≅ BlackBerry	Appendix D for the BlackB Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR			
Author Data	Dates of Test	Test Report No	FCC ID:	IC	
Andrew Becker	Nov 26, 2012- Feb 28, 2013	RTS-6026-1302-18	L6ARFN80UW	2503A-RFN80UW	
	Dec. 10-12, 2014	Rev 3			

APPENDIX D: PROBE & DIPOLE CALIBRATION DATA

	Revision History							
Rev. Number	Date	Changes						
Initial	May 23, 2013							
Rev 2	Dec 16, 2014	Added equipment used for 802.11a Hotspot mode SAR testing 1. Page 35-45						



Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR Report Rev 2

2(115)

Author Data

Andrew Becker

Dates of Test

Nov 26, 2012- Feb 28, 2013 Dec. 10-12, 2014

Test Report No RTS-6026-1302-18 Rev 3

FCC ID: L6ARFN80UW

2503A-RFN80UW

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





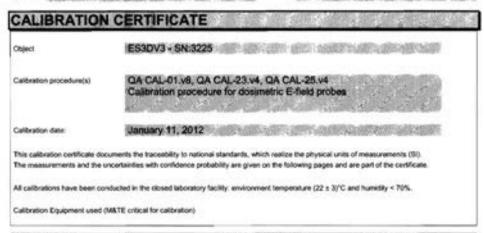
Schweizerischer Kalibrierdienst S Service suisse d'étalonnage C Servizio svizzero di taratura Swiss Calibration Service

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

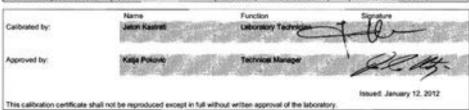
Accreditation No.: SCS 108

RTS (RIM Testing Services)

feats No: ES3-3225 Jan12



Primary Standards	10	Cal Date (Certificate No.)	Scheduled Calibration
Power meter £44198	G841293874	31-Mar-11 (No. 217-01372)	Apr-12
Power sensor E4412A	MY41498087	31-Mar-11 (No. 217-01372)	Apr-12
Reference 3 dB Attenuator	SN: 55054 (3c)	29-Mar-11 (No. 217-01369)	Apr-12
Reference 20 dB Attenuator	SN: 55086 (20b)	29-Mar-11 (No. 217-01367)	Apr-12
Reference 30 dB Attenuator	SN: 55129 (30b)	29-Mar-11 (No. 217-01370)	Apr-12
Reference Probe ES3DV2	SN: 3013	29-Dec-11 (No. ES3-3013_Dec11)	Dec-12
DAE4	SN: 654	3-May-11 (No. DAE4-654_May11)	May-12
Secondary Standards	10	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-11)	In house check: Apr-13
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-11)	In house check: Oct-12



Certificate No: ES3-3225_Jan12

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≅BlackBerry	Appendix D for the BlackB Report Rev 2	erry® Smartphone Mo	odel RFN81UW SAR	Page 3(115)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 26, 2012- Feb 28, 2013	RTS-6026-1302-18	L6ARFN80UW	2503A-RFN80UW
	Dec. 10-12, 2014	Rev 3		

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





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Accreditation No.: SCS 108

Accredited by the Swiss Accreditation Service (SAS)

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

Glossary:

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

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

Polarization o o rotation around probe axis

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

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

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

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

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Certificate No: ES3-3225_Jan12	Page 2 of 11	

≅BlackBerry	Appendix D for the BlackB Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR 4(11		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 26, 2012- Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1302-18 Rev 3	L6ARFN80UW	2503A-RFN80UW

ES30V3 - SN:3225

January 11, 2012

Probe ES3DV3

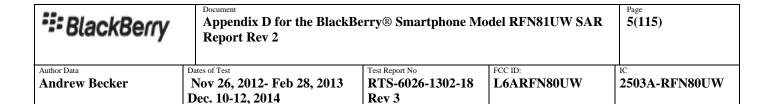
SN:3225

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

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

Certificate No: ES3-3225_Jan12

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ES30V3-SN:3225

January 11, 2012

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

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm (µV/(V/m) ²) ^A	1.26	1.20	1.30	± 10.1 %
DCP (mV) ⁶	101.2	100.8	101.2	11/20/20/20

Modulation Calibration Parameters

	Communication System Name	cation System Name PAR		me PAR		A dB	B dB	d8 1.00	VR mV 107.7	Unc ^c (k=2)	
	CW	0.00	X	0.00	0.00	±1.7 %					
			Y	0.00	0.00	1.00	113.4				
			2	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%.

Certificate No: ES3-3225_Jan12

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

Numerical Imparization parameter: uncertainty not required.

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

≅BlackBerry	Appendix D for the BlackB Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 26, 2012- Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1302-18 Rev 3	L6ARFN80UW	2503A-RFN80UW

ES30V3-SN:3225

January 11, 2012

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

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) ^c	Relative Permittivity	Conductivity (S/m)	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
750	41.9	0.89	6.42	6.42	6.42	0.27	2.04	± 12.0 %
900	41.5	0.97	6.06	6.06	6.06	0.35	1,74	± 12.0 %
1810	40.0	1.40	5.23	5.23	5.23	0.73	1,21	± 12.0 %
1950	40.0	1.40	4.98	4.98	4.98	0.58	1.41	± 12.0 %
2450	39.2	1.80	4,50	4.50	4.50	0.79	1,26	± 12.0 %
2600	39.0	1.96	4.32	4.32	4.32	0.77	1.32	± 12.0 %

Certificate No: ES3-3225_Jan12

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⁶ Prequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Plage 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
⁷ At frequencies below 3 GHz, the validity of issue parameters (c and n) can be released to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of issue parameters (c and e) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target issue parameters.

≅BlackBerry	Appendix D for the BlackB Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 26, 2012- Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1302-18 Rev 3	L6ARFN80UW	2503A-RFN80UW

ES3DV3- SN 3225

January 11, 2012

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

Calibration Parameter Determined in Body Tissue Simulating Media

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

Certificate No: ES3-3225_Jan12

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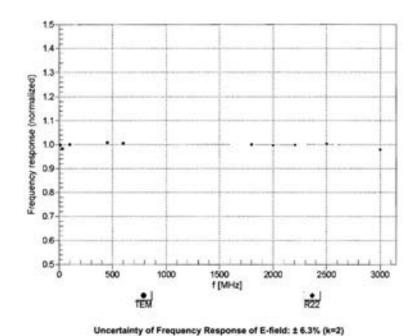
⁶ Frequency validity of a 100 MHz only applies for DASY v4.4 and higher (see Page 2), else d is restricted to a 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
⁷ At frequencies below 3 GHz, the validity of fissue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

≅BlackBerry	Appendix D for the BlackE Report Rev 2	Berry® Smartphone Mo	odel RFN81UW SAR	Page 8 (115)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 26, 2012- Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1302-18 Rev 3	L6ARFN80UW	2503A-RFN80UW

ES30V3-SN:3225

January 11, 2012

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



Certificate No: ES3-3225_Jan12

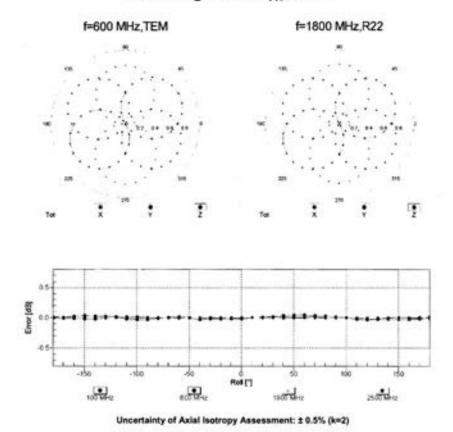
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≅BlackBerry	Appendix D for the BlackE Report Rev 2	Berry® Smartphone M	odel RFN81UW SAR	Page 9 (115)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 26, 2012- Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1302-18 Rev 3	L6ARFN80UW	2503A-RFN80UW

E830V3- SN:3225

January 11, 2012

Receiving Pattern (6), 9 = 0°



Certificate No: ES3-3225_Jan12

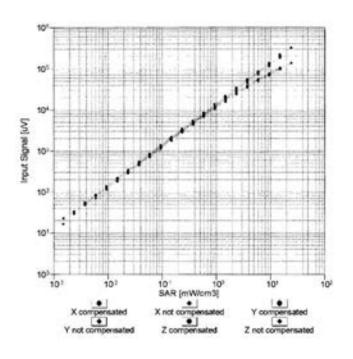
Page 8 of 11

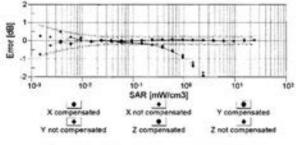
≅BlackBerry	Appendix D for the BlackB Report Rev 2	Berry® Smartphone Mo	odel RFN81UW SAR	Page 10(115)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 26, 2012- Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1302-18	L6ARFN80UW	2503A-RFN80UW

ES3DV3-SN:3225

January 11, 2012

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





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

Certificate No: ES3-3225_Jan12

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≅BlackBerry	Appendix D for the BlackB Report Rev 2	serry® Smartphone Mo	odel RFN81UW SAR	Page 11(115)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 26, 2012- Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1302-18 Rev 3	L6ARFN80UW	2503A-RFN80UW

ES3DV3-SN:3225 January 11, 2012 **Conversion Factor Assessment** f = 900 MHz, WGLS R9 (H_convF) f = 1810 MHz.WGLS R22 (H_convF) Deviation from Isotropy in Liquid Error (6, 8), f = 900 MHz 1.0 0.8 0.6 0.4 0.2 0.0 -0.4 -0.6 180 225 270 -1.0 -0.8 -0.5 -0.4 -0.2 0.0 0.2 0.4 0.5 0.8 Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

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≅BlackBerry	Appendix D for the BlackB Report Rev 2	erry® Smartphone M	odel RFN81UW SAR	Page 12(115)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 26, 2012- Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1302-18 Rev 3	L6ARFN80UW	2503A-RFN80UW

ES3DV3- SN:3225 January 11, 2012

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

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (*)	Not applicable
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	10 mm
Tip Diameter	4 mm
Probe Tip to Sensor X Calibration Point	2 mm
Probe Tip to Sensor Y Calibration Point	2 mm
Probe Tip to Sensor Z Calibration Point	2 mm
Recommended Measurement Distance from Surface	3 mm

Certificate No: ES3-3225_Jan12 Page 11 of 11



Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR Report Rev 2

13(115)

Author Data

Andrew Becker

Dates of Test

Nov 26, 2012- Feb 28, 2013 Dec. 10-12, 2014

Test Report No RTS-6026-1302-18 Rev 3

FCC ID: L6ARFN80UW

2503A-RFN80UW

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





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RTS (RIM Testing Services)

Accreditation No.: SCS 108

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Certificate No: ES3-3225_Jan13

CALIBRATION CERTIFICATE

Object

ES3DV3 - SN:3225

Calibration procedure(s)

QA CAL-01.v8, QA CAL-23.v4, QA CAL-25.v4 Calibration procedure for dosimetric E-field probes

Calibration date:

January 10, 2013

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

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

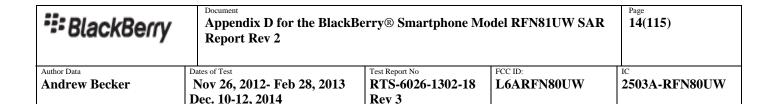
Calibration Equipment used (M&TE critical for calibration)

Primary Standards	10	Call Date (Certificate No.)	Scheduled Calibration
Power moter E4419tb	0841293874	29-Mar-12 (No. 217-01508)	Apr-13
Power sensor E4412A.	MY41498087	29-Mar-12 (No. 217-01508)	Apr-13
Reference 3 dB Attenuator	SN: S5054 (3c)	27-Mar-12 (No. 217-01531)	Apr-13
Reference 20 dB Altenuator	SN: 55086 (20b)	27-Mar-12 (No. 217-01529)	Apr.13
Reference 30 dB Attenuator	SN: S5129 (30b)	27-Mar-12 (No. 217-01532)	Apr-13
Reference Probe ES3DV2	SN: 3013	26-Dec-12 (No. ES3-3013_Dec12)	Dec-13
DAE4	SN: 660	20-Jun-12 (No. DAE4-660_Aur12)	Jun-13
Secondary Standards	ID .	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-11)	In house check: Apr-13
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-12)	In house check: Oct-13

Function Signature Calibrated by: Jeton Kastrati Laboratory Technician Approved by: Katja Pokovic Technical Manager bissed: January 14, 2013 This calibration certificate shall not be reproduced except in full without written approval of the laboratory

Certificate No: ES3-3225 Jan13

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





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Accreditation No.: SCS 108

Accredited by the Swiss Accreditation Service (SAS)

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

Glossary:

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

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

Polarization φ rotation around probe axis

Polarization 9

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

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

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

- NORMx,y,z: Assessed for E-field polarization 8 = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide).
 NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect the E²-field uncertainty inside TSL (see below ConvF).
- NORM(f)x,y,z = NORMx,y,z * frequency_response (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConvF.
- DCPx,y,z: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- PAR: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- Ax,y,z: Bx,y,z: Cx,y,z: Dx,y,z: VRx,y,z: A, B, C, D are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- ConvF and Boundary Effect Parameters: Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORMc,y,z * ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100
- Spherical isotropy (3D deviation from isotropy): in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

Certificate		

≅BlackBerry	Appendix D for the BlackB Report Rev 2	erry® Smartphone Mo	odel RFN81UW SAR	Page 15(115)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 26, 2012- Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1302-18 Rev 3	L6ARFN80UW	2503A-RFN80UW

ES3DV3 - SN:3225

January 10, 2013

Probe ES3DV3

SN:3225

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

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

Certificate No: ES3-3225_Jan13

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≅BlackBerry	Appendix D for the BlackBo Report Rev 2	erry® Smartphone Mo	del RFN81UW SAR	Page 16(115)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 26, 2012- Feb 28, 2013	RTS-6026-1302-18	L6ARFN80UW	2503A-RFN80UW
	Dec. 10-12, 2014	Rev 3		

ES30V3-SN:3225 January 10, 2013

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

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k×2)
Norm (µV/(V/m) ²) ^A	1.29	1.19	1.31	± 10.1 %
Norm (µV/(V/m)²)² DCP (mV)®	100.5	101.5	98.9	-

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dBõV	c	D dB	VR mV	Unc* (k=2)
0	CW	X	0.0	0.0	1.0	0.00	157.5	12.7 %
	1000	Y	0.0	0.0	1.0	11 100000	158.4	
		Z	0.0	0.0	1.0	100	165.9	

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

Certificate No: ES3-3225, Jan 13

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

Numerical linearization parameter: uncertainty not required.

