Testing Service	I CONTINUE TO THE PARTY OF THE			Page 1(55)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Mar 04 – May 30, 2013	RTS-6036-1305-06B	L6ARFR100LW	2503A-RFR100LW

# APPENDIX D: PROBE & DIPOLE CALIBRATION DATA



# Appendix D for the BlackBerry® Smartphone Model RFR101LW SAR Report

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Author Data
Andrew Becker

Dates of Test

Mar 04 - May 30, 2013

Test Report No

RTS-6036-1305-06B

L6ARFR100LW

FCC ID:

2503A-RFR100LW

Calibration Laboratory of Schmid & Partner Engineering AG Zeughausstrasse (3, 8004 Zurich, Switzerland





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Client

RTS (RIM Testing Services)

Continue No. ES3-3225\_Jan13

Accordination No.: SCS 108

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CALIBRATION CERTIFICATE

Object ES3DV3 - SN:3225

Calibration procedure(s) QA CAL-01.vi8, QA CAL-23.vi4, QA CAL-25.vi4
Calibration procedure for dosimetric E-field probes

Calibration obtain: January 10, 2013

This calibration conficults documents the traceability to national standards, which realize the physical units of measurements (II), 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 (I2) s 3°C and humidity < 70%.

Calibration Equipment used (MATE critical for calibration)

Primary Standards	0	Cal Date (Controlle No.)	Scheduled Calibration
Power mater E44196	0841290674	29-May-12 (No. 217-01608)	Apr-13
Power sensor E44/GA	M7Y41408087	29-May-12 (No. 217-01508)	Apr/13
Reference 3 dB Attenuetor	5N: 55054 (3c)	27 Mar-12 (No. 217-01551)	Apr-13
Beleronce 20 dB Attenuator	SN: 59085 (20b)	27 Mary 12 (No. 217 01929)	Apr.13
Reference 30 dR Attenuator	SN: 68429 (306)	27-May-12 (No. 217-01502)	Apr-13
Reference Probe ES30V2	8N: 3013	28-Dec-12 (No. ESS-3013, Dec12)	Dec-13
DAE4	SIN: 660	20-Jun-12 (No. DAEH-660, Jun12)	Jun 13
Secondary Standards	P	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-11)	In house check: Apr-13
Network Analyzer HP 87506	US37390585	18-Oct-01 (in house sheck Oct-12)	In house check: Odi-13

	Name	Function	Signature
Catioraned by:	Jeton Kastrati	Laboratory Technician	fu
Approved by	Karja Pokovic	Technical Manager	De de
			fewerd: January 14, 2013
This centination certificati	e shait not be reproduced except in fu	f without written approval of the lieborate	η.

Certificate Nor. ES3-3225, Jan 53

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L6ARFR100LW

FCC ID:

2503A-RFR100LW

Calibration Laboratory of Schmid & Partner Engineering AG Zeighausstrase 43, 804 Zurich, Buitzerland





S Schweizerlecher Kalibrierdienel
C Service suisse d'étalonnage
Servicie snizzero di tanatura
Swiss Calibration Service

Accreditation No.: SCS 108

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#### Glossary:

TSL NORMx,y,z ConvF

DCP.

tissue simulating liquid sensitivity in free space sensitivity in TSL / NORMx,y,z diode compression point

CF A, B, C, D crest factor (1/duty\_cycle) of the RF signal modulation dependent linearization parameters

Polarization e

e rotation around probe axis

Polarization 8

5 rotation around an axis that is in the plane normal to probe axis (at measurement center),

i.e., 3 = 0 is normal to probe axis

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

- IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003.
- Techniques", December 2003
  b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

#### Methods Applied and Interpretation of Parameters:

- MORMs,y,z: Assessed for E-field polarization 5 = 0 (f s 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide).
   NORMs,y,z are only informediate values, i.e., the uncertainties of NORMs,y,z does not affect the E<sup>2</sup>-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 with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- PAR: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- Ax.y.z: Bx.y.z: Cx.y.z: Dx.y.z: VRx.y.z: A, B, C, D are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- Const 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 \* Const\* whereby the uncertainty corresponds to that given for Const\*. A frequency dependent Const\* is used in DASY version 4.4 and higher which allows extending the validity from a 50 MHz to a 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 to-(on probe sxis). No tolorance required.

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**Andrew Becker** 

# Appendix D for the BlackBerry® Smartphone Model RFR101LW SAR Report

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FCC ID: RTS-6036-1305-06B | L6ARFR100LW

2503A-RFR100LW

ES30V3 - SN3225

January 10, 2013

# Probe ES3DV3

SN:3225

Manufactured: Calibrated:

September 1, 2009 January 10, 2013

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

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2503A-RFR100LW

ES30V3- SN:3225

January 10, 2013

# DASY/EASY - Parameters of Probe: ES3DV3 - SN:3225

#### **Basic Calibration Parameters**

	Sensor X	Sensor Y	Sensor Z	Ume (NP2)
Norm (yV/(Vilm) <sup>2</sup> ) <sup>a</sup>	1.29	1.19	1.31	n 10.1 %
DCP (mV)"	100.5	101.5	99.9	

#### Modulation Calibration Parameters

UID	Communication System Name		A. dB	68-/ <sub>9</sub> V	-0	0 dB	VR mY	Une* (k=2)
O .	OW	X	0.0	0.0	1.0	0.00	157.5	12.7%
		Y	0.0	0.0	1.0		158.4	
		Z	0.0	0.0	1.0		165.9	

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: ES3-3225, Jan 13

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

Namerical inearcration parameter: uncertainty not required.

Uncertainty is determined using the max, deviation from linear response applying rectangular distribution and is expressed for the square of the



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ES30V3-- SN:3225

January 10, 2013

# DASY/EASY - Parameters of Probe: ES3DV3 - SN:3225

#### Calibration Parameter Determined in Head Tissue Simulating Media

r(MHz) <sup>c</sup>	Relative Permittivity*	Conductivity (Sim)	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Umet. (k×2)
750	41.9	0.89	6.56	6.56	6.56	0.42	1.54	± 12.0 %
900	41.5	0.97	6.19	6.19	6.19	0.43	1.52	± 12.0 %
1810	40.0	1.40	5.35	5.35	5.35	0.63	1.39	± 12.0 %
1950	40.0	1.40	5.09	5.09	5.09	0.80	1.23	± 12.0 %
2450	39.2	1.80	4.65	4.65	4.65	0.61	1.63	± 12.0 %
2600	39.0	1.96	4.43	4.43	4.43	0.80	1.32	± 12.0 %

<sup>6</sup> Frequency validity of a 100 MHz only applies for DASY w.l.4 and higher (see Page 2), else it is restricted to a 50 MHz. The uncertainty is the RSS of the Const uncertainty at callfustion frequency and the uncertainty for the indicated bequency band.
<sup>8</sup> At Requencies below 3 GHz. The validity of issue parameters (s. and 4) can be relieved to a 10% if liquid componisation formula is applied to resource SAM values. At Requencies allows 3 GHz, the validity of linear parameters (s. and n) is restricted to a 5%. The uncertainty is the RSS of the Const uncertainty for indicated target issue parameters.

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ES30V3- SN:3225

January 10, 2013

# DASY/EASY - Parameters of Probe: ES3DV3 - SN:3225

### Calibration Parameter Determined in Body Tissue Simulating Media

r (MHa) <sup>c</sup>	Relative Permittivity	Conductivity (5/m)	Convil X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unot. (k+2)
750	55.5	0.96	6.27	6.27	6.27	0.48	1.51	± 12.0 %
900	55.0	1.05	6.12	6.12	6.12	0.73	1.25	± 12.0 %
1810	53.3	1.52	5.04	5.04	5.04	0.57	1.47	112.0%
1950	53.3	1.52	4.94	4.94	4.94	0.58	1.50	± 12.0 %
2450	52.7	1.95	4.35	4,35	4.35	0.70	1.16	1 12.0 %
2600	52.5	2.16	4.11	4.11	4.11	0.67	0.99	112.0 %

<sup>6</sup> Prequency validity of a 100 MHz only agains for DASY v4.4 and higher (see Page 2), also 8 is restricted to a 56 MHz. The uncertainty is the RSS of the Connf. uncertainty is calibration frequency and the uncertainty for the indicated frequency band.
<sup>8</sup> All frequencies better 3 GHz, the validity of issues parameters (i. and ii) can be reliated to a 10% if legal compensation formula is applied to measured SAR values. At frequencies store 3 GHz, the validity of fisces parameters (i. and ii) is restricted to a 5%. The uncertainty is the RSS of the Connf. uncertainty for indicated larger issues parameters.

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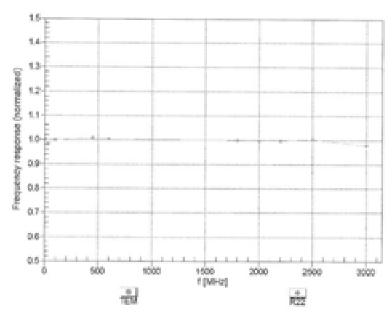
Author Data **Andrew Becker**  Dates of Test Mar 04 – May 30, 2013 Test Report No RTS-6036-1305-06B FCC ID: L6ARFR100LW

2503A-RFR100LW

ES30V3-SW3225

January 10, 2013

## 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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Author Data
Andrew Becker

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FCC ID:

L6ARFR100LW

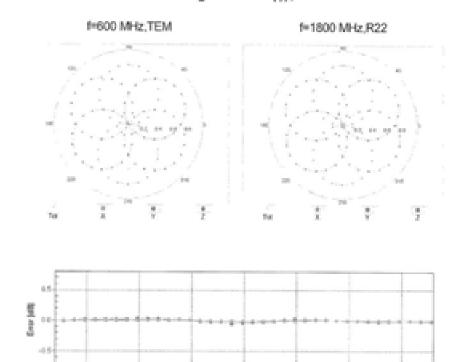
room .

