
	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>1(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW</b> <b>L6ARFP120LW</b>

**APPENDIX D: PROBE & DIPOLE CALIBRATION DATA**

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>2(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

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



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

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

Accreditation No.: **SCS 108**

Client: **RTS (RIM Testing Services)**

Certificate No.: **ES3-3225\_Jan12**

### CALIBRATION CERTIFICATE


Object: **ES3DV3 - SN:3225**  
 Calibration procedure(s): **QA CAL-01.v6, QA CAL-23.v4, QA CAL-25.v4  
Calibration procedure for dosimetric E-field probes**  
 Calibration date: **January 11, 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 ± 3)°C and humidity = 70%.

Calibration Equipment used (MATE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	5841290174	31-Mar-11 (No. 217-01372)	Apr-12
Power sensor E4412A	5N41488087	31-Mar-11 (No. 217-01372)	Apr-12
Reference 3 (B) Attenuator	SN: 55094 (20)	29-Mar-11 (No. 217-01368)	Apr-12
Reference 20 (B) Attenuator	SN: 55096 (206)	29-Mar-11 (No. 217-01367)	Apr-12
Reference 30 (B) Attenuator	SN: 55129 (306)	29-Mar-11 (No. 217-01370)	Apr-12
Reference Probe E530V3	SN: 3013	29-Dec-11 (No. E53-3013_Dec11)	Dec-12
CRF4	SN: 604	3-May-11 (No. D484-604_May11)	May-12
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3040201700	4-Aug-08 (in house check Apr-11)	in house check Apr-13
Network Analyzer HP 8733E	US37360555	18-Oct-01 (in house check Oct-11)	in house check Oct-12

Calibrated by: **Jelton Kasrell** (Name) / **Laboratory Technician** (Function) /  (Signature)  
 Approved by: **Katja Pitschke** (Name) / **Technical Manager** (Function) /  (Signature)  
 Issued: **January 12, 2012**

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

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>3(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

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



SC  
 SC  
 SC  
 Schweizerischer Kalibrierdienst  
 Service suisse d'étalonnage  
 Servizio svizzero di tarature  
 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 100**

**Glossary:**


TSL	tissue simulating liquid
$NORM_{x,y,z}$	sensitivity in free space
$Cor_{x,y,z}$	sensitivity in TSL / $NORM_{x,y,z}$
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C	modulation dependent linearization parameters
Polarization $\varphi$	$\varphi$ rotation around probe axis
Polarization $\beta$	$\beta$ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\beta = 0$ 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:**

- $NORM_{x,y,z}$ : Assessed for E-field polarization  $\beta = 0$  ( $f \leq 900$  MHz in TEM-cell;  $f > 1800$  MHz: R22 waveguide).  $NORM_{x,y,z}$  are only intermediate values, i.e., the uncertainties of  $NORM_{x,y,z}$  does not affect the E-field uncertainty inside TSL (see below  $Cor_{x,y,z}$ ).
- $NORM(x,y,z) = NORM_{x,y,z} \cdot frequency\_response$  (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  $Cor_{x,y,z}$ .
- $DCP_{x,y,z}$ : 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.
- $A_{x,y,z}$ ,  $B_{x,y,z}$ ,  $C_{x,y,z}$ ,  $VR_{x,y,z}$ : 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.
- $Cor_{x,y,z}$  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  $NORM_{x,y,z} \cdot Cor_{x,y,z}$  whereby the uncertainty corresponds to that given for  $Cor_{x,y,z}$ . A frequency dependent  $Cor_{x,y,z}$  is used in DASY version 4.4 and higher which allows extending the validity from  $\pm 50$  MHz to  $\pm 100$  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.

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>4(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW</b> <b>L6ARFP120LW</b>

ES3DV3 – SN:3225


January 11, 2012

# Probe ES3DV3

## SN:3225

Manufactured: September 1, 2009  
Calibrated: January 11, 2012

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

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>5(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

ES3DV3- 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 ( $\mu W/m^2$ ) <sup>2</sup>	1.26	1.26	1.30	± 10.1 %
DCP (mV) <sup>2</sup>	101.2	100.8	101.2	

### Modulation Calibration Parameters


usb	Communication System Name	PAR		A dB	B dB	C dB	WR mV	Unc <sup>2</sup> (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	107.7	±1.7 %
			Y	0.00	0.00	1.00	113.4	
			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%.

<sup>1</sup> The uncertainties of NormX,Y,Z do not affect the E<sup>2</sup>-field uncertainty inside TSI. (see Pages 8 and 9).

<sup>2</sup> Numerical linearization parameter: uncertainty not required.

<sup>3</sup> Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>6(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

ES3DV3- SN:3225

January 11, 2012


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

### Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) <sup>1</sup>	Relative Permittivity <sup>2</sup>	Conductivity (S/m) <sup>2</sup>	Coef X	Coef Y	Coef 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	1.60	4.50	4.50	4.50	0.79	1.26	± 12.0 %
2600	38.0	1.96	4.32	4.32	4.32	0.77	1.32	± 12.0 %

<sup>1</sup> Frequency validity 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 Coef<sup>2</sup> uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

<sup>2</sup> At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) 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 (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the Coef<sup>2</sup> uncertainty for indicated target tissue parameters.

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>7(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW</b> <b>L6ARFP120LW</b>

ES3DV3- SN:3225

January 11, 2012

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

### Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) <sup>c</sup>	Relative Permittivity <sup>a</sup>	Conductivity (S/m) <sup>a</sup>	CorrF X	CorrF Y	CorrF Z	Alpha	Depth (mm)	Unc. (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	0.50	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 %

<sup>a</sup> 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 'CorrF' uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

<sup>c</sup> At frequencies below 3 GHz, the validity of tissue parameters (a) and (c) 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 (a) and (c) is restricted to ± 5%. The uncertainty is the RSS of the 'CorrF' uncertainty for indicated target tissue parameters.

Author Data  
**Andrew Becker**

Dates of Test  
**Nov 22, 2012 – Feb 28, 2013**

Test Report No  
**RTS-6026-1303-02**

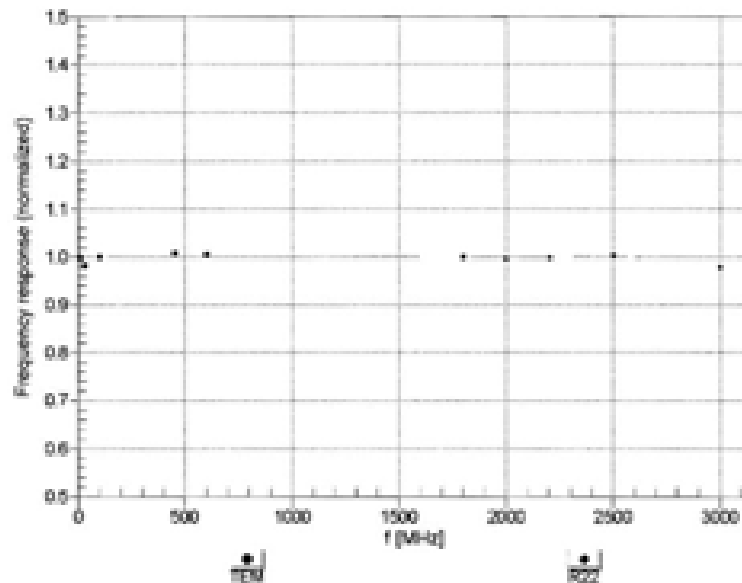
FCC ID:  
**L6ARFL110LW  
 L6ARFP120LW**

IC  
**2503A-RFL110LW  
 2503A-RFP120LW**

ES30v3- SW-3225


January 11, 2012

### Frequency Response of E-Field (TEM-Cell: iR110 EXX, Waveguide: R22)



Uncertainty of Frequency Response of E-field:  $\pm 6.3\%$  (k=2)

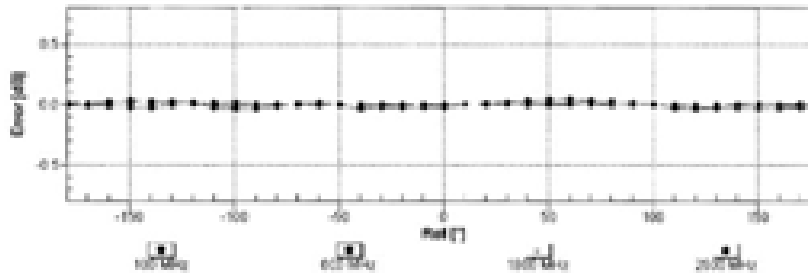
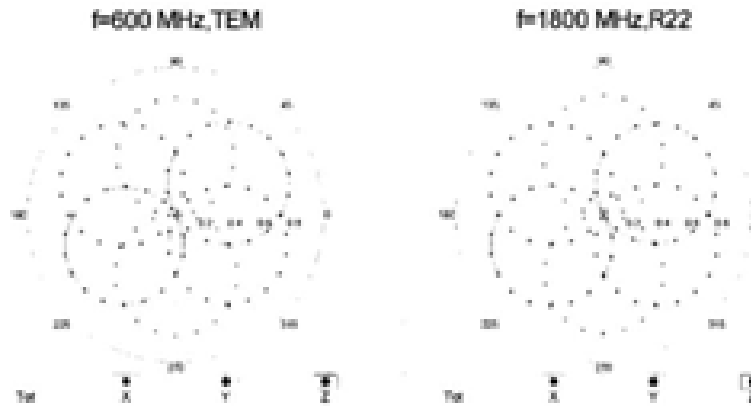


	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>9(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

ES3073- 04/2010

January 11, 2012

### Receiving Pattern ( $\phi$ ), $\theta = 0^\circ$



Uncertainty of Axial isotropy Assessment:  $\pm 0.5\%$  (k=2)

Author Data  
**Andrew Becker**

Dates of Test  
**Nov 22, 2012 – Feb 28, 2013**

Test Report No  
**RTS-6026-1303-02**

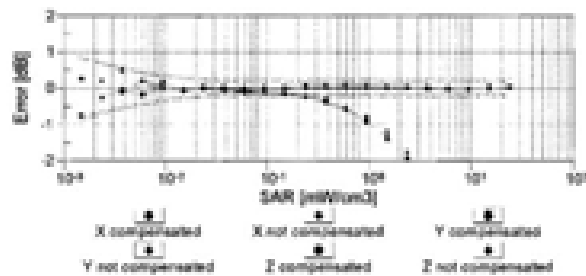
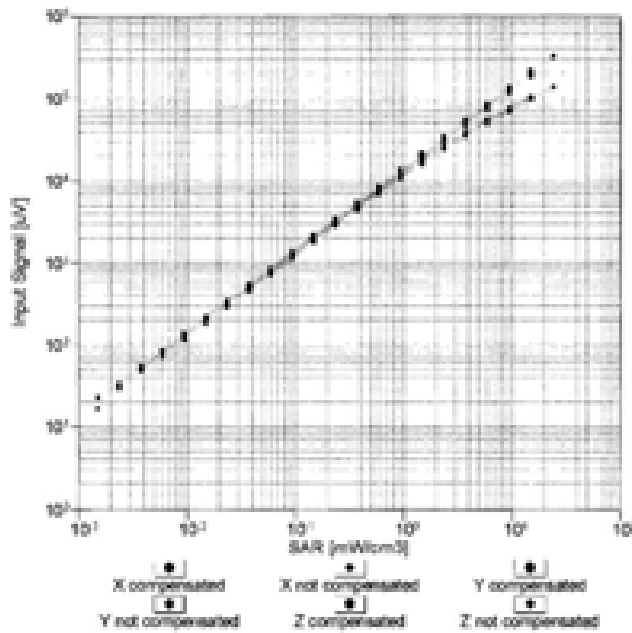
FCC ID:  
**L6ARFL110LW  
 L6ARFP120LW**

IC  
**2503A-RFL110LW  
 2503A-RFP120LW**


ES30V3- 04-3225

January 11, 2012

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



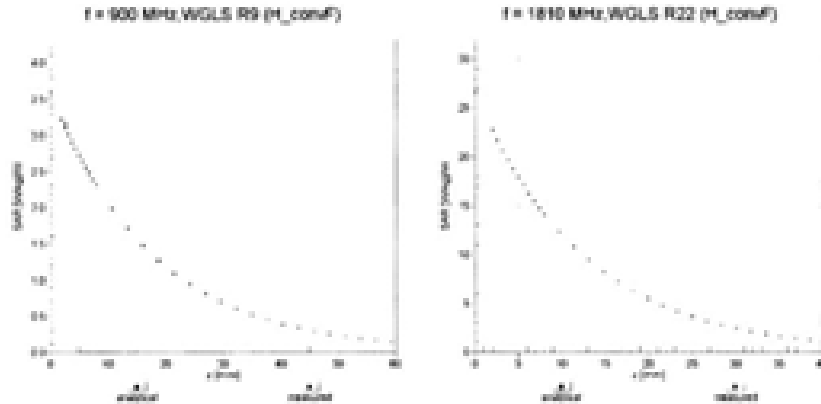
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>11(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

ES33DV3- 3N3325

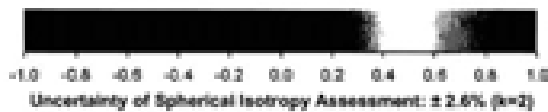
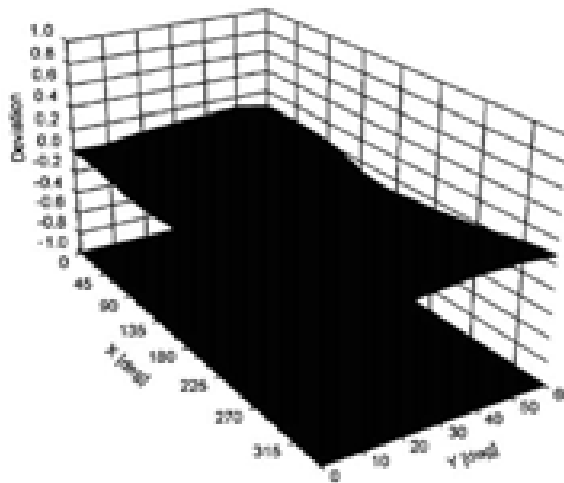
January 11, 2012


### Conversion Factor Assessment



### Deviation from Isotropy in Liquid

Error (δ, θ), f = 900 MHz



	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>12(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW</b> <b>L6ARFP120LW</b>


ES3DV3-3M3225

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

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>13(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

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



S Schweizerischer Kalibrierdienst  
 Service suisse d'étalonnage  
 Servizio svizzero 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



Accreditation No.: **SCS 108**


Client **RTS (RIM Testing Services)**

Certificate No: **ES3-3225\_Jan13**

CALIBRATION CERTIFICATE	
Object	<b>ES3DV3 - SN:3225</b>
Calibration procedure(s)	<b>QA CAL-01.v8, QA CAL-23.v4, QA CAL-25.v4 Calibration procedure for dosimetric E-field probes</b>
Calibration date	<b>January 10, 2013</b>
<p>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.</p> <p>All calibrations have been conducted in the closed laboratory facility; environment temperature (22 ± 3)°C and humidity &lt; 70%.</p> <p>Calibration Equipment used (MPE critical for calibration)</p>	

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter F44196	084170874	28-Mar-12 (No. 212-01008)	Apr-13
Power sensor 044124	MY11498087	28-Mar-12 (No. 212-01008)	Apr-13
Reference 1 (R) Attenuator	SN: 80254 (20)	27-Mar-12 (No. 212-01001)	Apr-13
Reference 20 (R) Attenuator	SN: 80286 (20a)	27-Mar-12 (No. 212-01029)	Apr-13
Reference 2 (R) Attenuator	SN: 80529 (20b)	27-Mar-12 (No. 212-01022)	Apr-13
Reference Probe 1 (S) DV3	SN: 3213	28-Dec-12 (No. 833-3013, Dec12)	Dec-13
DAF4	SN: 880	20-Jun-12 (No. DAF4-880, Jun12)	Jan-13
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8480C	US2642UC1700	4-Aug-09 (in house check Apr-12)	In house check: Apr-13
Network Analyser HP 8710E	US32780580	18-Oct-09 (in house check Oct-12)	In house check: Oct-13

	Name	Function	Signature
Calibrated by:	<b>Jeton Kestrel</b>	Laboratory Technician	
Approved by:	<b>Katja Polovic</b>	Technical Manager	
Issued: January 14, 2013			
This calibration certificate shall not be reproduced except in full without written approval of the laboratory.			

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>14(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

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



S Schweizerischer Kalibrierdienst  
 C Service suisse d'étalonnage  
 S Service suisse de tarature  
 S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 108**

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
$NORM_{x,y,z}$	sensitivity in free space
ConvF	sensitivity in TSL / $NORM_{x,y,z}$
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C, D	modulation dependent linearization parameters
Polarization $\varphi$	$\varphi$ rotation around probe axis
Polarization $\theta$	$\theta$ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\theta = 0$ 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:**

- $NORM_{x,y,z}$ : Assessed for E-field polarization  $\theta = 0$  ( $f \leq 900$  MHz in TEM-cell;  $f > 1800$  MHz: R22 waveguide).  $NORM_{x,y,z}$  are only intermediate values, i.e., the uncertainties of  $NORM_{x,y,z}$  does not affect the  $E^2$ -field uncertainty inside TSL (see below ConvF).
- $NORM(f)_{x,y,z} = NORM_{x,y,z} \cdot \text{frequency\_response}$  (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.
- $DCP_{x,y,z}$ : 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.
- $A_{k,y,z}$ ,  $B_{k,y,z}$ ,  $C_{k,y,z}$ ,  $D_{k,y,z}$ ,  $VR_{k,y,z}$ , 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 fat phantom using E-field (or Temperature Transfer Standard for  $f \leq 800$  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  $NORM_{x,y,z} \cdot \text{ConvF}$  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 a 50 MHz to a 150 MHz.
- Spherical isotropy (3D deviation from isotropy): in a field of low gradients realized using a fat 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.

