RTS RIM Testing Services	Appendix for the BlackBerry SAR Report	y® Smartphone Model l	RBJ41GW	Page 1(37)
Author Data	Dates of Test	Test Report No	FCC ID:	
Shahriar Ninad	May 23-June 01, 2007	RTS-0510-0706-03	L6ARBJ40	GW

APPENDIX D: PROBE & DIPOLE CALIBRATION DATA

RTS RIM Testing Services	Appendix for the BlackBerr SAR Report	ry® Smartphone Model	RBJ41GW	Page 2(37)
Author Data	Dates of Test	Test Report No	FCC ID:	
Shahriar Ninad	May 23-June 01, 2007	RTS-0510-0706-03	L6ARBJ40	GW

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





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

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Certificate No: ET3-1642_Jan07

Accreditation No.: SCS 108

CALIBRATION CERTIFICATE Object ET3DV6 - SN:1642 QA CAL-01.v5 Calibration procedure(s) Calibration procedure for dosimetric E-field probes Calibration date: January 15, 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 in # 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 cB 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) DAE4 SN: 654 21-Jun-06 (SPEAG, No. DAE4-654_Jun08) 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 Katja Pokovic Technical Manager Approved by: Niels Kuster Quality Manager Issued: January 15, 2007 This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Certificate No ET3-1642_Jan07

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RTS RIM Testing Services	Appendix for the BlackBerry SAR Report	y® Smartphone Model 1	RBJ41GW	Page 3(37)
Author Data	Dates of Test	Test Report No	FCC ID:	
Shahriar Ninad	May 23-June 01, 2007	RTS-0510-0706-03	L6ARBJ40	GW

Calibration Laboratory of Schmid & Partner

Engineering AG Zeughausstrasse 43, 8004 Zurich, Switzerland





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Swiss Calibration Service

Accreditation No.: SCS 108

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Glossary:

TSL tissue simulating liquid NORMx,y.z sensitivity in free space

ConF 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
- 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

Methods Applied and Interpretation of Parameters:

- NORMx,y,z: Assessed for E-field polarization 9 = 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,

Certificate No: ET3-1642_Jan07	Page 2 of 9		

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RTS RIM Testing Services	Appendix for the BlackBerr SAR Report	y® Smartphone Model l	RBJ41GW	Page 4(37)
Author Data	Dates of Test	Test Report No	FCC ID:	
Shahriar Ninad	May 23-June 01, 2007	RTS-0510-0706-03	L6ARBJ40	GW

January 15, 2007

Probe ET3DV6

SN:1642

Manufactured: November 7, 2001 Last calibrated: January 19, 2006 Recalibrated: January 15, 2007

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

Certificate No: ET3-1642_Jan07

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RTS RIM Testing Services	Appendix for the BlackBerry SAR Report	y® Smartphone Model I	RBJ41GW	Page 5(37)
Author Data	Dates of Test	Test Report No	FCC ID:	
Shahriar Ninad	May 23-June 01, 2007	RTS-0510-0706-03	L6ARBJ400	GW

ET3DV6 SN:1642 January 15, 2007

DASY - Parameters of Probe: ET3DV6 SN:1642

Sensitivity in Free Space ^A			Diode C	ompression ^B
NormX	1.69 ± 10.1%	$\mu V/(V/m)^2$	DCP X	94 mV
NormY	1.86 ± 10.1%	$\mu V/(V/m)^2$	DCP Y	96 mV
NormZ	1.62 ± 10.1%	$\mu V/(V/m)^2$	DCP Z	95 mV

Sensitivity in Tissue Simulating Liquid (Conversion Factors)

Please see Page 8.

Boundary Effect

TSL	900 MHz	Typical SAR of	gradient: 5 % per mm

Sensor Cente	r to Phantom Surface Distance	3.7 mm	4.7 mm
SAR _{be} [%]	Without Correction Algorithm	5.5	2.5
SAR _{be} [%]	With Correction Algorithm	0.3	0.2

TSL 1810 MHz Typical SAR gradient: 10 % per mm

Sensor Cente	er to Phantom Surface Distance	3.7 mm	4.7 mm
SAR _{be} [%]	Without Correction Algorithm	12.3	8.1
SAR _{be} [%]	With Correction Algorithm	0.6	0.3

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%.

Certificate No: ET3-1642_Jan07 Page 4 of 9

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

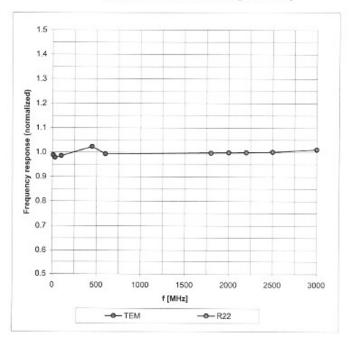
⁸ Numerical linearization parameter; uncertainty not required.

