≅ BlackBerry	Appendix D for the BlackBe Report Rev 2	erry® Smartphone Mo	odel RFP121LW SAR	Page 1(143)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3		2503A-RFL110LW 2503A-RFP120LW

APPENDIX D: PROBE & DIPOLE CALIBRATION DATA

	Revision History						
Rev. Number Date Changes							
Initial	May 23, 2013						
Rev 2	Dec 17, 2014	Added equipment used for 802.11a Hotspot mode SAR testing 1. Page 35-45					

≅ BlackBerry Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR 2(143) Report Rev 2 Dates of Test Test Report No FCC ID: Author Data 2503A-RFL110LW Nov 22, 2012 – Feb 28, 2013 RTS-6026-1303-02 L6ARFL110LW Andrew Becker L6ARFP120LW Dec. 10-12, 2014 Rev 3 2503A-RFP120LW

Calibration Laboratory of Schmid & Partner Engineering AG usstrasse 43, 6004 Zurich, Switzerland





Schweizerischer Kalibrierdienst S Service suisse d'étalonnag C Servizio svizzero di teratura Swiss Calibration Service

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



Approved by: Issued: January 12, 2012 This calibration certificate shall not be reproduced except in full without written approval of the laboratory

Certificate No: ES3-3225_Jan12

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≅BlackBerry	Appendix D for the BlackBo Report Rev 2	erry® Smartphone Mo	odel RFP121LW SAR	Page 3(143)
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Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW

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





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Accreditation No.: SCS 108

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Glossary:

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

CF crest factor (1/duty_cycle) of the RF signal A, B, C modulation dependent linearization parameters

Polarization o o rotation around probe axis

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

i.e., 9 = 0 is normal to probe axis

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

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

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≅BlackBerry	Appendix D for the BlackBo Report Rev 2	erry® Smartphone Mo	odel RFP121LW SAR	Page 4(143)
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	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3		2503A-RFL110LW 2503A-RFP120LW

ES30V3 - SN:3225

January 11, 2012

Probe ES3DV3

SN:3225

Manufactured: Calibrated:

September 1, 2009 January 11, 2012

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

Certificate No: ES3-3225_Jan12

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≅BlackBerry	Appendix D for the BlackBo Report Rev 2	erry® Smartphone Mo	odel RFP121LW SAR	Page 5(143)
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Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW

ES30V3-SN:3225

January 11, 2012

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

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm (µV/(V/m) ²) ^A	1.26	1.20	1.30	± 10.1 %
DCP (mV) ⁶	101.2	100.8	101.2	150000000000000000000000000000000000000

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C dB	WR mV	Unc ^t (k=2)
10000 CW	CW	0.00	X	0.00	0.00	1.00	107.7	±1.7 %
			Y	0.00	0.00	1.00	113.4	
		- 1	Z	0.00	0.00	1.00	110,4	

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%.

⁸ The uncertainties of NormX,Y,Z do not affect the E²-field uncertainty inside TSL (see Pages 5 and 6).
⁹ Numerical Integrisation parameter: uncertainty not required.
⁶ Uncertainty is determined using the max, deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

≅BlackBerry	Appendix D for the BlackB Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR 6(143)			
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Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW	

ES30V3-SN:3225

January 11, 2012

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

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) ^e	Relative Permittivity	Conductivity (S/m)	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
750	41.9	0.89	6.42	6.42	6.42	0.27	2.04	± 12.0 %
900	41.5	0.97	6.06	6.06	6.06	0.35	1,74	± 12.0 %
1810	40.0	1.40	5.23	5.23	5.23	0.73	1.21	± 12.0 %
1950	40.0	1.40	4.98	4.98	4.98	0.58	1.41	± 12.0 %
2450	39.2	1.80	4,50	4.50	4.50	0.79	1,26	± 12.0 %
2600	39.0	1.96	4.32	4.32	4,32	0.77	1.32	± 12.0 %

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⁶ Prequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Plage 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
⁶ At frequencies below 3 GHz, the validity of issue parameters (c and n) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (c and e) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target issue parameters.

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Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW

ES3DV3- SN 3225

January 11, 2012

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

Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) C	Relative Permittivity	Conductivity (Sim)	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
750	55.5	0.96	6.27	6.27	6.27	0.36	1.74	± 12.0 %
900	55.0	1.05	6.07	6.07	6.07	0.29	2.02	± 12.0 %
1810	53.3	1.52	4.92	4.92	4.92	0.50	1.57	± 12.0 %
1950	53.3	1.52	4.87	4.87	4.87	0.59	1.49	± 12.0 %
2450	52.7	1.95	4.30	4.30	4.30	0.68	1.16	± 12.0 %
2600	52.5	2.16	4.12	4.12	4.12	0.80	0.99	± 12.0 %

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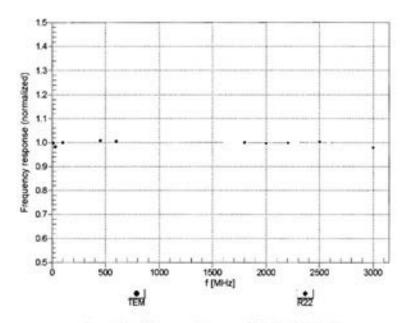
⁶ Frequency validity of a 100 MHz only applies for DASY v4.4 and higher (see Page 2), else d is restricted to a 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
⁷ At frequencies below 3 GHz, the validity of fissue parameters (s and e) can be related to a 10% if liquid compensation formula is applied to measured SAR values. Aft requencies above 3 GHz, the validity of fissue parameters (s and e) is restricted to a 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target fissue parameters.

≅ BlackBerry	Appendix D for the BlackBe Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		Page 8(143)
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Andrew Becker	1 /	RTS-6026-1303-02		2503A-RFL110LW
	Dec. 10-12, 2014	Rev 3	L6ARFP120LW	2503A-RFP120LW

ES30V3-SN:3225

January 11, 2012

Frequency Response of E-Field (TEM-Cell:Ifi110 EXX, Waveguide: R22)



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

Certificate No: ES3-3225_Jan12

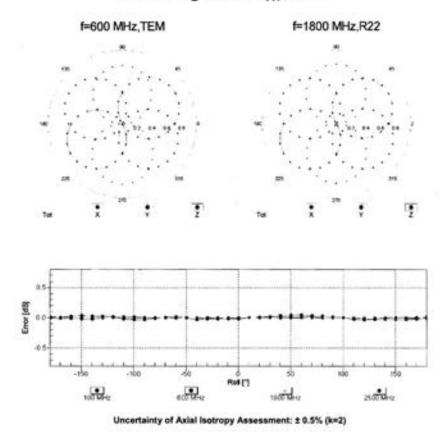
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≅BlackBerry	Appendix D for the BlackB Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		
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E830V3- SN:3225

January 11, 2012

Receiving Pattern (6), 9 = 0°



Certificate No: ES3-3225_Jan12

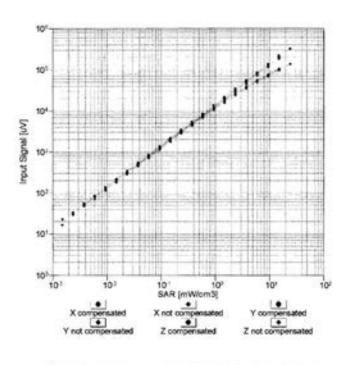
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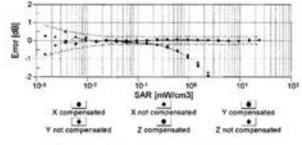
**** BlackBerry	Appendix D for the BlackBo Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		Page 10(143)
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Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW

ES3DV3-SN:3225

January 11, 2012

Dynamic Range f(SAR_{head}) (TEM cell , f = 900 MHz)





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

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≅BlackBerry	Appendix D for the BlackBo Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		Page 11(143)
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ES3DV3-SN:3225 January 11, 2012 **Conversion Factor Assessment** f = 900 MHz, WGLS R9 (H_convF) f = 1810 MHz.WGLS R22 (H_convF) Deviation from Isotropy in Liquid Error (6, 8), f = 900 MHz 1.0 0.8 0.6 0.4 0.2 0.0 -0.4 -0.6 180 225 270 -1.0 -0.8 -0.5 -0.4 -0.2 0.0 0.2 0.4 0.5 0.8 Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

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≅BlackBerry	Appendix D for the BlackBo Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		
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ES3DV3- SN:3225 January 11, 2012

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

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (*)	Not applicable
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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≅ BlackBerry Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR 13(143) Report Rev 2 Author Data Dates of Test Test Report No FCC ID: Nov 22, 2012 – Feb 28, 2013 RTS-6026-1303-02 L6ARFL110LW 2503A-RFL110LW Andrew Becker Dec. 10-12, 2014 Rev 3 L6ARFP120LW 2503A-RFP120LW

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





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Client

RTS (RIM Testing Services)

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Certificate No: ES3-3225_Jan13

CALIBRATION CERTIFICATE Object ES3DV3 - SN:3225 Calibration procedure(s) QA CAL-01.v8, QA CAL-23.v4, QA CAL-25.v4 Calibration procedure for dosimetric E-field probes Calibration date: Jamuary 10, 2013 This calibration certificate documents the traceptibility to national standards, which resilize the physical units of measurements (SD). The measurements and the uncertainties with certificate 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	10	Cal Date (Certificate No.)	Scheduled Calibration
Power moter E4419tb	0841293874	29-Mar-12 (No. 217-01508)	Apr-13
Power sensor E4412A.	MY41498087	29-Mar-12 (No. 217-01508)	Apr-13
Reference 3 dB Attenuator	SN: S5054 (3c)	27-Mar-12 (No. 217-01531)	Apr-13
Reference 20 dB Altenuator	SN: 55086 (20b)	27-Mar-12 (No. 217-01629)	Apr.13
Reference 30 dB Attenuator	SN: S5129 (30b)	27-Mar-12 (No. 217-01532)	Apr-13
Reference Probe ES3DV2	SN: 3013	26-Dec-12 (No. ES3-3013_Dec12)	Dec-13
DAE4	SN: 660	20-Jun-12 (No. DAE4-660_Jun12)	Jun-13
Secondary Standards	ID .	Check Date (in house)	Scheduled Check
RF generator HP 6645C	US3642U01700	4-Aug-99 (in house check Apr-11)	In house check: Apr-13
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-12)	In house check: Oct-13

Calibrated by Jeton Kestras Laboratory Technician Signature

Approved by: Kalja Pokovio Technical Manager

Hissued: January 14, 2013

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Certificate No: ES3-3225_Jan13

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*** BlackBerry	Appendix D for the BlackB Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		
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Calibration Laboratory of Schmid & Partner Engineering AG Zeughausstrosse 43, 8004 Zurich, Switzerland





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Glossary:

TSL NORMx,y,z ConvF DCP tissue simulating liquid sensitivity in free space sensitivity in TSL / NORMx,y,z diade compression point

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

Polarization o

o rotation around probe axis

Polarization 9 9 rots

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

i.e., 9 = 0 is normal to probe axis

Calibration is Performed According to the Following Standards:

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

- NORMx,y,z: Assessed for E-field polarization 8 = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide).
 NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect the E²-field uncertainty inside TSL (see below ConvF).
- NORM(f)x,y,z = NORMx,y,z * frequency_response (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConvF.
- DCPx,y,z: DCP are numerical linearization parameters assessed based on the data of power sweep 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.
- ConvF and Boundary Effect Parameters: Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORMc,y,z * ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100
- Spherical isotropy (3D deviation from isotropy): in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

Certificate		

**** BlackBerry	Appendix D for the BlackBo Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW

ES3DV3 - SN:3225

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!)

Certificate No: ES3-3225_Jan13

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≅BlackBerry	Appendix D for the BlackBo Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		Page 16(143)
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Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW

ES30V3-SN:3225 January 10, 2013

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

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k+2)
Norm (µV/(V/m) ²) ^A DCP (m/V) ^B	1.29	1.19	1.31	± 10.1 %
DCP (mV) ⁸	100.5	101.5	99.9	-

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dBõV	c	D dB	VR mV	Unc* (k=2)
0	CW	X	0.0	0.0	1.0	0.00	157.5	12.7 %
		Y	0.0	0.0	1.0	11 100000	158.4	
		Z	0.0	0.0	1.0	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%:

^{*} The uncertainties of NormX,Y,Z do not affect the E² field uncertainty inside TSL (see Pages 5 and 6).

Numerical linearization parameter: uncertainty not required.

* Uncertainty is determined using the mix, deviation from linear response applying rectangular distribution and is expressed for the square of the field velve.

≅BlackBerry	Appendix D for the BlackBe Report Rev 2	erry® Smartphone Mo	odel RFP121LW SAR	Page 17(143)
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Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW

ES30V3- SN:3225

January 10, 2013

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

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHZ) ^C	Relative Permittivity	Conductivity (S/m)	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k×2)
750	41.9	0.89	6.56	6.56	8.56	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 %

Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is nestricted to ± 50 MHz. The uncertainty is the RSS of the Constit uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
All requencies below 3 GHz, the validity of issue parameters (i, and ii) can be relaxed to ± 10% if liquid compensation formula is applied to released 8AR values. At frequencies above 3 GHz, the validity of fissue parameters (ii and ii) is restricted to ± 5%. The uncertainty is the RSS of the Constit uncertainty for indicated target issue parameters.

Certificate No: ES3-3225, Jan13

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ES3DV3- SN:3225 January 10, 2013

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

Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) ^C	Relative Permittivity ^F	Conductivity (Sim)	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (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	± 12.0 %
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	± 12.0 %
2600	52.5	2.16	4.11	4.11	4.11	0.67	0.99	± 12.0 %

⁶ Frequency validity of ± 100 MHz only applies for DASY vt.4 and higher (see Page 2), size it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConiF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
⁷ All frequencies below 3 CHz, the validity of issue parameters (u and s) can be refused to ± 10% if fould compensation formula is applied to measured SAR values. At frequencies obovs 3 CHz, the validity of fissue parameters (u and s) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target issue parameters.

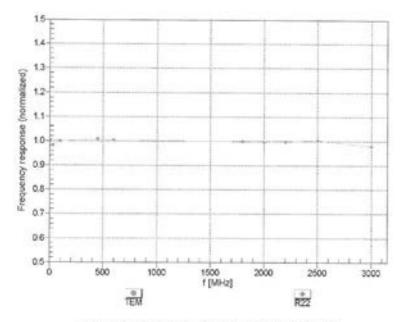
Certificate No: ES3-3225, Jan13

≅ BlackBerry	Appendix D for the BlackBo Report Rev 2	erry® Smartphone Mo	del RFP121LW SAR	Page 19(143)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	,	RTS-6026-1303-02		2503A-RFL110LW
	Dec. 10-12, 2014	Rev 3	L6ARFP120LW	2503A-RFP120LW

ES3DV3- SN:3225

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)

Certificate No: ES3-3225_Jan13

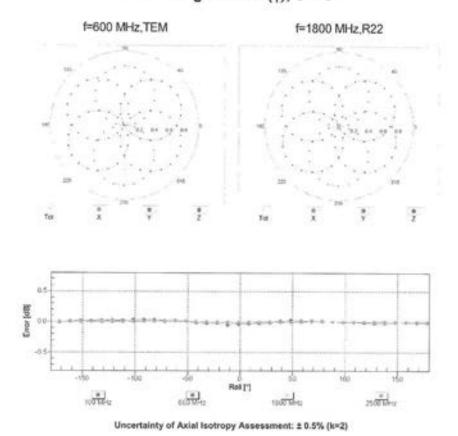
Page 7 of 51

*** BlackBerry	Appendix D for the Black Report Rev 2	Berry® Smartphone M	odel RFP121LW SAR	Page 20 (143)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22, 2012 – Feb 28, 2011 Dec. 10-12, 2014	3 RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW

ES30V3- SN 3225

January 10, 2013

Receiving Pattern (6), 9 = 0°



Certificate No: ES3-3225_Jan13

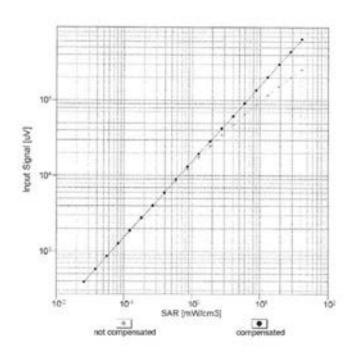
Page 8 of 11

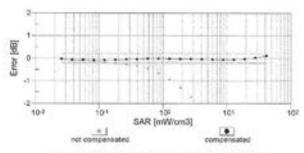
≅BlackBerry	Appendix D for the BlackBe Report Rev 2	erry® Smartphone Mo	odel RFP121LW SAR	Page 21(143)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW

ES3DV3- SN:3225

January 10, 2013

Dynamic Range f(SAR_{head}) (TEM cell , f = 900 MHz)





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

Certificate No: ES3-3225_Jan13

Page 9 of 11

IC
2503A-RFL110LW 2503A-RFP120LW
ı

ES3DV3-SN:3225 January 10, 2013 Conversion Factor Assessment f = 900 MHz, WGLS R9 (H_convF) f = 1810 MHz,WGLS R22 (H_convF) 14 Deviation from Isotropy in Liquid Error (¢, 3), f = 900 MHz 1.0 0.8 0.6 0.4 0.0 -0.2 -0.4 -1.0 135 -1.0 -0.6 -0.6 -0.4 -0.2 0.0 0.2 0.4 0.6 0.8 Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

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Certificate No: E83-3225_Jan13

≅ BlackBerry	/	Appendix D for the BlackBo Report Rev 2	erry® Smartphone Mo	odel RFP121LW SAR	Page 23(143)
Author Data	D	ates of Test	Test Report No	FCC ID:	IC
Andrew Becker	N	Nov 22, 2012 – Feb 28, 2013	RTS-6026-1303-02	L6ARFL110LW	2503A-RFL110LW
	Ι	Dec. 10-12, 2014	Rev 3	L6ARFP120LW	2503A-RFP120LW

ES30V3-SN:3225

January 10, 2013

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

Other Probe Parameters

Sensor 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

Certificate No: ES3-3225_Jan13

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≅ BlackBerry Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR 24(143) Report Rev 2 Author Data Dates of Test Test Report No FCC ID: Nov 22, 2012 – Feb 28, 2013 RTS-6026-1303-02 L6ARFL110LW 2503A-RFL110LW Andrew Becker Dec. 10-12, 2014 Rev 3 L6ARFP120LW 2503A-RFP120LW

Calibration Laboratory of Schmid & Partner Engineering AG Zeoghausstrasse 43, 8094 Zerich, Switzerland





S Schweiserischer Kalibrierdienst
C Service suitse d'étalonnage
Servicie sviszero di taratura
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

Client RTS (RIM Testing Services)

