR(1 g) = 0.549 mW/g; SAR(10 g) = 0.396 mW/g** Maximum value of SAR (measured) = 0.576 mW/g



0 dB = 0.576 mW/g = -4.79 dB mW/g

Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

WCDMA Band V Mid Tilt-Right

**DUT: WCDMA Digital Mobile Phone; Type: Y220-U17**

Communication System: UMTS; Communication System Band: Band V UTRA/FDD; Duty Cycle: 1:1.0; Frequency: 836.4 MHz; Medium parameters used:  $f = 836.4$  MHz;  $\sigma = 0.9$  mho/m;  $\epsilon_r = 40.92$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Phantom section: Right Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(9.52, 9.52, 9.52); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

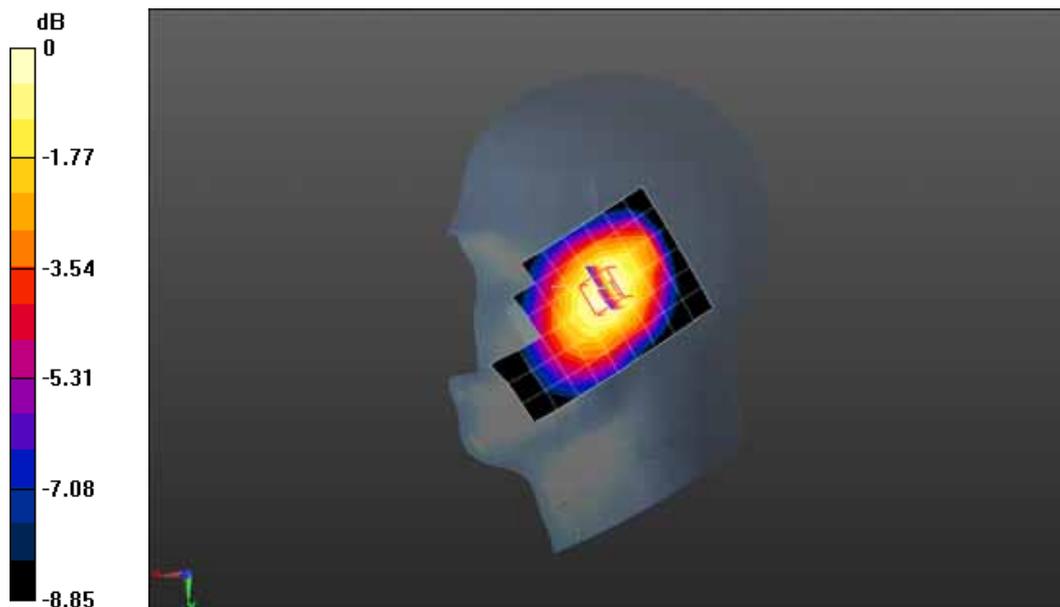
**Configuration/WCDMA Band V Mid Tilt-Right/Area Scan (7x10x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.420 mW/g

**Configuration/WCDMA Band V Mid Tilt-Right/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 16.903 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 0.500 mW/g

**SAR(1 g) = 0.408 mW/g; SAR(10 g) = 0.311 mW/g** Maximum value of SAR (measured) = 0.425 mW/g



0 dB = 0.425 mW/g = -7.43 dB mW/g

Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

WCDMA Band V Low Body-Back

**DUT: WCDMA Digital Mobile Phone; Type: Y220-U17**

Communication System: UMTS; Communication System Band: Band V UTRA/FDD; Duty Cycle: 1:1.0; Frequency: 826.4 MHz; Medium parameters used:  $f = 826.4$  MHz;  $\sigma = 0.96$  mho/m;  $\epsilon_r = 53.64$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(9.41, 9.41, 9.41); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

**Configuration/WCDMA Band V Low Body-Back/Area Scan (7x11x1):** Measurement grid: dx=15mm, dy=15mm

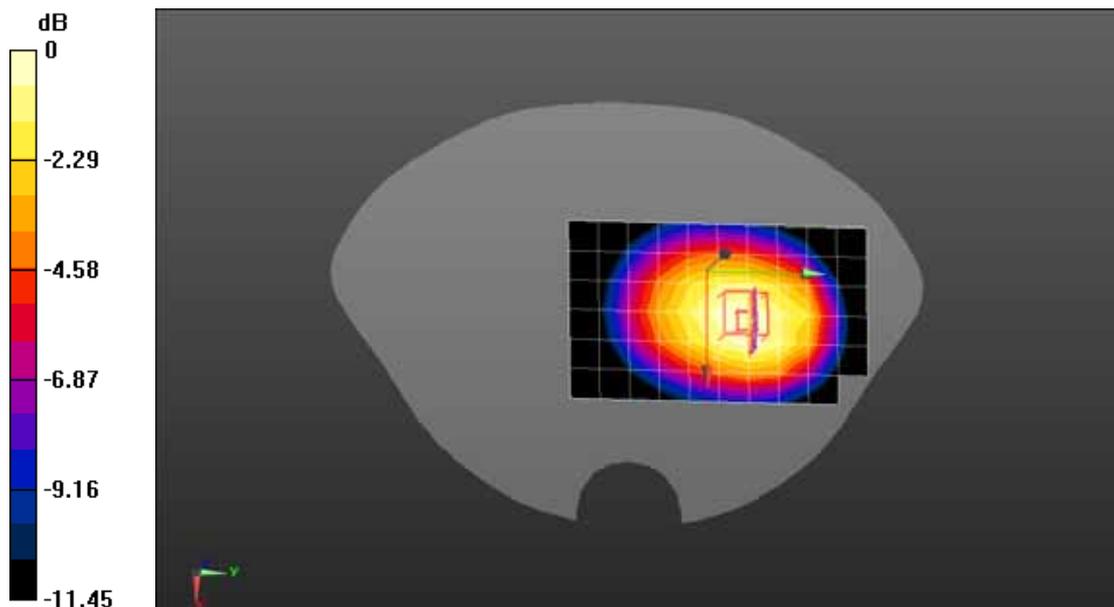
Maximum value of SAR (measured) = 0.910 mW/g

**Configuration/WCDMA Band V Low Body-Back/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:

dx=8mm, dy=8mm, dz=5mm, Reference Value = 15.123 V/m; Power Drift = 0.03 dB

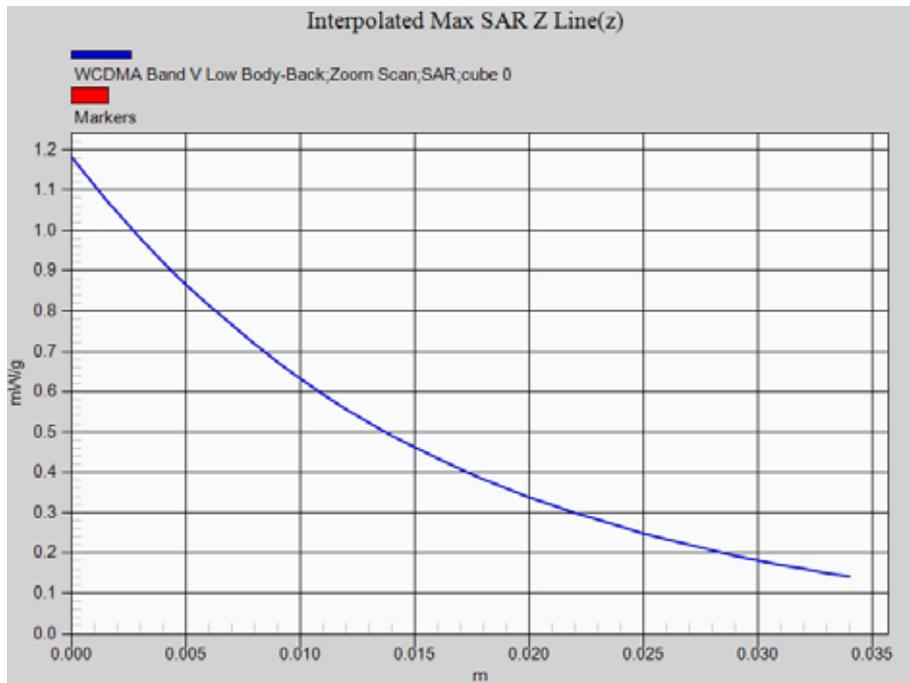
Peak SAR (extrapolated) = 1.184 mW/g

**SAR(1 g) = 0.880 mW/g; SAR(10 g) = 0.633 mW/g** Maximum value of SAR (measured) = 0.929 mW/g



0 dB = 0.929 mW/g = -0.64 dB mW/g

Z-Axis Plot



Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

WCDMA Band V Low Body-Back\*

**DUT: WCDMA Digital Mobile Phone; Type: Y220-U17**

Communication System: UMTS; Communication System Band: Band V UTRA/FDD; Duty Cycle: 1:1.0; Frequency: 826.4 MHz; Medium parameters used:  $f = 826.4$  MHz;  $\sigma = 0.96$  mho/m;  $\epsilon_r = 53.64$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(9.41, 9.41, 9.41); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

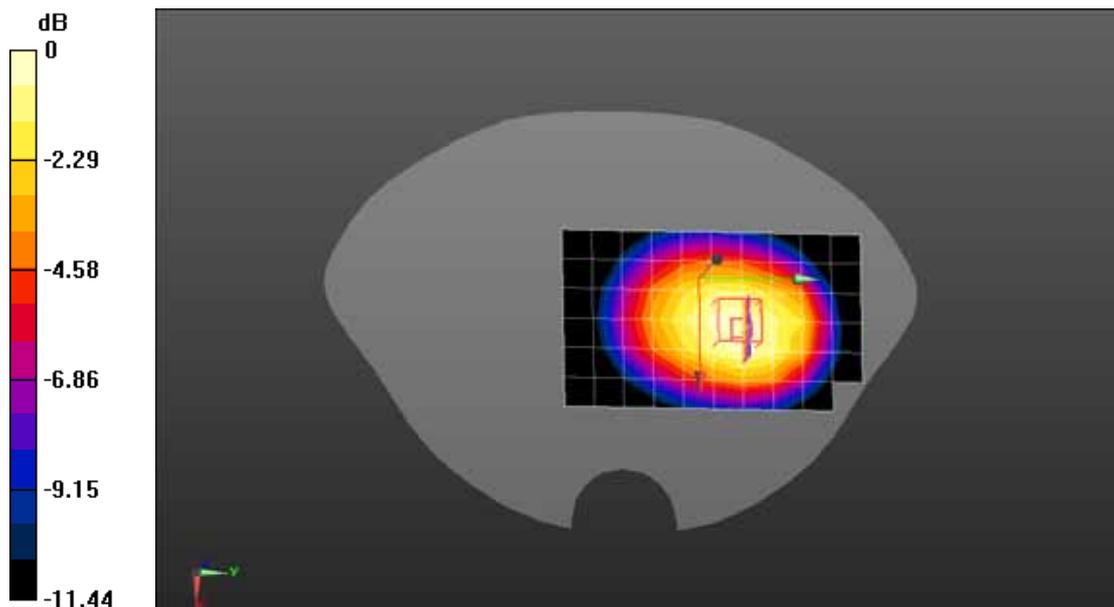
**Configuration/WCDMA Band V Low Body-Back/Area Scan (7x11x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.904 mW/g

**Configuration/WCDMA Band V Low Body-Back/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 15.018 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 1.181 mW/g

**SAR(1 g) = 0.876 mW/g; SAR(10 g) = 0.630 mW/g** Maximum value of SAR (measured) = 0.926 mW/g



0 dB = 0.926 mW/g = -0.67 dB mW/g

Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

WCDMA Band V Low Body-Back(with battery BYD)

**DUT: WCDMA Digital Mobile Phone; Type: Y220-U17**

Communication System: UMTS; Communication System Band: Band V UTRA/FDD; Duty Cycle: 1:1.0; Frequency: 826.4 MHz; Medium parameters used:  $f = 826.4$  MHz;  $\sigma = 0.96$  mho/m;  $\epsilon_r = 53.64$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(9.41, 9.41, 9.41); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

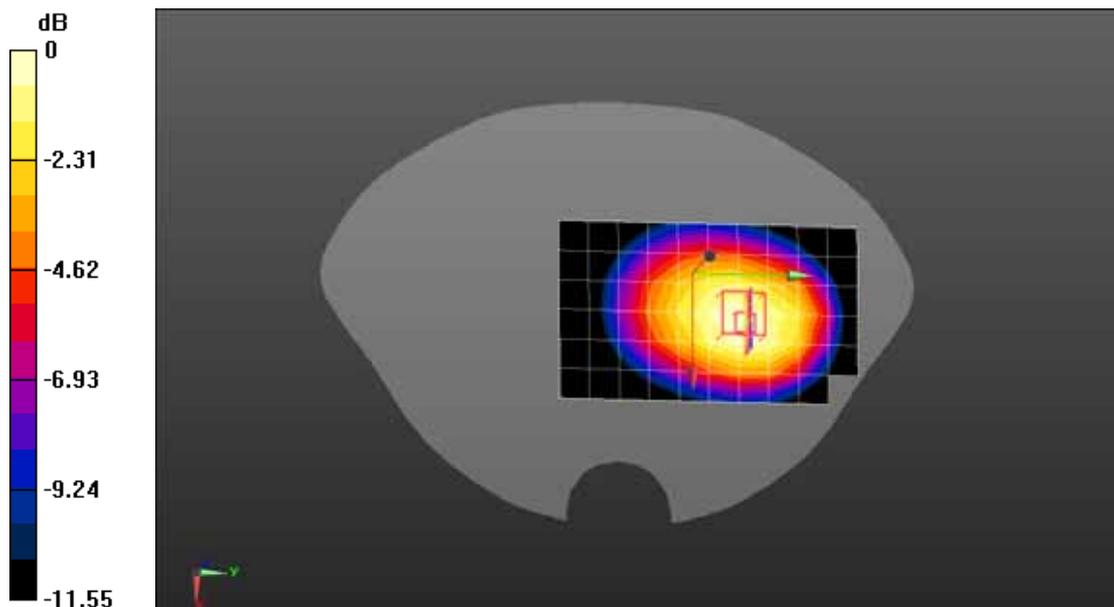
**Configuration/WCDMA Band V Low Body-Back/Area Scan (7x11x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.899 mW/g

**Configuration/WCDMA Band V Low Body-Back/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 13.204 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 1.188 mW/g

**SAR(1 g) = 0.869 mW/g; SAR(10 g) = 0.619 mW/g** Maximum value of SAR (measured) = 0.920 mW/g



0 dB = 0.920 mW/g = -0.72 dB mW/g

Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

WCDMA Band V Mid Body-Back

**DUT: WCDMA Digital Mobile Phone; Type: Y220-U17**

Communication System: UMTS; Communication System Band: Band V UTRA/FDD; Duty Cycle: 1:1.0; Frequency: 836.4 MHz; Medium parameters used:  $f = 836.4$  MHz;  $\sigma = 0.97$  mho/m;  $\epsilon_r = 53.58$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(9.41, 9.41, 9.41); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