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

≅ BlackBerry	Appendix D for the BlackE Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR				
Author Data	Dates of Test	Test Report No	FCC ID:	IC		
Andrew Becker	Nov 26, 2012- Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1302-18 Rev 3	L6ARFN80UW	2503A-RFN80UW		

January 10, 2013

ES3DV3- SN:3225

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

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHZ) ^C	Relative Permittivity	Conductivity (S/m)	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k×2)
750	41.9	0.89	6.56	6.56	8.56	0.42	1.54	±12.0%
900	41.5	0.97	6.19	6.19	6.19	0.43	1.52	± 12.0 %
1810	40.0	1.40	5.35	5.35	5.35	0.63	1.39	± 12.0 %
1950	40.0	1.40	5.09	5.09	5.09	0.80	1.23	± 12.0 %
2450	39.2	1.80	4.65	4.65	4.65	0.61	1.63	±12.0%
2600	39.0	1.96	4.43	4.43	4.43	0.80	1.32	±12.0 %

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

Certificate No: ES3-3225, Jan 13

≅BlackBerry	Appendix D for the BlackB Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR				
Author Data	Dates of Test	Test Report No	FCC ID:	IC		
Andrew Becker	Nov 26, 2012- Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1302-18 Rev 3	L6ARFN80UW	2503A-RFN80UW		

ES3DV3- SN:3225 January 10, 2013

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

Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) ^C	Relative Permittivity ^F	Conductivity (Sim)	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
750	55.5	0.96	6.27	6.27	6.27	0.48	1.51	± 12.0 %
900	55.0	1.05	6.12	6.12	6.12	0.73	1.25	# 12.0 %
1810	53.3	1.52	5.04	5.04	5.04	0.57	1.47	± 12.0 %
1950	53.3	1.52	4.94	4.94	4.94	0.58	1.50	±1209
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 %

Forguency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), size it is restricted to ± 50 MHz. The uncertainty is the RSS of the ComiF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
At Irrequencies before 3 CHz, the validity of tissue parameters (x and x) can be relaxed to ± 10% if fould compensation formula is applied to measured SAR values. At Irrequencies above 3 CHz, the validity of tissue parameters (x and x) is restricted to ± 5%. The uncertainty is the RSS of the Convif uncertainty for indicated target lissue parameters.

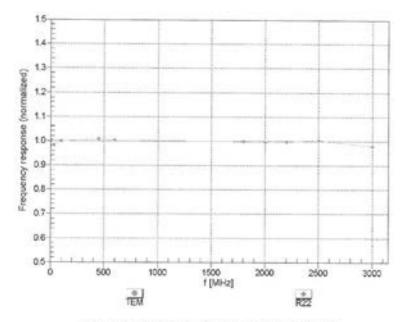
Certificate No: ES3-3225, Jan13

Appendix D for the Black Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR				
Dates of Test	Test Report No	FCC ID:	IC		
Nov 26, 2012- Feb 28, 2013	RTS-6026-1302-18	L6ARFN80UW	2503A-RFN80UW		
	Appendix D for the Black Report Rev 2	Appendix D for the BlackBerry® Smartphone M Report Rev 2 Dates of Test Nov 26, 2012- Feb 28, 2013 Test Report No RTS-6026-1302-18	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR Report Rev 2 Dates of Test Nov 26, 2012- Feb 28, 2013 Test Report No RTS-6026-1302-18 FCC ID: L6ARFN80UW		

ES30V3-SN:3225

January 10, 2013

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



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

Certificate No: ES3-3225_Jan13

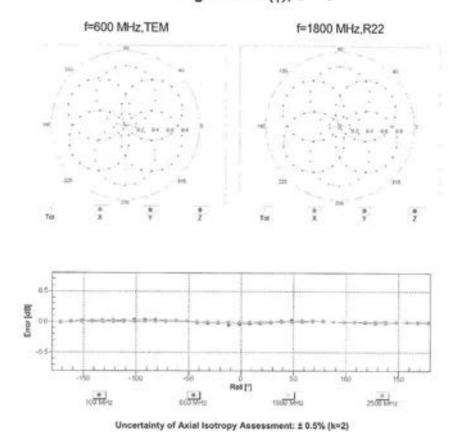
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≅BlackBerry	Appendix D for the BlackB Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR				
Author Data	Dates of Test	Test Report No	FCC ID:	IC		
Andrew Becker	Nov 26, 2012- Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1302-18 Rev 3	L6ARFN80UW	2503A-RFN80UW		

ES30V3- SN 3225

January 10, 2013

Receiving Pattern (6), 9 = 0°



Certificate No: ES3-3225_Jan13

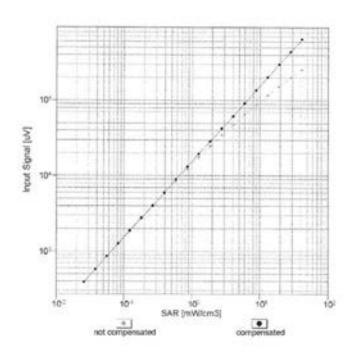
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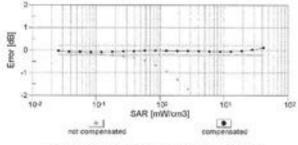
≅BlackBerry	Appendix D for the BlackB Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR				
Author Data	Dates of Test	Test Report No	FCC ID:	IC		
Andrew Becker	Nov 26, 2012- Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1302-18	L6ARFN80UW	2503A-RFN80UW		

ES3DV3- SN:3225

January 10, 2013

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





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

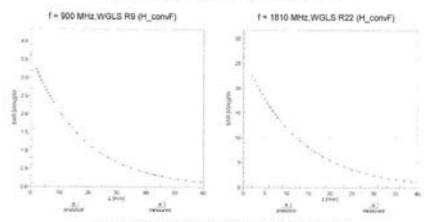
Certificate No: ES3-3225_Jan13

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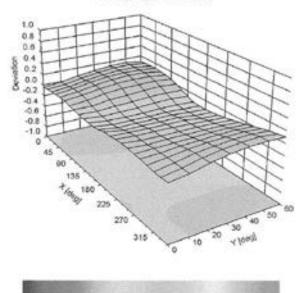
≅BlackBerry	Appendix D for the BlackE Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR				
Author Data	Dates of Test	Test Report No	FCC ID:	IC		
Andrew Becker	Nov 26, 2012- Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1302-18 Rev 3	L6ARFN80UW	2503A-RFN80UW		

ES3DV3- SN:3225

Conversion Factor Assessment



Deviation from Isotropy in Liquid Error (6, 9), f = 900 MHz



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

Certificate No: E83-3225_Jan13

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≅BlackBerry	Appendix D for the BlackB Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR				
Author Data	Dates of Test	Test Report No	FCC ID:	IC		
Andrew Becker	Nov 26, 2012- Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1302-18 Rev 3	L6ARFN80UW	2503A-RFN80UW		

ES3DV3- SN:3225 January 10, 2013

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

Other Probe Parameters

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

Certificate No: ES3-3225_Jan13 Page 11 of 11



Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR Report Rev 2

24(115)

Author Data

Andrew Becker

Dates of Test

Nov 26, 2012- Feb 28, 2013 Dec. 10-12, 2014

Test Report No RTS-6026-1302-18 Rev 3

FCC ID: L6ARFN80UW

2503A-RFN80UW

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





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

RTS (RIM Testing Services)

Accreditation No.: SCS 108

C

Certificate No: EX3-3592_Nov12

CALIBRATION CERTIFICATE

Coject

EX3DV4 - SN:3592

Calibration procedure(s)

QA CAL-01.v8, QA CAL-14.v3, QA CAL-23.v4, QA CAL-25.v4

Calibration procedure for dosimetric E-field probes

Calibration date:

November 14, 2012

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

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)/C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	10	Cal Date (Certificate No.)	Scheduled Calibration
Power meter £44198	0841293874	29-Mar-12 (No. 217-01508)	Apr-13
Power sensor E4412A	MY41498087	29-Mar-12 (No. 217-01508)	Apr-13
Reference 3 dB Attenuator	SN: S5054 (3c)	27-Mar-12 (No. 217-01551)	Apr-13
Reference 20 dil Atlenuator	SN: 55086 (20b)	27-Mar-12 (No. 217-01829)	Apr-13
Reference 30 dB Attenuator	SN: S5129 (30b)	27-Mar-12 (No. 217-01532)	Apr-13
Reference Probe ES30V2	SN: 3013	29-Dec-11 (No. ES3-3013_Dec11)	Dec-12
DAE4	SN: 660	20-Jun-12 (No. DAE4-660, Jun12)	Jun-13
Secondary Standards	10	Check Date (in fouse)	Scheduled Check
RF generator HP 8646C	US3842U01700	4-Aug-99 (in house check Apr-11)	In house check: Apr-13
Network Analyzer IIP 8753E	US37390565	16-Oct-01 (in house check Oct-12)	In house check: Oct-13

Function Calibrated by: Claudio Leubler Laboratory Technician Technical Manager Approved by: Issued November 14, 2012 This calibration certificate shall not be reproduced except in full without written approval of the laboratory

Certificate No: EX3-3592 Nov12

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≅BlackBerry	Appendix D for the BlackB Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR				
Author Data	Dates of Test	Test Report No	FCC ID:	IC		
Andrew Becker	Nov 26, 2012- Feb 28, 2013	RTS-6026-1302-18	L6ARFN80UW	2503A-RFN80UW		
	Dec. 10-12, 2014	Rev 3				

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





S Schweizenischer Kalitzierdienst C Service suitse d'etatonnage Servicio svitzero di taratura Swise Calibration Service

Accreditation No.: SCS 108

Accredited by the Swiss Accreditation Service (SAS)

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

Glossary:

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

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

Polarization o orotation around probe axis

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

i.e., 5 = 0 is normal to probe axis

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

- NORMx,y,z: Assessed for E-field polarization 5 = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide).
 NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect the E²-field uncertainty inside TSL (see below ConvF).
- NORM(f)x,y,z = NORMx,y,z * frequency_response (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of Com/F.
- DCPx,y,z: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- PAR: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- Ax,y,z; Bx,y,z; Cx,y,z, VRx,y,z; A, B, C are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- ConvF and Boundary Effect Parameters: Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORMx,y,z * ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 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.

Certificate No: EX3-3592_Nov12 Page 2 of 11

≅BlackBerry	Appendix D for the BlackB Report Rev 2	erry® Smartphone Mo	odel RFN81UW SAR	Page 26 (115)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 26, 2012- Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1302-18 Rev 3	L6ARFN80UW	2503A-RFN80UW

EX3DV4 - SN:3592

November 14, 2012

Probe EX3DV4

SN:3592

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

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

Certificate No: EX3-3592_Nov12

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≅BlackBerry	Appendix D for the BlackBe Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR			
Author Data	Dates of Test	Test Report No	FCC ID:	IC	
Andrew Becker	Nov 26, 2012- Feb 28, 2013	RTS-6026-1302-18	L6ARFN80UW	2503A-RFN80UW	
	Dec. 10-12, 2014	Rev 3			

EX3DV4~ SN:3592

November 14, 2012

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

Basic Calibration Parameters

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

Modulation Calibration Parameters

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

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

≅BlackBerry	Appendix D for the BlackE Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR			
Author Data	Dates of Test	Test Report No	FCC ID:	IC	
Andrew Becker	Nov 26, 2012- Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1302-18 Rev 3	L6ARFN80UW	2503A-RFN80UW	

EX3DV4~ SN:3592

November 14, 2012

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

Calibration Parameter Determined in Head Tissue Simulating Media

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

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

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

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≅BlackBerry	Appendix D for the BlackI Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR				
Author Data	Dates of Test	Test Report No	FCC ID:	IC		
Andrew Becker	Nov 26, 2012- Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1302-18 Rev 3	L6ARFN80UW	2503A-RFN80UW		

EX3DV4—SN:3592 November 14, 2012

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

Calibration Parameter Determined in Body Tissue Simulating Media

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

Frequency wildity 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 Constitution for uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
At frequencies below 3 GHz, the validity of issue paremeters (c and d) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (c and d) is restricted to ± 5%. The uncertainty is the RSS of the Constitution for indicated target issue parameters.

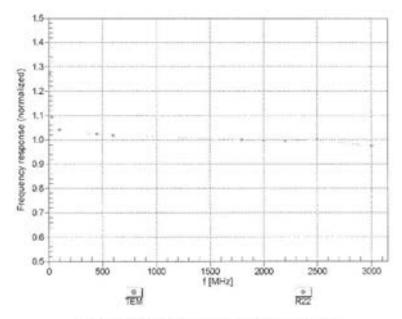
Certificate No: EX3-3592 Nov12 Page 6 of 11

≅BlackBerry	Appendix D for the BlackE Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR			
Author Data	Dates of Test	Test Report No	FCC ID:	IC	
Andrew Becker	Nov 26, 2012- Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1302-18 Rev 3	L6ARFN80UW	2503A-RFN80UW	

EX3DV4~SN:3592

November 14, 2012

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



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

Certificate No: EX3-3592_Nov12

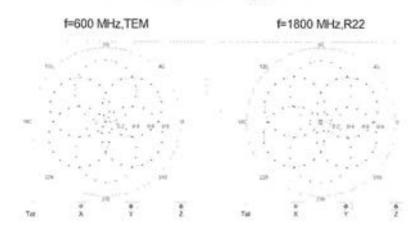
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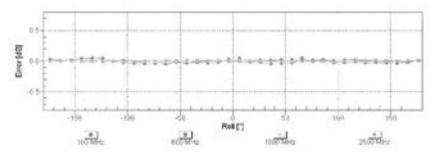
≅BlackBerry	Appendix D for the Black Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR				
Author Data	Dates of Test	Test Report No	FCC ID:	IC		
Andrew Becker	Nov 26, 2012- Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1302-18 Rev 3	L6ARFN80UW	2503A-RFN80UW		

EX3DV4-SN:3592

November 14, 2012

Receiving Pattern (6), 9 = 0°





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

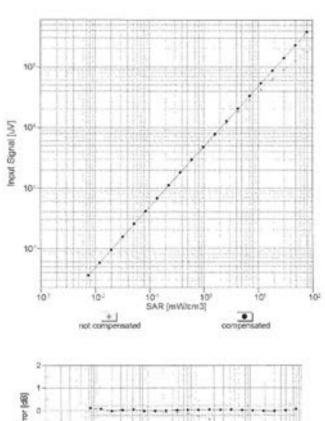
Certificate No: EX3-3592_Nov12

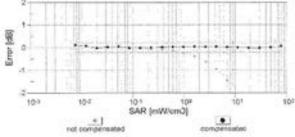
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≅BlackBerry	Appendix D for the BlackB Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR			
Author Data	Dates of Test	Test Report No	FCC ID:	IC	
Andrew Becker	Nov 26, 2012- Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1302-18 Rev 3	L6ARFN80UW	2503A-RFN80UW	

EX3DV4- \$N:3592 November 14, 2012

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





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

Certificate No: EX3-3592_Nov12 Page 9 of 11

≅BlackBerry	Appendix D for the Black Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR				
Author Data	Dates of Test	Test Report No	FCC ID:	IC		
Andrew Becker	Nov 26, 2012- Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1302-18 Rev 3	L6ARFN80UW	2503A-RFN80UW		

EX3DV4- SN:3592 November 14, 2012 Conversion Factor Assessment f = 2600 MHz.WGLS R22 (H_convF) f = 2600 MHz,WGLS R22 (M_convF) Deviation from Isotropy in Liquid Error (¢, 3), f = 900 MHz 0.5 0.6 04 0.0 0.0 0.0 0.0 0.0 0.0 -0.4 -0.8 180 02 04 0.6 0.6 -1.0 -0.8 -0.8 -0.4 -0.2 0.0 Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

Certificate No: EX3-3592_Nov12

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≅BlackBerry	Appendix D for the BlackB Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 26, 2012- Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1302-18 Rev 3	L6ARFN80UW	2503A-RFN80UW

EX30V4-SN:3592

November 14, 2012

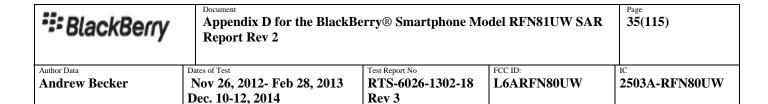
DASY/EASY - Parameters of Probe: EX3DV4 - SN:3592

Other Probe Parameters

Triangular
-13.6
enabled
disabled
337 mm
10 mm
9 mm
2.5 mm
1 mm
1 mm
1 mm
2 mm

Certificate No: EX3-3562_Nov12

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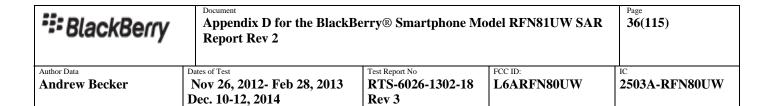
Accreditation No.: SCS 108 Approximation by the Switzs Appreciation Service (SAS) The Swiss Accreditation Service is one of the signatories to the EA Muridateral Agreement for the recognition of calibration pertilicates.