RTS RIM Testing Services	Appendix for the BlackBerry SAR Report	y® Smartphone Model I	RBJ41GW	Page 6(37)
Author Data	Dates of Test	Test Report No	FCC ID:	
Shahriar Ninad	May 23-June 01, 2007	RTS-0510-0706-03	L6ARBJ40	GW

January 15, 2007

Frequency Response of E-Field

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



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

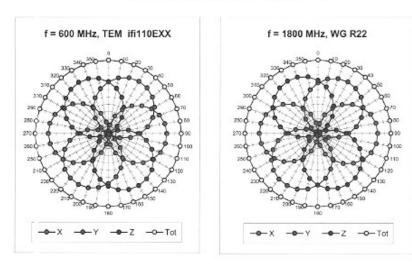
Certificate No: ET3-1642_Jan07

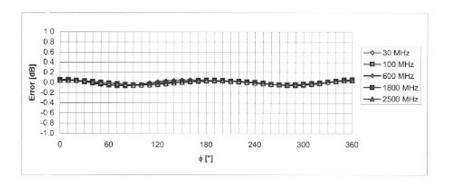
Page 5 of 9

RTS RIM Testing Services				Page 7(37)
Author Data	Dates of Test	Test Report No	FCC ID:	
Shahriar Ninad	May 23-June 01, 2007	RTS-0510-0706-03	L6ARBJ400	GW

January 15, 2007

Receiving Pattern (6), 9 = 0°





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

Certificate No: ET3-1642_Jan07

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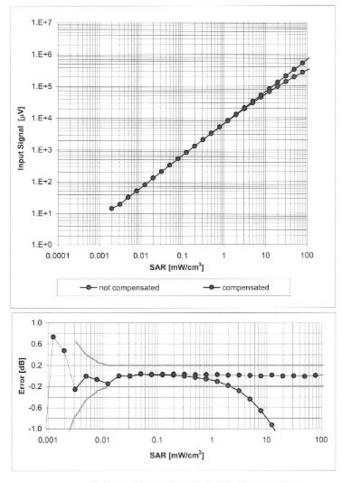
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RTS RIM Testing Services	Appendix for the BlackBerr SAR Report	y® Smartphone Model l	RBJ41GW	Page 8(37)
Author Data	Dates of Test	Test Report No	FCC ID:	
Shahriar Ninad	May 23-June 01, 2007	RTS-0510-0706-03	L6ARBJ40	GW

January 15, 2007

Dynamic Range f(SAR_{head})

(Waveguide R22, f = 1800 MHz)



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

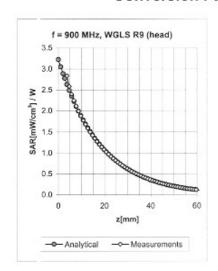
Certificate No: ET3-1642_Jan07

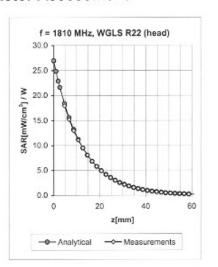
Page 7 of 9

RTS RIM Testing Services	Appendix for the BlackBerry SAR Report	y® Smartphone Model I	RBJ41GW	Page 9(37)
Author Data	Dates of Test	Test Report No	FCC ID:	
Shahriar Ninad	May 23-June 01, 2007	RTS-0510-0706-03	L6ARBJ40	GW

January 15, 2007

Conversion Factor Assessment





f [MHz]	Validity [MHz] ^c	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
900	± 50 / ± 100	Head	41.5 ± 5%	$0.97 \pm 5\%$	0.31	2.70	6.41 ± 11.0% (k=2)
1810	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.56	2.48	5.28 ± 11.0% (k=2)
900	±50/±100	Body	55.0 ± 5%	1.05 ± 5%	0.33	2.72	6.16 ± 11.0% (k=2)
		Body					
1810	± 50 / ± 100	Body	53.3 ± 5%	$1.52 \pm 5\%$	0.65	2.61	4.78 ± 11.0% (k=2)

Certificate No: ET3-1642_Jan07

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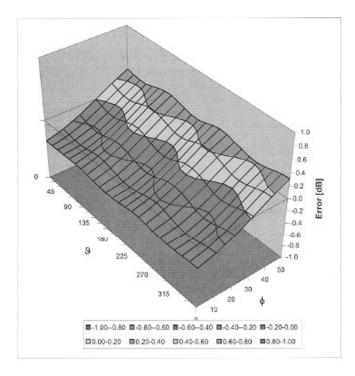
^C The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

RTS RIM Testing Services	Appendix for the BlackBerry SAR Report	y® Smartphone Model l	RBJ41GW	10(37)
Author Data	Dates of Test	Test Report No	FCC ID:	
Shahriar Ninad	May 23-June 01, 2007 RTS-0510-0706-03 L6ARBJ400			GW

January 15, 2007

Deviation from Isotropy in HSL

Error (¢, ३), f = 900 MHz



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

Certificate No: ET3-1642_Jan07

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RTS RIM Testing Services	Appendix for the BlackBer SAR Report	ry® Smartphone Model	RBJ41GW	Page 11(37)
Author Data	Dates of Test	Test Report No	FCC ID:	
Shahriar Ninad	May 23-June 01, 2007	RTS-0510-0706-03	L6ARBJ40	GW

