RTS RIM Testing Services	Appendix for the BlackBerry® Smartphone Model RCG41GW SAR Report			Page 1(52)
Author Data	Dates of Test	Test Report No	FCC ID:	
Jean-Paul Hacquoil	April 01-07, April 30-May 07, May 20, RTS-1615-0905-02 L6ARC 2009		CG40GW	

APPENDIX D: PROBE & DIPOLE CALIBRATION DATA

RIM Testing Services Appendix for the BlackBerry® Smartphone Model RCG41GW SAR Report Dates of Test April 01-07, April 30-May 07,May 20, 2009 April 01-07, April 30-May 07,May 20, 2009 April 01-07, April 30-May 07,May 20, 2009 Page 2(52) Page 2(52) Page 2(52) Page 2(52)

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





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

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

Accreditation No.: SCS 108

Client RTS (RIM Testing Services)

Certificate No: ET3-1642_Jan09

Object	ET3DV6 - SN:1	642	
Calibration procedure(s)		and QA CAL-23.v3 edure for dosimetric E-field probes	S
Calibration date:	January 12, 200	9	
Condition of the calibrated item	In Tolerance		
		tional standards, which realize the physical uni probability are given on the following pages an	
		ory facility: environment temperature (22 ± 3)°C	and humidity < 70%.
alibration Equipment used (M&			C and humidity < 70%. Scheduled Calibration
alibration Equipment used (M&	TE critical for calibration)	ory facility: environment temperature (22 ± 3)*C Cal Date (Certificate No.) 1-Apr-08 (No. 217-00788)	
allibration Equipment used (M& imary Standards wer meter E4419B	TE critical for calibration)	Cal Date (Certificate No.)	Scheduled Calibration
alibration Equipment used (M& imary Standards ower meter E4419B ower sensor E4412A	TE critical for calibration) ID # GB41293874	Cal Date (Certificate No.) 1-Apr-08 (No. 217-00788)	Scheduled Calibration Apr-09
alibration Equipment used (M& rimary Standards ower meter E4419B ower sensor E4412A ower sensor E4412A	TE critical for calibration) ID # GB41293874 MY41495277	Cal Date (Certificate No.) 1-Apr-08 (No. 217-00788) 1-Apr-08 (No. 217-00788)	Scheduled Celibration Apr-09 Apr-09
railibration Equipment used (M& rimary Standards ower meter E4419B ower sensor E4412A ower sensor E4412A eference 3 dB Attenuator eference 20 dB Attenuator	TE critical for calibration) ID # GB41293874 MY41495277 MY41498087	Cal Date (Certificate No.) 1-Apr-08 (No. 217-00788) 1-Apr-08 (No. 217-00788) 1-Apr-08 (No. 217-00788)	Scheduled Calibration Apr-09 Apr-09 Apr-09 Jul-09 Apr-09
Calibration Equipment used (M& Primary Standards Power meter E4419B Power sensor E4412A Power sensor E4412A Cover sensor E4412A Reference 3 dB Attenuator Reference 20 dB Attenuator	TE critical for calibration) ID # GB41293874 MY41495277 MY41498087 SN: S5054 (3c) SN: S5086 (20b) SN: S5129 (30b)	Cal Date (Certificate No.) 1-Apr-08 (No. 217-00788) 1-Apr-08 (No. 217-00788) 1-Apr-08 (No. 217-00788) 1-Jul-08 (No. 217-00865) 31-Mar-08 (No. 217-00787) 1-Jul-08 (No. 217-00866)	Scheduled Calibration Apr-09 Apr-09 Apr-09 Jul-09 Apr-09 Jul-09
rimary Standards ower meter E4419B ower sensor E4412A ower sensor E4412A ower sensor E4412A eference 3 dB Attenuator eference 20 dB Attenuator eference 20 dB Attenuator eference Probe ES3DV2	TE critical for calibration) ID # GB41293874 MY41495277 MY41498087 SN: S5054 (3c) SN: S5056 (20b) SN: S5129 (30b) SN: 3013	Cal Date (Certificate No.) 1-Apr-08 (No. 217-00788) 1-Apr-08 (No. 217-00788) 1-Apr-08 (No. 217-00788) 1-Jul-08 (No. 217-00865) 31-Mar-08 (No. 217-00787) 1-Jul-08 (No. 217-00866) 2-Jan-09 (No. ES3-3013_Jan09)	Scheduled Calibration Apr-09 Apr-09 Apr-09 Jul-09 Jul-09 Jul-09 Jan-10
Calibration Equipment used (M& Primary Standards Power meter E4419B Power sensor E4412A Power sensor E4412A Reference 3 dB Attenuator Reference 20 dB Attenuator Reference 30 dB Attenuator	TE critical for calibration) ID # GB41293874 MY41495277 MY41498087 SN: S5054 (3c) SN: S5086 (20b) SN: S5129 (30b)	Cal Date (Certificate No.) 1-Apr-08 (No. 217-00788) 1-Apr-08 (No. 217-00788) 1-Apr-08 (No. 217-00788) 1-Jul-08 (No. 217-00865) 31-Mar-08 (No. 217-00787) 1-Jul-08 (No. 217-00866)	Scheduled Calibration Apr-09 Apr-09 Apr-09 Jul-09 Apr-09 Jul-09