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>15(134)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW</b> <b>L6ARFP120LW</b>	IC <b>2503A-RFL110LW</b> <b>2503A-RFP120LW</b>

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>16(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW</b> <b>L6ARFP120LW</b>

ES3DV3 - SN3225

January 10, 2013


# Probe ES3DV3

## SN:3225

Manufactured: September 1, 2009  
Calibrated: January 10, 2013

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



	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>17(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

ES3DV3- SN3225

January 10, 2013

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

### Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc. (k=2)
Norm. ( $\mu\text{V}/\text{V}/\text{m}^2$ ) <sup>1</sup>	1.28	1.18	1.31	$\pm 10.1\%$
DCP (mV) <sup>2</sup>	100.5	101.5	99.9	

### Modulation Calibration Parameters


URS	Communication System Name		A dB	B dB- $\mu\text{V}$	C	D dB	VR mV	Unc. <sup>3</sup> (k=2)
0	CW	X	0.0	0.0	1.0	0.00	157.5	$\pm 2.7\%$
		Y	0.0	0.0	1.0		158.4	
		Z	0.0	0.0	1.0		160.9	


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%.

<sup>1</sup> The uncertainties of NormX, Y, Z do not affect the E<sup>2</sup> field uncertainty inside 700, (see Pages 5 and 6).

<sup>2</sup> Numerical linearization parameter; uncertainty not required.

<sup>3</sup> Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>18(134)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW</b> <b>L6ARFP120LW</b>	IC <b>2503A-RFL110LW</b> <b>2503A-RFP120LW</b>

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>19(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

ES3DV3 – SN:3225

January 18, 2013


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

### Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) <sup>1</sup>	Relative Permittivity <sup>2</sup>	Conductivity (S/m) <sup>2</sup>	CorrF X	CorrF Y	CorrF Z	Alpha	Depth (mm)	Unc. (k=2)
750	41.9	0.89	6.56	6.56	6.56	0.42	1.54	± 12.0 %
900	41.5	0.97	6.19	6.19	6.19	0.43	1.52	± 12.0 %
1810	40.0	1.40	5.35	5.35	5.35	0.63	1.39	± 12.0 %
1950	40.0	1.40	5.09	5.09	5.09	0.60	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	0.60	1.32	± 12.0 %

<sup>1</sup> 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 CorrF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

<sup>2</sup> At frequencies below 3 GHz, the validity of tissue parameters (ρ and σ) can be relaxed to ± 10% if equal compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ρ and σ) is restricted to ± 5%. The uncertainty is the RSS of the CorrF uncertainty for indicated target tissue parameters.

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>20(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

ES3DV3- 3243225

January 10, 2013


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


### Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) <sup>1</sup>	Relative Permittivity <sup>2</sup>	Conductivity (S/m) <sup>2</sup>	CorrF X	CorrF Y	CorrF Z	Alpha	Depth (mm)	Unc. (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 %

<sup>1</sup> Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 25), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the CorrF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

<sup>2</sup> At frequencies below 3 GHz, the validity of tissue parameters (ρ and σ) 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 (ρ and σ) is restricted to ± 5%. The uncertainty is the RSS of the CorrF uncertainty for indicated target tissue parameters.

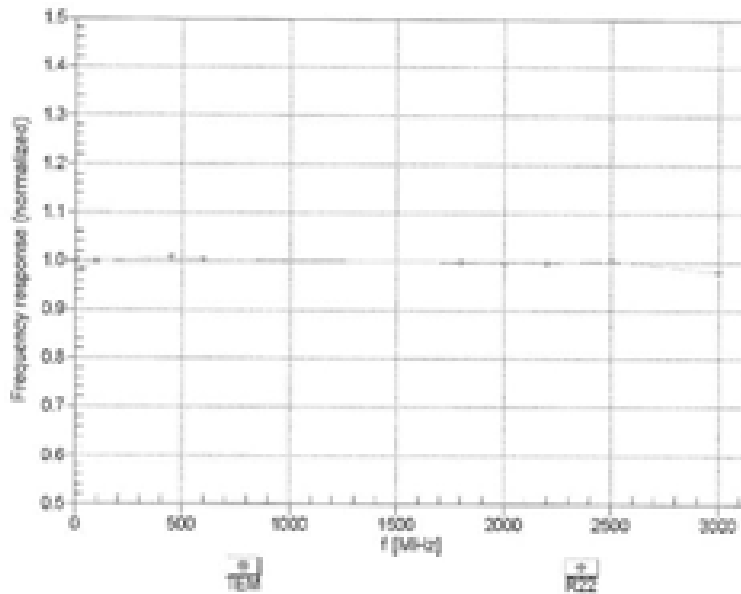
	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>21(134)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW</b> <b>L6ARFP120LW</b>	IC <b>2503A-RFL110LW</b> <b>2503A-RFP120LW</b>

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>22(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>


ES330v3- 04-2025

January 10, 2013

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



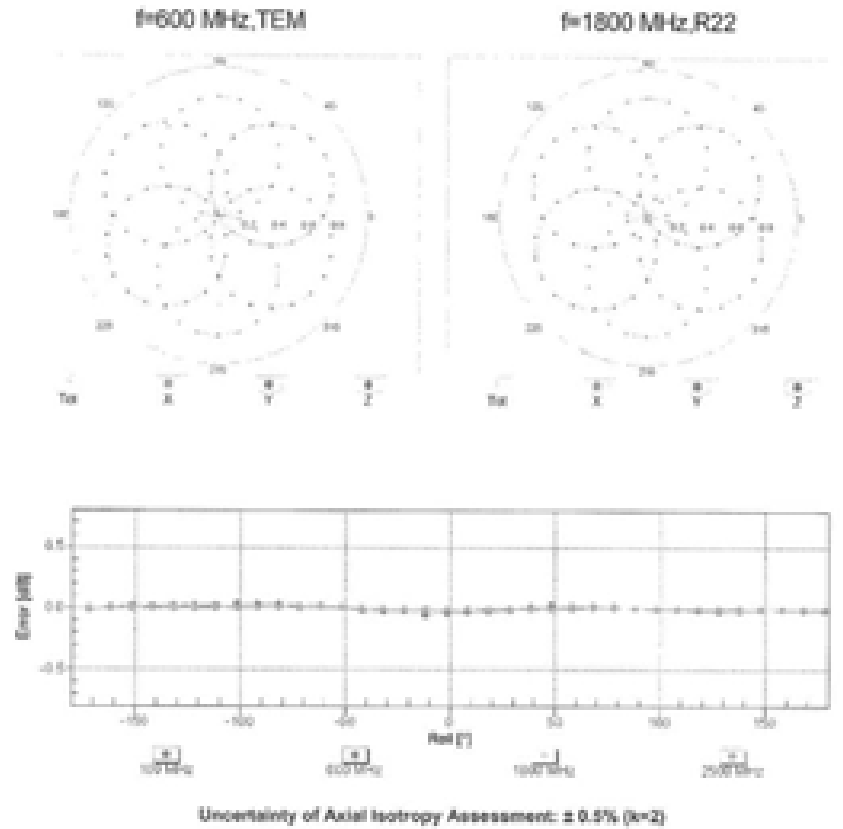
Uncertainty of Frequency Response of E-field:  $\pm 6.3\%$  ( $k=2$ )


	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>23(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW</b> <b>L6ARFP120LW</b>

ES33DV3-5M3225

January 10, 2013

### Receiving Pattern ( $\phi$ ), $\theta = 0^\circ$



	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>24(134)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW</b> <b>L6ARFP120LW</b>	IC <b>2503A-RFL110LW</b> <b>2503A-RFP120LW</b>



Author Data  
**Andrew Becker**

Dates of Test  
**Nov 22, 2012 – Feb 28, 2013**

Test Report No  
**RTS-6026-1303-02**

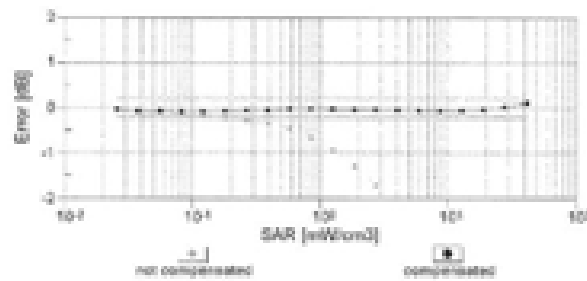
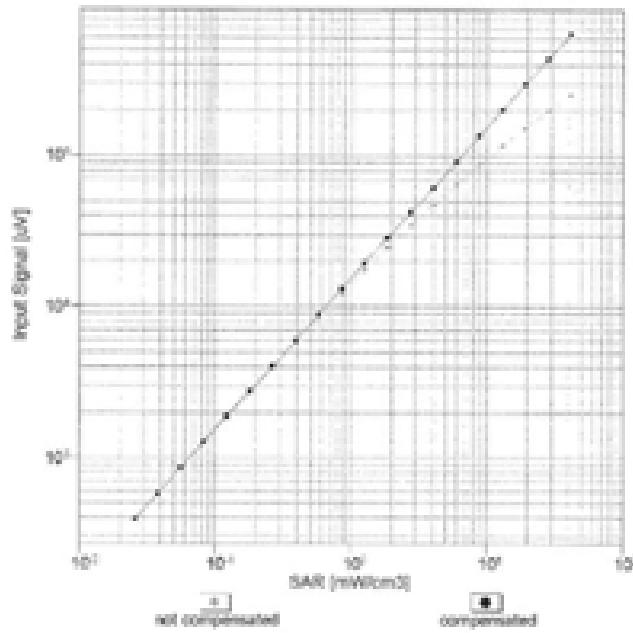
FCC ID:  
**L6ARFL110LW**  
**L6ARFP120LW**

IC  
**2503A-RFL110LW**  
**2503A-RFP120LW**


ES33225- 04.3225

January 18, 2013

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



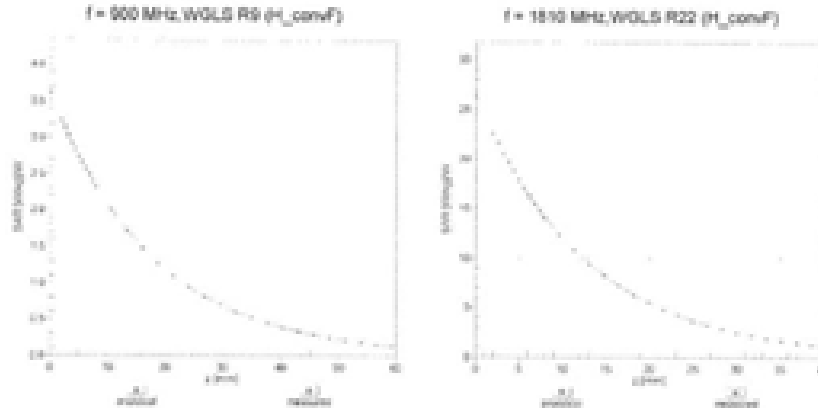
Uncertainty of Linearity Assessment:  $\pm 0.6\%$  ( $k=2$ )

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>26(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

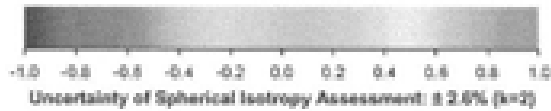
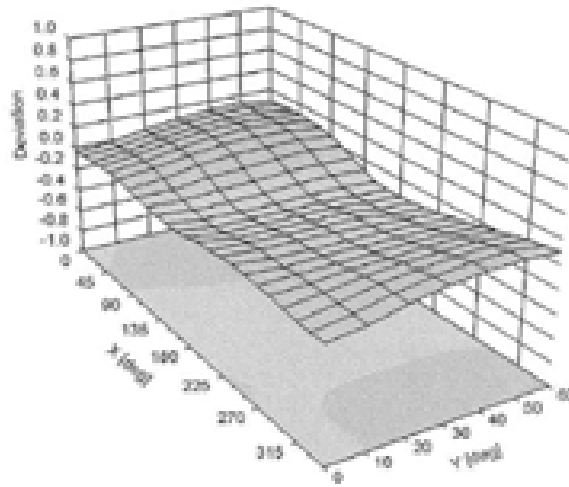
ES33-3225


January 10, 2013

### Conversion Factor Assessment



### Deviation from Isotropy in Liquid Error (θ, φ), f = 900 MHz



	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>27(134)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW</b> <b>L6ARFP120LW</b>	IC <b>2503A-RFL110LW</b> <b>2503A-RFP120LW</b>



Author Data  
**Andrew Becker**

Dates of Test  
**Nov 22, 2012 – Feb 28, 2013**

Test Report No  
**RTS-6026-1303-02**

FCC ID:  
**L6ARFL110LW  
L6ARFP120LW**

IC  
**2503A-RFL110LW  
2503A-RFP120LW**


ES3DV3 - SN:3225

January 18, 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

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>29(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

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



SNBS  
 Schweizerischer Kalibrierdienst  
 Service suisse d'étalonnage  
 Servizio svizzero 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



Accreditation No.: **SCS 108**


Client: **RTS (RIM Testing Services)**

Certificate No.: **EX3-3592\_Nov12**

CALIBRATION CERTIFICATE	
Object:	<b>EX3DV4 - SN 3592</b>
Calibration procedure(s):	<b>QA CAL-01 v8, QA CAL-14 v3, QA CAL-23 v4, QA CAL-25 v4 Calibration procedure for dosimetric E-field probes</b>
Calibration date:	<b>November 14, 2012</b>
<p>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.</p> <p>All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 2°C and humidity &lt; 70%).</p> <p>Calibration Equipment used (MPE critical for calibration):</p>	

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EM198	0841203874	29-Mar-12 (No. 217-01908)	Apr-13
Power sensor E-41 13A	MH11998697	29-Mar-12 (No. 217-01908)	Apr-13
Reference 3 dB Attenuator	SN: 55094 (30)	27-Mar-12 (No. 217-01937)	Apr-13
Reference 20 dB Attenuator	SN: 55085 (30c)	27-Mar-12 (No. 217-01929)	Apr-13
Reference 30 dB Attenuator	SN: 55129 (30c)	27-Mar-12 (No. 217-01932)	Apr-13
Reference Probe ES3DV2	SN: 3043	29-Dec-11 (No. 833-8013, Dec 11)	Dec-12
DNA	SN: 890	29-Jun-12 (No. DNA4-890, Jun12)	Jun-13
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8940C	US342001700	4-Aug-09 (in house check Apr-11)	in house check Apr-13
Network Analyzer HP 8710A	US37360565	18-Oct-01 (in house check Oct-02)	in house check Oct-13

Calibrated by:	Name <b>David Leuber</b>	Function Laboratory Technician	Signature 
Approved by:	Name <b>Kolja Polovic</b>	Technical Manager	
Issued November 14, 2012			
This calibration certificate shall not be reproduced except in full without written approval of the laboratory.			

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>30(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

**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

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**

**Glossary:**


TSL	Issue simulating liquid
$NORM_{x,y,z}$	sensitivity in free space
ConvF	sensitivity in TSL / $NORM_{x,y,z}$
DCP	diode compression point
CF	crest factor (Modul., cycle) of the RF signal
A, B, C	modulation dependent linearization parameters
Polarization $\varphi$	$\varphi$ rotation around probe axis
Polarization $\beta$	$\beta$ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\beta = 0$ 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:**

- $NORM_{x,y,z}$ : Assessed for E-field polarization  $\beta = 0$  ( $f \leq 900$  MHz in TEM-cell;  $f > 1800$  MHz: R22 waveguide).  $NORM_{x,y,z}$  are only intermediate values, i.e., the uncertainties of  $NORM_{x,y,z}$  does not affect the  $E^2$ -field uncertainty inside TSL (see below ConvF).
- $NORM_{f}(x,y,z) = NORM_{x,y,z} \cdot \text{frequency\_response}$  (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.
- $DCP_{x,y,z}$ : 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.
- $A_{x,y,z}; B_{x,y,z}; C_{x,y,z}; VR_{x,y,z}$ : 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  $f \leq 800$  MHz) and inside waveguide using analytical field distributions based on power measurements for  $f > 800$  MHz. The same setup 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  $NORM_{x,y,z} \cdot \text{ConvF}$  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  $\pm 50$  MHz to  $\pm 100$  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.

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>31(134)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW</b> <b>L6ARFP120LW</b>	IC <b>2503A-RFL110LW</b> <b>2503A-RFP120LW</b>

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>32(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW</b> <b>L6ARFP120LW</b>

EX3DV4 - 3M3592

November 14, 2012


# Probe EX3DV4

## SN:3592

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

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



	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>33(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

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 $(\mu V / \sqrt{W/m^2})^2$	0.49	0.47	0.41	$\pm 10.1\%$
DCP (mV) <sup>2</sup>	95.2	98.1	100.6	

### Modulation Calibration Parameters


UID	Communication System Name	FAR		A dB	B dB	C dB	WR mV	Unc <sup>1</sup> (k=2)
5	OW	0.00	X	0.0	0.0	1.0	101.4	$\pm 3.0\%$
			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%.

<sup>1</sup> The uncertainties of Norm X, Y, Z do not affect the E<sup>1</sup> field uncertainty inside TSI, (see Pages 5 and 6).

<sup>2</sup> Numerical linearization, parameter uncertainty not required.

<sup>3</sup> Uncertainty is determined using the rms. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>34(134)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW</b> <b>L6ARFP120LW</b>	IC <b>2503A-RFL110LW</b> <b>2503A-RFP120LW</b>

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>35(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

EX3DV4 - SN:3592

November 14, 2012


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


### Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) <sup>1</sup>	Relative Permittivity <sup>2</sup>	Conductivity (S/m) <sup>2</sup>	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unc. (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	1.60	± 13.1 %
5500	35.6	4.96	4.28	4.28	4.28	0.44	1.60	± 13.1 %
5800	35.3	5.27	4.12	4.12	4.12	0.48	1.60	± 13.1 %

<sup>1</sup> Frequency validity of ± 100 kHz only applies for DASY v4.4 and higher (see Page 23, also 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.