Certificate No: EX3-3592 Nov14 Blackberry Waterloo CALIBRATION CERTIFICATE Orquict EX3DV4 - SN:3592 QA CAL-01.V9, QA CAL-14.V4, QA CAL-23.V5, QA CAL-25.V6 Calibration procedure(x) Calibration procedure for dosimetric E-field probes Calibration sate: November 10, 2014 This calibration certificate documents the traccability to national standards, which revilie the physical units of measurements (55) The measurements and the uncontainting with confidence probability are given on the following pages and are part of the certi-All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 10% Celibration bigulpment used (M&TE critical for celibration) Primary Standards Curl Divini (Certificate No.) Scheduled Calibration Power meter E44198 Gi641293874 03-Apr-14 (No. 217-01011) Apr.15 03-Apr-14 (No. 217-01011) Power sensor E4412A 2/1/41/498007 Apr-15 03 Apr-14 (No. 217-01915) Agr-15 Reference 3 dB Attenuator SN: 55054 (3c) 03-Apr-14 (No. 217-01910) Apr-15 Reference 20 dB Attenuator SN: 85277 (20x) Reference 30 dB Attenuator SN: 55129 (30t) 09-Apr-14 (No. 217-01920) Apr-15 30-Dec-13 (No. 653-3013, Dec13) Dec-14 Reference Probe ESSDV2 13-Dec-13 (No. DAE4-660, Dec13) DAE4 5N: 660 Dec-14 Scheduled Check Secondary Standards Check Date (in house) HF generator HP 8648C US3042U01700 4-Aug-99 (in house sheck Apr-13) In house check: Apr-10 Notwork Analyzer HP 8753F US37390585 18-Oct-01 (in house check Oct-14) In house at each: Oct-55 Function Laboratory Technician Lef Klysner Galibrated by: Approved by: Technical Manager

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Certificate No: EXX-3592_Nov14

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Accordingtion No.: SCS 108

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Glossary:

TSL fiscue 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_oycle) of the RF signal A, B, C, D modulation dependent linearization parameters

Polarization φ o rotation around probe axis

Polarization 8 9 rotation around an exist hat is in the plane normal to probe exis (at measurement center),

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

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

Calibration is Performed According to the Following Standards:

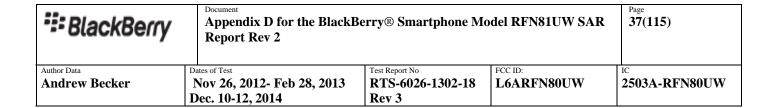
- iEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- EC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices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

Methods Applied and Interpretation of Parameters:

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

Contificate No. EX3-3592, Nov14

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EX3DV4 - 8N:3592

November 10, 2014

Probe EX3DV4

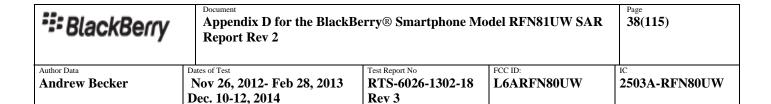
SN:3592

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

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

Certificate No. EX3-3592 Nov14

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EX3DV4-SN:3592

November 10, 2014

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

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (kv2)
Norm (µV/(V/m) ²) ²	0.48	0.47	0.40	±10.1%
DCP (mV)*	95.2	98.0	96.6	7

Modulation Calibration Parameters

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

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

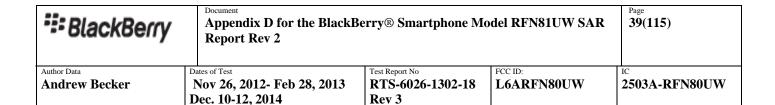
Gertificate No: EX3-3592_Nov14

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^{*} Namerical Breatcation parameter; uncertainty not required.

* Uncorridat Breatcation parameter; uncertainty not required.

* Uncorridately is determined using the max, deviation from knear response applying rectangular distribution and is expressed for the source of the field value.



EX3DV4- SN:3502

November 10, 2014

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

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) ^C	Relative Permittivity	Conductivity (5/m)	ConvF X	ConvF Y	ConvF Z	Alpha ⁰	Depth ^G (aver)	Unot. (k=2)
2600	39.0	1.98	6.80	5.80	6.80	0.36	0.93	±12.0 %
5250	35.9	4.71	4.63	4.63	4.63	0.35	1,80	± 13.1 %
5600	35.5	5.07	4.20	4.20	4.20	0.40	1.50	#13.1%
5750	35.4	5.22	4.34	4.34	4.34	0.40	1.80	±13.1 %

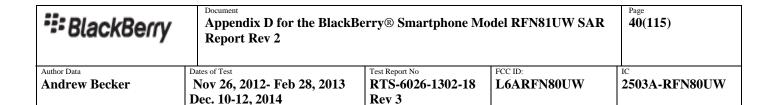
Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v1.4 and higher (see Page 2), else if its restricted to a 50 MHz. The Finguinty visited by the Confe colored to the colored to the confe colored to the colored to the confe colored to the color

Certificate No: EX3-3592 Nov14

Page 5 of 11

the Const Uncortainty for indicated target flavor preventions.

Aprill Dupth are determined during calibration. SPEAC warrants that the remaining deviation dus to the boundary effect effect compensation is always less then a 1% for frequencies adopt 3 GHz and below a 2% for frequencies between 3-5 GHz at any determine larger than half the protein to



EX30V4 SN:3592

November 10, 2014

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

Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) ^C	Relative Permittivity	Conductivity (5/m)	Com/F X	ConvFY	ConvF Z	A)pha [©]	Depth ⁰ (mm)	Unct. (k=2)
2600	52.5	2.16	6.84	6.84	6.84	0.78	0.62	± 12.0 %
5250	48.9	5.36	4.06	4.06	4.06	0.45	1.90	±13.1 %
5600	48.5	5.77	3.78	3,78	3,78	0.45	1.90	± 13.1 %
5750	48.3	5.94	3.81	3.81	3.81	0.50	1.90	±13.1 %

Frequency validity above 300 MHz of a 100 MHz only applied for DASY v4.4 and higher (see Plage 7), who if in restricted to a 50 MHz. The uncortainty is the RGS of the Const uncortainty at calibration frequency and the oncertainty for the indicated frequency limit. Fively-whilly validity behavior 300 MHz is a 10, 25, 40, 50 and 70 MHz for Const assessments at 30, 64, 128, 150 and 220 MHz nespectively. Above 5 GHz frequency validity can be extended to a 110 MHz. The volidity of tissue parameters (it and in) can be released to a 150 MHz. The volidity of tissue parameters (it and in) is negligible to insequence (SAR values). At the parameters above 3 GHz, the validity of tissue parameters is and if) is restricted to a 5%. The uncertainty is the RSS of the Const uncertainty in indicated larged tissue parameters.

Certificate No: EX3-3592_Nov14

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the Cornif uncertainty for indicated larget taxon phramoters.

Alpha/Depth are determined staring calibration. SPEAG worrants that the remaining deviation due to the boundary effect after compensation is always loss than 1, 1% for frequencies below 3 CHz and helice a 25- for fiscusancies between 3.6 GHz at any detained larger than helf the probe tip.

≅BlackBerry	Appendix D for the BlackB Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR			
Author Data	Dates of Test	Test Report No	FCC ID:	IC	
Andrew Becker	Nov 26, 2012- Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1302-18	L6ARFN80UW	2503A-RFN80UW	

Frequency Response of E-Field (TEM-Cell:Hi110 EXX, Waveguide: R22)

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

1500 f [MHz]

2000

2500

* R22 3000

Certificate No: EX3-3592, Nov14

0.6

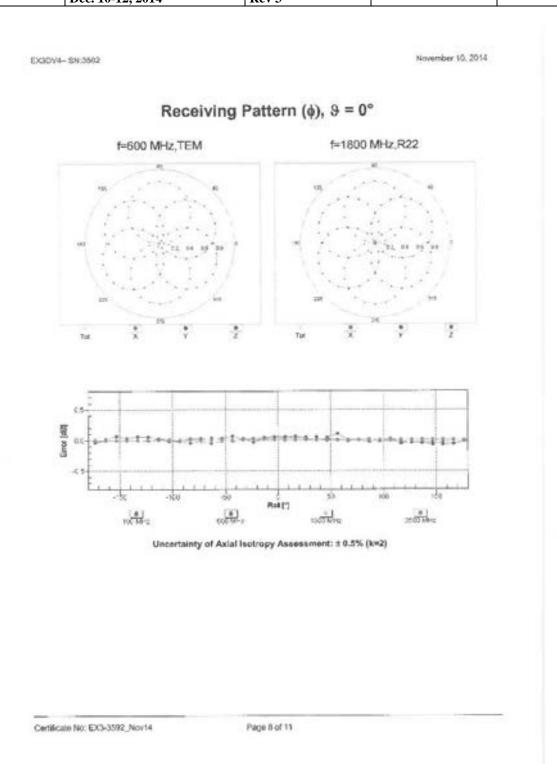
500

1000

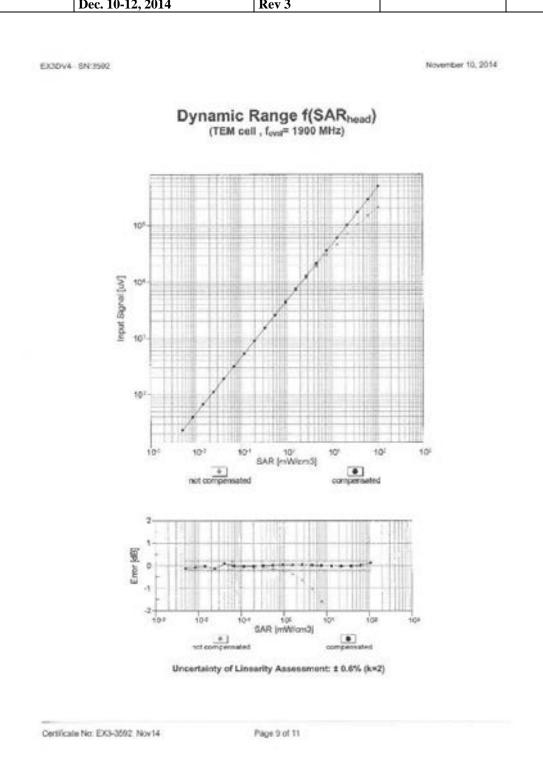
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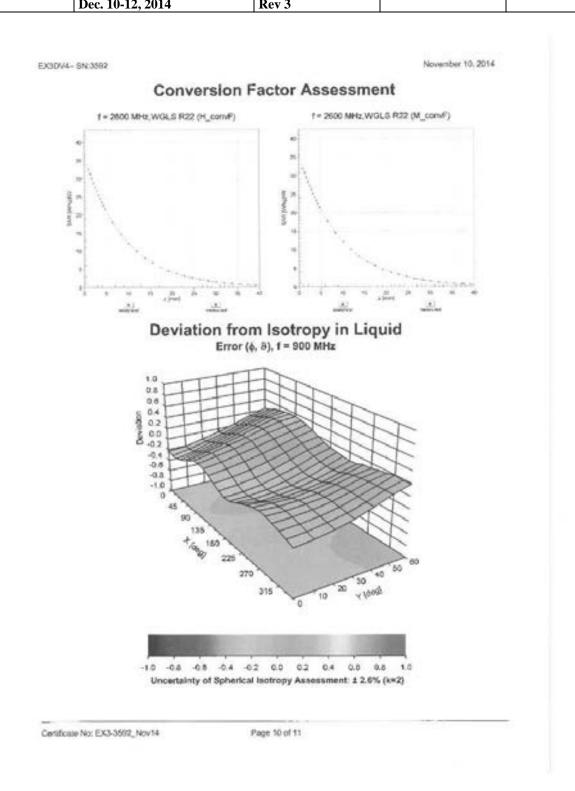
≅BlackBerry	Appendix D for the BlackB Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR			
Author Data	Dates of Test	Test Report No	FCC ID:	IC	
Andrew Becker	Nov 26, 2012- Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1302-18 Rev 3	L6ARFN80UW	2503A-RFN80UW	



≅BlackBerry	Appendix D for the BlackB Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 26, 2012- Feb 28, 2013	RTS-6026-1302-18	L6ARFN80UW	2503A-RFN80UW



≅BlackBerry	Appendix D for the BlackB Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR			
Author Data	Dates of Test	Test Report No	FCC ID:	IC	
Andrew Becker	Nov 26, 2012- Feb 28, 2013	RTS-6026-1302-18	L6ARFN80UW	2503A-RFN80UW	
	Dec 10-12 2014	Rev 3			



≅BlackBerry	Appendix D for the BlackB Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR			
Author Data	Dates of Test	Test Report No	FCC ID:	IC	
Andrew Becker	Nov 26, 2012- Feb 28, 2013	RTS-6026-1302-18	L6ARFN80UW	2503A-RFN80UW	
	Dec. 10-12, 2014	Rev 3			

EX3DV4~ SN:3592

November 10, 2014

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

Other Probe Parameters

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

Certificato No: EX3-3582_Nov14

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Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR Report Rev 2