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





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Accreditation No.: SCS 108

Multilateral Agreement for the recognition of calibration certificates

Client RIM

Certificate No: EX3-3548_Jan07

	CERTIFICAT	E	
Object	EX3DV4 - SN:3	548	
Calibration procedure(s)		and QA CAL-14.v3 redure for dosimetric E-field probes	
Calibration 6.ite:	January 19, 200	07	
Condition of the calibrated item	In Tolerance		
All calibrations have been condu Calibration Equipment used (M&		ory facility: environment temporature (22 ± 3)°C and	300000 10000
Primary Star dards	ID#	Cal Date (Calibrated by, Certificate No.)	Schoduled Calibration
	GB41293874	5-Apr-06 (METAS, No. 251-00657)	Apr-07
ower sensor E4412A	MY41495277	5-Apr-06 (METAS, No. 251-00557)	Apr-07
ower sensor E4412A ower sensor E4412A	MY41495277 MY41498087	5-Apr-06 (METAS, No. 251-00557) 5-Apr-06 (METAS, No. 251-00557)	Apx-07 Apx-07
ower sensor E4412A ower sensor E4412A reference 3 dB Attenuator	MY41495277 MY41498087 SN: S5054 (3c)	5-Apr-06 (METAS, No. 251-00557) 5-Apr-06 (METAS, No. 251-00557) 10-Aug-06 (METAS, No. 217-00592)	Apr-07 Apr-07 Aug-07
lower sensor E4412A lower sensor E4412A deference 3 dB Attenuator deference 23 dB Attenuator	MY41495277 MY41498087 SN: S5054 (3c) SN: S5086 (20b)	5-Agr-06 (METAS, No. 251-00557) 5-Agr-06 (METAS, No. 251-00557) 10-Aug-06 (METAS, No. 217-00592) 4-Agr-06 (METAS, No. 251-00558)	Apr-07 Apr-07 Aug-07 Apr-07
tower sensor E4412A fower sensor E4412A teference 3 dB Attenuator teference 20 dB Attenuator teference 30 dB Attenuator	MY41495277 MY41498087 SN: S5054 (3c) SN: S5086 (20b) SN: S5129 (30b)	5-Agr-06 (METAS, No. 251-00587) 5-Agr-06 (METAS, No. 251-00587) 10-Aug-06 (METAS, No. 217-00592) 4-Agr-06 (METAS, No. 251-00558) 10-Aug-06 (METAS, No. 217-00593)	Apr-07 Apr-07 Aug-07 Apr-07 Aug-07
Power sensor E4412A Power sensor E4412A Reference 3 dB Attenuator Reference 20 dB Attenuator Reference 93 dB Attenuator Reference Probe ES3DV2	MY41495277 MY41498087 SN: S5054 (3c) SN: S5086 (20b)	5-Agr-06 (METAS, No. 251-00557) 5-Agr-06 (METAS, No. 251-00557) 10-Aug-06 (METAS, No. 217-00592) 4-Agr-06 (METAS, No. 251-00558)	Apr-07 Apr-07 Aug-07 Apr-07
Power sensor E4412A Power sensor E4412A Reference 3 dB Attenuator Reference 20 dB Attenuator Reference 30 dB Attenuator Reference Probe ES3DV2 DAE4	MY41495277 MY41498087 SN: S5054 (3c) SN: S5086 (20b) SN: S5129 (30b) SN: 3013	5-Agr-06 (METAS, No. 251-00557) 5-Agr-06 (METAS, No. 251-00557) 10-Aug-06 (METAS, No. 217-00502) 4-Agr-06 (METAS, No. 251-00558) 10-Aug-06 (METAS, No. 217-00603) 4-Jan-07 (SPEAG, No. ES3-3013_Jan07)	Apr-07 Apr-07 Aug-07 Apr-07 Aug-07 Jan-08
tower sensor E4412A flower sensor E4412A feference 3 dB Attenuator feference 30 dB Attenuator feference 30 dB Attenuator feference Probe ES3DV2 fAE4 fecondary Standards	MY41495277 MY41498087 SN: S5054 (3c) SN: S5086 (20b) SN: S5129 (30b) SN: 3013 SN: 654	5-Agr-06 (METAS, No. 251-00557) 5-Agr-06 (METAS, No. 251-00557) 10-Aug-06 (METAS, No. 217-00592) 4-Agr-06 (METAS, No. 217-00593) 10-Aug-08 (METAS, No. 217-00593) 4-Jan-07 (SPEAG, No. E93-3013_Jan07) 21-Jun-06 (SPEAG, No. DAE4-054_Jun06)	Apr-07 Apr-07 Aug-07 Apr-07 Aug-07 Jan-08 Jun-07