Calibration Equipment used (M& Primary Standards Power meter E4419B Power sensor E4412A Power sensor E4412A Reference 3 dB Attenuator Reference 20 dB Attenuator Reference 30 dB Attenuator Reference Probe ES3DV2	TE critical for calibration) ID # GB41293874 MY41495277 MY41498087 SN: S5054 (3c) SN: S5056 (20b) SN: S5129 (30b) SN: 3013	Cal Date (Certificate No.) 1-Apr-08 (No. 217-00788) 1-Apr-08 (No. 217-00788) 1-Apr-08 (No. 217-00788) 1-Jul-08 (No. 217-00865) 31-Mar-08 (No. 217-00787) 1-Jul-08 (No. 217-00866) 2-Jan-09 (No. ES3-3013_Jan09)	Scheduled Calibration Apr-09 Apr-09 Apr-09 Jul-09 Jul-09 Jul-09 Jan-10
rimary Standards ower meter E4419B ower sensor E4412A ower sensor E4412A ower sensor E4412A teference 3 dB Attenuator eference 30 dB Attenuator eference Probe ES3DV2 AE4 econdary Standards	TE critical for calibration) ID # GB41293874 MY41495277 MY41498087 SN: S5054 (3c) SN: S5086 (20b) SN: S5129 (30b) SN: 3013 SN: 660	Cal Date (Certificate No.) 1-Apr-08 (No. 217-00788) 1-Apr-08 (No. 217-00788) 1-Apr-08 (No. 217-00788) 1-Jul-08 (No. 217-00865) 31-Mar-08 (No. 217-00787) 1-Jul-08 (No. 217-00866) 2-Jan-09 (No. ES3-3013_Jan09) 9-Sep-08 (No. DAE4-680_Sep08)	Scheduled Calibration Apr-09 Apr-09 Apr-09 Jul-09 Apr-09 Jul-09 Jan-10 Sep-09
alibration Equipment used (M& rimary Standards ower meter E4419B ower sensor E4412A ower sensor E4412A eference 3 dB Attenuator eference 3 d BAttenuator eference 20 dB Attenuator eference Probe ES3DV2 AE4 econdary Standards F generator HP 8648C	TE critical for calibration) ID # GB41293874 MY41495277 MY41498087 SN: S5054 (3c) SN: S5086 (20b) SN: S5129 (30b) SN: 3013 SN: 660	Cal Date (Certificate No.) 1-Apr-08 (No. 217-00788) 1-Apr-08 (No. 217-00788) 1-Apr-08 (No. 217-00788) 1-Jul-08 (No. 217-00787) 1-Jul-08 (No. 217-00787) 1-Jul-08 (No. 217-00787) 1-Jul-08 (No. 217-00866) 2-Jan-09 (No. ES3-3013_Jan09) 9-Sep-08 (No. DAE4-660_Sep08) Check Date (in house)	Scheduled Calibration Apr-09 Apr-09 Apr-09 Jul-09 Apr-09 Jul-09 Jan-10 Sep-09 Scheduled Check
Calibration Equipment used (M& Primary Standards Power meter E4419B Power sensor E4412A Reference 3 dB Attenuator Reference 20 dB Attenuator Reference Probe ES3DV2 PAE4 Recondary Standards RF generator HP 8648C	TE critical for calibration) ID # GB41293874 MY41495277 MY41498087 SN: S5054 (3c) SN: S5086 (20b) SN: S5129 (30b) SN: 3013 SN: 660 ID # US3642U01700	Cal Date (Certificate No.) 1-Apr-08 (No. 217-00788) 1-Apr-08 (No. 217-00788) 1-Apr-08 (No. 217-00788) 1-Aul-08 (No. 217-00786) 1-Jul-08 (No. 217-00787) 1-Jul-08 (No. 217-00787) 1-Jul-08 (No. 217-00866) 2-Jan-09 (No. ES3-3013_Jan09) 9-Sep-08 (No. DAE4-660_Sep08) Check Date (in house) 4-Aug-99 (in house check Oct-07)	Scheduled Calibration Apr-09 Apr-09 Apr-09 Jul-09 Jul-09 Jan-10 Sep-09 Scheduled Check In house check: Oct-09
Calibration Equipment used (M& Primary Standards Power meter E4419B Power sensor E4412A Power sensor E4412A Reference 3 dB Attenuator Reference 20 dB Attenuator Reference 20 dB Attenuator Reference Probe ES3DV2 DAE4 Secondary Standards RF generator HP 8648C Retwork Analyzer HP 8753E	TE critical for calibration) ID # GB41293874 MY41495277 MY41498087 SN: S5054 (3c) SN: S5054 (3c) SN: S5059 (30b) SN: S5129 (30b) SN: 3013 SN: 660 ID # US3642U01700 US37390585	Cal Date (Certificate No.) 1-Apr-08 (No. 217-00788) 1-Apr-08 (No. 217-00788) 1-Apr-08 (No. 217-00788) 1-Jul-08 (No. 217-00865) 31-Mar-08 (No. 217-00866) 2-Jan-09 (No. 27-00866) 2-Jan-09 (No. ES3-3013_Jan09) 9-Sep-08 (No. DAE4-660_Sep08) Check Date (in house) 4-Aug-99 (in house check Oct-07) 18-Oct-01 (in house check Oct-08)	Scheduled Calibration Apr-09 Apr-09 Apr-09 Jul-09 Jul-09 Jul-09 Jul-10 Sep-09 Scheduled Check In house check: Oct-09 In house check: Oct-09
All calibrations have been conductable and calibration Equipment used (M&Primary Standards Power meter E4419B Power sensor E4412A Power sensor E4412A Reference 3 dB Attenuator Reference 30 dB Attenuator Reference Probe ES3DV2 DAE4 Secondary Standards RF generator HP 8648C Network Analyzer HP 8753E Calibrated by:	TE critical for calibration) ID # GB41293874 MY41495277 MY41498087 SN: S5054 (3c) SN: S5086 (20b) SN: S5129 (30b) SN: 3013 SN: 660 ID # US3642U01700 US37390585 Name	Cal Date (Certificate No.) 1-Apr-08 (No. 217-00788) 1-Apr-08 (No. 217-00788) 1-Apr-08 (No. 217-00788) 1-Jul-08 (No. 217-00786) 1-Jul-08 (No. 217-00865) 31-Mar-08 (No. 217-00787) 1-Jul-08 (No. 217-00866) 2-Jan-09 (No. ES3-3013_Jan09) 9-Sep-08 (No. DAE4-660_Sep08) Check Date (in house) 4-Aug-99 (in house check Oct-07) 18-Oct-01 (in house check Oct-08)	Scheduled Calibration Apr-09 Apr-09 Apr-09 Jul-09 Jul-09 Jan-10 Sep-09 Scheduled Check In house check: Oct-09 In house check: Oct-09