46(115)

Author Data

Andrew Becker

Dates of Test

Nov 26, 2012- Feb 28, 2013 Dec. 10-12, 2014

Test Report No RTS-6026-1302-18 Rev 3

FCC ID:

L6ARFN80UW

2503A-RFN80UW

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





Schweizerischer Kalibrierdienst Service suisse d'étalonnage C Servizio sviggero di tanatura S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS):

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

RTS (RIM Testing Services)

Accreditation No.: SCS 108

Certificate No: ET3-1644_Nov12

CALIBRATION CERTIFICATE

Object

ET3DV6 - SN:1644

Calibration procedure(s)

QA CAL-01,vB, 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 treceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

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

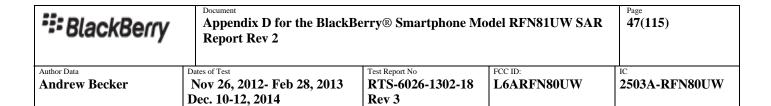
Calibration Equipment used (M&TE ortical for calibration)

Primary Standards	10	Carl Date (Certificate No.)	Scheduled Calibration
Power meter E44198	G841293874	29-Mar-12 (No. 217-01508)	Apr.13
Power sensor E4412A	MY41498087	29-Mar-12 (No. 217-01508)	Agr-13
Reference 3 dB Attenuation	SN: S5054 (3c)	27-Mar-12 (No. 217-01531)	Apr-13
Reference 20 dB Attenuator	SN: SS066 (20b)	27-Mar-12 (No. 217-01529)	Apr-13
Reference 30 dB Attenuator	SN: 85129 (30b)	27-Mar-12 (No. 217-01532)	Apr-13
Reference Probe ES3DV2	SN: 3013	29-Dec-11 (No. ES3-3013, Dec11)	Dec-12
DAE4	SN: 660	20-Jun-12 (No. DAE4-660, Jun 12)	Jun-13
Secondary Standards	ID O	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-11)	in house check: Apr-13
Network Analyzor HP 8753E	US37390585	18-Oct-01 (in house check Oct-12)	In house check: Oct-13

Function Signature Calibrated by: Jeton Kastrati Laboratory Technicis Technical Manager Katja Pokovic Approved by: Issued: November 13, 2012 This calibration certificate shall not be reproduced except in full without written approval of the laboratory

Certificate No. ET3-1644_Nov12

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Calibration Laboratory of Schmid & Partner Engineering AG Zeoghausstrasse 43, 8694 Zurich, Switzerland





S Schweizerischer Kalibrierdionst C Service seisse d'étalonnage Servisio sviozero di taratura Swiss Calibration Service

Accreditation No.: SCS 108

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

Glossary:

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

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

Polarization φ φ rotation around probe axis

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

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

Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2003, TEEE 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 2006

Methods Applied and Interpretation of Parameters:

- NORMx,y,z: Assessed for E-field polarization 8 = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide).
 NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect the E²-field uncertainty inside TSL (see below ConvF).
- NORM(f)x,y,z = NORMx,y,z * frequency_response (see Frequency Response Chart). This linearization is
 implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included
 in the stated uncertainty of ConvF.
- DCPx,y,z: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- PAR: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- Ax.y.z; Bx.y.z; Cx.y.z, VRx,y.z; A, B, C are numerical linearization parameters assessed based on the data of
 power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the
 maximum calibration range expressed in RMS voltage across the diode.
- ConvF and Boundary Effect Parameters: Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f ≥ 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORMx.y.z.* CorivF whereby the uncertainty corresponds to that given for CorivF. A frequency dependent CorivF is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100
- Spherical isotropy (3D deviation from isotropy): in a field of low gradients realized using a flat phantom exposed by a patch artenna.
- Sensor Offset. The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

Certificate No: ET3-1644_Nov12	Page 2 of 11	

≅BlackBerry	Appendix D for the BlackB Report Rev 2	erry® Smartphone Mo	odel RFN81UW SAR	Page 48(115)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 26, 2012- Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1302-18 Rev 3	L6ARFN80UW	2503A-RFN80UW

ET3DV6 - SN:1644

November 13, 2012

Probe ET3DV6

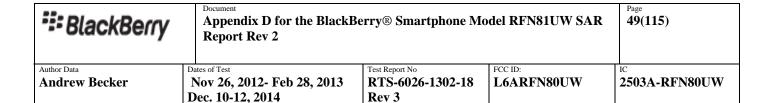
SN:1644

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

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

Certificate No: ET3-1644_Nov12

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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 (µV/(V/m) ²) ^x	1.71	1.97	1.98	± 10.1 %
DCP (mV) [®]	99.5	98.7	97.5	-

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C 48	WR mV	Unc (k=2)
0 (CW	0.00	X	0.0	0.0	1.0	193.5	±3.5 %
		1000	Y.	0.0	0.0	1,0	212.0	
			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%.

^{*} The uncertainties of NormX,Y,Z do not affect the E¹-lield uncertainty inside TSL (see Pages 5 and 6).

Numerical linearization parameter: uncertainty not required.
Lincertainty is dessentined using the max, deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

≅BlackBerry	Appendix D for the BlackBe Report Rev 2	erry® Smartphone Mo	del RFN81UW SAR	Page 50 (115)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 26, 2012- Feb 28, 2013	RTS-6026-1302-18	L6ARFN80UW	2503A-RFN80UW
	Dec. 10-12, 2014	Rev 3		

ET3DV6- SN:1644 November 13, 2012.

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

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) ^c	Relative Permittivity	Conductivity (Sim)	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
750	41.9	0.89	6.57	6.57	6.57	0.44	2.25	# 12.0 %
900	41.5	0.97	6.24	6.24	6.24	0.38	2.52	± 12.0 %
1810	40.0	1.40	5.21	5.21	5.21	0.80	2.10	± 12.0 %
1950	40.0	1.40	5.16	5.16	5.16	0.80	2.09	±12,0 %
2450	39.2	1.60	4.60	4.60	4.60	0.65	2.00	± 12.0 %

Certificate No: ET3-1644_Nov12

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

≅BlackBerry	Appendix D for the BlackB Report Rev 2	erry® Smartphone Mo	odel RFN81UW SAR	Page 51(115)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 26, 2012- Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1302-18 Rev 3	L6ARFN80UW	2503A-RFN80UW

ET30V6- SN:1844

November 13, 2012

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

Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) ^C	Relative Permittivity	Conductivity (Sim) ^f	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
750	55.5	0.96	6.30	6.30	6.30	0.33	2.61	± 12.0 %
900	55.0	1.06	0.06	6.06	6.06	0.31	2.99	± 12.0 %
1810	53.3	1.52	4.75	4.75	4.75	0.80	2.40	± 12.0 %
1950	53.3	1.52	4.75	4.75	4.75	0.80	2.28	± 12.0 %
2450	52.7	1.95	4.11	4.11	4.11	0.50	2.15	±12.0%

Cerificate No: ET3-1644_Nov12

Page 6 of 11

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

≅BlackBerry	Appendix D for the Black Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR			
Author Data	Dates of Test	Test Report No	FCC ID:	IC	
Andrew Becker	Nov 26, 2012- Feb 28, 2013	RTS-6026-1302-18	L6ARFN80UW	2503A-RFN80UW	
	Dec. 10-12, 2014	Rev 3			

ET3DV6- SN:1644

November 13, 2012

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

1.5-Frequency response (normalized) 1.0 0.9 8.0 0.7 0.6 0.5 500 1000 1500 2000 2500 3000 f (MHz) TEM R22

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

Certificate No. ET3-1644, Nov12

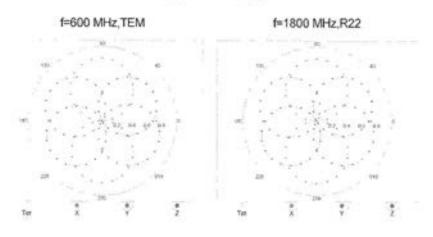
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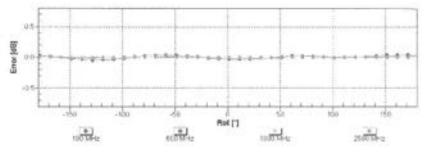
≅BlackBerry	Appendix D for the BlackE Report Rev 2	Berry® Smartphone M	odel RFN81UW SAR	Page 53(115)	
Author Data	Dates of Test	Test Report No	FCC ID:	IC	
Andrew Becker	Nov 26, 2012- Feb 28, 2013 Dec. 10-12, 2014	Nov 26, 2012- Feb 28, 2013 RTS-6026-1302-18 L6ARFN80UW			

ET3DV6- SN:1644

November 13, 2012

Receiving Pattern (\$\phi\$), 9 = 0°





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

Certificate No: ET3-1644_Nov12

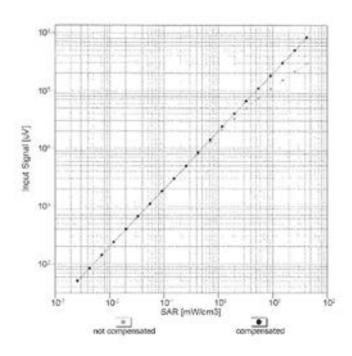
Page 8 of 11

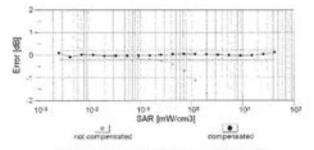
≅BlackBerry	Appendix D for the BlackB Report Rev 2	Berry® Smartphone Mo	odel RFN81UW SAR	Page 54(115)	
Author Data	Dates of Test	Test Report No	FCC ID:	IC	
Andrew Becker	Nov 26, 2012- Feb 28, 2013	, , , , , , , , , , , , , , , , , , ,			

ET30V6- \$N:1644

November 13, 2012

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





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

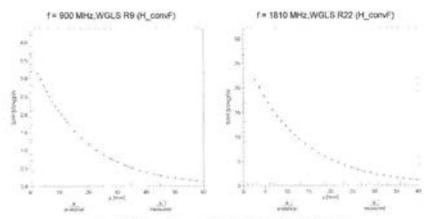
Certificate No: ET3-1644_Nov12

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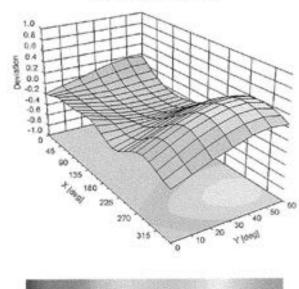
≅BlackBerry	Appendix D for the BlackE Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR				
Author Data	Dates of Test	Test Report No	FCC ID:	IC		
Andrew Becker	Nov 26, 2012- Feb 28, 2013 Dec. 10-12, 2014	ov 26, 2012- Feb 28, 2013 RTS-6026-1302-18 L6ARFN80UW				

ET3DV6- SN:1644 November 13, 2012

Conversion Factor Assessment



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



-1.0 -0.8 -0.5 -0.4 -0.2 0.0 0.2 0.4 0.6 0.8 1.0 Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

Certificate No: ET3-1644_Nov12

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∷ BlackBerry	Appendix D for the Bla Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR				
Author Data	Dates of Test	Test Report No	FCC ID:	IC		
Andrew Becker	Nov 26, 2012- Feb 28, 201 Dec. 10-12, 2014					

ET3DV6 - SN:1644 November 13, 2012

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

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (*)	61.5
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	enabled
Probe Overall Length	337 mm
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 num
Probe Tip to Sensor Z Calibration Point	2.7 mm
Recommended Measurement Distance from Surface	4 mm

Certificate No. ET3-1644_Nov12 Page 11 of 11



Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR Report Rev 2

Test Report No

57(115)

Author Data

Andrew Becker

Dates of Test

Dec. 10-12, 2014

Nov 26, 2012- Feb 28, 2013

RTS-6026-1302-18 Rev 3

FCC ID:

L6ARFN80UW

2503A-RFN80UW

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

Issued: January 21, 2011

Accredited by the Swiss Accreditation Service (SAS):

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

RTS (RIM Testing Services)

Accreditation No.: SCS 108

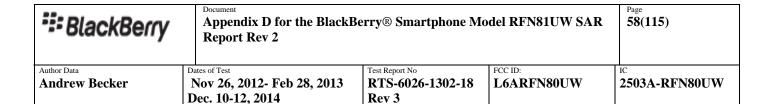
Certificate No: D835V2-446_Jan11

CALIBRATION CERTIFICATE Object D835V2 - SN: 446 QA CAL-05.v8 Calibration procedure(s) Calibration procedure for dipole validation kits Calibration date: January 21, 2011 This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate. All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%. Calibration Equipment used (M&TE critical for calibration) ID # Cal Date (Certificate No.) Scheduled Calibration Primary Standards GB37480704 Power meter EPM-442A 06-Oct-10 (No. 217-01266) Oct-11 Power sensor HP 8481A US37292783 06-Oct-10 (No. 217-01266) 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 ES30V3 SN: 3205 30-Apr-10 (No. ES3-3205_Apr10) Apr-11 SN: 601 10-Jun-10 (No. DAE4-601, Jun10) Jun-11 Secondary Standards ID # Check Date (in house) Scheduled Check Power sensor HP 8481A MY41092317 18-Oct-02 (in house check Oct-09) In house check: Oct-11 RF generator R&S SMT-06 100005 4-Aug-99 (in house check Oct-09) in house check: Oct-11 Notwork Analyzer HP 8753E US37390585 S4206 18-Oct-01 (in house check Oct-10) In house check: Oct-11 Name **Function** Calibrated by: Laboratory Technician Approved by:

Certificate No: D835V2-446_Jan11

Page 1 of 6

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



Calibration Laboratory of

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





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

Accreditation No.: SCS 108

Accredited by the Swiss Accreditation Service (SAS)

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

Glossary:

TSL ConvF tissue simulating liquid

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

N/A

Calibration is Performed According to the Following Standards:

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

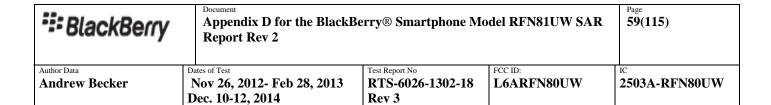
Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

Dertificate No: D835V2-446_Jan11	Page 2 of 6		



Measurement Conditions

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

DASY Version	DASY5	V52.6
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V4.9	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	- 75 - 0

Head TSL parameters

The following parameters and calculations were applied.