2503A-RFR100LW

E530V3-5N:3225

January 10, 2013

# Receiving Pattern (6), 9 = 0°



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

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Author Data
Andrew Becker

Dates of Test

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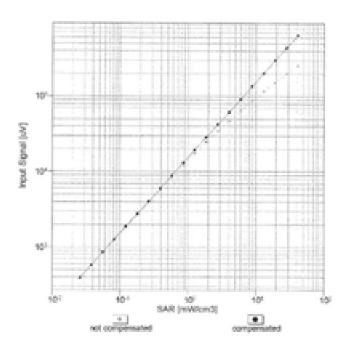
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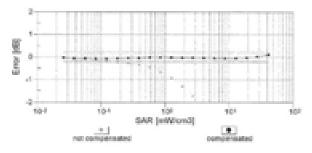
2503A-RFR100LW

ES30V3- SN:3225

January 10, 2013

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





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

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Dates of Test

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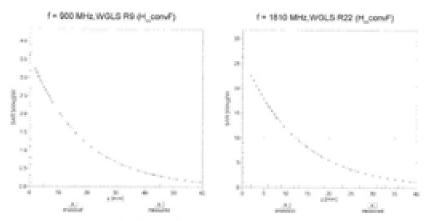
FCC ID: L6ARFR100LW

2503A-RFR100LW

ES30V3- SN:3225

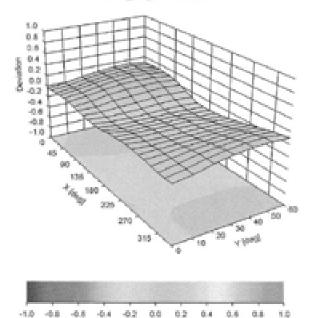
January 10, 2013

# Conversion Factor Assessment



# Deviation from Isotropy in Liquid

Error (4, 8), f = 900 MHz



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



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ES30V3-- SN 3225

January 10, 2013

# DASY/EASY - Parameters of Probe: ES3DV3 - SN:3225

#### Other Probe Parameters

Sersor Arrangement	Triangular
Connector Angle (*)	8.3
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	10 mm
Tip Diameter	4 mm
Probe Tip to Sensor X Calibration Point	2 mm
Probe Tip to Sensor Y Calibration Point	2 mm
Probe Tip to Sensor Z Calibration Point	2 mm
Recommended Measurement Distance from Surface	3 mm

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





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RTS (RIM Testing Services)

Accreditation No.: SCS 108

Certificate No. D750V3-1021\_Jan13

Riject	D750V3 - SN: 10	21 5 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	
Calibration procedure(s)	QA CAL-05.v9 Calibration proce	dure for dipole validation kits abo	ove 700 MHz
Calibration date:	January 07, 2013	3	
The measurements and the unce	rtainties with confidence p	onel standards, which realize the physical un robability are given on the following pages an ry facility: environment temperature (22 x 3)*(	of are part of the certificate.
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Calibration Equipment used (MIL)	TE critical for calibrations		
Yimayı Standarda	Dr	Cal Date (Certificate No.)	Scheduled Calibration
Vimary Standards Ower meter EPM-443A	ID # G837480704	01-Nov-12 (No. 217-01640)	Ox1-13
rimary Standards Ower meter CPM-442A Ower sensor HP 8481A	ID # G837480704 U637290783	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640)	Oxt-13 Oxt-13
rimary Standards ower meter EPM-442A ower sensor HP 8481A elerance 20-dS Atlenuator	ID # GR07480704 US37290780 SN: 5018 (204)	01-Nov-12 (No. 217-01040) 01-Nov-12 (No. 217-01040) 27-Nav-12 (No. 217-01030)	Oxt-13 Oxt-13 Apr-13
rimary Standards lower mater EPM-443A lower sensor HP 8481A leference 20-dB Attenuator ype-N mismatch combination	ID # GB37480704 US37290785 SN: 5056 (20x) SN: 5047.3 / 06827	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01600) 27-Mar-12 (No. 217-01603)	Osi-13 Osi-13 Apr-13 Apr-13
rimary Standards Over mater EPM-443A. Ioner sensor HP Britin. Idenance 20-dB Attenuator ype-N mismatch condination leterance Probe ES30V3	ID # G837460704 US37290785 SN: 5017.3 / 06327 SN: 5017.3 / 06327	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01600) 27-Mar-12 (No. 217-01603) 28-Dec-12 (No. ESS-3205, Dec12)	Ost-13 Ost-13 Apr-13 Apr-13 Osc-13
rimary Standards Over mater EPM-443A. Ioner sensor HP Britin. Idenance 20-dB Attenuator ype-N mismatch condination leterance Probe ES30V3	ID # GB37480704 US37290785 SN: 5056 (20x) SN: 5047.3 / 06827	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01600) 27-Mar-12 (No. 217-01603)	Out-13 Out-13 Apr-13 Apr-13
trimary Standards Ower meter EPM-44DA, Ower sensor HP 84B1A, leference 20-dB Affenuator yge-N mismatch combination leference Prute ESSOV3 AGIA	ID # G837460704 US37290785 SN: 5017.3 / 06327 SN: 5017.3 / 06327	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01600) 27-Mar-12 (No. 217-01603) 28-Dec-12 (No. ESS-3205, Dec12)	Ost-13 Ost-13 Apr-13 Apr-13 Osc-13
rimary Standards Ower meter EPM-44DA, Ower semon HP 84B1A elesence 20 dB Attenuator yes mismatch combination seterence Probe ESSOV3 AEI4 econdary Standards	ID # GR37460704 US372907109 SN: 5068 (200) SN: 5047.3 / 06827 SN: 3005 SN: 601	01-Nov-12 (No. 217-016N0) 01-Nov-12 (No. 217-016N0) 27-Mar-12 (No. 217-016N0) 27-Mar-12 (No. 217-016N0) 28-Dec-12 (No. ESS-3005, Dec12) 27-Jun-12 (No. DAEA-601, Jun12)	Oxi-13 Oxi-13 Apr-13 Apr-13 Dec-13 Jun-13
rimary Standards Tower meter EPM-44DA, Tower sensor HP 8481A, telesence 20:d8 Attenuator type-N mismatch continuation telesence Probe ES3OV3 IAEA tecondary Standards Tower sensor HP 8481A	ID # G607460704 U6372907105 SN 5016 (20K) SN: 5017.3 / 06027 SN: 3805 SN: 601	01-Nov-12 (No. 217-016N0) 01-Nov-12 (No. 217-016N0) 27-Mar-12 (No. 217-016N0) 27-Mar-12 (No. 217-016N0) 29-Dec-12 (No. ESB-3205, Dec.12) 27-Jun-12 (No. DAEA-R01, Jun12) Check Date (in house)	Oxi-13 Oxi-13 Apr-13 Apr-13 Dec-13 Jun-13 Sicheduled Check
Primary Standards Open meter EPM-443A Foreir semon HP SH81A Interence 20-d8 Attenuator Iypo-N misuraton constitution Interence Probe ES30V3 MEA Incondary Standards Fower semon HP 8481A If generator R&S SMT-06	ID # GR07460704 U637390790 SN 5016 (20%) SN: 5017.3 / 06507 SN: 3005 SN: 601	01-Nov-12 (No. 217-016N0) 01-Nov-12 (No. 217-016N0) 27-Mar-12 (No. 217-016N0) 27-Mar-12 (No. 217-016N0) 29-Dec-12 (No. ESB-3205 (Dec12) 27-Jun-12 (No. DAEA-601 (Jun12) Check Date (in house) 18-Out-02 (in house check Out-11)	Oxi-13 Oxi-13 Apr-13 Apr-13 Dec-13 Jun-13 Sicheduled Check In house check: Oxi-13
rimary Standards Open mater EPM-443A. Iones sensor HP 5481A. Interesce 20-d8 Attenuator Iyou-N misurator constitution Interesce Probe ES30V3 MEA Incompany Standards Tower sensor HP 5491A. If generator R&S SMT-06	ID # GR07460704 U637390785 SN: S058 (20k) SN: S047.3 / 06027 SN: 3205 SN: 601 ID # MY41000317 100005	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01600) 27-Mar-12 (No. 217-01600) 29-Dec-12 (No. ESS-3205, Dec12) 29-Dec-12 (No. ESS-3205, Dec12) 27-Jun-12 (No. DAE4-601, Jun12) Check Date (in house) 18-Out-02 (in house theck Out-11) 04-Aug-98 (in house theck Out-11)	Oxi-13 Oxi-13 Apr-13 Apr-13 Dec-13 Jun-13 Sicheduled Check In house check: Oxi-13 In house check: Oxi-13
nimery Standards Tower meter EPM-440A, Tower aemocr 16° 8481A, Inference 20' dB Affenuator yog-N mismatch combination Inference Probe ESSOV3 AAEA Incondary Standards Tower sensor 16° 8481A If generator 168 SMT-06 Interest 16° 8750E	ID # GR37460704 US37367105 SN: 5017-31/06327 SN: 5017-31/06327 SN: 5017-31/06327 SN: 6011 ID # MYH 1000317 100006 US37580686 SH206	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01630) 27-Mar-12 (No. ESS-3005, Dect2) 28-Dec-12 (No. ESS-3005, Dect2) 27-Jun-12 (No. ESS-3005, Dect2) 27-Jun-12 (No. ESS-3005, Dect2) 27-Jun-12 (No. ESS-3005, Dect2) 18-Oct-02 (In house of the Control of the Con	Oxi-13 Oxi-13 Apr-13 Apr-13 Dec-13 Jun-13 Sicheduled Check In house check: Oxi-13 In house check: Oxi-13 In house check: Oxi-13
	ID # GR37460704 US372907103 SN: 5082 (20x) SN: 5047:3 / 08027 SN: 3205 SN: 001 ID # MYH 1000317* 100005 US37300685 SH206 Name	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01630) 27-Mar-12 (No. ESS-3005, Dec12) 28-Oec-12 (No. ESS-3005, Dec12) 27-Jun-12 (No. ESS-3005, Dec12) 27-Jun-12 (No. ESS-3005, Dec12) 27-Jun-12 (No. ESS-3005, Dec12) 27-Jun-12 (No. ESS-3005, Dec12) 18-Oct-02 (In house (heck Cut-11) 04-Aug-98 (in house (heck Cut-11) 18-Oct-01 (in house (heck Cut-12)	Oxi-13 Oxi-13 Apr-13 Apr-13 Dec-13 Jun-13 Sicheduled Check In house check: Oxi-13 In house check: Oxi-13 In house check: Oxi-13

Certificate No: D750V3-1021\_Jan13

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Author Data Andrew Becker Dates of Test

Mar 04 – May 30, 2013

Test Report No

RTS-6036-1305-06B

L6ARFR100LW

FCC ID:

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2503A-RFR100LW

#### Calibration Laboratory of

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





Schweizerlacher Kalibrierdienst 8

Service suisse d'étalonnage Servicio 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:

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) 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
- 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.