Certificate No: EX3-3592_Nov12

Accreditation No.: SCS 108

CALIBRATION CERTIFICATE Coper EX3DV4 - SN:3592 Calibration procedure(s) QA CAL-01.v8, QA CAL-14.v3, QA CAL-23.v4, QA CAL-25.v4 Calibration procedure for dosimetric E-field probes Calibration certificate documents the traceability to national standards, which realize the physical units of measurements (S1). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the outsiticate. All calibrations have been conducted in the closed laboratory facility: environment temperature (22 s 3)°C and humidity < 70%. Calibration Equipment used (M&TE critical for calibration)

Primary Standards	10	Cal Date (Certificate No.)	Scheduled Calibration
Power meter il 44108	0841293874	29-Mar-12 (No. 217-01508)	Apr-13
Power sensor E4412A	MY41498087	29-Mar-12 (No. 217-01508)	Apr-13
Reference 3 dB Attenuator	SN: St054 (3c)	27-Mar-12 (No. 217-01551)	Apr-13
Reference 20 dB Attenuator	SN: 55086 (20b)	27-Mar-12 (No. 217-01529)	Apr-13
Reference 30 dB Attenuator	SN: S5129 (30b)	27-Mar-12 (No. 217-01532)	Apr-13
Reference Probe ES30V2	SN: 3013	29-Dec-11 (No. ES3-3013, Dec11)	Dec-12
DAE4	SN: 660	20-Jun-12 (No. DAE4-660, Jun12)	Jun-13
Secondary Standards	10	Check Date (in fouse)	Scheduled Check
RF generator HP 8646C	US3842U01700	4-Aug-99 (in house check Apr-11)	In house check: Apr-13
Network Analyzer HP 8753E	US37390666	16-Oct-01 (in house check Oct-12)	In house check: Oct-13

Cellbrated by Claudio Leubter Laboratory Technician Caponature

Approved by: Katja Pokosic Technical Manager

Technical Manager

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

Certificate No. EX3-3592_Nov12

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≅BlackBerry	Appendix D for the BlackBo Report Rev 2	erry® Smartphone Mo	odel RFP121LW SAR	Page 25 (143)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014			

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





S Schweizenischer Kalitzierdienst C Service suisse d'etstonnage S Servizio svizzero di taratura Swiss Calibration Service

Accreditation No.: SCS 108

Accredited by the Swiss Accreditation Service (SAS)

The Swise Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Glossary:

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

CF crest factor (1/duty_cycle) of the RF signal A, B, C modulation dependent linearization parameters

Polarization o or rotation around probe axis

Polarization 3 3 rotation around an axis that is in the plane normal to probe axis (at measurement center),

i.e., h = 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
- 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:

- NORMx,y,z: Assessed for E-field polarization 5 = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide).
 NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect the E²-field uncertainty inside TSL (see below ConvF).
- NORM(f)x,y,z = NORMx,y,z * frequency_response (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConvF.
- DCPx,y,z: DCP are numerical linearization parameters assessed based on the data of power sweep 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, VRx,y,z; A, B, C 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.
- ConvF and Boundary Effect Parameters: Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORMx,y,z * ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100
- Spherical isotropy (3D deviation from isotropy): in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset. The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

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**** BlackBerry	Appendix D for the BlackBe Report Rev 2	erry® Smartphone Mo	odel RFP121LW SAR	Page 26(143)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	' '		

EX3DV4 - SN:3592

November 14, 2012

Probe EX3DV4

SN:3592

Manufactured: Calibrated: September 18, 2006 November 14, 2012

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

Certificate No: EX3-3592_Nov12

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≅BlackBerry	Appendix D for the BlackBo Report Rev 2	erry® Smartphone Mo	odel RFP121LW SAR	Page 27 (143)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW

EX3DV4~ SN:3592

November 14, 2012

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3592

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm (µV/(V/m) ²) ^A	0.49	0.47	0.41	± 10.1 %
Norm (µV/(V/m)²)^ DCP (mV) ⁿ	95.2	96.1	100.6	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc ¹ (k=2)
0	CW	0.00 X 0.0	0.0	0.0	1.0	121.4	13.0 %	
	1000		Y	0.0	0.0	1.0	104.3	
			Z	0.0	0.0	1.0	109.2	

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Certificate No: EX3-3592_Nov12

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The uncertainties of NormX.Y.Z do not affect the E²-field uncertainty inside TSL (see Pages 5 and 6).
Numerical breakdon 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 field value.

≅BlackBerry	Appendix D for the BlackBe Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR					
Author Data	Dates of Test	Test Report No	FCC ID:	IC			
Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW			

EX3DV4~ SN:3592

November 14, 2012

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3592

Calibration Parameter Determined in Head Tissue Simulating Media

r (MHz) ^c	Relative Permittivity	Conductivity (S/m) ²	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
2600	39.0	1.96	6.45	6.45	6.45	0.53	0.79	± 12.0 %
5200	36.0	4.66	4.73	4.73	4.73	0.40	1.80	± 13.1 %
5500	35.6	4.96	4.28	4.28	4.28	0.44	1.80	± 13.1 %
5800	35.3	5.27	4.12	4.12	4.12	0.48	1.80	± 13.1 %

⁶ Frequency validity of a 100 fairtz only applies for CASY v4.4 and higher (see Page 2), size it is certriced to a 50 Mrtz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

As frequencies below 3 GHz, the validity of fissus parameters (x and x) can be released to a 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of fissue parameters (x and x) is restricted to a 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

Certificate No: EX3-3092_Nov12

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≅BlackBerry	Appendix D for the BlackBe Report Rev 2	erry® Smartphone Mo	odel RFP121LW SAR	Page 29 (143)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3		2503A-RFL110LW 2503A-RFP120LW

November 14, 2012

EX3DV4-- SN:3592

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3592

Calibration Parameter Determined in Body Tissue Simulating Media

r (MHz) ⁰	Relative Permittivity	Conductivity (S/m) ^F	ConvF X	Convf Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
2600	52.5	2.16	6.59	6.59	6.59	0.80	0.50	± 12.0 %
5200	49.0	5.30	4.02	4.02	4.02	0.46	1.90	± 13.1 %
5500	48.6	5.85	3.66	3.66	3.66	0.55	1.90	± 13.1 %
5800	48.2	6.00	3.57	3.57	3.57	0.57	1.90	± 13.1 %

Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the Convil uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

At frequencies below 3 CHz, the validity of tissue paremeters (c and d) can be retained to ± 10% if liquid compensation formula is applied to measures SAR values. At frequencies above 3 CHz, the validity of tissue parameters (c and n) is restricted to ± 5%. The uncertainty is the RSS of the Convil uncertainty for indicated target issue parameters.

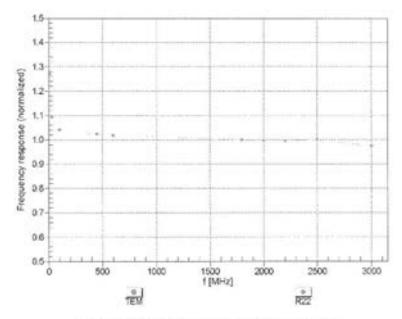
Certificate No: EX3-3592, Nov12 Page 6 of 11

*** BlackBerry	Appendix D for the BlackBo Report Rev 2	erry® Smartphone Mo	del RFP121LW SAR	Page 30 (143)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	, , , , , , , , , , , , , , , , , , , ,			2503A-RFL110LW 2503A-RFP120LW

EX3DV4~SN:3592

November 14, 2012

Frequency Response of E-Field (TEM-Cell:ifi110 EXX, Waveguide: R22)



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

Certificate No: EX3-3592_Nov12

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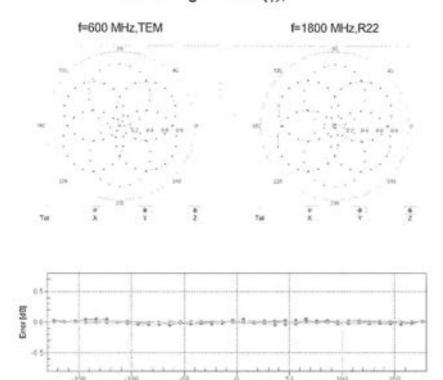
≅ BlackBerry	Appendix D for the BlackBo Report Rev 2	erry® Smartphone Mo	odel RFP121LW SAR	Page 31(143)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	2503A-RFL110LW 2503A-RFP120LW		

EX3DV4-SN:3592

November 14, 2012

25 (8 MHz

Receiving Pattern (6), 9 = 0°



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

Roll [7]

Certificate No: EX3-3592_Nov12

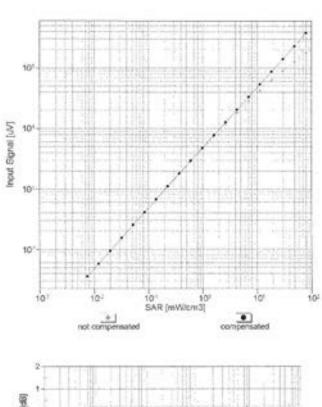
100 Miles

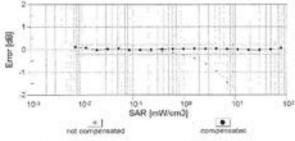
Page 8 of 11

≅BlackBerry	Appendix D for the BlackBo Report Rev 2	erry® Smartphone Mo	odel RFP121LW SAR	Page 32(143)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	, , , , , , , , , , , , , , , , , , , ,			2503A-RFL110LW 2503A-RFP120LW

EX3DV4- \$N:3592 November 14, 2012

Dynamic Range f(SAR_{head}) (TEM cell , f = 900 MHz)





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

Certificate No: EX3-3592_Nov12

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Appendix D for the BlackB Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		
Dates of Test	Test Report No	FCC ID:	IC
,		L6ARFL110LW	2503A-RFL110LW 2503A-RFP120LW
	Appendix D for the BlackBe Report Rev 2	Appendix D for the BlackBerry® Smartphone Mo Report Rev 2 Dates of Test Nov 22, 2012 – Feb 28, 2013 Test Report No RTS-6026-1303-02	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report Rev 2 Dates of Test Nov 22, 2012 – Feb 28, 2013 Test Report No RTS-6026-1303-02 L6ARFL110LW

EX3DV4- SN:3592 November 14, 2012 Conversion Factor Assessment f = 2600 MHz.WGLS R22 (H_convF) f = 2600 MHz,WGLS R22 (M_convF) Deviation from Isotropy in Liquid Error (¢, 3), f = 900 MHz 0.5 0.6 04 0.0 0.0 0.0 0.0 0.0 0.0 -0.4 -0.8 180 0.2 0.4 0.6 0.6 -1.0 -0.8 -0.8 -0.4 -0.2 0.0 Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

≅BlackBerry	Appendix D for the BlackBe Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW

EX30V4-SN:3592

November 14, 2012

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3592

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (*)	-13.6
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Dumeter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	2 mm

Certificate No: EX3-3562_Nov12

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::: BlackBerry	Appendix D for the BlackBe Report Rev 2	erry® Smartphone Mo	del RFP121LW SAR	Page 35(143)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3		2503A-RFL110LW 2503A-RFP120LW

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Blackberry Wa	aterioo	Contilicate No:	EX3-3592 Nov14
ALIBRATION	CERTIFICATE		7 LENET
Next	EX3DV4 - SN:35	92	
ialbration procedure(x)	QA CAL-01.v9, Q Calibration proces	IA CAL-14.v4, QA CAL-23.v5, QA dure for dosimetric E-field probes	CAL-25.V6
Salibration date:	November 10, 20	114	
his calibration certificate docur	naves the horsestality to patic	and a financial control of the contr	of measurements (56).
he measurements and the unc	containties with confidence pr ucted in the slosed laboratur	and standards, which well-se the physical units accepting one given on the following pages and τ y facility: environment temperature (22 ± 3)°G o	are part of the certificate.
he presidente sit differ and Il culibrations have been condi selbration biquigment used (Mil	consintee with confidence pr ucked in the closed laboratur 8TC critical for calibration)	robability ever given on the following pages and it y facility: environment temperature (22 ± 3)°C e	are part of the centitode. and frums6by < 70%.
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≅BlackBerry	Appendix D for the BlackBo Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		
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	Nov 22, 2012 – Feb 28, 2013	RTS-6026-1303-02	L6ARFL110LW	2503A-RFL110LW
	Dec. 10-12, 2014	Rev 3	L6ARFP120LW	2503A-RFP120LW

Calibration Laboratory of Schmid & Partner Engineering AG

Engineering AG Zoughausstrasse 43, 2004 Zurich, Switzerland





S Schweizerischer Kalibriertiensi
C Service suinze d'étalonnage
Service svizzero di tarature
Swiss Calibration Service

Accordingtion No.: SCS 108

Accredited by the Swiss Accreditation Service (SAS)

The Series Accreditation Service is one of the signatures to the EA Multilatural Agreement for the recognition of calibration certificates

Glossary:

TSL tissue simulating liquid sometivity in free space ConvF sensitivity in TSL / NORMX,y,z dode compression point

CF crest factor (1/duty_cycle) of the RF signal modulation dependent linearization parameters

Polarization φ o rotation around probe axis

Polarization 3 3 rotation around an axis that is in the plane normal to probe axis (at measurement center),

i.e., 8 = 0 is normal to probe axis

Connector Angle Information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

- iEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- EC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005.

Methods Applied and Interpretation of Parameters:

- NORMx,y,z: Assessed for E-field polarization a = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz; R22 waveguide).
 NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect the E²-field uncertainty inside TSL (see below ConvF).
- NORM(f)x,y,z = NORMx,y,z * frequency response (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of CorwF.
- 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.
- ConvF and Boundary Effect Parameters: Assessed in flat phantom using E-field (or Temperature Transfer Standard for f < 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORMx,y,z * ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from z S0 MHz to z 100 MHz.
- Spherical isotropy (3D deviation from isotropy): in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset. The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe sxis). No tolerance required.
- Convector Angle: The angle is assessed using the information gained by determining the NORMs (no uncertainty required).

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EX3DV4 - 8N:3592

November 10, 2014

Probe EX3DV4

SN:3592

Manufactured: Calibrated: September 18, 2006 November 10, 2014

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

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EX3DV4-SN:3592

November 10, 2014

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3592

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k+2)
Norm (µV/(V/m) ⁷) ^x	0.48	0.47	0.40	± 10.1 %
DCP (mV)*	95.2	98.0	98.8	7

Modulation Calibration Parameters

UID	Communication System Name		dB	B ⊲B√μV	c	D dB	VR mV	Unc* (k=2)
0	CW	×	0.0	0.0	1.0	0.00	145.9	23.3 %
		Y	0.0	0.0	1.0		155.9	
		Z	0.0	0.0	1.0	100	140.1	

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%.

Gertificate No: EX3-3592_Nov14

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⁶ The uncertainties of NormXYZ do not affect the E²-field uncertainty inside TSL (wer Pages 5 and 6).
⁸ Numerical Recordation parameter: uncertainty not required.
⁸ Uncurainty is determined using the max, deviation from linear response applying rectangular distribution and is expressed for the squire of the field variae.

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EX3DV4- SN:3502

November 10, 2014

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3592

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) ^C	Relative Permittivity*	Conductivity (5/m)	ConvF X	ConvF Y	ConvF Z	Alpha ⁶	Depth ⁶ (mm)	Unot. (k=2)
2600	39.0	1.98	6.80	5.80	6.80	0.36	0.93	±12.0 %
5250	35.9	4.71	4.63	4.63	4.63	0.35	1,80	±13.1%
5600	35.5	5.07	4.20	4.20	4.20	0.40	1.50	±13.1%
5750	35.4	5.22	4.34	4.34	4.34	0.40	1.80	±13.1%

Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v1.4 and higher (see Page 2), after it is restricted to a 50 MHz. The uncertainty in the HSS of the Conv5 incontainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for Conv5 associations of 30, 64, 128, 150 and 200 MHz respectively. Above 5 GHz thequency validity can be elektriced to ± 110 MHz.

At the parameters below 5 GHz, the validity of tinsue parameters (r and e) can be released to ± 10% if lepid companies on formula is applied to necessarily for advances above 3 GHz, the validity of tissue parameters (r and n) is restricted to a 15%. The uncertainty is the RSS of the Conv5 uncertainty for advanced strips from parameters.

AppliaDepth and observational during calibration. SPEAC was rures that the remaining deviation due to the boundary effect wife companisation is always less than ± 1% for frequencies bodow 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the protein to dismeter from the boundary.

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EX30V4 SN:3592

November 10, 2014

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3592

Calibration Parameter Determined in Body Tissue Simulating Media

r(MHz) [€]	Relative Permittivity	Conductivity (5/m)	Com/F X	ConvFY	ConvF Z	A)pha [©]	Depth (mm)	Unct. (k=2)
2600	52.5	2.16	6.84	6.84	6.84	0.78	0.62	± 12.0 %
5250	48.9	5.36	4.06	4.06	4.06	0.45	1.90	±13.1 %
5600	48.5	5.77	3.78	3,78	3,78	0.45	1.90	± 13.1 %
5750	48.3	5.94	3.81	3.61	3.81	0.50	1.90	# 13.1 %

Firequency validity above 300 MHz of a 100 MHz only applied for DASY v4.4 and higher (see Page 2), whe it is restricted to a 50 MHz. The uncortainty is the PGS of the Const uncortainty at calibration frequency and the uncertainty for the endoated frequency limit. Frequency validity below 300 MHz is a 10, 25, 40, 50 and 70 MHz for Const assessments at 30, 64, 128, 150 and 200 MHz nespectively. Above 5 GHz frequency validity can be entended to a 110 MHz.
**At Impurcises below 3 DHz, the validity of lissue paterneters (clerk s) can be released to a 10% if liquid compensation formula in applied to measured SAH values. At linguisecials above 3 GHz, the validity of tesse parameters is smill a) is restricted to a 6%. The uncertainty is the RBS of the Const (uncertainty is involvable larged tesse parameters.

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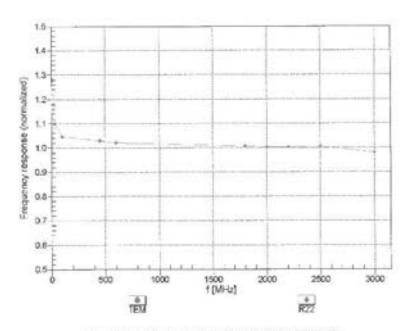
the Conf. undertainty is indicated larget takes parameters as the remaining deviacion due to the boundary effect after componential or a slauge loss than £ 1% for frequencies below 3. OHr and helice ± 2% for frequencies below 3. OHr and helice ± 2% for frequencies between 3.6 OHz at any distance larger from half the probe tip diameter from the boundary.