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

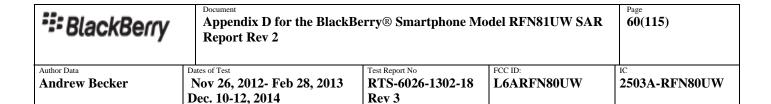
SAR result with Head TSL

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

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

Certificate No: D835V2-446_Jan11

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Appendix

Antenna Parameters with Head TSL

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

General Antenna Parameters and Design

	$\overline{}$
1.386 ns	
	1.386 ns

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

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	October 24, 2001

Certificate No: D835V2-446_Jan11

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≅BlackBerry	Appendix D for the BlackB Report Rev 2	erry® Smartphone Mo	odel RFN81UW SAR	Page 61 (115)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 26, 2012- Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1302-18 Rev 3	L6ARFN80UW	2503A-RFN80UW

DASY5 Validation Report for Head TSL

Date/Time: 21.01.2011 10:18:05

Test Laboratory: SPEAG, Zurich, Switzerland

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

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

Medium: HSL900

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

Phantom section: Flat Section

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

DASY5 Configuration:

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

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn601; Calibrated: 10.06,2010

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

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

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

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

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

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

Peak SAR (extrapolated) = 3.600 W/kg

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

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



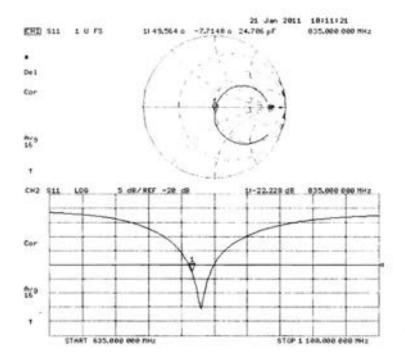
0 dB = 2.790 mW/g

Certificate No: D835V2-446_Jan11

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## BlackBerry	,	Appendix D for the BlackB Report Rev 2	erry® Smartphone Mo	odel RFN81UW SAR	Page 62(115)
Author Data	D	ates of Test	Test Report No	FCC ID:	IC
Andrew Becker]	Nov 26, 2012- Feb 28, 2013	RTS-6026-1302-18	L6ARFN80UW	2503A-RFN80UW
		Dec. 10-12, 2014	Rev 3		

Impedance Measurement Plot for Head TSL



Certificate No: D835V2-446_Jan11

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Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR Report Rev 2

63(115)

Author Data

Andrew Becker

Dates of Test

Nov 26, 2012- Feb 28, 2013 Dec. 10-12, 2014

Test Report No RTS-6026-1302-18 Rev 3

FCC ID: L6ARFN80UW

2503A-RFN80UW

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





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

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

17:00 - 20:00

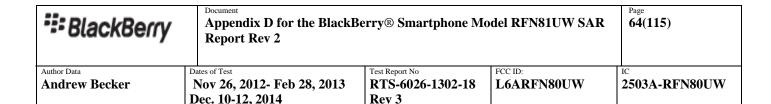
RTS (RIM Testing Services)

Certificate No: D835V2-446_Jan13

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Disjoca	D835V2 - SN: 44	6	
Calibration procedure(s)	QA CAL-05.v9		
	Calibration proce	dure for dipole validation kits abo	ove 700 MHz
Calibration date:	January 07, 2013		
		onal standards, which resilize the physical un	
he measurements and the unce	rtainties with confidence p	robability are given on the following pages an	d are part of the certificate.
All calibrations have been condu	cted in the closed laborator	ry facility: environment temperature (22 ± 3)*1	C and humidity < 70%.
Calibration Equipment used (M&)	TE ortical for calibration)		
an endiffe	e percentage de la companya de la co		
Primary Standards	10+	Cal Date (Certificate No.)	Scheduled Calibration
vimary Standards Ower meter EPM-442A	ID # GB37480704	01-Nov-12 (No. 217-01640)	Oct-13
rimary Standards Yower meter EPM-442A Yower sensor HP 8481A	ID # GB37480704 US37292783	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640)	Oct-13 Oct-13
himary Standards Power meter EPM-442A Power sensor HP 9481A Reference 20 dB Attenuator	ID # OB37480704 US37292783 SN: 5058 (204)	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01530)	Oct-13 Oct-13 Apr-13
Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch continuation	ID # OB37480704 US37292783 SN: 5058 (20k) 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)	Oct-13 Oct-13 Apr-19 Apr-13
Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination tellerence Probe ES3DV3	ID # GB37480704 US37292783 SN: 5058 (20k) SN: 5047.3 / 06327 SN: 3005	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)	Oct-13 Oct-13 Apr-13
Primary Standards Power meter EPM-442A Power sensor HP 9481A Reference 20 dB Attenuator Reference 20 th Attenuator Reference Probe ES3DV3 DAE4	ID # GB37480704 US37292783 SN: 5058 (204) SN: 5047.3 / 06327 SN: 5045 SN: 601	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01536) 27-Mar-12 (No. 217-01533) 28-Oec-12 (No. ES3-3205, Dec12) 27-Jun-12 (No. DAE4-601, Jun12)	Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Jun-13
Primary Standards Power meter EPM-442A Power sensor HP 9481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3 JAE4 Secondary Standards	ID # GB37480704 US37292783 SN: 5058 (204) SN: 5047.3 / 06327 SN: 3205 SN: 601	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. ES3-3305, Dec12) 27-Jun-12 (No. DAE4-601, Jun12) Check Date (in Incure)	Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Check
Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3 DAE4 Secondary Standards Power sensor HP 8481A	ID # GB37480704 US37292783 SN: 5058 (20k) SN: 5047.3 / 06327 SN: 5205 SN: 601 ID # MY41092317	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01530) 27-Mar-12 (No. 217-01530) 28-Dec-12 (No. ES3-3205_Dec12) 27-Jun-12 (No. DAE4-601_Jun12) Check Date (in house) 18-Oct-02 (in house check Oct-11)	Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Check In house check: Oct-13
rimary Standards Ower meter EPM-442A tower sensor HP 9481A telerence 20 dB Attanuator spe-N mismatch combination telerence Probe ES3DV3 IAE4 econdary Standards ower sensor HP 9481A If generator R&S SMT-95	ID # GB37480704 UB37292783 SN: 5058 (20k) SN: 5047.3 / 06327 SN: 3005 SN: 601 ID # MY41092317 100005	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01530) 27-Mar-12 (No. 217-01530) 28-Dec-12 (No. ES3-3205, Dec12) 27-Jun-12 (No. DAE4-601, Jun12) Check Date (in house check Oct-11) 04-Aug-99 (in house check Oct-11)	Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Check In house check: Oct-13 In house check: Oct-13
Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3 DAE4 Secondary Standards Power sensor HP 8481A RF generator R&S SMT-06	ID # GB37480704 US37292783 SN: 5058 (20k) SN: 5047.3 / 06327 SN: 5205 SN: 601 ID # MY41092317	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01530) 27-Mar-12 (No. 217-01530) 28-Dec-12 (No. ES3-3205_Dec12) 27-Jun-12 (No. DAE4-601_Jun12) Check Date (in house) 18-Oct-02 (in house check Oct-11)	Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Check In house check: Oct-13 In house check: Oct-13
Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3 DAE4 Secondary Standards Power sensor HP 8481A RF generator R&S SMT-06	ID # GB37480704 US37292783 SN: 5058 (20k) SN: 5047.3 / 06327 SN: 5005 SN: 601 ID # MY41092317 100005 US37390585 S4206	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01536) 27-Mar-12 (No. 217-01536) 28-Oec-12 (No. ES3-3205, Dec12) 27-Jun-12 (No. DAE4-601, Jun12) Check Date (in Incuter) 18-Oct-07 (in house check Oct-11) 06-Aug-99 (in house check Oct-12)	Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Check In house check: Oct-13 In house check: Oct-13 In house check: Oct-13
rimary Standards Tower meter EPM-642A Tower sensor HP 8481A telerence 20 dB Attenuator type-N mismatch combination telerence Probe ES30V3 IAEA secondary Standards Tower sensor HP 8481A IF generator R&S SMT-06 televork Analyzer HP 875SE	ID # GB3/7480704 US3/292783 SN: 5058 (20k) SN: 5047 3 / 06327 SN: 5005 SN: 601 ID # MY41092317 100005 US3/7390685 S4206	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01536) 27-Mar-12 (No. ES3-3205, Dec12) 27-Jun-12 (No. ES3-3205, Dec12) 27-Jun-12 (No. DAE4-601, Jun12) Check Date (in house) 18-Oct-07 (in house check Oct-11) 04-Aug-99 (in house check Oct-12) Function	Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Check In house check: Oct-13 In house check: Oct-13
Primary Standards Power meter EPM-442A Power sensor HP 9481A Reference 20 dB Attenuator Type-N mismatch continuation Reference Probe ES3DV3 DAE4 Secondary Standards Power sensor HP 8481A RF generator R&S SMT-05 Network Analyzer HP 875SE	ID # GB37480704 US37292783 SN: 5058 (20k) SN: 5047.3 / 06327 SN: 5005 SN: 601 ID # MY41092317 100005 US37390585 S4206	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01536) 27-Mar-12 (No. 217-01536) 28-Oec-12 (No. ES3-3205, Dec12) 27-Jun-12 (No. DAE4-601, Jun12) Check Date (in Incuter) 18-Oct-07 (in house check Oct-11) 06-Aug-99 (in house check Oct-12)	Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Check In house check: Oct-13 In house check: Oct-13 In house check: Oct-13
Primary Standards Power sensor HP 8481A Power sensor HP 8481A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination tellerence Probe ES3DV3 DAE4 Recondary Standards Power sensor HP 8481A RF generator PI&S SMT-06 Wetwork Analyzer HP 8753E Calibrated by:	ID # GB3/7480704 US3/292783 SN: 5058 (20k) SN: 5047 3 / 06327 SN: 5005 SN: 601 ID # MY41092317 100005 US3/7390685 S4206	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01536) 27-Mar-12 (No. ES3-3205, Dec12) 27-Jun-12 (No. ES3-3205, Dec12) 27-Jun-12 (No. DAE4-601, Jun12) Check Date (in house) 18-Oct-07 (in house check Oct-11) 04-Aug-99 (in house check Oct-12) Function	Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Check In house check: Oct-13 In house check: Oct-13 In house check: Oct-13
Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3	ID # GB37480704 US37292783 SN: 5058 (204) SN: 5047.3 / 06327 SN: 3005 SN: 601 ID # MY41092317 100005 US37390585 S4206 Name Lelf Klyaner	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01630) 27-Mar-12 (No. 217-01530) 28-Dec-12 (No. ES3-3295, Dec12) 27-Jun-12 (No. DAE4-601, Jun12) Check Date (in Incuter) 18-Oct-02 (in house check Oct-11) 04-Aug-99 (in house check Oct-12) Function Laboratory Technician	Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Check In house check: Oct-13 In house check: Oct-13 In house check: Oct-13

Certificate No: D835V2-446_Jan13

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Calibration Laboratory of Schmid & Partner Engineering AG

Engineering AG Zeughausstrasse 43, 8004 Zurich, Switzerland





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

Accreditation No.: SCS 108

Accredited by the Swiss Accreditation Service (SAS)

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

Glossary:

TSL tissue simulating liquid

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Certificate No: D835V2-446_Jan13

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≅BlackBerry	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR Report Rev 2		Page 65(115)	
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 26, 2012- Feb 28, 2013	RTS-6026-1302-18	L6ARFN80UW	2503A-RFN80UW
	Dec. 10-12, 2014	Rev 3		

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	-	inne.

SAR result with Head TSL

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

SAR averaged over 10 cm3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.55 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	6.13 W/kg a 16.5 % (k=2)

Certificate No: D835V2-446_Jan13

≅BlackBerry	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR Report Rev 2		Page 66(115)	
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 26, 2012- Feb 28, 2013	RTS-6026-1302-18	L6ARFN80UW	2503A-RFN80UW
	Dec. 10-12, 2014	Rev 3		

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	50.1 Ω + 6.5 jΩ	
Return Loss	- 23,7 dB	

General Antenna Parameters and Design

Electrical Delay (one direction)	1.385 ns
Ciecinical Delay (title direction)	1.303 %

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

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

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

Additional EUT Data

Manufactured by	SPEAG		
Manufactured on	October 24, 2001		

Certificate No: D635V2-446_Jan13

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≅BlackBerry	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR Report Rev 2		Page 67(115)	
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 26, 2012- Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1302-18 Rev 3	L6ARFN80UW	2503A-RFN80UW

DASY5 Validation Report for Head TSL

Date: 07.01.2013

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: CW; Frequency: 835 MHz

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

Phantom section: Flat Section

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

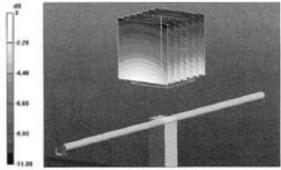
DASY52 Configuration:

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

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

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

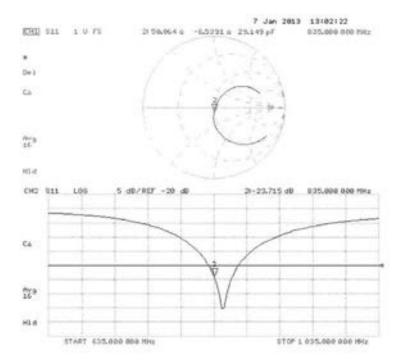
Maximum value of SAR (measured) = 2.79 W/kg



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

≅ BlackBerry	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR Report Rev 2		Page 68(115)	
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Impedance Measurement Plot for Head TSL



Certificate No: D835V2-446_Jan13

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Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR Report Rev 2

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Author Data

Andrew Becker

Dates of Test

Nov 26, 2012- Feb 28, 2013

RTS-6026-1302-18 Rev 3

Test Report No

FCC ID:

L6ARFN80UW

2503A-RFN80UW

Calibration Laboratory of

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

Dec. 10-12, 2014





Schweizerischer Kalibrierdienet Service suisse d'étalonnage Servizio svizzero di terefure Swies Calibration Service

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The Swies Accreditation Service is one of the signetories to the EA Multitateral Agreement for the recognition of celibration certificates

RTS (RIM Testing Services)

Accreditation No.: SCS 108

Certificate No: D835V2-4d043_Apr11

CALIBRATION CERTIFICATE

D835V2 - SN: 4d043 Otyect

Celibration procedure(s) QA CAL-05.v8

Calibration procedure for dipole validation kits

Calibration date: April 07, 2011

This onlibration conflicate documents the tracoubility to national standards, which realize the physical units of measurements (St. The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All culibrations have been conducted in the closed taboratory facility, environment temperature (22 a 3)°C and humidity < 70%

Calibration Equipment used (M&TE critical for calibration)

Primary Standards

Approved by:

10 4

Power meter EPM-442A	GB37480704	06-Oct-10 (No. 217-01266)	Oci-11	
Power sensor HP \$451A	13637292763	06-Oct-10 (No. 217-01266)	Oct-11	
Reference 20 dB Attenuator	Site 5086 (70g)	29 Mar-11 (No. 217-01368)	Apr 12	
Type N miswatch combination	SN: 5047.2 / 06327	29-Mar-11 (No. 217-01371)	Age-12	
Poloranco Proba ESSDV3	SN: 3205	30 Apr 10 (No. ES3-3205_Apr10)	Apr-11	
DAE4	SN: 601	10-Jun-10 (No. DAE4-601_Jun10)	Jun-11	
Secondary Standards	101	Check Date (in house)	Scheduled Check	
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-09)	in house check: Oct-11	
RF generator R&S SMT-06	100006	4-Aug-99 (in house check Oct-09)	in house check: Oct-11	
Network Analyzes HP 8753E	US37390585 54206	18 Oct 01 (in house theck Oct-10)	In house check: Oct-11	

Cal Date (Certificate Nn.)