Power sensor E4412A Power sensor E4412A Power sensor E4412A Reference 3 dB Attenuator Reference 20 dB Attenuator Reference Probe ES3DV2 PAE4 Secondary Standards SF general: r HP 8648C	MY41495277 MY41498087 SN: S5054 (3c) SN: S5086 (20b) SN: S5129 (30b) SN: 3013 SN: 654	5-Agr-06 (METAS, No. 251-00557) 5-Agr-06 (METAS, No. 251-00557) 10-Aug-06 (METAS, No. 217-00592) 4-Agr-06 (METAS, No. 217-00593) 10-Aug-06 (METAS, No. 217-00593) 4-Jan-07 (SPEAG, No. E53-3013_Jan07) 21-Jun-06 (SPEAG, No. DAE4-654_Jun06) Check Date (in house)	Apr-07 Apr-07 Aug-07 Apr-07 Aug-07 Jan-08 Jun-07 Scheduled Check
Power sensor E4412A Power sensor E4412A Reference 3 dB Attenuator Reference 20 dB Attenuator Reference 30 dB Attenuator Reference Probe ES3DV2 DAE4 Secondary Standards SF generals r HP 8648C	MY41495277 MY41498087 SN: S50546 (3c) SN: S5086 (20b) SN: S5129 (30b) SN: 3013 SN: 654	5-Agr-06 (METAS, No. 251-00587) 5-Agr-06 (METAS, No. 251-00587) 10-Aug-06 (METAS, No. 217-00592) 4-Agr-06 (METAS, No. 217-00593) 10-Aug-06 (METAS, No. 217-00593) 4-Jan-07 (SPEAG, No. ES3-3013_Jan07) 21-Jun-06 (SPEAG, No. DAE4-654_Jun06) Check Date (in house) 4-Aug-99 (SPEAG, in house check Nov-05)	Apr-07 Apr-07 Aug-07 Aug-07 Aug-07 Aug-07 Jan-08 Jun-07 Schedulad Check In house check: Nov-07
Power sensor E4412A Power sensor E4412A Reference 3 dB Attenuator Reference 20 dB Attenuator Reference 30 dB Attenuator Reference 90 dB Attenuator Reference Probe ES3DV2 DAE4 Secondary Standards RF generals HP 8549C Network Analyzer HP 8753E	MY41495277 MY41498087 SN: S5054 (3c) SN: S5056 (20b) SN: S5129 (30b) SN: 3013 SN: 654 ID # US3642U01700 US37390585	5-Agr-06 (METAS, No. 251-00557) 5-Agr-06 (METAS, No. 251-00557) 10-Aug-06 (METAS, No. 217-00592) 4-Agr-06 (METAS, No. 217-00593) 4-Jan-07 (SPEAG, No. ES3-3013_Jan07) 21-Jun-06 (SPEAG, No. DAE4-654_Jun06) Check Date (in house) 4-Aug-99 (SPEAG, in house check Nov-05) 18-Oct-01 (SPEAG, in house check Oct-06)	Apr-07 Apr-07 Aug-07 Aug-07 Aug-07 Jan-08 Jun-07 Scheduled Check In house check: Nov-07 In house check: Oct-07
Power sensor E4412A Power sensor E4412A Reference 3 dB Attenuator Reference 20 dB Attenuator Reference 30 dB Attenuator Reference Probe ES3DV2 DAE4 Secondary Standards RF generals of HP 8549C Network Analyzer HP 8753E	MY41495277 MY41498087 SN: S5086 (20b) SN: S5086 (20b) SN: 35129 (30b) SN: 3013 SN: 654 ID # US3642U01700 US37390585 Name	5-Agr-06 (METAS, No. 251-00587) 5-Agr-06 (METAS, No. 251-00587) 10-Aug-06 (METAS, No. 251-00582) 4-Agr-06 (METAS, No. 251-00569) 10-Aug-06 (METAS, No. 217-00593) 4-Jan-07 (SPEAG, No. E53-3013, Jan07) 21-Jun-06 (SPEAG, No. DAE4-654_Jun06) Check Date (in house) 4-Aug-99 (SPEAG, in house check Nov-05) 18-Oct-01 (SPEAG, in house check Oct-06) Function	Apr-07 Apr-07 Aug-07 Aug-07 Aug-07 Jan-08 Jun-07 Scheduled Check In house check: Nov-07 In house check: Oct-07
Power meter E44198 Power sensor E4412A Power sensor E4412A Reference 3 dB Attenuator Reference 20 dB Attenuator Reference Probe ES3DV2 DAE4 Secondary Standards RF generals HP 8649C Network Analyzer HP 8753E Calibrated by:	MY41495277 MY41498087 SN: S5054 (3c) SN: S5066 (20b) SN: S5129 (30b) SN: 3013 SN: 654 ID # US3642U01700 US37390585 Name Katja Pokovic	5-Agr-06 (METAS, No. 251-00587) 5-Agr-06 (METAS, No. 251-00587) 10-Aug-06 (METAS, No. 217-00582) 4-Agr-06 (METAS, No. 217-00583) 10-Aug-06 (METAS, No. 217-00693) 4-Jan-07 (SPEAG, No. ES3-3013_Jan07) 21-Jun-06 (SPEAG, No. DAE4-054_Jun06) Check Date (in house) 4-Aug-99 (SPEAG, in house check Nov-05) 18-Oct-01 (SPEAG, in house check Oct-06) Function	Apr-07 Apr-07 Aug-07 Aug-07 Aug-07 Jan-08 Jun-07 Scheduled Check In house check: Nov-07 In house check: Oct-07