<sup>2</sup> At frequencies below 3 GHz, the validity of tissue parameters (ε<sub>r</sub> and σ) can be related to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε<sub>r</sub> and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>36(134)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW</b> <b>L6ARFP120LW</b>	IC <b>2503A-RFL110LW</b> <b>2503A-RFP120LW</b>

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>37(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW</b> <b>L6ARFP120LW</b>

EX3DV4 - SN:3592

November 14, 2012


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

### Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) <sup>1</sup>	Relative Permittivity <sup>2</sup>	Conductivity (S/m) <sup>2</sup>	Coeff X	Coeff Y	Coeff Z	Alpha	Depth (mm)	Unc. (k=2)
2600	52.5	2.16	6.59	6.59	6.59	0.60	0.50	± 12.0 %
5200	40.0	5.30	4.02	4.02	4.02	0.48	1.00	± 13.1 %
5500	48.6	5.85	3.66	3.66	3.66	0.55	1.00	± 13.1 %
5800	48.2	6.00	3.57	3.57	3.57	0.57	1.00	± 13.1 %

<sup>1</sup> 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 Coeff<sup>2</sup> uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

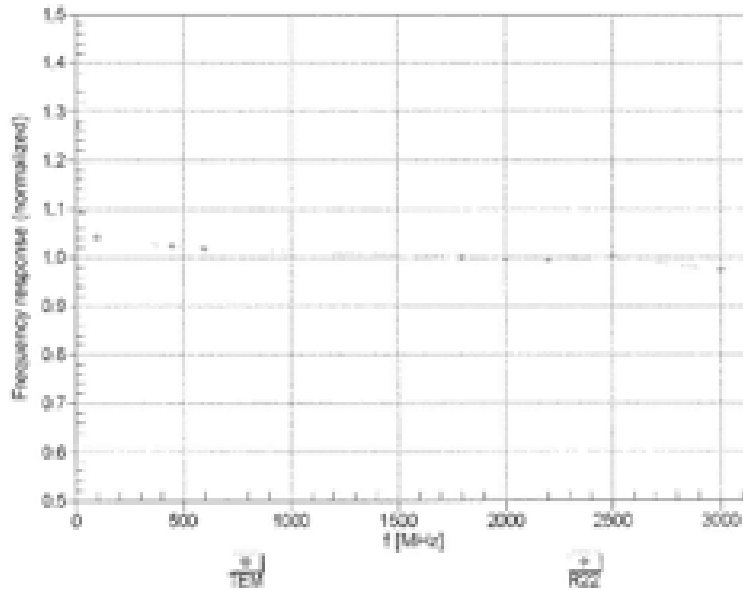
<sup>2</sup> At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formulae is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the Coeff<sup>2</sup> uncertainty for indicated target tissue parameters.

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>38(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>


EOGDA- SN 3592

November 14, 2012

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



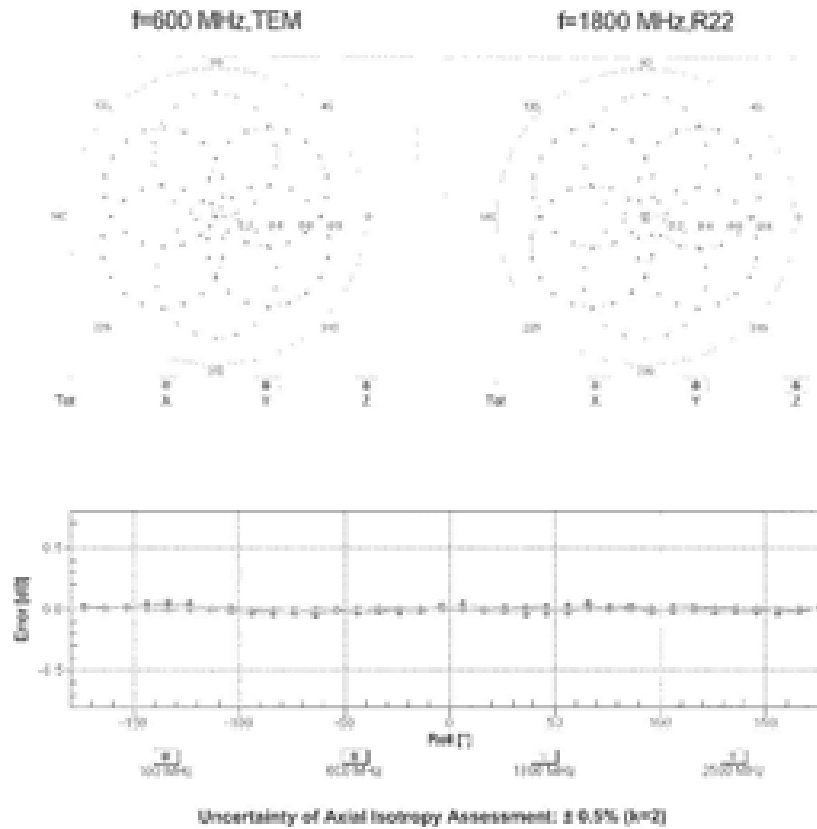
Uncertainty of Frequency Response of E-Field: ± 6.3% (k=2)


	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>39(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

EX0046-SN3092

November 14, 2012

### Receiving Pattern ( $\phi$ ), $\theta = 0^\circ$



	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>40(134)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW</b> <b>L6ARFP120LW</b>	IC <b>2503A-RFL110LW</b> <b>2503A-RFP120LW</b>



Author Data  
**Andrew Becker**

Dates of Test  
**Nov 22, 2012 – Feb 28, 2013**

Test Report No  
**RTS-6026-1303-02**

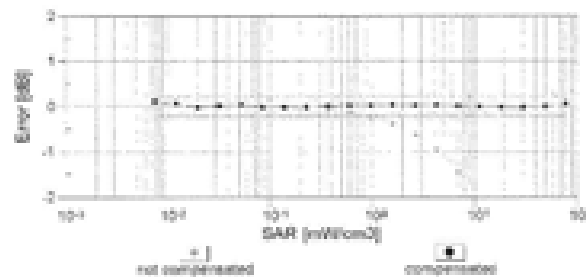
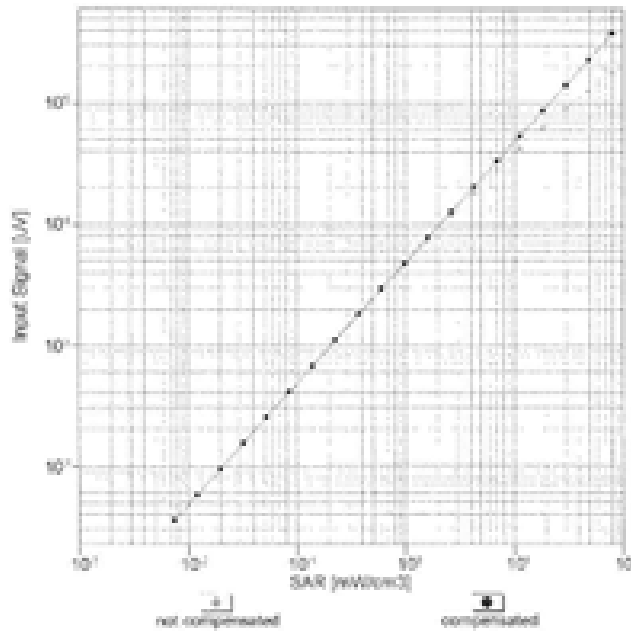
FCC ID:  
**L6ARFL110LW  
 L6ARFP120LW**

IC  
**2503A-RFL110LW  
 2503A-RFP120LW**


E00048-09(3592)

November 14, 2012

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



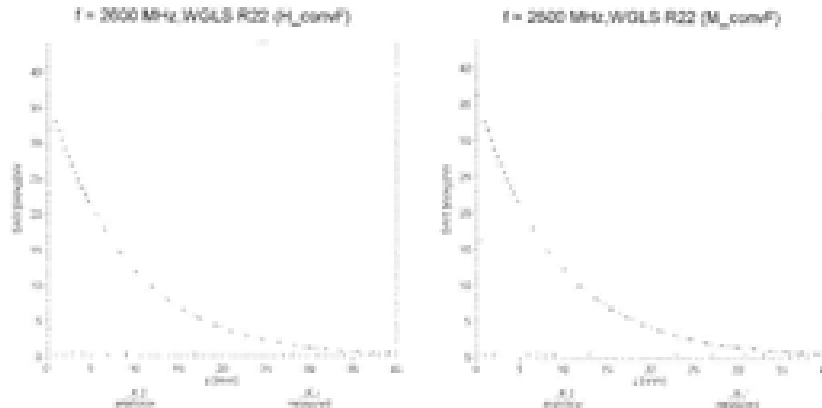
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>42(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

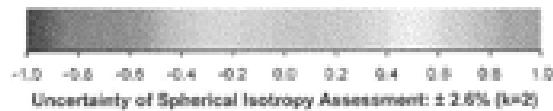
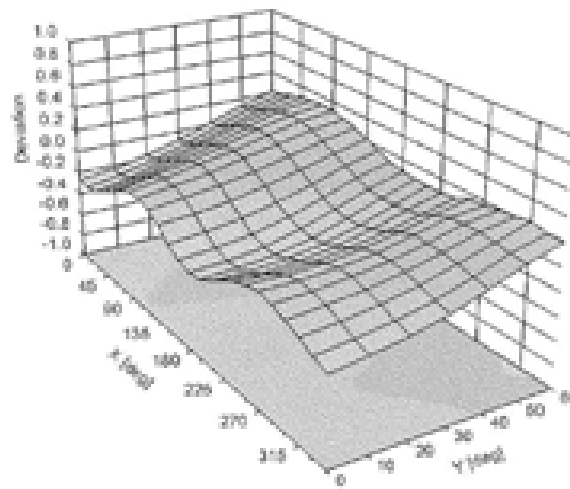
EX30344- 04-3092


November 14, 2012

### Conversion Factor Assessment



### Deviation from Isotropy in Liquid Error (φ, θ), f = 900 MHz



	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>43(134)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW</b> <b>L6ARFP120LW</b>	IC <b>2503A-RFL110LW</b> <b>2503A-RFP120LW</b>



Author Data  
**Andrew Becker**

Dates of Test  
**Nov 22, 2012 – Feb 28, 2013**

Test Report No  
**RTS-6026-1303-02**

FCC ID:  
**L6ARFL110LW  
L6ARFP120LW**

IC  
**2503A-RFL110LW  
2503A-RFP120LW**


EX3DV4 - 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 Diameter	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

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>45(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

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



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

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

Accreditation No.: **SCS 108**



Client **RTS (RIM Testing Services)**

Certificate No. **ET3-1644\_Nov12**


### CALIBRATION CERTIFICATE

Object: **ET30V8 - 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 date: **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 ± 0.3)°C and humidity = 70%.  
 Calibration Equipment used (MATE critical for calibration):

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E41199	Q841289214	29-Mar-12 (No. 212-01508)	Apr-13
Power sensor E41134	MF41498097	29-Mar-12 (No. 212-01508)	Apr-13
Reference 3 dB Attenuator	SN: 35054 (3%)	27-Mar-12 (No. 212-01520)	Apr-13
Reference 20 dB Attenuator	SN: 35086 (20%)	27-Mar-12 (No. 212-01520)	Apr-13
Reference 30 dB Attenuator	SN: 35129 (30%)	27-Mar-12 (No. 212-01520)	Apr-13
Reference Probe ES30V2	SN: 3012	29-Dec-11 (No. 813-3013, Dec-11)	Dec-12
DAE4	SN: 889	20-Jun-12 (No. 0A18460, Jun-12)	Jun-13
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US294301700	4-Aug-09 (in house check Apr-10)	In house check Apr-13
Network Analyser HP 8733E	US27360595	18-Oct-01 (in house check Oct-12)	In house check Oct-13

	Name	Function	Signature
Calibrated by:	Jeton Kastner	Laboratory Technician	
Approved by:	Katja Peters	Technical Manager	

Issued: November 13, 2012  
 This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>46(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

**Calibration Laboratory of  
Schmid & Partner  
Engineering AG**  
 Zeughausstrasse 41, 8004 Zurich, Switzerland



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

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

Accreditation No.: **SCS 108**

**Glossary:**


TSL tissue simulating liquid  
 NORM<sub>x,y,z</sub> sensitivity in free space  
 ConvF sensitivity in TSL, f NORM<sub>x,y,z</sub>  
 DCP diode compression point  
 CF crest factor (1/duty\_cycle) of the RF signal  
 A, B, C modulation dependent linearization parameters  
 Polarization  $\varphi$   $\varphi$  rotation around probe axis  
 Polarization  $\theta$   $\theta$  rotation around an axis that is in the plane normal to probe axis (at measurement center),  
 i.e.,  $\theta = 0$  is normal to probe axis

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

- a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- b) 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 2006

**Methods Applied and Interpretation of Parameters:**

- NORM<sub>x,y,z</sub>: Assessed for E-field polarization  $\theta = 0$  ( $f \leq 900$  MHz in TEM-cell;  $f > 1800$  MHz: R22 waveguide). NORM<sub>x,y,z</sub> are only intermediate values, i.e., the uncertainties of NORM<sub>x,y,z</sub> does not affect the E<sup>2</sup>-field uncertainty inside TSL (see below ConvF).
- NORM<sub>f</sub>( $x,y,z$ ) = NORM<sub>x,y,z</sub> \* 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.
- DCP<sub>x,y,z</sub>: 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.
- A<sub>x,y,z</sub>; B<sub>x,y,z</sub>; C<sub>x,y,z</sub>; VR<sub>x,y,z</sub>; 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 fat phantom using E-field (or Temperature Transfer Standard for  $f \leq 800$  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 NORM<sub>x,y,z</sub> \* 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  $\pm 50$  MHz to  $\pm 100$  MHz.
- Spherical isotropy (3D deviation from isotropy): in a field of low gradients realized using a fat 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.

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>47(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW</b> <b>L6ARFP120LW</b>

ET3DV6 - SN:1644

November 13, 2012

# Probe ET3DV6

## SN:1644

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

**Calibrated for DASY/EASY Systems**  
(Note: non-compatible with DASY2 systems)



Author Data  
**Andrew Becker**

Dates of Test  
**Nov 22, 2012 – Feb 28, 2013**

Test Report No  
**RTS-6026-1303-02**

FCC ID:  
**L6ARFL110LW  
L6ARFP120LW**

IC  
**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 $(\mu\text{W}/\text{m}^2)^2$	1.71	1.97	1.98	$\pm 10.1\%$
DCP $(\text{mV})^2$	99.5	98.7	97.5	

**Modulation Calibration Parameters**

UID	Communication System Name	FAR		A dB	B dB	C dB	WR mV	Unc <sup>1</sup> (k=2)
0	Cell	0.00	X	0.0	0.0	1.0	193.5	$\pm 3.5\%$
			Y	0.0	0.0	1.0	212.0	
			Z	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%.

<sup>2</sup> The uncertainties of NormX,Y,Z do not affect the E<sup>2</sup> field uncertainty inside T3a (see Pages 5 and 6).

<sup>3</sup> Numerical linearization parameter; uncertainty not required.

<sup>1</sup> Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.



	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>49(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

ET3DV6 - SN:1644

November 13, 2012


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

### Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) <sup>1</sup>	Relative Permittivity <sup>2</sup>	Conductivity (S/m) <sup>2</sup>	CorrF X	CorrF Y	CorrF Z	Alpha	Depth (mm)	Uncl. (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	0.60	2.10	± 12.0 %
1950	40.0	1.40	5.16	5.16	5.16	0.60	2.09	± 12.0 %
2450	39.2	1.60	4.60	4.60	4.60	0.65	2.00	± 12.0 %

<sup>1</sup> Frequency validity of a 100 MHz only applies for DASY v4.4 and higher (see Page 2), also it is restricted to ± 50 MHz. The uncertainty is the RSS of the CorrF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

<sup>2</sup> At frequencies below 3 GHz, the validity of tissue parameters (ε) and σ) can be related to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε) and σ) is restricted to ± 5%. The uncertainty is the RSS of the CorrF uncertainty for indicated target tissue parameters.

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>50(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW</b> <b>L6ARFP120LW</b>

ET3DV6- SN:1644

November 13, 2012


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

### Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) <sup>1</sup>	Relative Permittivity <sup>2</sup>	Conductivity (S/m) <sup>3</sup>	Coeff X	Coeff Y	Coeff Z	Alpha	Depth (mm)	Unc. (k=2)
750	55.5	0.86	6.30	6.30	6.30	0.33	2.61	± 12.0 %
900	55.0	1.05	6.06	6.06	6.06	0.31	2.99	± 12.0 %
1810	53.3	1.52	4.75	4.75	4.75	0.60	2.40	± 12.0 %
1950	53.3	1.52	4.75	4.75	4.75	0.60	2.28	± 12.0 %
2450	52.7	1.95	4.11	4.11	4.11	0.50	2.15	± 12.0 %

<sup>1</sup> 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 Coeff uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

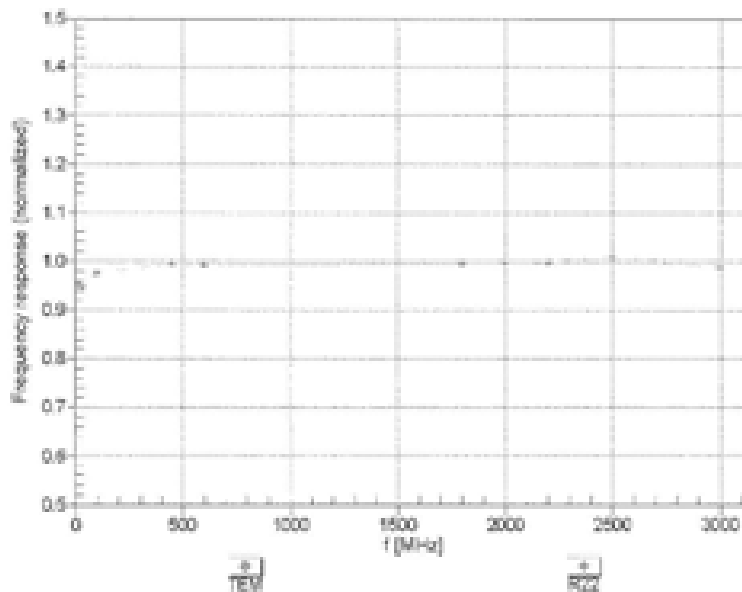
<sup>2</sup> At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if equal compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the Coeff uncertainty for indicated target tissue parameters.

