SlackBerry	/	Appendix D for the BlackBerry® Smartphone Model RHD131LW (STR100-1) SAR Report				
Author Data	Dates of Te	st	Test Report No	FCC ID:		
Andrew Becker	Jan 29	-Mar 09, 2015	RTS-6063-1503-17	L6ARHD130LW		

# APPENDIX D: PROBE & DIPOLE CALIBRATION DATA

Document Appendix D for t (STR100-1) SAR			ee BlackBerry® Smartphone Model RHD131LW Report			
uthor Data Andrew Becker	Dates of Tes Jan 29	-Mar 09, 2015	Test Report No RTS-6063-1503-17	FCC ID: L6ARHD130LW		
		P	robe 1643			
	Calibration Labor Schmid & Partner Engineering AG Zeughausstrasse 43, 8004	landa a a s		Schweizerischer Kalibrierdienst Service suisse d'étalonnage Servizio svizzero di taratura Swiss Calibration Service		
	Accredited by the Swiss Ac The Swiss Accreditation S	creditation Service (SAS) Service is one of the signatories		o.: SCS 108		
	Multilateral Agreement for Client Blackberry	the recognition of calibration of <b>Waterloo</b>		ET3-1643_Mar14		
		N CERTIFICATE				
	Object	ET3DV6 - SN:164				
	Calibration procedure(s)		A CAL-23.v5, QA CAL-25.v6 dure for dosimetric E-field probes			
	Calibration date:	March 10, 2014				
	The measurements and th All calibrations have been	e uncertainties with confidence pr	onal standards, which realize the physical units obability are given on the following pages and a y facility: environment temperature (22 ± 3)°C a	are part of the certificate.		
	Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration		
	Power meter E4419B	GB41293874	04-Apr-13 (No. 217-01733)	Apr-14		
	Power sensor E4412A	MY41498087	04-Apr-13 (No. 217-01733)	Apr-14		
	Reference 3 dB Attenuato	r SN: S5054 (3c)	04-Apr-13 (No. 217-01737)	Apr-14		
	Reference 20 dB Attenua	or SN: S5277 (20x)	04-Apr-13 (No. 217-01735)	Apr-14		
	Reference 30 dB Attenua		04-Apr-13 (No. 217-01738)	Apr-14		
	Reference Probe ES3DV		30-Dec-13 (No. ES3-3013_Dec13)	Dec-14		
	DAE4	SN: 660	13-Dec-13 (No. DAE4-660_Dec13)	Dec-14		
	Secondary Standards	ID	Check Date (in house)	Scheduled Check		
	RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-13)	In house check: Apr-16		
	Network Analyzer HP 875		18-Oct-01 (in house check Oct-13)	In house check: Oct-14		
			<b>F</b>	0 in a share		
	Calibrated by:	Name Israe El-Naoug	Function Laboratory Technician	Signature		
	Approved by:	Katja Pokovic	Technical Manager	bl llf		
	This calibration certificate	shall not be reproduced except in	full without written approval of the laboratory.	Issued: March 12, 2014		
	Certificate No: ET3-164	3_Mar14	Page 1 of 11			

SlackBerry	
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	Dates of Test
Andrew Becker	Jan 29 – Mar 09, 2015

Test Report No

FCC ID:

Document

L6ARHD130LW

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



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

Accreditation No.: SCS 108

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

#### Gloccary

Glossary.	
TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C, D	modulation dependent linearization parameters
Polarization $\phi$	φ rotation around probe axis
Polarization 9	9 rotation around an axis that is in the plane normal to probe axis (at measurement center),
	i.e., $\vartheta = 0$ is normal to probe axis
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

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

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

#### Methods Applied and Interpretation of Parameters:

- NORMx,y,z: Assessed for E-field polarization 9 = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz; R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect the E<sup>2</sup>-field uncertainty inside TSL (see below ConvF).
- NORM(f)x,y,z = NORMx,y,z \* frequency\_response (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConvF.
- DCPx,y,z: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- PAR: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- Ax,y,z; Bx,y,z; Cx,y,z; Dx,y,z; VRx,y,z: A, B, C, D are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- 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 setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORMx, y, z \* ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- Spherical isotropy (3D deviation from isotropy): in a field of low gradients realized using a flat phantom exposed by a patch antenna
- Sensor Offset: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- Connector Angle: The angle is assessed using the information gained by determining the NORMx (no uncertainty required).

Certificate No: ET3-1643\_Mar14

Page 2 of 11

SlackBerry	/	Appendix D for the BlackBerry® Smartphone Model RHD131LW (STR100-1) SAR Report				
Author Data	Dates of Te	st	Test Report No	FCC ID:		
Andrew Becker	Jan 29	-Mar 09, 2015	RTS-6063-1503-17	L6ARHD130LW		

March 10, 2014

# Probe ET3DV6

# SN:1643

Manufactured: Calibrated: November 7, 2001 March 10, 2014

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

Certificate No: ET3-1643\_Mar14

Page 3 of 11

*** BlackBerry	/	Appendix D for the BlackBerry® Smartphone Model RHD131LW (STR100-1) SAR Report				
Author Data Dates of Test		Test Report No	FCC ID:			
Andrew Becker	Jan 29	–Mar 09, 2015	RTS-6063-1503-17	L6ARHD130LW		

March 10, 2014

## DASY/EASY - Parameters of Probe: ET3DV6 - SN:1643

#### **Basic Calibration Parameters**

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm $(\mu V/(V/m)^2)^A$	1.75	1.96	1.75	± 10.1 %
DCP (mV) <sup>B</sup>	101.5	100.6	102.0	

#### **Modulation Calibration Parameters**

UID	Communication System Name		A dB	B dBõV	С	D dB	VR mV	Unc <sup>E</sup> (k=2)
0	CW	X 0.0	0.0	1.0	0.00	262.5	±3.3 %	
		Y	0.0	0.0	1.0		238.8	
		Z	0.0	0.0	1.0		265.3	

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

Certificate No: ET3-1643\_Mar14

Page 4 of 11

 <sup>&</sup>lt;sup>A</sup> The uncertainties of NormX,Y,Z do not affect the E<sup>2</sup>-field uncertainty inside TSL (see Pages 5 and 6).
 <sup>B</sup> Numerical linearization parameter: uncertainty not required.
 <sup>E</sup> Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value. field value.

			Appendix D for the BlackBerry® Smartphone Model RHD131LW (STR100-1) SAR Report					
А	uthor Data	Dates of Te	est	Test Report No	FCC ID:			
A	Andrew Becker	Jan 29	–Mar 09, 2015	RTS-6063-1503-17	L6ARHD130LW			

March 10, 2014

## DASY/EASY - Parameters of Probe: ET3DV6 - SN:1643

Calibration Paramete	r Determined in Head	Tissue Simulating Media
----------------------	----------------------	-------------------------

f (MHz) <sup>C</sup>	Relative Permittivity <sup>F</sup>	Conductivity (S/m) <sup>F</sup>	ConvF X	ConvF Y	ConvF Z	Alpha <sup>G</sup>	Depth <sup>G</sup> (mm)	Unct. (k=2)
750	41.9	0.89	6.55	6.55	6.55	0.41	2.30	± 12.0 %
900	41.5	0.97	6.15	6.15	6.15	0.38	2.41	± 12.0 %
1810	40.0	1.40	5.17	5.17	5.17	0.80	2.07	± 12.0 %
1950	40.0	1.40	4.92	4.92	4.92	0.80	2.04	± 12.0 %
2450	39.2	1.80	4.46	4.46	4.46	0.80	1.83	± 12.0 %

<sup>C</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 ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
<sup>F</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 ConvF uncertainty for indicated target tissue parameters.
<sup>C</sup> Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

Certificate No: ET3-1643\_Mar14

Page 5 of 11

SlackBerry		Appendix D for th (STR100-1) SAR I	Page <b>7(42)</b>		
Author Data	Dates of T	est	Test Report No	FCC ID:	
Andrew Becker	Jan 29	) –Mar 09, 2015	RTS-6063-1503-17	L6ARHD130LW	