Calibrated by

Issued April 7, 2011

Schoduled Calibration

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≅ BlackBerry	′			70(115)	
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Andrew Becker	1	Nov 26, 2012- Feb 28, 2013	RTS-6026-1302-18	L6ARFN80UW	2503A-RFN80UW
	I	Dec. 10-12, 2014	Rev 3		

Calibration Laboratory of Schmid & Partner Engineering AG Zeophoustrasse 43, 5004 Zurich, Switzerland





S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
Servizio avizzero di teralura
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 certification

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

Certificate No: D835V2-4d043_Apr11	Page 2 of 6		

≅ BlackBerry	Appendix D for the Bla Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR		Page 71 (115)
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Andrew Becker	Nov 26, 2012- Feb 28, 201 Dec. 10-12, 2014	3 RTS-6026-1302-18 Rev 3	L6ARFN80UW	2503A-RFN80UW

Measurement Conditions

DASY5	V52.6.2
Advanced Extrapolation	
Modular Flat Phantom V4.9	
15 mm	with Spacer
dx, dy, dz = 5 mm	
835 MHz ± 1 MHz	
	Advanced Extrapolation Modular Flat Phantom V4.9 15 mm dx, dy, dz = 5 mm

Head TSL parameters
The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.6 ± 6 %	0.88 mho/m ± 6 %
Head TSL temperature during test	(22.0 ± 0.2) °C		

SAR result with Head TSL

SAR averaged over 1 cm2 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.33 m/W / g
SAR normalized	normalized to 1W	9.32 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	9.43 mW /g = 17.0 % (k=2)

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

Certificate No: D835V2-4d043_Apr11

≅BlackBerry			Page 72(115)	
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 26, 2012- Feb 28, 2013	RTS-6026-1302-18	L6ARFN80UW	2503A-RFN80UW
	Dec. 10-12, 2014	Rev 3		

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	529 Ω - 3.4 Ω
Return Loss	- 27.2 dB

General Antenna Parameters and Design

			_
	1.391 ns		1
	7 44 1 14		

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

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

No excessive force must be applied to the dipote arms, because they might bend or the soldered connections near the

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	April 07, 2006

Certificate No: D835V2-4d043_Apr11

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≅BlackBerry	Appendix D for the BlackB Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR		Page 73(115)
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Andrew Becker	Nov 26, 2012- Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1302-18 Rev 3	L6ARFN80UW	2503A-RFN80UW

DASY5 Validation Report for Head TSL

Date/Time: 07.04.2011 09:28:21

Test Laboratory: SPEAG, Zurich, Switzerland

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

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

Medium: HSL900

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

Phantom section: Flat Section

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

DASY5 Configuration:

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

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn601; Calibrated: 10.06.2010

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

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

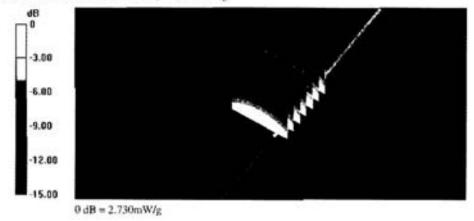
Postprocessing SW: SEMCAD X, V14.4.4 Build (2829)

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

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

Peak SAR (extrapolated) = 3.504 W/kg

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

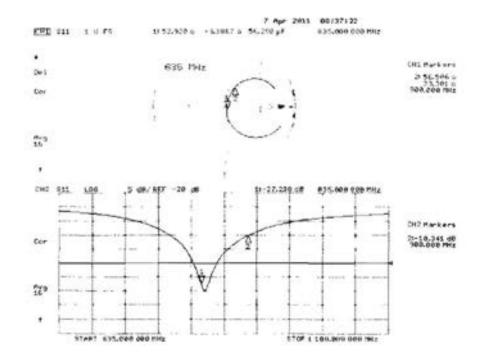


Certificate No: D835V2-4d043_Apr11

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Impedance Measurement Plot for Head TSL



Certificate No: D835V2-4x043_Apr11

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Author Data

Andrew Becker

Dates of Test

Nov 26, 2012- Feb 28, 2013 Dec. 10-12, 2014

Test Report No RTS-6026-1302-18 Rev 3

FCC ID: L6ARFN80UW

2503A-RFN80UW

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





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RTS (RIM Testing Services)

Accreditation No.: SCS 108

Certificate No: D1900V2-545_Jan11

Riject	D1900V2 - SN: 5	45 President Automobile	Sept. Carlo
Calibration procedure(s)	QA CAL-05.v8 Calibration proce	dure for dipole validation kits	. 3F . 3H
	The state of the s	AND THE RESERVE OF THE PARTY OF	and the sales
alibration date:	January 13, 2011	the best of the second	V200 00
ns calibration certificate documen	sents the transchilly to notice	onal standards, which realize the physical un	of massissements (SI)
		robability are given on the following pages ar	
calibrations have been condu	cted in the closed laborator	y facility: environment temperature (22 ± 301	C and humidity < 70%.
albration Equipment used (M&	TE critical for calibration)		
rimary Standards	10 *	Cal Date (Certificate No.)	Scheduled Calibration
ower meter EPM-442A	GB37480704	06-Oct-10 (No. 217-01266)	Oct-11
ower sensor HP 8481A	U\$37292783	06-Oct-10 (No. 217-01266)	Oct-11
eference 20 dB Attenuator	SN: 5086 (20g)	30-Mar-10 (No. 217-01158)	Mar-11
vpe-N mismatch combination	SN: 5047.2 / 06327	30-Mar-10 (No. 217-01162)	Mar-11
	SN: 3205	30-Apr-10 (No. ES3-3205, Apr10)	Apr-11
eference Probe ES3DV3		10 b- 10 bis DAF4 601 b-101	40.000.000
leference Probe ES3DV3	SN: 601	10-Jun-10 (No. DAE4-601_Jun10)	Jun-11
leference Probe ES3DV3 AE4		10-Jun-10 (No. DAE4-601_Jun10) Check Date (in house)	40.000.000
Reference Probe ES3DV3 DAE4 Secondary Standards	SN: 601		Jun-11 Scheduled Check
eference Probe ES3DV3 AE4 econdary Standards ower sensor HP 8481A	SN: 601	Check Date (in house)	Jun-11 Scheduled Check In house check: Oct-11
eference Probe ES3DV3 AEI.4 econdary Standards tower sensor HP 8481A F generator R&S SMT-06	SN: 601 ID # MY41092317	Check Date (in house) 18-Oct-02 (in house check Oct-09)	Schoduled Check In house check: Oct-11 In house check: Oct-11
teterence Probe ES3DV3 DAE4 Secondary Standards Power sensor HP 8481A RF generator R&S SMT-06	SN: 601 1D # MY41092317 100005 US37390585 S4206	Check Date (in house) 18-Oct-02 (in house check Oct-09) 4-Aug-99 (in house check Oct-09) 18-Oct-01 (in house check Oct-10)	Jun-11 Scheduled Check In house check: Oct-11 In house check: Oct-11 In house check: Oct-11
reference Probe ES3DV3 AEI4 econdary Standards beer sensor HP 8481A F generator R&S SMT-06 letwork Analyzer HP 8753E	SN: 601 1D # MY41092317 100005 US37390585 S4206 Name	Check Date (in house) 18-Oct-02 (in house check Oct-09) 4-Aug-89 (in house check Oct-09) 18-Oct-01 (in house check Oct-10) Function	Jun-11 Schoduled Check In house check: Oct-11 In house check: Oct-11
teference Probe ES3DV3 NAII.4 iecondary Standards tower sensor HP 8481A IF generator R&S SMT-06 letwork Analyzer HP 8753E	SN: 601 1D # MY41092317 100005 US37390585 S4206	Check Date (in house) 18-Oct-02 (in house check Oct-09) 4-Aug-99 (in house check Oct-09) 18-Oct-01 (in house check Oct-10)	Jun-11 Scheduled Check In house check: Oct-11 In house check: Oct-11 In house check: Oct-11
Reference Probe ES3DV3 DAE4 Secondary Standards Power sensor HP 8481A RF generator R&S SMT-06 Network Analyzer HP 8753E Calibrated by: Approved by:	SN: 601 1D # MY41092317 100005 US37390585 S4206 Name	Check Date (in house) 18-Oct-02 (in house check Oct-09) 4-Aug-89 (in house check Oct-09) 18-Oct-01 (in house check Oct-10) Function Laboratory Technician	Jun-11 Scheduled Check In house check: Oct-11 In house check: Oct-11 In house check: Oct-11
eference Probe ES3DV3 AE4 econdary Standards over sensor HP 8481A F generator R&S SMT-08 etwork Analyzer HP 87S3E	SN: 601 ID # MY41092317 100005 US37390585 S4206 Name Otnoe Rev	Check Date (in house) 18-Oct-02 (in house check Oct-09) 4-Aug-99 (in house check Oct-09) 18-Oct-01 (in house check Oct-10) Function Laboratory Technician	Jun-11 Scheduled Check In house check: Oct-11 In house check: Oct-11 In house check: Oct-11
eference Probe ES3DV3 AE4 econdary Standards over sensor HP 8481A F generator R&S SMT-08 etwork Analyzer HP 87S3E	SN: 601 ID # MY41092317 100005 US37390585 S4206 Name Otnoe Rev	Check Date (in house) 18-Oct-02 (in house check Oct-09) 4-Aug-99 (in house check Oct-09) 18-Oct-01 (in house check Oct-10) Function Laboratory Technician	Scheduled Check In house check: Oct-1 In house check: Oct-1 In house check: Oct-1

Certificate No: D1900V2-545_Jan11

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≅BlackBerry	Appendix D for the BlackB Report Rev 2	erry® Smartphone Mo	odel RFN81UW SAR	Page 76(115)
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Andrew Becker	Nov 26, 2012- Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1302-18 Rev 3	L6ARFN80UW	2503A-RFN80UW

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





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Accreditation No.: SCS 108

Accredited by the Swiss Accreditation Service (SAS)

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

Glossary:

TSL ConvF

N/A

tissue simulating liquid

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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≅BlackBerry	Appendix D for the BlackBo Report Rev 2	erry® Smartphone Mo	del RFN81UW SAR	Page 77(115)
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Andrew Becker	Nov 26, 2012- Feb 28, 2013	RTS-6026-1302-18	L6ARFN80UW	2503A-RFN80UW
	Dec. 10-12, 2014	Rev 3		

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 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	38.5 ± 6 %	1.43 mho/m ± 6 %
Head TSL temperature during test	(21.2 ± 0.2) °C		

SAR result with Head TSL

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

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

Certificate No: D1900V2-545_Jan11

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≅BlackBerry	Appendix D for the BlackBore Report Rev 2	erry® Smartphone Mo	odel RFN81UW SAR	Page 78 (115)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 26, 2012- Feb 28, 2013	RTS-6026-1302-18	L6ARFN80UW	2503A-RFN80UW
	Dec. 10-12, 2014	Rev 3		

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	

Certificate No: D1900V2-545_Jan11

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≅BlackBerry	Appendix D for the BlackB Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 26, 2012- Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1302-18 Rev 3	L6ARFN80UW	2503A-RFN80UW

DASY5 Validation Report for Head TSL

Date/Time: 13.01.2011 14:52:49

Test Laboratory: SPEAG, Zurich, Switzerland

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

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

Medium: HSL U12 BB

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

Phantom section: Flat Section

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

DASY5 Configuration:

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

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn601; Calibrated: 10.06,2010

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

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

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

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

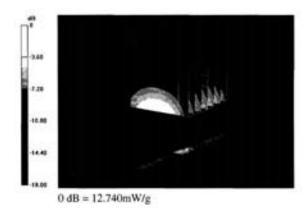
grid: dx=5mm, dy=5mm, dz=5mm

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

Peak SAR (extrapolated) = 18.648 W/kg

SAR(1 g) = 10.2 mW/g; SAR(10 g) = 5.26 mW/g

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

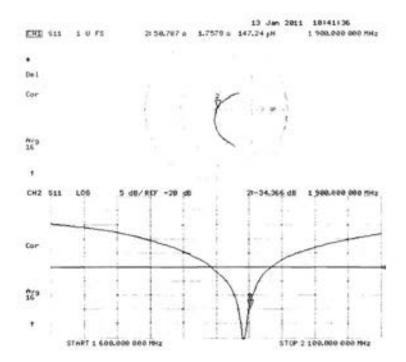


Certificate No: D1900V2-545_Jan11

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## BlackBerry		Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR Report Rev 2			Page 80 (115)
Author Data	D	ates of Test	Test Report No	FCC ID:	IC
Andrew Becker	1	Nov 26, 2012- Feb 28, 2013	RTS-6026-1302-18	L6ARFN80UW	2503A-RFN80UW
		Dec. 10-12, 2014	Rev 3		

Impedance Measurement Plot for Head TSL



Certificate No: D1900V2-545_Jan11

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Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR Report Rev 2

81(115)

Author Data

Andrew Becker

Dates of Test

Nov 26, 2012- Feb 28, 2013

RTS-6026-1302-18 Dec. 10-12, 2014

Rev 3

Test Report No

FCC ID:

L6ARFN80UW

2503A-RFN80UW

Calibration Laboratory of Schmid & Partner Engineering AG Zeughausstrasse 43, 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

RTS (RIM Testing Services)