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>51(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW</b> <b>L6ARFP120LW</b>


ET30V6- 09/1644

November 13, 2012

### Frequency Response of E-Field (TEM-Cell:R1110 E2X, Waveguide: R22)



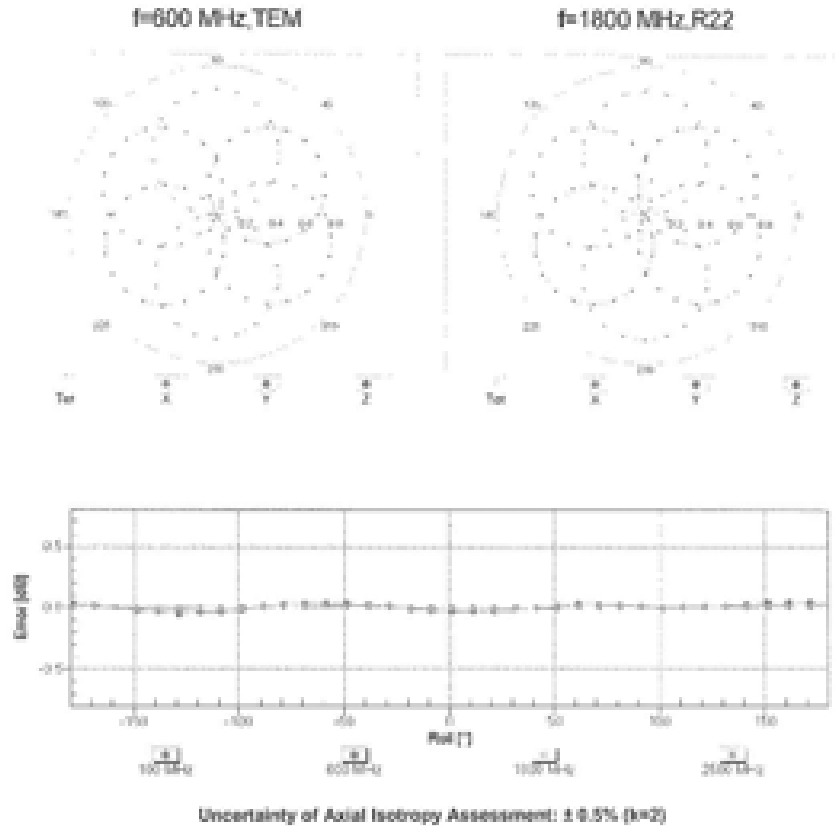
Uncertainty of Frequency Response of E-field:  $\pm 0.3\%$  ( $k=2$ )

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>52(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW</b> <b>L6ARFP120LW</b>

ET3076- 3N1944

November 13, 2012

### Receiving Pattern ( $\phi$ ), $\theta = 0^\circ$



Author Data  
**Andrew Becker**

Dates of Test  
**Nov 22, 2012 – Feb 28, 2013**

Test Report No  
**RTS-6026-1303-02**

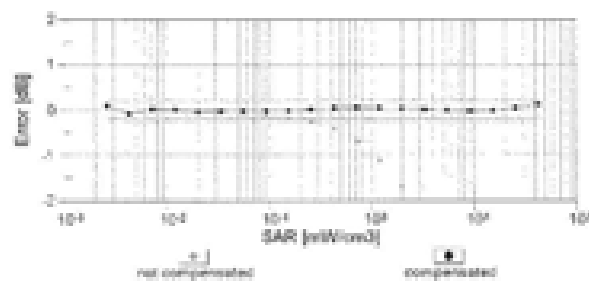
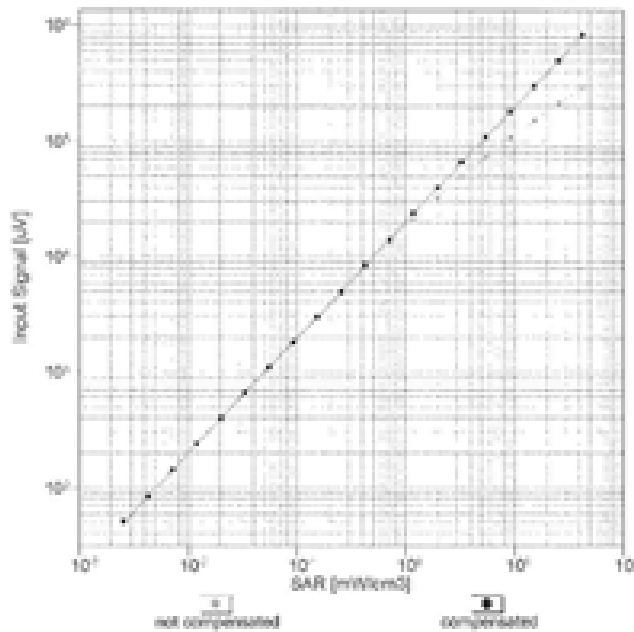
FCC ID:  
**L6ARFL110LW  
 L6ARFP120LW**

IC  
**2503A-RFL110LW  
 2503A-RFP120LW**


ETS0146- 04:1044

November 13, 2012

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



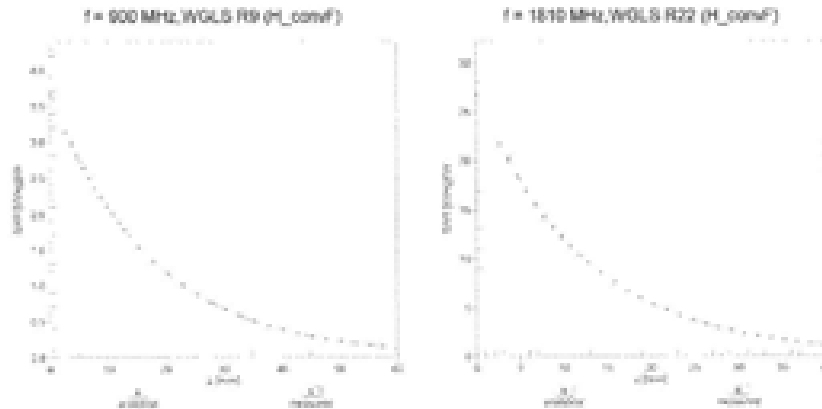
Uncertainty of Linearity Assessment:  $\pm 0.6\%$  ( $k=2$ )

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>54(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

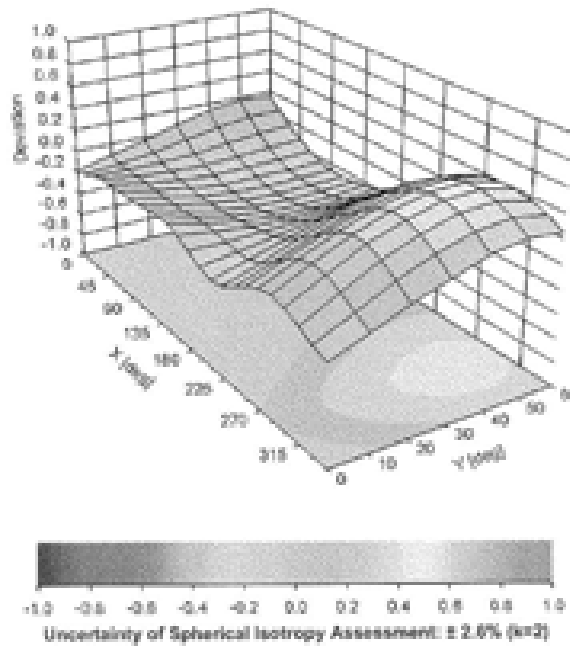
ETS046-5R1644

November 13, 2012

### Conversion Factor Assessment



### Deviation from Isotropy in Liquid Error (k, 3), f = 900 MHz





Author Data  
**Andrew Becker**

Dates of Test  
**Nov 22, 2012 – Feb 28, 2013**

Test Report No  
**RTS-6026-1303-02**

FCC ID:  
**L6ARFL110LW  
L6ARFP120LW**

IC  
**2503A-RFL110LW  
2503A-RFP120LW**


ET3DV6 - SN:1644

November 13, 2012


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

### Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	81.5
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	enabled
Probe Overall Length	33.7 mm
Probe 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 mm
Probe Tip to Sensor Z Calibration Point	2.7 mm
Recommended Measurement Distance from Surface	4 mm

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>56(134)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW</b> <b>L6ARFP120LW</b>	IC <b>2503A-RFL110LW</b> <b>2503A-RFP120LW</b>



	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>57(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

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



S Schweizerischer Kalibrierdienst  
 C Service suisse d'étalonnage  
 S Servizi svizzeri di taratura  
 S Swiss Calibration Service

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

Accreditation No.: **SCS 108**

Client **RIM**

Certificate No: **D750V3-1001\_Jan11**

### CALIBRATION CERTIFICATE

Object **D750V3 - SN: 1021**

Calibration procedure(s) **QA CAL-05.v8  
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 (MATE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	C857480704	06-Oct-10 (No. 217-01286)	Oct-11
Power sensor HP 8481A	US37282783	06-Oct-10 (No. 217-01286)	Oct-11
Reference 20 dB Attenuator	SN: 5086 (20g)	30-Mar-10 (No. 217-01158)	Mar-11
Type-N mismatch combination	SN: 5047.2 / 06327	30-Mar-10 (No. 217-01162)	Mar-11
Reference Probe E530V3	SN: 3205	30-Apr-10 (No. E53-3205_Apr10)	Apr-11
DAE4	SN: 601	10-Jun-10 (No. DAE4-601_Jun10)	Jun-11


  

Secondary Standards	ID #	Check Date (in-house)	Scheduled Check
Power sensor HP 8481A	MF41062317	18-Oct-09 (in house check Oct-09)	In-house check: Oct-11
RF generator FLS SMT-06	100005	4-Aug-09 (in house check Oct-09)	In-house check: Oct-11
Network Analyzer HP 8733E	US37390085 54205	18-Oct-09 (in house check Oct-10)	In-house check: Oct-11

Calibrated by: **Jason Kästner** (Name) / **Laboratory Technician** (Function) / *[Signature]* (Signature)  
 Approved by: **Kajsa Pokoiva** (Name) / **Technical Manager** (Function) / *[Signature]* (Signature)

Issued: January 6, 2011

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

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>58(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

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



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

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

Accreditation No.: **SCS 108**

**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
- 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:**

- 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.

Author Data  
**Andrew Becker**

Dates of Test  
**Nov 22, 2012 – Feb 28, 2013**

Test Report No  
**RTS-6026-1303-02**

FCC ID:  
**L6ARFL110LW  
 L6ARFP120LW**

IC  
**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	$dx, dy, dz = 5 \text{ mm}$	
Frequency	$750 \text{ MHz} \pm 1 \text{ MHz}$	

**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	$(22.0 \pm 0.2) \text{ °C}$	$42.3 \pm 6 \%$	$0.91 \text{ mho/m} \pm 6 \%$
Head TSL temperature during test	$(22.0 \pm 0.2) \text{ °C}$	---	---

**SAR result with Head TSL**

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.12 mW / g
SAR normalized	normalized to 1W	8.48 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	<b>8.38 mW / g <math>\pm 17.0 \%</math> (k=2)</b>

SAR averaged over 10 cm <sup>3</sup> (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	<b>5.45 mW / g <math>\pm 16.5 \%</math> (k=2)</b>



Author Data  
**Andrew Becker**

Dates of Test  
**Nov 22, 2012 – Feb 28, 2013**

Test Report No  
**RTS-6026-1303-02**

FCC ID:  
**L6ARFL110LW  
L6ARFP120LW**

IC  
**2503A-RFL110LW  
2503A-RFP120LW**

## 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
----------------------------------	----------


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 04, 2010

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>61(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

**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:  $f = 750 \text{ MHz}$ ;  $\sigma = 0.91 \text{ mho/m}$ ;  $\epsilon_r = 42.3$ ;  $\rho = 1000 \text{ kg/m}^3$

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)

**P<sub>in</sub>=250mW; dip=15mm; dist=3.0mm/Zoom Scan (7x7x7)/Cube 0; Measurement grid:**

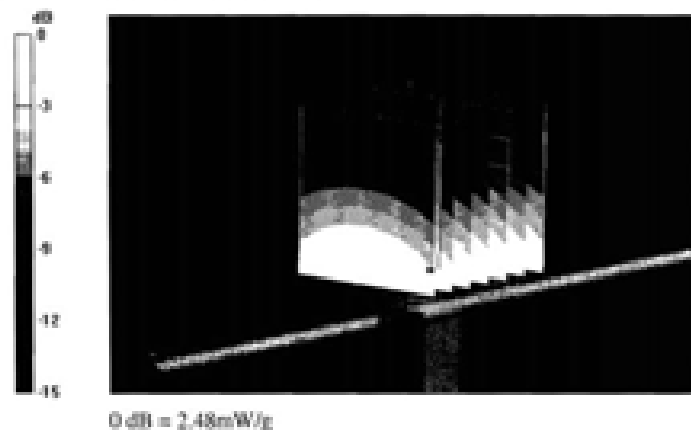
$dx=5mm, dy=5mm, dz=5mm$


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

Peak SAR (extrapolated) = 3.24 W/kg

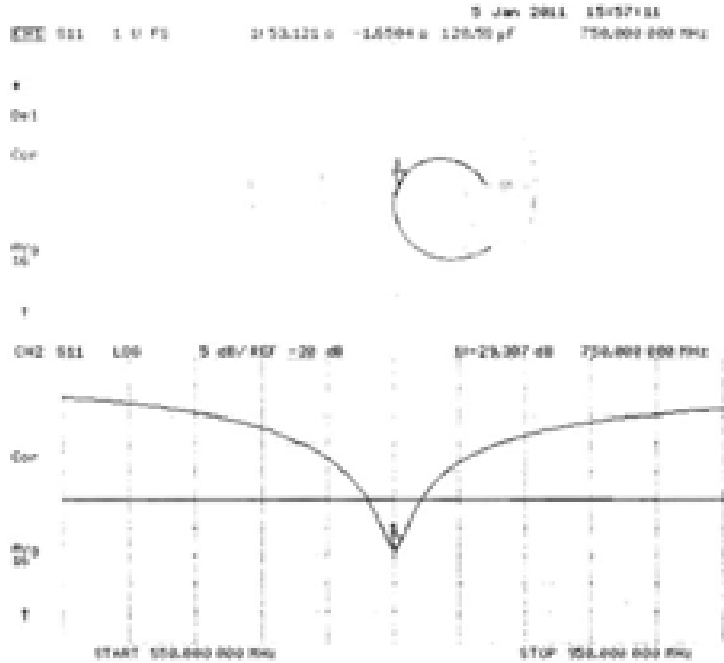
SAR(1g) = 2.12 mW/g; SAR(10g) = 1.38 mW/g


Maximum value of SAR (measured) = 2.48 mW/g



	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>62(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

**Impedance Measurement Plot for Head TSL**



	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>63(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

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





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

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

Accreditation No.: **SCS 108**


Client **RTS (RIM Testing Services)**

Certificate No: **D750V3-1021\_Jan13**

CALIBRATION CERTIFICATE																																															
Object	D750V3 - SN: 1021																																														
Calibration procedure(s)	OA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz																																														
Calibration date:	January 07, 2013																																														
<p>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.</p> <p>All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity &lt; 70%.</p> <p>Calibration Equipment used (MPE critical for calibration)</p> <table border="1"> <thead> <tr> <th>Primary Standards</th> <th>ID #</th> <th>Cal Date (Certificate No.)</th> <th>Scheduled Calibration</th> </tr> </thead> <tbody> <tr> <td>Power meter CPM-402A</td> <td>04521460704</td> <td>01-Nov-12 (No. 217-01040)</td> <td>Oct-13</td> </tr> <tr> <td>Power sensor HP 8471A</td> <td>US37290783</td> <td>01-Nov-12 (No. 217-01040)</td> <td>Oct-13</td> </tr> <tr> <td>Reference 20-dB Attenuator</td> <td>SN: 3058 (30x)</td> <td>27-Mar-12 (No. 217-01030)</td> <td>Apr-13</td> </tr> <tr> <td>Type-N mismatch combination</td> <td>SN: 8047.3 / 06327</td> <td>27-Mar-12 (No. 217-01030)</td> <td>Apr-13</td> </tr> <tr> <td>Reference Probe E530V3</td> <td>SN: 3205</td> <td>28-Dec-12 (No. E53-3205_Dec12)</td> <td>Dec-13</td> </tr> <tr> <td>DAE/s</td> <td>SN: 601</td> <td>27-Jun-12 (No. DAE4-601_Jun12)</td> <td>Jun-13</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>Secondary Standards</th> <th>ID #</th> <th>Check Date (in house)</th> <th>Scheduled Check</th> </tr> </thead> <tbody> <tr> <td>Power sensor HP 8471A</td> <td>MF11092317</td> <td>18-Oct-02 (in house check Oct-11)</td> <td>In house check: Oct-13</td> </tr> <tr> <td>RF generator RLS SMT-05</td> <td>100005</td> <td>04-Aug-09 (in house check Oct-11)</td> <td>In house check: Oct-13</td> </tr> <tr> <td>Network Analyzer HP 8712E</td> <td>US37390585-34205</td> <td>18-Oct-01 (in house check Oct-12)</td> <td>In house check: Oct-13</td> </tr> </tbody> </table>				Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration	Power meter CPM-402A	04521460704	01-Nov-12 (No. 217-01040)	Oct-13	Power sensor HP 8471A	US37290783	01-Nov-12 (No. 217-01040)	Oct-13	Reference 20-dB Attenuator	SN: 3058 (30x)	27-Mar-12 (No. 217-01030)	Apr-13	Type-N mismatch combination	SN: 8047.3 / 06327	27-Mar-12 (No. 217-01030)	Apr-13	Reference Probe E530V3	SN: 3205	28-Dec-12 (No. E53-3205_Dec12)	Dec-13	DAE/s	SN: 601	27-Jun-12 (No. DAE4-601_Jun12)	Jun-13	Secondary Standards	ID #	Check Date (in house)	Scheduled Check	Power sensor HP 8471A	MF11092317	18-Oct-02 (in house check Oct-11)	In house check: Oct-13	RF generator RLS SMT-05	100005	04-Aug-09 (in house check Oct-11)	In house check: Oct-13	Network Analyzer HP 8712E	US37390585-34205	18-Oct-01 (in house check Oct-12)	In house check: Oct-13
Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration																																												
Power meter CPM-402A	04521460704	01-Nov-12 (No. 217-01040)	Oct-13																																												
Power sensor HP 8471A	US37290783	01-Nov-12 (No. 217-01040)	Oct-13																																												
Reference 20-dB Attenuator	SN: 3058 (30x)	27-Mar-12 (No. 217-01030)	Apr-13																																												
Type-N mismatch combination	SN: 8047.3 / 06327	27-Mar-12 (No. 217-01030)	Apr-13																																												
Reference Probe E530V3	SN: 3205	28-Dec-12 (No. E53-3205_Dec12)	Dec-13																																												
DAE/s	SN: 601	27-Jun-12 (No. DAE4-601_Jun12)	Jun-13																																												
Secondary Standards	ID #	Check Date (in house)	Scheduled Check																																												
Power sensor HP 8471A	MF11092317	18-Oct-02 (in house check Oct-11)	In house check: Oct-13																																												
RF generator RLS SMT-05	100005	04-Aug-09 (in house check Oct-11)	In house check: Oct-13																																												
Network Analyzer HP 8712E	US37390585-34205	18-Oct-01 (in house check Oct-12)	In house check: Oct-13																																												
Calibrated by:	Name Lutz Klyener	Function Laboratory Technician	Signature 																																												
Approved by:	Name Katja Polowik	Function Technical Manager	Signature 																																												
			Issued: January 8, 2013																																												
<p>This calibration certificate shall not be reproduced except in full without written approval of the laboratory.</p>																																															

Certificate No: D750V3-1021\_Jan13

Page 1 of 6

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>64(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

Calibration Laboratory of  
 Schmid & Partner  
 Engineering AG  
 Zeughausstrasse 45, 8004 Zurich, Switzerland



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

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

Accreditation No.: SCS 108

**Glossary:**

TSL tissue simulating liquid  
 ConwF 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
- 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:**


- 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%.