March 10, 2014

# DASY/EASY - Parameters of Probe: ET3DV6 - SN:1643

Calibration Parameter	Determined in Bod	y Tissue Simulating Media
-----------------------	-------------------	---------------------------

f (MHz) <sup>C</sup>	Relative Permittivity <sup>F</sup>	Conductivity (S/m) <sup>F</sup>	ConvF X	ConvF Y	ConvF Z	Alpha <sup>G</sup>	Depth <sup>G</sup> (mm)	Unct. (k=2)
750	55.5	0.96	6.24	6.24	6.24	0.43	2.19	± 12.0 %
900	55.0	1.05	6.03	6.03	6.03	0.38	2.61	± 12.0 %
1810	53.3	1.52	4.59	4.59	4.59	0.80	2.41	± 12.0 %
1950	53.3	1.52	4.64	4.64	4.64	0.80	2.33	± 12.0 %
2450	52.7	1.95	4.07	4.07	4.07	0.70	1.23	± 12.0 %

<sup>C</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 ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. <sup>F</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 ConvF uncertainty for indicated target tissue parameters. <sup>6</sup> At pha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

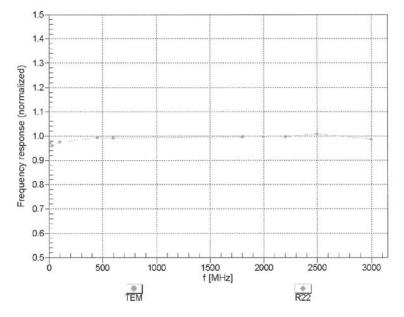
Certificate No: ET3-1643\_Mar14

Page 6 of 11

SlackBerry		Appendix D for the B (STR100-1) SAR Rep	lackBerry® Smartphon ort	ne Model RHD131LV	V	Page 8(42)
Author Data	Dates of Te	st	Test Report No	FCC ID:		
Andrew Becker	Jan 29	-Mar 09, 2015	RTS-6063-1503-17	L6ARHD130LW		

March 10, 2014

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



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

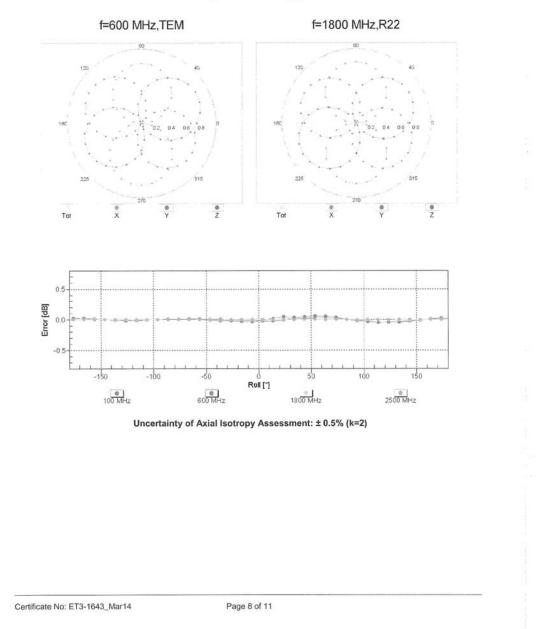
Certificate No: ET3-1643\_Mar14

Page 7 of 11

SlackBerry		Document Appendix D for the B (STR100-1) SAR Rep	lackBerry® Smartphon ort	ne Model RHD131LV	V	Page 9(42)
Author Data	Dates of Te	est	Test Report No	FCC ID:		
Andrew Becker	Jan 29	–Mar 09, 2015	RTS-6063-1503-17	L6ARHD130LW		

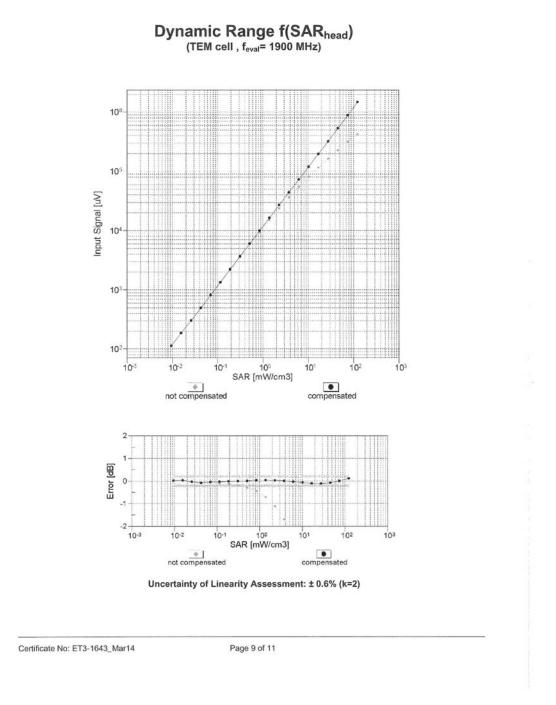
March 10, 2014

# Receiving Pattern ( $\phi$ ), $\vartheta = 0^{\circ}$



SlackBerry		Document Appendix D for the (STR100-1) SAR R	BlackBerry® Smartphon eport	ne Model RHD131LW	V Page <b>10(42)</b>
Author Data	Dates of Te	est	Test Report No	FCC ID:	
Andrew Becker	Jan 29	–Mar 09, 2015	RTS-6063-1503-17	L6ARHD130LW	

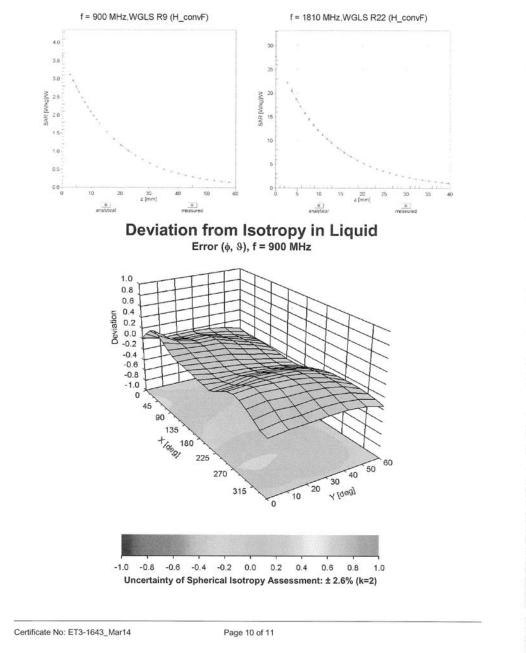
March 10, 2014



SlackBerry		Appendix D for the l (STR100-1) SAR Re	BlackBerry® Smartpho port	ne Model RHD131LV	V <sup>Page</sup> 11(42)
Author Data	Dates of Te	st	Test Report No	FCC ID:	
Andrew Becker	Jan 29	–Mar 09, 2015	RTS-6063-1503-17	L6ARHD130LW	

March 10, 2014

# **Conversion Factor Assessment**



👯 BlackBe	my	Appendix D for th (STR100-1) SAR I	e BlackBerry® Smartpho Report	ne Model RHD131LW	V 12(42)
Author Data	Dates of Te	est	Test Report No	FCC ID:	•
Andrew Becker	Jan 29	–Mar 09, 2015	RTS-6063-1503-17	L6ARHD130LW	

March 10, 2014

# DASY/EASY - Parameters of Probe: ET3DV6 - SN:1643

#### Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	3.8
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	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

Certificate No: ET3-1643\_Mar14

Page 11 of 11

SlackBerry		Appendix D for the B (STR100-1) SAR Rep	BlackBerry® Smartphor port	ne Model RHD131LV	V	Page 13(42)
Author Data	Dates of Te	est	Test Report No	FCC ID:		
Andrew Becker	Jan 29	–Mar 09, 2015	RTS-6063-1503-17	L6ARHD130LW		