≅BlackBerry	Appendix D for the BlackBe Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR					
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EX30V4-5N:3592

November 10, 2014

Frequency Response of E-Field (TEM-Cell:Hfi110 EXX, Waveguide: R22)

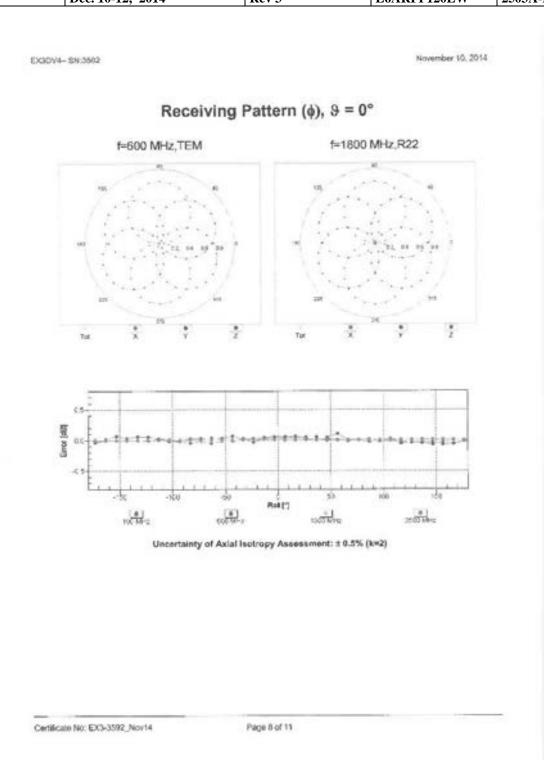


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

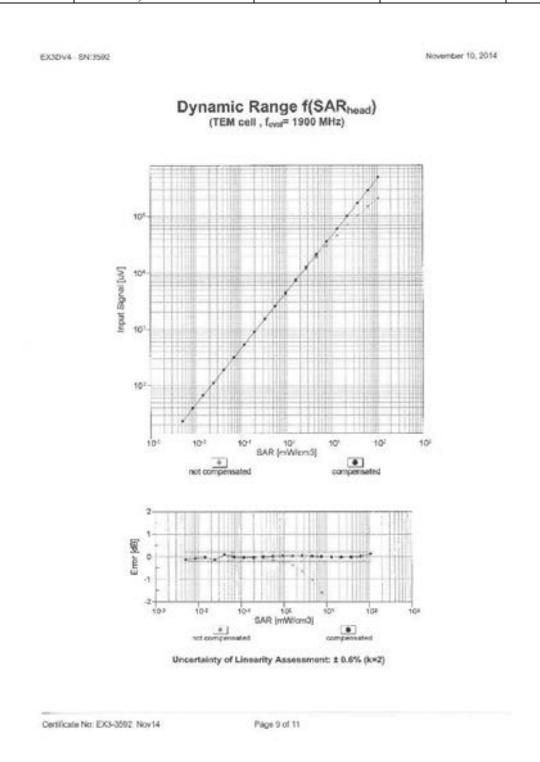
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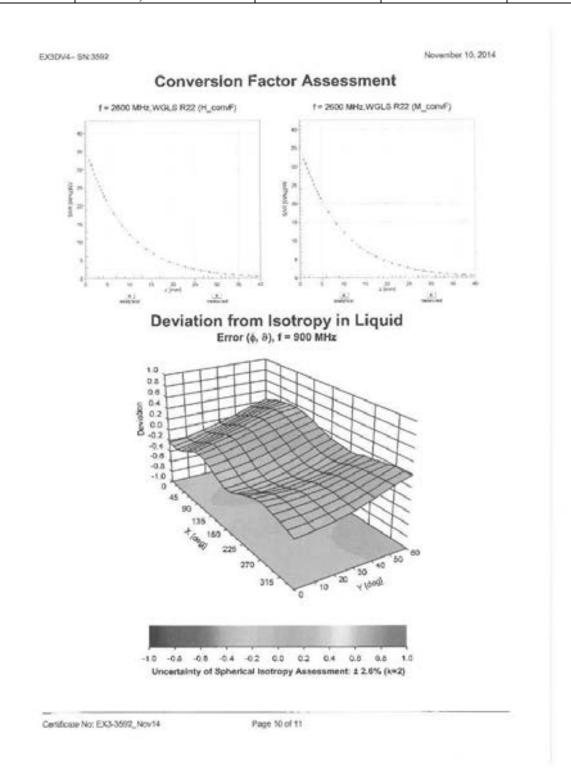
**** BlackBerry	Appendix D for the BlackBo Report Rev 2	erry® Smartphone Mo	odel RFP121LW SAR	Page 42(143)
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*** BlackBerry	Appendix D for the BlackB Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR				
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EX3DV4~ SN:3592

November 10, 2014

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3592

Other Probe Parameters

Sensor Amangement	Triengular
Connector Angle (*)	-13.3
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 nm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	1.4 mm

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≅ BlackBerry Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR 46(143) Report Rev 2 Author Data Dates of Test Test Report No FCC ID: Nov 22, 2012 – Feb 28, 2013 RTS-6026-1303-02 L6ARFL110LW 2503A-RFL110LW Andrew Becker Dec. 10-12, 2014 Rev 3 L6ARFP120LW 2503A-RFP120LW

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





S Schweizerischer Kalibrierdionst
C Service seisse d'étalonnage
Servizio svizzero di tanatura
Swiss Calibration Service

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

Client RTS (RIM Testing Services)

Certificate No: ET3-1644_Nov12

Accreditation No.: SCS 108

CALIBRATION CERTIFICATE Collect ET3DV6 - SN:1644 Calibration procedure(s) QA CAL-01.v8, QA CAL-23.v4, QA CAL-25.v4 Calibration procedure for dosimetric E-field probes Calibration data. November 13, 2012

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 x 3)°C and humidity = 70%.

Calibration Equipment used (M&TE ortical for calibration)

Primary Standards	10	Carl Date (Gertificate No.)	Scheduled Calibration
Power meter E44190	G841293874	29-Mar-12 (No. 217-01508)	Apr-13
Power sensor E4412A	MY41498087	29-Mar-12 (No. 217-01508)	Agr-13
Reference 3 dB Attenuator	SN: S5054 (3c)	27-Mar-12 (No. 217-01531)	Apr-13
Reference 20 dB Attenuator	SN: S5066 (20tr)	27-Mar-12 (No. 217-01529)	Apr-13
Reference 30 dB Attenuator	SN: 85129 (30b)	27-Mar-12 (No. 217-01532)	Apr-13
Reference Probe ES3DV2	SN: 3013	29-Dec-11 (No. ES3-3013, Dec11)	Dec-12
DAE4	SN: 000	20-Jun-12 (No. DAE4-660, Jun12)	Jun-13
Secondary Standards	ID D	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 8753E	US37390585	18-Oct-01 (in house check Oct-12)	In house check: Oct-13

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	-1
Anorowed by:	Kalia Pokovic	Technical Manager	1000
1000000	THE REAL PROPERTY.		parte day
CONTRACTOR OF THE			lasued: November 13, 2012
This colibration certificate	e shall not be reproduced except in ful	I without written approval of the laborator	y.

Certificate No. ET3-1544_Nov12

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	Dec	c. 10-12, 2014	Rev 3	L6ARFP120LW	2503A-RFP120LW

Calibration Laboratory of Schmid & Partner Engineering AG Zeughausstrasse 43, 8664 Zurich, Switzerland





S Schweizerischer Kalibrierdionst C Service suisse d'étalonnage Servisio svissero di taratera Swiss Calibration Service

Accreditation No.: SCS 108

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Glossary:

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

CF crest factor (1/duty_cycle) of the RF signal A, B, C modulation dependent linearization parameters

Polarization φ φ rotation around probe axis

Polarization 3 3 rotation around an axis that is in the plane normal to probe axis (at measurement center).

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

Calibration is Performed According to the Following Standards:

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- 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:

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 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.
- ConvF and Boundary Effect Parameters: Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz; and inside waveguide using analytical field distributions based on power measurements for f ≥ 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORMs,y,z * CorivF whereby the uncertainty corresponds to that given for CorivF. A frequency dependent CorivF is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100
- Spherical isotropy (3D deviation from isotropy): in a field of low gradients realized using a flat phantom exposed by a patch artenna.
- Sensor Offset: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

Certificate No: ET3-1644, Nov12	Page 2 of 11	

≅BlackBerry	Appendix D for the BlackBe Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR 48(143)			
Author Data	Dates of Test	Test Report No	FCC ID:	IC	
Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW	

ET3DV6 - SN:1644

November 13, 2012

Probe ET3DV6

SN:1644

Manufactured: Calibrated: November 7, 2001 November 13, 2012

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

Certificate No: ET3-1644_Nov12

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**** BlackBerry	Appendix D for the BlackBo Report Rev 2	erry® Smartphone Mo	odel RFP121LW SAR	Page 49(143)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW

ET3DV6- SN:1644

November 13, 2012

DASY/EASY - Parameters of Probe: ET3DV6 - SN:1644

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm (µW/(V/m) ²) ^x	1.71	1.97	1.98	± 10.1 %
DCP (mV) ⁸	99.5	98.7	97.5	-

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C dB	WR mV	Unc (k=2)
0	CW	0.00	X	0.0	0.0	1.0	193.5	±3.5 %
		1000	Y.	0.0	0.0	1,0	212.0	
			2	0.0	0.0	1.0	201.7	

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%.

^{*} Numerical linearization parameter: uncertainty not required.
* Numerical linearization 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 field value.

≅BlackBerry	Appendix D for the BlackBo Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR 50(143)				
Author Data	Dates of Test	Test Report No	FCC ID:	IC		
	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3		2503A-RFL110LW 2503A-RFP120LW		

ET3DV6- SN:1644 November 13, 2012.

DASY/EASY - Parameters of Probe: ET3DV6 - SN:1644

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) ^c	Relative Permittivity	Conductivity (Sim)	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
750	41.9	0.89	6.57	6.57	6.57	0.44	2.25	± 12.0 %
900	41.5	0.97	6.24	6.24	6.24	0.38	2.52	± 12.0 %
1810	40.0	1.40	5.21	5.21	5.21	0.80	2.10	± 12.0 %
1960	40.0	1.40	5.16	5.16	5.16	0.80	2.09	± 12,0 %
2450	39.2	1.60	4.60	4.60	4.60	0.65	2.00	± 12.0 %

Certificate No: ET3-1644_Nov12

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[&]quot;Frequency saidily of a 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band." At hequancies below 3 GHz, the validity of tissue parameters (r, and e) can be related to ± 10% if liquid compensation formula is applied to thesaured SAR values. At frequencies above 3 GRz, the validity of tissue parameters (r and e) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target fissue parameters.

≅BlackBerry	Appendix D for the BlackBo Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR				
Author Data	Dates of Test	Test Report No	FCC ID:	IC		
	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3		2503A-RFL110LW 2503A-RFP120LW		

ET30V6- SN:1844

November 13, 2012

DASY/EASY - Parameters of Probe: ET3DV6 - SN:1644

Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) ^C	Relative Permittivity	Conductivity (Sim)	Convf X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
750	55.5	0.96	6.30	6.30	6.30	0.33	2.61	± 12.0 %
900	55.0	1.05	0.06	6.06	6.06	0.31	2.99	± 12.0 %
1810	53.3	1.52	4.75	4.75	4.75	0.80	2.40	± 12.0 %
1950	53.3	1.52	4.75	4.75	4.75	0.80	2.28	± 12.0 %
2450	52.7	1.95	4.11	4.11	4.11	0.50	2.15	±12.0%

Cerificate No: ET3-1644_Nov12

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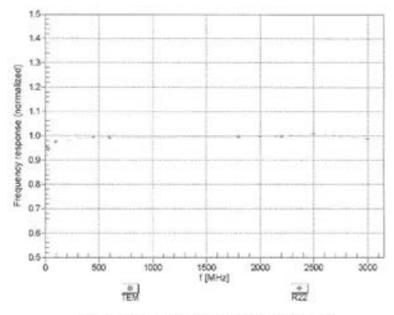
Frequency variety of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is nestricted to ± 50 MHz. The uncertainty is the RISS of the Constitutional state of the constitution of the constitution of the uncertainty for the indicated frequency band.
At it requiricies below 3 GHz, the validity of issue parameters (ii) and ii) can be retrained to x 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ii) and iii) is restricted to ± 5%. The uncertainty is the RISS of the Constitutional transfer indicated larget liesue parameters.

**** BlackBerry	Appendix D for the BlackBo Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR				
Author Data	Dates of Test	Test Report No	FCC ID:	IC		
Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW		

ET3DV6- SN:1644

November 13, 2012

Frequency Response of E-Field (TEM-Cell:ifi110 EXX, Waveguide: R22)



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

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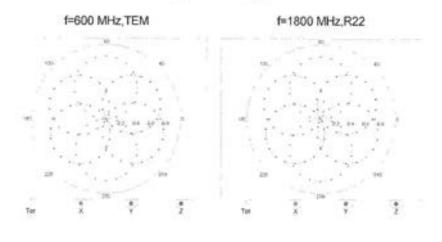
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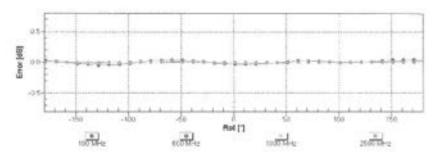
≅BlackBerry	Appendix D for the BlackBe Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR				
Author Data	Dates of Test	Test Report No	FCC ID:	IC		
Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW		

ET3DV6- SN:1644

November 13, 2012

Receiving Pattern (\$\phi\$), 9 = 0°





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

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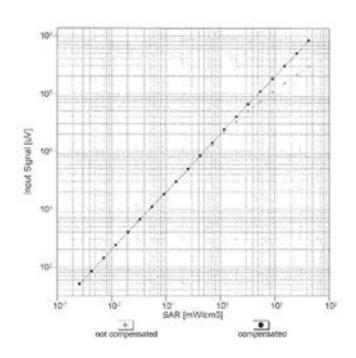
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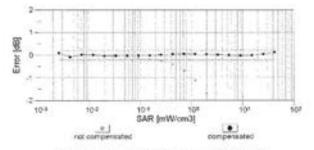
≅BlackBerry	Appendix D for the BlackBo Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR				
Author Data	Dates of Test	Test Report No	FCC ID:	IC		
Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW		

ET30V6- \$N:1644

November 13, 2012

Dynamic Range f(SAR_{head}) (TEM cell , f = 900 MHz)





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

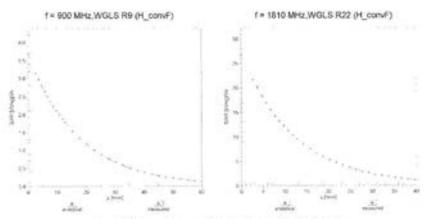
Certificate No: ET3-1644_Nov12

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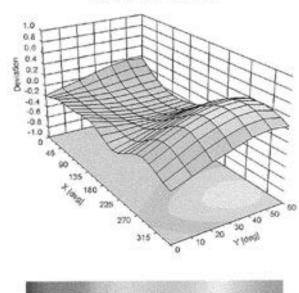
*** BlackBerry	Appendix D for the BlackBo Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR				
Author Data	Dates of Test	Test Report No	FCC ID:	IC		
Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW		

ET3DV6- SN:1644 November 13, 2012

Conversion Factor Assessment



Deviation from Isotropy in Liquid Error (6, 8), f = 900 MHz



-1.0 -0.8 -0.5 -0.4 -0.2 0.0 0.2 0.4 0.8 0.8 1.0 Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

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ET3DV6- SN:1644 November 13, 2012

DASY/EASY - Parameters of Probe: ET3DV6 - SN:1644

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (*)	61.5
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	enabled
Probe Overall Length	337 mm
Proce Body Diameter	10 mm
Tip Length	10 mm
Tip Diameter	6.8 mm
Probe Tip to Sensor X Calibration Point	2.7 mm
Probe Tip to Sensor Y Calibration Point	2.7 nvn
Probe Tip to Sensor Z Calibration Point	2.7 mm
Recommended Measurement Distance from Surface	4 mm

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**** BlackBerry	Appendix D for the BlackB Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR				
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≅ BlackBerry Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR 58(143) Report Rev 2 Author Data Dates of Test Test Report No FCC ID: Nov 22, 2012 – Feb 28, 2013 RTS-6026-1303-02 L6ARFL110LW 2503A-RFL110LW Andrew Becker Dec. 10-12, 2014 Rev 3 L6ARFP120LW 2503A-RFP120LW

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





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Hent RIM

Accreditation No.: SCS 108

Certificate No: D750V3-1021_Jan11

CALIBRATION CERTIFICATE D750V3 - SN: 1021 QA CAL-05.v8 Calibration procedure(s) Calibration procedure for dipole validation kits Calibration date: January 05, 2011 This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI), The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate. All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%. Calibration Equipment used (M&TE critical for calibration) Primary Standards ID# Cal Date (Certificate No.) Scheduled Calibration Power meter EPM-442A GB37480704 06-Oct-10 (No. 217-01266) Oct-11 Power sensor HP 8481A U\$37292783 06-Oct-10 (No. 217-01266) Oct-11 30-Mar-10 (No. 217-01158) Reference 20 dB Attenuator SN: 5086 (20g) Mar-11 30-Mar-10 (No. 217-01162) SN: 5047.2 / 06327 Type-N mismatch combination Mar-11 Reference Probe ES3DV3 30-Apr-10 (No. ES3-3205 Apr10) SN: 3005 Apr-11 DAE4 SN: 601 10-Jun-10 (No. DAE4-601_Jun10) Jun-11 Secondary Standards ID# Check Date (in house) Scheduled Check MY41092317 18-Oct-02 (in house check Oct-09) Power sensor HP 8481A. 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 6753E US37390585 S4206 18-Oct-01 (in house check Oct-10) In house check: Oct-11 Function Calibrated by: Approved by: Issued: January 6, 2011 This calibration certificate shall not be reproduced except in full without written approval of the laboratory

Certificate No: D750V3-1021_Jan11

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≅BlackBerry	Appendix D for the BlackBe Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR				
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Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW		

Calibration Laboratory of

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Glossary:

TSL.

tissue simulating liquid

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

Certificate	No:	D750V3-	1021	Jan1
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**** BlackBerry	Appendix D for the BlackBo Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR				
Author Data	Dates of Test	Test Report No	FCC ID:	IC		
Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW		

Measurement Conditions

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

DASY Version	DASY5	V52.6
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V4.9	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	750 MHz ± 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	42.3 ± 6 %	0.91 mho/m ± 6 %
Head TSL temperature during test	(22.0 ± 0.2) °C	****	

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.12 mW / g
SAR normalized	normalized to 1W	8.48 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	8.36 mW /g ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.38 mW / g
SAR normalized	normalized to 1W	5.52 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	5.45 mW /g ± 16.5 % (k=2)

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≅BlackBerry	Appendix D for the BlackBo Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		
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Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.1 Ω - 1.7 jΩ	
Return Loss	- 29.3 dB	

General Antenna Parameters and Design

Electrical Delay (one direction)	1.033 ns
- I recommended to the control of th	

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

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

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

Additional EUT Data

Manufactured by	SPEAG	
Manufactured on	December 01, 2010	

Certificate No: D750V3-1021_Jan11

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*** BlackBerry	Appendix D for the BlackBo Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		
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DASY5 Validation Report for Head TSL

