

<b>RTS</b> <b>RIM Testing Services</b>	Document <b>Appendix for the BlackBerry® Smartphone Model RBQ41GW SAR Report</b>		Page <b>1(22)</b>
Author Data <b>Shahriar Ninad</b>	Dates of Test <b>Oct 15-25, 2007</b>	Test Report No <b>RTS-0665-0710-08</b>	FCC ID: <b>L6ARBQ40GW</b>

**APPENDIX D: PROBE & DIPOLE CALIBRATION DATA**

<b>RTS</b> RIM Testing Services	Document <b>Appendix for the BlackBerry® Smartphone Model RBQ41GW SAR Report</b>		Page 2(22)
	Author Data <b>Shahriar Ninad</b>	Dates of Test <b>Oct 15-25, 2007</b>	Test Report No <b>RTS-0665-0710-08</b>
		FCC ID: <b>L6A RBQ40GW</b>	

**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 Federal Office of Metrology and Accreditation  
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 **RIM**

Certificate No: **ET3-1643\_Mar07**

CALIBRATION CERTIFICATE			
Object	ET3DV6 - SN:1643		
Calibration procedure(s)	QA CAL-01.v5 Calibration procedure for dosimetric E-field probes		
Calibration date:	March 9, 2007		
Condition of the calibrated item	In Tolerance		
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 (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	5-Apr-06 (METAS, No. 251-00557)	Apr-07
Power sensor E4412A	MY41495277	5-Apr-06 (METAS, No. 251-00557)	Apr-07
Power sensor E4412A	MY41498087	5-Apr-06 (METAS, No. 251-00557)	Apr-07
Reference 3 dB Attenuator	SN: S5054 (3c)	10-Aug-06 (METAS, No. 217-00592)	Aug-07
Reference 20 dB Attenuator	SN: S5086 (20b)	4-Apr-06 (METAS, No. 251-00558)	Apr-07
Reference 30 dB Attenuator	SN: S5129 (30b)	10-Aug-06 (METAS, No. 217-00593)	Aug-07
Reference Probe ES3DV2	SN: 3013	4-Jan-07 (SPEAG, No. ES3-3013_Jan07)	Jan-08
DAE4	SN: 654	21-Jun-06 (SPEAG, No. DAE4-654_Jun06)	Jun-07
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (SPEAG, in house check Nov-05)	In house check: Nov-07
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Oct-06)	In house check: Oct-07
Calibrated by:	Name Katja Pokovic	Function Technical Manager	Signature <i>Katja Pokovic</i>
Approved by:	Name Fin Bomholt	Function R&D Director	Signature <i>F. Bomholt</i>
			Issued: March 12, 2007
This calibration certificate shall not be reproduced except in full without written approval of the laboratory.			

<b>RTS</b> <b>RIM Testing Services</b>	Document <b>Appendix for the BlackBerry® Smartphone Model RBQ41GW SAR Report</b>		Page <b>3(22)</b>
	Author Data <b>Shahriar Ninad</b>	Dates of Test <b>Oct 15-25, 2007</b>	Test Report No <b>RTS-0665-0710-08</b>

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



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

Accredited by the Swiss Federal Office of Metrology and Accreditation  
 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  
 ConF sensitivity in TSL / NORM<sub>x,y,z</sub>  
 DCP diode compression point  
 Polarization  $\phi$   $\phi$  rotation around probe axis  
 Polarization  $\vartheta$   $\vartheta$  rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e.,  $\vartheta = 0$  is normal to probe axis

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

- 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  $\vartheta = 0$  ( $f \leq 900$  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 effect 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 (no uncertainty required). DCP does not depend on frequency nor media.
- **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.

<b>RTS</b> <b>RIM Testing Services</b>	Document <b>Appendix for the BlackBerry® Smartphone Model RBQ41GW SAR Report</b>		Page <b>4(22)</b>
	Author Data <b>Shahriar Ninad</b>	Dates of Test <b>Oct 15-25, 2007</b>	Test Report No <b>RTS-0665-0710-08</b>

ET3DV6 SN:1643

March 9, 2007

# Probe ET3DV6

## SN:1643

Manufactured: November 7, 2001  
Last calibrated: March 16, 2006  
Recalibrated: March 9, 2007

Calibrated for DASYS Systems

(Note: non-compatible with DASYS2 system!)

<b>RTS</b> <b>RIM Testing Services</b>	Document <b>Appendix for the BlackBerry® Smartphone Model RBQ41GW SAR Report</b>		Page <b>5(22)</b>
	Author Data <b>Shahriar Ninad</b>	Dates of Test <b>Oct 15-25, 2007</b>	Test Report No <b>RTS-0665-0710-08</b>

ET3DV6 SN:1643

March 9, 2007

### DASY - Parameters of Probe: ET3DV6 SN:1643

#### Sensitivity in Free Space<sup>A</sup>

#### Diode Compression<sup>B</sup>

NormX	1.73 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP X	94 mV
NormY	1.98 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP Y	96 mV
NormZ	1.71 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP Z	95 mV

#### Sensitivity in Tissue Simulating Liquid (Conversion Factors)

Please see Page 8.