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RTS RIM Testing Services	Appendix for the BlackBerry SAR Report	y® Smartphone Model I	RBJ41GW	Page 12(37)
Author Data	Dates of Test	Test Report No	FCC ID:	
Shahriar Ninad	May 23-June 01, 2007	RTS-0510-0706-03	L6ARBJ400	GW

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





Schweizerischer Kalibrierdienst S Service suisse d'étalonnage C

Servizio svizzero di taratura

Swiss Calibration Service

Accreditation No.: SCS 108

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

Glossary:

TSL tissue simulating liquid NORMx,y,z sensitivity in free space ConF sensitivity in TSL / NORMx,y,z DCP diode compression point Polarization o 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
- 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

Methods Applied and Interpretation of Parameters:

- NORMx,y,z: Assessed for E-field polarization 8 = 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.

Certificate No: EX3-3548 Jan07 Page 2 of 9

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RTS RIM Testing Services	Appendix for the BlackBerr SAR Report	y® Smartphone Model I	RBJ41GW	Page 13(37)
Author Data	Dates of Test	Test Report No	FCC ID:	
Shahriar Ninad	May 23-June 01, 2007	RTS-0510-0706-03	L6ARBJ40	GW

January 19, 2007

Probe EX3DV4

SN:3548

Manufactured:

November 16, 2004

Last calibrated: Recalibrated: December 12, 2005

January 19, 2007

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

Certificate No: EX3-3548 Jan07

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RTS RIM Testing Services	Appendix for the BlackBerry SAR Report	y® Smartphone Model I	RBJ41GW	Page 14(37)
Author Data	Dates of Test	Test Report No	FCC ID:	
Shahriar Ninad	May 23-June 01, 2007 RTS-0510-0706-03 L6ARBJ400			GW

January 19, 2007

DASY - Parameters of Probe: EX3DV4 SN:3548

Sensitivity in Free Space ^A	Diode	e Compression ^B

NormX	0.340 ± 10.1%	μV/(V/m) ^e	DCP X	92 mV
NormY	0.430 ± 10.1%	$\mu V/(V/m)^2$	DCP Y	93 mV
NormZ	0.460 ± 10.1%	$\mu V/(V/m)^2$	DCP Z	90 mV

Sensitivity in Tissue Simulating Liquid (Conversion Factors)

Please see Page 8.

Boundary Effect

TSL 2450 MHz Typical SAR gradient: 12 % per mm

Sensor Cente	r to Phantom Surface Distance	2.0 mm	3.0 mm
SAR _{be} [%]	Without Correction Algorithm	4.5	2.1
SAR _{be} [%]	With Correction Algorithm	0.3	0.6

TSL 5200 MHz Typical SAR gradient: 26 % per mm

Sensor Cente	er to Phantom Surface Distance	2.0 mm	3.0 mm
SAR _{be} [%]	Without Correction Algorithm	2.7	0.5
SAR _{be} [%]	With Correction Algorithm	0.0	0.0

Sensor Offset

Probe Tip to Sensor Center

1.0 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%.

Certificate No: EX3-3548_Jan07

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⁵ The uncertainties of NormX,Y,Z do not affect the E²-field uncertainty inside TSL (see Page 8).

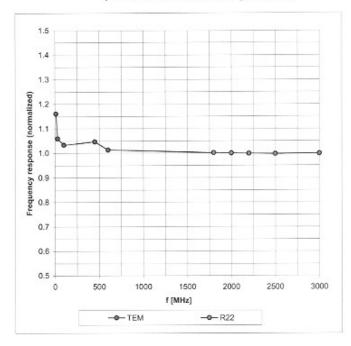
⁸ Numerical linearization parameter: uncertainty not required.

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Shahriar Ninad	May 23-June 01, 2007	RTS-0510-0706-03	L6ARBJ40	GW

January 19, 2007

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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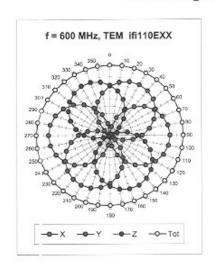
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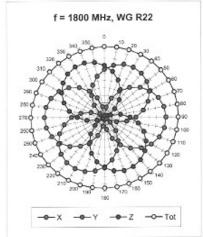
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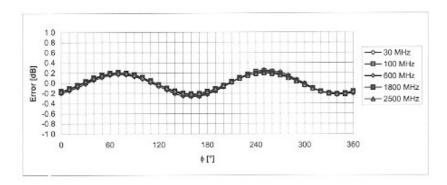
RTS RIM Testing Services	Appendix for the BlackBe SAR Report	rry® Smartphone Model	RBJ41GW	Page 16(37)
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Shahriar Ninad	May 23-June 01, 2007	RTS-0510-0706-03	L6ARBJ40	GW

January 19, 2007

Receiving Pattern (6), 9 = 0°







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

Certificate No: EX3-3548_Jan07

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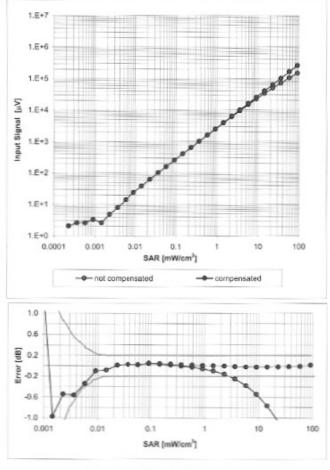
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RTS RIM Testing Services	Appendix for the BlackBerr SAR Report	y® Smartphone Model I	RBJ41GW	Page 17(37)
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January 19, 2007

Dynamic Range f(SAR_{head})

(Waveguide R22, f = 1800 MHz)



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

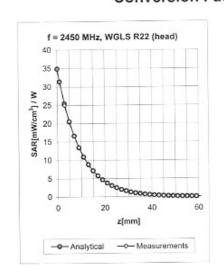
Certificate No: EX3-3548_Jan07

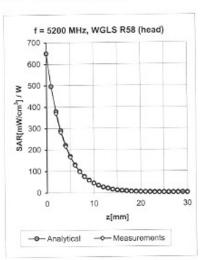
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RTS RIM Testing Services	Appendix for the BlackBerr SAR Report	y® Smartphone Model I	RBJ41GW	Page 18(37)
Author Data	Dates of Test	Test Report No	FCC ID:	
Shahriar Ninad	May 23-June 01, 2007	RTS-0510-0706-03	L6ARBJ40	GW