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Servizio svizzero di taratura
S Swiss Calibration Service

Accreditation No.: SCS 108

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

Glossary:

TSL tissue simulating liquid
NORMx,y,z sensitivity in free space
ConvF sensitivity in TSL / NORMx,y,z
DCP diode compression point
Polarization φ rotation around probe axis

Polarization 9 9 rotation around an axis that is in the plane normal to probe axis (at

measurement center), i.e., 9 = 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
- EC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

Methods Applied and Interpretation of Parameters:

- NORMx,y,z: Assessed for E-field polarization θ = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not effect the E²-field uncertainty inside TSL (see below ConvF).
- NORM(f)x,y,z = NORMx,y,z * frequency_response (see Frequency Response Chart). This
 linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of
 the frequency response is included in the stated uncertainty of ConvF.
- DCPx,y,z: DCP are numerical linearization parameters assessed based on the data of power sweep (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 ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORMx,y,z * ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- Spherical isotropy (3D deviation from isotropy): in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

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Certificate No. E13-1042 Janua	Page 2 01 9	

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Jean-Paul Hacquoil	April 01-07, April 30-May 07, May 20, RTS-1615-0905-02 L6ARC 2009		CG40GW	

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Jean-Paul Hacquoil	April 01-07, April 30-May 07, May 20, RTS-1615-0905-02 L6ARC 2009		CG40GW	

January 12, 2009

Probe ET3DV6

SN:1642

Manufactured: November 7, 2001 Last calibrated: January 18, 2008 Recalibrated: January 12, 2009

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

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January 12, 2009

DASY - Parameters of Probe: ET3DV6 SN:1642

Sensitivity in Free Space ^A			Diode C	compression ^B
NormX	1.68 ± 10.1%	$\mu V/(V/m)^2$	DCP X	91 mV
NormY	1.88 ± 10.1%	$\mu V/(V/m)^2$	DCP Y	93 mV
NormZ	1.66 ± 10.1%	$\mu V/(V/m)^2$	DCP Z	93 mV

Sensitivity in Tissue Simulating Liquid (Conversion Factors)

Please see Page 8.

Boundary Effect

TSL	900 MHz	Typical SAR gradient: 5 % per mm
IOL	JOO INITIAL	Typical Only gradient. 5 % per min

Sensor Cente	r to Phantom Surface Distance	3.7 mm	4.7 mm
SAR _{be} [%]	Without Correction Algorithm	- 10.1	5.8
SAR _{be} [%]	With Correction Algorithm	0.9	0.5

TSL 1810 MHz Typical SAR gradient: 10 % per mm

Sensor Cente	r to Phantom Surface Distance	3.7 mm	4.7 mm
SAR _{be} [%]	Without Correction Algorithm	12.6	8.1
SAR _{be} [%]	With Correction Algorithm	0.9	0.6

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%.

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 $^{^{\}rm A}$ The uncertainties of NormX,Y,Z do not affect the E²-field uncertainty inside TSL (see Page 8).

⁸ Numerical linearization parameter: uncertainty not required.