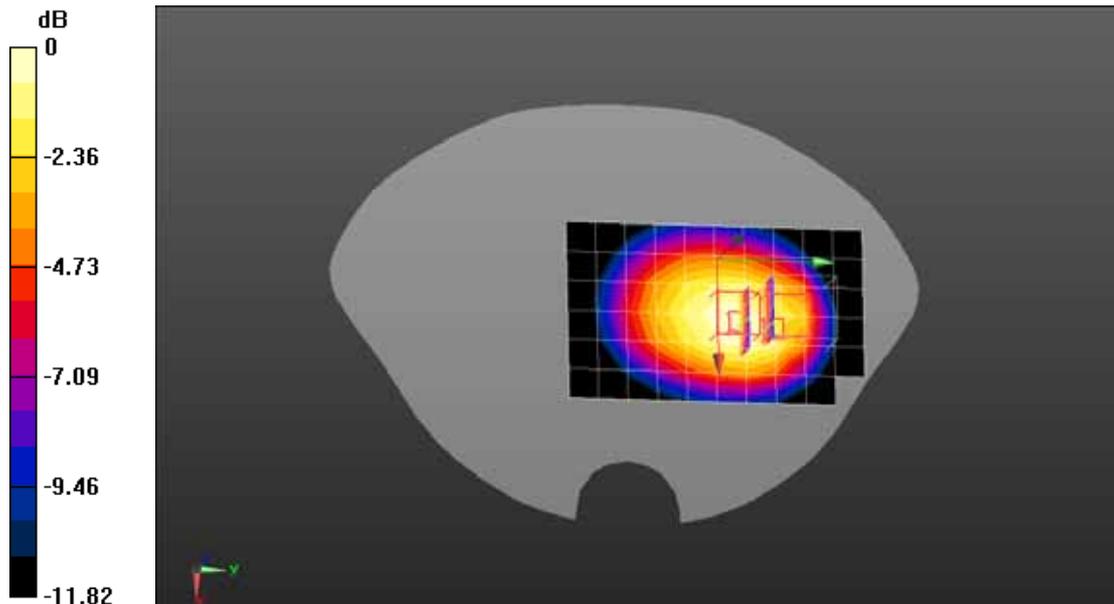
**Configuration/WCDMA Band V Mid Body-Back/Area Scan (7x11x1):** Measurement grid: dx=15mm, dy=15mm, Maximum value of SAR (measured) = 0.838 mW/g

**Configuration/WCDMA Band V Mid Body-Back/Zoom Scan (5x5x7)/Cube 1:** Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 15.542 V/m; Power Drift = 0.05 dB  
Peak SAR (extrapolated) = 1.035 mW/g

**SAR(1 g) = 0.645 mW/g; SAR(10 g) = 0.402 mW/g** Maximum value of SAR (measured) = 0.771 mW/g

**Configuration/WCDMA Band V Mid Body-Back/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 15.542 V/m; Power Drift = 0.05 dB  
Peak SAR (extrapolated) = 1.119 mW/g

**SAR(1 g) = 0.825 mW/g; SAR(10 g) = 0.593 mW/g** Maximum value of SAR (measured) = 0.871 mW/g



0 dB = 0.871 mW/g = -1.20 dB mW/g

Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

WCDMA Band V High Body-Back

**DUT: WCDMA Digital Mobile Phone; Type: Y220-U17**

Communication System: UMTS; Communication System Band: Band V UTRA/FDD; Duty Cycle: 1:1.0; Frequency: 846.6 MHz; Medium parameters used:  $f = 846.6$  MHz;  $\sigma = 0.98$  mho/m;  $\epsilon_r = 53.44$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(9.41, 9.41, 9.41); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

**Configuration/WCDMA Band V High Body-Back/Area Scan (7x11x1):** Measurement grid: dx=15mm, dy=15mm

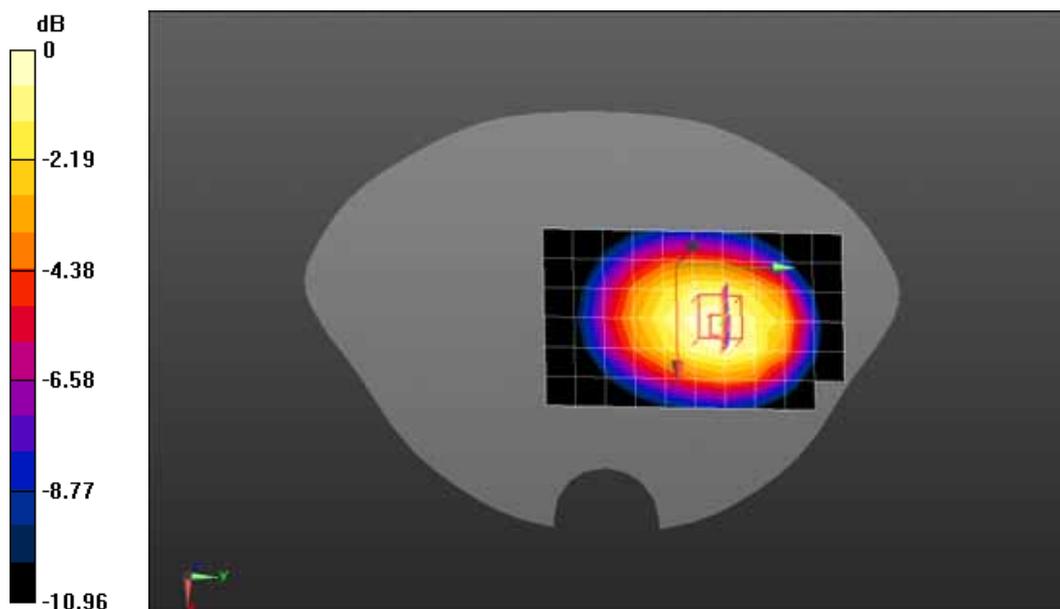
Maximum value of SAR (measured) = 0.801 mW/g

**Configuration/WCDMA Band V High Body-Back/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:

dx=8mm, dy=8mm, dz=5mm, Reference Value = 14.549 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 1.038 mW/g

**SAR(1 g) = 0.773 mW/g; SAR(10 g) = 0.558 mW/g** Maximum value of SAR (measured) = 0.818 mW/g



0 dB = 0.818 mW/g = -1.74 dB mW/g

Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

WCDMA Band V Mid Body-Front

**DUT: WCDMA Digital Mobile Phone; Type: Y220-U17**

Communication System: UMTS; Communication System Band: Band V UTRA/FDD; Duty Cycle: 1:1.0; Frequency: 836.4 MHz; Medium parameters used:  $f = 836.4$  MHz;  $\sigma = 0.97$  mho/m;  $\epsilon_r = 53.58$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(9.41, 9.41, 9.41); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

**Configuration/WCDMA Band V Mid Body-Front/Area Scan (7x11x1):** Measurement grid: dx=15mm, dy=15mm

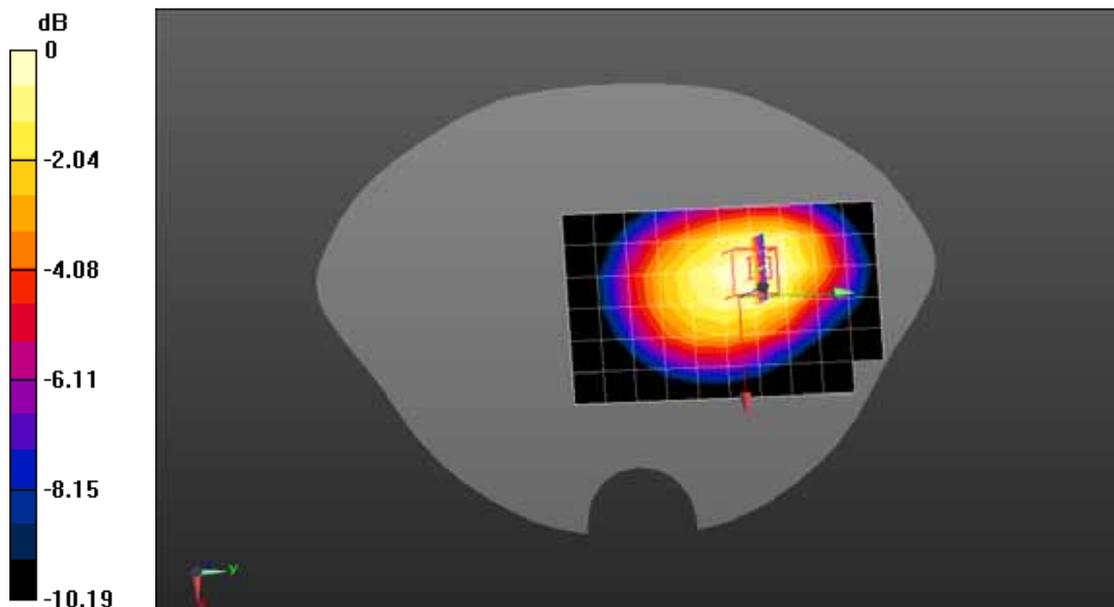
Maximum value of SAR (measured) = 0.662 mW/g

**Configuration/WCDMA Band V Mid Body-Front/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:

dx=8mm, dy=8mm, dz=5mm, Reference Value = 13.936 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 0.865 mW/g

**SAR(1 g) = 0.629 mW/g; SAR(10 g) = 0.453 mW/G** Maximum value of SAR (measured) = 0.660 mW/g



0 dB = 0.660 mW/g = -3.61 dB mW/g

Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

WCDMA Band V Mid Body-Right side

**DUT: WCDMA Digital Mobile Phone; Type: Y220-U17**

Communication System: UMTS; Communication System Band: Band V UTRA/FDD; Duty Cycle: 1:1.0; Frequency: 836.4 MHz; Medium parameters used:  $f = 836.4$  MHz;  $\sigma = 0.97$  mho/m;  $\epsilon_r = 53.58$ ;  $\rho = 1000$  kg/m<sup>3</sup>; Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(9.41, 9.41, 9.41); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

**Configuration/WCDMA Band V Mid Body-Right side/Area Scan (5x11x1):** Measurement grid: dx=15mm, dy=15mm

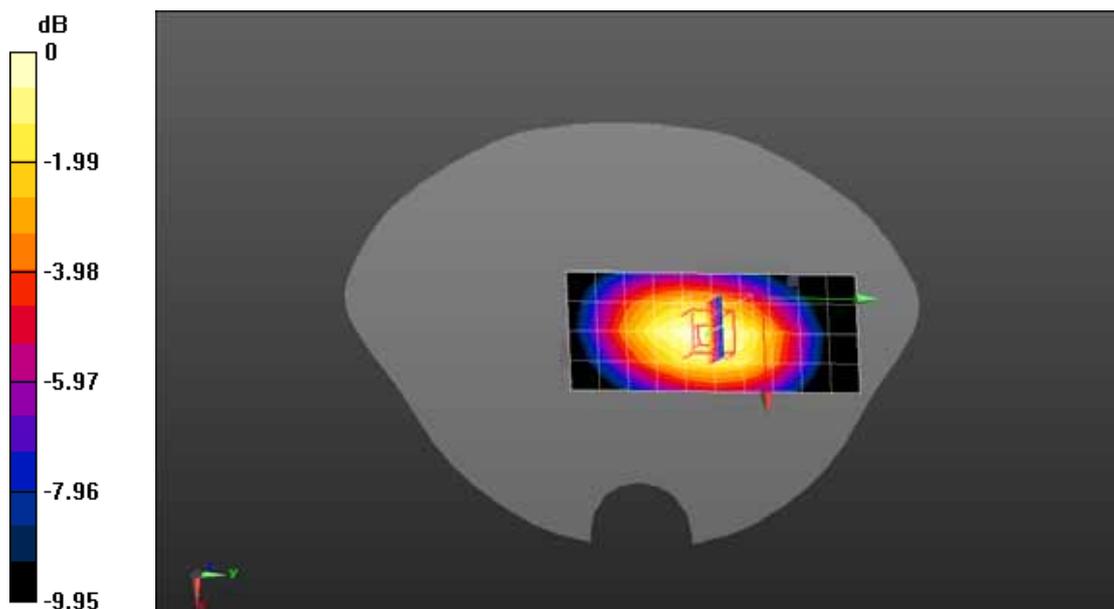
Maximum value of SAR (measured) = 0.430 mW/g

**Configuration/WCDMA Band V Mid Body-Right side/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:

dx=8mm, dy=8mm, dz=5mm, Reference Value = 16.289 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 0.582 mW/g

**SAR(1 g) = 0.411 mW/g; SAR(10 g) = 0.281 mW/g** Maximum value of SAR (measured) = 0.440 mW/g



0 dB = 0.440 mW/g = -7.13 dB mW/g

Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

WCDMA Band V Mid Body-Left side

**DUT: WCDMA Digital Mobile Phone; Type: Y220-U17**

Communication System: UMTS; Communication System Band: Band V UTRA/FDD; Duty Cycle: 1:1.0; Frequency: 836.4 MHz; Medium parameters used:  $f = 836.4$  MHz;  $\sigma = 0.97$  mho/m;  $\epsilon_r = 53.58$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(9.41, 9.41, 9.41); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

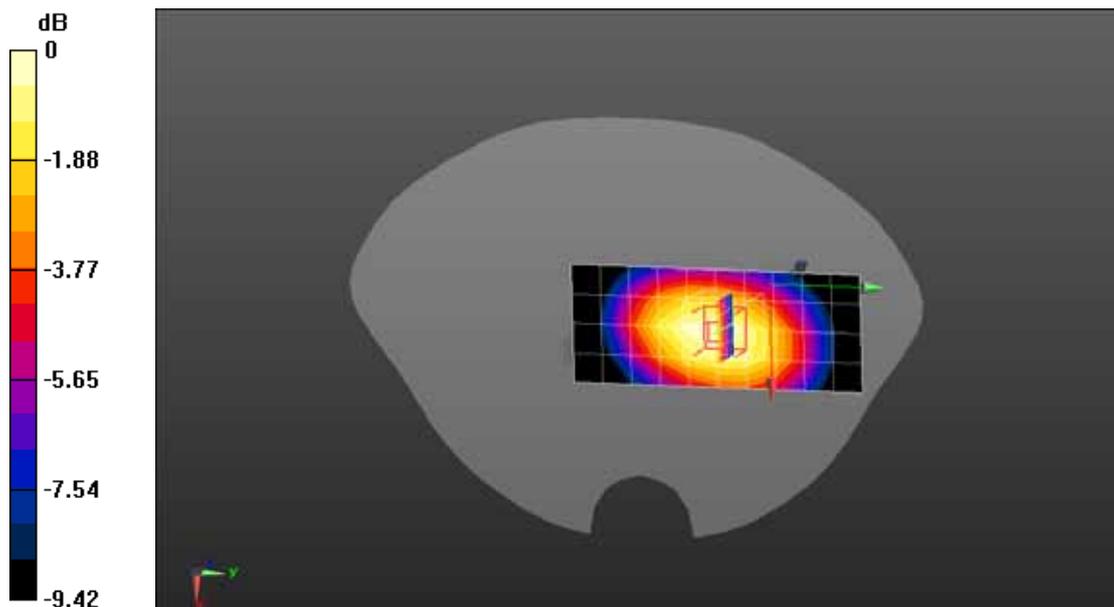
**Configuration/WCDMA Band V Mid Body-Left side/Area Scan (5x11x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.408 mW/g

**Configuration/WCDMA Band V Mid Body-Left side/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 14.368 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 0.543 mW/g

**SAR(1 g) = 0.387 mW/g; SAR(10 g) = 0.268 mW/g** Maximum value of SAR (measured) = 0.413 mW/g



0 dB = 0.413 mW/g = -7.68 dB mW/g

Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

WCDMA Band V Mid Body-Bottom

**DUT: WCDMA Digital Mobile Phone; Type: Y220-U17**

Communication System: UMTS; Communication System Band: Band V UTRA/FDD; Duty Cycle: 1:1.0; Frequency: 836.4 MHz; Medium parameters used:  $f = 836.4$  MHz;  $\sigma = 0.97$  mho/m;  $\epsilon_r = 53.58$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(9.41, 9.41, 9.41); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