January 19, 2007

Conversion Factor Assessment





f [MHz]	Validity [MHz] ^C	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF	Uncertainty
900	±50/±100	Head	41.5 ± 5%	0.97 ± 5%	0.60	0.90	9.00	± 11.0% (k=2)
1810	±50/±100	Head	40.0 ± 5%	1.40 ± 5%	0.25	1.00	7.69	± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	$1.80 \pm 5\%$	0.46	1.00	7.07	± 11.8% (k=2)
4950	±50/±100	Head	36.3 ± 5%	$4.40 \pm 5\%$	0.32	1.60	5.69	± 13.1% (k=2)
5200	±50/±100	Head	36.0 ± 5%	4.66 ± 5%	0.35	1.60	5.28	± 13.1% (k=2)
5500	±50/±100	Head	35.6 ± 5%	$4.96 \pm 5\%$	0.35	1.60	5.15	± 13.1% (k=2)
5800	± 50 / ± 100	Head	35.3 ± 5%	5.27 ± 5%	0.33	1.60	4.92	± 13.1% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.48	1.00	7.13	± 11.8% (k=2)
4950	±50/±100	Body	49.4 ± 5%	5.01 ± 5%	0.42	1.65	4.93	± 13.1% (k=2)
5200	±50/±100	Body	49.0 ± 5%	$5.30 \pm 5\%$	0.38	1.65	4.72	± 13.1% (k=2)
5500	±50/±100	Body	48.6 ± 5%	5.65 ± 5%	0.35	1.68	4.51	± 13.1% (k=2)
5800	± 50 / ± 100	Body	48.2 ± 5%	6.00 ± 5%	0.32	1.70	4.79	± 13.1% (k=2)

^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.

Certificate No: EX3-3548_Jan07

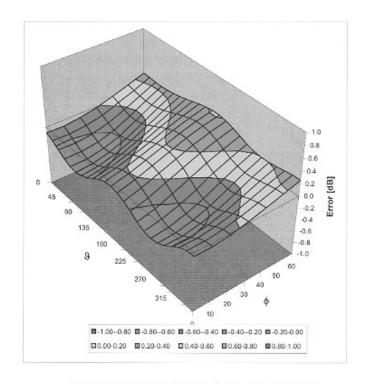
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RTS RIM Testing Services	Appendix for the BlackBerr SAR Report	y® Smartphone Model 1	RBJ41GW	Page 19(37)
Author Data	Dates of Test	Test Report No	FCC ID:	
Shahriar Ninad	May 23-June 01, 2007	RTS-0510-0706-03	L6ARBJ40	GW

January 19, 2007

Deviation from Isotropy in HSL

Error (¢, 3), f = 900 MHz



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

Certificate No: EX3-3548_Jan07

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RIM Testing Services Appendix for the BlackBerry® Smartphone Model RBJ41GW SAR Report Dates of Test May 23-June 01, 2007 Page 20(37) Page 20(37) Page 20(37) Page 20(37) Page 20(37)

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Accreditation No.: SCS 108

Multilateral Agreement for the recognition of calibration certificat

Client RIM

Certificate No: D835V2-446 Jan07

CALIBRATION CERTIFICATE D835V2 - SN: 446 Object QA CAL-05.v6 Calibration procedure(s) Calibration procedure for dipole validation kits Calibration date: January 8, 2007 In Tolerance Condition of the calibrated item This calibration certificate documents the tracesbility 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 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: 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 (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 Check Date (in house) Scheduled Check Power sensor HP 8481A MY41092317 18-Oct-(12 (SPEAG, in house check Oct-05) In house check: Oct-07 RF generator Agrient E4421B MY41000675 11-May-05 (SPEAG, in house check Nov-05) In house check: Nev-07 Network Analyze: HP 8753E US37390585 S4206 18-Oct-01 (SPEAG, in house check Oct-06) In house check: Oct-07 Function Calibrated by: Marcol Fehr Laboratory Technician Katja Pokovic Approved by: 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

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RTS RIM Testing Services	Appendix for the BlackBe SAR Report	rry® Smartphone Model	RBJ41GW	Page 21(37)
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Shahriar Ninad	May 23-June 01, 2007	RTS-0510-0706-03	L6ARBJ40	GW

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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 System Handbook

Methods Applied and Interpretation of Parameters:

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

Certificate No: D835V2-445 Jan07

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Author Data	Dates of Test	Test Report No	FCC ID:	
Shahriar Ninad	May 23-June 01, 2007	RTS-0510-0706-03	L6ARBJ40	GW

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 cm3 (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 1	normalized to 1W	9.28 mW / g ± 17.0 % (k=2)

SAR averaged over 10 cm ² (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 1	normalized to 1W	6.04 mW / g ± 16.5 % (k=2)

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

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Shahriar Ninad	May 23-June 01, 2007	RTS-0510-0706-03	L6ARBJ40	GW

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	50.8 Ω - 5.8 jΩ	
Return Loss	- 24.7 dB	

General Antenna Parameters and Design

Electrical Delay (one direction)	1.386 ns	
-investor and form discountly	1,300 113	

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 be a policy of the series and as the spidored excessive force must be applied to the dipole arms.