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: D750V3-1021 Jan 53

Page 2 of 6



# Appendix D for the BlackBerry $\hspace{-0.05cm}$ Smartphone Model RFR101LW SAR Report

Page 15(55)

Author Data
Andrew Becker

Dates of Test

Mar 04 – May 30, 2013

Test Report No **RTS-6036-1305-06B** 

FCC ID: L6ARFR100LW

2503A-RFR100LW

### Measurement Conditions

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

DASY Version	DASYS	V52.8.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	750 MHz n 1 MHz	

#### **Head TSL parameters**

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.9	0.89 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	41.4 ± 6 %	0.89 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C		

#### SAR result with Head TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.12 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	8.46 W/kg = 17.0 % (ke2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.38 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	5.51 W/kg a 16.5 % (k+2)

Certificate No: D750V3-1021\_Jan13

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16(55)

Author Data **Andrew Becker**  Dates of Test Mar 04 – May 30, 2013 Test Report No RTS-6036-1305-06B

L6ARFR100LW

FCC ID:

2503A-RFR100LW

#### Appendix

#### Antenna Parameters with Head TSL

Impedance, transformed to feed point	55.7 Ω - 0.2 JΩ
Return Loss	- 25.4 dB

#### General Antenna Parameters and Design

-[	Electrical Delay (one direction)	1.033 ns

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

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

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

#### Additional EUT Data

Manufactured by	SPEAG
Manufactured on	December 01, 2010

Certificate No: D750V3-1021\_Jan13

Page 4 of 6



Dates of Test Test Report No FCC ID: Author Data **Andrew Becker** Mar 04 – May 30, 2013 RTS-6036-1305-06B L6ARFR100LW 2503A-RFR100LW

#### **DASY5 Validation Report for Head TSL**

Date: 07.01.2013

17(55)

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN: 1021

Communication System: CW; Frequency: 750 MHz.

Medium parameters used: f = 750 MHz;  $\sigma = 0.89 \text{ S/m}$ ;  $\epsilon_r = 41.4$ ;  $\rho = 1000 \text{ kg/m}^3$ 

Phantom section: Flat Section

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

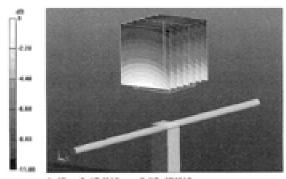
#### DASY52 Configuration:

- Probe: ES3DV3 SN3205; ConvF(6.28, 6.28, 6.28); Calibrated: 28.12.2012;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012.
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.4(1052); SEMCAD X 14.6.8(7028)

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

Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 54.107 V/m; Power Drift = 0.01 dB Peak SAR (extrapolated) = 3.23 W/kg SAR(1 g) = 2.12 W/kg; SAR(10 g) = 1.38 W/kg

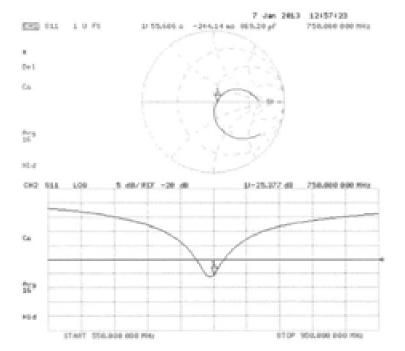
Maximum value of SAR (measured) = 2.47 W/kg



0 dB = 2.47 W/kg = 3.93 dBW/kg



### Impedance Measurement Plot for Head TSL





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Author Data **Andrew Becker**  Dates of Test

Mar 04 – May 30, 2013

Test Report No

RTS-6036-1305-06B | L6ARFR100LW

FCC ID:

2503A-RFR100LW

Calibration Laboratory of Schmid & Partner Engineering AG Zeughausstresse 43, 8004 Zurlich, Switzerland





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Accredited by the Swiss Accreditation Service (SAS)

The Swiss Accreditation Service is one of the signetories to the EA Multitaleral Agreement for the recognition of celibration certificates Accreditation No.: SCS 108

ARTON DESCRIPTIONS AND STREET

CALIBRATION C	ERTIFICATE		
Disparit	D835V2 - SN: 4d	043	
Californian procedure(s)	QA CAL-05.v8 Celloration proce	dure for dipole validation kits	
Subtration date:	April 07, 2011		
This measurements and the uncert	tainties with confidence p	onal standards, which resilize the shuscal c nobacility are given on the following gages a	and are part of the cartificans.
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Calibration Equipment used (MAT)	E orthool for calibration)		
hmary Standards	10+	California (Contificate No.)	Scheduled Calibration
Your motor EPM-442A	G837480704	06-Out-10-(No. 217-01266)	Oles-11
Tower server MP 8481A	U697242780	94-Oct 10-(No. 217-01246)	Owners
Neference 20 dB Attenuation	59Y 5006 (70g)	20 March 1 (No. 217-01060)	Apr-12
ype N manusch-combination	SN: 5047 2 / 06307	29-Mar-11 (No. 217-01371)	Age-12
Hulurance Probe ESCOVO NAFA	EN 3295	30 Apr 10-INs. ESS-2005_Apr 10)	April 1
DIAE4	SN 601	10-Jan 10 (No. DAE 4-001_Jun 10)	Jun-11
Secondary Standards	lex	Check Date on house?	Scheduled Check
POWER SHOWER PURPOSED A	MY41092317	18 Oct 02 in house chart Ora-Oth	In house shock: Osnili
M generator R&S SMT-06	100005	6-Aug-99 to house check Oct-019	In house check: Oct-11
Nowork Analyzis HP 87508	US07790585 54296	18 Oct 01 (in house sheek 0x3-15)	In house shock: Ocr 18
	None	Función	Signature Wil
Certificating by	Julion Hawtrell	Laboratory Technician	-y-=1/-
Approved by:	Kaga Pokovic	Technical Manager	ll the
		full without writter approved of the inborato	bound: April 7, 2911

Certificate No: D80512 46043 April 1

Page 1 of 6



20(55)

Author Data Andrew Becker Dates of Test Mar 04 – May 30, 2013 Test Report No RTS-6036-1305-06B

L6ARFR100LW

FCC ID:

2503A-RFR100LW

Calibration Laboratory of

Schmid & Partner Engineering AG Ziroghousebesse 45, 6004 Zurich, Switzerland





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Accompanies No.: SCS 108

Accredited by the Swiss Approditation Service (SAS)

The Swise 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
- 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
- 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 fiat 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.

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- SAR normalized: SAR as measured, normalized to an input power of 1 W at the antenna conflector.
- SAR for nominal TSL parameters: The measured TSL parameters are used to calculate the nominal SAR result.

Cardinata No. 089849 44549, April	Page 2 of 6	



# Appendix D for the BlackBerry $\hspace{-0.05cm}$ Smartphone Model RFR101LW SAR Report

Page **21(55)** 

Author Data
Andrew Becker

Dates of Test
Mar 04 – May 30, 2013

Test Report No

RTS-6036-1305-06B L6ARFR100LW

FCC ID:

2503A-RFR100LW

#### Measurement Conditions

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

DASY Version	DASYS	V52.6.2
Extrapolation	Advanced Extrapolation	
Phanton	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 colculations were applied

	Temperature	Permissivity	Conductivity
Nominal Head TSL parameters	22 0 "0	41.5	0:90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.6 ± 6 %	0.88 mhu/m ± 6 %
Head TSL temperature during test	(22.0 ± 0.2) °C		

#### SAR result with Head TSL

SAR averaged over 1 cm² (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2:30 mW / g
SAR normalized	normalized to 1W	9.32 mW / g
SAR for nominal Head TSL parameters	normalized to TW	9.43 mW/g ± 17.0 % (k=2)

SAR averaged over 10 cm² (10 g) of Head TSL	condition	
SAR measured	250 reW input power	1.52 mW / g
SAR normalized	normalized to 1W	6.06 mW / g
SAR for nominal Head TSL parameters	normalized to TW	6.14 mW /g ± 16.5 % (k=2)

Certificate No: D605V2-44043 ,April 1

Page 3 of 6



FCC ID: L6ARFR100LW

2503A-RFR100LW

22(55)

Author Data **Andrew Becker**  Dates of Test Mar 04 – May 30, 2013 Test Report No RTS-6036-1305-06B

### **Appendix**

#### Antenna Parameters with Head TSL

Impedance, transferred to feed point	52 9 Q - 3.4 JQ
Return Loss	- 27.2 dB

#### General Antenna Parameters and Design

- 1		
1	Electrical Delay (one direction)	1.391 66

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 expensive force must be applied to the dipole arms, because they might bend or the soldered convections near the feedpoint may be damaged.

#### Design Modification by End User

The dipole has been modified with Tellon Rings (TR) placed within identified markings close to the end of each dipole arm Calibration has been performed with TR attached to the dipole.