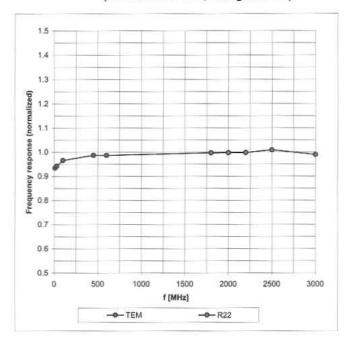
RTS RIM Testing Services	Appendix for the BlackBerry® Smartphone Model RCG41GW SAR Report				
Author Data	Dates of Test	Test Report No	FCC ID:		
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Frequency Response of E-Field

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



Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

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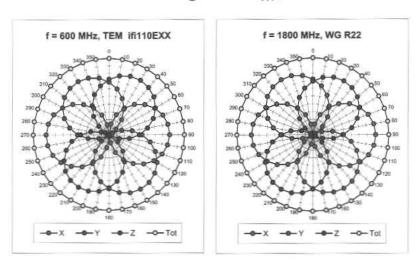
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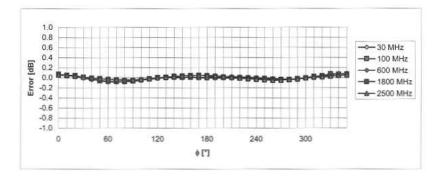
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RIM Testing Services					
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Receiving Pattern (ϕ), $\vartheta = 0^{\circ}$





Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

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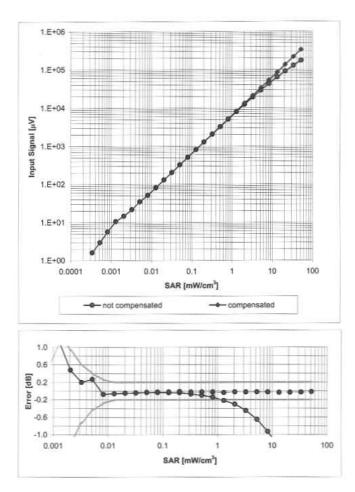
RTS RIM Testing Services	Appendix for the BlackBerry® Smartphone Model RCG41GW SAR Report				
Author Data	Dates of Test	Test Report No	FCC ID:		
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Dynamic Range f(SAR_{head})

(Waveguide R22, f = 1800 MHz)



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

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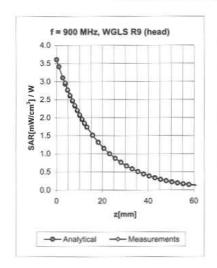
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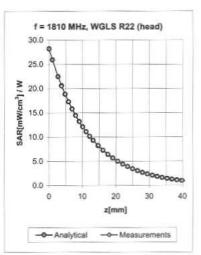
RTS RIM Testing Services	Appendix for the BlackBerry® Smartphone Model RCG41GW SAR Report				
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Conversion Factor Assessment





f [MHz]	Validity [MHz] ^C	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
900	± 50 / ± 100	Head	41.5 ± 5%	$0.97 \pm 5\%$	0.40	2.33	6.06 ± 11.0% (k=2)
1810	± 50 / ± 100	Head	40.0 ± 5%	$1.40 \pm 5\%$	0.54	2.62	5.14 ± 11.0% (k=2)
1950	± 50 / ± 100	Head	$40.0 \pm 5\%$	$1.40 \pm 5\%$	0.67	2.35	4.88 ± 11.0% (k=2)
2450	±50/±100	Head	39.2 ± 5%	1.80 ± 5%	0.90	1.74	4.54 ± 11.0% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.37	2.77	5.99 ± 11.0% (k=2)
		5-33-01V					
1810	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.85	2.33	4.71 ± 11.0% (k=2)
1950	± 50 / ± 100	Body	$53.3\pm5\%$	$1.52 \pm 5\%$	0.60	2.30	4.61 ± 11.0% (k=2)
2450	±50/±100	Body	52.7 ± 5%	$1.95 \pm 5\%$	0.90	1.89	4.02 ± 11.0% (k=2)

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^c 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.

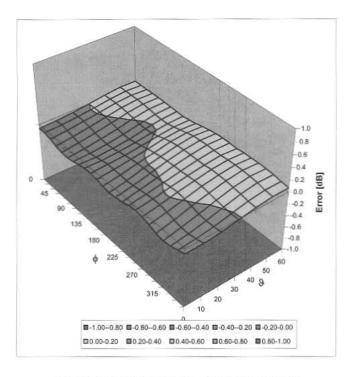
RTS RIM Testing Services	Appendix for the BlackBerry® Smartphone Model RCG41GW SAR Report				
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Deviation from Isotropy in HSL

Error (φ, θ), f = 900 MHz



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

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S Schweizerischer Kalibrierdienst
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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Certificate No: D835V2-446_Jan09 RTS (RIM Testing Services) CALIBRATION CERTIFICATE D835V2 - SN: 446 Object QA CAL-05.v7 Calibration procedure(s) Calibration procedure for dipole validation kits Calibration date: January 05, 2009 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) ID# Primary Standards Cal Date (Certificate No.) Scheduled Calibration Power meter EPM-442A GB37480704 08-Oct-08 (No. 217-00898) Oct-09 Power sensor HP 8481A US37292783 08-Oct-08 (No. 217-00898) Oct-09 Reference 20 dB Attenuator SN: 5086 (20g) 01-Jul-08 (No. 217-00864) Jul-09 Type-N mismatch combination SN: 5047.2 / 06327 01-Jul-08 (No. 217-00867) Jul-09 SN: 3025 28-Apr-08 (No. ES3-3025_Apr08) Reference Probe ES3DV2 Apr-09 DAE4 14-Mar-08 (No. DAE4-601 Mar08) Mar-09 SN: 601 Secondary Standards ID# Check Date (in house) Scheduled Check Power sensor HP 8481A MY41092317 18-Oct-02 (in house check Oct-07) In house check: Oct-09 RF generator R&S SMT-06 100005 4-Aug-99 (in house check Oct-07) In house check: Oct-09 US37390585 S4206 18-Oct-01 (in house check Oct-08) Network Analyzer HP 8753E In house check: Oct-09 Calibrated by: Jeton Kastrati Laboratory Technician Approved by: Katja Pokovic Technical Manager Issued: January 7, 2009 This calibration certificate shall not be reproduced except in full without written approval of the laboratory