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

RTS RIM Testing Services	Appendix for the BlackBe SAR Report	rry® Smartphone Model	RBJ41GW	Page 24(37)
Author Data	Dates of Test	Test Report No	FCC ID:	
Shahriar Ninad	May 23-June 01, 2007	RTS-0510-0706-03	L6ARBJ40	GW

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 MHz; $\sigma = 0.88$ mho/m; $\epsilon_t = 40.3$; $\rho = 1000$ kg/m³

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

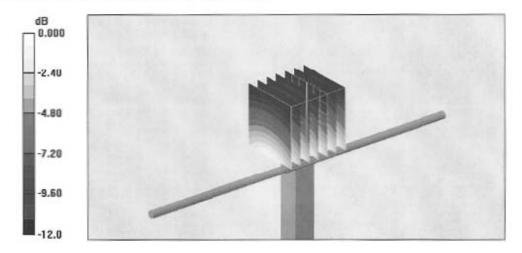
Pin = 250 mW; d = 15 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm,

dy=5mm, dz=5mm

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

Peak SAR (extrapolated) = 3.43 W/kg

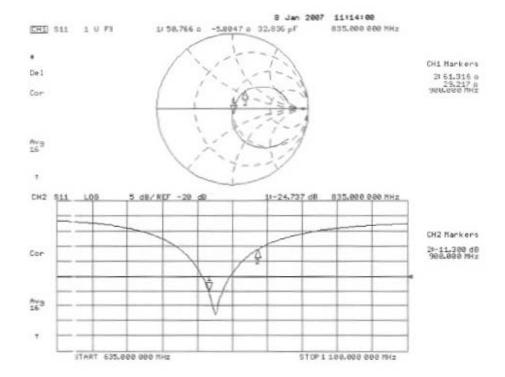
SAR(1 g) = 2.33 mW/g; SAR(10 g) = 1.52 mW/g Maximum value of SAR (measured) = 2.51 mW/g



0 dB = 2.51 mW/g

RTS RIM Testing Services	Appendix for the BlackBe SAR Report	rry® Smartphone Model	RBJ41GW	Page 25(37)
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Impedance Measurement Plot for Head TSL



RIM Testing Services Appendix for the BlackBerry® Smartphone Model RBJ41GW SAR Report Author Data Shahriar Ninad Dates of Test May 23-June 01, 2007 May 23-June 01, 2007 Page 26(37) Page 26(37) Page 26(37)

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Certificate No: D1900V2-545_Jan07

CALIBRATION CERTIFICATE D1900V2 - SN: 545 Object QA CAL-05 v6 Calibration procedure(s) Calibration procedure for dipole validation kits Calibration date: January 9, 2007 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 oritical 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 dF Attenuator SN: 5086 (20a) 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_Jul05) Jul-07 Secondary Standards ID 8 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 chock 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 Mike Meili Laboratory Technician Calibrated by: Approved by: Katja Pokovic Technical Manager Issued: January 16, 2007 This calibration certificate shall not be reproduced except in full without written approval of the laboratory

Certificate No: D1900V2-545_Jan07

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Shahriar Ninad	May 23-June 01, 2007	RTS-0510-0706-03	L6ARBJ40	GW

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Accreditation No.: SCS 108

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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) 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 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.

RTS RIM Testing Services	Appendix for the BlackBer SAR Report	ry® Smartphone Model	RBJ41GW	Page 28(37)
Author Data	Dates of Test	Test Report No	FCC ID:	
Shahriar Ninad	May 23-June 01, 2007	RTS-0510-0706-03	L6ARBJ40	GW

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 ² (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 1	normalized to 1W	37.0 mW / g ± 17.0 % (k=2)

SAR averaged over 10 cm3 (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 1	normalized to 1W	19.6 mW / g ± 16.5 % (k=2)

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

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Author Data	Dates of Test	Test Report No	FCC ID:	
Shahriar Ninad	May 23-June 01, 2007	RTS-0510-0706-03	L6ARBJ400	GW

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.0 Ω + 0.2 μΩ
Return Loss	- 34.1 dB

General Antenna Parameters and Design

lectrical 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	

RTS RIM Testing Services	Appendix for the BlackBe SAR Report	erry® Smartphone Model	RBJ41GW	Page 30(37)
Author Data	Dates of Test	Test Report No	FCC ID:	
Shahriar Ninad	May 23-June 01, 2007	RTS-0510-0706-03	L6ARBJ40	GW

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; $\epsilon_t = 38.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

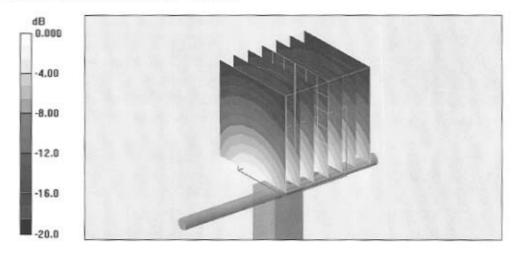
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 SN1507 (HF); ConvF(4.97, 4.97, 4.97); Calibrated: 19.10.2006
- Sens or-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 = 10 mm/Zoom Scan (7x7x7)/Cube 0:

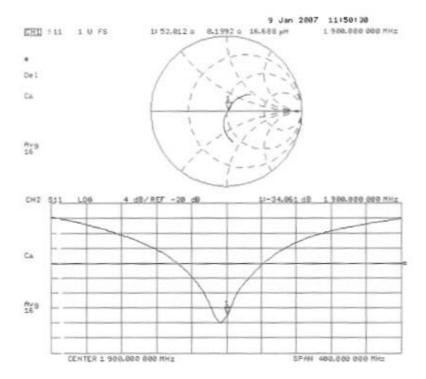
Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 90.8 V/m; Power Drift = 0.018 dB Peak SAR (extrapolated) = 16.5 W/kg SAR(1 g) = 9.49 mW/g; SAR(10 g) = 4.98 mW/g Maximum value of SAR (measured) = 10.7 mW/g