#### Boundary Effect

TSL                      900 MHz      Typical SAR gradient: 5 % per mm

Sensor Center to Phantom Surface Distance		3.7 mm	4.7 mm
SAR <sub>be</sub> [%]	Without Correction Algorithm	9.0	4.6
SAR <sub>be</sub> [%]	With Correction Algorithm	0.1	0.3

TSL                      1810 MHz      Typical SAR gradient: 10 % per mm

Sensor Center to Phantom Surface Distance		3.7 mm	4.7 mm
SAR <sub>be</sub> [%]	Without Correction Algorithm	13.7	9.4
SAR <sub>be</sub> [%]	With Correction Algorithm	0.5	0.1

#### Sensor Offset

Probe Tip to Sensor Center                      2.7 mm

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 Page 8).

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

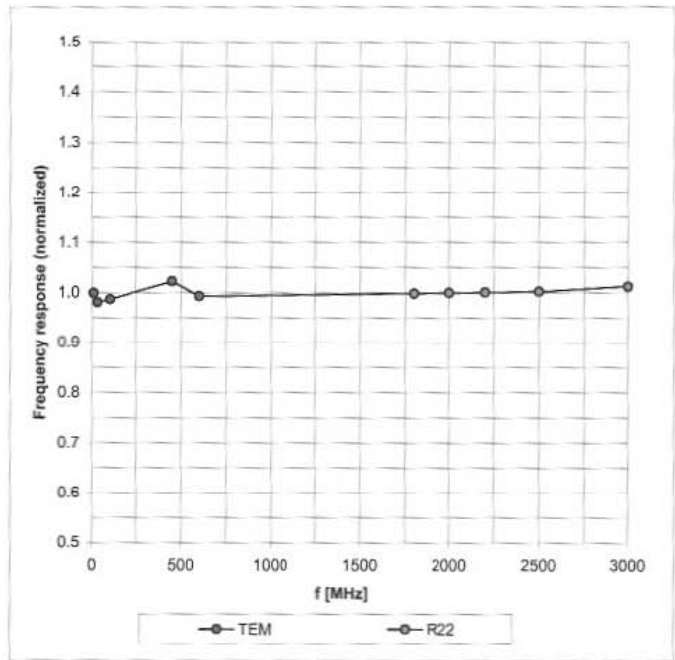
<b>RTS</b> RIM Testing Services	Document <b>Appendix for the BlackBerry® Smartphone Model RBQ41GW SAR Report</b>		Page 6(22)
	Author Data <b>Shahriar Ninad</b>	Dates of Test <b>Oct 15-25, 2007</b>	Test Report No <b>RTS-0665-0710-08</b>

ET3DV6 SN:1643

March 9, 2007

### Frequency Response of E-Field

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



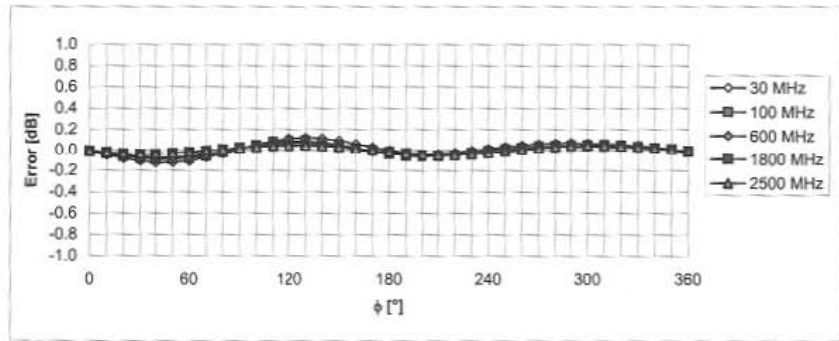
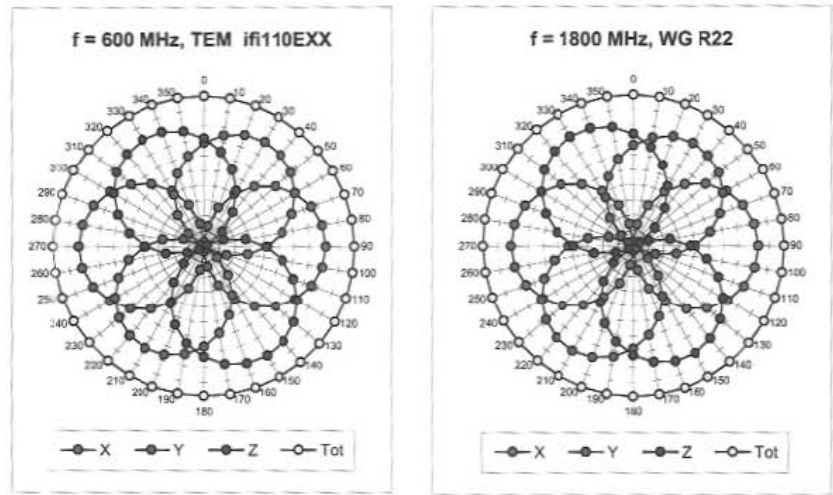
Uncertainty of Frequency Response of E-field:  $\pm 6.3\%$  (k=2)