**Probe 3225** 

A		ocument Appendix D for the BlackBerry® Smartphone Model RHD131LW STR100-1) SAR Report				
uthor Data	Dates of Test	NE 00 0015	Test Report No	FCC ID:		
ndrew Becker	Jan 29 –	Mar 09, 2015	RTS-6063-1503-17	L6ARHD130LW		
	Ca libration Labora Sc Imid & Partner En§neering AG Zeu Shatsstrasse 43, 8004 Z		S S S S	Schweizerischer Kalibrierdienst Service suisse d'étalonnage Servizio svizzero di taratura Swiss Calibration Service		
		ditation Service (SAS) vice is one of the signatories re recognition of calibration c	to the EA	creditation No.: SCS 0108		
	Client Blackberry	Naterloo	Certificate No:	ES3-3225_Feb15		
[	CALIBRATION	I CERTIFICATE				
	Object	ES3DV3 - SN:322	25			
	Calibration procedure(s)	QA CAL-01.v9, Q	A CAL-23.v5, QA CAL-25.v6			
			dure for dosimetric E-field probes			
	Calibration date:					
	This calibration certificate doo The measurements and the u	Calibration proces February 25, 2015 cuments the traceability to natio incertainties with confidence pro inducted in the closed laboratory		s of measurements (SI). I are part of the certificate.		
	This calibration certificate doo The measurements and the u All calibrations have been con Calibration Equipment used (	Calibration proces February 25, 2015 cuments the traceability to natio incertainties with confidence pro- nducted in the closed laboratory M&TE critical for calibration)	5 nal standards, which realize the physical units obability are given on the following pages and r facility: environment temperature (22 ± 3)°C	s of measurements (SI). I are part of the certificate. and humidity < 70%.		
	This Calibration certificate doo The measurements and the u All calibrations have been con Calibration Equipment used ( Primary Standards	Calibration proces February 25, 2015 cuments the traceability to natio incertainties with confidence pro inducted in the closed laboratory M&TE critical for calibration)	5 nal standards, which realize the physical units obability are given on the following pages and	s of measurements (SI). I are part of the certificate.		
	This calibration certificate doo The measurements and the u All calibrations have been con Calibration Equipment used (	Calibration proces February 25, 2015 cuments the traceability to natio incertainties with confidence pro- nducted in the closed laboratory M&TE critical for calibration)	5 nal standards, which realize the physical units obability are given on the following pages and r facility: environment temperature (22 ± 3)°C Cal Date (Certificate No.)	s of measurements (SI). are part of the certificate. and humidity < 70%. Scheduled Calibration Apr-15 Apr-15		
	This calibration certificate doo The measurements and the u All calibrations have been con Calibration Equipment used ( Primary Standards Power meter E44198 Power sensor E4412A Reference 3 dB Attenuator	Calibration process February 25, 2015 currents the traceability to natio incertainties with confidence pro- nducted in the closed laboratory M&TE critical for calibration) UD GB41293874 MY41498087 SN: S5054 (3c)	5 nal standards, which realize the physical units obability are given on the following pages and r facility: environment temperature (22 ± 3)°C - Cal Date (Certificate No.) 03-Apr-14 (No. 217-01911) 03-Apr-14 (No. 217-01911) 03-Apr-14 (No. 217-01915)	s of measurements (SI). are part of the certificate. and humidity < 70%. Scheduled Calibration Apr-15 Apr-15 Apr-15		
	This calibration certificate doo The measurements and the L All calibrations have been con Calibration Equipment used ( Primary Standards Power meter E44198 Power sensor E4412A Reference 3 dB Attenuator Reference 20 dB Attenuator	Calibration process February 25, 2015 cuments the traceability to natio incertainties with confidence pro- nducted in the closed laboratory M&TE critical for calibration) ID GB41293874 MY41498087 SN: S5054 (3c) SN: S5277 (20x)	5 nal standards, which realize the physical units bability are given on the following pages and r facility: environment temperature (22 ± 3)°C Cal Date (Certificate No.) 03-Apr-14 (No. 217-01911) 03-Apr-14 (No. 217-01911) 03-Apr-14 (No. 217-01915) 03-Apr-14 (No. 217-01919)	s of measurements (SI). I are part of the certificate. and humidity < 70%. Scheduled Calibration Apr-15 Apr-15 Apr-15 Apr-15		
	This Calibration certificate doo The m€asurements and the L All calibrations have been cor Calibration Equipment used ( Primary Standards Power meter E4419B Power sensor E4412A Reference 3 dB Attenuator Reference 30 dB Attenuator	Calibration process February 25, 2015 cuments the traceability to natio incertainties with confidence pro- nducted in the closed laboratory M&TE critical for calibration) ID GB41293874 MY41498087 SN: S5054 (3c) SN: S5277 (20x) SN: S5129 (30b)	5 nal standards, which realize the physical units obability are given on the following pages and r facility: environment temperature (22 ± 3)°C - Cal Date (Certificate No.) 03-Apr-14 (No. 217-01911) 03-Apr-14 (No. 217-01911) 03-Apr-14 (No. 217-01915)	s of measurements (SI). are part of the certificate. and humidity < 70%. Scheduled Calibration Apr-15 Apr-15 Apr-15		
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	This calibration certificate doo The measurements and the u All calibrations have been cor Calibration Equipment used ( Primary Standards Power meter E44198 Power sensor E4412A Reference 3 dB Attenuator Reference 3 dB Attenuator Reference 3 dB Attenuator Reference 3 dB Attenuator	Calibration process February 25, 2015 currents the traceability to natio incertainties with confidence pro- nducted in the closed laboratory M&TE critical for calibration) ID GB41293874 MY41498087 SN: S5054 (3c) SN: S5572 (20x) SN: S5129 (30b) SN: 3013 SN: 660	5 nal standards, which realize the physical units bability are given on the following pages and r facility: environment temperature (22 ± 3)°C Cal Date (Certificate No.) 03-Apr-14 (No. 217-01911) 03-Apr-14 (No. 217-01911) 03-Apr-14 (No. 217-01915) 03-Apr-14 (No. 217-01919) 03-Apr-14 (No. 217-01920) 30-Dec-14 (No. ES3-3013_Dec14) 14-Jan-15 (No. DAE4-660_Jan15)	s of measurements (SI). are part of the certificate. and humidity < 70%. Scheduled Calibration Apr-15 Apr-15 Apr-15 Apr-15 Apr-15 Dec-15 Jan-16		
	This calibration certificate doo The measurements and the L All calibrations have been con Calibration Equipment used ( Primary Standards Power sensor E44198 Power sensor E44198 Power sensor E4412A Reference 3 dB Attenuator Reference 30 dB Attenuator Reference 30 dB Attenuator Reference Probe ES3DV2 DAE4 Secondary Standards	Calibration process February 25, 2015 cuments the traceability to nation incertainties with confidence pro- nducted in the closed laboratory M&TE critical for calibration) ID GB41293874 MY41498087 SN: S5054 (3c) SN: S5054 (3c) SN: S5277 (20x) SN: S5129 (30b) SN: 3013 SN: 660 ID	5 nal standards, which realize the physical units bability are given on the following pages and r facility: environment temperature (22 ± 3)°C Cal Date (Certificate No.) 03-Apr-14 (No. 217-01911) 03-Apr-14 (No. 217-01911) 03-Apr-14 (No. 217-01911) 03-Apr-14 (No. 217-01919) 03-Apr-14 (No. 217-01920) 30-Dec-14 (No. ES3-3013_Dec14) 14-Jan-15 (No. DAE4-660_Jan15) Check Date (in house)	s of measurements (SI). are part of the certificate. and humidity < 70%. Scheduled Calibration Apr-15 Apr-15 Apr-15 Apr-15 Dec-15 Jan-16 Scheduled Check		
	This calibration certificate doo The measurements and the L All calibrations have been con Calibration Equipment used ( Primary Standards Power sensor E4412A Reference 3 dB Attenuator Reference 30 dB Attenuator Reference 30 dB Attenuator Reference Probe ES3DV2 DAE4 Secondary Standards RF generator HP 8648C	Calibration process February 25, 2015 cuments the traceability to nation incertainties with confidence pro- nducted in the closed laboratory M&TE critical for calibration) ID GB41293874 MY41498087 SN: S5054 (3c) SN: S5024 (3c) SN: S5129 (30b) SN: S5129 (30b) SN: S5129 (30b) SN: S013 SN: 660 ID US3642U01700	5 Cal Date (Certificate No.) 03-Apr-14 (No. 217-01911) 03-Apr-14 (No. 217-01911) 03-Apr-14 (No. 217-01911) 03-Apr-14 (No. 217-01915) 03-Apr-14 (No. 217-01915) 03-Apr-14 (No. 217-01916) 03-Apr-14 (No. 217-01920) 30-Dec-14 (No. 23-3013_Dec14) 14-Jan-15 (No. DAE4-660_Jan15) Check Date (in house) 4-Aug-99 (in house check Apr-13)	s of measurements (SI). I are part of the certificate. and humidity < 70%. Scheduled Calibration Apr-15 Apr-15 Apr-15 Apr-15 Dec-15 Jan-16 Scheduled Check In house check: Apr-16		
	This calibration certificate doo The measurements and the L All calibrations have been con Calibration Equipment used ( Primary Standards Power sensor E44198 Power sensor E44198 Power sensor E4412A Reference 3 dB Attenuator Reference 30 dB Attenuator Reference 30 dB Attenuator Reference Probe ES3DV2 DAE4 Secondary Standards	Calibration process February 25, 2015 cuments the traceability to nation incertainties with confidence pro- nducted in the closed laboratory M&TE critical for calibration) ID GB41293874 MY41498087 SN: S5054 (3c) SN: S5024 (3c) SN: S5129 (30b) SN: S5129 (30b) SN: S5129 (30b) SN: S013 SN: 660 ID US3642U01700	5 nal standards, which realize the physical units bability are given on the following pages and r facility: environment temperature (22 ± 3)°C Cal Date (Certificate No.) 03-Apr-14 (No. 217-01911) 03-Apr-14 (No. 217-01911) 03-Apr-14 (No. 217-01911) 03-Apr-14 (No. 217-01919) 03-Apr-14 (No. 217-01920) 30-Dec-14 (No. ES3-3013_Dec14) 14-Jan-15 (No. DAE4-660_Jan15) Check Date (in house)	s of measurements (SI). are part of the certificate. and humidity < 70%. Scheduled Calibration Apr-15 Apr-15 Apr-15 Apr-15 Dec-15 Jan-16 Scheduled Check		
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Certificate No: ES3-3225\_Feb15