#### Additional EUT Data

Manufactured by	SPEAG	
Manufactured on	April 07, 2006	

Certificate No: D836V2:44043\_Apr11

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# Appendix D for the BlackBerry $\hspace{-0.5pt}$ Smartphone Model RFR101LW SAR Report

Page **23(55)** 

Author Data
Andrew Becker

Dates of Test

Mar 04 – May 30, 2013

Test Report No RTS-6036-1305-06B

L6ARFR100LW

FCC ID:

2503A-RFR100LW

#### **DASY5 Validation Report for Head TSL**

Date/Time: 07.04.2011 09:28:21

Test Laboratory: SPEAG, Zurich, Switzerland

#### DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d043

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

Medium: HSL900

Medium parameters used: f = 835 MHz;  $\sigma = 0.88$  mbo/tr:  $\epsilon_r = 40.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

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

#### DASY5 Configuration:

Probe: ES3DV3 - SN3205; ConvF(6.03, 6.03, 6.03); Calibrated: 30.04.2010.

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn601; Calibrated: 10.06.2010

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

Measurement SW: DASYS2, V52.6.2 Build (424)

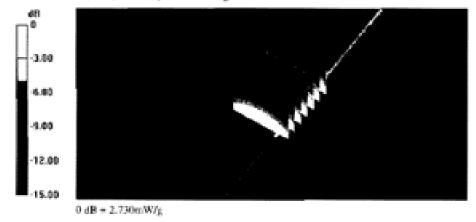
Postprocessing SW: SEMCAD X, V14.4.4 Build (2829)

### Pin=250 mW /d=15mm/Cube 0:

Measurement grid: dx=5mm, dy=5mm, da=5mm Reference Value = 57.201 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 3.504 W/kg

SAR(1 g) = 2.33 mW/g; SAR(10 g) = 1.52 mW/gMaximum value of SAR (measured) = 2.730 mW/g

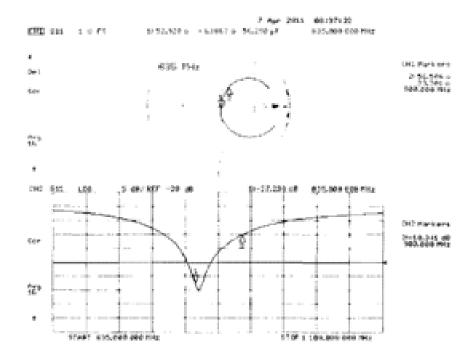


Certificate No: 0635V2-4d043\_Apr11

Page 5 of 6



### Impedance Measurement Plot for Head TSL





# Appendix D for the BlackBerry® Smartphone Model RFR101LW SAR Report

Page **25(55)** 

Author Data
Andrew Becker

Dates of Test

Mar 04 - May 30, 2013

Test Report No

RTS-6036-1305-06B

FCC ID: L6ARFR100LW

2503A-RFR100LW

Calibration Laboratory of Schmid & Partner Engineering AG Zeoghausstrasse 49, 8004 Zurich, Switzerland





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The Swiss Acceptation Service is one of the nin

The Swiss Accreditation Service is one of the signaturies to the EA Multilateral Agreement for the recognition of calibration certificates

Client

RTS (RIM Testing Services)

Acceeditation No.: SCS 108

Certificate No: D835V2-446\_Jan13

#### CALIBRATION CERTIFICATE Object D835V2 - SN: 446 Calibration procedure(s) QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz January 07, 2013 Calibration date: 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 (32 x 37°C and humidity < 70%. Calibration Equipment used (M&TE critical for calibration) Cal Date (Certificate No.) Scheduled Calibration Primary Standards 01-Nov-12 (No. 217-01640) Power meter EPM-442A G0007460704 Power sensor HP 8481A US37292783 01-Nov-12 (No. 217-01640) 00/18 Patienence 30 dB Attenuator SN: 5058 (20k) 27-May-12-Day, 217-015309 Apr. 10 Type-N mismatch combination SN: 5047.3 / 06357 27-May-12 (No. 217-01533) Apr. 13 Reference Probe ESSDV3 SN: 5005 29-Dec-12 (No. ES3-3205, Dec12) Dec-10. SN: 601 27-Jun-12 (No. DAE4-601 Jun12) Jun-13 Die Check Date (in house) Scheduled Check Secondary Standards Fromer sensor HP 8481A MY41002017 18-Oct-02 (in house check Oct-11): In house check: Oct-13 FIF generator P&S SMT-06 100005 04-Aug-99 (in house check: Oct-11): In house check: Oct-13 Network Analyzer HP 87536 US37390585 S4206 18-Oct-01 (in house check Oct-12) In house check: Oct-13 Function Laif Rysner Laboratory Technician Calibrated by: **Technical Manager** Kutja Pokovic Approved by: bound: January 8, 2013 This calibration certificate shall not be reproduced except in full without written approval of the laboratory

Certificate No: D835V2-446\_Jan13

Page 1 of 6



# Appendix D for the BlackBerry® Smartphone Model RFR101LW SAR Report

Page **26(55)** 

Author Data
Andrew Becker

Dates of Test

Mar 04 - May 30, 2013

Test Report No

RTS-6036-1305-06B

L6ARFR100LW

FCC ID:

2503A-RFR100LW

## Calibration Laboratory of

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





S Schweizerlacher Kalibrierdienst C Service suisse d'étalonnage

Servizio svizzoro di taratura Swiss Calibration Service

Accreditation No.: SCS 108

Accredited by the Stellar 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 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
- 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.

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: D635V2-446\_Jan/13

Page 2 of 6



27(55)

Author Data **Andrew Becker**  Dates of Test Mar 04 – May 30, 2013

Test Report No RTS-6036-1305-06B

FCC ID: L6ARFR100LW

2503A-RFR100LW

#### Measurement Conditions

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

DASY Version	DASYS	V52.8.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz a 1 MHz	

#### Head TSL parameters

The fello

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mholm
Measured Head TSL parameters	(22.0 ± 0.2) °C	42.0 ± 6 %	0.92 mhoim ± 6 %
Head TSL temperature change during test	< 0.5 °C	_	

#### SAR result with Head TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.38 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	9.39 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.55 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	6.13 W/kg a 16.5 % (k=2)

Certificate No: D835V2-445\_Jan13



28(55)

Author Data **Andrew Becker**  Dates of Test

Mar 04 – May 30, 2013

Test Report No RTS-6036-1305-06B

FCC ID:

L6ARFR100LW 2503A-RFR100LW

#### Appendix

#### Antenna Parameters with Head TSL

Impedance, transformed to feed point	50.1 Ω - 6.5 JΩ
Return Loss	-23.7 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 cosxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAPI data are not affected by this change. The overall dipole length is still according to the Standard.

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

#### Additional EUT Data

Manufactured by	SPEAG
Manufactured on	October 24, 2001

Certificate No: D635V2-446\_Jan13

Page 4 of 6



Author Data

## Appendix D for the BlackBerry® Smartphone Model RFR101LW SAR Report

29(55)

Dates of Test Test Report No FCC ID: **Andrew Becker** Mar 04 – May 30, 2013 RTS-6036-1305-06B

L6ARFR100LW

2503A-RFR100LW

#### DASY5 Validation Report for Head TSL

Date: 07.01.2013

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: CW; Frequency: 835 MHz

Medium parameters used: f = 835 MHz;  $\sigma = 0.92 \text{ S/m}$ ;  $\epsilon_r = 42$ ;  $\rho = 1000 \text{ kg/m}^3$ 

Phantom section: Flat Section

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

#### DASY52 Configuration:

- Probe: ES3DV3 SN3205; ConvF(6.05, 6.05, 6.05); Calibrated: 28.12.2012;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.4(1052); SEMCAD X 14.6.8(7028)

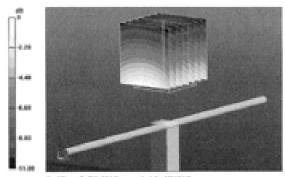
### Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 56.650 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 3.61 W/kg

SAR(1 g) = 2.38 W/kg; SAR(10 g) = 1.55 W/kg

Maximum value of SAR (measured) = 2.79 W/kg



0 dB = 2.79 W/kg = 4.46 dBW/kg



Page 30(55)

Author Data
Andrew Becker

Dates of Test

Mar 04 – May 30, 2013

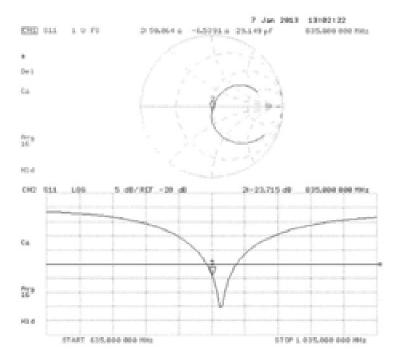
Test Report No

FCC ID:

RTS-6036-1305-06B | L6ARFR100LW

2503A-RFR100LW

### Impedance Measurement Plot for Head TSL



Certificate No: D835V2-446\_Jan13

Page 6 of 6



# Appendix D for the BlackBerry® Smartphone Model RFR101LW SAR Report

Page **31(55)** 

Author Data
Andrew Becker

Dates of Test

Mar 04 – May 30, 2013

Test Report No

RTS-6036-1305-06B

FCC ID: L6ARFR100LW

2503A-RFR100LW

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





S Schweizerischer Kalibrierdiesel
C Service suisse d'étalonnage
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S Swiss Calibration Service

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The Swiss Accreditation Service is one of the signatories to the EA.