**Configuration/WCDMA Band V Mid Body-Bottom/Area Scan (5x7x1):** Measurement grid: dx=15mm, dy=15mm

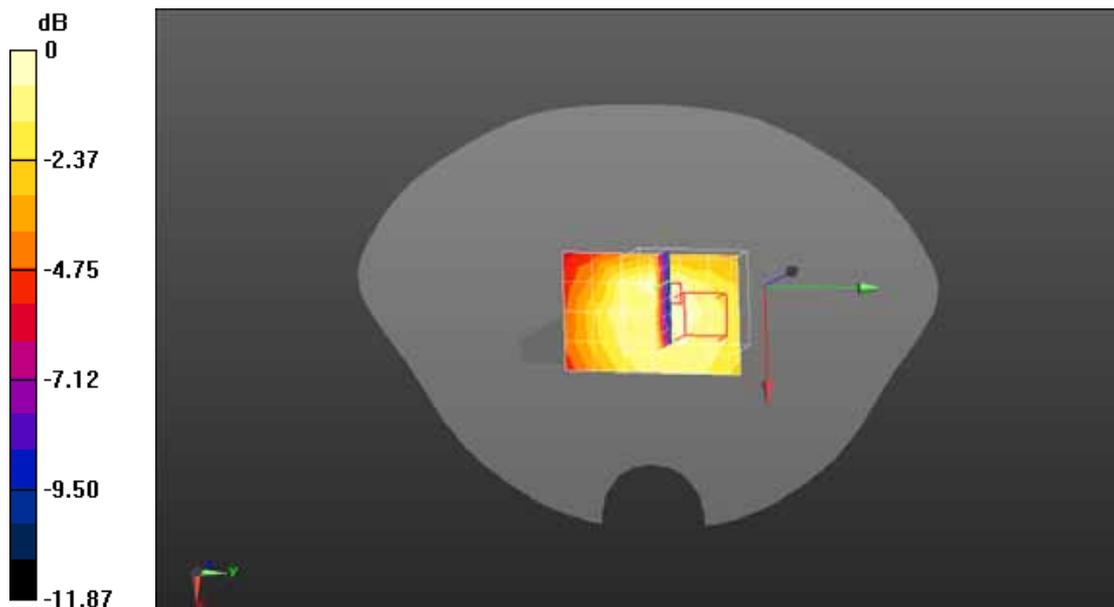
Maximum value of SAR (measured) = 0.0480 mW/g

**Configuration/WCDMA Band V Mid Body-Bottom/Zoom Scan (7x8x7)/Cube 0:** Measurement grid:

dx=8mm, dy=8mm, dz=5mm, Reference Value = 6.246 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 0.081 mW/g

**SAR(1 g) = 0.048 mW/g; SAR(10 g) = 0.031 mW/g** Maximum value of SAR (measured) = 0.0523 mW/g



0 dB = 0.0523 mW/g = -25.63 dB mW/g

Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

802.11b 2462MHz Touch-Left

**DUT: WCDMA Digital Mobile Phone; Type: Y220-U17**

Communication System: Wi-Fi; Communication System Band: 802.11b; Duty Cycle: 1:1.0; Frequency: 2462 MHz; Medium parameters used:  $f = 2462$  MHz;  $\sigma = 1.86$  mho/m;  $\epsilon_r = 38.58$ ;  $\rho = 1000$  kg/m<sup>3</sup>; Phantom section: Left Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(7.03, 7.03, 7.03); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

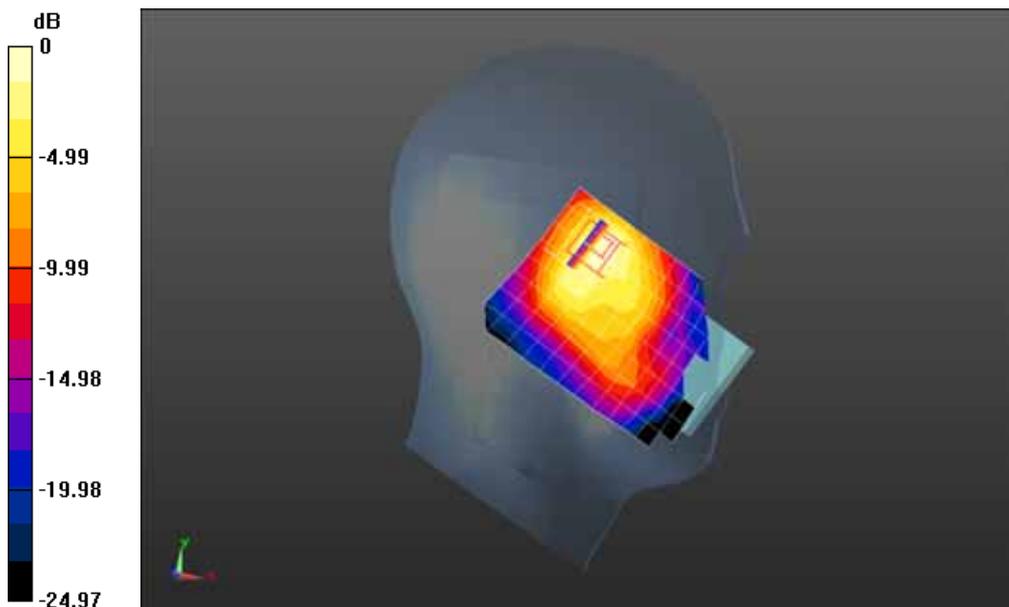
**Configuration/802.11b 2462MHz Touch-Left/Area Scan (9x13x1):** Measurement grid: dx=12mm, dy=12mm

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

**Configuration/802.11b 2462MHz Touch-Left/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 12.645 V/m; Power Drift = 0.09 dB

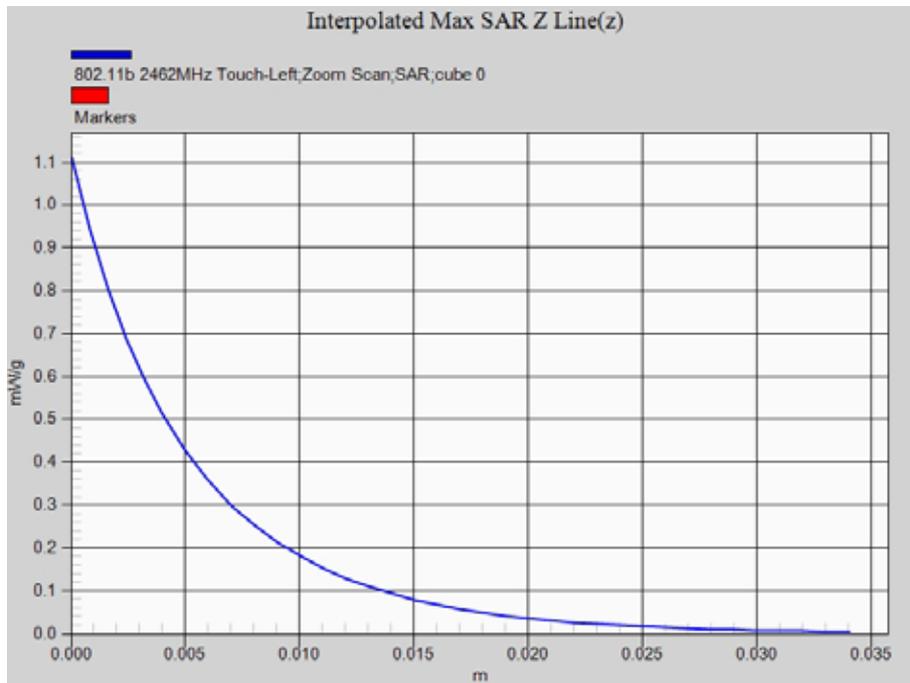
Peak SAR (extrapolated) = 1.113 mW/g

**SAR(1 g) = 0.452 mW/g; SAR(10 g) = 0.208 mW/g** Maximum value of SAR (measured) = 0.479 mW/g



0 dB = 0.479 mW/g = -6.39 dB mW/g

Z-Axis Plot



Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

802.11b 2462MHz Touch-Left(with battery #1)

**DUT: WCDMA Digital Mobile Phone; Type: Y220-U17**

Communication System: Wi-Fi; Communication System Band: 802.11b; Duty Cycle: 1:1.0; Frequency: 2462 MHz; Medium parameters used:  $f = 2462$  MHz;  $\sigma = 1.86$  mho/m;  $\epsilon_r = 38.58$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Phantom section: Left Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(7.03, 7.03, 7.03); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

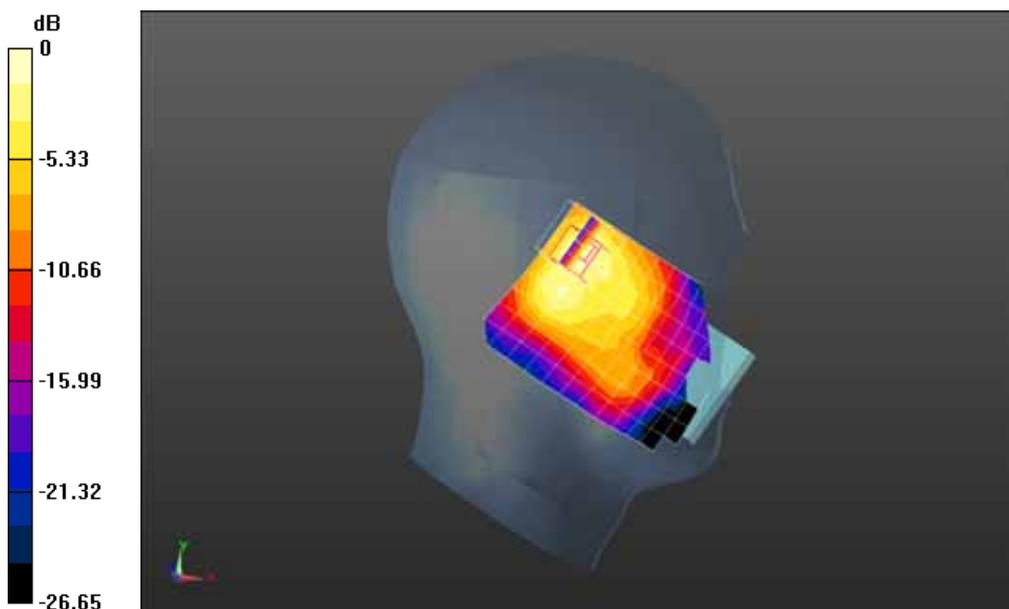
**Configuration/802.11b 2462MHz Touch-Left/Area Scan (9x13x1):** Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 0.330 mW/g

**Configuration/802.11b 2462MHz Touch-Left/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 11.785 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 0.827 mW/g

**SAR(1 g) = 0.346 mW/g; SAR(10 g) = 0.160 mW/g** Maximum value of SAR (measured) = 0.400 mW/g



0 dB = 0.400 mW/g = -7.96 dB mW/g

Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

802.11b 2462MHz Tilt-Left

**DUT: WCDMA Digital Mobile Phone; Type: Y220-U17**

Communication System: Wi-Fi; Communication System Band: 802.11b; Duty Cycle: 1:1.0; Frequency: 2462 MHz; Medium parameters used:  $f = 2462$  MHz;  $\sigma = 1.86$  mho/m;  $\epsilon_r = 38.58$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Phantom section: Left Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(7.03, 7.03, 7.03); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

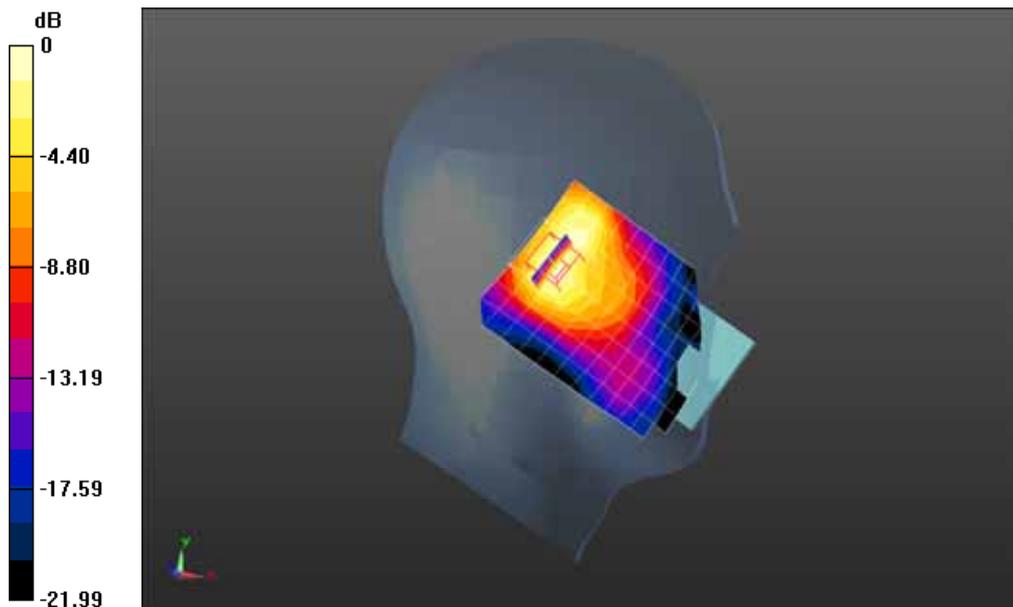
**Configuration/802.11b 2462MHz Tilt-Left/Area Scan (9x13x1):** Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 0.252 mW/g

**Configuration/802.11b 2462MHz Tilt-Left/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 11.631 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 0.467 mW/g

**SAR(1 g) = 0.234 mW/g; SAR(10 g) = 0.116 mW/g** Maximum value of SAR (measured) = 0.269 mW/g



0 dB = 0.269 mW/g = -11.40 dB mW/g

Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

802.11b 2462MHz Touch-Right

**DUT: WCDMA Digital Mobile Phone; Type: Y220-U17**

Communication System: Wi-Fi; Communication System Band: 802.11b; Duty Cycle: 1:1.0; Frequency: 2462 MHz; Medium parameters used:  $f = 2462$  MHz;  $\sigma = 1.86$  mho/m;  $\epsilon_r = 38.58$ ;  $\rho = 1000$  kg/m<sup>3</sup>; Phantom section: Right Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(7.03, 7.03, 7.03); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

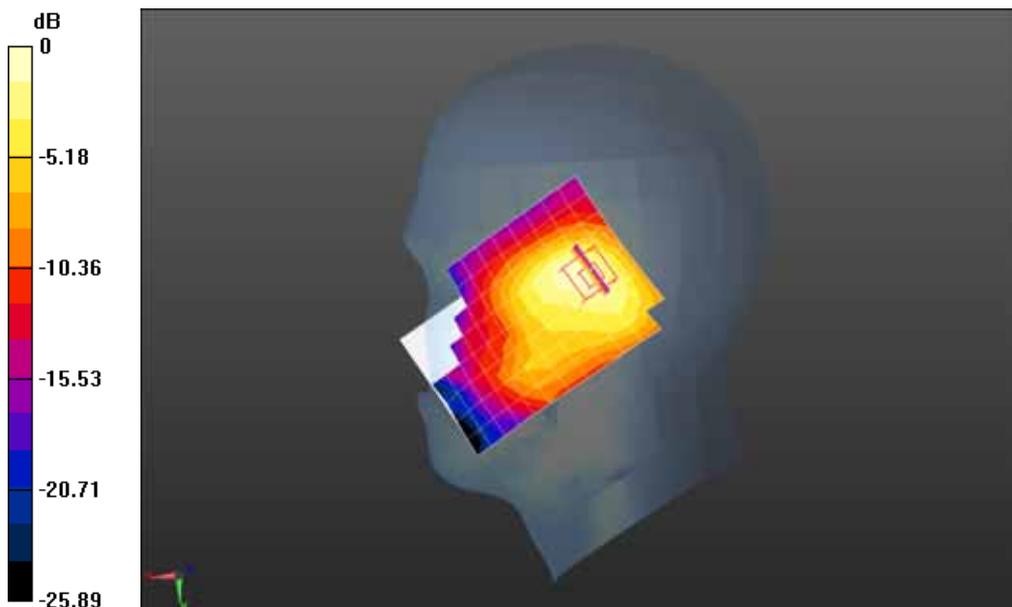
**Configuration/802.11b 2462MHz Touch-Right/Area Scan (9x13x1):** Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 0.284 mW/g