	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>65(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

### Measurement Conditions

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

DASY Version	DaSYS	V52-6.4
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 <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.12 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	<b>8.46 W/kg ± 17.0 % (k=2)</b>

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.58 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	<b>6.51 W/kg ± 14.5 % (k=2)</b>

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>66(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

## Appendix

### Antenna Parameters with Head TSL

Impedance, transformed to feed point	55.7 $\Omega$ - 0.2 j $\Omega$
Return Loss	- 25.4 dB

### General Antenna Parameters and Design

Electrical Delay (one direction)	1.000 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

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>67(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

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

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: ES3DV3 - SN:205; CoreF(6.28, 6.28, 6.28); Calibrated: 28.12.2012;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sa601; 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:**

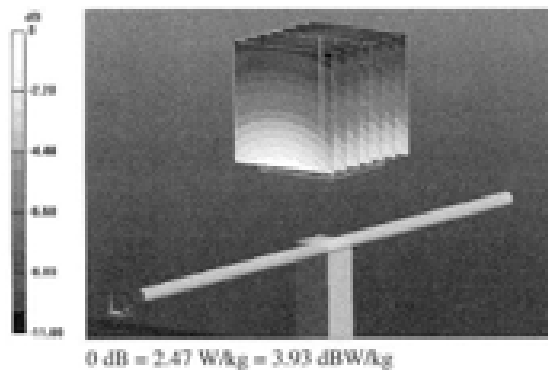
Measurement grid:  $d_x=5\text{mm}$ ,  $d_y=5\text{mm}$ ,  $d_z=5\text{mm}$


Reference Value = 54.107 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 3.23 W/kg

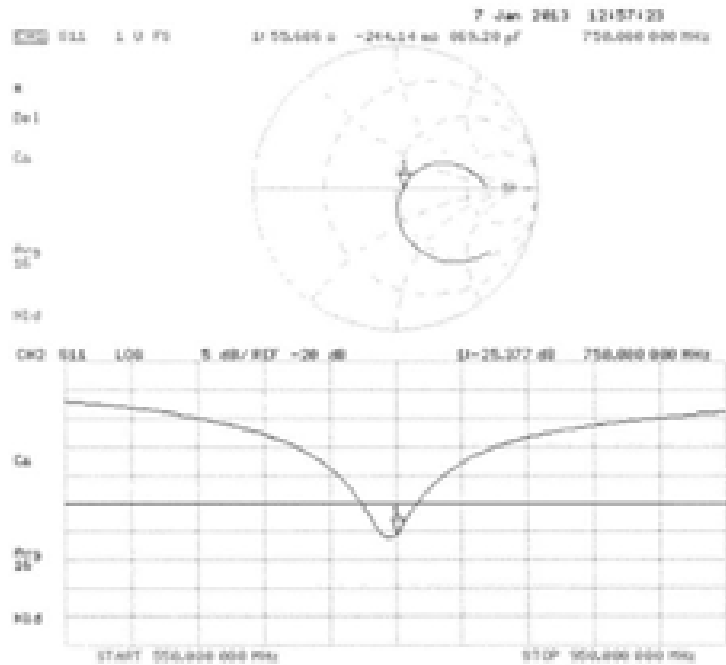
SAR(1 g) = 2.12 W/kg; SAR(10 g) = 1.38 W/kg


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




	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>68(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

Impedance Measurement Plot for Head TSL



	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>69(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW</b> <b>L6ARFP120LW</b>

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>70(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

**Calibration Laboratory of  
Schmid & Partner  
Engineering AG**  
 Zeughausstrasse 45, 8004 Zurich, Switzerland





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

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

Accreditation No.: **SCS 108**


Client: **RTS (RIM Testing Services)**

Certificate No.: **D835V2-446\_Jan11**

CALIBRATION CERTIFICATE			
Object:	<b>D835V2 - SN: 446</b>		
Calibration procedure(s):	<b>QA CAL-05.v8 Calibration procedure for dipole validation kits</b>		
Calibration date:	<b>January 21, 2011</b>		
<p>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.</p> <p>All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 0.1)°C and humidity &lt; 70%.</p> <p>Calibration Equipment used (MATE critical for calibration)</p>			
Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	Q830480704	06-Oct-10 (No. 217-01296)	Oct-11
Power sensor HP 8481A	US37292763	06-Oct-10 (No. 217-01296)	Oct-11
Reference 20 dB Attenuator	SA: 5086 (20g)	30-Mar-10 (No. 217-01158)	Mar-11
Type-N mismatch combination	SA: 5047.2 / 06327	30-Mar-10 (No. 217-01162)	Mar-11
Reference Probe ES30Y3	SA: 3205	30-Apr-10 (No. ES3-3205_Apr10)	Apr-11
DAE4	SA: 601	10-Jun-10 (No. DAE4-601_Jun10)	Jun-11
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MPH1092317	18-Oct-02 (in house check Oct-08)	In house check: Oct-11
RF generator H&S 30T-08	100005	4-Aug-09 (in house check Oct-09)	In house check: Oct-11
Network Analyser HP 8710E	US37380585 (4206)	18-Oct-01 (in house check Oct-10)	In house check: Oct-11
Calibrated by:	Name <b>Dirce Rey</b>	Function <b>Laboratory Technician</b>	Signature 
Approved by:	Name <b>Katja Pokorski</b>	Function <b>Technical Manager</b>	Signature 
Issued: <b>January 21, 2011</b>			
This calibration certificate shall not be reproduced except in full without written approval of the laboratory.			

Certificate No: **D835V2-446\_Jan11**

Page 1 of 6

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>71(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

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



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

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

Accreditation No.: **SCS 108**

**Glossary:**

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

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

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

**Additional Documentation:**

- d) DASY4/5 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.



Author Data  
**Andrew Becker**

Dates of Test  
**Nov 22, 2012 – Feb 28, 2013**

Test Report No  
**RTS-6026-1303-02**

FCC ID:  
**L6ARFL110LW  
 L6ARFP120LW**

IC  
**2503A-RFL110LW  
 2503A-RFP120LW**

**Measurement Conditions**

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

<b>DASY Version</b>	DASY5	V52.6
<b>Extrapolation</b>	Advanced Extrapolation	
<b>Phantom</b>	Modular Flat Phantom V4.0	
<b>Distance Dipole Center - TSL</b>	15 mm	with Spacer
<b>Zoom Scan Resolution</b>	dx, dy, dz = 5 mm	
<b>Frequency</b>	805 MHz ± 1 MHz	

**Head TSL parameters**

The following parameters and calculations were applied.

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

**SAR result with Head TSL**

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	3.29 mW / g
SAR normalized	normalized to 1W	9.56 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	9.63 mW / g ± 17.9 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (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)





Author Data  
**Andrew Becker**

Dates of Test  
**Nov 22, 2012 – Feb 28, 2013**

Test Report No  
**RTS-6026-1303-02**

FCC ID:  
**L6ARFL110LW  
L6ARFP120LW**

IC  
**2503A-RFL110LW  
2503A-RFP120LW**

## Appendix

### Antenna Parameters with Head TSL

Impedance, transformed to feed point	49.8 $\Omega$ - 7.7 $j\Omega$
Return Loss	- 22.2 dB

### General Antenna Parameters and Design

Electrical Delay (one direction)	1.300 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

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>74(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

**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;  $\sigma = 0.89$  mho/m;  $\epsilon_r = 41.2$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.03, 6.03, 6.03); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DA84 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)

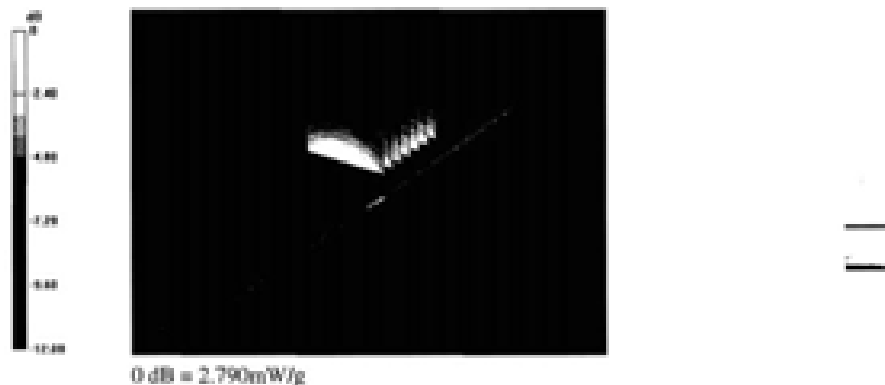
**Pin=250 mW /d=15mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0; Measurement grid: dx=5mm, dy=5mm, dz=5mm**


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

Peak SAR (extrapolated) = 3.600 W/kg

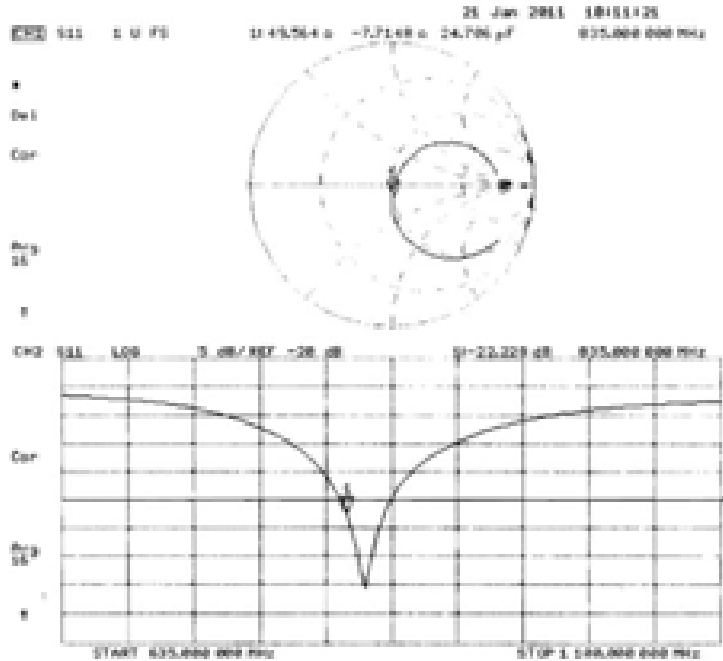
SAR(1 g) = 2.39 mW/g; SAR(10 g) = 1.56 mW/g


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



	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>75(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

**Impedance Measurement Plot for Head TSL**



	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>76(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

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





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

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

Accreditation No.: **SCS 108**


Client: **RTS (RIM Testing Services)**

Certificate No: **D835V2-446\_Jan13**

CALIBRATION CERTIFICATE																																															
Object	D835V2 - SN: 446																																														
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz																																														
Calibration date:	January 07, 2013																																														
<p>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.</p> <p>All calibrations have been conducted in the closed laboratory facility: environment temperature (20 ± 3)°C and humidity &lt; 70%.</p> <p>Calibration Equipment used (MPE critical for calibration)</p> <table border="1"> <thead> <tr> <th>Primary Standards</th> <th>ID #</th> <th>Cal Date (Certificate No.)</th> <th>Scheduled Calibration</th> </tr> </thead> <tbody> <tr> <td>Power meter EPM-612A</td> <td>0827460704</td> <td>01-Nov-12 (No. 217-01640)</td> <td>Oct-13</td> </tr> <tr> <td>Power sensor HP 8481A</td> <td>U037262783</td> <td>01-Nov-12 (No. 217-01640)</td> <td>Oct-13</td> </tr> <tr> <td>Reference 20 dB Attenuator</td> <td>SN: 5058 (20x)</td> <td>27-Mar-12 (No. 217-01530)</td> <td>Apr-13</td> </tr> <tr> <td>Type-N mismatch combination</td> <td>SN: 5047.3 / 66327</td> <td>27-Mar-12 (No. 217-01530)</td> <td>Apr-13</td> </tr> <tr> <td>Reference Probe ES3DV3</td> <td>SN: 3205</td> <td>28-Dec-12 (No. ES3-3205_Dec12)</td> <td>Dec-13</td> </tr> <tr> <td>DAE4</td> <td>SN: 601</td> <td>27-Jun-12 (No. DAE4-601_Jun12)</td> <td>Jun-13</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>Secondary Standards</th> <th>ID #</th> <th>Check Date (in house)</th> <th>Scheduled Check</th> </tr> </thead> <tbody> <tr> <td>Power sensor HP 8481A</td> <td>MY41000317</td> <td>18-Oct-02 (in house check Oct-11)</td> <td>In house check: Oct-13</td> </tr> <tr> <td>HP generator P&amp;S SMT-20</td> <td>100005</td> <td>01-Aug-09 (in house check Oct-11)</td> <td>In house check: Oct-13</td> </tr> <tr> <td>Network Analyzer HP 8713E</td> <td>U037300585 54206</td> <td>18-Oct-01 (in house check Oct-12)</td> <td>In house check: Oct-13</td> </tr> </tbody> </table>				Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration	Power meter EPM-612A	0827460704	01-Nov-12 (No. 217-01640)	Oct-13	Power sensor HP 8481A	U037262783	01-Nov-12 (No. 217-01640)	Oct-13	Reference 20 dB Attenuator	SN: 5058 (20x)	27-Mar-12 (No. 217-01530)	Apr-13	Type-N mismatch combination	SN: 5047.3 / 66327	27-Mar-12 (No. 217-01530)	Apr-13	Reference Probe ES3DV3	SN: 3205	28-Dec-12 (No. ES3-3205_Dec12)	Dec-13	DAE4	SN: 601	27-Jun-12 (No. DAE4-601_Jun12)	Jun-13	Secondary Standards	ID #	Check Date (in house)	Scheduled Check	Power sensor HP 8481A	MY41000317	18-Oct-02 (in house check Oct-11)	In house check: Oct-13	HP generator P&S SMT-20	100005	01-Aug-09 (in house check Oct-11)	In house check: Oct-13	Network Analyzer HP 8713E	U037300585 54206	18-Oct-01 (in house check Oct-12)	In house check: Oct-13
Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration																																												
Power meter EPM-612A	0827460704	01-Nov-12 (No. 217-01640)	Oct-13																																												
Power sensor HP 8481A	U037262783	01-Nov-12 (No. 217-01640)	Oct-13																																												
Reference 20 dB Attenuator	SN: 5058 (20x)	27-Mar-12 (No. 217-01530)	Apr-13																																												
Type-N mismatch combination	SN: 5047.3 / 66327	27-Mar-12 (No. 217-01530)	Apr-13																																												
Reference Probe ES3DV3	SN: 3205	28-Dec-12 (No. ES3-3205_Dec12)	Dec-13																																												
DAE4	SN: 601	27-Jun-12 (No. DAE4-601_Jun12)	Jun-13																																												
Secondary Standards	ID #	Check Date (in house)	Scheduled Check																																												
Power sensor HP 8481A	MY41000317	18-Oct-02 (in house check Oct-11)	In house check: Oct-13																																												
HP generator P&S SMT-20	100005	01-Aug-09 (in house check Oct-11)	In house check: Oct-13																																												
Network Analyzer HP 8713E	U037300585 54206	18-Oct-01 (in house check Oct-12)	In house check: Oct-13																																												
Calibrated by:	Name Lutz Ryener	Function Laboratory Technician	Signature 																																												
Approved by:	Name Kaja Polovnik	Function Technical Manager	Signature 																																												
Issued: January 8, 2013																																															
This calibration certificate shall not be reproduced except in full without written approval of the laboratory.																																															

Certificate No: D835V2-446\_Jan13

Page 1 of 6

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>77(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

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



**S** Schweizerischer Kalibrierdienst  
**S** Service suisse d'étalonnage  
**C** Service suisse d'étalonnage  
**S** Swiss Calibration Service

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

Accreditation No.: **SCS 108**

**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
- 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:**

- 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%.