<b>RTS</b> RIM Testing Services	Document <b>Appendix for the BlackBerry® Smartphone Model RBQ41GW SAR Report</b>		Page 7(22)
	Author Data <b>Shahriar Ninad</b>	Dates of Test <b>Oct 15-25, 2007</b>	Test Report No <b>RTS-0665-0710-08</b>

ET3DV6 SN:1643

March 9, 2007

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



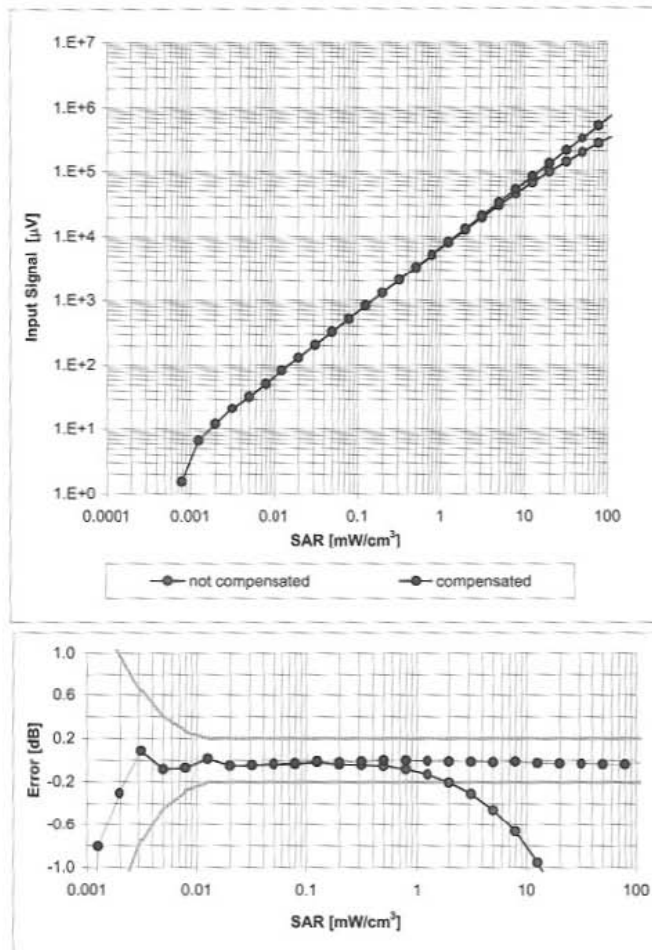
Uncertainty of Axial Isotropy Assessment:  $\pm 0.5\%$  (k=2)

<b>RTS</b> RIM Testing Services	Document <b>Appendix for the BlackBerry® Smartphone Model RBQ41GW SAR Report</b>		Page 8(22)
	Author Data <b>Shahriar Ninad</b>	Dates of Test <b>Oct 15-25, 2007</b>	Test Report No <b>RTS-0665-0710-08</b>

ET3DV6 SN:1643

March 9, 2007

**Dynamic Range  $f(SAR_{head})$**   
(Waveguide R22,  $f = 1800$  MHz)



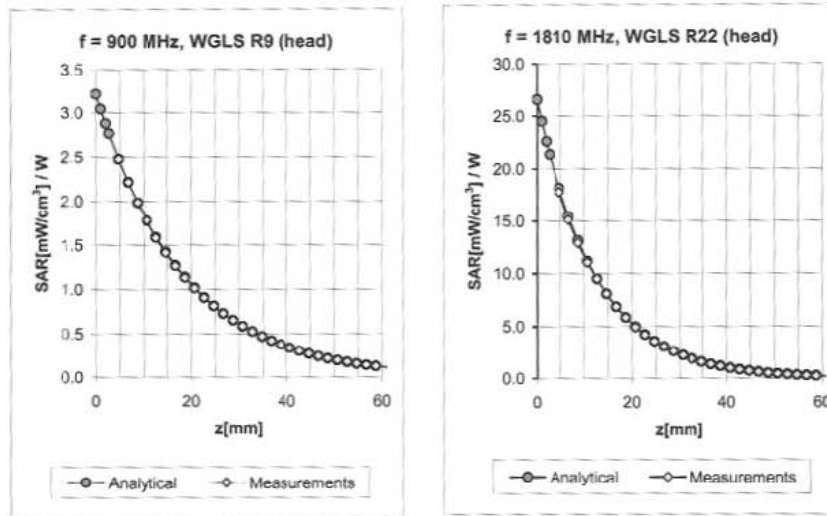
Uncertainty of Linearity Assessment:  $\pm 0.6\%$  ( $k=2$ )