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Author Data	Dates of Test	Test Report No	FCC ID:	
Jean-Paul Hacquoil	April 01-07, April 30-May 07, May 20, 2009	RTS-1615-0905-02	L6ARC	CG40GW

RTS RIM Testing Services	Appendix for the BlackBerry® Smartp SAR Report	phone Model RCG410	GW	Page 21 (52)
Author Data	Dates of Test	Test Report No	FCC ID:	
Jean-Paul Hacquoil	April 01-07, April 30-May 07,May 20, 2009	RTS-1615-0905-02	L6ARC	G40GW





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C Service suisse d'étalonnage
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S wiss Calibration Service

Accreditation No.: SCS 108

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

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
- EC 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.

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RTS RIM Testing Services	Appendix for the BlackBerry® Smartphone Model RCG41GW SAR Report			Page 22(52)
Author Data	Dates of Test	Test Report No	FCC ID:	
Jean-Paul Hacquoil	April 01-07, April 30-May 07, May 20, 2009	RTS-1615-0905-02	L6ARC	CG40GW

RTS RIM Testing Services	Appendix for the BlackBerry® Smartp SAR Report	phone Model RCG410	GW	Page 23(52)
Author Data	Dates of Test	Test Report No	FCC ID:	
Jean-Paul Hacquoil	April 01-07, April 30-May 07,May 20, 2009	RTS-1615-0905-02	L6ARC	G40GW

Measurement Conditions

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

DASY Version	DASY5	V5.0
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	41.3 ± 6 %	0.91 mha/m ± 6 %
Head TSL temperature during test	(21.5 ± 0.2) °C	****	

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.40 mW/g
SAR normalized	normalized to 1W	9.60 mW / g
SAR for nominal Head TSL parameters 1	normalized to 1W	9.50 mW/g ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.58 mW / g
SAR normalized	normalized to 1W	6.32 mW / g
SAR for nominal Head TSL parameters 1	normalized to 1W	6.27 mW/g ± 16.5 % (k=2)

Certificate No: D835V2-446_Jan09

¹ Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

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Jean-Paul Hacquoil	April 01-07, April 30-May 07, May 20, 2009	RTS-1615-0905-02	L6ARC	CG40GW

RTS RIM Testing Services	Appendix for the BlackBerry® Smartphone Model RCG41GW SAR Report			Page 25(52)
Author Data	Dates of Test	Test Report No	FCC ID:	
Jean-Paul Hacquoil	April 01-07, April 30-May 07, May 20, 2009	RTS-1615-0905-02	L6ARC	CG40GW

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	49.8 Ω - 6.9 jΩ	
Return Loss	- 23.3 dB	

General Antenna Parameters and Design

Electrical Delay (one direction)	1.385 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

Certificate No: D835V2-446_Jan09

RTS RIM Testing Services	Appendix for the BlackBerry® Smartphone Model RCG41GW SAR Report			Page 26(52)
Author Data	Dates of Test	Test Report No	FCC ID:	
Jean-Paul Hacquoil	April 01-07, April 30-May 07,May 20, 2009	RTS-1615-0905-02	L6ARC	CG40GW

RTS RIM Testing Services	Appendix for the BlackBerry® Smartphone Model RCG41GW SAR Report			Page 27(52)
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Jean-Paul Hacquoil	April 01-07, April 30-May 07, May 20,	RTS-1615-0905-02	L6ARC	CG40GW
_	2009			

DASY5 Validation Report for Head TSL

Date/Time: 05.01.2009 10:38:06

Test Laboratory: SPEAG, Zurich, Switzerland

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

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

Medium: HSL 900 MHz

Medium parameters used: f = 835 MHz; σ = 0.91 mho/m; ϵ_r = 41.1; ρ = 1000 kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

Probe: ES3DV2 - SN3025; ConvF(5.97, 5.97, 5.97); Calibrated: 28.04.2008

· Sensor-Surface: 3.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn601; Calibrated: 14.03.2008

Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

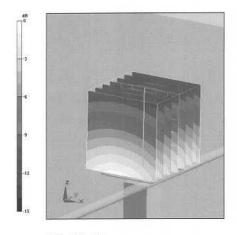
Pin=250mW; dip=15mm; dist=3.4mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 55.7 V/m; Power Drift = 0.024 dB