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>78(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

### Measurement Conditions

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

DASY Version	DASY5	V92.6.4
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 ± 0 %	0.92 mho/m ± 0 %
Head TSL temperature change during test	< 0.5 °C	---	---

### SAR result with Head TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.38 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	<b>6.29 W/kg ± 17.0 % (k=2)</b>

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

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>79(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

## 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)	1.395 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

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>80(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

**DASY5 Validation Report for Head TSL**

Date: 07.01.2013

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: DR35V2; Serial: DR35V2 - SN: 446

Communication System: CW; Frequency: 835 MHz

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

Phantom section: Flat Section

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

DASY52 Configuration:

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

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

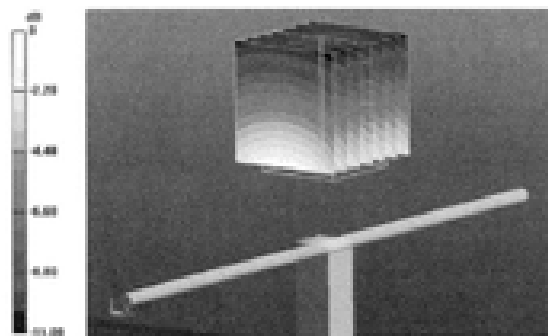
Measurement grid:  $d_x=5\text{mm}$ ,  $d_y=5\text{mm}$ ,  $d_z=5\text{mm}$

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

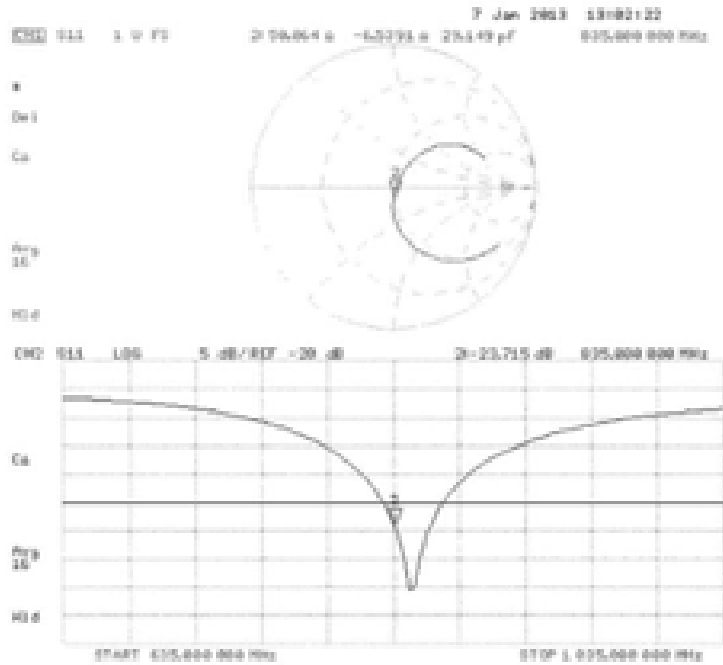



0 dB = 2.79 W/kg = 4.46 dBW/kg




	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>81(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

Impedance Measurement Plot for Head TSL



	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>82(134)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW</b> <b>L6ARFP120LW</b>	IC <b>2503A-RFL110LW</b> <b>2503A-RFP120LW</b>

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>83(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

**Calibration Laboratory of  
Schmid & Partner  
Engineering AG**  
 Zöggenstrasse 43, 8604 Zurich, Switzerland




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

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

Accreditation No.: **SCS 108**


Client **RTS (RIM Testing Services)**

Certificate No: **D835V2-4d043\_Apr11**

CALIBRATION CERTIFICATE			
Object	D835V2 - SN: 4d043		
Calibration procedure(s)	GA CAL-05.v8 Calibration procedure for dipole validation kits		
Calibration date:	April 07, 2011		
<p>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.</p> <p>All calibrations have been conducted in the client laboratory facility, environment temperature: (20 ± 3)°C and humidity &lt; 70%.</p> <p>Calibration Equipment used (NISTE critical for calibration)</p>			
Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-4024	0807480704	06-Oct-10 (No. 217-01060)	Oct-11
Power sensor HP 8481A	US37392780	06-Oct-10 (No. 217-01060)	Oct-11
Reference 3D dB Attenuator	SN: 3086 (70g)	29-Mar-11 (No. 217-01060)	Apr-12
Type-N mismatch combination	SN: 3047 2 / 06007	29-Mar-11 (No. 217-01060)	Apr-12
Reference Probe ES30V3	SN: 3205	26-Apr-10 (No. ES3-3205_Apr10)	Apr-11
DUT	SN: 601	18-Jun-10 (No. DUT-601_Jun10)	Jun-11
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY11062117	18-Oct-09 (in house check Oct-09)	In house check: Oct-11
RF generator RLS SMT-06	102825	4-Aug-09 (in house check Oct-09)	In house check: Oct-11
Network Analyser HP 8152B	US37391085 54306	18-Oct-09 (in house check Oct-09)	In house check: Oct-11
Calibrated by:	Name <b>Jelun Kasirali</b>	Function <b>Laboratory Technician</b>	Signature  
Approved by:	Name <b>Katja Polonic</b>	Function <b>Technical Manager</b>	
Issued April 7, 2011			
This calibration certificate shall not be reproduced except in full without written approval of the laboratory.			

Certificate No: **D835V2-4d043\_Apr11**

Page 1 of 6

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>84(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

**Calibration Laboratory of  
Schmid & Partner  
Engineering AG**  
 Zughausstrasse 41, 8004 Zurich, Switzerland



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

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

Accreditation No.: **SCS 108**

**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
- 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:**

- 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.

Author Data  
**Andrew Becker**

Dates of Test  
**Nov 22, 2012 – Feb 28, 2013**

Test Report No  
**RTS-6026-1303-02**

FCC ID:  
**L6ARFL110LW  
L6ARFP120LW**

IC  
**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 Scan Resolution	$d_x, d_y, d_z = 5 \text{ mm}$	
Frequency	$935 \text{ MHz} \pm 1 \text{ MHz}$	

### 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	$(22.0 \pm 0.2) \text{ °C}$	$40.6 \pm 6 \%$	$0.90 \text{ mho/m} \pm 6 \%$
Head TSL temperature during test	$(22.0 \pm 0.2) \text{ °C}$	---	---

### SAR result with Head TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.33 mW / g
SAR normalized	normalized to 1W	9.32 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	<b>9.43 mW / g <math>\pm 17.6 \%</math> (k=2)</b>

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.52 mW / g
SAR normalized	normalized to 1W	6.08 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	<b>6.14 mW / g <math>\pm 16.5 \%</math> (k=2)</b>

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>86(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

**Appendix**

**Antenna Parameters with Head TSL**

Impedance, transformed to feed point	52.8 Ω - 3.4 jΩ
Return Loss	-27.2 dB

**General Antenna Parameters and Design**

Electrical Delay (one direction)	1.291 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.

**Design Modification by End User**

The dipole has been modified with Teflon 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, 2008

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>87(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

**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: HSI-900

Medium parameters used:  $f = 835 \text{ MHz}$ ;  $\sigma = 0.88 \text{ mho/m}$ ;  $\epsilon_r = 40.6$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; Cores F(6.03, 6.03, 6.03); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Se601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 4-9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY52, V52.6.2 Build (424)
- Postprocessing SW: SEMCAD X, V14.4.4 Build (2829)

**$P_{in} = 250 \text{ mW}$  /  $d = 15 \text{ mm}$  / Cube 0;**

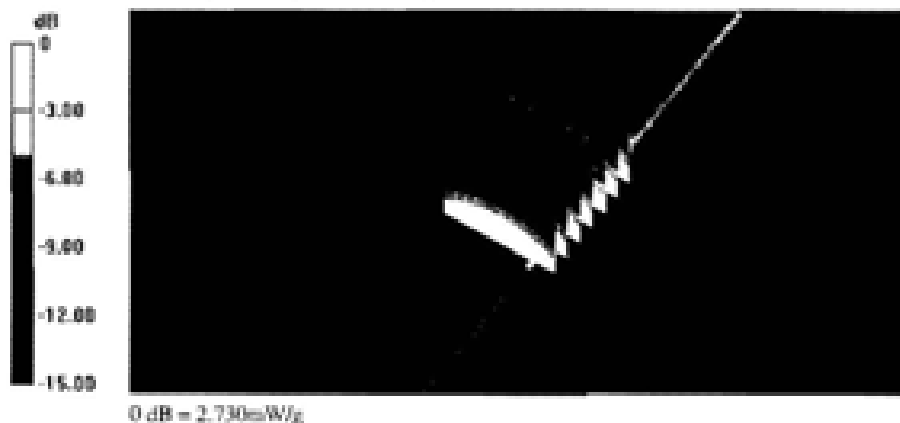
Measurement grid:  $d_x = 5 \text{ mm}$ ,  $d_y = 5 \text{ mm}$ ,  $d_z = 5 \text{ mm}$


Reference Value = 57.201 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 3.504 W/kg

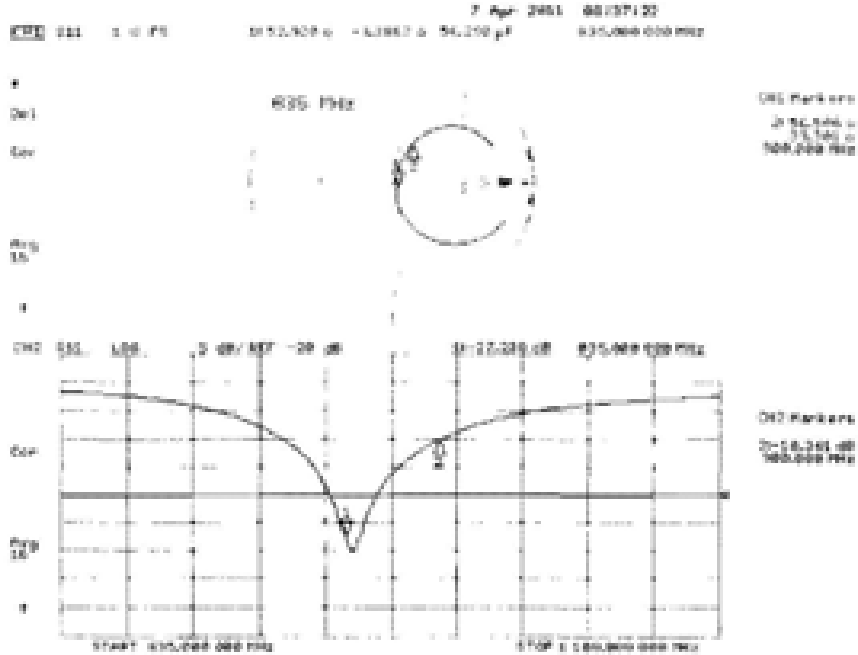
SAR(1 g) = 2.33 mW/g; SAR(10 g) = 1.52 mW/g

Maximum value of SAR (measured) = 2.730 mW/g




	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>88(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

**Impedance Measurement Plot for Head TSL**





	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>89(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

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



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

Accredited by the Swiss Accreditation Service (SAC)  
 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: **D1800V2-2d020\_Jan11**

### CALIBRATION CERTIFICATE

Object **D1800V2 - SN: 2d020**  
 Calibration procedure(s) **QA CAL-05.v8  
Calibration procedure for dipole validation kits**  
 Calibration date: **January 13, 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 (MPE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	0803480704	06-Oct-10 (No. 217-01266)	Oct-11
Power sensor HP 8481A	US237262763	06-Oct-10 (No. 217-01266)	Oct-11
Reference 20-dB Attenuator	SA: 5086 (20g)	30-Mar-10 (No. 217-01158)	Mar-11
Type-N mismatch combination	SA: 5047.2 / 06327	30-Mar-10 (No. 217-01162)	Mar-11
Reference Probe E530V3	SA: 3205	30-Apr-10 (No. E53-3205_Apr10)	Apr-11
DAE4	SA: 601	10-Jun-10 (No. DAE4-601_Jun10)	Jun-11
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41000317	18-Oct-02 (in house check Oct-08)	in house check: Oct-11
RF generator R&S SMY-06	100005	4-Aug-09 (in house check Oct-09)	in house check: Oct-11
Network Analyzer HP 8710E	US237260585 04206	18-Oct-01 (in house check Oct-10)	in house check: Oct-11

Calculated by: **Dimas Bar** (Name) / **Laboratory Technician** (Function) / *[Signature]* (Signature)  
 Approved by: **Katja Pokorski** (Name) / **Technical Manager** (Function) / *[Signature]* (Signature)  
 Issued: January 13, 2011

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>90(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

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



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

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

Accreditation No.: **SCS 108**

**Glossary:**

TSL tissue simulating liquid  
 CorvF 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
- 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:**

- 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.

Author Data  
**Andrew Becker**

Dates of Test  
**Nov 22, 2012 – Feb 28, 2013**

Test Report No  
**RTS-6026-1303-02**

FCC ID:  
**L6ARFL110LW  
L6ARFP120LW**

IC  
**2503A-RFL110LW  
2503A-RFP120LW**

**Measurement Conditions**

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

DASY Version	DASY5	V52.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	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 <sup>3</sup> (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	<b>39.3 mW / g ± 17.0 % (k=2)</b>

SAR averaged over 10 cm <sup>3</sup> (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	<b>20.5 mW / g ± 18.5 % (k=2)</b>

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>92(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

## Appendix

### Antenna Parameters with Head TSL

Impedance, transformed to feed point	46.5 $\Omega$ - 7.3 j $\Omega$
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

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>93(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

**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:20020**

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

Medium: HSL U12 BB

Medium parameters used:  $f = 1800$  MHz;  $\sigma = 1.38$  mho/m;  $\epsilon_r = 38.7$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(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)

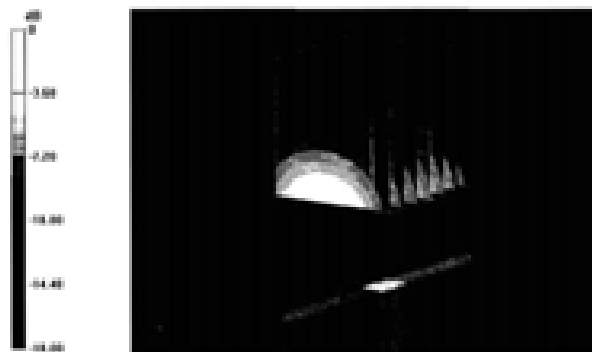
**Pin=250 mW /d=10mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm**


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

Peak SAR (extrapolated) = 17.902 W/kg

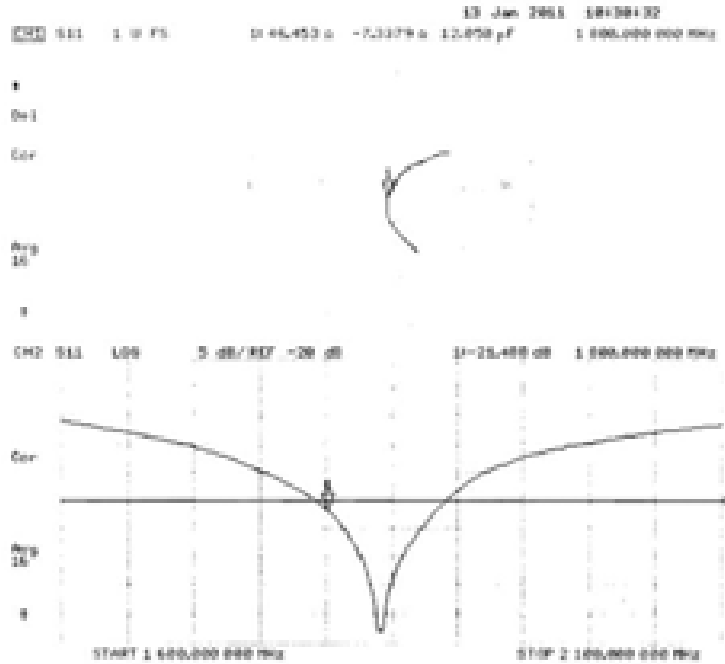
SAR(1g) = 9.78 mW/g; SAR(10g) = 5.13 mW/g


Maximum value of SAR (measured) = 12.051 mW/g



	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>94(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

**Impedance Measurement Plot for Head TSL**



	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>95(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

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





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

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

Accreditation No.: SCS 108


Client **RTS (RIM Testing Services)**

Certificate No: 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																																														
<p>The 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.</p> <p>All calibrations have been conducted in the closed laboratory facility; environment temperature (22 ± 3)°C and humidity &lt; 70%.</p> <p>Calibration Equipment used (MATE critical for calibration):</p> <table border="1"> <thead> <tr> <th>Primary Standards</th> <th>ID #</th> <th>Cal Date (Certificate No.)</th> <th>Scheduled Calibration</th> </tr> </thead> <tbody> <tr> <td>Power meter EPM-432A</td> <td>0807480704</td> <td>01-Nov-12 (No. 217-01640)</td> <td>Oct-13</td> </tr> <tr> <td>Power sensor HP 8481A</td> <td>U507292760</td> <td>01-Nov-12 (No. 217-01640)</td> <td>Oct-13</td> </tr> <tr> <td>Reference 20 dB Attenuator</td> <td>SN: 5058 (20A)</td> <td>27-Mar-12 (No. 217-01630)</td> <td>Apr-13</td> </tr> <tr> <td>Type-N mismatch combination</td> <td>SN: 5047.3 / 86327</td> <td>27-Mar-12 (No. 217-01630)</td> <td>Apr-13</td> </tr> <tr> <td>Reference Probe E5301V3</td> <td>SN: 3005</td> <td>26-Dec-12 (No. E53-3005_Dec12)</td> <td>Dec-13</td> </tr> <tr> <td>DAD4</td> <td>SN: 601</td> <td>27-Jan-12 (No. DAD4-601_Jan12)</td> <td>Jan-13</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>Secondary Standards</th> <th>ID #</th> <th>Check Date (in house)</th> <th>Scheduled Check</th> </tr> </thead> <tbody> <tr> <td>Power sensor HP 8481A</td> <td>MF110802107</td> <td>18-Oct-02 (in house check Oct-11)</td> <td>In house check: Oct-13</td> </tr> <tr> <td>RF generator PLS SMT-06</td> <td>100005</td> <td>04-Aug-09 (in house check Oct-11)</td> <td>In house check: Oct-13</td> </tr> <tr> <td>Network Analyzer HP 8710E</td> <td>U507290585-94706</td> <td>18-Oct-01 (in house check Oct-12)</td> <td>In house check: Oct-13</td> </tr> </tbody> </table>				Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration	Power meter EPM-432A	0807480704	01-Nov-12 (No. 217-01640)	Oct-13	Power sensor HP 8481A	U507292760	01-Nov-12 (No. 217-01640)	Oct-13	Reference 20 dB Attenuator	SN: 5058 (20A)	27-Mar-12 (No. 217-01630)	Apr-13	Type-N mismatch combination	SN: 5047.3 / 86327	27-Mar-12 (No. 217-01630)	Apr-13	Reference Probe E5301V3	SN: 3005	26-Dec-12 (No. E53-3005_Dec12)	Dec-13	DAD4	SN: 601	27-Jan-12 (No. DAD4-601_Jan12)	Jan-13	Secondary Standards	ID #	Check Date (in house)	Scheduled Check	Power sensor HP 8481A	MF110802107	18-Oct-02 (in house check Oct-11)	In house check: Oct-13	RF generator PLS SMT-06	100005	04-Aug-09 (in house check Oct-11)	In house check: Oct-13	Network Analyzer HP 8710E	U507290585-94706	18-Oct-01 (in house check Oct-12)	In house check: Oct-13
Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration																																												
Power meter EPM-432A	0807480704	01-Nov-12 (No. 217-01640)	Oct-13																																												
Power sensor HP 8481A	U507292760	01-Nov-12 (No. 217-01640)	Oct-13																																												
Reference 20 dB Attenuator	SN: 5058 (20A)	27-Mar-12 (No. 217-01630)	Apr-13																																												
Type-N mismatch combination	SN: 5047.3 / 86327	27-Mar-12 (No. 217-01630)	Apr-13																																												
Reference Probe E5301V3	SN: 3005	26-Dec-12 (No. E53-3005_Dec12)	Dec-13																																												
DAD4	SN: 601	27-Jan-12 (No. DAD4-601_Jan12)	Jan-13																																												
Secondary Standards	ID #	Check Date (in house)	Scheduled Check																																												
Power sensor HP 8481A	MF110802107	18-Oct-02 (in house check Oct-11)	In house check: Oct-13																																												
RF generator PLS SMT-06	100005	04-Aug-09 (in house check Oct-11)	In house check: Oct-13																																												
Network Analyzer HP 8710E	U507290585-94706	18-Oct-01 (in house check Oct-12)	In house check: Oct-13																																												
Calibrated by:	Name Igor El-Nasouj	Function Laboratory Technician	Signature 																																												
Approved by:	Name Kaja Polovic	Function Technical Manager	Signature 																																												
Issued: January 9, 2013																																															
This calibration certificate shall not be reproduced except in full without written approval of the laboratory.																																															

Certificate No: D1800V2-2d020\_Jan13

Page 1 of 6

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>96(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

Calibration Laboratory of  
Schmid & Partner  
Engineering AG  
Zughausstrasse 40, 8004 Zurich, Switzerland



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

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

Accreditation No.: SCS 108

**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
- 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:**


- 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%.