ET3DV6 SN:1643

March 9, 2007

### Conversion Factor Assessment



f [MHz]	Validity [MHz] <sup>c</sup>	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.28	2.80	6.03 ± 11.0% (k=2)
1810	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.50	2.74	5.08 ± 11.0% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.32	2.89	6.02 ± 11.0% (k=2)
1810	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.67	2.38	4.75 ± 11.0% (k=2)

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

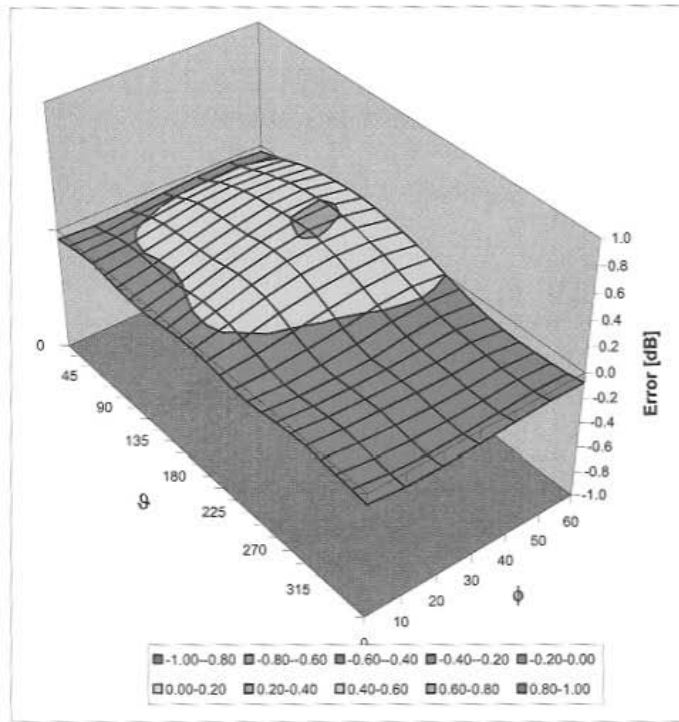
<b>RTS</b> RIM Testing Services	Document <b>Appendix for the BlackBerry® Smartphone Model RBQ41GW SAR Report</b>		Page 10(22)
	Author Data <b>Shahriar Ninad</b>	Dates of Test <b>Oct 15-25, 2007</b>	Test Report No <b>RTS-0665-0710-08</b>

ET3DV6 SN:1643

March 9, 2007

### Deviation from Isotropy in HSL

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



Uncertainty of Spherical Isotropy Assessment:  $\pm 2.6\%$  ( $k=2$ )

<b>RTS</b> <b>RIM Testing Services</b>	Document	Appendix for the BlackBerry® Smartphone Model RBQ41GW SAR Report		Page	11(22)
	Author Data	Dates of Test	Test Report No	FCC ID:	
Shahriar Ninad	Oct 15-25, 2007	RTS-0665-0710-08	L6A RBQ40GW		

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 Federal Office of Metrology and Accreditation  
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 **RIM**

Certificate No: D835V2-446\_Jan07

### CALIBRATION CERTIFICATE

Object	D835V2 - SN: 446
Calibration procedure(s)	QA CAL-05.v6 Calibration procedure for dipole validation kits
Calibration date:	January 8, 2007
Condition of the calibrated item	In Tolerance

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&E critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	03-Oct-06 (METAS, No. 217-00608)	Oct-07
Power sensor HP 8481A	US37292783	03-Oct-06 (METAS, No. 217-00608)	Oct-07
Reference 20 dB Attenuator	SN: 5085 (20g)	10-Aug-06 (METAS, No 217-00591)	Aug-07
Reference 10 dB Attenuator	SN: 5047.2 (10r)	10-Aug-06 (METAS, No 217-00591)	Aug-07
Reference Probe ET3DVB (HF)	SN 1507	19-Oct-06 (SPEAG, No. ET3-1507_Oct06)	Oct-07
DAE4	SN 907	20-Jul-06 (SPEAG, No. DAE4-907_Jul06)	Jul-07

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (SPEAG, in house check Oct-05)	In house check: Oct-07
RF generator Agilent E4421B	MY41000675	11-May-05 (SPEAG, in house check Nov-05)	In house check: Nov-07
Network Analyzer: HP 8753E	US37390585 S4205	18-Oct-01 (SPEAG, in house check Oct-06)	In house check: Oct-07