Peak SAR (extrapolated) = 3.54 W/kg

SAR(1 g) = 2.4 mW/g; SAR(10 g) = 1.58 mW/g

Maximum value of SAR (measured) = 2.7 mW/g



 $0~\mathrm{dB} = 2.7 \mathrm{mW/g}$

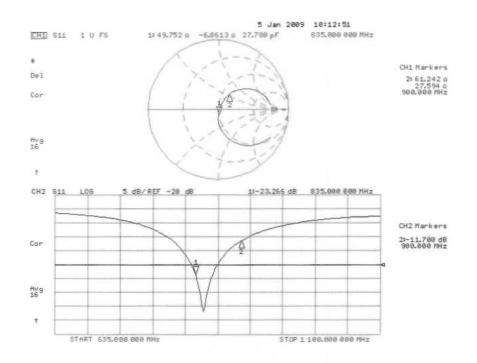
Certificate No: D835V2-446_Jan09

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Jean-Paul Hacquoil	April 01-07, April 30-May 07, May 20, 2009	RTS-1615-0905-02	L6ARC	CG40GW

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	Appendix for the BlackBerry® Smartp SAR Report	Appendix for the BlackBerry® Smartphone Model RCG410 SAR Report Dates of Test April 01-07, April 30-May 07,May 20, Test Report No RTS-1615-0905-02	Appendix for the BlackBerry® Smartphone Model RCG41GW SAR Report Dates of Test April 01-07, April 30-May 07,May 20, RTS-1615-0905-02 L6ARC

Impedance Measurement Plot for Head TSL



Certificate No: D835V2-446_Jan09

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RTS RIM Testing Services	Appendix for the BlackBerry® Smartphone Model RCG41GW SAR Report			Page 30(52)
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Jean-Paul Hacquoil	April 01-07, April 30-May 07, May 20, 2009	RTS-1615-0905-02	L6ARC	CG40GW

Appendix for the BlackBerry® Smartphone Model RCG41GW 31(52) **SAR Report RIM Testing Services** Author Data Dates of Test FCC ID: Test Report No April 01-07, April 30-May 07, May 20, RTS-1615-0905-02 L6ARCG40GW Jean-Paul Hacquoil 2009

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





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Accredited by the Swiss Accreditation Service (SAS) The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates Accreditation No.: SCS 108

RTS (RIM Testing Services)

Certificate No: D1900V2-545-Jan09

CALIBRATION CERTIFICATE D1900V2 - SN: 545 Object QA CAL-05.v7 Calibration procedure(s) Calibration procedure for dipole validation kits Calibration date: January 06, 2009 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) ID# Cal Date (Calibrated by, Certificate No.) Scheduled Calibration Primary Standards Power meter EPM-442A GB37480704 08-Oct-08 (No. 217-00898) Oct-09 Power sensor HP 8481A US37292783 08-Oct-08 (No. 217-00898) Oct-09 01-Jul-08 (No. 217-00864) Jul-09 Reference 20 dB Attenuator SN: 5086 (20g) Type-N mismatch combination SN: 5047.2 / 06327 01-Jul-08 (No. 217-00867) Jul-09 Reference Probe ES3DV2 SN: 3025 28-Apr-08 (No. ES3-3025_Apr08) Apr-09 DAE4 14-Mar-08 (No. DAE4-601 Mar08) Mar-09 SN: 601 Check Date (in house) Secondary Standards ID# Scheduled Check Power sensor HP 8481A MY41092317 18-Oct-02 (in house check Oct-07) In house check: Oct-09 RF generator R&S SMT-06 100005 4-Aug-99 (in house check Oct-07) In house check: Oct-09 Network Analyzer HP 8753E US37390585 S4206 18-Oct-01 (in house check Oct-08) In house check: Oct-09 Function Calibrated by: Laboratory Technician Approved by: Katja Pokovic Technical Manager Issued: January 7, 2009 This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Certificate No: D1900V2-545_Jan09

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RTS RIM Testing Services	Appendix for the BlackBerry® Smartphone Model RCG41GW SAR Report			Page 32(52)
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Jean-Paul Hacquoil	April 01-07, April 30-May 07,May 20, 2009	RTS-1615-0905-02	L6ARC	G40GW





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Swiss Calibration Service

Accreditation No.: SCS 108

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

Glossary:

TSL

tissue simulating liquid

ConvF N/A sensitivity in TSL / NORM x,y,z 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) 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
- c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

Certificate No: D1900V2-545_Jan09	Page 2 of 6

RTS RIM Testing Services	Appendix for the BlackBerry® Smartphone Model RCG41GW SAR Report			Page 33(52)
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Jean-Paul Hacquoil	April 01-07, April 30-May 07,May 20, 2009	RTS-1615-0905-02	L6ARC	CG40GW

RTS RIM Testing Services	Appendix for the BlackBerry® Smartphone Model RCG41GW SAR Report			Page 34(52)
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Jean-Paul Hacquoil	April 01-07, April 30-May 07, May 20, 2009	RTS-1615-0905-02	L6ARC	G40GW

Measurement Conditions

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

DASY Version	DASY5	V5.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
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	39.2 ± 6 %	1.47 mho/m ± 6 %
Head TSL temperature during test	(21.0 ± 0.2) °C		

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	condition	
SAR measured	250 mW input power	10.2 mW/g
SAR normalized	normalized to 1W	40.8 mW / g
SAR for nominal Head TSL parameters 1	normalized to 1W	39.5 mW / g ± 17.0 % (k=2)