	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>97(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

### 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:


	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 mho/m ± 6 %
Head TSL temperature change during test	± 0.5 °C	---	---

### SAR result with Head TSL

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

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

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>98(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

## Appendix

### Antenna Parameters with Head TSL

Impedance, transformed to feed point	40.2 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 SARF 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

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>99(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

**DASY5 Validation Report for Head TSL**

Date: 09.01.2013

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN: 24020

Communication System: CW; Frequency: 1800 MHz

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

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; CoreF(5.04, 5.04, 5.04); Calibrated: 28.12.2012;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DA64 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/Fin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:**

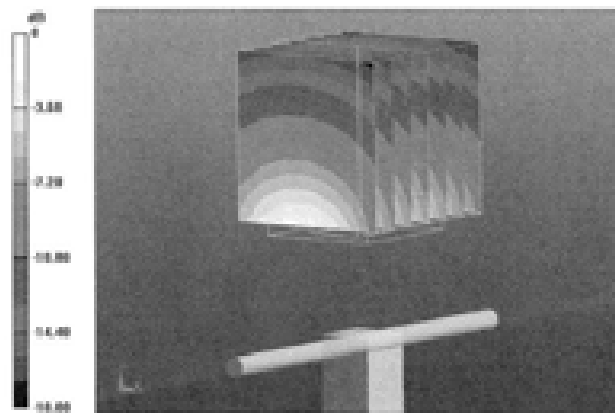
Measurement grid:  $d_x=5\text{mm}$ ,  $d_y=5\text{mm}$ ,  $d_z=5\text{mm}$

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

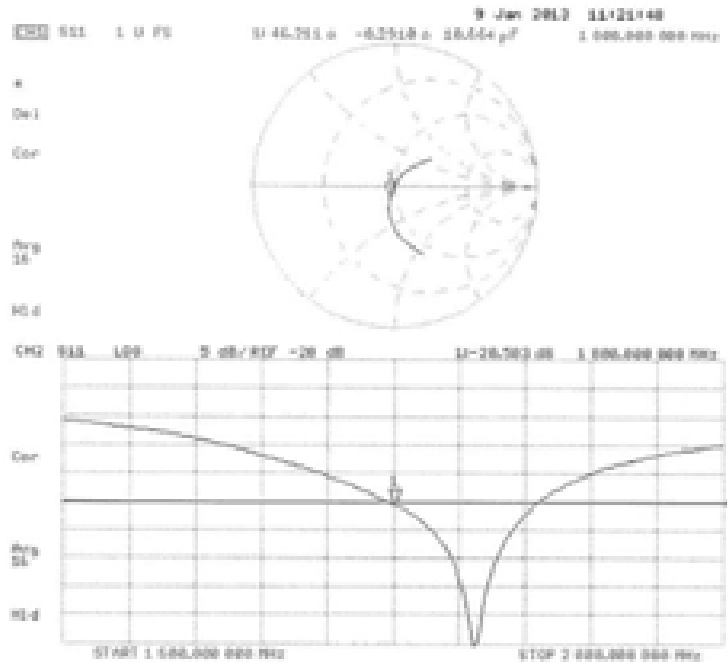
Maximum value of SAR (measured) = 11.8 W/kg





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

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>100(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW</b> <b>L6ARFP120LW</b>

Impedance Measurement Plot for Head TSL



	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>101(134)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW</b> <b>L6ARFP120LW</b>	IC <b>2503A-RFL110LW</b> <b>2503A-RFP120LW</b>

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>102(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

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



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

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

Accreditation No.: SCS 108

Client **RTS (RIM Testing Services)**

Certificate No: **D1900V2-545\_Jan11**

### CALIBRATION CERTIFICATE

Object: **D1900V2 - SN: 545**  
 Calibration procedure(s): **QA CAL-05.v8  
Calibration procedure for dipole validation kits**  
 Calibration date: **January 13, 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 (MATE critical for calibration)


Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-42A	0807480704	06-Oct-10 (No. 217-01266)	Oct-11
Power sensor HP 8481A	US37262763	06-Oct-10 (No. 217-01266)	Oct-11
Reference 20 dB Attenuator	SN: 5085 (203)	30-Mar-10 (No. 217-01158)	Mar-11
Type-N mismatch combination	SN: 5047.2 / 00327	30-Mar-10 (No. 217-01162)	Mar-11
Reference Probe E530V3	SN: 3205	30-Apr-10 (No. E53-3205_Apr10)	Apr-11
DAE4	SN: 601	10-Jun-10 (No. DAE4-601_Jun10)	Jun-11

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MF41092317	18-Oct-02 (in house check Oct-09)	In house check: Oct-11
RF generator R&S SMT-06	100005	4-Aug-09 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8710E	US37260585 54206	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

Calibrated by: **Dirk Bley** (Name) / **Laboratory Technician** (Function) / *[Signature]* (Signature)  
 Approved by: **Raja Pothuri** (Name) / **Technical Manager** (Function) / *[Signature]* (Signature)

Issued: January 14, 2011

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>103(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

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



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

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

Accreditation No.: **SCS 108**

**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
- 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:**

- 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.



Author Data  
**Andrew Becker**

Dates of Test  
**Nov 22, 2012 – Feb 28, 2013**

Test Report No  
**RTS-6026-1303-02**

FCC ID:  
**L6ARFL110LW  
L6ARFP120LW**

IC  
**2503A-RFL110LW  
2503A-RFP120LW**

**Measurement Conditions**

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

DASY Version	DASYS	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 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	39.5 ± 0 %	1.43 mho/m ± 0 %
Head TSL temperature during test	(21.2 ± 0.2) °C	---	---

**SAR result with Head TSL**

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

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





Author Data  
**Andrew Becker**

Dates of Test  
**Nov 22, 2012 – Feb 28, 2013**

Test Report No  
**RTS-6026-1303-02**

FCC ID:  
**L6ARFL110LW  
L6ARFP120LW**

IC  
**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

Electrical Delay (one direction)	1.199 ns
----------------------------------	----------


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

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

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

### Additional EUT Data

Manufactured by	SPEAG
Manufactured on	November 15, 2001

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>106(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

**DASYS 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;  $\sigma = 1.43$  mho/m;  $\epsilon_r = 38.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

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

DASYS Configuration:

- Probe: ES3DV3 - SN3205; ConvR(5.09, 5.09, 5.09); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAD4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- Measurement SW: DASYS2, V52.6.1 Build (408)
- Postprocessing SW: SEMCAD X, V14.4.2 Build (2595)

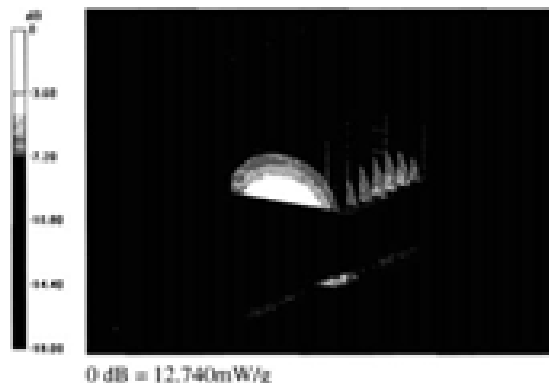
Pin=250 mW /d=10mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

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/g

Maximum value of SAR (measured) = 12.743 mW/g





Author Data  
**Andrew Becker**

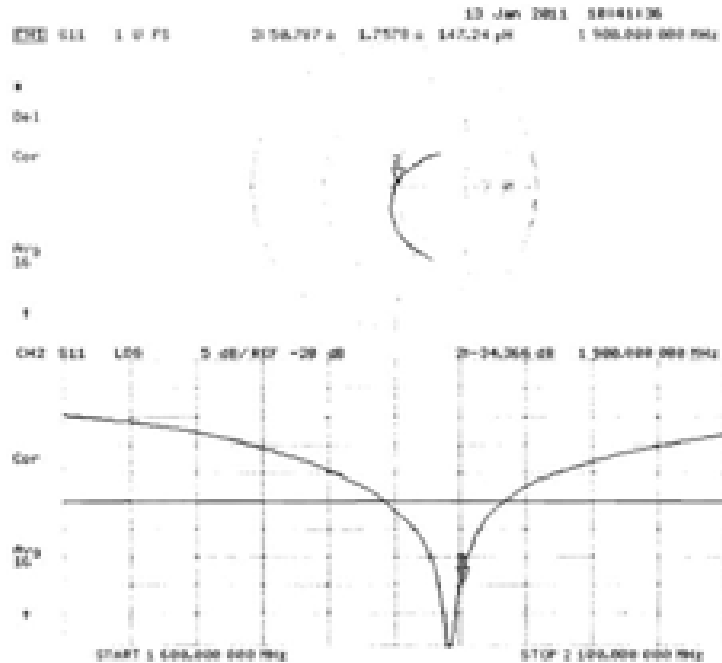
Dates of Test  
**Nov 22, 2012 – Feb 28, 2013**


Test Report No  
**RTS-6026-1303-02**

FCC ID:  
**L6ARFL110LW  
L6ARFP120LW**

IC  
**2503A-RFL110LW  
2503A-RFP120LW**

**Impedance Measurement Plot for Head TSL**



	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>108(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

**Calibration Laboratory of  
Schmid & Partner  
Engineering AG**  
 Zeughausstrasse 43, 8054 Zurich, Switzerland



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

Accredited by the Swiss Accreditation Service (SAC)  
 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.: **D1900V2-545\_Jan13**

### CALIBRATION CERTIFICATE

Object	D1900V2 - SN: 545		
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz		
Calibration date:	January 09, 2013		
<p>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.</p> <p>All calibrations have been conducted in the closed laboratory facility; environment temperature (22 ± 3)°C and humidity &lt; 70%.</p> <p>Calibration Equipment used (MTE critical for calibration)</p>			
Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-100A	0801480704	01-Nov-12 (No. 217-01040)	Oct-13
Power sensor HP 8401A	US37292760	01-Nov-12 (No. 217-01040)	Oct-13
Reference 20 dB Attenuator	SN: 3056 (704)	27-Mar-12 (No. 217-01530)	Apr-13
Type-N mismatch combination	SN: 5247.3 / 98307	27-Mar-12 (No. 217-01530)	Apr-13
Reference Probe E330V3	SN: 3005	06-Dec-12 (No. E33-3005_Dec12)	Dec-13
DAE4	SN: 601	27-Jun-12 (No. DAE4-001_Jun12)	Jun-13
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8401A	MY41092317	18-Oct-07 (in house check Oct-11)	In house check: Oct-13
RF generator RMS SM7 06	100005	04-Aug-09 (in house check Oct-11)	In house check: Oct-13
Network Analyzer HP 8713B	US37390545 54308	18-Oct-01 (in house check Oct-12)	In house check: Oct-13
Calibrated by:	Name Igor El-Nouq	Function Laboratory Technician	Signature 
Approved by:	Name Kaja Pokovic	Function Technical Manager	Signature 
Issued: January 9, 2013			
This calibration certificate shall not be reproduced except in full without written approval of the laboratory.			

Certificate No: D1900V2-545\_Jan13

Page 1 of 6

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>109(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

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



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

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

Accreditation No.: **SCS 108**

**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
- 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:**

- 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%.

Author Data  
**Andrew Becker**

Dates of Test  
**Nov 22, 2012 – Feb 28, 2013**

Test Report No  
**RTS-6026-1303-02**

FCC ID:  
**L6ARFL110LW  
 L6ARFP120LW**

IC  
**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 <sup>2</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	10.0 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	40.2 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm <sup>2</sup> (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.25 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	21.1 W/kg ± 16.5 % (k=2)

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>111(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

## 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 DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

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

### Additional EUT Data

Manufactured by	SPEAG
Manufactured on	November 15, 2011

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>112(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

**DASY5 Validation Report for Head TSL**

Date: 09/01/2013

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 848

Communication System: CW; Frequency: 1900 MHz

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

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; CoreF(4.98, 4.98, 4.98); Calibrated: 28.12.2012;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sa601; 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:**

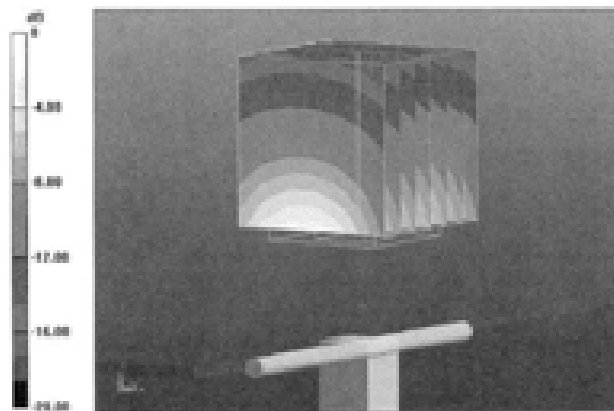
Measurement grid:  $d_x=5$ mm,  $d_y=5$ mm,  $d_z=5$ mm

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

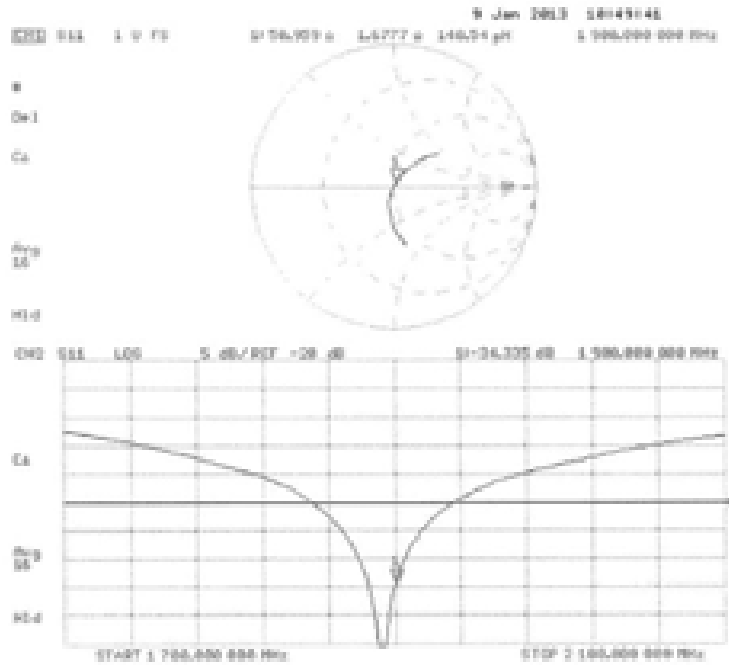



0 dB = 12.2 W/kg = 10.86 dBW/kg




	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>113(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW</b> <b>L6ARFP120LW</b>

**Impedance Measurement Plot for Head TSL**



	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>114(134)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW</b> <b>L6ARFP120LW</b>	IC <b>2503A-RFL110LW</b> <b>2503A-RFP120LW</b>

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>115(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

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



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

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

Accreditation No.: **SCS 108**


Client **RTS (RIM Testing Services)**

Certificate No: **D1900V2-5d075\_Apr11**

CALIBRATION CERTIFICATE			
Object	D1900V2 - SN: 5d075		
Calibration procedure(s)	QA CAL-05.v8 Calibration procedure for dipole validation kits		
Calibration date	April 5, 2011		
<p>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.</p> <p>All calibrations have been conducted in the closed laboratory facility: environment temperature (20 ± 0.5°C and humidity &lt; 70%).</p> <p>Calibration Equipment used (MPE/TE critical for calibration)</p>			
Primary Standards	ID #	Cal Date (Cert Issue No.)	Scheduled Calibration
Power meter EPM 440a	42537460704	06-Oct-10 (No. 217-01060)	Oct-11
Power sensor HP 8461A	LS27260783	06-Oct-10 (No. 217-01060)	Oct-11
Attenuator 20 dB Attenuator	SN: 1086 (J02)	29-Mar-11 (No. 217-01060)	Apr-12
Type-N mismatch combination	SN: 2047.2 / 06027	29-Mar-11 (No. 217-01060)	Apr-12
Reference Probe ES30V3	SN: 3202	30-Apr-10 (No. E53-3202_Apr10)	Apr-11
DAB4	SN: 801	10-Jun-10 (No. DAB4-801_Jun10)	Jun-11
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8461A	M141992517	18-Oct-07 (in house check Oct-09)	In house check Oct-11
Ref generator R&S SMT-68	106005	4-Aug-99 (in house check Oct-09)	In house check Oct-11
Network Analyzer HP 8713C	14537300285 54204	18-Oct-01 (in house check Oct-10)	In house check Oct-11
Calibrated by:	Name <b>Mike Hall</b>	Function <b>Laboratory Technician</b>	Signature 
Approved by:	Name <b>Kajsa Polonik</b>	Function <b>Technical Manager</b>	Signature 
Issued: April 5, 2011			
This calibration certificate shall not be reproduced except in full without written approval of the laboratory.			