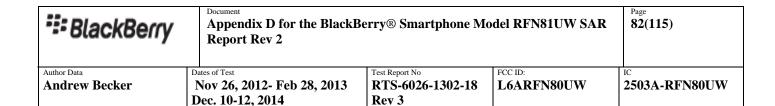
Accreditation No.: SCS 108

Certificate No: D1900V2-545_Jan13

	ERTIFICATE		
Object	D1900V2 - SN: 5	45	
Calibration procedure(s)	QA CAL-05.v9 Calibration proce	dure for dipole validation kits abo	ve 700 MHz
Calibration date:	January 09, 2013	College Unit College (
The measurements and the unce	rtainlies with confidence pr	conal standards, which realize the physical un robability are given on the following pages an ny facility: environment temperature (22 ± 31°C	d are part of the certificate.
Calibration Equipment used (M&T		y include, service interes service desired (co. 2 or s	January Com
Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Yower meter EPM-442A	GB37480704	01-Nov-12 (No. 217-01640)	Oct-13
	US37292783		
Yower sensor HP 8481A	10001202100	01-Nov-12 (No. 217-01640)	Oct-13
	SN: 5058 (20k)	01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01530)	Oct-13 Apr-13
Reference 20 dB Attenuator			1000000
Reference 20 dB Attenuator Type N mismatch combination	SN: 5058 (20k)	27-Mar-12 (No. 217-01530) 27-Mar-12 (No. 217-01533)	Apr-13
Reference 20 dB Attenuator Type N mismatch combination Reference Probe ES3DV3	SN: 5058 (20k) SN: 5047.3 / 06327	27-Mar-12 (No. 217-01530)	Apr-13 Apr-13
Reference 20 dB Attenuator Type N mismatch combination Reference Probe ES3DV3 DAE4	SN: 5058 (20k) SN: 5047.3 / 06327 SN: 3205	27-Mar-12 (No. 217-01530) 27-Mar-12 (No. 217-01533) 28-Dec-12 (No. ES3-3205, Dec12)	Apr-13 Apr-13 Dec-13
Reference 20 dB Attenuation Type N mismatch combination Reference Probe ES3DV3 DAE4 Secondary Standards	SN: 5058 (204) SN: 5047.3 / 06327 SN: 3205 SN: 601	27-Mar-12 (No. 217-01530) 27-Mar-12 (No. 217-01533) 28-Dec-12 (No. ES3-0205_Dec12) 27-Jun-12 (No. DAE4-601_Jun12)	Apr-13 Apr-13 Dec-13 Jun-13
Reference 20 dB Attenuator Type N mismatch combination Reference Probe ES3DV3 CAE4 Secondary Standards Power sensor HP 8481A	SN: 5058 (20k) SN: 5047.3 / 06327 SN: 3006 SN: 601	27-Mar-12 (No. 217-01530) 27-Mar-12 (No. 217-01533) 28-Dec-12 (No. ES3-3205, Dec12) 27-Jun-12 (No. DAE4-601, Jun12) Check Date (in floure)	Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Check
Reference 20 dB Attenuator Type N mismatch combination Reference Probe ES3DV3 DAE4 Secondary Standards Power sensor HP 8481A RF generator R&S SMT-06	SN: 5058 (204) SN: 5047.3 / 06327 SN: 5036 SN: 601 ID # MY41092317	27-Mar-12 (No. 217-01530) 27-Mar-12 (No. 217-01533) 28-Dec-12 (No. ES3-3205, Dec12) 27-Jun-12 (No. DAE4-601, Jun12) Check Date (in house) 18-Oct-92 (in house check Oct-11)	Apr.13 Apr.13 Dec-13 Jun-13 Scheduled Check In house check: Oct-13
Reference 20 dB Attenuator Type N mismatch combination Reference Probe ES3DV3 DAE4 Secondary Standards Power sensor HP 8481A RF generator R&S SMT-06	SN: 5058 (20k) SN: 5047 3 / 06327 SN: 3205 SN: 601 ID # MY41092317 100005	27-Mar-12 (No. 217-01530) 27-Mar-12 (No. 217-01533) 28-Dec-12 (No. ES3-3205, Dec12) 27-Jun-12 (No. DAE4-601, Jun12) Check Date (in flourie) 18-Oct-92 (in flourie) 04-Aug-99 (in house check Oct-11)	Apr.13 Apr.13 Dec-13 Jun-13 Scheduled Check In house check: Oct-13 In house check: Oct-13
Reference 20 dB Attenuator Type N mismatch combination Reference Probe ES3DV3 DAE4 Secondary Standards Power sensor HP 8481A RF generator R&S SMT-06 Network Analyzer HP 8753E	SN: 5058 (20k) SN: 5047.3 / 06327 SN: 3205 SN: 601 ID # MY41092317 100005 US37390585 S4206	27-Mar-12 (No. 217-01530) 27-Mar-12 (No. 217-01533) 28-Dec-12 (No. ES3-0205_Dec12) 27-Jun-12 (No. DAE4-601_Jun12) Check Date (in house) 18-Oct-02 (in house check Oct-11) D4-Aug-99 (in house check Oct-12)	Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Check In house check: Oct-13 In house check: Oct-13 Signature
Reference 20 dB Attenuation Type N mismatch combination Reference Probe ES3DV3 DAE4 Secondary Standards Power sensor HP 8481A RF generator R&S SMT-06 Network Analyzer HP 8753E	SN: 5058 (20k) SN: 5047.3 / 06327 SN: 3005 SN: 601 ID # MY41092317 100005 US37390585 S4206 Name	27-Mar-12 (No. 217-01530) 27-Mar-12 (No. 217-01533) 28-Dec-12 (No. ES3-0205_Dec12) 27-Jun-12 (No. DAE4-601_Jun12) Check Date (in house) 18-Oct-02 (in house check Oct-11) 04-Aug-99 (in house check Oct-12) Function	Apr.13 Apr.13 Dec-13 Jun-13 Scheduled Check In house check: Oct-13 In house check: Oct-13
Power sensor HP 8481A Reference 20 dB Attenuator Type N mismatch combination Reference Probe ES3DV3 DAE4 Secondary Standards Power sensor HP 8481A RF generator R&S SMT-06 Network Analyzer HP 8753E Calibrated by: Approved by:	SN: 5058 (20k) SN: 5047.3 / 06327 SN: 3205 SN: 601 ID # MY41092317 100005 US37390585 S4206 Name Israe El-Naouq	27-Mar-12 (No. 217-01530) 27-Mar-12 (No. 217-01530) 28-Dec-12 (No. ES3-3205, Dec12) 27-Jun-12 (No. DAE4-601, Jun12) Check Date (in house) 18-Oct-02 (in house check Oct-11) 04-Aug-99 (in house check Oct-12) Function Laboratory Technician	Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Check In house check: Oct-13 In house check: Oct-13 Signature

Certificate No: D1900V2-545_Jan13

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





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S Sarias Calibration Service

Accreditation No.: SCS 108

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

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Certificate No: D1900V2-545_Jan13

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≅BlackBerry	Appendix D for the BlackBe Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 26, 2012- Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1302-18 Rev 3	L6ARFN80UW	2503A-RFN80UW

Measurement Conditions

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

DASY Version	DASY5	V52.8.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

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

SAR result with Head TSL

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

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

Certificate No: D1900V2-545_Jan13

≅BlackBerry	Appendix D for the BlackBo Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 26, 2012- Feb 28, 2013	RTS-6026-1302-18	L6ARFN80UW	2503A-RFN80UW
	Dec. 10-12, 2014	Rev 3		

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.0 Ω + 1.7 jΩ	
Return Loss	- 34.3 dB	

General Antenna Parameters and Design

Electrical Delay (one direction)	1.198 ns

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

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

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

Additional EUT Data

Manufactured by	SPEAG	
Manufactured on	November 15, 2001	

Certificate No: D1900V2-545_Jan13

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≅BlackBerry	Appendix D for the BlackBo Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR		Page 85(115)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 26, 2012- Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1302-18 Rev 3	L6ARFN80UW	2503A-RFN80UW

DASY5 Validation Report for Head TSL

Date: 09.01.2013

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: CW; Frequency: 1900 MHz

Medium parameters used: f = 1900 MHz; $\sigma = 1.38$ S/m; $\epsilon_r = 39.4$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

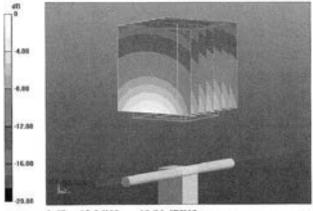
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

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

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

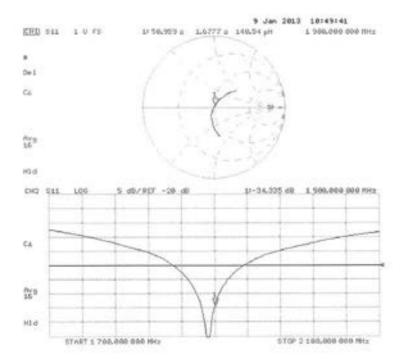
Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 95.493 V/m; Power Drift = 0.05 dB Peak SAR (extrapolated) = 18.1 W/kg SAR(1 g) = 10 W/kg; SAR(10 g) = 5.26 W/kg Maximum value of SAR (measured) = 12.2 W/kg



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

≅ BlackBerry	Appendix D for the BlackB Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR		Page 86(115)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 26, 2012- Feb 28, 2013	RTS-6026-1302-18	L6ARFN80UW	2503A-RFN80UW
	Dec. 10-12, 2014	Rev 3		

Impedance Measurement Plot for Head TSL



Certificate No: D1900V2-545_Jan13

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## BlackBerry	Appendix D for the Bla Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR		Page 87 (115)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 26, 2012- Feb 28, 201 Dec. 10-12, 2014	3 RTS-6026-1302-18 Rev 3	L6ARFN80UW	2503A-RFN80UW



Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR Report Rev 2

88(115)

Author Data

Andrew Becker

Dates of Test

Nov 26, 2012- Feb 28, 2013

Test Report No RTS-6026-1302-18 FCC ID: L6ARFN80UW

2503A-RFN80UW

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

Dec. 10-12, 2014



Rev 3



Schweizerlacher Kellbrierdienst 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 Multilyteral Agreement for the recognition of calibration certificates

RTS (RIM Testing Services)

Accreditation No.: SCS 108

Certificate No: D1800V2-5d075_Apr11

CALIBRATION CERTIFICATE D1900V2 - SN: 5d075 Copect

Calibration procedure(s)

QA CAL-05.v8

Calibration procedure for dipole validation kits

Calibration date:

April 5, 2011

This calibration conflicute documents the traceability to national standards, which realize the physical units of measurements (\$0). The measurements and the uncertainties with confidence probability are given on the livitowing pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (52 e 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for carbration):

Primary Standards	D #	Cel Date (Outriticate No.)	Scheduled Calibration	
Power motor EPM-442A	G007480704	06-Oct-10 (No. 217-01266)	Oct-11	
Power sensor HP 8461A	US37292783	00 Oct.10 (No. 217-01205)	Oei-11	
Polonence 20 dB Attenuator	SN: 5086 (20g)	29 Mar-11 (No. 217-01368)	Apr-12	
Type-N mismatch combination	SN: 5047.2 / 06027	29-Mar-11 (No. 217-01371)	Apr-12	
Poterance Probe ES30V3	SN: 5006	30 Apr-10 (No. ES3-3005, Apr10)	Apr-11	
DAE4	SN: 601	10-Jun-10 (No. DAE4-601_Jun10)	Jun-11	
Secondary Standards	10 4	Check Date (in house)	Scheduled Chick	
Power sensor HP 6461A	MY41092517	16-Oct-07 (in house check Clot-09)	in house check: Oct-11	
RF generator R&S SMT-08	100005	4-Aug-99 (in house check Oct-09)	In house sheck, Oct-11	
Network Analyzor HP 875%	US37390585 S4206	18-Oct-01 (in house check Oct-10)	in house check: Oct-11	
	Name	Function	Signature	
Calibrated by:	Mike Meli	Laboratory Technician	M 1 20 11	

Approved by:

Katja Pokovic

Insued April 8, 2011

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

Certificate No: D1900V2-5d075, April 1

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≅BlackBerry	Appendix D for the BlackB Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR		Page 89 (115)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 26, 2012- Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1302-18 Rev 3	L6ARFN80UW	2503A-RFN80UW

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





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

Accreditation No.: SCS 108

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

Glossary:

tissue simulating liquid TSL

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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Certificate No: D1900V2-5d075 April 1	Page 2 of 6	

≅BlackBerry	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR Report Rev 2		Page 90 (115)	
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 26, 2012- Feb 28, 2013	RTS-6026-1302-18	L6ARFN80UW	2503A-RFN80UW
	Dec. 10-12, 2014	Rev 3		

Measurement Conditions

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

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

Head TSL parameters
The following parameters and calculations were applied.

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

SAR result with Head TSL

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

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

Certificate No: D1900V2-5d075_Apr11

≅BlackBerry	Appendix D for the BlackBo Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 26, 2012- Feb 28, 2013	RTS-6026-1302-18	L6ARFN80UW	2503A-RFN80UW
	Dec. 10-12, 2014	Rev 3		

Appendix

Antenna Parameters with Head TSL

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

General Antenna Parameters and Design

A CONTRACT OF THE PARTY OF THE	- AMERICAN
Electrical Delay (one direction)	1.197 ns

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

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

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

Additional EUT Data

Manufactured by	SPEAG	
Manufactured on	January 24, 2006	

Certificate No: D1900V2-5d075_Apr11

≅BlackBerry	Appendix D for the BlackB Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 26, 2012- Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1302-18 Rev 3	L6ARFN80UW	2503A-RFN80UW

DASY5 Validation Report for Head TSL

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

Test Laboratory: SPEAG, Zurich, Switzerland

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

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

Medium: HSL U12 BB

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

Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: ES3DV3 SN3205; Conv815.09, 5.09; Calibrated, 30.04,3010
- Sensor-Surface: Junn (Mochanical Surface Detection)
- Electronics: DAE4 Set01; Calibrated: 10:06.2010
- Phanton: Flut Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- Measurement SW: DASY52, V52.6.2 Build (424)
- Postprocessing SW: SEMCAD X, V14.4.4 Build (2829)

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

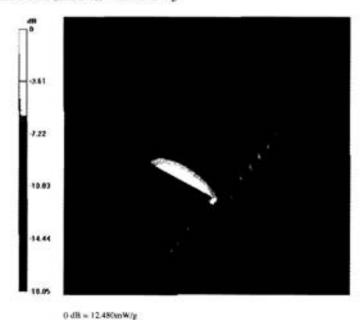
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 97.376 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 18.796 W/kg

SAR(1 g) = 10.2 mW/g; SAR(10 g) = 5.29 mW/g

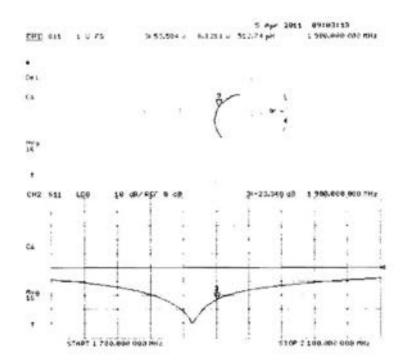
Maximum value of SAR (measured) = 12.476 mW/g



Certificate No: D1900V2-5d075_Apr11

≅BlackBerry	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR Report Rev 2		Page 93(115)	
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 26, 2012- Feb 28, 2013	RTS-6026-1302-18	L6ARFN80UW	2503A-RFN80UW
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Impedance Measurement Plot for Head TSL



Certificate No. D1900V2-5d075_Apr11

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Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR Report Rev 2

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Author Data

Andrew Becker

Dates of Test

Nov 26, 2012- Feb 28, 2013

Test Report No RTS-6026-1302-18 FCC ID: L6ARFN80UW

2503A-RFN80UW

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

Dec. 10-12, 2014



Rev 3



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

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RTS (RIM Testing Services)