Multilateral Agreement for the recognition of calibration certificates

Client RTS (RIM Testing Services)

Accreditation No.: SCS 108

Certificate No: D1800V2-2d020\_Jan13

	ERTIFICATE		
Object	D1800V2 - SN: 2	4020	
Calibration procedure(s)		dure for dipole validation kits abo	
Cultivation date:	January 09, 2013	Like Section	
		ional standards, which realize the physical un robability are given on the following pages or	
		ry facility: environment temperature (22 s 30°	
Calibration Equipment used (MA		A served accommon secularismes for a 50.	u and numbery 4 rock.
	le.	Cal Date (Cortificate No.)	School and Collection
Yenary Standards	Di	Call Date (Cortificate No.)	Scheduled Calibration
rimary Standards Ower meter EPM-642A		01-Nov-12 (No. 217-01640)	Out-13
vimary Standards Ower meter EPM-642A Ower sensor HP 6481A	ID # GBS7480794 USS7290765	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640)	Ost-13 Ost-13
rimary Standards tower meter EPM-642A tower sensor HP 8481A elerance 20 dB Attenuator	ID # GBS7480704	01-Nov-12 (No. 217-01640)	Out-13
remary Standards fower meter EPM-642A fower sensor HP 8481A leferance 20 dB Attenuator you-N mismatch combination	ID # GBS7480794 USS7290793 SPI: 5058 (204)	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01630)	Osi-13 Osi-13 Apr-13
vinary Standards Osser mater EPM-642A Osser sensor HP 6481A Interesco 20 68 Attenuator (go =1 mismatch combination feference Probe ES30V3	ID # GB37480794 US37290783 SPc 5058 (20k) SPc 5067.3 / 06307	01-Nov-12 (No. 217-01640) 01-Nov-17 (No. 217-01640) 27-Mar-12 (No. 217-01630) 27-Mar-12 (No. 217-01630)	Osi-13 Osi-13 Apr-13 Apr-13
remary Standards Ower meter EPM-642A Ower sensor HP 8481A etherence 20 d8 Attenuator you'll mismatch-combination leference Prote ESSOV3 IAE4 econdary Standards	ID # GBS7480704 UBS7290796 SPC 5058 (20k) SPC 5047 3 / 08307 SPC 3005 SPC 601	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01630) 27-Mar-12 (No. 217-01630) 29-Geo-12 (No. ES3-0205, Dec12) 27-Jun-12 (No. DAE4-601, Jun12) Check Date (in house)	Osi-13 Osi-13 Apr-13 Apr-13 Osi-13
Primary Standards Power meter EPM-642A Power sensor HIP 8481A televence 20 d8 Attenuator (poi-N mismatch-combination televence Prote ESSOV3 1AE4 Recordery Standards Power sensor HIP 8481A	ID # GB07480704 UB07990780 SPC 5058 (2010) SPC 5050 (2010) SPC 5050 (2010) SPC 5050 (2010) SPC 5050 (2010) SPC 5050 (2010) SPC 5050 (2010)	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01630) 27-Mar-12 (No. 217-01630) 29-Geo-12 (No. ES3-0205, Dec12) 27-Jun-12 (No. CAE4-601, Jun12) Check Date (in house) 18-Oction (in house)	Osi-13 Osi-13 Apr-13 Apr-13 Osi-13 Jun-13 Suheduled Check In house check: Oci-13
Veinary Standards Voice matter EPM-642A Voice sensor HP 6481A Interestor 20 68 Attenuator Igo N Interestor Combination Inference Probe ES30V3 IAE4 Voice sensor HP 6481A IF generator RBS SMT-06	15 # GB07480794 USX7990793 SPC 5058 (20K) SPC 5067-3 / 060877 SPC 3005 SPC 601 IQ-# MY41092317 100005	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01630) 27-Mar-12 (No. 217-01630) 28-Osc-12 (No. ES3-0205, Dec12) 27-Jun-12 (No. DAE4-601, Jun12) Check Date (in house) 18-Out-02 (in house check Oct-11) 94-Aug-99 (in house check Oct-11)	Osi+13 Osi+13 Apr+13 Apr+13 Osi+13 Jun-13 Scheduled Check In Novee check: Oci-13 In house check: Oci-13
Primary Standards Power meter EPM-042A Power sensor HIP 6481A fellerance 20 dB Attenuator (goe-N mismatch-combination fellerance Probe ESSOV3 3AE4 Secondary Standards Power sensor HIP 6481A RF generator RES SMT-05 felleranck Analyzer HIP 6753E	ID # GB07480704 UB07990780 SPC 5058 (2010) SPC 5050 (2010) SPC 5050 (2010) SPC 5050 (2010) SPC 5050 (2010) SPC 5050 (2010) SPC 5050 (2010)	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01630) 27-Mar-12 (No. 217-01630) 29-Geo-12 (No. ES3-0205, Dec12) 27-Jun-12 (No. CAE4-601, Jun12) Check Date (in house) 18-Oction (in house)	Osi-13 Osi-13 Apr-13 Apr-13 Osi-13 Jun-13 Suheduled Check In house check: Oci-13
Veinary Standards Voice matter EPM-642A Voice sensor HP 6481A Interestor 20 68 Attenuator Igo N Interestor Combination Inference Probe ES30V3 IAE4 Voice sensor HP 6481A IF generator RBS SMT-06	15 # GB07480794 USX7990793 SPC 5058 (20K) SPC 5067-3 / 060877 SPC 3005 SPC 601 IQ-# MY41092317 100005	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01630) 27-Mar-12 (No. 217-01630) 28-Osc-12 (No. ES3-0205, Dec12) 27-Jun-12 (No. DAE4-601, Jun12) Check Date (in house) 18-Out-02 (in house check Oct-11) 94-Aug-99 (in house check Oct-11)	Osi+13 Osi+13 Apr+13 Apr+13 Osi+13 Jun-13 Scheduled Check In Novee check: Oci-13 In house check: Oci-13
Primary Standards Power mater EPM-642A Power sensor HP 6481A Interestor 20 68 Attenuator Igos-N mismatch combination Inference Probe ES30V2 IAE34 Recondary Standards Power sensor HP 6481A 8F generator RBS SME-06	ID # GBS7480794 USS7759790 SPC 5058 (20k) SPC 5067 3.7 06397 SPC 3005 SPC 604 ID # MY41092317 100005 USS7580685 S4206	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01630) 27-Mar-12 (No. 217-01630) 28-Osc-12 (No. ES3-3095, Dec12) 27-Jun-12 (No. DAE4-601, Jun12) Check Date (in house) 16-Ost-02 (in house check Oct-11) 04-Aug-99 (in house check Oct-11) 18-Oct-01 (in house check Oct-12)	Out-13 Out-13 Apr-13 Apr-13 Den-13 Jun-13 Subscluded Check In house check: Oct-13 In house check: Oct-13 In house check: Oct-13
Veiwary Standards Voxer sensor HP 8481A Reference 20 dB Affenuation (goe-11 mismatch combination letterance Probe ESSOV3 IAE4 Recordary Standards Voxer sensor HP 8481A Figeneration RBS SMT-06 letwork Analyzer HP 8753E	ID # GBS7460704 USS7250740 SPC 5058 (20k) SPC 5057 (3 / 06307 SPC 3005 SPC 604 ED # MPV41082517 100005 USS73406685 S4206	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01630) 27-Mar-12 (No. 217-01630) 28-Ceo-12 (No. ES3-3095, Dec12) 27-Jun-12 (No. DAE4-601, Jun12) Check Date (in house) 18-Oxt-02 (in house check Oxt-11) 04-Aug-92 (in house check Oxt-11) 18-Oxt-01 (in house check Oxt-12)	Out-13 Out-13 Apr-13 Apr-13 Den-13 Jun-13 Substituted Check In house check: Oct-13 In house check: Oct-13 In house check: Oct-13 In house check: Oct-13

Certificate No: D1800V2-24020\_Jan13

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Author Data Andrew Becker Dates of Test

Mar 04 – May 30, 2013

Test Report No

RTS-6036-1305-06B

FCC ID: L6ARFR100LW

2503A-RFR100LW

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





Schweigerischer Kalibrierdi-S Service suisse d'étalonnage C

Servicio avignero di taratura

Swiss Calibration Service

Accreditation No.: SCS 108

Accredited by the Swiss Accreditation Senior (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 M/A

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

# Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques\*, December 2003
- 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
- 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.

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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# Appendix D for the BlackBerry $\hspace{-0.05cm}$ Smartphone Model RFR101LW SAR Report

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Author Data
Andrew Becker

Dates of Test

Mar 04 – May 30, 2013

Test Report No

FCC ID:

RTS-6036-1305-06B | L6ARFR100LW

2503A-RFR100LW

#### Measurement Conditions

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

DASY Version	DASYS	VS2.8.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1800 MHz ± 1 MHz	

## Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22:0 ± 0:2) °C	30.9 ± 6 %	1.38 mhoim ± 6 %
Head TSL temperature change during test	< 0.5 °C		

#### SAR result with Head TSL

SAR averaged over 1 cm <sup>2</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.61 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	38.5 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.06 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	20.3 W/kg a 16.5 % (k=2)

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Author Data **Andrew Becker**  Dates of Test Mar 04 – May 30, 2013 Test Report No RTS-6036-1305-06B

L6ARFR100LW

FCC ID:

2503A-RFR100LW

#### Appendix

#### Antenna Parameters with Head TSL

Impedance, transformed to feed point	46.2 \( \Omega \cdot \text{6.3 } \( \Omega \cdot \text{6.3 } \( \Omega \cdot \text{6.3 } \)
Return Loss	- 20.5 dB

#### General Antenna Parameters and Design

Electrical Delay (one direction)	1.216 ns

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

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

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

#### Additional EUT Data

Manufactured by	SPEAG	
Manufactured on	September 07, 2001	

Certificate No: D1800V2-2d020\_Jan13

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# Appendix D for the BlackBerry® Smartphone Model RFR101LW SAR Report

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Author Data
Andrew Becker

Dates of Test

Mar 04 – May 30, 2013

Test Report No **RTS-6036-1305-06B** 

L6ARFR100LW

FCC ID:

2503A-RFR100LW

### **DASY5 Validation Report for Head TSL**

Date: 09.01.2013

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN: 2d020

Communication System: CW; Frequency: 1800 MHz

Medium parameters used: f = 1800 MHz;  $\sigma = 1.38 \text{ S/m}$ ;  $\varepsilon_r = 38.9$ ;  $\rho = 1000 \text{ kg/m}^3$ 

Phantom section: Flat Section

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

#### DASY52 Configuration:

- Probe: ES3DV3 SN3205; ConvF(5.04, 5.04, 5.04); Calibrated: 28.12.2012;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.4(1052); SEMCAD X 14.6.8(7028)

### Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0;

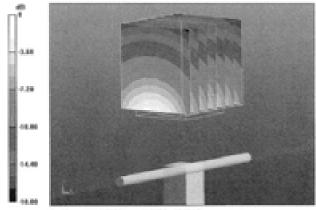
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 95.870 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 17.5 W/kg

SAR(1 g) = 9.61 W/kg; SAR(10 g) = 5.06 W/kg

Maximum value of SAR (measured) = 11.8 W/kg



0 dB = 11.8 W/kg = 10.72 dBW/kg



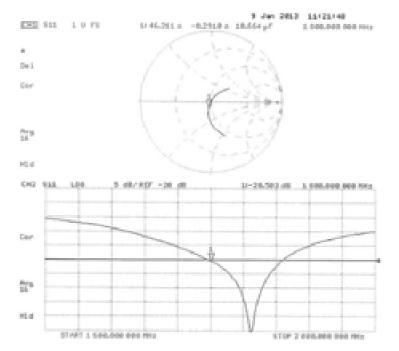
36(55)

Author Data **Andrew Becker**  Dates of Test Mar 04 – May 30, 2013 Test Report No

FCC ID: RTS-6036-1305-06B | L6ARFR100LW

2503A-RFR100LW

#### Impedance Measurement Plot for Head TSL



Certificate No: 01800V2-2d020\_Jan13

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Mar 04 – May 30, 2013

Test Report No

RTS-6036-1305-06B

FCC ID: L6ARFR100LW

2503A-RFR100LW

### Calibration Laboratory of

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





Service suisse d'étalonnege Servizio svizzero di laretura Swiss Calibration Service:

Issued April 8, 2011

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

RTS (RIM Teeting Services)

Accreditation No.: SCS 108

Curtificate No. D1900V2-5d075\_Apr11

### CALIBRATION CERTIFICATE

D1900V2 - SN: 5d075 Ottleet

Calibration procedurals in QA CAL-05.v8

Calibration procedure for dipole validation kits

April 5, 2011 Carbration date:

This collision outflows documents the incestibility to return standards, which realize the physical units of measurements (\$0). The measurements and the uncertainties with confidence probability are given on the infowing pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (52 x 5)°C and humidity x 70%.

Calibration Equipment used (METE original for pathwares):

Primary Standards	O #	Cel Date (Gert Books No.)	Scheduled Calibration
Power meter EPM 4404	GB57480F64	06-Oct-10 (No. 217-01286)	Oct-11
Power sensor HP SHELA	US07290790	99-Oct-10 (No. 217-01286)	Om-11
Poliprehoe 20: 59 Athenuator	SN: 50M (J0g)	29-May-11 (No. 217-01388)	App.12
Type N minmaton combination	SM: 5047.2 / 05027	29-Mar-11 (No. 217-01371)	April 2
Pulsiance Probe ES00V3	SN: 5055	30-Apr-16 (No. ESS-3005, Apr-15)	April 1
DAE4	SN: 601	10-Jun-10 (Nr. DAE446)1_Jun+15	Jun-11
Secondary Standards	10.4	Check Date (in house)	Scheduled Check
Power sengor HP 8461A	MF41000317	18-Oct-02 (in house check Oct-09)	in house obsolic Oct-11
RF generalize RAS SMT-06	100005	4-Aug 99 (in house check Oct-99)	in house check, Gct-tit
Network Analyzer InP 87530	US37390545 54896	18-Oct-01 (in house check Oct 10)	In house check: Oci-11
	Name	Function	Signature
Calibrated by:	Miles Made	Laboratory Technicien	thredi
Approved by:	Kada Potento	Taulvistal Manager	00 40

Certificate No: D1900V2-56075\_April I

Page 1 of 6

This colloration conflicate shall not be reproduced suport in full without written approved of the laboratory.



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Author Data Andrew Becker Dates of Test Mar 04 – May 30, 2013 Test Report No RTS-6036-1305-06B

L6ARFR100LW

FCC ID:

2503A-RFR100LW

Calibration Laboratory of

Schmid & Partner Engineering AG Zeughauestranse 43, 8064 Zurich, Switzerland





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Accreditation No.: SCS 108

Apprecised by the Swiss Accorditation Service (SAII):

The Swiss Accreditation Service is one of the signaturies to the EA Multileteral Agreement for the recognition of calibration certificates

#### Glossary:

TSI.

tissue simulating liquid

ConvF sensitivity in TSL / NORM x,y,z M/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
- Federal Communications Commission Office of Engineering & Technology (FCC OET). Evaluating Compilance 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
- SAR for nominal TSL parameters: The measured TSL parameters are used to calculate the nominal SAR result.

Certificate No: 01900N2-5d075_Apr11	Page 2 of 6	



# Appendix D for the BlackBerry $\hspace{-0.05cm}$ Smartphone Model RFR101LW SAR Report

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 Author Data
 Dates of Test
 Test Report No
 FCC ID:
 IC

 Andrew Becker
 Mar 04 – May 30, 2013
 RTS-6036-1305-06B
 L6ARFR100LW
 2503A-RFR100LW

### Measurement Conditions

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

DASY Version	DASYS	V52.6.2
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
Nomical Head TSL parameters	22:0 °G	40:0	1,40 mho/m
Measured Head TSI, parameters	(22.0 ± 0.2) °C	39.8 ± 6 %	1.41 mhoim ± 6 %
Head TSL temperature during test	(21.3 ± 0.2) °C		

#### SAR result with Head TSL

SAR averaged over 1 cm <sup>2</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	10.2 mW / g
\$AR normalized	normalized to TW	40.8 mW / g
SAR for nominal Head TSL parameters	normalized to TW	49.4 mW/g ± 17.0 % (k=2)

SAFI averaged over 10 cm <sup>2</sup> (10 g) of Head TSL.	condition	
SARI manasured	250 mW input power	5.29 n/W / g
SAR normalized	normalized to 1W	21.2 mW / g
SAR for nominal Head TSL paremeters	normalized to 1W	21.0 mW/g a 16.5 % (k-2)

Certificate No: D1900V2-5d075\_April 1

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## Appendix D for the BlackBerry® Smartphone Model RFR101LW SAR Report

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Author Data

Andrew Recker

Dates of Test

Test Report No

FCC ID:

IC

Andrew Becker Mar 04 – May 30, 2013

RTS-6036-1305-06B

L6ARFR100LW

2503A-RFR100LW

### Appendix

### Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.5 Ω + 6.1 jΩ
Return Loss	-23.3 66

### General Antenna Parameters and Design

Electrical Delay (one direction)	1.197 ns

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

The dipole is made of standard semirigid ossalial 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	January 24, 2005

Certificate No: D1900V2-50075\_Apr11

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Author Data

**Andrew Becker** 

#### Document

Dates of Test

## Appendix D for the BlackBerry® Smartphone Model RFR101LW SAR Report

RTS-6036-1305-06B

Test Report No

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2503A-RFR100LW

FCC ID: IC

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**DASY5 Validation Report for Head TSL** 

Mar 04 – May 30, 2013

Date/Time: 05.04.2011 12:41:39

L6ARFR100LW

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d075

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

Medium: HSL U12 BB

Medium parameters used: f = 1900 MHz;  $\sigma = 1.41 \text{ mho/m}$ ;  $r_s = 39$ ;  $\rho = 1000 \text{ kg/m}^3$ 

Phantom section: Flat Section

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

#### DASY5 Configuration:

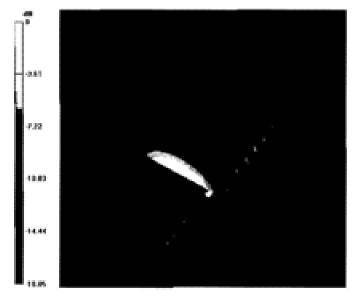
- Probe: ES3DV3 SN3205; ConvES309, 5.09, 5.09 r. Culbrated. 30.04.2010
- Sensor-Surface: Jenn (Machinical Surface Detection)
- Electronics: DABI Sn601; Calibrated: 10.06.2010
- Phanices: Plut Phanicis 5.0 (Sout); Type: QD000P56AA; Serial: 1001
- Mossurement SW: DASY52, V32.6.2 Build (424)
- Postprocessing SW: SEMCAD X, V14.4.4 Build (2)(29)

#### Head / d=10mm, Pin=250 mW / Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 97.376 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 18.796 W/kg

SAR(1 g) = 10.2 mW/g; SAR(10 g) = 5.29 mW/gMaximum value of SAR (measured) = 12.476 mW/g



 $0.48 \times 12.480 \text{km/W/y}$ 

Certificate No: D1900V2 5d075\_Apr11

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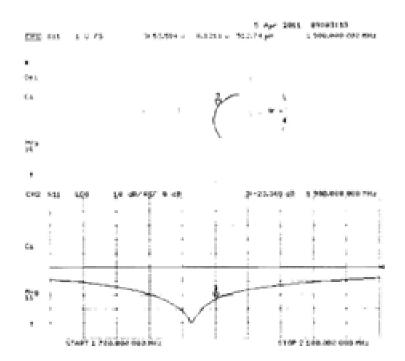
42(55)

Author Data **Andrew Becker**  Dates of Test Mar 04 – May 30, 2013 Test Report No RTS-6036-1305-06B | L6ARFR100LW

FCC ID:

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### Impedance Measurement Plot for Head TSL



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Author Data **Andrew Becker**  Dates of Test Mar 04 – May 30, 2013 Test Report No RTS-6036-1305-06B | L6ARFR100LW

FCC ID:

2503A-RFR100LW

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





S Schweizerischer Kalibrierdienst Service suisse d'étalonnage C Servizio svizzero di teratura 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

RTS (RIM Testing Services)