	Name	Function	Signature
Calibrated by:	Marcel Fahr	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: January 9, 2007

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

Certificate No: D835V2-446\_Jan07

Page 1 of 6

<b>RTS</b> RIM Testing Services	Document <b>Appendix for the BlackBerry® Smartphone Model RBQ41GW SAR Report</b>		Page 12(22)
	Author Data <b>Shahriar Ninad</b>	Dates of Test <b>Oct 15-25, 2007</b>	Test Report No <b>RTS-0665-0710-08</b>
		FCC ID: <b>L6A RBQ40GW</b>	

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 Federal Office of Metrology and Accreditation  
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:**

- 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
- CENELEC EN 50361, "Basic standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones (300 MHz - 3 GHz), July 2001
- 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:**

- DASY4 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.

<b>RTS</b> <b>RIM Testing Services</b>	Document <b>Appendix for the BlackBerry® Smartphone Model RBQ41GW</b> <b>SAR Report</b>		Page <b>13(22)</b>
	Author Data <b>Shahriar Ninad</b>	Dates of Test <b>Oct 15-25, 2007</b>	Test Report No <b>RTS-0665-0710-08</b>

### Measurement Conditions

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

DASY Version	DASY4	V4.7
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V4.9	
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	40.2 ± 6 %	0.88 mho/m ± 6 %
Head TSL temperature during test	(22.2 ± 0.2) °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	2.33 mW / g
SAR normalized	normalized to 1W	9.32 mW / g
SAR for nominal Head TSL parameters <sup>1</sup>	normalized to 1W	<b>9.28 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	1.52 mW / g
SAR normalized	normalized to 1W	6.08 mW / g
SAR for nominal Head TSL parameters <sup>1</sup>	normalized to 1W	<b>6.04 mW / g ± 16.5 % (k=2)</b>

<sup>1</sup> Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

<b>RTS</b> <b>RIM Testing Services</b>	Document <b>Appendix for the BlackBerry® Smartphone Model RBQ41GW SAR Report</b>		Page <b>14(22)</b>
	Author Data <b>Shahriar Ninad</b>	Dates of Test <b>Oct 15-25, 2007</b>	Test Report No <b>RTS-0665-0710-08</b>

## Appendix

### Antenna Parameters with Head TSL

Impedance, transformed to feed point	50.8 $\Omega$ - 5.8 j $\Omega$
Return Loss	- 24.7 dB

### General Antenna Parameters and Design

Electrical Delay (one direction)	1.386 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. 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	October 24, 2001

<b>RTS</b> <b>RIM Testing Services</b>	Document <b>Appendix for the BlackBerry® Smartphone Model RBQ41GW SAR Report</b>		Page <b>15(22)</b>
	Author Data <b>Shahriar Ninad</b>	Dates of Test <b>Oct 15-25, 2007</b>	Test Report No <b>RTS-0665-0710-08</b>

**DASY4 Validation Report for Head TSL**

Date/Time: 08.01.2007 11:34:46

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 446**

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: HSL 900 MHz;

Medium parameters used:  $f = 835 \text{ MHz}$ ;  $\sigma = 0.88 \text{ mho/m}$ ;  $\epsilon_r = 40.3$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

**DASY4 Configuration:**

- Probe: ET3DV6 - SN1507 (HF); ConvF(6.09, 6.09, 6.09); Calibrated: 19.10.2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn907; Calibrated: 20.07.2006
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; ;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

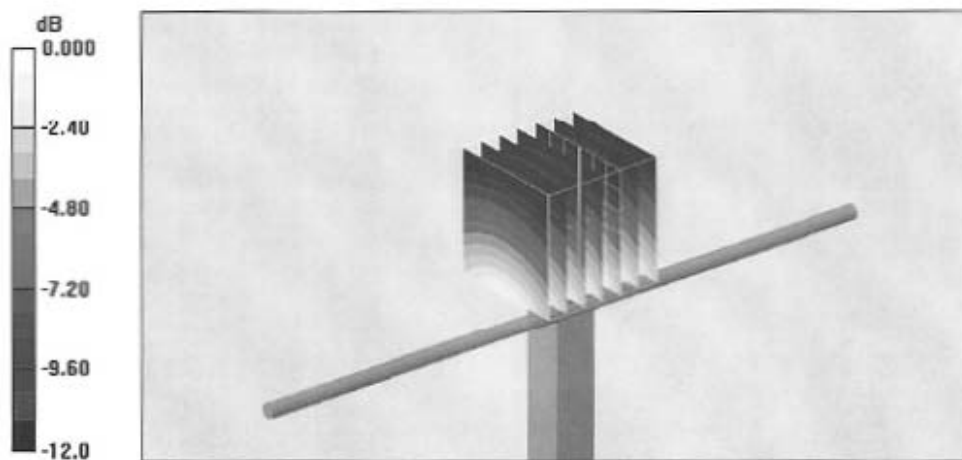
**Pin = 250 mW; d = 15 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm**