Page 1 of 11

SlackBerry	
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Andrew Becker

Author Data

#### Dates of Test Jan 29 – Mar 09, 2015

Document

RTS-6063-1503-17

FCC ID:

Test Report No

Ca litration Laboratory of Schhid & Partner Engineering AG Zeu Shusstrasse 43, 8004 Zurich, Switzerland



Schweizerischer Kalibrierdienst S Service suisse d'étalonnage С

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s Swiss Calibration Service

Accreditation No.: SCS 0108

Acc rected by the Swiss Accreditation Service (SAS) The Shiss Accreditation Service is one of the signatories to the EA Mul tilteral Agreement for the recognition of calibration certificates

GIOSsary:	
TSL	tissue simulating liquid
NO RIAX, V.Z	sensitivity in free space
Cortvi	sensitivity in TSL / NORMx,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 o	φ rotation around probe axis
Polarization 9	9 rotation around an axis that is in the plane normal to probe axis (at measurement center),
	i.e., $\vartheta = 0$ is normal to probe axis
Cornector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

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

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

#### Methods Applied and Interpretation of Parameters:

- NORMx,y,z: Assessed for E-field polarization 9 = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect the E2-field uncertainty inside TSL (see below ConvF).
- NORM(f)x,y,z = NORMx,y,z \* frequency\_response (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConvF.
- DCPx,y,z: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- PAR: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- Ax,y,z; Bx,y,z; Cx,y,z; Dx,y,z; VRx,y,z: A, B, C, D are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode
- ConvF and Boundary Effect Parameters: Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORMx, y, z \* ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- Spherical isotropy (3D deviation from isotropy): in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- Connector Angle: The angle is assessed using the information gained by determining the NORMx (no uncertainty required).

Certificate No: ES3-3225 Feb15

Page 2 of 11

BlackBerry         Appendix D for the BlackBerry® Smartphone Model RHD131LW (STR100-1) SAR Report					V <sup>Page</sup> 16(42)		
Author Data	Dates of Te	est	Test Report No	FCC ID:			
Andrew Becker	Jan 29	–Mar 09, 2015	Mar 09, 2015 RTS-6063-1503-17 L6ARHD130LW				

ES 30/3 - SN:3225

February 25, 2015

# Probe ES3DV3

# SN:3225

Manufactured:	September 1, 2009
Repaired:	February 18, 2015
Calibrated:	February 25, 2015

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

Certificate No: ES3-3225\_Feb15

Page 3 of 11

SlackBerry	/	Appendix D for the B (STR100-1) SAR Rep	lackBerry® Smartphon ort	e Model RHD131LV	V	Page <b>17(42)</b>
Author Data	Dates of Te	st	Test Report No	FCC ID:		
Andrew Becker	Jan 29 – Mar 09, 2015 RTS-6063-1503-17 L6ARHD130LW					

ES 30/3- SN:3225

February 25, 2015

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

#### Basc Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
$VOTh (\mu V/(V/m)^2)^A$	1.07	1.00	1.12	± 10.1 %
DC <sup>p</sup> (mV) <sup>B</sup>	107.0	106.0	105.6	

#### Modulation Calibration Parameters

JID	Communication System Name		A dB	B dBõV	С	D dB	VR mV	Unc <sup>±</sup> (k=2)
2	CW	X	0.0	0.0	1.0	0.00	196.9	±3.3 %
		Y	0.0	0.0	1.0		189.2	
		Z	0.0	0.0	1.0	-	195.9	

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>A</sup> The uncertainties of NormX,Y,Z do not affect the E<sup>2</sup>-field uncertainty inside TSL (see Pages 5 and 6).
 <sup>B</sup> Numerical linearization parameter: uncertainty not required.
 <sup>E</sup> Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

Certificate No: ES3-3225\_Feb15

Page 4 of 11

ES 3- SN:3225

February 25, 2015

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

f(MHz) <sup>c</sup>	Relative Permittivity <sup>F</sup>	Conductivity (S/m) <sup>F</sup>	ConvF X	ConvF Y	ConvF Z	Alpha <sup>G</sup>	Depth <sup>G</sup> (mm)	Unct. (k=2)
750	41.9	0.89	6.50	6.50	6.50	0.61	1.31	± 12.0 %
900	41.5	0.97	6.22	6.22	6.22	0.30	1.84	± 12.0 %
1810	40.0	1.40	5.26	5.26	5.26	0.50	1.46	± 12.0 %
1950	40.0	1.40	5.01	5.01	5.01	0.80	1.11	± 12.0 %
2300	39.5	1.67	4.77	4.77	4.77	0.75	1.25	± 12.0 %
2450	39.2	1.80	4.60	4.60	4.60	0.57	1.49	± 12.0 %
2600	39.0	1.96	4.40	4.40	4.40	0.72	1.30	± 12.0 %

Ca libration Parameter Determined in Head Tissue Simulating Media

<sup>C</sup> Frequency validity above 300 MHz of  $\pm$  100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to  $\pm$  50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is  $\pm$  10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to  $\pm$  110 MHz. \* Af frequencies below 3 GHz, the validity of tissue parameters ( $\epsilon$  and  $\sigma$ ) can be relaxed to  $\pm$  10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters ( $\epsilon$  and  $\sigma$ ) is restricted to  $\pm$  5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters. \* AlphaDepth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than  $\pm$  1% for frequencies below 3 GHz and below  $\pm$  2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

Certificate No: ES3-3225\_Feb15

Page 5 of 11

ES 7 D'3- SN:3225

February 25, 2015

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

f MHz) c	Relative Permittivity <sup>F</sup>	Conductivity (S/m) <sup>F</sup>	ConvF X	ConvF Y	ConvF Z	Alpha <sup>G</sup>	Depth <sup>G</sup> (mm)	Unct. (k=2)
750	55.5	0.96	6.19	6.19	6.19	0.80	1.23	± 12.0 %
_900	55.0	1.05	6.07	6.07	6.07	0.53	1.41	± 12.0 %
1810	53.3	1.52	4.89	4.89	4.89	0.63	1.46	± 12.0 %
1950	53.3	1.52	4.86	4.86	4.86	0.44	1.86	± 12.0 %
2300	52.9	1.81	4.48	4.48	4.48	0.80	1.29	± 12.0 %
2450	52.7	1.95	4.34	4.34	4.34	0.72	1.14	± 12.0 %
2600	52.5	2.16	4.06	4.06	4.06	0.80	1.08	± 12.0 %