Date/Time: 05.01.2011 15:51:17

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: CW; Frequency: 750 MHz; Duty Cycle: 1:1

Medium: HSL750

Medium parameters used: f = 750 MHz; $\sigma = 0.91 \text{ mho/m}$; $\varepsilon_r = 42.3$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: ES3DV3 SN3205; ConvF(6.37, 6.37, 6.37); 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: DASY52, V52.6 Build (401)
- Postprocessing SW: SEMCAD X, V14.4.2 Build (2595)

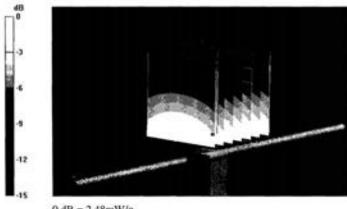
Pin=250mW; dip=15mm; dist=3.0mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid:

dx=5mm, dy=5mm, dz=5mm

Reference Value = 53.5 V/m; Power Drift = -0.00432 dB

Peak SAR (extrapolated) = 3.24 W/kg

SAR(1 g) = 2.12 mW/g; SAR(10 g) = 1.38 mW/gMaximum value of SAR (measured) = 2.48 mW/g



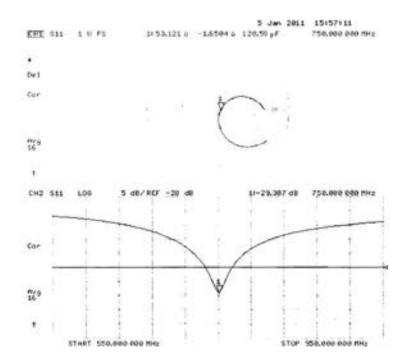
0 dB = 2.48 mW/g

Certificate No: D750V3-1021_Jan11

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≅BlackBerry	Appendix D for the Black Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		
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Impedance Measurement Plot for Head TSL



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RTS (RIM Testing Services) Client

Accreditation No.: SCS 108

Certificate No: D750V3-1021_Jan13 CALIBRATION CERTIFICATE Object D750V3 - SN: 1021 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 tracesbility to national standards, which realize the physical units of measurements (St). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate. All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3/°C and humidity < 70% Calibration Equipment used (M&TE critical for calibration) Primary Standards ID # Cal Date (Certificate No.) Scheduled Calibration Power meter EPM-442A G837480704 01-Nov-12 (No. 217-01640) Oct-13 Power sensor HP 8481A US37292783 01-Nov-12 (No. 217-01640) Oct-13 SN: 5058 (20k) 27-Mar-12 (No. 217-01530) Reference 20 dB Attenuator Apr-13 Type-N mismatch combination SN: 5047.3 / 06327 27-Mar-12 (No. 217-01533) Apr-13 Reference Probe ESSOV3 28-Dec-12 (No. ES3-3205, Dec12) SN: 3205 Dec-13 DAE4 SN: 601 27-Jun-12 (No. DAE4-601_Jun12) DI Check Date (in house) Scheduled Chock Secondary Standards Power sensor HP 8481A MY41092317 18-Oct-02 (in house check Oct-11) In house check: Oct-13 RF generator R&S SMT-06 100005 04-Aug-99 (in house check Oct-11) In house check: Oct-13 Network Analyzer HP 8753E US37390585 S4206 In house check: Oct-13 18-Oct-01 (in house check Oct-12) Name Function Signature Leif Klysner Laboratory Technician Calibrated by: Katia Pokovic Yechnical Manager Approved by: Issued: January 8, 2013 This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

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*** BlackBerry	Appendix D for the BlackBe Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		
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Glossary:

TSL

tissue simulating liquid

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

Calibration is Performed According to the Following Standards:

- 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: D750V3-1021_Jan13

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**** BlackBerry	Appendix D for the Black Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		Page 66(143)
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Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW

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 - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	750 MHz ± 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 ³ (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 % (k=2)

SAR averaged over 10 cm ³ (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 ± 16.5 % (k=2)

≅BlackBerry	Appendix D for the BlackBo Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW

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

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 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	December 01, 2010

Certificate No: D750V3-1021_Jan13

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≅BlackBerry	Appendix D for the BlackBe Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		
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Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW

DASY5 Validation Report for Head TSL.

Date: 07.01.2013

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; $\sigma = 0.89 \text{ S/m}$; $\varepsilon_c = 41.4$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

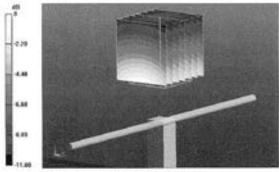
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

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:

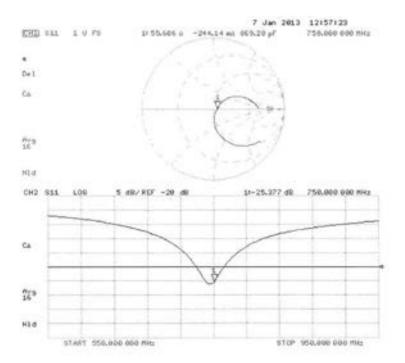
Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 54.107 V/m; Power Drift = 0.01 dB Peak SAR (extrapolated) = 3.23 W/kg SAR(1 g) = 2.12 W/kg; SAR(10 g) = 1.38 W/kg Maximum value of SAR (measured) = 2.47 W/kg



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

≅BlackBerry	Appendix D for the BlackBo Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3		2503A-RFL110LW 2503A-RFP120LW

Impedance Measurement Plot for Head TSL



*** BlackBerry	Appendix D for the BlackBe Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		
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Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW

≅ BlackBerry Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR 71(143) Report Rev 2 Test Report No Author Data Dates of Test FCC ID: **Andrew Becker** Nov 22, 2012 – Feb 28, 2013 RTS-6026-1303-02 L6ARFL110LW 2503A-RFL110LW Dec. 10-12, 2014 L6ARFP120LW Rev 3 2503A-RFP120LW

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





S Schweizerischer Kalibrierdienst
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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Client RTS (RIM Testing Services)

Certificate No: D835V2-446_Jan11

Object	D835V2 - SN: 44	6	
Calibration procedure(s)	QA CAL-05.v8 Calibration proce	dure for dipole validation kits	
		ST SHERE	
Calibration date:	January 21, 2011		
		ional standards, which realize the physical u robability are given on the following pages a	
			make an expension of more destinations.
	ของสายสายเกราะเกรี		°C and humidity < 70%.
	cted in the closed laborato	ry facility: environment temperature (22 ± 3)	°C and humidity < 70%.
NI calibrations have been condu Calibration Equipment used (M&	cted in the closed laborato		°C and humidity < 70%. Scheduled Calibration
N calibrations have been condu- calibration Equipment used (M& Primary Standards	cted in the closed laborato TE critical for calibration)	ry facility: environment temperature (22 ± 3)	
III calibrations have been condu- calibration Equipment used (M& Primary Standards Power motor EPIM-442A Power sensor HP 8481A	cted in the closed laborato TE critical for calibration) ID # G6837480704 US37292783	ry facility: environment temperature (22 ± 3) Cal Date (Certificate No.) 06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266)	Scheduled Calibration
III calibrations have been condu- Calibration Equipment used (M& Primary Standards Power meter EPM-442A Power sensor HF 8481A Reference 20 dB Attenuator	cited in the closed laborato TE critical for calibration) ID # GB37480704 US37292783 SN: 5086 (20g)	ry facility: environment temperature (22 ± 3) Cal Date (Certificate No.) 06-Oct-10 (No. 217-01266) 06-Oct-10 No. 217-01266) 30-Mar-10 (No. 217-01158)	Scheduled Calibration Oct-11 Oct-11 Mar-11
All calibrations have been condu- Calibration Equipment used (M& Primary Standards Power moter EPM-442A Power sensor HP 8481A Reference 20 dB Amenuator Type-N mismasch combination	cited in the closed laborato TE critical for calibration) ID # G837480704 US37292783 SN: 5066 (20g) SN: 5047.2 / 06327	ry facility: environment temperature (22 ± 3) Cal Date (Certificate No.) 06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266) 30-Mar-10 (No. 217-01168) 30-Mar-10 (No. 217-01162)	Scheduled Calibration Oct-11 Oct-11 Mar-11 Mar-11
All calibrations have been condu- calibration Equipment used (M& Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES30V3	cited in the closed laborato TE critical for calibration) ID # GB37480704 US37292783 SN: 5086 (20g)	ry facility: environment temperature (22 ± 3) Cal Date (Certificate No.) 06-Oct-10 (No. 217-01266) 06-Oct-10 No. 217-01266) 30-Mar-10 (No. 217-01158)	Scheduled Calibration Oct-11 Oct-11 Mar-11
All calibrations have been condu- Calibration Equipment used (M& Primary Standards Power sensor EPM-442A Power sensor RM-442A Power sensor RM-442A Peterence 20 dB Attenuator Type-N mismatch combination Reference Probe ES3	TE critical for calibration) ID # GB37480704 US37292783 SN: 5085 (20g) SN: 5047.2 / 06327 SN: 3005 SN: 601	ry facility: environment temperature (22 ± 3) Cal Date (Certificate No.) 06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266) 30-Mar-10 (No. 217-01162) 30-Mar-10 (No. 217-01162) 30-Apr-10 (No. ES3-3205, Apr10) 10-Jun-10 (No. DAE4-601_Jun10)	Scheduled Calibration Oct-11 Oct-11 Mar-11 Mar-11 Apr-11 Jun-11
All calibrations have been condu- Calibration Equipment used (M& Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES30V3 DAE4 Secondary Standards	Cited in the closed laborator) ID # G837489704 US37292783 SN: 5085 (20g) SN: 5047 2 / 06327 SN: 3205 SN: 601 ID #	Cal Date (Certificate No.) 06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266) 30-Mar-10 (No. 217-01168) 30-Mar-10 (No. 217-01162) 30-Agr-10 (No. ES3-3205_Agr10) 10-Jun-10 (No. DAE4-601_Jun10) Check Date (in house)	Scheduled Calibration Oct-11 Oct-11 Mar-11 Mar-11 Apr-11 Jun-11
All calibrations have been condu- Calibration Equipment used (M& Primary Standards Power mater EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES30V3 DAE4 Secondary Standards Power sensor HP 8481A	TE critical for calibration) ID # GB37480704 US37292783 SN: 5085 (20g) SN: 5047.2 / 06327 SN: 3005 SN: 601	Cal Date (Certificate No.) 06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266) 30-Mar-10 (No. 217-01168) 30-Mar-10 (No. 217-01162) 30-Apr-10 (No. ES3-3205, Apr10) 10-Jun-10 (No. DAE4-601, Jun10) Check Date (in house)	Scheduled Calibration Oct-11 Oct-11 Mar-11 Mar-11 Apr-11 Jun-11 Scheduled Check In house check: Oct-11
All calibrations have been condu- Calibration Equipment used (M& Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Amenuator Type-N mismatch combination Reference Probe ES30V3 DAE4 Secondary Standards Power sensor HP 8481A RF generator R&S SMT-06	Cited in the closed laborato TE critical for calibration) ID # GB37480704 US37292783 SN: 5086 (20g) SN: 5047 2 / 06327 SN: 3005 SN: 601 ID # MY41092317	Cal Date (Certificate No.) 06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266) 30-Mar-10 (No. 217-01168) 30-Mar-10 (No. 217-01162) 30-Agr-10 (No. ES3-3205_Agr10) 10-Jun-10 (No. DAE4-601_Jun10) Check Date (in house)	Scheduled Calibration Oct-11 Oct-11 Mar-11 Mar-11 Apr-11 Jun-11
All calibrations have been condu- Calibration Equipment used (M& Primary Standards Power sensor HP 8481A Reference 20 dB Amenuator Type-N mismatch combination Reference Probe ES30V3 DAE4 Secondary Standards Power sensor HP 8481A RF generator R&S SMT-06	Cited in the closed laborator TE critical for calibration) ID # GB37480704 US37292783 SN: 5067 2 / 06327 SN: 5047 2 / 06327 SN: 5047 1 / 06327 SN: 601 ID # MY41082317 100005 US37390585 S4206	Cal Date (Certificate No.) 06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266) 30-Mar-10 (No. 217-01369) 30-Mar-10 (No. 217-01369) 30-Apr-10 (No. ES3-3205_Apr10) 10-Jun-10 (No. DAE4-601_Jun10) Check Date (in house) 18-Oct-02 (in house check Oct-09) 18-Oct-01 (in house check Oct-09)	Scheduled Calibration Oct-11 Oct-11 Mar-11 Mar-11 Agr-11 Jun-11 Scheduled Check In house check: Oct-11 In house check: Oct-11
All calibrations have been condu- Calibration Equipment used (M& Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES30V3 DAE4 Secondary Standards Power sensor HP 8481A RF generator R&S SMT-06 Notwork Analyzer HP 8753E	Cited in the closed laborato TE critical for calibration) ID # G837489704 US37292783 SN: 5086 (20g) SN: 5047 2 / 06327 SN: 3205 SN: 601 ID # MY41092317 100005 US37390585 S4206	Cal Date (Certificate No.) 06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266) 30-Mar-10 (No. 217-01168) 30-Mar-10 (No. 217-01162) 30-Apr-10 (No. ES3-3205, Apr10) 10-Jun-10 (No. ES3-3205, Apr10) Check Date (in house) 18-Oct-02 (in house check Oct-09) 4-Aug-99 (in house check Oct-09) 18-Oct-01 (in house check Oct-10) Function	Scheduled Calibration Oct-11 Oct-11 Mar-11 Mar-11 Agr-11 Jun-11 Scheduled Check In house check: Oct-11 In house check: Oct-11
All calibrations have been condu	Cited in the closed laborator TE critical for calibration) ID # GB37480704 US37292783 SN: 5067 2 / 06327 SN: 5047 2 / 06327 SN: 5047 1 / 06327 SN: 601 ID # MY41082317 100005 US37390585 S4206	Cal Date (Certificate No.) 06-Oct-10 (No. 217-01266) 06-Oct-10 (No. 217-01266) 30-Mar-10 (No. 217-01369) 30-Mar-10 (No. 217-01369) 30-Apr-10 (No. ES3-3205_Apr10) 10-Jun-10 (No. DAE4-601_Jun10) Check Date (in house) 18-Oct-02 (in house check Oct-09) 18-Oct-01 (in house check Oct-09)	Scheduled Calibration Oct-11 Oct-11 Mar-11 Mar-11 Apr-11 Jun-11 Scheduled Check In house check: Oct-11 In house check: Oct-11

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∷ BlackBerry Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR 72(143) Report Rev 2 Author Data Dates of Test Test Report No FCC ID: Andrew Becker Nov 22, 2012 – Feb 28, 2013 RTS-6026-1303-02 L6ARFL110LW 2503A-RFL110LW Rev 3 Dec. 10-12, 2014 L6ARFP120LW 2503A-RFP120LW

Calibration Laboratory of

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





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

Accreditation No.: SCS 108

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Glossary:

TSL ConvF tissue simulating liquid

sensitivity in TSL / NORM x.y.z.

N/A

not applicable or not measured

Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques*, December 2003
- b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)*,
- 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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≅ BlackBerry	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report Rev 2			Page 73(143)
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Andrew Becker	1 /	RTS-6026-1303-02		2503A-RFL110LW
	Dec. 10-12, 2014	Rev 3	L6ARFP120LW	2503A-RFP120LW

Measurement Conditions

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

DASY Version	DASY5	V52.6
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V4.9	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters
The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	41.3 ± 6 %	0.89 mho/m ± 6 %
Head TSL temperature during test	(21.8 ± 0.2) °C	****	

SAR result with Head TSL

SAR averaged over 1 cm3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.39 mW / g
SAR normalized	normalized to 1W	9.56 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	9.63 mW /g ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.56 mW / g
SAR normalized	normalized to 1W	6.24 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	6.27 mW/g ± 16.5 % (k=2)

Certificate No: D835V2-446_Jan11

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≅BlackBerry	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report Rev 2			Page 74(143)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	49.6 Ω - 7.7 Ω		
Return Loss	- 22.2 dB		

General Antenna Parameters and Design

Electrical Delay (one direction)	1.386 ns

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

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	October 24, 2001

Certificate No: D835V2-446_Jan11

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≅BlackBerry	Appendix D for the BlackBo Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR			
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Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW	

DASY5 Validation Report for Head TSL

Date/Time: 21.01.2011 10:18:05

Test Laboratory: SPEAG, Zurich, Switzerland

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

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

Medium: HSL900

Medium parameters used: f = 835 MHz; $\sigma = 0.89 \text{ mho/m}$; $\varepsilon_r = 41.2$; $\rho = 1000 \text{ kg/m}^3$

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: DASY52, V52.6.1 Build (408)

Postprocessing SW: SEMCAD X, V14.4.2 Build (2595)

Pin=250 mW /d=15mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0: Measurement

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

Reference Value = 57.426 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 3.600 W/kg

SAR(1 g) = 2.39 mW/g; SAR(10 g) = 1.56 mW/g.