Reference Value = 55.7 V/m; Power Drift = 0.017 dB

Peak SAR (extrapolated) = 3.43 W/kg

**SAR(1 g) = 2.33 mW/g; SAR(10 g) = 1.52 mW/g**

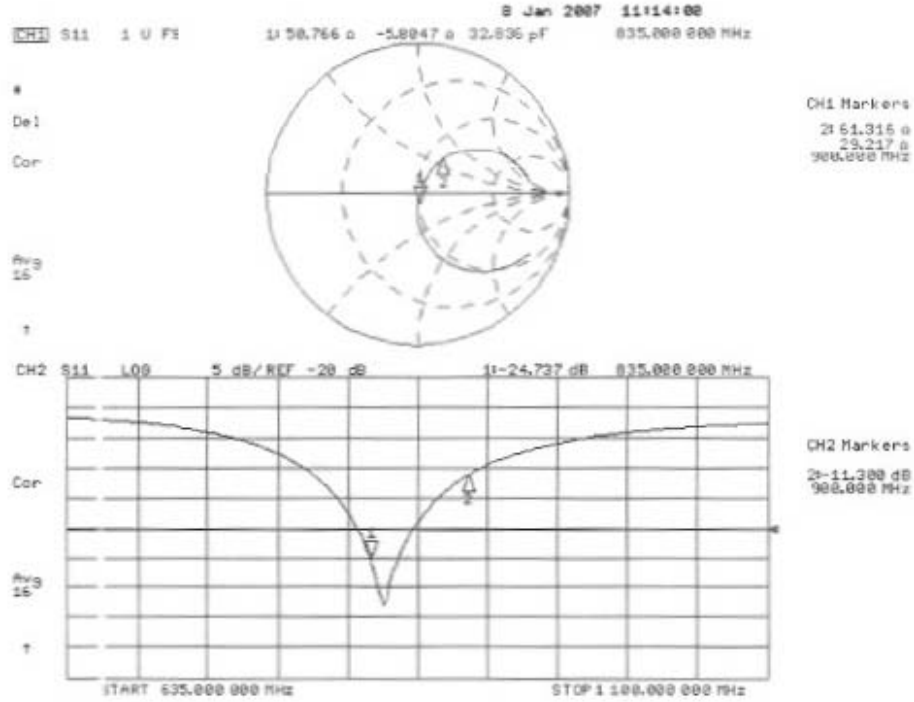
Maximum value of SAR (measured) = 2.51 mW/g



0 dB = 2.51mW/g

<b>RTS</b> RIM Testing Services	Document <b>Appendix for the BlackBerry® Smartphone Model RBQ41GW SAR Report</b>		Page 16(22)
	Author Data <b>Shahriar Ninad</b>	Dates of Test <b>Oct 15-25, 2007</b>	Test Report No <b>RTS-0665-0710-08</b>

**Impedance Measurement Plot for Head TSL**





<b>RTS</b> <b>RIM Testing Services</b>	Document	Appendix for the BlackBerry® Smartphone Model RBQ41GW SAR Report		Page	17(22)
	Author Data	Dates of Test	Test Report No	FCC ID:	
Shahriar Ninad	Oct 15-25, 2007	RTS-0665-0710-08	L6A RBQ40GW		

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 Federal Office of Metrology and Accreditation  
 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 RIM