Ca likration Parameter Determined in Body Tissue Simulating Media

<sup>C</sup> Frequency validity above 300 MHz 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 ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity validity can be extended to ± 110 MHz.
<sup>F</sup> At frequencies below 3 GHz, the validity of tissue parameters (s and σ) can be relaxed to ± 10% if liquid compensation formula is applied to

At Trequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% in iquid 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 Con/F uncertainty for indicated target tissue parameters. <sup>5</sup> At pha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

Certificate No: ES3-3225\_Feb15

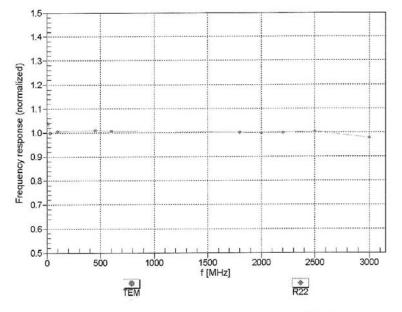
Page 6 of 11

SeckBerry					
Author Data	Dates of Te	est	Test Report No	FCC ID:	
Andrew Becker         Jan 29 – Mar 09, 2015         RTS-6063-1503-17         L6ARHD130LW					

ES 7 D'3- SN:3225

February 25, 2015

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





Certificate No: ES3-3225\_Feb15

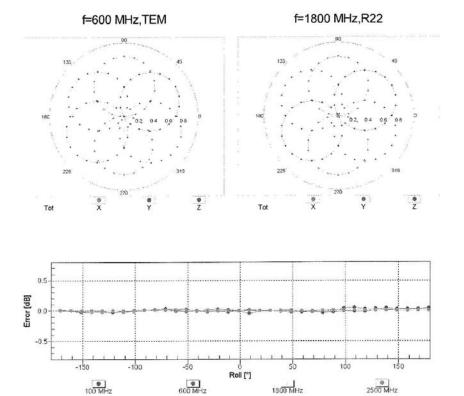
Page 7 of 11

SlackBerry	BlackBerry       Appendix D for the BlackBerry® Smartphone Model RHD131LW (STR100-1) SAR Report         Dates of Test       Test Report No					<sup>age</sup> 1(42)
Author Data	Dates of Te	st	Test Report No	FCC ID:		
Andrew Becker	Jan 29	-Mar 09, 2015	RTS-6063-1503-17	L6ARHD130LW		

ES D'3- SN:3225

February 25, 2015

# Receiving Pattern ( $\phi$ ), $\vartheta = 0^{\circ}$



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

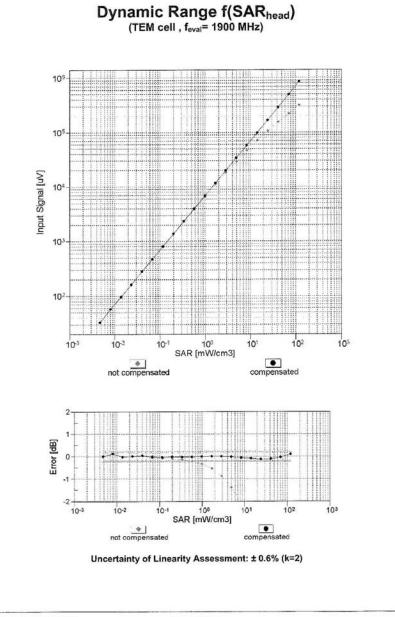
Certificate No: ES3-3225\_Feb15

Page 8 of 11

SeckBerry	Appendix D for the BlackBerry® Smartphone Model RHD131LW (STR100-1) SAR Report							
Author Data	Dates of Te	est	Test Report No	FCC ID:				
Andrew Becker	Jan 29	–Mar 09, 2015	Mar 09, 2015 RTS-6063-1503-17 L6ARHD130LW					

ES 7 D'3- SN:3225

February 25, 2015



Certificate No: ES3-3225\_Feb15

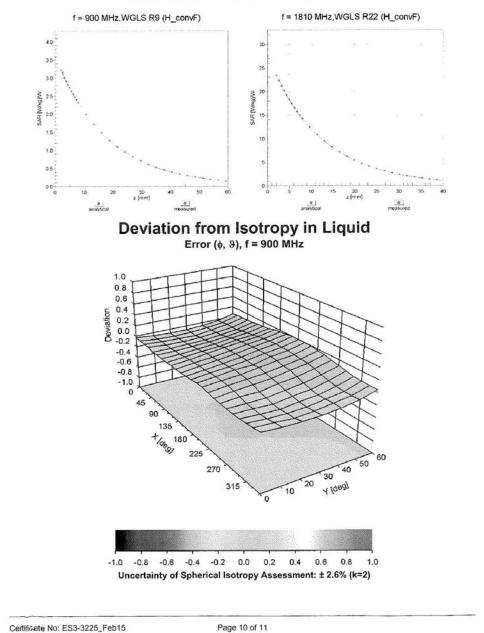
Page 9 of 11

SlackBerry	Appendix D for the BlackBerry® Smartphone Model RHD131LW (STR100-1) SAR Report					Page <b>23(42)</b>	
Author Data	Dates of Te	est	Test Report No	FCC ID:			
Andrew Becker	Jan 29	–Mar 09, 2015	-Mar 09, 2015 RTS-6063-1503-17 L6ARHD130LW				

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ES 30/3- SN:3225
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February 25, 2015

# **Conversion Factor Assessment**



SlackBerr	Y	Appendix D for the (STR100-1) SAR R	e BlackBerry® Smartpho Report	ne Model RHD131LW	Page <b>24(42)</b>
Author Data	Dates of Te	st	Test Report No	FCC ID:	
Andrew Becker	Jan 29	-Mar 09, 2015	RTS-6063-1503-17	L6ARHD130LW	

ES 9 Di3- SN:3225

February 25, 2015

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

#### Other Probe Parameters

Sentor Arrangement	Triangular
Contector Angle (°)	-61.4
Mechanical Surface Detection Mode	enabled
OPtilal Surface Detection Mode	disabled
Prote Overall Length	337 mm
Prote Body Diameter	10 mm
Tiplength	10 mm
Tip Diameter	4 mm
Prote Tip to Sensor X Calibration Point	2 mm
Probe Tip to Sensor Y Calibration Point	2 mm
Probe Tip to Sensor Z Calibration Point	2 mm
Recommended Measurement Distance from Surface	3 mm

Certificate No: ES3-3225\_Feb15

Page 11 of 11

😳 Black	Berry	Document Appendix D for th (STR100-1) SAR	ne BlackBerry® Smartpho Report	ne Model RHD131LW	Page 25(4
Data rew Becker	Dates of Te	st –Mar 09, 2015	Test Report No <b>RTS-6063-1503-17</b>	FCC ID: L6ARHD130LW	
new becker	5 dil 27		35 Dipole	- 3. 17	
8	Calibration Labor Schmid & Partner Engineering AG Zeughausstrasse 43, 8004		BC MRA RC MRA RC RTSS RC RTSS RC RTSS SC SC SC SC SC SC SC SC SC SC SC SC S	Schweizerischer Kalibrierdienst Service suisse d'étalonnage Servizio svizzero di taratura Swiss Calibration Service	
		creditation Service (SAS) Service is one of the signatorie r the recognition of calibration	es to the EA	n No.: SCS 108	
		Testing Services)	ct bee way and the	o: D835V2-446_Jan13	
L. L.	Object	D835V2 - SN: 44			
	Calibration procedure(s)	QA CAL-05.v9 Calibration proce	edure for dipole validation kits ab	ove 700 MHz	
	Calibration date:	January 07, 2013	31 heyeljang gege ender begrup gege		
	The measurements and th	e uncertainties with confidence p	ional standards, which realize the physical un robability are given on the following pages an ry facility: environment temperature $(22 \pm 3)^6$	nd are part of the certificate.	
	Calibration Equipment use	d (M&TE critical for calibration)			
	Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration	
	Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuat Type-N mismatch combina Reference Probe ES3DV3 DAE4	ation SN: 5047.3 / 06327	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01530) 27-Mar-12 (No. 217-01533) 28-Dec-12 (No. ES3-3205_Dec12) 27-Jun-12 (No. DAE4-601_Jun12)	Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Jun-13	
		ID #	Check Date (in house)	Scheduled Check	
	Secondary Standards Power sensor HP 8481A RF generator R&S SMT-0 Network Analyzer HP 875	MY41092317 6 100005	18-Oct-02 (in house check Oct-11) 04-Aug-99 (in house check Oct-11) 18-Oct-01 (in house check Oct-12)	In house check: Oct-13 In house check: Oct-13 In house check: Oct-13	
	Calibrated by:	Name Leif Klysner	Function Laboratory Technician	Signature Set Marco	
	Approved by:	Katja Pokovic	Technical Manager	lelot-	
	This calibration certificate	shall not be reproduced except in	n full without written approval of the laborator	Issued: January 8, 2013 y.	
-	Certificate No: D835V2-		Page 1 of 6		