SAR averaged over 10 cm3 (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	5.29 mW / g
SAR normalized	normalized to 1W	21.2 mW/g
SAR for nominal Head TSL parameters 1	normalized to 1W	20.8 mW / g ± 16.5 % (k=2)

Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

RTS RIM Testing Services	Appendix for the BlackBerry® Smartp SAR Report	ohone Model RCG410	GW	Page 35(52)
Author Data	Dates of Test	Test Report No	FCC ID:	
Jean-Paul Hacquoil	April 01-07, April 30-May 07,May 20, 2009	RTS-1615-0905-02	L6ARC	CG40GW

RTS	Appendix for the BlackBerry® Smartphone Model RCG41GW SAR Report		Page 36(52)	
RIM Testing Services				
Author Data	Dates of Test	Test Report No	FCC ID:	
Jean-Paul Hacquoil	April 01-07, April 30-May 07, May 20,	RTS-1615-0905-02	L6ARC	CG40GW
	2009			

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	$49.9 \Omega + 1.9 j\Omega$	
Return Loss	- 34.4 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

Certificate No: D1900V2-545_Jan09

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Author Data	Dates of Test	Test Report No	FCC ID:	
Jean-Paul Hacquoil	April 01-07, April 30-May 07, May 20, 2009	RTS-1615-0905-02	L6ARC	CG40GW

RTS RIM Testing Services	Appendix for the BlackBerry® Smartp SAR Report	ohone Model RCG410	GW	Page 38(52)
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Jean-Paul Hacquoil	April 01-07, April 30-May 07, May 20,	RTS-1615-0905-02	L6ARC	CG40GW
_	2009			

DASY5 Validation Report for Head TSL

Date/Time: 06.01.2009 13:17:58

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; $\sigma = 1.47$ mho/m; $\epsilon_r = 39.4$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Probe: ES3DV2 SN3025; ConvF(4.9, 4.9, 4.9); Calibrated: 28.04.2008
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 14.03.2008
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

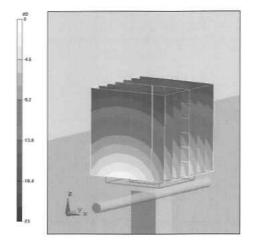
Pin = 250 mW; dip = 10 mm, scan at 3.4mm/Zoom Scan (dist=3.4mm, probe 0deg)

(7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 92.5 V/m; Power Drift = 0.037 dB

Peak SAR (extrapolated) = 19 W/kg

SAR(1 g) = 10.2 mW/g; SAR(10 g) = 5.29 mW/gMaximum value of SAR (measured) = 12 mW/g



0 dB = 12mW/g

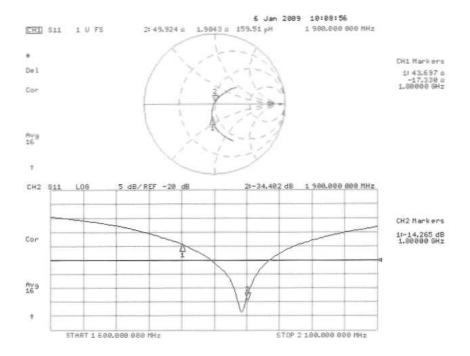
Certificate No: D1900V2-545_Jan09

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RTS RIM Testing Services	Appendix for the BlackBerry® Smartp SAR Report	ohone Model RCG410	GW	Page 39(52)
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Jean-Paul Hacquoil	April 01-07, April 30-May 07,May 20, 2009	RTS-1615-0905-02	L6ARC	CG40GW

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Dates of Test	Test Report No	FCC ID:	
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	Appendix for the BlackBerry® Smartp SAR Report	Appendix for the BlackBerry® Smartphone Model RCG410 SAR Report Dates of Test April 01-07, April 30-May 07,May 20, Test Report No RTS-1615-0905-02	SAR Report Test Report No April 01-07, April 30-May 07, May 20, RTS-1615-0905-02 L6ARC

Impedance Measurement Plot for Head TSL



RTS RIM Testing Services	Appendix for the BlackBerry® Smartp SAR Report	ohone Model RCG410	GW	Page 41(52)
Author Data	Dates of Test	Test Report No	FCC ID:	
Jean-Paul Hacquoil	April 01-07, April 30-May 07, May 20, 2009	RTS-1615-0905-02	L6ARC	CG40GW

RIM Testing Services Appendix for the BlackBerry® Smartphone Model RCG41GW SAR Report Dates of Test April 01-07, April 30-May 07,May 20, 2009 Page 42(52) Page 42(52) Page 42(52) Page 42(52) Page 42(52)

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

Certificate No: D2450V2-747_Nov07





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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 RIM