Maximum value of SAR (measured) = 2.790 mW/g



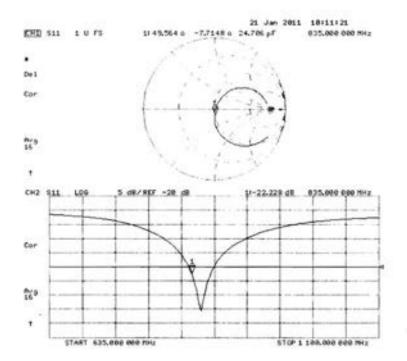
0 dB = 2.790 mW/g

Certificate No: D835V2-446_Jan11

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≅BlackBerry	Appendix D for the BlackBo Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
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Impedance Measurement Plot for Head TSL



Certificate No: D835V2-446_Jan11

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≅BlackBerry	A	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report Rev 2			Page 77 (143)
Author Data	Dates	of Test	Test Report No	FCC ID:	IC
Andrew Becker		,	RTS-6026-1303-02		2503A-RFL110LW
	Dec	c. 10-12, 2014	Rev 3	L6ARFP120LW	2503A-RFP120LW

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





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S Swiss Calibration Service

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

Accreditation No.: SCS 108

17:00 - --

Client RTS (RIM Testing Services)

Certificate No: D835V2-446_Jan13

bject		Will be the state of the state	
	D835V2 - SN: 44	0	
alibration procedure(s)	QA CAL-05.v9		and the course
	Calibration proce	dure for dipole validation kits abo	we 700 MHz
allbration date:	January 07, 2013	Charles of the San	
nis calibration certificate rinou	ments the traceability to nati	onal standards, which reslice the physical un	ts of measurements (SI)
		robability are given on the following pages an	
I calibrations have been cond	ucted in the closed laborator	y facility, environment temperature (22 ± 3)*C	C and burnidity < 70%.
albration Equipment used (M	STE critical for calibration)		
rimary Standards	ID+	Cal Date (Certificate No.)	Scheduled Calibration
ower meter EPM-442A	GB37480704	01-Nov-12 (No. 217-01640)	Oct-13
ower sensor HP 8481A	US37292783	01-Nov-12 (No. 217-01640)	Oct-13
eference 20 dB Attenuator	SN: 5058 (20k)	27-Mar-12 (No. 217-01530)	Apr-13
pe-N mismatch combination	SN: 5047.3 / 06327	27-Mar-12 (No. 217-01533)	Apr-13
elerence Probe ES3DV3	SN: 3005	28-Dec-12 (No. ES3-3205_Dec12)	Dec-13
AE4	SN: 601	27-Jun-12 (No. DAE4-601_Jun12)	Jun-13
and the second	10+	Check Date (in house)	Scheduled Check
econdary Standards	MY41092317	18-Oct-02 (in house check Oct-11)	In house check: Oct-13
ower sensor HP 8481A	A CONTRACTOR OF THE PARTY OF TH	to detail by relation mades one 115	and the second of the second second second
ower sensor HP 8481A	100005	04-Aug-99 (in house check Oct-11)	
Management Angle Control of the Cont			In house check: Oct-13
ower sensor HP 8481A F generator R&S SMT-06	100005 US37390585 S4206	04-Aug-90 (in house check Oct-11) 18-Oct-01 (in house check Oct-12)	In house check: Oct-13 In house check: Oct-13
ower sensor HP 8451A Figenerator P835 SMT-06 etwork Analyzer HP 6753E	100005 US37390585 S4206 Name	04-Aug-89 (in house check Oct-11) 18-Oct-01 (in house check Oct-12) Function	In house check: Oct-13
ower sensor HP 8481A F generator R&S SMT-06	100005 US37390585 S4206	04-Aug-90 (in house check Oct-11) 18-Oct-01 (in house check Oct-12)	In house check: Oct-13 In house check: Oct-13
ower sensor HP 8451A Figenerator P835 SMT-05 etwork Analyzer HP 6753E	100005 US37390585 S4206 Name	04-Aug-89 (in house check Oct-11) 18-Oct-01 (in house check Oct-12) Function	In house check: Oct-13 In house check: Oct-13

Certificate No: D835V2-446_Jan13

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≅BlackBerry	Appendix D for the BlackBo Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW

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





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S Swiss Calibration Service

Accreditation No.: SCS 108

Accredited by the Swiss Accreditation Service (SAS)

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

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: D835V2-446_Jan13

Page 2 of 6

≅BlackBerry	Appendix D for the Black Report Rev 2	Berry® Smartphone M	odel RFP121LW SAR	Page 79(143)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22, 2012 – Feb 28, 2011 Dec. 10-12, 2014	3 RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW

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 - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41,5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	42.0 ± 6 %	0.92 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	-	

SAR result with Head TSL

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

SAR averaged over 10 cm3 (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 ± 16.5 % (k=2)

Certificate No: D835V2-446_Jan13

**** BlackBerry	Appendix D for the Black Report Rev 2	Berry® Smartphone M	odel RFP121LW SAR	Page 80(143)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22, 2012 – Feb 28, 201 Dec. 10-12, 2014	3 RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW

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) 1.38	5 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	October 24, 2001

Certificate No: D635V2-446_Jan13

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≅BlackBerry	Appendix D for the BlackBe Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW

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; $\sigma = 0.92 \text{ S/m}$; $\varepsilon_c = 42$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

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

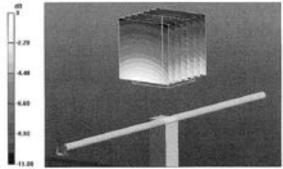
DASY52 Configuration:

- 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

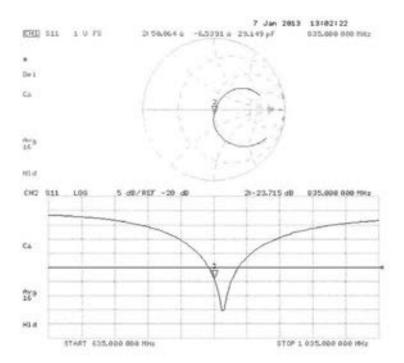
Maximum value of SAR (measured) = 2.79 W/kg



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

≅BlackBerry	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report Rev 2		Page 82(143)	
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	,	RTS-6026-1303-02		2503A-RFL110LW
	Dec. 10-12, 2014	Rev 3	L6ARFP120LW	2503A-RFP120LW

Impedance Measurement Plot for Head TSL



≅BlackBerry	Appendix D for the BlackBe Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW

≅ BlackBerry Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR 84(143) Report Rev 2 Author Data Dates of Test Test Report No FCC ID: 2503A-RFL110LW Nov 22, 2012 – Feb 28, 2013 L6ARFL110LW Andrew Becker RTS-6026-1303-02 L6ARFP120LW Dec. 10-12, 2014 2503A-RFP120LW Rev 3

Calibration Laboratory of

Schmid & Partner
Engineering AG
Zeughausstresse 43, 9004 Zurich, Switzerland





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Accredited by the Swes Accreditation Service (SAS)

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

Certificate No: D835V2-4d043_Apr11 RTS (RIM Testing Services) CALIBRATION CERTIFICATE D835V2 - SN: 4d043 Otyect Celibration procedure(s) QA CAL-05.v8 Calibration procedure for dipole validation kits Calibration date: April 07, 2011 This onlibration conflicate documents the tracoubility to national standards, which realize the physical units of measurements (St. The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate. All culibrations have been conducted in the closed taboratory facility, environment temperature (22 a 3)°C and humidity < 70% Calibration Equipment used (M&TE critical for calibration) Primary Standards Oal Date (Certificate No.) Schoduled Calibration Power meter EPM-442A GB37480704 06-Oct-10 (No. 217-01266) Oct-11 Power sensor HP 8481A U637292783 08-Oct-10 (No. 217-01256) Oct-11 29 Mar-11 (No. 217-01368) Palerence 20 dB Attenuator Site 5086 (70g) Acr-12 Type N miswetch combination SN: 5047.2 / 06327 29-Mar-11 (No. 217-01371) App-12 Pelerance 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 Os Check Date (in house) Scheduled Check Secondary Standards Power sensor HP 8481A MY41092317 18-Oct-02-lin house check Oct-09in house check: Oct-11 RF generator R&S SMT-06 100005 4-Aug-99 (in house check Oct-0%) in house check: Oct-11 Network Analyzes HP 8753E US37390585 54206 18 Oct 01 (in house theck Oct-10) In house check: Oct-11 Function Calibrated by Approved by: Issued April 7, 2011 This calibration certificate shall not be reproduced except in full without written approval of the laboratory

Certitionte No: D835V2-4d043_Apr11

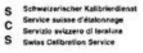
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≅ BlackBerry	Appendix D for the BlackBo Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	,	RTS-6026-1303-02		2503A-RFL110LW
	Dec. 10-12, 2014	Rev 3	L6ARFP120LW	2503A-RFP120LW

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Accreditation No.: SCS 108

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

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Certificate No: D835V2-4d043, April 1	Page 2 of 6			
Permission for Population and Laboration and Labora	1 10go A 01 0			

≅BlackBerry	Appendix D for the BlackBe Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW

Measurement Conditions

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

DASY Version	DASY5	V52.6.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V4.9	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scen Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters
The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.6 ± 6 %	0.88 mho/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	2.33 mW/g
SAR normalized	normalized to 1W	9.32 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	9.43 mW/g = 17.0 % (k-2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	201570
SAR measured	250 mW input power	1.52 mW / g
SAR normalized	normalized to 1W	6.08 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	6.14 mW /g ± 16.5 % (k=2)

*** BlackBerry	Appendix D for the Black Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22, 2012 – Feb 28, 201 Dec. 10-12, 2014	3 RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52 9 Ω - 3.4 JΩ
Return Loss	- 27.2 dB

General Antenna Parameters and Design

The state of the s	177.577.00
Electrical Delay (one direction)	1.391 ns

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

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

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

Design Modification by End User

The dipole has been modified with Totan 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: D835V2-4d043_Apr11

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≅BlackBerry	Appendix D for the BlackBo Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		Page 88 (143)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3		2503A-RFL110LW 2503A-RFP120LW

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: 1:1

Medium: HSL900

Medium parameters used: f = 835 MHz; $\sigma = 0.88$ mho/m; $\varepsilon_r = 40.6$; $\rho = 1000$ kg/m³

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; Scrial: 1001

Measurement SW: DASY52, V52.6.2 Build (424)

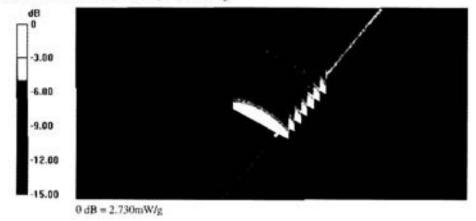
Postprocessing SW: SEMCAD X, V14.4.4 Build (2829)

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

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

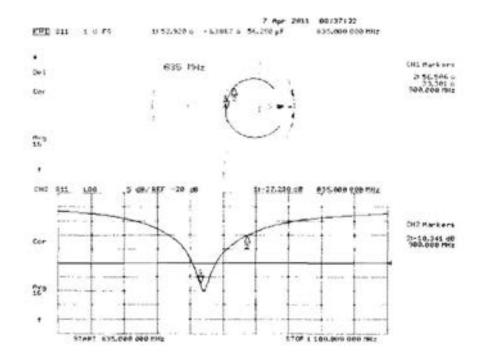


Certificate No: D835V2-4d043_Apr11

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≅BlackBerry	Appendix D for the BlackBo Report Rev 2	erry® Smartphone Mo	odel RFP121LW SAR	Page 89(143)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22, 2012 – Feb 28, 2013	RTS-6026-1303-02	L6ARFL110LW	2503A-RFL110LW
	Dec. 10-12, 2014	Rev 3	L6ARFP120LW	2503A-RFP120LW

Impedance Measurement Plot for Head TSL



Certificate No. D835V2-4s043_Apr11

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∷ BlackBerry Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR 90(143) Report Rev 2 Test Report No Author Data Dates of Test FCC ID: **Andrew Becker** Nov 22, 2012 – Feb 28, 2013 RTS-6026-1303-02 L6ARFL110LW 2503A-RFL110LW Dec. 10-12, 2014 L6ARFP120LW Rev 3 2503A-RFP120LW

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





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Accredited by the Swiss Accreditation Service (SAS)
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Multilateral Agreement for the recognition of calibration certificates

Client RTS (RIM Testing Services)

Accreditation No.: SCS 108

Certificate No: D1800V2-2d020_Jan11

Selbration procedure(s)	QA CAL-05.v8		
	Calibration proce	dure for dipole validation kits	
altration date:	January 13, 2011	K. G. Wast Skins	
		ional standards, which realize the physical u robability are given on the following pages a	
il calibrations have been cond	jucted in the closed laborato	ry facility: environment temperature (22 ± 3)	°C and humidity < 70%.
Calibration Equipment used (M	STE critical for calibration)		
Primary Standards	10.	Call Date (Certificate No.)	Scheduled Calibration
ower meter EPM-442A	G837480704	06-Oct-10 (No. 217-01266)	Oct-11
ower sensor HP 8481A	US37292783	06-Oct-10 (No. 217-01266)	Oct-11
eference 20 dB Attenuator	SN: 5086 (20g)	30-Mar-10 (No. 217-01158)	Mor-11
pe-N mismatch combination.	SN: 5047,2 / 06327	30-Mar-10 (No. 217-01162)	Mar-11
eference Probe ES30V3	SN: 3205	30-Apr-10 (No. ES3-3205_Apr10)	Apr-11
AE4	SN: 601	10-Jun-10 (No. DAE4-601_Jun10)	Jun-11
econdary Standards	ID.	Check Date (in house)	Scheduled Check
ower sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-09)	In house check: Oct-11
F generator R&S SMT-06	100008	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
etwork Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-10)	in house check: Oct-11
	Name	Function	Signature
Calibrated by:	Dimce likey	Laboratory Technician	THE RESERVE TO SERVE THE PARTY.
	62250	gradult - gradulterfell	Drie
approved by:	Katja Poković	Technical Manager	Leks

Certificate No: D1800V2-2d020_Jan11

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∷ BlackBerry Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR 91(143) Report Rev 2 Author Data Dates of Test Test Report No FCC ID: L6ARFL110LW Andrew Becker Nov 22, 2012 – Feb 28, 2013 RTS-6026-1303-02 2503A-RFL110LW Dec. 10-12, 2014 Rev 3 L6ARFP120LW 2503A-RFP120LW

Calibration Laboratory of Schmid & Partner

Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland





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

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 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:

- 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.

Certificate No: D1800V2-2d020_Jan11	Page 2 of 6	

≅ BlackBerry	Appendix D for the BlackB Report Rev 2	erry® Smartphone Mo	odel RFP121LW SAR	Page 92 (143)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	, , ,	RTS-6026-1303-02		2503A-RFL110LW
	Dec. 10-12, 2014	Rev 3	L6ARFP120LW	2503A-RFP120LW

Measurement Conditions

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

DASY Version	DASY5	V52.6
Extrapolation	Advanced Extrapolation	1,717,100
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm with Space	
Zoom Scan Resolution	dx, dy, dz = 5 mm	15-15
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	38.6 ± 6 %	1.38 mho/m ± 6 %
Head TSL temperature during test	(21.3 ± 0.2) °C		

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.78 mW / g
SAR normalized	normalized to 1W	39.1 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	39.2 mW /g ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.13 mW / g
SAR normalized	normalized to 1W	20.5 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	20.5 mW /g ± 16.5 % (k=2)

Certificate No: D1800V2-2d020_Jan11

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≅BlackBerry	Appendix D for the BlackBe Report Rev 2	erry® Smartphone Mo	odel RFP121LW SAR	Page 93(143)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	46.5 Ω - 7.3 μΩ
Return Loss	-21.5 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.

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_Jan11

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*** BlackBerry	Appendix D for the Black Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW

DASY5 Validation Report for Head TSL

Date/Time: 13.01.2011 12:34:12

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: CW; Frequency: 1800 MHz; Duty Cycle: 1:1

Medium: HSL U12 BB

Medium parameters used: f = 1800 MHz; $\sigma = 1.38 \text{ mho/m}$; $\epsilon_r = 38.7$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: ES3DV3 SN3205; ConvF(5.05, 5.05, 5.05); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- Measurement SW: DASY52, V52.6.1 Build (408)
- Postprocessing SW: SEMCAD X, V14.4.2 Build (2595)

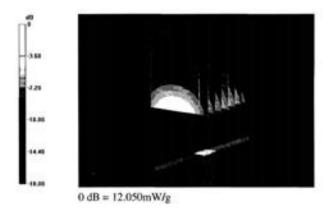
Pin=250 mW /d=10mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0: Measurement

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

Reference Value = 96.654 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 17.902 W/kg

SAR(1 g) = 9.78 mW/g; SAR(10 g) = 5.13 mW/gMaximum value of SAR (measured) = 12.051 mW/g

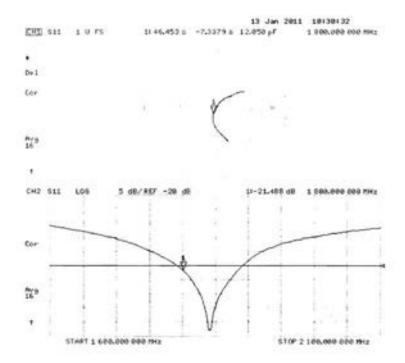


Certificate No: D1800V2-2d020_Jan11

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≅BlackBerry	Appendix D for the BlackBo Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	,	RTS-6026-1303-02		2503A-RFL110LW
	Dec. 10-12, 2014	Rev 3	L6ARFP120LW	2503A-RFP120LW

Impedance Measurement Plot for Head TSL



Certificate No: D1800V2-2d020_Jan11

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≅BlackBerry	Appendix D for the BlackBe Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW

Calibration Laboratory of Schmid & Partner Engineering AG Zeughausstrasse 43, 6004 Zurich, Switzerland





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

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RTS (RIM Testing Services)

Accreditation No.: SCS 108

Certificate No: D1800V2-2d020_Jan13 CALIBRATION CERTIFICATE Object D1800V2 - SN: 2d020 Calibration procedure(s) QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz Calibration date: January 09, 2013 This calibration certificate documents the traceability to national standards, which resize the physical units of measurements (5): 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 s 3)°C and frumidity < 70%. Calibration Equipment used (M&TE critical for calibration) ID# Primary Standards Cal Date (Certificate No.) Scheduled Calibration Power meter EPM-442A GB37480704 01-Nov-12 (No. 217-01640) Power sensor HP 8481A US37292783 01-Nov-12 (No. 217-01640) Oct-13 Reference 20 dB Attenuator SN: 5058 (20k) 27-Mar-12 (No. 217-01530) Apr-13 Type-N mismatch combination SN: 5047.3 / 06327 27-Mar-12 (No. 217-01533) Apr-13 SN: 3205 28-Dec-12 (No. ES3-3205_Dec12) Reference Probe ES3DV3 Dec-13 DAE4 SN: 601 27-Jun-12 (No. DAE4-601_Jun12) Secondary Standards ID # Check Date (in house) Scheduled Check Power sensor HP 8481A MY41092917 18-Oct-02 (in house check Oct-11) In house check: Oct-13 RF generator R&S SMT-06 100005 04-Aug-99 (in house check Oct-11) In house check: Oct-13 Network Analyzer HP 8753E US37390585 84206 18-Oct-01 (in house check Oct-12) In house check: Oct-13 Function Calibrated by: Israe El-Naoug Laboratory Technician Approved by: **Technical Manager** Issued: January 9, 2013 This calibration cartificate shall not be reproduced except in full without written approval of the laboratory

Certificate No: D1800V2-2d020_Jan13

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≅BlackBerry	Appendix D for the BlackBo Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW

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





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S Swiss Calibration Service

Accreditation No.: SCS 108

Accredited by the Swiss Accreditation Service (SAS)

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

Glossary:

TSL tissue simulating liquid

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

Calibration is Performed According to the Following Standards:

- 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
- 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: D1800V2-2d020_Jan13

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≅BlackBerry	Appendix D for the BlackBe Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW

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 - 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.