SlackBerry

Author Data Andrew Becker

#### Dates of Test Jan 29 – Mar 09, 2015

Document

Test Report No RTS-6063-1503-17

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



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- S Swiss Calibration Service

Accreditation No.: SCS 108

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

#### Glossarv:

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.

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

Certificate No: D835V2-446 Jan13

Page 2 of 6

#### Document Appendix D for the BlackBerry® Smartphone Model RHD131LW (STR100-1) SAR Report

	Author Data	Dates of Test	Test Report No	FCC ID:	
	Andrew Becker	Jan 29 –Mar 09, 2015	RTS-6063-1503-17	L6ARHD130LW	
- H		· · · · · · · · · · · · · · · · · · ·			

#### **Measurement Conditions**

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

DASY Version	DASY5	V52.8.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

#### **Head TSL parameters**

The following parameters and calculations were applied.

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

#### SAR result with Head TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.38 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	9.39 W/kg ± 17.0 % (k=2)
SAB averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL SAR measured	condition 250 mW input power	1.55 W/kg

Certificate No: D835V2-446\_Jan13

Page 3 of 6

SlackBerry
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Author Data	Dates of Test	Test Report No	FCC ID:	
Andrew Becker	Jan 29 – Mar 09, 2015	RTS-6063-1503-17	L6ARHD130LW	

#### Appendix

Antenna Parameters with Head TSL

Document

Impedance, transformed to feed point	50.1 Ω - 6.5 jΩ
Return Loss	- 23.7 dB

#### General Antenna Parameters and Design

Electrical Delay (one direction)	1.385 ns	
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After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

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

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

#### Additional EUT Data

Manufactured by	SPEAG	
Manufactured on	October 24, 2001	

Certificate No: D835V2-446\_Jan13

Page 4 of 6

Author Data	Dates of Test	Test Report No	FCC ID:	
Andrew Becker	Jan 29 –Mar 09, 2015	RTS-6063-1503-17	L6ARHD130LW	
		•		

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

Document

Date: 07.01.2013

Test Laboratory: SPEAG, Zurich, Switzerland

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

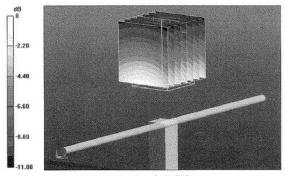
Communication System: CW; Frequency: 835 MHz Medium parameters used: f = 835 MHz;  $\sigma$  = 0.92 S/m;  $\epsilon_r$  = 42;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

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

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

Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 56.650 V/m; Power Drift = 0.01 dB Peak SAR (extrapolated) = 3.61 W/kg SAR(1 g) = 2.38 W/kg; SAR(10 g) = 1.55 W/kg Maximum value of SAR (measured) = 2.79 W/kg



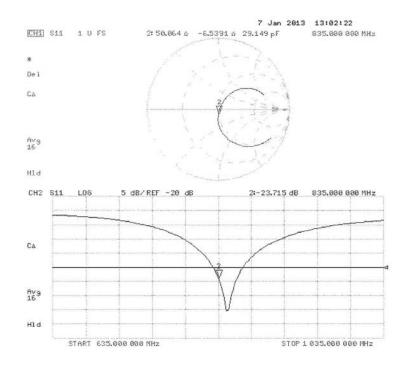
0 dB = 2.79 W/kg = 4.46 dBW/kg

Certificate No: D835V2-446\_Jan13

Page 5 of 6

SlackBerry		Document Appendix D for the BlackBerry® Smartphone Model RHD131LW (STR100-1) SAR Report			V <sup>Page</sup> 30(42)
Author Data	Dates of Te	est	Test Report No	FCC ID:	
Andrew Becker	Jan 29	–Mar 09, 2015	RTS-6063-1503-17	L6ARHD130LW	

#### Impedance Measurement Plot for Head TSL



Certificate No: D835V2-446\_Jan13

Page 6 of 6

👯 Blac	kBerry	Document Appendix D for the BlackBerry® Smartphone Model RHD131LW (STR100-1) SAR Report			Pa 3
thor Data ndrew Becker	Dates of Tes	-Mar 09, 2015	Test Report No RTS-6063-1503-17	FCC ID: L6ARHD130LW	
	Jun 2				
		19	00 Dipole		
	Calibration Labora Schmid & Partner Engineering AG Zeughausstrasse 43, 8004		Hac MRA REALESS S	Service suisse d'étalonnage Servizio svizzero di taratura	
		reditation Service (SAS) ervice is one of the signatories the recognition of calibration	s to the EA	n No.: SCS 108	
	Client RTS (RIM )	esting Services)	Certificate N	o: D1900V2-545_Jan13	
	CALIBRATIO	N CERTIFICATE	n gan generative period		
	Object	D1900V2 - SN: 5	45 11 11 11 11 11 11 11 11 11 11 11 11	an a	
	Calibration procedure(s)	QA CAL-05.v9 Calibration proce	dure for dipole validation kits ab	ove 700 MHz	
	Calibration date:	January 09, 2013	8		
	The measurements and the	uncertainties with confidence p	onal standards, which realize the physical u robability are given on the following pages a ry facility: environment temperature (22 ± 3)	nd are part of the certificate.	
	Calibration Equipment used	(M&TE critical for calibration)			
	Primary Standards Power meter EPM-442A	ID # GB37480704	Cal Date (Certificate No.) 01-Nov-12 (No. 217-01640)	Scheduled Calibration Oct-13	
	Power sensor HP 8481A Power sensor HP 8481A Reference 20 dB Attenuato Type-N mismatch combina Reference Probe ES3DV3 DAE4	US37292783 r SN: 5058 (20k)	01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01530) 27-Mar-12 (No. 217-01533) 28-Dec-12 (No. ES3-3205_Dec12) 27-Jun-12 (No. DAE4-601_Jun12)	Oct-13 Apr-13 Apr-13 Dec-13 Jun-13	
	Secondary Standards	ID #	Check Date (in house)	Scheduled Check	
	Power sensor HP 8481A RF generator R&S SMT-06 Network Analyzer HP 8753	MY41092317 100005	18-Oct-02 (in house check Oct-11) 04-Aug-99 (in house check Oct-11) 18-Oct-01 (in house check Oct-12)	In house check: Oct-13 In house check: Oct-13 In house check: Oct-13	
	Calibrated by:	Name Israe El-Naouq	Function Laboratory Technician	signature Norecu Andreaug	
	Approved by:	Katja Pokovic	Technical Manager	Lelly !!	
				Issued: January 9, 2013	
	This calibration certificate s	shall not be reproduced except in	h full without written approval of the laborato	ry.	

