RTS RIM Testing Services	Appendix for the BlackBerry SAR Report	y® Smartphone Model 1	RBW71CW	Page 1(13)
Author Data	Dates of Test	Test Report No	FCC ID:	
Shahriar Ninad	Aug 06-14, Sep 15-18, 2008	RTS-1191-0808-22	L6ARBW7	0CW

APPENDIX D: PROBE & DIPOLE CALIBRATION DATA

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Author Data	Dates of Test	Test Report No	FCC ID:	
Shahriar Ninad	Aug 06-14, Sep 15-18, 2008	RTS-1191-0808-22	L6ARBW7	0CW

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





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Accredited by the Swiss Federal Office of Metrology and Accreditation The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates Accreditation No.: SCS 108

Client RIM	SKANET	Certificate	No: D1900V2-545_Jan07
CALIBRATION C	ERTIFICATE		
Object	D1900V2 - SN: 5	45	Selection of the select
Calibration procedure(s)	QA CAL-05.v6 Calibration proce	dure for dipole validation kits	
Calibration date:	January 9, 2007		DAMES AND A
Condition of the calibrated item	In Tolerance	FED TO BE STORY	
All calibrations have been conducted that the calibration Equipment used (M&1) Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Reference 10 dB Attenuator		y facility: environment temperature (22 ± Cal Date (Calibrated by, Certificate No 03-Oct-06 (METAS, No. 217-00608) 10-Aug-06 (METAS, No. 217-00601) 10-Aug-06 (METAS, No. 217-00501)	Scheduled Calibration Oct-07 Oct-07 Aug-07
Reference Probe ET3DV6 Reference Probe ES3DV3 DAE4	SN: 1507 SN: 3025 SN: 907	19-Oct-06 (SPEAG, No. ET3-1507_Oc 19-Oct-06 (SPEAG, No. ES3-3025_Oc 20-Jul-06 (SPEAG, No. DAE4-907_Jul	:06) Oct-07
Secondary Standards Power sensor HP 8481A RF generator Ag ent E4421B Network Analyzer HP 8753E	ID 8 MY41092317 MY41000675 US37390585 S4208	Check Date (in house) 18-Oct-02 (SPEAG, in house check Or 11-May-05 (SPEAG, in house check Or 18-Oct-01 (SPEAG, in house check Or	ov-05) In house check: Nov-07
Culibrated by:	Name Mike Melli	Function Laboratory Technician	Scrawe M. Heili Blini M.J.
Approved by:	Katja Pokovic	Technical Manager	Mi KJ-
			Issued: January 16, 2007

Certificate No: D1900V2-545_Jan07

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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
- 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
- SAR for nominal TSL parameters: The measured TSL parameters are used to calculate the nominal SAR result.

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Shahriar Ninad	Aug 06-14, Sep 15-18, 2008	RTS-1191-0808-22	L6ARBW7	0CW

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)

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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	52.0 Ω + 0.2 jΩ
Return Loss	- 34.1 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.197 ns

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

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.

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

Additional EUT Data

Manufactured by	SPEAG	
Manufactured on	November 15, 2001	

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Shahriar Ninad	Aug 06-14, Sep 15-18, 2008	RTS-1191-0808-22	L6ARBW7	0CW

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; $\sigma = 1.43 \text{ mho/m}$; $\epsilon_t = 38.8$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 SN1507 (HF); ConvF(4.97, 4.97, 4.97); Calibrated: 19.10.2006
- · Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn907; Calibrated: 20.07.2006
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

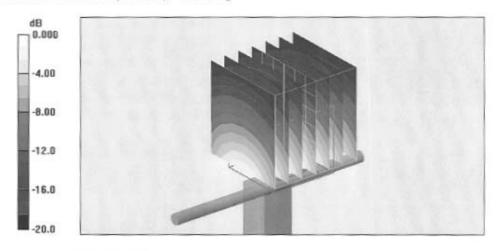
Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0:

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

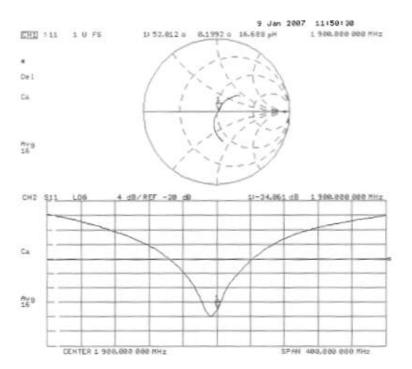
Maximum value of SAR (measured) = 10.7 mW/g



0 dB = 10.7 mW/g

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Impedance Measurement Plot for Head TSL



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Shahriar Ninad	Aug 06-14, Sep 15-18, 2008	RTS-1191-0808-22	L6ARBW7	0CW

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 Accreditation No.: SCS 108

Certificate No: D2450V2-747_Nov07

S

Multilateral Agreement for the recognition of calibration certificates RIM

CALIBRATION CERTIFICATE D2450V2 - SN: 747 Object QA CAL-05.v6 Calibration procedure(s) Calibration procedure for dipole validation kits November 06, 2007 Calibration date: 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 GB37480704 Power meter EPM-442A 04-Oct-07 (METAS, No. 217-00736) Oct-08 Power sensor HP 8481A US37292783 04-Oct-07 (METAS, No. 217-00736) Oct-08 Reference 20 dB Attenuator SN: 5086 (20g) 07-Aug-07 (METAS, No 217-00718) Aug-08 Reference 10 dB Attenuator SN: 5047.2 (10r) 07-Aug-07 (METAS, No 217-00718) Aug-08 Reference Probe ES3DV2 SN: 3025 26-Oct-07 (SPEAG, No. ES3-3025_Oct07) Oct-08 DAF4 SN: 601 30-Jan-07 (SPEAG, No. DAE4-601_Jan07) Jan-08 10# Check Date (in house) Scheduled Check Secondary Standards Power sensor HP 8481A MY41092317 In house check: Oct-08 18-Oct-02 (SPEAG, in house check Oct-07) RF generator R&S SMT-06 4-Aug-99 (SPEAG, in house check Oct-07) In house check: Oct-09 100005 Network Analyzer HP 8753E US37390585 S4206 18-Oct-01 (SPEAG, in house check Oct-07) In house check: Oct-08 Function Calibrated by: Laboratory Technician Claudio Leubler Approved by: Katja Pokovic Technical Manager This calibration certificate shall not be reproduced except in full without written approval of the laboratory

Certificate No: D2450V2-747_Nov07

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Shahriar Ninad	Aug 06-14, Sep 15-18, 2008	RTS-1191-0808-22	L6ARBW7	0CW

Calibration Laboratory of

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





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C Service suisse detaionnage
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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

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

d) DASY4 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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Author Data	Dates of Test	Test Report No	FCC ID:	
Shahriar Ninad	Aug 06-14, Sep 15-18, 2008	RTS-1191-0808-22	L6ARBW7	0CW

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
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters
The following parameters and calculations were applied.

To roll of the state of the sta	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 cm ³ (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)

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
Electrical Delay (one direction)	33.75550750

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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Shahriar Ninad	Aug 06-14, Sep 15-18, 2008	RTS-1191-0808-22	L6ARBW7	0CW

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;;

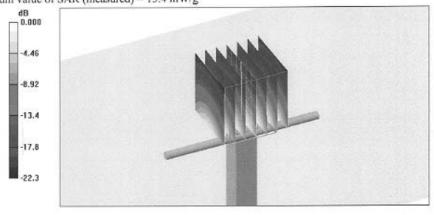
Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 172

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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Impedance Measurement Plot for Head TSL