0 dB - 10.7mW/g

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Impedance Measurement Plot for Head TSL



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Shahriar Ninad	May 23-June 01, 2007	RTS-0510-0706-03	L6ARBJ400	GW

Calibration Laboratory of Schmid & Partner Engineering AG Zeughausstrasse 43, 8004 Zurich, Switzerland Multilateral Agreement for the recognition of calibration certificates RIM CALIBRATION CERTIFICATE





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

Accreditation No.: SCS 108 Accredited by the Swiss Federal Office of Metrology and Accreditation The Swiss Accreditation Service is one of the signatories to the EA

Certificate No: D2450V2-747_Dec05

D2450V2 - SN: 747 Object Calibration procedure(s) QA CAL-05.v6 Calibration procedure for dipole validation kits December 14, 2005 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) Primary Standards ID# Cal Date (Calibrated by, Certificate No.) Scheduled Calibration Power meter EPM E442 GB37480704 12-Oct-04 (METAS, No. 251-00412) 12-Oct-04 (METAS, No. 251-00412) Power sensor HP 8481A US37292783 Oct-05 Reference 20 dB Attenuator SN: 5086 (20g) 11-Aug-05 (METAS, No 251-00498) Aug-06 Reference 10 dB Attenuator SN: 5047.2 (10r) 11-Aug-05 (METAS, No 251-00498) Aug-06 Reference Probe ES3DV2 SN 3013 07-Jan-05 (SPEAG, No. ES3-3013_Jan05) Jan-06 07-Jan-05 (SPEAG, No. DAE4-601_Jan05) SN 601 Secondary Standards ID# Check Date (in house) Scheduled Check Power sensor HP 8481A MY41092317 18-Oct-02 (SPEAG, in house check Oct-03) In house check: Oct-05 RF generator R&S SML-03 100698 27-Mar-02 (SPEAG, in house check Dec-03) In house check: Dec-05 Network Analyzer HP 8753E US37390585 S4206 18-Oct-01 (SPEAG, in house check Nov-04) In house check: Nov-05 Name Function Laboratory Technician Calibrated by: Mike Meili Katja Pokovic Technical Manager Approved by: Issued: December 14, 2005 This calibration certificate shall not be reproduced except in full without written approval of the laboratory

Certificate No: D2450V2-747_Dec05

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Shahriar Ninad	May 23-June 01, 2007	RTS-0510-0706-03	L6ARBJ40	GW

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





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

Accreditation No.: SCS 108

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

Glossary:

TSL ConvF

N/A

tissue simulating liquid

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 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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Shahriar Ninad	May 23-June 01, 2007	RTS-0510-0706-03	L6ARBJ40	GW

Measurement Conditions

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

DASY Version	DASY4	V4.6
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	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

The following parameters and consecution was a applicate					
	Temperature	Permittivity	Conductivity		
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m		
Messured Head TSL parameters	(22.0 ± 0.2) °C	38.0 ± 6 %	1.78 mho/m ± 6 %		
Head TSL temperature during test	(22.0 ± 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	53.8 mW / g ± 17.0 % (k=2)

SAR averaged over 10 cm² (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.29 mW / g
SAR normalized	normalized to 1W	25.2 mW / g
SAR for nominal Head TSL parameters 1	normalized to 1W	24.9 mW / g ± 18.5 % (k=2)

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⁵ 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 + 3.1 jΩ	
Return Loss	-29.8 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 1, 2003	

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Shahriar Ninad	May 23-June 01, 2007	RTS-0510-0706-03	L6ARBJ40	GW

DASY4 Validation Report for Head TSL

Date/Time: 14.12.2005 17:37:31

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:747

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

Medium: HSL U10 BB;

Medium parameters used: f = 2450 MHz; $\sigma = 1.78 \text{ mho/m}$; $\varepsilon_r = 38$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 SN3013; ConvF(4.33, 4.33, 4.33); Calibrated: 07.01.2005
- · Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601;
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA;;
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

3013_Pin = 250 mW; d = 10 mm/Area Scan (61x61x1): Measurement grid: dx=10mm, dy=10mm Maximum value of SAR (interpolated) = 16.1 mW/g

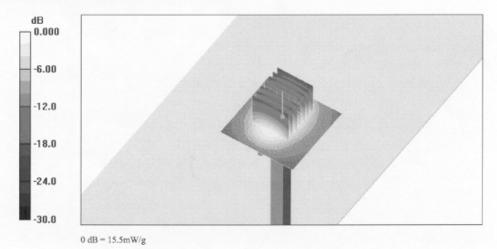
3013_Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 92.4 V/m; Power Drift = 0.067 dB

Peak SAR (extrapolated) = 28.0 W/kg

SAR(1 g) = 13.6 mW/g; SAR(10 g) = 6.29 mW/g

Maximum value of SAR (measured) = 15.5 mW/g

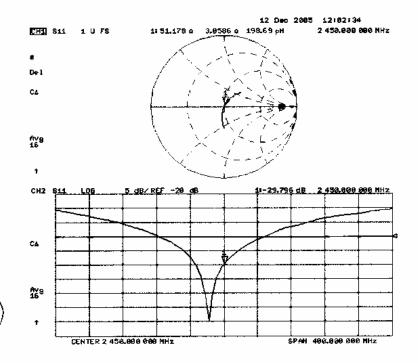


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Impedance Measurement Plot for Head TSL



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