SlackBerry

Author Data Andrew Becker

#### Dates of Test Jan 29 – Mar 09, 2015

Document

Test Report No RTS-6063-1503-17

L6ARHD130LW

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



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

Accreditation No.: SCS 108

Accredited by the Swiss Accreditation Service (SAS)

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

#### **Glossary:**

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

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

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

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

Certificate No: D1900V2-545\_Jan13

Page 2 of 6

#### Document Appendix D for the BlackBerry® Smartphone Model RHD131LW (STR100-1) SAR Report

	Author Data	Dates of Test	Test Report No	FCC ID:	
	Andrew Becker	Jan 29 –Mar 09, 2015	RTS-6063-1503-17	L6ARHD130LW	
- H		· · · · · · · · · · · · · · · · · · ·			

#### **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>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	10.0 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	40.2 W/kg ± 17.0 % (k=2)
SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL SAR measured	condition 250 mW input power	5.26 W/kg

Certificate No: D1900V2-545\_Jan13

Page 3 of 6

SlackBerry
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Author Data	Dates of Test	Test Report No	FCC ID:	
Andrew Becker	Jan 29 – Mar 09, 2015	RTS-6063-1503-17	L6ARHD130LW	

#### Appendix

Antenna Parameters with Head TSL

Document

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, 2001	

Certificate No: D1900V2-545\_Jan13

Page 4 of 6

Author Data	Dates of Test	Test Report No	FCC ID:	
Andrew Becker	Jan 29 – Mar 09, 2015	RTS-6063-1503-17	L6ARHD130LW	L

#### DASY5 Validation Report for Head TSL

Document

Date: 09.01.2013

Test Laboratory: SPEAG, Zurich, Switzerland

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

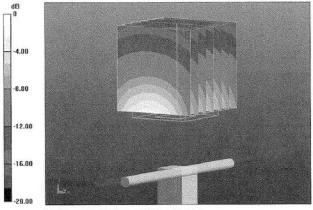
Communication System: CW; Frequency: 1900 MHz Medium parameters used: f = 1900 MHz;  $\sigma = 1.38$  S/m;  $\varepsilon_r = 39.4$ ;  $\rho = 1000$  kg/m<sup>3</sup> Phantom section: Flat Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

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

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

Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 95.493 V/m; Power Drift = 0.05 dB Peak SAR (extrapolated) = 18.1 W/kg SAR(1 g) = 10 W/kg; SAR(10 g) = 5.26 W/kg Maximum value of SAR (measured) = 12.2 W/kg



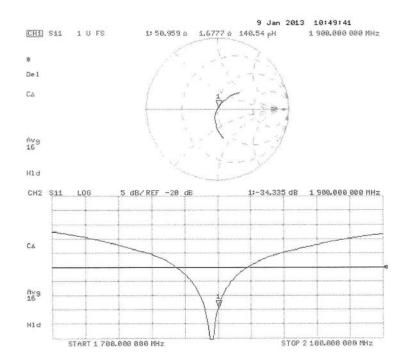
0 dB = 12.2 W/kg = 10.86 dBW/kg

Certificate No: D1900V2-545\_Jan13

Page 5 of 6

SlackBerry	/	Document Appendix D for the B (STR100-1) SAR Rep	lackBerry® Smartphor ort	ne Model RHD131LV	W <sup>Page</sup> <b>36(42)</b>
Author Data	Dates of Te	est	Test Report No	FCC ID:	
Andrew Becker	Jan 29	–Mar 09, 2015	RTS-6063-1503-17	L6ARHD130LW	

#### Impedance Measurement Plot for Head TSL



Certificate No: D1900V2-545\_Jan13

Page 6 of 6

W Rookon	Dates of Test	Mar 09, 2015	Test Report No RTS-6063-1503-17	FCC ID: L6ARHD130LW	<b>I</b>
ew Becker	Jan 29 –	viar 09, 2015	K15-0005-1505-17	LUAKHDIJULW	
	Calibration Laborat Schmid & Partner		50 Dipole	Convion quinno d'étalonnano	
	Engineering AG Zeughausstrasse 43. 8004 Zu	rich, Switzerland	BOCHEA CO Z CO	Servizio svizzero un taratura	
	Accredited by the Swiss Accre The Swiss Accreditation Ser Multilateral Agreement for th	vice is one of the signatories	s to the EA	on No.: SCS 108	
	Client Blackberry V	Vaterloo	Certificate M	No: D2450V2-791_Sep13	
	CALIBRATION	CERTIFICATE			
	Object	D2450V2 - SN: 7	91		
	Calibration procedure(s)	QA CAL-05.v9 Calibration proce	dure for dipole validation kits at	pove 700 MHz	
	Calibration date:	September 10, 26	013		
	This calibration certificate doc The measurements and the u	suments the traceability to nati ncertaintles with confidence p	onal standards, which realize the physical robability are given on the following pages	and are part of the certificale.	
	This calibration certificate doc The measurements and the u	suments the traceability to nati ncertaintles with confidence p inducted in the closed laborator	onal standards, which realize the physical	and are part of the certificale.	
	This calibration certificate doc The measurements and the u All calibrations have been cor	suments the traceability to nati ncertaintles with confidence p inducted in the closed laborator	onal standards, which realize the physical robability are given on the following pages	and are part of the certificale.	
	This calibration certificate doc The measurements and the u All calibrations have been cor Calibration Equipment used ( <u>Primary Standards</u> Power sensor HP 8481A Reference 20 dB Attenuator Type-1 mismatch combinatio Reference Probe ES3DV3	noertainties with confidence p nducted in the closed laborator M&TE critical for calibration) ID # GB37480704 US37292783 SN: 5058 (20k) n SN: 5057.3 / 06327 SN: 3205	onal standards, which realize the physical i robability are given on the following pages i ry facility: environment temperature (22 ± 3 Cal Date (Certificate No.) 01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 04-Apr-13 (No. 217-01736) 04-Apr-13 (No. 217-01736) 04-Apr-13 (No. 217-01739) 28-Doc-12 (No. ES3-3205_Dec12)	and are part of the certificate. PC and humidity < 70%. Scheduled Calibration Oct-13 Oct-13 Oct-13 Apr-14 Apr-14 Dec-13	
	This calibration certificate doc The measurements and the u All calibrations have been cor Calibration Equipment used ( Primary Standards Power maler EPM-442A Power sensor HP 6481A Heference 20 dB Attenuator Type-N mismatch combinatio	ncertainties with confidence p nducted in the closed laborator M&TE critical for calibration) ID # GB37480704 US37292783 SN: 5058 (20k) n SN: 5057.3 / 06327	onal standards, which realize the physical i robability are given on the following pages : ry facility: environment temperature (22 ± 3 Cal Date (Certificate No.) 01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 04-Apr-13 (No. 217-01640) 04-Apr-13 (No. 217-01736) 04-Apr-13 (No. 217-01739) 28-Dac-12 (No. ES3-3205_Dec12) 25-Apr-13 (No. DAF4-601_Apr13) Chock Date (in house) 18-Oct-02 (in house chock Oct-11)	and are part of the certificate. PC and humidity < 70%. Scheduled Calibration Oct-13 Oct-13 Oct-13 Apr-14 Apr-14 Dec-13 Apr-14 Scheduled Check In house check: Oct-13	
	This calibration certificate doc The measurements and the u All calibrations have been cor Calibration Equipment used ( Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combinatio Reference Probe ES3DV3 DAE4 Secondary Standards	suments the traceability to nation neertaintiles with confidence p nducted in the closed laborator M&TE critical for calibration) ID # GB37480704 US37292783 SN: 5058 (20k) n SN: 5047.3 / 06327 SN: 3205 SN: 601 ID #	onal standards, which realize the physical is robability are given on the following pages is ry facility: environment temperature (22 ± 3 Cal Date (Certificate No.) 01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 04-Apr-13 (No. 217-01736) 04-Apr-13 (No. 217-01736) 04-Apr-13 (No. 217-01739) 28-Dac-12 (No. ES3-3205_Dec12) 25-Apr-13 (No. OAE4-601_Apr13) Chock Date (in house)	and are part of the certificate. PG and humidity < 70%. Scheduled Calibration Oct-13 Oct-13 Apr-14 Apr-14 Dec-13 Apr-14 Scheduled Check	
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	This calibration certificate doc The measurements and the u All calibrations have been cor Calibration Equipment used ( Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combinatio Reference Probe ES3DV3 DAE4 Secondary Standards Power sensor HP 8481A RF generator R&S SMT-06 Network Analyzar HP 8753E	suments the traceability to nation neertaintiles with confidence ponducted in the closed laborator M&TE critical for calibration) ID # GB37480704 US37292783 SN: 5058 (20k) NSN: 5047.3 / 06327 SN: 3205 SN: 601 ID # MY41092317 100005 US37390585 S4206 Name	onal standards, which realize the physical or robability are given on the following pages or ry facility: environment temperature (22 ± 3) Cal Date (Certificate No.) 01-Nov-12 (No. 217-01640) 04-Apr-13 (No. 217-01640) 04-Apr-13 (No. 217-01736) 04-Apr-13 (No. 217-01736) 04-Apr-13 (No. 217-01736) 04-Apr-13 (No. ES3-3205_Dec12) 25-Apr-13 (No. DAE4-601_Apr13) Check Date (in house) 18-Oct-02 (in house check Oct-11) 04-Aug-99 (in house check Oct-11) 18-Oct-01 (in house check Oct-12) Function	and are part of the certificate. )*G and humidity < 70%. Scheduled Calibration Oct-13 Oct-13 Oct-13 Apr-14 Dec-13 Apr-14 Dec-13 Apr-14 Scheduled Check In house check: Oct-13 In house check: Oct-13 In house check: Oct-13	