Accreditation No.: SCS 108

Certificate No: D1900V2-545\_Jan13

ALIDIATION	ERTIFICATE	And the state of the state of the	
Rjort	D1900V2 - SN: 5	45 17 10 10 10 10 10 10 10	
Calibration procedure(s)		dure for dipole validation kits abo	ve 700 MHz
Calibration date:	January 09, 2013	gladag file.	
The measurements and the unco	dainties with confidence protection the closed laborator	onal standards, which realize the physical unit robability are given on the following pages are y facility: environment temperature (52 a 3)°C	dare part of the certificate.
Nimury Standards	10 W	Call Date (Certificate No.)	Signeduled Calibration
	ID # GBG/480704	Call Date (Certificate No.) 01-Nov-12 (No. 217-01940)	Scheduled Calibration Oct 13
Ower meter EPM-HSDA	G807480704	01-Nov-12 (No. 217-01010)	
Ower meter EPM-44DA Ower sensor HP 8401A	G8G7480704 USG7290763	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640)	Oct 13
Young mater EPM-442A Young sensor HP 8461A Neterance 20-88 Attenuator	G837480704 US37290763 SN: 5658 (70k)	01-Nov-12 (No. 217-01010) 01-Nov-12 (No. 217-01010) 27-Mar-12 (No. 217-01530)	Om 13 Om 13
*Ower meter EPM-44DA *Ower sensor HP 8481A feference 20 dB Attenuator *gpe N mismatch combination	G8G7480704 USG7290763	01-Rev-12 (Ro. 217-01640) 01-Rev-12 (Ro. 217-01640) 27-Mar-12 (Ro. 217-01630) 27-Mar-12 (Ro. 217-01630)	Om 13 Om 13 Apr 13
*Ower mater EPM-44DA *Power sensor HP 8481A *Neterance 20 dB Attenuator *ppe N mismatch combination *Inforence Probe ESSDVS	G8G/480704 USS/290783 SN: 5058 (704) SN: 5047.3 / 00027	01-Nov-12 (No. 217-01010) 01-Nov-12 (No. 217-01010) 27-Mar-12 (No. 217-01530)	Oct-13 Oct-13 Apr-13 Apr-13
*County mater EPM-44DA *County sensor HSP 8481A feference 20 dB Attenuator *ppe N mismatch combination feference Probe ESSDV3 JAE4	C8037480704 USS7290763 SN: 5058 (704) SN: 5047.3 / 00007 SN: 5047.3 / 00007	01-Rev-12 (Rev. 217-01640) 01-Rev-12 (Rev. 217-01640) 27-Mar-12 (Rev. 217-01630) 27-Mar-12 (Rev. 217-01630) 28-Dec-12 (No. 217-01630)	Ost 13 Ost 13 Apr 13 Apr 13 Dec 13
Primary Standards  Power sensor HP 8461A  Power sensor HP 8461A  Reference OB Attenuator  Type N Information continuation  Reference Probe ESSONS  DAS4  Secondary Standards  Power sensor HP 8481A	GSG7480704 US97290793 SN: 5058 (204) SN: 5647.3 / 06027 SN: 3005 SN: 601	01-Nov-12 (No. 217-01040) 01-Nov-12 (No. 217-01040) 27-Mar-12 (No. 217-01530) 27-Mar-12 (No. 217-01530) 28-Dac-12 (No. ESS-3006, Dec12) 27-Jun-12 (No. CAG-401, Jun12)	Oct 13 Get 13 Apr 13 Apr 13 Date 13 Jun 13
*Course mater EPM-44DA *Course sensor HP 8481A *Inference 20 dB Attanuator *ppe N mismatch continuation *Inference Probe ESCOV3 DAE!4 **Secondary Standards	GSG1480794 US97290783 SN: 5658 (204) SN: 5647.37 96327 SN: 3096 SN: 601	01-Nov-12 (No. 217-01010) 01-Nov-12 (No. 217-01040) 27-Mar-12 (No. 217-01030) 27-Mar-12 (No. 217-01030) 28-Dec-12 (No. ESS-0005, Dec-12) 27-Jun-12 (No. DAE4-001, Jun12) Check Date (in house)	Oze 13 Get 13 Apr 13 Apr 13 Det 13 Jun 13
Power mater EPM-440A Power sensor HP 8461A Reference 20 dB Attenuator Type N mismatch combination Reference Probe ES00V3 DAEI4 Secondary Standards Power sensor HP 8481A	GSG1480704 US97290783 SN: 5658 (75k) SN: 5647.37 96327 SN: 3096 SN: 601	01-Nov-12 (No. 217-01040) 01-Nov-12 (No. 217-01040) 27-Mar-12 (No. 217-01030) 27-Mar-12 (No. 217-01030) 29-Dao-12 (No. ES3-0305, Dee12) 27-Jun-12 (No. DAI(4-601, Jun12) Check Date (in house check Oct-11)	Oce 13 Ges 13 Apr 13 Apr 13 Dec 13 Jun 13 Sofreduled Check In house check: Oct-13
Power mater EPM-442A Power sensor HP 8461A Reference 30 dB Attenuator Type N mismatch combination Reference Probe ESSCNS SAE4 Secondary Standards Power sensor HP 8461A RF generator R&S SMT-06	GSG7480754 US97292783 SN: 5656 (704) SN: 5657.3/106327 SN: 5695 SN: 601 SN: 601	01-Nov-12 (No. 217-01040) 01-Nov-12 (No. 217-01040) 27-Mar-12 (No. 217-01030) 27-Mar-12 (No. 217-01030) 28-Dec-12 (No. ES3-0005, Dec12) 27-Jun-12 (No. DAE+601, Jun12) Check (Date-(in house check Oct-11) 06-Aug-00 (in house check Oct-11)	Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Jun-13 Sofreduled Check In house-check: Oct-13 In house-check: Oct-13
Power meter EPM-H-DA Power sensor HP 6461.A feference 20 dB Attenuator (ppe N mismatch combination feference Probe ESSCNS) 3AE4 Secondary Standards Power sensor HP 8461.A RF generator R&S SMT-06 Natwork Analyzor HP 8750E	GSG7480704 US37292783 SN: 5656 (204) SN: 5647.37 (60027 SN: 3005 SN: 601 SD: # MY41092317 100005 US37280648 (54206)	01-Rov-12 (No. 217-01040) 01-Rov-12 (No. 217-01040) 27-Mar-12 (No. 217-01030) 27-Mar-12 (No. 217-01030) 28-Deo-12 (No. ESS-0005, Dec12) 27-Jun-12 (No. DAE-4-021, Jun12) Check Date (in house check Oct-11) 01-Aug-09 (in house check Oct-11) 18-Oct-01 (in house check Oct-12) Function Laboratory Technician	Oct 13 Oct 13 Apr 13 Apr 13 Dec-13 Jun-13 Schreckled Check In house check: Oct-13 In house check: Oct-13 In house check: Oct-13
Power mater EPM-442A Power sensor HP 8461A Reference 30 dB Attenuator Type N mismatch combination Reference Probe ESSCNS SAE4 Secondary Standards Power sensor HP 8461A RF generator R&S SMT-06	GSG1*480704 US97290763 SN: 5656 (754) SN: 5647.37 (90327 SN: 3096 SN: 601 ID # MY41092317 100005 US37390569 S4206 Name Israe IS-Neoug	01-Rov-12 (No. 217-01040) 01-Rov-12 (No. 217-01040) 27-Mar-12 (No. 217-01030) 27-Mar-12 (No. 217-01030) 28-Deo-12 (No. ESS-0005, Dec12) 27-Jun-12 (No. DAE-4-021, Jun12) Check Date (in house check Oct-11) 01-Aug-09 (in house check Oct-11) 18-Oct-01 (in house check Oct-12) Function Laboratory Technician	Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Jun-13 Soheduled Check In house check: Oct-13 In house check: Oct-13 In house check: Oct-13
Coefficient EPM-44DA Poser sensor HP 8481A feterance 20 dB Attenuator (ppe N mismatch continuation feterance Probe ESCOV3 DAEJ4 Secondary Standards Poser sensor HP 8481A HF generator R8S SMT 06 letteork Analysor HP 8750E	GS37480704 US97292783 SN: 5656 (704) SN: 5647.3/105327 SN: 5041 SN: 601 SN: 60	01-Nov-12 (No. 217-01040) 01-Nov-12 (No. 217-01040) 27-Mar-12 (No. 217-01030) 27-Mar-12 (No. 217-01030) 28-Dec-12 (No. ESS-0005, Dec12) 27-Jun-12 (No. DAE-4-601, Jun12) Check Date (in house check Oct-11) 06-Aug-00 (in house check Oct-11) 18-Oct-21 (in house check Oct-12) Function Laboratory Technician	Oce 13 Oce 13 Apr 13 Apr 13 Dec-13 Jun-13 Scheduled Check In Incuse check: Oct-13 In Incuse check: Oct-13 In Incuse check: Oct-13 In Incuse check: Oct-13

Certificate No: D1900V2-545\_Jan13

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Author Data Andrew Becker Dates of Test Mar 04 – May 30, 2013 Test Report No RTS-6036-1305-06B

L6ARFR100LW

FCC ID:

2503A-RFR100LW

## Calibration Laboratory of

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





Schweigerischer Kalibrierdienst 8 Service suisse d'étalonnage C Servizio evissero di taratura Swiss Calibration Service

Accreditation No.: SCS 108

Accredited by the Swiss Accreditation Senice (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
- 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
- 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.