**Configuration/802.11b 2462MHz Touch-Right/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 12.616 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 0.538 mW/g

**SAR(1 g) = 0.267 mW/g; SAR(10 g) = 0.138 mW/g** Maximum value of SAR (measured) = 0.288 mW/g



0 dB = 0.288 mW/g = -10.81 dB mW/g

Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

802.11b 2462MHz Tilt-Right

**DUT: WCDMA Digital Mobile Phone; Type: Y220-U17**

Communication System: Wi-Fi; Communication System Band: 802.11b; Duty Cycle: 1:1.0; Frequency: 2462 MHz; Medium parameters used:  $f = 2462$  MHz;  $\sigma = 1.86$  mho/m;  $\epsilon_r = 38.58$ ;  $\rho = 1000$  kg/m<sup>3</sup>; Phantom section: Right Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(7.03, 7.03, 7.03); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

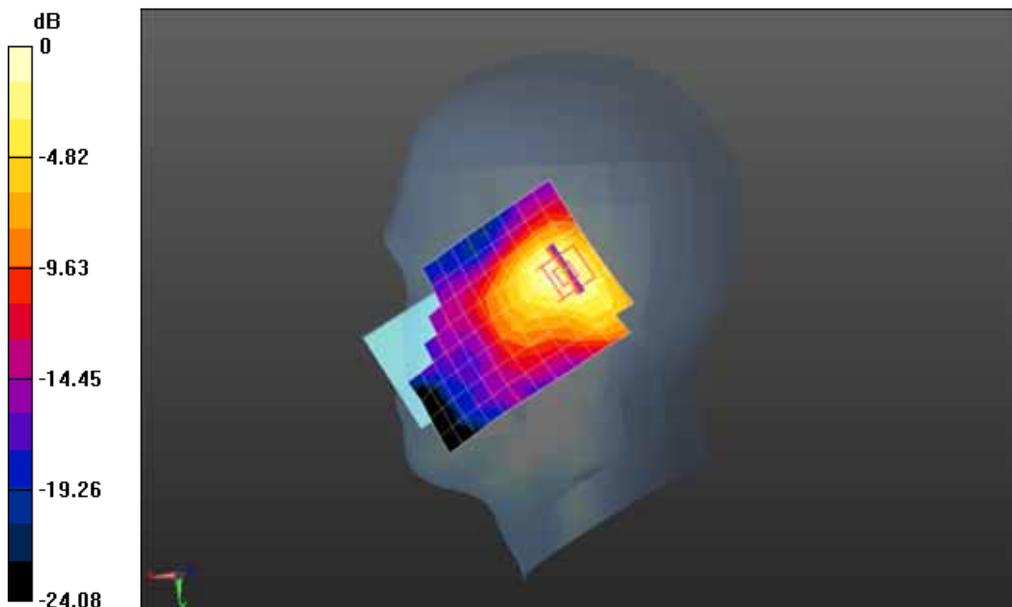
**Configuration/802.11b 2462MHz Tilt-Right/Area Scan (9x13x1):** Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 0.276 mW/g

**Configuration/802.11b 2462MHz Tilt-Right/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 12.210 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 0.489 mW/g

**SAR(1 g) = 0.246 mW/g; SAR(10 g) = 0.124 mW/g** Maximum value of SAR (measured) = 0.265 mW/g



0 dB = 0.265 mW/g = -11.54 dB mW/g

Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

802.11b 2462MHz Body-Back

**DUT: WCDMA Digital Mobile Phone; Type: HUAWEI Y220-U17**

Communication System: Wi-Fi; Communication System Band: 802.11b; Duty Cycle: 1:1.0; Frequency: 2462 MHz; Medium parameters used:  $f = 2462$  MHz;  $\sigma = 2.02$  mho/m;  $\epsilon_r = 52.25$ ;  $\rho = 1000$  kg/m<sup>3</sup>; Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(7.08, 7.08, 7.08); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

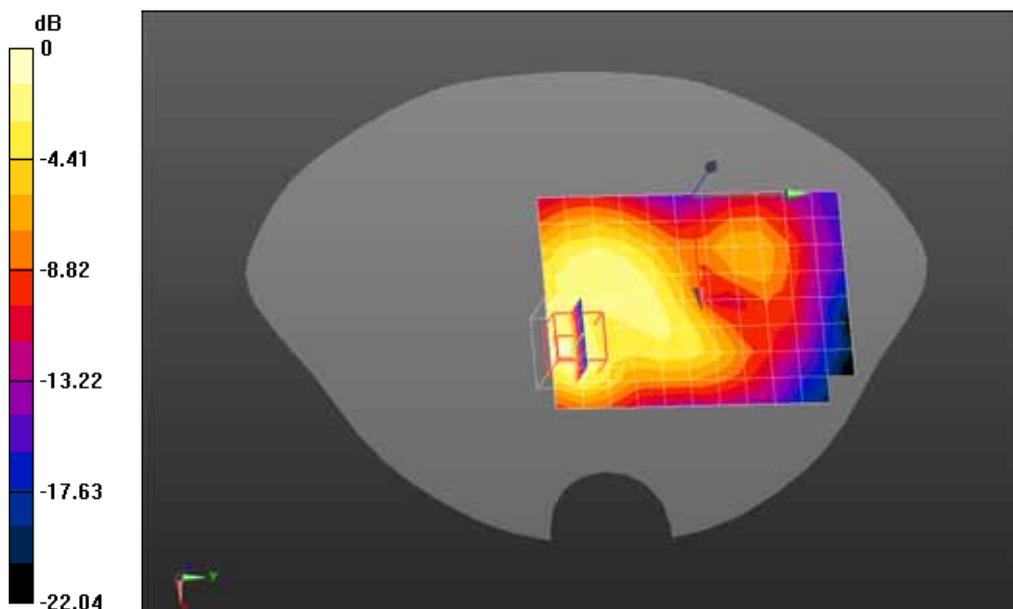
**Configuration/802.11b 2462MHz Body-Back/Area Scan (9x12x1):** Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 0.262 mW/g

**Configuration/802.11b 2462MHz Body-Back/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 9.093 V/m; Power Drift = 0.24 dB

Peak SAR (extrapolated) = 0.591 mW/g

**SAR(1 g) = 0.275 mW/g; SAR(10 g) = 0.129 mW/g** Maximum value of SAR (measured) = 0.301 mW/g



0 dB = 0.301 mW/g = -10.43 dB mW/g

Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

802.11b 2462MHz Body-Front

**DUT: WCDMA Digital Mobile Phone; Type: HUAWEI Y220-U17**

Communication System: Wi-Fi; Communication System Band: 802.11b; Duty Cycle: 1:1.0; Frequency: 2462 MHz; Medium parameters used:  $f = 2462$  MHz;  $\sigma = 2.02$  mho/m;  $\epsilon_r = 52.25$ ;  $\rho = 1000$  kg/m<sup>3</sup>; Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(7.08, 7.08, 7.08); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

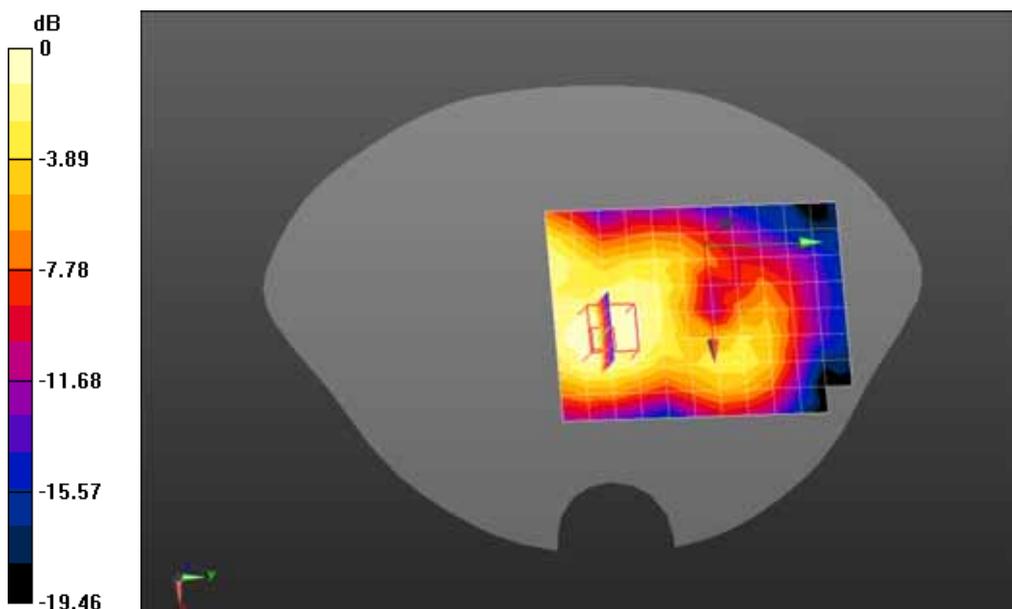
**Configuration/802.11b 2462MHz Body-Front/Area Scan (9x12x1):** Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 0.111 mW/g

**Configuration/802.11b 2462MHz Body-Front/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 6.747 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 0.177 mW/g

**SAR(1 g) = 0.104 mW/g; SAR(10 g) = 0.060 mW/g** Maximum value of SAR (measured) = 0.112 mW/g



0 dB = 0.112 mW/g = -19.02 dB mW/g

Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

802.11b 2462MHz Body-Right side

**DUT: WCDMA Digital Mobile Phone; Type: HUAWEI Y220-U17**

Communication System: Wi-Fi; Communication System Band: 802.11b; Duty Cycle: 1:1.0; Frequency: 2462 MHz; Medium parameters used:  $f = 2462$  MHz;  $\sigma = 2.02$  mho/m;  $\epsilon_r = 52.25$ ;  $\rho = 1000$  kg/m<sup>3</sup>; Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(7.08, 7.08, 7.08); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

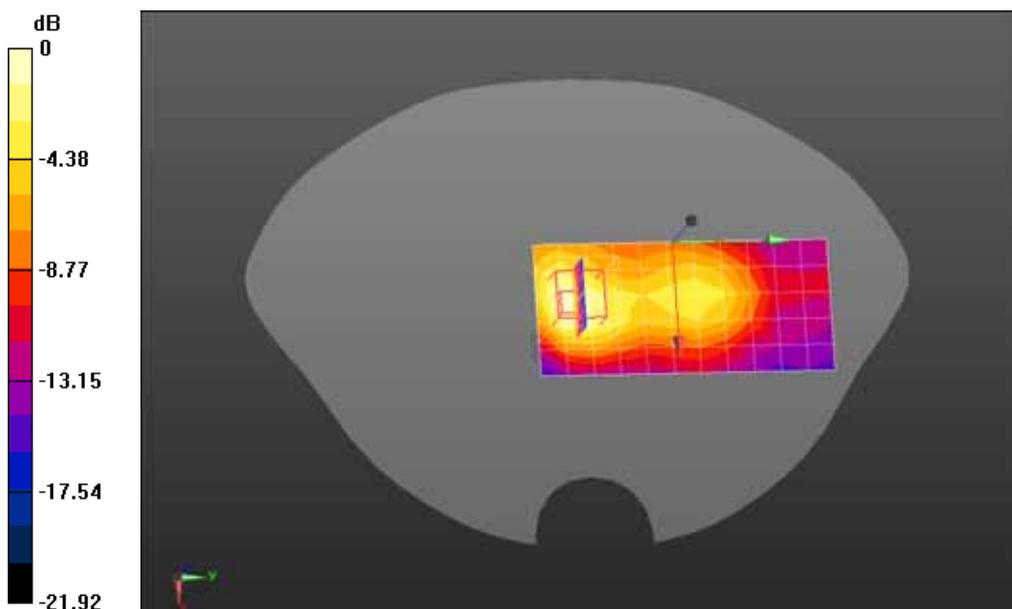
**Configuration/802.11b 2462MHz Body-Right side/Area Scan (6x12x1):** Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 0.181 mW/g

**Configuration/802.11b 2462MHz Body-Right side/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 9.652 V/m; Power Drift = -0.13 dB

Peak SAR (extrapolated) = 0.355 mW/g

**SAR(1 g) = 0.168 mW/g; SAR(10 g) = 0.081 mW/g** Maximum value of SAR (measured) = 0.187 mW/g



0 dB = 0.187 mW/g = -14.56 dB mW/g

Date/Time: 16-07-2013

Test Laboratory: QuieTek Lab

802.11b 2462MHz Body-Top

**DUT: WCDMA Digital Mobile Phone; Type: HUAWEI Y220-U17**

Communication System: Wi-Fi; Communication System Band: 802.11b; Duty Cycle: 1:1.0; Frequency: 2462 MHz; Medium parameters used:  $f = 2462$  MHz;  $\sigma = 2.02$  mho/m;  $\epsilon_r = 52.25$ ;  $\rho = 1000$  kg/m<sup>3</sup>; Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(7.08, 7.08, 7.08); Calibrated: 27/03/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 24/01/2013
- Phantom: SAM2; Type: SAM; Serial: TP1562
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

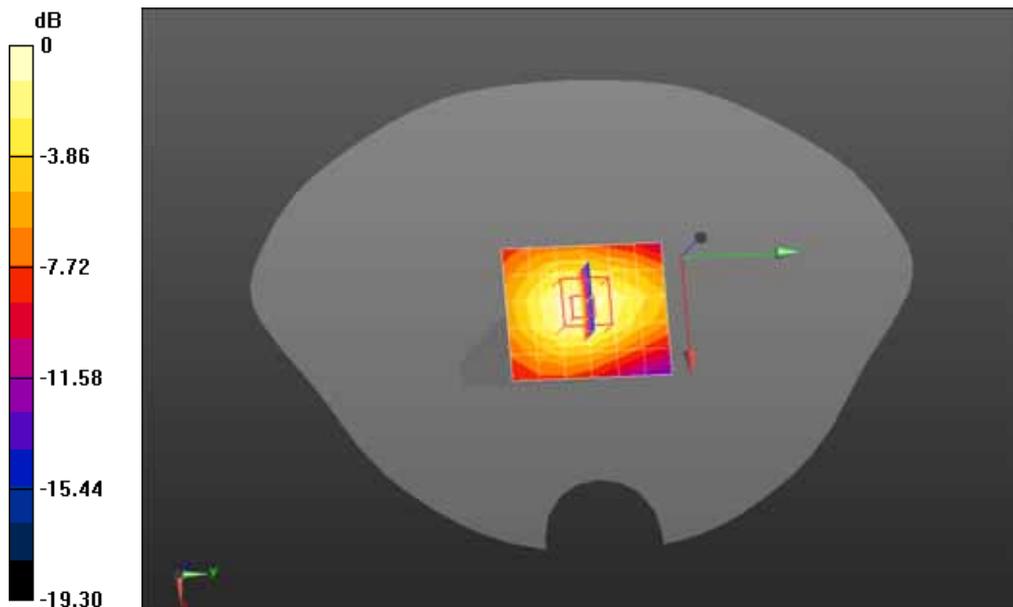
**Configuration/802.11b 2462MHz Body-Top/Area Scan (6x7x1):** Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 0.151 mW/g

**Configuration/802.11b 2462MHz Body-Top/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 8.990 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 0.277 mW/g

**SAR(1 g) = 0.147 mW/g; SAR(10 g) = 0.078 mW/g** Maximum value of SAR (measured) = 0.162 mW/g



0 dB = 0.162 mW/g = -15.81 dB mW/g

**Appendix D. Probe Calibration Data**

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



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

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

Accreditation No.: **SCS 108**

Client **Quietek-CN (Auden)**

Certificate No: **EX3-3710\_Mar13**

<b>CALIBRATION CERTIFICATE</b>	
Object	EX3DV4 - SN:3710
Calibration procedure(s)	QA CAL-01.v8, QA CAL-12.v7, QA CAL-14.v3, QA CAL-25.v4, QA CAL-25.v4 Calibration procedure for dosimetric E-field probes
Calibration date:	March 27, 2013
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	29-Mar-12 (No. 217-01508)	Apr-13
Power sensor E4412A	MY41498087	29-Mar-12 (No. 217-01508)	Apr-13
Reference 3 dB Attenuator	SN: S5054 (3c)	27-Mar-12 (No. 217-01531)	Apr-13
Reference 20 dB Attenuator	SN: S5086 (20b)	27-Mar-12 (No. 217-01528)	Apr-13
Reference 30 dB Attenuator	SN: S5129 (30b)	27-Mar-12 (No. 217-01532)	Apr-13
Reference Probe ES3DV2	SN: 3013	28-Dec-12 (No. ES1-3013_Dec12)	Dec-12
DAE4	SN: 660	31-Jan-13 (No. DAE4-660_Jan13)	Jan-14
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-09 (in house check Apr-11)	In house check: Apr-13
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-12)	In house check: Oct-13

Calibrated by:	Name Claudio Leubler	Function Laboratory Technician	Signature 
Approved by:	Name Katja Pokovic	Function Technical Manager	Signature 
			Issued: April 2, 2013
This calibration certificate shall not be reproduced except in full without written approval of the laboratory.			