Certificate No: D1900V2-5d075\_Apr11

Page 1 of 6

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>116(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

**Calibration Laboratory of  
Schmid & Partner  
Engineering AG**  
 Zeughausstrasse 42, 8004 Zurich, Switzerland



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

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

Accreditation No.: **SCS 108**

**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
- 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:**

- 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.

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>117(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

### Measurement Conditions

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

DASY Version	DASY5	V50.a.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz ± 1 MHz	

### Head TSL parameters


The following parameters and calculations were applied

	Temperature	Permittivity	Conductivity
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 <sup>3</sup> (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	40.4 mW / g ± 17.0 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.29 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)

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>118(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW</b> <b>L6ARFP120LW</b>

## Appendix

### Antenna Parameters with Head TSL

Impedance, transformed to feed point	$53.5 \Omega + 6.1 j\Omega$
Return Loss	-23.3 dB

### General Antenna Parameters and Design

Electrical Delay (one direction)	1.197 ns
----------------------------------	----------


After long term use with 100W radiated power, only a slight warping 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	January 24, 2008

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>119(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

**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:54075

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

Medium: HSL U12 BB

Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.41$  mho/m;  $\epsilon_r = 39$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

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

**DASY5 Configuration:**

- Probe: ES31W3 - SN1266; Cal=HLS09\_3.09\_5.09; Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detectors)
- Electronics: DAB S460; Calibrated: 10.06.2010
- Phantom: Flat Phantom S41 (Head); Type: QD000P25AA; Serial: 1000
- Measurement SW: DASY52, V32.6.2 Build (424)
- Postprocessing SW: SIMCAD-X, V14.4.6 Build (2829)

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

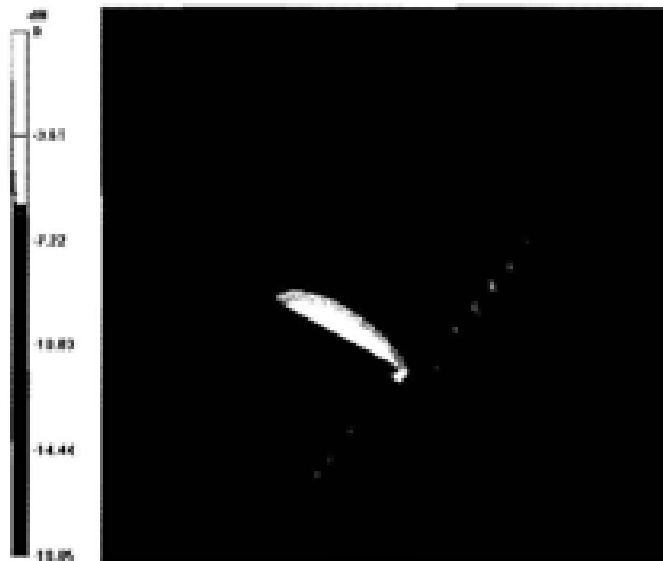
Measurement grid:  $d_x=5$ mm,  $d_y=5$ mm,  $d_z=5$ mm

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

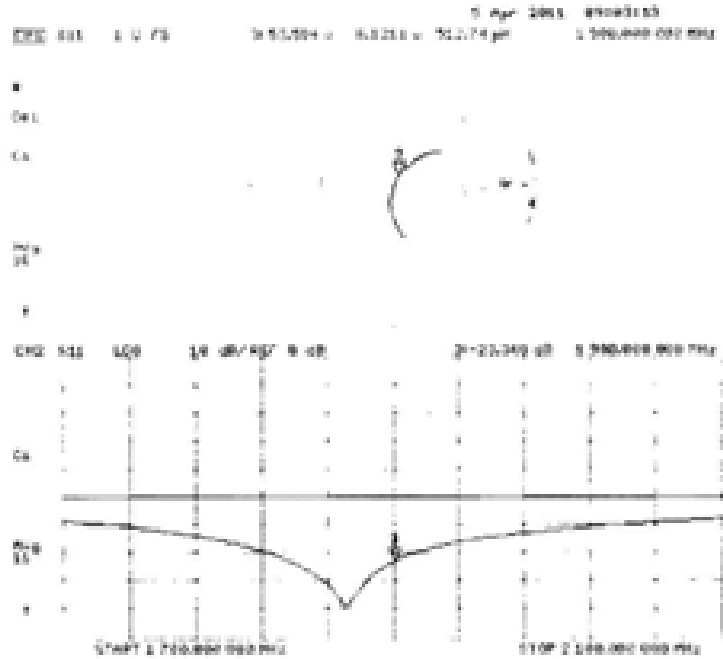
Maximum value of SAR (measured) = 12.476 mW/g




0-dB = 12.480mW/g

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>120(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

**Impedance Measurement Plot for Head TSL**





	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>121(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

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



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

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

Accreditation No.: **SCS 108**


Client: **RTS (RIM Testing Services)**

Certificate No.: **D2450V2-747\_Nov11**

CALIBRATION CERTIFICATE			
Object	<b>D2450V2 - SN: 747</b>		
Calibration procedure(s)	<b>QA CAL-05.v6 Calibration procedure for dipole validation kits above 700 MHz</b>		
Calibration date	<b>November 09, 2011</b>		
<p>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.</p> <p>All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity &lt; 75%.</p> <p>Calibration Equipment used (MPE, critical for calibration)</p>			
<b>Primary Standards</b>	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	08927462704	05-Oct-11 (No. 217-01451)	Oct-12
Power sensor HP 8481A	US37292785	05-Oct-11 (No. 217-01451)	Oct-12
Reference 20-dB Attenuator	SN: 5086 (20g)	29-Mar-11 (No. 217-01368)	Apr-12
Type-N mismatch combination	SN: 5047.2 / 06327	29-Mar-11 (No. 217-01371)	Apr-12
Reference Probe ES30V3	SN: 3205	29-Apr-11 (No. ES3-3205_Apr11)	Apr-12
DA24	SN: 601	04-Jul-11 (No. DA24-601_Jul11)	Jul-12
<b>Secondary Standards</b>	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41062017	18-Oct-09 (in house check Oct-11)	In house check: Oct-13
RF generator R&S SMT-06	100005	04-Aug-09 (in house check Oct-11)	In house check: Oct-13
Network Analyser HP 8753E	US37390585 54206	18-Oct-01 (in house check Oct-11)	In house check: Oct-12
Calibrated by:	Name <b>Jeton Kasriel</b>	Function <b>Laboratory Technician</b>	Signature 
Approved by:	Name <b>Katja Polovic</b>	Function <b>Technical Manager</b>	Signature 
Issued: November 9, 2011			
This calibration certificate shall not be reproduced except in full without written approval of the laboratory.			

Certificate No: D2450V2-747\_Nov11

Page 1 of 5

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>122(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

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



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

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

Accreditation No.: **SCS 108**

**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
- 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:**

- 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.

Author Data  
**Andrew Becker**

Dates of Test  
**Nov 22, 2012 – Feb 28, 2013**

Test Report No  
**RTS-6026-1303-02**

FCC ID:  
**L6ARFL110LW  
 L6ARFP120LW**

IC  
**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	
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 <sup>3</sup> (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	<b>54.1 mW / g ± 17.0 % (k=2)</b>

SAR averaged over 10 cm <sup>3</sup> (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	<b>25.3 mW / g ± 16.5 % (k=2)</b>

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>124(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

**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**

Electrical Delay (one direction)	1.161 ns
----------------------------------	----------


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

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

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

**Additional EUT Data**

Manufactured by	SPEAG
Manufactured on	December 01, 2003

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>125(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

**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;  $\sigma = 1.84$  mho/m;  $\epsilon_r = 37.7$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.45, 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.A.2(482); SEMCAD X 14.4.S(3634)

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

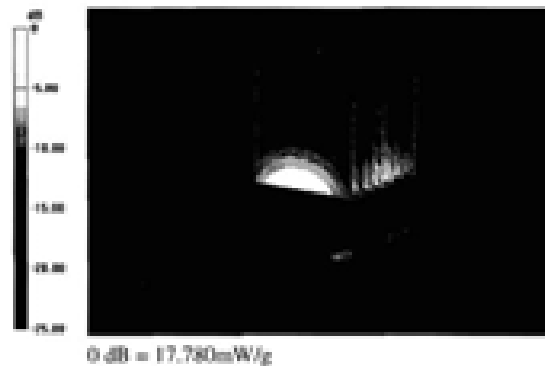
Measurement grid:  $d_x=5$ mm,  $d_y=5$ mm,  $d_z=5$ mm


Reference Value = 102.1 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 28.853 W/kg

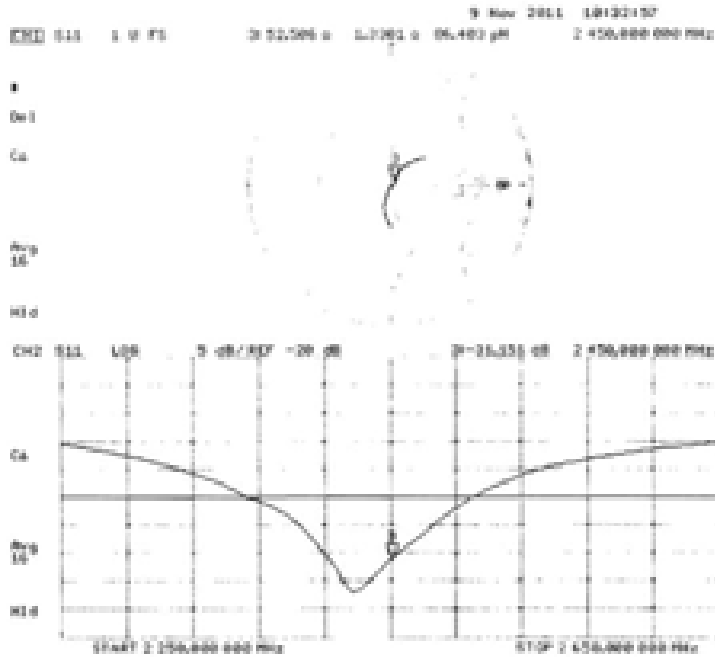
SAR(1 g) = 13.8 mW/g; SAR(10 g) = 6.39 mW/g


Maximum value of SAR (measured) = 17.782 mW/g



	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>126(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

**Impedance Measurement Plot for Head TSL**



	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>127(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

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



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


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

Accreditation No.: **SGS 106**

Client **RTS (RIM Testing Services)**

Certificate No: **D5GHzV2-1033\_Nov11**

CALIBRATION CERTIFICATE			
Object	<b>D5GHzV2 - SN: 1033</b>		
Calibration procedure(s)	<b>QA CAL-22.v1 Calibration procedure for dipole validation kits between 3-8 GHz</b>		
Calibration date:	<b>November 16, 2011</b>		
<p>This calibration certificate documents the traceability to national standards, which realises 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.</p> <p>All calibrations have been conducted in the closed laboratory facility: environment temperature (20 ± 2)°C and humidity &lt; 70%.</p> <p>Calibration Equipment used (MATE critical for calibration)</p>			
Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	0607480704	05-Oct-11 (No. 217-01407)	Oct-12
Power sensor HP 8481A	US37292783	05-Oct-11 (No. 217-01407)	Oct-12
Reference 20 dB Attenuator	SN: 5086 (20g)	29-Mar-11 (No. 217-01368)	Apr-12
Type-N mismatch combination	SN: 5047.2 / 06327	29-Mar-11 (No. 217-01371)	Apr-12
Reference Probe EX3DV4	SN: 3603	04-Mar-11 (No. EX3-3603_Mar11)	Mar-12
DA84	SN: 601	04-Jul-11 (No. DA84-601_Jul11)	Jul-12
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092017	18-Oct-02 (in house check Oct-11)	In house check: Oct-12
RF generator PMS SMT-06	100005	04-Aug-09 (in house check Oct-11)	In house check: Oct-12
Network Analyzer HP 8713E	US37300646-34206	18-Oct-01 (in house check Oct-11)	In house check: Oct-12
Calibrated by:	Name: <b>Dence Bar</b>	Function: <b>Laboratory Technician</b>	Signature: 
Approved by:	Name: <b>Kate Pokorski</b>	Function: <b>Technical Manager</b>	Signature: 
			Issued: November 16, 2011
This calibration certificate shall not be reproduced except in full without written approval of the laboratory.			

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>128(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

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



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

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

Accreditation No.1 **SCS 108**

**Glossary:**

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

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

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

**Additional Documentation:**

- d) DASY4/5 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.



Author Data  
**Andrew Becker**

Dates of Test  
**Nov 22, 2012 – Feb 28, 2013**

Test Report No  
**RTS-6026-1303-02**

FCC ID:  
**L6ARFL110LW  
L6ARFP120LW**

IC  
**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	$dx, dy = 4.0 \text{ mm}$ , $dz = 1.4 \text{ mm}$	Graded Ratio = 1.4 (Z direction)
Frequency	5200 MHz $\pm$ 1 MHz 5500 MHz $\pm$ 1 MHz 5800 MHz $\pm$ 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	$(22.0 \pm 0.2) \text{ °C}$	$34.8 \pm 6 \%$	$4.46 \text{ mho/m} \pm 6 \%$
Head TSL temperature change during test	$< 0.5 \text{ °C}$	---	---

### SAR result with Head TSL at 5200 MHz

SAR averaged over 1 cm <sup>3</sup> (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	<b>80.8 mW / g <math>\pm</math> 17.0 % (k=2)</b>

SAR averaged over 10 cm <sup>3</sup> (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	<b>23.0 mW / g <math>\pm</math> 16.5 % (k=2)</b>

### 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	$(22.0 \pm 0.2) \text{ °C}$	$34.2 \pm 6 \%$	$4.75 \text{ mho/m} \pm 6 \%$
Head TSL temperature change during test	$< 0.5 \text{ °C}$	---	---

### SAR result with Head TSL at 5500 MHz

SAR averaged over 1 cm <sup>3</sup> (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	<b>87.3 mW / g <math>\pm</math> 17.0 % (k=2)</b>

SAR averaged over 10 cm <sup>3</sup> (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	<b>24.7 mW / g <math>\pm</math> 16.5 % (k=2)</b>



Author Data  
**Andrew Becker**

Dates of Test  
**Nov 22, 2012 – Feb 28, 2013**

Test Report No  
**RTS-6026-1303-02**

FCC ID:  
**L6ARFL110LW  
L6ARFP120LW**

IC  
**2503A-RFL110LW  
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	36.3	5.27 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	33.7 ± 8 %	5.03 mho/m ± 8 %
Head TSL temperature change during test	< 0.5 °C	---	---

**SAR result with Head TSL at 5800 MHz**

SAR averaged over 1 cm <sup>2</sup> (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	<b>79.4 mW / g ± 17.8 % (k=2)</b>

SAR averaged over 10 cm <sup>2</sup> (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	<b>22.5 mW / g ± 16.5 % (k=2)</b>

Author Data  
**Andrew Becker**

Dates of Test  
**Nov 22, 2012 – Feb 28, 2013**

Test Report No  
**RTS-6026-1303-02**

FCC ID:  
**L6ARFL110LW  
 L6ARFP120LW**

IC  
**2503A-RFL110LW  
 2503A-RFP120LW**

**Appendix**

**Antenna Parameters with Head TSL at 5200 MHz**

Impedance, transformed to feed point	51.1 Ω - 8.7 jΩ
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**


Electrical Delay (one direction)	1.202 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	SPEAK
Manufactured on	July 09, 2004

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>132(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW L6ARFP120LW</b>

**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;  $\sigma = 4.46$  mho/m;  $\epsilon_r = 34.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>, Medium parameters used:  $f = 5500$  MHz;  $\sigma = 4.75$  mho/m;  $\epsilon_r = 34.2$ ;  $\rho = 1000$  kg/m<sup>3</sup>, Medium parameters used:  $f = 5800$  MHz;  $\sigma = 5.03$  mho/m;  $\epsilon_r = 33.7$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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
- Sensee-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Ss601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.6.2(482); SEMCAD X 14.4.S(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/g

Maximum 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**

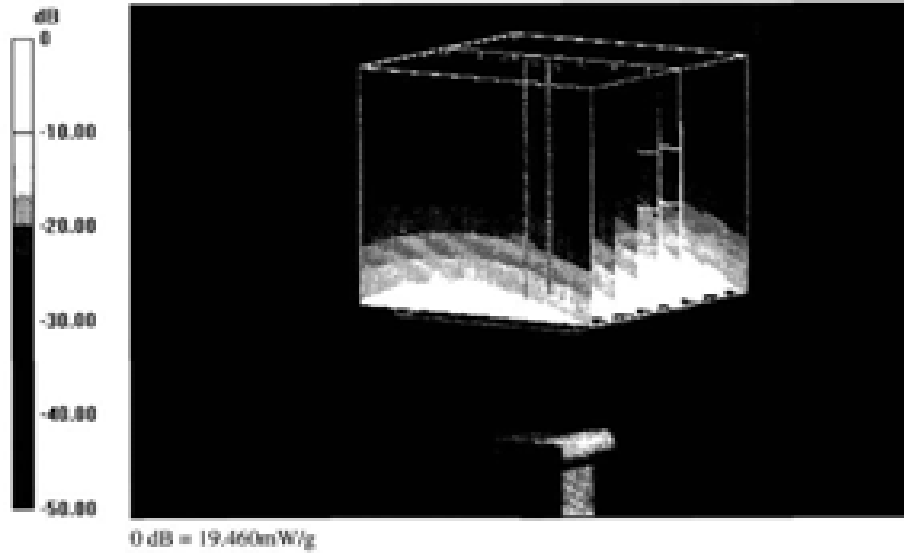
Reference Value = 62.220 V/m; Power Drift = 0.04 dB


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

	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>133(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW</b> <b>L6ARFP120LW</b>



	Document <b>Appendix D for the BlackBerry® Smartphone Model RFP121LW SAR Report</b>			Page <b>134(134)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov 22, 2012 – Feb 28, 2013</b>	Test Report No <b>RTS-6026-1303-02</b>	FCC ID: <b>L6ARFL110LW</b> <b>L6ARFP120LW</b>

**Impedance Measurement Plot for Head TSL**