The second second	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.9 ± 6 %	1.38 mha/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	4444	

SAR result with Head TSL

SAR averaged over 1 cm ³ (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 ² (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 ± 16.5 % (k=2)

≅BlackBerry	Appendix D for the BlackBe Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	46.2 Ω - 8.3 jΩ	
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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≅BlackBerry	Appendix D for the BlackBe Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		Page 100(143)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW

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)

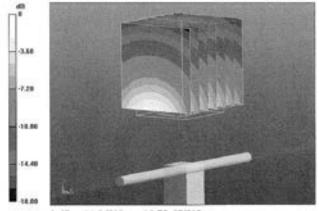
DASY52 Configuration:

- 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

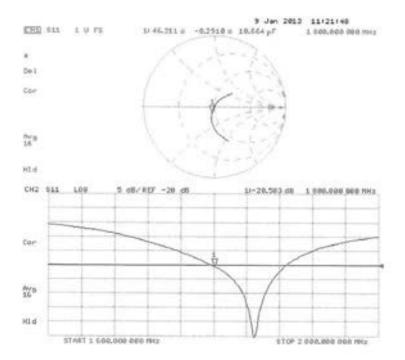
Maximum value of SAR (measured) = 11.8 W/kg



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

≅BlackBerry	Appendix D for the BlackBo Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		Page 101(143)
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	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3		2503A-RFL110LW 2503A-RFP120LW

Impedance Measurement Plot for Head TSL



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Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW

∷ BlackBerry Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR 103(143) Report Rev 2 Test Report No Author Data Dates of Test FCC ID: **Andrew Becker** Nov 22, 2012 – Feb 28, 2013 RTS-6026-1303-02 L6ARFL110LW 2503A-RFL110LW Dec. 10-12, 2014 L6ARFP120LW Rev 3 2503A-RFP120LW

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





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

Accreditation No.: SCS 108

Multilateral Agreement for the recognition of calibration certificates

Client RTS (RIM Testing Services)

Certificate No: D1900V2-545 Jan11

Calibration procedure(s) Calibration procedure for dipole validation kits Calibration procedure for dipole validation kits Calibration date: January 13, 2011 This calibration certificate documents the traceability to national standards, which resilize the physical units of measurements. The measurements and the uncertainties with confidence probability are given on the following pages and are part of the cert. All calibrations have been conducted in the closed laboratory facility: emironment temperature (22 ± 3)°C and humidity < 70°. Calibration Equipment used (M&TE critical for calibration) Primary Standards D # Cal Date (Certificate No.) Scheduled Continue to the property of the certificate (22 ± 3)°C and humidity < 70°. Calibration Equipment used (M&TE critical for calibration) Primary Standards D # Cal Date (Certificate No.) Scheduled Continue to the certificate (22 ± 3)°C and humidity < 70°. Calibration Equipment used (M&TE critical for calibration) Primary Standards D # Cal Date (Certificate No.) Scheduled Continue to the certificate (22 ± 3)°C and humidity < 70°. Cal Date (Certificate No.) Scheduled Continue to the certificate (22 ± 3)°C and humidity < 70°. Cal Date (Certificate No.) Scheduled Continue to the certificate (22 ± 3)°C and humidity < 70°. Cal Date (Certificate No.) Scheduled Continue to the certificate (22 ± 3)°C and humidity < 70°. Cal Date (Certificate No.) Scheduled Continue to the certificate (22 ± 3)°C and humidity < 70°. Cal Date (Certificate No.) Scheduled Continue to the certificate (22 ± 3)°C and humidity < 70°. Cal Date (Certificate No.) Scheduled Continue to the certificate (22 ± 3)°C and humidity < 70°. Cal Date (Certificate No.) Scheduled Continue to the certificate (22 ± 3)°C and humidity < 70°. Cal Date (Certificate No.) Scheduled Continue to the certificate (22 ± 3)°C and humidity < 70°. Cal Date (Certificate No.) Scheduled Continue to the certificate (22 ± 3)°C and humidity < 70°. Cal Date (Certificate No.) Scheduled Continue to the certificate (22 ±	841
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Certificate No: D1900V2-545_Jan11

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≅BlackBerry	Appendix D for the BlackBe Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		Page 104(143)
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Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW

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





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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 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.

	26.11 SECSECTION.	
Certificate No: D1900V2-545_Jan11	Page 2 of 6	

≅BlackBerry	Appendix D for the BlackBo Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		Page 105(143)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW

Measurement Conditions

DASY Version	DASY5	V52.6
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 tollowing parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.5 ± 6 %	1.43 mho/m ± 6 %
Head TSL temperature during test	(21.2 ± 0.2) °C	-	

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	10.2 mW / g
SAR normalized	normalized to 1W	40.8 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	40.0 mW /g ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.26 mW / g
SAR normalized	normalized to 1W	21.0 mW / g
SAR for nominal Head TSL parameters	nomalized to 1W	20.8 mW/g ± 16.5 % (k=2)

Certificate No: D1900V2-545_Jan11

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**** BlackBerry	Appendix D for the BlackBo Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	50.8 Ω + 1.8 jΩ		
Return Loss	- 34.4 dB		

General Antenna Parameters and Design

1.199 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.

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

Additional EUT Data

Manufactured by	SPEAG		
Manufactured on	November 15, 2001		

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*** BlackBerry	Appendix D for the Black Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22, 2012 – Feb 28, 2011 Dec. 10-12, 2014	3 RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW

DASY5 Validation Report for Head TSL.

Date/Time: 13.01.2011 14:52:49

Test Laboratory: SPEAG, Zurich, Switzerland

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

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

Medium: HSL U12 BB

Medium parameters used: f = 1900 MHz; $\sigma = 1.43 \text{ mho/m}$; $\varepsilon_c = 38.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

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

DASY5 Configuration:

Probe: ES3DV3 - SN3205; ConvF(5.09, 5.09, 5.09); Calibrated: 30.04.2010

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn601; Calibrated: 10.06.2010

Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001

Measurement SW: DASY52, V52.6.1 Build (408)

Postprocessing SW: SEMCAD X, V14.4.2 Build (2595)

Pin=250 mW /d=10mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0: Measurement

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

Reference Value = 98.053 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 18.648 W/kg

SAR(1 g) = 10.2 mW/g; SAR(10 g) = 5.26 mW/gMaximum value of SAR (measured) = 12.743 mW/g

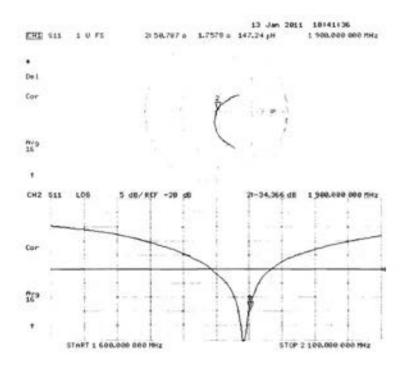


Certificate No: D1900V2-545_Jan11

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≅ BlackBerry	Appendix D for the Black Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22, 2012 – Feb 28, 2013	RTS-6026-1303-02	L6ARFL110LW	2503A-RFL110LW
	Dec. 10-12, 2014	Rev 3	L6ARFP120LW	2503A-RFP120LW

Impedance Measurement Plot for Head TSL



≅BlackBerry				Page 109(143)	
Author Data	Da	ites of Test	Test Report No	FCC ID:	IC
Andrew Becker		,			2503A-RFL110LW
	עו	ec. 10-12, 2014	Rev 3	L6ARFP120LW	2503A-RFP120LW

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





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

Client RTS (RIM Testing Services)

Certificate No: D1900V2-545_Jan13

Accreditation No.: SCS 108

Object	D1900V2 - SN: 5	45	
Calibration procedure(s)	QA CAL-05.v9 Calibration proce	dure for dipole validation kits abo	ove 700 MHz
Calibration date:	January 09, 2013	parents of per-	
		onal standards, which realize the physical un robability are given on the following pages ar	
All culibrations have been condu	cted in the closed laborato	ry facility: environment temperature (22 ± 31"	C and humidity < 70%.
		ry facility: environment temperature (22 ± 3)*	C and humidity < 70%.
		ry facility: environment temperature (22 ± 31°	C and humidity < 70%.
Calibration Equipment used (M8 Primary Standards	TE critical for calibration)	Cal Date (Certificate No.)	Scheduled Calibration
Calibration Equipment used (M6 Primary Standards Power meter EPM-442A	TE critical for calibration) ID # GB37480704	Cal Date (Certificate No.) 01-Nov-12 (No. 217-01640)	Scheduled Calibration Oct-13
Calibration Equipment used (M6 Primary Standards Power meter EPM-442A Power sensor HP 8481A	TE critical for calibration) ID # G837480704 US37292783	Cal Date (Certificate No.) 01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640)	Scheduled Calibration Oct-13 Oct-13
Calibration Equipment used (M8 Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator	TE critical for calibration) ID # GB37480704 US37292783 SN: 5058 (204)	Cal Date (Certificate No.) 01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01530)	Scheduled Calibration Oct-13 Apr-13
Calibration Equipment used (M8 Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type N mismatch combination	TE critical for calibration) ID # GB37480704 US37292783 SN: 5058 (90k) SN: 5047.3 / 06327	Cal Date (Certificate No.) 01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01530) 27-Mar-12 (No. 217-01533)	Scheduled Calibration Oct-13 Oct-13 Apr-13 Apr-13
Calibration Equipment used (M8 Primary Standards Power meter EPM-442A Power sensor 14P 8481A Reference 20 dB Attenuator Type N mismatch combination Reference Probe ES3DV3	TE critical for calibration) ID # GB37480704 US37292783 SN: 5058 (204)	Cal Date (Certificate No.) 01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01530) 27-Mar-12 (No. 217-01533) 28-Dec-12 (No. ES3-2205, Dec12)	Scheduled Calibration Oct-13 Apr-13
Calibration Equipment used (M8 Primary Standards Power meter EPM-442A Power sensor HP 8481A Perference 20 dB Attenuator Type N mismatch combination Beforence Probe ESQDV3 DAE4	TE critical for calibration) ID # GB37480704 U537292783 SN: 5058 (20k) SN: 5047-3 / 06327 SN: 3005 SN: 601	Cal Date (Certificate No.) 01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01530) 27-Mar-12 (No. 217-01533) 28-Dec-12 (No. ES3-3205, Dec12) 27-Jun-12 (No. DAE4-601, Jun12)	Scheduled Calibration Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Jun-13
Calibration Equipment used (M6 Primary Standards Power meter EPM-442A Power sensor HP 8481A Pelerence 20 dB Attenuation Type N mismatch combination Reference Probe ES3DV3 CALL4 Secondary Standards	TE critical for calibration) ID # GB37480704 U537292783 SN: 5047.3 / 06327 SN: 3006 SN: 601	Cal Date (Certificate No.) 01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01530) 27-Mar-12 (No. 217-01530) 28-Dec-12 (No. ES3-2205, Dec12) 27-Jun-12 (No. DAE4-601, Jun12) Check Date (in Bouse)	Scheduled Calibration Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Check
Calibration Equipment used (M8 Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type N mismatch combination Reference Probe ES3DV3 DAE4 Secondary Standards Power sensor HP 8481A	TE critical for calibration) ID # GB37480704 US37292783 SN: 5058 (20k) SN: 5047.3 / 06327 SN: 3005 SN: 601 ID # MY41092317	Cal Date (Certificate No.) 01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01530) 27-Mar-12 (No. 217-01533) 28-Dec-12 (No. ES3-3205, Dec12) 27-Jun-12 (No. DAE4-601, Jun12) Check Date (in house check Oct-11)	Scheduled Calibration Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Check In house check: Oct-13
Calibration Equipment used (M8 Primary Standards Power meter EPM-442A Power sensor HP 8481A Pelerence 20 dB Attenuator Type-N mismatch combination Beforence Probe ESCIDV3 CAE4	TE critical for calibration) ID # GB37480704 U537292783 SN: 5047.3 / 06327 SN: 3006 SN: 601	Cal Date (Certificate No.) 01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01530) 27-Mar-12 (No. 217-01530) 28-Dec-12 (No. ES3-2205, Dec12) 27-Jun-12 (No. DAE4-601, Jun12) Check Date (in Bouse)	Scheduled Calibration Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Check
Calibration Equipment used (M8 Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 d8 Abenuator Type N mismatch combination Reference Probe ES3DV3 DAL4 Secondary Standards Power sensor HP 8481A RF generator R&S SMT-06	TE critical for calibration) ID # GB37480704 US37292783 SN: 5058 (20k) SN: 5047 3 / 06327 SN: 3006 SN: 601 ID # MY41092317 100006	Cal Date (Certificate No.) 01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01530) 27-Mar-12 (No. 217-01533) 28-Dec-12 (No. ES3-3205, Dec12) 27-Jun-12 (No. DAE4-601, Jun12) Check Date (in flourie) 18-Oct-02 (in flourie) 18-Oct-02 (in flourie)	Scheduled Calibration Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Check In house check: Oct-13 In house check: Oct-13
Calibration Equipment used (M8 Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 d8 Abenuator Type N mismatch combination Reference Probe ES3DV3 DAL4 Secondary Standards Power sensor HP 8481A RF generator R&S SMT-06	TE critical for calibration) ID # GB37480704 US37292783 SN: 5058 (20k) SN: 5047 3 / 06327 SN: 3006 SN: 601 ID # MY41092317 100006	Cal Date (Certificate No.) 01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01530) 27-Mar-12 (No. 217-01533) 28-Dec-12 (No. ES3-3205, Dec12) 27-Jun-12 (No. DAE4-601, Jun12) Check Date (in flourie) 18-Oct-02 (in flourie) 18-Oct-02 (in flourie)	Scheduled Calibration Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Check In house check: Oct-13 In house check: Oct-13
Calibration Equipment used (M8 Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 d8 Abenuator Type N mismatch combination Reference Probe ES3DV3 DAL4 Secondary Standards Power sensor HP 8481A RF generator R&S SMT-06	TE critical for calibration) ID # GB37480704 US37292783 SN: 5058 (20k) SN: 5047 3 / 06327 SN: 2005 SN: 601 ID # MY41092317 100005 US37390685 S4206	Cal Date (Certificate No.) 01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01530) 27-Mar-12 (No. 217-01533) 28-Dec-12 (No. ES3-3205_Dec12) 27-Jun-12 (No. DAE4-601_Jun12) Check Date (in house) 18-Oct-07 (in house check Oct-11) 04-Aug-99 (in house check Oct-12)	Scheduled Calibration Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Check In house check: Oct-13 In house check: Oct-13 In house check: Oct-13

Certificate No: D1900V2-545_Jan13

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





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Accreditation No.: SCS 108

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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:

- 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: D1900V2-545_Jan13

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Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW

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 - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.4 ± 6 %	1.38 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	****	-

SAR result with Head TSL

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

SAR averaged over 10 cm ² (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.26 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	21.1 W/kg = 16.5 % (k=2)

Certificate No: D1900V2-545_Jan13

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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 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 DG-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: D1900V2-545_Jan13

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≅BlackBerry	Appendix D for the BlackBo Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR			
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Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW	

DASY5 Validation Report for Head TSL

Date: 09.01.2013

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: CW; Frequency: 1900 MHz

Medium parameters used: f = 1900 MHz; $\sigma = 1.38 \text{ S/m}$; $\epsilon_r = 39.4$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

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

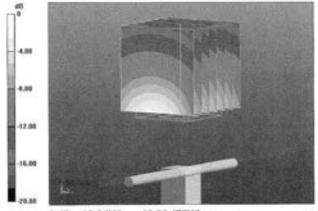
DASY52 Configuration:

- Probe: ES3DV3 SN3205; ConvF(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

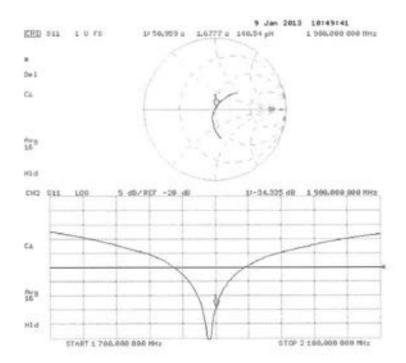
Maximum value of SAR (measured) = 12.2 W/kg



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

≅BlackBerry	Appendix D for the BlackBo Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	, , , , , , , , , , , , , , , , , , , ,	RTS-6026-1303-02		2503A-RFL110LW
	Dec. 10-12, 2014	Rev 3	L6ARFP120LW	2503A-RFP120LW

Impedance Measurement Plot for Head TSL



Certificate No: D1900V2-545_Jan13

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Andrew Becker	N	Nov 22, 2012 – Feb 28, 2013	RTS-6026-1303-02	L6ARFL110LW	2503A-RFL110LW
	Γ	Dec. 10-12, 2014	Rev 3	L6ARFP120LW	2503A-RFP120LW

≅ BlackBerry Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR 116(143) Report Rev 2 Test Report No Author Data Dates of Test FCC ID: **Andrew Becker** Nov 22, 2012 – Feb 28, 2013 RTS-6026-1303-02 L6ARFL110LW 2503A-RFL110LW Dec. 10-12, 2014 L6ARFP120LW Rev 3 2503A-RFP120LW

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





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According by the Swiss Accordinator Service (SAS)
The Swiss Accordination Service is one of the signaturies to the EA
Multilyteral Agreement for the recognition of calibration certificates

Client RTS (RIM Testing Services)