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



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

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

Accreditation No.: **SCS 108**

**Glossary:**

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

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

EX3DV4 – SN:3710

March 27, 2013

# Probe EX3DV4

## SN:3710

Manufactured: July 21, 2009  
Calibrated: March 27, 2013

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

EX3DV4- SN:3710

March 27, 2013

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

### Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ( $\mu\text{V}/(\text{V}/\text{m})^2$ ) <sup>A</sup>	0.51	0.56	0.45	$\pm 10.1\%$
DCP (mV) <sup>B</sup>	101.3	99.6	96.6	

### Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB $\sqrt{\mu\text{V}}$	C	D dB	VR mV	Unc <sup>C</sup> (k=2)
0	CW	X	0.0	0.0	1.0	0.00	159.5	$\pm 2.7\%$
		Y	0.0	0.0	1.0		182.9	
		Z	0.0	0.0	1.0		159.4	

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%.

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

<sup>B</sup> Numerical linearization parameter: uncertainty not required.

<sup>C</sup> Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

EX3DV4- SN:3710

March 27, 2013

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

### Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) <sup>c</sup>	Relative Permittivity <sup>f</sup>	Conductivity (S/m) <sup>f</sup>	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
450	43.5	0.87	9.87	9.87	9.87	0.14	1.30	± 13.4 %
750	41.9	0.89	9.94	9.94	9.94	0.29	0.99	± 12.0 %
835	41.5	0.90	9.52	9.52	9.52	0.39	0.83	± 12.0 %
900	41.5	0.97	9.50	9.50	9.50	0.70	0.63	± 12.0 %
1810	40.0	1.40	7.75	7.75	7.75	0.66	0.63	± 12.0 %
1950	40.0	1.40	7.47	7.47	7.47	0.75	0.59	± 12.0 %
2450	39.2	1.80	7.03	7.03	7.03	0.63	0.64	± 12.0 %
2600	39.0	1.96	6.83	6.83	6.83	0.50	0.74	± 12.0 %
3500	37.9	2.91	6.81	6.81	6.81	0.82	0.73	± 13.1 %
5200	36.0	4.66	4.86	4.86	4.86	0.45	1.80	± 13.1 %
5300	35.9	4.76	4.74	4.74	4.74	0.45	1.80	± 13.1 %
5500	35.6	4.96	4.50	4.50	4.50	0.50	1.80	± 13.1 %
5600	35.5	5.07	4.42	4.42	4.42	0.45	1.80	± 13.1 %
5800	35.3	5.27	4.43	4.43	4.43	0.50	1.80	± 13.1 %

<sup>c</sup> 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.

<sup>f</sup> 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 27, 2013

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

### Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) <sup>c</sup>	Relative Permittivity <sup>f</sup>	Conductivity (S/m) <sup>f</sup>	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
450	56.7	0.94	10.89	10.89	10.89	0.05	1.20	± 13.4 %
750	55.5	0.96	9.60	9.60	9.60	0.48	0.83	± 12.0 %
835	55.2	0.97	9.41	9.41	9.41	0.38	0.90	± 12.0 %
900	55.0	1.05	9.30	9.30	9.30	0.80	0.63	± 12.0 %
1810	53.3	1.52	7.60	7.60	7.60	0.42	0.81	± 12.0 %
1950	53.3	1.52	7.62	7.62	7.62	0.34	0.98	± 12.0 %
2450	52.7	1.95	7.08	7.08	7.08	0.76	0.56	± 12.0 %
2600	52.5	2.16	6.88	6.88	6.88	0.80	0.50	± 12.0 %
3500	51.3	3.31	6.38	6.38	6.38	1.00	0.57	± 13.1 %
5200	49.0	5.30	4.32	4.32	4.32	0.45	1.90	± 13.1 %
5300	48.9	5.42	4.16	4.16	4.16	0.45	1.90	± 13.1 %
5500	48.6	5.65	3.87	3.87	3.87	0.50	1.90	± 13.1 %
5600	48.5	5.77	3.89	3.89	3.89	0.40	1.90	± 13.1 %
5800	48.2	6.00	4.05	4.05	4.05	0.50	1.90	± 13.1 %

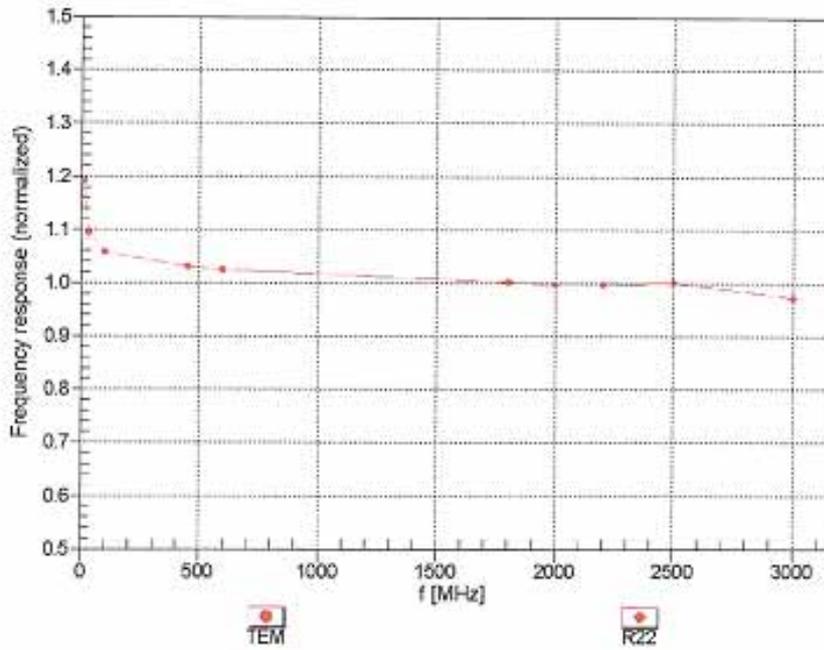
<sup>c</sup> Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

<sup>f</sup> At frequencies below 3 GHz, the validity of tissue parameters ( $\epsilon$  and  $\sigma$ ) 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 ( $\epsilon$  and  $\sigma$ ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

EX30V4- SN:3710

March 27, 2013

### Frequency Response of E-Field (TEM-Cell:if1110 EXX, Waveguide: R22)



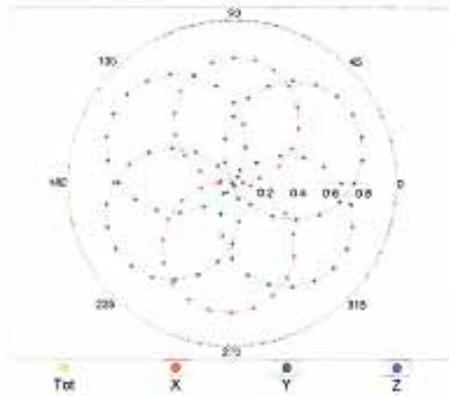
Uncertainty of Frequency Response of E-field:  $\pm 6.3\%$  (k=2)

EX3DV4-SN:3710

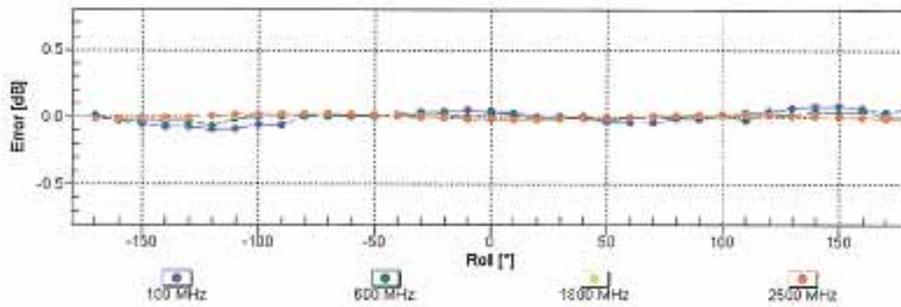
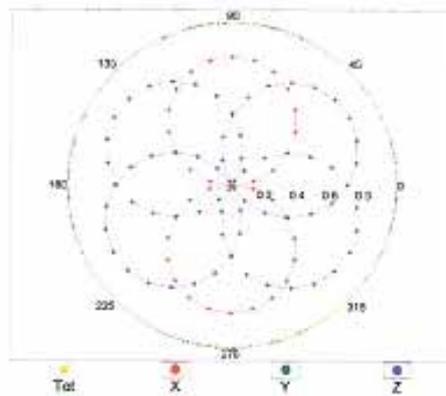
March 27, 2013

Receiving Pattern ( $\phi$ ),  $\theta = 0^\circ$

f=600 MHz, TEM



f=1800 MHz, R22

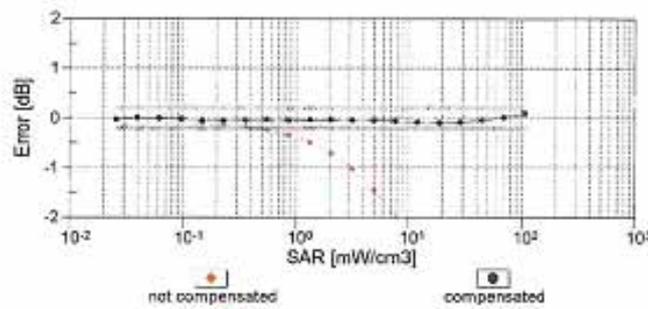
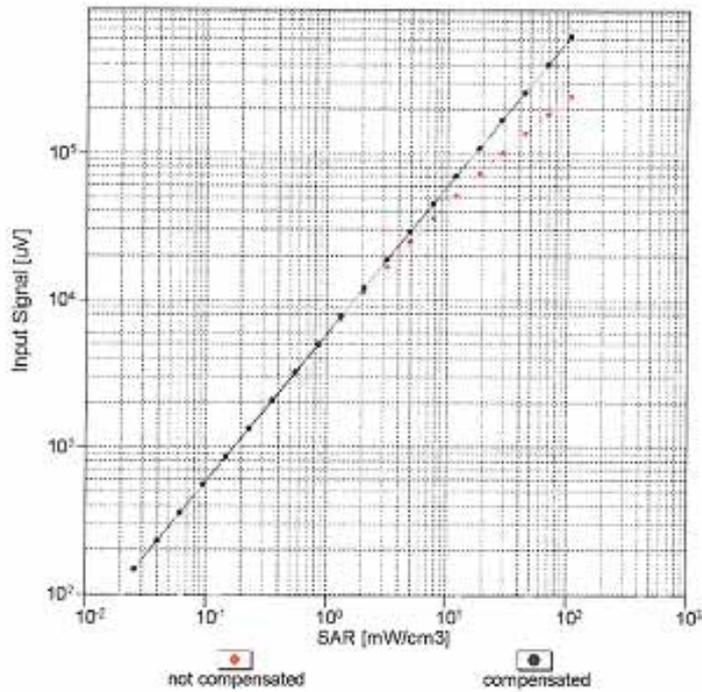


Uncertainty of Axial Isotropy Assessment:  $\pm 0.5\%$  (k=2)

EX3DV4- SN:3710

March 27, 2013

**Dynamic Range f(SAR<sub>head</sub>)**  
(TEM cell , f = 900 MHz)

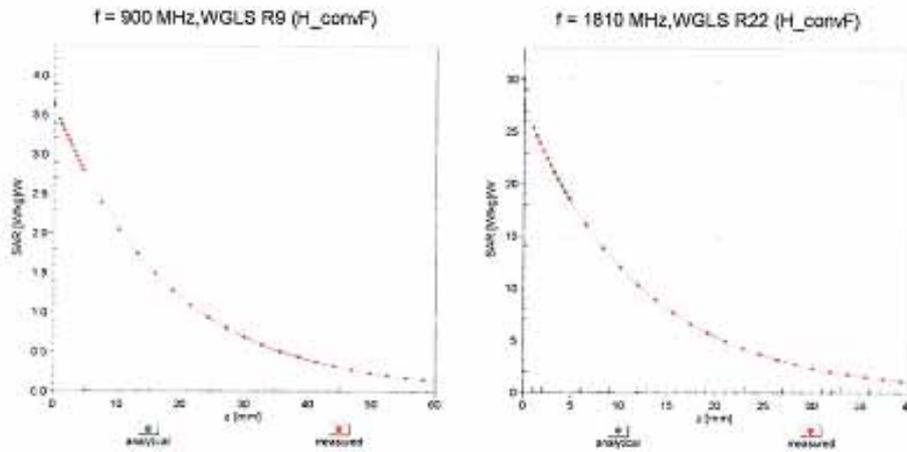


Uncertainty of Linearity Assessment: ± 0.6% (k=2)

EX3DV4- SN:3710

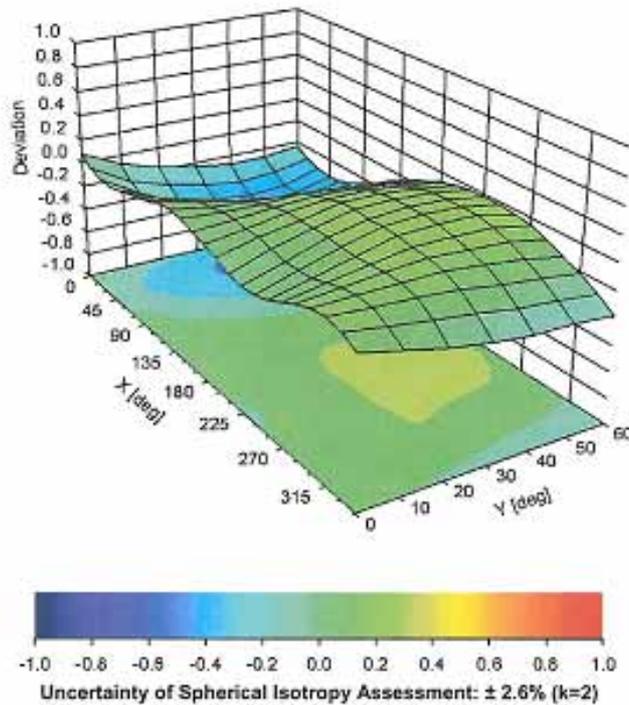
March 27, 2013

### Conversion Factor Assessment



### Deviation from Isotropy in Liquid

Error ( $\phi, \theta$ ), f = 900 MHz



EX3DV4- SN:3710

March 27, 2013

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

**Other Probe Parameters**

Sensor Arrangement	Triangular
Connector Angle (°)	-20.2
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	2 mm

## Appendix E. Dipole Calibration Data

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



**S** Schweizerischer Kalibrierdienst  
**C** Service suisse d'étalonnage  
**S** Servizio svizzero di taratura  
**S** 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: **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

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

Issued: February 17, 2012

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

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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**

**Glossary:**

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

**Calibration is Performed According to the Following Standards:**

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

**Additional Documentation:**

- d) DASY4/5 System Handbook

**Methods Applied and Interpretation of Parameters:**

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

**Measurement Conditions**

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

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

**Head TSL parameters**

The following parameters and calculations were applied.