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: D1900V2-545\_Jan13

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# Appendix D for the BlackBerry $\hspace{-0.05cm}$ Smartphone Model RFR101LW SAR Report

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Author Data
Andrew Becker

Dates of Test
Mar 04 – May 30, 2013

Test Report No

FCC ID:

RTS-6036-1305-06B | L6ARFR100LW

2503A-RFR100LW

#### Measurement Conditions

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

DASY Version	DASY5	V52.8.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSt.	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz a 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	39.4 ± 6 %	1.38 mhoim ± 6 %
Head TSL temperature change during test	< 0.5 °C		

#### SAR result with Head TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	10.0 W/kg
SAR for nominal Head TSL parameters	normalized to TW	40.2 W/kg x 17.0 % (k×2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.26 W/kg
SAR for nominal Head TSL parameters	normalized to TW	21.1 W/kg = 16.5 % (k=2)

Certificate No: D1900V2:645, Jan13

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## Appendix D for the BlackBerry® Smartphone Model RFR101LW SAR Report

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Author Data
Andrew Becker

Dates of Test

Mar 04 - May 30, 2013

Test Report No

RTS-6036-1305-06B

L6ARFR100LW

FCC ID:

2503A-RFR100LW

#### Appendix

#### Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.0 Ω = 1.7 JΩ
Return Loss	- 34.3 dB

#### General Antenna Parameters and Design

Electrical Delay (one direction)	1.198 ms
----------------------------------	----------

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

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

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

#### Additional EUT Data

Manufactured by	SPEAG
Manufactured on	November 15, 2001

Certificate No: D1900V2-645\_Jan13

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## Appendix D for the BlackBerry® Smartphone Model RFR101LW SAR Report

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Author Data
Andrew Becker

Dates of Test

Mar 04 – May 30, 2013

Test Report No **RTS-6036-1305-06B** 

FCC ID:

L6ARFR100LW

2503A-RFR100LW

### **DASY5 Validation Report for Head TSL**

Date: 09.01.2013

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: \$45

Communication System: CW; Frequency: 1900 MHz

Medium parameters used: f = 1900 MHz;  $\sigma = 1.38$  S/m;  $\epsilon_r = 39.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

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

#### DASY52 Configuration:

- Probe: ES3DV3 SN3205; ConvF(4.98, 4.98, 4.98); Calibrated: 28.12.2012;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012.
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.4(1052); SEMCAD X 14.6.8(7028)

### Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 95.493 V/m; Power Drift = 0.05 dB Peak SAR (extrapolated) = 18.1 W/kg SAR(1 g) = 10 W/kg; SAR(10 g) = 5.26 W/kg

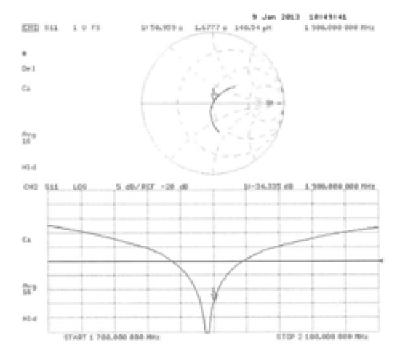
Maximum value of SAR (measured) = 12.2 W/kg

4.50 4.50 41.50

0 dB = 12.2 W/kg = 10.86 dBW/kg



Impedance Measurement Plot for Head TSL





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Author Data Andrew Becker Dates of Test

Mar 04 – May 30, 2013

Test Report No

RTS-6036-1305-06B

FCC ID: L6ARFR100LW

2503A-RFR100LW

## Calibration Laboratory of

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





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Client RTS (RIM Teeting Services) Accreditation No.: SCS 108

Certificate No: D2450V2-791\_Apr11

## CALIBRATION CERTIFICATE

D2450V2 - SN: 791 Object

QA CAL-05.v8 Calibration procedure(s)

Calibration procedure for dipole validation kits

Calibration date: April 5, 2011

This calibration certificate documents the (raceability 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 #	Call Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	06-Oct-10 (No. 217-01266)	Oct-11
Power sensor HP 6481A	US37292783	06-Oct-10 (No. 217-01266)	Oct-11
Reference 20 dB Attenuator	SN: 5086 (20g)	29-Mar-11 (No. 217-01368)	Apr-12
Type-N mismatch combination	SN: 5047.2 / 06327	29-Mar-11 (No. 217-01371)	Apr-12
Reference Probe ES3DV3	SN: 3205	30-Apr-10 (No. ES3-3205_Apr10)	Apr-11
DAE4	SN: 601	10-Jun-10 (No. DAE4-601_Jun10)	Jun-11
Secondary Standards	ID#	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-09)	In house check: Oct-11
RF generator R&S SMT-06	100005	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-10)	In house check: Oct-11
	Name	Function	Signature
Calibrated by:	Mike Meth	Laboratory Technician	الم هم الأراب
			0 0.0 00
			-2-
Approved by:	Katja Pokovic	Technical Manager	6000
I			100

Issued: April 6, 2011

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

Certificate No: D2450V2-791\_Apr11 Page 1 of 6



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Author Data
Andrew Becker

Dates of Test

Mar 04 – May 30, 2013

Test Report No **RTS-6036-1305-06B** 

FCC ID: **L6ARFR100LW** 

2503A-RFR100LW

Calibration Laboratory of

Schmid & Partner Engineering AG Joughausessee St, 6004 Zunch, Swizentero





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Servizio erizzano di lanatora Swiss Calibration Service

Accordination No.: SCS 108

Accrained by the Swiss Accordination Service (SAS).
The Swiss Accreditation Service is one of the eignatories to the EA.
Multiluteral 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:

- 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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Author Data **Andrew Becker**  Dates of Test Mar 04 – May 30, 2013 Test Report No RTS-6036-1305-06B | L6ARFR100LW

FCC ID:

2503A-RFR100LW

#### Measurement Conditions

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

DASY Version	CASYS	V52.6.2
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 s 1 MHz	

### Head TSL parameters

The introdes commeters and calculations were applied

	Temperature	Permittivity	Conductivity
Nominal Heed TSL parameters	22.0 °G	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.7 ± 6 %	1.72 mho/m ± 6 %
Head TSL temperature during lest	(21.0 ± 0.2) °C		

#### SAR result with Head TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.3 mW / g
SAR normalized	normalized to 1W	53.2 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	54.1 mW/g = 17.0 % (k=2)

SAR averaged over 10 cm² (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.21 mW / g
SAR normeland	normalized to TW	24.8 mW / g
SAR for nominal Head TSL personners	normalized to 1W	25.0 mW /g = 16.5 % (k=2)

Conflicatio No: 02450V2-791\_April 1

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## Appendix D for the BlackBerry® Smartphone Model RFR101LW SAR Report

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Author Data
Andrew Becker

Dates of Test

Mar 04 – May 30, 2013

Test Report No **RTS-6036-1305-06B** 

FCC ID: L6ARFR100LW

2503A-RFR100LW

#### Appendix

#### Antenna Parameters with Head TSL

Impedance, transformed to feed point	55.5 (2 + 3.6 )(2
Fletum Less	- 24.1 dB

#### General Antenna Parameters and Design

Electrical Delay (one direction)	1.152 ns

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

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

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

### Additional EUT Date

Manufactured by	SPEAG
Manufactured on	January 24, 2006

Certificate No: D2450V2-791\_April 1

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## Appendix D for the BlackBerry ${\bf @}$ Smartphone Model RFR101LW SAR Report

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Author Data
Andrew Becker

Dates of Test

Mar 04 – May 30, 2013

Test Report No

RTS-6036-1305-06B | Lo

L6ARFR100LW

FCC ID:

2503A-RFR100LW

#### DASYS Validation Report for Head TSL

Date/Time: 05.04.2011 15:06:24

Test Laboratory: SPEAG, Zurich, Switzerland

### DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:791

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

Medium: HSL U12 BB

Medium parameters used: f = 2450 MHz;  $\sigma = 1.74$  mbs/m;  $c_r = 38.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

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

#### **DASY5 Configuration:**

- Probe: ES3DV3 \$20209; ConvRA53, 4.53, 4.53); Calibrated: 30.04.2010.
- Sensor-Surface: 3mm (Mechanical Surface Descript)
- Electronics: DAE4 Sn601; Cultimated: F0.04.3010
- Pharmonic Flux Pharmon 5.D (Eront): Type: QD000PSIAA: Serial: 1/101
- Messarement SW: DASY52, V52.6.2 Boild (424)
- Preprocessing SW: SEMCAD X, V14.4.4 Bolid (2929)

#### Head / d=10mm, Pin=250 mW / Cube 0:

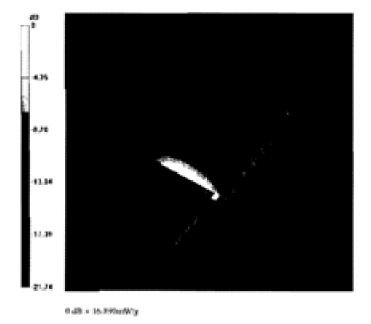
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 102.4 V/m; Power Drift = 0.04 dB

Peak SAR (exampolated) = 27.237 W/kg

#### SAR(1|g) = 13.3 mW/g; SAR(10|g) = 6.21 mW/g.

Maximum value of SAR (measured) = 15.889 m/W/g

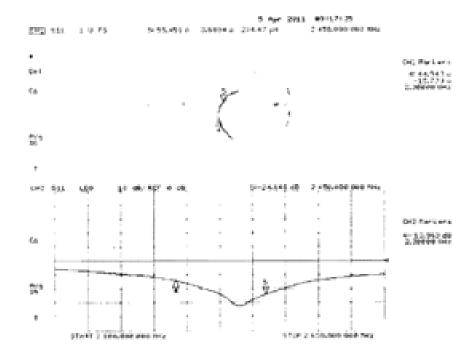


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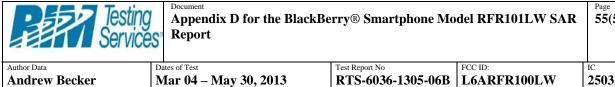
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## Impedance Measurement Plot for Head TSL



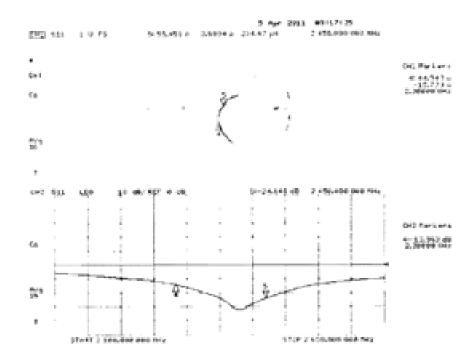
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## Impedance Measurement Plot for Head TSL



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