Certificate No: D1900V2-545\_Jan07

CALIBRATION CERTIFICATE																																																			
Object	D1900V2 - SN: 545																																																		
Calibration procedure(s)	QA CAL-05.v6 Calibration procedure for dipole validation kits																																																		
Calibration date:	January 9, 2007																																																		
Condition of the calibrated item	In Tolerance																																																		
<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 (Calibrated by, Certificate No.)</th> <th>Scheduled Calibration</th> </tr> </thead> <tbody> <tr> <td>Power meter EPM-442A</td> <td>GB37480704</td> <td>03-Oct-06 (METAS, No. 217-00608)</td> <td>Oct-07</td> </tr> <tr> <td>Power sensor HP 8481A</td> <td>US37282783</td> <td>03-Oct-06 (METAS, No. 217-00608)</td> <td>Oct-07</td> </tr> <tr> <td>Reference 20 dB Attenuator</td> <td>SN: 5086 (20g)</td> <td>10-Aug-06 (METAS, No 217-00591)</td> <td>Aug-07</td> </tr> <tr> <td>Reference 10 dB Attenuator</td> <td>SN: 5047.2 (10r)</td> <td>10-Aug-06 (METAS, No 217-00591)</td> <td>Aug-07</td> </tr> <tr> <td>Reference Probe ET3DV6</td> <td>SN: 1507</td> <td>19-Oct-06 (SPEAG, No. ET3-1507_Oct06)</td> <td>Oct-07</td> </tr> <tr> <td>Reference Probe ES3DV3</td> <td>SN: 3025</td> <td>19-Oct-06 (SPEAG, No. ES3-3025_Oct06)</td> <td>Oct-07</td> </tr> <tr> <td>DAE4</td> <td>SN 907</td> <td>20-Jul-06 (SPEAG, No. DAE4-907_Jul06)</td> <td>Jul-07</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>Secondary Standards</th> <th>ID #</th> <th>Check Date (in house)</th> <th>Scheduled Check</th> </tr> </thead> <tbody> <tr> <td>Power sensor HP 8481A</td> <td>MY41092317</td> <td>18-Oct-02 (SPEAG, in house check Oct-05)</td> <td>In house check: Oct-07</td> </tr> <tr> <td>RF generator Agilent E4421B</td> <td>MY41000575</td> <td>11-May-05 (SPEAG, in house check Nov-05)</td> <td>In house check: Nov-07</td> </tr> <tr> <td>Network Analyzer HP 8753E</td> <td>US37390585 S4206</td> <td>18-Oct-01 (SPEAG, in house check Oct-06)</td> <td>In house check: Oct-07</td> </tr> </tbody> </table>				Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration	Power meter EPM-442A	GB37480704	03-Oct-06 (METAS, No. 217-00608)	Oct-07	Power sensor HP 8481A	US37282783	03-Oct-06 (METAS, No. 217-00608)	Oct-07	Reference 20 dB Attenuator	SN: 5086 (20g)	10-Aug-06 (METAS, No 217-00591)	Aug-07	Reference 10 dB Attenuator	SN: 5047.2 (10r)	10-Aug-06 (METAS, No 217-00591)	Aug-07	Reference Probe ET3DV6	SN: 1507	19-Oct-06 (SPEAG, No. ET3-1507_Oct06)	Oct-07	Reference Probe ES3DV3	SN: 3025	19-Oct-06 (SPEAG, No. ES3-3025_Oct06)	Oct-07	DAE4	SN 907	20-Jul-06 (SPEAG, No. DAE4-907_Jul06)	Jul-07	Secondary Standards	ID #	Check Date (in house)	Scheduled Check	Power sensor HP 8481A	MY41092317	18-Oct-02 (SPEAG, in house check Oct-05)	In house check: Oct-07	RF generator Agilent E4421B	MY41000575	11-May-05 (SPEAG, in house check Nov-05)	In house check: Nov-07	Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (SPEAG, in house check Oct-06)	In house check: Oct-07
Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration																																																
Power meter EPM-442A	GB37480704	03-Oct-06 (METAS, No. 217-00608)	Oct-07																																																
Power sensor HP 8481A	US37282783	03-Oct-06 (METAS, No. 217-00608)	Oct-07																																																
Reference 20 dB Attenuator	SN: 5086 (20g)	10-Aug-06 (METAS, No 217-00591)	Aug-07																																																
Reference 10 dB Attenuator	SN: 5047.2 (10r)	10-Aug-06 (METAS, No 217-00591)	Aug-07																																																
Reference Probe ET3DV6	SN: 1507	19-Oct-06 (SPEAG, No. ET3-1507_Oct06)	Oct-07																																																
Reference Probe ES3DV3	SN: 3025	19-Oct-06 (SPEAG, No. ES3-3025_Oct06)	Oct-07																																																
DAE4	SN 907	20-Jul-06 (SPEAG, No. DAE4-907_Jul06)	Jul-07																																																
Secondary Standards	ID #	Check Date (in house)	Scheduled Check																																																
Power sensor HP 8481A	MY41092317	18-Oct-02 (SPEAG, in house check Oct-05)	In house check: Oct-07																																																
RF generator Agilent E4421B	MY41000575	11-May-05 (SPEAG, in house check Nov-05)	In house check: Nov-07																																																
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (SPEAG, in house check Oct-06)	In house check: Oct-07																																																
Calibrated by:	Name Mike Meit	Function Laboratory Technician	Signature <i>M. Meit</i>																																																
Approved by:	Katja Pokovic	Technical Manager	<i>Katja Pokovic</i>																																																
Issued: January 18, 2007																																																			
This calibration certificate shall not be reproduced except in full without written approval of the laboratory.																																																			

Certificate No: D1900V2-545\_Jan07

Page 1 of 6

<b>RTS</b> RIM Testing Services	Document <b>Appendix for the BlackBerry® Smartphone Model RBQ41GW SAR Report</b>		Page 18(22)
	Author Data <b>Shahriar Ninad</b>	Dates of Test <b>Oct 15-25, 2007</b>	Test Report No <b>RTS-0665-0710-08</b>
		FCC ID: <b>L6A RBQ40GW</b>	

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 Federal Office of Metrology and Accreditation  
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:**

- 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
- CENELEC EN 50361, "Basic standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones (300 MHz - 3 GHz)", July 2001
- 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:**

- DASY4 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.