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

**SAR result with Head TSL**

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

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

**Body TSL parameters**

The following parameters and calculations were applied.

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

**SAR result with Body TSL**

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

SAR averaged over 10 cm <sup>3</sup> (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 $\Omega$ - 2.0 j $\Omega$
Return Loss	- 28.1 dB

**Antenna Parameters with Body TSL**

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

**General Antenna Parameters and Design**

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

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

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

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

**Additional EUT Data**

Manufactured by	SPEAG
Manufactured on	September 15, 2009

## DASY5 Validation Report for Head TSL

Date: 17.02.2012

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: CW; Frequency: 835 MHz

Medium parameters used:  $f = 835$  MHz;  $\sigma = 0.89$  mho/m;  $\epsilon_r = 41$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

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

DASY52 Configuration:

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

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

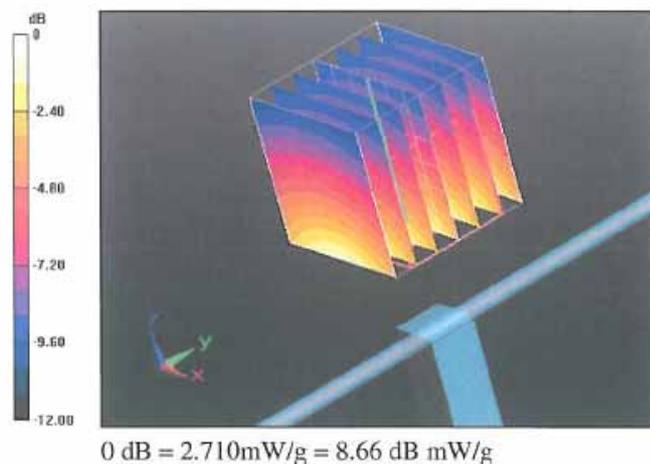
Measurement grid: dx=5mm, dy=5mm, dz=5mm

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

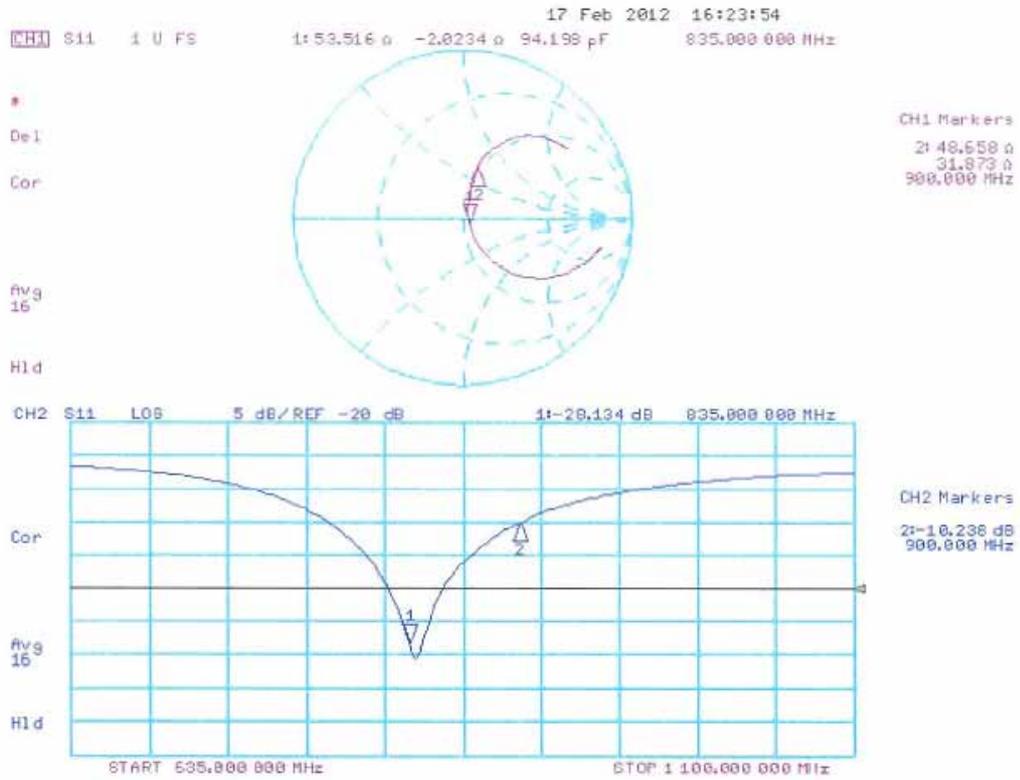
Peak SAR (extrapolated) = 3.4380

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

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



Impedance Measurement Plot for Head TSL



## DASY5 Validation Report for Body TSL

Date: 17.02.2012

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: CW; Frequency: 835 MHz

Medium parameters used:  $f = 835$  MHz;  $\sigma = 1.01$  mho/m;  $\epsilon_r = 55.7$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

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

DASY52 Configuration:

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

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

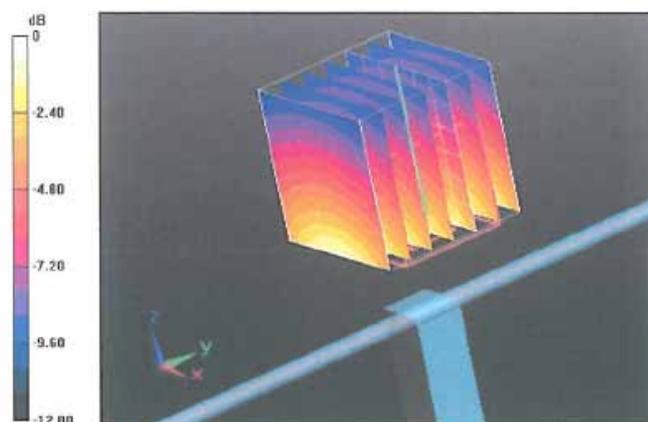
Measurement grid: dx=5mm, dy=5mm, dz=5mm

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

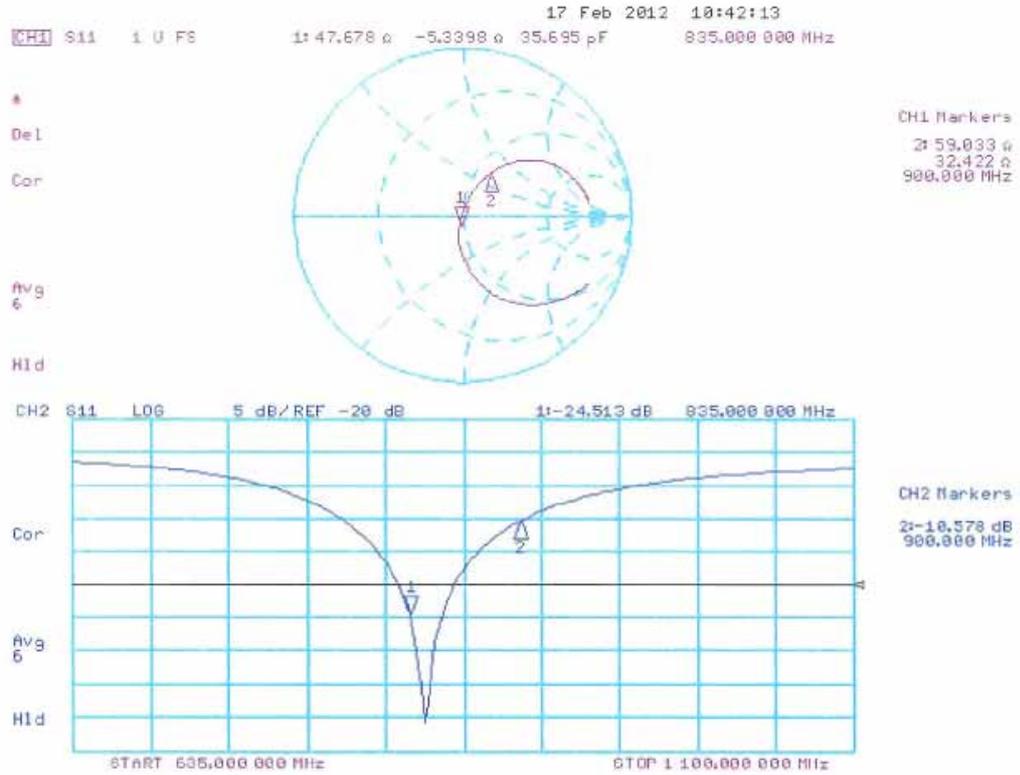
Peak SAR (extrapolated) = 3.5590

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

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



Impedance Measurement Plot for Body TSL



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Accreditation No.: **SCS 108**

Client **Quietek-CN (Auden)**

Certificate No: **D1800V2-2d179\_Feb12**

## CALIBRATION CERTIFICATE

Object: **D1800V2 - SN: 2d179**

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

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Accreditation No.: **SCS 108**

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- 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.
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- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

**Measurement Conditions**

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

DASY Version	DASY5	V52.8.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1800 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	40.5 ± 6 %	1.34 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

**SAR result with Head TSL**

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.17 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	<b>37.8 mW / g ± 17.0 % (k=2)</b>

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.91 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	<b>20.0 mW / g ± 16.5 % (k=2)</b>

**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	53.1 ± 6 %	1.49 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

**SAR result with Body TSL**

SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	9.27 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	<b>37.5 mW / g ± 17.0 % (k=2)</b>

SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL	condition	
SAR measured	250 mW input power	4.92 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	<b>19.8 mW / g ± 16.5 % (k=2)</b>

**Appendix**

**Antenna Parameters with Head TSL**

Impedance, transformed to feed point	50.2 $\Omega$ - 2.9 j $\Omega$
Return Loss	- 30.7 dB

**Antenna Parameters with Body TSL**

Impedance, transformed to feed point	46.1 $\Omega$ - 2.8 j $\Omega$
Return Loss	- 26.0 dB

**General Antenna Parameters and Design**

Electrical Delay (one direction)	1.214 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 05, 2008

**DASY5 Validation Report for Head TSL**

Date: 22.02.2012

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN: 2d179**

Communication System: CW; Frequency: 1800 MHz

Medium parameters used:  $f = 1800$  MHz;  $\sigma = 1.34$  mho/m;  $\epsilon_r = 40.5$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.07, 5.07, 5.07); 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:**

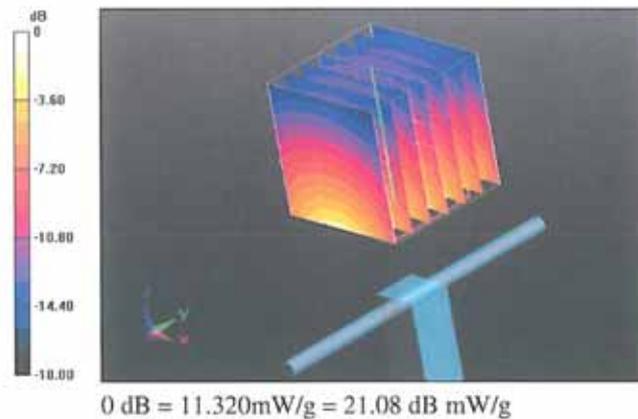
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 95.908 V/m; Power Drift = 0.04 dB

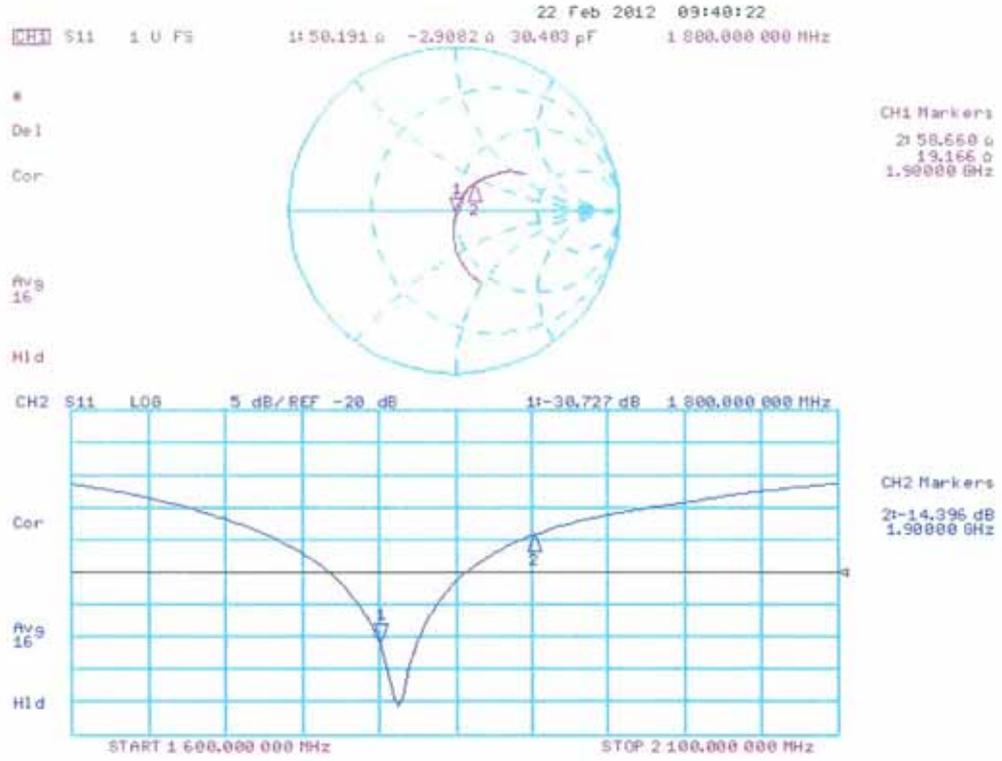
Peak SAR (extrapolated) = 16.0120

**SAR(1 g) = 9.17 mW/g; SAR(10 g) = 4.91 mW/g**

Maximum value of SAR (measured) = 11.315 mW/g



Impedance Measurement Plot for Head TSL



## DASY5 Validation Report for Body TSL

Date: 22.02.2012

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN: 2d179**

Communication System: CW; Frequency: 1800 MHz

Medium parameters used:  $f = 1800$  MHz;  $\sigma = 1.49$  mho/m;  $\epsilon_r = 53.1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.74, 4.74, 4.74); 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:

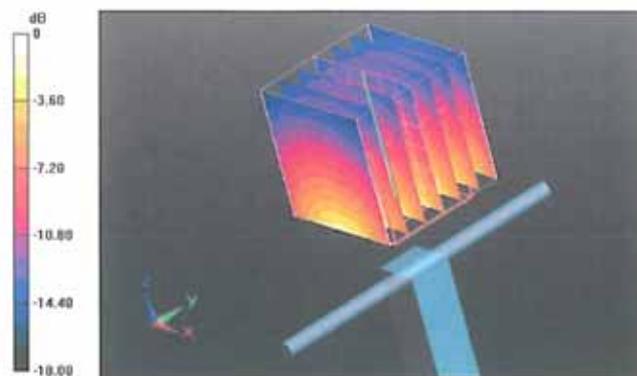
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 92.820 V/m; Power Drift = 0.0038 dB

Peak SAR (extrapolated) = 16.0810

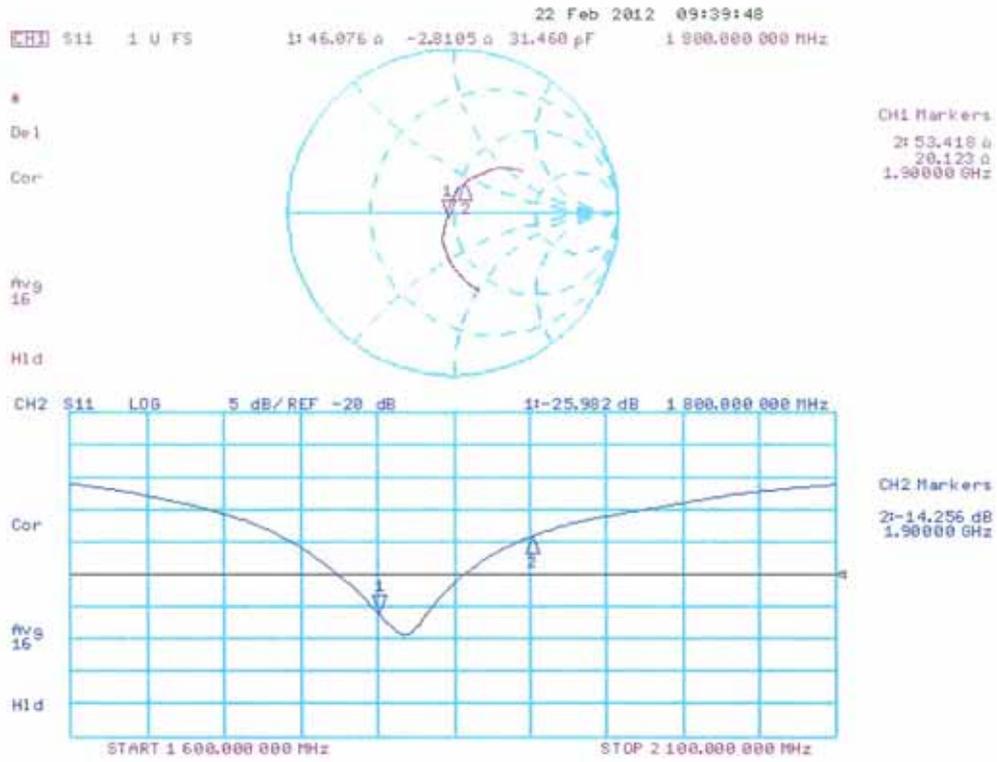
**SAR(1 g) = 9.27 mW/g; SAR(10 g) = 4.92 mW/g**

Maximum value of SAR (measured) = 11.751 mW/g



0 dB = 11.750mW/g = 21.40 dB mW/g

Impedance Measurement Plot for Body TSL



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Accreditation No.: **SCS 108**

Client **Quietek-CN (Auden)**

Certificate No: **D1900V2-5d121\_Feb12**

## CALIBRATION CERTIFICATE

Object: **D1900V2 - SN: 5d121**

Calibration procedure(s): **QA CAL-05.v8  
Calibration procedure for dipole validation kits above 700 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: 6047.2 / 06327	29-Mar-11 (No. 217-01371)	Apr-12
Reference Probe ES3DV3	SN: 3205	30-Dec-11 (No. ES3-3205_Dec11)	Dec-12
DAE4	SN: 601	04-Jul-11 (No. DAE4-601_Jul11)	Jul-12
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-11)	In house check: Oct-13
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-11)	In house check: Oct-13
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-11)	In house check: Oct-12

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

Issued: February 22, 2012

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Accreditation No.: **SCS 108**

**Glossary:**

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

**Calibration is Performed According to the Following Standards:**

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

**Additional Documentation:**

- d) DASY4/5 System Handbook

**Methods Applied and Interpretation of Parameters:**

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

**Measurement Conditions**

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

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

**Head TSL parameters**

The following parameters and calculations were applied.

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

**SAR result with Head TSL**

SAR averaged over 1 cm <sup>3</sup> (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	<b>39.4 mW / g ± 17.0 % (k=2)</b>

SAR averaged over 10 cm <sup>3</sup> (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	<b>20.8 mW / g ± 16.5 % (k=2)</b>

**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 <sup>3</sup> (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	<b>38.7 mW / g ± 17.0 % (k=2)</b>

SAR averaged over 10 cm <sup>3</sup> (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	<b>20.4 mW / g ± 16.5 % (k=2)</b>

**Appendix**

**Antenna Parameters with Head TSL**

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

**Antenna Parameters with Body TSL**

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

**General Antenna Parameters and Design**

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

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

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

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

**Additional EUT Data**

Manufactured by	SPEAG
Manufactured on	August 25, 2009

## DASY5 Validation Report for Head TSL

Date: 22.02.2012

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: CW; Frequency: 1900 MHz

Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.4$  mho/m;  $\epsilon_r = 40.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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:

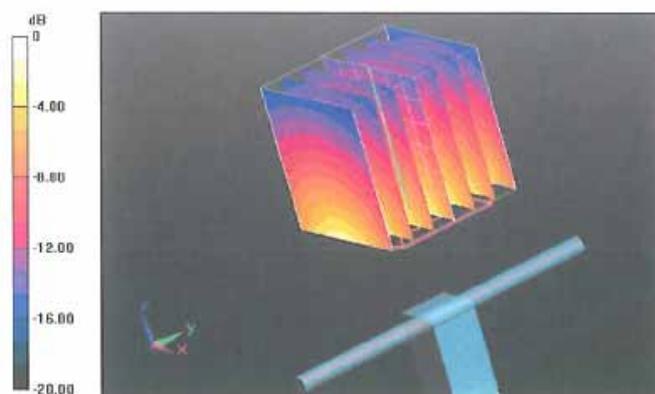
Measurement grid: dx=5mm, dy=5mm, dz=5mm

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

Peak SAR (extrapolated) = 17.5160

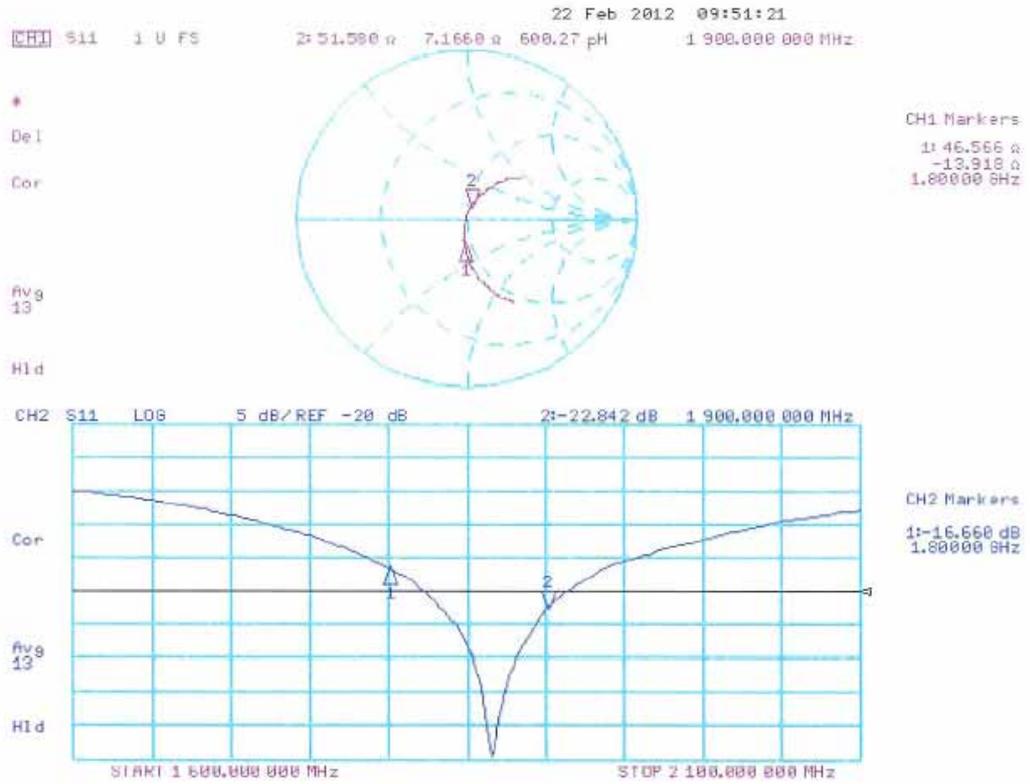
**SAR(1 g) = 9.84 mW/g; SAR(10 g) = 5.19 mW/g**

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



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

Impedance Measurement Plot for Head TSL



## DASY5 Validation Report for Body TSL

Date: 22.02.2012

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: CW; Frequency: 1900 MHz

Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.56$  mho/m;  $\epsilon_r = 53$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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:

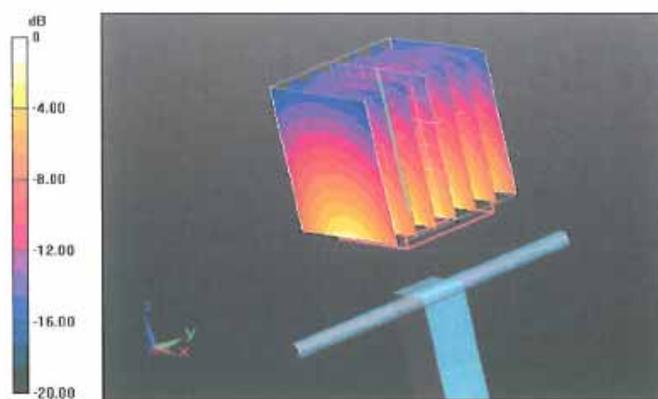
Measurement grid: dx=5mm, dy=5mm, dz=5mm

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

Peak SAR (extrapolated) = 17.3450

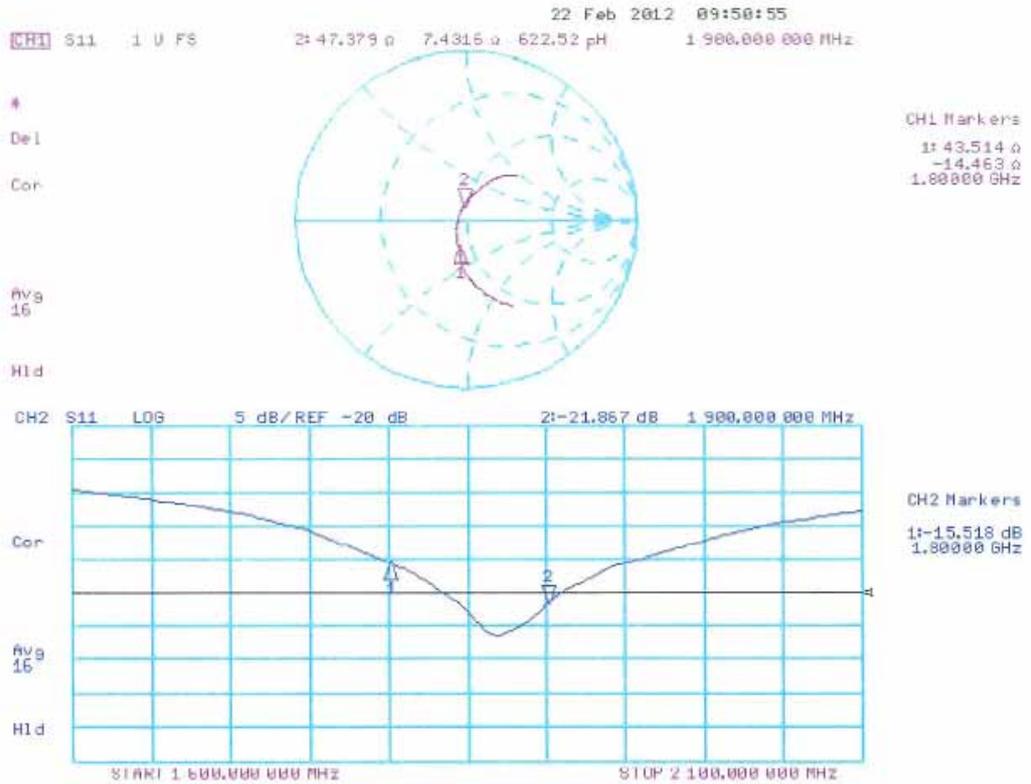
**SAR(1 g) = 9.84 mW/g; SAR(10 g) = 5.15 mW/g**

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

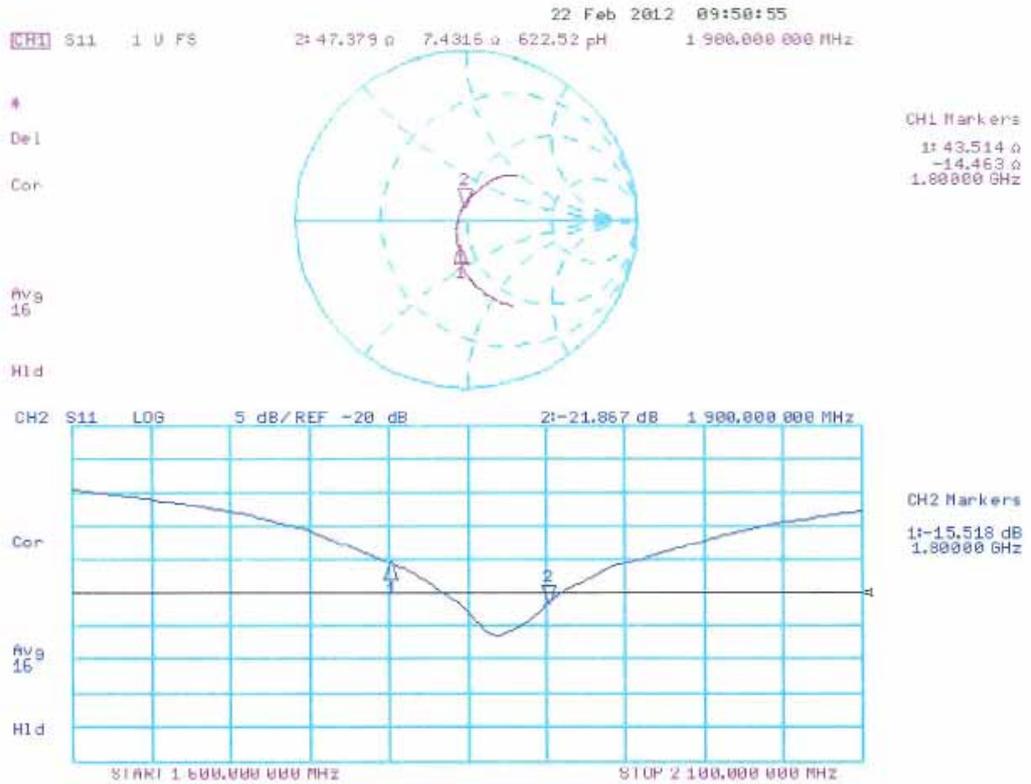


0 dB = 12.470mW/g = 21.92 dB mW/g

Impedance Measurement Plot for Body TSL



Impedance Measurement Plot for Body TSL



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Accreditation No.: **SCS 108**