Accreditation No.: SCS 108

ting Services) Certificate No: D1900V2-5d075_Apr11

Citiject	D1900V2 - SN: 5	d075	
Calibration procedure(x)	QA CAL-05.v8 Calibration proce	dure for dipole validation kits	
Corbration date	April 5, 2011		
	College Control Spring Science (College Control	onel standards, which resilize the physical s robability are given on the linkowing pages it	
All culibrations have been conduc	rted in the closed laborator	y facility: environment temperature (22 e 3)	°C and humidity < 70%.
Calibration Equipment used (M&)	TE ortical for cathyabon:		
Primary Standards	0.	Cal Date (Ostificate No.)	Scheduled Calibration
		Call Date (Cortificate No.) 06-Oct-16 (No. 217-01266)	Scheduled Calibration Oct-11
Power motor EPM-442A	01		
Power meter EPM-442A Power sensor HP 8461A	ID # G007480704	06-Oct-16 (No. 217-01266)	Oct-11
Power moter EPM-442A Power sensor HP 8461A Pelenence 20 dB Attenuator	ID # G807480704 US37292783	06-Oct-10 (No. 217-01286) 08-Oct-10 (No. 217-01286)	Oct-11 Oct-11
Power mater EPM-442A Power sensor HP 8481A Poloninos 20 dB Alternator Type N mismatch combination	ID # G2037480794 US37292783 SN: 5096 (20g)	06-Oct-16 (No. 217-01266) 06-Oct-10 (No. 217-01266) 29-Mar-11 (No. 217-01368)	Oct-11 Oct-11 Apr-12
Power mater EPM-442A Power sensor HP 8461A Polenence 20 dB Attenuator Type-N mismatch combination Reterance Probe ES30V3	ID # G807480794 US37292783 SN: 5086 (20g) SN: 5047 2 / 06027	06-Oct-10 (No. 217-01266 00 Oct-10 (No. 217-01266 29 Mar 11 (No. 217-01266) 29 Mar-11 (No. 217-01271)	Oct-11 Oct-11 Apr-12 Apr-12
Power moner EPM-442A Power sensor HP 5461A Polennice 20 dd Attanuator Type N mismatch combination Pulletanico Probe ES30V3 DAE4	ID # G807480794 US:37292783 SN: 5086 (20g) SN: 5047 2 / 08027 SN: 3056	06-Oct-10 (No. 217-01266) 00 Oct-10 (No. 217-01266) 29 Mar-11 (No. 217-01266) 29 Mar-11 (No. 217-01271) 30 Apr-10 (No. ESS-3006, Aprilli)	Oct-11 Oct-11 Apr-12 Apr-12 Apr-11
Primary Standards Power sensor HP 8481A Policininos 20 88 Attenuator Type N mismatch combination Pulsinance Probe ES30V3 DAS4 Secondary Standards Power sensor HP 8481A	ID # G807480794 US37292783 SN: 5086 (20g) SN: 5047 2 / 06027 SN: 5006 SN: 601	06-Oct-10 (No. 217-01286) 06-Oct-10 (No. 217-01286) 29-Mar-11 (No. 217-01381) 29-Mar-11 (No. 217-01371) 30-Apr-10 (No. ESS-3006, Aprill) 10-Aun-10 (No. DAE4-601, Junill)	Oct-11 Oct-11 Apr-12 Apr-12 Apr-11 Jun-11
Power moter EPM-442A Power sensor HP 8461A Polenance 20 dB Attenuator Type N mismatch combination Polenance Probe ES30V3 DA84 Secondary Standards Power sensor HP 8461A	ID # G807480704 US37292783 SN: 5086 (20g) SN: 5047 2 / 06027 SN: 5055 SN: 601	06-Oct-10 (No. 217-01286) 06-Oct-10 (No. 217-01286) 29-Mar-11 (No. 217-01388) 29-Mar-11 (No. 217-01371) 30-Apr-10 (No. ESS-3006_Apr10) 10-Aun-10 (No. DAE4-801_Auri10) Check Date (in house)	Oct-11 Oct-11 Apr-12 Apr-12 Apr-11 Jun-11 Scheduled Chick
Power meter EPM-442A Power sensor HP 8461A Pelenance 20 d8 Afternator Type-N mismatch combination Pulseance Probe ES30V3 DAE4 Secondary Standards	ID # G807480704 US37292783 SN: 5086 (20g) SN: 5047 2 / 06027 SN: 5055 SN: 601	06-Oct-10 (No. 217-01286) 06-Oct-10 (No. 217-01286) 29-Mar-11 (No. 217-01371) 30-Apr-10 (No. ES3-3006_Apr10) 10-Aun-10 (No. DAE4-801_Aun10) Check Date (in house check Clot-09)	Oct-11 Oct-11 Apr-12 Apr-12 Apr-12 Apr-11 Jun-11 Scheduled Check In house check: Oct-11
Power moter EPM-442A Power sensor HP 8481A Polenence 20 d8 Attenuator Type-N mismatch combination Polenence Probe ES30V3 DA64 Secondary Standards Power sensor HP 8461A RF generator RAS SMT-68	ID # G807480704 US37292783 SN: 5086 (20g) SN: 5047 2 / 08327 SN: 5055 SN: 601 ID # MY41092317 10005	06-Oct-10 (No. 217-01286) 06-Oct-10 (No. 217-01286) 29-Mar-11 (No. 217-01381) 29-Mar-11 (No. 217-01371) 30-Apr-10 (No. ESS-0006, Aprillo) 10-Jun-10 (No. DAE4-801, Jun-10) Check Date (in house check Oct-09) 4-Aug-99 (in house check Oct-09) 16-Oct-01 (in house check Oct-09) 16-Oct-01 (in house check Oct-09)	Oct-11 Oct-11 Age-12 Age-12 Age-12 Apr-11 Jun-11 Scheduled Check In thouse check: Oct-11 In house check: Oct-11 In house check: Oct-11
Power moter EPM-442A Power sensor HP 8461A Reference 20 dd Attanuator Fyse-N mismatch combination Reterance Probe ES30V3 DAE4 Secondary Standards Power tempor HP 8461A RF generator PAS SMT-08 Network Analyzor HP 8753E	ID # G007480794 US37292783 SN: 5086 (20g) SN: 5047 2 / 06027 SN: 5006 SN: 601 ID # Mn'41092317 1(0006 US37390045 54206	06-Oct-10 (No. 217-01286) 06-Oct-10 (No. 217-01286) 29-Mar-11 (No. 217-01381) 29-Mar-11 (No. 217-01371) 30-Apr-10 (No. 853-0006, Aprillo) 10-Aun-10 (No. 853-0006, Aprillo) Check Date (in house of Aunillo) Check Date (in house check Oct-09) 4-Aug-99 (in house check Oct-09) 16-Oct-01 (in house check Oct-09) 16-Oct-01 (in house check Oct-10)	Oct-11 Oct-11 Age-12 Age-12 Age-12 Apr-11 Jun-11 Scheduled Check In thouse check: Oct-11 In house check: Oct-11 In house check: Oct-11
Power moter EPM-442A Power sensor HP 8481A Poleninos 20 d8 Attenuator Type-N mismatch combination Poleninos Probe ES30V3 DA64 Secondary Standards Power sensor HP 8461A RF generator PAS SMT-68	ID # G007480794 US37292783 SN: 5096 (20g) SN: 5047 2 / 06027 SN: 5096 SN: 601 ID # MY41092317 I(0005) US37390545 \$4206	06-Oct-10 (No. 217-01286) 06-Oct-10 (No. 217-01286) 29-Mar-11 (No. 217-01381) 29-Mar-11 (No. 217-01371) 30-Apr-10 (No. ESS-0006, Aprillo) 10-Jun-10 (No. DAE4-801, Jun-10) Check Date (in house check Oct-09) 4-Aug-99 (in house check Oct-09) 16-Oct-01 (in house check Oct-09) 16-Oct-01 (in house check Oct-09)	Oct-11 Oct-11 Age-12 Age-12 Age-12 Apr-11 Jun-11 Scheduled Check In thouse check: Oct-11 In house check: Oct-11 In house check: Oct-11
Power meter EPM-442A Power sensor HP 8461A Pelenance 20 dB Afternator Type-N mismatch combination Pelenance Probe ES30V3 DA64 Secondary Standards Power sensor HP 8461A RF generator PAS SMT-08 Network Analyzer HP 8753E	ID # G007480794 US37292783 SN: 5086 (20g) SN: 5047 2 / 06027 SN: 5006 SN: 601 ID # Mn'41092317 1(0006 US37390045 54206	06-Oct-10 (No. 217-01286) 06-Oct-10 (No. 217-01286) 29-Mar-11 (No. 217-01381) 29-Mar-11 (No. 217-01371) 30-Apr-10 (No. 853-0006, Aprillo) 10-Aun-10 (No. 853-0006, Aprillo) Check Date (in house of Aunillo) Check Date (in house check Oct-09) 4-Aug-99 (in house check Oct-09) 16-Oct-01 (in house check Oct-09) 16-Oct-01 (in house check Oct-10)	Oct-11 Oct-11 Apr-12 Apr-12 Apr-11 Jun-11 Scheduled Check In house check: Oct-11 In house check: Oct-11 In house check: Oct-11

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**** BlackBerry	Appendix D for the BlackBe Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW

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





Schweigerischer Keilbrierdienst Service sulsse d'étalonnage C Servizio svizzero di tareture **Swies Calibration Service**

Accreditation No.: SCS 108

Accredited by the Swiss Accreditation Service (SAS)

The Swise Accreditation Service is one of the eignatories to the EA Multileteral Agreement for the recognition of calibration certificates

Glossary:

tissue simulating liquid TSL

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

d) DASY4/5 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.

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≅BlackBerry	Appendix D for the BlackBe Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		
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Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW

Measurement Conditions

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

DASY Version	DASY5	V52.6.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	1779-14
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz ± 1 MHz	

Head TSL parameters
The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.8 ± 6 %	1.41 mho/m ± 6 %
Head TSL temperature during test	(21.3 ± 0.2) °C	****	****

SAR result with Head TSL

SAR averaged over 1 cm ² (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	10.2 mW / g
SAR normalized	normalized to 1W	40.8 mW / g
SAR for nominal Head TSL parameters	normelized to 1W	49.4 mW/g ± 17.0 % (k=2)

SAR averaged over 10 cm ² (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.29 mW / g
SAR normalized	normalized to 1W	21.2 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	21.0 mW/g ± 16.5 % (k=2)

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≅BlackBerry	Appendix D for the BlackBo Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW

Appendix

Antenna Parameters with Head TSL

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

General Antenna Parameters and Design

· Transport and it is a second a	
Electrical Delay (one direction)	1.197 ns

After long ferm 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 america 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, 2006	

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≅BlackBerry	Appendix D for the BlackBo Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3		2503A-RFL110LW 2503A-RFP120LW

DASY5 Validation Report for Head TSL

Date/Time: 05.04:2011 12:41:39

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; $\sigma = 1.41 \text{ mho/m}$; $\epsilon_r = 39$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: ES3DV3 SN3205; Conv8(5.09, 5.09, 5.09); Calibrated, 30:04,3010
- Sensor-Surface: Junn (Mochanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10:06.2010
- Phanton: Flut Phantom 5.0 (front); Type: QD000P50AA: Senal: 1001
- Measurement SW: DASY52, V52.6.2 Build (424)
- Postprocessing SW: SEMCAD X, V14.4.4 Build (2829)

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

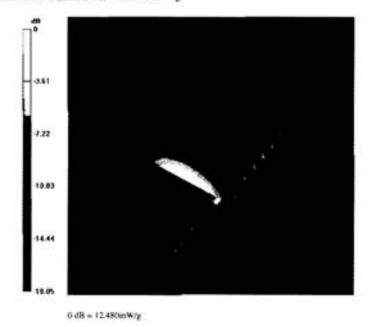
Measurement grid: dx=5mm, dy=5mm, dz=5mm

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/g

Maximum value of SAR (measured) = 12.476 mW/g

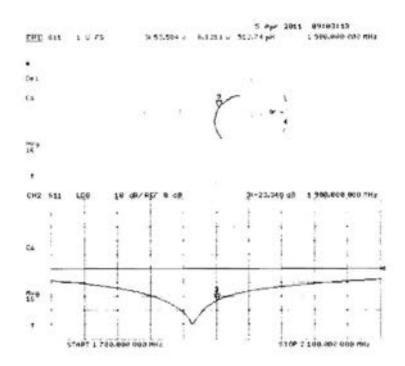


Certificate No: D1900V2-5d075_Apr11

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≅BlackBerry	Appendix D for the BlackB Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR			
Author Data	Dates of Test	Test Report No	FCC ID:	IC	
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Impedance Measurement Plot for Head TSL



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Andrew Becker		,	RTS-6026-1303-02		2503A-RFL110LW
	Dec	c. 10-12, 2014	Rev 3	L6ARFP120LW	2503A-RFP120LW

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





Schweizerischer Kalibrierdienst Service sulsse d'étalonnage Servizio svizzero di taratura Swiss Calibration Service

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

Accreditation No.: SCS 108

Client RTS (RIM Testing Services)

Certificate No: D2450V2-747_Nov11

	CERTIFICATE		CONTRACTOR AND ASSESSMENT OF THE
Object	D2450V2 - SN: 7	47 ST ST ST ST ST ST	All Colors of the
Calibration procedure(s)	QA CAL-05.v8 Calibration proce	dure for dipole validation kits abo	ove 700 MHz
Calibration date:	November 09, 20		MAN WEST AND A
The measurements and the unco	etainties with confidence p	onal standards, which realize the physical un robability are given on the following pages an sy facility: environment temperature (22 x 3)*	nd are part of the certificate.
All calibrations have been condu	cted in the closed laborator	y faciny: environment temperature (22 x 3) 1	G and humidity < 70%.
Calibration Equipment used (M&	TE critical for calibration)		
	Acres -	Cal Data (Cartificate No.)	Schaduled Calibration
Yimary Standards	10+	Car Date (Certificate No.)	Scheduled Calibration
Yimary Standards Yower meter EPM-442A	ID # G837480704	05-Oct-11 (No. 217-01451)	Oct-12
Yimary Standards Yower meter EPM-442A Yower sensor HIP 6481A	10 # G837480704 US37292783	05-Oct-11 (No. 217-01451) 05-Oct-11 (No. 217-01451)	Oct-12 Oct-12
Primary Standards Power meter EPM-642A Power sensor HIP 8481A Reference 20 dB Attenuator	ID # G837480704 US37292783 SN: 5086 (20g)	05-Oct-11 (No. 217-01451) 05-Oct-11 (No. 217-01451) 29-Mar-11 (No. 217-01368)	Oct-12 Oct-12 Apr-12
Primary Standards Power meter EPM-642A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination	ID # G837480704 US37292783 SN: 5086 (20g) SN: 5047 2 / 06327	05-Oct-11 (No. 217-01461) 05-Oct-11 (No. 217-01451) 29-Mar-11 (No. 217-01368) 29-Mar-11 (No. 217-01371)	Oct-12 Oct-12 Apr-12 Apr-12
Primary Standards Power mater EPM-642A Power sensor HP 6481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3	ID # G837480704 US37292783 SN: 5086 (20g)	05-Oct-11 (No. 217-01451) 05-Oct-11 (No. 217-01451) 29-Mar-11 (No. 217-01368)	Oct-12 Oct-12 Apr-12
Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES30V3 DAE4	ID # G837480704 US37292783 SN: 5086 (20g) SN: 5047 2 / 06327 SN: 3205	05-Oct-11 (No. 217-01461) 05-Oct-11 (No. 217-01451) 29-Mar-11 (No. 217-01368) 29-Mar-11 (No. 217-01371) 29-Apr-11 (No. ES3-3205,Apr11)	Oct-12 Oct-12 Apr-12 Apr-12 Apr-12
Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Eype-N mismatch combination Reference Probe ES3DV3 DAE4 Secondary Standards	ID # G837480704 US37292783 SN: 5086 (20g) SN: 5047.2 / 06327 SN: 3206 SN: 601	05-Oct-11 (No. 217-01451) 05-Oct-11 (No. 217-01451) 29-Mar-11 (No. 217-01368) 29-Mar-11 (No. 217-01371) 29-Apr-11 (No. ES3-3205, Apr11) 04-Jul-11 (No. DAE4-601_Jul-11)	Oct-12 Oct-12 Apr-12 Apr-12 Apr-12 Apr-12 Aut-12
Primary Standards Power meter EPM-642A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3 DAE4 Secondary Standards Power sensor HP 8481A	ID # G837480704 US37292783 SN: 5086 (20g) SN: 5047.2 / 06327 SN: 3205 SN: 601	05-Oct-11 (No. 217-01451) 05-Oct-11 (No. 217-01451) 29-Mar-11 (No. 217-01368) 29-Mar-11 (No. 217-01371) 29-Apr-11 (No. ESS-3205, Apr11) 04-Jul-11 (No. DAE4-601_Jul-11) Check Date (in house)	Oct-12 Oct-12 Apr-12 Apr-12 Apr-12 Jul-12 Scheduled Check
Primary Standards Power senecr HP 8481.A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3 DAE4 Secondary Standards Power sensor HP 8481.A RF generator R&S SMT-06	ID # G837480704 US37292783 SN: 5086 (20g) SN: 5047.2 / 06327 SN: 3205 SN: 601 ID # MY41092317	05-Oct-11 (No. 217-01451) 05-Oct-11 (No. 217-01451) 29-Mar-11 (No. 217-01368) 29-Mar-11 (No. 217-01371) 29-Apr-11 (No. ESS-3205_Apr11) 04-Jul-11 (No. DAE4-601_Jul-11) Check Date (in house) 18-Oct-02 (in house check Oct-11)	Oct-12 Oct-12 Apr-12 Apr-12 Apr-12 Jul-12 Scheduled Check In house check: Oct-13
Calibration Elquipment used (MA Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES30V3 DAE4 Secondary Standards Power sensor HP 8481A RF generator R&S SMT-06 Network Analyzer HP 8753E	ID # GB37480704 US37292783 SN: 5086 (20g) SN: 5047 2 / 06327 SN: 3005 SN: 601 ID # MY41092317 100005 US37390585 S4206	05-Oct-11 (No. 217-01451) 05-Oct-11 (No. 217-01451) 29-Mar-11 (No. 217-01368) 29-Mar-11 (No. 217-01371) 29-Apr-11 (No. E53-3205_Apr11) 04-Jul-11 (No. DAE4-601_Jul-11) Check Date (in house) 18-Oct-02 (in house check Oct-11) 04-Aug-99 (in house check Oct-11) 18-Oct-01 (in house check Oct-11)	Oct-12 Oct-12 Apr-12 Apr-12 Apr-12 Apr-12 Jul-12 Scheduled Check In house check: Oct-13 In house check: Oct-13
Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20:08 Abenuator Type-N mismatch combination Reference Probe ES3DV3 DAE4 Secondary Standards Power sensor HP 8481A RP generator R&S SMT-06 Network Analyzer HP 8753E	ID # G837480704 US37292783 SN: 5086 (20g) SN: 5047 2 / 06327 SN: 3205 SN: 601 ID # MY41092317 100005	05-Oct-11 (No. 217-01451) 05-Oct-11 (No. 217-01451) 29-Mar-11 (No. 217-01368) 29-Mar-11 (No. 217-01371) 29-Apr-11 (No. ESS-3205_Apr11) 04-Jul-11 (No. DAE4-601_Jul-11) Check Date (in house check Oct-11) 04-Aug-99 (in house check Oct-11)	Oct-12 Oct-12 Apr-12 Apr-12 Apr-12 Apr-12 Jul-12 Scheduled Check In house check: Oct-13 In house check: Oct-13
Primary Standards Power meter EPM-442A Power senecr HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3 DAE4 Secondary Standards Power sensor HP 8481A RF generator R&S SMT-06	ID # G837480704 US37292783 SN: 5086 (20g) SN: 5047 2 / 06327 SN: 3206 SN: 601 ID # MY41092317 100005 US37390585 \$4206	05-Oct-11 (No. 217-01451) 05-Oct-11 (No. 217-01451) 29-Mar-11 (No. 217-01368) 29-Mar-11 (No. 217-01371) 29-Apr-11 (No. ES3-3205_Apr11) 04-Jul-11 (No. DAE4-601_Jul-11) Check Date (in house) 18-Oct-02 (in house check Oct-11) 04-Aug-99 (in house check Oct-11) 18-Oct-01 (in house check Oct-11)	Oct-12 Oct-12 Apr-12 Apr-12 Apr-12 Apr-12 Jul-12 Scheduled Check In house check: Oct-13 In house check: Oct-13

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Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW

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





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

Accreditation No.: SCS 108

Accredited by the Swiss Accreditation Service (SAS)

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

Glossary:

TSL tissue simulating liquid

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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≅BlackBerry	Appendix D for the BlackBe Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW

Measurement Conditions

DASY Version	DASY5	V52.6.2
Extrapolation	Advanced Extrapolation	100
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters
The following parameters and calculations were applied:

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	37.7 ± 6 %	1.84 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	****	****

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.8 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	54.1 mW /g ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.39 mW/g
SAR for nominal Head TSL parameters	normalized to 1W	25.3 mW/g ± 16.5 % (k=2)

≅BlackBerry	Appendix D for the BlackBo Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.5 Ω + 1.3 JΩ
Return Loss	- 31.2 dB

General Antenna Parameters and Design

Control of the Contro	THE STATE OF THE S
Electrical Delay (one direction)	1.161 ns
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After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	December 01, 2003