Certificate No: D2450V2-747_Nov07

CALIBRATION CERTIFICATE D2450V2 - SN: 747 Object QA CAL-05.v6 Calibration procedure(s) Calibration procedure for dipole validation kits November 06, 2007 Calibration date: In Tolerance Condition of the calibrated item 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) ID # Scheduled Calibration Primary Standards Cal Date (Calibrated by, Certificate No.) Power meter EPM-442A GB37480704 04-Oct-07 (METAS, No. 217-00736) Oct-08 Power sensor HP 8481A US37292783 04-Oct-07 (METAS, No. 217-00736) Oct-08 07-Aug-07 (METAS, No 217-00718) Reference 20 dB Attenuator SN: 5086 (20g) Aug-08 SN: 5047.2 (10r) 07-Aug-07 (METAS, No 217-00718) Aug-08 Reference 10 dB Attenuator Reference Probe ES3DV2 26-Oct-07 (SPEAG, No. ES3-3025 Oct07) SN: 3025 Oct-08 DAE4 SN: 601 30-Jan-07 (SPEAG, No. DAE4-601_Jan07) Jan-08 ID# Check Date (in house) Scheduled Check Secondary Standards MY41092317 18-Oct-02 (SPEAG, in house check Oct-07) In house check: Oct-08 Power sensor HP 8481A RF generator R&S SMT-06 100005 4-Aug-99 (SPEAG, in house check Oct-07) In house check: Oct-09 Network Analyzer HP 8753E US37390585 S4206 18-Oct-01 (SPEAG, in house check Oct-07) In house check: Oct-08 Function Name Calibrated by: Claudio Leubler Laboratory Technician Technical Manager Approved by: Katja Pokovic Issued: November 15, 2007 This calibration certificate shall not be reproduced except in full without written approval of the laboratory

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RTS RIM Testing Services			Page 43(52)	
Author Data	Dates of Test	Test Report No	FCC ID:	
Jean-Paul Hacquoil	April 01-07, April 30-May 07, May 20, 2009	RTS-1615-0905-02	L6ARC	CG40GW

RTS RIM Testing Services	Appendix for the BlackBerry® Smartphone Model RCG41GW SAR Report 44(52)		Page 44(52)	
Author Data	Dates of Test	Test Report No	FCC ID:	
Jean-Paul Hacquoil	April 01-07, April 30-May 07,May 20, 2009	RTS-1615-0905-02	L6ARC	G40GW

Calibration Laboratory of

Schmid & Partner Engineering AG Zeughausstrasse 43, 8004 Zurich, Switzerland





Schweizerischer Kalibrierdienst Service sulsse d'étalonnage C Servizio svizzero di taratura

Swiss Calibration Service Accreditation No.: SCS 108

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

Glossary:

tissue simulating liquid TSL

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

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
- 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 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.

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Measurement Conditions

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

DASY4	V4.7
Advanced Extrapolation	
Modular Flat Phantom V5.0	
10 mm	with Spacer
dx, dy, dz = 5 mm	
2450 MHz ± 1 MHz	
	Advanced Extrapolation Modular Flat Phantom V5.0 10 mm dx, dy, dz = 5 mm

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	38.4 ± 6 %	1.85 mho/m ± 6 %
Head TSL temperature during test	(21.5 ± 0.2) °C		

SAR result with Head TSL

SAR averaged over 1 cm3 (1 g) of Head TSL	condition	
SAR measured	250 mW input power	13.6 mW / g
SAR normalized	normalized to 1W	54.4 mW / g
SAR for nominal Head TSL parameters 1	normalized to 1W	53.2 mW / g ± 17.0 % (k=2)

SAR averaged over 10 cm3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.27 mW/g
SAR normalized	normalized to 1W	25.1 mW/g
SAR for nominal Head TSL parameters 1	normalized to 1W	24.8 mW / g ± 16.5 % (k=2)

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¹ Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

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Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.2 Ω + 2.1 jΩ	
Return Loss	- 32.4 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.

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	December 01, 2003

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DASY4 Validation Report for Head TSL

Date/Time: 06.11.2007 15:01:41

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN747

Communication System: CW-2450; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: HSL U10 BB;

Medium parameters used: f = 2450 MHz; $\sigma = 1.79$ mho/m; $\epsilon_r = 38$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 SN3025 (HF); ConvF(4.41, 4.41, 4.41); Calibrated: 26.10.2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.01.2007
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA;;
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 172

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

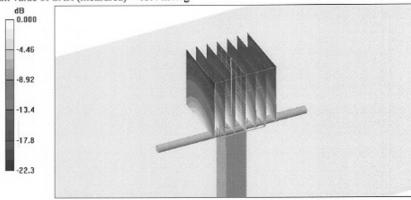
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 93.4 V/m; Power Drift = 0.016 dB

Peak SAR (extrapolated) = 29.4 W/kg

SAR(1 g) = 13.6 mW/g; SAR(10 g) = 6.27 mW/g

Maximum value of SAR (measured) = 15.4 mW/g



0 dB = 15.4 mW/g

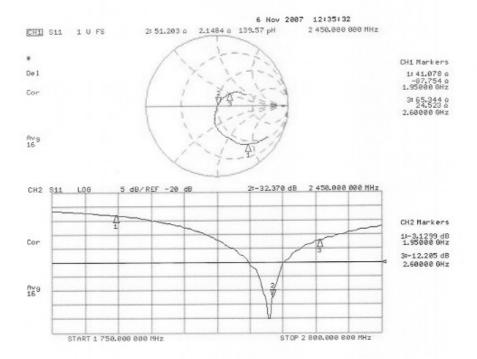
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	2009			

Impedance Measurement Plot for Head TSL



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