<b>RTS</b> RIM Testing Services	Document <b>Appendix for the BlackBerry® Smartphone Model RBQ41GW SAR Report</b>		Page 19(22)
	Author Data <b>Shahriar Ninad</b>	Dates of Test <b>Oct 15-25, 2007</b>	Test Report No <b>RTS-0665-0710-08</b>

### Measurement Conditions

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

DASY Version	DASY4	V4.7
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Area Scan Resolution	dx, dy = 15 mm	
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	38.8 ± 6 %	1.43 mho/m ± 6 %
Head TSL temperature during test	(22.0 ± 0.2) °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	9.49 mW / g
SAR normalized	normalized to 1W	38.0 mW / g
SAR for nominal Head TSL parameters <sup>1</sup>	normalized to 1W	<b>37.0 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	4.98 mW / g
SAR normalized	normalized to 1W	19.9 mW / g
SAR for nominal Head TSL parameters <sup>1</sup>	normalized to 1W	<b>19.6 mW / g ± 16.5 % (k=2)</b>

<sup>1</sup> Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

<b>RTS</b> <b>RIM Testing Services</b>	Document <b>Appendix for the BlackBerry® Smartphone Model RBQ41GW SAR Report</b>		Page <b>20(22)</b>
	Author Data <b>Shahriar Ninad</b>	Dates of Test <b>Oct 15-25, 2007</b>	Test Report No <b>RTS-0665-0710-08</b>

## Appendix

### Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.0 $\Omega$ + 0.2 j $\Omega$
Return Loss	-34.1 dB

### General Antenna Parameters and Design

Electrical Delay (one direction)	1.197 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.

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	November 15, 2001

<b>RTS</b> RIM Testing Services	Document <b>Appendix for the BlackBerry® Smartphone Model RBQ41GW SAR Report</b>		Page 21(22)
	Author Data <b>Shahriar Ninad</b>	Dates of Test <b>Oct 15-25, 2007</b>	Test Report No <b>RTS-0665-0710-08</b>

**DASY4 Validation Report for Head TSL**

Date/Time: 09.01.2007 12:59:52

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:545**

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: HSL U10 BB;

Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.43$  mho/m;  $\epsilon_r = 38.8$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507 (HF); ConvF(4.97, 4.97, 4.97); Calibrated: 19.10.2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn907; Calibrated: 20.07.2006
- Phantom: Flat Phantom 4.9L; Type: QD900P49AA
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

**Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0:**

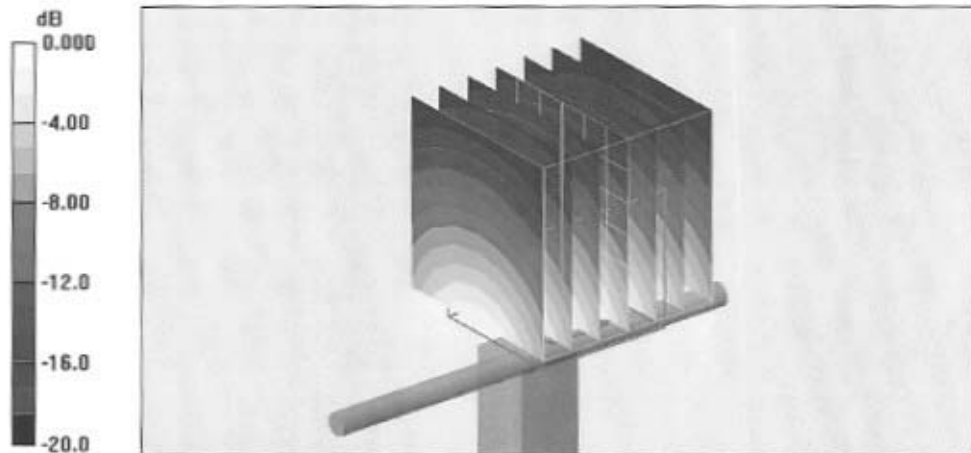
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 90.8 V/m; Power Drift = 0.018 dB

Peak SAR (extrapolated) = 16.5 W/kg

**SAR(1 g) = 9.49 mW/g; SAR(10 g) = 4.98 mW/g**

Maximum value of SAR (measured) = 10.7 mW/g



0 dB = 10.7mW/g

<b>RTS</b> <b>RIM Testing Services</b>	Document <b>Appendix for the BlackBerry® Smartphone Model RBQ41GW SAR Report</b>		Page <b>22(22)</b>
	Author Data <b>Shahriar Ninad</b>	Dates of Test <b>Oct 15-25, 2007</b>	Test Report No <b>RTS-0665-0710-08</b>

**Impedance Measurement Plot for Head TSL**