SlackBerry

Author Data Andrew Becker

Dates of Test Jan 29 – Mar 09, 2015

Document

Test Report No RTS-6063-1503-17

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



- Schweizerischer Kallbrierdienst Service suisse d'étalonnage С
  - Servizio svizzero di taratura Swiss Calibration Service

Accreditation No.: SCS 108

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

#### Glossarv:

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) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

#### Additional Documentation:

d) DASY4/5 System Handbook

#### Methods Applied and Interpretation of Parameters:

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

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

Certificate No: D2450V2-791\_Sep13

Page 2 of 6

SlackBerry

#### Document Appendix D for the BlackBerry® Smartphone Model RHD131LW (STR100-1) SAR Report

Author Data         Dates of Test         Test Report No         FCC ID:           Andrew Becker         Jan 29 – Mar 09, 2015         RTS-6063-1503-17         L6ARHD130LW					
Andrew Becker         Jan 29 – Mar 09, 2015         RTS-6063-1503-17         L6ARHD130LW	Author Data	Dates of Test	Test Report No	FCC ID:	
	Andrew Becker	Jan 29 – Mar 09, 2015	RTS-6063-1503-17	L6ARHD130LW	

#### **Measurement Conditions**

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

DASY Version	DASY5	V52.8.7
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
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	39.4 ± 6 %	1.83 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	(منبعه)	

#### 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	13.0 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	51.6 W/kg ± 17.0 % (k=2)
SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL SAR measured	condition 250 mW input power	6.03 W/kg

Certificate No: D2450V2-791\_Sep13

Page 3 of 6

👯 Black	Rerry		Appendix D for the BlackBerry® Smartphone Model RHD131LW (STR100-1) SAR Report		
Author Data	Dates of		1		
Andrew Becker	Jan	29 –Mar 09, 2015	RTS-6063-1503-17	L6ARHD130LW	
	Appendix Antenna Param	eters with Head TSL			
	Impedance, tra	ansformed to feed point	56.1	Ω + 3.4 jΩ	-
	Return Loss			23.6 dB	-
	General Antenn	a Parameters and Des	ign		
	1000 - 1000 - 1000 - 1000	a Parameters and Des		.153 ns	7
	Electrical Dela	y (one direction) /ith 100W radiated power, only	a slight warming of the dipole near th	e feedpoint can be measured.	]
	Electrical Dela After long term use w The dipole is made o second arm of the dip are added to the dipo "Measurement Condi according to the Star	y (one direction) with 100W radiated power, only f standard semirigid coaxial ca pole. The antenna is therefore ole anns in order to improve ma- tions" paragraph. The SAR da vdard. hust be applied to the dipole au	1	e feedpoint can be measured. ing line is directly connected to the ne of the dipoles, small end caps position as explained in the e overall dipole length is still	19
	Electrical Dela After long term use w The dipole is made o second arm of the dip are added to the dip "Measurement Condi according to the Star No excessive force n	y (one direction) with 100W radiated power, only f standard semirigid coaxial ca pole. The antenna is therefore ble arms in order to improve mi- tions" paragraph. The SAR dan dard. hust be applied to the dipole and maged.	a slight warning of the dipole near the able. The center conductor of the feed short-circuited for DC-signals. On sor atching when loaded according to the ta are not affected by this change. Th	e feedpoint can be measured. ing line is directly connected to the ne of the dipoles, small end caps position as explained in the e overall dipole length is still	na
	Electrical Dela After long term use w The dipole is made o second arm of the dip are added to the dipo "Measurement Condi according to the Star No excessive force n feedpoint may be dar	y (one direction) with 100W radiated power, only f standard semirigid coaxial ca pole. The antenna is therefore ble arms in order to improve mi- tions" paragraph. The SAR dan dard. nust be applied to the dipole and maged. Data	a slight warning of the dipole near the able. The center conductor of the feed short-circuited for DC-signals. On son atching when loaded according to the ta are not affected by this change. Th rms, because they might bend or the s	e feedpoint can be measured. ing line is directly connected to the ne of the dipoles, small end caps position as explained in the e overall dipole length is still	ne

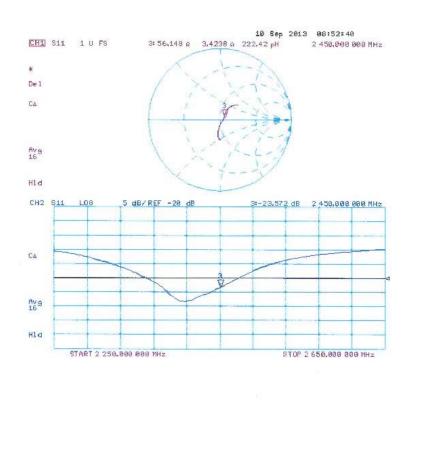
Certificate No: D2450V2-791\_Sep13

Page 4 of 6

SlackBerry			opendix D for the BlackBerry® Smartphone Model RHD131LW TR100-1) SAR Report		
Author Data Andrew Becker	Dates of Te Jan 29	est 9 – Mar 09, 2015	Test Report No RTS-6063-1503-17	FCC ID: L6ARHD130LW	
:	l'est Laboratory: SP	<b>Report for Head TSL</b> EAG, Zurich, Switzerland MHz: Type: <b>D2450V2</b> : 5		Date: 10.09.2013	
	Communication Sys Medium parameters Phantom section: Fl Measurement Stands DASY52 Configura	tem: UID 0 - CW; Freque used: $f = 2450$ MHz; $\sigma =$ at Section ard: DASY5 (IEEE/IEC/A	ency: 2450 MHz 1.83 S/m; ε <sub>r</sub> = 39,4; ρ = 1000 k ANSI C63.19-2007)	• 14-23	
	Sensor-Surfa	ce: 3mm (Mechanical Su		1.2012;	
	Phantom: Fla	DAE4 Sn601; Calibrated: at Phantom 5.0 (front); Ty 8.7(1137); SEMCAD X	pe: QD000P50AA; Serial: 1001		
1 1 7 2	vleasurement grid: c Reference Value = 9 Peak SAR (extrapol: SAR(1 g) = 13 W/k	lx=5mm, dy=5mm, dz=5i 9.824 V/m; Power Drift :	= 0.04 dB	n Scan (7x7x7)/Cube 0:	
		dU -4.80 -9.60 -14.40			
		-24.00 0 dB = 16.9 WA	xg = 12.28 dBW/kg		
	Certificate No: D2450V2	-791_Sep13	Page 5 of 6		

SlackBerry		Appendix D for the BlackBerry® Smartphone Model RHD131LW (STR100-1) SAR Report			Page 42(42)
Author Data	Dates of Test		Test Report No	FCC ID:	
Andrew Becker	Jan 29 – Mar 09, 2015		RTS-6063-1503-17	L6ARHD130LW	

#### Impedance Measurement Plot for Head TSL



Certificate No: D2450V2-791\_Sep13

Page 6 of 6