Certificate No: D2450V2-747_Nov11

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≅BlackBerry	Appendix D for the BlackBo Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3		2503A-RFL110LW 2503A-RFP120LW

DASY5 Validation Report for Head TSL

Date: 09.11.2011

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: CW; Frequency: 2450 MHz

Medium parameters used: f = 2450 MHz; $\sigma = 1.84 \text{ mho/m}$; $\epsilon_r = 37.7$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

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

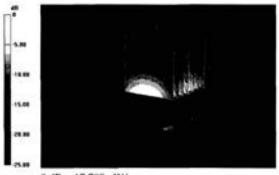
DASY52 Configuration:

- Probe: ES3DV3 SN3205; ConvF(4.45, 4.45, 4.45); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

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 = 102.1 V/m; Power Drift = 0.04 dB Peak SAR (extrapolated) = 28.853 W/kg SAR(10.0) = 13.8 mW/m; SAR(10.0) = 6.39 mW/m

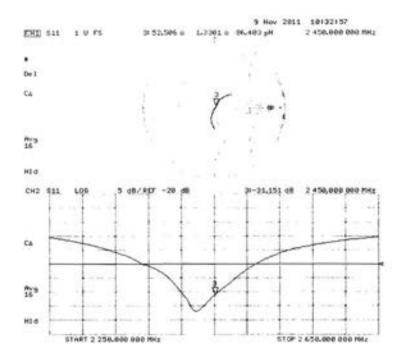
SAR(1 g) = 13.8 mW/g; SAR(10 g) = 6.39 mW/gMaximum value of SAR (measured) = 17.782 mW/g



0 dB = 17.780 mW/g

≅ BlackBerry	Appendix D for the Blackl Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		Page 127(143)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22, 2012 – Feb 28, 2013	RTS-6026-1303-02	L6ARFL110LW	2503A-RFL110LW
	Dec. 10-12, 2014	Rev 3	L6ARFP120LW	2503A-RFP120LW

Impedance Measurement Plot for Head TSL



Certificate No: D2450V2-747_Nov11

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≅BlackBerry	Appendix D for the BlackB Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22, 2012 – Feb 28, 2013	RTS-6026-1303-02	L6ARFL110LW	2503A-RFL110LW
Andrew Becker	Dec. 10-12, 2014	R1S-0020-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110L 2503A-RFP120L

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





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

Accredited by the Swiss Accreditation Service (SAS)

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

Multilateral Agreement for the recognition of calibration certificates

RTS (RIM Testing Services)

Certificate No: D5GHzV2-1033_Nov11

Accreditation No.: SCS 108

CALIBRATION CERTIFICATE D5GHzV2 - SN: 1033 - 11 (11/25/00 DEL) Object 6707° Calibration procedure(s) Calibration procedure for dipole validation kits between 3-6 GHz HARON PURE L-CHICKEN - introduction NAME OF PERSONS ASSESSED. November 15, 2011 Calibration date: This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (St). 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 x 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 05-Oct-11 (No. 217-01451) Oct-12 Power sensor HP 8481A US37292783 05-Oct-11 (No. 217-01451) Oct-12 Reference 20 dB Attenuator SN: 5086 (20g) 29-Mar-11 (No. 217-01368) April 2 Type-N mismatch combination SN: 5047.2 / 06027 29-Mar-11 (No. 217-01371) Apr-12 Reference Probe EX3DV4 SN: 3503 04-Mar-11 (No. EX3-3503_Mar11) Mar-12 DAE4 SN: 601 04-Jul-11 (No. DAE4-601_Jul11) Jul 12 ID# Secondary Standards Check Date (in house) Scheduled Check Power sensor HP 8481A MY41092317 16-Oct-02 (in house check Oct-11) In house check: Oct-13. RF generator R&S SMT-06 100005 04-Aug-99 (in house check Oct-11) In house check: Oct-13 Network Analyzer HP 8753E US37390585 S4206 18-Oct-01 (in house check Oct-11) In house check: Oct-12 Function Calibrated by: Technical Menager Katja Pokovio Approved by: Issued: November 16, 2011 This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Certificate No: D5GHzV2-1033_Nov11

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*** BlackBerry	Appendix D for the BlackBo Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW

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





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Accreditation No.: SCS 108

Accredited by the Swiss Accreditation Service (SAS).

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

Glossary:

TSL tissue simulating liquid

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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Certificate No: D5GHzV2-1033_Nov11	Page 2 of 8	

≅ BlackBerry	Appendix D for the BlackBe Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW

Measurement Conditions

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

DASY Version	DASY5	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 = 4.0 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	5200 MHz ± 1 MHz 5500 MHz ± 1 MHz 5800 MHz ± 1 MHz	

Head TSL parameters at 5200 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	36.0	4.66 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.6 ± 6 %	4.46 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C		-

SAR result with Head TSL at 5200 MHz

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.16 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	80.8 mW /g ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.33 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	23.0 mW /g ± 16.5 % (k=2)

Head TSL parameters at 5500 MHz

The following parameters and calculations were applied

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.6	4.96 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.2 ± 6 %	4.75 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C		

SAR result with Head TSL at 5500 MHz

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.82 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	87.3 mW / g ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.50 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	24.7 mW / g ± 16.5 % (k=2)

Certificate No: D5GHzV2-1033_Nov11

≅ BlackBerry	′	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report Rev 2			Page 131(143)
Author Data	D	ates of Test	Test Report No	FCC ID:	IC
Andrew Becker	N	Nov 22, 2012 – Feb 28, 2013	RTS-6026-1303-02	L6ARFL110LW	2503A-RFL110LW
	I	Dec. 10-12, 2014	Rev 3	L6ARFP120LW	2503A-RFP120LW

Head TSL parameters at 5800 MHz The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.3	5.27 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	33.7 ± 6 %	5.03 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C		

SAR result with Head TSL at 5800 MHz

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.03 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	79.4 mW / g ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.28 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	22.5 mW / g ± 16.5 % (k+2)

≅BlackBerry	Appendix D for the BlackBe Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW

Appendix

Antenna Parameters with Head TSL at 5200 MHz

Impedance, transformed to feed point	51.1 Ω - 8.7 Ω
Return Loss	-21.2 dB

Antenna Parameters with Head TSL at 5500 MHz

Impedance, transformed to feed point	52.3 Ω - 2.7 JΩ
Return Loss	- 29.2 dB

Antenna Parameters with Head TSL at 5800 MHz

Impedance, transformed to feed point	56.7 Ω - 4.3 JΩ
Return Loss	- 22.6 dB

General Antenna Parameters and Design

photosical decisional and interest and in the contract of the	
Electrical Delay (one direction)	1.202 ns
Electrical point forte disposerd.	1.202.10

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

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

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

Additional EUT Data

Manufactured by	SPEAG	
Manufactured on	July 09, 2004	

Certificate No: D5GHzV2-1033_Nov11

**** BlackBerry	Appendix D for the BlackBe Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		Page 133(143)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW

DASY5 Validation Report for Head TSL

Date: 15.11.2011

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1033

Communication System: CW; Frequency: 5200 MHz, Frequency: 5500 MHz, Frequency: 5800 MHz Medium parameters used: f = 5200 MHz; $\sigma = 4.46 \text{ mho/m}$; $\varepsilon_r = 34.6$; $\rho = 1000 \text{ kg/m}^3$, Medium parameters used: f = 5500 MHz; $\sigma = 4.75 \text{ mho/m}$; $\epsilon_e = 34.2$; $\rho = 1000 \text{ kg/m}^3$, Medium parameters used: f = 5800 MHz; $\sigma = 5.03 \text{ mho/m}; \epsilon_r = 33.7; \rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 SN3503; ConvF(5.41, 5.41, 5.41), ConvF(4.91, 4.91, 4.91), ConvF(4.81, 4.81. 4.81); Calibrated: 04.03.2011
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5200 MHz/Zoom Scan,

dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm Reference Value = 65.595 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 30.134 W/kg

SAR(1 g) = 8.16 mW/g; SAR(10 g) = 2.33 mW/gMaximum value of SAR (measured) = 18.725 mW/g

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5500 MHz/Zoom Scan,

dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 66.819 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 35.056 W/kg

SAR(1 g) = 8.82 mW/g; SAR(10 g) = 2.5 mW/g

Maximum value of SAR (measured) = 21.019 mW/g

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5800 MHz/Zoom Scan,

dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 62.220 V/m; Power Drift = 0.04 dB

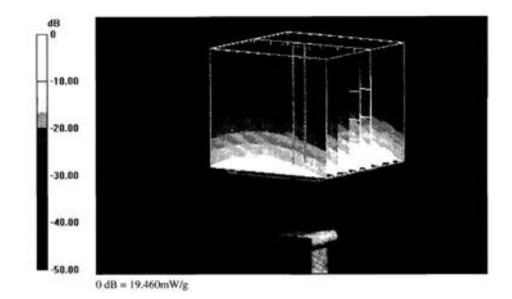
Peak SAR (extrapolated) = 33.743 W/kg

SAR(1 g) = 8.03 mW/g; SAR(10 g) = 2.28 mW/g

Maximum value of SAR (measured) = 19.463 mW/g

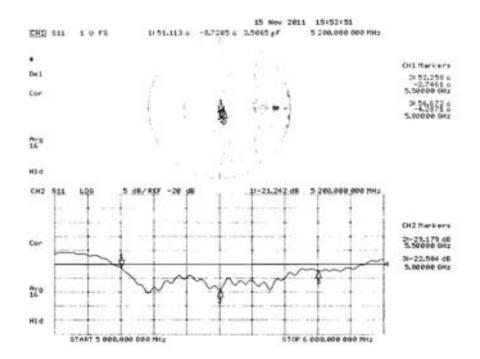
Certificate No: D5GHzV2-1033_Nov11	Page 6 of 8	

≅BlackBerry	Appendix D for the BlackBe Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22, 2012 – Feb 28, 2013	RTS-6026-1303-02	L6ARFL110LW	2503A-RFL110LW
	Dec. 10-12, 2014	Rev 3	L6ARFP120LW	2503A-RFP120LW



≅BlackBerry	Appendix D for the BlackBo Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		Page 135(143)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22, 2012 – Feb 28, 2013	RTS-6026-1303-02	L6ARFL110LW	2503A-RFL110LW
	Dec. 10-12, 2014	Rev 3	L6ARFP120LW	2503A-RFP120LW

Impedance Measurement Plot for Head TSL



≅ BlackBerry Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR 136(143) Report Rev 2 Author Data Dates of Test Test Report No FCC ID: 2503A-RFL110LW Nov 22, 2012 – Feb 28, 2013 RTS-6026-1303-02 L6ARFL110LW Andrew Becker Dec. 10-12, 2014 Rev 3 L6ARFP120LW 2503A-RFP120LW

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





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Accepted by the Swiss Acceptation Service (SAS)

The Swiss Acceptation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Client Blackberry Waterloo

Accred/lation No.: SCS 108

Certificate No: D5GHzV2-1033_Nov13

CALIBRATION CERTIFICATE D5GHzV2 - SN: 1033 Object QA CAL-22.v2 Calibration procedure(t) Calibration procedure for dipole validation kits between 3-6 GHz November 08, 2013 Calibration date: This calibration certificate occurrents the tracoability to national standards, which realize the physical ents of measurements (St). The measurements and the uncontainties with confidence probability are given on the following pages and are part of the certificate. At pathrations have been conducted in the closed laboratory facility: environment temporature (22 a 3)°C and humility < 70% Calibration Equipment used (M&TE critical for calibration) Scheduled Calibration 10 2 Cal Date (Certificate No.) Primary Standards 0837480704 08-Oct-13 (No. 217-01827) Oct-14 Power meter EPM-442A Oct-14 Power sensor HP 8461A US3/297/93 09-Oct-13 (No. 217-01827). Power sensor HP 8481A MY41092317 09-Oct-13 (No. 217-01626) Oct-14 04-Apr-13 (No. 217-01736) Apr-14 Reference 20 dtl Attenuator SIN: 5058 (20%) SN: 5047.3 / 08327 04-Apr-13 (No. 217-01739) Apr-14 Type-N mismatch combination 26-Dec-12 (No. ESD-3205_Dec12) Dec-13 Heference Probe ESSDV3 SN. 3205 DAE4 550 601 25-Apr-13 (No. DAE4-601, Apr13): Apr-14 Schooland Chaok 1D# Check Date (in house) Secondary Standards 04-Aug-99 (in house check Oct-13) In house check: Oct-15 RF generator R&S SMT-06 100005 US37393585 S4206 18-Oct-01 (in house chack Oct-12) In house check: Oct-14 Network Analyzer HP 5753E Name Function Laboratory Technician Calibrated by: Claudio Leutrier Technical Manager Approved by: Katja Pokovic Issued Nevember 8, 2013 This calibration cartificate shall not be reproduced except in full willbout written approval of the faboratory

Certificate No: D6GHzV2-1033_Nov13

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≅ BlackBerry	Appendix D for the BlackBo Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3		2503A-RFL110LW 2503A-RFP120LW

Calibration Laboratory of Schmid & Partner Engineering AG Zeughausskresse 43, 8004 Zurich, Soikzerland





S Schweiberischer Kalibrierdiener
C Service suisse d'étatomage
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S Swiss Calibration Service

Accreditation No.: SCS 108

Accredited by the Swiss Accreditation Senson (SIAS)

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) IEC 62209-2, "Evaluation of Human Exposure to Radio Frequency Fields from Handheld and Body-Mounted Wireless Communication Devices in the Frequency Range of 30 MHz to 6 GHz: Human models, Instrumentation, and Procedures"; Part 2: "Procedure to determine the Specific Absorption Rate (SAR) for including accessories and multiple transmitters", March 2010
- b) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"
- c) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013

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: D5GHzV2-1033_Nov13

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≅BlackBerry	Appendix D for the BlackBo Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR		Page 138(143)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 22, 2012 – Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1303-02 Rev 3	L6ARFL110LW L6ARFP120LW	2503A-RFL110LW 2503A-RFP120LW

Measurement Conditions

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

DASY Version	DASY5	V52.8.7
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy = 4.0 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	5200 MHz ± 1 MHz 5500 MHz ± 1 MHz 5800 MHz ± 1 MHz	

Head TSL parameters at 5200 MHz

The following parameters and calculations were applied

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	36.0	4.66 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.0 ± 6 %	4,46 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	and the same of th	

SAR result with Head TSL at 5200 MHz

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	7.99 W/kg
SAR for nominal Head TSL parameters	normalized to TW	79.4 W/kg + 19.9 % (k=2)

SAR averaged over 10 cm ² (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.28 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	22.6 W/kg = 19.5 % (k=2)

Head TSL parameters at 5500 MHz

he following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.6	4.96 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.6 × 6 %	4.75 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C		

SAR result with Head TSL at 5500 MHz

SAR averaged over 1 cm ¹ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.51 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	84.4 W / kg ± 19.9 % (k+2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.41 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	23.9 W/kg = 19.5 % (k=2)

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Head TSL parameters at 5800 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.3	5.27 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.2 × 6 %	5.06 mho/m ± 6 %
Head TSL temperature change during test	< 0.5°C	-	100

SAR result with Head TSL at 5800 MHz

SAR averaged over 1 cm2 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.01 W/Avg
SAR for nominal Head TSL parameters	normalized to 1W	79.4 W/kg ± 19.9 % (k×2)

SAR averaged over 10 cm² (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.28 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	22.6 W/kg ± 19.5 % (km2)

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Appendix

Antenna Parameters with Head TSL at 5200 MHz

Impedance, transformed to feed point	49.1 \(\Omega - 9.6 \)	
Return Loss	- 20.3 dB	

Antenna Parameters with Head TSL at 5500 MHz

Impedance, transformed to feed point	50.3 Ω - 4.1 52		
Roturn Loss	- 27.7 ob		

Antenna Parameters with Head TSL at 5800 MHz

Impedance, transformed to feed point	57.8 Ω − 4.0 jΩ		
Return Loss	-21.8 dB		

General Antenna Parameters and Design

- 1		
	Electrical Delay (one direction)	1.213 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	July 09, 2004		

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DASY5 Validation Report for Head TSL

Date: 08.11.2013

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1033

Communication System: UID 0 - CW; Frequency: 5200 MHz, Frequency: 5500 MHz, Frequency: 5800

Medium parameters used: f = 5200 MHz; $\sigma = 4.46$ S/m; $\epsilon_r = 35$; $\rho = 1000$ kg/m³, Medium parameters used: f = 5500 MHz; $\sigma = 4.75$ S/m; $\epsilon_r = 34.6$; $\rho = 1000$ kg/m³, Medium parameters used: f = 5800 MHz; $\sigma = 5.06$ S/m; $\epsilon_r = 34.2$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 SN3503; ConvF(5.41, 5.41, 5.41); Calibrated: 28.12.2012, ConvF(4.91, 4.91, 4.91); Calibrated: 28.12.2012, ConvF(4.81, 4.81, 4.81); Calibrated: 28.12.2012;
- Sensor-Surface: L4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001.
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5200 MHz/Zoom Scan,

dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 64,635 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 29.5 W/kg

SAR(1 g) = 7.99 W/kg; SAR(10 g) = 2.28 W/kg

Maximum value of SAR (measured) = 18.4 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5500 MHz/Zoom Scan,

dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 64.397 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 33.8 W/kg

SAR(1 g) = 8.51 W/kg; SAR(10 g) = 2.41 W/kg

Maximum value of SAR (measured) = 20.3 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5800 MHz/Zoom Scan,

dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 61.128 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 33.0 W/kg

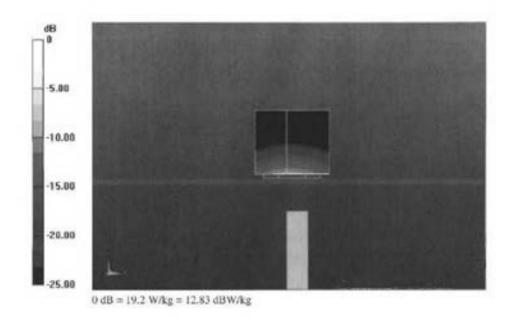
SAR(1 g) = 8.01 W/kg; SAR(10 g) = 2.28 W/kg

Maximum value of SAR (measured) = 19.2 W/kg

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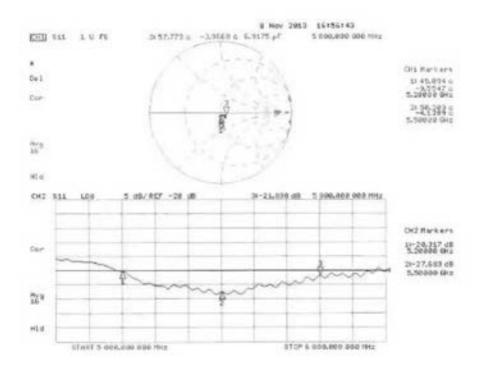
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Impedance Measurement Plot for Head TSL



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