Client **Quietek-CN (Auden)**

Certificate No: **D2450V2-839\_Feb12**

## CALIBRATION CERTIFICATE

Object **D2450V2 - SN: 839**

Calibration procedure(s) **QA CAL-05.v8  
Calibration procedure for dipole validation kits above 700 MHz**

Calibration date: **February 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 ± 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: 5017.2 / 06327	29-Mar-11 (No. 217-01371)	Apr-12
Reference Probe ES3DV3	SN: 3205	30-Dec-11 (No. ES3-3205_Dec11)	Dec-12
DAE4	SN: 601	04-Jul-11 (No. DAE4-601_Jul11)	Jul-12
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-11)	In house check: Oct-13
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-11)	In house check: Oct-13
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-11)	In house check: Oct-12

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

Issued: February 23, 2012

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**Glossary:**

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

**Calibration is Performed According to the Following Standards:**

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

**Additional Documentation:**

- d) DASY4/5 System Handbook

**Methods Applied and Interpretation of Parameters:**

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

**Measurement Conditions**

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

DASY Version	DASY5	V52.8.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

**Head TSL parameters**

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.9 ± 6 %	1.86 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

**SAR result with Head TSL**

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.2 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	<b>51.9 mW / g ± 17.0 % (k=2)</b>

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.09 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	<b>24.1 mW / g ± 16.5 % (k=2)</b>

**Body TSL parameters**

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.3 ± 6 %	2.02 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

**SAR result with Body TSL**

SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	12.4 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	<b>48.7 mW / g ± 17.0 % (k=2)</b>

SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.76 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	<b>22.8 mW / g ± 16.5 % (k=2)</b>

**Appendix**

**Antenna Parameters with Head TSL**

Impedance, transformed to feed point	55.7 $\Omega$ - 1.0 j $\Omega$
Return Loss	- 25.2 dB

**Antenna Parameters with Body TSL**

Impedance, transformed to feed point	52.1 $\Omega$ + 1.0 j $\Omega$
Return Loss	- 32.9 dB

**General Antenna Parameters and Design**

Electrical Delay (one direction)	1.160 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	July 20, 2009

**DASY5 Validation Report for Head TSL**

Date: 23.02.2012

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 839**

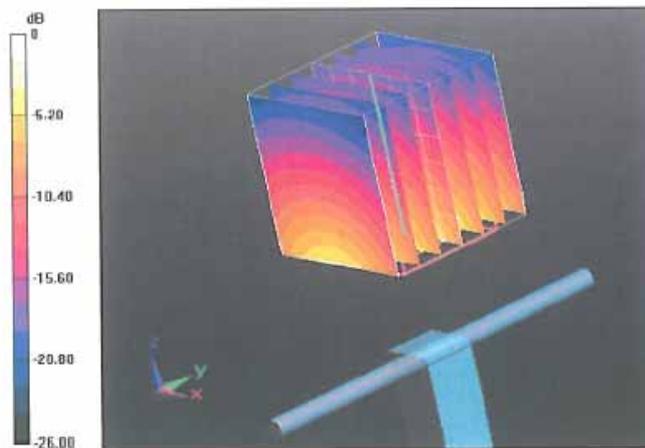
Communication System: CW; Frequency: 2450 MHz  
 Medium parameters used:  $f = 2450$  MHz;  $\sigma = 1.86$  mho/m;  $\epsilon_r = 38.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
 Phantom section: Flat Section  
 Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

**DASY52 Configuration:**

- Probe: ES3DV3 - SN3205; ConvF(4.45, 4.45, 4.45); 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)

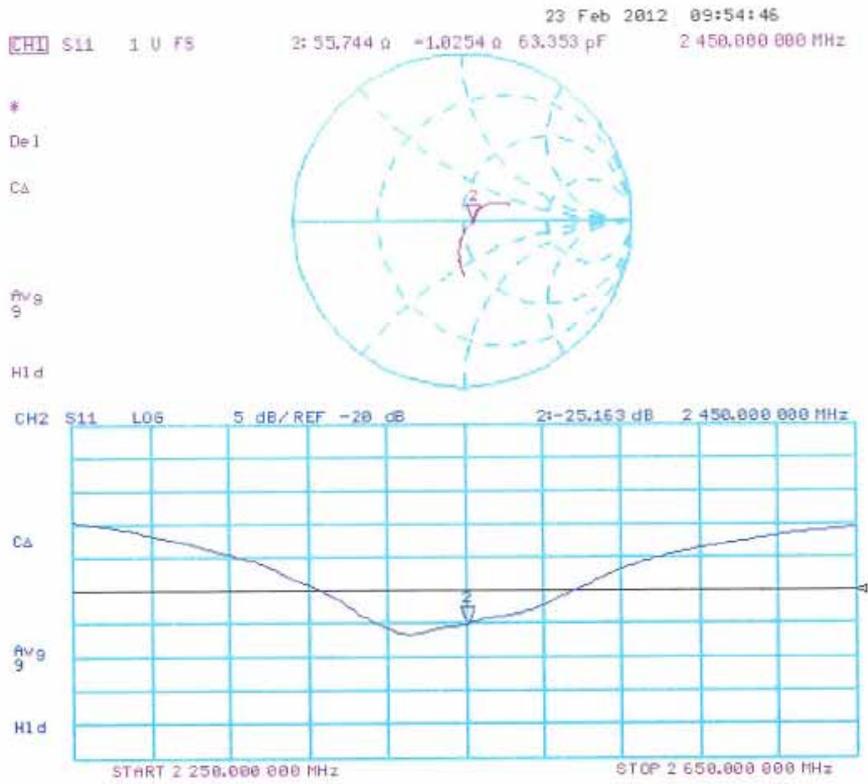
**Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:**

Measurement grid:  $dx=5$ mm,  $dy=5$ mm,  $dz=5$ mm  
 Reference Value = 98.155 V/m; Power Drift = 0.08 dB  
 Peak SAR (extrapolated) = 27.8700  
**SAR(1 g) = 13.2 mW/g; SAR(10 g) = 6.09 mW/g**  
 Maximum value of SAR (measured) = 16.839 mW/g



0 dB = 16.840mW/g = 24.53 dB mW/g

Impedance Measurement Plot for Head TSL



## DASY5 Validation Report for Body TSL

Date: 23.02.2012

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 839**

Communication System: CW; Frequency: 2450 MHz

Medium parameters used:  $f = 2450$  MHz;  $\sigma = 2.02$  mho/m;  $\epsilon_r = 52.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.26, 4.26, 4.26); 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:

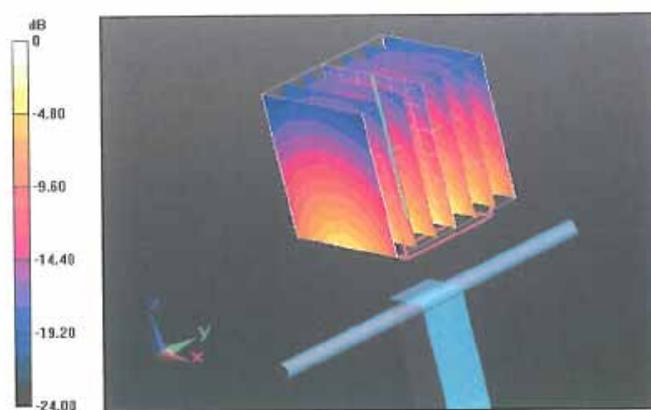
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 93.056 V/m; Power Drift = 0.0053 dB

Peak SAR (extrapolated) = 25.2250

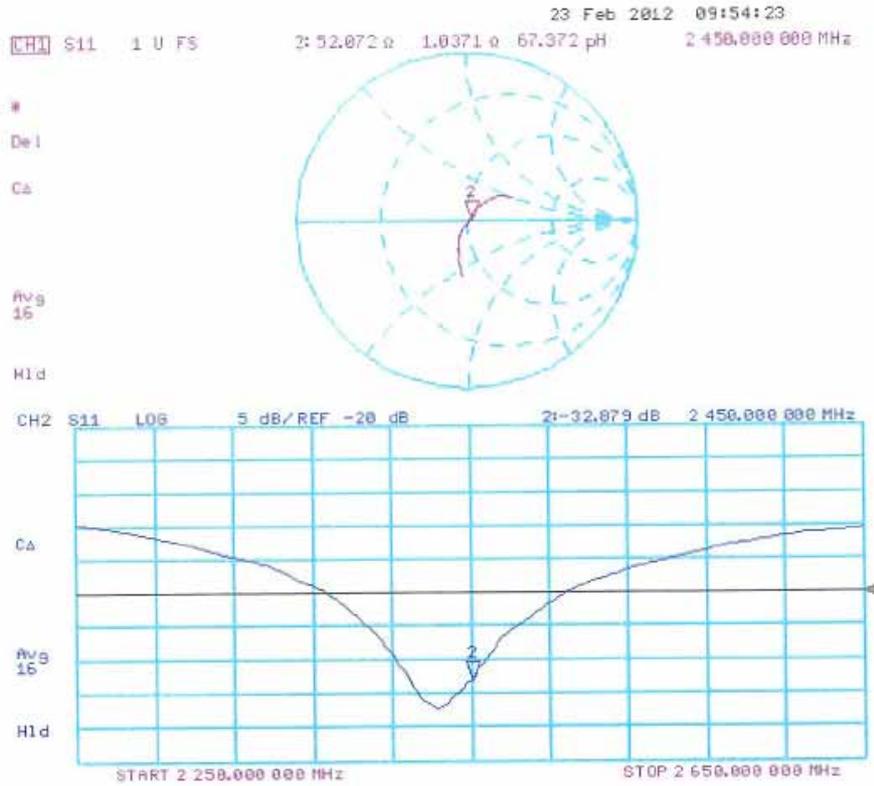
**SAR(1 g) = 12.4 mW/g; SAR(10 g) = 5.76 mW/g**

Maximum value of SAR (measured) – 16.258 mW/g



0 dB = 16.260mW/g = 24.22 dB mW/g

Impedance Measurement Plot for Body TSL



**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  
**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 **Quie Tek (Auden)**

Certificate No: **DAE4-1220\_Jan13**

**CALIBRATION CERTIFICATE**

Object	DAE4 - SD 000 D04 BJ - SN: 1220																						
Calibration procedure(s)	QA CAL-06.v25 Calibration procedure for the data acquisition electronics (DAE)																						
Calibration date:	January 24, 2013																						
<p>This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.</p> <p>All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity &lt; 70%.</p> <p>Calibration Equipment used (M&amp;TE critical for calibration)</p> <table border="1"> <thead> <tr> <th>Primary Standards</th> <th>ID #</th> <th>Cal Date (Certificate No.)</th> <th>Scheduled Calibration</th> </tr> </thead> <tbody> <tr> <td>Keithley Multimeter Type 2001</td> <td>SN: 0810278</td> <td>02-Oct-12 (No:12728)</td> <td>Oct-13</td> </tr> <tr> <th>Secondary Standards</th> <th>ID #</th> <th>Check Date (in house)</th> <th>Scheduled Check</th> </tr> <tr> <td>Auto DAE Calibration Unit</td> <td>SE UWS 053 AA 1001</td> <td>07-Jan-13 (in house check)</td> <td>In house check: Jan-14</td> </tr> <tr> <td>Calibrator Box V2.1</td> <td>SE UMS 006 AA 1002</td> <td>07-Jan-13 (in house check)</td> <td>In house check: Jan-14</td> </tr> </tbody> </table>				Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration	Keithley Multimeter Type 2001	SN: 0810278	02-Oct-12 (No:12728)	Oct-13	Secondary Standards	ID #	Check Date (in house)	Scheduled Check	Auto DAE Calibration Unit	SE UWS 053 AA 1001	07-Jan-13 (in house check)	In house check: Jan-14	Calibrator Box V2.1	SE UMS 006 AA 1002	07-Jan-13 (in house check)	In house check: Jan-14
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Calibrator Box V2.1	SE UMS 006 AA 1002	07-Jan-13 (in house check)	In house check: Jan-14																				
Calibrated by:	Name R Mayoraz	Function Technician	Signature <i>R Mayoraz</i>																				
Approved by:	Fin Bornholt	Deputy Technical Manager	<i>F Bornholt</i>																				
			Issued: January 24, 2013																				
This calibration certificate shall not be reproduced except in full without written approval of the laboratory.																							

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



**S** Schweizerischer Kalibrierdienst  
**S** Service suisse d'étalonnage  
**C** 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**

## Glossary

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

## Methods Applied and Interpretation of Parameters

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

**DC Voltage Measurement**

A/D - Converter Resolution nominal

High Range: 1LSB = 6.1 $\mu$ V, 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	405.203 $\pm$ 0.02% (k=2)	404.925 $\pm$ 0.02% (k=2)	404.155 $\pm$ 0.02% (k=2)
Low Range	3.97823 $\pm$ 1.55% (k=2)	3.99494 $\pm$ 1.55% (k=2)	3.98678 $\pm$ 1.55% (k=2)

**Connector Angle**

Connector Angle to be used in DASY system	176.5 $^{\circ}$ $\pm$ 1 $^{\circ}$
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## Appendix

### 1. DC Voltage Linearity

High Range	Reading ( $\mu\text{V}$ )	Difference ( $\mu\text{V}$ )	Error (%)
Channel X + Input	199994.51	-0.20	-0.00
Channel X + Input	20002.32	2.74	0.01
Channel X - Input	-19999.37	2.24	-0.01
Channel Y + Input	199995.12	0.58	0.00
Channel Y + Input	19999.79	0.15	0.00
Channel Y - Input	-20001.15	0.37	-0.00
Channel Z + Input	199993.80	-0.47	-0.00
Channel Z + Input	19998.06	-1.59	-0.01
Channel Z - Input	-20003.12	-1.65	0.01

Low Range	Reading ( $\mu\text{V}$ )	Difference ( $\mu\text{V}$ )	Error (%)
Channel X + Input	2000.11	0.30	0.02
Channel X + Input	199.89	-0.29	-0.15
Channel X - Input	-199.74	-0.14	0.07
Channel Y + Input	2000.30	0.54	0.03
Channel Y + Input	200.19	0.06	0.03
Channel Y - Input	-199.81	-0.14	0.07
Channel Z + Input	1999.40	-0.47	-0.02
Channel Z + Input	199.41	-0.98	-0.49
Channel Z - Input	-200.25	-0.72	0.36

### 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 ( $\mu\text{V}$ )	Low Range Average Reading ( $\mu\text{V}$ )
Channel X	200	9.11	7.73
	-200	-8.18	-9.59
Channel Y	200	-9.61	-9.37
	-200	8.21	8.45
Channel Z	200	12.18	11.90
	-200	-15.16	-14.84

### 3. Channel separation

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

	Input Voltage (mV)	Channel X ( $\mu\text{V}$ )	Channel Y ( $\mu\text{V}$ )	Channel Z ( $\mu\text{V}$ )
Channel X	200	-	2.08	-4.00
Channel Y	200	7.59	-	2.69
Channel Z	200	9.59	6.24	-

#### 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	15892	15975
Channel Y	16014	16213
Channel Z	15705	16067

#### 5. Input Offset Measurement

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

Input 10M $\Omega$

	Average ( $\mu$ V)	min. Offset ( $\mu$ V)	max. Offset ( $\mu$ V)	Std. Deviation ( $\mu$ V)
Channel X	1.05	-0.80	2.18	0.45
Channel Y	-0.16	-1.22	0.92	0.45
Channel Z	-0.69	-2.22	0.60	0.48

#### 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