Certificate No: D2450V2-747_Nov11

Issued: November 9, 2011

Accreditation No.: SCS 108

CALIBRATION CERTIFICATE 02450V2 - SN: 747 Object Calibration procedure(s) Calibration procedure for dipole validation kits above 700 MHz November 09, 2011 Calibration date: This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (St). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate. All calibrations have been conducted in the closed laboratory facility: environment temperature (22 x 3)°C and humidity < 70%. Calibration Equipment used (M&TE critical for calibration) 10 4 Cal Date (Certificate No.) Scheduled Calibration Primary Standards Power meter EPM-442A GR07480704 05-Oct-11 (No. 217-01451) Oct-12 Power sensor HP 8481A US37292783 05-Oct-11 (No. 217-01451) Oct-12 Reference 20 dB Attenuator SN: 5086 (20g) 29-Mar-11 (No. 217-01368) Apr-12 SN: 5047.2 / 06327 29-Mar-11 (No. 217-01371) Type-N mismatch combination Apr-12 SN: 3205 Reference Probe ES3DV3 29-Apr-11 (No. ES3-3205_Apr11) Apr-12 SN: 601 04-Jul-11 (No. DAE4-601_Jul11) A4-12 Secondary Standards ID # Check Date (in house) Scheduled Check Power sensor HP 8481A MY41092317 18-Oct-02 (in house check Oct-11) In house check: Oct-13 RF generator R&S SMT-06 in house check: Oct-13 100005 04-Aug-99 (in house check Oct-11) Network Analyzer HP 8753E US37390585 S4206 18-Oct-01 (in house check Oct-11) In house check: Oct-12 Calibrated by: Approved by:

Certificate No: D2450V2-747_Nov11

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

≅BlackBerry	Appendix D for the BlackB Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 26, 2012- Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1302-18 Rev 3	L6ARFN80UW	2503A-RFN80UW

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





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Accreditation No.: SCS 108

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Glossary:

TSL tissue simulating liquid

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

Certificate No: D2450V2-747 Nov11	Page 2 of 6	

*** BlackBerry	Appendix D for the Bla Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 26, 2012- Feb 28, 201 Dec. 10-12, 2014	RTS-6026-1302-18 Rev 3	L6ARFN80UW	2503A-RFN80UW

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

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

Certificate No: D2450V2-747_Nov11

≅BlackBerry	Appendix D for the BlackBo Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 26, 2012- Feb 28, 2013	RTS-6026-1302-18	L6ARFN80UW	2503A-RFN80UW
	Dec. 10-12, 2014	Rev 3		

Appendix

Antenna Parameters with Head TSL

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

General Antenna Parameters and Design

Control of the Contro	THE STATE OF THE S
Electrical Delay (one direction)	1.161 ns
The second secon	The state of the s

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

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	December 01, 2003

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≅BlackBerry	Appendix D for the BlackB Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 26, 2012- Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1302-18 Rev 3	L6ARFN80UW	2503A-RFN80UW

DASY5 Validation Report for Head TSL

Date: 09.11.2011

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: CW; Frequency: 2450 MHz

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

Phantom section: Flat Section

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

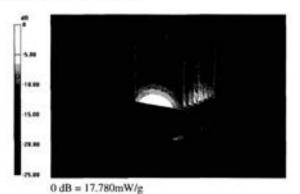
DASY52 Configuration:

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

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

Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 102.1 V/m; Power Drift = 0.04 dB Peak SAR (extrapolated) = 28.853 W/kg SAR(10) = 13.8 mW/m SAR(10) = 6.39 mW/m

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

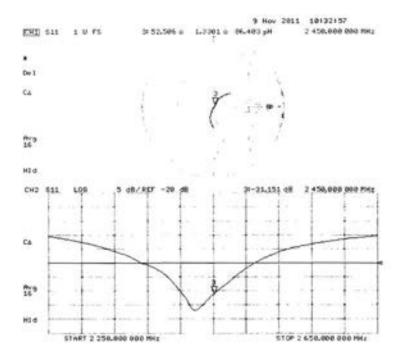


Certificate No: D2450V2-747_Nov11

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≅BlackBerry	Appendix D for the BlackB Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 26, 2012- Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1302-18 Rev 3	L6ARFN80UW	2503A-RFN80UW

Impedance Measurement Plot for Head TSL



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Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR Report Rev 2

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Author Data

Andrew Becker

Dates of Test

Nov 26, 2012- Feb 28, 2013 Dec. 10-12, 2014 Test Report No **RTS-6026-1302-18**

FCC ID: L6ARFN80UW

2503A-RFN80UW

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



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Accreditation No.: SCS 108

Client R

RTS (RIM Testing Services)

Certificate No: D5GHzV2-1033_Nov11

Calibration procedure(s)			1188000 NO.
	QA CAL-22.v1 Calibration proce	dure for dipole validation kits bet	ween 3-8 GHz
	STEEL STEEL STEEL STEEL	oure for apole validation was bei	AND THE PARTY OF T
Caribration date:			AND AND THE PARTY OF THE PARTY
		ional standards, which realize the physical ur	
		robability are given on the following pages ar $r_{\rm c}$ facility: environment temperature (22 ± 3) ⁻¹	
Calibration Equipment used (M&T		y many. Similari angenasa (az 2 s)	o and running C role.
Primary Standards	10.	Call Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	G837480704	05-Oct-11 (No. 217-01451)	Oct-12
Power sensor HP 8481A	US37292783	05-Oct-11 (No. 217-01451)	Oct-12
Reference 20 dB Attenuator	SN: 5086 (20g)	29-Mar-11 (No. 217-01368)	Apr-12
Type-N mismatch combination	SN: 5047.2 / 06027	29-Mar-11 (No. 217-01371)	Apr-12
Reference Probe EX3DV4	SN: 3503	04-Mar-11 (No. EX3-3503_Mar11)	Mar-12
DAE4	SN: 601	04-Jul-11 (No. DAE4-601_Jul11)	Jul 12
Secondary Standards	10 #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	16-Oct-02 (in house check Oct-11)	In house check: Oct-13
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-11)	In house check: Oct-13
Network Analyzer HP 8753E	US37390585 54206	16-Oct-01 (in house check Oct-11)	In house check: Oct-12
	Name	Function	Signature
Calibrated by:	Direce Blev	Laboratory Technician	71 0-2 4485
See and of	Hart Street	Sales Sales	W. Liev
Approved by:	Katja Pokovio	Jectrical Manager	Dele

Certificate No: DSGHzV2-1033_Nov11

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≅BlackBerry	Appendix D for the BlackB Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 26, 2012- Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1302-18 Rev 3	L6ARFN80UW	2503A-RFN80UW

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

Glossary:

TSL tissue simulating liquid

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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≅BlackBerry	Appendix D for the Black Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 26, 2012- Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1302-18 Rev 3	L6ARFN80UW	2503A-RFN80UW

Measurement Conditions

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

DASY Version	DASY5	V52.6.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy = 4.0 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	5200 MHz ± 1 MHz 5500 MHz ± 1 MHz 5800 MHz ± 1 MHz	

Head TSL parameters at 5200 MHz

The following parameters and calculations were applied.

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

SAR result with Head TSL at 5200 MHz

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

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

Head TSL parameters at 5500 MHz

The following parameters and calculations were applied.

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

SAR result with Head TSL at 5500 MHz

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

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

Certificate No: D5GHzV2-1033_Nov11

≅ BlackBerry	Appendix D for the BlackB Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 26, 2012- Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1302-18 Rev 3	L6ARFN80UW	2503A-RFN80UW

Head TSL parameters at 5800 MHz

The following parameters and calculations were applied.

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

SAR result with Head TSL at 5800 MHz

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

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

≅BlackBerry	Appendix D for the BlackB Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR		
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 26, 2012- Feb 28, 2013	RTS-6026-1302-18	L6ARFN80UW	2503A-RFN80UW
	Dec. 10-12, 2014	Rev 3		

Appendix

Antenna Parameters with Head TSL at 5200 MHz

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

Antenna Parameters with Head TSL at 5500 MHz

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

Antenna Parameters with Head TSL at 5800 MHz

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

General Antenna Parameters and Design

ection) 1.202 ns	
action) 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	SPEAG
Manufactured on	July 09, 2004

Certificate No: D5GHzV2-1033_Nov11

≅BlackBerry	Appendix D for the BlackB Report Rev 2	Appendix D for the BlackBerry® Smartphone Model RFN81UW SAR		Page 105(115)
Author Data	Dates of Test	Test Report No	FCC ID:	IC
Andrew Becker	Nov 26, 2012- Feb 28, 2013 Dec. 10-12, 2014	RTS-6026-1302-18 Rev 3	L6ARFN80UW	2503A-RFN80UW

DASY5 Validation Report for Head TSL

Date: 15.11.2011

Test Laboratory: SPEAG, Zurich, Switzerland

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

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

Phantom section: Flat Section

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

DASY52 Configuration:

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

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

dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm Reference Value = 65.595 V/m; Power Drift = 0.07 dB Peak SAR (extrapolated) = 30.134 W/kg

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

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

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

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

Peak SAR (extrapolated) = 35.056 W/kg

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

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

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

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

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

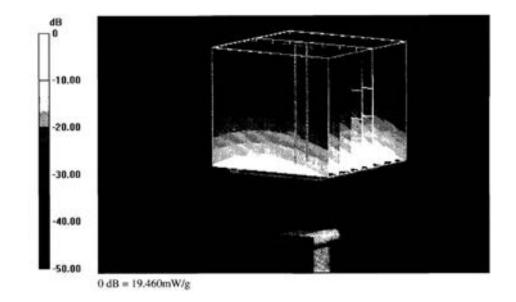
Peak SAR (extrapolated) = 33.743 W/kg

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

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

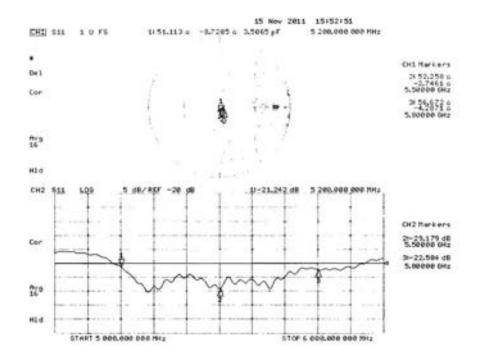
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Impedance Measurement Plot for Head TSL



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Andrew Becker

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FCC ID:

L6ARFN80UW

2503A-RFN80UW

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





Schweiserischer Kallbrierdienst Service suisse d'étalonnage C Servizio svizzero di teratura Swiss Calibration Service

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Client

Blackberry Waterloo

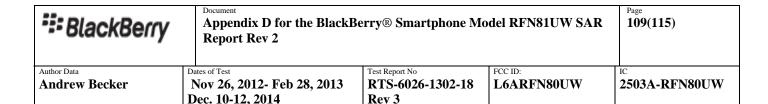
Accreditation No.: SCS 108

Certificate No: D5GHzV2-1033_Nov13

CALIBRATION CERTIFICATE D5GHzV2 - SN: 1033 Object QA CAL-22.v2 Calibration procedure(t) Calibration procedure for dipole validation kits between 3-6 GHz Calibration date: November 08, 2013 This calibration certificate occurrents the tracoability to national standards, which resilies the physical entits of measurements (St). The measurements and the uncontainties with confidence probability are given on the following pages and are part of the certificate. At calibrations have been conducted in the closed laboratory facility: environment temporature (22 a 3)°C and humility < 70% Calibration Equipment used (M&TE critical for calibration) Scheduled Calibration 10 2 Cal Date (Certificate No.) Primary Standards 0837480704 08-Oct-13 (No. 217-01827) Oct-14 Power meter EPM-442A Oct-14 Power sensor HP 8461A US3/297/93 09-Oct-13 (No. 217-01827). Power sensor HP 8481A MY41092317 09-Oct-13 (No. 217-01626) Oct-14 04-Apr-13 (No. 217-01736) Apr-14 Reference 20 dtl Attenuator SIN: 5058 (20%) SN: 5047.3 / 08327 04-Apr-13 (No. 217-01739) Apr-14 Type-N mismatch combination 26-Dec-12 (No. ESD-3205_Dec12) Dec-13 Heference Probe ESSDV3 SN. 3205 DAE4 550 601 25-Apr-13 (No. DAE4-601, Apr13): Apr-14 Schooland Chaok 1D# Check Date (in house) Secondary Standards 04-Aug-99 (in house check Oct-13) In house check: Oct-15 RF generator R&S SMT-06 100005 In house check: Oct-14 US37390585 S4206 18-Oct-01 (in house check Oct-12) Network Analyzer HP 5753E Name Function Laboratory Technician Calibrated by: Claudio Leutrier Technical Manager Approved by: Katja Pokovic Issued Nevember 8, 2013 This calibration cartificate shall not be reproduced except in full willbout written approval of the faboratory

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Glossary:

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

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Measurement Conditions

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

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

Head TSL parameters at 5200 MHz

The following parameters and calculations were applied

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

SAR result with Head TSL at 5200 MHz

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

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

Head TSL parameters at 5500 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.6	4.96 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.6 × 6 %	4.75 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	-	100

SAR result with Head TSL at 5500 MHz

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

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

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Head TSL parameters at 5800 MHz

The following parameters and calculations were applied.

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

SAR result with Head TSL at 5800 MHz

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

SAR averaged over 10 cm² (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.28 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	22.6 W/kg ± 19.5 % (k=2)

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Appendix

Antenna Parameters with Head TSL at 5200 MHz

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

Antenna Parameters with Head TSL at 5500 MHz

Impedance, transformed to feed point	50.3 12 - 4.1 (32
Return Loss	- 27.7 oB

Antenna Parameters with Head TSL at 5800 MHz

Impedance, transformed to feed point	57.8 (2 - 4.0 ji)	
Return Loss	-21.8 dB	

General Antenna Parameters and Design

3	Electrical Delay (one direction)	1.213 ns

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

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

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

Additional EUT Data

Manufactured by	SPEAG	
Manufactured on	July 09, 2004	

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DASY5 Validation Report for Head TSL

Date: 08.11.2013

Test Laboratory: SPEAG, Zurich, Switzerland

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

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

MHz

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

Phantom section: Flat Section

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

DASY52 Configuration:

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

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

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

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

Peak SAR (extrapolated) = 29.5 W/kg

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

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

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

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

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

Peak SAR (extrapolated) = 33.8 W/kg

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

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

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

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

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

Peak SAR (extrapolated) = 33.0 W/kg

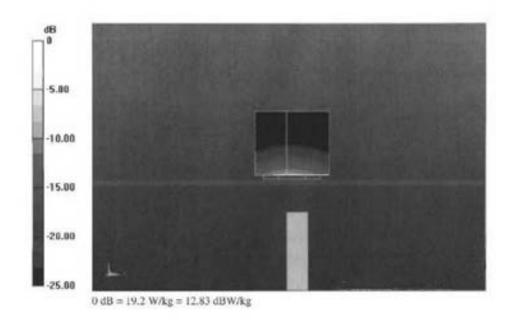
SAR(1 g) = 8.01 W/kg; SAR(10 g) = 2.28 W/kg

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

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Impedance Measurement Plot for Head TSL

